



AUTORITÉ
DES MARCHÉS
FINANCIERS

GUIDELINE ON CAPITAL ADEQUACY REQUIREMENTS

Property and casualty insurance

January ~~2023~~2024

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Chapter 1. Introduction and general requirements

1.1 Introduction

1.1.1 Guideline objective

The *Insurers Act* (CQLR, Chapter A-32.1) (the “Act”) prescribes that every insurer must adhere to sound and prudent management practices.” Moreover, under the Act, the *Autorité des marchés financiers* (the “AMF”) may establish guidelines, for all authorized insurers, informing them of measures that they may establish to satisfy their obligations under Titles II and IV of the Act, including the obligation to adhere to practices that provide that they maintain adequate capital to ensure their sustainability.¹

The objective of these guidelines is essentially to increase the transparency and predictability of the criteria used by 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 investors and policyholders is key to achieving this objective. This principle is reflected in the capital adequacy requirements for property and casualty (P&C) insurers (“damage” insurers in Québec) set forth in this guideline.

The risk-based capital adequacy framework is based on an assessment of the riskiness of insurance risk, market risk, credit risk and operational risk, by applying varying risk factors and margins. P&C insurers are required to meet a **capital available to capital required** test. The definition of capital available to be used for this purpose is described in Chapter 2 and is calculated on a consolidated basis.

The *Guideline on Capital Adequacy Requirements* outlines the capital framework, using a risk-based formula for target capital requirements and minimum capital requirements, and defines the capital that is available to meet the minimum standard. The Minimum Capital Test (MCT) determines the minimum capital required and not the optimum capital required at which an insurer must operate.

1.1.2 Scope of application

This guideline applies to all ~~P&C~~ insurers authorized to carry on P&C insurance activities in Québec (excluding self-regulatory organizations and holding a charter issued by the province of Québec or by another Canadian jurisdiction reciprocal unions) (hereinafter collectively to as the “P&C-insurers” and individually as the “insurer”). It applies on a consolidated basis in accordance with Canadian generally accepted accounting principles (CGAAP).² Accordingly, each component of capital available and capital required is

¹ Sections 74, 463 and 464 of the Act.

² The Canadian Accounting Standards Board has adopted International Financial Reporting Standards (IFRS) as Canadian GAAP for publicly accountable enterprises, including insurers. The primary source of Canadian GAAP is the Chartered Professional Accountants of Canada Handbook.

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 purposes of this guideline, non-qualifying subsidiaries³ should be deconsolidated and accounted for using the equity method. Interests in non-qualifying subsidiaries are excluded from capital available and capital required calculations, as are loans or other debt instruments issued to them if they are considered as capital in the entity (reference Section 2.4).

For insurers operating in both P&C insurance and life and health insurance ("insurance of persons" in Québec), this guideline only applies to balance sheet items and off-balance-sheet instruments attributed by the insurer to the P&C insurance sector and to the accident and sickness class of insurance business.

1.1.3 Effective date

This version of the guideline takes effect on January 1, ~~2023~~2024 and is applicable for fiscal years beginning on or after that date. Early application is not permitted.

1.1.4 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 CGAAP.

Assets and liabilities of subsidiaries consolidated for the purposes of this guideline are therefore subject to risk factors and liability margins in the insurer's MCT.

1.1.5 Interpretation

Because the requirements set forth in this guideline are intended mainly as guidance for insurers, 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~~The insurer is 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.

Furthermore, despite the requirements described in the guideline, in any case where the AMF believes that the capital treatment is inappropriate, a specific capital requirement may be determined for a particular insurer.

³ See Section 2.4 for the definition of "non-qualifying subsidiary".

1.2 Risk-based capital adequacy

The AMF expects P&C insurers to meet the MCT capital requirements at all times. To be considered as regulatory capital to be used for this purpose, capital instruments must meet qualifying criteria and are subject to capital composition limits and deductions and adjustments (reference Chapter 2). Under this guideline, the notion of capital encompasses capital available within all subsidiaries that are consolidated for the purpose of calculating the MCT ratio.

Under the MCT, capital requirements for various risks are set directly at a pre-determined target confidence level. The AMF has elected 99% of the expected shortfall (conditional tail expectation or CTE 99%) over a one-year time horizon, including a terminal provision, as a target confidence level.⁴

As a first step, the risk factors defined in this guideline are used to compute the target capital requirements on a consolidated basis. The minimum capital required is then determined as the sum of the target capital requirements for each risk component, less the diversification credit, the result of which is divided by 1.5.

The target capital requirements are calculated as follows:

Sum of the capital required for the following risks:

- Insurance risk (reference Chapter 3~~); and 4~~):
 - liability for incurred claims and unexpired coverage;
 - exposure to unregistered reinsurance held;
 - earthquakes.
- Market risk (reference ~~);Chapter 5~~):
 - interest rate;
 - foreign exchange;
 - equity;
 - real estate;
 - other market risk exposures.
- Credit risk (reference Chapter 5~~6~~):
 - counterparty default risk for balance sheet assets;

⁴ As an alternative, the AMF used a value at risk (VaR) at 99.5% confidence level or expert judgement when it was not practical to use the CTE approach.

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- counterparty default risk for off-balance sheet exposures;
 - guarantee instruments held for unregistered reinsurance (reference Section 3.4.2) and self-insured retention (reference Section 3.5).
- Operational risk (reference Chapter 67).

Less:

- Diversification credit (reference Chapter 78).

The minimum capital required is then calculated as follows:

- Target capital required divided by 1.5.

The MCT ratio, expressed as a percentage, is then calculated by dividing the insurer's capital available by minimum capital required.

1.3 General requirements

1.3.1 Minimum ratio, intervention target ratio and internal capital target ratio

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

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

In addition to capital management principles such as:

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

The *Capital Management Guideline* sets out the AMF's expectations regarding the different incremental levels of capital⁶ that a financial institution should maintain, taking into account

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

⁶ Regulatory capital, internal capital target and excess capital.

regulatory requirements, its risk profile and its other current or future needs. These levels are established in relation with the requirements related to the calculation of the MCT ratio.

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

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

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

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

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

- residual credit, market and insurance risks; for example, certain risks related to risk transfers are types of market risk not covered in the calculation of the MCT ratio;
- liquidity risk;
- concentration risk;
- regulatory risk;

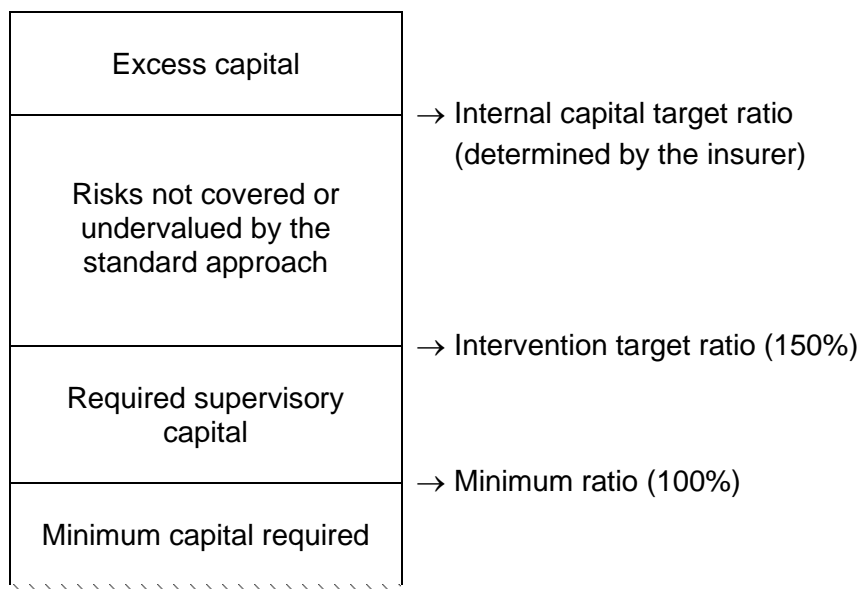
⁷ In order to make sure that the internal capital target ratio is above the intervention target ratio, the level of internal target capital should be expressed as a percentage of the insurer's minimum capital ~~requirements~~required as set forth following this *guideline*, and compared to the minimum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

- strategic risk;
- risk related to access to market capital;
- reputation risk.

Insurers should then consider the risks specific to them when determining their respective internal capital target ratios. Insurers can meet this requirement by drawing, for example, on plausible adverse financial condition testing (FCT) scenarios or on stress testing scenarios. The impact of the various scenarios should be tested on the internal capital target ratio instead of the insurer's actual capital ratio.

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

Minimum ratio, intervention target ratio and internal capital target ratio



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

- take into account the variable nature of the MCT ratio and the possibility that it could fall below their internal capital target ratio under their routine operating conditions due, among other reasons, to normal market volatility and insurance experience;
- maintain or attain a credit rating;
- innovate by, for example, developing new products;
- keep pace with business combination trends, in particular, opportunities to acquire portfolios or companies;
- be prepared for global industry-wide change, including standard-setting developments such as changes in accounting and actuarial standards.

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

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

1.3.2 Considerations relating to reinsurance

1.3.2.1 Definitions

In this guideline, the expressions "registered reinsurance" and "unregistered reinsurance" refer to Annex A of the *Reinsurance Risk Management Guideline*.

1.3.2.2 Registered reinsurance

Capital requirement calculations under the MCT reflect insurers' use of registered reinsurance in the course of their activities. Amounts receivable and recoverable under registered reinsurance contracts held are subject to the risk factors described in Section 56.1.3 of this guideline.

In this guideline, the following risk pooling arrangements are recognized as registered reinsurers:

- Risk Sharing Plan (RSP) administered by the Groupement des assureurs automobiles;
- Provincial Risk Sharing Pools administered by the Facility Association.

As regards these two risk pooling arrangements, the capital treatment is aligned with the accounting treatment for these transactions.

1.3.2.3 Unregistered reinsurance

For business under an unregistered reinsurance contract held, amounts receivable and recoverable from the agreement and reported on the balance sheet are deducted from capital available, that is, calculations must be made as if the business was not registered, to the extent that they are not covered by amounts payable to assuming reinsurers. A ceding insurer may also ask the AMF to benefit from a credit in respect of this capital requirement if it demonstrates to the AMF that these amounts are covered by acceptable

collateral⁸ obtained from assuming reinsurers, which allow the insurer to guarantee the performance of its obligations in Québec.

Section [3.4.2](#) of this guideline provides additional guidance on capital deduction, the margin requirement on amounts recoverable from unregistered reinsurance and the limit on the use of guarantee instruments.

1.3.3 Audit requirement

1.3.3.1 External Audit

Effective for fiscal years beginning before January 1, 2025

The AMF expects the MCT ratio to be audited annually by ~~the~~[an external](#) auditor ~~designated and charged with the functions provided for under Chapter VII of Title II of the Act.~~⁹ The [external](#) auditor's opinion should address compliance with this guideline as at the time the MCT ratio is determined.

The AMF expects the external auditor to provide an external audit opinion to the AMF annually within 90 days of fiscal year-end.

Effective for fiscal years beginning on or after January 1, 2025

The AMF expects the external auditor to evaluate and opine on whether the numerator and denominator of the annual MCT ratio have been prepared, in all material respects, in accordance with the MCT requirements.

The AMF expects the external auditor to provide an external audit opinion to the AMF annually no later than 90 days of fiscal year-end.

1.3.3.2 Internal audit

The AMF expects an internal auditor to evaluate and opine on the effectiveness of the processes and internal controls in place for the MCT Return, including related systems, and the monitoring of compliance with AMF-approved models.

The AMF expects the internal auditor to provide his or her opinion to the AMF at a minimum once every three years based on the insurer's risk-based frequency of review.

The internal audit may be completed at any time during the fiscal year. If the internal audit opinion does not include testing of controls at year-end, the insurer must attest to the AMF

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

⁹ ~~Sections 115 and 130 of the Act.~~

[that the processes and controls continue to be in place and that no material changes occurred at year-end.](#)

[An insurer may appoint an independent qualified party to conduct out this audit](#)

1.3.4 Allocation

Insurers may need to undertake an allocation exercise in order to determine the capital requirements in accordance with the provisions of this guideline. In such cases, the AMF expects:

- the allocation approaches to be systematic and justified in an appropriate manner;
- the allocation approaches used by the insurer for capital purposes to be aligned with the allocation approaches it uses for its other business decisions;
- the allocation approaches to be reasonably consistent both over time and as regards the similarity of their characteristics. Any occasional changes in the allocation approach should be justifiable;
- the allocation approaches to be determined without creating bias. Insurers should be aware of results that are regularly biased by the choice of the allocation approach. Allocation approaches must therefore be adjusted accordingly;
- the allocation approaches to allow for allocating income and expense amounts with acceptable accuracy¹⁰ and take into account any reasonable supporting information available at the reporting date and obtained without undue cost or effort.

Insurers must have effective monitoring and internal reporting processes in order to ensure their ongoing compliance with the above principles. They must document the principles underlying their allocation process and any changes to significant professional judgment used in their allocation approaches, including how they meet the principles set out above ~~period.~~

1.3.5 Intra-group pooling arrangements

For any intra-group pooling arrangement, prior approval from the AMF is required before the capital treatment set out in this guideline can be applied by an insurer.¹¹

1.3.6 Transition period

The contractual service margin (CSM) arising from favorable development from business combinations and portfolio transfers, entered into by no later than June 30, 2019, can be included in capital available. This transitional provision will apply ~~for a period of three years after this guideline becomes effective~~ [until December 31, 2025.](#)

¹⁰ The allocation approaches for amounts relating to loss components, if any, should reflect the expected relative profitability of each of the classes of insurance in this guideline.

¹¹ Any amendment to an intra-group pooling arrangement approved before May 1, 2022 must be re-approved by the AMF.

1.3.7 Designated representative's signature

The senior management attestation on the MCT Return cover page must be signed by a representative of the insurer that is designated by the board of directors (the "designated representative"). The designated representative must not be directly involved in the preparation of the MCT Return and must have the knowledge and expertise required to interpret the MCT.

The AMF expects senior management attestation to be submitted to it based on the MCT Return filing frequency and requirements.

The AMF expects the designated representative to perform a review of the MCT Return to inform the senior management attestation, and to provide an attestation on the accuracy and completeness of the MCT Return, which attestation must appear on the MCT Return cover page.

The designated representative's annual attestation submission is to be accompanied by a summary of unadjusted errors¹² identified by the external auditor. Submission of unadjusted errors is limited to those impacting the calculation of the MCT ratio.

¹² Unadjusted errors below misstatement posting thresholds identified by external auditors in the performance of their work can aid AMF in understanding where errors reside in regulatory ratio calculations, which can support their effective supervision.

Chapter 2. Capital available

This chapter establishes requirements for the adequacy and appropriateness of capital resources used to meet capital requirements, having regard to their ability to meet P&C insurers' obligations to policyholders and creditors and to absorb losses in periods of stress. This includes the determination of the criteria for assessing the quality of capital components for inclusion in capital available and the composition of capital available, focussing on the predominance of highest quality capital.

2.1 Capital components

Capital available is determined on a consolidated basis, but in agreement with Section 1.1.2, which provides for the deconsolidation of non-qualifying subsidiaries.¹³

The four primary considerations underlying the qualifying criteria of the capital available components of a financial institution for the purpose of measuring capital adequacy are:

- its availability: the extent to which the capital element is fully paid in and available to absorb losses;
- its permanence: the period for, and the extent to which, the capital element is available;
- absence of encumbrances and mandatory servicing costs: the extent to which the capital element is free from mandatory payments or encumbrances;
- subordination: the extent to which and the circumstances under which the capital element is subordinated to the rights of policyholders and other creditors of the institution in an insolvency or winding-up.

The integrity of capital elements is paramount to the protection of policyholders. Therefore, these considerations will be taken into account in the overall assessment of a P&C insurer's financial condition.

Capital available is defined as the sum of the following components: common equity (or category A capital), category B capital, and category C capital.

2.1.1 Category A capital (common equity)

- Common shares issued by the P&C insurer that meet the category A qualifying criteria as described in Annex 1;¹³
- Surplus (share premium) resulting from the issuance of common equity capital instruments;¹⁴
- Other contributed surplus;¹⁴
- Retained earnings;¹⁴

¹³ See section 2.4 for the definition of "non-qualifying subsidiary".

¹⁴ Where repayment is subject to the AMF's approval.

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- Earthquake, nuclear and general contingency reserves²;
 - Accumulated other comprehensive income²;
 - Residual interest, reported either as equity or as a liability, of policyholders of certain mutual entities.

Retained earnings and other comprehensive income include interim profit or loss. Dividends are removed from capital available in accordance with relevant accounting standards.

For an instrument to be included in capital available under category A, it must meet all of the criteria listed in Annex 1.

2.1.2 Category B capital

- Instruments issued by the insurer that meet category B criteria listed in Annex 2 and do not meet the criteria for classification as category A, subject to applicable limits;
- surplus (share premium) resulting from the issuance of instruments meeting category B criteria.

For an instrument to be included in capital available under category B, it must meet all of the criteria listed in Annex 2.

Purchase for cancellation of category B capital instruments is permitted at any time with the prior approval of the AMF. For further clarity, a purchase for cancellation does not constitute a call option at the initiative of the issuer as described in the qualifying criteria for category B capital instruments laid down in Annex 2.

Tax and regulatory event calls are permitted during an instrument's life subject to the prior approval of the AMF and provided the insurer was not in a position to anticipate such an event at the time of issuance.

Dividend stopper arrangements that stop payments on common shares or category B instruments are permissible provided the stopper does not impede the full discretion the insurer must have at all times to cancel distributions or dividends on the category B instrument, nor must it act in a way that could hinder the recapitalization of the insurer pursuant to qualifying criterion #13 of Annex 2. For example, it would not be permitted for a stopper on a category B instrument to:

- attempt to stop payment on another instrument where the payments on the other instrument were not also fully discretionary;
- prevent distributions to shareholders for a period that extends beyond the point in time that dividends or distributions on the category B instrument are resumed;
- impede the normal operation of the insurer or any restructuring activity, including acquisitions or disposals.

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

Where an amendment or variance of a category B instrument's terms and conditions affects its recognition as capital available under this guideline, such amendment or variance will only be permitted with the prior approval of the AMF.¹⁵

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

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

2.1.3 Category C capital

- Instruments issued by the insurer that meet category C criteria listed in Annex 3, but do not meet the category A or B criteria, subject to an applicable limit.
- Surplus (share premium) resulting from the issuance of instruments meeting the category C criteria.

For an instrument to be included in capital available under category C, it must meet all of the criteria listed in Annex 3.

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

Purchase for cancellation of category C capital instruments is permitted at any time with the prior approval of the AMF. For further clarity, a purchase for cancellation does not constitute a call option at the initiative of the issuer as described in the qualifying criteria for category C capital instruments laid down in Annex 3.

Tax and regulatory event calls are permitted during an instrument's life subject to the prior approval of the AMF and provided the insurer was not in a position to anticipate such an event at the time of issuance.

Where an amendment or variance of a category C instrument's terms and conditions affects its recognition as capital available under this guideline, such amendment or variance will only be permitted with the prior approval of the AMF.¹⁶

¹⁵ Any modification of, addition to, or renewal or extension of the term of an instrument issued to a related enterprise may be subject to the provisions of the Act regarding transactions with natural persons or groups that are restricted parties with respect to the insurer.

¹⁶ Any modification of, addition to, or renewal or extension of the term of an instrument issued to a related enterprise may be subject to the provisions of the Act regarding transactions with natural persons or groups that are restricted parties with respect to the insurer.

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

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

2.1.3.1 Amortization

Category C capital instruments are subject to straight-line amortization in the final five years prior to maturity. Hence, as these instruments approach maturity, redemption or retraction, such outstanding balances are to be amortized based on the following schedule:

Years to maturity	Included in capital
5 years or more	100%
4 years and less than 5 years	80%
3 years and less than 4 years	60%
2 years and less than 3 years	40%
1 year and less than 2 years	20%
Less than 1 year	0%

For instruments issued prior to January 1, 2015, where the terms of the instrument include a redemption option that is not subject to prior approval of the AMF and/or holders' retraction rights, amortization should begin five years prior to the effective dates governing such options. For example, a 20-year debenture that can be redeemed at the insurer's option at any time on or after the first 10 years would be subject to amortization commencing in year 5. Further, where a subordinated debt was redeemable at the insurer's option at any time without the prior approval of the AMF, the instrument would be subject to amortization from the date of issuance. For greater certainty, this would not apply when redemption requires the AMF's approval as is required for all instruments issued pursuant to the qualifying criteria found in Annex 3.

Amortization should be computed at the end of each fiscal quarter based on the "years to maturity" schedule above. Thus, amortization would begin during the first quarter that ends within five calendar years to maturity. For example, if an instrument matures on October 15, 2020, 20% amortization of the issue would occur on October 16, 2015 and be reflected in the December 31, 2015 regulatory return. An additional 20% amortization would be reflected in each subsequent December 31 return.

2.1.4 Consolidated qualifying non-controlling interests

Insurers are permitted to include in capital available, qualifying non-controlling interests in subsidiaries that are consolidated for MCT purposes, provided that:

- the capital instruments meet the qualifying criteria under category A, B and C;
- the capital in the subsidiary is not excessive in relation to the amount necessary to carry on the subsidiary's business;
- the level of capitalization of the subsidiary is comparable to that of the insurer as a whole.

If a subsidiary issues capital instruments for the funding of the insurer or that are 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 directly in order for it to qualify as capital available upon consolidation. 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 held by third parties cannot effectively be secured by other assets, such as cash, held by the subsidiary.

2.2 Capital composition limits

The inclusion of capital instruments qualifying under category B and category C criteria is subject to the following limits:

- The sum of capital instruments meeting the qualifying criteria under category B and category C will not exceed 40% of total capital available, excluding accumulated other comprehensive income.
- Capital instruments meeting the qualifying criteria under category C will not exceed 7% of total capital available, excluding accumulated other comprehensive income.

Category B and category C capital exceeding the allowable limits will be subject to the following treatment for capital available purposes:

- In cases where capital instruments qualifying under one of either category B or C exceed the limits, the capital in excess of the limits will not be considered in the calculation of capital available. In cases where capital instruments both under category B and category C are in excess of the prescribed limits, the greater value of the two excess amounts will be excluded from capital available. In doing so, P&C insurers must first fully exclude excess capital under category C, followed by excess capital under category B.
- Under certain exceptional circumstances and subject to the AMF's approval, an insurer may be permitted to continue to include such excess amounts in capital available temporarily, upon providing the AMF with a satisfactory plan outlining the

company's strategy to achieve compliance with the limits as soon as possible. Typically, only those excesses arising after issuance and as a result of operating losses or extraordinary events beyond the control of management will normally be eligible for temporary inclusion in capital available. In most other circumstances, for example, excesses resulting from:

- purchases or redemptions of capital instruments;
- discretionary dividend payments;
- new issuances of non-common capital instruments within the same fiscal quarter; or
- foreseeable events

would generally not qualify for inclusion in capital available.

2.3 Regulatory adjustments to capital available

2.3.1 Deductions

The following amounts must be deducted from the capital available:

- interests in non-qualifying subsidiaries¹⁷, associates and joint ventures¹⁸ in which the insurer holds more than a 10% ownership interest (reference Section 2.4);
- loans or other forms of lending provided to non-qualifying subsidiaries, associates and joint ventures in which the insurer holds more than a 10% ownership interest which are considered as capital (reference Section 2.4);
- amounts receivable and recoverable from unregistered reinsurance contracts held to the extent that they are not covered by amounts payable to assuming reinsurers or by acceptable collateral from assuming reinsurers (reference Section 3.4.2);
- self-insured retentions (SIR), included in other recoverables on liability for incurred claims, where the AMF requires acceptable collateral to ensure collectability of recoverables, and no collateral has been received (reference Section 3.5);
- the earthquake premium reserve (EPR) not used as part of financial resources to cover earthquake risk exposure (reference Section 3.6);
- any asset for insurance acquisition cash flows that appears as a balance sheet asset;

¹⁷ See section 2.4 for the definition of "non-qualifying subsidiary".

¹⁸ Interests in limited partnerships that are reported using the equity method of accounting are subjects to the same capital treatment as joint ventures.

- unamortized insurance acquisition cash flows¹⁹ other than those arising from commissions²⁰ and premium taxes. This deduction is gross of any associated income tax and does not apply to the class of title insurance contracts;
- accumulated other comprehensive income on cash flow hedges. The amount of cash flow hedge reserve that relates to the hedging of items that are not fair valued on the balance sheet (including projected cash flows) must be derecognized in the calculation of capital available. This includes items that are not recognized on the balance sheet but excludes items that are fair valued on the balance sheet. Positive amounts should be deducted from capital available and negative amounts should be added back. This treatment specifically identifies the element of the cash flow hedge reserve that is to be derecognized for prudential purposes. It removes the element that gives rise to artificial volatility in capital available, as in this case the reserve only reflects one half of the picture (the fair value of the derivative, but not the changes in fair value of the hedged future cash flow);
- defined benefit pension fund assets and liabilities. For each defined benefit pension fund that is in a surplus position and reported as an asset on the insurer's balance sheet, the amounts reported as a surplus asset on the balance sheet must be deducted from capital available, net of any associated deferred tax liability (DTL) that would be extinguished if the asset becomes impaired or derecognized under the relevant accounting standards, and net of any amount of available refunds of defined benefit pension fund surplus assets to which the insurer has unrestricted and unfettered access. Insurers can only reduce this deduction by an amount of available refunds of defined benefit pension fund surplus assets if they obtain prior written supervisory authorization from the AMF;²¹

¹⁹ ~~Unamortized~~ Unless insurance acquisition cash flows ~~refers, here and elsewhere in this guideline, to paid and deferred~~ are recognized as expenses by applying paragraph 59(a) of IFRS 17, the balance of unamortized insurance acquisition ~~expenses included in the liability~~ cash flows at the end of a reporting period must be determined using one of the following methods.

If using the general measurement method (GMM):

- taking the insurance acquisition cash flows allocated to the group of contracts for the purpose of calculating the contractual service margin (CSM) or ~~asset for remaining coverage~~ the loss component at the date of initial recognition, and
- subtracting the portion of the insurance acquisition cash flows that ~~have not yet been~~ was amortized or ~~recognized as~~ under paragraph B125 of IFRS 17.

If using the premium allocation approach (PAA):

- taking the insurance acquisition cash flows paid at initial recognition of the group of contracts,
- adding any amount arising from the derecognition of an ~~expense~~ asset for insurance acquisition cash flows applying paragraph 28C of IFRS 17,
- adding the cumulative amount of insurance acquisition cash flows paid since the date of initial recognition, and
- subtracting the portion of insurance acquisition cash flows that was amortized under paragraph B125 of IFRS 17.

The balance of unamortized insurance acquisition cash flows cannot be negative.

²⁰ Excludes contingent commissions and other commissions that cannot be readily identified as exclusively relating to and varying with premiums and therefore are not recoverable.

²¹ To obtain the AMF written supervisory 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

- deferred tax assets (DTAs) except for those eligible for the 10% risk factor, must be deducted from capital available. In addition, the amount of DTAs that is in excess of the amount that could be recoverable from income taxes paid in the three immediately preceding years is deducted from capital available. DTAs may be netted with associated DTLs only if the DTAs and DTLs relate to taxes levied by the same taxation authority and offsetting is permitted by the relevant taxation authority.²² The DTLs permitted to be netted against DTAs must exclude amounts that have been netted against the deduction of goodwill, intangibles and defined benefit pension plan assets, and must be allocated on a pro rata basis between DTAs that are to be deducted in full and DTAs that are subject to the 10% risk factor (reference Section 56.1.3);
- accumulated net after-tax unrealized gains (losses) that have resulted from changes in the fair value of a P&C insurer's financial liabilities that are due to changes in the insurer's own credit risk must be deducted from capital available. In addition, with regard to derivative liabilities, all accounting valuation adjustments arising from the insurer's own credit risk should also be deducted on an after-tax basis. The offsetting between valuation adjustments arising from the insurer's own credit risk and those arising from its counterparties' credit risk is not permitted.
- goodwill and other intangible assets:
 - Goodwill related to consolidated subsidiaries and subsidiaries deconsolidated for regulatory capital purposes and the proportional share of goodwill in joint ventures subject to the equity method of accounting must be deducted from capital available. The amount reported on the balance sheet is to be deducted net of any associated DTL that would be extinguished if the goodwill becomes impaired or derecognized under relevant accounting standards;
 - All other intangible assets²³ must be deducted from capital available. This includes intangible assets related to consolidated subsidiaries and subsidiaries deconsolidated for regulatory capital purposes, and the proportional share of intangible assets in joint ventures subject to the equity method of accounting. The full amount is to be deducted net of any associated DTL that would be extinguished if the intangibles assets become impaired or derecognized under relevant accounting standards.
- investments in own instruments (treasury stock). All of an insurer's investments in its own instruments, whether held directly or indirectly, must be deducted from capital available (unless already derecognized under IFRS). In addition, any own stock that the insurer could be contractually obliged to purchase should be deducted from capital available;
- reciprocal cross holdings in the common shares of insurance, banking and financial entities (e.g., Insurer A holds shares of Insurer B and Insurer B in return holds shares

to the surplus pension assets including, among other things, having obtained an acceptable independent legal opinion and the prior authorization from the pension plan members and the pension regulator, where applicable.

²² This does not permit offsetting of DTAs across provinces.

²³ This includes computer software intangibles.

of Insurer A), also known as back-to-back placements, that are designed to artificially inflate the capital position of institutions must be fully deducted from capital available.

- for future business, when the general measurement model (GMM) is used, the difference (if positive) between:
 - the amount of aggregate reinsurance contracts held that are assets that correspond to underlying future business, other than underlying future business that has been assumed through reinsurance contracts issued;
 - the amount of aggregate reinsurance contracts held that are liabilities that correspond to underlying future business, other than underlying future business that has been assumed through reinsurance contracts issued.

No risk factor is applied to items that are deducted from capital available.

2.3.2 Additions

CSM for title insurance contracts:

- The net of reinsurance amount of CSM for the class of title insurance contracts must be added to the insurer's capital available.

2.3.3 Adjustments

The following amounts are reversed from the total of capital available:

- owner-occupied property valuations:²⁴
 - for owner-occupied property accounted for using the cost model and where the deemed value of the property was determined at conversion to the IFRS by using fair value, unrealized after-tax fair value gains (losses) must be reversed from the insurer's reported retained earnings for capital adequacy purposes. The amount determined at conversion is an on-going deduction from capital available and can only be changed as a result of a sale of owner-occupied properties (owned at the time of IFRS conversion) and the resulting realization of actual gains (losses);
 - accumulated net after tax revaluation losses in excess of gains accounted for using the revaluation model must be reversed from retained earnings. Net after tax revaluation gains must be reversed from accumulated other comprehensive income included in capital available.

²⁴ No adjustments are required for investment properties, as fair value gains (losses) are allowed for capital purposes.

2.4 Interests in and loans to subsidiaries, associates and joint ventures

The equity method of accounting is used for all interests in non-qualifying subsidiaries, associates and joint ventures²⁵. These interests remain unconsolidated for MCT purposes.

Under this guideline, a non-qualifying subsidiary is a dissimilar regulated financial institution, such as a bank, trust company, savings company or insurer of persons, or any subsidiary other than a subsidiary:

- that is a P&C insurer;
- that carries on only activities similar to those the insurer is authorized to carry on;
- whose principal activity is the purchase, management, sale or leasing of immovables;
- whose principal activity is the offering of shares in investment portfolios, the making of loans and investments, factoring, leasing, the offering of computing services or actuarial advisory services;
- whose principal activity is complementary to the distribution of certain insurance products such as travel assistance, legal assistance and road assistance;
- whose activities are those of a firm within the meaning of the *Act respecting the distribution of financial products and services* (CQLR, chapter D-9.2) or that offers financial products and services outside Québec; or
- that operates a residential and long-term care centre.

2.4.1 Qualifying consolidated subsidiaries

The assets and liabilities of these subsidiaries are fully consolidated in the insurer's regulatory financial statements and are included in the calculation of capital available and required; they are therefore subject to risk factors and liability margins in the insurer's MCT.

2.4.2 Joint ventures with less than or equal to 10% ownership interest

Where an insurer holds less than or equal to 10% ownership interest in a joint venture, the investment is included in capital available. The investment is reported under capital required for equity risk and is subject to the risk factor applicable to investments in common shares (reference Section [45.3](#)).

2.4.3 Non-qualifying subsidiaries, associates and joint ventures with more than a 10% ownership interest

Interests in non-qualifying subsidiaries, associates and joint ventures in which the insurer holds more than a 10% ownership interest are excluded from capital available. Loans or

²⁵ Interests in limited partnerships that are reported using the equity method of accounting are subjects to the same capital treatment as joint ventures.

other forms of lending provided to these entities are also excluded from capital available of the insurer if they are considered as equity in the entity.

Loans or other forms of lending provided to these entities that are not considered as equity in the entity are subject to a risk factor of 45% (or higher for higher risk loans). Insurers should contact the AMF to discuss higher risk factors.

Insurance receivables from registered reinsurers that are associates will attract a risk factor of 0.7%. Other receivables from these entities will attract a risk factor of 5% or 10% depending on how long the balances are outstanding (reference Section [56.1.3](#)).

2.4.4 Ownership interests in intra-group investment arrangement

Where an insurer participates in an intra-group investment arrangement, and the arrangement has received prior approval from the AMF, the insurer is not required to deduct from capital available its ownership interest. A “look-through” approach should be used for intra-group investments similar to that for mutual funds.

In particular, investments of the insurer held and managed by a limited partnership on behalf of the insurer are treated as direct investments of the insurer, provided that the insurer can demonstrate to the AMF’s satisfaction that these investments are not used to capitalize such a partnership under the laws and regulations governing it. Consequently, the capital required for such investments is calculated using a “look-through” approach to the underlying assets held by the limited partnership, by applying the risk factors in Chapters [45](#) and [56](#) to the limited partnership investments.²⁶

²⁶ In such circumstances, requirements regarding limited partnerships using the equity method of accounting do not apply.

Chapter 3. Insurance risk

3.1 Description of insurance risk

Insurance risk is the risk arising from the potential for claims or payouts to be made to policyholders or beneficiaries. Exposure to this risk results from the present value of losses being higher than the amounts originally estimated.

Insurance risk includes uncertainties around:

- the ultimate amount of net cash flows from premiums, commissions, claims, and related settlement expenses;
- the timing of the receipt and payment of these cash flows.

The “insurance risk” component reflects the insurer’s consolidated risk profile by its individual classes of insurance and results in specific margin requirements for insurance risk. For the MCT, the risk associated with insurance exposure is divided into four parts:

- liability for incurred claims (i.e., reserving risk associated with variation in claims provisions);
- unexpired coverage (i.e., underwriting risk including catastrophe risk, other than earthquakes and nuclear);
- unregistered reinsurance;
- earthquakes.

3.2 Diversification credit within insurance risk

The risk factors for each line of business contain an implicit diversification credit based on the assumption that insurers have a well-diversified portfolio of risks for a given portfolio of business.

3.3 Margins for liability for incurred claims and unexpired coverage

Given the uncertainty that insurance contract liabilities will be sufficient to cover future claims, margins are added to cover the potential shortfall.

From the AMF’s perspective, these margins are included to take into account possible unexpected negative variations in the provision amounts, given the fact that the margins added by actuaries in their valuations are primarily intended to cover expected variations.

3.3.1 Margin for liability for incurred claims

The margin for liability for incurred claims²⁷ is calculated by class of insurance, by multiplying the best estimate of the liability for incurred claims for insurance contracts issued (~~net of salvage and subrogation~~) less the best estimate of the asset for incurred claims for reinsurance contracts held, by the applicable risk factors, then by multiplying the total for all classes of insurance by 1.10.

Margin for liability for incurred claims = 1.10 x the sum for all classes of insurance of the risk factor x (best estimate of the liability for incurred claims for insurance contracts issued less the best estimate of the asset for incurred claims for reinsurance contracts held)

where:

Best estimate of the liability for incurred claims for insurance contracts issued = Liability for incurred claims for insurance contracts issued (net of salvage and subrogation) excluding the associated risk adjustment²⁸

Best estimate of the asset for incurred claims for reinsurance contracts held = Asset for incurred claims for reinsurance contracts held excluding the associated risk adjustment

The applicable insurance risk factors for determining the margins for liability for incurred claims are as follows:

²⁷ Liability for incurred claims includes the costs directly attributable to the performance of insurance contracts.

²⁸ The term “risk adjustment”, as used in this guideline, refers to risk adjustment for non-financial risk.

Class of insurance	Risk factor Net liability for incurred claims
Personal property	15%
Commercial property	10%
Aircraft	20%
Automobile – Liability	10%
Automobile – Personal accident	10%
Automobile – Other	15%
Boiler and machinery	15%
Credit	20%
Credit protection	20%
Fidelity	20%
Hail	20%
Legal expense	25%
Liability	25%
Other approved products	20%
Surety	20%
Title	15%
Marine	20%
Accident and sickness	See Annex 4

For funds withheld reinsurance contracts, the liability or asset for incurred claims must be increased by the amount of funds held, if any. For insurance contracts issued, the amount of funds held by the ceding insurer is added back to the liability for incurred claims of the assuming reinsurer. For reinsurance contracts held, the amount of funds held is added back to the asset for incurred claims of the ceding insurer.

Groups of retroactive reinsurance contracts held, recognized on the balance sheet as an asset for remaining coverage, are included in the calculation of the margin for liability for incurred claims (reference Section 3.3.1) instead of the calculation of the margin for unexpired coverage (reference Section 3.3.2), when the underlying insurance contract issued is recognized as a liability for incurred claims.

3.3.2 Margin for unexpired coverage

The margin for unexpired coverage is calculated by class of insurance, by multiplying the applicable risk factors by the greater of net unexpired coverage and 30% of net premiums received (i.e., premiums received net of associated reinsurance premiums paid) in the past 12 months.

The net unexpired coverage is determined as follows:

$$\text{Net unexpired coverage} = \{ \text{Unexpired coverage for insurance contracts issued} \} - \{ \text{Unexpired coverage for reinsurance contracts held} \}$$

Insurance contracts issued in accordance with paragraphs 25 to 28 of the IFRS 17 standard are recognized for calculation of the unexpired coverage in this guideline, unless otherwise specified. To determine the unexpired coverage for insurance contracts issued, only insurance contracts that have the earliest of:

- the date the coverage begins, and
- the date on which the first payment of the premium is due,

on or prior to the reporting date should be considered recognized. In other words, this means that only insurance contracts that individually meet the recognition criteria (a) or (b) set out in paragraph 25 of IFRS 17, by the reporting date, are to be treated as insurance contracts issued for purposes of the MCT's requirements for unexpired coverage.

3.3.2.1 Unexpired coverage for insurance contracts issued

The unexpired coverage for insurance contracts issued is determined using one of the following two methods depending on whether the general measurement model (GMM) or the premium allocation approach (PAA) is used to calculate the liability for remaining coverage (LRC) for a group of insurance contracts issued.

Groups of insurance contracts issued measured using the GMM

$$\text{Unexpired coverage for insurance contracts issued (using the GMM)} = \text{Estimate of future cash flows for insurance contracts issued (excluding premium, reinsurance commissions²⁹ and acquisition expenses cash flows) adjusted for the time value of money³⁰}$$

The estimate of future cash flows includes expenses directly attributable to fulfilling insurance contract obligations, but excludes risk adjustments.

²⁹ Reinsurance commissions to be excluded from the calculation are those not meeting the definition of insurance acquisition cash flows set out in Appendix A of IFRS 17. Reinsurance commissions are defined in section 3.3.2.2.

³⁰ Reference to IFRS 17 paragraphs 33-36.

Groups of insurance contracts issued measured using the PAA

$$\begin{array}{l} \text{Unexpired coverage for} \\ \text{insurance contracts} \\ \text{issued (using [the PAA](#))} \end{array} = \left\{ \begin{array}{l} \text{LRC excluding the loss component} \\ \text{+ unamortized insurance acquisition cash flows}^{31} \\ \text{+ [unamortized reinsurance commissions](#)}^{32} \\ \text{+ premiums receivable}^{33} \end{array} \right\} \times \begin{array}{l} \text{expected loss ratio} \\ \text{(ELR) + costs} \end{array}$$

The costs in the unexpired coverage for insurance contracts issued (using [the PAA](#)) are expenses directly attributable to fulfilling insurance contract obligations. These costs can be implicitly included in the ELR, explicitly added, or a combination of implicit and explicit. The unexpired coverage for insurance contracts issued (using [the PAA](#)) excludes any risk adjustment and may be adjusted for the time value of money.

For a reinsurance contract issued, all underlying insurance contracts within the contract boundary, including underlying insurance contracts that have not yet been issued, must be included in the determination of the unexpired coverage for insurance contracts issued. This includes both the group of issued insurance contracts measured using the GMM and the PAA to determine the LRC.

- For the GMM, these underlying insurance contracts will be reflected in the estimate of future cash flows for insurance contracts issued.
- For the PAA, these underlying insurance contracts will be reflected in the premiums to be received, whether outstanding or not yet due, including instalment premiums.

3.3.2.2 Unexpired coverage for reinsurance contracts held

The unexpired coverage for reinsurance contracts held applies to the unexpired portion of underlying insurance contracts issued. It is determined using one of the following two methods, depending on whether the GMM or PAA is used to calculate the asset for remaining coverage (ARC) for a group of reinsurance contracts held.

³¹ If the insurer chooses to expense its insurance acquisition cash flows, per IFRS 17 paragraph 59 (a), the remaining amount of unamortized insurance acquisition cash flows will be zero. Otherwise, unamortized insurance acquisition cash flows are calculated in accordance with Footnote 18 of this guideline.

³² Reinsurance commissions to be excluded from the calculation are those not meeting the definition of insurance acquisition cash flows set out in Appendix A of IFRS 17. Reinsurance commissions are defined in section 3.3.2.2.

³³ Whether outstanding or not yet due, including ~~installment~~ instalment premiums.

Groups of reinsurance contracts held measured using the GMM

Unexpired coverage for reinsurance contracts held (using [the](#) GMM) = (Estimate of future cash flows from reinsurance contracts held [\(excluding premium and reinsurance commission cash flows that are due\)](#)³⁴ + estimate of future cash flows from future reinsurance contracts held), adjusted for the time value of money³⁵

The estimate of future cash flows excludes the risk adjustment. The estimate of future cash flows from reinsurance contracts held and future reinsurance contracts held refers to the portion of such contracts that covers the unexpired portion of the underlying insurance contracts issued. These cash flows include expected losses recoverable, net of expected future reinsurance costs.

For example, an insurance contract written October 1 would have reinsurance coverage for three months under an existing January to December reinsurance contract held. The remaining portion (i.e., nine months) of the insurance contract issued would be covered under a future reinsurance contract held.

³⁴ [Premium and reinsurance commission cash flows on risk attaching proportional reinsurance contracts held are considered due and therefore are zero.](#)

³⁵ [See paragraphs 33 to 36 of IFRS 17.](#)

Groups of reinsurance contracts held measured using the PAA

Unexpired coverage for reinsurance contracts held (using [the](#) PAA) = {(ARC excluding the loss-recovery component + unamortized reinsurance commission³⁶) + premiums to be paid³⁷ for reinsurance contracts held + expected premiums payable for future reinsurance contracts held} x ELR³⁸ - (~~expected premiums to be paid~~payable³⁹ for reinsurance contracts held net of associated reinsurance commissions ~~to be received~~receivable⁴⁰ + expected premiums payable for future reinsurance contracts held net of ~~expected~~ associated expected reinsurance commissions receivable)

Unamortized reinsurance commission is equal to the reinsurance commission amount used for the measurement of the ARC, and includes ceding commissions that are received, and yet to be amortized. The unexpired coverage for reinsurance contracts held (using [the](#) PAA) excludes any risk adjustment and may be adjusted for the time value of money.

The applicable insurance risk factors for determining the margins for unexpired coverage are as follows:

³⁶ The reinsurance commission is the ceding commission (or a portion of the ceding commission), paid by the reinsurer to the ceding insurer, which is not contingent on claims of the underlying contracts and generally includes a total provision for broker/agent commissions, premium taxes and other acquisition and servicing expenses.

³⁷ Whether outstanding or not yet due.

³⁸ The ELR for the unexpired coverage for reinsurance contracts held (using [the](#) PAA) in section 3.3.2.2 is the ELR for the ceded calculations that relates to the portion of such contracts that covers the unexpired portion of the underlying insurance contracts issued. It can therefore differ from the ELR in section 3.3.2.1 for calculating the unexpired coverage for insurance contracts issued (using [the](#) PAA).

³⁹ ~~Whether outstanding or not yet due.~~ Not yet due. Expected premiums payable and associated reinsurance commissions receivable on risk attaching proportional reinsurance contracts held are considered due; therefore, the amount of expected premiums payable for these contracts is zero.

⁴⁰ ~~Whether outstanding or not yet due.~~ Not yet due. Expected premiums payable and associated reinsurance commissions receivable on risk attaching proportional reinsurance contracts held are considered due; therefore, the amount of expected premiums payable for these contracts is zero.

Class of insurance	Risk factor Net unexpired coverage
Personal property	20%
Commercial property	20%
Aircraft	25%
Automobile – Liability	15%
Automobile – Personal accident	15%
Automobile – Other	20%
Boiler and machinery	20%
Credit	25%
Credit protection	25%
Fidelity	25%
Hail	25%
Legal expense	30%
Liability	30%
Other approved products	25%
Surety	25%
Title	20%
Marine	25%
Accident and sickness	See Annex 4

3.4 Risk mitigation and risk transfer mechanisms - reinsurance

The risk of default for amounts recoverable from reinsurers arises from both credit and actuarial risk. Credit risk relates to the risk that the reinsurer will fail to pay the ceding insurer what it is owed. Actuarial risk relates to the risk associated with the mis-assessment of the amount of the required provision.

3.4.1 Registered reinsurance

The risk factor applied to premiums associated with unexpired coverage on reinsurance contracts held⁴¹ and the asset for incurred claims recoverable from the assuming reinsurer

⁴¹ The concept of premiums associated with unexpired coverage on reinsurance contracts held is defined in part A of Section 3.4.2.1.

on reinsurance contracts held is treated as a combined weight under the MCT, reflecting both the credit risk and the actuarial risk (reference Section 56.1.3).

Insurance amounts receivable and amounts recoverable under intra-group pooling arrangements approved by the AMF are exempt from the application of the risk factor.

The balance sheet values used to calculate the risk requirement for the premium amounts associated with unexpired coverage for reinsurance contracts held and the asset for incurred claims recoverable from the assuming reinsurer, arising from registered reinsurance contracts held, may be reduced to a minimum of zero by:

- the funds held by the ceding insurer for the exclusive benefit of the ceding insurer (e.g., funds withheld reinsurance) to secure the payment to the ceding insurer by the reinsurer of the reinsurer's share of any loss or liability for which the reinsurer is liable under the reinsurance contract held; and
- any other liabilities of the ceding insurer due to the reinsurer for which the ceding insurer has a legal and contractual right of setoff against the amount recoverable from the reinsurer.

Total reinsurance contract held assets by reinsurer cannot be negative. Acceptable collateral posted by a reinsurer under a registered reinsurance contract held may be recognized, provided the conditions under Section 3.4.2.3 are met.

3.4.2 Unregistered reinsurance

3.4.2.1 Deduction from capital available

Rather than being applied a risk factor to cover the risk of default of the reinsurers, amounts receivable and recoverable from unregistered reinsurance contracts held, as reported for regulatory purposes, are deducted from capital available to the extent that they are not covered by premiums payable to assuming reinsurers or acceptable collateral. Acceptable collateral is defined as guarantee instruments from assuming reinsurers and funds held to secure payment from assuming reinsurers. Section 3.4.2.3 outlines further conditions for using collateral to obtain credit for unregistered reinsurance contracts held. Amounts payable to assuming reinsurers may be deducted from amounts receivable and recoverable only where there is a legal and contractual right of setoff against the latter.

For each of the unregistered reinsurance contracts held, the amount to be deducted from available capital is the result of the following calculation where the result is positive:

$$A + B + C - D - E - F$$

where:

- A: is the amount of premiums associated with unexpired coverage, including any loss-recovery component, on reinsurance contracts held.

Premiums associated with unexpired coverage on reinsurance contracts held are determined using one of the following two methods, depending on whether the GMM or the PAA is used to calculate the ARC for a group of reinsurance contracts held.

Groups of reinsurance contracts held measured using the PAA

Premiums associated with unexpired coverage for reinsurance contracts held (using [the PAA](#)) = ARC on reinsurance contracts held + unamortized reinsurance commission⁴² + premiums payable to the assuming reinsurer

Groups of reinsurance contracts held measured using the GMM

If the CSM of a group of reinsurance contracts held represents a net cost of purchasing reinsurance,⁴³ then:

Premiums associated with unexpired coverage on reinsurance contracts held (using [the GMM](#)) = Expected cash inflow from reinsurer + risk adjustment + CSM + unamortized reinsurance commission

If the CSM of a group of reinsurance contracts held represents a net gain of purchasing reinsurance, then:

Premiums associated with unexpired coverage on reinsurance contracts held (using [the GMM](#)) = Expected cash inflow from reinsurer + risk adjustment - CSM + unamortized reinsurance commission

- B: is the asset for incurred claims on reinsurance contracts held from the assuming reinsurer.
- C: is the amount of cash outflows associated with the funds held collateral that are included in (A) and (B) above.
- D: is the amount of premiums payable and non-owned deposits or other assets held as security from the assuming reinsurer, as a guarantee instrument for reinsurance.
- E: is the amount of funds held to secure payment from the assuming reinsurer.
- F: is the amount of acceptable letters of credit held as security from assuming reinsurer.

⁴² Unamortized reinsurance commission is equal to the amount used for the measurement of the ARC, and includes ceding commissions that are received and ~~receivable, and~~ yet to be amortized.

⁴³ A group of reinsurance contracts held representing a net cost may include the aggregate of groups of contracts within a portfolio that have not been included in the group of contracts with a net gain for accounting purposes (i.e., the groups for which there is no significant possibility of a net gain and the remaining contracts).

3.4.2.2 Margin required

The margin for unregistered reinsurance is calculated in the unregistered reinsurance exhibit of the MCT Returns and reported on the “Reinsurance Held with Unregistered Insurers” line on the MCT calculation page of the Returns. [The insurer must present, in the same exhibit, all reinsurance arrangements held with unregistered insurers, including captive fronting arrangements.](#)⁴⁴

The margin is 20% of premiums associated with the unexpired coverage on unregistered reinsurance contracts held, of the asset for incurred claims recoverable from the assuming reinsurer under such contracts and cash outflows for funds withheld (the sum of amounts A, B and C in Section 3.4.2.1). The margin requirement for each unregistered reinsurance contract held may be reduced to a minimum of zero by premiums payable to the reinsurer and acceptable collateral (the sum of amounts D, E and F in Section 3.4.2.1) that are in excess of the amounts of premium associated with the unexpired coverage on unregistered reinsurance contracts held, asset for incurred claims recoverable from the assuming reinsurer under such contracts and cash outflows for funds held (the sum of amounts A, B and C in Section 3.4.2.1).

3.4.2.3 Collateral

A ceding insurer is given credit for an unregistered reinsurance contract held where the insurer obtains and maintains a valid and enforceable guarantee interest that has priority over any other security interest in assets of an unregistered reinsurer that are held in Canada, to secure the payment to the ceding insurer by the reinsurer of the reinsurer’s share of any loss or liability for which the reinsurer is liable under the reinsurance contract held.

The collateral used to obtain credit for a specific unregistered reinsurance contract held must materially reduce the risk arising from the credit quality of the reinsurer. In particular, the instruments used may not be related party obligations of the unregistered reinsurer (i.e. obligations of the reinsurer itself, its parent, or one of its subsidiaries or associates). With respect to the above three sources available to obtain credit, this implies that:

- to the extent that a ceding insurer is reporting obligations due from a related party of the reinsurer as assets in its annual return, the ceding insurer is precluded from taking credit for funds held to secure payment from the unregistered reinsurer;
- reinsurer’s assets located in Canada in which a ceding insurer has a valid and perfected first priority security interest under applicable law, may not be used to obtain credit if they are obligations of a related party of the unregistered reinsurer;
- a letter of credit is not acceptable if it has been issued by a related party of the unregistered reinsurer.

⁴⁴ [A captive fronting arrangement means any insurance contract entered into with a policyholder and subsequently reinsured in whole by the insurer to an entity within the same group as the policyholder.](#)

Collateral must be available to the insurer for a period of not less than the remaining term of the liabilities covered by the reinsurance contracts held in order to be valid towards obtaining credit for unregistered reinsurance. In cases where an arrangement contains a renewal provision for the ceding insurer to maintain collateral for a part or the whole of the remaining term of the liabilities covered by the reinsurance contracts held (e.g., additional fees or higher interest rate), the renewal provision should be included when determining the ceded reserves.

Letters of credit held as guarantee against unregistered reinsurance are considered a direct credit substitute and are subject to risk factors based on the credit rating of the issuing/confirming bank and the term of the liabilities covered by the reinsurance contracts held (reference Section [56.2](#)). Where a letter of credit is issued or confirmed by a related enterprise of a ceding insurer, no reduction in capital required is permitted.

Guarantee instruments other than letter of credits, such as non-owned deposits, held as guarantee against unregistered reinsurance, are subject to the same risk factors as those applied to similar assets owned by the insurer (reference Sections [45.3](#) and [56.1](#)).

Capital requirements for collateral associated with unregistered reinsurance are calculated on an aggregate basis using applicable risk factors, on the total amount of acceptable collateral from each reinsurer. However, acceptable collateral that is greater than the unregistered reinsurance requirements is considered excess collateral and is not subject to capital requirements. Where appropriate, the total amount of capital required for the collateral is pro-rated in order to exclude capital otherwise required on the excess portion of collateral.

Two steps are required to compute excess collateral and arrive at a reduction in capital required for excess collateral.

Step 1: Computation of excess collateral

Reinsurance ceded under unregistered reinsurance contracts held	Amount (\$)
Premiums associated with the unexpired coverage on reinsurance contracts held	100
Asset for incurred claims recoverable from assuming reinsurer	500
Cash outflows for funds withheld	100
20% margin on premiums associated with the unexpired coverage, asset for incurred claims recoverable and cash outflows for funds withheld	140
Unregistered reinsurance exposure	840
Collateral required to reduce margin required to 0 (100 + 500 + 100) x 120%	840
Premiums payable and non-owned deposits	1,000
Funds held	100
Letters of credit	100
Total collateral	1,200
Excess collateral (no capital required on this amount) 1,200 - 840	360

The amount of excess collateral should be calculated separately for each individual reinsurer and then added together.

Step 2: Reduction in capital required for excess collateral

Using the above example, the ratio of 0.30 (360/1,200) should be applied to the total amount of capital required for collateral, in order to calculate the capital requirement for collateral excluding the excess portion. The calculation is provided in the following table.

	Collateral amount	Risk factor	Total capital required	Proportional allocation of excess collateral	Reduction in capital required for excess collateral
	(01)	(02)	(03)=(01)x(02)	(04)	(05)=(03)x(04)
Letters of credit (AA rating ≤1 year)	\$100	0.25%	\$0.25		
Non-owned deposits (AAA bonds ≤1 year)	\$500	0.25%	\$1.25		
Non-owned deposits (AA bonds >1 year ≤5 years)	\$500	1.00%	\$5.00		
Funds held (demand deposits)	\$100	0.25%	\$0.25		
Total	\$1,200		\$6.75	0.30	\$2.03

The capital requirements for acceptable collateral, less the excess, are reported as part of capital required for credit risk (reference Chapter 5).

Letters of credit

The limit on the use of letters of credit to obtain capital credit for unregistered reinsurance is 30% of reinsurance contract held assets (the sum of A and B in Section 3.4.2.1). This limit is applied in the aggregate and not against individual reinsurance exposures.

Non-owned deposits from reinsurers received as security

Deposits from reinsurers received under unregistered reinsurance contracts held and that are “not owned” by the insurer, including deposits held in trust on behalf of reinsurers, are not to be reported on the insurer's balance sheet. Details of these deposits must also be reported in the unregistered reinsurance exhibit of the MCT Returns.

Non-owned deposits held as security on behalf of an unregistered assuming reinsurer must be valued at market value as at the end of the statement year, including the amount of investment income due and accrued respecting these deposits.

Funds held as security against unregistered reinsurance

Cash and securities received to secure payment from unregistered reinsurance contracts held that have been co-mingled with the insurer's own funds should be reported on the insurer's balance sheet in the appropriate asset categories and will be subject to the

corresponding risk factors. Funds held also include reinsurance premiums withheld by the ceding insurer as specified in the reinsurance contract held. Details of funds held must be reported in the unregistered reinsurance exhibit of the MCT Returns. The reinsurance contract held must clearly provide that, in the event of the ceding insurer's or reinsurer's insolvency, the funds held must form part of the property of the ceding insurer's general estate⁴⁵.

In order for a ceding insurer to obtain credit for funds held under a funds withheld reinsurance contract held, the contract must not contain any contractual provision that would require payment of funds held to the reinsurer, other than those funds that, together with other forms of acceptable collateral, if any, are in excess of the ceded contract liabilities and the margin required for unregistered reinsurance, before all subject contracts have expired and all claims settled. (e.g., an acceleration clause). Furthermore, the ceding insurer may not provide non-contractual or implicit support, or otherwise create or sustain an expectation that any funds held could be paid to the reinsurer, other than those funds that, together with other forms of acceptable collateral, if any, are in excess of the ceded contract liabilities and the margin required for unregistered reinsurance, before all subject contracts have expired and all claims settled.

3.5 Self-insured retentions

Self-insured retention (SIR) represents the portion of a loss that is payable by the policyholder. In some cases, SIRs may be included in the policy declaration or in an endorsement to the policy, stipulating that the policy limit applies in excess of the SIR.

To admit SIRs recoverable for regulatory capital purposes, the AMF must be satisfied with the collectability of recoverables, and may require collateral to ensure collectability. For example, collateral may be required when it is deemed that there is an excessive concentration of SIRs owed by any one debtor.

Letters of credit and other acceptable securities may be used as collateral for SIRs. Collateral used may not be related party obligations of the policyholder (i.e., obligations of the policyholder itself, its parent, or one of its subsidiaries or associates); in such cases, no reduction in capital required is permitted.

Letters of credit for SIRs are considered a direct credit substitute and are subject to a risk factor based on the credit rating of the issuing/confirming bank and the term of the SIR liabilities (subject to the provision for excess guarantees) (reference Section [56.2](#)). Risk factors for collateral other than letters of credit are the same as those applied to similar assets owned by the insurer (reference Chapters [45](#) and [56](#)).

3.6 Earthquake risk exposure

Insurers must refer to the AMF's *Sound Management and Measurement of Earthquake Exposure Guideline* (the "Earthquake Guideline") for details on the AMF's expectations

⁴⁵ This requirement only applies to reinsurance contracts held that came into force on or after January 1, 2018, or that have been renewed after that date.

relating to ~~P&C~~ insurers' earthquake exposure risk management and the related definitions. The present guideline outlines the framework for quantifying the earthquake risk exposure for regulatory capital purposes and assessing insurers' capacity and financial preparedness to meet contractual obligations that may arise from a major earthquake.

The amount of earthquake reserves includes the Earthquake Premium Reserve (EPR) and the Earthquake Reserve Component (ERC) and is added to total capital requirements for the purposes of the MCT as target capital requirement. The earthquake reserve is to be set using the following formula:

$$\text{Earthquake Reserves at target level} = (\text{EPR} + \text{ERC}) \times 1.25$$

where:

$$\text{ERC (Section 3.6.3)} = \{ \text{Earthquake Risk Exposure (Section 3.6.1)} \} - \{ \text{Financial Resources (Section 3.6.2)} \}$$

$$\text{ERC} \geq 0$$

In the case where the EPR is not used as part of financial resources to cover the earthquake risk exposure, i.e. the insurer has enough financial resources to cover its earthquake risk exposure without the voluntary reserve, the EPR can be deducted from capital available instead of being added to total capital requirements.

3.6.1 Measurement of earthquake risk exposure

The earthquake Probable Maximum Loss (PML) is the threshold dollar value of losses beyond which losses caused by a major earthquake are unlikely. Gross PML, which is the PML amount *after* deductibles but *before* catastrophic and other reinsurance protection, is used for calculating earthquake risk exposure for regulatory purposes. In this section, PML refers to a dollar amount⁴⁶ that includes adjustments for data quality, non-modelled exposures and model uncertainty as outlined in the Earthquake Guideline.

3.6.1.1 Model approach

- Insurers with material exposure to earthquake risk are required to use models to estimate their PML. Earthquake models include models licensed from various commercial vendors and maintained in-house or run by third parties on behalf of the insurer or can be an internal estimation technique or model developed by the insurer. Whichever is used, it must be to the AMF's satisfaction, as explained in the Earthquake Guideline;
- the AMF expects the insurers to meet a test of financial preparedness for a 500-year return period country-wide earthquake event. This requirement can be determined as follows:

⁴⁶ The PML amount corresponds to the worldwide exposure.

$$\text{Country-wide PML500} = (\text{East Canada PML500}^{1.5} + \text{West Canada PML500}^{1.5})^{\frac{1}{1.5}}$$

where:

- East Canada PML500 refers to a one in 500-year Eastern Canada event, which represents the 99.8th percentile of the exceeding probability curve plus appropriate adjustments for data quality, model uncertainty, non-modelled business etc., using exceeding probability curves based only on earthquake risk exposure in Eastern Canada;
- West Canada PML500 refers to a one in 500-year Western Canada event, which represents the 99.8th percentile of the exceeding probability curve plus appropriate adjustments for data quality, model uncertainty, non-modelled business etc., using exceeding probability curves based only on earthquake risk exposure in Western Canada.

3.6.1.2 Standard approach

- Insurers should use the standard formula for calculating their PML if:
 - the insurer does not use an earthquake model for calculating its PML; or
 - an earthquake risk exposure estimation technique or model is not to the AMF's satisfaction.
- the standard formula is defined as:

$$\text{Country-wide PML} = \text{MAX} (\text{East Canada PTIV}, \text{West Canada PTIV})$$

where:

PTIV: is the property total insured value for earthquake risk exposure after applicable policyholder deductibles, which includes building, contents, outbuildings, additional living expenses and business interruption

3.6.2 Financial resources

An insurer must have adequate financial resources to cover its earthquake risk exposure calculated in Section 3.6.1. Financial resources that can be used to support the insurer's earthquake risk exposure include:

- capital & surplus:
 - insurers can count up to a maximum of 10% of capital and surplus as part of their financial resources to cover their earthquake risk exposure. This maximum limit is subject to the AMF's discretion and can be lowered to an amount less than 10% of capital and surplus;

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- the amount of capital and surplus corresponds to a maximum of 10% of total equity as at the end of the reporting period being filed.
 - earthquake premium reserve:
 - The EPR is the voluntary accumulation of earthquake premiums. This amount must not exceed the ~~country-wide~~countrywide PML500.⁴⁷
 - In the case where the earthquake coverage premium is implicitly included in an overall contract premium, the insurer should be able to demonstrate the reasonableness of the premium allocation specifically attributed to earthquake coverage. As an example, in the case of catastrophic reinsurance coverage not specific to earthquake risk, an allocation of the premium amount must be made and the reasonableness of the reinsurer's premium allocation must be demonstrated.
 - Any earthquake premium contributed to the EPR must remain in the EPR unless there is a material decrease in the exposure. The AMF reserves the right to require information on any decrease in the ERC.
 - Should an earthquake occur and trigger claims, insurers would establish an incurred claims provision including claims adjustment expenses. The EPR component would be reduced by an amount equal to this provision.
 - Any reduction in the EPR should be brought back into unappropriated surplus immediately.
 - The EPR is a component of the reserves amount reported on the balance sheet.
 - reinsurance coverage:
 - The estimated reinsurance coverage available should be based on reinsurance contracts held in force on the day immediately following the end of the financial reporting period and should be equal to an amount of reinsurance collectable for a loss of the size of the PML, net of retention (e.g., contracts in force on July 1 for MCT calculations as on June 30).
 - capital market financing:
 - Prior supervisory approval from the AMF is required before these instruments can be recognized as a financial resource in the calculation of the earthquake risk formula. Refer to the Earthquake Guideline for additional information.

3.6.3 Earthquake reserve component

The ERC is an additional component used to cover an insurer's earthquake risk exposure not covered by the financial resources. The formula to compute the ERC is as follows:

⁴⁷ Refer to the tax laws applicable to the insurer in Canada for the annual contribution limit.

$$\text{ERC} = \text{Country-wide PML500 - capital and surplus - reinsurance coverage - capital market financing - EPR}$$

- Should an earthquake occur and trigger claims, insurers would establish an incurred claims provision including unpaid claims adjustment expenses. The ERC component would be reduced after the EPR, by an amount equal to this provision.
- Any reduction in the ERC should be brought back into unappropriated surplus immediately.
- The ERC is a component of the reserves amount reported on the balance sheet.

3.7 Other classes

3.7.1 Accident and sickness insurance

Accident and sickness reserves determined by actuaries in their valuations are primarily intended to cover expected variations in these requirements based on assumptions about mortality and morbidity. Margins on unexpired coverage and liabilities for incurred claims for accident and sickness insurance are included in the MCT to take into account possible unexpected negative variations in actual requirements.

The unexpired coverage margin is calculated by applying a factor to annual insurance revenue. Generally, the factor varies with the length of the premium guarantee remaining. A margin for insurance acquisition cash flows arising from commissions is also required and is calculated by multiplying unamortized insurance acquisition cash flows on commissions, net of unamortized reinsurance commissions, by 45%. The liability for incurred claims margin is calculated by applying a factor to the liability for incurred claims experience relating to prior years. Generally, the factor varies with the length of benefit period remaining.

Instructions for calculating the margin required for accident and sickness business are included in Annex 4. The total requirement calculated should be included in the amount reported as the margin required for liability for incurred claims and unexpired coverage in the MCT.

3.7.2 Mortgage insurance

Consult the AMF.

Chapter 4. Insurance risk – Internal model

The AMF may permit the use of an internal model⁴⁸ to calculate the required capital for insurance risk. The requirements to be met are explained below. When an insurer applies to the AMF for authorization, it must be able to demonstrate that the model is used and fully documented. In addition, key internal model limitations, as well as the conditions under which the internal model operates optimally, must be reported and documented. The AMF's requirements are described in detail in the following sections.

4.1 Main phases leading to approval

The process for obtaining approval to use an internal model consists of four distinct and consecutive phases:

1. Filing of a formal application
2. Implementation efforts for purposes of the required capital calculation and parallel calculations
3. Granting of authorization
4. Ongoing monitoring

For an insurer to obtain approval to use its internal model for the required capital calculation, the first three phases must be completed.

4.1.1 Phase 1: Filing of a formal application

In Phase 1, the insurer must formally apply to the AMF for approval by providing the required documents.

4.1.1.1 Required documents

The formal application to the AMF must include, without limitation, the following documents:

1. a cover letter from the chief risk officer to the AMF that contains the following information:
 - a. the status of the implementation efforts and a self-assessment of compliance with the requirements outlined in Sections 4.2 to 4.7

⁴⁸ The expression "internal model" includes all the processes, methods, controls, models as well as computer and data collection systems used to assess insurance risk. A model is a subcomponent of the internal model. For the purpose of this guideline, a model is defined as the assembly of the concepts representing in a simplified way an actual item so as to understand and forecast its behaviour with statistical, financial, mathematical or other concepts. A model includes assumptions, data and algorithms.

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- (the “Requirements”), specifying the nature and scope of the work to be completed;
- b. details of the information submitted to the Board of Directors (or a designated committee thereof) regarding the internal model implementation work;
2. a copy of a resolution:
- a. of a committee or committees designated by the Board of Directors recommending approval by the Board of Directors of the formal application to be submitted, as required, to the AMF; and
- b. of the Board of Directors approving the submission of the formal application to the AMF;
3. a description of the process for self-assessing compliance with the Requirements, including a description of the roles and responsibilities of each of the stakeholders;
4. a self-assessment of compliance with the Requirements according to the four dimensions;⁴⁹
5. an attestation by the chief risk officer regarding the adequacy of the self-assessment of compliance with the Requirements;
6. a list of the work performed by the validation team and internal audit, particularly work leading to opinions, pertaining to operations and relating to internal operating controls over the approval process. If requested by the AMF, a description of the work may be required;
7. documentation of the model in accordance with the Requirements;
8. gaps in compliance with the Requirements for which the insurer plans to request an exemption from the AMF;
9. the implementation plan approved by the Board of Directors and a negative internal audit opinion on it, particularly regarding the ability to execute the implementation plan and the adequacy of financial and human resources; and
10. a positive internal audit opinion on all the required documents included in the formal application filing, on the adequacy of the self-assessment of compliance with the Requirements and on the design and effectiveness of the internal controls in place.

Following receipt of the required documents, the AMF will determine whether additional information will need to be obtained from the insurer. The AMF will also discuss the implementation plan with the insurer to satisfy itself that the plan is coherent and realistic.

⁴⁹ The four dimensions are: formal framework, operationalization of the formal framework, reporting and controls in place. The four dimensions are defined in Section 4.1.5. Not all criteria may be relevant to certain measures of success.

4.1.1.2 Self-assessment

The insurer must submit a self-assessment of compliance with the Requirements to the AMF. The self-assessment must be demonstrated through the decomposition of the Requirements into four dimensions, with which the measures of success will be associated.

4.1.1.3 Implementation plan

The insurer must submit its implementation plan to the AMF. At a minimum, the plan must contain the following information:

1. the action plans presenting the initiatives used to close any compliance gaps;
2. a detailed schedule for the implementation of the action plans associated with the identified gaps, as required;
3. the financial resources allotted and the number and expertise of the human resources and their expertise; and
4. the template that will be used to prepare the quarterly report on monitoring and compliance with the Requirements.

In addition, the risk management function will be required to submit a quarterly status report on the work performed under the implementation plan until approval is obtained from the AMF.

The AMF will periodically monitor the status of efforts to achieve compliance with the Requirements. The AMF expects the insurer's efforts to advance in accordance with the submitted implementation plan.

The insurer may complete the implementation work during Phase 1, in which case, the requirements outlined in Part 2A apply to the work.

4.1.2 Phase 2: Implementation efforts and parallel calculations

Phase 2 has two parts: the implementation efforts and the parallel calculations. Both are described below.

4.1.2.1 Part 2A: Implementation efforts

For this component, the insurer must provide the AMF with a quarterly report on monitoring and compliance with the Requirements including:

1. a quarterly update to the schedule;
2. a quarterly update to the self-assessment of compliance with the Requirements;

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3. a quarterly update to internal model documentation satisfying the Requirements;
 4. the documents pertaining to application for approval that were submitted to the Board of Directors (or a designated committee thereof) during the quarter;
 5. compliance gaps in relation to the Requirements for which the insurer plans to request an exemption from the AMF;
 6. the negative internal audit opinion regarding the quarterly report on monitoring and compliance with the Requirements; and
 7. the negative validation team opinion regarding the technical aspects of the internal model used in relation to the Requirements.

4.1.2.2 Part 2B: Parallel calculations

During Part 2B, the AMF will review the validity of the required capital calculation. Quantitative gaps in compliance with the Requirements must be resolved before Part 2B begins. Compliance gaps that do not have a quantitative impact can be addressed concurrently with this component. Where applicable, the requirements outlined in Part 2A apply.

During Part 2B, the insurer must prepare a report on the results of its required capital calculations for four consecutive quarters and submit it to the AMF.

The AMF will review work in progress and decide whether the insurer can advance to the next phase.

4.1.3 Phase 3: Granting of approval

If the results obtained in the preceding phases are adequate and the Requirements are satisfied, then AMF will grant its approval.

An update to the formal application submitted in Phase 1, reflecting all the changes that have occurred since the initial filing, must be submitted to the AMF upon completion of the implementation efforts. The updated application must include:

1. a self-assessment of compliance with the Requirements;
2. an attestation, signed by the chief risk officer, confirming the adequacy of the self-assessment of compliance with the Requirements;
3. a positive internal audit and validation team opinion covering:
 - a. all the documents submitted to the AMF;
 - b. the adequacy of the self-assessment of compliance with the Requirements based on the four dimensions, including the technical Requirements described in these documents; and
 - c. the design and effectiveness of the internal controls in place;

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4. a senior management attestation confirming that the Board of Directors received all the information required to assume its responsibilities with respect to the internal model; and
 5. the gaps in compliance with the Requirements for which the insurer has requested an exemption from the AMF.

The granting of AMF approval means the insurer must use its internal model for the purpose of the required capital calculation.

4.1.4 Phase 4: Ongoing monitoring

This last phase begins when final approval is granted. From that date onward, the insurer must comply on an ongoing basis with the Requirements.

The insurer must also demonstrate that the processes and procedures in place continue to be effective. To do this, the chief risk officer must submit an annual attestation of compliance with the Requirements to the AMF containing the following information:

1. the gaps in compliance with the Requirements for which the insurer requested an exemption from the AMF. A reassessment of the status of these exemptions must be submitted annually along with the rationale supporting maintaining or revoking the exemption;
2. changes made to the internal model used for the purpose of the required capital calculation; and
3. the self-assessment of compliance with the Requirements.

Internal audit must issue a negative opinion on the first two points indicated above. The validation team must issue a positive opinion on the technical aspects of the internal model used in relation to the Requirements and on the second point. Internal audit must also submit a positive opinion to the AMF on an annual basis on the elements considered as part of its annual review included in its multi-annual planning pertaining to:

1. the adequacy of the self-assessment of compliance with the Requirements based on the four dimensions and the chief risk officer's attestation of compliance relating to the self-assessment; and
2. the design and effectiveness of the internal controls in place.

Internal audit's work for the year must, at a minimum, include elements that have undergone change since the previous review.

The insurer must also provide the AMF with a periodic monitoring report once a year. The content of this report is outlined in Section 4.9.

4.1.4.1 Changes

If changes are made to the internal model, the insurer must demonstrate to the AMF that it is still in compliance with the Requirements. The concepts of material and non-material change and the AMF's expectations with respect to such changes are outlined in Section 4.8.

4.1.4.2 Unresolved compliance gaps

Any gaps in compliance with the Requirements that are not resolved (i.e., that are deemed non-material by the AMF) after the approval date and not covered by an exemption granted by the AMF must be closed within a time period not exceeding three years that is determined by the AMF. During that time period, a quarterly report on monitoring and compliance with the Requirements must be submitted to the AMF. An annual attestation by the chief risk officer must be submitted to the AMF indicating the status of work related to the unresolved compliance gaps. In addition, internal audit must provide a negative opinion on a quarterly basis on the quarterly report on monitoring and compliance with the Requirements and provide a negative opinion on an annual basis on the chief risk officer's attestation.

Internal audit must issue a positive opinion on the self-assessment of compliance with the Requirements once the compliance gaps are resolved.

4.1.5 Definitions of the four dimensions

The self-assessment of compliance with the Requirements must be based the following four dimensions. These dimensions provide a framework for the self-assessment and ensure that all the Requirements are covered. One or more of the dimensions may not be relevant for certain measures of success. The self-assessment must be conducted for only the dimensions that are relevant for each measure of success.

4.1.5.1 Formal framework

This dimension encompasses the formal framework implemented by the insurer. It must therefore include, without limitation, the policies, methodologies, mandates, roles and responsibilities approved by the Board of Directors and senior management.

4.1.5.2 Operationalization of the formal framework

This dimension covers the means used to ensure that the formal framework is operationalized within the insurer. It refers to the systems, procedures and associated documentation enabling the effective functioning of the formal framework.

4.1.5.3 Reporting

This dimension covers all the methods used to report to the chief risk officer, senior management and the Board of Directors among others, on the insurer's status with respect to the formal framework. Methods may include ongoing reporting on the status of a project

or compliance in relation to a limitation. Reporting must include formal mechanisms and be subject to monitoring by senior management and the Board of Directors.

4.1.5.4 Controls

This dimension addresses the controls put in place to ensure, among other things, that the formal framework is adequately operationalized and that the source data and calculations are reliable.

4.2 Internal model documentation

The AMF expects the internal model documentation to be complete, consistent and up to date. The AMF expects the documentation (i.e., the documents drafted by the insurer, books, scientific papers, third-party documents, etc.) to be sufficient to allow an independent expert to make an informed judgment on the significant sources of model risk, whether covered or not by the validation requirements.

The internal model documentation must include the following elements:

1. a description of the internal model's general operation;
2. a description of the data used for the calculations and their source;
3. a description of the random number generator;
4. a description and justification of assumptions and use of professional or expert judgment;
5. mathematical descriptions and references used (scientific papers, books, etc.);
6. a description of algorithms used;
7. approximations and simplifications used;
8. the weaknesses and limitations of the internal model;
9. circumstances under which the internal model does not function effectively; and
10. details of the technologies and software used.

4.3 Governance

An insurer that plans to use an internal model must demonstrate to the AMF that its governance, internal control mechanisms and internal model are sufficiently developed.

This section sets out the governance requirements specific to the internal model that are not considered in the *Governance Guideline*, the *Integrated Risk Management Guideline* and the *Capital Management Guideline* established by the AMF.

4.3.1 Roles and responsibilities of the Board of Directors

The Board of Directors is responsible for:

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1. approving a governance policy that ensures separation of the oversight functions, including a clear separation between internal model design⁵⁰ and validation;
 2. ensuring compliance with the requirements set out in this chapter;
 3. ensuring sufficient human, financial and material resources to allow the oversight functions to properly perform their roles;
 4. ensuring that validation exercises are carried out on a recurring (as least annual) basis; and
 5. setting up mechanisms to ensure that the conclusions from validation and process review activities are sent to the Board of Directors annually.

The roles and responsibilities listed in paragraphs 2 to 5 above may be assigned to a committee of the board that will be required to report to the Board on an annual basis.

4.3.2 Roles and responsibilities of senior management

Senior management applies the Board-approved policies relating to use of an internal model. The company demonstrates transparency in the management of its financial activities by informing the Board of Directors and the AMF of situations with a material impact on the internal model and the assessment of the capital required.

The AMF expects senior management to:

1. develop a governance policy that ensures separation of the oversight functions, including a clear separation between internal model design and validation;
2. ensure that a reporting process is in place to make sure that the findings and recommendations of the validation team and internal audit are considered by the decision-making bodies.⁵¹ In particular, the validation team⁵² and internal audit must both be given an opportunity, at least once a year, to present their observations to the Board of Directors (or a committee appointed by the Board of Directors);
3. ensure that the activities of the design, validation and internal audit teams are not biased by any form of influence within the company. The internal model must be designed, validated and audited by parties that will not profit directly or indirectly from the results arising therefrom. In particular, the AMF expects the remuneration of the validation and audit team leads not to be tied to the internal model results. In addition, these teams must be independent of the teams responsible for pricing or for calculating insurance contract liabilities, in other words, the users of the internal model. The insurer must provide the AMF with documentation to this effect;

⁵⁰ Design includes development and implementation of the internal model.

⁵¹ The decision-making bodies are defined in the Governance Guideline.

⁵² The validation team reports to the chief risk officer.

4. ensure that the insurer's risk management policies include assignments for the development, implementation, continuous updating and application of practices designed to satisfy the requirements for use of the internal model;
5. ensure that, in the event of staff departures, understanding of the internal model is maintained at the same level;
6. ensure that follow-up of internal model implementation effectiveness is performed once a year; and
7. ensure that a plan is in place to ensure activity continuity.

4.3.3 Design team

The design team is under the first line of defence.⁵³ It handles the development and implementation of the internal model and may perform its own validation work. However, the validation team must review its work to ensure that it is performed properly.

The design team must ensure the "transparency" of the internal model. "Transparency" refers to the ability of third parties, such as the insurer's external auditors or the bodies responsible for supervising the insured, to observe and understand the objectives of the internal model. The work of the design team must be documented.

4.3.4 Risk management function

Risk management function remuneration must be in line with the function's independence, especially that of the validation team.

The responsibilities of the risk management function with respect to the internal model are as follows:

1. set up a validation team that reports to it;
2. define and implement a framework for internal model validation and the use of professional judgment that takes into account:
 - a. the business strategy;
 - b. risk appetite, risk tolerance and limits, and metrics used;
 - c. the insured's total risk profile; and
 - d. the definition of risk materiality with respect to insurance risk and model risk (as defined in Section 4.4 "Validation and Internal Audit").

⁵³ The design of the internal model may be under the corporate actuarial function, but not under the risk management function.

3. ensure that model risk sources are managed and that internal model outputs are sufficiently reliable and stable for senior management to be able to make informed decisions;
4. make a recommendation as to whether the internal model should be used.

Due to its independence, the risk management function and the validation team cannot participate in the development or implementation of the internal model.⁵⁴

4.3.5 Internal audit function

The internal audit function considers all the activities relating to the internal model and also evaluates interactions with the insurer's other activities. Its function, in connection with the internal model, is permanent and separate from the risk management function. The internal audit function must have a clear mandate and sufficient and qualified resources.

The AMF expects internal audit to review the effectiveness of the internal controls that are intended to ensure adherence to the requirements for the use of the internal model. To this end, the insurer must submit to the AMF, based on the frequency set by the AMF, a report signed by the auditor containing, at a minimum:

1. a description of the scope of the audit performed; and
2. an assessment of the operational effectiveness of the internal model.

In preparation for approval of use an internal model for the purposes of assessing insurance risk, internal audit activities must include, but not be limited to:

1. mapping of the internal model approach requirements to the audit program;
2. a detailed audit plan indicating the activities that would be reviewed annually and the activities that would be covered on some pre-determined cycle in order to assess adherence to the requirements for the use of the internal model;
3. a review of controls and processes on a recurring basis (at least annually);
4. a review of the escalation process that must be in place to facilitate the flow of information to senior management;
5. a description of the audit scope and assessment of the design and effectiveness of the internal controls intended to ensure adherence to all the requirements for the use of the internal model;
6. a review of reports produced by the validation team and a review of the effectiveness of the internal controls to ensure independence of the validation team;

⁵⁴ Direct users who manipulate the outputs of the internal model are a special case in that they are included in model risk and are therefore not considered independent (refer to Section 4.4 "Validation and Internal Audit").

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7. details of any internal audit work that would be outsourced to another, equally independent, function;
 8. an assessment of the adequacy of the resources and skills required to perform the audit and internal model validation work;
 9. a presentation of their observations to the Board of Directors; and
 10. an assessment of risk management and governance in relation to the internal model.

4.4 Validation and internal audit

Given the importance of model risk, the insurer's adherence to the requirements set out in this section will be a key consideration in the AMF's initial approval of the insurer's use of its internal model and ongoing use of the internal model approach.

The AMF expects the validation and internal audit teams to have the necessary expertise, resources and independence to assess internal model design, operation and risk quantification. A documented description of the skills of these teams must be submitted to the AMF.

Where the validation or internal audit team does not have the requisite technical expertise, the insurer must select other independent experts.

The AMF expects the roles of the experts who make up the validation and internal audit teams to be documented.

Model risk is the risk of adverse consequences arising from, or inappropriate decisions being made owing to, flaws or limitations in the model, incorrect implementation of the model, the use of erroneous assumptions or data, or an inappropriate choice of model.

An internal model designed by a third-party does not absolve the validation and internal audit teams of their responsibilities. The insurer must have a sufficient understanding and complete documentation of the internal model developed by the outside third party. Since contracting important tasks to third parties entails additional risks, it is essential to ascertain that the insurer has adequate controls in place and to ensure the continuity of the tasks entrusted to third-parties.

The relevance of the external data used and the consistency of such data with internal data must be analyzed and documented. Finally, conclusions from validation and process review activities must be reported to senior management and the Board of Directors.

4.4.1 Validation team

The insurer must consider all data and issues that may be material and relevant to the validation of the internal model.

In particular, the AMF expects the validation team to have sufficient knowledge of insurance risk and model risk. The validation team must assess the development and implementation of the internal model.

4.4.1.1 Validation of internal model development

The validation team must analyze the internal model, the assumptions and their interactions.

To this end, the validation team must:

1. demonstrate that the level of conservatism applied by the insurer in the calculation of required capital is not lower than that applied by it in the other calculations performed in the course of its operations;
2. ensure the internal model's limitations have been clearly identified and documented;
3. perform sensitivity analysis of the risks on both an individual and aggregate basis;
4. validate that the implementation applications are identical to the theoretical models;
5. identify any known limitations of the day-to-day validation process, if applicable. If Such limitations are identified, the validation team must document them;
6. document internal model components not considered in the validation;
7. ensure that approximations and simplifications are appropriate and do not increase the instability of the internal model inordinately;
8. verify the reasonableness of the use of the design team's professional or expert judgment and document the resulting conclusions;
9. validate data quality;
10. ensure that backtesting and benchmarking to competing models are adequately performed, both at the aggregate risk level and for each component of insurance risk, and that model risk is considered; and
11. perform goodness-of-fit tests, particularly in the tails of distribution.

4.4.1.2 Validation of internal model implementation

The validation team must ensure proper implementation of the internal model developed. To this end, the validation team must:

1. validate the implementation while ensuring the model's operational effectiveness and the reliability of its results; and
2. verify that all input data processing is complete (refer to Section 4.5.3).

4.4.1.3 Other validation éléments

Lastly, the validation team must ensure that:

1. the technology infrastructure is adequate;
2. financial statement items and internal model results are consistent;
3. data maintenance is adequate (refer to Section 4.5 “Data maintenance”);
4. the use test is satisfactory (refer to Section 4.6 “Use Test”);
5. the validation requirements are adhered to⁵⁵ (refer to Section 4.7 “Insurance risk modelling validation requirements”); and
6. the documentation satisfies the requirements (refer to Section 4.2 “Internal model documentation”).

In addition, any material risks identified by the validation team must be considered in greater depth during stress testing.

Also, the validation team must periodically follow up on its own recommendations and conclusions.

4.4.2 Internal audit

4.4.2.1 Responsibilities

In addition to the expectations already set out in the AMF’s *Governance Guideline*, *Integrated Risk Management Guideline* and *Capital Management Guideline*, internal audit must ensure the adequacy of its processes and controls with respect to:

1. data maintenance;
2. consistency between financial statement items and internal model results;⁵⁶
3. the quality and performance of the technology infrastructure;
4. internal model documentation;
5. the work of the validation team;
6. disclosure of issues and the escalation process; and
7. identification of the resources authorized to make changes to the internal model;

The internal audit team must also ensure that users:

⁵⁵ The validation team is responsible for ensuring that validation requirements are adhered to and that any other material sources of model risk not covered by the validation requirements identified during internal model validation are documented. The AMF expects the designers of the internal model to take the necessary corrective action to reduce such sources of model risk.

⁵⁶ The process review must include the processes that draw a link between the internal model results and the financial statement items so that the financial statements reflect the internal model results. The objective is not to verify the reconciliation of account balances or the financial disclosure.

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1. have the necessary authorizations to use the internal model;
 2. have the skills and experience to use the internal model;
 3. understand model risk and the limitations of the internal model;
 4. know the insurer's risk tolerance and limits;
 5. do not fail to provide material information affecting decision-making processes by ensuring that there are processes and controls in place for that purpose;
 6. synthesize all relevant information so that senior management can understand the insurer's day-to-day exposure to insurance risk;
 7. can explain all internal model results; and
 8. do not make changes to the internal model or modify inputs without authorization.

Internal audit must make sure the insurer satisfies the use test requirements. In addition, internal audit must periodically follow up on its own recommendations and conclusions. It may, at its discretion or at the request of the AMF, perform certain technical validations.

4.4.3 Documentation

The insurer must document the validation and internal audit's review of the internal model processes to ensure all the parties tasked with the documentation review understand the scope, methodology and conclusions drawn from the validation and process review activities.

4.4.4 Adjustments after validation and process review

The insurer must adjust its internal model to take account of conclusions drawn from the work of the validation and internal audit teams if the impact on the internal model results is material. The chief risk officer must be informed of any material deficiencies. Remedial action must be taken in a timely manner and documented.

The insurer must establish processes to periodically (at least annually) validate the internal model and review the related processes. The processes must also allow for validation of the model and a review of the related processes when special situations or events occur that could affect them.

A resolution procedure must be implemented to reconcile the opinions of the design, validation and internal audit teams.

4.5 Data maintenance

Data extracted from the insurer's database provide an important foundation for setting up and using the internal model. The data collected are used primarily as inputs for projecting the current position and establishing projection assumptions.

In order to successfully implement the internal model, the insurer must address the challenges presented by data management and the execution of computer programs. This section outlines the AMF's data maintenance requirements for insurers with an internal model for insurance risk.

The AMF expects the insurer to consider all available data, but also the material issues relating to the inputs of its internal model. Specifically, the AMF expects the insurer to have data to effectively support its processes for measuring and managing insurance risk.

Any data used in the assessment and management of insurance risk must be properly preserved.

The term "data maintenance" refers to the main components of the data management cycle: collection, processing, access, extraction, preservation and storage. The insurer is responsible for implementing a data maintenance framework and must document all the aforementioned components in accordance with the requirements of this section.

4.5.1 Governance of the data maintenance process

Senior management must be involved in identifying, assessing and managing data maintenance risks.

With respect to the internal model, the AMF expects senior management to:

1. establish a data management framework and ensure that the related procedures are documented;
2. ensure appropriate actions are taken to actively involve the various functions with a responsibility to the data (i.e., risk management, compliance, head of the business line, information technology management) with a view to achieving this objective;
3. ensure that data maintenance processes provide security, confidentiality, integrity and auditability of the data throughout the data management cycle, including minimum standards of quality;
4. ensure that the insurer's technology infrastructure provides for timely access to the data under both normal and stressed conditions and that the data remains accessible if there is a material change in the data architecture;
5. implement independent validation and vetting programs for the various data maintenance functions;
6. ensure that adequate procedures are in place and that accountabilities are in place to ensure observance of the data management framework;⁵⁷ and
7. ensure all the data required to assess insurance risk are available for this purpose.

⁵⁷ Refer to the Compliance Guideline.

In addition, the insurer's structure must not impede its risk data maintenance capabilities at the consolidated level or any other relevant level within the company (e.g., unconsolidated level or at the level of each jurisdiction where the insurer conducts business). In other words, the data maintenance processes must not be affected by the insurer's choices regarding legal status or geographical location.

4.5.2 Data collection

In the context of assessing required capital, the data collection component involves determining requisite data elements in various internal and external sources, and their validation and extraction to appropriate operational databases or data repositories.

The insurer must therefore:

1. establish documentation for data definition, collection and aggregation, indicating the breakdown of data by product as well as data flows or other identifiers, where necessary;
2. establish standards for data security, integrity, completeness, accuracy, auditability, timeliness and availability;
3. identify data gaps and, where applicable, document the manual or automated workarounds used to close gaps and meet data requirements;
4. establish standards, policies and procedures around data cleansing, mapping, field validation, reformatting and data decomposition, where applicable; and

establish procedures for identifying and reporting on data errors and data linkage breaks to source systems (downstream or external). The error detection and reporting procedures must be documented and be accessible to the insurer's control functions. In addition, senior management must be provided with regular reports indicating the actions to remedy the reported errors.

4.5.3 Data processing

The data processing component covers a wide range of data management tasks, including its conversion through multiple systems (or manual) processes, transmissions, source authentication, validation, reconciliation, etc.

Insurer's data processing must:

1. ensure appropriate levels of front-end validation/data cleansing for each process and reconciliation to related processes as applicable;
2. institute appropriate change control procedures for changes to data, including, where applicable, change initiation, authorization, program modifications, testing, parallel processing, sign-offs, release and library controls;
3. limit data manipulation to mitigate operational risk;

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4. ensure appropriate levels of front-end validation/data cleansing to prevent the introduction of bias. Any bias that is introduced must be documented;
 5. establish adequate controls to ensure processing by authorized staff with adequate expertise;
 6. ensure appropriate levels of disaster back-up, process resumption and recovery capabilities to mitigate loss of data and/or data integrity;
 7. institute appropriate change control procedures for changes to the processing environment; and
 8. establish procedures for setting risk limits and assessing the impact of missing or outdated information on its internal model.

4.5.4 Data access and retrieval

For the purpose of internal model approval and the supervisory process, the AMF expects insurer's data to be available and monitored on an ongoing basis for compliance.

The insurer must ensure that:

1. databases and/or data repositories and underlying extraction, query and retrieval routines are designed and built to support its own data requirements;
2. access to data is not restricted under either normal or stressed conditions. Access must not be restricted in any arrangement where data maintenance is out side to external service providers. Notwithstanding these arrangements, insurers must be able to provide data/information further to AMF requests; and
3. access controls and data/information distribution are based on user roles and responsibilities and industry best practices in the context of effective segregation of duties, as validated by the insurer's internal compliance and audit functions.

4.5.5 Data storage, retention and archival

The data storage, retention and archival component of data maintenance allows insurers to comply with insurance risk data/information requests.

The insurer must:

1. establish documented policies and procedures addressing storage, retention and archival;
2. maintain back-ups of relevant data files/stores and databases;
3. ensure that electronic versions of all relevant data/information are available and usable at all times; and
4. ensure appropriate levels of disaster planning, process resumption and recovery capabilities to mitigate loss of data and/or data integrity.

4.6 Use test

The use test is a process that allows the AMF to ensure the insurer makes appropriate use of its internal model to manage insurance risk. The use test must be applied on an insurer-wide and continuous basis. This test must be viewed as a complement to governance principles.

4.6.1 Management and use test

The AMF expects the internal model not to be used only for the purpose of calculating required capital, but for it to also form an integral part of the decision-making process and ongoing insurance risk management.

The relationship between the internal model and the insurer's decisions must be adequately documented.

An insurer must justify and document any decision significantly impacting it that is contrary to the decision that would have made had it been based solely on the internal model. In such a case, the internal model should be reviewed taking the difference between the decision and the model results into account.

Moreover, senior management is responsible for taking steps to ensure the internal model is used in the decision-making process, particularly in:

1. regular reporting to senior management and the Board of Directors;
2. strategic planning;
3. the assessment of the risk exposure (e.g., risk concentration, risk diversification);
4. the development of new products;
5. the assessment of risk appetite and limits;
6. the determination of insurance contract liabilities;
7. the business strategy risk assessment;
8. calculation and setting of the internal capital target (economic capital); and
9. pricing.

In addition, the insurer must identify and document all uses of the internal model likely to influence its operations.

4.6.2 Consistency

Use of the internal model must be consistent across the insurer, and internal model results must be consistent with those presented in the financial statements. The Best Estimate Assumptions, stochastic models and modelling structure used must be the same for the valuation of insurance contract liabilities, the calculation of required capital and pricing. The insurer must provide the AMF with a list and explanations of any differences.

indicating that they do not constitute an internal model weakness in assessing required capital. The insurer must also demonstrate that users of the internal model have adequate knowledge of the model, including such differences, in accordance with their respective roles.

In addition, the insurer must have a sufficient number of staff skilled in the use of the internal model. The insurer must demonstrate that the information technology associated with the internal model is being used properly by its staff. Each staff member's access to the internal model must be limited to what is necessary for the performance of their duties.

4.6.3 Understanding of the internal model

The AMF expects senior management, the Board of Directors and the chief risk officer to have an adequate understanding of the following elements of the internal model:

1. the objectives of the internal model and how it is used within the insurer;
2. the main risks associated with the internal model and internal model limitations and weaknesses; and
3. internal model issues, under stressed and normal conditions, related, but not limited, to capital required.

Accordingly, the insurer must document and implement mechanisms enabling the various stakeholders to obtain a clear understanding of the internal model's features and behaviour. Such documentation must be provided to the AMF at its request.

The AMF expects the insurer's Board of Directors (or a committee appointed by the Board of Directors) and senior management to have a sufficient understanding of the management reports submitted to them. This understanding must encompass reporting on the validation process.

4.6.4 Internal model exceptions

Exceptions to the assessment constraints for capital required are permitted, subject to certain conditions. An insurer can deviate from the internal model results when making decisions for purposes other than that of assessing capital required, including pricing purposes, for calculating insurance contract liabilities or on the choice of going-concern assumptions.

When using such exceptions, the insurer must take precautions to ensure that:

1. policies setting out the situations in which exceptions are permitted are adequate; and
2. the exceptions are not used to overcome a weakness in the internal model.

4.7 Insurance risk modelling validation requirements

4.7.1 Definition of insurance risk and requirements that are common to the components of insurance risk

4.7.1.1 Components of insurance risk

For the purposes of this chapter, in the context of using an internal model, insurance risk consists of three components:

1. Risk associated with the liability for incurred claims (LIC risk) (i.e., reserving risk associated with variation in claims provisions)
2. Underwriting risk including catastrophe risk, other than earthquakes
3. Earthquake risk

The required capital for these components can be calculated separately or in combination. However, a minimum correlation of 50% is assumed between LIC risk and underwriting risk.

Furthermore, the maximum reduction in required capital available to an insurer, when produced by an internal model, is 5% of the minimum capital required for insurance risk determined under the standard approach.

4.7.1.2 Required scope

Insurers are required to specify the scope of the internal model for all classes of insurance to which this chapter applies. The AMF expects the insurer to submit a request for the exclusion of any line of business from an internal model that the internal model cannot be properly applied to, for example, a newly acquired line of business or a line of business with insufficient data.

As part of the scope, the insurer must establish a process to identify and document all departures from the standard Minimum Capital Test guideline (MCT) where risks have been categorized differently between the insurer's internal model and the standard approach as defined in the MCT.

For all three components of insurance risk, the insurer must demonstrate how its internal model addresses the risk of social inflation, i.e., rising costs of insurance claims caused by trends in case law and policyholder behaviour.

4.7.1.3 Lines of business

The internal models of all the lines of business to which this guideline applies must be approved before the internal model is approved.

Under exceptional circumstances, some lines of business may be exempted from application of the internal model for the following reasons:

1. the level of credible data is insufficient;
2. the line of business is new or small; or
3. it is a newly acquired line of business.

If the capital required calculated for LIC risk and underwriting risk by the internal model is not approved, it will be calculated based on the standard approach⁵⁸ as defined in Chapter 3 and treated as capital add-ons to the capital required resulting from the internal model.

4.7.1.4 Segmentation of data

When insurers model each individual component of insurance risk, the data is segmented into groups of claims that exhibit similar characteristics which are referred to as homogeneous risk groups (HRGs). Examples of similar characteristics are underwriting policy, claims settlement patterns, risk profile of policyholders, likely policyholder behaviour, product features (including guarantees) and expense structures.

Insurers must demonstrate to the AMF's satisfaction that they have an appropriate reconciliation process to map the required capital for the modelled HRGs to the lines of business as defined in the regulatory financial statements in order to benchmark against the standard approach as defined in this guideline.

Insurers need to demonstrate to the AMF's satisfaction that each HRG is reasonable in terms of grouping and the data for each HRG is sufficient and reliable to inform the volatility in the tail of the distribution.

The internal model result depends on the quality of the data, meaning that the data for each HRG used for an internal model should be voluminous, homogeneous, specific and current. For some HRGs, the available data might be sparse, heterogeneous or out-dated, and insurers should use available external data and professional judgement to make appropriate adjustments, which introduces more risk.

In addition, some data may present values the insurer judges to be outliers and not representative of the actual variability of the data of an HRG. If the insurer decides to exclude such data, it must document this decision.

Under these circumstances, insurers would need to demonstrate to the AMF that the adjustments made to the data are appropriate in order to include the HRG in the model.

4.7.1.5 Business environment and internal control factors

There is a wide range of factors or events that will affect LIC risk and underwriting risk, such as the ultimate cost to settle all of an insurer's incurred claims or the future premiums or expenses that would be different from expected. Some of these factors or events are driven by the business environment in which an insurer is operating, such as pending court

⁵⁸ With the exception of catastrophe risk in underwriting risk (refer to section 4.7.4.4)

decisions or the underwriting environment, which are not fully reflected in the historical data; while others are driven by changes to an insurer's own internal control processes such as a shift in risk portfolio as a result of recent business decisions or the implementation of a new computer system for underwriting and claims handling. An insurer should take these factors or events into account when modelling.

Insurer are expected to identify and document these factors or events and determine whether they are explicitly or implicitly modelled/considered in its internal model. For each factor or event considered, an insurer is required to describe the assumptions used. For each factor or event not modelled/considered, the insurer should explain how they are accounted for. A qualitative scenario analysis approach can be used to account for non-modelled factors or events. The insurer must ensure that no important factors or events are omitted before applying the model.

Insurers also need to distinguish the factors and events that affect the variability of the unpaid claims run-off from those that are considered in operational risk.

4.7.1.6 Internal loss data

An insurer's internal loss data policy must establish clear guidance describing the circumstances, types of data and methodology for grouping data according to an insurer's business, risk management and capital charge modelling requirements. Insurers must also document their professional judgment in applying the criteria established in the internal loss data policy.

For the analysis of LIC risk, if adjustments are made to past data due to, for example, changes of law, level of cost increase, changes in coverage and settlement of claims, then these changes need to be clearly justified.

For the analysis of underwriting risk, the thresholds of large claims by HRG and the supporting analysis must be appropriately documented.

4.7.1.7 External loss data

For regulatory capital purposes, it is important to obtain sufficient data to provide information about the tail of the distribution. Insurers are expected to consider a comprehensive list of data sources including external data, as required. When external data are used, insurers must document the sources.

4.7.1.8 Event not in data (ENID)

Events not in data (ENIDs) are low-frequency/high-severity events. ENIDs are not necessarily extreme or rare. When they are excluded from the data as part of the reserving process, it results in missing data. Insurers must therefore take the removed events into account when calculating the required capital, unless they have demonstrated

to the AMF that it would not be possible for these, or similar events, to occur again in the future.

4.7.2 Validation requirements for modelling liability for incurred claims (LIC) risk

The required capital for LIC risk is used to support reserves to meet the final settlement value of all incurred claims as they run off. The required capital for LIC risk is equal to the risk evaluated using CTE 99/ VaR 99.5 or higher on an ultimate methodology from the estimated LIC risk loss distribution (adjusted for non-modelled reinsurance recoverable), and minus the unpaid claims and adjustment expenses carried on the insurer's balance sheet at the valuation date net of recoverables from reinsurers (including the risk adjustment).

4.7.2.1 Minimum required data

In order for an internal model for LIC risk to be approved for regulatory capital purposes, an insurer is required to meet, at a minimum, the following requirements:

1. demonstrating to the AMF's satisfaction that the model can split LIC risk from underwriting risk when an insurer groups data on an underwriting year basis;
2. using relevant external data as well as internal data, especially to inform the tail of the LIC risk distribution;
3. using internal claims development triangles, gross or net of reinsurance, that have sufficient development length so that 99.5% of claims have been paid off;
4. at least 10 accident or underwriting years for general and auto liability lines of business;
5. at least 10 accident or underwriting years for personal and commercial property lines of business; and
6. at least 15 accident or underwriting years for all other lines of business.

It is understood that some historical data may be less appropriate for an insurer to use due to various reasons. Insurers are required to demonstrate to the AMF's satisfaction that the exclusion of certain years of data from the required number of years to model an HRG is appropriate.

4.7.2.2 Key calibration decisions including justification

Insurers are required to document and justify the inputs (key assumptions), adjustments, and approximation/simplification (e.g., how various simulation issues are addressed, including the problems of dividing by zero and determining the square root of a negative value), calibration decisions (choice of distribution, parameters around the distribution and alternative methods considered) and associated professional judgement for modelling LIC risk.

4.7.2.3 Permitted methods for measuring the required capital for LIC risk

The AMF requires the use of stochastic reserving methods based on aggregate development triangles to analyze the required capital for LIC risk. The permitted methods for assessing LIC risk fall into three families of methods:

1. Bootstrapping
2. Generalized linear models (GLM), such as the over-dispersed Poisson (ODP) method
3. Markov Chain Monte Carlo (MCMC)

The insurer will need to ensure that the method used is adapted to the claim basis, which may be paid or incurred. If the insurer treats negative incremental data, it will need to ensure that this treatment does not result in a reduction in capital required. The treatment will need to be documented.

Insurers will need to pay attention when choosing experience period and development length frequencies because, depending on the stochastic method used, results can vary depending on whether the data are monthly, quarterly, semi-annual or annual.

If the insurer uses bootstrapping, the AMF expects, at a minimum, that analyses of residuals by accident, development and calendar year will be carried out to check for evidence of significant bias or heteroscedasticity in the residuals. If necessary, the insurer will have to take remedial action to address these issues.

If the insurer opts for generalized linear models, it must justify and document the choice of link function and the definition of the power parameter. Some parameters may not be material, so tests must be carried out to verify the impact of excluding such parameters. If, during validation tests and analyses, the exclusion of these parameters results in an increase in capital required, they will need to be removed from the assessment of the capital required.

If the insurer chooses the Markov Chain Monte Carlo method, the burn-in period used will need to be sufficient to enable the convergence of results. This method may result in autocorrelation of the values of the estimated parameters. Consequently, autocorrelation effects must be minimized when they have a material impact on simulation results.

Furthermore, the contribution to the error in loss cost estimates at CTE 99/VaR 99.5 attributable to the Monte Carlo simulation process must be negligible.

4.7.2.4 LIC risk aggregation and diversification

In an internal model, the capital required for each HRG is typically calculated in isolation and the aggregate required capital for LIC risk is less than the sum of the stand-alone

required capital amounts to recognize the diversification benefit between HRGs assuming that an insurer has a well-diversified portfolio of risk.

Insurers use different approaches to construct an aggregate distribution for LIC risk from the marginal distributions of different HRGs, namely, dependence modelling, to incorporate dependence effects. The choice of the dependence modelling approach can have a significant impact on the capital required generated by the model. As a result, dependence assumptions should be supported to the greatest extent possible by an appropriate combination of empirical data analysis and professional or expert judgement.

The diversification credit should consider a stressed environment, not a normal environment. At minimum, the aggregated required capital after diversification for all lines of business should be no less than the required capital for all the lines of business treated as one HRG using the same internal model.

Assumptions regarding dependence must be conservative given the uncertainties around the dependence modelling for LIC risk in a stress environment. When a company has sufficient data and uses credible HRGs, the diversification credit between HRGs used in the internal model cannot exceed 50% of the required capital for LIC risk before diversification. The degree of prudence must increase as the rigor of the dependence model and the reliability of the resulting capital requirement estimates decrease.

Insurers are required to justify and document the risk aggregation approach between HRGs within LIC risk, including the methodology, assumptions and professional judgement.

4.7.3 Validation requirements for underwriting risk

The required capital for underwriting risk is to support premium liabilities⁵⁹ assuming the liabilities run off to ultimate. The required capital for underwriting risk is equal to the risk evaluated using the CTE 99/VaR 99.5 or higher on an ultimate methodology deviated from the mean of the estimated underwriting risk distribution (adjusted for non-modelled reinsurance recoverable) with a floor of 0.

Underwriting risk includes catastrophe risk.⁶⁰ Specific criteria for this risk are set out in Section 4.7.4.

Insurers are permitted to include new business provided that the inclusion of the new business does not reduce overall capital requirements.

4.7.3.1 Minimum data required for underwriting risk

⁵⁹ Premium liabilities include expected costs related to the unexpired portion of the insurance contract in force (i.e., incurred after the valuation date) and all other liabilities related to premium realization adjustments.

⁶⁰ With the exception of earthquake risk, which is dealt with in Section 4.7.5.

In order for an internal model for underwriting risk to be approved for regulatory capital purposes, an insurer is required to meet, at a minimum, the following requirements for each HRG:

1. using at least 10, 10 and 15 accident or underwriting years of reported claims amount and claim counts, separated by attritional⁶¹ and large claims⁶² (if modelling these separately), gross of reinsurance or net of reinsurance for general and auto liability, personal and commercial property, and all other lines of business, respectively;
2. using 10, 10 and 15 calendar or underwriting years of earned and written premiums, gross of reinsurance or net of reinsurance for general and auto liability, personal and commercial property, and all other lines of business, respectively;
3. using 10, 10 and 15 calendar or policy years of the number of policies written⁶³ for general and auto liability, personal and commercial property, and all other lines of business respectively;
4. using relevant external data as well as internal data, to inform the tail of the underwriting risk distribution; and
5. demonstrating to the AMF's satisfaction that the model can generate the required capital equivalent to that measured on an accident year basis when an insurer groups data on an underwriting year basis.

The lines of business excluded from the assessment of the capital required for LIC risk will need to also be excluded for underwriting risk. In addition to the above, insurers will also need to have rate change history data.

The internal data of each HRG used for modelling purposes should be sufficient and reliable for determining the tail, not just the mean. Any adjustments made to the data must be justified, expertly reviewed and well documented.

When an insurer models large claims separately from attritional claims, the credibility of the insurer's own large claims data is typically lower than that of attritional claims as the volume of the data is much less than for attritional claims. The calibration for large claims should consider an appropriate combination of internal and external data analysis containing a considerable number of large claims.

It is the AMF's expectation that the required capital for each HRG generated from the internal model should be stable year over year. In general, all other things being equal, the use of longer data history will result in more stable statistical measures. However, for various reasons, some historical data may be less appropriate for an insurer to use. Insurers are required to demonstrate to the AMF's satisfaction that the use of less than the required years of data to model a HRG is appropriate.

⁶¹ Attritional claims are routine claims and exclude claims that are unusually large and catastrophe claims.

⁶² Large claims are value claims of a severe nature that exclude claims linked to catastrophe risk.

⁶³ Insurers may propose alternative, non-premium exposure measures.

4.7.3.2 Permitted methods for measuring the required capital for underwriting risk

Variability in premiums liabilities is measured separately for the uncertainty in future claims, the premiums expected to be earned within a year, and the associated expenses. The permitted methods for modelling these three components for regulatory capital purposes are:

1. For future claims:

- a) frequency-severity modelling;
- b) aggregated modelling of claims and frequency-severity modelling for large claims; and
- c) loss ratio variability modelling.

Reinsurance recoveries should be modelled appropriately by examining closely each reinsurance treaty in place and counterparty default risk.

2. For expected premiums to be earned:

The variability of the premiums expected to be earned within a year can be modelled based on variability around the average premium or the underwriting cycle.

3. For associated expenses:

If the variability of expenses is significant, the AMF expects these expenses to be modelled separately. The methods used to model expenses are based on the type of expense:

- a) Claim-related expenses (LAE) are modelled as a percentage of total claims
- b) Expenses such as commissions, premium taxes, insurance acquisition costs and general variable expenses are modelled as a percentage of gross written/earned premium or an aggregated value
- c) General fixed expenses are modelled as an aggregated value
- d) Contingent profit commissions are modelled as a deterministic function of the overall insurance underwriting results
- e) Reinsurance costs are modelled as a percentage of gross written/earned premiums or other reasonable methods

Furthermore, the contribution to the error in loss cost estimates at CTE 99/VaR 99.5 attributable to the Monte Carlo simulation process should be negligible.

4.7.3.3 Key calibration decisions including justification

Insurers are required to document and justify the inputs (key assumptions, adjustments, and approximation/simplification), calibration decisions (choice of distribution, parameters

around the distribution, scaling, and alternative methods considered) and associated professional judgement for modelling underwriting risk.

Unique to modelling future claims within premium liability risk, insurers need to apply professional judgement in order to issue assumptions specifying the dependency between frequency and severity and between attritional and large claims if these are modelled separately. Therefore, documentation of justifications for such professional judgement and assumptions is particularly important.

4.7.3.4 Diversification linked to underwriting risk

Insurers can use various dependence approaches, such as simple summation, variance-covariance matrix or copula, to model the dependence across claims, premiums and expenses within underwriting risk modelling. The choice of the dependence approach can have a significant impact on the capital requirements generated by the model. As a result, dependence assumptions should be supported to the greatest extent possible by an appropriate combination of empirical data analysis and expert judgement.

Assumptions regarding dependence must be prudent given the uncertainties around the dependence modelling for underwriting risk in a stress environment.

The methods for calibrating and aggregating the components of underwriting risk for the purposes of calculating required capital must be tailored for tail events (or extreme scenarios). As the relationship between risks, within underwriting risk, under extreme scenarios could differ from that under normal conditions and insurers must take this into consideration when the dependence assumptions are determined.

The diversification credit must be developed using a stressed environment, not a normal environment. The diversification credit between HRGs cannot exceed 25% of the total aggregated required capital before diversification. At minimum, the aggregated required capital after diversification for all lines of business should be no less than the required capital for all the lines of business treated as one HRG using the same internal model.

4.7.4 Validation requirements for catastrophe risk modellinga

For the purposes of catastrophe risk modelling, the AMF distinguishes between “perils” and “hazards.”⁶⁴ For the AMF, “peril” is the word commonly used to refer to a catastrophe (for instance, flood, convective storm, winter storm, forest fire, etc.), whereas “hazard” refers to the danger from the peril, in other words, what causes damage. Hazards include fire, wind, water, snow, ice, etc.

⁶⁴ The AMF recognizes that there may be different definitions of peril and hazard. However, the purpose of the definitions used by the AMF is to provide a better understanding of the requirements presented in section 4.7.4.2.

For the purposes of this guideline, perils are divided into two categories. Category 1 perils are:

- Convective storms,
- Floods,
- Wildfires,
- Winter storms, and
- Hurricanes.

Category 2 perils are perils other than Category 1 perils and excluding earthquakes.

The AMF expects the insurer to have sufficient financial resources to cope with losses measured at a CTE 99/VaR 99.5. In addition, losses are to be measured on a net of reinsurance basis.

4.7.4.1 Category 1 perils

The general structure of the catastrophe models for Category 1 perils consists of four main modules:

- The hazard module,
- The exposure module,
- The vulnerability module,
- The financial module

Hazard module

The hazard module models the occurrence of a peril and the intensity of the hazard. The output of the hazard module corresponds to values linked to one or more hazard metrics. A hazard metric is a specific measurement of hazard intensity that is subsequently used to determine a damage level. These outputs will be used as inputs for the vulnerability module. The following table includes examples of hazard metrics:

<u>Perils</u>	<u>Hazards</u>	<u>Examples of hazard metrics</u>
<u>Flood</u>	<u>Water</u>	<u>Maximum water depth</u>
<u>Windstorm</u>	<u>Wind</u>	<u>Maximum wind gust speed</u>
<u>Hail</u>	<u>Hailstone</u>	<u>Maximum hailstone size</u>

When a peril occurs, hazards are rarely observed in one specific spot. They occur more often within a region or zone. Given this, the hazard module simulates an area likely to be affected by a hazard, with varying intensities at various locations. The area involved is called a footprint. For example, for hail, the footprint will be an area within which maximum hailstone size values will vary across location points.

The intensity values for the metrics may be obtained using probability distributions or an events catalog. For example, during a simulation, several possible footprint configurations are randomly generated based on the probability distributions.

Exposure module

Whereas the hazard module generates the footprint, the exposure module contains the information on the insured values that may be exposed to the footprint. Two key characteristics of a risk that need to be determined are the geolocation of the thing that is insured and the insured value. The exposure model contains this information, as well as the characteristics of the insured thing (e.g., year and type of structure, type of roof and other data related to a particular structure).

Vulnerability module

The vulnerability module relates a hazard's intensity to the damage caused to the insured thing, according to various levels of intensity (e.g., maximum wind gusts of 120 km/h cause \$50,000 in damage to an insured home with a total value of \$300,000. This relationship is described through intensity-damage curves called vulnerability curves or functions.

Financial module

The financial module estimates insured damage by applying the insurance contract terms (deductibles, limits, etc.) to the losses generated by the three previous modules. This module may also consider applicable reinsurance treaties to measure a loss net of reinsurance.

4.7.4.2 Validation requirements for category 1 perils

The following validation requirements are applied to category 1 perils. However, certain validation requirements may not apply for a particular peril. In such cases, the insurer will need to justify to the AMF that the requirement does not apply.

Validation requirements for the hazard module

The AMF's requirements for the hazard module are as follows:

1. The determination of the location of a peril must be supported by relevant data or information (e.g., claims data, public data and/or scientific literature).
2. The determination of the temporal evolution of the peril (e.g., storm trajectories) must be supported by public data and/or the scientific literature. The methodology of data collection by agencies⁶⁵ should be underscored.

⁶⁵ Recognized body, such as a research centre or agency related to a government department (e.g., ECCC, NOAA).

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3. Strategies must be implemented to manage the accuracy and/or reliability of data (such as data from instrumentation⁶⁶). These include data cleansing techniques. The strategies used must be justified.⁶⁷
 4. Interpolation and extrapolation methods used to determine the footprint must be justified.
 5. Discontinuities in smoothing when establishing the footprint surface, if present, must not have a material impact on loss results.
 6. Strategies must be used to overcome a lack of data, particularly in extreme scenarios⁶⁸ (e.g., including other parameters from other models such as the Global Climate Model or the Numerical Weather Prediction Model, using different methods statistics or using proxies from radars, satellites and other instruments). The strategies used must be justified.
 7. The modelling must consider the non-stationary aspect of data used to calibrate the hazard module, if applicable.
 8. Any standardization⁶⁹ of data must be justified and consistent with current scientific literature and techniques.
 9. The association of a hazard intensity with a probability must be consistent with internal and external data and/or scientific literature.
 10. Biases⁷⁰ generated by the physical models,⁷¹ if any, must be eliminated.
 11. The methodology for determining short- and long-distance spatial dependence⁷² must be justified and documented.
 12. Topography tools must be used (e.g., the Digital Terrain Model) to determine the impact of the topography on the hazard and indicate the type, source and resolution level of topographic data. The accuracy and reliability of topographic tools must also be considered.

⁶⁶ For example, the wind speed time series observed during a storm may be incomplete if the measuring instrument fails to collect data during the storm as a result of a power outage.

⁶⁷ This validation requirement also applies to any other source of data used to calibrate the hazard module.

⁶⁸ If the insurer does not use any strategies, it will have to demonstrate that the lack of data does not represent a material model risk issue.

⁶⁹ Standardizing data involves understanding how local conditions can cause a particular observing site not to be representative of the surrounding area, then adjusting the observing site data so it is representative for the surrounding area. For example, wind observations may need to be adjusted for height (e.g., up to 10 metres) or based on surface roughness conditions.

⁷⁰ Bias refers to the difference between what is generated by the physical model and what is observed empirically. For example, for winter storm trajectories, the physical model may produce trajectories that differ from what is observed.

⁷¹ Physical parameters are mathematical equations that represent the physical behaviors of a natural phenomenon. These equations rely, for example, on principles of thermodynamics or fluid mechanics for the modelling of meteorological catastrophes such as convective storms, floods, hurricanes and winter storms.

⁷² Spatial dependence means that the materialization of a risk at a particular location provide information about the materialization of the same risk at another location.

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13. Methods of representation of all the physical parameters⁷³ of the modelled hazard must be based on information documented in current scientific and technical literature. Differences between what is observed and what is modelled in terms of the way the physical parameters of the hazard are treated must be justified.
 14. Uncertainty related to the determination of the mathematical parameters⁷⁴ of the model must be considered in the modelling.
 15. Event catalogues, if used, must cover all the insurer's exposures.

Validation requirements for the exposure module

The AMF's requirements for the exposure module are as follows:

1. Geocoding techniques must be robust.
2. Coordinates interpreted from address data by catastrophe models, or via geocoding tools, must be validated. The linkage between exposure and claims information that may originate from different systems must be consistent.
3. Exposure data sources must be documented.
4. The method for standardizing exposure data must be documented.
5. The determination of non-static exposures (car, motorcycle, etc.) must be justified.
6. The risk of a sudden surge in inflation must be considered in the modelling.

Validation requirements for the vulnerability module

The AMF's requirements for the vulnerability module are formulated as follows:

1. Uncertainty related to the damage ratio for the same hazard intensity level must be considered in the modelling.
2. The choice of vulnerability curve for structures with unknown characteristics must be justified.
3. For extrapolated intensity values, the dispersion of the damage ratios for the same intensity must be determined in a manner consistent with what is observed and considered in the modelling.
4. Development of the structure vulnerability curves must be based on at least one of the following:

⁷³ The physical parameters are the parameters enabling the behavior of a peril to be determined. For hurricanes, for example, the physical parameters are windspeed, radial distributions of wind and pressure, minimum central pressure, radius of maximum winds, tracks, spatial and time variant wind fields.

⁷⁴ For example, for the Poisson probability distribution $X \sim \text{Poisson}(\lambda)$, λ (lambda) is the mathematical parameter.

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- a) Insurance claims data.
 - b) Laboratory or field testing, and/or
 - c) Post-event site investigations.
5. Any development of the structure vulnerability curves based on post-event site investigations and laboratory, or field testing must be supported by historical data.
6. The derivation of the vulnerability functions and the associated uncertainties must be theoretically sound and consistent with fundamental engineering principles.
7. Development of the content vulnerability functions must be based on at least one of the following:
- a) Insurance claims data.
 - b) Rational engineering analysis, and/or
 - c) Post-event site investigations.
8. Any development of the content vulnerability curves based on rational engineering analysis, post-event site investigations and tests shall be supported by historical data.
9. The relationship between the structure and content with respect to the vulnerability functions must be consistent and supported by the relationship observed in historical data.

Validation requirements for the financial module

The AMF expects:

1. The material terms of insurance contracts to be adequately and exhaustively reflected in the modelling, and
2. The insured values to be up to date.

Other validation requirements

The other validation requirements are as follows:

1. The contribution to error in the loss cost estimates at CTE 99/VaR 99.5 attributable to the Monte Carlo simulation process must be negligible.
2. For a given peril, for any potentially material unmodelled risk, a capital amount must be estimated for a CTE 99 or VaR 99.5 and added to the required capital. A description and justification of the estimation method must be documented.

4.7.4.3 Validation requirements for category 2 perils

In order to assess the losses related to a category 2 peril, the AMF may allow the use of less sophisticated catastrophe models than those described above. However, the following validation requirements must be met:

The validation team should ensure that:

1. modelling methods are based on appropriate, applicable and relevant actuarial and statistical techniques;
2. modelling methods are based on current, credible information and realistic assumptions;
3. the data used for the internal model is accurate, complete and appropriate; and
4. model outputs are reasonable, accurate, appropriate and complete.

In addition:

1. the modelling must consider the non-stationary aspect of data used to calibrate the module, if applicable;
2. the uncertainty related to the determination of the mathematical parameters of the model must be considered in the modelling; and
3. the contribution to error in the loss cost estimates at CTE 99/VaR 99.5 attributable to the Monte Carlo simulation process must be negligible.

4.7.4.4 Diversification within catastrophe risk

Assumptions regarding dependence must be conservative given the uncertainties around the dependence modelling for catastrophe risk. Dependence assumptions must be supported by an appropriate combination of empirical data analysis and expert judgement. In addition, the following minimum correlations must be met for category 1 perils.

	<u>Flood</u>	<u>Wildfire</u>	<u>Winter storm</u>	<u>Convective storm</u>	<u>Hurricane</u>	<u>Category 2 peril⁷⁵</u>
<u>Flood</u>	1	0.375	0.375	0.375	0.25	D
<u>Wildfire</u>	0.375	1	0.375	0.375	0.25	D
<u>Winter storm</u>	0.375	0.375	1	0.375	0.25	D
<u>Convective storm</u>	0.375	0.375	0.375	1	0.25	D
<u>Hurricane</u>	0.25	0.25	0.25	0.25	1	D
<u>Category 2 peril</u>	D	D	D	D	D	1

When, for a given peril, the model does not meet the validation requirements for catastrophe risk (Sections 4.7.4.2 and 4.7.4.3), then the correlation is set to 100%. For example, if the hurricane model does not meet the validation requirements in Section 4.7.4.2, the correlations with all other perils are set at 100%. If the insurer does not use the minimum correlation matrix above, it will need to justify how it models dependence across perils and assume a minimum correlation of 85% between LIC risk and underwriting risk.

4.7.5 Earthquake risks

The required capital for earthquake exposure is determined by separate calculations. The capital requirements for these risks are determined using the standard approach as defined in Chapter 3 of this guideline. Given the nature of low frequency and high severity of the resulting losses, the AMF does not require these risks to be included in the internal model to determine insurance risk. Should these risks be included in the internal model, the AMF expects that the required capital for each of these risks should be no less than the minimum required capital determined using the standard approach.

4.8 Changes and change tracking

Where an insurer has obtained approval to use an internal model approach, it must provide the AMF with a detailed report on the status of the internal model whenever material or non-material changes occur.

All changes must be disclosed and documented. The insurer must not aggregate changes with opposing impacts so as to be able to consider them as a single non-material change.

The insurer must establish a procedure for the oversight of changes to the internal model, which will be submitted to the AMF for review.

The changes must be made on a copy of the internal model so the internal model on which the changes are made and the internal model used in the insurer's operations are kept separate.

⁷⁵ D: correlation determined by the insurer. These correlations must be justified by the insurer.

The AMF recommends that the insurer plan appropriately when implementing changes to its internal model. It should contact the AMF at the outset of the process if it anticipates that the changes could be material.

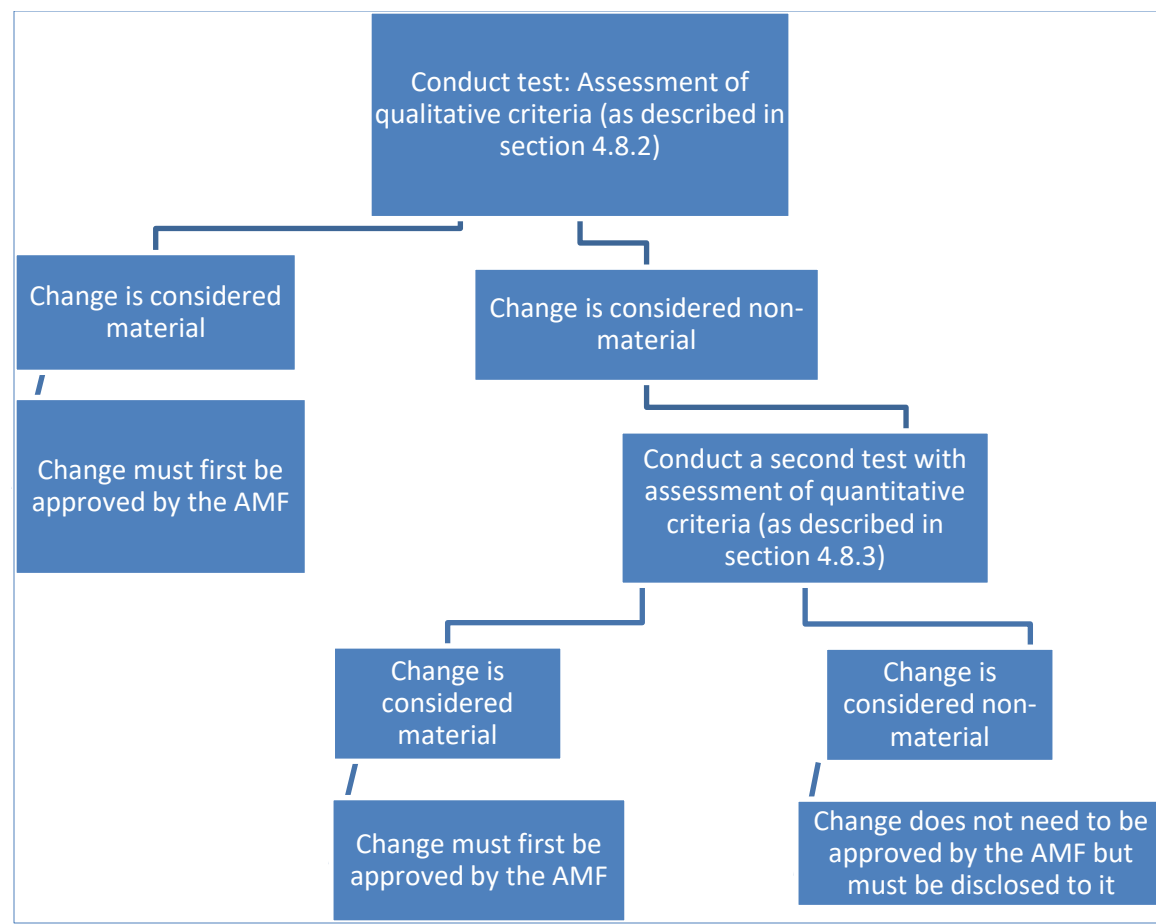
4.8.1 Change materiality

The change oversight procedure for the internal model must include a definition of change materiality that is consistent with Section 4.8. This definition of materiality will inform the concepts of material and non-material changes described in this section. In order to properly assess materiality, the insurer must apply a combination of qualitative and quantitative criteria to the changes.

The qualitative criteria must, at a minimum, consider the criteria described in Section 4.8.2. To quantitatively assess materiality, the insurer must review the changes in the light of the internal definition of materiality in the change oversight procedure, which must, at a minimum, contain the requirements of Section 4.8.3.

The qualitative criteria must be considered as an initial test. If a change cannot be classified as material after the first test, the quantitative criteria, or second test, must be applied to it.

The following diagram show the steps in classifying changes.



4.8.2 Qualitative criteria for material changes

A change to the internal model that affects the following elements must be disclosed to the AMF prior to being implemented so that the AMF may determine whether the change is to be considered material at that stage:

- governance, including the roles and responsibilities of the parties involved or that are responsible for the internal model, including senior management and the Board of Directors;
- the internal audit and validation policies with respect to the internal model;
- the procedure for oversight of changes to the internal model;
- the theoretical foundations and methodology of the internal model;⁷⁶

⁷⁶ For example, switching from bootstrapping to generalized linear model-based methods.

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- the data and data sources, type and history;⁷⁷
 - the technology platform;⁷⁸ and
 - other aspects of the internal model deemed important by the insurer or by the AMF, and the accumulation of several non-material changes.⁷⁹

The insurer must provide justifications for the change. The requirements concerning the material changes described in Section 4.8.4 apply if the change is deemed material by the AMF. If the change is deemed non-material by the AMF, the quantitative criteria in Section 4.8.3 must be applied to it.

4.8.3 Quantitative criteria for material changes

This subsection presents the quantitative criteria for determining whether a change is to be considered material or non-material.

A change is material if it results in a decrease of 1% or more in total required capital.

This ratio must be calculated as follows:

- the numerator: the difference between required capital before and after the change;
and
- the denominator: required capital before the change.

In addition, the required capital amounts used in the calculations for the above ratio must be calculated at the same date.

4.8.4 Change tracking

Depending on the nature of the changes, the insurer must report on the status of the situation to senior management and the AMF. The AMF expects the insurer to keep a history of the changes.

4.8.4.1 Non-material changes

An additional quantitative test must be performed for changes deemed non-material according to Sections 4.8.2 and 4.8.3. As such, any change that leads to a decrease of more than 5% in the capital requirement must be disclosed to the AMF within a reasonable

⁷⁷ For example, a change in data source (e.g., when a new administrative system is implemented) or a change in start day of the history used to determine certain assumptions constitute a material change. The addition of a new recent year of experience, the updating of an assumption based on a moving average and the updating of macroeconomic parameters (e.g., interest rate curve or discount rate) do not constitute material changes under the qualitative criteria.

⁷⁸ For example, the migration from a model included in the internal model to the use of an external model or a change to the technology platform supporting the internal model.

⁷⁹ The combined impact on an insurer of several non-material changes can be material. If several non-material changes occurred for a given period, the AMF may require that the changes be treated as material.

time frame before its implementation. The ratio must be calculated in accordance with the instructions in Section 4.8.3.

All other non-material changes must be disclosed to the insurer's senior management and the AMF at least once every fiscal year or when requested by the AMF.

4.8.4.2 Material changes

AMF approval is required prior to the implementation of any material change for the calculation of required capital under this guideline. Senior management must approve any application for AMF approval. The insurer must disclose the type of changes and reasons for them to the Board of Directors and senior management. Any changes made to the internal model and the validation process are required to have to been validated by the validation team.

The insurer must continue using the existing internal model to calculate required capital until the AMF approves the proposed material changes. The AMF may, at its discretion, consider the impacts of the proposed material changes to be potentially too significant and ask the insurer to submit a new application for approval for use of the internal model.

The application for approval of changes that is submitted to the AMF must contain, at minimum, the following elements:

1. an application for approval letter signed by senior management;
2. a positive opinion from the validation team with respect to the changes;
3. a use test (i.e., demonstration of compliance with the requirements described in Section 4.6);
4. the proposed effective date of the changes for the purpose of disclosure to the AMF or the public of the MCT ratio;
5. a document describing the proposed changes and summarizing the conclusions of the validation team;
6. a documented impact study (i.e., sensitivity analysis, ex post control, impact on required capital, impact on the MCT Ratio, etc.);
7. identification of the most significant changes affecting the documentation provided to the AMF, with respect to new documents and documents modifying the initially provided accompanying documents;
8. the name of the change contact or coordinator; and
9. any other relevant document relating to the changes.

The insurer must demonstrate the nature of the proposed changes and why they must be considered such. In addition, the insurer's key control functions (e.g., risk management and senior management) must not have received unfavourable opinions from the parties involved in the change process.

The insurer must also describe all organizational changes resulting from or related to the proposed changes to the internal model.

4.8.5 Change history

The insurer must document the changes made to the internal model and enable, among other things, the identification of changes made since the last disclosure of the MCT Ratio to the AMF or the public.

The following data must be used for monitoring purposes:

1. the date of the change,
2. the portfolio affected,
3. the size of the portfolio affected,
4. the anticipated and actual effect⁸⁰ on required capital and the MCT Ratio,
5. the type of change or event, and
6. the rationale for the change.

The insurer must document and update the change history. Such documentation must be provided to the AMF at the latter's request, subject to the conditions set out in Section 4.8. In addition, the documentation must identify the staff responsible for the changes.

4.9 Ongoing monitoring

Detailed periodic monitoring reports must be provided to the insurer's senior management and the AMF at each disclosure of the MCT Ratio to the AMF or the public. These reports must, at a minimum, include:

1. the variations in the MCT Ratio associated with insurance risk, the variations in required capital and an explanation of such variations;⁸¹ and
2. the exceptions to the insurer's policies (e.g., departures from the policies, situations where the limits set out in the risk appetite and tolerance policy may be exceeded, etc.).

If the AMF deems it necessary, it may request that additional information be permanently included in all the periodic monitoring reports.

⁸⁰ The anticipated effect is the expected impact calculated (or estimated) during a test conducted prior to the implementation of a change. The actual effect is the impact calculated after the change has been implemented.

⁸¹ The AMF expects to receive qualitative explanations regarding the general sense of the changes. The insurer may support its explanations, however, with certain amounts when necessary.

The AMF expects the insurer to consider new analysis techniques and changing industry practices and adopt them if they improve estimation accuracy.

The insurer must have a list of the various models used within the internal model and the intended objectives of those models and keep the list up to date.

If the insurer does not comply with the requirements of this guideline on an ongoing basis, the AMF may require it to hold additional capital.

The insurer must reassess the parameters of the internal model:

- at least once per fiscal year,
- following specific events that materially affect the internal model, and
- when requested by the AMF.

~~Chapter 4.~~Chapter 5. **Market risk**

Market risk arises from potential changes in rates or prices in various markets such as for interest rates, foreign exchange rates, equities, real estate, and other market risk exposures. Exposure to this risk results from trading, investing, and other business activities, which create on- and off-balance sheet positions.

Investments in mutual funds or other similar assets must be broken down by type of investment (bonds, preferred shares, common shares, etc.) and assigned the appropriate risk factor relating to the investment. If the information available on an investment is not broken down, then the factor of the riskiest asset held in the fund is assigned to the entire investment.

~~4.1~~5.1 **Interest rate risk**

Interest rate risk represents the risk of economic loss resulting from market changes in interest rates and the impact on interest rate sensitive assets and liabilities. Interest rate risk arises due to the volatility and uncertainty of future interest rates.

Assets and liabilities whose value depends on interest rates are affected. Interest rate sensitive assets include fixed income assets. Interest rate sensitive liabilities include those for which the values are determined using a discount rate.

To compute the interest rate risk margin, a duration and an interest rate shock factor are applied to the fair value of interest rate sensitive assets and liabilities. The interest rate risk margin is the difference between the change in the value of interest rate sensitive assets and the change in the value of interest rate sensitive liabilities, taking into account the change in the value of recognized interest rate derivative contracts, as appropriate.

The components used to calculate the interest rate risk margin are as follows.

~~4.1.15~~1.1 **Interest rate sensitive assets**

The interest rate sensitive assets to be included in the calculation of the interest rate margin requirement are those for which their fair value will change with movements in interest rates. Although certain assets, for example loans and bonds held to maturity, may be reported on the balance sheet on an amortized cost basis, their economic value, and changes in that value, are to be considered for interest rate risk margin purposes. Interest rate sensitive assets include the following:

- term deposits and other similar short-term securities (excluding cash);
- bonds and debentures;
- commercial paper;
- loans;
- mortgages (residential and commercial);
- mortgage-backed and asset-backed securities (MBS and ABS);

-
- preferred shares;
 - interest rate derivatives held for other than hedging purposes;
 - insurance contracts assets;
 - reinsurance contracts held assets.

Assets in mutual funds and other similar assets that are interest rate sensitive are to be included in the determination of the fair value of the insurer's total interest rate sensitive assets.

Other assets, such as cash, investment income due and accrued, common shares and investment properties, are not to be included in the determination of the value of interest rate sensitive assets. Such assets are assumed for interest rate risk margin determination purposes to be insensitive to movements in interest rates.

4.1.25.1.2 Interest rate sensitive liabilities

The interest rate sensitive liabilities to be included in the calculation of the interest rate risk margin are those for which their fair value will change with movements in interest rates. The following liabilities are considered sensitive to interest rates and are to be included:

- insurance contracts liabilities for incurred claims;
- insurance contracts liabilities for remaining coverage;
- reinsurance contract held liabilities.

Insurer must obtain the AMF's approval in order to consider other liabilities in the calculation of the interest rate risk margin.

A mutual P&C insurer's [residual interest of policyholders] is not to be included in the interest rate sensitive liabilities in the calculation of the interest rate risk margin.

4.1.35.1.3 Allowable interest rate derivatives

Interest rate derivatives are those for which the cash flows are dependent on future interest rates. They may be used to hedge a P&C insurer's interest rate risk and as such may be recognized in the determination of the margin required for interest rate risk, subject to the conditions below.

Only plain-vanilla interest rate derivatives that clearly serve to offset fair value changes in an insurer's capital position due to changes in interest rates may be included in the interest rate risk calculation. Plain-vanilla interest rate derivative instruments are limited to the following:

- interest rate and bond futures;
- interest rate and bond forwards;
- single-currency interest rate swaps.

Other interest rate derivatives, including interest rate options, caps and floors are not considered plain-vanilla and may not be recognized in the determination of the interest rate risk margin.

Insurers must understand the interest rate hedging strategies that they have in place and be able to demonstrate to the AMF, upon request, that the underlying hedges decrease interest rate risk exposure and that the addition of such derivatives does not result in overall increased risk. For example, insurers are expected to be able to demonstrate that they have defined the hedging objectives, the class of risk being hedged, the nature of the risk being hedged, the hedge horizon and have considered other factors, such as the cost and liquidity of hedging instruments. In addition, the ability to demonstrate an assessment, retrospectively or prospectively, of the performance of the hedge would be appropriate. If the insurer cannot demonstrate that the derivatives result in decreased overall risk, then additional capital may be required, and insurers in this situation should contact the AMF for details.

Derivatives used for hedging an insurer's interest rate risk are subject to credit risk requirements. Refer to Section 56.2 for further details.

4.1.45.1.4 Duration of interest rate sensitive assets and liabilities

Insurers are required to calculate the duration of the interest rate sensitive assets and liabilities for the purpose of the interest rate risk capital requirement calculation. The duration of an asset or a liability is a measure of the sensitivity of the value of the asset or liability to changes in interest rates.^{82 83} More precisely, it is the percentage change in an asset or liability value given a change in interest rates.

The calculation of duration for an asset or liability will depend on the duration measure chosen and whether the cash flows of the asset or liability are themselves dependent on interest rates. Modified duration is a duration measure in which it is assumed that interest rate changes do not change the expected cash flows. Effective duration is a duration measure in which recognition is given to the fact that interest rate changes may change the expected cash flows.

An insurer may use either modified duration or effective duration to calculate the duration of its assets and liabilities. However, the duration methodology chosen should apply to all interest rate sensitive assets and liabilities under consideration and the same methodology must be used consistently from year to year (i.e., “cherry-picking” is not permitted).

The cash flows associated with interest rate derivatives are sensitive to changes in interest rates and therefore the duration of an interest rate derivative must be determined using effective duration. In particular, if an insurer has interest rate derivatives on its balance

⁸² An asset or liability for which future cash flows are not adjusted to reflect the time value of money has a duration of zero.

⁸³ The duration of the LRC is a weighted average of its components including the CSM. Under the GMM approach, the CSM component of the LRC is normally insensitive to interest rates. As a result, the duration of the CSM is zero.

sheet that lie within the scope of Section 4.5.1.3, then it must use effective duration for all of its interest rate sensitive assets and liabilities.

The portfolio duration (modified or effective) can be obtained by calculating the weighted average of the duration of the assets or the liabilities in the portfolio.

The dollar duration of an asset or liability is the change in dollar value of an asset or liability for a given change in interest rates.

4.1.4.1 5.1.4.1 Modified duration

Modified duration is defined as the approximate percentage change in the present value of cash flows for a 100-basis point change in the annually compounded yield rate, assuming that expected cash flows do not change when interest rates change.

Modified duration can be written as:

$$\text{Modified duration} = \frac{1}{(1+\text{yield}/k)} \times \frac{\sum t \times \text{PVCF}_t}{k \times \text{Market Value}}$$

where:

k : number of periods, or payments, per year (e.g., $k = 2$ for semi-annual payments and $k = 12$ for monthly payments)

yield: periodically compounded yield to maturity of the cash flows

PVCF_t : present value of the cash flow at time t discounted at the yield rate

4.1.4.2 5.1.4.2 Effective duration

Effective duration is a duration measure in which recognition is given to the fact that interest rate changes may change the expected cash flows. Although modified duration will give the same estimate of the percentage fair value change for an option-free series of cash flows, the more appropriate measure for any series of cash flows with an embedded option is effective duration.

Effective duration is determined as follows:

$$\text{Effective duration} = \frac{\text{Fair value if yields decline} - \text{Fair value if yields rise}}{2 \times (\text{initial price}) \times (\text{change in yield in decimal})}$$

Denoting:

Δy : change in yield in decimal

V_0 : initial fair value

V_- : fair value if yields decline by Δy

V_+ : fair value if yields increase by Δy

Then, effective duration is as follows:

$$\frac{V_- - V_+}{2 \times (V_0) \times (\Delta y)}$$

4.1.4.3 5.1.4.3 Portfolio duration

The duration of a portfolio of interest rate sensitive assets or liabilities is to be determined by calculating the weighted average of the duration of the assets or liabilities in the portfolio. The weight is the proportion of the portfolio that a security comprises. Mathematically, a portfolio's duration is calculated as follows:

$$w_1D_1 + w_2D_2 + w_3D_3 + \dots + w_KD_K$$

where:

w_i : fair value of security i / fair value of the portfolio

D_i : duration of security i

K : number of securities in the portfolio

4.1.4.4 5.1.4.4 Dollar fair value change

Modified and effective duration are related to percentage fair value changes. The interest rate risk capital requirements depend on determining the adjustment to the fair value of interest rate sensitive assets and liabilities for dollar fair value changes. The dollar fair value change can be measured by multiplying duration by the dollar fair value and the number of basis points (in decimal form). In other words:

Dollar fair value change = duration x dollar fair value x interest rate change (in decimal)

4.1.5 5.1.5 Duration of allowable interest rate derivatives

Effective duration is the appropriate measure that should be used when assets or liabilities have embedded options. For portfolios with eligible plain-vanilla interest rate derivatives, insurers should be using effective dollar duration⁸⁴ because the insurer is hedging the dollar interest rate risk exposure.

Example 45-1: Effective dollar duration of a swap

Assuming an insurer has a longer duration for its interest rate sensitive assets and a shorter duration for its interest rate sensitive liabilities, the current dollar duration position of the insurer, prior to taking into consideration any interest rate derivatives, is effectively as follows:

⁸⁴ Effective dollar duration is the fair value change in dollars for a unit change in the yield (per one percentage point or per one basis point).

Insurer's dollar duration = dollar duration of assets – dollar duration of liabilities > 0

The insurer enters into a single-currency interest rate swap in which it pays fixed-rate and receives floating-rate. The dollar duration of a swap for a fixed-rate payer can be broken down as follows:

Effective dollar duration of a swap for a fixed-rate payer = effective dollar duration of a floating-rate bond – effective dollar duration of a fixed-rate bond

Assuming the dollar duration of the floater is near zero, then:

Effective dollar duration of a swap for a fixed-rate payer = 0 – effective dollar duration of a fixed-rate bond

The dollar duration of the swap position is negative; therefore, adding the swap position reduces the insurer's dollar duration of assets and moves the insurer's overall dollar duration position closer to zero.

4.1.65.1.6 Interest rate risk margin

The interest rate risk margin is determined by measuring the economic impact on the insurer of a Δy change in interest rates. The Δy interest rate shock factor is 1.25% ($\Delta y = 0.0125$).

- (A) The estimated change in the interest sensitive asset portfolio for an interest rate increase of Δy is determined as follows:

Dollar fair value change of the interest rate sensitive asset portfolio = (Duration of interest rate sensitive asset portfolio) x Δy x (Fair value of interest rate sensitive asset portfolio)

- (B) The change in the interest rate sensitive liabilities for an interest rate increase of Δy is determined as follows:

Dollar fair value change of the interest rate sensitive liabilities = (Duration of interest rate sensitive liabilities) x Δy x (Fair value of interest rate sensitive liabilities)

- (C) The change in the allowable interest rate derivatives for an interest rate increase of Δy is determined as follows:

Effective dollar duration of the allowable interest rate derivatives portfolio = Sum of the effective dollar duration of the allowable interest rate derivatives for a Δy increase in interest rates

- (D) The capital requirement for an interest rate increase of Δy is determined as the greater of zero and A - B + C.

(E) Steps A through C are repeated for an interest rate decrease of Δy (i.e. $-\Delta y$) and the capital requirement for an interest rate decrease of Δy is the greater of zero and $A - B + C$.

(F) The interest rate risk margin is then determined as the maximum of D or E.

4.2.5.2 Foreign exchange risk

The foreign exchange risk margin is intended to cover the risk of loss resulting from fluctuations in currency exchange rates and is applied to the entire business activity of the insurer.

4.2.15.2.1 General requirements

Two steps are necessary to calculate the foreign exchange risk margin. The first is to measure the exposure in each currency position. The second is to calculate the capital requirement for the portfolio of positions in different currencies.

The foreign exchange risk margin is 10% of the greater of:

- the aggregate net long positions in each currency, adjusted by effective allowable foreign exchange rate hedges if any are used;
- the aggregate net short positions in each currency, adjusted by effective allowable foreign exchange rate hedges if any are used.

Effective allowable foreign exchange rate hedges are limited to plain-vanilla foreign currency derivatives such as futures and forward foreign currency contracts and currency swaps.

Assets in mutual funds and other similar assets that are denominated in a foreign currency are to be included in the calculation to determine the capital requirement for each currency position. In cases where a claim liability is recorded in Canadian dollars, but the settlement of the claim will be made in a foreign currency, the liability must be included in the foreign exchange risk margin.

4.2.25.2.2 Foreign exchange risk margin

Step 1: Measuring the exposure in a single currency

The net open position for each currency is calculated by summing:

- the net spot position, defined as all asset items less all liability items denominated in the currency under consideration, including accrued interest and accrued expenses if they are subject to exchange rate fluctuations;
- the net forward position (i.e., all net amounts under forward foreign exchange transactions, including currency futures and the principal on currency swaps), valued at current spot market exchange rates or discounted using current interest rates and translated at current spot rates;

-
- guarantees (and similar instruments) that are certain to be called and are likely to be irrecoverable;
 - net future income/expenses not yet accrued but already fully hedged (at the discretion of the reporting institution); and
 - any other item representing a profit or loss in foreign currencies.

Adjustments

For insurers with foreign operations, those items that are currently deducted from capital available in calculating the MCT ratio and are denominated in the corresponding currency may be excluded from the calculation of net open currency positions, to a maximum of zero. For example:

- goodwill and other intangibles;
- interests in non-qualifying subsidiaries, associates and joint ventures;
- non-allowable foreign exchange rate hedges that are not considered in capital available.

Carve-out

An insurer with a net open long position in a given currency may reduce the amount of the net exposure, to a maximum of zero, by the amount of a carve-out, which is equivalent to a short position of up to 25% of the liabilities denominated in the corresponding currency.

Step 2: Calculating the capital requirement for the portfolio

The nominal amount (or net present value) of the net open position in each foreign currency calculated in Step 1 is converted at a spot rate into Canadian dollars. The gross capital requirement is 10% of the overall net open position, calculated as the greater of:

- the sum of the net open long positions; and
- the absolute value of the sum of the net open short positions.

Example 45-2

An insurer has \$100 of ~~U.S.~~ assets and \$50 of ~~U.S.~~ liabilities and the spot exchange rate is 1.000.

- the net spot position, defined as assets less liabilities, is a long position of \$50;
- the carve-out, using 25% of liabilities, is:

$$= 25\% \times \$50$$

$$= \$12.50$$

-
- therefore, the foreign exchange risk margin is:
= 10% x MAX⁸⁵ ((net spot position - carve-out), 0)
= 10% x MAX ((\$50 – \$12.50), 0)
= 10% x \$37.50
= \$3.75

4.2.2.15.2.2.1 Allowable foreign currency hedges

Foreign currency derivatives are those for which the cash flows are dependent on future foreign exchange rates. They may be used to hedge an insurer's foreign exchange risk and as such, may be recognized in the determination of the capital requirement for foreign exchange risk, subject to the following requirements.

Only effective hedges that offset the changes in fair value of the hedged item may be included in the foreign exchange risk calculation. The company must be able to demonstrate to the AMF the effectiveness of its foreign exchange hedges.

Insurers with foreign currency derivatives on their balance sheet must be able to demonstrate that the addition of such derivatives does not result in increased risk. If the insurer cannot demonstrate that the derivatives do not result in increased risk, then the AMF may require additional capital.

Only plain-vanilla foreign currency derivatives may be recognized in the calculation of the foreign exchange capital requirement. Plain-vanilla foreign currency derivative instruments are limited to the following:

- futures foreign currency contracts;
- forward foreign currency contracts;
- currency swaps.

Other foreign currency derivatives, including options on foreign currencies, are not considered plain-vanilla and are not to be recognized in the determination of the foreign exchange risk margin.

Derivatives used for hedging a P&C insurer's foreign exchange risk are subject to credit risk requirements. Refer to Section [56.2](#) for further details.

4.2.2.25.2.2.2 Measurement of forward currency positions

Forward currency positions should be valued at current spot market exchange rates. It would not be appropriate to use forward exchange rates since they partly reflect current interest rate differentials. Insurers that base their normal management accounting on net present values are expected to use the net present values of each position, discounted

⁸⁵ The carve-out can be used to reduce the net open long currency position to a minimum of zero.

using current interest rates and translated at current spot rates, for measuring their forward currency positions.

4.2.2.3 **5.2.2.3** **Accrued and unearned interest income and expenses**

Accrued interest, accrued income and accrued expenses should be treated as a position if they are subject to exchange rate fluctuations. Unearned but expected future interest, income or expenses may be included, provided the amounts are certain and have been fully hedged by allowable forward foreign exchange contracts. Insurers must be consistent in their treatment of unearned interest, income and expenses and must have written policies covering the treatment. The selection of positions that are only beneficial to reducing the overall position will not be permitted for capital purposes.

4.2.2.4 **5.2.2.4** **Unregistered reinsurance**

A separate component calculation must be performed for each group of liabilities ceded to a reinsurer under an unregistered reinsurance contract held that is backed by a distinct pool of assets, where the defining characteristic of the pool is that any asset in the pool is available to pay any of the corresponding liabilities.

Each calculation should take into consideration the ceded liabilities, the assets supporting them, and deposits placed by the reinsurer to cover the capital requirement for the ceded liabilities, if the deposits are in a currency different from the currency in which the ceded liabilities are payable to policyholders.

If some of the assets supporting the liabilities ceded under an unregistered reinsurance contract held are held by the ceding insurer (e.g., funds held), the insurer's corresponding liability should be treated as an asset in the calculation of the open positions for the ceded business.

Excess deposits placed by an unregistered reinsurer within a pool of supporting assets may be used to reduce the foreign exchange risk requirement for the corresponding ceded business to a minimum of zero. Any requirements not covered by excess deposits must be added to the ceding company's own requirement.

4.3 **5.3** **Equity risk**

Equity risk is the risk of economic loss due to fluctuations in the value of common shares and other equity securities.

4.3.1 **5.3.1** **Common shares and joint ventures**

A 30% risk factor applies to investments in common shares and joint ventures in which an insurer holds less than or equal to 10% ownership interest.

4.3.2 **5.3.2** **Futures, forwards and swaps**

Equity futures, forwards, and swaps attract a 30% risk factor, which is applied to the market value of the underlying equity security or index. Where a swap exchanges a return

on an equity security or index for a return on a different equity security or index, a 30% risk factor applies to the market value of both equity securities and indices for which the returns are being exchanged.

Example 45-3

A P&C insurer has entered into a one-year swap during which it will pay the 3-month Canadian Dollar Offered Rate (CDOR) plus fees, and receive the total return on a notional index of equities that was worth \$100 at the time of inception. The index of equities is currently worth \$110. A 30% equity risk capital charge will apply to \$110 for the long position in the index, but no capital will be required on the short position in the bond because such a position is not subject to a capital charge.

In addition to the capital requirements set out in this section, futures, forwards, and swaps are subject to credit risk requirements. Refer to Section 56.2 for further details.

4.3.35.3.3 Short positions

The capital requirements for short positions in common shares, equity futures, forwards, and swaps that do not wholly or partially offset a long equity position are determined by assuming the instrument is held long and then applying the corresponding risk factor. Common shares, futures, forwards, and swaps eligible for offset recognition and the corresponding capital treatment are described in Section 45.3.4.

4.3.45.3.4 Recognition of equity hedges

Equity futures, forwards, and swaps, as well as common shares can be used to wholly or partially hedge an equity exposure. ~~P&C~~ Insurers may recognize qualifying equity hedges in the calculation of the capital requirements in accordance with Sections 45.3.4.1 and 45.3.4.2.

~~P&C~~ Insurers must document the equity hedging strategies employed and demonstrate that the hedging strategies decrease the overall risk. The documentation must be available for review, upon request. If the P&C insurer cannot demonstrate, to the AMF's satisfaction, that the hedging strategies result in decreased overall risk, then additional capital above that calculated per Sections 45.3.4.1 and 45.3.4.2 may be required, at the discretion of the AMF.⁸⁶

For hedges to qualify, the instruments which make them up must be issued by an entity that:

- issues obligations which attract a 0% factor under Section 56.1.3; or
- is rated A- or higher (including clearing houses rated A- or higher).

⁸⁶ An insurer may contact the AMF to discuss the adequacy of its documentation and/or risk assessment to assess the likelihood or amount of potential additional capital that may be required.

4.3.4.1 5.3.4.1 Identical equity securities or indices

Long and short positions in exactly the same underlying equity security or index may be considered to be offsetting so that the capital requirements are calculated for the net exposure only. Individual instruments of portfolios that qualify for the capital treatment under Section 45.3.4.2 cannot be carved out of the portfolios to receive the capital treatment of Section 45.3.4.1.

Only common shares and plain-vanilla equity futures, forwards, and swaps can obtain the capital treatment under this section. Options and other exotic equity derivatives⁸⁷ do not qualify for this treatment.

4.3.4.2 5.3.4.2 Closely linked equity securities or indices

A portfolio of common shares and equity futures, forwards, and swaps can be used to partially hedge the equity exposure of another portfolio of similar instruments. When the instruments contained in both portfolios are closely linked, instead of following the capital requirements set out in Sections 45.3.1, 45.3.2, and 45.3.3, P&C insurers may calculate the capital requirements for the combined portfolios in the following manner:

$$(1 - \text{Correlation Factor}) \times 1.5 \times \text{MIN} (\text{market value of the portfolio of hedging instruments, market value of the portfolio of instruments being hedged})$$

The capital requirements set out above are capped at 60% of the minimum market value of both portfolios.

The difference between the market value of the two portfolios is not considered a hedged position and is subject to a 30% risk factor.

The Correlation Factor (CF) is derived by using:

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

where:

- A: represents the historical correlation between the returns on the portfolio of instruments being hedged and the returns on the portfolio of hedging instruments
- B: represents the minimum of (standard deviation of returns on the portfolio of instruments being hedged, standard deviation of returns on the portfolio of hedging instruments)
- C: represents the maximum of (standard deviation of returns on the portfolio of instruments being hedged, standard deviation of returns on the portfolio of hedging instruments)

⁸⁷ An example of an exotic derivative would be one that has a discontinuous payoff structure.

The historical correlations and standard deviations must be calculated on a weekly basis, covering the previous 52-week period. The returns on each portfolio of hedging instruments used to calculate the components of the CF must be determined by assuming that the portfolio is held long. The returns on each portfolio must be measured net of additional capital injections and must include the returns on each component of the portfolio. For example, the returns on both the long and short legs of a total return swap included in a portfolio must be reflected in the calculation of the CF.

The CF for the previous 52 weeks is required to be calculated for each of the past four quarters. The correlation factor is the lowest of the four CFs calculated and is used to calculate capital requirements.

In order for the portfolios to obtain the capital treatment set out in this section, the following conditions must be met:

- the instruments in both portfolios are limited to exchange-traded common shares, and plain-vanilla equity futures, forwards, and swaps where the underlying asset is an exchange-traded common share or an equity index. Options and other exotic equity derivatives do not qualify for this treatment. Portfolios that contain instruments other than those specified in this section will be subject to the capital treatment under Sections [5.3.1](#), [5.3.2](#), and [5.3.3](#);
- the CF is determined at the portfolio level. Individual instruments cannot be carved out of the portfolios and receive the capital treatment as per Section [5.3.4.1](#);
- the portfolios that are part of a hedging strategy must have been established at least two years prior to the reporting date. In addition, the hedging strategy and the active management strategy on which both portfolios are based must not have changed in the past two years prior to the reporting date.⁸⁸ Portfolios that have been established for at least two years but have undergone a change in the hedging strategy or active management strategy will attract a 30% risk factor.

Example [45-4](#)

Suppose a portfolio of instruments is valued at \$200 and is paired with another portfolio of instruments as part of a qualifying equity hedge. Assuming that the second portfolio is worth \$190 and that the correlation factor between the two portfolios is 0.95, the total capital charge for both portfolios will be $\$190 \times 5\% \times 1.5 + \$10 \times 30\% = \$17.25$.

Portfolios recently established

Portfolios that were established less than two years prior to the reporting date attract the following capital treatment:

⁸⁸ For the purposes of this section, the hedging strategy and active management strategy together are deemed to be unchanged if the ex-ante equity risk profile of the combined portfolios is maintained. For example, the ex-ante equity risk profile is maintained if the combined beta is continuously targeted to be zero (the hedging strategy), and if instrument selection is continuously based on the price-earnings ratio (the active management strategy).

- no recognition of the equity hedge in the first year following the establishment of the portfolios (i.e., a 30% factor is applied to both portfolios); and
- in the second year, the sum of:
 - T x capital requirements for the combined portfolios using the correlation factor approach described in this section;⁸⁹ and
 - (1-T) x capital requirements without recognition (as set out above).

where T equals 20%, 40%, 60%, and 80% in the first, second, third, and fourth quarter, respectively, of the second year following the establishment of the portfolios.

Example 45-5

Two portfolios (as part of an equity hedge), each equal to \$100, are established on April 1, 2016. On March 31, 2017, the capital charge for both portfolios will be $(30\% \times \$100 + 30\% \times \$100) = \$60$. On June 30, 2017, assuming that the Correlation Factor is 0.90, the combined portfolios will be subject to a capital charge of $(20\% \times 10\% \times 1,5 \times \$100 + 80\% \times 30\% \times 2 \times \$100) = \$51$.

4.45.4 Real estate risk

Real estate risk is the risk of economic loss due to changes in the value of a property or in the amount and timing of cash flows from investments in real estate.

Risk factor	Real estate
10%	Owner-occupied properties
20%	Held for investment purposes

For owner-occupied properties, the risk factor is applied to the value using the cost model, excluding any unrealized fair value gains (losses) resulting from the conversion to IFRS, or subsequent unrealized fair value gains (losses) due to revaluation.

4.55.5 Right-of-use assets

The risks associated with right-of-use assets are related to fluctuating market lease rates and contingent changes in the amount and timing of cash flows arising from early cancellation penalties and the costs associated with renegotiating or finding a new lease.

A 10% risk factor is applied to right-of-use assets, determined in accordance with applicable accounting principles and associated with leased properties occupied by the

⁸⁹ For the purposes of this calculation, the CF must be determined based on actual portfolio returns (i.e., portfolio returns up to the reporting date). Projected (simulated) returns cannot be used. The CF must be determined as the lowest of available 52 weeks CF given the actual history of portfolio returns. During the second year, the number of available 52 weeks CF will increase from one to four as time elapses.

insurer and with leased assets that fall into the “Other assets” category, for example, equipment.

A 20% risk factor is applied to right-of-use assets, determined in accordance with applicable accounting principles and associated with leases on properties used for investment purposes.

4.65.6 Other market risk exposures

Other market risk exposures include assets that fall in the category “Other assets”, for example, equipment, that are exposed to asset value fluctuations that may result in the value realized upon disposal being less than the balance sheet carrying value. A 10% risk factor applies to other assets as part of the total capital requirements for market risk.

~~Chapter 5.~~Chapter 6. Credit risk

Credit risk is the risk of loss arising from a counterparty's potential inability or unwillingness to fully meet its contractual obligations due to an insurer. Exposure to this risk occurs any time funds are extended, committed, or invested through actual or implied contractual agreements. Components of credit risk include loan loss/principal risk, pre-settlement/replacement risk and settlement risk. Counterparties covered by this guideline include issuers, debtors, borrowers, brokers, policyholders, reinsurers and guarantors.

All on- and off-balance sheet exposures are subject to a specific risk factor that either:

- corresponds to the external credit rating of the counterparty or issuer; or
- represents a prescribed factor determined by the AMF.

To determine the capital requirements for balance sheet assets, factors are applied to the balance sheet values or other specified values of these assets. To determine the capital requirements for off-balance sheet exposures, factors are applied to the exposure amounts determined according to Section 56.2. Collateral and other forms of credit risk mitigators may be used to reduce the exposure. No risk factors are applied to assets deducted from capital available (reference Section 2.3.1). The resulting amounts are summed to arrive at the credit risk capital requirements.

5.1.6.1 Capital requirements for balance sheet assets

For the purpose of calculating the capital requirements for credit risk, balance sheet assets should be valued at their balance sheet carrying amounts, with the following exceptions:

- loans carried at fair value through profit or loss, or through other comprehensive income, or fair value hedge accounting, which should be valued at amortized cost;
- the balance sheet values must be gross of IFRS 9 Stage 1 and Stage 2 impairment amounts;
- off-balance sheet exposures, which should be valued in accordance with Section 56.2.

5.1.6.1.1 Use of ratings

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

Insurers may recognize credit ratings from the following rating agencies for MCT purposes:

- DBRS;
- Moody's Investors Service;

-
- Standard and Poor's (S&P);
 - Fitch Rating Services;
 - Kroll Bond Rating Agency (KBRA).

An insurer must choose the rating agencies it intends to rely on and then use their ratings for MCT purposes consistently for each type of claim. Insurers should not select the assessments provided by different rating agencies with the sole intent to reduce their capital requirements (i.e., “cherry picking” is not permitted).

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 requirement 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 risk factor 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 risk factor, and then use the rating that corresponds to the lowest risk factor 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 requirement 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 higher 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 BBB- or higher 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 risk factor for an unrated claim on the issuer.
- Short-term assessments are deemed to be issue specific. They can only be used to derive capital requirements 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 risk factor for an unrated long-term claim.

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- Where the capital requirement 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 requirements 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 risk factor for other entities within the same group. This condition does not apply to assets held with a credit union that is a member of a federation within the meaning of *An Act respecting financial services cooperatives* (CQLR, Chapter C-67.3).⁹⁰
- 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 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 associates.
- 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 credit risk associated with repayment of both principal and interest.
- Insurers may not rely on unsolicited ratings in determining the risk factor for an asset, except where the asset is a sovereign exposure and a solicited rating is not available.

5.1-26.1.2 Variable credit risk factors

Various risk factors are applied to invested assets depending on the external credit ratings and the remaining term to maturity as outlined below.

Investments in mutual funds or other similar assets must be broken down by type of investment (bonds, preferred shares, etc.) and assigned the appropriate risk factor relating to the investment. If the information available on an investment is not broken down, then the factor of the riskiest asset held in the fund is assigned to the entire investment.

⁹⁰ To qualify for this exception, the insurer must refer to a rating assigned to a financial services cooperative by a rating agency duly recognized under this guideline, which rating should be closely linked to the evaluation of the quality of the financial condition and the risk assessment of the credit unions that are members of the federation. If more than one financial services cooperative is assessed, the insurer must apply the risk factor corresponding to the lowest rating.

5.1.2.1 Long-term Obligations

- Long-term obligations, including term deposits, bonds debentures and loans that are not eligible for a 0% risk factor, and that are not Québec municipal bonds, have risk factors according to the following table:

Rating	Remaining term to maturity		
	1 year or less	Greater than 1 year up to and including 5 years	Greater than 5 years
AAA	0.25%	0.5%	1.25%
AA+ to AA-	0.25%	1%	1.75%
A+ to A-	0.75%	1.75%	3%
BBB+ to BBB-	1.5%	3.75%	4.75%
BB+ to BB-	3.75%	7.75%	8%
B+ to B-	7.5%	10.5%	10.5%
Unrated	6%	8%	10%
Below B-	15.5%	18%	18%

- Bonds of Québec municipalities only⁹¹ have risk factors according to the following table:

Rating	Remaining term to maturity		
	1 year or less	Greater than 1 year up to and including 5 years	Greater than 5 years
AAA	0.125%	0.25%	0.625%
AA+ to AA-	0.125%	0.5%	0.875%
A+ to A-	0.375%	0.875%	1.5%
BBB+ to BBB-	0.75%	1.875%	2.375%
BB+ to BB-	1.875%	3.875%	4%
B+ to B-	3.75%	5.25%	5.25%
Unrated	3%	4%	5%
Below B-	7.75%	9%	9%

- Long-term obligations generally have an original term to maturity at issue of 1 year or more.
- Remaining term to maturity denotes the number of years from the reporting date until the maturity date.
- ~~Insurers~~ [The insurer](#) may use effective maturity as an option for determining risk factors for investments in long-term obligations subject to a determined cash flow schedule. The following formula may be used to calculate effective maturity:

$$\text{Effective maturity (M)} = \frac{\sum t \times CF_t}{\sum CF_t}$$

where CF_t denotes the cash flows (principal, interest payments and fees) contractually payable by the borrower in period t .

- In cases where an insurer elects not to calculate an effective maturity or if it is not feasible to do so using the above formula, the insurer is required to use the maximum remaining time (in years) that the borrower is permitted to fully discharge its contractual obligation (principal, interest, and fees) under the terms of the loan

⁹¹ For other municipal bonds, refer to the risk factors of the other long-term obligations.

agreement. Normally, this would correspond to the nominal maturity or term to maturity of the instrument;

- Where information is not available to determine the redemption/maturity of an asset, insurers must use the “Greater than 5 years” category for that asset.

5.1.2.26.1.2.2 Short-term obligations

- Short-term obligations, including commercial paper, that are not eligible for a 0% risk factor, have risk factors assigned according to the following table:

Rating	Factor
A-1, F1, P-1, R-1 or equivalent	0.25%
A-2, F2, P-2, R-2 or equivalent	0.5%
A-3, F3, P-3, R-3 or equivalent	2%
Unrated	6%
All other ratings, including non-prime and B or C ratings	8%

- Short-term obligations generally have an original term to maturity at issue of no more than 365 days.

5.1.2.36.1.2.3 Asset-backed securities

The category of asset-backed securities encompasses all securitizations, including mortgage-backed securities and collateralized mortgage obligations, as well as other exposures that result from stratifying or tranching an underlying credit exposure. For exposures that arise as a result of asset securitization transactions, the insurer should refer to Chapter 6 (Dispositions relatives à la titrisation) of the AMF’s *Capital Adequacy Guideline* (French only) published for financial services cooperatives, to determine whether there are functions provided (e.g., credit enhancement and liquidity facilities) that require capital for credit risk.

National Housing Act (NHA) mortgage-backed securities

NHA [National Housing Act \(R.S.C. 1985, c. N-11\)](#) (the “NHA”) mortgage-backed securities that are guaranteed by the Canada Mortgage and Housing Corporation (CMHC) receive a 0% risk factor to recognize the fact that obligations incurred by the CMHC are legal obligations of the Government of Canada.

Other asset-backed securities

The capital requirements for all other asset-backed securities are based on their external credit ratings. In order to use external credit ratings to determine a capital requirement,

the insurer must comply with all of the operational requirements for the use of ratings found in the AMF's *Capital Adequacy Guideline* published for financial services cooperatives.

For asset-backed securities (other than resecuritizations) rated BBB or higher, the capital requirement is the same as the requirement specified in Section 56.1.2.1 for a long-term obligation having the same rating and maturity as the asset-backed security. If an asset-backed security is rated BB, a P&C insurer may recognize the rating only if it is a third-party investor in the security. The credit risk factor for an asset-backed security (other than a resecuritization) rated BB in which the insurer is a third-party investor is 300% of the requirement for a long-term obligation rated BB having the same maturity as the security.

The credit risk factors for short-term asset-backed securities (other than resecuritizations) rated A-3 or higher are the same as those in Section 56.1.2.2 for short-term obligations having the same rating.

The credit risk factor for any resecuritization rated BBB or higher is 200% of the risk factor applicable to an asset-backed security having the same rating and maturity as the resecuritization.

The credit risk factor for any asset-backed security that is not mentioned above (including unrated securities) is 60%.

5.1.2.4 6.1.2.4 Preferred shares

- Preferred shares risk factors should be assigned according to the following table:

Rating	Factor
AAA, AA+ to AA-, Pfd-1, P-1 or equivalent	3%
A+ to A-, Pfd-2, P-2 or equivalent	5%
BBB+ to BBB-, Pfd-3, P-3 or equivalent	10%
BB+ to BB-, Pfd-4, P-4 or equivalent	20%
B+ or lower, Pfd-5, P-5 or equivalent or unrated	30%

5.1.3 6.1.3 Fixed credit risk factors

0% Risk factor

- Cash held on the insurer's own premises.

-
- Obligations⁹² of federal, provincial and territorial governments in Canada.
 - Obligations of agents of the federal, provincial or territorial governments in Canada whose obligations are, by virtue of their enabling legislation, direct obligations of the parent government.
 - Obligations of sovereigns rated AA- or higher and their central banks.⁹³
 - Obligations that have been explicitly, directly, irrevocably and unconditionally guaranteed by a government Grade entity eligible for a 0% risk factor including, for example, residential mortgages insured under the NHA or equivalent provincial mortgage insurance program, and NHA mortgage-backed securities that are guaranteed by the Canada Mortgage and Housing Corporation.
 - Current tax assets (income tax receivable).
 - Premiums associated with the unexpired coverage on reinsurance contracts held from registered reinsurers arising from intra-group pooling arrangements approved by the AMF (reference Section 3.4.1).
 - The asset for incurred claims recoverable on reinsurance contracts held from registered reinsurers arising from intra-group pooling arrangements approved by the AMF (reference Section 3.4.1).
 - Any deductions from capital, including goodwill, intangible assets and interests in non-qualifying subsidiaries, associates, and joint ventures with more than 10% ownership interest.

0.25% Risk factor

- Demand deposits, certificates of deposit, drafts, checks, acceptances and similar obligations that have an original maturity of less than three months, and that are drawn on regulated deposit-taking institutions subject to the solvency requirements of the Basel Framework.⁹⁴

0.70% Risk factor

- Insurance receivables from registered reinsurers that are not included in premiums associated with the unexpired coverage on reinsurance contracts held or asset for incurred claims recoverable, excluding intra-group pooling arrangement approved by the AMF.
- Accounts receivable from the Facility Association Residual Market and Uninsured Automobile Fund.

⁹² Including securities loans and accounts receivable.

⁹³ Sovereign obligations rated lower than AA- may not receive a factor of 0% and are instead subject to the factor requirements in Section 5.1.2.

⁹⁴ Where the maturity of the asset is longer than three months, the risk factor related to the credit rating of the regulated deposit-taking institution would apply instead.

2.5% Risk factor

- Investment income due and accrued.
- Premiums associated with the unexpired coverage on reinsurance contracts held from registered reinsurers, excluding intra-group pooling arrangement approved by the AMF (reference Section 3.4.1).
- Asset for incurred claims recoverable on reinsurance contracts held from registered reinsurers, excluding intra-group pooling arrangement approved by the AMF (reference Section 3.4.1).

4% Risk factor

- First mortgages on one- to four-unit residential dwellings.

5% Risk factor

- Accounts receivable, not yet due and outstanding less than 60 days, from agents, brokers, non-qualifying subsidiaries, associates, joint ventures and policyholders, including other receivables.⁹⁵
- Instalment premiums outstanding less than 60 days.

10% Risk factor

- Accounts receivable, outstanding 60 days or more, from agents, brokers, non-qualifying subsidiaries, associates, joint ventures and policyholders, including instalment premiums and other receivables.⁹⁶
- Commercial mortgages and other residential mortgages that do not qualify as first mortgages on one- to four-unit residential dwellings.
- The amount of available refunds of defined benefit pension plan surplus assets included in capital available.
- DTAs arising from temporary differences that the institution could recover from income taxes paid in the three immediately preceding years. DTAs from temporary differences that are in excess of the amount of taxes recoverable in the three immediately preceding years should be deducted from capital available.
- Other investments not specified in this section or Section 45.6 as part of other market risk exposures, excluding derivative-related amounts. Capital requirements for derivative-related amounts included in other investments are set out in Section 56.2.
- Other assets not specified in this section or Section 45.6 as part of other market risk exposures, excluding other investments.

⁹⁵ Includes receivables from unregistered insurers for reinsurance contracts issued.

⁹⁶ Includes receivables from unregistered insurers for reinsurance contracts issued.

15% Risk factor

- Mortgages secured by undeveloped land (e.g., construction financing), other than land used for agricultural purposes or for the production of minerals. A property recently constructed or renovated will be considered as “under construction” until it is completed and 80% leased.

20% Risk factor

- Other recoverables (mainly salvage and subrogation) on the liability for incurred claims.
- SIR recoverables not deducted from capital (reference Section 3.5).
- Assets held for sale (other than financial).⁹⁷

45% Risk factor

- Loans or other forms of lending (bonds, debentures, mortgages, etc.) provided to non-qualifying (non-consolidated) subsidiaries, associates and joint ventures with more than a 10% ownership interest which are not considered as capital.
- Unamortized insurance acquisition cash flows, net of unamortized reinsurance commissions, related to accident and sickness business (reference Section 3.7.1).

5.26.2 Capital requirements for off-balance sheet assets exposures

The capital required for off-balance sheet exposures such as structured settlements, letters of credit or non-owned deposits, derivatives and other exposures is calculated in a manner similar to the on-balance sheet assets in that the credit risk exposure is multiplied by a counterparty risk factor to arrive at the capital required. However, unlike most assets, the face amount of an off-balance sheet exposure does not necessarily reflect the true credit risk exposure. To approximate this exposure, a credit equivalent amount is calculated for each exposure. This amount, net of any collateral or guarantees, is then multiplied by a credit conversion factor. For letters of credit and non-owned deposits, the credit equivalent amount is the face value. The determination of the counterparty credit risk categories and the approach for determining the eligibility of collateral and guarantees is the same as it is for other assets. For letters of credit and non-owned deposits, the counterparty credit risk is found under Section 3.4.2.3.

⁹⁷ 1) Alternatively, assets classified as held for sale may be re-consolidated (look-through approach) at the option of the insurer. If this method is selected, any write-down made as a result of re-measuring the assets classified as held for sale at the lower of carrying amount and fair value less costs to sell should be reflected in the MCT after re-consolidation. Any asset within a consolidated group that is deducted from capital available for MCT purposes should continue to be deducted from capital when it becomes an asset held for sale.

2) If the insurer has elected to apply a 20% risk factor to assets held for sale instead of using the look-through approach, associated liabilities held for sale should be subject to the usual MCT treatment of liabilities as per Chapter 3.

The risk to a P&C insurer associated with structured settlements, letters of credit, non-owned deposits, derivatives and other exposures and the amount of capital required to be held against this risk is:

- the credit equivalent amount of the instrument at the reporting date;
- less: the value of eligible collateral securities or guarantees (reference Section [56.3](#));
- multiplied by: a factor reflecting the nature and maturity of the instrument (Credit Conversion Factors); and
- multiplied by: a factor reflecting the risk of default of the counterparty to a transaction (Risk Factors).

5.2.14.2.1 Credit equivalent amount

The credit equivalent amount related to off-balance sheet exposures varies according to the type of instrument.

5.2.14.2.1.1 Structured settlements

The credit equivalent amount for a “Type 1” structured settlement is the current replacement cost of the settlement, which is gross of the coverage provided by Assuris.

“Type 1” structured settlements are not recorded as liabilities on the balance sheet and have the following characteristics:

- An annuity is purchased by a P&C insurer who is named as the owner. There is an irrevocable direction from the P&C insurer to the annuity underwriter to make all payments directly to the claimant.
- Since the annuity is non-commutable, non-assignable and non-transferable, the P&C insurer is not entitled to any annuity payments and there are no rights under the contractual arrangement that would provide any current or future benefit to the P&C insurer.
- The P&C insurer is released by the claimant indicating settlement of the claim amount.
- The P&C insurer remains liable to make payments to the claimant in the event and to the extent the annuity underwriter fails to make payments under the terms and conditions of the annuity and the irrevocable direction given.

Under this type of structured settlement arrangement, the P&C insurer is not required to recognize a liability to the claimant, nor is it required to recognize the annuity as a financial asset. However, the P&C insurer is exposed to some credit risk by guaranteeing the obligation of the annuity underwriter to the claimant and, consequently, must set aside additional capital.

For details on the types of structured settlements, insurers should refer to Special Topics, Section IV of the Instructions to the P&C Returns.

5.2.1.26.2.1.2 Derivatives

The credit equivalent amount for derivatives is the positive replacement cost (obtained by marking to market) plus an amount for potential future credit exposure (an “add-on” factor).

Derivatives include forwards, futures, swaps, purchased options, and other similar contracts. Insurers are not exposed to credit risk for the full face value of these contracts (notional principal amount), only to the potential cost of replacing the cash flow (on contracts showing a positive value) if the counterparty defaults. The credit equivalent amounts are assigned the risk factor appropriate to the counterparty in order to calculate the capital requirement.

The credit equivalent amount depends on the maturity of the contract and the volatility of the underlying instrument. It is calculated by adding:

- the total replacement cost (obtained by marking to market) of all contracts with positive values; and
- an amount for potential future credit exposure (or “add-on”). This is calculated by multiplying the notional principal amount by the following “add-on” factors.

Residual Maturity	Interest Rate (01)	Exchange Rate and Gold (02)	Equity (03)	Precious Metals except Gold (04)	Other Instruments (05)
One year or less	0%	1%	6%	7%	10%
One year to five years	0.5%	5%	8%	7%	12%
Over five years	1.5%	7.5%	10%	8%	15%

Notes

- Instruments traded on exchanges do not require capital for counterparty credit risk where they are subject to daily margining requirements.
- For contracts with multiple exchanges of principal, the factors are to be multiplied by the number of remaining payments in the contract.
- For contracts that are structured to settle outstanding exposures following specified payment dates, and where the terms are reset so that the market value of the contract is zero on these specified dates, the residual maturity is considered to be the time until the next reset date. In the case of interest rate contracts with residual maturities of more than one year and that also meet the above criteria, the add-on factor is subject to a floor of 0.5%.
- Contracts not covered by columns 01 to 04 in the above table are to be treated as “Other Instruments” for the purpose of determining the “add-on” factor.

-
- No potential credit exposure would be calculated for single currency floating/floating interest rate swaps; the credit exposure on these contracts would be evaluated solely on the basis of their mark-to-market value.
 - The add-ons are based on effective rather than stated notional amount. In the event that the stated notional amount is leveraged or enhanced by the structure of the transaction, insurers must use the actual or 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 over-the-counter (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.

5.2.1.3 6.2.1.3 Other exposures

Commitments

A commitment involves an obligation (with or without a material adverse change clause or similar clause) of the insurer to fund its customer in the normal course of business should the customer seek to draw down the commitment. This includes:

- extending credit in the form of loans or participations in loans, lease financing receivables, mortgages or loan substitutes; or
- purchasing loans, securities, or other assets.

Normally, commitments involve a written contract or agreement and a commitment fee or some other form of consideration.

The maturity of a commitment should be measured from the date when the commitment was accepted by the customer, 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.

Repurchase and reverse repurchase 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 transaction for accounting purposes, the securities remain on the balance sheet. Given that these securities are temporarily assigned to another party, the factor accorded to the asset should be the

higher of the factor of the security and the factor of the counterparty to the transaction (net of any eligible collateral).

A reverse repo agreement is the opposite of a repo agreement and involves the purchase and subsequent sale 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. Where the asset temporarily acquired is a security that attracts a lower factor, this would be recognized as collateral and the factor would be reduced accordingly.

Guarantees provided in securities lending

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. When the insurer lends its own securities, the risk factor is the higher of:

- the risk factor related to the instruments lent; or
- the risk factor for an exposure to the borrower of the securities. The exposure to the borrower may be reduced if the insurer holds eligible collateral (reference Section [56.3.1](#)). 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 [56.3.2](#).

When the insurer, acting as agent, lends securities on behalf of a client and guarantees that the securities lent will be returned or the insurer will reimburse the client for the current market value, the insurer should calculate the capital requirement as if it were the principal to the transaction. The capital requirements are those for an exposure to the borrower of the securities, where the exposure amount may be reduced if the insurer holds eligible collateral (reference Section [56.3.1](#)).

For details on how to record these and other such exposures, contact the AMF. In addition, insurers should refer to any other applicable guidelines.

~~5.2.26.2.2~~ [56.2.2](#) Credit conversion factors

Separate credit conversion factors exist for structured settlements, letters of credit, non-owned deposits, derivatives and other exposures.

For other exposures, the weighted average of the credit conversion factors, described below, for all of these instruments held by the insurer, should be used.

100% Conversion factor

- Direct credit substitutes (general guarantees of indebtedness and guarantee-type instruments, including standby letters of credit and non-owned deposits serving as financial guarantees for, or supporting, loans and securities).
- Derivatives such as forwards, futures, swaps, purchased options (including options purchased over the counter) and other similar derivative contracts, including:

-
- interest rate contracts (single currency interest rate swaps, basis swaps, forward rate agreements and derivative contracts with similar characteristics, interest rate futures, interest rate options purchased, and similar derivative contracts based on specific parameters or on indices, etc.);
 - equity contracts (forwards, swaps, purchased options, and similar derivative contracts based on specific parameters or on indices, etc.);
 - exchange rate contracts (gold contracts, cross-currency swaps, cross-currency interest rate swaps, outright forward foreign exchange contracts, currency futures, currency options purchased, and similar derivative contracts based on specific parameters or on indices, etc.);
 - precious metals (except gold) and other commodity contracts (forwards, swaps, purchased options, and similar derivative contracts based on specific parameters or on indices, etc.);
 - other derivative contracts based on specific parameters or on indices (such as catastrophe insurance options and futures).
- Forward agreements (contractual obligations) to purchase assets.
 - Sale and repurchase agreements.
 - All other exposures not contemplated elsewhere (provide details).

50% Conversion factor

- Structured settlements that are not recorded as liabilities on the balance sheet (refer to Type 1 characteristics and to Section IV, Special Topics, of the Instructions to the P&C Returns).
- Transaction-related contingencies (for example, warranties and standby letters of credit related to a particular transaction).
- Commitments with an original maturity exceeding one year.

20% Conversion factor

- Commitments with an original maturity of one year or less.

0% Conversion factor

- Commitments that are unconditionally cancellable at any time without prior notice.⁹⁸

⁹⁸ Other than any notice required under legislation or court rulings that require notice.

5.2.36.2.3 Risk factors

Off-balance sheet exposures are assigned a risk factor consistent with Section 56.1. All criteria in Section 56.1 around the use of ratings are applicable to off-balance sheet exposures.

Risk factors for structured settlements, which are considered long-term exposures, are based on the credit rating of the counterparty from which the annuity is purchased. The risk factors to be applied are:

Rating	Factor
Rated A- or higher	2%
Rated BBB+ to B-	8%
Unrated	10%
Below B-	18%

If the structured settlement is not rated by one of the four rating agencies listed in Section 56.1.1, a P&C insurer may use a credit rating from another reputable rating agency. The use of an alternative rating agency must comply with all the criteria around the use of ratings specified in Section 56.1.1, including a consistent use of the same rating agency in order to assign a risk factor based on the credit rating of the annuity underwriter.

5.36.3 Capital treatment of collateral and guarantees

5.3.16.3.1 Collateral

A collateralized transaction is one in which:

- an insurer has a credit exposure or potential credit exposure; and
- the credit exposure or the potential credit exposure is hedged in whole or in part by collateral posted by a counterparty or by a third party on behalf of the counterparty.

Recognition of collateral in reducing the capital requirements is limited to cash or securities rated A- or higher. Any collateral must be held throughout the period for which the exposure exists. Only that portion of an exposure that is covered by eligible collateral will be assigned the risk factor given to the collateral, while the uncovered portion retains the risk factor of the underlying counterparty. Only collateral securities with a lower risk factor than the underlying exposure will lead to reduced capital requirements. All criteria in Section 56.1 around the use of ratings are applicable to collateral. Where a rating is not available for the collateral asset, exposure, or counterparty where applicable, no reduction in capital required is permitted.

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.

Collateral securities used to reduce capital requirements must materially reduce the risk arising from the credit quality of the underlying exposure. In particular, collateral used may not be related party obligations of the issuer of the underlying exposure (i.e. obligations of the underlying counterparty itself, its parent, or one of its subsidiaries or associates).

5.3.2.6.3.2 Guarantees

Investments (principal and interest) or exposures that have been explicitly, directly, irrevocably and unconditionally guaranteed by a guarantor whose long-term issuer credit rating is A- or higher, may attract the risk factor allocated to a direct claim on the guarantor where the desired effect is to reduce the risk exposure. Thus, only guarantees⁹⁹ issued by entities with a lower risk factor than the underlying counterparty will lead to reduced capital requirements.

Where the recovery of losses on a loan, financial lease agreement, security or exposure is partially guaranteed, only the part that is guaranteed is to be weighted according to the risk factor of the guarantor (see following examples). The uncovered portion retains the risk factor of the underlying counterparty.

All criteria in Section 56.1 around the use of ratings remain applicable to guarantees. Where a rating is not available for the investment, exposure, or guarantor where applicable, no reduction in capital required is permitted.

An insurer may not recognize a guarantee provided by a related enterprise (parent, subsidiary or associate). This treatment follows the principle that guarantees within a corporate group are not a substitute for capital.

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.

To be eligible, a guarantee must cover the full term of the exposure, i.e. no recognition will be given to a guarantee if there is a maturity mismatch¹⁰⁰, and be legally enforceable.

5.3.2.4.6.3.2.1 Additional requirements for guarantees

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

⁹⁹ Letters of credit for which a company is the beneficiary are included within the definition of guarantees and receive the same capital treatment.

¹⁰⁰ A maturity mismatch occurs when the residual maturity of the credit protection is less than that of the underlying exposure.

- 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 56.1.

5.3.36.3.3 Examples

Example 56-1: Credit risk exposure

To record a \$100,000 bond rated AAA due in 10 years that has a government guarantee of 90%, the insurer would report a balance sheet value of \$90,000 ($\$100,000 \times 90\%$) in the 0% risk weighted category and a balance sheet value of \$10,000 ($\$100,000 - \$90,000$) in the AAA category under “Term Deposits, Bonds and Debentures - Expiring or redeemable in more than five years”. The capital required in the 0% risk weighted category is \$0 ($\$90,000 \times 0.0\%$). The capital required in the AAA category is \$125 ($\$10,000 \times 1.25\%$) for a total capital requirement of \$125.

An example of the calculation, assuming no other assets, is provided in the table below.

	Risk factor (%)	Balance sheet value	Capital required
Investments:			
Term Deposits, Bonds and Debentures:			
Expiring or redeemable in more than five years:			
0% risk factor	0%	\$90,000	\$0
Rating: AAA	1.25%	\$10,000	\$125
Total		\$100,000	\$125

Example 56-2: Type 1 structured settlement

To record a \$300,000 Type 1 structured settlement rated BBB+ to B-, backed by collateral or by a guarantee of \$200,000 from a counterparty rated A- or higher, the insurer would report a credit equivalent amount of \$300,000 and collateral and guarantees of negative \$200,000 in the BBB+ to B- category, and collateral and guarantees of \$200,000 in the A- or higher category.

The capital required in the BBB+ to B- category is \$4,000 $((\$300,000 - \$200,000) \times 50\% \times 8\%)$. The capital required in the A- or higher category is \$500 $(\$200,000 \times 50\% \times 0.5\%)$ for a total capital requirement of \$4,500.

An example of the calculation, assuming no other exposures, is provided in the following table.

	Credit equivalent amount	Collateral and guarantees	Credit conversion factor (%)	Risk factor (%)	Capital required
Structured Settlements					
0% risk factor					
Rating: A- or higher		\$200,000	50%	0.5%	\$500
Rating: BBB+ to B-	\$300,000	(\$200,000)	50%	8%	\$4,000
Total					\$4,500

Chapter 6. Chapter 7. Operational risk

Operational risk is the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. The definition includes legal risk¹⁰¹ but excludes strategic and reputation risk.

Exposure to operational risk results from either day-to-day operations or a specific, unanticipated event.

6.4.7.1 Operational risk formula

The two risk drivers used to determine the operational risk margin are capital required and premiums, subject to a cap.

$$\text{Operational risk margin} = \text{MIN} \{30\% \text{ CR}_0, (8.50\% \text{ CR}_0 + 2.50\% \text{ P}_d + 1.75\% \text{ P}_a + 2.50\% \text{ P}_p + 2.50\% \text{ P}_\Delta) + \text{MAX} (0.75\% \text{ P}_{\text{aig}}, 0.75\% \text{ P}_{\text{pig}})\}$$

where:

- CR₀: is the total capital required for the reporting period, before the operational risk margin and diversification credit
- P_d: is the direct premiums received in the past 12 months for insurance contracts issued
- P_a: is the premiums received in the past 12 months for reinsurance contracts issued arising from third party reinsurance¹⁰²
- P_{aig}: is the premiums received in the past 12 months for reinsurance contracts issued arising from intra-group pooling arrangements¹⁰³
- P_p: is the premiums paid in the past 12 months for reinsurance contracts held arising from third party reinsurance¹⁰⁴
- P_{pig}: is the premiums paid in the past 12 months for reinsurance contracts held arising from intra-group pooling arrangements¹⁰⁵
- P_Δ: is the growth in gross premiums received in the past 12 months above a 20% threshold

¹⁰¹ Legal risk includes, but is not limited to, exposure to fines, penalties, or punitive damages resulting from supervisory actions, as well as private settlements.

¹⁰² Includes reinsurance contracts with insurers within the same group that do not qualify as intra-group pooling arrangements.

¹⁰³ The mere payment of premiums by one insurer to another within a group, in connection with a reinsurance contract, is not considered as an intra-group pooling arrangement under this guideline. Assumed and ceded insurance risks between insurers within a group will be recognised as part of an intra-group pooling arrangement only where the arrangement contains provisions to, for example, insure a common management of the MCT ratio or the profitability of the participating insurers.

¹⁰⁴ Idem P_a

¹⁰⁵ Idem P_{aig}

6.2.7.2 Components of operational risk margin

6.2.7.2.1 Capital required

A portion of the operational risk margin is based on total capital required, reflecting the overall riskiness of an insurer. An 8.50% risk factor applies to total capital required, before the operational risk margin and diversification credit.

6.2.7.2.2 Premium volume

The following risk factors apply to insurance premiums:

- 2.50% for direct premiums received for insurance contracts issued;
- 1.75% for premiums received for reinsurance contracts issued arising from third party reinsurance;
- 0.75% for premiums received for reinsurance contracts issued arising from intra-group pooling arrangements;
- 2.50% for premiums paid for reinsurance contracts held arising from third party reinsurance;
- 0.75% for premiums paid for reinsurance contracts held arising from intra-group pooling arrangements.

The 2.50% risk factor for direct premiums received and 1.75% risk factor for premiums received from third party reinsurance contracts issued capture an insurer's operational risk exposure on new business and renewals.

The 2.50% risk factor for premiums paid arising from third party reinsurance contracts held captures the operational risk remaining with the ceding insurer. While the insurer cedes a portion of its insurance risk exposure through reinsurance, the operational risk remains with the ceding insurer. Because the capital requirements for insurance liabilities (reference Section 3.3) are calculated on the net amount of risk (net of reinsurance), the portion of operational risk requirement calculated as 8.50% of capital required does not account for the operational risk on the entire business of the insurer.

6.2.7.2.1 Intra-group pooling arrangements

The 0.75% risk factor for premiums received for reinsurance contracts issued and premiums paid for reinsurance contracts held arising from intra-group pooling arrangements captures the additional operational risks associated with pooling insurance risks within a group compared to a company that does not enter into transactions moving the insurance risks from a company to another within a group.

Only premiums received and paid from intra-group pooling arrangements between related Canadian federally or provincially regulated insurers are included in P_{aig} and P_{pig} , and a prior approval from the AMF is required in order to be allowed to apply this approach. If prior approval is not granted, the premiums received and paid in the intra-group pooling arrangement will be considered as premiums arising from a third-party reinsurance

contract and, therefore, will be included in P_a and P_p for capital requirement calculation purposes.

In cases where P&C subsidiaries are consolidated in the financial statements of the P&C parent company, P_d , P_a , and P_p , at the parent level, must be determined on a consolidated basis, while P_{aig} and P_{pig} must be equal to the non-consolidated intra-group pooled premiums received and paid by the parent company, respectively. For example:

- assume that two subsidiaries, insurer Y and insurer Z, cede 100% of their direct premiums received to insurer X (the parent);
- insurer X then cedes 20% of the total of the direct business of each insurer (including the parent's business) to each subsidiary;
- assuming that each of the three insurers receives \$100 of direct premiums, the following amounts would apply to calculate the operational risk margin for insurer X:

P_d : 3 x \$100 (direct premiums received by each insurer) = \$300

P_a, P_p : \$0 (assuming all three insurers are not part of third-party reinsurance contracts)

P_{aig} : 2 x \$100 (premiums received by insurer X as part of the intra-group arrangement) = \$200

P_{pig} : 2 x \$60 (premiums paid by insurer X as part of the intra-group arrangement) = \$120

P_{Δ} : \$0 (growth in gross premiums written exceeding 20%)

- the capital requirement for operational risk associated with the premiums for insurer X would be calculated as follows:

$$\begin{aligned} &= (2.50\% P_d + 1.75\% P_a + 2.50\% P_p + 2.50\% P_{\Delta}) + \text{MAX}(0.75\% P_{aig}, 0.75\% P_{pig}) \\ &= (2.50\% \times \$300 + 1.75\% \times \$0 + 2.50\% \times \$0 + 2.50\% \times \$0) + \text{MAX}(0.75\% \times \$200, 0.75\% \times \$120) \\ &= (\$7.50 + \$0 + \$0 + \$0) + \text{MAX}(\$1.50, \$0.90) \\ &= \$9.00 \end{aligned}$$

6.2.37.2.3 Year-over-year premium growth beyond a threshold

Rapid growth, which is linked to the acquisition of another entity, the acquisition of a block of business through assumption reinsurance, new lines of business or changes to existing products or underwriting criteria, can create additional pressures on people and systems. Insurers with premium growth beyond a 20% threshold are subject to additional capital requirements for operational risk.

The premium growth requirement is calculated using gross premiums received, i.e. direct premiums received for insurance contracts issued plus premiums received for reinsurance contracts issued. For the purposes of this section, premiums received for reinsurance

contracts issued arising from intra-group pooling arrangements (i.e. P_{aig}) are excluded from gross premiums received. A 2.50% risk factor applies to the total amount of gross premiums received in the past 12 months above the 20% growth threshold compared to the gross premiums received for the same period in the previous year. For example:

- assume that as a result of rapid growth, gross premiums received increase by 50% from \$100 to \$150;
- then, the amount above the 20% increase (\$30) is subject to an additional risk factor of 2.50%.

In the case of an acquisition, the total gross premiums received for a prior reporting period (before the acquisition) is the sum of the gross premiums received by the two separate entities, i.e. the sum of the acquiring and the acquired insurers' gross premiums received. For example:

- assume that in Year T insurer A, with gross premiums received of \$100 for the 12 months period ending December 31, Year T-1, acquired insurer B with gross premiums received of \$50 for the same period;
- the merged insurer reported a total of \$225 in gross premiums received for the 12 months period ending December 31, Year T;
- the capital requirement for operational risk associated with rapid growth in premiums would be calculated as follows:

$$2.50\% \times [\$225 - ((\$100 + \$50) \times 1.2)] \text{ or } 2.50\% \times \$45 = \$1.13$$

6.2.47.2.4 Cap on operational risk margin

A 30% cap serves to dampen the operational risk margin. The 30% cap is calculated in relation to total capital required, before the operational risk margin and diversification credit.

~~Chapter 7.~~Chapter 8. Diversification credit

Because losses arising across some risk categories are not perfectly correlated with each other, an insurer is not likely to incur the maximum probable loss at a given level of confidence from each type of risk simultaneously. Consequently, an explicit credit for diversification is permitted between the sum of credit and market risk requirements and the insurance risk requirement so that the total capital required for these risks is lower than the sum of the individual requirements for these risks.

~~7.4~~8.1 Risk aggregation and diversification credit

The diversification credit is calculated using the following formula:

$$\text{Diversification credit} = A + I - \sqrt{A^2 + I^2 + 2 \times R \times A \times I}$$

where:

- A: is the asset risk margin, which is the sum of capital required for:
- credit risk, including requirements for balance sheet assets, off-balance sheet exposures and collateral for unregistered reinsurance and SIRs;
 - market risk, including interest rate risk, foreign exchange risk, equity risk, real estate risk and other market risk exposures.
- I: is the insurance risk margin, which is the sum of capital required for:
- liability for incurred claims;
 - unexpired coverage;
 - unregistered reinsurance exposure;
 - earthquake risk exposure.
- R: is the correlation factor between A and I, determined as 50% for the diversification credit calculation.

Annex 1. Qualifying criteria for category A capital instruments¹⁰⁶

For an instrument to be included in capital available under category A, it must meet all of the following criteria:

1. The instrument represents the most subordinated claim in liquidation of the insurer.
2. The investor is entitled to a claim on the residual assets that is proportional with its share of issued capital, after all senior claims have been paid in liquidation (i.e. has an unlimited and variable claim, not a fixed or capped claim).
3. The principal is perpetual and never repaid outside of liquidation (setting aside discretionary repurchases or other means of effectively reducing capital in a discretionary manner that is allowable under relevant law and subject to the prior approval of the AMF).
4. The insurer does not, in the sale or marketing of the instrument, create an expectation at issuance that the instrument will be bought back, redeemed or cancelled, nor do the promotional material and statutory or contractual terms provide any feature that might give rise to such expectation.
5. Distributions are paid out of distributable items (retained earnings included). The level of distributions is not in any way tied or linked to the amount paid in at issuance and is not subject to a contractual cap (except to the extent that an insurer is unable to pay distributions that exceed the level of distributable items or to the extent that distribution on senior ranking capital must be paid first).
6. There are no circumstances under which the distributions are obligatory. Non-payment is, therefore, not an event of default.
7. Distributions are paid only after all legal and contractual obligations have been met and payments on more senior capital instruments have been made. This means that there are no preferential distributions, including in respect of other elements classified as the highest quality issued capital.
8. It is in the form of issued capital that takes the first and proportionately greatest share of any losses as they occur. Within the highest quality capital, each instrument absorbs losses on a going concern basis proportionately and *pari passu* with all the others.
9. The paid-in amount is recognized as equity capital (i.e. not recognized as a liability) for determining balance sheet solvency.
10. It is directly issued and paid-in¹⁰⁷ and the insurer cannot directly or indirectly have funded the purchase of the instrument. Where the consideration for the shares is

¹⁰⁶ The criteria also apply to non-joint stock companies, such as mutuals, taking into account their specific constitution and legal structure. The application of the criteria should preserve the quality of the instruments by requiring that they are deemed fully equivalent to common shares in terms of their capital quality as regards loss absorption and do not possess features that could cause the condition of the insurer to be weakened as a going concern during periods of market stress.

¹⁰⁷ Paid-in capital generally refers to capital that has been received with finality by the insurer, is reliably valued, fully under the insurer's control and does not directly or indirectly expose the insurer to the credit risk of the investor.

other than cash, the issuance of the common shares is subject to the prior approval of the AMF.

11. The paid-in amount is neither secured nor covered by a guarantee of the issuer or related enterprise¹⁰⁸ or subject to any other arrangement that legally or economically enhances the seniority of the claim.
12. It is only issued with the approval of the owners of the issuing insurer, either given directly by the owners or, if permitted by applicable law, given by the Board of Directors or by other persons duly authorized by the owners.
13. It is clearly and separately disclosed on the insurer's balance sheet, prepared in accordance with the relevant accounting standards.

¹⁰⁸ A related enterprise can include a parent company, a sister company, a subsidiary or any other affiliate. A holding company is a related enterprise irrespective of whether it forms part of the consolidated insurance group.

Annex 2. Qualifying criteria for category B capital instruments

For an instrument to be included in capital available under category B, it must meet all of the following criteria:

1. The instrument is issued and paid-in in cash or, subject to the prior approval of the AMF, in property.
2. The instrument is subordinated to policyholders, general creditors and subordinated debt holders of the insurer.
3. The instrument is neither secured nor covered by a guarantee of the issuer or related enterprise or other arrangement that legally or economically enhances the seniority of the claim vis-à-vis the insurer's policyholders and creditors.¹⁰⁹
4. The instrument is perpetual, i.e., there is no maturity date and there are no step-ups¹¹⁰ or other incentives to redeem.¹¹¹
5. The instrument may be callable at the initiative of the issuer only after a minimum of five years:
 - i. To exercise a call option, an insurer must receive prior approval of the AMF.
 - ii. An insurer must not do anything that creates an expectation that the call will be exercised.
 - iii. An insurer must not exercise a call unless:
 1. It replaces the called instrument with capital of the same or higher quality, including through an increase in retained earnings, and the replacement of this capital is done at conditions that are sustainable for the income capacity of the insurer;¹¹² or
 - b) It demonstrates that its capital position is above the internal capital target ratio after the call option is exercised.
6. Any repayment of principal (e.g., through repurchase or redemption) must require approval of the AMF and insurers should not assume or create market expectations that such approval will be given.

¹⁰⁹ Further, where an insurer uses a special purpose vehicle to issue capital to investors and provides support, including overcollateralization, to the vehicle, such support would constitute enhancement in breach of criterion #3 above.

¹¹⁰ A step-up is defined as a call option combined with a pre-set increase in the initial credit spread of the instrument at a future date over the initial dividend (or distribution) rate after taking into account any swap spread between the original reference index and the new reference index. Conversion from a fixed rate to a floating rate (or vice versa) in combination with a call option without any increase in credit spread would not constitute a step-up.

¹¹¹ Other incentives to redeem include a call option combined with a requirement or an investor option to convert the instrument into common shares if the call is not exercised.

¹¹² Replacement issuances can be concurrent with, but not after, the instrument is called.

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7. Dividend/coupon discretion:
 - i. the insurer must have full discretion at all times to cancel distributions/payments;¹¹³
 - ii. cancellation of discretionary payments must not be an event of default or credit event;
 - iii. the insurer must have full access to cancelled payments to meet obligations as they fall due;
 - iv. cancellation of distributions/payments must not impose restrictions on the insurer except in relation to distributions to common shareholders.

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8. Dividends/coupons must be paid out of distributable items.
9. The instrument cannot have a credit sensitive dividend feature, i.e., a dividend/coupon that is reset periodically based in whole or in part on the insurance organization's credit standing.¹¹⁴
10. The instrument cannot contribute to liabilities exceeding assets if such a balance sheet test forms part of national insolvency law.
11. Other than preferred shares, category B instruments included in capital available must be classified as equity per relevant accounting standards.
12. Neither the insurer nor a related enterprise over which the insurer exercises control or significant influence can have purchased the instrument, nor can the insurer directly or indirectly have funded the purchase of the instrument.
13. The instruments cannot have any features that hinder recapitalization, such as provisions that require the issuer to compensate investors if a new instrument is issued at a lower price during a specified timeframe.
14. If the instrument is not issued directly by the insurer (e.g., it is issued out of a special purpose vehicle or SPV), proceeds must be available immediately without limitation to an insurer in a form that meets or exceeds all of the other criteria for inclusion in capital available as specified under category B. For greater certainty, the only assets the SPV may hold are intercompany instruments issued by the insurer or a related enterprise with terms and conditions that meet or exceed criteria specified under category B. Put differently, instruments issued to the SPV have to fully meet or

¹¹³ A consequence of full discretion at all times to cancel distributions/payments is that "dividend pushers" are prohibited. An instrument with a dividend pusher obliges the issuing insurer to make a dividend/coupon payment on the instrument if it has made a payment on another (typically more junior) capital instrument or share. Such an obligation is inconsistent with the requirement for full discretion to cancel distributions/payments at all times. Furthermore, the term "cancel distributions/payments" means to forever extinguish these payments. It does not permit features that require the insurer to make distributions/payments in kind at any time.

¹¹⁴ Insurers may use a broad index as a reference rate in which the issuing insurer is a reference entity; however, the reference rate should not exhibit significant correlation with the insurer's credit standing. If an insurer plans to issue capital instruments where the margin is linked to a broad index in which the insurer is a reference entity, the insurer should ensure that the dividend/coupon is not credit sensitive.

exceed all of the eligibility criteria under category B as if the SPV itself was an end investor – i.e. the insurer cannot issue a lower quality capital or senior debt instrument to an SPV and have the SPV issue higher quality capital instruments to third-party investors so as to receive recognition as qualifying capital under category B.

Annex 3. Qualifying criteria for category C capital instruments

For an instrument to be included in capital available under category C, it must meet all of the following criteria:

1. The instrument is issued and paid-in in cash or, with the prior approval of the AMF, in property.
2. The instrument is subordinated to policyholders and general creditors of the insurer.
3. The instrument is neither secured nor covered by a guarantee of the issuer or related enterprise or other arrangement that legally or economically enhances the seniority of the claim vis-à-vis the insurer's policyholders and/or general creditors.
4. Maturity:
 - i. minimum original maturity of at least five years;
 - ii. recognition in capital available in the remaining five years before maturity will be amortized on a straight line basis;
 - iii. there are no step-ups¹¹⁵ or other incentives to redeem.
5. The instrument may be callable at the initiative of the issuer only after a minimum of five years:
 - i. To exercise a call option, an insurer must receive the prior approval of the AMF.
 - ii. An insurer must not do anything that creates an expectation that the call will be exercised.¹¹⁶
 - iii. An insurer must not exercise a call unless:
 - a) It replaces the called instrument with capital of the same or higher quality, including through an increase in retained earnings, and the replacement of this capital is done at conditions that are sustainable for the income capacity of the insurer;¹¹⁷ or
 - b) It demonstrates that its capital position is above the internal capital target ratio after the call option is exercised.

¹¹⁵ A step-up is defined as a call option combined with a pre-set increase in the initial credit spread of the instrument at a future date over the initial dividend (or distribution) rate after taking into account any swap spread between the original reference index and the new reference index. Conversion from a fixed rate to a floating rate (or vice versa) in combination with a call option without any increase in credit spread would not constitute a step-up.

¹¹⁶ An option to call the instrument after five years but prior to the start of the amortization period will not be viewed as an incentive to redeem as long as the insurer does not do anything that creates an expectation that the call will be exercised at this point.

¹¹⁷ Replacement issuances can be concurrent with but not after the instrument is called.

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6. The investor must have no rights to accelerate the repayment of future scheduled payments (interest or principal), except in bankruptcy, insolvency, wind-up, or liquidation.
 7. The instrument cannot have a credit sensitive dividend feature, i.e. a dividend/coupon that is reset periodically based in whole or in part on the insurance organization's credit standing.¹¹⁸
 8. Neither the insurer nor a related enterprise over which the insurer exercises control or significant influence can have purchased the instrument, nor can the insurer directly or indirectly have funded the purchase of the instrument.
 9. If the instrument is not issued directly by the insurer (e.g., it is issued out of an SPV), proceeds must be available immediately without limitation to the insurer in a form that meets or exceeds all of the criteria for inclusion specified under category C. For greater certainty, the only assets the SPV may hold are intercompany instruments issued by the insurer or a related enterprise with terms and conditions that meet or exceed the above category C criteria. Put differently, instruments issued to the SPV have to fully meet or exceed all of the eligibility criteria under category C as if the SPV itself was an end investor – i.e. the insurer cannot issue a lower capital or a senior debt instrument to an SPV and have the SPV issue higher quality capital instruments to third-party investors so as to receive recognition as qualifying capital under category C.

¹¹⁸ Insurers may use a broad index as a reference rate in which the issuing insurer is a reference entity; however, the reference rate should not exhibit significant correlation with the insurer's credit standing. If an insurer plans to issue capital instruments where the margin is linked to a broad index in which the insurer is a reference entity, the insurer should ensure that the dividend/coupon is not credit-sensitive.

Annex 4. Instructions – capital required – accident and sickness insurance

Mortality/morbidity risk for accident and sickness insurance is the risk that the liability assumptions about mortality and morbidity rates will be wrong.

To compute the mortality/morbidity component, a factor is applied to the measure of the exposure to the risk. The resulting values are added to arrive at the unexpired coverage and liability for incurred claims margin requirements.

The factors used in deriving the risk component vary with the guaranteed term remaining in the exposure measure. The measure of the exposure to risk is as follows:

Risk	Measure of exposure (before reinsurance)	Applicable guaranteed term
Disability Income, New Claims Risk	Annual insurance revenue	The length of the premium guarantee remaining
Disability Income, Continuing Claims Risk	Disability income net reserves relating to claims of prior years	The length of the benefit period remaining
Accidental Death and Dismemberment	Net amount at risk = the total net face amount of insurance less the contract liabilities (even if negative)	The period over which the mortality cost cannot be changed (limited to the remaining period to expiry or maturity)

Disability Income Insurance

The additional risks associated with non-cancellable guaranteed premium business should be recognized. As well, significant volatility is characteristic of disability income insurance, as compared with medical and dental insurance.

New claims risk

The unexpired coverage component relates to claims arising from the current year's coverage and includes the risks of incidence and claims continuance. The factor applied to the measure of exposure is as follows:

Percentage of annual insurance revenue ¹¹⁹		Length of the premium guarantee remaining
Individually underwritten	Other	
15%	15%	Less than or equal to 1 year
25%	31.25%	Greater than 1 year, but less than or equal to 5 years
37.5%	50%	Greater than 5 years

Continuing claims risk

The liability for incurred claims component covers the risk of claims continuance arising from coverage provided in prior years. The factor applies to disability income claim reserves related to claims incurred in prior years, including the portion of the provision for incurred but unreported claims. The factor applied to the measure of risk exposure is as follows:

Duration of disability			Length of benefit period remaining
Less than or equal to 2 years	Greater than 2 years but less than or equal to 5 years	Greater than 5 years	
5%	3.75%	2.5%	Less than or equal to 1 year
7.5%	5.625%	3.75%	Greater than 1 year but less than or equal to 2 years
10%	7.5%	5%	Greater than 2 years or lifetime

¹¹⁹ For travel insurance, annual insurance revenue should be considered revenue premiums.

Accidental death and dismemberment

To compute the components for accidental death and dismemberment, the following factors are applied to the net amount at risk:

Type		Factor	Guaranteed term remaining
Participating	Group	0.019%	Less than or equal to 1 year
	All other	0.038%	All
Non-participating <i>Individual</i>	Adjustable	0.038%	All
	All other	0.019%	Less than or equal to 1 year
		0.038%	Greater than 1 year but less than or equal to 5 years
		0.075%	Greater than 5 years, whole life, and all life insurance continued on disabled lives without payment of premiums
Non-participating <i>Group</i>	All	0.019%	Less than or equal to 1 year
		0.038%	Greater than 1 year but less than or equal to 5 years
		0.075%	Greater than 5 years, whole life, and all life insurance continued on disabled lives without payment of premiums

For participating business without meaningful dividends and participating adjustable contracts where mortality adjustability is not reasonably flexible, the factors for all other non-participating business should be used.

If current premium rates are significantly less than the maximum guaranteed premium rates, the guarantee term used is that applicable to the current rates.

Additional adjustments are according to group insurance. They are as follows:

- The above factors may be multiplied by 50% for any group benefit that carries one of the following features: 1) a “guaranteed no risk”; 2) deficit repayment by policyholders, or 3) “hold harmless” agreement where the policyholder has a legally enforceable debt to the insurer.
- No component is required for “Administrative services only” group cases where the insurer has no liability for claims.

Only “all cause” contracts solicited by mail should be included in this section for automobile and common carrier accidental death and dismemberment. Specific accident perils included in accidental death and dismemberment contracts solicited by mail, and “free”

coverages on premium credit card groups, should be included in the “Other Accident and Sickness Benefits” section.

Other accident and sickness benefits

New claims risk

The component requirement is 15% of annual insurance revenue.

Continuing claims risk

The component requirement is 12.5% of the provision for the liability for incurred claims relating to prior years. The use of prior years avoids a double component requirement for the liability for incurred claims arising from coverage purchases by premiums received in the current year.

Special policyholder arrangements

For group insurance contracts, deposits in excess of liabilities may be used to reduce the component requirement to a minimum of zero. Such deposits must be:

- made by policyholders;
- available for claims payment (e.g., claim fluctuation and premium stabilization reserves, and accrued provision for experience refunds); and
- returnable, net of applications, to policyholders on policy termination.