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AUTORITÉ
DES MARCHÉS
FINANCIERS

CAPITAL ADEQUACY REQUIREMENTS GUIDELINE

LIFE AND HEALTH INSURANCE

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Introduction

Guideline objective

An Act respecting insurance (R.S.Q., 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 beneficiaries³ 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 subsidiaries⁴ 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 apply 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 July 1, 2013.

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.

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 2.5.1 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

The calculations required by this guideline and their results must be reported in the prescribed disclosure form (the "QFP form"). The 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 and target capital ratio

The requirements in this guideline comprise three stages.

1. determining the **capital available** to the insurer;
2. establishing the amount of **capital required** in order to meet the standards;
3. establishing the **Capital Adequacy Requirements (CAR) as a ratio** of capital available to capital required.

In order to meet the 100% minimum ratio, capital available must be equal or superior to capital required.

Moreover, this ratio does not explicitly consider all risks that could occur. In fact, quantifying several of these risks using a standard approach for all insurers is not warranted at this time, given the varying level of exposure to these risks from one insurer to the other and the difficulty in using a standard approach to measure them.

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 a target capital ratio that is superior to the minimum ratio.

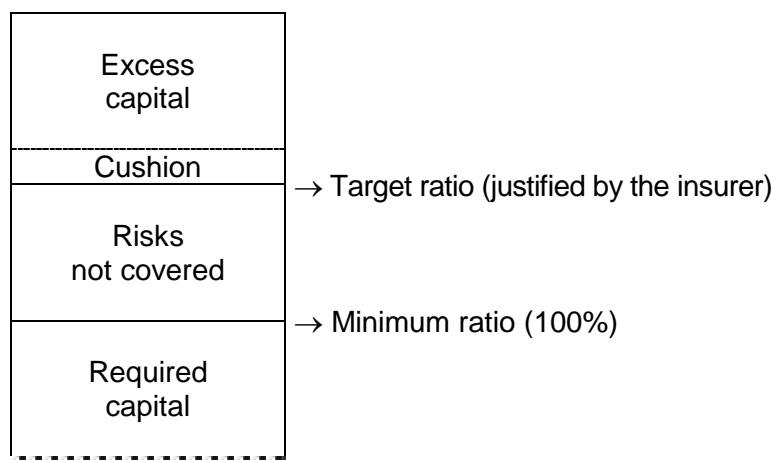
To establish this target ratio, insurers must determine the capital required to cover the risks related to their operations using various techniques such as sensitivity analyses based on various scenarios and simulations. Therefore, in addition to the other risks covered by the calculation of the CAR ratio, the target 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 risks;
- liquidity risks;
- concentration risks;
- legal and regulatory risks;
- strategic risks;
- reputation risk.

As a result, the calculation of the target ratio allows insurers to appropriately measure the risks specific to them. The capital requirement for each identified risk must be consistent with the capital requirement for the risks covered by the calculation of the CAR ratio, namely, adequate capital to cover a conditional tail expectation (“CTE”) of 95%.

The AMF's expectations are specified in the diagram below.

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

Failure to comply with the 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.

For consistency, the AMF uses the target capital ratio concept for both life and health insurers and P&C insurers.

Since Tier 1 capital is the primary element of capital that enables insurers to absorb losses during ongoing operations, the AMF expects each insurer to maintain most of its capital in Tier 1.

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*.

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 were not reinsured.

However, a ceding insurer may benefit from a credit in respect of its capital requirements if it obtains from the reinsurer an eligible guarantee. To be considered eligible, guarantees must meet the criteria set out in the *Guide respecting the use of guarantee instruments*.

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 criteria⁵:

- the policies must pay meaningful dividends;

⁵ 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).

- the company's participating dividend policy must be publicly disclosed and must make it clear that policyholder dividends 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, for example, which individual elements of actual experience, to the extent that they are not anticipated in the current dividend scale, have been transferred to policyholders in the annual dividend adjustment. Furthermore, it must be able to demonstrate that overall shortfalls with respect to the elements incorporated in the annual dividend adjustment process are substantially recovered within a period not exceeding five years⁶;
- the company must be able to demonstrate to the AMF that it follows the dividend policy and practices referred to above.

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 to take into account the risk variation covered by the component;
- 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.

⁶ The substantial recovery of shortfalls must be demonstrated based on actual reductions in dividend payments during the five-year period from what would have been paid during that period. Only those elements that are transferred to policyholders should be taken into account. Reduction in dividend scale may be allowed as risk transfer to policyholders only if approved by a formal board resolution of the company.

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); and
- 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.

Qualifying non-controlling interests

Non-controlling interests, including subordinated debt issued to independent investors, arising on consolidation will be included in the respective tiers, provided:

- the instruments meet the criteria applicable to that tier;

and

- they 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 by the amount 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 the amount of capital available that must be removed so that its CAR ratio is equal to its target ratio. The details of the calculation of the reduction must be disclosed in the Capital Guideline Certification Report.

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.

Items deducted from capital available

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;
 - contributed surplus; and
 - retained earnings.
- policyholders' equity, including:
 - participating account; and
 - mutual companies' non-participating account;
- non-cumulative perpetual preferred shares meeting the requirements in section 2.2.5.2;
- qualifying non-controlling interests;

- accumulated unrealized holding loss on available-for-sale equity securities⁷ reported in other comprehensive income ("OCI")⁸. 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;
- qualifying innovative instruments (refer to section 2.9);
- accumulated defined benefit pension plan remeasurements included in OCI.

Insurers may elect a transition period to defer on gross Tier 1 capital the impact on gross Tier 1 capital:

- a) of including the accumulated defined benefit pension plan OCI remeasurements, if any, recognized on December 31, 2012 (i.e.: the amounts, if any, that was reported immediately prior to the effective date of the requirement in this guideline to include in gross Tier 1 capital accumulated defined pension plan remeasurements in OCI); and
- b) related to net defined benefit pension plan liabilities (assets) upon the initial adoption of the revisions to IAS 19 Employee Benefits, effective for fiscal years beginning on or after January 1, 2013 (i.e.: the impact on gross Tier 1 capital of the net restatement of retained earnings and accumulated OCI together).

The deferred amount is the sum of a) and b) above. It is amortized on a straight-line basis over the transition period. This period begins on January 1, 2013 for item a) and on the effective date of the revision to IAS 19 standard for item b). It must be completed by the earliest quarter-end occurring on or after December 31, 2014. If an insurer elects the transition period, it will be irrevocable, is reflected via adjustments to gross Tier 1 capital and the insurer will also have to defer the net defined benefit pension plan impacts on net Tier 1 capital and on the other capital items of Tier 2, as outlined in sections 2.2.1 and 2.3. The details of the calculation of the deferred amount must be disclosed in the Capital Guideline Certification Report.

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;

⁷ 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.

⁸ All OCI amounts are net of tax.

- after-tax fair value gains (losses) on own-use property upon conversion to IFRS (cost model);⁹
- accumulated after-tax revaluation loss on own-use 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;
- the net decrease in actuarial liabilities (for insurance and annuity business combined¹⁰, net of all reinsurance, subject to the requirements of section 1.2) resulting from the recognition of future mortality improvement under CIA standard 2350.06 and additional future mortality improvement under CIA standard 2350.11.¹¹

This amount may be offset by the net increase in technical provisions due to the use of a Canadian risk-free interest rate lower than the lower bound of the range prescribed under CIA standards 2330.15.1 to 2330.15.3. However, the following criteria must be met:

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

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

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

2.2.1 Deductions from gross Tier 1 capital

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

- goodwill;
- the carrying value of intangible assets that is in excess of 5% of gross Tier 1 capital (refer to section 2.2.5.3);
- negative actuarial liabilities less the effect of income taxes as defined in section 2.2.5.4;

⁹ 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).

¹⁰ Excluding segregated funds guarantees.

¹¹ 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 promulgated by the CIA, and the liability calculated using the promulgated secular trend toward lower mortality rates that was in effect on December 31, 2010.

- excess cash value over actuarial liabilities;
- 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 liability¹². Subject to prior written AMF authorization¹³, this deduction is net of any amount of available refunds of defined 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.

Insurers that elect a transition period to defer the impact on gross Tier 1 capital of changes related to the net defined benefit pension plan liability (asset) must also phase-in, in net Tier 1 capital, the impact on net Tier 1 capital of the pension plan asset deduction:

- a) resulting from the recognition of each net defined benefit pension plan (inclusive of the impact of any asset ceiling limitation) net of any associated deferred tax liability¹², if any, that was reported on December 31, 2012 (i.e.: the amount of the pension plan asset deduction, if any, immediately prior to the effective date of the pension plan asset deduction requirement in this guideline); and
- b) restatement upon the initial adoption of the revisions to IAS 19 Employee Benefits, effective for fiscal years beginning on or after January 1, 2013 (i.e.: the impact of the restatement on the pension plan asset deduction).

The deferred amount in net Tier 1 capital is the sum of a) and b) above. It is amortized on a straight-line basis over the transition period. This period begins on January 1, 2013 for item a) and on the effective date of the revision to IAS 19 standard for item b). It must be completed by the earliest quarter-end occurring on or after December 31, 2014. If an insurer elects the transition period, it will be irrevocable and is reflected via adjustments to net Tier 1 capital. The details of the calculation of the deferred amount must be disclosed in the Capital Guideline Certification Report.

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.

¹² The liability that would be extinguished if the asset should become impaired or derecognized under IFRS.

¹³ 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 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.

2.2.3 Net Tier 1 capital

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 2.3.1).

2.2.5 Specific criteria for eligibility

2.2.5.1 Common shareholders' equity

Common shares with a redemption option may only qualify as Tier 1 capital to the extent that this option has been authorized by the AMF prior to any redemption.

Similarly, any common shareholders' equity repayment option must provide for prior authorization by the AMF.

2.2.5.2 Preferred shares qualifying for Tier 1 capital

To qualify as Tier 1 capital, preferred shares must meet the following criteria:

Permanence

Tier 1 preferred shares are deemed to be permanent only if:

- they carry no clause for retraction by the holder;
- they carry no obligation for the issuer to redeem shares;
- they are redeemable by the issuer only after an initial term of five years, with prior authorization of the AMF. Such redemption will normally be authorized to an insurer with an adequate capital position or when the instrument is replaced by capital elements of equal or higher quality, including an increase in retained earnings or if the insurer reduces its commitments.

Conversion privileges, other than in common shares of the insurer, as well as redemption privileges, are subject to prior authorization of the AMF. Redemption may only take place in consideration of cash or cash equivalent. The terms of the conversion may not be structured to provide either a redemption or payment of the original security.

No mandatory fixed charges

In addition to the characteristics set forth in the preceding criteria, preferred shares qualify as Tier 1 capital only if:

- the dividends are not cumulative;
- the dividends cannot be influenced by the insurer's credit rating;
- dividends are the only compensation earned by shareholders;
- there are no sinking or purchase funds.

Moreover, the non-declaration or non-payment of a dividend must not trigger restrictions on the issuer other than the need to seek the authorization of the holders of the preferred shares before paying dividends on other shares or before retiring other outstanding shares. Non-declaration or non-payment does not preclude the issuer from making the preferred shares voting or from making payment in common shares.

Subordination

Preferred shares must be subordinated to the rights of policyholders and other preferred creditors.

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 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). Intangible assets include those related to consolidated subsidiaries and subsidiaries deducted from available capital calculation purposes.

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:

- 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:
 - cumulative perpetual preferred shares;
 - perpetual debentures meeting the requirements set forth in section 2.3.2.1;
 - qualifying non-controlling interests;

- accumulated net after-tax unrealized holding gain on available-for-sale equity securities¹⁴ 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. When the accumulated net after-tax fair value change in investment properties shows a gain, this gain is included in Tier 2 capital;
- limited life instruments, 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;
- 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 2.2.2;
 - 75% of the excess cash value over actuarial liabilities;
 - the amount corresponding to the value of the software which is deducted from Tier 1 capital;
 - the pension plan asset add-back, i.e. 50% of the pension plan asset deduction (see section 2.2.1);
 - 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).

¹⁴ 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 (see section 2.2.1);
- 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.

Insurers that elect a transition period to defer the impact on gross Tier 1 capital of changes related to the net defined benefit pension plan liability (asset) must also phase-in, in the other capital items of Tier 2, the impact on the other capital items of Tier 2 of the pension plan asset add-back:

- c) resulting from the recognition of each net defined benefit pension plan that was reported on December 31, 2012 (i.e.: the amount of the pension plan asset add-back, if any, immediately prior to the effective date of the requirement in this guideline to add-back in the other capital items of Tier 2 50% of the pension plan asset deduction); and
- d) restatement upon the initial adoption of the revisions to IAS 19 *Employee Benefits*, effective for fiscal years beginning on or after January 1, 2013 (i.e.: the impact of the restatement on the pension plan asset add-back).

The deferred amount in the other capital items of Tier 2 is the sum of a) and b) above. It is amortized on a straight-line basis over the transition period. This period begins on January 1, 2013 for item a) and on the effective date of the revision to IAS 19 standard for item b). It must be completed by the earliest quarter-end occurring on or after December 31, 2014. If an insurer elects the transition period, it will be irrevocable and is reflected via adjustments to the other capital items of Tier 2. The details of the calculation of the deferred 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

2.3.2.1 Tier 2 hybrid instruments

Hybrid instruments must, at a minimum, have the following characteristics:

- they are unsecured, subordinated to rights of policyholders and other preferred creditors, and are fully paid up;
- they are not redeemable at the initiative of the holder;
- they may be redeemed by the issuer after an initial term of five years with prior authorization of the AMF;
- they may participate in losses without triggering a cessation of ongoing operations or the start of insolvency proceedings;
- they allow service obligations to be deferred, where the profitability of the insurer would not support payment.

To qualify as Tier 2 hybrid instruments, preferred shares must meet the requirements for Tier 1 instruments, except that dividends may be cumulative.

Perpetual debentures, including debentures with a 99-year term, with the above characteristics, may qualify as Tier 2 hybrid instruments if they also meet the following criteria:

- they are available to absorb losses while the issuer is still a going concern. If the retained earnings of the issuer are negative, the instrument must automatically convert to common or perpetual preferred shares;
- they must allow the issuer to defer principal and interest payments if the issuer does not report a net profit for the most recent combined four quarters and the issuer eliminates cash dividends on its common and preferred stock. Under no circumstances will the deferral of interest be allowed to compound;
- they must not contain provisions for any form of compensation in respect of any unpaid payments, except subject to prior authorization of the AMF;
- they are free from special restrictive covenants that would allow the holder to trigger acceleration of repayment in circumstances other than insolvency.

Debentures with characteristics resulting in a permanent subscribed capital are subject to the same requirements as those for perpetual debentures.

The AMF will not normally prevent the redemption of Tier 2 hybrid instruments after a five-year term by an insurer with an adequate capital position and when the instrument is replaced by capital elements of equal or higher quality, including an increase in retained earnings or if the insurer reduces its commitments.

2.3.2.2 Tier 2 limited life instruments

In contrast to hybrid instruments, limited life instruments are not permanent and must, at a minimum, have the following characteristics:

- they are subordinated to the rights of policyholders and other preferred creditors;
- they have a term greater than five years at time of issue;
- they may be redeemed by the issuer with prior authorization of the AMF;
- the instrument must be free from any restrictive covenants that would allow the holder to trigger acceleration of repayment in circumstances other than insolvency, bankruptcy, winding-up or dissolution of the issuer.

The AMF will not normally prevent the redemption of Tier 2 limited life instruments by an insurer with an adequate capital position and when the instrument is replaced by capital of equal or higher quality, including an increase in retained earnings or if the insurer is downsizing.

An insurer may issue limited life instruments to its parent company or to a related legal person. As the case may be, the AMF requires notification thereof from the insurer beforehand.

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, dissimilar regulated financial subsidiaries, associates and non-qualifying joint ventures, net of goodwill and identified intangible assets that have been deducted from Tier 1 capital, and subject to the requirements of section 2.5.1;
- 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 3.2.13.4.

2.5.1 Investments in non-qualifying subsidiaries, dissimilar regulated financial subsidiaries, associates and non-qualifying joint ventures

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;
- a non-qualifying joint venture is a joint venture in which the participation of the insurer is more than 10%.

Investments in non-qualifying subsidiaries, dissimilar regulated financial subsidiaries, associates and non-qualifying joint ventures 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 the laws and regulations governing them. 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 2.2.1; 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 the laws and regulations of Québec or those of the incorporating jurisdiction must be deducted.

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

2.5.2 Transitional provisions

Until December 31, 2014, the insurers can reduce the deduction provided in section 2.5.1. This reduction is obtained by applying a percentage to the amount of the following subtraction calculated as of December 31, 2012:

- the deduction described in section 2.5.1 under the January 1, 2013 version of the guideline;
less
- the sum of the deductions described in subsections 2 to 4 of the section B5 under the March 31, 2011 version of the guideline.

The percentage is equal to $\left(1 - \frac{n}{8}\right)$ where n is the number of quarters that have elapsed since December 31, 2012.

The details of the calculation 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:

- innovative instruments included in Tier 1 capital must not make up more than 15% of the amount of net Tier 1 capital as defined in section 2.2.3;
- the amount of innovative instruments and perpetual non-cumulative preferred shares should not in aggregate exceed 40% of the amount of net Tier 1 capital as defined in section 2.2.3. Tier 1-qualifying preferred shares issued in excess of this limit may be included in Tier 2 capital. The insurer needs not include the amounts of innovative instruments that are included in Tier 2, in the calculation of this limit;

- the amount of Tier 2 capital, net of amortization, must not exceed the amount of net Tier 1 capital as defined in section 2.2.3;
- 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 2.2.3.

2.7 Goodwill

The current accounting value of goodwill on an insurer's books is fully deducted from the sum of Tier 1 capital elements. This deduction is comprised of goodwill related to consolidated subsidiaries and subsidiaries deconsolidated for available capital calculation purposes.

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

2.8 Amortization

Hybrid instruments and limited life instruments in Tier 2 capital are subject to straight-line amortization in the final five years prior to maturity or the effective dates governing holders' retraction rights.

Hence, outstanding balances of preferred shares and subordinated debts of the insurer or outstanding balances on preferred shares and debt securities of qualifying non-controlling interests are subject to straight-line amortization based on the following sequence:

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%

Because the sums paid into a sinking fund are not subordinated to the rights of policyholders, amortization of these sums must begin five years before the payment.

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

2.9 Principles governing inclusion of innovative instruments in Tier 1 capital

2.9.1 Application

2.9.1.1 Objective and content

The objective of section 2.9 is to provide Québec's life and health insurers ("QLIs") with the AMF's guidance for the inclusion of innovative instruments in Tier 1 capital.

For the purposes of this section, "innovative instrument" means an instrument issued by a Special Purpose Vehicle ("SPV"), which is a consolidated non-operating entity whose primary purpose is to raise capital. A non-operating entity cannot have depositors or policyholders. This section applies to indirect issues carried out through an SPV.

To qualify as capital, direct issues must meet the conditions set out in this guideline.

The content of this section is based notably on the principles outlined in the paper of the Bank for International Settlements titled "Instruments eligible for inclusion in Tier 1 capital" and includes necessary adjustments for life and health insurers in regard to Québec's legislative regime.

In this section, a "Québec Life and Health Insurer" (QLI) means an active life and health insurer that has policyholders and is incorporated in Québec as a stock insurance company.

The AMF will continue to review the principles included in this section in light of any issues arising from their application to specific transactions. The AMF may make modifications based on its experience.

In this section, a Loan-Based Structure is one where the SPV's primary asset is an instrument issued by a QLI.

2.9.1.2 Prior Requirements

When a QLI seeks to make use of an innovative instrument for capitalization purposes, it must transmit to the AMF *a priori* the following details and documents so that it can proceed with the initial review of the proposed issuance:

- the timetable of the proposed transaction;
- a letter that clearly indicates to the AMF that the project complies with each of the principles set out in section 2.9 as well as with this guideline;
- independent unqualified legal opinions on the transaction's compliance with laws and regulations, notably regarding insurance matters, as well as on governance of the structures by tax laws and their compliance therewith. It should be clear that the AMF may rely on these opinions;

- a full description of the proposed Loan-Based Structure;
- the "term sheets" describing in detail the terms of each instrument involved in the proposed transaction (such as debenture rates and dividend rates on preferred shares established at the issuance of the innovative instrument);
- the trust deed and the administration agreement;
- the preliminary prospectus, if any is to be issued.

Additional information may be required, depending on the complexity of the transaction and the supervisory concerns it raises.

Finally, the QLI would seek a written confirmation from the AMF regarding the inclusion of the innovative instruments in the Tier 1 capital.

2.9.2 Limits on Innovative Instruments in Tier 1 Capital

Principle 1: The AMF expects QLIs to meet capital adequacy requirements without undue reliance on innovative instruments. Common shareholders' equity (i.e., common shares and retained earnings) and participating account surplus, as applicable, should be the primary forms of a QLI's Tier 1 capital.

- 1a) A QLI's Tier 1 capital raised through an SPV by way of innovative instruments should not exceed the lower of the following amounts: the amount of the inter-company instrument issued by the QLI or the amount of innovative instruments issued through an SPV.

The AMF authorizes a QLI to issue innovative instruments up to 20% of net Tier 1 capital. A maximum of 15% of net Tier 1 capital can be included in the innovative Tier 1 category with the balance, a maximum of 5% of net Tier 1 capital eligible for inclusion in the limited life instruments category of Tier 2 capital. The innovative instruments permissible within Tier 2 capital can thereafter be transferred to the innovative Tier 1 category as and when this will be permitted by these limits.

In the event of any excess amount above this limit, the QLI that wishes to include this excess in its Tier 1 capital must immediately notify the AMF and submit a plan for its authorization, showing how it proposes to eliminate this excess expeditiously. Following an analysis of the terms and conditions of the plan, the AMF may authorize the QLI to include a portion or all the excess amount in its Tier 1 or Tier 2 capital until such time as the excess amount is eliminated in accordance with the plan.

- 1b) The value of innovative instruments and perpetual non-cumulative preferred shares should not in aggregate exceed 40% of the QLI's net Tier 1 capital. Tier 1-qualifying preferred shares issued in excess of this limit may be included in Tier 2 capital.

QLIs need not include the amounts of innovative instruments that are included in Tier 2 capital, in the calculation of the 40% limitation on preferred shares and innovative instruments in Tier 1 capital.

- 1c) The term “net Tier 1 capital” means Tier 1 capital available after deduction of qualified instruments as designated in this guideline.

2.9.3 General Principles Governing Innovative Instruments

Innovative instruments may be included in Tier 1 capital subject to the limits set out in Principle 1, provided they meet certain requirements. The following principles govern their inclusion:

Principle 2 : The nature of inter-company instruments issued by the QLI in connection with the raising of Tier 1 capital by way of innovative instruments must not compromise the Tier 1 qualities of the innovative instrument.

- 2a) An SPV must not, at any time, hold assets that materially exceed the amount of the innovative instrument. The AMF will consider the excess amount to be material if it exceeds 3% of the value of the innovative instrument in the case of a Loan-Based Structure. Amounts in excess of this threshold require the AMF's authorization.
- 2b) The following minimum standards apply to inter-company instruments issued by the QLI when indirectly raising Tier 1 capital by way of an innovative instrument:
- inter-company instruments must be permanent; they may carry a maturity date provided the term to maturity is at least 30 years. If, at maturity, the proceeds are not used to repay the innovative instrument, the SPV must reinvest the proceeds in assets acquired from the QLI;
 - failure to make payments or to meet covenants must not cause acceleration of repayment of the inter-company instrument;
 - the inter-company instrument must not be secured or covered by a guarantee or other arrangement that legally or economically results in a priority that would be inconsistent with the provisions of the Québec Act respecting insurance, the regulation thereunder and any other legislation applicable to the QLI.

Principle 3: Innovative instruments must enable QLIs to absorb losses on an ongoing basis.

- 3a) Innovative instruments must enable QLIs to absorb losses without triggering the cessation of ongoing operations or the start of insolvency proceedings. The ability to absorb losses must be established well before the QLI's financial position seriously deteriorates.

3b) The method used to achieve loss absorption within the QLI must be transparent and must not raise any uncertainty about the availability of capital for this purpose. Any of the following mechanisms would be acceptable, provided the AMF is assured that they will function appropriately:

- Automatic conversion of innovative instruments into perpetual non-cumulative preferred shares of the QLI. Automatic conversion must occur, at a minimum, upon the occurrence of any of the following events designated as “loss absorption events”:
- an application for a winding-up order in respect of the QLI pursuant to the *Winding-up and Restructuring Act* (R.S. 1985, c. W-11) is granted by a court;
- the AMF notifies the QLI in writing that it or any other person designated by the minister has assumed provisional administration of the QLI pursuant to the *Québec Act respecting insurance* (R.S. c. A-32) if it believes that the QLI’s assets are inadequate for effectively ensuring the protection of policyholders.
- the AMF notifies the QLI in writing that, in its opinion, it has a net Tier 1 capital ratio of less than 75%¹⁵ or that its CAR ratio is less than 120%¹⁶;
- the QLI’s Board of Directors notifies the AMF in writing that its net Tier 1 capital ratio is less than 75% or its CAR ratio is less than 120%;
- the AMF directs the QLI to increase its capital or to provide additional liquidity, and the QLI elects to cause the conversion of innovative instruments following such direction or the QLI does not comply with such direction within the time specified.

If the Tier 1-qualifying preferred shares issued pursuant to an automatic conversion carry a feature allowing the holder to convert into common shares at future market prices, such a feature must be structured to ensure that the holder is required to absorb losses. Accordingly, the right to convert must be structured to ensure that the holder cannot exercise the conversion right while a loss absorption event is continuing.

The dividend rate on the Tier 1-qualifying preferred shares issued pursuant to the automatic conversion must be established at the time the innovative instrument is issued and must not exceed the market rate for such shares as at that date.

- Any other method that is consistent with Principle 4 hereafter and authorized by the AMF.

¹⁵ The net Tier 1 capital ratio is calculated as follows: (Tier 1 capital available after deduction of identified items as prescribed in this guideline ÷ total capital required) x 100.

¹⁶ The CAR ratio is calculated as follows: (total capital available ÷ total capital required) x 100.

Principle 4: Innovative instruments must absorb losses in the event of liquidation.

- 4a) In the event of liquidation, innovative instruments must have, through conversion or other means (for example, a mechanism that ensures investors will receive distributions consistent with preferred shareholders of the QLI), a ranking below the claims of policyholders, other creditors and subordinated security holders of QLI.
- 4b) Innovative instruments must not be secured or covered by a guarantee or other arrangement that legally or economically results in a claim ranking ahead of the claims of policyholders, other creditors and subordinated security holders of the QLI in the event of liquidation.

Principle 5: Innovative instruments must not carry any feature that may impair the permanence of the instrument.

- 5a) For the purposes of this principle, a “step-up”¹⁷ is defined as a pre-set increase at a future date in the dividend (or distribution) rate to be paid on an innovative instrument. Moderate step-ups in innovative instruments are permitted only if the moderate step-up occurs at least 10 years after the issue date and if it results in an increase over the initial rate not exceeding the greater of:
 - 100 basis points, less the swap spread between the initial index basis and the stepped-up index basis;and
 - 50% of the initial credit spread, less the swap spread between the initial index basis and the stepped-up index basis.

The terms of the innovative instrument should provide for no more than one rate step-up over the life of the instrument. The swap spread should be fixed as of the pricing date and should reflect the differential in pricing on that date between the initial reference debt security or rate and the stepped-up reference debt security or rate.

- 5b) A step-up feature cannot be combined with any other feature that creates an economic incentive to redeem.
- 5c) A redemption feature after an initial five-year period is acceptable in an innovative instrument provided the redemption is authorized beforehand by the AMF and the innovative instrument is replaced by capital of the same or better quality, unless the AMF determines that the QLI’s capital is more than adequate to cover its risks.

¹⁷ It should be noted that the “step-up” is not allowed when the Tier 1 capital instrument is issued directly.

An innovative instrument may be redeemed during the initial five-year period, with the AMF's authorization, upon the occurrence of tax or regulatory (including legislative) amendments affecting at least one component of the transaction. It is highly unlikely that the AMF would authorize redemption of an innovative instrument in the initial five-year period due to a tax reassessment.

The purchase of an innovative instrument for cancellation requires the prior authorization of the AMF.

- 5d) Innovative instruments must not carry a maturity date or other feature that requires the instrument to be paid in cash. The instrument may carry the right of holders to convert their innovative instrument into Tier 1-qualifying preferred shares of the QLI, provided the dividend rate is established at the time the innovative instrument is issued and it does not exceed the market rate for such shares as at that date.
- 5e) An innovative instrument must not carry a feature allowing the holder to convert the innovative instrument directly into common shares of the QLI or of other entities. Conversions into common shares are permitted only if the conversion occurs first into Tier 1-qualifying preferred shares of the QLI, which are then convertible into common shares of the QLI, and provided the AMF is satisfied that the innovative instrument is issued in a market where the conversion feature is widely accepted.

Principle 6: Innovative instruments must be free from mandatory fixed charges.

- 6a) Through the SPV, the QLI must have discretion over the amount and timing of distributions. Rights to receive distributions must clearly be non-cumulative and must not provide for compensation in lieu of undeclared distributions. The QLI must have full access to undeclared payments.
- 6b) Distributions may be paid only in cash.
- 6c) Distributions may not be reset based on the future credit standing of the QLI.

Principle 7: Innovative instruments must be issued and fully paid-for in cash or, with the authorization of the AMF, in property.

Principle 8: Innovative instruments, even if not issued as shares, may be included in Tier 1 capital, if they are in accordance with the principles contained in the Interim Appendix.

Principle 9: The main features of an innovative instrument must be easily understood and publicly disclosed.

- 9a) For the purposes of this principle, the AMF will consider the main features of an innovative instrument to be easily understood where:
- the legal, tax and regulatory risks arising from the innovative instrument have been minimized to the satisfaction of the AMF. The likelihood of failing this test rises as the number of entities between investors and the ultimate recipient of the investment proceeds increases, and as the number of jurisdictions involved increases.
 - the manner by which the innovative instrument meets the Tier 1 capital requirements and the main features of the instrument are easily understandable to a reasonably sophisticated investor.
- 9b) The main features of innovative instruments, including those features designed to achieve Tier 1 capital status (for example, the triggers and mechanisms used to achieve loss absorption), must be publicly disclosed in the QLI's annual report to shareholders.

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. 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 in which it would not have a controlling interest if units held by the insurer's policyholders in segregated funds were excluded, then the assets of the mutual fund that are attributable to policyholders and investors outside of the insurer may also be excluded from the requirements of this chapter, 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 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;
- own-use 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.

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 1.3.1.

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 3.4 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 any unsolicited rating in determining the capital charge for an asset.

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 Québec regulated insurers 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 and joint ventures.

Bonds 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;¹⁸
- unrated sovereigns with a consensus risk score of 0 or 1, as assigned by export credit agencies participating in the "Arrangement on Officially Supported Export Credits" for obligations denominated in the sovereign's domestic currency;¹⁹
- 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;

¹⁸ 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.

¹⁹ The consensus country risk classification is available on the OECD's web site (<http://www.oecd.org>) in the Export Credit Arrangement web page of the Trade Directorate.

- the International Monetary Fund;
- the European Community and the European Central Bank;
- 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");
 - The International Finance Facility for Immunisation ("IFFIm");
- public sector entities in jurisdictions outside Canada for which the national bank supervisor in the jurisdiction of origin permits banks under its supervision to use a risk weight of 0% in accordance with Basel;
- recognized exchanges and clearing houses that serve as central counterparties²⁰ 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 other debtors;
- prepaid and deferred expenses;
- deferred tax assets;

²⁰ 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.

- intangible assets that are not deducted from capital;
- accounts receivable of insurers not subject to Québec regulation and those related to unregistered reinsurance contracts;
- 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).

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

3.2.2 Short-term securities (original maturities of less than one year)

Factor	Short-term securities
0%	Notes and bills issued by qualifying entities eligible for a 0% factor.
0.25%	Demand deposits, certificates of deposit, drafts, cheques, acceptances and similar obligations of regulated deposit-taking institutions.
	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 (“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 (for example, a guarantee made pursuant to subsection 193(1) of the Budget Implementation Act of 2006), 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 3.1, 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*
	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

* Other than investments deducted from the insurer's available capital.

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

The factor for investments in 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 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 own-use property. For own-use properties that are accounted for using the revaluation model, the factors should be applied to the value obtained when reversing the impact on the book value of:

- the balance of any revaluation surplus included in OCI;
- accumulated after-tax revaluation losses that are reflected in retained earnings at conversion to IFRS or as a result of subsequent revaluations.

For own-use properties that are accounted for using the cost model, the factors should be applied to:

- book value, 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.

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 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 capital 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

Insurers may use a 0% factor for any 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.

For financial leases and sales-type 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. 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 (refer to section 6.3.2). For hedges of segregated fund guarantees undertaken as part of an AMF-authorized hedging program, the AMF will determine at the time of authorization the extent to which the hedges may be exempted from the requirements of this section.

Where an insurer has entered into transactions (including short equity positions) that:

- are intended to hedge the insurer's segregated fund guarantee risk,
- are not applied as offsets or hedges against other positions within the insurer to reduce required capital, and
- have not been undertaken as part of an AMF-authorized hedging program.

the capital charge for the hedges may be reduced to a minimum of zero if the insurer is able to demonstrate that losses on the hedges under particular scenarios would be offset by decreases in its segregated fund guarantee liabilities. Insurers should contact the AMF for details on the calculation for determining the capital requirement for hedges in this situation. The details of the calculation must be disclosed in the Capital Guideline Certification Report.

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 3.2.13.8.

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 $\pm 25\%$ 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

$$\begin{aligned} &= \$1,183.41 + 8\% \times \$6,570 \\ &= \$1,709.01 \end{aligned}$$

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. 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 applied towards other equity risks simultaneously.

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 counterparty²¹ 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 3.1 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.

²¹ 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.

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).

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 3.1) 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 above²².

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.

²² 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.

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 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 either²³ 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 3.3.4.2 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 3.3.4.3 sets out conditions under which insurers may use zero haircuts for certain types of repo-style transactions involving government bonds. Finally, section 3.3.4.4 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:

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

²³ The exposure amount may vary where, for example, securities are being lent.

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.

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 zero²⁴. 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 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.

3.3.4.3 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;

²⁴ 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.

- 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 days²⁵;
- 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.

²⁵ 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.

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 3.3.4.2 equivalently apply for insurers using bilateral netting agreements for repo-style transactions.

3.4 Guarantees and credit derivatives

Where guarantees²⁶ 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 3.1 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 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 exposure²⁷. 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.

²⁶ Letters of credit for which an insurer is the beneficiary are included within the definition of guarantees, and receive the same treatment.

²⁷ 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.

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);
 - 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* applicable 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; and
- 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 (see 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;

- 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 6.1.1.6. 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 a Canadian risk-free interest rate equal to the lower bound of the range prescribed in paragraphs 2330.15.1 to 2330.15.3 of the actuarial 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:

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

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:

$$S = 2.5 \times A \times B \times \frac{E}{F}$$

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:

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

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:

$$\sum_{\text{All Products}} K$$

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:

$$K = \alpha \times C \times \frac{E}{F}$$

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 4.2.1.4, 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 4.2.1.4, 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:

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

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

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.

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 4.3.4, 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.

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 a Canadian risk-free interest rate equal to the lower bound of the range prescribed in paragraphs 2330.15.1 to 2330.15.3 of the actuarial standards of practice when these technical provisions are greater than the one reported in the financial statements at the date of the calculation.

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 a Canadian risk-free interest rate equal to the lower bound of the range prescribed in paragraphs 2330.15.1 to 2330.15.3 of the actuarial standards of practice; and
- the one reported in the financial statements at the date of the calculation.

5.1 Weighting

5.1.1 Life and health 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.

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; and
- 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; and
- 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

6.1 Factor requirements

This component measures risk associated with investment or performance-related guarantees on segregated funds or other similar products. The risk is normally determined using the factors prescribed in this section.

The AMF could also authorize the use of internal models to calculate factors for a particular product or reinsurance agreement or to calculate the net capital component for segregated funds. In order to use internal models, an insurer must follow the requirements outlined in section 6.2 (“Custom factors and internal models”) and must obtain prior authorization from the AMF.

Insurers may choose between the two methods described in this section. In the first financial period when this section is applicable, insurers are required to irrevocably elect the method they intend to use to calculate the net capital component.

6.1.1 Global method

6.1.1.1 Total gross required capital

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 103).

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 Total Gross Capital Required, *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 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;
- $\hat{f}(\tilde{\theta})$ = benefit cost factor;
- $\hat{g}(\tilde{\theta})$ = margin offset factor;
- $\tilde{\theta}$ is a vector that defines the risk characteristics for the policy.

The factors $\hat{f}(\tilde{\theta})$ and $\hat{g}(\tilde{\theta})$ are described more fully in step 4 (refer to section 6.1.1.6). 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 6.1.1.2.

There are four (4) major steps in determining the *TGCR* for a given policy/cell:

Step 1 - Classifying the asset exposure (refer to section 6.1.1.3);

Step 2 - Determining the risk attributes (refer to section 6.1.1.4);

Step 3 - Retrieving the appropriate nodes (refer to section 6.1.1.5);

Step 4 - Using the supplied functions to determine the requirement (refer to section 6.1.1.6).

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 6.1.1.5 and 6.1.1.6. 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 6.1.1.8.

In section 6.1.1, 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 6.1.1.9) 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 follow the instructions outlined in section 6.2.

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 6.1.1.8 to illustrate this concept.

In practice, $f(\circ)$, $g(\circ)$, $h(\boxplus)$ and $w(\boxplus)$ are values interpolated from the factor grid. The use of the factor grid is discussed more fully in step 4 (refer to section 6.1.1.6). 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 TGCRC 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 (<i>MER</i>)	Vary by fund class. See Table 2 later in this section (page 94).
Base margin offset	100 basis points per annum.
GMDB description	<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ 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	<p>Actual lapse rate = $\lambda \times [\text{Base policy lapse rate}]$, where:</p> $\lambda = \text{MIN} \left[\lambda^+, \text{MAX} \left[\lambda^-, \left[a + b \times \left(\frac{VG}{VC} \right) \right] \times [c + d \times \text{MIN}(h, T)] \right] \right]$ <p>$\lambda^+ = 1.6667$, $\lambda^- = 0.3333$, $a = -0.0952$, $b = 0.8010$, $c = 0.6279$, $d = 0.0654$, $h = 10$ and $T = \text{time-to-next maturity}$.</p>
Mortality	100% of Canadian Institute of Actuaries (“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%.

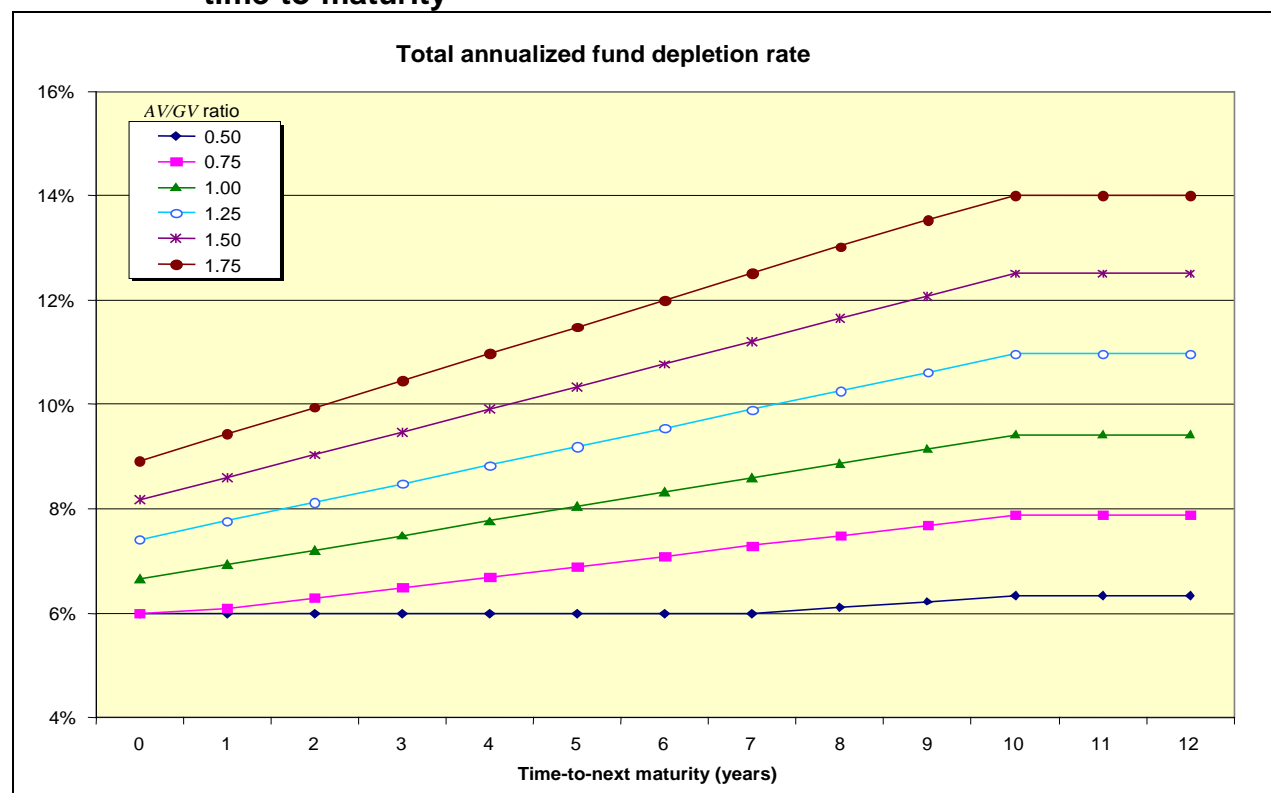
Notes on factor development

- 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 (<i>MER</i>)
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.

Figure 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 98).
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*	Fixed Income	Intermediate	Diversified

* 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

$$\begin{aligned}
 A &= \left(\frac{5}{15} \times 0.06 \right)^2 + \left(\frac{9}{15} \times 0.17 \right)^2 + \left(\frac{1}{15} \times 0.26 \right)^2 \\
 &= 1.1104\% \\
 B &= 2 \cdot \left(\frac{5}{15} \cdot \frac{9}{15} \right) (0.25 \times 0.06 \times 0.17) + 2 \cdot \left(\frac{5}{15} \cdot \frac{1}{15} \right) (0.10 \times 0.06 \times 0.26) + 2 \cdot \left(\frac{9}{15} \cdot \frac{1}{15} \right) (0.65 \times 0.17 \times 0.26) \\
 &= 0.3388\%
 \end{aligned}$$

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 94), subject to a cap (floor) of 100 bps (-100 bps). See Table 5 (page 103) for more details.

For *GMDB*, there are $4 \times 2 \times 2 \times 7 \times 4 \times 4 \times 5 \times 7 \times 3 \times 2 = 376,320$ “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 *GMDB*s.

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 6.1.1.6), 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 distribution²⁸ 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.²⁹ The policy attribute keys for the cost factors are shown in Table 5 (page 103).

²⁸ 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.

²⁹ 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.

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 103).

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 104).

DF should be set equal to 1 in the $GetCost$ and $GetTGCR$ functions (see page 108).

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 105).

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, ..., M). 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 108). 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: <i>Not used</i> . 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: <i>Not used</i> . 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 4: 10 years 1: 3 years 5: 20 years 2: 5 years 6: 30 years 3: 8 years	
Attained age (last birthday), X .	GMDB	0: 35 2: 65 1: 55 3: 75	
	GMMB & GMSB	0: 55	
Time to next maturity, T . (years from valuation date)		0: 1 year 3: 8 years 1: 3 years 4: 10+ years 2: 5 years	
Account value-to-guaranteed value ratio, ϕ .		0: 0.25 4: 1.25 1: 0.50 5: 1.50 2: 0.75 6: 2.00 3: 1.00	
Annualized account charge differential from Table 2 assumptions in page 94 ("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 6.1.1.6).

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 94).	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:	<i>Not used.</i>		
		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, <i>P</i> .	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: <i>Not used</i> . 3: 10-year rollover.
Guarantee level (% of deposits), <i>G</i> .		0: 75% 1: 100%
Fund class, <i>F</i> .		0: <i>Not used</i> . 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, <i>R</i> .		0: 0% 1: 100%
“In-the-money” surrender rate (GMSB only), <i>S</i> .		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 *MERs* 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, $0.02093 = 0.5 \times 0.04187$.

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 6.1.1.8.

Table 8: Sample lookup keys

KEY	NODE TYPE	PRODUCT / GV%	GV ADJUST .	FUND CLASS	ATT. AGE / MAT. AGE	NEXT MAT.	AV/GV	RESET UTIL.%	ITM TERM%
10103214110	A	GMDB-ROP / 100%	Pro-rata	Balanced allocation	65 / 80	10+	50%	0%	n/a
200150444110	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.³⁰ 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 103).

Installation instructions are given in section 6.1.1.7.

Table 10: Input parameters (arguments) to supplied lookup/retrieval functions

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

See page 102 for instructions on setting the parameters for *DF* and *DT*.

³⁰ Visual Basic for Applications.

Using the notation given earlier,

$$\begin{aligned}
 TGCR &= GV \times h(\circ) \times w(\circ) \times [\text{basic cost factor}] - \frac{\alpha}{100} \times AV \times [\text{basic margin factor}] \\
 &= GV \times h(\circ) \times w(\circ) \times f(\tilde{\theta}) - \frac{\alpha}{100} \times AV \times g(\tilde{\theta}) \\
 &= GV \times \hat{f}(\tilde{\theta}) - AV \times \hat{g}(\tilde{\theta}) \\
 &= \hat{F}(\tilde{\theta}) - \hat{G}(\tilde{\theta})
 \end{aligned}$$

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* $\hat{F}(\tilde{\theta})$, 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* $\hat{G}(\tilde{\theta})$, 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* $\hat{F}(\tilde{\theta}) - \hat{G}(\tilde{\theta})$, 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* $f(\tilde{\theta})$, simply use the function *GetCost* with *AV* = *AV*/*GV*, *GV* = 1 and *DF* = *DT* = 0. Similarly, the *basic margin factor* $g(\tilde{\theta})$ 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* $f(\tilde{\theta})$, interpolating between nodes where necessary.

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

Returns the GMDB *scaled margin offset factor* $\hat{g}(\tilde{\theta})$, 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 $g(\tilde{\theta})$, use $RC = 100$.

GetGMDBFundDiversification(P, G, R)

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

GetGMDBTimeDiversification(P, G, F, R)

Returns the GMDB *time diversification factor* $w(\tilde{\theta})$, interpolating between nodes where necessary. Currently, $w(\tilde{\theta}) = 1$ 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* $f(\tilde{\theta})$, 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* $\hat{g}(\tilde{\theta})$, 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 $g(\tilde{\theta})$, use $RC = 100$.

GetGMMBFundDiversification(P, G, R, S)

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

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

Returns the GMMB/GMSB *time diversification factor* $w(\tilde{\theta})$, 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 6.1.1.7.
GMDBFactors_CTE95.csv GMMBFactors_CTE95.csv	Comma-separated value (flat text) files containing the factors and parameters described in step 2 (refer to section 6.1.1.4). Each “row” in the file corresponds to a test policy as identified by the lookup keys shown in Table 5 (page 103). Each row consists of three (3) entries and is terminated by new line and line feed characters. See step 2 (refer to section 6.1.1.4) 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).

Parameter / Attribute	Value	Description and/or Notes
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 6.1.1.3).
MER	265	Total charge against policyholder funds (bps).
GMDB product code (P)	0	Product definition code as per lookup key in Table 5 (page 103).
GMMB product code (P)	3	Product definition code as per lookup key in Table 5 (page 103).
Guarantee level code (G)	1	Guarantee code as per key in Table 5 (page 103).
GV adjustment code (A)	0	GV adjustment upon partial withdrawal as per Table 5 (page 103).
Fund code (F)	5	Fund class code as per lookup key in Table 5 (page 103).
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 108,

$$\begin{aligned}
 TGCR &= GV \times h(\circ) \times w(\circ) \times [basic\ cost\ factor] - \frac{\alpha}{100} \times AV \times [basic\ margin\ factor] \\
 &= GV \times h(\circ) \times w(\circ) \times f(\tilde{\theta}) - \frac{\alpha}{100} \times AV \times g(\tilde{\theta}) \\
 &= GV \times \hat{f}(\tilde{\theta}) - AV \times \hat{g}(\tilde{\theta}) \\
 &= \hat{F}(\tilde{\theta}) - \hat{G}(\tilde{\theta})
 \end{aligned}$$

$$\begin{aligned}
 \hat{f}_{GMDB}(\tilde{\theta}) &= GetCost(1, 0, 1, 0, 5, 81, 58, 23, 0.9, 1, 265, 0, 0, 80, 1, 1) \\
 &= 0.04592
 \end{aligned}$$

$$\begin{aligned}
 \hat{f}_{GMMB}(\tilde{\theta}) &= GetCost(2, 3, 1, 0, 5, 85, 62, 3, 0.9, 1, 265, 0.35, 0, 80, 1, 1) \\
 &= 0.32849
 \end{aligned}$$

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):

$$\alpha_{GMD\bar{B}} = \frac{0.04592}{(0.04592 + 0.32849)} \times 80 = 0.12264 \times 80 = 9.81 \text{ basis points per annum available to fund the GMD\bar{B} claims and } \alpha_{GMM\bar{B}} = 80 - 9.81 = 70.19 \text{ bps p.a. to fund GMM\bar{B} payouts.}$$

$$\begin{aligned} \hat{F}_{GMD\bar{B}}(\tilde{\theta}) &= \text{GetCost}(1, 0, 1, 0, 5, 81, 58, 23, 90, 100, 265, 0, 0, 9.81, 1, 1) \\ &= \$4.59 \quad \quad \quad = 0.04592 \times \$100 \\ \hat{F}_{GMM\bar{B}}(\tilde{\theta}) &= \text{GetCost}(2, 3, 1, 0, 5, 85, 62, 3, 90, 100, 265, 0.35, 0, 70.19, 1, 1) \\ &= \$32.85 \quad \quad \quad = 0.32849 \times \$100 \end{aligned}$$

For reference, the *basic cost factors* (i.e., before diversification adjustments) are:

$$\begin{aligned} f_{GMD\bar{B}}(\tilde{\theta}) &= \text{GetCost}(1, 0, 1, 0, 5, 81, 58, 23, 0.9, 1, 265, 0, 0, 9.81) \\ &= 0.04794 \\ f_{GMM\bar{B}}(\tilde{\theta}) &= \text{GetCost}(2, 3, 1, 0, 5, 85, 62, 3, 0.9, 1, 265, 0.35, 0, 70.19) \\ &= 0.36461 \\ g_{GMD\bar{B}}(\tilde{\theta}) &= \text{GetMargin}(1, 0, 1, 0, 5, 81, 58, 23, 0.9, 1, 265, 0, 0, 100) \\ &= 0.04697 \\ g_{GMM\bar{B}}(\tilde{\theta}) &= \text{GetMargin}(2, 3, 1, 0, 5, 85, 62, 3, 0.9, 1, 265, 0.35, 0, 100) \\ &= 0.06890 \\ \hat{G}_{GMD\bar{B}}(\tilde{\theta}) &= \text{GetMargin}(1, 0, 1, 0, 5, 81, 58, 23, 90, 100, 265, 0, 0, 9.81) \\ &= \$0.41 \quad \quad \quad = 0.04697 \times \$90 \times \left(\frac{9.81}{100} \right) \\ \hat{G}_{GMM\bar{B}}(\tilde{\theta}) &= \text{GetMargin}(2, 3, 1, 0, 5, 85, 62, 3, 90, 100, 265, 0.35, 0, 70.19) \\ &= \$4.35 \quad \quad \quad = 0.06890 \times \$90 \times \left(\frac{70.19}{100} \right) \\ TGCR_{GMD\bar{B}} &= \text{GetTGCR}(1, 0, 1, 0, 5, 81, 58, 23, 90, 100, 265, 0, 0, 9.81, 1, 1) \\ &= \$4.18 \\ &= \$4.59 - \$0.41 \end{aligned}$$

$$\begin{aligned} TGCR_{GMMB} &= GetTGCR(2, 3, 1, 0, 5, 85, 62, 3, 90, 100, 265, 0.35, 0, 70.19, 1, 1) \\ &= \$28.50 \\ &= \$32.85 - \$4.35 \end{aligned}$$

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 Net capital component

The net capital required is obtained by subtracting the credit for reinsurance ceded from the total gross capital required. Finally, the net capital component is obtained by subtracting the credit for hedging programs and the net actuarial liabilities held from the net capital required.

6.1.2 Expected payment date method

The net required component is determined using the steps that follow.

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 <i>or</i> annuitant age greater than or equal to 85
2	Contracts with time to maturity greater than 1 year <i>and</i> annuitant age less than 85 <i>but not including</i> 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 <i>and</i> 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 net required component for contracts in group 1

The net 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 net required component for contracts in group 2

The net 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 net required component for contracts in group 3

The net required component for contracts in group 3 is determined as the sum of:

- 95% of the previous quarter-end net 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 $\text{CTE}(95) - 25\% \times (\text{CTE}(95) - \text{CTE}(80)) - L_3$ and
- a cap of $\text{CTE}(95) - L_3$.

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 net required component for the portfolio as a whole

The net required component for the portfolio as a whole is the sum of the net required component amounts determined in Steps 3, 4 and 5.

Additional information

Insurers using this method must disclose this in the Capital Guideline Certification Report and provide information on the net 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 Custom factors and internal models

The AMF could authorize the use of internal models for the development of segregated fund capital requirements, for Canadian business as well as for foreign business. Insurers seeking to use their internal models to calculate factors for a particular reinsurance product or agreement or to calculate the segregated fund total net capital component must therefore follow the requirements outlined below and obtain prior authorization from the AMF.

When an insurer submits an application to the AMF, it must be in a position to show that the models are fully documented, implemented and proven to be effective. In addition, key model limitations should be reported and documented. Circumstances under which the models do or do not function effectively should also be documented.

6.2.1 General requirements related to the use of internal models

6.2.1.1 Review and validation

The models used should be subject to a review or validation by a qualified resource, provided such resource was not involved in developing or implementing the models. Qualified individuals are those who have the requisite analytical skills and expertise to understand and evaluate the models. In this context, the review should cover the models and assumptions. The review should, at a minimum, include an evaluation of:

- data integrity, reliability and controls;
- model logic;
- existence and appropriateness of validation methodology for the models and assumptions;
- replication of modelling results;
- sufficiency of documentation.

6.2.1.2 Supporting letter

Furthermore, at the time of initial application or re-application, the actuary should provide a supporting letter indicating the appropriateness of the models and the reasonableness of the results, including the appropriateness of capital reduction, if any.

6.2.1.3 Modifications to model

For any model that was previously presented to the AMF and that is materially modified, the insurer must re-apply to the AMF in order to maintain its authorization. Likewise, any modification to a program should follow the requirements under section 6.2.

All other modifications should be clearly disclosed in the Capital Guideline Certification Report.

6.2.1.4 Ongoing compliance with requirements

Documentation demonstrating compliance with all requirements above must be retained. All relevant documents should be made available to the AMF. The AMF may modify any prior decision made if it is established that the model is no longer in compliance with the requirements under section 6.2.

6.2.2 Particular requirements related to the use of internal models to calculate factors for a particular product of agreement

Insurers using the factor approach and evaluating a product type that is materially different from those presented in the tables or evaluating a complex reinsurance arrangement will need to use stochastic modelling to calculate factors for their particular product or agreement. In order to set the appropriate factors, the insurer must contact the AMF for specific details.

With time, the assumptions underlying authorized factors may not reflect emerging experience and can become inconsistent with the current valuation assumptions. In such instances, an inconsistency between the total gross capital required ("TGCR") calculated using the authorized factors and that determined at CTE (95) using the insurer's stochastic model with current valuation assumptions might develop. For this reason, the actuary must regularly review this relationship to ensure that the TGCR held using the authorized factors is not materially less than that calculated at CTE (95) using the insurer's stochastic model with current valuation assumptions. If the TGCR using the previously authorized factors is materially less than the TGCR calculated at CTE (95) using the insurer's stochastic model with current valuation assumptions, the insurer must use the higher TGCR and obtain authorization from the AMF to use new factors or file an application to use its internal model to calculate capital requirements.

6.2.3 Particular requirements related to the use of internal models to calculation net capital component

Insurers may choose between the two methods described in this section. When an insurer submits its first application to authorize the use of internal models for the development of segregated fund capital requirements, it is required to irrevocably elect the method it intends to use to calculate the net capital component.

6.2.3.1 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 models authorized by the AMF prior to their 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 net capital required is obtained by subtracting the credit for reinsurance ceded from the TGCR. Finally, the net capital component is obtained by subtracting the credit for hedging programs and net actuarial liabilities held from the net capital required.

6.2.3.2 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 T_1 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 T_2 defined in steps 8 and 13);
 - the TGCR for cash flows greater than 5 years (the quantity T_3 defined in steps 14 through 22).
7. The net 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 net 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, net 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 net capital component amount for the greater than 5 years cash flow bucket is determined using a weighted average of the previous quarter's net 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 net capital component amount just calculated based on the earlier assumption that net 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 net capital component amounts

18. *Calculation of upper bound RC_3^u* :

$$RC_3^u = 0 \quad \text{if } T_3^u \leq 0$$

$$RC_3^u = \frac{T_3^u}{\max(T_1 + T_2, 0) + T_3^u} \times \max\{T_1 + T_2 + T_3^u - \min(L, L_u), 0\} \quad \text{if } T_3^u > 0$$

The quantity RC_3^u represents an upper bound on the current quarter net capital component amount for cash flows greater than 5 years.

19. Calculation of lower bound RC_3^l :

$$RC_3^l = 0 \quad \text{if } T_3^l \leq 0$$

$$RC_3^l = \frac{T_3^l}{\max(T_1 + T_2, 0) + T_3^l} \times \max\{T_1 + T_2 + T_3^l - \min(L, L_u), 0\} \quad \text{if } T_3^l > 0$$

The quantity RC_3^l represents a lower bound on the current quarter net capital component amount for cash flows greater than 5 years.

20. Calculation of $RC_3^{(95)}$:

$$RC_3^{(95)} = 0 \quad \text{if } T_3^{(95)} \leq 0$$

$$RC_3^{(95)} = \frac{T_3^{(95)}}{\max(T_1 + T_2, 0) + T_3^{(95)}} \times \max\{T_1 + T_2 + T_3^{(95)} - \min(L, L_u), 0\} \quad \text{if } T_3^{(95)} > 0$$

The quantity $RC_3^{(95)}$ is the current quarter net capital component amount to be used in the averaging formula.

Calculation of net capital component amount for cash flows greater than 5 years based on averaging formula

21. Calculation of RC_3 : $RC_3 = \max\{RC_3^l, \min(RC_3^u, 95\% \times RC_3^p + 5\% \times RC_3^{(95)})\}$, where FP_3^p represents the previous quarter net capital component amount for cash flows greater than 5 years. The quantity RC_3 represents the current quarter net 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

$$RC_3 = \frac{T^*}{\max(T_1 + T_2, 0) + T^*} \times \max\{T_1 + T_2 + T^* - \min(L, L_u), 0\}.$$

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 net 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

$$\frac{T_3^u}{\max(T_1 + T_2, 0) + T_3^u} . \text{ Insurers requiring further guidance on this matter should contact the AMF.}$$

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 net 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. Other aspects of this method may be reviewed and modified in the future.

6.2.3.3 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:			
	2.5 th percentile of return not greater than	-25%	-35%
	5 th percentile of return not greater than	-18%	-26%
	10 th percentile of return not greater than	-10%	-15%
Right tail criteria:			
	90 th percentile of return not less than	20%	30%
	95 th percentile of return not less than	25%	38%
	97.5 th 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 equities³¹ 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 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.

³¹ 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."

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

$$r - \max\left(D - \frac{1}{2}; 0\right) \times (a_p + b_p \cdot \sqrt{r}) - d_p$$

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
2.5 th	2.00%	1.60%	1.20%	0.80%
5 th	1.70%	1.35%	1.00%	0.70%
10 th	1.30%	1.05%	0.80%	0.50%

The values of b_p are given by the following table:

Percentile	b_p
2.5 th	5.00%
5 th	4.20%
10 th	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%.

Insurers should take into consideration the limited historical experience with very low interest rate environments when setting assumptions for bond fund models and ensure that their models appropriately capture 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 should contact the AMF for information on how to calibrate the segregated fund return scenarios.

Calculation of total requirement for exposures subject to this section

The total requirement for business subject to this section (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 TGCR for the segregated fund guarantee exposure as a whole will be the sum of the total requirements for business subject to this section and all other business. For both business groups, the individual components have to be floored at zero before the sum is calculated.

6.2.3.4 Transitional rules

Transitional rules apply to all models 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 internal models, and 50% of the capital requirements as determined by standard or pre-authorized factors. Starting in the year-end following the first anniversary of use, internal model requirements may be used for all TGCR.

6.3 Credit for utilization of risk mitigation strategies

The purpose of this section is to guide insurers seeking acknowledgment of the reduction in the risk due to risk mitigation strategies, including reinsurance and capital markets hedging. To this end, this section exposes more precisely minimal requirements regarding credit for reinsurance and hedging in the determination of the capital required component.

All other risk mitigation strategies that could be used by the insurer must obtain the AMF's prior authorization in order to potentially obtain a credit.

6.3.1 Credit for reinsurance ceded

For reinsurance that can be expressed directly in terms of the factors, credit can be taken on that basis. For more complex reinsurance arrangements that cannot be expressed using the factors, the impact will need to be modelled. For example, a reinsurance agreement that has the ceding insurer retain losses to a predetermined level (a "deductible"), with the reinsurer assuming losses above this level, but with a cap on the reinsurance claims (e.g., a maximum annual payment cap under the agreement). For details regarding modeling, see the "Custom factors and internal models" section of this guideline (section 6.2).

All provisions regarding the unregistered reinsurance found in section 1.2 also apply to segregated funds. Deposits held for a period not less than the remaining fund guarantee term that are in excess of the actuarial liabilities for the risk reinsured may reduce the required segregated fund risk component requirement on any policy to a minimum of zero. The reduction is limited to that available had the business been ceded to a reinsurer subject to similar requirements.

6.3.2 Credit for capital markets hedging

The AMF may recognize a credit for life and health insurers seeking a capital offset relating to capital adequacy requirements for hedging programs used in managing segregated fund market and insurance risks.

All insurers that wish to obtain a capital offset for segregated fund hedging programs must meet the requirements below and submit an application to obtain a prior authorization from the AMF. Each application must include the following documents:

- Copies of pertinent board approvals;
- Documentation to support board approvals;
- Evidence of meeting operational requirements;
- Sample reporting, including technical analyses;
- Copy of the independent review and validation report, along with a supporting letter from the actuary of the company.

Each of the preceding points is detailed below in this section.

All relevant documents should be available for review by the AMF at the insurer's head office.

6.3.2.1 Requirements

The following are minimum expectations to obtain a capital offset in connection with the capital adequacy requirements when hedging strategies are used.

A “model” as it is defined in section 6.3.2 refers to a cash flow projection model that encompasses both investment returns and segregated fund liability characteristics. This model must be able to evaluate financial market options accurately within the context of real world-based investment return simulations pertinent to actuarial projections. An audit trail must be maintained for further verification and control.

6.3.2.2 Board approval

A strong risk management culture is a prerequisite for any hedging program. As such, the insurer should have in place policies, processes, controls, management and board approvals that show that a strong risk management framework is in place and is working effectively and in compliance with the guidelines given to the insurers by the AMF, including the *Governance Guideline* and the *Integrated Risk Management Guideline*.

The segregated fund risk mitigation program must be presented for review to both senior management and the board and must be explicitly approved by the board or an appropriate board committee. As appropriate, the board or board committee must also approve policies that address the insurer's derivatives, capacity limits and operational limits.

6.3.2.3 Documentation

A comprehensive summary of all the principles, techniques and processes used to implement the model should be available for review of the credit application and monitoring by the AMF. The documentation submitted to the AMF should include a description of the:

- rationale for use of hedging;
- hedging program, including any rebalancing criteria;
- products to which the program is to be applied;
- implementation plan for the program;
- derivative or risk mitigation instruments contemplated in the hedging program;
- measurement criteria for basic risk, liquidity risk, counterparty risk or any other material risks associated with the hedging program;
- model's ability to evaluate risk-neutral capital markets (Q-measure) within a real world experience-based valuation (P-measure);
- methodology, models and their limitations;
- use of hedging models within the day-to-day risk management process;
- review and approval process for the adoption of new models or modifications to existing hedging models;
- hedging model validation criteria;
- process and criteria for analyzing hedge effectiveness and relationship to model validation criteria;
- frequency and types of model review;
- risk limits (corporate and trigger levels);
- escalation procedures for limit exceptions;
- stress testing and frequency of such tests;
- appropriateness of the chosen stress tests;
- reporting and monitoring requirements;
- systems used to support the monitoring and reporting;

- controls to ensure the integrity of data and results;
- skills and expertise required of personnel to execute and monitor the hedging program;
- CVs of individuals who develop, execute and manage the hedging program(s).

6.3.2.4 Operational requirements

The program must be fully documented, implemented and proven to be effective for at least three months before the insurer submits an application to the AMF in order to obtain a capital offset.

6.3.2.5 Reporting and technical analysis

The results of the hedging program must be reported to senior management at least monthly, with summaries of the relevant items to the board at least quarterly. The reporting must define measurement criteria, quantify key risk exposures, analyze the hedge effectiveness (results of the program) and any residual risks, discuss financial implications, and specify appropriate action plans. Reporting must also include evidence of compliance with pertinent internal policies and limits.

All reports produced further to the initial capital offset application must be available for AMF's examination.

The analysis underpinning the reporting must include:

- a description of the stress testing undertaken (both quantitative and qualitative in nature and incorporating market risk, the liquidity aspects of market disturbances and liability characteristics);
- demonstration and explanation of hedge effectiveness under stressed conditions;
- critical assumptions;
- demonstration of hedge effectiveness under routine and stressed conditions;
- analysis of residual risks.

Stress testing should be meaningful and should identify risks applicable to the hedging program as well as liability and product characteristics. Stress testing should be conducted at least monthly, consistent with management reporting, and should incorporate deterministic adverse scenarios. It could also include stochastic scenarios. Stress testing scenarios must take into account all material risks relating to the hedging strategy. Examples include: illiquidity, in particular where financial options required to rebalance the portfolio are not readily available, correlation changes between asset classes, and failure to execute the hedging program.

In addition, key model limitations should be reported and documented. Circumstances under which the models do or do not work effectively should also be reported and documented. The modelling should follow the guidance outlined in the final version report of the “CIA Task Force on Segregated Funds Investment Guarantees” published in March 2002. See section 2.3 (“Modelling of Hedges”) of that report.

6.3.2.6 Independent review and validation

The hedging program and the models used to implement the hedging strategy should be subject to an independent review or validation by a qualified resource provided such resource was not involved in developing, implementing or executing the hedging program or models. Qualified individuals are those who have the requisite analytical skills and expertise to understand and evaluate the hedging program. In this context, the review should cover the models, assumptions, reporting to senior management, and overall risk management infrastructure.

The review should, at a minimum, include an evaluation of:

- data integrity, reliability and controls;
- model logic;
- existence and appropriateness of validation methodology for the models and assumptions;
- replication of modelling results;
- ability of models to accurately capture the hedging strategy;
- appropriateness of the stress testing program, including the use of stress testing results;
- sufficiency of documentation supporting the program (including models and assumptions); and
- robustness of the process for reviewing hedging results and relationship to model validation criteria.

6.3.2.7 Supporting letter

Furthermore, at the time of application or re-application, the actuary should provide a supporting letter indicating the appropriateness of the models, the hedging program and stress tests, and the reasonableness of the results, including the appropriateness of capital offsets, if any, under stress scenarios.

6.3.2.8 Modifications to program

For any hedging program that was previously presented to the AMF and is materially modified, the insurer must re-apply to the AMF in order to continue to receive a capital offset or to have a revaluation of the offset. If the program is discontinued, the insurer must provide written notification to the AMF; the capital offset will be revoked.

Examples of material modifications include, but are not limited to a:

- change in board approval;
- change in model;
- change in the hedging program;
- change in the hedge effectiveness.

Any modified program will need to satisfy the requirements of section 6.3.2.

6.3.2.9 Maximum allowable reduction amount

Hedging strategies with respect to segregated fund market and insurance risks are relatively new and evolving. To allow for operational and execution risks in implementing such strategies successfully, the maximum capital offset will be limited to 50% of the reduction shown by the models. As the industry and the AMF become more familiar with strategy implementation, this limitation will be reviewed.

The capital offset is determined by the use of models as previously described that accurately capture the hedging program in place and is approved by the board. Those same models must be used to calculate the actuarial liability for these products. To determine the percentage reduction due to hedging, costs determined at the conditional tail expectation at 95% (CTE (95)) should be calculated on two bases:

1. with no hedging program in place; and
2. with hedging.

The underlying assumptions and scenarios must be the same for both calculations. The maximum allowable reduction will then be one half of the difference between the two values, expressed as a percentage of the costs set at CTE (95) determined without hedging. This reduction is to be applied to the Net Capital Required ("NCR") in order to obtain the maximum allowable reduction amount.

Therefore, the **maximum allowable percentage reduction** will be equal to:

$$0.50 \times \left(\frac{(\text{costs without hedging}) - (\text{costs with hedging})}{\text{costs without hedging}} \right)$$

and

the maximum allowable reduction amount will be equal to:

$$\text{NCR} \times \text{maximum allowable percentage reduction.}$$

6.4 Modes of calculation

6.4.1 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: *Total Gross Capital Required:*

The calculation based on prescribed factors is detailed in section 6.1, and that based on factors for a particular product calculated from internal models is detailed in section 6.2 (lines 010 to 060 of the QFP form). However, if the insurer uses models, the result will be reported to line 070 of the QFP form.

Column 04: *Credit for Reinsurance Ceded:*

This is determined as outlined in section 6.3.1.

Column 05: *Net Capital Required:*

This is determined as:

$$\text{Total Gross Capital Required} - \text{Credit for Reinsurance Ceded}$$

Column 06: *Credit for Hedging Programs:*

This amount is the maximum reduction. It is determined as:

$$\text{Maximum allowable percentage reduction} \times \text{Net Capital Required}$$

Where the maximum allowable percentage reduction is limited to 50% of the percentage reduction shown by the models. For more details, see section 6.3.2.

Column 07: *Net Actuarial Liabilities Held*:

This is the total net actuarial liabilities held on the balance sheet for the segregated fund guarantee risks.

Column 08: *Net Capital Required Component*:

This is determined as:

$$\text{Net Capital Required} - \text{Credit for Hedging Programs} - \text{Net Actuarial Liabilities Held}$$

Note: The total in line 099 (page 95.010 of QFP disclosure form) must not be less than zero.

6.4.2 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: *Factor Requirements*:

This is the gross calculated requirement based on the factors established through specific tables of section 6.1 or on the factors established through requirements outlined in section 6.2.

Column 02: *Internal Models Requirements*:

This is the gross calculated requirement based on insurer's specific internal models.

Column 03: *Total Gross Capital Required*:

The following "transition rules" apply to Total Gross Capital Required based on internal models:

- In the first year of the use of the models, total gross capital required is calculated as: 50% of the 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, total gross capital required will represent 100% of the factor requirements.

Column 04: *Credit for Reinsurance Ceded:*

This is determined as outlined in section 6.3.1.

Column 05: *Net Capital Required:*

This is determined as:

$$\text{Total Gross Capital Required} - \text{Credit for Reinsurance Ceded}$$

Column 06: *Credit for Hedging Programs:*

This amount is the maximum reduction. It is determined as:

$$\text{Maximum allowable percentage reduction} \times \text{Net Capital Required}$$

Where the maximum allowable percentage reduction is limited to 50% of the percentage reduction shown by the models. For more details, see section 6.3.2.

Column 07: *Net Actuarial Liabilities Held:*

This is the total net actuarial liabilities held on the balance sheet for the segregated fund guarantee risks.

Column 08: *Net Capital Required Component:*

This is determined as:

$$\text{Net Capital Required} - \text{Credit for Hedging Programs} - \text{Net Actuarial Liabilities Held}$$

Note: In the QFP form, the amount on page 95.020, column 08, line 100 should be the same as the amount on page 95.010, column 08, 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 7.1. 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 1.3.1.

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.³²

³² 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 contracts³³;
 - 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.

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;

³³ Gold contracts are treated the same as exchange rate contracts for the purpose of calculating asset yield deficiency risk.

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}),³⁴
- 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.

³⁴ 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
2.9.3.1 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 $(0.4 \times 4.5) + (0.6 \times 0.5 \times 4.5) = 3.15$.

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 Purchases³⁵ (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.

³⁵ This does not include a spot transaction that is contracted to settle within the normal settlement period.

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.

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.

Chapitre 8. Transitional provisions

1. Initial impact on available capital of the adoption of the revisions to IAS 19 *Employee Benefits*

Insurers may elect a transition period to defer on gross Tier 1 capital the impact on gross Tier 1 capital:

- a) of including the accumulated defined benefit pension plan OCI remeasurements, if any, recognized on December 31, 2012 (i.e.: the amounts, if any, that was reported immediately prior to the effective date of the requirement in this guideline to include in gross Tier 1 capital accumulated defined pension plan remeasurements in OCI); and
- b) related to net defined benefit pension plan liabilities (assets) upon the initial adoption of the revisions to IAS 19 Employee Benefits, effective for fiscal years beginning on or after January 1, 2013 (i.e.: the impact on gross Tier 1 capital of the net restatement of retained earnings and accumulated OCI together).

The deferred amount is the sum of a) and b) above. It is amortized on a straight-line basis over the transition period. This period begins on January 1, 2013 for item a) and on the effective date of the revision to IAS 19 standard for item b). It must be completed by the earliest quarter-end occurring on or after December 31, 2014. If an insurer elects the transition period, it will be irrevocable, is reflected via adjustments to gross Tier 1 capital and the insurer will also have to defer the net defined benefit pension plan impacts on net Tier 1 capital and on the other capital items of Tier 2, as outlined in sections 2.2.1 and 2.3.

Insurers that elect a transition period to defer the impact on gross Tier 1 capital of changes related to the net defined benefit pension plan liability (asset) must also phase-in, in net Tier 1 capital, the impact on net Tier 1 capital of the pension plan asset deduction:

- a) resulting from the recognition of each net defined benefit pension plan (inclusive of the impact of any asset ceiling limitation) net of any associated deferred tax liability³⁶, if any, that was reported on December 31, 2012 (i.e.: the amount of the pension plan asset deduction, if any, immediately prior to the effective date of the pension plan asset deduction requirement in this guideline); and
- b) restatement upon the initial adoption of the revisions to IAS 19 Employee Benefits, effective for fiscal years beginning on or after January 1, 2013 (i.e.: the impact of the restatement on the pension plan asset deduction).

The deferred amount in net Tier 1 capital is the sum of a) and b) above. It is amortized on a straight-line basis over the transition period. This period begins on January 1, 2013 for item a) and on the effective date of the revision to IAS 19 standard for item b). It must be completed by the earliest quarter-end occurring on or after December 31, 2014. If an insurer elects the transition period, it will be irrevocable and is reflected via adjustments to net Tier 1 capital. The details of the calculation of the deferred amount must be disclosed in the Capital Guideline Certification Report.

³⁶ See footnote 12.

Insurers that elect a transition period to defer the impact on gross Tier 1 capital of changes related to the net defined benefit pension plan liability (asset) must also phase-in, in the other capital items of Tier 2, the impact on the other capital items of Tier 2 of the pension plan asset add-back:

- a) resulting from the recognition of each net defined benefit pension plan that was reported on December 31, 2012 (i.e.: the amount of the pension plan asset add-back, if any, immediately prior to the effective date of the requirement in this guideline to add-back in the other capital items of Tier 2 50% of the pension plan asset deduction); and
- b) restatement upon the initial adoption of the revisions to IAS 19 *Employee Benefits*, effective for fiscal years beginning on or after January 1, 2013 (i.e.: the impact of the restatement on the pension plan asset add-back).

The deferred amount in the other capital items of Tier 2 is the sum of a) and b) above. It is amortized on a straight-line basis over the transition period. This period begins on January 1, 2013 for item a) and on the effective date of the revision to IAS 19 standard for item b). It must be completed by the earliest quarter-end occurring on or after December 31, 2014. If an insurer elects the transition period, it will be irrevocable and is reflected via adjustments to the other capital items of Tier 2.

2. Investments in non-qualifying subsidiaries, dissimilar regulated financial subsidiaries, associates and non-qualifying joint ventures

Until December 31, 2014, the insurers can reduce the deduction provided in section 2.5.1. This reduction is obtained by applying a percentage to the amount of the following subtraction calculated as of December 31, 2012:

- the deduction described in section 2.5.1 under the January 1, 2013 version of the guideline;
less
- the sum of the deductions described in subsections 2 to 4 of the section B5 under the March 31, 2011 version of the guideline.

The percentage is equal to $\left(1 - \frac{n}{8}\right)$ where n is the number of quarters that have elapsed since December 31, 2012.