DRAFT

AUTORITÉ DES MARCHÉS FINANCIERS

CAPITAL ADEQUACY GUIDELINE

Life and Health Insurance

January 2017

TABLE OF CONTENTS

Introduction

Guideline objective

An Act respecting insurance (CQLR, chapter A-32) (the "Act") prescribes a provision whereby every insurer must adhere to sound and prudent management practices.[1] Moreover, under the Act, guidelines pertaining notably to the adequacy of capital may be given to insurers.[2]

The objective of these guidelines is essentially to increase the transparency and predictability of the criteria used by the *Autorité des marchés financiers* (the "AMF") in assessing the quality and prudence of the management practices of the financial institutions for which those criteria are intended. The ability of these institutions to meet their obligations toward savers, policyholders and beneficiaries[3] is key to achieving this objective. This principle is reflected in the capital adequacy requirements for life and health insurers set forth in this guideline.

Scope of application

This guideline applies to insurers licensed to transact insurance of persons ("life and health insurance") in Québec (the "insurers"). It applies on a consolidated basis in accordance with Canadian generally accepted accounting principles (GAAP). Accordingly, each component of capital available or capital required is calculated in such a way as to include all of the insurer's operations as well as any financial activity by its subsidiaries. However, for the purposes of this guideline, non-qualifying subsidiaries and dissimilar regulated financial subsidiaries[4] should be deconsolidated and considered under the equity method.

An insurer operating in both life and health insurance and damage insurance ("P&C insurance") should only applies this guideline to balance sheet items and off-balance-sheet instruments attributed by the insurer to the life and health insurance sector.

Effective date

Amendments to this guideline come into effect on January 1, 2017.

Clarification

Unless the context indicates otherwise, in this guideline, concepts pertaining to corporate relationships, such as subsidiaries, associates, joint ventures and related enterprises, as well as terminology, should be interpreted in accordance with GAAP.

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1 Section 222.1

2 Sections 325.0.1 and 325.0.2

3 In this Guideline, "policyholders" could also refer to "savers" and "beneficiaries", according to the context.

4 Refer to Section 2.3 for the definitions of "non-qualifying subsidiaries" and dissimilar regulated financial subsidiaries."

Assets and liabilities of subsidiaries consolidated under this guideline are subject to the asset and liability factors that apply in the calculation of the insurer's required capital. The factors apply to the asset and liability value, regardless of the insurer percentage ownership in the subsidiaries.

Interpretation

Because the requirements set forth in this guideline are intended mainly as guidance for managers, the terms, conditions and definitions contained therein may not cover all situations arising in practice. The results of applying these requirements should therefore not be interpreted as being the sole indicator for assessing an insurer's financial position or the quality of its management. Insurers are expected to submit to the AMF beforehand, where applicable, any situation for which treatment is not covered in this guideline or for which the recommended treatment seems inadequate. This also applies with respect to any issue arising from an interpretation of the requirements set forth in this guideline.

Reporting and auditing

The calculations required by this guideline and their results must be reported in the prescribed disclosure form (the "QFP Form") and must be audited according to the requirements set out in the Notice of the AMF published on October 3, 2013. The QFP form must be submitted to the AMF according to the LIFE returns and other documents filing instructions available on the AMF's website (http://www.lautorite.qc.ca).

The certificate on the front page of the QFP form must be signed by an insurer official designated by the board of directors. For the annual return, this person must not be the actuary designated under Sections 298.3 and 298.4 of the Act (the "actuary").

The actuary must sign the opinion on the front page of the annual QFP form in accordance with Subsection 2480 of the Canadian Institute of Actuaries (the "CIA") Practice-Specific Standards for Insurers. The memorandum required under this subsection (the "Capital Guideline Certification Report") must be available to the AMF upon request.

For auditing purposes, the insurer must keep the data for all calculations performed at each step leading to the final figures in the QFP form.

Chapter 1. General instructions

1.1 Minimum ratio, supervisory target ratio and internal capital target ratio

Capital management is a broad process which covers not only the measurement of capital adequacy, but also all the strategies, policies and procedures used by an institution to determine and plan its capital.

While this guideline describes the AMF's expectations regarding capital adequacy required for sound and prudent management[5], the objective of the *Capital Management Guideline* issued by the AMF is to articulate the principles which should guide and oversee financial institutions' management of capital on a more global basis, that is, beyond the determination of the minimum level of regulatory capital.

In addition to capital management principles such as:

- integration into strategic planning and risk management activities;
- presence of a sound governance structure;
- the implementation of a capital management framework consistent with the institution's risk profile as well as of a strategy conductive to maintaining adequate capital levels;

the *Capital Management Guideline* describes the AMF's expectations regarding the different incremental levels of capital[6] that a financial institution should maintain, taking into account regulatory requirements, its risk profile and its other current or future needs. These levels are established in relation with the requirements related to the calculation of the CAR ratio defined as the ratio of capital available to capital required.

Thus, the insurers are required to maintain, continuously and at a minimum, a CAR ratio of 100%, this means that capital available must be equal or superior to minimum capital required. However, during the course of its supervisory activities, the AMF expects a CAR supervisory target capital ratio, or supervisory target ratio, of 150%. These two ratios correspond to the regulatory capital requirement levels as defined in the *Capital Management Guideline.*

The 150% supervisory target ratio provides a sufficient cushion above the minimum capital required and allows for early detection of issues by the AMF, so that intervention can be timely if the insurer's situation so requires, and for there to be a reasonable expectation that the insurer's actions can successfully address the difficulties. The supervisory target ratio provides additional capacity to absorb unexpected losses in relation to the risks covered in this guideline.

[5] By determining and comparing the insurers' capital needs and capital available, to ensure that they meet the prescribed requirements.

[6] Regulatory capital, internal capital target and excess capital.

However, the minimum ratio and the supervisory target ratio do not explicitly consider all risks that could occur. In fact, these ratios are based upon simplifying assumptions common to a standard approach to solvency valuation. Quantifying several of these risks using a standard methodology for all insurers is not warranted at this time, given that, on the one hand, the level of exposure to these risks and the risk profile vary from one insurer to the other and that, on the other hand, using a standard approach to measure them is difficult.

Consequently, the AMF requires that each insurer assess its overall capital adequacy based on its risk profile for the purposes of sound and prudent management. Insurers will therefore determine an internal capital target ratio that is superior to the 150% supervisory target ratio.

To establish this internal capital target ratio, insurers must determine the capital required to cover the risks related to their operations, considering specifically their risk appetite and the results of sensitivity analyses based on various scenarios and simulations[7]. Therefore, in addition to the risks covered in the calculation of the CAR ratio, the target internal capital ratio must also take into account at least the following risks:

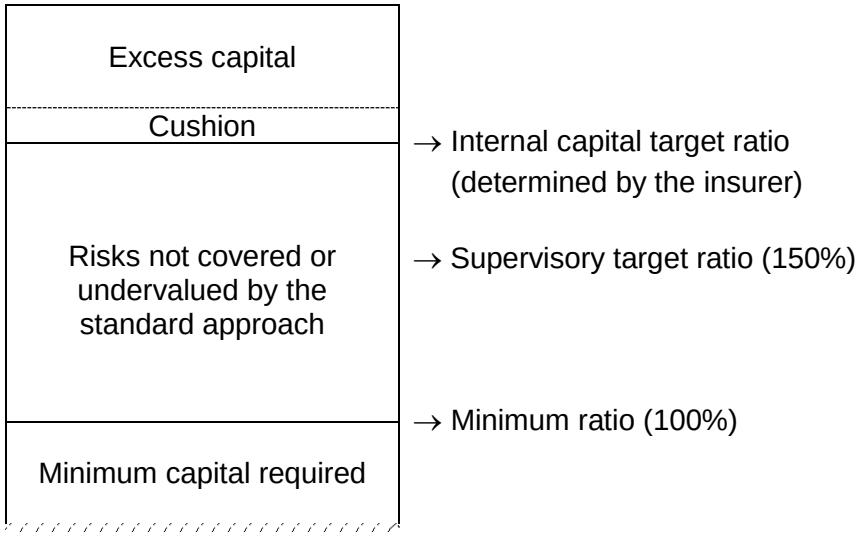
- residual credit, market and insurance risks; for example, foreign exchange risk and certain risks related to risk transfers are types of market risk not covered by the calculation of the CAR ratio;
- operational risk;
- liquidity risk;
- concentration risk;
- legal and regulatory risks;
- strategic risk;
- reputation risk.

Insurers should then consider the risks specific to them when determining their respective internal capital target ratios. In order to be consistent with the capital requirement for the risks covered by the calculation of the CAR ratio, capital requirement for each identified risk should be calculated at a minimum confidence level equivalent to a conditional tail expectation (“CTE”) of 95% over the tem of the risks. Insurers can meet this requirement by drawing, for example, on dynamic capital adequacy testing (DCAT) plausible adverse scenarios, or on stress testing scenarios. The impact of the various scenarios should be tested on the internal capital target ratio instead of the insurer’s actual capital ratio.

[7] In order to make sure that the internal capital target ratio is above the supervisory target ratio, the level of internal target capital should be expressed as a percentage of the insurer’s minimum capital requirements as set forth following this guideline, and compared to the minimum capital ratio and the supervisory target capital ratios.

The AMF's expectations are illustrated in the diagram below:

Minimum ratio, supervisory target ratio and internal capital target ratio



Based on the above diagram, insurers should also provide a capital amount (as shown by the cushion) to take into account the variable nature of the CAR ratio and the possibility that it could fall below their internal capital target ratio under their routine operating conditions due, among other reasons, to normal market volatility and insurance experience. Issues such as access to capital limitations should also be considered when determining this cushion.

In addition, the AMF expects insurers to hold a level of capital in excess of the level of capital underlying the internal capital target ratio and the cushion, to enable them to:

- maintain or attain a credit rating;
- innovate by, for example, developing new products;
- keep pace with business combination trends, in particular, opportunities to acquire portfolios or companies;
- be prepared for global industry-wide change, including standard-setting developments such as changes in accounting and actuarial standards.

The internal capital target ratio must be reported in the Capital Guideline Certification Report. At the AMF's request, insurers will be required to justify their internal capital target ratio and support their explanations with an appropriate calculation method and data. The AMF may require an insurer to establish a new internal capital target ratio if the justifications do not demonstrate to the AMF's satisfaction that the capital ratio submitted is relevant and sufficient.

Failure to comply with the internal capital target ratio will result in supervisory measures by the AMF commensurate with the circumstances and the corrective actions taken by the insurer to comply with the established target.

1.2 Requirements related to treatment of reinsurance

1.2.1 Definitions

In this Guideline:

- The terms "registered reinsurance" and "unregistered reinsurance" refer to Appendix A of the *Reinsurance Risk Management Guideline* issued by the AMF.
- The capital reductions described apply only to reinsurance agreements that are not exposed to basis risk. For example, an agreement is exposed to basis risk if the reinsurance payments are linked to an external index instead of losses actually incurred by the ceding insurer.

1.2.2 Registered reinsurance

Capital requirements calculations may reflect registered reinsurance. However, when the factor applied to the amount of risk depends on the remaining guarantee term of the reinsured amount, the appropriate multiplier is the lesser of:

- the factor based on the terms of the reinsurance contract;
- the factor used to determine the required gross amount (for risk being ceded).

Moreover, where the reinsured business is ceded back to the ceding insurer, the factors should apply to the gross amount of risk (as if there was no reinsurance arrangement), unless it can be demonstrated in the reporting process that, according to the terms of the reinsurance arrangement, the reinsured risk is in fact reduced.

1.2.3 Unregistered reinsurance

For business under an unregistered reinsurance agreement, ceded actuarial liabilities must be deducted from the amount of capital available and the components of capital required may not benefit from reinsurance, i.e. calculations must be made as if the business was not reinsured.

However, a ceding insurer may ask the AMF to benefit from a credit in respect of its capital requirements if it demonstrates to the AMF that it obtains from the reinsurer funds or a guarantee instrument[8] allowing the insurer to guarantee the performance of its obligations in Québec. The amount of credit taken for letters of credit cannot be higher than 30% of technical provisions ceded as unregistered reinsurance.

[8] The AMF may, if deemed appropriate, require the insurer to provide the necessary documents or to observe certain formalities in order to obtain the credit. Insurers are advised to consult the AMF's website before any request to see if instructions have been issued in this regard.

The guarantee amount is applied first to reduce the amount of technical provisions deducted from available capital. Thereafter, the amount obtained by dividing the balance of the guarantee amount by the insurer target ratio can be used to reduce the components making up the required capital for the share of risks ceded in reinsurance. In such cases, the reduction of the required capital amount is limited to the required capital that would have been available had the risk been ceded as registered reinsurance.

When a credit is used, the capital requirements of Chapter 3 (Asset yield deficiency risk and index-linked products risk) and Section 5.3 (Asset cash flow uncertainty) apply to the guarantee used to obtain the credit, up to the amount of the credit. All elements of the calculation of the credit and of the capital requirements of the guarantee must be disclosed in the Capital Guideline Certification Report.

1.2.4 Credit for stop-loss arrangements

Should a legally binding agreement exist whereby an insurer assumes all claim-related costs for a block of policies in excess of a predetermined amount, the ceding insurer may reduce its capital requirements subject to prior authorization from the AMF. To obtain such authorization, the ceding insurer must justify that the amount of the reduction it is seeking is based on the results of the insurer's own modeling. The modeled results must include measurements of the stop-loss arrangement's impact on losses related to volatility and catastrophes.

In the specific situation where the assuming insurer is licensed to do business in Canada, the ceding insurer must retain in its records the certification from the actuary that the assuming insurer:

- is legally bound to pay all claims in excess of the predetermined amount;

and

- has included the amount reported by the ceding insurer in its own calculation of capital requirements.

Catastrophe coverage is ineligible for stop-loss credits.

1.3 Requirements related to treatment of qualifying participating policies and adjustable products

In light of the nature of participating policies and adjustable products, a portion of the risk related to these products is transferred to policyholders. Consequently, the factors applied to the risk components associated with "qualifying participating policies" and "qualifying adjustable products" liabilities may be reduced relative to the weighting of non-participating policies, if certain conditions are met. Reduced factors could be applied as well to the assets backing the actuarial liabilities of qualifying participating policies.

1.3.1 Qualifying participating policies

Qualifying participating policies are participating policies that meet the following four criteria: [9]

- The policies must pay meaningful dividends, i.e. the present value of projected dividends using valuation assumptions must be greater than the reduction in required capital that would result from using reduced risk factors.
- The company's participating dividend policy must be publicly disclosed and must make it clear that policyholder dividends are not guaranteed and will be adjusted to reflect actual experience. The company must publicly disclose the elements of actual experience that are incorporated in the annual dividend adjustment process. Such elements may include investment income (including any asset defaults), mortality, lapses and expenses.
- The company must regularly (at least once a year) review the policyholder dividend scale in relation to the actual experience of the participating account. It must be able to demonstrate to the AMF which individual elements of actual experience, in excess of amounts anticipated in the current dividend scale, have been transferred to policyholders in the annual dividend adjustment. Furthermore, it must be able to demonstrate that that excesses in actual overall experience, to the extent that they are not fully absorbed by any dividend stabilization reserves (DSRs)[10] or other similar experience levelling mechanisms, are recovered[11] on a present value basis through (level or declining) reductions in the dividend scale.[12] The dividend scale reductions required to effect recovery must be made within two years from when the excess occurs.
- The company must be able to demonstrate to the AMF that it follows the dividend policy and practices referred to above.

The actuary must explain in the Capital Guideline Certification Report how he has verified that qualifying participating policies comply with the preceding criteria. Documentation supporting these explanations must be kept and be made available to the AMF upon request.

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9 The treatment also applies if the participating policy contains adjustable factors other than dividends that meet the criteria above (i.e., adjustable factors are meaningful, the criteria for their review is disclosed, they are reviewed and adjusted regularly and the company can demonstrate that it is following the policy).

10 For the purposes of this guideline, a DSR is defined as a reserve in an open or closed participating block from which an insurer may make a dividend payment during periods of loss or lower profit and where the insurer may pay profits into during periods of higher profit.

11 The recovery of excesses must be demonstrated based on reductions in the dividend scale compared to what would have been paid taking into account all of those elements, and only those elements, that are passed through to policyholders. Reduction in dividend scale may be allowed as risk transfer to policyholders only if approved by a board resolution of the company.

12 Reductions in the dividend scale must be level or must represent front-loaded or accelerated experience recovery. Reductions in terminal dividends are considered to be level reductions in the dividend scale.

Risk factors may only be reduced in respect of a block of policies if experience with respect to the risk component is explicitly incorporated in the annual dividend adjustment process in a consistent manner from year to year for these policies.

With respect to Chapters 3 to 7 of this guideline, the risk factors applied to the risk components associated with "qualifying participating policies" liabilities and to the assets backing the actuarial liabilities of these policies must be reduced by half, unless otherwise specifically indicated.

1.3.2 Qualifying adjustable products

Qualifying adjustable products are adjustable products that meet the following criteria for a specific risk component:

- Some product characteristics (premium, insured capital, etc.) can be adjusted during the term of the contract to take into account the risk variation covered by the component. For example, a group contract with a one year term where the policyholder has no renewal obligation is not considered a qualifying adjustable product.
- The "adjustable" property of the product must be clearly established in the contract and in the administration of the product by the insurer. The insurer must be able to demonstrate that the product characteristics were adjusted when the risk covered by the component has changed.
- The level of characteristics sensitive to the risk covered by the component is not near an explicit or implicit guarantee. An example of an implicit guarantee is when the cash surrender reaches zero.

The actuary must explain in the Capital Guideline Certification Report how he has verified that qualifying adjustable products comply with the preceding criteria. Documentation supporting these explanations must be kept and be made available to the AMF upon request.

With respect to Chapters 4 and 5 of this guideline, the risk factors applied to the risk components associated with qualifying adjustable product liabilities must be reduced by half, unless otherwise specifically indicated.

1.4 Requirements related to treatment of deposits

Some deposits, for example, deposits made by the policyholder or deposits received by the reinsurer under a reinsurance agreement may be used to reduce the capital requirement. Such deposits must meet the following criteria:

- They are made to the insurer applying for the credit.
- They are not reflected in policy liabilities.

- They can be used to reduce the insurer's risk, specifically, claims settlement (e.g., claims fluctuation and premium stabilization reserves, and accrued provision for experience refunds).
- They may be returned to depositors only after extinguishing all claims settlement risk and net of amounts already returned.

For a deposit made under a particular contract, the capital requirement may be reduced to a maximum of the amount of the deposit, but may not be lower than zero. However, the same deposit amount cannot be used to reduce the capital requirement for more than one risk. Where a deposit covers more than one risk, the allocation of the deposit amount to each of the risks is at the discretion of the insurer.

Use of the credit should be articulated clearly in the Capital Guideline Certification Report. Following its review of the Report, if the AMF considers that the deposit does not meet all of the above criteria, the insurer may no longer use the credit.

Chapter 2. Capital available

2.1 Primary and general criteria

The elements that may be considered capital for the purposes of this guideline must meet a series of criteria set forth in this chapter. However, the three primary criteria considered by the AMF in defining and classifying capital available to life and health insurers are:

- its permanence;
- its being free of mandatory fixed charges against earnings;
- its subordination to the rights of policyholders and other creditors.

Based on these characteristics, the capital elements of a life and health insurer may be divided into two tiers. Tier 1 consists of elements that meet the above three criteria without conditions or reservations. Tier 2 consists of elements that do not meet any of the first two criteria but which nonetheless contribute to the insurer's financial soundness.

In order to be recognized in both tiers, capital instruments must be fully paid-up.

Unless explicitly stated otherwise in this guideline, deferred tax liabilities may not be used to increase any component of available capital, and the carrying amount of any item required to be deducted from available capital may not be reduced by any portion of associated deferred tax liabilities.

2.1.1 Qualifying non-controlling interests

Non-controlling interests, including capital instruments issued by subsidiaries to third parties, arising on consolidation (except those in deconsolidated subsidiaries for the purposes of this guideline) will be included in the respective tiers, provided:

- the instruments meet the criteria applicable to that tier;

and

- the interests do not rank equally or ahead of the claims of policyholders and other senior creditors of the insurer as a result of an insurer guarantee or any other contractual means.

If a subsidiary issues capital instruments for the funding of the insurer or substantially in excess of its own requirements, the terms and conditions of the issue, as well as the intercompany transfer, must ensure that investors are placed in the same position as if the instrument were issued by the insurer in order for it to qualify as qualifying non-controlling interests.

This can only be achieved by the subsidiary using the proceeds of the issue to purchase a similar instrument from the insurer. Since subsidiaries cannot buy shares in the insurer, it is likely that this treatment will only be applicable to the subordinated debt. In addition, to qualify as capital for the consolidated entity, the debt securities held by third

parties cannot effectively be secured by other assets, such as cash, held by the subsidiary.

When the capital ratio of a subsidiary exceeds its target ratio, the amount of qualifying non-controlling interests related to this subsidiary should be reduced for their part of excess capital available of the subsidiary. The amounts of each class of capital should be reduced in the same proportion. For the purposes of this section, the amount of excess capital available of a subsidiary is its amount of capital available that exceeds the sum of its amount of capital covered by its target ratio and of its cushion, as defined in Section 1. The details of the calculation of the reduction and the description of the determination of the cushion must be disclosed in the Capital Guideline Certification Report.

2.1.2 Liabilities recognized as capital

Accumulated net after-tax fair value gains/losses arising from changes in the insurer's own credit risk are not recognized in its capital. Therefore, the amounts of liabilities recognized as capital and reported at fair value on the balance sheet must be disclosed in the QFP form without considering these gains/(losses). In addition, these gains/(losses) must be subtracted from Tier 1 capital since they are already included in the insurer's equity.

2.1.3 Items deducted from capital available

With respect to deductions related to deconsolidated subsidiaries (non-qualifying subsidiaries and dissimilar regulated financial subsidiaries), only the insurer portion in proportion to all tiers of available capital should be considered. For example, if an insurer owns an amount of 60 of a deconsolidated subsidiary shareholders' equity (subsidiary's Tier 1) and an amount of 10 of subordinated debt (subsidiary's Tier 2) and an external investor owns an amount of 20 of the subsidiary shareholders' equity and an amount of 10 of subordinated debt, the insurer portion is 70% (i.e. (60 + 10) / (60 + 20 + 10 + 10)).

No asset yield deficiency risk factor will be applied to items that are deducted from capital. If changes in the balance sheet value of a deducted item have not been recognized in capital available, the amount deducted for the item should be its amortized cost rather than the value reported on the balance sheet.

2.2 Tier 1 capital

The elements that life and health insurers may place in this tier are restricted to the following:

- common shareholders' equity, including:
  - common shares meeting the requirements in Section 0;
  - contributed surplus; and
  - retained earnings.

- policyholders' equity, including:
  - participating account; and
  - mutual companies' non-participating account;
- qualifying Tier 1 instruments other than common shares (refer to Section 0):
  - non-cumulative perpetual preferred shares;
  - other instruments;
- qualifying non-controlling interests arising on consolidation from Tier 1 capital instruments (refer to Section 0);
- accumulated unrealized holding loss on available-for-sale equity securities[13] reported in other comprehensive income ("OCI").[14] When the accumulated fair value change in available-for-sale equity securities shows a loss, this loss reduces Tier 1 capital;
- accumulated foreign currency translation adjustment reported in OCI;
- accumulated changes in liabilities included in OCI under shadow accounting;
- accumulated defined benefit pension plan remeasurements included in OCI.

For available capital calculation purposes, the following item is added to Tier 1 capital:

- accumulated gains reported in OCI up to the transfer date on investment property that was previously classified as owner-occupied property.

For available capital calculation purposes, the following items are not recognized in the insurer's capital and are subtracted from Tier 1 capital:

- accumulated after-tax gains (losses) on fair-valued liabilities that arise from changes to an insurer's own credit risk;
- the following items related to real estate:[15]
  - accumulated net after-tax gains or losses up to the transfer date on owner-

[13] Preferred shares should generally be characterized by the holder as equity securities, in a manner consistent with Section 5.2.1 vi) of the guideline applicable to financial services cooperatives, except for preferred shares that have a fixed maturity date on which the holder is repaid, or which allow the holder to require the issuer to repay the holder at some point prior to liquidation.

[14] All OCI amounts are net of tax.

[15] In calculating these items, significant capital additions made after transition to IFRS should be treated separately from the underlying property. The acquisition date for such an addition is the date on which the addition was completed and not the acquisition date of the underlying property.

occupied property that was previously classified as investment property[16];

- after-tax fair value gains (losses) on owner-occupied property upon conversion to IFRS (cost model);[17]
- accumulated after-tax revaluation loss on owner-occupied property (revaluation model);
- the accumulated net after-tax fair value gain after transition to IFRS on investment properties that do not back actuarial liabilities. When the accumulated net after-tax fair value change in investment properties shows a gain, this gain is deducted from Tier 1 capital[18];

- the net decrease in actuarial liabilities (for insurance and annuity business combined,[19] net of all reinsurance, subject to the requirements of Section 1.2) resulting from the recognition of future mortality improvement under CIA standard of practice 2350.06 and additional future mortality improvement under CIA standard of practice 2350.11.[20]

  This amount may be offset by the net increase in technical provisions due to the use of an interest rate scenario differing from the prescribed scenario with the largest insurance contract liability according to paragraph 2320.50 and Subsection 2330 of the CIA standards of practice. However, the following criteria must be met:

  - The net increase in technical provisions due to another assumption or related to segregated fund guarantee cannot be used as an offset.
  - The amount after the offset cannot be negative.

  The details of the calculation must be disclosed in the Capital Guideline Certification Report;

16 The amount of gains or losses is the difference between the property's deemed cost on the date of transfer into owner-occupied property, and either the moving average market value immediately prior to conversion to IFRS net of subsequent depreciation (when booked) if the property was acquired before conversion to IFRS, or the original acquisition cost net of subsequent depreciation (when booked) if the property was acquired after conversion to IFRS.

17 The amounts should equal the difference between deemed cost on transition to IFRS (i.e., on January 1, 2011 for insurers with a December 31 year-end), and the moving average market value immediately prior to conversion to IFRS (i.e., on December 31, 2010 for those insurers).

18 For investment property acquired before transition to IFRS that was previously classified as owner-occupied property, the cost base for calculating the gain is either the property's deemed cost on transition to IFRS (cost model) or its carrying value immediately after transition to IFRS (revaluation model). For similarly reclassified investment property acquired after transition to IFRS, the cost base for calculating the gain is the property's original acquisition cost.

19 Excluding segregated funds guarantees.

20 When used in relation to the valuation of actuarial liabilities for annuities, the term "additional future mortality improvement" means the difference between the liability calculated using the secular trend toward lower mortality rates currently prescribed by the CIA standards of practice, and the liability calculated using the promulgated secular trend toward lower mortality rates that was in effect on December 31, 2010.

- 50% of the net decrease in policy liabilities, net of reinsurance, resulting from the recognition of morbidity improvement. This amount may be offset by the net increase in technical provisions due to mortality improvement within the same product, provided that it is not applied in the calculation of the preceding deduction related to the net decrease in policy liabilities resulting from the recognition of future mortality improvement.

- discretionary participation features reported in a component of equity that is included in available capital;

- from January 1, 2015 and until December 31, 2018, a portion equal to 1/16 multiplied by the number of quarters that have elapsed since December 31, 2014 of the following elements deducted from the available capital of the P&C insurer subsidiaries (refer to Section 0):

  - the accumulated net after-tax unrealized gains (losses) that have resulted from changes in the fair value of a P&C insurer's financial liabilities that are due to changes arising from changes in the insurer's own credit risk;
  - the unrealized after tax fair value gains (losses) on owner-occupied properties accounted for using the cost model and where the deemed value of the property was determined at conversion to the IFRS by using fair value;
  - the accumulated net after tax revaluation losses on owner-occupied properties in excess of gains accounted for using the revaluation model;
  - the net after-tax impact of shadow accounting.

2.2.1 Deductions from gross Tier 1 capital

The following elements must be deducted from gross Tier 1 capital:

- Goodwill (refer to Section 2.7);
- the carrying value of intangible assets that is in excess of 5% of gross Tier 1 capital (refer to Section 0);
- negative actuarial liabilities less the effect of income taxes as defined in Section 0;
- excess cash value over actuarial liabilities (refer to Section 0);
- back-to-back placements of new Tier 1 capital, arranged either directly or indirectly, between financial institutions
- the pension plan asset deduction, i.e. the sum of each net defined benefit pension plan asset, net of any associated deferred tax liability.[21] Subject to prior written AMF authorization,[22] this deduction is net of any amount of available refunds of defined

[21] The liability that would be extinguished if the asset should become impaired or derecognized under IFRS.

[22] To obtain this authorization, the insurer must demonstrate to the AMF's satisfaction that it has clear entitlement to the surplus and that it has unrestricted and unfettered access to the surplus pension

benefit pension plan surplus assets to which the insurer has unrestricted and unfettered access. The details of the calculation of the deduction must be disclosed in the Capital Guideline Certification Report;

- from January 1, 2015 and until December 31, 2018, a portion equal to 1/16 multiplied by the number of quarters that have elapsed since December 31, 2014 of the following elements deducted from the available capital of the P&C insurer subsidiaries (refer to Section 0):

  - goodwill and other intangible assets;
  - the self-insured retentions ("SIR"), included in other recoverables on unpaid claims, where the AMF requires acceptable collateral, and no collateral has been received;
  - the earthquake premium reserve ("EPR") not used as part of financial resources to cover earthquake risk exposure;
  - the deferred policy acquisition expenses ("DPAD") associated with accident and sickness business, other than those arising from commissions and premium taxes;
  - accumulated other comprehensive income on cash flow hedges;
  - the investments in own instruments (treasury stock);
  - the reciprocal cross holdings in the common shares of insurance, banking and financial entities that are designed to artificially inflate the capital position;
  - the defined benefit pension plan surplus asset, net of any associated deferred tax liability, and net of any amount of available refunds of defined benefit pension plan surplus assets to which the insurer has unrestricted and unfettered access;
  - the deferred tax assets, except for those eligible for the 10% risk factor.

2.2.2 Negative actuarial liabilities qualifying for Tier 1 capital

Negative actuarial liabilities qualifying for Tier 1 capital correspond to the minimum between:

- the negative actuarial liabilities, less the effect of income taxes;

and

- 25% of the amount obtained by subtracting the deductions defined above from Tier 1 capital.

2.2.3 Net Tier 1 capital

assets. Evidence required by the AMF may include, among other things, an acceptable independent legal opinion and the prior authorization from the pension plan members and the pension regulator.

Net Tier 1 capital is the result of adding negative actuarial liabilities qualifying for Tier 1 capital to the amount obtained by subtracting the above deductions from gross Tier 1 capital.

2.2.4 Adjusted net Tier 1 capital

Adjusted net Tier 1 capital is defined as net Tier 1 capital less the following additional deductions:

- 50% of deductions defined in Section 2.5;
- deductions from Tier 2 capital in excess of total Tier 2 capital available (Reference: Section 2.2).

2.2.5 Specific criteria for eligibility

Capital instruments issued before September 25, 2014 that don't satisfy all the criteria of Sections 0 and 0 qualify if they satisfy the criteria included in Section 2.2.5.1 or 2.2.5.2 of the version of this guideline that came into effect on January 1, 2014. These instruments will be subject to transitional measures in due course.

2.2.5.1 Common shares

Common shares may only qualify as Tier 1 capital to the extent that the following criteria are met:

1. The instrument represents the most subordinated claim in liquidation of the insurer.

2. The investor is entitled to a claim on the residual assets that is proportional with its share of issued capital, after all senior claims have been paid in liquidation (i.e., it is an unlimited and variable claim, not a fixed or capped claim).

3. The instrument is perpetual and never repaid outside of liquidation (setting aside discretionary repurchases or other means of effectively reducing capital in a discretionary manner that is allowable under relevant law and subject to the prior authorization of the AMF).

4. The insurer does not create an expectation at issuance that the instrument will be bought back, redeemed or cancelled, nor do the promotional material and the statutory or contractual terms provide any feature which might give rise to such expectation.

5. Distributions are paid out of distributable items (retained earnings included). The level of distributions is not in any way tied or linked to the amount paid in at issuance and is not subject to a contractual cap (except to the extent that an insurer is unable to pay distributions that exceed the level of distributable items or to the extent that distributions on senior ranking capital must be paid first).

6. There are no circumstances under which the distributions are obligatory. Non-payment is, therefore, not an event of default.

7. Distributions are paid only after all legal and contractual obligations have been met and payments on more senior capital instruments have been made. This means that there are no preferential distributions, including in respect of other elements classified as the highest quality issued capital.

8. It is in the form of issued capital that takes the first and proportionately greatest share of any losses as they occur. Within the highest quality capital, each instrument absorbs losses on a going-concern basis proportionately and *pari passu* with all the others.

9. The paid-in amount is recognised as equity capital (i.e., not recognised as a liability) for determining balance sheet solvency.

10. It is directly issued and paid-in[23] and the insurer cannot directly or indirectly have funded the purchase of the instrument. Where the consideration for the share is other than cash, the issuance of the common share is subject to the prior authorization of the AMF.

11. The paid-in amount is neither secured nor covered by a guarantee of the issuer or related entity[24] or subject to any other arrangement that legally or economically enhances the seniority of the claim.

12. It is only issued with the approval of the owners of the issuing insurer, either given directly by the owners or, if permitted by applicable law, given by the Board of Directors or by other persons duly authorised by the owners.

13. It is clearly and separately disclosed as equity on the insurer's balance sheet, prepared in accordance with relevant accounting standards.

Purchase for cancellation of common shares is permitted at any time with the prior authorization of the AMF. For further clarity, a purchase for cancellation does not constitute a call option as described in the qualifying criteria of this section.

Dividend stopper arrangements that stop payments on common shares are permissible provided the stopper does not impede the full discretion the insurer must have at all times to cancel distributions or dividends on common shares. For example, it would not be permitted for a stopper on common shares to:

- stop payment on another instrument where the payments on the other instrument were not also fully discretionary;

[23] Paid-in capital generally refers to capital that has been received with finality by the insurer, is reliably valued, fully under the insurer's control and does not directly or indirectly expose the insurer to the credit risk of the investor.

[24] A related entity can include a parent company, a sister company, a subsidiary or any other affiliate. A holding company is a related entity irrespective of whether it forms part of the consolidated insurance group.

- prevent distributions to shareholders for a period that extends beyond the point in time that dividends or distributions on the common shares are resumed;

- impede the normal operation of the insurer or any restructuring activity, including acquisitions or disposals.

A dividend stopper may also act to prohibit actions that are equivalent to the payment of a dividend, such as the insurer undertaking discretionary share buybacks.

The criteria for common shares also apply to non-joint stock companies, such as mutual insurance companies, taking into account their specific constitutions and legal structures. The application of the criteria should preserve the quality of the instruments by requiring that they are deemed fully equivalent to common shares in terms of their capital quality, including their loss absorption capacity, and do not possess features which could cause the condition of the insurer to be weakened as a going concern during periods when the insurer is under stress.

2.2.5.2 Tier 1 capital instruments other than common shares

Instruments, other than common shares, qualify as Tier 1 capital if all of the following criteria are met:

1. The instrument is issued and paid-in in cash or, subject to the prior authorization of the AMF, in other means.

2. The instrument is subordinated to policyholders, general creditors, and subordinated debt holders of the insurer.

3. The instrument is neither secured nor covered by a guarantee of the issuer or related entity or other arrangement that legally or economically enhances the seniority of the claim vis-à-vis the insurer's policyholders and creditors.[25]

4. The instrument is perpetual, i.e. there is no maturity date and there are no step-ups[26] or other incentives to redeem.[27]

5. The instrument may be callable at the initiative of the issuer only after a minimum of five years.

    a. To exercise a call option an insurer must receive prior authorization of the AMF.

[25] Further, where an issuer uses a SPV to issue capital to investors and provides support, including overcollateralization, to the vehicle, such support would constitute enhancement in breach of Criterion # 3 above.

[26] A step-up is defined as a call option combined with a pre-set increase in the initial credit spread of the instrument at a future date over the initial dividend (or distribution) rate after taking into account any swap spread between the original reference index and the new reference index. Conversion from a fixed rate to a floating rate (or vice versa) in combination with a call option without any increase in credit spread would not constitute a step-up.

[27] Other incentives to redeem include a call option combined with a requirement or an investor option to convert the instrument into common shares if the call is not exercised.

b. An insurer's actions and the terms of the instrument must not create an expectation that the call will be exercised.

c. An insurer must not exercise the call unless:

i. it replaces the called instrument with capital of the same or better quality, including through an increase in retained earnings, and the replacement of this capital is done at conditions which are sustainable for the income capacity of the insurer;[28] or

ii. it demonstrates that its capital position is well above the target capital amount after the call option is exercised.[29]

6. Any repayment of principal (e.g., through repurchase or redemption) requires the AMF prior authorization and insurers should not assume or create market expectations that such authorization will be given.

7. The dividend / coupon payments must be discretionary.

- The insurer must have full discretion at all times to cancel distributions/payments.[30]
- Cancellation of discretionary payments must not be an event of default or credit event.
- Insurer must have full access to cancelled payments to meet obligations as they fall due.
- Cancellation of distributions/payments must not impose restrictions on the insurer except in relation to distributions to common shareholders.

8. Dividends/coupons must be paid out of distributable items.

9. The instrument cannot have a credit sensitive dividend feature, i.e. a dividend/coupon that is reset periodically based in whole or in part on the insurer's credit standing.[31]

10. The instrument cannot contribute to liabilities exceeding assets if such a balance sheet test forms part of insolvency law.

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28 Replacement issuances can be concurrent with but not after the instrument is called.

29 The target amount is equal to the multiplication of the total required capital amount by the target ratio defined in Section 1.

30 A consequence of full discretion at all times to cancel distributions/payments is that "dividend pushers" are prohibited. An instrument with a dividend pusher obliges the issuing insurer to make a dividend/coupon payment on the instrument if it has made a payment on another (typically, more junior) capital instrument or share. This obligation is inconsistent with the requirement for full discretion at all times to cancel distributions/payments. Furthermore, the term "cancel distributions/payments" means to forever extinguish these payments. It does not permit features that require the insurer to make distributions/payments in kind at any time.

31 The insurer may use a broad index as a reference rate in which the issuing insurer is a reference entity; however, the reference rate should not exhibit significant correlation with the insurer's credit standing. If an insurer plans to issue capital instrument where the margin is linked to a broad index in which the insurer is a reference entity, the insurer should ensure that the dividend/coupon is not credit-sensitive.

11. Other than preferred shares, instruments included in Tier 1 capital instruments other than common shares must be classified as equity per relevant accounting standards.

12. Neither the insurer nor a related party over which the insurer exercises control or significant influence can have purchased the instrument, nor can the insurer directly or indirectly have funded the purchase of the instrument.

13. The instrument cannot have any features that hinder recapitalisation, such as provisions that require the issuer to compensate investors if a new instrument is issued at a lower price during a specified timeframe.

14. If the instrument is not issued out of an operating entity[32] or the holding company in the consolidated group (e.g., a special purpose vehicle – "SPV"), proceeds must be immediately available without limitation to an operating entity or the holding company in the consolidated group in a form which meets or exceeds all of the other qualifying criteria of Tier 1 capital.[33]

Purchase for cancellation of Tier 1 capital instruments other than common shares is permitted at any time with the prior authorization of the AMF. For further clarity, a purchase for cancellation does not constitute a call option as described in the qualifying criteria of this section.

Tax and regulatory event calls are permitted during an instrument's life subject to the prior authorization of the AMF and provided the insurer was not in a position to anticipate such an event at the time of issuance. Where an insurer elects to include a regulatory event call in a Tier 1 capital instrument other than common shares, the regulatory event should be defined as "the date specified in a letter from the AMF to the insurer on which the instrument will no longer be recognized in full as eligible Tier 1 capital of the insurer on a consolidated basis".

Dividend stopper arrangements that stop payments on Tier 1 capital instruments other than common shares are permissible provided the stopper does not impede the full discretion the insurer must have at all times to cancel distributions or dividends on these Tier 1 capital instruments, nor must it act in a way that could hinder the recapitalization of the insurer pursuant to criterion N^{o} 13 above. For example, it would not be permitted for a stopper on a Tier 1 capital instrument other than common shares to:

- attempt to stop payment on another instrument where the payments on the other instrument were not also fully discretionary;

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32 An operating entity is an entity set up to conduct business with clients with the intention of earning a profit in its own right.

33 For greater certainty, the only assets the SPV may hold are intercompany instruments issued by the insurer or a related entity with terms and conditions that meet or exceed the Tier 1 criteria. Put differently, instruments issued to the SPV have to fully meet or exceed all of the eligibility criteria for Tier 1 capital as if the SPV itself was an end investor – i.e., the insurer cannot issue a lower quality capital or senior debt instrument to an SPV and have the SPV issue higher quality capital instruments to third-party investors so as to receive recognition as Tier 1 capital.

- prevent distributions to shareholders for a period that extends beyond the point in time that dividends or distributions on the Tier 1 instrument are resumed;

- impede the normal operation of the insurer or any restructuring activity, including acquisitions or disposals.

A dividend stopper may also act to prohibit actions that are equivalent to the payment of a dividend, such as the insurer undertaking discretionary share buybacks.

Where an amendment or variance of a Tier 1 capital instrument other than common shares' terms and conditions affects its recognition as available capital, such amendment or variance will only be permitted with the prior authorization of the AMF.[34]

Insurers are permitted to "re-open" offerings of capital instruments to increase the principal amount of the original issuance provided that call options will only be exercised, with the prior authorization of the AMF, on or after the fifth anniversary of the closing date of the latest re-opened tranche of securities.

Defeasance options may only be exercised on or after the fifth anniversary of the closing date with the prior authorization of the AMF.

Instruments other than common shares issued to a parent

In addition to the qualifying criteria and minimum requirements specified in this Guideline, Tier 1 capital instruments other than common shares issued by an insurer to a parent, either directly or indirectly, can be included in available capital subject to the insurer providing prior notification of the intercompany issuance to the AMF together with the following:

- a copy of the instrument's terms and conditions;

- the intended classification of the instrument for available capital purposes;

- the rationale for not issuing common shares in lieu of the subject capital instrument;

- confirmation that the rate and terms of the instrument are at least as favourable to the insurer as market terms and conditions;

- confirmation that the failure to make dividend or interest payments, as applicable, on the subject instrument would not result in the parent, now or in the future, being unable to meet its own debt servicing obligations nor would it trigger cross-default clauses or credit events under the terms of any agreements or contracts of either the insurer or the parent.

[34] Any modification of, addition to, or renewal of an instrument issued to a related party is subject to the provisions of the Act relative to transactions with restricted parties and with associates of directors or officers.

Instruments other than common shares issued out of branches and subsidiaries outside Canada

In addition to any other requirements prescribed in this guideline, where an insurer wishes to include, in its consolidated available capital, a capital instrument issued out of a branch or subsidiary of the insurer outside Canada, it must provide the AMF with the following documentation:

- a copy of the instrument's terms and conditions;
- certification from a senior executive of the insurer, together with the insurer's supporting analysis, that confirms that the instrument meets the qualifying criteria for the tier of available capital in which the insurer intends to include the instrument on a consolidated basis;
- an undertaking whereby both the insurer and the subsidiary confirm that the instrument will not be redeemed, purchased for cancellation, or amended without the prior authorization of the AMF. Such undertaking will not be required where the prior authorization of the AMF is incorporated into the terms and conditions of the instrument.

2.2.5.3 Intangible assets

The treatment defined in this section does not apply to goodwill. Specific requirements for goodwill are defined in Section 2.7.

The carrying value, net of amortization, of intangible assets[35] that is in excess of 5% of gross Tier 1 capital must be deducted from gross Tier 1 capital. Such intangible assets may be acquired (for example, trade names, customer relationships, and policy and other distribution channels) or can be generated internally (for example, software). For available capital calculation purposes, intangible assets include those related to consolidated subsidiaries and deconsolidated subsidiaries (refer to Section 0), but that were not deducted according to the other requirements of Section 2.1.

An asset yield deficiency risk weighting factor of 8% applies to intangible assets not deducted from capital.

2.2.5.4 Negative actuarial liabilities

The deduction related to negative actuarial liabilities is a result of the difference between:

[35] Insurers may net associated deferred tax liabilities against the carrying value of an identified intangible asset arising from a business combination (recognized and measured in accordance with *IFRS 3 – Business Combinations*) when both of the following conditions are met: 1) The cost of the intangible asset is completely non-deductible for tax purposes in the tax jurisdiction in which it was acquired, so that the tax base for the intangible asset is nil. In particular, no portion of any reduction in the carrying amount of the intangible asset due to amortization or impairment is allowed as a tax-deductible expense, and no portion of the cost of the intangible asset is tax deductible if it is sold; and 2) The recognition of the deferred tax liability associated with the acquired intangible was recorded by increasing the company's reported consolidated goodwill, and is included in the goodwill amount deducted from Tier 1 capital.

- negative actuarial liabilities, calculated on a policy-by-policy basis;

and

- the effect of income taxes.

For the purposes of the treatment of negative actuarial liabilities, the effect of income taxes is defined as 30% of negative actuarial liabilities for the following two classes of business:

- active life actuarial liabilities for Canadian individual health business;
- Canadian individual life business.

No tax reduction is allowed for negative actuarial liabilities relating to any other type of business.

2.2.5.5 Excess cash value over actuarial liabilities

For the purposes of this guideline, the excess must be calculated on an aggregate basis within a particular line of business by allowing excesses on policies with excesses to offset deficiencies on policies with deficiencies.

The lines of business are as follows:

- Participating insurance
  - Life insurance
  - Annuities
  - Accident-sickness
- Non-participating insurance:
  - Life insurance
  - Annuities
  - Accident-sickness

2.3 Tier 2 capital

Capital that insurers may place in this tier are, subject to the amortization rules and restrictions contained in this guideline, limited to the following:

- hybrid capital instruments and accumulated net unrealized gains, including:
  - hybrid capital instruments meeting the requirements set forth in Section 0, including cumulative perpetual preferred shares and perpetual debentures;

- qualifying non-controlling interests arising on consolidation from Tier 2 hybrid instruments (refer to Section 0);
- accumulated net after-tax unrealized holding gain on available-for-sale equity securities[36] reported in OCI. When the accumulated net after-tax fair value change in available-for-sale equity securities shows a gain, this gain is included in Tier 2 capital. However, impairment losses on these securities must not be deducted from this gain;
- the accumulated net after-tax fair value gain after transition to IFRS on investment properties that do not back actuarial liabilities, i.e. the gain subtracted from Tier 1 capital (refer to Section 2.2);

- limited life instruments meeting the requirements set forth in Section 0, including:
  - limited life redeemable preferred shares;
  - capital instruments issued in conjunction with a capital repackaging arrangement;
  - subordinated debt securities, including debentures other than hybrid debentures;
  - qualifying non-controlling interests arising on consolidation from Tier 2 limited life instruments (refer to Section 0);

- other capital items, including:
  - the amount of negative actuarial liabilities qualifying for Tier 2 capital, defined as the difference between the negative actuarial liabilities, less the effect of income taxes, and the amount of negative actuarial liabilities qualifying for Tier 1 capital, as defined in Section 0;
  - 75% of the excess cash value over actuarial liabilities;
  - the amount corresponding to the value of the software which is included in the deduction for intangible assets value that is in excess of 5% of gross Tier 1 capital (refer to Section 0);
  - the pension plan asset add-back, i.e. 50% of the pension plan asset deduction (refer to Section 2.1);
  - an adjustment amount to amortize the impact in the current period on available capital on account of the net defined benefit pension plan liability (asset).

[36] Preferred shares should generally be characterized by the holder as equity securities, in a manner consistent with Section 5.2.1 vi) of the guideline applicable to financial services cooperatives, except for preferred shares that have a fixed maturity date on which the holder is repaid, or which allow the holder to require the issuer to repay the holder at some point prior to liquidation.

Insurers may make a one-time election to amortize the impact on available capital on account of the net defined benefit pension plan liability (asset). The amounts subject to amortization in each period include the change, in each period:

a) of the accumulated net defined benefit pension plan OCI remeasurements included in gross Tier 1 capital;

b) of the pension plan asset deduction from gross Tier 1 capital (refer to Section 2.1);

c) of the Pension Asset Add-back in the other capital items of Tier 2.

The amount subject to amortization in each period is the sum of a), b) and c) above. It is amortized on a straight-line basis over the amortization period. This period will be twelve rolling quarters and begins on the first day of the current quarter. The election is irrevocable and the company will continue, in each quarter, to amortize the new impact on available capital in subsequent periods. The adjustment amount will be reflected in the other capital items of Tier 2. The details of the calculation of the adjustment amount must be disclosed in the Capital Guideline Certification Report.

2.3.1 Net Tier 2 capital

Net Tier 2 capital is defined to be total Tier 2 capital available less the following deductions:

- 50% of deductions defined in Section 2.5;

- back-to-back placements of new Tier 2 capital, arranged either directly or indirectly, between financial institutions.

However, net Tier 2 capital may not be lower than zero. If the total of all Tier 2 capital deductions exceeds total Tier 2 capital available, the excess must be deducted from Tier 1 capital.

2.3.2 Specific criteria for eligibility

Capital instruments issued before September 25, 2014 that don't satisfy all the criteria of Section 0 qualify if they satisfy the criteria included in Section 2.3.2.1 or 2.3.2.2 of the version of this guideline that came into effect on January 1, 2014. These instruments will be subject to transitional measures in due course.

2.3.2.1 Tier 2 instruments

Instruments qualify as Tier 2 capital if all of the following criteria are met:

1. The instrument is issued and paid-in in cash or, subject to the prior authorization of the AMF, in other means.

2. The instrument is subordinated to policyholders and general creditors of the insurer.

3. The instrument is neither secured nor covered by a guarantee of the issuer or related entity or other arrangement that legally or economically enhances the seniority of the claim vis-à-vis the insurer's policyholders and creditors.

4. Maturity.

   a. Minimum original maturity of at least five years.

   b. Recognition in available capital in the remaining five years before maturity will be amortised on a straight line basis

   c. There are no step-ups[37] or other incentives to redeem.

5. The instrument may be callable at the initiative of the issuer only after a minimum of five years.

   a. To exercise a call option an insurer must receive prior authorization of the AMF.

   b. An insurer's actions and the terms of the instrument must not create an expectation that the call will be exercised.[38]

   c. An insurer must not exercise the call unless:

      i. it replaces the called instrument with capital of the same or better quality, including through an increase in retained earnings, and the replacement of this capital is done at conditions which are sustainable for the income capacity of the insurer;[39] or

      ii. it demonstrates that its capital position is well above the target capital amount after the call option is exercised.[40]

6. The investor must have no rights to accelerate the repayment of future scheduled principal or interest payments, except in bankruptcy, insolvency, wind-up or liquidation.

7. The instrument cannot have a credit sensitive dividend feature, i.e. a dividend/coupon that is reset periodically based in whole or in part on the insurer's credit standing, for example its credit rating or its CAR ratio.[41]

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37 A step-up is defined as a call option combined with a pre-set increase in the initial credit spread of the instrument at a future date over the initial dividend (or distribution) rate after taking into account any swap spread between the original reference index and the new reference index. Conversion from a fixed rate to a floating rate (or vice versa) in combination with a call option without any increase in credit spread would not constitute a step-up.

38 An option to call the instrument after five years but prior to the start of the amortization period will not be viewed as an incentive to redeem as long as the insurer does not do anything that creates an expectation that the call will be exercised at this point.

39 Replacement issuances can be concurrent with but not after the instrument is called.

40 The target amount is equal to the multiplication of the total required capital amount by the target ratio defined in Section 1.

41 The insurer may use a broad index as a reference rate in which the issuing insurer is a reference entity; however, the reference rate should not exhibit significant correlation with the insurer's credit standing. If an insurer plans to issue capital instrument where the margin is linked to a broad index in

8. Neither the insurer nor a related party over which the insurer exercises control or significant influence can have purchased the instrument, nor can the insurer directly or indirectly have funded the purchase of the instrument.

9. If the instrument is not issued out of an operating entity[42] or the holding company in the consolidated group (e.g., a special purpose vehicle – "SPV"), proceeds must be immediately available without limitation to an operating entity or the holding company in the consolidated group in a form which meets or exceeds all of the other qualifying criteria of Tier 2 capital.[43]

Tier 2 capital instruments must not contain restrictive covenants or default clauses that would allow the holder to trigger acceleration of repayment in circumstances other than the liquidation, insolvency, bankruptcy or winding-up of the issuer.

Purchase for cancellation of Tier 2 capital instruments is permitted at any time with the prior authorization of the AMF. For further clarity, a purchase for cancellation does not constitute a call option as described in the qualifying criteria of this section.

Tax and regulatory event calls are permitted during an instrument's life subject to the prior authorization of the AMF and provided the insurer was not in a position to anticipate such an event at the time of issuance. Where an insurer elects to include a regulatory event call in a Tier 2 capital instrument, the regulatory event should be defined as "the date specified in a letter from the AMF to the insurer on which the instrument will no longer be recognized in full as eligible Tier 2 capital of the insurer on a consolidated basis".

Where an amendment or variance of a Tier 2 capital instrument's terms and conditions affects its recognition as available capital, such amendment or variance will only be permitted with the prior authorization of the AMF.[44]

Insurers are permitted to "re-open" offerings of capital instruments to increase the principal amount of the original issuance provided that call options will only be exercised, with the prior authorization of the AMF, on or after the fifth anniversary of the closing date of the latest re-opened tranche of securities.

Defeasance options may only be exercised on or after the fifth anniversary of the closing date with the prior authorization of the AMF.

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which the insurer is a reference entity, the insurer should ensure that the dividend/coupon is not credit-sensitive.

42 An operating entity is an entity set up to conduct business with clients with the intention of earning a profit in its own right.

43 For greater certainty, the only assets the SPV may hold are intercompany instruments issued by the insurer or a related entity with terms and conditions that meet or exceed the Tier 2 criteria. Put differently, instruments issued to the SPV have to fully meet or exceed all of the eligibility criteria for Tier 2 capital as if the SPV itself was an end investor – i.e., the insurer cannot issue a senior debt instrument to an SPV and have the SPV issue quality capital instruments to third-party investors so as to receive recognition as Tier 2 capital.

44 Any modification of, addition to, or renewal of an instrument issued to a related party is subject to the provisions of the Act relative to transactions with restricted parties and with associates of directors or officers.

Tier 2 instruments issued to a parent

In addition to the qualifying criteria and minimum requirements specified in this Guideline, Tier 2 capital instruments issued by an insurer to a parent, either directly or indirectly, can be included in available capital subject to the insurer providing prior notification of the intercompany issuance to the AMF together with the following:

- a copy of the instrument's terms and conditions;
- the intended classification of the instrument for available capital purposes;
- the rationale for not issuing common shares in lieu of the subject capital instrument;
- confirmation that the rate and terms of the instrument are at least as favourable to the insurer as market terms and conditions;
- confirmation that the failure to make dividend or interest payments, as applicable, on the subject instrument would not result in the parent, now or in the future, being unable to meet its own debt servicing obligations nor would it trigger cross-default clauses or credit events under the terms of any agreements or contracts of either the insurer or the parent.

Tier 2 instruments issued out of branches and subsidiaries outside Canada

Debt instruments issued out of an insurer's branches or subsidiaries outside Canada must be governed by Canadian law. The AMF may, however, waive this requirement where the insurer can demonstrate that an equivalent degree of subordination can be achieved as under Canadian law.

In addition to any other requirements prescribed in this guideline, where an insurer wishes to include, in its consolidated available capital, a capital instrument issued out of a branch or subsidiary of the insurer outside Canada, it must provide the AMF with the following documentation:

- a copy of the instrument's terms and conditions;
- certification from a senior executive of the insurer, together with the insurer's supporting analysis, that confirms that the instrument meets the qualifying criteria for the tier of available capital in which the insurer intends to include the instrument on a consolidated basis;
- an undertaking whereby both the insurer and the subsidiary confirm that the instrument will not be redeemed, purchased for cancellation, or amended without the prior authorization of the AMF. Such undertaking will not be required where the prior authorization of the AMF is incorporated into the terms and conditions of the instrument.

2.4 Hedging arrangements

When an insurer issues subordinated debentures denominated in a foreign currency and fully hedges these debentures (both in terms of value and duration) against movements

in the other currency and the hedge is subordinated to the rights of policyholders and other creditors, the insurer must report the Canadian dollar value of the instrument, net of the accrued receivable or payable on the hedge.

For limited life subordinated debentures (Tier 2), a hedge to within the last three years to maturity qualifies as a full hedge. This rule does not apply to hedges to a call date or to a period greater than three years before maturity.

Information on the hedging arrangement, the amount of the translation gains/losses and the accounting treatment accorded to the translation gains/losses must be reported by the insurer in the Capital Guideline Certification Report.

Subordinated debentures denominated in a foreign currency that are not fully hedged, or where the hedge is not subordinated to the rights of policyholders or other creditors, must be translated into Canadian dollars at their value at the time of disclosure.

2.5 Deductions

Fifty percent of the following elements is deducted from Tier 1 capital and the other 50% from Tier 2 capital:

- investments in non-qualifying subsidiaries and dissimilar regulated financial subsidiaries, net of goodwill and identified intangible assets that have been deducted from Tier 1 capital, and subject to the requirements of Section 2.3;

- technical provisions ceded as unregistered reinsurance in excess of the guarantee obtained from the reinsurer, subject to the requirements of Section 1.2;

- purchased options for which the insurer elects deduction under Section 0;

- from January 1, 2015 and until December 31, 2018, a portion equal to 1/16 multiplied by the number of quarters that have elapsed since December 31, 2014 of the following elements deducted from the available capital of the P&C insurer subsidiaries (refer to Section 0):

  - the interests in non-qualifying subsidiaries, associates and joint ventures in which the insurer holds more than a 10% ownership interest;
  - the loans to, or other debt instruments issued to non-qualifying subsidiaries, associates and joint ventures in which the insurer holds more than a 10% ownership interest which are considered as capital;
  - the amounts receivable and recoverable from unregistered reinsurance agreements to the extent that they are not covered by amounts payable to assuming reinsurers or by guarantee instruments from assuming reinsurers.

2.5.1 Investments in non-qualifying subsidiaries and dissimilar regulated financial subsidiaries

For the purposes of this guideline:

- a non-qualifying subsidiary is a subsidiary that is not referred to in Section 244.2 of the Act;
- a dissimilar regulated financial subsidiary is a subsidiary that is a bank, a trust company, a savings company, a P&C insurer or an investment dealer or adviser

Investments in non-qualifying subsidiaries and dissimilar regulated financial subsidiaries must be fully deducted from capital available. The value of the investment to be deducted is based on the equity method of accounting. The amount invested by the insurer in the form of preferred shares or debt securities of these entities must also be deducted from the available capital unless the insurer can prove to the satisfaction of the AMF that these securities are not used to capitalize these entities under their capitalization standards. The value of letters of credit and guarantees provided by the insurer to these entities must also be fully deducted (used and unused portions) from the available capital if they are treated as capital in these entities, if they are available for drawdown in the event of impairment of the capital and if they are subordinated to the entities' customer obligations.

The deduction should be net of both:

- goodwill and intangible assets related to the investment that have been deducted from Tier 1 capital per Section 2.1; and
- all amounts related to the investment representing components of OCI that are ineligible for inclusion in available capital.

No asset yield deficiency weighting factor will be applied to investments, letters of credit and guarantees that are deducted from capital. However, investments in the form of preferred shares or debt securities of or letters of credit provided to these entities that are not deducted from capital are treated like any other asset in accordance with the provisions under Chapter 3. Moreover, the guarantees provided by the insurer to these entities require additional amounts of capital, in accordance with the off-balance sheet capital requirements in this guideline.

However, where the insurer can prove to the satisfaction of the AMF that the dissimilar regulated financial subsidiary is subject to Québec's capitalization standards or to capitalization standards at least equivalent to those of Québec for similar categories of enterprises, only the consideration for the investments corresponding to the capital required of the subsidiary under these capitalization standards must be deducted (refer to Section 0). For P&C insurer subsidiaries, the deduction must be equal to the consideration for the investments corresponding to the multiplication of the capital required of the subsidiary under these capitalization standards and of the maximum between its target ratio and 150%.

The details of the calculation must be disclosed in the Capital Guideline Certification Report.

2.5.2 Transitional provision

From January 1, 2015 and until December 31, 2018, the deduction prescribed in Section 2.3 may be reduced by the following amount for each P&C insurer subsidiary:

P × Capital required of the subsidiary × (max [Target ratio of the subsidiary , 150%] – 1)

where P is equal to $\left(1-\frac{n}{16}\right)$ where n is the number of quarters that have elapsed since December 31, 2014.

The details of the calculations must be disclosed in the Capital Guideline Certification Report.

2.6 Limitations

The capital elements of a life and health insurer are subject to the following limitations:

- The amount of Tier 1 capital instruments other than common shares must not in aggregate exceed 40% of the amount of net Tier 1 capital as defined in Section 0. Moreover, Tier 1 capital instruments other than common and preferred shares must not, at the time of issuance, comprise more than 15% of the same amount. If either limit is breached, the insurer must immediately notify the AMF and provide an acceptable plan showing how the insurer proposes to quickly eliminate the excess.
- The amount of Tier 2 capital, net of amortization, must not exceed the amount of net Tier 1 capital as defined in Section 0.
- The amount of limited life instruments included in Tier 2 capital, net of amortization, must not exceed 50% of the amount of net Tier 1 capital as defined in Section 0.

2.7 Goodwill

The current accounting value of an insurer's goodwill is fully deducted from the sum of Tier 1 capital elements. For available capital calculation purposes, this deduction is comprised of goodwill related to consolidated subsidiaries and subsidiaries deconsolidated (refer to Section 0), but that were not deducted according to the other requirements of Section 2.1.

No asset yield deficiency weighting factor will be applied to the amount of goodwill deducted from capital.

2.8 Amortization of Tier 2 capital instruments

Tier 2 capital instruments are subject to straight-line amortization in the final five years prior to maturity. Hence, as these instruments approach maturity, such outstanding balances of preferred shares and subordinated debts of the insurer or outstanding balances are to be amortized on the following schedule:

Years to Maturity	Included in Capital
More than 5 years	100%
Between 4 and 5 years	80%
Between 3 and 4 years	60%
Between 2 and 3 years	40%
Between 1 and 2 years	20%
Less than 1 year	0%

Amortization should be computed at the end of each fiscal quarter based on the above schedule. Thus amortization would begin during the first quarter that ends within five calendar years of maturity. For example, if an instrument matures on October 31, 2020, 20% amortization of the issue would occur on November 1, 2015, and be reflected in the December 31, 2015 QFP form. An additional 20% amortization would be reflected in each subsequent December 31 QFP form.

The details of the calculation of the amortization must be disclosed in the Capital Guideline Certification Report.

Chapter 3. Asset yield deficiency risk and index-linked products risk

A life and health insurer's capital requirements for the purposes of this guideline are based on an evaluation of its overall risk profile. Asset yield deficiency risk is the first risk category under consideration. It corresponds to the losses that could result from on-balance sheet asset yield deficiency as well as losses associated with off-balance sheet instruments and related loss of income.

The amount of capital required corresponding to this risk is derived from the sum of the amounts resulting from the application, to the various asset categories concerned, of weighting factors representing the risk level. The factors are applied to the balance sheet value, other than for the following:

- loans carried at fair value under available-for-sale accounting, the fair value option, or fair value hedge accounting, in which case the factors are applied to amortized cost;
- debt securities carried at fair value under available-for-sale accounting, where the factors are applied to amortized cost;
- owner-occupied properties, where the factors are applied to the values defined under Section 3.2.10.

Investment income due and accrued should be reported with, and receive the same factor as, the assets to which it relates. In the case of securities lending, the capital requirement should be calculated in accordance with Section 3.6.

This chapter of the guideline is limited to the treatment of the insurer's on-balance sheet assets as well as assets replicated synthetically and derivatives transactions that increase an insurer’s exposure to asset yield deficiency risk and for which the full notional amount of the transaction may not be reported on the balance sheet. Off-balance sheet items requirements for counterparty default risk and potential replacement cost are treated in Chapter 7 of this guideline.

Assets held in segregated funds and related to policyholder liabilities are not subject to the requirements of this chapter. If an insurer is required to consolidate an unleveraged mutual fund entity under IFRS, the requirements of Section 3.7 will apply to the portion of assets where returns on those assets are retained for the insurer’s own account, unless this entity is deducted from available capital. The requirements of this chapter do not apply to the portion of assets where the insurer can demonstrate:

- ownership by policyholders or outside investors; and
- a contractual obligation to pass through all returns,

provided that the insurer is able to track and distinguish the mutual fund units held for its own account from those held by policyholders and outside investors. Non-controlling interests in such mutual fund entities may not be included in the insurer’s available capital.

The calculation of the capital amount for this component also takes into account various features that could affect the assets, such as guarantees from a public agency. In addition, assets backing index-linked products must also be separated, as these assets are subject to factors based on correlation calculations. Those features are treated under specific sections in this chapter.

With respect to guidance related to the treatment of qualifying participating policies in this chapter, please refer to Section 1.3.

3.1 Use of ratings

Many of the factors in this guideline depend on the rating assigned to an asset or an obligor. In order to use a factor that is based on a rating, an insurer must meet all of the conditions specified below.

Insurers may recognize credit ratings from the following rating agencies for purposes of this guideline:

- DBRS;
- Moody's Investors Service;
- Standard and Poor's (S&P);
- Fitch Rating Services.

An insurer must choose the rating agencies it intends to rely on and then use their ratings for purposes of this guideline consistently for each type of claim. Insurers may not "cherry pick" the assessments provided by different rating agencies in order to obtain the most advantageous capital charge.

Any rating used to determine a factor must be publicly available, i.e., the rating must be published in an accessible form and included in the rating agency's transition matrix. Ratings that are made available only to the parties to a transaction do not satisfy this requirement.

If an insurer is relying on multiple rating agencies and there is only one assessment for a particular claim, that assessment should be used to determine the capital charge for the claim. If there are two assessments from the rating agencies used by an insurer and these assessments differ, the insurer should apply the capital charge corresponding to the lower of the two ratings. If there are three or more assessments for a claim from an insurer's chosen rating agencies, the insurer should exclude one of the ratings that corresponds to the lowest capital charge, and then use the rating that corresponds to the lowest capital charge of those that remain (i.e., the insurer should use the second-highest rating from those available, allowing for multiple occurrences of the highest rating).

Where an insurer holds a particular securities issue that carries one or more issue-specific assessments, the capital charge for the claim will be based on these

assessments. Where an insurer's claim is not an investment in a specifically rated security, the following principles apply:

- In circumstances where the borrower has a specific rating for an issued debt security, but the insurer's claim is not an investment in this particular security, a rating of BBB- or better on the rated security may only be applied to the insurer's unrated claim if this claim ranks *pari passu* or senior to the rated claim in all respects. If not, the credit rating cannot be used and the insurer's claim must be treated as an unrated obligation.
- In circumstances where the borrower has an issuer rating, this assessment typically applies to senior unsecured claims on that issuer. Consequently, only senior claims on that issuer will benefit from a high-quality (BBB- or better) issuer assessment; other unassessed claims on the issuer will be treated as unrated. If either the issuer or one of its issues has a rating of BB+ or lower, this rating should be used to determine the capital charge for an unrated claim on the issuer.
- Short-term assessments are deemed to be issue specific. They can only be used to derive capital charges for claims arising from the rated security. They cannot be generalized to other short-term claims, and in no event can a short-term rating be used to support a capital charge for an unrated long-term claim.
- Where the capital charge for an unrated exposure is based on the rating of an equivalent exposure to the borrower, foreign currency ratings should be used for exposures in foreign currency. Canadian currency ratings, if separate, should only be used to determine the capital charge for claims denominated in Canadian currency.

The following additional conditions apply to the use of ratings:

- External assessments for one entity within a corporate group may not be used to determine the capital charge for other entities within the same group.
- No rating may be inferred for an unrated entity based on assets that the entity possesses.
- In order to avoid the double counting of credit enhancement factors, insurers may not recognize credit risk mitigation under Sections 3.3 and 0 if the credit enhancement has already been reflected in the issue-specific rating.
- An insurer may not recognize a rating if the rating is at least partly based on unfunded support (e.g., guarantees, credit enhancement or liquidity facilities) provided by the insurer itself or one of its affiliates.
- Any assessment used must take into account and reflect the entire amount of credit risk exposure an insurer has with regard to all payments owed to it. In particular, if an insurer is owed both principal and interest, the assessment must fully take into account and reflect the asset yield deficiency risk associated with repayment of both principal and interest.

Insurers may not rely on unsolicited ratings in determining the capital charge for an asset, except where the asset is a sovereign exposure and a solicited rating is not available.

3.2 Weighting

3.2.1 Items with a factor of 0% and miscellaneous items

For the items given below, the following weighting factors apply.

A factor of 0% is applied to these items:

- cash held on the insurer's own premises;
- accounts receivable of insurers subject to a federal or Canadian provincial regulation and those related to registered reinsurance agreements;
- outstanding premiums;
- reinsurance assets;
- unrealized gains and accrued receivables on off-balance sheet transactions associated with exchange rates and interest rates when they have been taken into account in the calculation of capital required for off-balance sheet items;
- any deductions from capital, including goodwill, excess intangible assets, and some investments in subsidiaries.

Bonds, notes and other obligations of the following entities are eligible for a 0% factor:

- The Government of Canada
- Sovereigns rated AA- or better and their central banks, provided such rating applies to the currency in which an obligation is issued[45]
- Unrated sovereigns with a country risk classification of 0 or 1, as assigned by participants in the "Arrangement on Officially Supported Export Credits" for obligations denominated in the sovereign's domestic currency[46]
- Provincial and territorial governments and agents of federal, provincial or territorial governments whose debts are, by virtue of their enabling legislation, direct obligations of the parent government
- The Bank for International Settlements
- The International Monetary Fund
- The European Community and the European Central Bank

[45] Sovereign obligations rated lower than AA- may not receive a factor of 0%, and are instead subject to the factor requirements in the following sections.

[46] The country risk classification is available on the OECD's web site (http://www.oecd.org) in the Export credits web page of the topic "Trade".

- The following multilateral development banks:
  - International Bank for Reconstruction and Development (IBRD)
  - International Finance Corporation (IFC)
  - Asian Development Bank (ADB)
  - African Development Bank (AfDB)
  - European Bank for Reconstruction and Development (EBRD)
  - Inter-American Development Bank (IADB)
  - European Investment Bank (EIB)
  - European Investment Fund (EIF)
  - Nordic Investment Bank (NIB)
  - Caribbean Development Bank (CDB)
  - Islamic Development Bank (IDB)
  - Council of Europe Development Bank (CEDB)
  - Multilateral Investment Guarantee Agency (MIGA)
- public sector entities in jurisdictions outside Canada where:
  - the jurisdiction's sovereign rating is AA- or better, and
  - the national bank supervisor in the jurisdiction of origin permits banks under its supervision to use a risk weight of 0% for the public sector entity under the Basel Framework;
  - recognized exchanges and clearing houses that serve as central counterparties[47] to derivatives and securities financing transactions.

A factor of 8% is applied to the book value of various items, such as:

- agents' and brokers' debit balances;
- accounts receivable of insurers not subject to a federal or Canadian provincial regulation and those related to unregistered reinsurance contracts;

[47] A central counterparty is an entity that interposes itself between counterparties to contracts traded within one or more financial markets, becoming the legal counterparty so that it is the buyer to every seller and the seller to every buyer. In order to qualify for a 0% factor, the central counterparty must have mitigated its own exposure to credit risk by requiring all participants in its arrangements to fully collateralize their obligations to the central counterparty on a daily basis. The 0% factor may not be used in respect of transactions that have been rejected by the central counterparty, nor in respect of equity investments, guarantee fund or default fund obligations a company may have to a central counterparty.

- other accounts receivable , except accounts of insurers subject to a federal or Canadian provincial regulation and those related to registered reinsurance agreements;
- prepaid and deferred expenses;
- deferred tax assets;
- intangible assets that are not deducted from capital (including software recognized in other capital items of Tier 2);
- amount of available refunds from defined benefit pension plan surplus assets included in Tier 1 capital;
- instruments or investments that are not specifically identified in this guideline.

As for agents' and brokers' debit balances, where collection of the interest or principal is uncertain, the insurer must establish a provision or write off the loan. The provision would be based on the insurer's collection experience for these loans and current economic conditions. The asset yield deficiency weighting factor is then applied to the agents' and brokers' net balance (unpaid balance less provisions).

A factor of 16% is applied to the accounting value of the assets[48] classified as held for sale. Alternatively, an insurer may elect to reclassify on the balance sheet assets held for sale according to their nature. For example, real estate held for sale may be reclassified as a real estate investment or a disposal group classified as held for sale may be re-consolidated. If this option is selected, the insurer should retain in available capital any write-down made as a result of re-measuring[49] the assets after reclassification or re-consolidation. The write-down amount should be applied to the reclassified/re-consolidated assets in a manner consistent with the basis for the write-down of the held for sale assets. If an insurer applies this option for a disposal group, a pro-forma QFP form that includes the impact of the sale should be filed with the regular form upon its transmission to the AMF. The pro-forma form must include, among other things, the projected gain or loss on sale, the impact of other related transactions and agreements which may occur in parallel and impact the results, which may not be recognized at period-end. The details of the adjustments required to the pro-forma form must be disclosed in the Capital Guideline Certification Report

Capital requirements in respect of mortgage-backed securities and other asset-backed securities are discussed under Section 3.5.

[48] If the insurer elects to apply the risk factor for assets held for sale, and does not use the reclassification option, the associated liabilities held for sale will be subject to the usual treatment of this guideline.

[49] The re-measuring value of the assets held for sale is equal to the lower of their carrying amount and their fair value less expected costs to sell.

3.2.2 Short-term securities

Factor	Short-term securities
0.25%	Demand deposits, certificates of deposit, drafts, cheques, acceptances and similar obligations of regulated deposit-taking institutions (original maturities of less than three months)
	Commercial paper:
0.25%	A-1, P-1, F1, R-1 or equivalent
0.50%	A-2, P-2, F2, R-2 or equivalent
2%	A-3, P-3, F3, R-3 or equivalent
8%	All other ratings, including non-prime and B or C ratings.

3.2.3 Bonds, private placements, loans other than mortgage loans and derivatives contracts

Factor	Public sector bonds
0%	Bonds of qualifying entities
0%	Bonds of subsidized entities(1)
	Municipal bonds(2)
0.125%	AAA, Aaa or equivalent
0.25%	AA, Aa or equivalent
0.5%	A or equivalent
1.0%	BBB, Baa or equivalent
2%	BB, Ba or equivalent
4%	B or equivalent
8%	Lower than B or equivalent

(1) Securities whose payment in principal and interest is guaranteed by the grant of a subsidy by the Québec government payable out of the funds voted each year for such purpose by the Québec National Assembly. The application of this factor is conditional upon a vote in favour of such subsidy. Otherwise, or if the financing structure of the entity is modified, the factors to be used would be those for corporate bonds.

(2) Bonds of Canadian municipalities only. For other municipal bonds, the factors to be used are those for corporate bonds.

Factor	Corporate and other bonds
0.25%	AAA or equivalent
0.5%	AA or equivalent
1%	A or equivalent
2%	BBB or equivalent (external ratings)
2%	AAA, AA, A, BBB (internal ratings)
4%	BB or equivalent (external ratings)
4%	BB (internal ratings)
8%	B or equivalent (external ratings)
8%	B (internal ratings)
16%	Lower than B or equivalent (external ratings)
16%	Lower than B (internal ratings)

Investments in innovative Tier 1 capital instruments issued by financial institutions must be treated as equity investments based upon the underlying economic risk of the instruments.

3.2.4 Unrated claims

Unrated short-term facilities should receive the factor corresponding to a rating of A-3, P-3 or equivalent, unless an issuer has a short-term facility with an assessment that warrants a capital charge of 8%. If an issuer has such a short-term facility outstanding, all unrated debt claims on the issuer, whether long term or short term, also receive a capital charge of 8% unless the insurer uses recognized credit risk mitigation techniques (Reference: Sections 3.3 and 3.4) for such claims.

For existing investments (as at December 31, 1993) in bonds and short-term securities, the insurer's internal ratings may be used. However, if the AMF believes that the results are inappropriate, a higher factor could be prescribed.

Where a rating is not available for a long-term claim, the insurer must use a factor of at least 2%, or a higher factor, if the insurer's internal rating results in a higher factor. In the case of investments in municipal bonds, internal ratings are not subject to this rule. Insurers' internal ratings must be reviewed at least once a year. If the AMF believes that the factor used is inappropriate, a higher factor could be prescribed.

Internal ratings may not be used for mortgage loans, asset-backed securities or other loans which are not explicitly covered in Section 3.2. The treatment of unrated asset-backed securities is described in Section 3.5. In the case of loans, a factor of 8% should normally be used.

A factor of 8% must be used for derivative contracts or other capital market transactions for which a rating cannot be inferred.

3.2.5 Mortgage loans

A 2% weighting factor applies to the following qualifying residential mortgages:

- loans secured by first mortgages on individual condominium residences and one- to four-unit residential dwellings made to a person(s) or guaranteed by a person(s), provided that such loans are not more than 90 days past due and do not exceed a loan-to-value ratio of 80%;
- collateral mortgages (first and junior) on individual condominium residences or one- to four-unit residential dwellings, provided that such loans are made to a person(s) or guaranteed by a person(s), where no other party holds a senior or intervening lien on the property to which the collateral mortgage applies and such loans are not more than 90 days past due and do not, collectively, exceed a loan-to-value ratio of 80%.

Investments in hotel properties and time-shares are excluded from the definition of "qualifying residential mortgages."

The factor for residential mortgages insured under the *National Housing Act* (the NHA) or equivalent provincial mortgage insurance programs is 0%. Where a mortgage is comprehensively insured by a private sector mortgage insurer that has a backstop guarantee provided by the Government of Canada (e.g. a guarantee made pursuant to the *Protection of Residential Mortgage or Hypothecary Insurance Act*), insurers may recognize the risk-mitigating effect of the counter-guarantee by reporting the portion of the exposure that is covered by the Government of Canada backstop as if this portion were directly guaranteed by the Government of Canada. The remainder of the exposure should be treated as an exposure to the mortgage guarantor in accordance with the rules set out in Section 3.4.

The weighting factor is 8% for mortgage loans related to undeveloped land (e.g. construction financing), other than land used for agricultural purposes or the production of minerals. A building recently constructed or renovated will be considered to be under construction until it is completed and 80% leased.

The weighting factor is also 8% for that portion of the mortgage loan that is based on an increase in value resulting from a different future use.

3.2.6 Commercial mortgage loans

Where the mortgage loan does not meet the criteria for qualifying residential mortgage loans, such a loan should be treated as a commercial mortgage loan and be subject to a 4% weighting factor.

3.2.7 Impaired loans

The factor for the unsecured portion of any loan for which there is reasonable doubt about the timely collection of the full amount of principal or interest (including any asset that is contractually more than 90 days in arrears), and that does not carry an external rating from an agency Section 3, is 16%. This factor is applied to the net carrying amount of the loan on the balance sheet, defined as the principal balance of the obligation net of write-downs and specific allowances. For the purpose of defining the secured portion of a past due obligation, eligible collateral and guarantees are the same as in Sections 3.3 and 3.4.

3.2.8 Restructured loans

The capital treatment for impaired loans also applies to restructured loans. A loan is considered to have been restructured when the insurer, for economic or legal reasons related to the obligor's financial difficulties, grants a concession that it would not otherwise consider. The 16% factor will continue to apply to restructured loans until cash flows have been collected for a period of at least one year in accordance with the amended terms and conditions.

3.2.9 Stocks and other similar investments

Factor	Stocks and other similar investments[50]
	Preferred stocks
1%	AAA, AA, Pfd-1, P-1 or equivalent
2%	A, Pfd-2, P-2 or equivalent
4%	BBB, Pfd-3, P-3 or equivalent
6%	BB, Pfd-4, P-4 or equivalent
15%	B or lower, Pfd-5, P-5 or equivalent or unrated
	Common stocks, mutual funds and similar investments
15%	common stocks and other similar investments, as well as interests in joint ventures
Varies, min. 2%	mutual funds and other similar investments

Investments in mutual funds generally include those defined in the Québec *Securities Act*.

[50] Other than investments deducted from the insurer's available capital.

The factor for investments in unleveraged[51] mutual funds, segregated funds and real estate investment trusts is a weighted average of factors for assets that the fund is permitted to invest in. The weights and factors are calculated assuming that the fund first invests in the asset class attracting the highest capital requirement, to the maximum extent permitted in its prospectus or Annual Information Form (where more current). It is then assumed that the fund continues allocating investments to asset classes in declining order of capital charge, to the maximum extent permitted, until a total allocation of 100% is reached. The factor for the mutual fund is then the sum of the products of the weights and risk factors for the assumed investment allocation.

In the absence of specific limits to asset classes or if the fund is in violation of the limits stated in the prospectus, the entire fund is subject to the highest risk charge applicable to any security that the fund holds or is permitted to invest in.

In all cases, a minimum factor of 2% is required nonetheless for mutual funds or similar investments to reflect the volatility risk of the share value. The factor for any fund that employs leverage is 15%. The details of the calculation and factor used must be disclosed in the Capital Guideline Certification Report.

3.2.10 Real estate (including foreclosed properties)

Factor	Real estate
4%	Used by the insurer or a consolidated legal person not subject to by the deductions defined in Section 2.5
7%	Income producing properties
35%	Oil and gas properties
15%	Other

The factors are applied to the book values, with the exception of owner-occupied property. For these properties, the factors should be applied to:

- original acquisition cost net of subsequent depreciation, for properties acquired after December 31, 2010;
- moving-average market value immediately prior to conversion to IFRS (i.e. December 31, 2010) net of subsequent depreciation (i.e., from January 1, 2011), for properties acquired before January 1, 2011.

The details of the adjustment to the book value must be disclosed in the Capital Guideline Certification Report. The factors should be applied to real estate amounts, gross of any associated mortgages or other debt.

[51] Leveraged funds are those that issue debt/preferred shares, or that use financial derivatives to amplify returns. Funds that employ an insignificant amount of leverage may be considered as unleveraged funds.

For the purposes of this section, income-producing properties are limited to investments with a yield of at least 4% of the book value (net of encumbrances, where applicable), after all direct real estate expenses (including interest on encumbrances) and taxes have been charged. The book value does not include deferred charges.

Income does not include amortization of the value of the property. Only cash is included. Excluded are those properties currently under development or for which imputed interest is capitalized for financial statement purposes. When calculating the income however, the amortization of deferred charges should be taken into account.

3.2.11 Limited partnerships

Investments in limited partnerships as a limited partner are treated as direct investments by the insurer, regardless of the existence of such partnerships. Therefore, the insurer must use the weighting factors otherwise applicable to the investments made by the limited partnership. The details of the calculation and factor used must be disclosed in the Capital Guideline Certification Report.

3.2.12 Leases

3.2.12.1 Lessee

Where an insurer is the lessee under an operating lease, no capital is required. Under a finance lease, the capital requirement for the asset held on the balance sheet is subject to the weighting factor applicable to a real estate investment.

3.2.12.2 Lessor

For finance leases, the 4% factor applies if the lease is secured only by equipment. If the lease is also secured by the general credit of the lessee and the lease is rated or a rating for the lease can be inferred under the use of ratings criteria, the factor is based on this rating. Any rating used must be applicable to the direct obligor of the instrument held by the insurer (or the direct guarantor, if recognition is permitted under Section 3.4), which may be different from the underlying lessee. If no rating can be inferred, the weighting factor is 2% or higher, if the insurer's internal rating results in a higher factor.

Insurers may use a 0% factor for any finance lease that is a direct obligation of an entity that is eligible for a 0% asset yield deficiency factor. A 0% factor may also be used for a lease that is guaranteed by such an entity if the guarantee meets the criteria for recognition under Section 3.4. The 0% factor may not be used for leases where an insurer does not have direct recourse to an entity eligible for a 0% factor under the terms of the obligation, even if such an entity is the underlying lessee. The details of the calculation and factor used must be disclosed in the Capital Guideline Certification Report.

3.2.13 Assets replicated synthetically and derivatives transactions

This section describes the amount of capital required for transactions that increase an insurer's exposure to asset yield deficiency risk and for which the full notional amount of the transaction may not be reported on the balance sheet, such as transactions undertaken through derivatives. Insurers are required to report the entire exposure amount in the QFP form and to hold capital for the full underlying risk assumed for these transactions irrespective of how they are reported on the balance sheet.

No additional capital is required under this section for hedges of index-linked liabilities that have been taken into account in the correlation factor calculation (refer to Section 3.7), nor for purchased put options that clearly serve to hedge an insurer's segregated fund guarantee risk as part of an AMF-authorized hedging strategy (refer to Section 6.2.8).

The requirements in this section are distinct from the requirements for counterparty default risk described in the chapter of the guideline for off-balance sheet items risk (refer to Chapter 7). Potential replacement costs described in Section 3.2 and in Chapter 7 also apply to transactions referenced in this section.

3.2.13.1 Credit protection provided

Where an insurer has guaranteed a debt security (for example through the sale of a credit derivative), it should hold the same amount of capital and report the exposure in the QFP form as if it held the security directly.

Where an insurer provides credit protection on a securitization tranche rated BBB- or higher via a first-to-default credit derivative on a basket of assets, the capital requirements may be determined as the notional amount of the derivative times the asset yield deficiency risk factor corresponding to the tranche's rating, provided that this rating represents an assessment of the underlying tranche that does not take account of any credit protection provided by the insurer. If the underlying product does not have an external rating, the insurer may either deduct the full notional amount of the derivative from capital available as a first loss position, or it may calculate the capital requirements as the notional amount times the sum of the asset yield deficiency risk factors for each asset in the basket.

In the case of a second-to-default credit derivative, the insurer may exclude the asset in the basket having the lowest asset yield deficiency risk factor if using the summation approach.

3.2.13.2 Short positions in equities

The capital required for a short position in any equity security or index that does not wholly or partially offset a long equity position held by the insurer is the same as that for a long position of the same magnitude. Positions eligible for offset recognition and the corresponding capital treatments are described in Section 0.

3.2.13.3 Futures, forwards and swaps

The capital treatment for a futures or forward position in any security or index is the same as that for the equivalent spot position, and should be reported in the QFP form as if the position were current. The requirement for a swap is the same as that for the series of future or forward transactions that replicates the swap.

Example:

An insurer has entered into a futures contract to purchase equity securities on a future date. The insurer should report an equity exposure in an amount equal to the total current market value of the equities underlying the futures contract.

Example:

An insurer has entered into a one-year swap during which it will pay the total return (coupons and capital gains) on a 10-year Government bond, and receive the return on a notional index of equities that was worth $100M at the time of inception. The index of equities is currently worth $110 million. The insurer should report an equity exposure of $110 million for the long position in the index, but no exposure for the short position in the bond because such a position is not subject to a capital charge.

3.2.13.4 Options on equities

The following describes the methodology used to determine the capital required for both equity options that have been purchased and options that have been sold. This methodology may not be applied to equity options embedded in products sold to policyholders. The market risk capital required for policies containing an equity option component should be calculated using the methodologies for index-linked products (refer to Section 3.7) or segregated fund guarantees (refer to Chapter 6) as appropriate.

The capital required for an option (or a combination of options in exactly the same underlying equity) is determined by constructing a two-dimensional matrix of changes in the value of the option position under various market scenarios, using the same valuation model that is used for financial reporting purposes. The first dimension of the matrix requires an insurer to evaluate the price of the option position over a range of 15% above and below the current value of the underlying stock or index, with at least seven observations (including the current observation) used to divide the range into equally spaced intervals. The second dimension of the matrix entails a change in the volatility of the underlying stock or index equal to ±25% of its current volatility. The capital required for the option position is then equal to the largest decline in value (or 50% of this amount for options backing the qualifying participating policies' liability) calculated in the matrix.

As an alternative to constructing a scenario matrix for a purchased option, an insurer may deduct the entire carrying amount of the option from capital available. Fifty percent should be deducted from Tier 1 capital and the other 50% from Tier 2 capital.

The application of this method and the precise manner in which the analysis is undertaken will be subject to review by the AMF. Insurers must understand the details of the valuation model used to construct the scenario matrix, and must independently review and test the model on an ongoing basis. Market prices, volatilities and other inputs to the valuation model must be subject to verification by a unit independent of the immediate parties to the transactions. The details of the calculation must be disclosed in the Capital Guideline Certification Report.

Example:

An insurer has sold a call option on a stock, with the stock currently having a market value of $100 and volatility of 20%. The first dimension of the matrix should range from $85 to $115, divided into six intervals of $5 each, and the second dimension should assume that volatility stays at 20%, increases to 25% (= 20% + 25% of 20%) or decreases to 15% (=20% - 25% of 20%). If the change in the value of the insurer's option position under the various market scenarios is as below, then the capital required for the option is $8.16 ($4.08 if the option backs the qualifying participating policies liability).

Gain (loss) due to change in option value							
	Stock price						
Volatility	**$85**	**$90**	**$95**	**$100 (current)**	**$105**	**$110**	**$115**
15%	$3.71	$2.96	$2.22	$1.14	($0.61)	($2.12)	($5.60)
20% (current)	$2.68	$1.84	$1.04	$0.00	($1.72)	($4.47)	($6.69)
25%	$1.32	$0.70	($0.65)	($1.93)	($3.58)	($5.80)	($8.16)

3.2.13.5 Equity-linked notes

The balance sheet carrying amount of an equity- or index-linked note should be decomposed into the sum of a fixed-income amount, equivalent to the present value of the minimum guaranteed payments under the note, and an amount representing the value of the option embedded within the note. The fixed-income portion of the note should be classified as a debt exposure, with the capital required based on the rating of the note, and the residual amount should be treated as an equity option.

Example:

An insurer purchases an A-rated equity-linked note from a Canadian bank for $10,000. The note promises to pay, in two years, the $10,000 purchase price of the note plus the purchase price times 65.7% of the percentage appreciation (if positive) of a stock index over the term of the note. The insurer uses the Black-Scholes option valuation model for

financial reporting purposes. The volatility of the stock index is 25%, the yield curve is flat, the annual risk-free rate is 5%, and the issuing bank's annual borrowing rate is 6.5%. The capital required for this note is $861.41, which is the sum of the following three separate capital requirements:

1. Bond requirement

   The value of the fixed-income component of the note is $10,000/(1.065)^2 = $8,816.59. The capital required, based on the note's A rating, is 1% of this amount, or $88.17.

2. Option requirement

   The value of the call option embedded within the note, taking into account the credit risk of the issuer, is the residual amount, namely $1,183.41. In the option scenario table, the greatest loss will occur if the value of the index declines by 15% at the same time as the index volatility declines to 18.75%, in which case the value of the option will decline by $756.15; this is the capital requirement for the option.

3. Counterparty default risk requirement (per Chapter 7)

   The exposure amount for the option is calculated under the current exposure method as:

   Positive mark-to-market + Factor x Notional

   = $1,183.41 + 8% x $6,570
   = $1,709.01

Since the note has an A rating, the capital requirement is 1% of the current exposure amount, or $17.09.

3.2.13.6 Convertible bonds

The capital required for a convertible bond is equal to the charge for the bond's fixed-income component plus the equity option charge for the bond's embedded warrant. The capital required for the fixed-income component is equal to the bond's asset yield deficiency factor (based on its rating) multiplied by the present value of the minimum guaranteed payments under the bond. The capital required for the embedded warrant should be calculated using the scenario table method for options on equities, where the gains and losses are based on either the change in value of the bond's warrant component (if the valuation methodology assigns an explicit value to this component) or the change in value of the whole bond.

As an alternative to the above methodology, an insurer may classify the full carrying amount of the convertible bond as an equity exposure.

3.2.13.7 Other instruments

If an insurer has entered into a transaction not described in Section 3.2.13 that increases its exposure to asset yield deficiency risk, it should provide the AMF with the details of the transaction in order to determine the appropriate treatment for purposes of this guideline.

3.2.13.8 Recognition of equity hedges

Offsetting long and short positions in equities

Equity positions backing indexed-linked policyholder liabilities for which a required capital factor is calculated under Section 3.7 may not be recognized as an offset to any other positions. However, 50% of any net equity position backing the insurer's participating business may be offset against positions that do not support the participating block. Offsetting hedges of an equity position may only be recognized if the party providing the hedge is an eligible guarantor as defined in Section 3.4.

Identical reference assets

Long and short positions in exactly the same underlying equity security or index may be considered as offsetting positions so that an insurer is required to hold capital only for the net position.

Closely correlated reference assets

Where the underlying securities or indices in a long and short position are not exactly the same but are closely correlated (e.g., a broad stock index and a large capitalization sub-index), insurers should calculate the required capital factor for the combined position using the correlation factor methodology described in Section 3.7. However, the maximum factor is 30% in this case. If an insurer has not held a short position over the entire period covered in the correlation factor calculation, but the security or index underlying the short position has quotations that have been published at least weekly for at least the past two years, the insurer may perform the calculation as if it had held the short position over the entire period. However, returns for actively managed short positions may not be inferred for periods in which the positions were not actually held, and mutual funds that are actively managed externally may not be recognized as an offsetting short position in an inexact hedging relationship. The details of the calculation must be disclosed in the Capital Guideline Certification Report.

Recognition of option hedges

Option hedges of an equity holding may only be recognized if the party providing the hedge is an eligible guarantor as defined in Section 3.4. Option hedges of segregated fund guarantee risk may not be recognized in the segregated fund guarantee capital calculation without explicit authorization from the AMF. The form and amount of any such recognition will be specified by the AMF at the time of authorization. Option hedges of segregated fund guarantee risk that receive recognition in the segregated fund guarantee capital calculation cannot be applied towards other equity risks.

Identical reference assets

If an option's reference asset is exactly the same as that underlying an equity position held, an insurer may exclude the equity holding in calculating the capital required for its equity exposures and instead consider the combined change in value of the equity position with the option in constructing the scenario table.

Closely correlated reference assets

If an option's reference asset is not exactly the same as that underlying an equity position, but is closely correlated with the equity, then the required capital factor for offsetting long and short positions in the option's reference asset and the asset underlying the equity position should be calculated as described above for closely correlated reference assets. An insurer may then exclude the equity holding from its requirement for equity exposures and instead calculate the combined change in value of the equity position with the option in a scenario table. However, the movement in the option's reference asset under each scenario must be assumed to be higher or lower (whichever produces a lower value for the option position) than the movement of the equity, by an amount equal to the capital requirement for directly offsetting positions. No additional adjustments need be made to the assumed changes in asset volatilities under the scenarios to account for asset mismatch. The details of the calculation must be disclosed in the Capital Guideline Certification Report.

Example:

An insurer has a long position in a main equity index, and also owns a call option and a put option on different indices that are closely correlated with the main index. The lowest correlation factor over the previous four quarters between the reference index of the call option and the main index, calculated per Section 3.7, is 97%, and the lowest correlation factor calculated over the previous four quarters between the reference index of the put option and the main index is 99%. The insurer would therefore construct a scenario table in which the price of the main index ranged from 15% below to 15% above its current value, while the index underlying the call option ranged from 18% below to 12% above its current value, and the index underlying the put option ranged from 14% below to 16% above its current value. In the scenarios in the centre column of the table, the main index would remain at its current value, while the index underlying the call option would be 3% lower than currently and the index underlying the put option would be 1% higher than currently.

3.3 Collateral

A collateralized transaction is one in which:

- an insurer has a credit exposure or potential credit exposure;

- that credit exposure or potential credit exposure is hedged in whole or in part by collateral posted by a counterparty[52] or by a third party on behalf of the counterparty.

The following standards must be met before capital relief will be granted in respect of any form of collateral:

- The effects of collateral may not be double counted. Therefore, insurers may not recognize collateral on claims for which an issue-specific rating is used that already reflects that collateral. All criteria in Section 3 remain applicable to collateral.

- All documentation used in collateralized transactions must be binding on all parties and legally enforceable in all relevant jurisdictions. Insurers must have conducted sufficient legal review to verify this and have a well-founded legal basis to reach this conclusion, and undertake such further review as necessary to ensure continuing enforceability.

- The legal mechanism by which collateral is pledged or transferred must ensure that the insurer has the right to liquidate or take legal possession of it, in a timely manner, in the event of the default, insolvency or bankruptcy (or one or more otherwise-defined credit events set out in the transaction documentation) of the counterparty (and, where applicable, of the custodian holding the collateral). Furthermore, insurers must take all steps necessary to fulfil those requirements under the law applicable to the company's interest in the collateral for obtaining and maintaining an enforceable security interest, e.g., by registering it with a registrar, or for exercising a right to net or set off in relation to title transfer collateral.
- The credit quality of the counterparty and the value of the collateral must not have a material positive correlation. For example, securities issued by the counterparty – or by any related group entity – provide little protection and are therefore ineligible.
- Insurers must have clear and robust procedures for the timely liquidation of collateral to ensure that any legal conditions required for declaring the default of the counterparty and liquidating the collateral are observed, and that collateral can be liquidated promptly.
- Where collateral is held by a custodian, insurers must take reasonable steps to ensure that the custodian segregates the collateral from its own assets.

Collateralized transactions are classified according to whether they are policy loans, capital markets transactions, or other secured lending arrangements. The category of capital markets transactions includes repo-style transactions (e.g., repos and reverse repos, and securities lending and borrowing) and other capital-markets driven transactions (e.g., OTC derivatives and margin lending).

[52] In this section "counterparty" is used to denote a party to whom an insurer has an on- or off-balance sheet credit exposure or a potential credit exposure. That exposure may, for example, take the form of a loan of cash or securities (where the counterparty would traditionally be called the borrower), of securities posted as collateral, of a commitment, or of an exposure under an OTC derivatives contract.

3.3.1 Policy loans

Loans for which insurance policies are provided as collateral will be assigned a 0% factor if the following conditions are met:

- Both the loan and the policy provided as collateral are issued by and remain held by the insurer.
- The term of the loan does not exceed the term of the policy provided as collateral.
- The insurer has the legal right and intention of offset in the event the loan goes into default or the policy is cancelled.
- Amounts owing under the loan, including any unpaid interest, are never greater than the amounts paid under the policy.
- The aggregate amount outstanding under the loan agreement, including accrued interest, does not at any time exceed the cash surrender value of the policy.

If any of these conditions are not met, a risk weighting factor of 8% should be applied to the loan.

3.3.2 Eligible financial collateral

The following collateral instruments may be recognized for secured lending and capital markets transactions:

- debt securities rated by a recognized rating agency (reference Section 3) where these securities are:
  - rated BB- or better and issued by an entity eligible for a 0% bond factor; or
  - rated BBB- or better and issued by other entities (including banks, insurers, and securities firms); or
  - short-term and rated A-3/P-3 or better;
- debt securities not rated by a recognized rating agency where:
  - the securities are issued by a Canadian bank whose equity is listed on a recognized exchange; and
  - the original maturity of the securities is less than one year; and
  - the securities are classified as senior debt; and
  - all debt issues by the issuing bank having the same seniority as the securities and that have been rated by a recognized rating agency are rated at least BBB- or A-3/P-3;
- equities and convertible bonds that are included in a main index;
- gold;

- mutual funds where:
  - a price for the units is publicly quoted daily; and
  - the mutual fund is limited to investing in the instruments listed above.[53]

Additionally, the following collateral instruments may be recognized for capital markets transactions:

- equities and convertible bonds that are not included in a main index but that are listed on a recognized exchange;
- mutual funds that include such equities and bonds.

For collateral to be recognized in a secured lending transaction, it must be pledged for at least the life of the loan. For collateral to be recognized in a capital markets transaction, it must be secured in a manner that would preclude release of the collateral unless warranted by market movements, the transaction is settled, or the collateral is replaced by new collateral of equal or greater value.

3.3.3 Secured lending

Collateral received in secured lending must be revalued on a mark-to-market basis at least every six months. The market value of collateral that is denominated in a currency different from that of the loan must be reduced by 20%. The portion of a loan that is collateralized by the market value of eligible financial collateral receives the weighting factor applicable to the collateral instrument, subject to a minimum of 0.25% with the exception noted below. The remainder of the loan is assigned the factor appropriate to the counterparty.

A 0% factor may be used for a secured lending transaction if:

- the loan and the collateral are denominated in the same currency; and
- the collateral consists entirely of securities eligible for a 0% factor; and
- the market value of the collateral is at least 25% greater than the carrying value of the loan.

3.3.4 Capital markets transactions

3.3.4.1 Introduction

When taking collateral for a capital markets transaction, insurers must calculate an adjusted exposure amount to a counterparty for capital adequacy purposes in order to

[53] However, the use or potential use of derivative instruments by a mutual fund solely to hedge investments listed as eligible financial collateral shall not prevent units in that mutual fund from being recognized as eligible financial collateral.

take account of the effects of that collateral. Using haircuts, insurers are required to adjust both the amount of the exposure to the counterparty and the value of any collateral received in support of the counterparty's obligations to take account of possible future fluctuations in the value of either[54] occasioned by market movements. This will produce volatility-adjusted amounts for both the exposure and the collateral. Unless either side of the transaction is in cash, the volatility-adjusted amount for the exposure will be higher than the exposure itself, and for the collateral it will be lower. Additionally, where the exposure and collateral are held in different currencies, an additional downwards adjustment must be made to the volatility-adjusted collateral amount to take account of possible future fluctuations in exchange rates.

Where the volatility-adjusted exposure amount is greater than the volatility-adjusted collateral amount (including any further adjustment for foreign exchange risk), the capital requirements are calculated as the difference between the two multiplied by the asset yield deficiency risk factor appropriate to the counterparty.

Section 0 describes the size of the individual haircuts used. These haircuts depend on the type of instrument and the type of transaction. The haircut amounts are then scaled using a square root of time formula depending on the frequency of remargining. Section 0 sets out conditions under which insurers may use zero haircuts for certain types of repo-style transactions involving government bonds. Finally, Section 0 describes the treatment of master netting agreements.

3.3.4.2 Calculation of the capital requirement

For a collateralized capital markets transaction, the exposure amount after risk mitigation is calculated as follows:

$$E^{*} = max\left(0, \left[E \times (1 + H_e) - C \times (1 - H_c - H_{fx})\right]\right)$$

where:

- E^* is the exposure value after risk mitigation
- E is the current value of the exposure
- H_e is the haircut appropriate to the exposure
- C is the current value of the collateral received
- H_c is the haircut appropriate to the collateral
- H_{fx} is the haircut appropriate for currency mismatch between the collateral and the exposure

The exposure amount after risk mitigation is multiplied by the weighting factor appropriate to the counterparty to obtain the requirements for the collateralized transaction.

[54] The exposure amount may vary where, for example, securities are being lent.

When the collateral consists of a basket of assets, the haircut to be used on the basket is the average of the haircuts applicable to the assets in the basket, where the average is weighted according to the market values of the assets in the basket.

The following are the standard haircuts, expressed as percentages:

Issue rating for debt securities	Residual maturity	Securities eligible for a 0% factor	Other securities
AAA to AA-/A-1	≤ 1 year	0.5	1
	>1 year, ≤ 5 years	2	4
	> 5 years	4	8
A+ to BBB-/A-2/A-3/P-3 and unrated bank debt securities	≤ 1 year	1	2
	>1 year, ≤ 5 years	3	6
	> 5 years	6	12
BB+ to BB-	All	15	
Main index equities and convertible bonds, and gold		15	
Other equities and convertible bonds listed on a recognized exchange		25	
Mutual funds		Highest haircut applicable to any security in which the fund can invest	

The standard haircut for currency risk where the exposure and collateral are denominated in different currencies is 8%.

For transactions in which an insurer lends cash, the haircut to be applied to the exposure is zero.[55] For transactions in which an insurer lends non-eligible instruments (e.g., corporate debt securities rated lower than BBB-), the haircut to be applied to the exposure should be the same as that applied to an equity that is traded on a recognized exchange but not part of a main index.

For collateralized OTC derivatives transactions, the *E** component term $E \times (1 + H_e)$, representing the volatility-adjusted exposure amount before risk mitigation, is replaced by the exposure amount for the derivatives transaction calculated using the current

[55] A Canadian insurer may use a haircut of zero for cash received as collateral if the cash is held in Canada in the form of a deposit at one of the insurer's banking subsidiaries.

exposure method as described in Section 7.2. This is either the positive replacement cost of the transaction plus the add-on for potential future exposure, or, for a series of contracts eligible for netting, the net replacement cost of the contracts plus A_{Net}. The haircut for currency risk should be applied when there is a mismatch between the collateral currency and the settlement currency, but no additional adjustments beyond a single haircut for currency risk are required if there are more than two currencies involved in collateral, settlement and exposure measurement.

All of the standard haircuts listed above must be scaled by a square root of time factor according to the following formula:

$$H = S \times \sqrt{\frac{N + T - 1}{10}}$$

where:

- *H* represents any of the haircuts used in calculating the exposure amount after risk mitigation;
- *S* is the standard haircut specified above for the exposure or collateral;
- *N* is the actual number of business days between remargining under the transaction; and
- *T* is equal to 5 for repo-style transactions, and 10 for all other capital markets transactions.

7.3.4.3 Conditions for using zero haircuts

For repo-style transactions that satisfy the following conditions, and for which the counterparty is a core market participant as defined below, insurers may apply haircuts of zero to both the exposure and collateral:

- both the exposure and the collateral are cash or securities issued by the Government of Canada or a provincial or territorial government in Canada;
- both the exposure and the collateral are denominated in the same currency;
- either the transaction is overnight or both the exposure and the collateral are marked to market daily and are subject to daily remargining;
- following a counterparty's failure to remargin, the time that is required between the last mark to market before the failure to remargin and the liquidation of the collateral is considered to be no more than four business days;[56]

[56] This does not require an insurer to always liquidate the collateral but rather to have the capability to do so within the given time frame.

- the transaction is settled across a settlement system proven for that type of transaction;
- the documentation covering the agreement is standard market documentation for repo-style transactions in the securities concerned;
- the transaction is governed by documentation specifying that if the counterparty fails to satisfy an obligation to deliver cash or securities or to deliver margin or otherwise defaults, then the transaction is immediately terminable;
- upon any default event, regardless of whether the counterparty is insolvent or bankrupt, the insurer has the unfettered, legally enforceable right to immediately seize and liquidate the collateral for its benefit.

Core market participants include the following entities:

- Sovereigns, central banks and public sector entities
- Banks and securities firms
- Other financial companies (including insurers) rated AA- or better
- Regulated mutual funds that are subject to capital or leverage requirements
- Regulated pension funds
- Recognized clearing organizations.

3.3.4.4 Treatment of repo-style transactions covered under master netting agreements

The effects of bilateral netting agreements covering repo-style transactions will be recognized on a counterparty-by-counterparty basis if the agreements are legally enforceable in each relevant jurisdiction upon the occurrence of an event of default and regardless of whether the counterparty is insolvent or bankrupt. In addition, netting agreements must:

- provide the non-defaulting party the right to terminate and close out in a timely manner all transactions under the agreement upon an event of default, including in the event of insolvency or bankruptcy of the counterparty;
- provide for the netting of gains and losses on transactions (including the value of any collateral) terminated and closed out under it so that a single net amount is owed by one party to the other;
- allow for the prompt liquidation or setoff of collateral upon the event of default; and
- be, together with the rights arising from the provisions required above, legally enforceable in each relevant jurisdiction upon the occurrence of an event of default and regardless of the counterparty's insolvency or bankruptcy.

For repo-style transactions included within a master netting agreement, the exposure amount after risk mitigation is calculated as follows:

$$E^* = max\left(0, \left[\sum E - \sum C + \sum (E_s \times H_s) + \sum (E_{fx} \times H_{fx})\right]\right)$$

where:

- E^* is the exposure value after risk mitigation
- E is the current value of the exposure
- C is the current value of the collateral received
- E_s is the absolute value of the net position in a given security
- H_s is the haircut appropriate to E_s
- E_{fx} is the absolute value of the net position in a currency different from the settlement currency
- H_{fx} is the haircut appropriate for currency mismatch

All other rules regarding the calculation of haircuts in Section 0 equivalently apply for insurers using bilateral netting agreements for repo-style transactions.

3.4 Guarantees and credit derivatives

Where guarantees[57] or credit derivatives are direct, explicit, irrevocable and unconditional, and insurers fulfil certain minimum operational conditions relating to risk management processes, they will be allowed to take account of such credit protection in calculating capital requirements. The capital treatment is founded on the substitution approach, whereby the protected portion of a counterparty exposure is assigned the weighting factor of the guarantor or protection provider, while the uncovered portion retains the weighting factor of the underlying counterparty. Thus only guarantees issued by or protection provided by entities with a lower weighting factor than the underlying counterparty will lead to reduced capital requirements. A range of guarantors and protection providers is recognized.

3.4.1 Operational requirements common to guarantees and credit derivatives

The effects of credit protection may not be double counted. Therefore, no capital recognition is given to credit protection on claims for which an issue-specific rating is used that already reflects that protection. All criteria in Section 3 around the use of ratings remain applicable to guarantees and credit derivatives.

A guarantee (counter-guarantee) or credit derivative must represent a direct claim on the protection provider and must be explicitly referenced to a specific exposure or a pool of exposures, so that the extent of the cover is clearly defined and incontrovertible. Other than non-payment by a protection purchaser of money due in respect of the credit protection contract it must be irrevocable; there must be no clause in the contract that would allow the

[57] Letters of credit for which an insurer is the beneficiary are included within the definition of guarantees, and receive the same treatment.

protection provider unilaterally to cancel the credit cover or that would increase the effective cost of cover as a result of deteriorating credit quality in the hedged exposure.[58] It must also be unconditional; there should be no clause in the protection contract outside the direct control of the insurer that could prevent the protection provider from being obliged to pay out in a timely manner in the event that the original counterparty fails to make the payment(s) due.

All documentation used for documenting guarantees and credit derivatives must be binding on all parties and legally enforceable in all relevant jurisdictions. Insurers must have conducted sufficient legal review to verify this and have a well-founded legal basis to reach this conclusion, and undertake such further review as necessary to ensure continuing enforceability.

3.4.2 Additional operational requirements for guarantees

The following conditions must be satisfied in order for a guarantee to be recognized:

- On the qualifying default/non-payment of the counterparty, the insurer may in a timely manner pursue the guarantor for any monies outstanding under the documentation governing the transaction. The guarantor may make one lump sum payment of all monies under such documentation to the insurer, or the guarantor may assume the future payment obligations of the counterparty covered by the guarantee. The insurer must have the right to receive any such payments from the guarantor without first having to take legal action in order to pursue the counterparty for payment.
- The guarantee is an explicitly documented obligation assumed by the guarantor.
- Except as noted in the following sentence, the guarantee covers all types of payments the underlying obligor is expected to make under the documentation governing the transaction, for example notional amount, margin payments, etc. Where a guarantee covers payment of principal only, interest and other uncovered payments should be treated as an unsecured amount in accordance with Section 3.5.

3.4.3 Additional operational requirements for credit derivatives

The following conditions must be satisfied in order for a credit derivative contract to be recognized:

- The credit events specified by the contracting parties must at a minimum cover:
  - failure to pay the amounts due under terms of the underlying obligation that are in effect at the time of such failure (with a grace period that is closely in line with the grace period in the underlying obligation);

[58] Note that the irrevocability condition does not require that the credit protection and the exposure be maturity matched; rather that the maturity agreed ex ante may not be reduced ex post by the protection provider.

- bankruptcy, insolvency or inability of the obligor to pay its debts, or its failure or admission in writing of its inability generally to pay its debts as they become due, and analogous events; and
- restructuring of the underlying obligation involving forgiveness or postponement of principal, interest or fees that results in a credit loss event (i.e., charge-off, specific provision or other similar debit to the profit and loss account). Refer to the exception below when restructuring is not specified as a credit event.

- If the credit derivative covers obligations that do not include the underlying obligation, the penultimate item below governs whether the asset mismatch is permissible.
- The credit derivative shall not terminate prior to expiration of any grace period required for a default on the underlying obligation to occur as a result of a failure to pay.
- Credit derivatives allowing for cash settlement are recognized for capital purposes insofar as a robust valuation process is in place in order to estimate loss reliably. There must be a clearly specified period for obtaining post-credit event valuations of the underlying obligation. If the reference obligation specified in the credit derivative for purposes of cash settlement is different than the underlying obligation, the penultimate item below governs whether the asset mismatch is permissible.
- If the protection purchaser's right/ability to transfer the underlying obligation to the protection provider is required for settlement, the terms of the underlying obligation must provide that any required consent to such transfer may not be unreasonably withheld.
- The identity of the parties responsible for determining whether a credit event has occurred must be clearly defined. This determination must not be the sole responsibility of the protection seller. The protection buyer must have the right/ability to inform the protection provider of the occurrence of a credit event.
- A mismatch between the underlying obligation and the reference obligation under the credit derivative (i.e., the obligation used for purposes of determining cash settlement value or the deliverable obligation) is permissible if (1) the reference obligation ranks *pari passu* with or is junior to the underlying obligation, and (2) the underlying obligation and reference obligation share the same obligor (i.e., the same legal entity) and legally enforceable cross-default or cross-acceleration clauses are in place.
- A mismatch between the underlying obligation and the obligation used for purposes of determining whether a credit event has occurred is permissible if (1) the latter obligation ranks *pari passu* with or is junior to the underlying obligation, and (2) the underlying obligation and reference obligation share the same obligor (i.e., the same legal entity) and legally enforceable cross-default or cross-acceleration clauses are in place.

When the restructuring of the underlying obligation is not covered by the credit derivative, but the other requirements above are met, partial recognition of the credit derivative will be allowed. If the amount of the credit derivative is less than or equal to the amount of the underlying obligation, 60% of the amount of the hedge can be recognized as covered. If the

amount of the credit derivative is larger than that of the underlying obligation, then the amount of eligible hedge is capped at 60% of the amount of the underlying obligation.

Only credit default swaps and total return swaps that provide credit protection equivalent to guarantees will be eligible for recognition. Where an insurer buys credit protection through a total return swap and records the net payments received on the swap as net income, but does not record offsetting deterioration in the value of the asset that is protected (either through reductions in fair value or by increasing provisions), the credit protection will not be recognized.

Other types of credit derivatives are not eligible for recognition.

3.4.4 Eligible guarantors and protection providers

Insurers may recognize credit protection given by the following entities:

- entities eligible for a 0% weighting factor under Section 3.2.1;
- public sector entities, banks and securities firms with a lower factor than that of the counterparty; and
- other entities rated A- or better. This includes credit protection provided by parent and subsidiary of an obligor, as well as enterprises to which it is related, when they have a lower weighting factor than that of the obligor.

However, an insurer may not recognize a guarantee or credit protection on an exposure to a third party when the guarantee or credit protection is provided by a related party of the insurer. This treatment follows the principle that guarantees within a group of related enterprises cannot be a substitute for the capital of the insurer.

3.4.5 Capital treatment

The protected portion of a counterparty exposure is assigned the weighting factor of the protection provider. The uncovered portion of the exposure is assigned the weighting factor of the underlying counterparty.

A 0% weighting factor will be applied to assets of a securities portfolio whose initial value is guaranteed by the *Caisse de dépôt et placement du Québec*. The conditions of such a guarantee should be the same as those discussed in Section 3.4.

Where the amount guaranteed, or against which credit protection is held, is less than the amount of the exposure, and the secured and unsecured portions are of equal seniority (i.e., the insurer and the guarantor share losses on a pro-rata basis), capital relief will be afforded on a proportional basis, so that the protected portion of the exposure will receive the treatment applicable to eligible guarantees and credit derivatives, and the remainder will be treated as unsecured. Where an insurer transfers a portion of the risk of an exposure in one or more tranches to a protection seller or sellers and retains some level of risk, and the risk transferred and the risk retained are of different seniority, the insurer may obtain credit protection for the senior tranches (e.g., second-loss position) or the junior tranches (e.g., first-loss position). In this case the rules as set out in Chapter 6 (rules related to

securitization) of the *Guideline on capital base adequacy requirements* given by the AMF to financial services cooperatives will apply.

3.4.6 Currency mismatches

Where the credit protection is denominated in a currency different from that in which the exposure is denominated, the amount of the exposure deemed to be protected will be 80% of the nominal amount of the credit protection, converted at current exchange rates.

3.4.7 Maturity mismatches

A maturity mismatch occurs when the residual maturity of the credit protection is less than that of the underlying exposure. If there is a maturity mismatch and the credit protection has an original maturity lower than one year, the protection may not be recognized. As a result, the maturity of protection for exposures with original maturities less than one year must be matched to be recognized. Additionally, credit protection with a residual maturity of three months or less may not be recognized if there is a maturity mismatch. Credit protection will be partially recognized in other cases where there is a maturity mismatch.

The maturity of the underlying exposure and the maturity of the credit protection should both be measured conservatively. The effective maturity of the underlying should be gauged as the longest possible remaining time before the counterparty is scheduled to fulfil its obligation, taking into account any applicable grace period. For the credit protection, embedded options that may reduce the term of the protection should be taken into account so that the shortest possible effective maturity is used. Where a call is at the discretion of the protection seller, the maturity will always be at the first call date. If the call is at the discretion of the insurer buying protection but the terms of the arrangement at origination contain a positive incentive for the insurer to call the transaction before contractual maturity, the remaining time to the first call date will be deemed to be the effective maturity. For example, where there is a step-up cost in conjunction with a call feature or where the effective cost of cover increases over time even if credit quality remains the same or improves, the effective maturity will be the remaining time to the first call.

When there is a maturity mismatch, the following adjustment will be applied:

$$P_a = P \times \frac{t - 0.25}{T - 0.25}$$

where:

- P_a is the value of the credit protection adjusted for maturity mismatch
- P is the nominal amount of the credit protection, adjusted for currency mismatch if applicable
- t is the lower of T or the residual maturity of the credit protection arrangement expressed in years
- T is the lower of 5 or the residual maturity of the exposure expressed in years

3.4.8 Sovereign counter-guarantees

Some claims may be covered by a guarantee that is indirectly counter-guaranteed by a sovereign. Such claims may be treated as covered by a sovereign guarantee provided that:

- the sovereign providing the counter-guarantee is eligible for a 0% weighting factor;
- the sovereign counter-guarantee covers all credit risk elements of the claim;
- both the original guarantee and the counter-guarantee meet all the operational requirements for guarantees, except that the counter-guarantee need not be direct and explicit to the original claim; and
- the cover is robust, and there is no historical evidence suggesting that the coverage of the counter-guarantee is less than effectively equivalent to that of a direct sovereign guarantee.

3.4.9 Public sector guarantees

Insurers may not recognize guarantees made by public sector entities, including provincial and territorial governments in Canada, that would disadvantage private sector competition. Insurers should look to the host (sovereign) government to confirm whether a public sector entity is in competition with the private sector.

3.4.10 Other items related to the treatment of credit risk mitigation

In the case where an insurer has multiple types of mitigators covering a single exposure (e.g., both collateral and a guarantee partially cover an exposure), the insurer will be required to subdivide the exposure into portions covered by each type of mitigator (e.g., portion covered by collateral, portion covered by guarantee) and the capital requirements for each portion must be calculated separately. When credit protection provided by a single protection provider has differing maturities, these must be subdivided into separate protection as well.

There are cases where an insurer obtains credit protection for a basket of reference names and where the first default among the reference names triggers the credit protection and the credit event also terminates the contract. In this case, the insurer may recognize credit protection for the asset within the basket having the lowest capital requirement, but only if the notional amount of the asset is less than or equal to the notional amount of the credit derivative. In the case where the second default among the assets within the basket triggers the credit protection, the insurer obtaining credit protection through such a product will only be able to recognize credit protection on the asset in the basket having the lowest capital requirement if first-to-default protection has also been obtained, or if one of the assets within the basket has already defaulted.

3.5 Asset backed securities (ABS)

The category of ABS encompasses all securitizations, including collateralized mortgage obligations (CMO) and mortgage-backed securities (MBS).

3.5.1 NHA-insured mortgage-backed securities

Mortgage-backed securities that are guaranteed by the Canada Mortgage and Housing Corporation ("CMHC") under the NHA carry a weighting factor of 0% in recognition of the fact that CMHC commitments are legal obligations of the Government of Canada.

3.5.2 Rated asset-backed securities

An asset-backed security rated by a recognized credit rating service will be assigned the asset yield deficiency risk factor that applies to a bond with the same rating.

3.5.3 Unrated asset-backed securities

Asset-backed securities of the pass-through type, which are effectively a direct holding of the underlying assets, are assigned the weighting factor associated with the underlying assets, provided all the following conditions are met:

- the underlying asset pool may contain only assets that are fully performing when the asset-backed security is created;
- the securities must absorb their pro rata share of any losses incurred;
- a special-purpose vehicle must be established for securitization and administration of the pooled assets;
- the asset pool is assigned to an independent third party for the benefit of the investors in the securities, who therefore hold the asset pool;
- the arrangements for the special-purpose vehicle and trustee must provide compliance with these obligations:
    - If an administrator is employed to carry out administrative functions, the vehicle and trustee must monitor the performance of the administrator or agent.
    - The vehicle and/or trustee must provide detailed and regular information on structure and performance of the pooled assets.
    - The vehicle and trustee must be legally separate from the originator of the pooled assets.
    - The vehicle and trustee must be responsible for any prejudice or loss to investors created by their own or their agent's mismanagement of the pooled assets.
    - The trustee must have a first priority charge on underlying assets on behalf of the holders of the securities.
    - The agreement must provide for the trustee to take clearly specified steps in cases of a delinquent debtor.
    - The holder of the security must have a pro rata share in the underlying asset pool, or the vehicle that issues the security must have only liabilities related to the issuing of the asset-backed security.

- The cash flows of the underlying assets must meet the cash flow requirements of the security without undue reliance on any reinvestment income.
- The vehicle or trustee may invest cash flows pending distribution to investors only in short-term money market instruments (without any material reinvestment risk) or in new assets that meet the terms and conditions of the security.

Should the underlying pool of assets be composed of assets assigned a different weighting factor, the factor applied to the securities will be the highest factor associated with the underlying assets. The details of the calculation and factor used must be disclosed in the Capital Guideline Certification Report.

Asset-backed securities that do not meet these conditions will require an 8% weighting factor. Stripped asset-backed securities or other classes of securities (senior/junior debt) that bear more than their pro-rata share of losses are automatically assigned an 8% risk factor.

Where the underlying asset pool contains assets that have become impaired, the proportion of the security concerned will require a factor calculated in accordance with the treatment accorded to impaired loans (Section 3.2.7).

3.6 Repurchase, reverse repurchase and securities lending agreements

A securities repurchase (repo) is an agreement whereby a transferor agrees to sell securities at a specified price and repurchase the securities on a specified date and at a specified price. Since the transaction is regarded as a financing for accounting purposes, the securities remain on the balance sheet. Given that these securities are temporarily assigned to another party, the weighting factor associated with this exposure should be the higher of:

- the weighting factor for the security, or
- the weighting factor for an exposure to the counterparty to the transaction, recognizing any eligible collateral (refer to Section 3.3).

A reverse repurchase agreement is the opposite of a repurchase agreement, and involves the purchase and subsequent resale of a security. Reverse repos are treated as collateralized loans, reflecting the economic reality of the transaction. The risk is therefore to be measured as an exposure to the counterparty. If the asset temporarily acquired is a security that qualifies as eligible collateral per Section 3.3, the exposure amount may be reduced accordingly.

In securities lending, insurers can act as principal to the transaction by lending their own securities or as agent by lending securities on behalf of clients.

Where the insurer lends its own securities, the weighting factor applicable is the higher of:

- the weighting factor related to the instruments lent; or

- the factor for an exposure to the borrower of the securities. This factor may be reduced if the lender holds an eligible collateral, as defined in Section 3.3. Where the insurer lends securities through an agent and receives an explicit guarantee of the return of the securities, the insurer may treat the agent as the borrower, subject to the conditions in Section 3.4.

Where the insurer, acting as agent, lends securities on behalf of a client and guarantees that the securities on loan will be returned or the insurer will reimburse the client for the current market value, the capital requirement should be calculated as if the insurer were the principal to the transaction. The factor may be reduced if the insurer holds eligible collateral, as defined in Section 3.3.

The methodologies described above do not apply to repurchases or loans of securities backing an insurer's index-linked products, as defined in Section 3.7. If an insurer enters into a repurchase or loan agreement involving such assets, the capital requirements are equal to the requirements for the exposure to the counterparty or borrower (taking account of eligible collateral), plus the requirements applicable under Section 3.7.

3.7 Index-linked products

These products have the following features:

- Both assets and liabilities for these contracts are held in the general fund of the insurer.
- The policyholder is promised a certain return in the contract, based on an index. The following are examples of such returns:
  - the same return as a specified public index. This includes, but is not limited to, a stock index, a bond index, an index maintained by a financial institution, etc.
  - the same return as is earned by one of the insurer's segregated funds;
  - the same return as is earned by one of the insurer's mutual funds;
  - the same return as is earned by another company's mutual funds;
- The insurer may invest in assets that are not the same as those that make up the indexes.

The current asset yield deficiency weighting factors do not apply to assets backing index-linked products. All assets backing index-linked products must be segmented and included by asset type on page 35.010 of the QFP form; they will be assigned capital factors based on correlation calculations (see below).

The following conditions must be met:

- All assets backing index-linked products must be segmented into asset subgroups.
- A separate asset subgroup must be maintained for each index referred to in the policies.

- The returns (on a market basis) of each asset subgroup must be tracked.
- Any transfers into or out of the asset subgroup must be at market.

To determine the required capital factor applicable to a particular subgroup of assets, these steps must be followed:

Step 1 – Calculation of correlation factors (CF)

A CF is to be calculated for each quarter.

$$CF = A \times (B \div C)$$

where: **A** represents the historical correlation between the returns credited to the policyholder funds and the returns on the subgroup's assets;

B corresponds to the minimum of [standard deviation of asset returns and standard deviation of returns credited to policyholder funds];

C corresponds to the maximum of [standard deviation of asset returns and standard deviation of returns credited to policyholder funds].

Note: The CF must be calculated for each asset subgroup.

The historical correlations and standard deviations must be calculated on a weekly basis, covering the previous 52-week period. The returns on the asset subgroups must be measured by the increase in their market value net of policyholder cash flows.

Step 2 – Calculation of required capital factor

The quarterly required capital factor is equal to 100% minus CF.

The required capital factor applicable to a particular subgroup of assets is equal to the highest quarterly required capital factor of the latest four quarters.

The capital requirement for an asset subgroup is equal to the required capital factor applied to the market value at the year-end of the assets in the subgroup.

Instead of using policyholder funds in the calculations, an insurer could use cash surrender values or actuarial liabilities to measure the correlation. The basis used must be consistently applied in all periods.

The required capital factor is 15% (i.e. CF = 85%) for assets:

- that are not segmented into asset subgroups even though they back index-linked products;
- for which the CF cannot be calculated or the CF is lower than 85%;
- that are backing newly formed funds for the first three quarters.

Combined with the requirement to use the highest quarterly required capital factor of the latest four quarters, this entails that the required capital factor will be 15% (i.e. CF = 85%) for the first 18 months of newly formed funds.

Where a synthetic index investment strategy is used, there is some asset yield deficiency risk that is not directly borne by the policyholder. For instance, this can relate to the asset yield deficiency requirements of the fixed income securities associated with the synthetic index strategies and the related counterparty risks on the derivatives. These required asset yield deficiency amounts must also be held, in addition to the index-linked requirements in this section.

For index-linked insurance policies that have a minimum death benefit guarantee, the appropriate factor for mortality guarantees discussed in the segregated fund section of this guideline should be applied. These factors may be obtained using the *GetCost* function as described in Section 0. These required amounts may be reduced by reinsurance credits (subject to the requirements of Section 1.2) and by any policyholder liabilities covering this risk.

Chapter 4. Mortality, morbidity and lapse risk

4.1 Summary of elements of risk calculation

Mortality, morbidity and lapse risks relate to the possibility that assumptions about mortality, morbidity and lapse are not realized.

For the purposes of calculating capital attributable to the risk of annuities involving life contingencies and to the morbidity risk, a factor is applied to the risk calculation element. The sum of the values thus obtained results in the amount of capital required for this risk category. The factors used in calculating the capital requirement vary with the guaranteed term remaining. The risk calculation is as follows:

Risk	Risk calculation element (before reinsurance ceded)	Applicable guaranteed term
Annuities involving life contingencies	Total actuarial liabilities (including any portion that does not involve life contingencies)	
Disability income and waiver of premium New claims risk	Annual earned premiums	Length of premium guarantee remaining
Disability income and waiver of premium Continuing claims risk	Disability income and waiver of premium actuarial liabilities relating to claims of prior years	Length of coverage remaining

For the life insurance mortality risk (including accidental death and dismemberment), required capital is determined using volatility risk and the catastrophe risk. Volatility risk is based on the standard deviation of expected death claims and on the duration of projected death claims. On the other hand, catastrophe risk is based on the application of a factor to expected death claims.

Required capital for lapse risk is a result of the difference between actuarial liabilities calculated with modified assumptions and actuarial liabilities calculated with statutory valuation assumptions.

4.2 Mortality risk

4.2.1 Insurance (including accidental death and dismemberment)

The gross capital required for life insurance (both individual and group) is the sum of the capital required for the volatility component and the catastrophe component. The gross capital required is reduced by the credits for deposits and stop-loss arrangements to arrive at the net capital required.

In order to compute its capital required, an insurer must partition its book of business into sets of like products. Basic death and accidental death and dismemberment ("AD&D") products may not be included in the same set, nor may individual and group products. All products within a set must have similar attributes with respect to adjustability and mortality guarantee duration.

All cashflow projections, benefit amounts and reserve amounts used to determine the capital required must be calculated net of reinsurance, subject to the requirements of Section 1.2. Cashflow projections must take into account all current valuation decrement assumptions (mortality, lapse, etc.), including margins for adverse deviation.

The net amount at risk for a policy or set of products, for both directly written business and business acquired through reinsurance, refers to the total net face amount of all included policies minus the total net reserve for the included policies, where both the face amount and the reserve are net of reinsurance, subject to the requirements of Section 1.2.

For purposes of the mortality component, basic death benefits include supplementary term coverages, participating coverages arising out of dividends (paid-up additions and term additions), and increasing death benefits associated with universal life policies (i.e. policies where the death benefit is the face amount plus funds invested). More generally, any mortality risk supported by the general account should be included in this calculation.

When the technical provisions reported in the financial statements are reduced due to the recognition of future mortality improvement, required capital should be calculated as follow:

- for the calculations based on the amount of technical provision: using an amount of technical provision equal to the greater of:
    - that obtained by excluding the mortality improvement and using the interest rate prescribed scenario with the largest insurance contract liability according to Subsection 2330 of the CIA standards of practice; and
    - the one reported in the financial statements at the date of the calculation;
- for the calculations based on mortality rates: using rates excluding future mortality improvement.

4.2.1.1 Volatility component

The capital required for volatility risk is calculated with the following formula:

$$\sqrt{\sum_{\text{BasicDeath}} S^2} + \sqrt{\sum_{\text{AD\&D}} S^2}$$

where:

- S is the volatility component for the set of products;
- These sums are taken over all sets of basic death and AD&D products respectively.

S is calculated with the following formula:

$$S = 2.5 \times A \times B \times E/F$$

where

- A is the standard deviation of the upcoming year's projected net death claims for the set and is defined by:

$$A = \sqrt{\sum q(1-q)b^2}$$

where

- q is equal to the valuation mortality (including the margin for adverse deviations) for a particular policy;
- b is the net death benefit for the policy ;
- the sum is taken over all policies in the set. Also, the calculation must be based on claims at the policy level, rather than claims per life insured. Multiple policies on the same life may be treated as separate policies, but distinct coverages of the same life under a single policy should be aggregated. If this aggregation cannot be performed due to systems limitations, the impact should still be measured and accounted for in the total requirement;

- B is defined by:

$$B = \begin{cases} \max\left(\frac{1}{2}\ln(D);1\right) & \text{for sets of adjustable and qualifying participating policies that meet the criteria set in Section 1.3} \\ \max(\ln(D);1) & \text{for all other sets of policies} \end{cases}$$

where

  - D is equal to the Macaulay duration of all projected net death claims for the policies in the set, calculated assuming a discount rate of 5% per year;
  - ln is the natural logarithm function;

- E is the total net amount at risk for the policies in the set;
- F is the total net face amount for the policies in the set.

When there is insufficient data available to calculate A for a set of products and the standard deviation of the net death benefit amounts for all policies (or certificates for group products) in the set is known, factor A for the set should be approximated as:

$$A \approx \sqrt{\frac{C \times \sum b^2}{F}}$$

where:

- C is the projected value of the upcoming year's total net death claims for all policies in the set (including claims projected to occur after policy renewal dates),
- the sum is taken over all policies (or certificates for group products) in the set, and b is the net death benefit amount for the policy or certificate,
- F is the total net face amount for the policies in the set.

When there is insufficient data available to calculate A for a set of products and the standard deviation of the net death benefit amounts is not known, insurers may approximate factor A for the set using a comparable set of the insurer's own products for which it is able to calculate the volatility component exactly. For the set whose volatility component is being approximated, A may be approximated as:

$$A \approx \frac{A_c \times \sqrt{N_c}}{C_c} \times \sqrt{C} \times \sqrt{\max\left(\frac{F}{n}, \frac{C}{N}\right)}$$

where:

- A_c is the exact factor A calculated for the comparison set;
- N_c and N are the total numbers of deaths projected to occur over the upcoming year for all policies in the comparison set and all policies in the set for which A is being approximated, respectively;
- C_c and C are the projected values of the upcoming year's total net death claims for all policies in the comparison set and all policies in the set for which A is being approximated, respectively;
- F is the total net face amount for the policies in the set for which A is being approximated;
- n is the total number of lives covered under the policies in the set for which A is being approximated.

The use of the above approximation is subject to the following conditions:

- There should be no basis from which to conclude that the dispersion of the distribution of net death benefit amounts, as measured by the ratio of the standard deviation to the mean, of the comparison set may with material likelihood be lower

than that of the set for which *A* is being approximated. It may not be appropriate to base the approximation on an insurer's entire book of products of the same type. The insurer's actuary should be able to explain why using the approximation based on the comparison set produces appropriate results.

- Insurers must use comparison sets of individual products to approximate factors for sets of individual products, and comparison sets of group products to approximate factors for sets of group products. Insurers may use sets of basic death products to approximate factors for sets of AD&D products, but may not use sets of AD&D products to approximate factors for sets of basic death products.
- For any particular set of products used as a comparison set, the number of covered lives in the comparison set must be greater than or equal to the total number of covered lives summed over all sets for which factors are approximated based on the comparison set.
- If this approximation is used for sets of individual basic death products, the sets in aggregate must not be material relative to the insurer's entire book of business.

When an insurer is not able to use the results of a comparison set of products, it may use, for sets of products consisting entirely of traditional employer-sponsored group policies, the formula:

$$A = 1{,}75 \times \sqrt{C} \times \sqrt{\max\left(\frac{F}{n}, \frac{C}{N}\right)}$$

In order to use this approximation, each policy in the set must have the characteristic that an employee is required to remain actively working for the plan sponsor in order to continue coverage. In particular, such a set may not contain debtor, association, mass mailing or dependent coverages.

When there is insufficient data available to calculate A for a set of products and the standard deviation of the net death benefit amounts is not known, insurers may also approximate factor A for the set using the formula:

$$A \approx \sqrt{C} \times \sqrt{b_{min} + b_{max} - \frac{b_{min} \times b_{max}}{F/n}}$$

where:

- C is the projected value of the upcoming year's total net death claims for all policies in the set (including claims projected to occur after policy renewal dates);
- b_{min} is less than or equal to the lowest single-life net death benefit amount of any policy (or certificate) in the set;
- b_{max} is the highest single-life net death benefit amount or retention limit of any policy (or certificate) in the set;

- F is the total net face amount for the policies in the set;
- n is the total number of lives covered under the policies in the set.

The value of the average net death benefit amount F / n used in the above formula must be exact, and may not be based on an estimate. If an insurer cannot establish with certainty both the average net death benefit amount and a lower bound b_{min} on the net death benefit amounts, it must use the value $b_{min} = 0$ in the formula so that the approximation used is:

$$A \approx \sqrt{C \times b_{max}}$$

When there is insufficient data to calculate B for a set of products, and an insurer calculates A for the set using a set of comparable products, and it is probable that the duration of projected net death claims for the comparison set is the same as or longer than that of the set for which there is insufficient data, the insurer should use the value of B for the comparison set as the approximation of B for the set for which there is insufficient data. If an insurer is using the formula based on the sum of the squares of the policy benefit amounts to approximate A for a set of individual products, it may still use an appropriately conservative comparison set of products to estimate B for the set provided that the comparison set meets the same conditions as required for a comparison set used to approximate A.

When there is insufficient data to calculate B for a set of group products and this factor is not estimated from a comparison set, the following approximation may be used:

$$B \approx \begin{cases} 1 & \text{for qualifying adjustable and participating products and for products having a mortality guarantee duration of 2 years or less} \\ 2 & \text{for all other products} \end{cases}$$

When there is insufficient data to calculate B for a set of individual products and this factor is not estimated from a comparison set, an insurer may calculate B using the exact formula with the exception that the duration of projected net death claims D is replaced by the longest remaining liability valuation term of any policy in the set.

4.2.1.2 Catastrophe component

The capital required for catastrophe risk is:

$$\sum_{\text{AllProducts}} K$$

where:

- K is the catastrophe component for the set;
- the book of business is partitioned into the same sets as in the volatility component;

- the formula for K is given by the following formula:

$$K = \alpha \times C \times E/F$$

where:

$$\alpha = \begin{cases} 0.05 & \text{for sets of adjustable and qualifying participating policies that meet the criteria set in Section 1.3} \\ 0.1 & \text{for all other sets of policies} \end{cases}$$

  - C is the projected value of the upcoming year's total net death claims for all policies in the set (including claims projected to occur after policy renewal dates);
  - E is the total net amount at risk for the policies in the set;
  - F is the total net face amount for the policies in the set.

For purposes of the catastrophe component, group policies with no rate guarantee beyond the current year are considered qualifying adjustable.

4.2.1.3 Particular features of group insurance

Group policies or benefits that are associated with one of the risk-reduction features below should be placed into separate sets consisting exclusively of policies with such features. These sets should be further partitioned according to whether the policyholder is the Canadian Government or a provincial or territorial government in Canada, or another type of policyholder. An insurer may apply a scaling factor to both the volatility and catastrophe components for a set of policies having risk-reduction features, where the scaling factor used is 5% for Canadian federal, provincial or territorial group policyholders, and 15% for all other policyholders. The risk-reduction features eligible are:

- "guaranteed no risk";
- deficit repayment by policyholders; or
- a "hold harmless" agreement where the policyholder has a legally enforceable debt to the insurer.

The above applies for groups where the risk-reduction features provide for a full transfer of risk. Where a policy has one of the above risk-reduction features, but the maximum recoverable amount (as specified in the insurance contract) from the policyholder is subject to a limit, the credit for the risk-reduction feature should be calculated in the same manner as the credit for policyholder deposits under Section 0, with the following modifications:

- use the maximum recoverable amount in place of the deposit amount in the calculation, and

- the credit obtained with this calculation, i.e. the lower of the maximum recoverable amount and the result of the formula in Section 0 , must be reduced by 5% for Canadian federal, provincial or territorial group policyholders, and 15% for all other policyholders.

"Administrative Services Only" group contracts where the insurer bears no risk and has no liability for claims should be excluded from the calculation of the required amount.

4.2.1.4 Credit for deposits

Some deposits may be used to reduce the required capital amount. The general treatment of deposits is outlined in Section 1.4.

The amount by which the component may be reduced for a deposit made under a particular contract is limited to a maximum of:

$$\left(50\% \times \left[V - \left(\sqrt{\sum_{\substack{\text{Individual} \\ \text{BasicDeath}}} S^2} + \sqrt{\sum_{\substack{\text{Individual} \\ \text{AD\&D}}} S^2} \right) \right] + \sum_{\text{Group}} K \right) \times E/G$$

where:

- V is the amount of capital required for the volatility component;
- S is the volatility component for the set of individual products being summed;
- K is the catastrophe risk requirement for the set of group products being summed;
- E is the annualized premium for the group contract;
- G is the total of annualized premiums for all group business.

4.2.1.5 Credit for reinsurance

Refer to Section 1.2 for the general treatment of reinsurance (registered and unregistered) for the purposes of calculating this risk. Regarding specifically the risk mortality component, all intermediate quantities used to determine the mortality capital must be calculated net of all registered reinsurance. Such reinsurance may include modco agreements, provided that the assuming insurer fully takes the agreement into account in its own mortality risk capital calculation.

For sets of products containing contracts where the direct or assumed premiums are guaranteed but the reinsurance premiums are adjustable, both the volatility component and the catastrophe component should be calculated twice: once, net of the reinsurance as if it were not adjustable, and once, gross of the reinsurance. The volatility component and the catastrophe component used in the capital required calculation are then the averages of the results of the two calculations.

With respect to authorized credits for unregistered reinsurance ceded, the maximum amount for a particular reinsurer is limited to:

$$(M_1 - M_2) \times E/G$$

where:

- M1 is the gross capital required calculated net of registered reinsurance ceded only;
- M2 is the gross capital required calculated net of all reinsurance ceded (registered and unregistered);
- is the weighted net amount at risk ceded to the reinsurer under all unregistered reinsurance agreements. For qualifying participating policies and adjustable products that meet the criteria in Section 1.3, a weight of 50% should be applied to the ceded net amounts at risk. For all other policies, the weight used should be 25% if the mortality guarantee term remaining is one year or less, 50% if the guarantee term is greater than one year but less than or equal to five years, and 100% otherwise;
- G is the total weighted net amount at risk ceded to all reinsurers under unregistered reinsurance agreements.

4.2.2 Annuities involving life contingencies

The amount required is 1% of the total actuarial liabilities, including any portion of the actuarial liability that does not involve life contingencies. In the case of a longevity swap where an insurer assumes longevity risk, the 1% factor should be applied to the actuarial present value of the gross annuity payments under the swap, not the net value of the swap.

Since risks of random statistical fluctuations are not material, no additional adjustment is necessary for differences in size.

Refer to Section 1.2 for the treatment of reinsurance (registered and unregistered) for the purposes of calculating this component.

4.3 Morbidity risk

4.3.1 Disability income and waiver of premium insurance

Disability income and waiver of premium insurance requires from insurers a greater amount of capital than medical and dental expense reimbursement business because of its higher level of volatility. Moreover, the additional risks associated with non-cancellable guaranteed premium business should be considered in this section.

4.3.1.1 New claims risk

The new claims risk element relates to claims arising from the current year's coverage, and includes the risks of incidence and claims continuance for disability income and waiver of premium insurance. The applicable factors are as follows:

Percentage of annual earned premiums		Length of premium guarantee remaining
Individually underwritten	**Other**	
12%	12%	less than or equal to 1 year
20%	25%	greater than 1 year, but less than or equal to 5 years
30%	40%	greater than 5 years

For supplementary morbidity guarantees attached to group life insurance policies, the insurer must use the factors applicable to individual insurance.

Those factors may be multiplied by 75% for benefit periods that do not exceed two years. This adjustment must be disclosed in the Capital Guideline Certification Report.

4.3.1.2 Continuing claims risk

The continuing claims element applies to disability income and waiver of premium claims arising from coverage provided in prior years. The factor applies to disability income and waiver of premium claim reserves related to claims incurred in prior years, including the portion of the provision for incurred but unreported claims.

The applicable factors are as follows:

Duration of disability			Length of coverage period remaining
From 1 to no more than 2 years	**Greater than 2 years but no more than 5 years**	**Greater than 5 years**	
4.0%	3.0%	2.0%	less than or equal to 1 year
6.0%	4.5%	3.0%	greater than 1 year but less than or equal to 2 years
8.0%	6.0%	4.0%	greater than 2 years or lifetime

When the technical provisions reported in the financial statements are reduced due to the recognition of future morbidity improvement, the calculation must be done by using technical provisions that exclude 50% of the morbidity improvement.

4.3.1.3 Accidental death and dismemberment

The amount of capital required is calculated by using the criteria applicable to the mortality risk (including accidental death and dismemberment). The details of the calculation must be disclosed in the Capital Guideline Certification Report.

4.3.2 Other accident and sickness benefits

4.3.2.1 New claims risk

The amount of capital required corresponds to 12% of annual earned premiums.

For travel insurance sold on an individual basis, where contracts are signed for short-term periods (e.g. 14 or 30 days), the insurer may adjust the amount of capital required in order to reflect the nature of those contracts. However, such an insurer must include in the Capital Guideline Certification Report a short description of the adjustment made in relation with the nature of the contracts.

4.3.2.2 Continuing claims risk

The amount required corresponds to 10% of the provision for incurred but unpaid claims relating to prior years. The use of prior years avoids a double capital requirement for incurred but unpaid claims arising from coverage purchases by premiums paid in the current year.

When the technical provisions reported in the financial statements are reduced due to the recognition of future morbidity improvement, the calculation must be done by using technical provisions that exclude 50% of the morbidity improvement.

4.3.3 Particular features of group insurance

The requirement for any group benefit may be multiplied by a scaling factor if it is associated with a policy or benefit that has one of the following features:

- “guaranteed no risk”;
- deficit repayment by policyholders; or
- a “hold harmless” agreement where the policyholder has a legally enforceable debt to the insurer.

The scaling factor to be used is 5% if the group policyholder is the Canadian Government or a provincial or territorial government in Canada, and 15% for all other policyholders. This adjustment must be disclosed in the Capital Guideline Certification Report.

The above applies for groups where the risk-reduction features provide for a full transfer of risk. Where a policy has one of the above risk-reduction features, but the maximum recoverable amount (as specified in the insurance contract) from the policyholder is subject

to a limit, the credit for the risk-reduction feature should be calculated in the same manner as the credit for policyholder deposits under Section 0, with the following modifications:

- use the maximum recoverable amount in place of the deposit amount in the calculation, and
- the credit obtained with this calculation, i.e. the lower of the maximum recoverable amount and the amount of required capital, must be reduced by 5% for Canadian federal, provincial or territorial group policyholders, and 15% for all other policyholders.

"Administrative Services Only" group contracts where the insurer bears no risk and has no liability for claims should be excluded from the calculation of the required amount.

4.3.4 Credits for deposits

Some deposits may be used to reduce required capital. The general treatment of deposits is provided in Section 1.4. The amount by which the component may be reduced for a deposit made under a particular contract is limited to the marginal morbidity requirement. The marginal morbidity requirement for a policy is defined as the difference between the following two amounts:

- the morbidity requirement, net of both registered and unregistered reinsurance and after adjustment for statistical fluctuation, for an insurer's entire book of business;
- the morbidity requirement (taking account of the increased statistical fluctuation factor) for the insurer's book of business excluding the policy under which the deposit is made.

4.3.5 Credits for reinsurance

To calculate credits, the insurer should refer to the treatment of registered and unregistered reinsurance in Section 1.2.

4.3.6 Adjustment for statistical fluctuation

The total amount of capital required for the morbidity risk is adjusted further in accordance with the following table:

Factor	Calculated capital requirement for this element
1.00	$10,000,000 or less
0.95	$20,000,000
0.85	$50,000,000
0.75	$100,000,000 or more

Insurers must use interpolation to determine the factor applicable to intermediate values of the calculated capital requirement in the above values.

The applicable factor for a subsidiary to make further adjustment for the statistical fluctuation may be equivalent to the insurer's factor if any existing legally binding agreement between the two provides that the insurer fully guarantees all of the subsidiary's liabilities. The use of the parent factor must be specified in the Capital Guideline Certification Report.

4.4 Lapse risk

The lapse risk component is based on adjustments to the lapse assumption at all policy durations. It is required for all individual life and individual health business as well as for group policies for which premiums or actuarial liabilities are based on individual insured characteristics. It is calculated by:

1. using the net actuarial liabilities as determined for statutory financial statement purposes;

2. recalculating net actuarial liabilities for all durations by increasing the margin for adverse deviation by 13 percentage points.

   For example, for those durations for which lower lapses will produce higher net actuarial liabilities, if the valuation assumption assumes a best estimate lapse rate of 6%, reduced by a 10% margin to 5.4%, the revised assumption calls for a lapse rate of 6% reduced by a 23% margin to 4.62%. For those durations for which higher lapses will produce higher net actuarial liabilities, if the valuation assumption calls for a best estimate lapse rate of 6%, increased by a 10% margin to 6.6%, the revised assumption calls for a lapse rate of 6% increased by a 23% margin to 7.38%.

   All other assumptions are unchanged from Step 1;

3. Subtracting the actuarial liabilities calculated in Step 1 from the actuarial liabilities calculated in Step 2.

When the technical provisions reported in the financial statements are reduced due to the recognition of future mortality improvement, the calculation in the above steps must be done by using technical provisions that exclude the mortality improvement and use the interest rate prescribed scenario with the largest insurance contract liability according to Subsection 2330 of the CIA standards of practice when these technical provisions are greater than the one reported in the financial statements at the date of the calculation.

Similarly, when the technical provisions reported in the financial statements are reduced due to the recognition of future morbidity improvement, the calculation in the above steps must be done by using technical provisions that exclude 50% of the morbidity improvement.

Guidance related to the treatment of qualifying participating policies and qualifying adjustable products are defined in Section 1.3.

Although it is preferable to calculate the lapse risk component based on year-end actuarial liabilities, insurers may make the calculation on a quarter-end basis. The increase in net actuarial liabilities is then expressed as a percentage and is applied to the year-end net actuarial liabilities in the calculation of the lapse risk component at the end of the financial year.

The AMF recognizes that the lapse experience may have an impact on the mortality experience. However, for the purposes of calculating the lapse risk component, it is not necessary to modify other assumptions that have an impact on mortality. However, in order to simplify the calculation of the lapse risk component for insurers having a valuation system with automatic mortality adjustments related to the lapse assumption, those systems are not expected to be modified.

Refer to Section 1.2 for the treatment of reinsurance (registered and unregistered) and to Section 1.4 for the general treatment of deposits for the purposes of calculating the lapse risk component.

Chapter 5. Changes in interest rate environment risk

Change in interest rate environment risk corresponds to the risk associated with asset depreciation arising from interest rate shifts. Capital is necessary to cover the effects of interest rate fluctuation on asset and liability cash flows.

Losses arising from asset yield deficiency risk are treated separately for the calculation of capital required. For that reason, they are not treated in this risk category.

Capital required for the changes in interest rate environment risk is calculated by applying factors to the actuarial liabilities or to the funds value associated with the products concerned. The amount of capital required is derived from the sum of the resulting values. However, the total amount of required capital cannot be less than zero.

With respect to the treatment of the reinsurance credit related to this component, insurers must refer to Section 1.2 for the applicable requirements.

When the technical provisions reported in the financial statements are reduced due to the recognition of future mortality improvement, required capital should be calculated by using an amount of technical provision equal to the greater of:

- that obtained by excluding the mortality improvement and using the interest rate prescribed scenario with the largest insurance contract liability according to Subsection 2330 of the CIA standards of practice; and
- the one reported in the financial statements at the date of the calculation.

Similarly, when the technical provisions reported in the financial statements are reduced due to the recognition of future morbidity improvement, the calculation of the required capital must be done by using technical provisions that exclude 50% of the morbidity improvement.

5.1 Weighting

5.1.1 Insurance and annuities (excluding accumulation funds)

The applicable factors are as follows:

Factor	Guaranteed period remaining on premium rates or credited interest	Product
0.010	less than 5 years	life and health insurance
0.020	greater than or equal to 5 years, but less than 10 years	
0.030	greater than or equal to 10 years	
0.015	less than 5 years	endowment insurance
0.030	greater than or equal to 5 years, but less than 10 years	
0.050	greater than or equal to 10 years	
0.010	single premium immediate annuities (including RRIFs) and disability claims payable in instalments (including disability waiver)	

For applying the corresponding factors, actuarial liabilities should be net of policy loans where the policy loan rate is variable, and not subject to an upper limit; or where there is direct recognition of policy loans by policy in the dividend scale, or the crediting of excess interest. Policy loan interest rates based on an index would be considered variable.

Insurers must use half of the tabled factors for insured policies without guaranteed cash values (including maturity values) in the next five years. The details of the adjustment must be disclosed in the Capital Guideline Certification Report.

For qualifying participating life insurance business and qualifying adjustable products as defined in Section 1.3, the factor for a guarantee period of less than five years must be used.

For current premium rates that are less than the maximum guaranteed premium rates, the guarantee term is that applicable to the current rates. For a policy with no due premium (a paid-up policy), the remaining guaranteed period is the period over which the zero-premium is guaranteed, for example, the remaining term of the contract when new premiums cannot be required.

A specific treatment is applied to universal life products. Policyholder funds are treated as accumulation funds. For these products, the factors included in the preceding table are applied to the difference between actuarial liabilities and the value of policyholder funds.

No capital is required for business where the actuarial liabilities are not discounted for interest, and on which there is no interest credited.

5.1.2 Accumulation funds

Separate treatment is accorded for accumulation funds, deferred annuities, retirement income policies and universal life policyholder funds. Accumulation funds include all amounts on deposit, claims fluctuation and premium stabilization reserves, and provision for experience refunds. The factors to be used vary with the guaranteed term and the plan type. The different plan types are defined as follows:

Type A At all times, funds may be withdrawn only:

- with an adjustment to reflect changes in interest rates or asset values since fund receipt; or
- by way of an immediate life annuity; or
- in instalments over a minimum of five years; or
- for amounts not greater than the annual interest credits allowed.

Type B Fund withdrawal is defined as for Type A, except that funds may be withdrawn at the end of the interest guarantee period in a single sum, or in instalments over less than five years.

Type C Funds may be withdrawn before the end of the guarantee period in a single sum, or in instalments over less than five years, either

- without adjustment to reflect changes in interest rates or asset values since fund receipt; or
- subject only to a fixed surrender charge, either in an amount or as a percentage of the funds.

The following table contains the factors used in deriving the capital amount required for accumulation funds (including all amounts on deposit), deferred annuities, retirement income policies and universal life policyholder funds.

Factor	Type of Plan
0.000	1 - index-linked funds as defined in Section 3.7
0.005	2 - daily interest accounts being credited with market short-term interest, and with interest rate guarantee periods of six months or less
0.010	3 - guaranteed period remaining less than 10 years (other than in 2) for Plan Types A and B
0.020	4 - guaranteed period remaining greater than or equal to 10 years for Plan Types A and B
0.020	5 - guaranteed period remaining greater than 6 months but less than 18 months for Plan Type C
0.050	6 - guaranteed period remaining greater than 18 months but less than 10 years for Plan Type C
0.100	7 - guaranteed period remaining greater than or equal to 10 years for Plan Type C

For the purposes of this section, the guarantee period is the number of years remaining until the next interest rate reset date.

For universal life products, the factors are applied to the value of the policyholder funds.

For group plans, for purposes of distinguishing between plan types, fund withdrawal does not include employee withdrawals upon termination of employment, retirement, disability or death. Withdrawals resulting from adverse aggregate group experience, such as claim fluctuation reserves, are also excluded.

5.2 Debt securities

Debt securities issued by an insurer that do not qualify as capital are subject to a weighting factor of 1%.

5.3 Asset cash flow uncertainty

The asset cash flow uncertainty risk component covers against losses caused by the prepayment and extension of investments that are sensitive to interest rate fluctuations.

No factor is required for:

- Traditional fixed-income investments including non-callable, callable and extendible bonds

- Residential mortgages and commercial mortgages with prepayment penalties or prepayment conditions
- Commercial mortgage securities backed by pools of commercial mortgages with prepayment penalties or prepayment conditions
- Canadian pass-through MBSs and Canadian CMOs backed by pools of NHA-insured mortgages with prepayment penalties or prepayment conditions
- Assets-backed by a pool of automobile and light truck loans, credit card receivables and trade receivables
- Asset-backed securities with floating rate coupons
- Franchise loans with treasury make whole clauses
- Assets backing index-linked products identified in Section 3.7

A factor of 1% applies to:

- Residential mortgages and commercial mortgages that have no prepayment penalties or conditions
- Canadian MBSs backed by a pool of commercial mortgages that have no prepayment penalties or clauses
- U.S. pass-through MBSs and CMOs
- Pass-through asset-backed securities collateralized by home improvement loans and manufactured housing loans

An 8% factor applies to leveraged derivatives and leveraged structured notes.

The factors for cash flow uncertainty may be reduced by 50% for assets backing cash flow tested reserves.

Chapter 6. Segregated fund guarantee risk

This component measures risk associated with performance-related guarantees on segregated funds or products offering similar guarantees. The capital component required for this risk can be determined using the prescribed factors or using an internal model. In the latter case, authorization must be obtained from the AMF. To this end, the insurer must follow the conditions outlined in Section 6.2. In some cases, the AMF may require that an internal model be used, for example, when the prescribed factors do not apply to the insurer's products or if the business is deemed too large to be properly evaluated with the prescribed factors.

The AMF may also recognize the use of risk mitigation strategies by the insurer, particularly reinsurance agreements or capital market hedging strategies (the "hedging strategies"). With respect to hedging strategies, the insurer must follow the conditions outlined in Section 6.2 and obtain prior authorization from the AMF. For reinsurance agreements, the insurer must communicate with the AMF for the approach to use.

6.1 Requirements using prescribed factors

An insurer that has not had its internal model approved in accordance with the conditions outlined in Section 6.2 must determine its capital requirements using prescribed factors.

An insurer may choose between the two methods described in this section. In the first financial period when this section is applicable, the insurer is required to irrevocably elect the method it intends to use to calculate the capital component.

6.1.1 Global method

6.1.1.1 Total gross capital required (TGCR)

Capital factors are provided for a variety of standardized product forms for guaranteed minimum death benefit (GMDB) and guaranteed minimum maturity benefit (GMMB) commonly offered for segregated fund guarantee products in Canada and the United States. Below is a general description of the product forms modelled. More details can be found in Table 5 (page 106).

GMDB forms modelled include the following:

- **Return of premium (ROP):** provides a death benefit guarantee equal to the higher of the account value or the premiums paid.
- **5% annual roll-up (ROLL):** provides a guaranteed benefit that increases 5% per annum compounded at each contract anniversary with the guarantee frozen at age 80.
- **Maximum anniversary value/annual ratchet (MAV):** automatic annual reset of guarantee at each contract anniversary with resets frozen at age 80.

- **10-year rollover contract (GMDB_10):** guarantee can reset and term-to-maturity also will reset to 10 years. No resets are permitted in the final 10 years prior to contract maturity.

GMMB forms modelled include:

- **Fixed maturity date (FIXED):** guarantee is level and applies up to the fixed maturity date.
- **10-year rollover maturity benefit (GMMB_10):** guarantee can be reset and term-to-maturity also resets to 10 years. No resets are permitted in the 10 years prior to contract maturity.
- **Guaranteed minimum surrender benefit (GMSB_10):** guarantee applies 10 years after contract issue. If 10-year guarantee value is higher than account value, a "top-up" benefit is paid upon contract surrender.

It is expected that the CAR methodology for TGCR will be applied on a policy-by-policy basis (i.e. seriatim). If the insurer adopts a cell-based approach, only materially similar contracts should be grouped together. Specifically, all policies in a "cell" must display substantially similar characteristics for those attributes expected to affect risk-based capital (e.g. definition of guaranteed benefits, attained age, policy duration, years-to-maturity, market-to-guaranteed value, asset mix, etc.). The TGCR and net actuarial liabilities held for the purpose of determining capital requirements for segregated funds using prescribed or authorized factors should not include deferred income taxes.

The total portfolio TGCR is the sum of the TGCR calculations for each policy or cell. The result for any given policy (cell) may be negative, zero or positive. However, the portfolio TGCR cannot be negative.

The TGCR for a given policy is equal to:

$$TGCR = GV \times \hat{f}(\tilde{\theta}) - AV \times \hat{g}(\tilde{\theta})$$

where

- GV = current guaranteed minimum benefit;
- AV = current account balance;
- $\hat{f}\left(\tilde{\theta}\right)$ = benefit cost factor;
- $\hat{g}\left(\tilde{\theta}\right)$ = margin offset factor;
- $h(\circ) = h(\tilde{\theta}) =$ is a vector that defines the risk characteristics for the policy.

The factors $\hat{f}\left(\tilde{\theta}\right)$ and $\hat{g}\left(\tilde{\theta}\right)$ are described more fully in step 4 (refer to Section 0). The TGCR is calculated separately for each guaranteed minimum benefit (i.e., death, maturity and surrender).

The model assumptions for the TGCR factors are documented in Section 0.

There are four major steps in determining the TGCR for a given policy/cell:

Step 1 - Classifying the asset exposure (refer to Section 0)

Step 2 - Determining the risk attributes (refer to Section 0)

Step 3 - Retrieving the appropriate nodes (refer to Section 0)

Step 4 - Using the supplied functions to determine the requirement (refer to Section 0).

The first step requires the insurer to categorize the asset value for the given policy/cell by mapping the entire exposure to one of the prescribed "fund classes." TGCR factors are provided for each asset class.

The second step requires the insurer to determine (or derive) the appropriate attributes for the given policy or cell. The attributes needed to access the factor tables and calculate the required values are:

- product form ("Guarantee Definition"), *P*;
- guarantee level, *G;*
- adjustment to guaranteed value upon partial withdrawal ("GMDB/GMMB Adjustment"), *A*;
- fund class, *F*;
- attained age of the policyholder, *X* (for GMDB only, use a 4-year setback for female lives);
- contract maturity age, *M*, (for GMDB only, use a 4-year setback for female lives);
- time-to-next maturity date, *T*;
- ratio of account value to guaranteed value, ϕ;
- total "equivalent" account-based charges, *MER* ("management expense ratio");
- reset utilization rate, *R* (where applicable);
- in-the-money termination rate, *S* (guaranteed surrender benefits only).

Other required policy values include:

- total account value on which the guaranteed benefit is calculated, *AV*;

- current GMDB, GMMB and GMSB;
- total net spread available to fund guaranteed benefits ("margin offset"), α.

The next steps – retrieving the appropriate nodes and using the supplied functions to determine the requirement – are explained in Sections 0 and 6.1.1.6 Step 4 - Using the supplied functions to determine the requirement. Software tools have been developed to assist insurers in these efforts. If an insurer is unable to use the supplied software, it will be required to develop software of its own. In such a situation, the insurer should contact the AMF for specific guidance on how to develop its own lookup and extraction routines. A calculation example demonstrating the application of the various component factors to a sample policy is provided in Section 0.

In Section 0, GMDB, GMMB, GMSB are generically denoted by *GV*. *AV* generically denotes either Account Value or Market Value. The total "equivalent" account charges should include all amounts assessed against policyholder accounts, expressed as a level spread per year (in basis points). This quantity is called the Management Expense Ratio (*MER*) and is defined as the average amount (in dollars) charged against policyholder funds in a given year divided by average account value. Normally, the *MER* would vary by fund class and be the sum of investment management fees, mortality and expense charges, guarantee fees/risk premiums, etc. The total spread available to fund the guaranteed benefits (i.e., GMDB, GMMB, GMSB costs) is called the "margin offset" (denoted by α) and should disregard spread-based costs and expenses (e.g., maintenance expenses, investment management fees, trailer commissions, amounts required to provide for deferred acquisition costs, etc.). The section on margin offset adjustment (refer to Section 0) describes how to determine *MER* and α.

The GMDB/GMMB/GMSB definition for a given policy/cell may not exactly correspond to those provided. In some cases, it may be reasonable to use the factors/formulas for a different product form. In other cases, the insurer might determine the *TGCR* based on two different guarantee definitions and interpolate the results to obtain an appropriate value for the given policy/cell. However, if the policy form is sufficiently different from those provided and there is no practical or obvious way to obtain a reasonable result, the insurer should contact the AMF.

The general format for TGCR may be written as:

$$TGCR = GV \times h(\circ) \times w(\circ) \times f(\circ) - \frac{\alpha}{100} \times AV \times g(\circ)$$

where:

- *GV* = current guaranteed minimum benefit (dollars);
- *AV* = current account value (dollars);
- $f(\circ) = f(\tilde{\theta}) =$ cost factor per $1 of *GV*;

- $g(\circ) = g(\tilde{\theta}) =$ margin offset factor per $1 of *AV* (assuming 100 bps of available spread);
- $h(\circ) = h(\tilde{\theta}) =$ asset mix diversification factor;
- $w(\circ) = w(\tilde{\theta}) =$ time diversification factor.

Under this notation, $\tilde{\theta}$ is used to generically represent the risk attribute set (e.g., product form, guaranteed level, asset class, attained age, etc.) for the policy, or some relevant subset thereof. *α* is the net spread ("margin offset," in basis points per annum) available to fund the guaranteed benefits.

Where more than one feature (i.e., guaranteed benefit) is present in a product, unless the insurer has a justifiable alternative for allocating the total available spread between the benefit types (e.g., explicitly defined risk charges), the split should be based on the proportionate gross guaranteed benefit costs. An example is provided in Section 0 to illustrate this concept.

In practice, $f(\circ)$, $g(\circ)$, $h(\circ)$ and $w(\circ)$ are values interpolated from the factor grid. The use of the factor grid is discussed more fully in step 4 (refer to Section 0). The factor grid is a large pre-computed table developed using stochastic modeling for a wide array of combinations of the risk attribute set. The risk attribute set is defined by those policy/product characteristics that affect the risk profile of the business: product form (guarantee definition), fund class, attained age, *AV*/*GV* ratio, time-to-maturity, etc.

6.1.1.2 Assumptions for TGCR methodology published factors

Each node in the factor grid is effectively the modeled result for a given "cell" assuming a $100 single deposit.

TABLE 1

Model assumptions and product characteristics

Account charges (*MER*)	Vary by fund class. See Table 2 later in this section (page 95).
Base margin offset	100 basis points per annum.
GMDB description	ROP = return of premium ROLL = 5% compound roll-up, frozen at age 80 MAV = annual ratchet (maximum anniversary value), frozen at age 80 GMDB_10 = 10-year rollover contract
GMMB & GMSB descriptions	▪ FIXED = fixed maturity date ▪ GMSB_10 = 10-year guaranteed surrender benefit ▪ GMMB_10 = 10-year rollover maturity benefit
***GV* adjustment on withdrawal**	"Pro-Rata by Market Value" and "Dollar-for-Dollar" are tested separately.
Surrender charges	Ignored (i.e., zero).
Base policy lapse rate	6% p.a. at all policy durations. See also "Dynamic Lapse Multiplier."
Partial withdrawals	Flat 4% p.a. at all policy durations (as a % of *AV*). No dynamics.
Rollover (renewal) rate	85% at the end of each 10-year term (GMDB_10 and GMMB_10 only).
Dynamic lapse multiplier	Actual lapse rate = $\lambda \times$ [Base policy lapse rate], where: $\lambda = MIN\left[\lambda^{+}, MAX\left[\lambda^{-}, \left[a + b \times \left(\frac{VG}{VC}\right)\right] \times \left[c + d \times MIN(h,T)\right]\right]\right]$ λ^{+} = 1.6667, λ^{-} = 0.3333, a = –0.0952, b = 0.8010, c = 0.6279, d = 0.0654, h = 10 and T = time-to-next maturity.
Mortality	100% of CIA 1986-92 ALB Male Aggregate Ultimate.
Fixed expenses, annual fees	Ignored (i.e., zero).
Discount Rate	5.5% annual effective (non-dynamic).
Elective reset of *GV*	Whenever the *AV*/*GV* ratio exceeds 115% (maximum 2 resets per year). No resets are permitted in the 10 years prior to the final "contract" maturity date.
In-the-money surrender (GMSB_10 only)	Whenever the benefit is payable (i.e., 10 years after issue or last reset) and the *AV*/*GV* ratio is less than 85%.

Notes on factor development

- The GMDB roll-up is compounded (not simple interest, not stepped at each anniversary) and is applied to the previous roll-up guaranteed value.

- The base policy lapse rate is the rate of policy termination (surrenders). Policy terminations (surrenders) are assumed to occur throughout the policy year (not only on anniversaries).
- Partial withdrawals are assumed to occur at the end of each time period (quarterly).
- Account charges ("MER") represent the total amount (annualized, in basis points) assessed against policyholder funds (e.g., sum of investment management fees, mortality and expense charges, risk premiums, policy/administrative fees, etc.). They are assumed to occur throughout the policy year (not only on anniversaries).
- For the GMDB_10 and GMMB_10 products, the contract rolls over (renews) at the end of each 10-year term for another 10 years. The guaranteed benefit resets to Z% of AV (after payment of any top-up maturity benefit for in-the-money maturity guarantees) where Z is typically 75 or 100.
- The guaranteed minimum surrender benefit (GMSB_10) applies 10 years after contract issue. If the 10-year guaranteed value is higher than the account value, a "top-up" benefit is paid upon policy surrender.

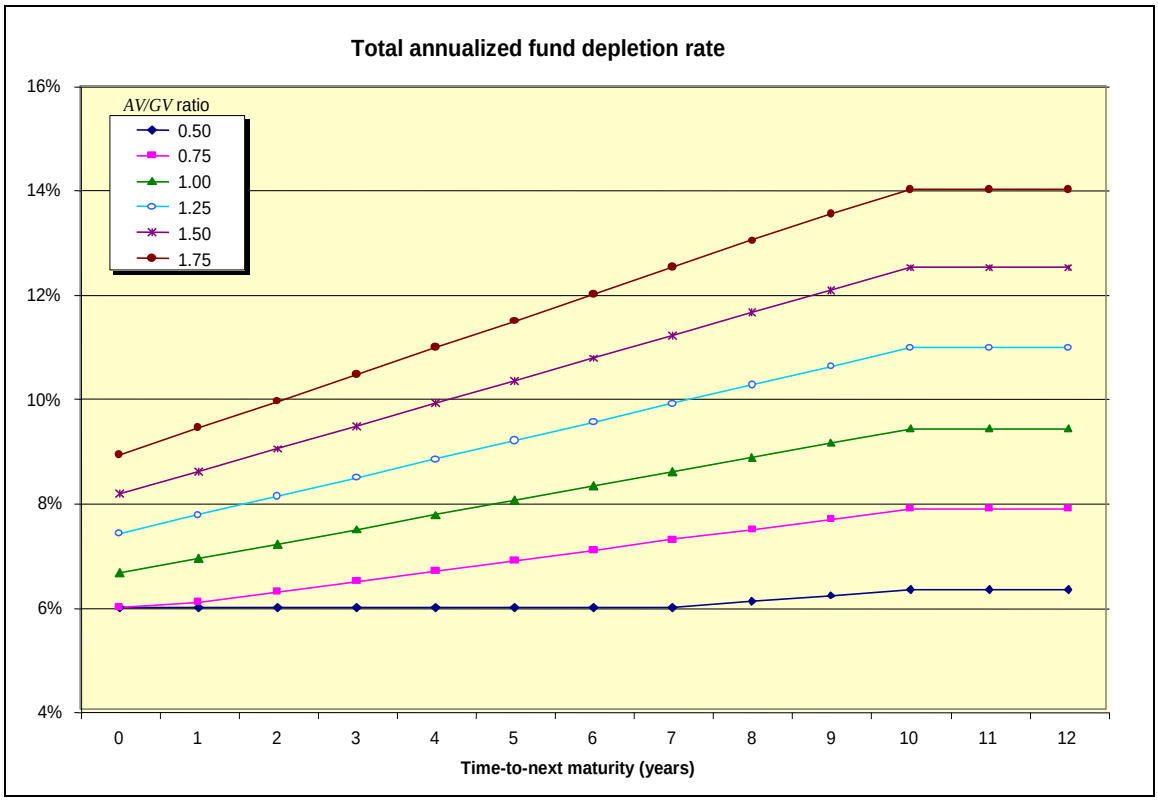
TABLE 2

Account-based fund charges (bps per annum)

Asset class / fund	Account value charges (*MER*)
Money market	110
Fixed income (bond)	200
Balanced	250
Low volatility equity	265
Broad-based diversified equity	265
Intermediate risk equity	280
Aggressive or exotic equity	295

The annualized total fund depletion rates (i.e., including the fixed 4% per annum partial withdrawal) are illustrated in Figure 1 for various *AV*/*GV* ratios and times to maturity.

Diagram 1: Fund depletion rates (lapse + partial withdrawal) by *AV/GV* ratio and time-to-maturity



6.1.1.3 Step 1 - Classifying the asset exposure

The following criteria should be used to select the appropriate factors, parameters and formulas for the exposure represented by a specified guaranteed benefit. When available, the volatility of the long-term annualized total return for the fund(s) – or an appropriate benchmark – should conform to the limits presented. For this purpose, "long-term" is defined as twice the average projection period that would be applied to test the product in a stochastic model (generally, at least 25 years).

Where data for the fund or benchmark are too sparse or unreliable, the fund exposure should be moved to the next higher volatility class than otherwise indicated. In reviewing the asset classifications, care should be taken to reflect any additional volatility of returns added by the presence of currency risk, liquidity (bid-ask) effects, short selling and speculative positions.

All exposures/funds must be categorized into one of the following seven (7) asset classes:

1. Money market
2. Fixed income

3. Balanced
4. Low volatility equity
5. Broad-based diversified equity
6. Intermediate risk equity
7. Aggressive or exotic equity

Money market/short-term. The fund is invested in money market instruments with an average remaining term-to-maturity of less than 365 days.

Fixed income. The fund is invested primarily in investment grade fixed-income securities. Up to 25% of the fund within this class may be invested in diversified equities or high-yield bonds. The expected volatility of the fund returns will be lower than the Balanced fund class.

Balanced. This class is a combination of fixed-income securities with a larger equity component. The fixed-income component should exceed 25% of the portfolio. Additionally, any aggressive or "specialized" equity component should not exceed one-third (33.3%) of the total equities held. Should the fund violate either of these constraints, it should be categorized as an equity fund. These funds usually have a long-term volatility in the range of 8% - 13%.

Low volatility equity. This fund is comparable to the broad-based diversified equity class with the additional attributes noted below. Only funds that otherwise would be classified as broad-based diversified equity are candidates for this fund classification. For foreign funds, volatility should take into account the impact of currency fluctuations.

The expected volatility of the fund should be less than 15.5% (annualized) and the aggressive/exotic equity component of the equity holdings should be less than 33.3% of the total equities by market value. Further, the overall asset holdings should satisfy at least one of the following conditions:

- The fund permanently maintains a relatively large cash or fixed-income position (greater than 10% of the market value of assets) as part of its investment strategy.
- The fund is "income" oriented and contains a significant (greater than 10% of the market value of assets) proportion of stocks paying material and regular dividends that are automatically reinvested in the fund.

Broad-based diversified equity. The fund is invested in a well-diversified mix of Canadian, U.S. or global equities. The foreign equity component must consist of liquid securities in well-developed markets. Funds in this category would exhibit long-term volatility comparable to that of the TSX. These funds should usually have a long-term volatility in the range of 13% - 19%.

Intermediate risk equity. The fund has a mix of characteristics from both the Diversified and Aggressive equity classes. These funds have a long-term volatility in the range of 19% - 25%.

Aggressive or exotic equity. This class comprises more volatile funds where risk can arise from: (a) underdeveloped markets, (b) uncertain markets, (c) high volatility of returns, (d) narrow focus (e.g., specific market sector), etc. Generally speaking, the fund (or market benchmark) either does not have sufficient history to allow for the calculation of a long-term expected volatility, or the volatility is very high. This class would be used whenever the long-term expected annualized volatility is indeterminable or exceeds 25%.

Selecting appropriate investment classes. The selection of an appropriate investment type should be done at the level for which the guarantee applies. For guarantees applying on a deposit-by-deposit basis, the fund selection is straightforward. However, where the guarantee applies across deposits or for an entire contract, the approach can be more complicated. In such instances, the approach is to identify for each policy where the "grouped holdings" fit within the categories listed and to classify the associated assets on this basis.

A seriatim process is used to identify the "grouped" fund holdings, to assess the risk profile of the current fund holdings (possibly calculating the expected long-term volatility of the funds held with reference to the indicated market proxies) and to classify the entire 'asset exposure' into one of the specified choices. Here, 'asset exposure' refers to the underlying assets (segregated and/or general account investment options) on which the guarantee will be determined. For example, if the guarantee applies separately for each deposit year within the contract, then the classification process would be applied separately for the exposure of each deposit year.

In summary, mapping the benefit exposure (i.e., the asset exposure that applies to the calculation of the guaranteed minimum benefits) to one of the prescribed asset classes is a multistep process:

1. Map each separate and/or general account investment option to one of the prescribed asset classes. For some funds, this mapping will be obvious, but for others it will involve a review of the fund's investment policy, performance benchmarks, composition and expected long-term volatility.

2. Combine the mapped exposure to determine the expected long-term volatility of current fund holdings. This will require a calculation based on the expected long-term volatilities for each fund and the correlations between the prescribed asset classes as given in Table 3 (page 100).

3. Evaluate the asset composition and expected volatility (as calculated in step 2) of current holdings to determine the single asset class that best represents the exposure, with due consideration to the constraints and guidelines presented earlier in this section.

In **Step 1**, the insurer should use the fund's actual experience (i.e., historical performance, inclusive of reinvestment) only as a guide in determining the expected long-term volatility. Due to limited data and changes in investment objectives, style and/or management (e.g., fund mergers, revised investment policy, different fund

managers, etc.), the insurer may need to give more weight to the expected long-term volatility of the fund's benchmarks. In general, the insurer should exercise caution and not be overly optimistic in assuming that future returns will consistently be less volatile than the underlying markets.

In **Step 2**, the insurer should calculate the "volatility of current fund holdings" (σ for the exposure being categorized) by the following formula using the volatilities and correlations in Table 3.

$$\sigma = \sqrt{\sum_{i=1}^{n}\sum_{j=1}^{n} w_i w_j \rho_{ij} \sigma_i \sigma_j}$$

where

- $w_i = \frac{AV_i}{\sum_k AV_k}$ is the relative value of fund *i* expressed as a proportion of total contract value;
- ρ_{ij} is the correlation between asset classes *i* and *j*;
- σ_i is the volatility of asset class *i* (see Table 3).

TABLE 3

Volatilities and correlations for prescribed asset classes

ANNUAL VOLATILITY		GENERAL ACCOUNT	MONEY MARKET	FIXED INCOME	BALANCED	LOW VOLATILITY EQUITY	DIVERSE EQUITY	INTERM EQUITY	AGGRESSIVE EQUITY
1%	**GENERAL ACCOUNT**	**1**	0.50	0.15	0	0	0	0	0
1%	**MONEY MARKET**	0.50	**1**	0.20	0	0	0	0	0
6%	**FIXED INCOME**	0.15	0.20	**1**	0.50	0.25	0.25	0.20	0.10
11%	**BALANCED**	0	0	0.50	**1**	0.80	0.95	0.75	0.65
15%	**LOW VOLATILITY EQUITY**	0	0	0.25	0.80	**1**	0.80	0.75	0.65
17%	**DIVERSE EQUITY**	0	0	0.25	0.95	0.80	**1**	0.75	0.65
22%	**INTERM EQUITY**	0	0	0.20	0.75	0.75	0.75	**1**	0.70
26%	**AGGRESSIVE EQUITY**	0	0	0.10	0.65	0.65	0.65	0.70	**1**

As an example, suppose three funds (fixed income, diversified equity and aggressive equity) are offered to clients on a product with a contract level guarantee (i.e., across all funds held within the policy). The current fund holdings (in dollars) for five sample contracts are shown in Table 4.

TABLE 4

Fund categorization example

	1	2	3	4	5
MV Fund X (fixed income):	5,000	6,000	8,000	-	5,000
MV Fund Y (diversified equity):	9,000	5,000	2,000	5,000	-
MV Fund Z (aggressive equity):	1,000	4,000	-	5,000	5,000
Total market value:	$15,000	$15,000	$10,000	$10,000	$10,000
Total equity market value:	$10,000	$9,000	$2,000	$10,000	$5,000
Fixed income % (*A*):	33%	40%	80%	0%	50%
Fixed income test (*A*>75%):	No	No	Yes	No	No
Aggressive % of equity (*B*):	10%	44%	n/a	50%	100%
Balanced test (*A*>25% and *B*<33.3%):	Yes	No	n/a	No	No
Volatility of current fund holdings:	12.0%	12.1%	6.5%	19.6%	13.6%
Fund classification:	**Balanced**	**Diversified**[59]	**Fixed Income**	**Intermediate**	**Diversified**

[59] Although the volatility suggests “balanced fund,” the balanced fund criteria were not met. Therefore, this ‘exposure’ is moved “up” to diversified equity. For those funds classified as diversified equity, additional analysis would be required to assess whether they can be reclassified as “low volatility equity.” In the examples above, none qualify.

The "Volatility of Fund Holdings" for policy #1 is calculated as $\sqrt{A+B} = 12.04\%$

where

$$A = \left(\frac{5}{15} \times 0.06\right)^2 + \left(\frac{9}{15} \times 0.17\right)^2 + \left(\frac{1}{15} \times 0.26\right)^2$$
$$= 1{,}1104\%$$
$$B = 2 \cdot \left(\frac{5}{15} \cdot \frac{9}{15}\right)(0.25 \times 0.06 \times 0.17) + 2 \cdot \left(\frac{5}{15} \cdot \frac{1}{15}\right)(0.10 \times 0.06 \times 0.26) + 2 \cdot \left(\frac{9}{15} \cdot \frac{1}{15}\right)(0.65 \times 0.17 \times 0.26)$$
$$= 0.3388\%$$

Importantly, the volatility would be understated if we assumed zero correlation (e.g., all market returns are independent) since *B* contributes materially to the final value.

6.1.1.4 Step 2 - Determining the risk attributes

The 'Tabular' approach for the *TGCR* component creates a multidimensional grid (array) by testing a very large number of combinations for the policy attributes. The results are expressed as factors. The *TGCR* is calculated by looking into (based on a "key") the large, pre-computed multidimensional tables and using multidimensional linear interpolation. The lookup "key" depends on the risk attributes for the policy, defined as:

$$\tilde{\theta} = (P, G, A, F, X, M, T, \phi, \Delta, R, S)$$

where

- ϕ is the *AV*/*GV* ratio for the benefit exposure under consideration;
- Δ is the "*MER* Delta";
- *R* is the utilization rate of the elective reset option (if applicable);
- *S* is the "in-the-money" termination rate on GMSB_10 policies.

The "*MER* Delta" is calculated based on the difference between the actual *MER* and that assumed in the factor testing (see Table 2, page 95), subject to a cap (floor) of 100 bps (-100 bps). See Table 5 (page 106) for more details.

For GMDB, there are 4 × 2 × 2 × 7 × 4 × 4 × 5 × 7 × 3 × 2 = 376,320 "nodes" in the "Basic factor" grid. Interpolation will only be permitted across the six (6) dimensions: Contract maturity age (*M*), Attained age (*X*), Time to next maturity (*T*), *AV*/*GV* Ratio (ϕ), *MER* Delta (Δ) and Reset utilization rate (*R*). The "In-the-money" termination rate (*S*) is not used for GMDBs.

For GMMB, there are $3 \times 2 \times 2 \times 7 \times 1 \times 7 \times 5 \times 7 \times 3 \times 2 \times 2 = 246{,}960$ "nodes" in the "Basic factor" grid. Interpolation will only be permitted across the six (6) dimensions: Contract maturity age (*M*), Time to next maturity (*T*), *AV*/*GV* Ratio (ϕ), *MER* Delta (Δ), Reset utilization rate (*R*) and "In-the-money" termination rate (*S*). The "In-the-money" termination rate (S) only applies to the "GMSB_10" product form. The testing for guaranteed minimum maturity and surrender benefits assumed all lives attained age 55 at the calculation date.

Functions are available to assist the insurer in applying the *TGCR* methodology. More fully described in step 4 (refer to Section 0), these functions perform the necessary factor table lookups and associated multidimensional linear interpolations. If the insurer is unable to use the supplied functions, it will be required to develop its own. In such a case, the insurer should contact the AMF for specific details.

The GMDB and GMMB/GMSB factors are respectively contained in the files "GMDBFactors_CTE95.csv" and "GMMBFactors_CTE95.csv." These are comma-separated value text files where each "row" represents the factors for a test policy as identified by its lookup key. Rows are terminated by new line and line feed characters. Factors are also provided at the CTE80 confidence level – the factor files are "GMDBFactors_CTE80.csv" and "GMMBFactors_CTE80.csv." For the determination of capital requirements, the "GMDBFactors_CTE95.csv" and "GMMBFactors_CTE95.csv" factors are to be used.

Each row in the factor tables consists of three entries, described further below.

1	2	3
Test case identifier (key)	Basic cost or diversification factor	Basic margin offset factor or zero (n/a)

An individual test case (i.e., a node on the multidimensional matrix of factors) can be uniquely identified by its key, which is the concatenation of the relevant individual policy attribute keys (or some subset thereof) prefixed by a leading "factor code." The factor codes are shown below:

Factor code	Description
1	Basic GMDB "cost" and "margin offset" factors
2	Basic GMMB and GMSB "cost" and "margin offset" factors
3	Asset mix diversification factors for GMDB options
4	Asset mix diversification factors for GMMB and GMSB options
5	Time diversification factors for GMDB options
6	Time diversification factors for GMMB and GMSB options

Basic cost factor - This is the term $f(\circ)$ in the formula for TGCR. The values in the factor grid represent CTE95 (or CTE80) of the sample distribution[60] for the present value of guaranteed minimum benefit cash flows (in excess of account value) in all future years (i.e., to the earlier of contract maturity and 30 years), normalized by current guaranteed value.[61] The policy attribute keys for the cost factors are shown in Table 5 (page 106).

Basic margin offset factor - This is the term $g(\circ)$ in the formula for TGCR. The values in the factor grid represent CTE95 (or CTE80) of the sample distribution for the present value of margin offset cash flows in all future years (i.e., to the earlier of contract maturity and 30 years), normalized by current account balance. The basic margin offset factors assume $\hat{\alpha} = 100$ basis points of "margin offset" (net spread available to fund the guaranteed benefits). The policy attribute keys for the margin offset factors are shown in Table 5 (page 106).

Asset mix diversification factor - This is the term $h(\circ)$ in the formula for *TGCR*. $h(\circ) = h(P, G, R, S)$ is an adjustment factor that reflects the benefits of fund diversification (asset mix) at the insurer (i.e., total portfolio) level. Note that $h(\circ) \leq 1$ depends on product form "*P*," guarantee level "*G*," reset utilization rate "*R*" (where applicable) and "in-the-money" termination rate "*S*" (GMSB only). The lookup keys for the asset mix diversification factors are given in Table 6 (page 107).

DF should be set equal to 1 in the *GetCost* and *GetTGCR* functions (see page 113).

[60] Technically, the sample distribution for "present value of net cost" = PV[benefit claims] – PV[Margin offset] was used to determine the scenario results that comprise the CTE95 risk measure. Hence, the "cost factors" and "base margin offset factors" are calculated from the same scenarios.

[61] In other words, the basic cost factors are expressed "per $1 of current guaranteed benefit" and the margin offset factors are "per $1 of account balance," assuming 100 basis points (per annum) of available spread.

Time diversification factor - This is the term $w(\circ)$ in the formula for *TGCR*. $w(\circ) = w(P, G, F, R, S)$ is an adjustment factor that attempts to capture the benefits (i.e., net reduction in guaranteed benefit costs) of a dispersed maturity profile. This adjustment applies to maturity benefit factors only; it does not apply to death benefit factors. Note that $w(\circ) \leq 1$ also depends on fund class "*F*." If the insurer does not satisfy the time diversification criteria, then $w(\circ) = 1$ (i.e., no time diversification benefit). Although the structure permits otherwise, the time diversification factors for GMDB are set to 1. The lookup keys for the time diversification factors are given in Table 7 (page 107).

This factor is set either to 0 or 1 based on the results of a time diversification test.

To perform the test, the in-force maturity dates for each product/maturity guarantee form are grouped by "quarter-to-maturity" (i.e., 1, 2… *N*). For limited-term contracts that offer the client the opportunity to renew ("rollover"), the next maturity date should be used (not final contract maturity). Using current market value (at the calculation date), the current market value in each future 3-month time period is determined.

If the current market value in any given quarter exceeds 10% of the total, then the portfolio fails the test. If the current market value in each quarter is less than or equal to 10% of the total, the portfolio passes the test. If the portfolio fails the test, *DT* is set equal to 0 in the *GetCost* and *GetTGCR* functions (see page 113). Otherwise, *DT* is set equal to 1.

TABLE 5

Nodes of the cost and margin offset factor grids

Policy attribute		Key: Possible values and description
Product definitions, *P*.	**GMDB**	0: Return-of-premium. 1: Roll-up (5% per annum). 2: Maximum anniversary value (MAV). 3: 10-year rollover.
	GMMB & GMSB	0: Fixed maturity date. 1: 10-year CSV (benefit paid on surrender). 2: *Not used.* 3: 10-year rollover.
Guarantee level (% of deposits), *G*.		0: 75% 1: 100%
GV adjustment upon partial withdrawal, *A*.		0: Pro-rata by market value. 1: Dollar-for-dollar.
Fund class, *F*.		0: *Not used.* 1: Money market. 2: Fixed income (bond). 3: Balanced asset allocation. 4: Low volatility equity. 5: Diversified equity. 6: Intermediate risk equity. 7: Aggressive/exotic equity.
Contract maturity age, *M*. (years from valuation date)	**GMDB**	0: 5 years 1: 15 years 2: 25 years 3: 30 years
	GMMB & GMSB	0: 1 year 1: 3 years 2: 5 years 3: 8 years 4: 10 years 5: 20 years 6: 30 years
Attained age (last birthday), *X*.	**GMDB**	0: 35 1: 55 2: 65 3: 75
	GMMB & GMSB	0: 55
Time to next maturity, *T*. (years from valuation date)		0: 1 year 1: 3 years 2: 5 years 3: 8 years 4: 10+ years
Account value-to-guaranteed value ratio, ϕ.		0: 0.25 1: 0.50 2: 0.75 3: 1.00 4: 1.25 5: 1.50 6: 2.00
Annualized account charge differential from Table 2 assumptions in page ("*MER* Delta"), Δ		0: −100 bps 1: 0 bps 2: +100 bps
Reset utilization rate, *R*.		0: 0% 1: 100%
"In-the-money" surrender rate (GMSB only), *S*.		0: 0% 1: 100%

It is important to note that the lookup keys for the factor tables define certain values differently from the parameters (arguments) passed to the lookup/retrieval functions, as indicated in the following table. More details are provided in step 4 (refer to Section 0).

Policy attribute	Key interpretation	Function arguments
Contract maturity age, *M*	Years from valuation date. Equal to [Contract maturity age] less [Attained age].	Actual contract maturity age.
AV/GV ratio, ϕ	Ratio of current Account Balance (*AV*) to Guaranteed Value (*GV*).	*AV* and *GV* are provided separately.
MER Delta, Δ	[Actual *MER*] less [Assumed *MER*], in basis points. The "Assumed *MER*s" are shown in Table 2 (page 95).	*MER* (annualized, in basis points p.a.) is passed directly.

TABLE 6

Nodes of the asset mix diversification factor grid

Policy attribute		Key : Possible values and description
Product definitions, *P*.	**GMDB**	0: Return-of-premium. 1: Roll-up (5% per annum). 2: Maximum anniversary value (MAV). 3: 10-year rollover.
	GMMB & GMSB	0: Fixed maturity date. 1: 10-year CSV (benefit paid on surrender). 2: *Not used.* 3: 10-year rollover.
Guarantee level (% of deposits), *G*.		0: 75% 1: 100%
Reset utilization rate, *R*.		0: 0% 1: 100%
"In-the-money" surrender rate (GMSB only), *S*.		0: 0% 1: 100%

TABLE 7

Nodes of the time diversification factor grid

Policy attribute		Key : Possible values and description
Product definitions, *P*.	**GMDB**	0: Return-of-premium. 1: Roll-up (5% per annum). 2: Maximum anniversary value (MAV). 3: 10-year rollover.
	GMMB & GMSB	0: Fixed maturity date. 1: 10-year CSV (benefit paid on surrender). 2: *Not used.* 3: 10-year rollover.
Guarantee level (% of deposits), *G*.		0: 75% 1: 100%
Fund class, *F*.		0: *Not used.* 1: Money market. 2: Fixed income (bond). 3: Balanced asset allocation. 4: Low volatility equity. 5: Diversified equity. 6: Intermediate risk equity. 7: Aggressive/exotic equity.
Reset utilization rate, *R*.		0: 0% 1: 100%
"In-the-money" surrender rate (GMSB only), *S*.		0: 0% 1: 100%

6.1.1.5 Step 3 - Retrieving the appropriate nodes

Table 8 provides some sample lookup keys (assuming the annualized fund-based charges equal the base assumption, hence $\Delta = 0$), while Table 9 shows the "basic cost" and "basic margin offset" values from the factor grid for sample GMDB and GMMB policies. All sample policies in Table 9 use a 100% guarantee level, base *MER*s and no resets. As mentioned earlier, the base margin offset factors (in the tables) assume 100 basis points of "available spread." The "margin offset factors" are therefore scaled by the ratio $\frac{\alpha}{100}$, where α = the actual margin offset (in basis points per annum) for the policy being valued. Hence, the margin factor for the 7th policy is exactly half the factor for node "11105214210" (the 4th sample policy in Table 9), that is, 0.02093 = 0.5 × 0.04187.

Where more than one feature (i.e., guaranteed benefit) is present in a product, unless the insurer has a justifiable alternative for allocating the total available spread between the benefit types (e.g., explicitly defined risk charges), the split should be based on the proportionate gross guaranteed benefit costs. An example of this allocation is provided in Section 0.

TABLE 8

Sample lookup keys

KEY	NODE TYPE	PRODUCT / *GV*%	*GV* ADJUST.	FUND CLASS	ATT. AGE / MAT. AGE	NEXT MATURITY	AV/GV	RESET UTIL.%	ITM TERM%
1010321 4110	A	GMDB-ROP / 100%	Pro-rata	Balanced allocation	65 / 80	10+	50%	0%	n/a
2001504 44110	A	GMMB-fixed / 75%	$-for-$	Diverse equity	55 / 75	5	125%	100%	n/a
3311	B	GMDB_10 / 100%	n/a	n/a	n/a	n/a	n/a	100%	n/a
43100	B	GMDB_10 / 100%	n/a	n/a	n/a	n/a	n/a	0%	n/a
611411	C	GMSB_10 / 100%	n/a	Low Vol. Equity	n/a	n/a	n/a	100%	100%

A = Basic cost and Margin offset factors; B = Asset mix diversification factors; C = Time diversification factors.

TABLE 9

Sample nodes on the basic factor grids

KEY	PRODUCT	*GV* ADJUST.	FUND CLASS	ATT. AGE / MAT. AGE	NEXT MAT.	*AV/GV*	OFFSET	COST FACTOR	MARGIN FACTOR
10113124310	GMDB ROP	$-for-$	Balanced allocation	55 / 80	10+	1.00	100	0.01802	0.05762
10113214310	GMDB ROP	$-for-$	Balanced allocation	65 / 80	10+	1.00	100	0.03926	0.04747
10113302310	GMDB ROP	$-for-$	Balanced allocation	75 / 80	5	1.00	100	0.04443	0.02653
11105214210	GMDB 5% rollup	Pro-rata	Diverse equity	65 / 80	10+	0.75	100	0.16780	0.04187
11105214310	GMDB 5% rollup	Pro-rata	Diverse equity	65 / 80	10+	1.00	100	0.13091	0.04066
11105214410	GMDB 5% rollup	Pro-rata	Diverse equity	65 / 80	10+	1.25	100	0.09925	0.03940
11105214210	GMDB 5% rollup	Pro-rata	Diverse equity	65 / 80	10+	0.75	50	0.16780	0.02093
231050513100	GMMB_10	Pro-rata	Diverse equity	55 / 75	3	1.00	100	0.32250	0.05609
231050523100	GMMB_10	Pro-rata	Diverse equity	55 / 75	5	1.00	100	0.25060	0.05505
231050533100	GMMB_10	Pro-rata	Diverse equity	55 / 75	8	1.00	100	0.16758	0.05545

6.1.1.6 Step 4 - Using the supplied functions to determine the requirement

Special functions have been supplied in the file SegFundFactorCalc.dll (C++ dynamic linked library) to retrieve the "cost," "margin offset" and "diversification" factors from the factor files and perform the multidimensional linear interpolation. Cover functions in the Microsoft® Visual Basic "Add-In" are provided in the file AMFFactorCalc.xla so that the C++ routines are callable from Microsoft Excel through VBA.[62] The function arguments are described in Table 10. Not all parameters apply to all functions (i.e., some are optional and/or not applicable). The keys for the input parameters are given in Table 5 (page 106).

Installation instructions are given in Section 0.

[62] Visual Basic for Applications.

TABLE 10

Input parameters (arguments) to supplied lookup/retrieval functions

Input parameter – Variable name	Variable type	Description
B – BenefitType	Long integer	Benefit type code (1=GMDB, 2=GMMB/GMSB).
P – ProductCode	Long integer	Product definition code.
G – GuarCode	Long integer	Guarantee level code.
A – GVAdjustCode	Long integer	*GV* adjustment upon partial withdrawal.
F – FundCode	Long integer	Fund class code.
M – FinalMatAge	Floating point double	Contract maturity age of annuitant (in years).
X – AttainedAge	Floating point double	Attained age of annuitant (in years).
T – TimeToMat	Floating point double	Time to next maturity date (in years).
AVGV – MVGV	Floating point double	Ratio of account balance to guaranteed value (*AV*/*GV*).
MER – MER	Floating point double	Total equivalent account charges (annualized, in bps).
R – ResetUtil	Floating point double	Reset utilization rate (from 0 to 1).
S – SurrenderUtil	Floating point double	"In-the-money" termination rate (from 0 to 1).
RC – RiskCharge	Floating point double	Margin offset (annualized, in basis points).
AV– AccountValue	Floating point double	Current account balance, in dollars.
GV – GuarValue	Floating point double	Current guaranteed value, in dollars.
DF – FundDivAdj	Floating point double	The fraction of the asset mix diversification adjustment reflected in the adjusted cost factor (from 0 to 1).
DT – TimeDivAdj	Floating point double	The fraction of the time diversification adjustment reflected in the adjusted cost factor (from 0 to 1).

See page 105 for instructions on setting the parameters for *DF* and *DT*.
Using the notation given earlier,

$$TGCR = GV \times h(\circ) \times w(\circ) \times [basic\ \cos t\ \ factor\ ] - \frac{\alpha}{100} \times AV \times [basic\ margin\ factor]$$

$$= GV \times h(\circ) \times w(\circ) \times f(\tilde{\theta}) - \frac{\alpha}{100} \times AV \times g(\tilde{\theta})$$

$$= GV \times \hat{f}(\tilde{\theta}) - AV \times \hat{g}(\tilde{\theta})$$

$$= \hat{F}(\tilde{\theta}) - \hat{G}(\tilde{\theta})$$

The VBA functions are:

GetCost(B, P, G, A, F, M, X, T, AV, GV, MER, R, S, RC, DF, DT)

Returns the *adjusted dollar cost* $\hat{F}\left(\tilde{\theta}\right)$, interpolating between nodes where necessary. *S* and *RC* are required arguments, but *RC* is ignored in the calculations (i.e., the margin offset does not affect the "cost" component). Also, *S* is ignored for GMDB calculations (i.e., *S* = 0 if *B* = 1). *DF* and *DT* are optional, but assumed to be zero if not supplied.

GetMargin(B, P, G, A, F, M, X, T, AV, GV, MER, R, S, RC, DF, DT)

Returns the *adjusted dollar margin offset* $\hat{G}\left(\tilde{\theta}\right)$, interpolating between nodes where necessary. *S* is required, but ignored for GMDB calculations (i.e., *S* = 0 if *B* = 1). *DF* and *DT* are optional, but ignored regardless (i.e., the diversification factors only apply to the "cost" component).

GetTGCR(B, P, G, A, F, M, X, T, AV, GV, MER, R, S, RC, DF, DT)

Returns the *adjusted dollar TGCR* $= \hat{F}\left(\tilde{\theta}\right) - \hat{G}\left(\tilde{\theta}\right)$, interpolating between nodes where necessary. *S* is required, but ignored for GMDB calculations (i.e., *S* = 0 if *B* = 1). *DF* and *DT* are optional, but assumed to be zero if not supplied.

To retrieve the *basic cost factor* $f\left(\tilde{\theta}\right)$, simply use the function *GetCost* with *AV* = *AV*/*GV*, *GV* = 1 and *DF* = *DT* = 0. Similarly, the *basic margin factor* $g\left(\tilde{\theta}\right)$ may be obtained by calling

GetMargin with GV = GV/AV, AV = 1 and RC = 100

For reference, the underlying C++ routines are listed below. These tools are also available as VBA functions where the name is prefixed with an "x" (e.g., xGetGMDBCostFactor).

GetGMDBCostFactor(P, G, A, F, M, X, T, AVGV, MER, R)

Returns the GMDB *basic cost factor* $f\left(\tilde{\theta}\right)$, interpolating between nodes where necessary.

GetGMDBMarginFactor(P, G, A, F, M, X, T, AVGV, MER, R, RC)

Returns the GMDB *scaled margin offset factor* $\hat{g}\left(\tilde{\theta}\right)$, interpolating between nodes where necessary. In this case, the basic (i.e., tabular) margin offset factor has already been

scaled by the ratio $\frac{\alpha}{100}$ to account for the actual available spread. To extract the tabular factor $g\left(\tilde{\theta}\right)$, use *RC* = 100.

GetGMDBFundDiversification(P, G, R)

Returns the GMDB *asset mix diversification factor* $h\left(\tilde{\theta}\right)$, interpolating between nodes where necessary.

GetGMDBTimeDiversification(P, G, F, R)

Returns the GMDB *time diversification factor* $w\left(\tilde{\theta}\right)$, interpolating between nodes where necessary. Currently, $w\left(\tilde{\theta}\right)=1$ for all nodes, so this function call is unnecessary for GMDB.

GetGMMBCostFactor(P, G, A, F, M, X, T, AVGV, MER, R, S)

Returns the GMMB/GMSB *basic cost factor* $f\left(\tilde{\theta}\right)$, interpolating between nodes where necessary.

GetGMMBMarginFactor(P, G, A, F, M, X, T, AVGV, MER, R, S, RC)

Returns the GMMB/GMSB *scaled margin offset factor* $\hat{g}\left(\tilde{\theta}\right)$, interpolating between nodes where necessary. In this case, the basic (i.e., tabular) margin offset factor has already been scaled by the ratio $\frac{\alpha}{100}$ to account for the actual available spread. To extract the tabular factor $g\left(\tilde{\theta}\right)$, use *RC* = 100.

GetGMMBFundDiversification(P, G, R, S)

Returns the GMMB/GMSB *asset mix diversification factor* $h\left(\tilde{\theta}\right)$, interpolating between nodes where necessary.

GetGMMBTimeDiversification(P, G, F, R, S)

Returns the GMMB/GMSB *time diversification factor* $w\left(\tilde{\theta}\right)$, interpolating between nodes where necessary.

6.1.1.7 Installing and using the AMF factor calculation routines

The files shown in Table 11 comprise the "AMF factor calculation" tools, supplied by the AMF to assist the insurer in calculating the *TGCR* for GMDB, GMMB and GMSB options.

TABLE 11

AMF factor calculation tools – required files

File name	Description
Setup.exe	Windows® setup program to unzip and install the calculation tools.
AMFFactorCalc.xla	Microsoft® Excel Visual Basic Add-In. This functionality 'wraps' the C++ routines, allowing them to be called directly from Microsoft Excel workbooks (i.e., can be invoked the same way as built-in Excel functions).
SegFundFactorCalc.dll	The C++ dynamic linked library that contains the lookup and interpolation functions as described in Section 0.
GMDBFactors_CTE95.csv GMMBFactors_CTE95.csv	Comma-separated value (flat text) files containing the factors and parameters described in step 2 (refer to Section 0). Each "row" in the file corresponds to a test policy as identified by the lookup keys shown in Table 5 (page 106). Each row consists of three (3) entries and is terminated by new line and line feed characters. See step 2 (refer to Section 0) for more details. Files are also provided at the CTE80 confidence level.

Installing the AMF factor calculation routines

Run the setup utility and follow the instructions. This will unzip (decompress) the files and register the DLL in the Windows program registry.

Using the AMF factor calculation routines

1. Open "AMFFactorCalc.xla" from Microsoft® Excel.

2. When the dialog box appears, select the appropriate CTE confidence level for calculation (either CTE95 or CTE80). This controls which factor tables are read into memory. For a given workbook, only a single set of factor files can be accessed (i.e., either CTE80 or CTE95).

Notes on VBA functions

- The Microsoft® Add-In must be loaded (into Excel) before the VBA functions can be called.
- The factor files and the Microsoft® Excel Add-In (*.xla) must reside in the same folder.
- To view the VBA program, press [Alt-F11].
- A call to an Excel function (built-in or VBA) must be preceded by a "+" or "=" character.

6.1.1.8 Calculation example

In this example, it is assumed that the portfolio satisfies the criteria in order to apply the "Time diversification" factors. The policy/product parameters are specified in Table 12.

TABLE 12

Sample results for 10-year GMMB with elective resets, level ROP GMDB without resets

Parameter / Attribute	Value	Description and/or Notes
Account value (*AV*)	$90.00	Total account value at valuation date, in dollars.
Original deposit	$100.00	Original deposit, in dollars.
GMDB (*GV*)	$100.00	Current guaranteed death maturity benefit, in dollars.
GMMB (*GV*)	$100.00	Current guaranteed minimum maturity benefit, in dollars.
Guarantee level	100%	Initial guaranteed value as % of original deposit.
Gender	Female	Use 4-year age setback for *X* and *M* (GMDB only).
Actual attained age (*X*)	62	Attained age at the valuation date (in years).
Contract maturity age (*M*)	85	Contract maturity age (in years).
Time to next maturity (*T*), GMDB	23	Time to next maturity/rollover date (in years).
Time to next maturity (*T*), GMMB	3	Time to next maturity/rollover date (in years).
GV adjustment	Pro-rata	*GV* adjusted pro-rata by MV upon partial withdrawal.
Fund class	Diversified equity	Contract exposure mapped to diversified equity as per the Fund categorization instructions in step 1 (refer to Section 0).
MER	265	Total charge against policyholder funds (bps).

Parameter / Attribute	Value	Description and/or Notes
GMDB product code (*P*)	0	Product definition code as per lookup key in Table 5 (page 106).
GMMB product code (*P*)	3	Product definition code as per lookup key in Table 5 (page 106).
Guarantee level code (*G*)	1	Guarantee code as per key in Table 5 (page 106).
GV adjustment code (*A*)	0	*GV* adjustment upon partial withdrawal as per Table 5 (page 106).
Fund code (*F*)	5	Fund class code as per lookup key in Table 5 (page 106).
GMMB reset utilization (*R*)	0.35	Reset utilization rate (from 0 to 1).
"In-the-money" termination (*S*)	0	"In-the-money" termination rate (from 0 to 1).
Total allocated spread (*RC*)	80	Total margin offset (bps p.a.) for GMDB & GMMB combined.
Asset mix diversification (*DF*)	1	Credit for asset mix diversification.
Time diversification (*DT*)	1	Credit for time diversification (GMMB).

Using the notation from page 113,

$$TGCR = GV \times h(\circ) \times w(\circ) \times [basic\ \cos t\ \ factor\ ] - \frac{\alpha}{100} \times AV \times [basic\ margin\ factor]$$

$$= GV \times h(\circ) \times w(\circ) \times f(\tilde{\theta}) - \frac{\alpha}{100} \times AV \times g(\tilde{\theta})$$

$$= GV \times \hat{f}(\tilde{\theta}) - AV \times \hat{g}(\tilde{\theta})$$

$$= \hat{F}(\tilde{\theta}) - \hat{G}(\tilde{\theta})$$

$\hat{f}_{GMDB}(\tilde{\theta})$ = *GetCost*(1, 0, 1, 0, 5, 81, 58, 23, 0.9, 1, 265, 0, 0, 80, 1, 1)
= 0.04592

$\hat{f}_{GMMB}(\tilde{\theta})$ = *GetCost*(2, 3, 1, 0, 5, 85, 62, 3, 0.9, 1, 265, 0.35, 0, 80, 1, 1)
= 0.32849

In the absence of specific and well-defined risk charges for each guaranteed benefit, we allocate the total spread based on the claims cost and obtain (in bps per annum):

$\alpha_{GMDB} = \frac{0.04592}{(0.04592 + 0.32849)} \times 80 = 0.12264 \times 80 = 9.81$ basis points per annum available to fund the GMDB claims and $\alpha_{GMMB} = 80 - 9.81 = 70.19$ bps p.a. to fund GMMB payouts.

$\hat{F}_{GMDB}(\tilde{\theta})$ = *GetCost*(1, 0, 1, 0, 5, 81, 58, 23, 90, 100, 265, 0, 0, 9.81, 1, 1)
= \$4.59 = 0.04592 × \$100

$\hat{F}_{GMMB}(\tilde{\theta})$ = *GetCost*(2, 3, 1, 0, 5, 85, 62, 3, 90, 100, 265, 0.35, 0, 70.19, 1, 1)
= \$32.85 = 0.32849 × \$100

For reference, the *basic cost factors* (i.e., before diversification adjustments) are:

$f_{GMDB}(\tilde{\theta})$ = *GetCost*(1, 0, 1, 0, 5, 81, 58, 23, 0.9, 1, 265, 0, 0, 9.81)
= 0.04794

$f_{GMMB}(\tilde{\theta})$ = *GetCost*(2, 3, 1, 0, 5, 85, 62, 3, 0.9, 1, 265, 0.35, 0, 70.19)
= 0.36461

$g_{GMDB}(\tilde{\theta})$ = *GetMargin*(1, 0, 1, 0, 5, 81, 58, 23, 0.9, 1, 265, 0, 0, 100)
= 0.04697

$g_{GMMB}(\tilde{\theta})$ = *GetMargin*(2, 3, 1, 0, 5, 85, 62, 3, 0.9, 1, 265, 0.35, 0, 100)
= 0.06890

$\hat{G}_{GMDB}(\tilde{\theta})$ = *GetMargin*(1, 0, 1, 0, 5, 81, 58, 23, 90, 100, 265, 0, 0, 9.81)
= \$0.41 = 0.04697 × \$90 × $\left(\frac{9.81}{100}\right)$

$\hat{G}_{GMMB}(\tilde{\theta})$ = *GetMargin*(2, 3, 1, 0, 5, 85, 62, 3, 90, 100, 265, 0.35, 0, 70.19)
= \$4.35 = 0.06890 × \$90 × $\left(\frac{70.19}{100}\right)$

$TGCR_{GMDB}$ = *GetTGCR*(1, 0, 1, 0, 5, 81, 58, 23, 90, 100, 265, 0, 0, 9.81, 1, 1)
= \$4.18
= \$4.59 - \$0.41

$TGCR_{GMMB}$ = *GetTGCR*(2, 3, 1, 0, 5, 85, 62, 3, 90, 100, 265, 0.35, 0, 70.19, 1, 1)
= \$28.50
= \$32.85 - \$4.35

Finally, the *TGCR* for the policy is \$4.18 + \$28.50 = \$32.68

If desired, the asset mix and time diversification factors may be obtained through additional function calls by setting *DF* or *DT* to zero as required and solving for the other factor.

For example, if we set *DF* = 1 and *DT* = 0, we obtain for the GMMB component:

0.34307 = *GetCost*(2, 3, 1, 0, 5, 85, 62, 3, 0.9, 1, 265, 0.35, 0, 80, 1, 0)

However, with *DF* = 1 and *DT* = 1, we obtained $\hat{f}_{GMMB}(\tilde{\theta})$ = 0.32849 (see earlier in this section). Hence, the GMMB time diversification factor is equal to $0.9575 = \frac{0.32849}{0.34307}$.

6.1.1.9 Margin offset adjustment

The total equivalent account charge ("*MER*") is meant to capture all amounts that are deducted from policyholder funds, not only those that are commonly expressed as spread-based fees. The *MER* must include (but not be limited to) the following: investment management fees, mortality and expense charges, administrative loads, policy fees and risk premiums. It must be expressed as an equivalent annual basis point charge against account value. It may be necessary to estimate an equivalent *MER* if there are fees withdrawn from policyholder accounts that are not expressed as basis point charges against account value.

The margin offset, *α*, represents the total amount available to fund the guaranteed benefit claims and amortization of the unamortized surrender charge allowance after considering most other policy expenses (including overhead). The margin offset, expressed as an equivalent annual basis point charge against account value, should be deemed permanently available in all future scenarios. However, the margin offset should not include per policy charges (e.g., annual policy fees) since these are included in fixed expenses. It is often helpful to interpret the margin offset as $\alpha = MER - X$, where *X* is the sum of:

- Investment management expenses and advisory fees;
- Commissions, bonuses (dividends) and overrides;
- Maintenance expenses;
- Amounts required to amortize unamortized acquisition costs (net of available surrender charges).

6.1.1.10 Capital component

To obtain the capital component, the TGCR must be separately calculated for these two sets of policies:

Set 1: business written prior to January 1, 2011;

Set 2: business written on or after January 1, 2011.

The TGCR for the totality of the segregated funds guarantee exposure (the total TGCR) corresponds to the sum of 115% of Set 1 TGCR and of 130% of Set 2 TGCR.

The capital required is obtained by subtracting the credit for reinsurance ceded from the TGCR. Finally, the capital component is obtained by subtracting the net actuarial liabilities held from the capital required.

6.1.2 Expected payment date method

To obtain the required component, the calculation of the steps below must be separately done for these two sets of policies:

Set 1: business written prior to January 1, 2011;

Set 2: business written on or after January 1, 2011.

Step 1: Partition of contracts into three groups

Segregated fund guarantee contracts are partitioned into three groups based on time-to-maturity and annuitant age characteristics as of quarter-end:

Group	Defining characteristics
1	Contracts with time to maturity less than or equal to 1 year *or* annuitant age greater than or equal to 85
2	Contracts with time to maturity greater than 1 year *and* annuitant age less than 85 *but not including* contracts with time to maturity greater than 5 years and annuitant age less than 80 years
3	Contracts with time to maturity greater than 5 years *and* annuitant age less than 80 years

Step 2: Allocation of the segregated fund guarantee liability to the three groups

The segregated fund guarantee liability for the portfolio as whole, which is determined in accordance with actuarial practice standards, is allocated to the three groups based on the CTE(80) requirements determined by the AMF software tool. In particular, if L represents the segregated fund guarantee liability for the portfolio as a whole determined in accordance with actuarial practice standards, R_i represents the sum of the CTE(80) requirements for contracts in group i determined by the AMF software tool and L is positive then the liability allocated to group i is

$$L_i = \alpha_i \times L$$

where $$\alpha_i = \frac{\max(R_i, 0)}{\max(R_1, 0) + \max(R_2, 0) + \max(R_3, 0)}$$

If $L \leq 0$ then the liability allocated to each group is 0.

Step 3: Calculation of required component for contracts in group 1

The required component for contracts in group 1 is determined as the total gross capital required for contracts in group 1 minus L_1, the actuarial liability allocated to group 1. The total gross capital required for contracts in group 1 is the sum of the contract-specific total gross capital required for group 1. The contract-specific total gross capital required for group 1 is determined as:

$$\text{CTE}(95) + 50\% \times (\text{CTE}(95) - \text{CTE}(80))$$

where the CTE(80) and CTE(95) values are calculated using the AMF software tool.

Step 4: Calculation of required component for contracts in group 2

The required component for contracts in group 2 is determined as the total gross capital required for contracts in group 2 minus L_2, the actuarial liability allocated to group 2. The total gross capital required for contracts in group 2 is the sum of the contract-specific total gross capital required for group 2. The contract-specific total gross capital required for group 2 is determined as CTE(95), where the CTE(95) values are calculated using the AMF software tool.

Step 5: Calculation of required component for contracts in group 3

The required component for contracts in group 3 is determined as the sum of:

- 95% of the previous quarter-end required component amount for contracts classified as group 3 as at the previous quarter-end; and
- 5% of the excess of the current quarter CTE(95) amounts for group 3 over L_3

subject to

- a floor of CTE(95) – 25% × (CTE(95) – CTE(80)) – L_3 and
- a cap of CTE(95) – L_3.

Here CTE(80) and CTE(95) represent respectively the sums of the current quarter CTE(80) and CTE(95) amounts for group 3 determined using the AMF software tool.

Step 6: Calculation of required component for the portfolio as a whole

The required component for the portfolio as a whole is the sum of 115% of the required component amounts of Set 1 determined in Steps 3, 4 and 5 and of 130% of the required component amounts of Set 2 determined in Steps 3, 4 and 5.

Additional information

An insurer using this method must disclose this in the Capital Guideline Certification Report and provide information on the required component amounts according to the defined time-to-maturity and annuitant age groups.

The AMF expects insurers using this method to perform on an annual basis, or more frequently as necessary, forward projections of capital requirements, particularly when the time-to-maturity and annuitant age profiles of the insurer's contracts are such that a large number of contracts are expected to migrate from one of the defined groups to another.

6.2 Internal model

The AMF could authorize or require the use of an internal model[63] for the calculation of segregated fund capital requirements, for Canadian business as well as for foreign business. An insurer seeking to use its internal model to calculate the segregated fund capital component must follow the requirements outlined below and obtain prior authorization from the AMF.

When an insurer submits an authorization application to the AMF, it must be in a position to show that the model is fully documented and used. In addition, key internal model limitations should be reported and documented. Circumstances under which the internal model does or does not function effectively should also be documented.

A detailed description of the requirements is provided in the following sections. The requirements pertaining to the use of hedging strategies only apply to an insurer who has submitted an application to this effect.

6.2.1 Key phases leading to authorization

The authorization process for using an internal model consists of the following four distinct and consecutive phases:

- Formal application submittal;
- Implementation work for the purposes of calculating the capital requirement and parallel calculations;
- Granting of the authorization;
- Continuous monitoring.

To ensure the appropriateness of the process and to authorize the insurer to use its internal model to calculate capital requirements, the first three phases must be completed to the satisfaction of the AMF.

[63] The expression "internal model" includes all the process, methods, controls, models as well as computer and data collection systems that allow the assessment of the segregated funds risk.

A model is a subcomponent of the internal model. For the purpose of this document, a model is defined as the composition of the concepts representing in a simplified way a tangible thing with the objective to understand and forecast its behavior with statistical, financial, economical, mathematical or other concepts. A model includes assumptions, data and algorithms.

6.2.1.1 Phase 1: Formal application submittal

In Phase 1, the insurer must submit to the AMF the formal application and various documents required for the authorization process.

Documents required

The formal application to the AMF must include the following documents, particularly:

1. A cover letter from the chief risk officer addressed to the AMF including the following information:

    a) The progress of the implementation work and a self-assessment of compliance with the requirements outlined in Sections 6.2.2 to 6.2.8 (the "requirements"), specifying the nature and extent of the work required to be completed;

    b) Details of the information submitted to the risk management committee, the audit committee and the Board of Directors concerning the work to implement the internal model;

2. A copy of the resolution:

    a) of the risk management and audit committees recommending that the Board of Directors approve the formal application to the AMF;

    b) of the Board of Directors approving all the documents comprising the formal application;

3. A description of the compliance self-assessment process, including each party's roles and responsibilities;

4. A self-assessment of compliance with respect to the requirements according to the four criteria;[64]

5. A statement from the chief risk officer to the effect that the compliance self-assessment is adequate;

6. A description of the work performed by the validation team and the internal audit, particularly the work that led to the opinions, the work with respect to operations, and the work with respect to internal operating controls as they pertain to the authorization process;

[64] These four criteria are: the formal framework, the operationalization of the formal framework, reporting, and the controls in place. The definitions of the four criteria are outlined in Section 6.2.1.5. A criterion or some criteria may not be relevant to certain measures of success.

7. Documentation in accordance with the requirements;

8. Compliance gaps for which the insurer intends to request an exemption from the AMF;

9. The implementation plan approved by the Board of Directors and a negative assurance opinion from internal audit with respect thereto, particularly as regards the ability to execute the implementation plan and the sufficiency of financial and human resources;

10. A positive assurance opinion from internal audit with respect to all the documents required for the formal application, the adequacy of the compliance self-assessment and the design and effectiveness of the operational controls put in place.

On receipt of the information, the AMF will determine whether additional information is required from the insurer. The AMF will also speak to the insurer to obtain assurance that its implementation plan is consistent and realistic.

Self-assessment

The insurer must submit to the AMF a compliance self-assessment. The self-assessment must be based on the requirements of the four criteria with which the measures of success will be associated.

Implementation plan

The insurer must submit its implementation plan to the AMF. At minimum, the plan must contain the following information:

1. The action plans containing the initiatives to close the gaps, if required;

2. A detailed implementation schedule of the action plans for each gap identified, if required;

3. The financial resources allotted and the number and expertise of the human resources;

4. The template that will be used to produce the quarterly compliance monitoring report.

The risk management function will be required to submit a quarterly report on the progress of the work in respect of the implementation plan until authorization is obtained.

The AMF will periodically monitor the progress of the work to achieve compliance with the requirements. The AMF expects the insurer’s work to progress according to the implementation plan submitted.

The insurer can complete the implementation work during Phase 1. In such a case, the requirements outlined in Part 2A apply to the work.

6.2.1.2 Phase 2: Implementation work and parallel calculations

Phase 2 has two parts: the implementation work and the parallel calculations. Both are described below.

Part 2A: Implementation work

During this part, the insurer must provide the AMF with a quarterly monitoring and compliance report including:

1. a quarterly update of the schedule;

2. a quarterly update of the compliance self-assessment;

3. a quarterly update of the documentation satisfying the requirements;

4. the documents in connection with the authorization application sent to the risk management committee during the quarter;

5. the documents in connection with the authorization application sent to the audit committee during the quarter;

6. compliance gaps for which the insurer intends to request an exemption from the AMF;

7. the negative assurance opinion issued by internal audit with respect to the quarterly monitoring and compliance report;

8. the negative assurance opinion issued by the validation team with respect to the technical aspects of the internal model used for the requirements.

Part 2B: Parallel calculations

In Part 2B, the AMF will review the validity of the capital requirement calculations. Quantitative compliance gaps must be resolved before the beginning of Part 2B. Non-quantitative compliance gaps may be addressed at the same time as this part. Where applicable, the requirements outlined in Part 2A apply.

In Part 2B, the insurer must produce and provide the AMF with a report on the results of its capital calculations for four consecutive quarters.

The AMF will review the work underway and decide whether the insurer can advance to the next phase.

6.2.1.3 Phase 3: Granting of the authorization

During this phase, the AMF grants authorization provided the previous phases have been successfully completed and the requirements have been satisfied.

An updated version of the formal application filed in Phase 1 must be submitted to the AMF at the end of the implementation work reflecting all the changes made since the initial filing. The following documents must be included with the updated application:

1. A compliance self-assessment;

2. An updated statement signed by the chief risk officer attesting to the adequacy of the compliance self-assessment;

3. A positive assurance opinion from the internal audit and the validation team covering:

    a) all the documents submitted to the AMF;

    b) the adequacy of the compliance self-assessment based on the four criteria, including the technical requirements described in these documents;

    c) the design and effectiveness of the internal operating controls put in place;

4. A copy of the resolution showing that the Board of Directors received all the information required to assume its responsibilities with respect to the internal model;

5. The compliance gaps for which the insurer requested an exemption from the AMF;

Receipt of authorization means the insurer must use its internal model to calculate its capital requirements.

6.2.1.4 Phase 4: Continuous monitoring

This last phase begins when final authorization is granted. As of that date, the insurer must be continuously in compliance with the requirements.

The insurer must also show that the processes and procedures put in place remain effective. To this end, the chief risk officer must submit to the AMF an annual statement of compliance containing the following information:

1. The compliance gaps for which the insurer requested an exemption from the AMF. A reassessment of these positions or portfolios must be submitted annually along with justification for maintaining or removing the exemption;

2. Changes made to the internal capital requirement calculation model;

3. The compliance self-assessment.

Internal audit must issue a negative assurance opinion on the first two points mentioned above. The validation team must issue a positive assurance opinion on the technical aspects of the internal model used with respect to the requirements and on the second point. Internal audit must also issue a positive assurance opinion annually as to:

1. the adequacy of the self-assessment and the chief risk officer's statement of compliance with respect thereto;

2. the design and effectiveness of the internal operating controls put in place to maintain compliance with the requirements.

As well, the insurer must provide the AMF, with a continuous monitoring report, the content of which is defined in Section 6.2.9.6.

Changes

If changes are made to the internal model, the insurer must demonstrate to the AMF that it still respects the requirements. The notion of material and non-material changes and the AMF's expectations with respect to these changes are outlined in Section 6.2.9.

Unresolved compliance gaps

Any unresolved compliance gaps (i.e. deemed non-material by the AMF) remaining after the date authorization is granted and for which the AMF did not grant an exemption must be eliminated within a time frame established by the AMF that do not exceed three years. During this time, a quarterly monitoring and compliance report must be submitted to the AMF as well as an annual statement from the chief risk officer documenting the progress of the work to eliminate the unresolved compliance gaps. As well, internal audit must issue, quarterly, a negative assurance opinion on the quarterly monitoring and compliance report and issue, annually, a negative assurance opinion on the chief risk officer's statement.

Internal audit must issue a positive assurance opinion on the compliance self-assessment once the compliance gaps are resolved.

6.2.1.5 Definitions of the four criteria

The compliance self-assessment must be made on the basis of the four criteria below. The use of the criteria provides a framework for the self-assessment and ensures that all the requirements are covered.

Formal framework

This criterion encompasses the formal framework put in place by the insurer and must include, particularly, the policies, methodologies, mandates and roles and responsibilities approved by the Board of Directors.

Operationalization of the formal framework

This criterion covers the means used to ensure the insurer operationalizes the formal framework. It refers to the systems, procedures and associated documents that support the effective operation of the formal framework.

Reporting

This criterion covers all the means used to communicate, particularly to the chief risk officer, senior management and the Board of Directors, the insurer's status in relation to the formal framework. These means can take the form of a status in relation to the progress of a project or to continuous compliance against a limit. Reporting must include formal mechanisms and be subject to monitoring by senior management and the Board of Directors.

Controls

This criterion addresses the controls put in place to ensure, among other things, that the formal framework is appropriately operationalized and that the source data and calculations are reliable.

6.2.2 Documentation

The AMF expects the internal model documentation to be complete, consistent and up to date. The AMF expects the documentation (i.e. the documents drafted by the insurer, books, scientific articles, third-party documents, etc.) to be sufficient to allow an independent expert (internal or external) to replicate, if necessary, the results obtained and to assess the work performed concerning the internal model. Work performed by third parties does not relieve the insurer of its documentation obligations.

Any differences between the assumptions, stochastic models and modeling structure used in the valuation of actuarial liabilities, the calculation of capital requirements, the hedging strategy and the pricing must be clearly identified and justified in the documentation.

The documentation must include the following elements:

1. A description of the segregated funds and products:

    a) A brief description of the products, the mathematical representation of the products in the internal model, and the divergence between the actual products sold and their mathematical representation;

    b) A description of the portfolio based on the material risk factors:

- The guarantee;
- The term before the maturity date of the guarantee;
- The accumulation and withdrawal phase;
- The age of the policyholders.

c) A description of the segregated funds:

- Asset value;
- Management style;
- Investment policy;
- Allocation of assets under management with their respective benchmarks.

d) A summary of the management fees and fees charged for the guarantee by product and segregated fund category;

e) A description of the general fees, commissions, redemption fees and commission recapture scales.

2. A description of the internal model:

a) A description of the assessment method used to calculate the total gross capital requirement (TGCR):

- Bifurcated or global approach;
- Global method or expected payment date method;
- With or without recognition of the hedging strategy;
- Level of aggregation (product, year of issue, market segment, etc.);
- Discount rate.

b) A description of the data used for the calculations and their source;

c) A description of the random number generator;

d) A description of the real world economic scenario generator:

- Scope (interest rates, bond indices, stock market indices, inflation, ...);
- Justification for selecting the generator;
- Number of scenarios and projection frequency (time steps);

- Determination of parameters and data used;
- Mathematical description of the models (e.g. an interest rate model, a model to generate stock market returns and a model to generate bond returns);
- A description of the data used;
- A detailed description of the calibration methods used for the econometric models;
- Modeling of hedge assets;
- Analysis of the basis risk for the method to replicate the funds for the funds with the highest exposure.

e) A description of the risk-neutral economic scenario generator used in the hedging strategy, if applicable;

- Scope (interest rates, bond indices, stock market indices, inflation, etc.);
- Justification for the generator selected;
- Number of scenarios and projection frequency (time steps);
- Determination of parameters and data used;
- Mathematical description of the sub-models used (e.g. an interest rate model and a model to generate stock market returns);
- A description of the data used;
- A detailed description of the calibration methods used for the econometric models.

f) A description and justification for the non-economic assumptions, particularly:

- The mortality rates and, if applicable, their rate of improvement;
- The lapse rates, including the functions for determining dynamic lapse rates;
- Transfers between funds;
- Asset rebalancing between and within funds;

- Resets;
- Withdrawal start date for guaranteed withdrawal benefits;
- Selection of payout option for guaranteed withdrawal benefits;
- Periodic withdrawal amount;
- General expenses.

g) A description of the sensitivity testing for daily hedging transactions as well as for real-world projections in order to calculate hedging inefficiencies, if applicable;

h) The data compression method, if applicable;

i) Details of the technologies and software used;

j) Mathematical proof and references used (scientific articles, books, etc.) for the internal model;

k) A description of the modeling of financial instrument used for the hedging strategy;

l) A description of the fund replication methodology used in the model;

m) The rates used to discount the cash flows and justification for their use;

n) Length of the selected forecast horizon.

3. Governance of the internal model

a) A description of the roles and responsibilities of the main users and other parties;

b) The CVs of the main users and of members of the design and validation teams;

c) Formal documentation of the risk appetite associated with segregated fund guarantees, risk tolerance levels, risk exposure limits and resulting monitoring mechanisms, if applicable;

d) Practices with respect to data keeping and changes to the model that must include restricted access;

e) The data aggregation and report generation process required to establish the value of obligations with respect to segregated fund guarantees;

f) The measures put in place to ensure the objectivity and independence of the main users and other parties;

g) The succession mechanisms in place for key personnel.

4. Hedging strategy, if applicable

a) A description of the hedging strategy (e.g. delta-rho hedge, hedged products and unhedged products, hedging level, etc.);

b) The level of and justification for the selected rebalancing limits;

c) Information concerning swap agreements with counterparties, particularly, a brief description of the agreement, the nominal value in effect by counterparty, and clauses allowing the counterparty to terminate the agreement;

d) A description of the financial instruments used in the hedge portfolio (futures, forwards, swaps, intersegment notes, if applicable, etc.);

e) A description of the daily hedging process including outsourced services;

f) The gains and losses reports along with a description of the efficiency metric associated with the hedging strategy, if applicable.

5. Sensitivity analysis

The insurer must perform a sensitivity analysis minimally on :

a) The shock for numerical approximation of the greeks, if applicable;

b) The parameters for the fund replication method;

c) Rebalancing limits;

d) The parameter for the choice of the payout option for guaranteed withdrawal benefits;

e) Discount rate for hedging inefficiencies.

6. Stress test

This section is complementary to the *Stress testing guideline*.

Several stress test scenarios must be performed by the insurer. Those scenarios must minimally include stock market and interest rate shocks. The scenarios

must put in light the risk of the segregated fund portfolio[65]. The insurer must minimally consider the following scenarios:

a) Interest rates remain low for a long period of time;

b) Stock market drop over a long period of time;

c) High volatility;

d) Downgrade of the insurer (margin call/swaps);

e) Lack of liquidity on the market;

f) Additional deposits from contract holders.

A summary of the stress test analysis must be presented to senior management.

The AMF may, at its discretion, require the insurer to add specific elements to its documentation.

6.2.3 Governance

An insurer that plans to use an internal model must demonstrate to the AMF that its governance, internal control mechanisms and internal model are sufficiently developed. This section sets out additional governance practices not considered in the *Governance Guideline*,[66] the *Guideline Governing Integrity and Competence Criteria*,[67] and the *Integrated Risk Management Guideline*.[68]

Although the insurer is required to conform to the *Governance Guideline*, the *Guideline Governing Integrity and Competence Criteria* and the *Integrated Risk Management Guideline*, it is not required to produce a self-assessment covering these guidelines in order to obtain authorization to use an internal model.

6.2.3.1 Roles and responsibilities of senior management and the Board of Directors

Senior management and the Board of Directors are responsible for ensuring compliance with the requirements for the use of an internal model.

Senior management and the Board of Directors must appoint persons responsible for:

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65 For example, a stock market drop in the next three months could not put in light the risk of a product with a maturity concentration far in the future of for guaranteed withdrawal benefits not yet in payout phase.

66 AUTORITÉ DES MARCHÉS FINANCIERS. *Governance Guideline*, April 2009.

67 AUTORITÉ DES MARCHÉS FINANCIERS. Guideline Governing Integrity and Competence Criteria, June 2012.

68 AUTORITÉ DES MARCHÉS FINANCIERS. *Integrated Risk Management Guideline*, April 2009.

1. approving a governance policy that ensures segregation of supervision functions, including clear segregation of the design[69] and internal model validation functions;

2. ensuring sufficient human, financial and material resources to allow the supervision functions to perform their duties;

3. ensuring the validation exercises are carried out at least once a year;

4. setting up mechanisms to ensure the conclusions of the validation and process review are sent to senior management and the Board of Directors;

5. ensuring the effectiveness of internal controls;

6. ensuring data-keeping requirements are satisfied (refer to Section 6.2.5 “Data keeping”);

7. ensuring the requirements of the use test are satisfied (refer to Section 6.2.6 “Use test”);

8. ensuring the internal model is supported by complete, consistent and up-to-date documentation (refer to Section 6.2.2 “Documentation”);

9. approving use of the internal model for evaluating capital requirements and approving material changes thereto (refer to Section 6.2.9 “Changes and monitoring”);

10. ensuring the hedging strategy is supported by adequate policies and procedures;

11. ensuring the hedging strategy is always operational in the event of employee departures or technology problems (e.g. IT breakdown);

12. ensuring the effectiveness of the hedging strategy is monitored;

13. ensuring the company has a business continuity plan in place.

6.2.3.2 Additional roles and responsibilities of senior management

Senior management applies policies approved by the Board of Directors. The company demonstrates transparency in the management of its financial activities by informing the Board of Directors and the AMF of situations with a material impact on the internal model and on the effectiveness of the hedging strategy.

The AMF also expects senior management to ensure:

[69] Design includes development and implementation of the internal model.

1. that a reporting process is in place to make sure the conclusions and recommendations of the validation team and internal audit are considered by the decision-making bodies. In particular, the validation team and internal audit must have an opportunity, at least once a year, to present their observations to the Board of Directors;

2. that the activities of the validation and internal audit teams are not biased by any form of influence within the company. In particular, the AMF expects that the remuneration of the validation and audit team leads will not to be tied to tasks or performance. These teams must be independent of the teams responsible for pricing or for calculating actuarial liabilities, in other words, the users of the internal model. The insurer must provide the AMF with documentation to this effect;

3. that the insurer's risk management policies include assignments for the development, implementation, continuous updating and application of practices designed to satisfy the requirements for use of the internal model.

6.2.3.3 Design team

The design team handles the development and implementation of the internal model and may perform its own validation. However, its work must be reviewed by the validation team.

The insurer must be able to demonstrate the integrity of the design team, which must be, among other things, independent and free from undue influence from, for example, the insurer's distribution network. The internal model must be designed and validated by a party that will not profit directly or indirectly from the results arising therefrom.

The design team must ensure the transparency of the internal model, in other words, allow third parties, particularly the insurer's external auditors or supervisory agencies, to observe and understand the objectives of the internal model. The work of the design team must be documented.

6.2.3.4 Risk management function

The risk management function must be independent of the business lines, in other words, it must not be involved in generating profits (e.g. pricing or the calculation of actuarial liabilities). In addition, it must be compensated in a manner that is consistent with the function's independence, particularly for the validation team.

The responsibilities of the risk management function with respect to the internal model are as follows:

1. Form a validation team;

2. Define and implement a framework for internal model validation and use of professional judgment that takes into account:

   a) the business strategy;
   b) risk appetite, tolerance, limits and metrics used;
   c) the insurer's overall risk profile;
   d) the definition of the materiality of a risk with respect to segregated fund guarantees and model risk (as defined in Section 6.2.4 "Validation and internal audit");

3. Manage model risk sources and ensure internal model outputs are sufficiently reliable and stable for senior management to be able to make informed decisions;

4. Make a recommendation as to whether the internal model should be used.

This function has ultimate responsibility for stress testing and for taking into consideration all material risks[70] associated with the insurer's operations, including those related to the hedging strategy. It therefore has access to all of the insurer's activities.

Due to its independence, the risk management function and the validation team cannot participate in the development or implementation of the internal model.[71]

6.2.3.5 Internal audit function

The internal audit function provides, while exercising utmost independence, the Board of Directors and senior management with assurance as to the quality and effectiveness of internal controls and the governance program. It considers all the activities relating to the internal model and evaluates interactions with the insurer's other activities. Its function is permanent and separate from the risk management function. The internal audit function must have a clear mandate and sufficient qualified resources.

The AMF expects internal audit to examine the effectiveness of internal control mechanisms designed to ensure compliance with the requirements for use of the internal model. To this end, the insurer must submit to the AMF a report containing at minimum:

1. a description of the scope of the audit performed;

2. an assessment of the operational effectiveness of the internal model;

3. an assessment of the operational effectiveness of the hedging strategy.

In anticipation of the authorization to use an internal model, internal audit activities must include, at minimum:

[70] As stated in the Integrated Risk Management Guideline.

[71] Direct users who manipulate the outputs of the internal model are a special case and are not considered independent since they form part of the model risk (refer to Section 6.2.4 "Validation and internal audit").

1. alignment of the audit program with the requirements of the internal model approach;

2. a detailed audit plan indicating the activities to be reviewed annually and at a predefined frequency to assess compliance with the requirements for use of the internal model;

3. a control and process review, performed on an ongoing basis and at least once a year;

4. a verification of the escalation process, which must be in place to facilitate the flow of information to senior management;

5. a description of the audit scope and an assessment of the design and effectiveness of internal control mechanisms designed to ensure compliance with all the requirements for use of the internal model;

6. a review of reports produced by the validation team and a review of the effectiveness of internal control mechanisms to ensure the independence of the validation team;

7. details of internal audit work to be sourced to another function that respects the same independence criteria;

8. an assessment of the adequacy of the resources and skills required to perform the audit and validation work;

9. a presentation of their observations to the Board of Directors;

10. an assessment of the risk management and governance as they pertain to the internal model.

The audit committee must meet regularly with the risk management function to ensure, based on the analyses provided by internal audit, that all risks are adequately covered.

6.2.3.6 Deviation from the internal model

In the course of its operations, the insurer may decide to deviate from the results of its internal model when making certain decisions involving, for example, pricing or the calculation of actuarial liabilities. When deviating from the results of its internal model, the insurer must ensure that:

1. adequate policies exist to define cases where deviation is permitted;

2. the deviation is appropriately justified and documented;

3. the deviation is not indicative of weakness in the internal model.

In particular, the AMF seeks to ensure that the internal model authorized for calculating capital requirements adequately quantifies the insurer's risks. The insurer should put in place corrective action if its finds itself deviating from its internal model too often.

6.2.4 Validation and internal audit

Given the importance of model risk, the insurer's compliance with the requirements outlined in this section will be an important factor in the AMF's decision to grant the insurer initial authorization to use its internal model and to apply it permanently thereafter. The AMF expects the internal model to be validated and the related processes reviewed.

The AMF expects the validation and internal audit teams to have the necessary expertise, resources and independence to assess the design and operation of the internal model and the quantification of its risks. A documented description of the skills of these teams must be submitted to the AMF.

Where the validation or internal audit team does not have the requisite technical expertise, the insurer must select other independent experts (internal or external). If the AMF deems it necessary, it can request external experts to perform all or part of the validation team's work.

The AMF expects the roles of the experts who make up the validation and internal audit teams to be specified and documented.

Model risk is defined as the possibility of negative consequences materializing or inappropriate decisions being made due to shortcomings or limitations in the model, incorrect implementation, the use of wrong assumptions or data, or the selection of an inappropriate model.

An internal model developed by a third party does not relieve the validation and internal audit teams of their responsibilities. The insurer must have sufficient understanding of the internal model developed externally and have complete documentation in respect thereof. Since contracting important tasks to third parties entails additional risks, it is essential to ascertain that the insurer has adequate controls in place and to ensure the continuity of the tasks entrusted to third parties.

The relevance of the external data used and their consistency with internal data must be analyzed and documented. Finally, the conclusions drawn from the process validation and review must be reported to senior management and to the Board of Directors.

6.2.4.1 Validation team

The insurer must take into account all important data and issues relating to the validation of the internal model.

In particular, the AMF expects the validation team to understand the risks associated with segregated fund guarantees as well as the hedging strategy, and unhedged

residual risks. The validation team must assess the development and implementation of the internal model.

Validation of internal model development

The validation team must analyze the internal model, the assumptions and their interactions.

To this end, the validation team must:

1. ensure the econometric models are properly calibrated and that any adjustment thereto is not made for the purpose of reducing the capital requirements;

2. ensure the econometric models behave as expected, particularly with respect to stylized facts (e.g. an interest rate model with curve inversions, a stock market model that generates effects similar to financial crises, stock market model with negative correlation between volatility and return, etc.);

3. ensure the data history favours a broad range of market scenarios in order to establish correlations between benchmark indices and yield spreads in relation to risk-free rates;

4. ensure the robustness of the econometric models (e.g. addition of new historical data must not materially affect results produced by the internal model);

5. demonstrate to the AMF that the insurer is not less conservative in the calculation of the capital requirement than in the other calculations done in the course of their operations;

6. ensure the limitations of the internal model have been clearly identified and documented;

7. perform sensitivity analyses on the risks taken individually and in aggregate;

8. consider the magnitude of the risks in situations where the guarantee is significantly in-the-money (e.g. situation with a low market value to guarantee value ratio);

9. validate that the applications implemented are identical to the theoretical models;

10. determine and document any and all known limitations of the current validation process, if applicable;

11. document components not taken into account in the validation;

12. ensure approximations are adequate and do not unduly increase the instability of the internal model;

13. ascertain the reasonableness of using professional judgment and document the resulting conclusions;

14. perform unit tests to reproduce the calculations for material exposures;

15. validate data quality;

16. ensure, as far as practicable, that backtesting and benchmarking are adequately done and that model risk is considered.

Validation and implementation of the internal model

The validation team must ensure proper implementation of the internal model developed by ensuring:

1. no errors exist in the computer program code and its execution;

2. all input data are processed.

Other validation elements

Lastly, the validation team must ensure that:

1. the technology infrastructure is adequate;

2. financial statements items and internal model results are consistent;

3. data keeping is adequate (refer to Section 6.2.5 “Data keeping”);

4. the use test is satisfactory (refer to Section 6.2.6 “Use test”);

5. the documentation satisfies the requirements (refer to Section 6.2.2 “Documentation”);

6. the quantitative requirements are respected (refer to Section 6.2.7 “Quantitative requirements without recognition of a hedging strategy” and 6.2.8 “Quantitative requirements with recognition of a hedging strategy”);

7. the changes are appropriate and made in a compliant manner (refer to Section 6.2.9 “Changes and monitoring”).

Significant risks detected by the validation team must be examined in greater detail during stress testing.

The validation team must periodically monitor its own recommendations and conclusions.

6.2.4.2 Internal audit

The insurer must ensure the adequacy of its processes and controls. Internal audit is responsible for reviewing processes relating to:

1. data keeping;
2. consistency between financial statement items and internal model results;
3. the quality and performance of the technology infrastructure;
4. documentation for the internal model;
5. changes to the internal model;
6. the work of the validation team;
7. the disclosure of issues and the escalation process;
8. determining the resources authorized to make changes to the internal model;
9. the hedging strategy.

The internal audit team must also ensure that users:

1. have the necessary authorizations to use the internal model;
2. have the skills and experience to use the internal model;
3. understand model risk and the limitations of the internal model;
4. understand the insurer's risk tolerance and limits;
5. do not neglect to provide material information that affects decision-making processes;
6. properly synthesize the information so that senior management can understand the insurer's current exposure to segregated fund guarantees;
7. can explain the variances between gains and losses and the internal model results;
8. do not make changes to the internal model or its inputs without authorization.

Internal audit must make sure the insurer satisfies the use test requirements. It must periodically monitor its own recommendations and conclusions and may, at its discretion or at the request of the AMF, perform certain technical validations.

Internal controls associated with hedging

Where an insurer follows a hedging strategy, the related day-to-day operations require effective control mechanisms.

Deficient controls could expose the insurer to internal fraud or errors that could result in heavy losses. Internal audit must therefore ensure that:

1. market participants are identified when they perform transactions and they have access in accordance with their position (i.e. security);

2. intraday trade confirmations between the insurer's and the counterparty's front office are recorded and saved;

3. intraday trade confirmations between the insurer's and the counterparty's back office are recorded and saved;

4. the back office can confirm transactions with each counterparty to validate their authenticity and accuracy;

5. the middle office effectively follows up on front office transactions for compliance with the rebalancing limits for hedge assets;

6. processes are in place for transactions with discrepancies;

7. clear definitions are established for major discrepancies and factors that trigger the escalation process;

8. the hierarchical structure of the front office and the segregation between front-, middle- and back-office functions are adequate, particularly with respect to the independence of the back office;

9. the operation of the rebalancing limits is documented, if applicable.

Since the rebalancing limits underpin the hedging strategy, any rebalancing dictated by the internal model must be respected. The consequences of delayed rebalancing, once the limit has been reached, on hedge performance must be documented.

6.2.4.3 Documentation

The insurer must document the validation and internal audit review of the internal model processes to ensure all the parties tasked with the documentation review understand the scope, methodology and conclusions drawn from the process validation and review.

6.2.4.4 Adjustments after the process validation and review

The insurer should adjust its internal model to reflect the conclusions drawn from the work of the validation and internal audit teams. The chief risk officer must be informed of material shortcomings. Corrective action must be taken in a timely manner and documented.

The insurer must establish processes to periodically (at least annually) validate the internal model and review its processes. The validation and review of the related processes also depend on special situations or events.

A resolution procedure must be implemented to reconcile the opinions of the design, validation and internal audit teams.

6.2.5 Data keeping

Data extracted from the insurer's computer systems provide an important foundation for the establishment and use of the internal model. The data collected are used primarily as inputs for the projection of in-force business and to establish the assumptions used in the projection.

In order to successfully implement the internal model, the insurer must successfully respond to data management and IT challenges. This section outlines the AMF's data-keeping requirements for insurers with an internal model for segregated fund guarantees.

The AMF expects the insurer to consider all the available data and key issues relating to the inputs used in its internal model and to have the data required to effectively support its processes for measuring and managing the risk associated with segregated fund guarantees.

Any data used in the assessment and management of the risk associated with segregated fund guarantees must be properly saved. The insurer must store aggregate historical data for all legal entities and geographic areas. These data must cover, in particular, new deposits, redemptions, inter-fund transfers, resets and payout options.

The term "data keeping" means the main components of the data management cycle: collection, processing, access, extraction, conservation and storage. The insurer is responsible for implementing a data-keeping framework and must document all the aforementioned components in accordance with the requirements of this section.

6.2.5.1 Governance of the data-keeping process

Senior management must be involved in identifying, assessing and managing the risks associated with data keeping.

As such, the AMF expects senior management to:

1. implement a data management framework and ensure its processes are documented;

2. establish a company-wide data management procedure and ensure appropriate means are deployed to obtain buy-in from the bodies responsible for these data (i.e. risk management, compliance, the head of the line of business, IT management) with a view to achieving this objective;

3. ensure the security, confidentiality, integrity and auditability of the data throughout the data management cycle, including minimum service standards;

4. make sure the insurer has a technology infrastructure that allows timely access to the data both under routine and stressed conditions and that the data remain accessible in the event of a material change in the data architecture;

5. implement independent validation and verification programs for each data-keeping function;

6. make sure adequate procedures are in place and that the responsibilities are defined to ensure compliance with the data management framework;[72]

7. ensure all the data required to assess segregated fund guarantees are available for this purpose.

The insurer's structure must not hinder risk-related data keeping either at the consolidated or at any other pertinent level within the company (e.g. non-consolidated or jurisdictions where the insurer conducts business). In other words, data-keeping processes must not be affected by the insurer's legal form or geographic location.

6.2.5.2 Data collection

With respect to the assessment of capital requirements, "data collection" means selecting, validating and extracting the data elements required from various internal and external sources and uploading them to the appropriate operational databases or repositories.

The insurer must therefore:

2. document the definition, collection and grouping of the data by indicating their breakdown by product, data flow or other identifiers, as needed;

3. institute standards for data security, integrity, comprehensiveness, accuracy, auditability, relevance and availability;

4. identify deficiencies in the data, take the necessary corrective action and, if applicable, document the manual or computerized solutions used to satisfy the data requirements;

5. introduce, as needed, standards, policies and procedures for data cleansing, matching, field validation, reformatting and disaggregation, if applicable;

6. implement a procedure for detecting and reporting errors between data series and system sources (upstream or external). This error detection and reporting procedure must be documented and accessible to the insurer's control functions.

[72] AUTORITÉ DES MARCHÉS FINANCIER. *Governance Guideline*, April 2009.

Periodic reports must be prepared for senior management, indicating the corrective action taken for the errors reported.

6.2.5.3 Data processing

The “data processing” part includes various tasks relating to data management, including breaking down the processing into multiple computerized or manual processes, data transmission, source authentication, validation, reconciliation, etc.

The insurer’s data processing process must:

1. ensure appropriate levels of initial validation and cleansing for each process as well as when reconciling with any related processes;

2. introduce appropriate procedures to control data changes, particularly, the origin of the change, the authorization, program changes, tests, parallel processing, approvals, data production and controls;

3. limit data manipulation to reduce operational risk. Data manipulation refers to both manual and automated manipulation. With regard to contract data, the AMF expects the majority of the data used to be derived directly from administrative systems and minimally from other sources;

4. establish a data processing procedure and infrastructure that covers the contract lifecycle, including, among other things, deposits, redemptions, the payout trigger and option selection, resets, inter-fund transfers and error monitoring. These data are essential for, among other things, establishing or ascertaining the robustness of certain assumptions;

5. guarantee appropriate initial validation and cleansing levels to avoid introducing bias. Any bias must be documented;

6. implement controls to ensure processing is carried out by authorized resources with adequate expertise;

7. ensure appropriate data backup and recovery in case of a disaster to mitigate data loss and to avoid compromising data integrity;

8. introduce adequate change control procedures for changes made during processing.

The insurer must develop procedures to establish tolerance limits and to assess the effect of missing or outdated information on its internal model.

6.2.5.4 Access to data and extraction

For the purposes of the internal model authorization process and the monitoring process, the AMF expects data pertaining to the insurer’s activities to be available and to be continuously monitored for compliance.

To this end, the insurer must ensure that:

1. the design of the databases and/or data repositories and related extraction, consultation and recovery subprograms satisfy its specific data requirements;

2. access to the data is unrestricted under routine and stressed conditions. Access must not be limited by any data-keeping outsourcing agreements with external service providers. Despite such agreements, the insurer must be able to provide any data or information within the prescribed time frame;

3. access controls and data dissemination are based on user roles and responsibilities and on industry best practices in terms of segregation of duties, the whole certified by the insurer's internal compliance and audit functions.

6.2.5.5 Data storage, conservation and archiving

The "data storage, conservation and archiving" component allows the insurer to satisfy requests for data or information concerning the management of risks associated with segregated fund guarantees.

The insurer must:

1. establish documented policies and procedures for data storage, conservation and archiving;

2. keep backup copies of pertinent data banks, bases or files. One copy must be stored in Québec, even if the source system is in another jurisdiction;

3. ensure the electronic versions of all the data and of any pertinent information are available and usable at all times;

4. have an appropriate disaster and recovery plan to ensure the continuity of the process in order to mitigate the risk of losing data or compromising their integrity.

6.2.6 Use test

The use test is a process that allows the AMF to ensure the insurer makes appropriate use of its internal model to manage the risks associated with segregated fund guarantees. The use test must be applied on an ongoing basis across the company and must be viewed as a complement to governance principles.

6.2.6.1 Management and use test

The AMF expects the internal model to be used not only to calculate capital requirements but to form an integral part of the decision-making process and the risk management process for segregated fund guarantees.

The link between the internal model and the insurer's decisions must be properly documented.

Where the insurer makes a decision with a material impact that would have been different had it been based solely on the internal model, it must justify and document its choice. In such a case, it may be advisable to review the internal model considering the variance between the decision and the model results.

Senior management is responsible for taking steps to ensure the internal model is used in the decision-making process, particularly with respect to:

1. periodic reporting to senior management and the Board of Directors;

2. strategic planning;

3. the assessment of the risk exposure associated with segregated fund guarantees (e.g. risk concentration, risk diversification);

4. the development of new products;

5. the assessment of risk appetite and limits;

6. the determination of actuarial liabilities;

7. the business strategy risk assessment;

8. the calculation and allocation of capital (economic capital);

9. the hedging strategy;

10. pricing.

The insurer must identify and document all uses of the internal model likely to influence its operations.

6.2.6.2 Uniform and consistent use

The internal model must be used uniformly across the company and its results must be consistent with the figures in the financial statements. The same deterministic assumptions, stochastic models and modeling structure must be used for the valuation of actuarial liabilities, calculation of capital (except for the exceptions mentioned in Section 6.2.8), the hedging strategy and pricing. If there are differences, the insurer must provide the AMF with a list of such differences with justification. The insurer must also demonstrate that based on their respective roles, the users of the internal model have adequate knowledge of the model, including such differences.

The insurer must have sufficient qualified staff familiar with the operation of the internal model and demonstrate that they make proper use of the information technology

associated with the internal model. Staff access to the internal model must be commensurate with their functions.

6.2.6.3 Understanding of the internal model

The AMF expects senior management, the Board of Directors and the chief risk officer to have an adequate understanding of the following elements of the internal model:

1. The objectives of the internal model and its use by the insurer;
2. The main risks associated with the internal model, its limitations and weaknesses;
3. The issues associated with the internal model under stressed and routine conditions concerning, among other things, capital requirements.

Consequently, the insurer must put mechanisms in place to allow a clear understanding of the characteristics and behaviour of the internal model. These mechanisms include awareness-raising sessions, meetings and discussions between the Board of Directors, senior management, the risk management function and internal audit. The insurer must document these discussions and the content of the awareness-raising sessions. Such documentation must be provided to the AMF at the latter's request. The AMF expects the following topics to be discussed at these meetings:

1. The modeling variances arising from the inability to replicate the segregated fund returns (basis risk);

2. The risks not modeled by the internal model;

3. The impact of an increase in the proportion of funds invested in stock market;

4. The impact on the guarantee to offer certain funds over others;

5. The impact of approximations on the internal model (e.g. fund replication methodology, data compression method, gaps between real world and internal model[73], number of scenarios, etc.);

6. The important elements of the hedging strategy:

    i. The risks mitigated and those not mitigated by the hedging strategy;

    ii. The effect of rebalancing limits on hedging efficiency;

    iii. The liquidity risk associated with margin calls and collateral calls, particularly in favourable market conditions;

[73] For example, the internal model may use bonds while swaps may be used in reality to cover interest rates sensitivity or stock market indices can be used in the internal model while forward contracts may be used in reality to cover stock market sensitivity.

iv. The impact of a ratings downgrade of the insurer on derivatives transactions;

v. The problems that can arise if the internal controls for hedging transactions are not effective.

The AMF expects the insurer's Board of Directors (or a committee designated by the latter) and senior management to have sufficient understanding of the management reports submitted to them, including any reports submitted as part of the validation process.

In addition, the Board of Directors and senior management must have qualitative and quantitative information not only on the risks hedged by the risk mitigation strategies but also those that are not.

6.2.7 Quantitative requirements without recognition of a hedging strategy

The insurer may choose between the two methods described in this section. When an insurer submits its first application to authorize the use of its internal model for the development of segregated fund capital requirements, it is required to irrevocably elect the method it intends to use to calculate the capital component.

6.2.7.1 Global method

Under this method, the total gross capital required ("TGCR") is calculated first. It is determined as the cost calculated at CTE (95) using the internal model authorized by the AMF prior to its use.

CTE (95) is calculated on two bases:

- using explicit valuation margins for adverse deviations on the non-scenario-tested risk factors and;
- without such margins.

The maximum of a) or b) is taken to be CTE (95).

Then the capital required is obtained by subtracting the credit for reinsurance ceded from the TGCR. Finally, the capital component is obtained by subtracting the net actuarial liabilities held from the capital required.

6.2.7.2 Expected payment date method

Under this method, cash flows are grouped into 3 categories according to expected dates, and the following minimum confidence levels would apply:

- due in 1 year or less, CTE (98);
- due between 1 and 5 years, CTE (95);

- due after 5 years, CTE (90).

The TGCR is to be determined in the following way under this method:

1. A large number of stochastic investment return scenarios is generated (e.g., 5,000 or more).

2. Segregated fund guarantee cash flows corresponding to these scenarios are determined based on the identified term of the liability.

3. In each scenario, cash flows are partitioned into buckets based on the timing of the cash flow as follows:

    - 1 year or less
    - greater than 1 year and less than or equal to 5 years
    - greater than 5 years.

4. For each scenario and each time bucket, the present value of benefit payments less guarantee premium receipts is calculated.

5. The result is four distributions of present values based on cash flow period:

    - 1 year or less – distribution 5a
    - greater than 1 year and less than or equal to 5 years – distribution 5b
    - greater than 5 years – distribution 5c
    - all periods combined (i.e., no bucketing of cash flows) – distribution 5d.

6. The TGCR is the sum of:

    - the TGCR for cash flows 1 year or less (the quantity T1 defined in steps 8 through 12)
    - the TGCR for cash flows greater than 1 year and less than or equal to 5 years (the quantity T2 defined in steps 8 and 13)
    - the TGCR for cash flows greater than 5 years (the quantity T3 defined in steps 14 through 22).

7. The capital component is the TGCR calculated in step 6 minus the lesser of:

    - the segregated fund guarantee actuarial liability reported by the insurer and determined in accordance with actuarial practice standards (denoted by L in the steps that follow)
    - the segregated fund guarantee actuarial liability based on a CTE(85) standard (the quantity L_u defined in steps 8 and 9).

In symbols, the capital component is

$$T_1 + T_2 + T_3 - \min(L, L_u)$$

or 0 if this amount is negative.

Calculation of L_u, T_1 and T_2

8. Based on the example illustrated in step 1, the 5000 scenarios are ordered according to the present value distribution for all cash flow periods combined (distribution 5d), i.e., without respect to cash flow bucketing. The resulting ordering is labelled such that scenario 1 represents the greatest present value and scenario 5,000 the least present value.

9. *Calculation of L_u*: The average present value for distribution 5d (present value cash flows for all periods combined) corresponding to scenarios 1 through 750 is calculated and denoted L_u. If the calculated value is negative, a value of 0 is assigned to L_u. The quantity L_u represents the total segregated fund guarantee actuarial liability based on a CTE(85) standard.

10. Scenarios 501 through 5000 are discarded.

11. Scenarios 1 through 500 are re-ordered according to the present value distribution for cash flows 1 year or less (distribution 5a). The resulting re-ordering is labelled such that scenario 1* has the greatest present value with respect to cash flows 1 year or less and scenario 500* the least present value.

12. *Calculation of T_1*: The average of the present values for distribution 5a (present value cash flows 1 year or less) corresponding to scenarios 1* through 100* is calculated and denoted T_1. The quantity T_1 represents the TGCR for cash flows 1 year or less. Note that T_1 could be negative.

13. *Calculation of T_2*: The average of the present value cash flows greater than 1 year and less than or equal to 5 years corresponding to scenarios 1 through 250 is calculated and denoted T_2. Note that scenarios 1 through 250 (i.e., the scenarios for the ordering based on all cash flows combined) are used here, not scenarios 1* through 250*. The quantity T_2 represents the TGCR for cash flows greater than 1 year and less than or equal to 5 years. Note that T_2 could be negative.

Calculation of T_3

The TGCR for cash flows greater than 5 years is determined in the following way:

i) first, upper and lower bounds for the TGCR for this cash flow bucket are determined as well as the TGCR based on a CTE (95) standard;

ii) then, capital component amounts corresponding to the TGCR upper and lower bounds and the CTE (95) standard are determined assuming that these amounts are allocated to the three cash flow buckets in proportion to the corresponding TGCR floored at 0;

iii) following this, the capital component amount for the greater than 5 years cash flow bucket is determined using a weighted average of the previous quarter's capital component amount for this cash flow bucket and the current quarter amount based on a CTE (95) standard, subject to the upper and lower bounds on TGCR previously calculated;

iv) finally, the TGCR for the greater than 5 years cash flow bucket is inferred from the capital component amount just calculated based on the earlier assumption that capital component amounts are allocated to the three cash flow buckets in proportion to the corresponding TGCR.

The detailed calculations are described in steps 14 through 22 as follows:

Determination of upper and lower bounds for TGCR and TGCR based on CTE (95)

14. Scenarios 1 through 500 are re-ordered according to the present value distribution for cash flows greater than 5 years (distribution 5c). The resulting re-ordering is labelled such that scenario 1*** has the greatest present value with respect to cash flows greater than 5 years and scenario 500*** the least present value.

15. *Calculation of upper bound* T_3^u : The average of the present values for distribution 5c (present value cash flows greater than 5 years) corresponding to scenarios 1*** through 250*** is calculated and denoted T_3^u . The quantity T_3^u represents an upper bound for the TGCR before flooring for cash flows greater than 5 years.

16. *Calculation of lower bound* T_3^l: The average of the present values for distribution 5c (present value cash flows greater than 5 years) corresponding to scenarios 1*** through 500*** is calculated and denoted T_3^l . The quantity T_3^l represents a lower bound for the TGCR before flooring for cash floors greater than 5 years.

17. *Calculation of CTE (95) proxy* $T_3^{(95)}$: The average of the present value cash flows greater than 5 years corresponding to scenarios 1 through 250 is calculated and denoted $T_3^{(95)}$. Note that scenarios 1 through 250 (i.e., the scenarios for the ordering based on all cash flows combined) are used here, not scenarios 1* through 250* or scenarios 1*** through 250***. The quantity $T_3^{(95)}$ represents the contribution to the TGCR of cash flows greater than 5 years when a TGCR standard of CTE (95) is used without cash flow partitioning.

Determination of corresponding capital component amounts

18. *Calculation of upper bound* RC_3^u:

$RC_3^u = 0$ if $T_3^u \leq 0$

$$RC_3^u = \frac{T_3^u}{\max(T_1 + T_2, 0) + T_3^u} \times \max\left\{T_1 + T_2 + T_3^u - \min(L, L_u), 0\right\} \quad \text{if } T_3^u > 0$$

The quantity RC_3^u represents an upper bound on the current quarter capital component amount for cash flows greater than 5 years.

19. *Calculation of lower bound* RC_3^l*:*

$RC_3^l = 0$ if $T_3^l \leq 0$

$$RC_3^l = \frac{T_3^l}{\max(T_1 + T_2, 0) + T_3^l} \times \max\left\{T_1 + T_2 + T_3^l - \min(L, L_u), 0\right\} \quad \text{if } T_3^l > 0$$

The quantity RC_3^l represents a lower bound on the current quarter capital component amount for cash flows greater than 5 years.

20. *Calculation of* $RC_3^{(95)}$*:*

$RC_3^{(95)} = 0$ if $T_3^{(95)} \leq 0$

$$RC_3^{(95)} = \frac{T_3^{(95)}}{\max(T_1 + T_2, 0) + T_3^{(95)}} \times \max\left\{T_1 + T_2 + T_3^{(95)} - \min(L, L_u), 0\right\} \text{ if } T_3^{(95)} > 0$$

The quantity $RC_3^{(95)}$ is the current quarter capital component amount to be used in the averaging formula.

Calculation of capital component amount for cash flows greater than 5 years based on averaging formula

21. *Calculation of* RC_3: $RC_3 = \max\left\{RC_3^l, \min\left(RC_3^u, 95\% \times RC_3^p + 5\% \times RC_3^{(95)}\right)\right\}$, where FP_3^p represents the previous quarter capital component amount for cash flows greater than 5 years. The quantity RC_3 represents the current quarter capital component amount for cash flows greater than 5 years.

Calculation of corresponding TGCR for cash flows greater than 5 years

22. The TGCR for cash flows greater than 5 years is $T_3 = \max(T_3^l, \min(T^*, T_3^u))$, where the quantity *T** is determined as follows: if $RC_3 = 0$ then $T^* = 0$. Otherwise, if $RC_3 > 0$ then *T** is the unique positive solution of the equation

$$RC_3 = \frac{T^*}{\max(T_1 + T_2, 0) + T^*} \times \max\left\{T_1 + T_2 + T^* - \min(L, L_u), 0\right\}.$$

Note that insurers that determine segregated fund guarantee actuarial liability and capital requirements without separating guarantee fees from non-guarantee fees must add the unamortized amount of the deferred acquisition cost to the TGCR amounts sums in steps 6, 18, 19, 20 and 22 and the quantity L_u in step 9 in order to determine the appropriate capital component amounts. For example, in step 18, the unamortized amount of the deferred acquisition cost would be added to $T_1 + T_2 + T_3^u$ but not to the numerator or denominator of $\frac{T_3^u}{\max(T_1 + T_2, 0) + T_3^u}$. Insurers requiring further guidance on this matter should contact the AMF.

The quantity L_u defines a cap on the segregated fund guarantee actuarial liability that may be subtracted from the TGCR in the determination of the segregated fund guarantee capital component amount (see step 7). The calculation of L_u described in step 9 is based on a CTE(85) actuarial liability standard and represents an interim measure. The calculation of L_u will be reviewed and may be modified in future reporting periods to become more closely aligned with the CTE(80) maximum actuarial liability standard promulgated by the CIA standard of practice. Other aspects of this method may be reviewed and modified in the future.

6.2.7.3 Calibration criteria

This criteria described in this section will apply to segregated fund guarantee capital requirements for business written on or after January 1, 2011. The existing calibration criteria will continue to apply to business written prior to January 1, 2011 until a new approach is developed and implemented.

Equity index calibration criteria

New minimum quantitative calibration criteria are mandated for the scenarios used to model the returns of the following total return equity indexes (henceforth referred to as "listed indexes"):

- TSX
- Canadian small cap equity, mid cap equity and specialty equity
- S&P 500
- US small cap equity, mid cap equity and specialty equity
- MSCI World Equity and MSCI EAFE

The actual investment return scenarios for each of the listed indexes used in the determination of total requirements must meet the criteria specified in the following table.

	Time Period	
	6 months	**1 year**
Left tail criteria		
2.5th percentile of return not greater than	-25%	-35%
5th percentile of return not greater than	-18%	-26%
10th percentile of return not greater than	-10%	-15%
Right tail criteria		
90th percentile of return not less than	20%	30%
95th percentile of return not less than	25%	38%
97.5th percentile of return not less than	30%	45%

Furthermore, the arithmetic average of the actual investment return scenarios for each listed index over any one-year period (including the one-year period starting on the valuation date) cannot be greater than 10%. All of these criteria must be met for the scenarios of a listed index to be in accordance with the new minimum calibration criteria.

In addition to the criteria above, modeled scenarios of TSX total return indexes must continue to satisfy the CIA calibration criteria at all percentiles over the five- and ten-year time horizons as published in the CIA's March 2002 report. In addition to the criteria above, modeled scenarios of S&P 500 total return indexes must satisfy the American Academy of Actuaries' calibration criteria for equities[74] at all percentiles over the five-, ten- and twenty-year time horizons.

The scenarios used to model returns of an equity index that is not one of the listed indexes need not meet the same calibration criteria, but must still be consistent with the calibrated scenarios used to model the returns of the listed indexes.

Correlation: The scenarios used to model returns for different equity indexes should be positively correlated with one another. Unless it can be justified otherwise, the correlation between the returns generated for any two equity indexes (whether or not they are listed) should be at least 70%. If scenarios are generated using a model that distinguishes between positive and negative trend market phases (e.g., the regime-switching lognormal model with two regimes) then, unless it can be justified otherwise, the scenarios should be such that there is a very high probability that different equity

[74] For example, as published in the June 2005 document entitled "Recommended Approach for Setting Regulatory Risk-Based Capital Requirements for Variable Annuities and Similar Products."

indexes will be in the same market phase at the same time, and a very low probability that different equity indexes will be in different phases at the same time.

Bond index calibration criteria

New minimum quantitative calibration criteria are mandated for the scenarios used to model total return bond indexes that track the performance of Canadian government, US government, or investment grade corporate bonds. The actual investment return scenarios for each such index used in the determination of total requirements must have the specified characteristics.

Left tail criteria

Upper bounds are placed on the 2.5th, 5th and 10th percentiles of the one-year total returns of the indicated bond indexes. For p = 2.5, 5 and 10, the p^{th} percentile of the total return over one year cannot be greater than

$$r - \max\left(D - \frac{1}{2}; 0\right) \times \left(a_p + b_p \cdot \sqrt{r}\right) - d_p$$

where:

- r is the effective per annum yield, at the time of valuation, on a D-year zero-coupon government bond in the currency of the bond index;
- D is the duration, measured in years, of the bond index at the time of valuation;
- a_p and b_p, as set forth below, are parameters related to the associated p^{th} percentile increase in interest rates;
- d_p, as set forth below, is the reduction in the return at percentile p due to credit default and downgrade losses associated with the particular bond index.

The values of a_p for a particular percentile depend on the average term to maturity of the bond index. For terms to maturity of 1, 3, 5 and 10 years, the values of a_p are given by the following table:

Percentile	**Term to maturity**			
	1 year	**3 years**	**5 years**	**10 years**
	a_p	a_p	a_p	a_p
2.5th	2.00%	1.60%	1.20%	0.80%
5th	1.70%	1.35%	1.00%	0.70%
10th	1.30%	1.05%	0.80%	0.50%

The values of b_p are given by the following table:

Percentile	b_p
2.5th	5.00%
5th	4.20%
10th	3.30%

The value of d_p for all government bond indexes is 0. The values of d_p for other credit classes are given by the following tables:

$d_{2.5}$	Term to maturity			
	1 year	3 years	5 years	10 years
AAA/AA	0.10%	0.50%	0.75%	1.30%
A	0.30%	0.80%	1.20%	2.00%
BBB	0.80%	2.00%	2.80%	4.00%

d_5	Term to maturity			
	1 year	3 years	5 years	10 years
AAA/AA	0.06%	0.30%	0.55%	1.00%
A	0.20%	0.55%	0.85%	1.50%
BBB	0.50%	1.40%	2.00%	3.00%

d_{10}	Term to maturity			
	1 year	3 years	5 years	10 years
AAA/AA	0.03%	0.15%	0.30%	0.65%
A	0.10%	0.30%	0.50%	1.00%
BBB	0.30%	0.85%	1.30%	2.00%

For terms to maturity between 1 and 10 years, the values of a_p and d_p are determined by linear interpolation between the nearest terms to maturity in the above tables. For terms to maturity greater than 10 years, the values of a_p and d_p for the 10-year term to maturity are to be used. For terms to maturity less than 1 year, the values of a_p and d_p for the 1-year term to maturity are to be used. For indexes containing bonds in multiple credit classes, d_p for the index should be calculated as the notional-weighted average of d_p taken over each of the bonds in the index.

Average return criterion

An upper bound is placed on the expected compounded average total return of each of the indicated bond indexes. The arithmetic average of the scenario-specific compounded average returns calculated over the D-year period beginning on the valuation date may not be greater than

$$r + s,$$

where *D* and *r* are defined as before, and *s* represents the average credit risk premium.

The value of *s* is given by the following table:

Credit class	*s*
Government	0.00%
AA or higher	0.85%
A	1.10%
BBB	1.45%

Criteria for other bond indexes

The scenarios used to model returns of a bond index that does not track the performance of Canadian government, US government, or investment grade corporate bonds need not meet the same calibration criteria, but must still be consistent with the calibrated scenarios used to model the returns of these indexes, and must be conservatively determined.

Correlation

The scenarios used to model returns for different bond indexes should be positively correlated with one another. Unless it can be justified otherwise, the correlation between the returns generated for an equity index and a bond index in the same currency should not be greater than 40%.

The insurer should take into consideration the limited historical experience with very low interest rate environments when setting assumptions for bond fund models and ensure that its internal model appropriately captures the risks associated with very low interest rate environments. An insurer's implementation of the new calibration criteria should not result in less conservative modeling or the use of less conservative scenario sets for bond indexes than is currently the case.

Criteria for individual segregated funds

If weighted averages of modeled indexes are used to calculate the return scenarios for an individual segregated fund (before fee deductions), all of the index return scenarios on which the segregated fund return scenarios are based must meet the above calibration criteria. Insurers that do not model segregated fund investment returns (before fee deductions) as weighted averages of index returns must contact the AMF for information on how to calibrate the segregated fund return scenarios.

6.2.7.4 Calculation of the total capital component

The total capital component for business subject to Section 6.2.7.3 (i.e., for business written on or after January 1, 2011) will be calculated separately from the total requirement for all other segregated fund guarantee business.

The total capital component for the segregated fund guarantee exposure as a whole will be the sum of the components for business subject to Section 6.2.7.3 Calibration criteria and all other business. For both business groups, the individual components have to be floored at zero before the sum is calculated.

6.2.7.5 Transitional rules

Transitional rules apply to any internal model used to calculate the TGCR and whose use has been newly authorized. For the initial year of use, the insurer must maintain, as the TGCR, 50% of the capital requirements, as determined through the use of the internal model, and 50% of the capital requirements determined with the prescribed factors. Starting in the year-end following the first anniversary of use, the internal model requirement may be used for all TGCR.

6.2.8 Quantitative requirements with recognition of a hedging strategy

With this method, the total gross capital requirement (TGCR) is determined first. The TGCR is the value of the obligations with respect to the guarantees offered on segregated funds and is calculated at CTE (95) with the internal model whose use was previously authorized by the AMF. The capital required will be the difference between the TGCR and the actuarial liabilities associated with the segregated fund guarantees on the insurer's balance sheet. For the purposes of this section, the actuarial liabilities are all the liabilities held for segregated fund guarantees, including the unamortized amount of the deferred acquisition cost (DAC).

The first part of the calculation involves generating a large number of stochastic real-world scenarios. The number of scenarios must be sufficient so that any change in scenario does not materially change the capital requirements. For each scenario, the insurer must forecast all the cash flows associated with the guarantees offered (i.e. payments under the guarantee, expenses, commissions, total management expense ratios, etc.). Where the insurer selects this approach, all its segregated funds with guarantees must be included in the forecast and assessed in the same manner whether or not a hedging strategy is used in their regard.

An insurer that has a hedging strategy must recognize it under this approach. The strategy modeling must be as faithful as possible to the manner in which the strategy is actually applied. Since the hedging strategy is modeled to calculate the capital requirements, the balance sheet assets under this strategy must not be factored in the calculation in Section 3.2.13. However, these assets are subject to the requirements associated with counterparty risk, discussed in Chapters 3 and 7.

When calculating the TGCR using this approach, certain considerations must be respected concerning the assumptions and modeling. These considerations are presented in greater detail in the following sections.

6.2.8.1 Basis of valuation

The calculation of the value of the obligations with the margins for adverse deviation (MfAD) and hedging inefficiency is subject to the following conditions:

1. The entire portfolio of policies with segregated fund guarantees must be modeled. Thus, policies subject to a hedging strategy as well as those that are not must be included in the calculations.

2. The assumptions used for the calculations must be the same as those used to calculate the actuarial liabilities and include the MfADs, except for the assumptions or margins described in Section 6.2.8.

3. All the calculations must be made using CTE (95) as a risk measure.

4. With respect to modeling the hedging strategy, use of the stochastic-on-stochastic method must be founded on the basic principles described in the Canadian Institute of Actuaries' document titled Reflection of Hedging in Segregated Fund Valuation and used by the insurer to calculate its actuarial liabilities.

5. The prescribed actuarial assumptions described in Section 6.2.8.4 apply in the outer loops according to real-world scenarios, both for hedged and unhedged products.

6. The inner loops employed to calculate risk-neutral liabilities and the greeks are used to model the hedging strategy. The calculation assumptions must be the same as those officially used to calculate risk-neutral liabilities and the greeks on a daily basis for hedging purposes.

7. Use of the same in-force data compression approach as that used to evaluate actuarial liabilities, if such an approach is used.

6.2.8.2 Hedging strategy

The insurer must use the same hedging strategy as the one in effect on the valuation date. Among other things, if rebalancing limits dictate when the insurer rebalances its hedging portfolio, such rebalancing limits must be reflected in the modeling. The

modeling must not underestimate the impact of actual rebalancing transactions on risks, particularly as regards to the frequency of rebalancing risk-neutral liabilities and hedge assets.

The hedging strategy cannot be modeled if it contains elements that could affect maintenance of the actual hedging strategy or a part thereof in the long term. For example, with respect to swaps, it might contain clauses allowing the counterparty to terminate the agreement in the event that the insurer is downgraded below a certain rating.

6.2.8.3 Economic assumptions

Real-world market projections are subject to the calibration criteria outlined in Section 6.2.7.3. These criteria apply to all policies, including business written before January 1, 2011. Stock market models with mean reversion are not permitted for the purposes of this guideline.

With respect to the cash flow discount rates, these must be consistent with the insurer's investments in terms of the underlying assets that back segregated funds' TGCR. In addition, the reinvestment rates of these assets must vary according to the scenario for which the cash flows are discounted. For products with a hedging strategy, the discount rates of the underlying assets of the segregated funds can only be used for discounting margins and hedging inefficiencies. For risk-neutral liabilities of the guarantee, the discount rates must be consistent with the hedging strategy.

6.2.8.4 Non-economic assumptions

Certain margins and assumptions are defined by the AMF. All assumptions and margins not specified by the AMF must be those used in the valuation of actuarial liabilities and include the corresponding MfADs.

Lapses

A 40% margin is applied to the best estimate assumption in replacement of the MfAD used in the calculation of actuarial liabilities. The lapse margin must be applied to create an adverse impact for the insurer. For example, if increasing the lapse rate by 40% is more favourable than reducing it by 40%, the insurer should reduce the lapse rate assumption by 40%. Lapse margins must be re-evaluated for each time step and for each contract, not globally. The direction of the margin usually varies based on the moneyness of the guarantee.

The final assumption, including the 40% margin, must be adjusted in the following manner for some products:

- Products with guaranteed withdrawal benefits

  Lapses before the withdrawal period must be the ones of the insurer including the 40% margin while lapses during the withdrawal period must be modified. The insurer's best estimate assumption including the 40% margin is used at the

beginning of the withdrawal period and moves on a straight line basis to reach a lapse rate of 0.5% 10 years after the start of the withdrawal period. The 0.5% rate is then maintained for the next 5 years after which it becomes zero. If the client's surrender value becomes nil during the withdrawal period, the lapse rate must be zero as of that point in time.

The amount used in the assumption for the client's periodic withdrawal during the withdrawal period must be the maximum guaranteed withdrawal set out in the policy.

- Products with maturity guarantee

  A zero lapse rate must be used when the moneyness ratio (market value/guaranteed value ratio) falls below a given value at a given point in time before the maturity date. The best estimate lapse rate assumption including the 40% margin continue to apply otherwise, including when the moneyness ratio moves above the floor.

  The moneyness ratio below which the lapse rates must be zero are presented in the following table. For parts of years, the rates must be obtained by linear interpolation.

Years to Maturity	Moneyness ratio
0	100%
1	80%
2	70%
3	60%
4	50%
5	40%

Mortality

A 16% margin is applied to the best estimate assumption in replacement of the MfAD used in the calculation of actuarial liabilities. The mortality margin must be added or subtracted in order to create an adverse impact for the insurer, for each product or with greater granularity, i.e. not globally for all segregated funds by mixing death benefits guarantees with guaranteed withdrawal benefits.

Longevity for guaranteed withdrawal benefits only

The mortality improvement assumption (best estimate and MfAD) is replaced for all future years with an assumption equal to 300% of the base mortality improvement rates.[75]

Expenses

[75] The base mortality improvement rates are those described in the memorandum of the Canadian Institute of Actuaries (Document 211072): http://www.cia-ica.ca/docs/default-source/2011/211072e.pdf

A 20% margin is applied to the transaction fee best estimate assumption for hedge assets (e.g. swaps, futures) in replacement of the MfAD used in the calculation of actuarial liabilities.

A 15% margin is applied to the best estimate assumption for administrative expenses in replacement of the MfAD used in the calculation of actuarial liabilities.

6.2.8.5 Basis risk

A separate calculation is made to quantify the basis risk related to the replication of the funds in a hedging strategy. Consequently, if the insurer implicitly models this element when calculating its actuarial liabilities, it should be removed when calculating capital requirements. The following calculation applies only to insurers following a hedging strategy and the funds hedged under the strategy.

The formula for the risk factor (RF) will be $RF = 20\ x\ B\ x\sqrt{2 - 2A}$

Where:

- A represents the historical correlation between segregated fund returns and hedge asset returns;
- B represents the standard deviation of segregated fund returns.

The historical correlations must be calculated on a weekly basis and cover the previous 52 weeks. The returns of the two asset subgroups are measured by the increase in their market value, net of cash flows resulting from policyholder deposits or hedge portfolio rebalancing.

The insurer may be slightly under- or over-hedged depending on its position within the rebalancing limits. In such a case, the data must be adjusted by a multiplier so as to assume the insurer is fully hedged at the beginning of each week.

The standard deviation of weekly segregated fund returns must be determined based on the volatility assumptions used in the hedging strategy and be based on the actual distribution between the different segregated funds on the calculation date.

The factor selected for a given quarter will be the greatest *RF* calculated for the four previous quarters. In order to obtain the capital requirements for the basis risk (*BR*), the factor is then applied to the sum of the market positions required by the hedging program at the end of the fiscal year (i.e. the total delta, including both equity and bond funds).

The calculation can be separated by type of guarantee if the hedging program is managed in this manner. The insurer could therefore separately calculate maturity guarantees, lifetime income guarantees, death guarantees and guarantees with different levels (e.g. 100% guarantee versus 75% guarantee), and then add up the capital requirements for each group to obtain a total amount.

The calculation details with respect to basis risk must be presented in the Capital Guidelines Certification Report.

6.2.8.6 Diversification credit

A diversification credit or benefit results when the aggregation of risks produces results that are less than the total of the individual risk elements.

The segregated fund risk requirement for insurance and market risks before diversification is calculated on the basis of a CTE (95) using the insurer's forecast model and economic and non-economic assumptions as outlined in Sections 6.2.8.3 and 6.2.8.4, to which the basis risk component (*BR)* is added, in accordance with the formula described in Section 6.2.8.5. To determine the CTE (95), the values of the obligations in the scenarios are sorted to determine the 5% with the highest value. The scenarios corresponding to the value of these obligations are then used to separately calculate each component's risk (i.e. it is therefore not necessary to repeat the calculations for all the scenarios; only those that served to determine the CTE (95) before diversification will be used). The following risk components must be calculated with the internal model: lapse (*A*), mortality (*M*), longevity (*L*), expenses (*D)*, and market (*I*).

The risk of each component is determined by recalculating the obligation value with the internal model after replacing the assumption with the prescribed MfAD by the insurer's assumption including its MfAD. The replacement is made on a cumulative basis.

Calculation steps using the internal model

1. Calculate the total requirement using all the assumptions outlined in Sections 6.2.8.3 and 6.2.8.4 (economic and non-economic);

2. Identify the scenarios that make up the CTE (95) and that will serve for calculations 3 to 6 below;

3. Redo the calculation in step 1, replacing the lapse assumption with the assumption with MfAD used by the insurer in calculating its actuarial liabilities;

4. Redo the calculation in step 3, replacing the mortality assumption with the assumption with MfAD used by the insurer in calculating its actuarial liabilities;

5. Redo the calculation in step 4, replacing the mortality improvement assumption with the assumption with MfAD used by the insurer in calculating its actuarial liabilities;

6. Redo the calculation in step 5, replacing the expense assumption with the assumption with MfAD used by the insurer in calculating its actuarial liabilities.

Calculation of components

- *BR* is the amount resulting from the calculation based on Section 6.2.8.5;

- *A* is the difference between the value of the obligations calculated in steps 1 and 3;
- *M* is the difference between the value of the obligations calculated in steps 3 and 4;
- *L* is the difference between the value of the obligations calculated in steps 4 and 5;
- *D* is the difference between the value of the obligations calculated in steps 5 and 6;
- *I* is the difference between the value of the obligations calculated in step 6 and the actuarial liabilities in the financial statements, including the DAC.

The requirement for insurance and market risks after diversification (*IMR*) is calculated using the following formula:

$$IMR = \sqrt{\sum_{i,j=1}^{5} \rho_{ij} \times R_i \times R_j}$$

Where:

- R_i is risk i;
- The market risk and basis risk are combined into one component for calculation purposes;
- ρ_{ij} is the correlation factor between risks *i and j*, as defined in the following correlation matrix:

i \ *j*	**Market + Basis risk**	**Lapse**	**Mort.**	**Long.**	**Exp.**
Market + Basis risk	1				
Lapse	0,25	1			
Mortality	0	0	1		
Longevity	0	0	-0,25	1	
Expenses	0	0	0	0	1

However, the *IMR* value cannot be lower than the highest R_i value for all *i* risks in the matrix.

The diversification credit *DC* is calculated using the following formula:

$$DC = \sum_{i=1}^{5} R_i - IMR$$

However, the diversification credit is limited to 30% of the value of $\sum_{i=1}^{5} R_i$.

6.2.8.7 Operational risk

Capital requirement for operational risk (*OR*) is the sum of the following elements:

- Capital requirements associated with business volume;
- Capital requirements associated with a large increase in business volume;
- Capital requirements associated with the hedging strategy;
- General capital requirements.

Capital requirements associated with business volume are determined by applying a factor of 0.40% to the value of segregated fund accounts with guarantees.

Capital requirements associated with a large increase in business volume are determined by applying a factor of 0.40% to the amount by which the year-over-year increase in the value of the segregated fund accounts with guarantees exceeds a 20% threshold.

Capital requirements associated with the hedging strategy are determined by applying a factor of 0.40% to the value of segregated fund accounts for hedged contracts. Even if the contract is only partially hedged, the total value of the contract accounts must be included in the calculation.

The general capital requirements are determined by applying a factor of 4.5% to the capital requirement calculated in Section 6.2.8, excluding the operational risk, and reduced by the diversification credit, i.e. the product of:

$$4{,}5\ \% \times (A + M + L + D + I + BR - DC)$$

6.2.8.8 Capital requirement before adjustment

The capital requirement before adjustment (*CR*) for segregated fund risks is calculated as follows:

$$CR = \frac{A + M + L + D + I + BR + OR - DC}{150\%}$$

However, the *CR* cannot be negative.

6.2.8.9 Capital requirement after adjustment

The capital requirement for the segregated funds risks calculated in this section is adjusted to smooth the impact of the current period. The amount that can be amortized corresponds to the difference between the capital requirement before adjustment for the current quarter and the last quarter. The amortizations of the impact will be done over 5 quarters, with 20% of the impact reflected per quarter starting in the current quarter.

Calculation example

Quarter	Capital requirement before adjustment (CR)	CR change	Capital requirement after adjustment (adjusted CR)
0	100		100
1	120	20	104 = 100 + (20)x20%
2	150	30	114 = 104 + (20+30)x20%
3	130	(20)	120 = 114 + (20+30-20)x20%
4	90	(40)	118 = 120 + (20+30-20-40)x20%
5	80	(10)	114 = 118 + (20+30-20-40-10)x20%
6	75	(5)	105 = 114 + (30-20-40-10-5)x20%

The details of the calculation with respect to the adjustment must be disclosed in the Capital Guidelines Certification Report.

6.2.8.10 Uncertainty associated with parameters in the internal model

Estimating parameters can entail uncertainty or sources of data errors. The insurer must determine, document and present the uncertainties and sources of errors associated with risk quantification.

For each source of error, the insurer must determine whether the degree of conservatism is adequate. The margins of conservatism must not be used to correct the internal model. The AMF expects the adjustments made to the quantification of parameters to lead to an increase in capital requirements, particularly to satisfy the calibration criteria. When material estimation errors occur, the insurer must not simply add margins of conservatism but must also inform the AMF.

6.2.8.11 Approximations and simplifications

The AMF expects the insurer to pay attention to approximations and simplifications. The AMF would like to ensure that these approximations and simplifications do not compromise the integrity and reliability of the capital requirement calculation results. When approximations and simplifications are used, the AMF expect these to generate conservatism in the internal model.

The insurer must ensure that the approximations and simplifications are reasonable in relation to:

1. the calculation of sensitivities (greeks) and cross-greeks in day-to-day hedging transactions and in real-world projections to evaluate hedging inefficiencies;

2. the interpolation and extrapolation methods used in the yield curves of real-world and risk-neutral projections;

3. the sufficiency of the number of points on the swap curve for the interpolations;

4. the frequency of portfolio rebalancing associated with the hedging strategy in the projections compared to reality;

5. projection horizon;

6. currency risk;

7. the data compression methods.

With respect to the data compression methods used, the insurer must show that the compressed extract has similar values as the complete extract; in particular:

1. risk-neutral liabilities;
2. hedged and unhedged greeks;
3. some cash flows or their discounted value (e.g. revenues, benefits, etc.);
4. the value of funds and their guaranteed value.

6.2.9 Changes and monitoring

Where an insurer has obtained authorization to use an internal model approach, it must provide the AMF with a detailed report on the status of the internal model whenever material or non-material changes occur.

All changes must be disclosed and documented. The insurer must not group changes that would have opposite effects so as to consider them a single non-material change.

The insurer must establish a procedure to manage the changes to the internal model, which will be reviewed by the AMF.

The changes must be made on a copy of the internal model so as to maintain a separation between the internal model on which the changes are made and the internal model used in the insurer's operations.

The AMF recommends that the insurer plan appropriately when making changes to its internal model. It should contact the AMF at the beginning of the process if it anticipates material changes.

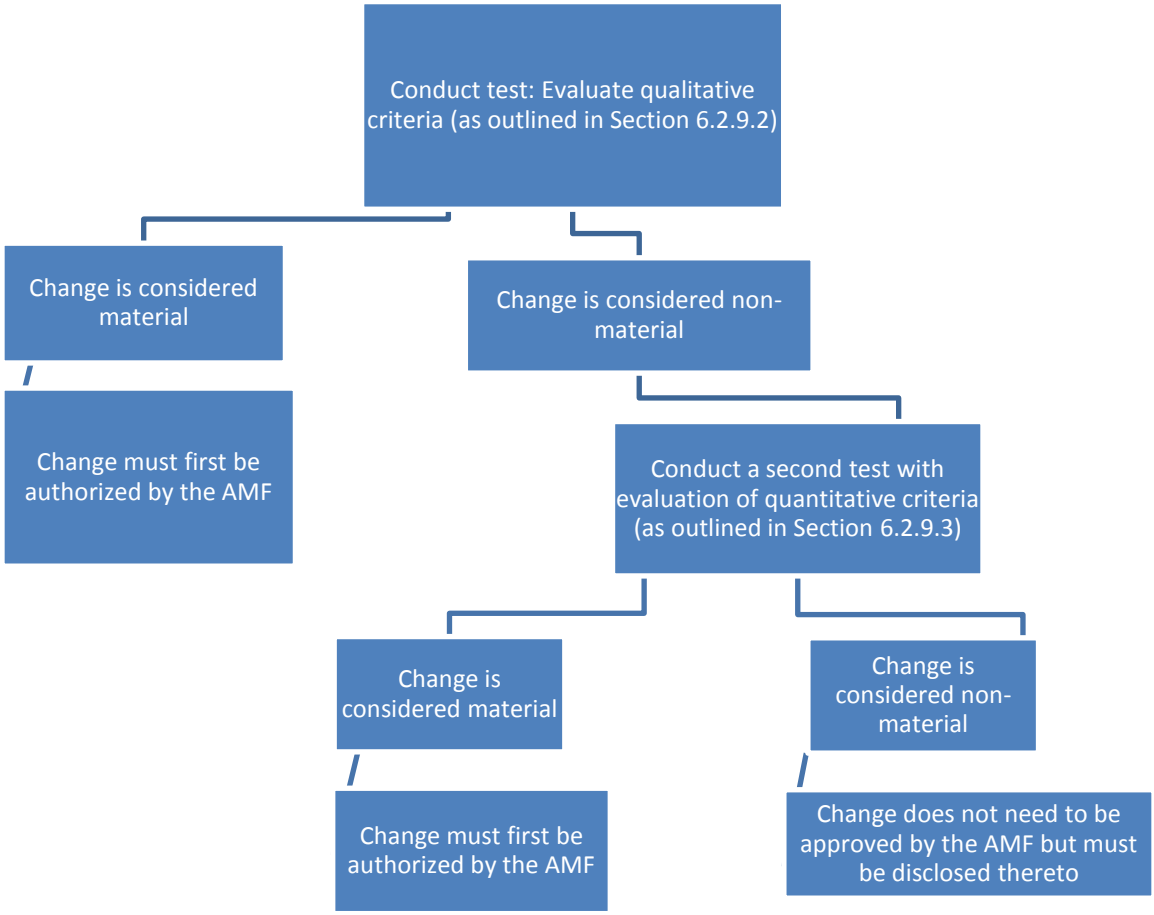
6.2.9.1 Relative importance of changes

The procedure to manage the changes to the internal model must contain a definition of the relative importance of changes authorized by the AMF. This definition will make it possible to frame the notion of material and non-material changes as outlined in Section 6.2.9. In order to properly assess relative importance, the insurer must apply a combination of qualitative and quantitative criteria to the changes. These definitions must be authorized by the AMF.

The qualitative criteria must, at minimum, consider the criteria outlined in Section 6.2.9.2. To quantitatively assess relative importance, the insurer must examine the changes based on the internal definition of relative importance in the change procedure, which must, at minimum, contain the requirements of Section 6.2.9.3.

The qualitative criteria must be considered as an initial test. If a change cannot be classified as material or non-material after the first test, the change must be subjected to the second test involving quantitative criteria.

The following diagram illustrates the change classification steps.



6.2.9.2 Qualitative criteria for material changes

Before its implementation, a change to the internal model that affects the following elements must be disclosed to the AMF to allow it to determine whether the change must be considered material at this stage:

- Governance: This includes the roles and responsibilities of the parties involved or responsible for the internal model, including senior management and members of the Board of Directors;
- Internal audit policies and validation;
- Change the procedure to manage the changes to the internal model;
- Theoretical foundations and methodology of the internal model[76]
- The internal model's scope of use and risks modeled;[77]
- The data, their sources, nature and history;[78]
- Adaptation of the internal model after changes were made to the hedging strategy;
- The technology platform;[79]
- Switching from the global method to the expected payment date method or to the method with recognition of hedges and vice-versa;
- Other aspects of the internal model deemed important by the insurer or by the AMF, and the accumulation of non-material changes.[80]

The insurer must provide justification for the change. The requirements concerning material changes outlined in Section 6.2.9.4 apply if the change is deemed material by the AMF. If the change is deemed non-material by the AMF, it must be subject to the quantitative criteria set out in Section 6.2.9.3.

6.2.9.3 Quantitative criteria for material changes

This subsection outlines the quantitative criteria for determining whether a change should be considered material or non-material. The capital requirement before adjustment for segregated funds corresponds to the CTE (95) as defined in Section 6.2.7.1 or RC_3^u as defined in Section 6.2.7.2 or *CR* as defined in Section 6.2.8.8 depending on the formula used.

[76] For example, changing the stock market return scenario generator by switching from a regime switching lognormal model to a single regime model or changing the dynamic lapse formula would constitute material changes.

[77] For example, adding new products would constitute a material change.

[78] For example, a change in the source of the data, such as the implementation of a new administrative system or a change in the start day of the history used to determine some assumptions, constitutes a material change.

[79] For example, migration of a model included in the internal model to the use of an external model or a change in the technology platform supporting the internal model.

[80] The combination of several non-material changes can have a material impact on insurers. As such, if for a given period, several non-material changes were to take place, the AMF could require that the changes be treated as material changes.

A change is material if:

1. it results in a decrease of 1% or more in total capital requirement; or
2. it results in a decrease of 10% or more in the capital requirement before adjustment for segregated funds in the current environment or in an environment simulating an immediate 25% drop in the stock market.

These two ratios must be calculated as follows:

- The numerator: The difference between the capital requirement before adjustment for segregated funds before and after the change;
- The denominator: The capital requirement (total or before adjustment for segregated funds) before the change.

Capital requirements used in calculating the above ratios must be calculated at the same date.

6.2.9.4 Tracking changes

Depending on the nature of the changes, the insurer must report the status of the situation to senior management and to the AMF. The AMF expects the insurer to keep a history of the changes.

Non-material changes

An additional quantitative test must be performed for changes deemed non-material according to Sections 6.2.9.2 and 6.2.9.3. As such, any change that leads to a decrease of more than 5% in the capital requirement before adjustment for segregated funds must be disclosed to the AMF within a reasonable time frame before its implementation. The ratio must be calculated in accordance with the instructions in Section 6.2.9.3.

All other non-material changes must be disclosed to the insurer's senior management and to the AMF at least once per fiscal year or when requested by the AMF.

Material changes

The insurer must disclose to the Board of Directors and senior management the type and reason for any material change. Authorization from the AMF is required prior to the implementation of any material change.

Senior management must approve material changes before they are submitted to the AMF for authorization. Any changes made to the internal model and to the validation process must have been validated by the validation team.

The insurer must continue using the existing internal model until the AMF authorizes the proposed material changes. The AMF may, at its discretion, consider that the proposed material changes are likely to have too great an impact and ask the insurer to submit a new application for authorization to use the internal model.

The application for authorization of changes submitted to the AMF must contain, at minimum, the following elements:

1. An application for authorization letter signed by senior management;

2. A positive opinion from the validation team with respect to the changes;

3. A use test (i.e. demonstration of compliance with the requirements outlined in Section 6.2.6);

4. The proposed effective date of the changes for the purpose of disclosure of the CAR ratio to the public or to the AMF;

5. A document describing the proposed changes and summarizing the conclusions of the validation team and of the controls;

6. A documented impact study (i.e. sensitivity analysis, *ex post* control, impact on the capital requirement, impact on the capital ratio, etc.);

7. Identification of the most important changes affecting the documentation provided to the AMF, both in terms of new documents and those that change the accompanying documents initially provided;

8. The name of the change contact or coordinator;

9. Any other relevant document.

The insurer must demonstrate the nature of the proposed changes and why they should be considered as such. The insurer's key control functions (e.g. risk management and senior management) must not have received unfavourable opinions from the parties involved in the change process.

The insurer must describe all the organizational changes arising from the proposed changes to the internal model or related thereto.

6.2.9.5 Change history

The insurer must document the changes made to the internal model and indicate the changes made since the last revision.

The following data must be used for tracking purposes:

1. The date of the change;

2. The portfolio affected;

3. The size of the portfolio affected;

4. The anticipated and actual effect on capital requirements and on the capital ratio;

5. The type of change or event;

6. Justification for the change.

The insurer is responsible for documenting and updating the change history. This documentation must be presented to the AMF at its request and in accordance with the conditions outlined in Section 6.2.9. The documentation must indicate the personnel responsible for the changes.

6.2.9.6 Continuous monitoring

Detailed monitoring reports must be provided to senior management and the AMF at disclosure of the CAR ratio to the public or to the AMF. These reports must contain, at minimum:

1. Changes in the capital ratio associated with segregated funds, and in the capital requirements, and an explanation for these changes;

2. Details of the hedging strategy's performance over the previous nine quarters (gains and losses with explanations, efficiency metric, etc.);

3. Sensitivity tests of the capital ratio, capital requirements and net earnings in the event of a stock market decline of at least 25%;

4. Exceptions to the insurer's policies (e.g. deviations from these policies, situations where the limits in the risk appetite and tolerance policy can be exceeded);

5. Concentration analyses of the most important counterparties associated with the hedging strategy.

An executive summary of this report must be sent to the Board of Directors.

If deemed necessary, the AMF may request that additional information be included in all the periodic monitoring reports.

The AMF expects the insurer to remain abreast of new analysis techniques and changing industry practices and to adopt them if they improve estimation accuracy.

The insurer must have and maintain an up-to-date list of the different models used within the internal model and their objectives.

If the insurer does not satisfy the requirements of this guideline on a continuous basis, the AMF may require that it hold additional capital.

The insurer must re-evaluate the parameters of the internal model:

- at least once per fiscal year;
- following market events or specific events that materially affect the internal model;
- at the AMF's request.

6.3 Modes of calculation

6.3.1 Page 95.010 of the QFP disclosure form

The columns on page 95.010 of the QFP disclosure form must be filled in as follows:

Column 01: *Guaranteed Value:*

This is the amount guaranteed in all segregated funds. If the funds are subject to guarantees of different amounts, for example 100% on death and 75% on maturity, report the larger amount here.

Column 02: *Market Value:*

This is the market value of the segregated funds.

Column 03: TGCR

The calculation based on prescribed factors is detailed in Section 6.1 (lines 010 to 060 of the QFP form). However, if the insurer uses an internal model, the result will be carried forward to line 070 of the QFP form.

Column 04: *Credit for Reinsurance Ceded:*

This is determined according to the approach agreed with the AMF.

Column 05: *Net Capital Required:*

This is determined as:

TGCR – Credit for Reinsurance Ceded

Column 06: *Net Actuarial Liabilities Held:*

This is the total net actuarial liabilities held on the balance sheet for the segregated fund guarantee risks, excluding deferred income taxes.[81]

Column 07: *Net Capital Required Component:*

[81] The amount of net actuarial liabilities held or any similar amount should be calculated on a basis that is consistent with the calculation of the TGCR with respect to the inclusion or exclusion of deferred income taxes.

This is determined as:

Net Capital Required – Net Actuarial Liabilities Held

Note: The total in line 099 (page 95.010 of QFP disclosure form) must not be less than zero.

6.3.2 Page 95.020 of the QFP disclosure form

The columns on page 95.020 of the QFP disclosure form are filled in as follows:

Column 01: *Prescribed Factor Requirements:*

This is the gross calculated requirement based on the prescribed factors established in Section 6.1.

Column 02: *Internal Model Requirements:*

This is the gross calculated requirement based on insurer's specific internal model.

Column 03: TGCR

The following "transition rules" apply to TGCR based on the internal model according to the formula in section 6.2.7:

- In the first year of the use of the model, the TGCR is calculated as: 50% of the prescribed factor requirements + 50% of the internal model requirements.

- Thereafter, total gross capital required will represent 100% of the internal model requirements.

If the insurer only uses the factor approach, the TGCR will represent 100% of the factor requirements.

If the insurer uses the approach according to the Section 6.2.8, it represents 100% of the internal model requirements.

Column 04: *Credit for Reinsurance Ceded:*

This is determined according to the approach agreed with the AMF.

Column 05: *Net Capital Required:*

This is determined as:

TGCR – Credit for Reinsurance Ceded

Column 06: *Net Actuarial Liabilities Held:*

This is the total net actuarial liabilities held on the balance sheet for the segregated fund guarantee risks, excluding deferred income taxes[81].

Column 07: *Net Capital Required Component:*

This is determined as:

Net Capital Required – Net Actuarial Liabilities Held

Note: In the QFP form, the amount on page 95.020, column 07, line 100 should be the same as the amount on page 95.010, column 07, line 099.

Chapter 7. Off balance sheet activities

The term “off-balance sheet activities”, as used in this guideline, encompasses guarantees, commitments, derivatives, and similar contractual arrangements whose full notional principal amount may not necessarily be reflected on the balance sheet. Such instruments are subject to a capital requirement under this chapter irrespective of whether they have been recorded on the balance sheet at market value.

This chapter of the guideline is concerned with the default risk of the counterparty to a transaction associated with an insurer's off-balance sheet activities. The requirements in this chapter are distinct from the requirements for transactions that increase an insurer’s exposure to asset yield deficiency risk and for which the full notional amount of the transaction may not be reported on the balance sheet (refer to Section 3.2.13).

The face value of an off-balance sheet item does not always properly reflect the amount of capital required in terms of counterparty risk. In order to estimate the potential risk associated with those items in these terms, the insurer must first convert them into credit equivalent by multiplying the face value of the item by a credit conversion factor, in accordance with Section 7. The resulting credit equivalent amount is then assigned the appropriate counterparty factor, as referred to in Section 3.2, or, as the case may be, the factor assigned to the collateral (refer to Section 3.3) or to the guarantor (refer to Section 3.4).

The risk factors that appear in this chapter of the guideline are subject to the guidance related to the treatment of “qualifying participating policies” defined in Section 1.3.

7.1 Credit conversion factors

The credit conversion factors are as follows:

100% Conversion factor

- Direct credit substitutes (general guarantees of indebtedness and guarantee-type instruments, including standby letters of credit serving as financial guarantees for, or supporting, loans and securities).
- Acquisitions of risk participations in bankers' acceptances and participations in direct credit substitutes (for example, standby letters of credit).
- Sale and repurchase agreements.
- Forward agreements (contractual obligations) to purchase assets, including financing facilities with certain drawdown.
- Written put options on specified assets with the feature of a credit enhancement.[82]

[82] Written put options (where premiums are paid upfront) expressed in terms of market rates for currencies or financial instruments bearing no credit are excluded from the framework.

50% Conversion factor

- Transaction-related contingencies (for example, bid bonds, performance bonds, warranties and standby letters of credit related to a particular transaction).
- Commitments with an original maturity exceeding one year, including underwriting commitments and commercial credit lines.
- Revolving underwriting facilities (RUFs), note issuance facilities (NIFs) and other similar arrangements.

20% Conversion factor

- Short-term self-liquidating trade-related contingencies, including commercial/documentary letters of credit (the 20% factor applies if an insurer has either issued or confirmed the contingent liability).
- Commitments with an original maturity of one year or less.

0% Conversion factor

- Commitments that are unconditionally cancellable at any time without prior notice.

These off-balance sheet items are described in Section 7.4.

7.2 Forwards, swaps, purchased options and similar derivatives

The treatment of forwards, swaps, purchased options and similar derivatives contracts requires special attention because insurers are not exposed to credit risk for the full face value of their contracts (notional principal amount), but only to the potential cash flow replacement cost (on contracts showing a positive value) if the counterparty defaults. The credit equivalent amounts are calculated using the current exposure method and are assigned the weighting factor appropriate to the counterparty.

The add-on applied in calculating the credit equivalent amount depends on the maturity of the contract and on the volatility of the rates and prices underlying that type of instrument. Options purchased over the counter are included with the same conversion factors as other instruments.

- Interest rate contracts include:
  - single currency interest rate swaps;
  - basis swaps;
  - forward rate agreements and products with similar characteristics;
  - interest rate futures;
  - interest rate options purchased.

- Exchange rate contracts include:
  - gold contracts;[83]
  - cross-currency swaps;
  - cross-currency interest rate swaps;
  - outright forward foreign exchange contracts;
  - currency futures;
  - currency options purchased.
- Equity contracts include:
  - futures;
  - forwards;
  - swaps;
  - purchased options;
  - similar derivatives contracts based on individual equities or on equity indexes.
- Precious metals (e.g., silver, platinum) contracts include:
  - futures;
  - forwards;
  - swaps;
  - purchased options;
  - similar derivatives contracts based on precious metals.
- Other commodities contracts include:
  - futures;
  - forwards;
  - swaps;
  - purchased options;
  - similar derivatives contracts based on energy contracts, agricultural contracts, base metals (e.g., aluminum, copper, zinc);
  - other non-precious metal commodity contracts.

[83] Gold contracts are treated the same as exchange rate contracts for the purpose of calculating asset yield deficiency risk.

An insurer must calculate the credit equivalent amount of these contracts using the current exposure method. Under this method, an insurer adds:

- the total replacement cost (obtained by "marking to market") of all its contracts with positive value;

and,

- an amount for potential future asset yield deficiency risk exposure by multiplying the notional principal amounts by one of the following add-ons:

Contracts					
Residual maturity	**Interest rate**	**Exchange rate and gold**	**Equity**	**Precious metals except gold**	**Other commodities**
One year or less	0.0%	1.0%	6.0%	7.0%	10.0%
Over one year to five years	0.5%	5.0%	8.0%	7.0%	12.0%
Over five years	1.5%	7.5%	10.0%	8.0%	15.0%

Notes:

- Instruments traded on exchanges do not require capital for counterparty arising from asset yield deficiency risk where they are subject to daily margining requirements.
- For contracts with multiple exchanges of principal, the residual maturity factor is based on the number of remaining payments in the contract.
- For contracts that are structured to settle outstanding exposure following specified payment dates and where the terms are to reset so that the market value of the contract is zero on specified dates, the residual maturity is considered to be the time until the next reset date. In the case of interest rate contracts with remaining maturities of more than one year and that meet the above criteria, the add-on factor is subject to a floor of 0.5%.
- Contracts not covered by any of the columns of the previous matrix are to be treated as "other commodities."
- No potential asset yield deficiency risk exposure would be calculated for single currency floating/floating interest rate swaps since the credit equivalent amount is evaluated solely on the basis of their mark-to-market value.
- The add-ons are based on effective rather than apparent notional amounts. In the event that the effective notional amount is leveraged or enhanced by the structure of the transaction, insurers must use the effective notional amount when determining

potential future exposure. For example, a stated notional amount of $1 million with payments calculated at two times LIBOR would have an effective notional amount of $2 million.

- Potential credit exposure is to be calculated for all OTC contracts (with the exception of single currency floating/floating interest rate swaps), regardless of whether the replacement cost is positive or negative.
- No add-on for potential future exposure is required for credit derivatives. The credit equivalent amount for a credit derivative is equal to the greater of its replacement cost or zero.

7.3 Netting of forwards, swaps, purchased options and similar derivatives

Insurers may net contracts subject to novation or any legally valid form of netting. Novation refers to a written bilateral contract between two counterparties under which each obligation to the other to deliver a given currency on a given date is automatically cancelled and replaced by an obligation to pay a single amount, which is the result of netting the amounts owed by the counterparties to each other under all the cancelled obligations.

Insurers that wish to net transactions under either novation or another form of bilateral netting will need to satisfy the AMF that the following conditions are met:

- The insurer must have a netting contract or agreement with each counterparty that creates a single legal obligation, covering all included transactions subject to netting. The result of such arrangement would be that the insurer only has one obligation for payment or one claim to receive funds based on the net sum of the positive and negative mark-to-market values of all the transactions with that counterparty in the event of default, bankruptcy, liquidation or similar circumstances.

- The insurer must have written and reasoned legal opinions that, in the event of any legal challenge, the relevant courts and authorities would find the exposure under the netting agreement to be the net amount under:

  - the law of the jurisdiction where the counterparties are incorporated and the laws of any jurisdiction applicable to branches involved;
  - the law governing the individual transactions; and,
  - the law governing any contracts or agreements required for netting purposes;

- The insurer has internal procedures to verify that, prior to recognizing a transaction as being subject to netting, the transaction is covered by legal opinions that meet the above criteria.

- The insurer must have procedures in place to ensure that a review of the legal characteristics of netting arrangements for possible changes in law is undertaken to maintain the validity of such contracts.

- The insurer maintains all required documentation in its files.

Any contract containing a walkaway clause will not be eligible to qualify for netting for the purpose of calculating capital requirements. A walkaway clause is a provision within the contract that permits a non-defaulting counterparty to make only limited payments, or no payments, to the defaulter.

Asset yield deficiency exposure on bilaterally netted transactions is calculated as the sum of the net mark-to-market replacement cost, if positive, plus an add-on based on the notional principal of the individual underlying contracts before netting. However, for purposes of calculating potential asset yield deficiency exposure of contracts subject to legally enforceable netting agreements in which notional principal is equivalent to cash flows, notional principal is defined as the net receipts falling due on each value date in each currency.

The reason that these contracts are treated as a single contract is that offsetting contracts in the same currency maturing on the same date will have lower potential future exposure as well as lower current exposure. For multilateral netting schemes, current exposure (i.e., replacement cost) is a function of the loss allocation rules of the clearing house.

The calculation of the gross add-ons should be based on the legal cash flow obligations in all currencies. This is calculated by netting all receivable and payable amounts in the same currency for each value date. The netted cash flow obligations are converted to the reporting currency using the current forward rates for each value date. Once converted the amounts receivable for the value date are added together and the gross add-on is calculated by multiplying the receivable amount by the appropriate add-on factor.

The future asset yield deficiency exposure for netted transactions (A_{Net}) equals the sum of:

- 40% of the add-on as presently calculated (A_{Gross}),[84]

  and

- 60% of the add-on multiplied by the ratio of net current replacement cost to positive current replacement cost ("NPR"),

where:

NPR = level of net replacement cost/level of positive replacement cost for transactions subject to legally enforceable netting agreements.

The calculation of NPR can be made on a counterparty basis or on an aggregate portfolio basis for all transactions subject to legally enforceable netting agreements. On a counterparty by counterparty basis, a unique NPR is calculated for each counterparty. On an aggregate basis, the NPR is calculated and applied to each legally enforceable netting agreement.

[84] A_{Gross} equals the sum of the future asset yield deficiency exposures (i.e., notional principal amount times the appropriate add-on factor from Section 7.2) for transactions subject to legally enforceable netting agreements.

7.3.1 Steps for determining the credit equivalent amount of netted contracts

Step 1 Determine the add-ons and replacement costs of each transaction for each counterparty subject to bilateral netting. A worksheet similar to that set out below could be used for this purpose.

Counterparty					
Transaction	**Notional principal amount (1)**	**Add-on factor (ref. H6) (2)**	**Potential credit exposure (1) x (2) = (3)**	**Positive replacement cost (4)**	**Negative replacement cost (5)**
1					
2					
etc.					
Total			**A_{Gross}**	**R^+**	**R^-**

Step 2 Calculate the net replacement cost for each counterparty subject to bilateral netting. Sum the positive and negative replacement costs ($R^+ + R^-$) (note: negative replacement costs for one counterparty cannot be used to offset positive replacement costs for another counterparty in the aggregate approach). If the result is less than zero, enter zero.

Step 3 Calculate the NPR. For insurers using the counterparty by counterparty basis, the NPR is the net replacement cost (from step 2) divided by the positive replacement cost (amount R^+ calculated in step 1).

For insurers using the aggregate basis, the NPR is the sum of the net replacement costs of all counterparties subject to bilateral netting divided by the sum of the positive replacement costs for all counterparties subject to bilateral netting.

A simple example of calculating the NPR ratio is set out below:

Transaction	Counterparty 1		Counterparty 2		Counterparty 3	
	Notional amount	Mark to market value	Notional amount	Mark to market value	Notional amount	Mark to market value
Transaction 1	100	10	50	8	30	-3
Transaction 2	100	-5	50	2	30	1
Positive replacement cost (R^+)		10		10		1
Net replacement cost (NR)		5		10		0
NPR (per counterparty)	0.5		1		0	
NPR (aggregate)	**$SNR/SR^+ = 15/21 = 0.71$**					

Step 4 Calculate A_{Net} for each counterparty subject to bilateral netting. However, the NPR applied will depend on whether the insurer is using the counterparty by counterparty basis or the aggregate basis. The insurer must choose which basis it will use and use it consistently for all netted transactions.

For netted contracts where the net replacement cost is > 0
A_{Net} is: $(0.4 \times A_{Gross}) + (0.6 \times NPR \times A_{Gross})$.

For netted contracts where the net replacement cost is zero
A_{Net} is: $(0.4 \times A_{Gross})$.

Step 5 Calculate the credit equivalent amount for each counterparty subject to bilateral netting by adding the net replacement cost (step 2) and A_{Net} (step 4). Aggregate the counterparties by the factors appropriate to each type of counterparty. The sum corresponds to the credit equivalent amount.

7.3.2 Example of netting calculation for potential future exposure with contracts subject to novation

Assume an insurer has 6 contracts with the same counterparty and has a legally enforceable netting agreement with that counterparty:

Contract	Notional Principal Amount	Marked to Market
A	10	1
B	20	-2
C	10	-1
D	40	4
E	30	3
F	20	-2

Contracts A and B are subject to novation, as are contracts C and D. Under novation, the two contracts are replaced by one new contract. Therefore to calculate the capital requirements, the insurer would replace contracts A and B for contract A+ and contracts C and D for contract C+, netting the notional amounts and calculating a new marked to market amount.

Contract	Notional Principal Amount	Marked to Market
A+	10	-1
C+	30	3
E	30	3
F	20	-2

Assume the add-on factor for all contracts is 5%. The potential asset yield deficiency exposure is calculated for each contract. AGross is the sum of the potential exposures:

Contract	Notional Principal Amount	Add-on Factor (5%)	Potential Credit Exposure	Positive Replacement Cost	Negative Replacement Cost
A+	10	0.05	0.5	0	-1
C+	30	0.05	1.5	3	0
E	30	0.05	1.5	3	0
F	20	0.05	1.0	0	-2
Total			**4.5**	**6**	**-3**

The net replacement cost is 3 (i.e., 6 - 3; the greater of zero or the sum of the positive and negative replacement costs).

The NPR is 0.5 (i.e., 3 / 6; the net replacement cost divided by the positive replacement cost).

A_{Net} is (0.4 x 4.5) + (0.6 x 0.5 x 4.5) = 3.15.

The credit equivalent amount is 6.15 (i.e., 3 + 3.15; the net replacement cost plus A_{Net}).

7.4 Off balance sheet item categories

7.4.1 Direct credit substitutes (100% conversion factor)

Direct credit substitutes include guarantees or equivalent instruments backing financial claims. With a direct credit substitute, the risk of loss to the insurer is directly dependent on the creditworthiness of the counterparty.

Examples of direct credit substitutes include:

- guarantees given on behalf of customers to stand behind the financial obligations of the customer and to satisfy these obligations should the customer fail to do so; for example, guarantees of:
  - payment of existing indebtedness for services;
  - payment with respect to a purchase agreement;
  - lease, loan or mortgage payments;
  - payment of uncertified cheques;
  - remittance of (sales) tax to the government;
  - payment of existing indebtedness for merchandise purchased;

  - payment of an unfunded pension liability; and
  - reinsurance of financial obligations;

- standby letters of credit or other equivalent irrevocable obligations, serving as financial guarantees, such as letters of credit supporting the issue of commercial paper;
- risk participations in bankers' acceptances and risk participations in financial letters of credit. Risk participations constitute a guarantee by the participating insurers such that if there is a default by the underlying obligor, they will indemnify the selling company for the full principal and interest attributable to them;
- securities lending transactions, where the insurer is liable to its customer for any failure to recover the securities on loan.

7.4.2 Transaction-related contingencies (50% conversion factor)

Transaction-related contingencies relate to the ongoing business activities of a counterparty, where the risk of loss to the reporting institution depends on the likelihood of a future event that is independent of the creditworthiness of the counterparty. Essentially, transaction-related contingencies are guarantees that support particular performance obligations rather than supporting customers' general financial obligations. Performance-related guarantees specifically exclude items relating to non-performance of financial obligations.

Performance-related and non-financial guarantees include items such as:

- performance bonds, counter-guarantees and indemnities. Performance standby letters of credit represent obligations backing the performance of non-financial or commercial contracts or undertakings. These include arrangements backing:
  - subcontractors' and suppliers' performance,
  - labour and materials contracts,
  - delivery of merchandise, bids or tender bonds,
  - guarantees of repayment of deposits or prepayments in cases of non-performance;
- customs bonds and bond notes. The amount recorded for such instruments should be the reporting institution's liability.

7.4.3 Trade-related Contingencies (20% conversion factor)

These include short-term self-liquidating trade-related items such as commercial and documentary letters of credit issued by the insurer that are, or are to be, collateralized by the underlying shipment.

Letters of credit issued on behalf of a counterparty back-to-back with letters of credit of which the counterparty is a beneficiary ("back-to-back" letters) should be reported as documentary letters of credit.

Letters of credit advised by the company for which the insurer is acting as reimbursement agent should not be considered as a risk asset.

7.4.4 Sale and Repurchase Agreements (100% conversion factor)

A repurchase agreement is a transaction that involves the sale of a security or other asset with the simultaneous commitment by the seller that after a stated period of time, the seller will repurchase the asset from the original buyer at a pre-determined price. A reverse repurchase agreement consists of the purchase of a security or other asset with the simultaneous commitment by the buyer that after a stated period of time, the buyer will resell the asset to the original seller at a predetermined price. In any circumstance where they are not reported on-balance sheet, they should be reported as an off-balance sheet exposure with a 100% credit conversion factor.

7.4.5 Forward Asset Purchases[85] (100% conversion factor)

These items refer to commitments to purchase a loan, security or other asset at a specified future date, usually on prearranged terms.

7.4.6 Forward/Forward Deposits (100% conversion factor)

An agreement between two parties whereby one will pay and the other receive an agreed rate of interest on a deposit to be placed by one party with the other at some predetermined date in the future. Such deposits are distinct from future forward rate agreements in that, with forward/forwards, the deposit is actually placed.

7.4.7 Partly Paid Shares and Securities (100% conversion factor)

Transactions where only a part of the issue price or nominal face value of a security purchased has been subscribed and the issuer may call for the outstanding balance (or a further instalment) either on a date predetermined at the time of issue or at an unspecified future date.

7.4.8 Note Issuance/Revolving Underwriting Facilities (50% conversion factor)

These are arrangements whereby a borrower may issue short-term notes, typically three to six months in maturity, up to a prescribed limit over an extended period of time, commonly by means of repeated offerings to a tender panel. If at any time the notes are not sold by the tender at an acceptable price, an underwriter (or group of underwriters) undertakes to buy them at a prescribed price.

[85] This does not include a spot transaction that is contracted to settle within the normal settlement period.

7.4.9 Future/Forward Rate Agreements

These are agreements between two parties where, at some predetermined future date, a cash settlement will be made for the difference between the contracted rate of interest and the current market rate on a predetermined notional principal amount for a predetermined period.

7.4.10 Interest Rate Swaps

In an interest rate swap, two parties contract to exchange interest service payments on the same amount of notional indebtedness. In most cases, fixed interest rate payments are provided by one party in return for variable rate payments from the other and vice versa. However, it is possible that variable interest payments may be provided in return for other variable interest rate payments.

7.4.11 Interest Rate Options and Currency Options

An option is an agreement between two parties where the seller of the option grants the buyer, for compensation (premium/fee), the future right, but not the obligation, to buy from the seller, or to sell to the seller, either on a specified date or during a specified period, a financial instrument or commodity at a price agreed when the option is arranged. Other forms of interest rate options include interest rate capping agreements and collar (floor/ceiling) agreements.

7.4.12 Forward Foreign Exchange Contracts

A forward foreign exchange contract is an agreement between an insurer and a counterparty in which the insurer agrees to sell to or purchase from the counterparty a fixed amount of foreign currency at a fixed rate of exchange for delivery and settlement on a specified date in the future or within a fixed optional period.

7.4.13 Cross Currency Swaps

A cross currency swap is a transaction in which two parties exchange currencies and the related interest flows for a period of time. Cross currency swaps are used to swap fixed interest rate indebtedness in different currencies.

7.4.14 Cross Currency Interest Rate Swaps

Cross currency interest rate swaps combine the elements of currency and interest rate swaps.

7.4.15 Interest Rate and Foreign Currency Futures

A future is a standardized contractual obligations to make or take delivery of a specified quantity of a commodity (financial instrument, foreign currency, etc.) on a specified future date at a specified price established in a central regulated marketplace.

7.4.16 Precious Metals Contracts and Financial Contracts on Commodities

Precious metals contracts and financial contracts on commodities can involve spot, forward, futures and options contracts. Precious metals are mainly gold, silver and platinum. For the purposes of this guideline, gold contracts are treated the same as foreign exchange contracts. Commodities are bulk goods such as grains, metals and foods traded on a commodities exchange or in the spot market.

7.4.17 Non-Equity Warrants

Warrants include cash settlement options/contracts whose values are determined by the movements in a given underlying index, product or foreign exchange over time. Where non-equity warrants or the hedge for such warrants expose the financial institution to counterparty risk, the credit equivalent amount must be determined using the current exposure method for foreign exchange rate contracts.

7.5 Commitments

Commitments are arrangements that obligate an insurer, at a client's request, to:

- extend credit in the form of loans or participations in loans, lease financing receivables, mortgages, overdrafts, acceptances, letters of credit, guarantees or loan substitutes; or
- purchase loans, securities, or other assets.

Normally, commitments involve a written contract or agreement and some form of consideration, such as a commitment fee.

7.5.1 Credit Conversion Factors

The credit conversion factor applied to a commitment is dependent on its maturity. Longer maturity commitments are considered to be of higher risk because there is a longer period between credit reviews and less opportunity to withdraw the commitment if the credit quality of the drawer deteriorates.

The conversion factors to be applied to commitments can generally be categorized as:

0% conversion factor

- Commitments that are unconditionally cancellable at any time by the insurer without notice or that effectively provide for automatic cancellation due to deterioration in the borrower’s creditworthiness. This implies that the insurer conducts a formal review of the facility at least annually, thus giving it an opportunity to take note of any perceived deterioration in credit quality. Retail commitments are unconditionally cancellable if the terms permit the insurer to cancel them to the full extent allowable under consumer protection and related legislation.

20% conversion factor

- Commitments with an original maturity of one year and under.

50% conversion factor

- Commitments with an original maturity of over one year.
- Note issuance/revolving underwriting facilities.
- The undrawn portion of a commitment to provide a loan that will be drawn down in a number of tranches, some less than and some over one year.
- Forward commitments (where the insurer undertakes to issue a commitment) if the loan can be drawn down more than one year after the insurer's initial undertaking is signed.

7.5.2 Maturity

7.5.2.1 Original Maturity

Insurers must use original maturity to report these instruments. The original maturity of a commitment should be measured from the date when the commitment was accepted by the client, regardless of whether the commitment is revocable or irrevocable, conditional or unconditional, until the earliest date on which:

- the commitment is scheduled to expire, or
- the insurer can, at its option, unconditionally cancel the commitment.

A material adverse change clause is not considered to give sufficient protection for a commitment to be considered unconditionally cancellable.

Where the insurer commits to granting a facility at a future date (a forward commitment), the original maturity of the commitment is to be measured from the date the commitment is accepted until the final date that drawdowns are permitted.

7.5.2.2 Renegotiation of a Commitment

If both parties agree, a commitment may be renegotiated before its term expires. If the renegotiation process involves a credit assessment of the customer consistent with the insurer's credit standards, and provides the insurer with the total discretion to renew or extend the commitment and to change any other terms and conditions of the commitment, then on the date of acceptance by the customer of the revised terms and conditions, the original commitment may be deemed to have matured and a new commitment begun. If new terms are not reached, the original commitment will remain in force until its original maturity date. This process must be clearly documented.

In syndicated and participated transactions, a participating insurer must be able to exercise its renegotiation rights independent of the other syndicate members.

Where these conditions are not all met, the original start date of the commitment must be used to determine maturity.

7.5.3 Specific Types of Commitments

7.5.3.1 Undated/Open-ended Commitments

A 0% credit conversion factor is applied to undated or open-ended commitments, such as unused credit card lines of credit, personal lines of credit and overdraft protection for personal chequing accounts that are unconditionally cancellable at any time.

7.5.3.2 Evergreen Commitments

Open-ended commitments that are cancellable by the insurer at any time subject to a notice period do not constitute unconditionally cancellable commitments and are converted at 50%. Long-term commitments must be cancellable without notice to be eligible for the 0% conversion factor.

7.5.3.3 Commitments Drawdown in a Number of Tranches

A 50% credit conversion factor is applied to a commitment to provide a loan (or purchase an asset) to be drawn down in a number of tranches, some one year and under and some over one year. In these cases, the ability to renegotiate the terms of later tranches should be regarded as immaterial. Often these commitments are provided for development projects from which the insurer may find it difficult to withdraw without jeopardizing its investment.

Where the facility involves unrelated tranches, and where conversions are permitted between the over- and under-one-year tranches (i.e., where the borrower may make ongoing selections as to how much of the commitment is under one year and how much is over), then the entire commitment should be converted at 50%.

Where the facility involves unrelated tranches with no conversions permitted between the over- and under-one-year tranches, then each tranche may be converted separately, depending on its maturity.

7.5.3.4 Commitments for Fluctuating Amounts

For commitments that vary in amount over the life of the commitment, such as the financing of a business subject to seasonal variation in cash flow, the conversion factor should apply to the maximum unutilized amount that can be drawn under the remaining period of the facility.

7.5.3.5 Commitment to Provide a Loan with a Maturity of Over One Year

A commitment to provide a loan that has a maturity of over one year but that must be drawn within a period of less than one year may be treated as an under-one-year instrument, as long as any undrawn portion of the facility is automatically cancelled at the end of the drawdown period.

However, if through any combination of options or drawdowns, repayments and redraw-downs, etc., the client can access a line of credit past one year, with no opportunity for the insurer to unconditionally cancel the commitment within one year, the commitment must be converted at 50%.

7.5.3.6 Commitments for Off-Balance Transactions

Where there is a commitment to provide an off-balance sheet item, the insurer is to apply the lower of the two applicable credit conversion factors.

Chapter 8. Transitional provisions

1. Participations in P&C insurer subsidiaries

From January 1, 2015 and until December 31, 2018, the deduction prescribed in Section 2.3 may also be reduced by the following amount for each P&C insurer subsidiary:

P × Capital required of the subsidiary × (max [Target ratio of the subsidiary , 150%] – 1)

where P is equal to $\left(1-\frac{n}{16}\right)$ where n is the number of quarters that have elapsed since December 31, 2014.