Notice No. : MAS 133

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NOTICE ON VALUATION AND CAPITAL FRAMEWORK FOR INSURERS

Contents

1 INTRODUCTION

1.1 This Notice is issued pursuant to section 18 and 64(2) of the Insurance Act (Cap. 142) ["the Act"] and comprises both mandatory requirements and guidelines on the supervisory intervention levels, valuation of policy liabilities in respect of life business and general business, and the calculation of the total risk requirements and financial resources.

1.2 Section 1 of this Notice applies to all licensed insurers. Sections 2 to 5 of this Notice applies to all licensed insurers except captive insurers, marine mutual insurers and special purpose reinsurance vehicles ("SPRVs"). Section 6 of this Notice applies to captive insurers, marine mutual insurers and SPRVs only.

1.3 The Notice (with the exception of section 6.4 and paragraph 10 in **Appendix 5E** shall take effect on **31 March 2020**. Section 6.4 and paragraph 10 in **Appendix 5E** shall take effect on **1 January 2022**.

1.4 While any deviation from the guidelines set out in this Notice does not of itself amount to an offence under the Act, the Authority may consider such deviation as one of the factors in determining whether the insurer should be subject to additional supervisory requirements as a result of the increased risk in the operations of the insurer, including a fund solvency or capital adequacy requirement which is higher than those prescribed in the Regulations or specified in this Notice.

Definitions

1.5 For the purposes of this Notice:

"adjusted capital ratio", in relation to an insurer, means the ratio of the financial resources of the insurer (excluding the financial resources of any participating fund) to the total risk requirement of the insurer (excluding such requirement arising from any participating fund);

"adjusted fund" means a fund referred to in –

(a) regulation 4(11)(a) of the Regulations ("SIF-Par");

(b) regulation 4(11)(b) of the Regulations ("OIF-Par");

(c) regulation 4(11)(c) of the Regulations ("SIF-Others"); or

(d) regulation 4(11)(d) of the Regulations ("OIF-Others");

"affiliate" means –

(a) an entity that has a beneficial interest in 20% or more of the total number of ordinary shares or controls 20% or more of the voting power in the insurer, or

(b) an entity in which the insurer has a beneficial interest in 20% or more of the total number of ordinary shares or controls 20% or more of the voting power in the entity, or

(c) an entity in which a related corporation of the insurer has a beneficial interest in 20% or more of the number of ordinary shares or controls 20% or more of the voting power in the entity;

"appointed actuary" means a person appointed under section 31(1)(b) of the Act;

"associate" has the same meaning as "associate" under the Accounting Standards;

"Banking Act" means Banking Act (Cap. 19);

"banking institution" means –

(a) any bank licensed under the Banking Act;

(b) any finance company licensed under the Finance Companies Act (Cap. 108); or

(c) any entity which is approved, licensed, registered or otherwise regulated by a bank regulatory agency in a foreign jurisdiction to carry on banking business as defined in the Banking Act;

"Best estimate of claim liabilities" or "BE of CL" means the part of claim liabilities that relates to the value of the expected future payments in relation to all claims incurred prior to or on the valuation date (including any expense expected to be incurred in settling the claims) and that fall due for payment after the valuation date, whether or not the claims have been reported to the insurer;

"Best estimate of unexpired risk reserves" or "BE of URR" means the part of unexpired risk reserves that relates to the value of the expected future payments arising from future events insured under policies in force as at the valuation date (including any expense expected to be incurred in administering the policies and settling claims against those policies);

"certifying actuary" means a person appointed under section 31(1)(c) of the Act;

"charged asset" means any asset which is subjected to a charge under which a third party has a right of retention or sale of the asset upon default of the insurer;

"commodity", in relation to a forward contract or futures contract, means —

(a) a financial instrument; or

(b) gold, any class of oil or any other physical commodity;

"credit facility" means —

(a) the granting by a financial institution of advances, loans and other facilities whereby an insurer has access to funds or financial guarantees; or

(b) the incurring by a financial institution of other liabilities on behalf of an insurer;

"derivative" includes any warrant, convertible security, forward contract, futures contract, swap, contract for differences or option;

"ECAI" means an external credit assessment institution, and includes all entities trading under the trade name of that external credit assessment institution;

"expected future payments", in relation to amounts payable in the future, includes guaranteed and non-guaranteed benefits, management and distribution expenses, and reinsurance premiums;

"expected future receipts", in relation to amounts receivable in the future, includes premiums, charges and fee income, and reinsurance recoverables;

"financial resources" means financial resources determined in accordance with Section 5 of this Notice;

"forward contract" means a contract the effect of which is that one party to the contract agrees to deliver a specified commodity, or a specified quantity of a specified commodity, to another party to the contract at a specified future time and at a specified price payable at that time, and includes an option on a forward contract but does not include a futures contract;

"futures contract" means a contract the effect of which is that —

(a) one party to the contract agrees to deliver a specified commodity, or a specified quantity of a specified commodity, to another party to the contract at a specified future time and at a specified price payable at that time under the terms and conditions set out in the business rules and practices of the futures exchange, recognised trading system provider or overseas futures exchange at which the contract is made; or

(b) the parties to the contract will discharge their obligations under the contract by settling the difference between the value of a specified quantity of a specified commodity agreed at the time of the making of the contract and at a specified future time, such difference being determined in accordance with the business rules and practices of the futures exchange, recognised trading system provider or overseas futures exchange at which the contract is made, and includes an option on a futures contract;

"Homogeneous risk group" or "HRG" refers to a group of policies with similar risk characteristics, determined in accordance to paragraphs 4.2.8 to 4.2.17, where the risks refer to the risks covered under C1 requirement for life business in paragraph 4.2.18;

"insurance group entity" means any subsidiary or any other entity which is treated as part of the insurer's group of entities according to Accounting Standards;

"investment grade" means Credit Quality Class of D or better under **Appendix 4K** or Counterparty Risk Class of D or better under **Appendix 4L;**

"life insurer" means an insurer licensed to carry on life business;

"LLP" means last liquid point, as specified in **Appendix 3C;**

"long-term medical policies" means long-term accident and health policies where the main purpose of the policies is to provide policy moneys with respect to health services;

"MA portfolio" means products where the Matching Adjustment as described in sub-section 3.4 is applied, and assets assigned to back the liabilities for the guaranteed benefits of these products;

"ordinary share" means any share other than a preference share;

"Provision for adverse deviation of claim liabilities" or "PAD of CL" means —

(a) in the case of captive insurers, marine mutual insurers and special purpose reinsurance vehicles, the part of CL that relates to the PAD from the expected experience; or

(b) in any other case, the part of CL that relates to the PAD from the expected experience, calculated based on 75% level of sufficiency;

"Provision for adverse deviation of unexpired risk reserves" or "PAD of URR" means —

(a) in the case of captive insurers, marine mutual insurers and special purpose reinsurance vehicles, the part of URR that relates to the PAD from the expected experience; or

(b) in any other case, the part of URR that relates to the PAD from the expected experience, calculated based on 75% level of sufficiency;

"PSE" or public sector entity means –

(a) a regional government or local authority that is able to exercise one or more functions of the central government at the regional or local level;

(b) an administrative body or non-commercial undertaking responsible to, or owned by, a central government, regional government or local authority, which performs regulatory or non-commercial functions;

(c) a statutory board in Singapore (other than the Authority); or

(d) a town council in Singapore established pursuant to the Town Councils Act (Cap. 392A);

"recognised ECAI" means an ECAI recognised by the Authority pursuant to **Appendix 4I** and listed in **Appendix 4J**;

"Regulations" means the Insurance (Valuation and Capital) Regulations 2004 (G.N. No. S 498/2004);

"risk-free discount rate" means the interest rate determined in the manner described in **Appendix 3C** of this Notice;

"total risk requirement" means total risk requirement determined in accordance with Section 4 of this Notice;

"UFR" means ultimate forward rate, as specified in **Appendix 3C**;

"unadjusted capital ratio", in relation to an insurer, means the ratio of the financial resources of the insurer (including the financial resources of any participating fund) to the total risk requirement of the insurer (including such requirement arising from any participating fund).

1.6 The expressions used in this Notice, except where expressly defined in this Notice or where the context otherwise requires, have the same respective meanings as in the Act, the Regulations and MAS Notice 129, MAS Notice 130, MAS Notice 131, MAS Notice 212 and MAS Notice 213, as applicable.

2 SUPERVISORY SOLVENCY INTERVENTION LEVELS

2.1 Assessment of Solvency Position

2.1.1 An insurer must at all times maintain its fund solvency requirement at the adjusted fund level and the capital adequacy requirement at the company level.

2.1.2 At the company level, the insurer must calculate its Capital Adequacy Ratio ("CAR") as follows:

$$\text{CAR} = \frac{\text{Financial Resources ("FR")}}{\text{Total Risk Requirement ("TRR")}}$$

where

FR is determined in accordance with Section 5 of this Notice; and must not be lower than a minimum amount of $5 million

TRR is determined as the sum of –

a) aggregate of the TRR of all adjusted funds; and

b) where the insurer is incorporated in Singapore, the TRR arising from the assets and liabilities of the insurer that do not belong to any insurance fund established and maintained under the Act,

where sub-paragraphs a) and b) are determined in accordance with Section 4 of this Notice

2.1.3 For each of the following adjusted fund, where applicable,

a) SIF-Par;

b) OIF-Par;

c) SIF-Others;

d) OIF-Others;

the insurer must calculate its Fund Solvency Ratio ("FSR") as follows:

$$\text{FSR} = \frac{\text{Financial Resources ("FR")}}{\text{Total Risk Requirement ("TRR")}}$$

where

FR is determined in accordance with Section 5 of this Notice; and

TRR is determined in accordance with Section 4 of this Notice

2.2 Higher and Lower Supervisory Intervention Levels

2.2.1 An insurer must at all times meet the fund solvency requirement and capital adequacy requirement at two supervisory solvency intervention levels:

a) the higher solvency intervention level, where the TRR, also referred to as the prescribed capital requirements ("PCR"), are calibrated at 99.5% Value-at-Risk ("VaR") over a one year period and detailed in Section 4 of this Notice;

b) the lower solvency intervention level, where the TRR, also referred to as the minimum capital requirements ("MCR"), are determined at 90.0% VaR over a one year period. MCR is set as 50% of PCR.

2.2.2 For the purposes of paragraph 2.2.1a)—

a) an insurer meets the fund solvency requirement at the higher solvency intervention level if at the adjusted fund level, the FSR is not less than 100%; and

b) an insurer meets the capital adequacy requirement at the higher solvency intervention level if—

i) at the company level, the CAR is not less than 100%; and

ii) the insurer satisfies paragraph 5.7 of the Notice

2.2.3 For the purposes of paragraph 2.2.1b)—

a) an insurer meets the fund solvency requirement at the lower solvency intervention level if at the adjusted fund level, the FSR is not less than 50%; and

b) an insurer meets the capital adequacy requirement at the lower solvency intervention level if—

i) at the company level, the CAR is not less than 50%; and

ii) MCR (excluding participating fund risk requirements) are fully met by -

(A) in the case of a locally incorporated insurer, CET1 Capital as defined in paragraph 5.6; or

(B) in other cases, the sum of the following components:

1. the aggregate of the surpluses of the assets over the liabilities of all insurance funds (other than a participating

fund) established and maintained under the Act by the insurer;

2. the balance in the surplus account of each participating fund; and

less the aggregate of the reinsurance adjustments of all insurance funds established and maintained under the Act by the insurer, any financial resource adjustment and any adjustment for asset concentration.

2.2.4 An insurer must ensure that for each insurance fund established and maintained by the insurer under the Act, the surplus (total assets less total liabilities) of the fund is not less than zero at all times.

3 VALUATION OF ASSETS AND LIABILITIES

3.1 Valuation of liabilities for life business

Valuation of Participating Policies

3.1.1 For the purposes of the Regulations, when calculating the value of expected future payments arising from "non-guaranteed benefits" of policies of a participating fund, an insurer must—

a) include projected future allocations to participating policies by way of bonuses, including dividends, under section 17(6)(b) of the Act;

b) include projected future allocations to the surplus account of the participating fund under section 17(6)(c) of the Act; and

c) take into account the policy assets of the participating fund and the insurer's internal policy on bonus allocation.

Valuation of Universal Life ("UL") Policies

3.1.2 An insurer must value the policy liability of a UL policy as the higher of the following amounts:

a) the value obtained by projecting the liability cash flows under the policy (including any provision for adverse deviation ("PAD") from the expected experience) at the minimum guaranteed crediting rate and discounted at the risk-free discount rate determined in accordance with paragraph 3.3.4, and 3.4.1 (which represents the liability for guaranteed benefits); and

b) the value obtained by projecting the liability cash flows under the policy (including any provision for adverse deviation ("PAD") from the expected experience) at the current crediting rate and discounted at the best estimate investment return determined in accordance with paragraph 3.3.3 (which represents the liability for total benefits).

[MAS Notice 133 (Amendment) 2020]

Valuation of Long-term Medical Policies

3.1.3 An insurer must value the liabilities in respect of a portfolio of long-term medical policies as the sum of the following components:

a) an amount which is adequate to cover the value of expected future payments less expected future receipts, and any PAD from the expected experience. An insurer must determine the term of projection of future

cash flows based on contract boundary considerations set out at paragraphs 3.1.4 to 3.1.5 below; and

b) the value of expected payments arising from claims which has already been incurred prior to the valuation date which must comprise reported but not settled ("RBNS") claims and incurred but not reported ("IBNR") claims, including any PAD from the expected experience.

Contract Boundary Considerations

3.1.4 An insurer must consider the boundary of an insurance contract when valuing a long-term medical policy, and must determine the boundary of the insurance contract as follows:

a) An insurer must treat cash flows as being within the boundary of the insurance contract if they arise from rights and obligations that exist during the period in which the insurer has a substantive obligation to provide the policyholder with the contracted insurance coverage or other services.

b) For the purposes of sub-paragraph a), a substantive obligation ends when all of the following criteria are satisfied:

(i) the insurer has the unconstrained practical ability to reassess the risks of the contract or a portfolio of contracts to which the contract that is being valued belongs, and, as a result, can set a price or level of benefits that fully reflects the reassessed risk of that contract or portfolio; and

(ii) the pricing of premiums for the coverage up to the date when risks are reassessed, do not reflect risks related to periods beyond the reassessment date.

c) In assessing whether the criteria in sub-paragraph b)(i) has been satisfied, an insurer must consider all the risks that it would normally consider when underwriting equivalent contracts on the renewal date for the remaining coverage.

d) An insurer must disclose the boundary of the insurance contract it has used in its valuation of a long-term medical policy, including its justification on how the criteria in sub-paragraph b)(i) has been satisfied, in every actuarial investigation report lodged with the Authority in accordance with section 37(1) of the Insurance Act.

e) The insurer must regularly assess if there is any change in circumstances that may affect its practical ability to reprice (per sub-paragraph b)(i)). Where an insurer assesses that there has been a change in circumstances, the insurer must revalue the portfolio based on the new boundary arising from the change in circumstances, from the next valuation date after such change.

Guidelines:

3.1. For instance, if the insurer foresees restrictions to such practical ability to reassess the risk and to set a price or level of benefits accordingly, it should then value the liabilities of the portfolio based on a longer term of projection (i.e. up to the natural expiry of the policies within the portfolio).

3.1.5 For medical riders attached to long-term medical policies, an insurer must determine the contract boundary in accordance with paragraph 3.1.4 save that the contract boundary of a rider must not be longer than that of the long-term medical policy the rider is attached to.

3.1.6 An insurer must compute the C1 requirement for long-term medical policies using the same contract boundary used by the insurer for the valuation of the liability of a long-term medical policy determined in accordance with paragraphs 3.1.4 and 3.1.5.

Valuation of Investment-Linked Policies

3.1.7 For the purpose of valuing the liability of an investment-linked policy, an insurer must project the unit reserves and value the non-unit reserves at the risk-free discount rate determined in accordance with paragraph 3.3.4 of this Notice. An insurer must also project the unit reserves and value the non-unit-reserves at the risk-free discount rate when providing the negative reserves for regulatory adjustment that is to be determined in accordance with sub-section C of **Appendix 5E**.

Guidelines:

*3.2. For guidelines on the valuation of policy liabilities relating to the life business of an insurer, refer to **Appendix 3A**.*

3.2A. For the information that should be disclosed in the actuarial investigation report lodged with the Authority in accordance with section 37(1) of the Insurance Act, refer to Guidelines on the Preparation of the Actuarial Investigation Report (ID 01/20).

[MAS Notice 133 (Amendment) 2020]

3.2 Valuation of liabilities for general business

Guidelines:

*3.3. For guidelines on the valuation of policy liabilities relating to the general business of an insurer, refer to **Appendix 3B**.*

3.3A. For the information that should be disclosed in the actuarial investigation report lodged with the Authority in accordance with section 37(1) of the Insurance Act, refer to Guidelines on the Preparation of the Actuarial Investigation Report (ID 01/20).

[MAS Notice 133 (Amendment) 2020]

3.3 Discount rates

Life business

3.3.1 An insurer must use the risk-free discount rate in determining —

a) the liability in respect of a non-participating policy;

b) the liability for guaranteed benefits of a UL policy;

c) the non-unit reserves of an investment-linked policy; and

d) the minimum condition liability of a participating fund.

3.3.2 An insurer must use the best estimate investment return as the discount rate in determining —

a) the liability in respect of a participating policy; and

b) the liability for total benefits in respect of a UL policy.

3.3.3 For the purposes of paragraph 3.3.2, an insurer must derive the best estimate investment return based on the expected investment return of policy assets in the case of 3.3.2a), and the expected investment return of assets backing the UL policies in the case of 3.3.2b).

3.3.4 An insurer must determine the risk-free discount rate in the manner specified in **Appendix 3C** of this Notice.

General business

3.3.5 For general insurance business—

a) an insurer need not carry out any discounting for liability durations of more than one year, if the insurer deems that the impact of discounting is not material; and

b) an insurer need not carry out any discounting for liability durations of one year or less.

3.3.6 Where an insurer carries out discounting for general insurance business, the insurer must use the same discount rates that would have been applicable for life business (except that the adjustments mentioned in sub-section 3.4 shall not apply).

Guidelines:

3.4. The Authority has provided a workbook ("Discount Rate Workbook") which can be used to generate the risk-free discount rates for SGD and USD denominated liabilities. The workbook may be used or modified to derive the risk-free discount rates for liabilities denominated in other currencies.

3.4 Adjustments to risk-free discount rates

3.4.1 For the purposes of sub-section 3.3, insurers that write direct life business or life reinsurance business may apply a positive adjustment in the form of a Matching Adjustment, and must apply a positive adjustment in the form of an Illiquidity Premium, to the spot risk-free discount rates, in accordance with this sub-section. The adjustments are not applicable for general business.

Applicability of Matching Adjustment ("MA") and Illiquidity Premium ("IP")

3.4.2 Subject to paragraph 3.4.3—

a) an insurer may apply a MA where all the conditions in the first column of Table 3A are satisfied; and

b) an insurer must apply an IP where all the conditions in the second column of Table 3A are satisfied, unless a MA has been applied.

Table 3A: Applicability of MA and IP

	First column	*Second column*
	MA	**IP**
(a) Applicable Type of insurers or Business	Life business written by a direct life insurer	Life business written by a direct life insurer and reinsurer
(b) Applicable Currencies	Liabilities denominated in SGD or USD	
(c) Applicable Products	All products that meet the eligibility criteria in **Appendix 3D**, with the exception of investment-linked policies ("ILPs")	For direct life business, non-ILPs which are classified as Whole Life, Endowment, or Annuity in Form L6 as set out in MAS Notice 129 For life reinsurance business, IPs shall only apply for reinsurance arrangements which exhibit similar characteristics as the direct life insurance products eligible for IP
(d) Applicable Insurance Funds	Participating Fund and Non-participating Fund	

3.4.3 Where an insurer applies a MA or IP to the spot risk-free discount rate used for the purpose of valuing a product, an insurer may apply either the MA or IP, but must not apply both a MA and IP at the same time.

3.4.4 Where a reinsurer applies IP to its life reinsurance business, the reinsurer must, upon the Authority's request, provide the Authority with documentary evidence of how the reinsurance arrangement in respect of which IP is applied, exhibits similar characteristics as direct life insurance products eligible for IP.

Matching Adjustment

3.4.5 An insurer must not—

a) use a MA on a MA portfolio; or

b) use a MA on a MA portfolio, in respect of which the insurer has previously obtained the Authority's approval to use a MA—

(i) where the insurer adds a product (which was not previously included in the portfolio) to the MA portfolio; or

(ii) where the insurer adds an asset class (which was not previously included in the portfolio) into the MA portfolio,

without the written approval of the Authority.

Guidelines:

3.5. For example, written approval from the Authority is required before a derivative can be included into a MA portfolio which only has plain vanilla bonds.

3.4.6 An insurer who desires to use a MA on a MA portfolio in the circumstances described in paragraph 3.4.5 must apply in writing to the Authority for approval and must comply with the submission requirements set out in **Appendix 3F**.

3.4.7 Upon receiving an application under paragraph 3.4.6, the Authority will consider the application, including how the MA portfolio satisfies the conditions in **Appendix 3D** and the governance requirements on the use of MA as set out in **Appendix 3E**, and may grant approval to the insurer with or without conditions (including but not limited to a condition requiring the insurer to provide the Authority information or documents on a periodic basis), or refuse to grant approval.

3.4.8 The Authority may at any time revoke any approval given to an insurer under paragraph 3.4.7.

3.4.9 Where the Authority has granted approval under paragraph 3.4.7, the insurer must immediately notify the Authority when it becomes aware that it has failed, or is likely to fail, to comply with any condition in **Appendix 3D**, any governance requirement in **Appendix 3E** or any additional condition imposed by the Authority under paragraph 3.4.7. To avoid doubt, providing notification under this paragraph to the Authority does not preclude the insurer from complying with paragraph 3.4.11.

Guidelines:

3.6. For the purpose of determining the MA, the Authority has provided a workbook ("MA workbook"), but insurers can perform their own calculations that can produce similar results.

3.4.10 An insurer must update the MA and ensure the MA portfolio continues to satisfy the criteria in **Appendix 3D** each calendar quarter at the minimum, subject to sub-paragraph (8) of **Appendix 3D**.

3.4.11 Where an insurer that applies a MA is no longer able to comply with any condition in **Appendix 3D**, any governance requirement in **Appendix 3E** or any additional condition imposed by the the Authority under paragraph 3.4.7, it must take the necessary steps to restore compliance with the conditions or requirements as the case may be within a period of three months. Where an insurer is not able to restore compliance with the conditions or requirements within a period of three months, the insurer must cease applying the MA for all the products in the MA portfolio. Where an insurer thereafter desires to apply a MA to any product in that MA portfolio, the insurer must reapply for the Authority's written approval in accordance with paragraph 3.4.6 and may only reapply for the Authority's approval 24 months after ceasing to apply MA for the products in the MA portfolio.

3.4.12 Where an insurer elects to cease to apply a MA to any product in the MA portfolio, the insurer must not revert to applying a MA in respect of that product unless the insurer has reapplied for the Authority's written approval in accordance with paragraph 3.4.6. The insurer may only reapply for the Authority's approval 24 months after ceasing to apply MA for that product in the MA portfolio.

3.4.13 Where an insurer ceases to apply MA to a particular product, the insurer must apply an IP to that product if all the conditions in the second column of Table 3A are satisfied.

3.4.14 The insurer must ensure that the MA is floored at the IP determined based on the asset allocation of the MA portfolio. An insurer must determine the IP floor as the IP determined based on the asset allocation of the MA portfolio.

3.4.15 Where the MA before the application of paragraph 3.4.14 is less than the IP floor, the modified MA ("MA'") that is used to determine the C2 credit spread risk requirement must be reduced by the difference between the MA before the

application of paragraph 3.4.14 and the IP floor, subject to MA' not being less than zero.

Guidelines:

3.7. The flooring of the MA has been built into the MA workbook.

Illiquidity Premium

3.4.16 An insurer must apply IP to a product where all of the following conditions are satisfied:

a) all the conditions in the second column of Table 3A are satisfied; and

b) the insurer does not apply MA to that product.

3.4.17 An insurer must determine IP in accordance with **Appendix 3G**.

Guidelines:

3.8. Insurers may use the Discount Rate Workbook provided by the Authority to generate the spot discount rates which incorporate the MA or IP. Instructions on how this can be done is provided in the workbook. Alternatively insurers can perform their own calculations.

Impact of MA and IP on risk requirements and regulatory adjustment

3.4.18 When computing the C1, C2 (other than the C2 credit spread risk requirement) and operational risk requirements as well as any negative reserves recognised as regulatory adjustment[1], an insurer must include the MA and IP in the discount rates used to determine the risk requirements. Likewise, an insurer must include MA and IP in the discount rates for the minimum condition liability of the participating fund used to calculate the allowance for provision for non-guaranteed benefits[2] of a participating fund.

Treatment of Diversification

3.4.19 An insurer must explicitly identify and separately manage the assets and liabilities within each MA portfolio from the other assets in the insurance fund, to ensure that the assets of the MA portfolio are not exposed to the risk of forced sale to support liabilities other than that within the MA portfolio. An insurer must limit

[1] As defined in Section 5 of this Notice.

[2] As defined in Section 5 of this Notice.

the benefits of diversification for each MA portfolio to diversification within the MA portfolio only.

Guidelines:

3.9. The limitation of the diversification benefit for each MA portfolio has been taken into account in the RBC 2 Main Workbook provided by the Authority.

4 TOTAL RISK REQUIREMENT

4.1 Calculation of total risk requirement ("TRR")

4.1.1 An insurer must determine the total risk requirement for:

a) each of the adjusted fund; and

b) at the company level of the insurer

4.1.2 Within an adjusted fund, an insurer must calculate its diversified C1 and C2 requirements for each non-diversifiable portfolio as follows:

$$Diversified\ C1\ and\ C2\ requirements = \sqrt{C1^2 + C2^2}$$

where

- C1 denotes C1 Insurance Risk Requirement as set out in sub-section 4.2
- C2 denotes C2 Asset Risk Requirement as set out in sub-section 4.3

4.1.3 For the purposes of paragraph 4.1.2, an insurer must treat each MA portfolio as non-diversifiable to each other and from the rest of the adjusted fund which is not subject to matching adjustments.

4.1.4 An insurer must calculate the total risk requirement of an adjusted fund by aggregating the total risk requirements of all non-diversifiable portfolios in the same fund and operational risk requirement of the adjusted fund, as follows:

$$TRR = \sum_i \sqrt{C1^2 + C2^2} + ORR$$

where

- $\sqrt{C1^2 + C2^2}$ is calculated according to paragraph 4.1.2 for each non-diversifiable portfolio i where i = 1, 2, 3...
- ORR denotes Operational Risk Requirement as set out in sub-section 4.4

Guidelines:

4.1 A schematic diagram of all relevant risk requirements under C1, C2 and ORR are summarised in ***Appendix 4-I.***

4.1.5 Subject to paragraph 4.3.1.5, an insurer must calculate the total risk requirement by aggregating –

a) the total risk requirements of every adjusted fund; and

b) where the insurer is an insurer incorporated in Singapore, the total risk requirements arising from assets and liabilities that do not belong to any insurance fund established and maintained under the Act (including assets and liabilities of any of the insurer's branches located outside Singapore).

4.1.6 In the calculation of the total risk requirement, an insurer must not include the following items:

a) Subject to paragraph 4.3.1.8, in the case of an investment-linked fund, the part of the fund relating to the unit reserves of the policies of the fund, except for the determination of the operational risk requirement;

b) in the case of a reinsurer incorporated outside of Singapore, any insurance fund established and maintained under the Act by a reinsurer in respect of offshore policies;

c) in the case of a reinsurer incorporated in Singapore and headquartered outside of Singapore, the C2 and operational risk requirements —

(i) of any insurance fund established and maintained under the Act in respect of offshore policies; and

(ii) arising from the assets and liabilities of any of its branches located outside of Singapore; and

d) the C2 requirements arising from reinsurers' share of policy liabilities, premium liabilities and claim liabilities respectively.

[MAS Notice 133 (Amendment) 2020]

4.1.7 In the case of an insurer incorporated in Singapore, in determining the total risk requirements for assets and liabilities that do not belong to any insurance fund established and maintained under the Act, an insurer must determine the value of such assets and liabilities (including that arising from insurance business) in accordance with Parts IV and V of the Regulations.

4.1.8 An insurer must value the contribution to the total risk requirements of any asset excluded from the financial resources of the insurer as zero. To avoid doubt, an insurer must exclude from the calculation of C2 requirement, any asset or part of an asset that causes an insurer's adjustment for asset concentration, as defined in Section F of **Appendix 5E**, to increase.

Guidelines:

*4.2 For schematic view of how the Total Risk Requirements are calculated for an insurer, refer to **Appendix 4-II**. For schematic views of how the C1 and C2 requirements are aggregated, refer to **Appendices 4-III and 4-IV respectively.** For schematic overview of applicability of RBC 2, refer to **Appendix 4-V**.*

[MAS Notice 133 (Amendment) 2020]

4.2 C1 Requirement

4.2.1 Subject to paragraph 4.2.39, an insurer must determine the C1 requirement of an adjusted fund in the following manner:

a) where the insurance fund within the adjusted fund is established and maintained in respect of the life business of an insurer, the insurer must determine the C1 requirement in the manner as provided in paragraphs 4.2.3 to 4.2.28; and

b) where the insurance fund within the adjusted fund is established and maintained in respect of the general business of an insurer, the insurer must determine the C1 requirement in the manner as provided in paragraphs 4.2.29 to 4.2.35; and

c) where the adjusted fund comprises both life and general business, the insurer must ensure that the C1 requirement takes into account the diversification benefits allowed between the life and general business as provided in paragraphs 4.2.36 to 4.2.38.

4.2.2 Subject to paragraphs 4.2.3 to 4.2.39, an insurer incorporated in Singapore must determine the C1 requirement arising from any insurance business of the insurer that does not belong to any insurance fund established and maintained under the Act in the same manner as its insurance business relating to an insurance fund established and maintained under the Act.

C1 Requirement – Life Business

4.2.3 In the case of an insurer other than a reinsurer incorporated in Singapore and headquartered outside of Singapore, the insurer must calculate the C1 requirement of an adjusted fund in respect of life business as the policy liability risk requirement, and must calculate the policy liability risk requirement in accordance with paragraph 4.2.5.

[MAS Notice 133 (Amendment) 2020]

4.2.4 In the case of a reinsurer incorporated in Singapore and headquartered outside of Singapore, the reinsurer must calculate the C1 requirement in respect of life business as follows:

a) in relation to an adjusted fund that relates to Singapore policies and in relation to assets and liabilities that do not belong to any insurance fund established and maintained under the Act (excluding the assets and liabilities of any of the reinsurer's branches located outside of Singapore), the reinsurer must calculate the C1 requirement as the amount equivalent

to the policy liability risk requirement calculated according to paragraph 4.2.5.

b) in relation to an adjusted fund that relates to offshore policies, the reinsurer must calculate the C1 requirement as the higher of the following amounts:

(i) the difference between –

A. a modified liability in respect of the policies of the fund, determined as —

(AA) the product of the liability (net of reinsurance) in respect of the policies of the fund determined in the manner provided in regulation 20 of the Regulations and 110%; or

(AB) the sum of the liability (net of reinsurance) in respect of the policies of the fund determined in the manner provided in regulation 20 of the Regulations and $5 million,

whichever is the higher; and

B. the liability (net of reinsurance) in respect of the policies of the fund determined in the manner provided in regulation 20 of the Regulations; and

(ii) zero.

c) in relation to the assets and liabilities of any of the reinsurer's branches located outside of Singapore, the reinsurer must calculate the C1 requirement in respect of life business as the higher of the following amounts:

(i) the difference between –

A. a modified liability in respect of policies written by the branches located outside of Singapore, determined as —

(AA) the product of the liability (net of reinsurance) in respect of policies written by the branches located outside of Singapore determined in the manner provided in regulation 20 of the Regulations and 110%; or

(AB) the sum of the liability (net of reinsurance) in respect of policies written by the branches located outside of Singapore determined in the manner provided in regulation 20 of the Regulations and $5 million,

whichever is the higher; and

B. the liability (net of reinsurance) in respect of policies written by the branches located outside of Singapore determined in the manner provided in regulation 20 of the Regulations; and

(ii) zero.

4.2.5 Subject to paragraph 4.2.6, an insurer must calculate the policy liability risk requirement in respect of life business of an adjusted fund in accordance with paragraph 4.2.7 below.

4.2.6 Where there is a MA portfolio within an adjusted fund, an insurer must calculate the policy liability risk requirement for each MA portfolio separately, in accordance with paragraph 4.2.7 below.

4.2.7 An insurer must calculate the policy liability risk requirement of—

a) the life business of an adjusted fund (excluding any MA portfolio within the same adjusted fund); and

b) a MA portfolio—

as the higher of—

c) the difference between –

(i) diversified C1 requirement for life business calculated according to paragraphs 4.2.18 to 4.2.28; and

(ii) any provision made for any adverse deviation ("PAD") from the expected experience in respect of policies of the fund, where —

(A) PAD must be determined in the same manner in which liability (net of reinsurance) is determined under regulation 20(1) of the Regulations, in the case of a non-participating policy, and regulation 20(2) of the Regulations, in the case of an investment-linked policy; and

(B) PAD must be determined in the manner consistent with the minimum condition liability of the fund, in the case of a participating policy; and

d) zero.

Guidelines:

4.3 For guidelines on determining PAD, refer to ***Appendix 3A****.*

Homogeneous Risk Grouping

4.2.8 An insurer may group policies into homogeneous risk groups ("HRGs") for the purpose of calculating C1 requirement for life business in accordance with paragraphs 4.2.18 to 4.2.28, instead of performing the calculations at each policy level.

4.2.9 For the purposes of paragraph 4.2.8, an HRG refers to a collection of policies with similar risk characteristics, where the risks refer to the risks covered under C1 requirement for life business.

4.2.10 An insurer must consider the appropriate manner to group policies into HRGs and must exercise prudence in respect of the granularity of policy groupings.

Guidelines:

4.4 HRGs are expected to be reasonably stable over time, and not give rise to material change in C1 requirement between reporting periods.

4.5 The more homogeneous the policy groupings, the lesser the extent of offsetting effects between policies for any particular risk. An insurer should ensure that majority of policies within the same HRG is susceptible to the same direction of C1 shocks such that the extent of offsetting effects between policies in the HRG is not material.

4.2.11 In grouping the policies into HRGs, the insurer must at the minimum, consider the following factors:

- Underwriting policy
- Risk profile of policyholders
- Product features, in particular guarantees
- Future management actions

4.2.12 An insurer must group policies that are more susceptible to mortality risks separately from those which are more prone to longevity risks.

Guidelines:

4.6 Policies with high death benefits that are more susceptible to mortality risks should be grouped separately from policies such as annuities, long-term care policies, policies with high survival benefits that are more susceptible to longevity risks.

4.2.13 An insurer must assess the lapse behavior and risks of every policy based on its product features and group policies with similar lapse behavior and risks together.

Guidelines:

4.7 Policies with more guarantees may be at a greater risk of having lower than expected lapse rates, while policies with high surrender benefits may face greater risk when there are higher than expected lapse rates. Policies expected to have different lapse behaviour and risks should be grouped separately.

4.2.14 Within the adjusted fund, an insurer must not group policies belonging to different insurance funds established and maintained under the Act into the same HRG.

4.2.15 An insurer must group policies in the Participating Funds (or Sub-Funds) according to the risk sharing rules allowed by the insurer's internal participating fund governance policy for the various risks covered under C1 requirement in 4.2.18.

4.2.16 To avoid doubt, an insurer must continue to perform the valuation of liability at each policy level. The insurer must only group policies into HRGs for the sole purpose of computation of C1 requirement in paragraphs 4.2.18 to 4.2.28.

Guidelines:

4.8 Below illustrates an example of computing risk requirement for a particular C1 life insurance risk for a HRG:

Assuming there are only 4 policies in a HRG:

A HRG	Liability value before the application of prescribed shock for a life insurance risk	Liability value after the application of prescribed shock for a life insurance risk	Change in liability value
	Column A	Column B	[B] – [A]
Policy 1	100	120	20
Policy 2	80	95	15
Policy 3	120	115	-5
Policy 4	100	120	20
Total	**400**	**450**	**50**

Risk requirement for the particular C1 life insurance risk for the above HRG is 50. If there is no HRG concept, the risk requirement would be 55.

4.2.17 An insurer must review the appropriateness of the basis on which policies are grouped into HRGs regularly and at least once a year. The insurer must:

a) disclose and justify the basis; and

b) disclose and explain any material financial impact arising from any change in the basis from the previous accounting period;

in every actuarial investigation report lodged with the Authority in accordance with section 37(1) of the Act.

Diversified C1 requirement for life business

4.2.18 To derive the diversified C1 requirement in respect of life business of an adjusted fund (excluding any MA portfolio within the same adjusted fund) and of a MA portfolio, an insurer must first determine the following for each HRG within the adjusted fund:

a) the life insurance risk requirements for all of the following life insurance risks:

(i) Mortality

(ii) Longevity

(iii) Disability

(iv) Dread disease

(v) Other insured events (Accident & Health)

(vi) Expense

(vii) Conversion of options,

in accordance with paragraph 4.2.19;

b) the life insurance risk requirement for lapse risk, in accordance with paragraph 4.2.21;

c) the life insurance risk requirement for insurance catastrophe risk, in accordance with paragraph 4.2.24.

Life insurance risks (excluding lapse risk and catastrophe risk)

4.2.19 For each of the life insurance risks mentioned in paragraph 4.2.18a), an insurer must calculate the risk requirement for an HRG as –

a) the difference between –

(i) the sum of the liability of the policies within the HRG after applying the prescribed shock in accordance with Table 4A below, net of reinsurance; and

(ii) the sum of the liability of the policies within the HRG before applying the prescribed shock, net of reinsurance; or

b) zero,

whichever is higher.

4.2.20 For the purposes of paragraph 4.2.19a),

a) an insurer must determine liability in the following manner:

(i) For a non-participating policy (except for a UL policy) and investment-linked policy, an insurer must determine liability in the same manner in which liability (net of reinsurance) is determined under regulation 20(1) and 20(2) of the Regulations respectively, but must not include any PAD;

(ii) For an investment-linked policy, an insurer must not include the unit reserves;

(iii) For a participating policy, an insurer must determine liability in the same manner in which minimum condition liability is determined but must not include any PAD;

(iv) In the case of a UL policy, an insurer must determine liability as the liability for guaranteed benefits but must not include any PAD, and must determine liability subject to regulation 20(4) of the Regulations; and

(v) an insurer must determine the risk-free discount rates in accordance with **Appendix 3C** of this Notice and must include any adjustment for illiquidity premium or matching adjustment where applicable.

b) an insurer must determine prescribed shock as an increase of x% to the best estimate assumption of the life insurance risk used in deriving the liability in paragraph 4.2.19a),where x% is as follows:

Table 4A: Risk requirements for life insurance risks (excluding lapse risk and catastrophe risk)

Life insurance risks	X%
Mortality	+20% to best estimate mortality rates where the payment of benefits is contingent on mortality risk
Longevity	-25% to best estimate mortality rates where the payment of benefits is contingent on longevity risk
Disability	+20% to best estimate disability rates where the payment of benefits is contingent on disability risk
Dread Disease	+40% to best estimate rates during periods where premium rates are guaranteed and where the payment of benefits is contingent on dread disease risk; +30% to best estimate rates during periods where premium rates are not guaranteed, and where the payment of benefits is contingent on dread disease risk. For limited pay policy where premium payment term is shorter than the full term of the policy, an insurer must apply the +40% shock where the premium payment term has ended as there are no further premium receipts after that.
Other Insured Events (Accident & Health)	+40% to best estimate rates during periods where premium rates are guaranteed and +30% to best estimate rates during periods where premium rates are not guaranteed
Expense	+20% in first year and +10% thereafter to the insurer's best estimate assumptions for expenses (including expense inflation)
Conversion of Options	+50% on best estimate conversion rates (for options provided to the policy owner) or -50% on best estimate conversion rates, whichever produces a higher liability

Lapse risk

4.2.21 For lapse risk stated in paragraph 4.2.18b), an insurer must determine the risk requirement for an HRG as–

a) The highest of the following amounts:

(i) the difference between –

A. the sum of the liability of the policies within the HRG after applying the prescribed shock of an increase of 50% to the best

estimate assumption for lapse risk used in deriving the liability, net of reinsurance; and

B. the sum of the liability of the policies within the HRG before applying the prescribed shock, net of reinsurance;

(ii) the difference between –

A. the sum of the liability of the policies within the HRG after applying the prescribed shock of a decrease of 50% to the best estimate assumption for lapse risk used in deriving the liability, net of reinsurance; and

B. the sum of the liability of the policies within the HRG before applying the prescribed shock, net of reinsurance;

(iii) mass lapse risk requirement that is to be calculated for all policies which provide cash value upon surrender in the following manner:

A. for policies belonging to individual life business, the following formula shall apply -

an immediate surrender of 30% of policies such that the mass lapse risk requirement is 30% X Maximum [(aggregate surrender value less policy liability of the policies in the HRG), 0]; and

B. for policies belonging to group life business the following formula shall apply -

an immediate surrender of 50% of policies such that the mass lapse risk requirement is 50% X Maximum [(aggregate surrender value less policy liability of the policies in the HRG), 0] ; or

b) zero,

whichever is higher.

4.2.22 For the purposes of paragraph 4.2.21a)(iii), an insurer must determine policy liability (net of reinsurance) in accordance with regulation 20 of the Regulations.

Guidelines:

4.9 Lapse risk is the risk of loss or change in liabilities due to a change in the expected exercise rates of policyholder options. This risk takes into account all legal and contractual policyholder contractual options which can significantly change the value of future cash flows.

Lapse risk includes options to fully or partly terminate, surrender, renew, extend, reduce or increase insurance coverage as well as reduction or suspension of premium payments and changes in take up options such as annuitisation options.

As such, an insurer should consider the type of options for the upward shock or downward shock in paragraphs 4.2.21*a)(i) and (ii) appropriately. For example, where the option allows for an increase in insurance cover (e.g. extension of cover), the +50% should be applied to the rate that would apply if the option is not taken up under the upward shock scenario. As a rule of thumb, the +50% shock is meant to be applied in a manner that increases lapses and the -50% is meant to be applied in a manner that decreases lapses.*

4.2.23 For the purposes of paragraphs 4.2.21a)(i) and (ii), an insurer must determine liability in the following manner:

a) For a non-participating policy and investment-linked policy, an insurer must determine liability in the same manner liability (net of reinsurance) is determined under regulation 20(1) and 20(2) of the Regulations respectively, but must not include any PAD;

b) For an investment-linked policy, an insurer must not include the unit reserves;

c) For a participating policy, an insurer must determine liability in the manner minimum condition liability is determined but must not include any PAD;

d) In the case of a UL policy, an insurer must determine liability as the liability for guaranteed benefits but must not include any PAD, and must determine liability subject to regulation 20(4) of the Regulations; and

e) an insurer must determine the risk-free discount rates in accordance with **Appendix 3C** of this Notice and must include any adjustment for illiquidity premium or matching adjustment where applicable.

Life insurance catastrophe risk

4.2.24 For insurance catastrophe risk stated in paragraph 4.2.18c), an insurer shall apply this to policies which are contingent on mortality risk and an insurer must calculate the risk requirement for an HRG as –

a) the difference between –

(i) the total death benefit payable after applying the prescribed shock of an absolute increase in the rate of policyholders dying over the following year of 1 per 1000; and

(ii) any reduction in policy liability due to lesser number of policies remaining within the HRG after the prescribed shock in sub-paragraph (i) above, or

b) zero,

whichever is higher.

4.2.25 For the purposes of calculating insurance catastrophe risk requirement in paragraph 4.2.24, an insurer must take into account the effect of reinsurance where applicable.

Guidelines:

4.10 Where it is appropriate, an insurer should account for outstanding incurred claims and IBNR claims ("claim liabilities") in determining the liability of a policy in its life business. If there is risk of uncertainty in the best estimate value of the claim liabilities, the insurer should include such risks in the calculation of C1 requirement. The prescribed shocks to apply depend on the type of risks involved. For instance, if there is uncertainty in future expenses expected in settling the claims (that form part of the claim liabilities), the insurer should apply the prescribed shocks for expense in determining the amount of C1 requirement.

Other requirements

4.2.26 Subject to paragraph 4.2.27 below, an insurer must sum up the risk requirements for each life insurance risk mentioned in paragraph 4.2.18a) to c) across the HRGs within an adjusted fund.

4.2.27 Where there is a MA portfolio within the adjusted fund, an insurer must ensure that the benefits of diversification for each MA portfolio is limited to diversification within the MA portfolio only (according to paragraph 3.4.19). Hence, for the purposes of paragraph 4.2.26 above, an insurer must sum up the risk requirements for each life insurance risk mentioned in paragraph 4.2.18a) to c) separately for each MA portfolio and must not include the risk requirements of the HRGs formed outside the MA portfolio.

4.2.28 An insurer must calculate the diversified C1 requirement for life business for each adjusted fund (excluding the MA portfolios within the same adjusted fund) and for each MA portfolio as follows–

$$\sqrt{\sum CorrLife_{r,c} \times Life_r \times Life_c}$$

where

$CorrLife_{r,c}$= the entries of the correlation matrix in Table 4B below; and

$Life_r$, $Life_c$= Risk Requirement for each life insurance risk, calculated based on paragraph 4.2.18, according to the rows and columns of correlation matrix in Table 4B below

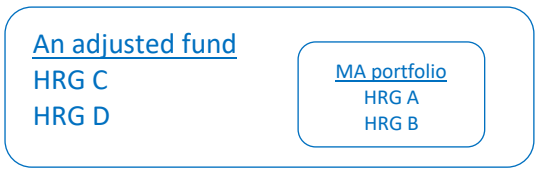
Table 4B: Correlation matrix to derive the diversified C1 requirement for life business

	Mortality	Longevity	Disability	Morbidity	Other Insured Event	Catastrophe	Expense	Lapse	Conversion of Options
Mortality	1	-0.25	0.25	0.50	0.50	0.25	0.25	0.00	0.00
Longevity	-0.25	1	0.00	0.25	0.25	0.00	0.25	0.25	0.25
Disability	0.25	0.00	1	0.50	0.50	0.25	0.50	0.00	0.00
Morbidity	0.50	0.25	0.50	1	0.50	0.50	0.50	0.00	0.00
Other Insured Event	0.50	0.25	0.50	0.50	1	0.75	0.50	0.00	0.00
Catastrophe	0.25	0.00	0.25	0.50	0.75	1	0.25	0.25	0.25
Expense	0.25	0.25	0.50	0.50	0.50	0.25	1	0.50	0.50
Lapse	0.00	0.25	0.00	0.00	0.00	0.25	0.50	1	0.00
Conversion of Options	0.00	0.25	0.00	0.00	0.00	0.25	0.50	0.00	1

Guidelines:

4.11 Example of calculating diversified C1 requirement for life business of an adjusted fund:

Assuming there is one MA portfolio within an adjusted fund, and for simplicity, there are only two insurance risks (mortality and expense) within the adjusted fund. Strictly for illustration purpose, it is assumed there are 2 HRGs within the MA portfolio (HRG A and HRG B) and 2 HRGs within the rest of the adjusted fund (HRG C and HRG D).



For the MA portfolio,

$Life_{mortality}$ for HRG A =55, $Life_{mortality}$ for HRG B = 45

Hence, $Life_{mortality}$ for the MA portfolio = 55 + 45 = 100, where $Life_{mortality}$ is the mortality risk requirement for life business.

$Life_{expense}$ for HRG A =20, $Life_{expense}$ for HRG B = 15
Hence, $Life_{expense}$ for the MA portfolio = 20 + 15 = 35, where $Life_{expense}$ is the expense risk requirement for life business.

Diversified C1 requirement for the MA portfolio = $\sqrt{100^2 + 2 \times (0.25 \times 100 \times 35) + 35^2}$ = 113.91

For the rest of the adjusted fund, excluding the MA portfolio:
$Life_{mortality}$ for HRG C =120, $Life_{mortality}$ for HRG D = 60
Hence, $Life_{mortality}$ for the adjusted fund excluding the MA portfolio = 120 + 60 = 180, where $Life_{mortality}$ is the mortality risk requirement for life business.

$Life_{expense}$ for HRG C =40, $Life_{expense}$ for HRG D = 25
Hence, $Life_{expense}$ for the adjusted fund excluding the MA portfolio = 40 + 25 = 65, where $Life_{expense}$ is the expense risk requirement for life business.

Diversified C1 requirement for the adjusted fund excluding the MA portfolio
= $\sqrt{180^2 + 2 \times (0.25 \times 180 \times 65) + 65^2}$ = 206.09

C1 Requirement - General Business

4.2.29 In the case of an insurer other than a reinsurer incorporated in Singapore and headquartered outside of Singapore, the insurer must calculate the C1 requirement of an adjusted fund in respect of general business as the sum of —

a) premium liability risk requirement calculated in accordance with paragraphs 4.2.31 and 4.2.32; and

b) claim liability risk requirement calculated in accordance with paragraphs 4.2.33 and 4.2.34.

[MAS Notice 133 (Amendment) 2020]

Guidelines:

4.12 The general insurance catastrophe risk requirement is currently being calibrated by an industry workgroup and will be incorporated within the computation of the C1 requirement when finalised.

The Authority will separately consult on the calibration of the general insurance catastrophe risk requirement and will give industry sufficient notice before introducing the risk requirement. Industry has already been informed that the general insurance catastrophe risk requirement will be introduced no earlier than 1 January 2021.

4.2.30 In the case of a reinsurer incorporated in Singapore and headquartered outside of Singapore, the reinsurer must calculate the C1 requirement in respect of general business as follows:

a) in relation to an adjusted fund that relates to Singapore policies and in relation to assets and liabilities that do not belong to any insurance fund established and maintained under the Act (excluding the assets and liabilities of any of the reinsurer's branches located outside of Singapore), the reinsurer must calculate the C1 requirement as the sum of —

(i) the premium liability risk requirement calculated in accordance with paragraphs 4.2.31 and 4.2.32; and

(ii) the claim liability risk requirement calculated in accordance with paragraphs 4.2.33 and 4.2.34;

b) in relation to an adjusted fund that relates to offshore policies, the reinsurer must calculate the C1 requirement as the highest of the following amounts:

(i) $5 million;

(ii) 10% of the net premiums written by the fund in the preceding accounting period; and

(iii) 10% of the claim liabilities (net of reinsurance) relating to the fund as at end of the preceding accounting period; and

c) in relation to the assets and liabilities of any of the reinsurer's branches located outside of Singapore, the reinsurer must calculate the C1 requirement as the highest of the following amounts:

(i) $5 million;

(ii) 10% of the net premiums written by the branches located outside of Singapore in the preceding accounting period; and

(iii) 10% of the claim liabilities (net of reinsurance) relating to the branches located outside of Singapore as at end of the preceding accounting period.

4.2.31 For each volatility category, an insurer must calculate the premium liability risk requirement for that category as —

a) the product of —

(i) the premium liability risk factor for that volatility category set out in **Appendix 4A**; and

(ii) the unexpired risk reserves (net of reinsurance) determined in the manner provided in regulation 19(1)(a)(ii) of the Regulations relating to that volatility category,

less the premium liability (net of reinsurance) relating to that volatility category; or

b) zero,

whichever is the higher.

4.2.32 An insurer must calculate the premium liability risk requirement of the insurance fund as the aggregate of the premium liability risk requirements for each volatility category.

4.2.33 For each volatility category, an insurer must calculate the claim liability risk requirement for that category as —

a) the product of —

(i) the claim liability risk factor for that volatility category set out in **Appendix 4A**; and

(ii) the claim liabilities (net of reinsurance) determined in the manner provided in regulation 19(1)(b) of the Regulations relating to that volatility category, excluding such claim liabilities (net of reinsurance) arising from any policy which the maximum loss that may be incurred under the policy is already provided for,

less the claim liabilities (net of reinsurance) relating to that volatility category (excluding such claim liabilities (net of reinsurance) arising from any policy which the maximum loss that may be incurred under the policy is already provided for); or

b) zero,

whichever is the higher.

4.2.34 An insurer must calculate the claim liability risk requirement of the insurance fund as the aggregate of the claim liability risk requirements for each volatility category.

4.2.35 For the purposes of paragraphs 4.2.31 to 4.2.34, "volatility category" refers to the grouping of business lines in accordance with Tables 2 and 3 of **Appendix 4A**, or any other grouping that the Authority may allow in respect of any particular insurer.

Diversification of C1 Requirement between Life and General Business

4.2.36 Subject to paragraphs 4.2.37 and 4.2.38, an insurer must recognise diversification benefits when summing the C1 requirement for life and general (excluding Accident and Health) business where the insurer is licensed to carry both life business and general business. An insurer must calculate the C1 requirement for an adjusted fund which comprises both life and general business, taking into account of diversification, as follows:

$$\sqrt{C1_{life}^2 + C1_{general\ excluding\ A\&H}^2} \quad + \quad C1_{general\ (A\&H\ only)}$$

where $C1_{life}$ is the C1 requirement for life business determined in the manner provided for in paragraphs 4.2.3 to 4.2.28;

$(C1_{general\ excluding\ A\&H})$ is the C1 requirement for general business excluding accident and health business determined in the manner provided for in paragraphs 4.2.29 to 4.2.35;

$(C1_{general\ (A\&H\ only)})$ is the C1 requirement for general business for accident and health business only determined in the manner provided for in paragraphs 4.2.29 to 4.2.35.

4.2.37 An insurer may diversify the C1 requirement for life business with the C1 requirement for general business if capital is fungible between the insurance funds established and maintained under the Act. To avoid doubt, an insurer must not diversify the C1 requirement for participating funds with the C1 requirement of other businesses.

4.2.38 Where there is a MA portfolio within the life business of an adjusted fund, an insurer must not diversify the C1 requirement for the MA portfolio with the C1 requirement for the insurer's general business.

Alternative method of calculating C1

4.2.39 An insurer may use any alternative method to calculate the C1 requirement provided that the method results in a C1 requirement which is no less than that determined in the manner provided in this notice and in such a case, the Authority may require the insurer to provide documentary evidence of that fact.

4.3 C2 Requirement

4.3.1 An insurer must determine the C2 requirements of:

a) an adjusted fund; and

b) where the insurer is an insurer incorporated in Singapore, assets and liabilities that do not belong to any insurance fund established and maintained under the Act (including assets and liabilities of any of the insurer's branches located outside Singapore)

in the following manner:

[MAS Notice 133 (Amendment) 2020]

4.3.1.1 An insurer must use the following formula to derive the diversified C2 requirements:

$$C2 = C2_{misc} + \sqrt{C2_{market}^2 + C2_{default}^2 + 2 \times Corr_{m,d} \times C2_{market} \times C2_{default}}$$

where

$Corr_{m,d}$ = 0.5

$C2_{market}$ = Market-related C2 requirements (described below)

$C2_{default}$ = C2 Counterparty Default risk requirement

$C2_{misc}$ = C2 Miscellaneous risk requirement

4.3.1.2 For the purposes of paragraph 4.3.1.1, market-related C2 requirements refer to all of the following:

- Equity investment risk requirement
- Interest rate mismatch risk requirement
- Credit spread risk requirement
- Property investment risk
- Foreign currency mismatch risk requirement

4.3.1.3 Subject to paragraph 4.3.1.12, an insurer must calculate the C2 requirement for the following risk requirements in accordance with the respective subsections:

a) the equity investment risk requirement calculated in accordance with subsection 4.3.2;

b) the interest rate mismatch risk requirement calculated in accordance with subsection 4.3.3;

c) the credit spread risk requirement calculated in accordance with subsection 4.3.3;

d) the property investment risk requirement calculated in accordance with subsection 4.3.4;

e) the foreign currency mismatch risk requirement calculated in accordance with subsection 4.3.5;

f) the counterparty default risk requirement calculated in accordance with subsection 4.3.6;

g) the miscellaneous risk requirement calculated in accordance with subsection 4.3.7.

4.3.1.4 An insurer must derive market-related C2 requirements using the following formula:

$$C2_{market} = \sqrt{\sum Corr_{i,j} \times Market_i \times Market_j}$$

where

$Corr_{i,I}$ = the correlation parameter for market risk sub-modules i and j

$Market_i$, $Market_j$ = Risk requirements for market risk sub-modules i and j respectively.

a) Where an insurer determines the interest rate mismatch risk requirement using the upward interest rate scenario, an insurer must use a value of $Corr_{i,i}$ that is equal to the value set out in row i and in column j of the following correlation matrix in Table 4C-I:

Table 4C-I: Correlation matrix to derive the diversified market-related C2 requirement in an upward interest rate scenario

Row i/ Column j	Equity	Interest Rate	Credit Spread	Property	FX Mismatch
Equity	1	0.1	0.8	0.8	0.1
Interest Rate	0.1	1	0.1	0.1	0.1
Credit Spread	0.8	0.1	1	0.5	0.1
Property	0.8	0.1	0.5	1	0.1
FX Mismatch	0.1	0.1	0.1	0.1	1

b) Where an insurer determines the interest rate mismatch risk requirement using the downward interest rate scenario, an insurer must use a value of $Corr_{i,i}$ that is equal to the value set out in row i and in column j of the following correlation matrix in Table 4C-II:

Table 4C-II: Correlation matrix to derive the diversified market-related C2 requirement in a downward interest rate scenario

Row i/ Column j	Equity	Interest Rate	Credit Spread	Property	FX Mismatch
Equity	1	0.5	0.8	0.8	0.1
Interest Rate	0.5	1	0.5	0.25	0.1
Credit Spread	0.8	0.5	1	0.5	0.1
Property	0.8	0.25	0.5	1	0.1
FX Mismatch	0.1	0.1	0.1	0.1	1

4.3.1.5 Given that interest rates can only move either upwards or downwards at a given point in time, an insurer must recognise interest rate mismatch diversification benefits between insurance funds (other than the Participating Fund or MA portfolios) when calculating the interest rate mismatch risk requirement at the company level. That is, an insurer must first determine a "dominant scenario" for the company as a whole, this scenario being either the upward or the downward scenario, which results in the higher aggregated loss across all insurance funds (excluding the Participating Fund and MA portfolio). For Participating Funds and MA portfolios, an insurer must determine the dominant interest rate scenario for each Participating Fund (excluding MA portfolio) and each MA portfolio separately.

4.3.1.6 An insurer may only diversify C2 risk requirements for MA portfolio within individual MA portfolios and C2 risk requirements for MA portfolio must not be diversified with other parts of the insurance funds.

4.3.1.7 Where there is a MA portfolio within an adjusted fund, an insurer must calculate the C2 risk requirement separately for each MA portfolio.

4.3.1.8 An insurer must take into account C2 stresses on assets backing unit reserves in the impact to the non-unit reserves.

4.3.1.9 Swap positions

An insurer must deem a position in a swap as —

a) a notional long position in a forward contract or an option, on a security or an index; and

b) a notional short position in a forward contract or an option, on a security or an index,

such that the combined payouts arising from the two notional positions match the payouts arising from the swap exactly in terms of timing and amount.

4.3.1.10 Where an insurer refers to an interest rate instead of a specific security in the notional position referred to in paragraph 4.3.1.9, the insurer must deem the notional position as a position in a government debt security.

4.3.1.11 Valuation of notional positions

An insurer must value a notional position in a security as the current market value of the security, except in the case of a notional position derived from a warrant or a convertible security, in which event the insurer must value the notional position as —

a) the sum of the current market value of the underlying share and an amount equal to any loss on conversion; or

b) the current market value of the underlying share less an amount equal to any profit on conversion, subject to a minimum value of zero.

4.3.1.12 C2 requirement for non-standard instruments

Where an insurer holds a position in any security, futures contract, forward contract, foreign exchange contract or other financial asset for which no method for computation of a C2 requirement has been specified in this Notice, the insurer must —

a) immediately consult the Authority; and

b) until otherwise directed by the Authority —

(i) add 100% of the current market value of the position to the miscellaneous risk requirement calculated in paragraph 4.3.7.1; or

(ii) calculate an appropriate C2 requirement for the position in the manner that the Authority may otherwise direct

4.3.2 Equity Investment Risk Requirement

4.3.2.1 Equity Investment Risk Requirement Computation—:

a) To calculate the equity investment risk requirement, an insurer must—

i) Calculate for such type of equity exposure specified in the first column of Table 4D, the product of the corresponding stress factor specified in the second column of Table 4D and the market value of each equity exposure; and

Table 4D: Stress factors to be applied to equity exposure

First column	***Second column***
Type of equity exposure	**Stress factor**
Equities listed in Developed Markets	35%
Other equities *(include equities listed in other markets, unlisted equities, including private equity and hedge funds, and commodities.)*	50%

ii) Calculate the equity investment risk requirement as the aggregate of the products calculated in sub-paragraph a) for all equities.

b) An insurer must characterise debt instruments which are convertible into equity at the option of the issuer or automatically by the terms of the instruments as equity exposures. An insurer must convert its equity derivative instruments into notional positions in the relevant underlying equity instruments and use the current market value of the underlying instruments to calculate its market risk capital requirement for equity position risk.

c) An insurer must refer to the constituent countries or jurisdictions in MSCI's World Equity Index for countries or jurisdictions that are to be classified as Developed Markets for risk charging purposes. An insurer must ensure that it is using the most up-to-date MSCI's World Index information as at the valuation date for the purpose of calculating the equity investment risk requirement.

d) An insurer must refer to **Appendix 4B** for the treatment of Collective Investment Schemes ("CIS") and must calculate the equity investment risk requirement for CIS in accordance with **Appendix 4B**.

e) An insurer must treat investments in commodities as equity investments, and must apply the risk charge for "Other equities".

Guidelines:

4.13 The constituents of the MSCI World Index as of 31 January 2020 are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong SAR, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, United Kingdom and United States.

4.3.2.2 In calculating the equity investment risk requirement, an insurer must include:

a) any position in an equity security;

b) any position in an equity derivative; and

c) any position in a convertible security that —

(i) has less than 30 days remaining to the first date on which conversion may take place; and

(ii) is trading at a premium of less than 10%, where "premium" means the excess of the current market value of the convertible security over the current market value of the underlying share, expressed as a percentage of the current market value of the underlying share.

4.3.2.3 In the calculation of the equity investment risk requirement, an insurer must derive the position in relation to every depository receipt, warrant, convertible security or other equity derivative included —

a) in relation to a depository receipt, a warrant, a convertible security, futures on a single stock, or a forward on a single stock, as a notional position in the underlying share;

b) in relation to a future or a forward on a basket of shares or share index, as notional positions in the constituent shares of the basket of shares or share index;

c) in relation to a purchased call option or a written put option, as a notional long position in the underlying share; and

d) in relation to a purchased put option or a written call option, as a notional short position in the underlying share.

4.3.2.4 Adjustments for warrant or option

a) An insurer must adjust the absolute value of the equity investment risk requirement arising from an option by deducting an amount equal to the extent to which the option is out-of-the-money, which is determined as —

(i) in the case of a call option, any positive excess of the value at which the option will be exercised (exercise value) over the current market value of the underlying share; and

(ii) in the case of a put option, any positive excess of the current market value of the underlying share over the exercise value, but the adjusted absolute value of the equity investment risk requirement arising from the option must not exceed the current market value of the option and in any case no less than zero.

b) An insurer must restrict the absolute value of the equity investment risk requirement arising from a warrant to the current market value of the warrant.

4.3.2.5 Interest rate add-on for equity derivatives

a) An insurer must calculate a risk requirement to cover any interest rate risk in a position in an equity derivative (whether or not the equity derivative has been treated or included as an equity position or equity derivative position) by including the notional position in a debt security derived in accordance with sub-paragraph b) in the calculation of the interest rate mismatch risk requirement.

b) For the purposes of sub-paragraph a), the insurer must derive the notional position in an appropriate debt security as follows:

(i) the notional position must have a maturity equal to the period up to the expiry of the equity derivative contract;

(ii) the notional position must be either —

A. a long position, in a case where the underlying equity position is a short position; or

B. a short position, in a case where the underlying equity position is a long position.

4.3.3 Interest Rate Mismatch Risk Requirement and Credit Spread Risk Requirement

4.3.3.1 For the purpose of calculation of interest rate mismatch risk requirement and credit spread risk requirement in section 4.3.3, “government debt security” means a debt security which is issued or fully guaranteed by a central government or central bank of a country or territory.

4.3.3.2 Interest Rate Risk Requirement Computation:

a) For interest rate mismatch risk requirement, an insurer must apply the following factors in Table 4E in accordance with sub-paragraph b), to the positions defined in paragraph 4.3.3.6.

Table 4E: Upward and Downward Factors to be applied for calculating interest rate risk requirement

Time of Cash Flow (closest term)	Upward Adjustment (%)	Downward Adjustment (%)
3 months	100	-75
6 months	100	-70
1 year	100	-70
2 years	100	-70
3 years	95	-65
4 years	95	-65
5 years	90	-60
6 years	85	-55
7 years	80	-50
8 years	80	-50
9 years	75	-45
10 years	70	-40
11 years	65	-40
12 years	60	-35
13 years	60	-35
14 years	55	-30
15 years	50	-30
16 years	45	-30
17 years	40	-30
18 years	35	-25
19 years	30	-25
20 years and above	25	-25

b) To calculate the interest rate mismatch risk requirement, an insurer must do all of the following:

(i) The insurer must recompute the value of interest rate sensitive assets and liabilities under the upward interest rate scenario in sub-paragraph a), by adjusting the relevant yield curve by the absolute upward interest rate adjustment, and calculating the resulting change in Net Assets.

A. For adjusting the relevant yield curve, in order to derive the absolute upward and downward interest rate adjustments, the insurer must multiply the percentage adjustments as specified in Table 4E by:

(AA) the risk-free spot discount rates as specified under the scenario, in the case of policy liabilities. The insurer must derive the spot risk-free discount rate from the risk-free discount rate computed in accordance with **Appendix 3C**. The insurer must not apply the upward and downward interest rate adjustments to the MA or IP spreads.

(BB) the government yield curve relevant to the asset, in the case of assets.

B. To avoid doubt, the upward and downward percentage interest rate adjustments are to be applied on the relevant base yield curve.

C. An insurer must ensure that the calculated absolute interest rate adjustments are subject to a maximum of 200 basis points for both upward and downward scenarios.

D. An insurer must value Net Assets as the value of the assets less liabilities, where liabilities refer to:

(AA) In respect of life business—

i. In the case of non-participating policies (except for UL policies) or investment-linked policies the liabilities determined under regulation 20(1) and 20(2) of the Regulations respectively;

ii. In the case of participating funds, the minimum condition liability; and

iii. In the case of UL policies, the liability for guaranteed benefits determined in accordance with paragraph 3.1.2a); and

(BB) In respect of general business, the policy liabilities. Subject to paragraph 3.3.5, an insurer may elect not to recompute the value of liabilities for an insurance fund established and maintained in respect of general business, in which case the change in value of liabilities under the upward and downward interest rate scenarios is zero.

(ii) The insurer must recompute the value of interest rate sensitive assets and liabilities under the downward interest rate scenario in sub-paragraph b), by adjusting the relevant base yield curve by the

absolute downward interest rate adjustment, and calculating the resulting change in Net Assets.

(iii) The insurer must take the larger of the reduction in Net Assets from (i) and (ii) as the interest rate mismatch risk requirement.

(iv) For cash flows that occur between the time periods specified in Table 4E, an insurer must apply the upward and downward adjustments of the closest term.

(v) For floating rate instruments, an insurer must use the term until the next coupon reset date.

(vi) Where MA has been applied, an insurer must determine the interest rate mismatch requirement at the MA portfolio level.

c) An insurer may use the following simplified approaches:

(i) An insurer may use the modified duration of the asset to approximate the change in value of each interest rate sensitive security.

(ii) For bonds with optionality, an insurer must use the effective duration and may determine the effective duration using:

A. the term to final maturity, in the upward interest rate scenario and

B. the term to first call date, in the downward interest rate scenario,

and the "after shock" market price of the callable bond must not exceed the present value of [call price + all cash flows payable before and on the first call date].

Guidelines:

4.14 *An insurer which has a significant and/or more complex debt security portfolio is expected to utilise the discounted cash flow approach, which is more appropriate to the nature, scale and complexity of the risks the insurer bears.*

4.15 *An example of a bond with optionality is a callable bond.*

4.3.3.3 Credit Spread Risk Requirement Computation:

a) For credit spread risk requirement, an insurer must apply the following factors to the positions defined in paragraph 4.3.3.6, in accordance with sub-paragraph b) below.

Table 4F-I: Credit Spread Risk Adjustment Factors (for short-term ratings) to be applied for calculating credit spread risk requirement

Credit Quality Class	Class A1	Class B1	Class C1	Class D1	Class E1
Adjustment	105	120	165	245	540

Table 4F-II: Credit Spread Risk Adjustment Factors (for long-term ratings) to be applied for calculating credit spread risk requirement

Term\ Credit Quality Class	Class A	Class B	Class C	Class D	Class E	Class F and below
Up to 5 years	105	120	165	245	405	540
Between 5 to 10 years	95	115	145	230	365	500
>10 years	90	95	125	215	355	475

Guidelines:

4.16 The credit quality class is set out in ***Appendix 4K****.*

b) To calculate the credit spread risk requirement—

(i) An insurer must first identify the relevant constant basis point credit spread adjustment using the tables under sub-paragraph a) for each credit-related security, which is to be determined based on the remaining term and credit rating of the security:

A. In the case of short-term ratings, the insurer must for such credit quality class specified in the first row of Table 4F-I, use the constant basis point credit spread adjustment specified in the second row of Table 4F-I.

B. In the case of long-term ratings, the insurer must for such credit quality class specified in the first row of Table 4F-II and for such remaining term of the security specified in the first column of Table 4F-II, use the constant basis point credit spread adjustment specified in the corresponding cell in Table 4F-II.

(ii) The insurer must then revalue the security by adding this constant basis point credit spread adjustment on the relevant yield curve for the security, and calculate the resulting fall in value of the security.

(iii) The insurer must repeat the same calculation for all credit-related securities, and calculate the credit spread risk requirement as the aggregate resulting fall in value of all securities.

c) An insurer may use the following simplified approaches:

(i) An insurer may use the modified duration of the asset to approximate the change in value of each credit spread sensitive security.

(ii) For bonds with optionality, the insurer must use the effective duration and may determine the effective duration using the term to maturity.

Guidelines:

4.17 An insurer which has a significant and/or more complex debt security portfolio is expected to utilise the discounted cash flow approach, which is more appropriate to the nature, scale and complexity of the risks the insurer bears.

d) An insurer must convert its credit-related derivatives into notional positions in the relevant underlying instruments and use the current market value of the principal amount of the underlying instruments to calculate its credit risk capital requirement.

e) For debt securities issued by a Statutory Board in Singapore and recognised multilateral agencies as listed in **Appendix 4C**, an insurer must apply credit spread risk adjustments of 50% of that specified for Credit Quality Class A in Tables 4F-I and 4F-II.

f) Subject to sub-paragraph g), for unrated debt securities, for such term specified in the first column of the following table, an insurer must adopt the credit spread risk adjustment in between Credit Quality Class D and Class E specified in the second column of the following table:

Table 4F-III: Credit Spread Risk Adjustment Factors (for unrated debt securities) to be applied for calculating credit spread risk requirement

Term	Unrated
Up to 5 years	325
Between 5 to 10 years	298
More than 10 years	285

g) Notwithstanding sub-paragraph f), where unrated bonds exhibit features that are close to junk bonds, an insurer must apply a higher risk charge based on Credit Quality Class E in Table 4F-I or Credit Quality Class F and Below in Table 4F-II for short-term rating and long-term rating respectively.

h) An insurer which meets MAS' criteria under either of the approaches set out in **Appendices 4D and 4E** must fully (or partially) use the internal credit rating determined by its internal credit rating model (or process) in deciding which credit spread risk adjustment factor to apply in the case of unrated bonds.

i) An insurer need not calculate the credit spread risk requirement for debt securities that are issued by central governments or central banks of countries or territories that have a sovereign credit rating of at least Credit Quality Class C or better (based on **Appendix 4K**).

j) An insurer must calculate the credit spread risk requirement for debt securities that are issued by central governments or central banks that have a sovereign credit rating lower than Credit Quality Class C (based on **Appendix 4K**) but an insurer must use the credit spread risk requirement of the next best credit rating above the sovereign credit rating when deriving the credit spread adjustment that shall be applied under this risk module where the debt securities are in the national currency of the country.

k) In determining the credit spread adjustment that should be applied under this risk module in respect of debt securities that are issued by public sector entities that are fully guaranteed by central governments or central banks, an insurer must adopt the relevant sovereign credit rating when deriving the credit spread adjustment.

l) An insurer must apply a credit spread shock of between Credit Quality Class D and Class E (based on **Appendix 4K**) , as shown in the table in sub-paragraph f), for unrated debt securities that are issued by public sector entities that are not fully guaranteed by central governments or central banks.

m) An insurer must refer to **Appendix 4F** to determine the credit spread risk adjustment when there are guarantees and collaterals in place.

n) An insurer must refer to **Appendix 4G** for the treatment of structured products and derivatives and must determine the credit spread risk adjustment in accordance with **Appendix 4G**.

o) An insurer must use the final maturity for floating rate instruments.

Guidelines:

4.18 For the purpose of determining the credit spread risk requirement, where the coupons are reset based on the level of credit spreads, an insurer may assume a term until the next coupon reset date.

Reduction in credit spread risk requirement from MA

4.3.3.4 For portfolios where the MA is applied, an insurer must reduce the C2 credit spread risk requirement by applying a modified MA (i.e. MA'). The insurer must calculate the MA' based on a percentage of the credit spread adjustment applicable to the assets within the MA portfolio, in accordance with paragraph 4.3.3.5. The insurer must then add MA' to the MA when determining the C2 credit spread risk requirement. The insurer must ensure that the recognition of MA' is consistent with the recognition of the MA that is already present before the application of the credit spread adjustment.

Guidelines:

4.19 For example, if MA is recognised in full up to the LLP, and amortised over a period of 10 years immediately after the LLP, then MA' should be recognised in the same manner.

4.3.3.5 An insurer must calculate MA' as follows:

$$MA' = \sum W_i * F_i * CS_{adj\ i}$$ where;

- W_i is the weight corresponding to the proportion of bonds in rating and duration band category i;
- F_i is the adjustment factor for rating and duration band category i determined in accordance with Table 4G; and
- $CS_{adj\ i}$ is the credit spread adjustment for credit quality class and duration band category i determined in accordance with Table 4G

Table 4G: Table of Adjustment Factors to apply for calculating MA'

		Credit Quality Class			
$CS_{adj\ i}$ (bps)		**Class A**	**Class B**	**Class C**	**Class D**
Maturity (years)	**5 years or less**	105	120	165	245
	More than 5 years but not more than 10 years	95	115	145	230
	More than 10 years but not more than 15 years	90	95	125	215
	More than 15 years	90	95	125	215
F_i		80%	80%	80%	50%

Guidelines:

4.20 The derivation of the MA' has been built into the MA Workbook.

4.3.3.6 In calculating the interest rate mismatch risk requirement and credit spread risk requirement, an insurer must include —

a) any position in a debt security;

b) any position in a debt derivative;

c) any non-convertible preference share;

d) any position in a convertible security that does not meet the conditions in paragraph 4.3.2.2c)); and

e) any notional position arising from interest rate add-on for equity derivatives derived in accordance with paragraph 4.3.2.5b).

4.3.3.7 An insurer must characterise debt instruments which are convertible into equity at the option of the issuer or automatically by the terms of the instruments as equity exposures. An insurer must convert its interest rate-related derivatives into notional positions in the relevant underlying instruments and use the current market value of the principal amount of the underlying instruments to calculate its interest rate risk capital requirement.

4.3.3.8 In the calculation of the interest rate mismatch risk requirement and credit spread risk requirement, an insurer must, subject to paragraph 4.3.3.9, derive the position in relation to every debt derivative to be —

a) in relation to a long (or short) futures or forward contract on a debt security, a notional long (or short) position in the underlying debt security and a notional short (or long) position in a zero coupon government debt security with a maturity equal to the time of expiry of the futures or forward contract;

b) in relation to a futures contract on an interest rate or a forward rate agreement —

i. where the insurer buys a futures contract on an interest rate or sells a forward rate agreement —

A. a notional short position in a zero-coupon government debt security with a maturity equal to the period to expiry of the futures contract or the settlement date of the forward rate agreement; and

B. a notional long position in a zero-coupon government debt security with a maturity equal to the sum of the period to expiry of the futures contract or the settlement date of the forward rate agreement and the maturity of the deposit period; and

ii. where the insurer sells a futures contract on an interest rate or buys a forward rate agreement —

A. a notional short position in a zero-coupon government debt security with a maturity equal to the sum of the period to expiry of the futures contract or the settlement date of the forward rate agreement and the maturity of the borrowing period; and

B. a notional long position in a zero-coupon government debt security with a maturity equal to the period to expiry of the futures contract or the settlement date of the forward rate agreement;

c) in relation to a purchased call option or written put option on a debt security, a notional long position in the underlying debt security;

d) in relation to a purchased put option or written call option on a debt security, a notional short position in the underlying debt security;

e) in relation to an option on an interest rate, a notional position in an appropriate government security —

(i) which is —

A. a long position, in the case of a purchased call option or a written put option; or

B. a short position, in the case of a purchased put option or written call option; and

(ii) which has a maturity equal to the sum of the period until the expiry of the option and the period for which the interest rate is fixed;

f) in relation to an option on a futures contract or forward contract on a debt security, a notional position in the underlying futures contract or forward contract; and

g) in relation to an option on a futures contract on an interest rate or a forward rate agreement, a notional position in the underlying futures contract or forward rate agreement.

4.3.3.9 Where it relates to a forward contract or a futures contract that allows settlement by a range of deliverable debt securities, an insurer must ensure that the notional position derived according to paragraph 4.3.3.8 refers to the debt

security that is clearly identified as the most profitable for the party having a short position to deliver.

4.3.3.10 An insurer may exclude a pair of long and short positions in the same debt security from the calculation of interest rate mismatch risk requirement and credit spread risk requirement to the extent they are matched.

4.3.3.11 For the purposes of paragraph 4.3.3.10, a pair of long and short positions is matched if —

a) the positions are in respect of the same debt security with identical issuer, coupon, currency and residual maturity; or

b) for notional positions with identical issuer, nominal value and currency, but different coupon or residual maturity —

(i) the notional positions arise from futures contracts and mature within 7 days of each other;

(ii) both of the notional positions arise from swaps or forward rate agreements and have identical reference rates (for floating rate positions), and the coupon rates are within 15 basis points of each other; or

(iii) both the notional positions arise from swaps, forward rate agreements or forward contracts and —

A. where the maturity of the positions are no more than 30 days from the valuation date, the maturity of the positions are on the same day;

B. where the maturity of the positions are more than 30 days but no more than 12 months from the valuation date, the maturity of the positions are within 7 days of each other; or

C. where the maturity of the positions are more than a year from the valuation date, the maturity of the positions are within 30 days of each other.

4.3.3.12 Adjustments for option –

An insurer must adjust the absolute value of the interest rate mismatch risk requirement and credit spread risk requirement, arising from an option by deducting an amount equal to the extent to which the option is out-of-the-money, which is determined as —

a) in the case of a call option, any positive excess of the exercise value over the current market value of the underlying share; and

b) in the case of a put option, any positive excess of the current market value of the underlying share over the exercise value, but the adjusted absolute value of the debt investment risk requirement arising from the option must not exceed the current market value of the option and, in every case, no less than zero.

4.3.4 **Property Investment Risk Requirement**:

4.3.4.1 To calculate the property investment risk requirement, an insurer must do all of the following:

a) the insurer must apply a 30% risk charge to the current market value of each property exposure for immovable property, whether or not the immovable property is for investment purposes or self-occupation purposes;

b) the insurer must apply a look-through approach (as described for CIS in **Appendix 4B**) for collective real estate investment vehicles. Where the insurer chooses not to or is unable to adopt a look-through approach, the insurer must apply a risk charge of 50% on the value of the CIS;

c) the insurer must calculate the property investment risk requirement as the aggregate of the calculations for all property exposures obtained from paragraphs a) and b).

4.3.4.2 An insurer must treat investments in companies that are engaged in real estate management or real estate project development or similar activities as equity investments.

4.3.5 **Foreign Currency Mismatch Risk Requirement**:

4.3.5.1 An insurer must apply this risk module for an insurance fund established and maintained under section 17 of the Act.

4.3.5.2 For MA portfolios, an insurer must compute the foreign currency mismatch risk charge at each MA portfolio level.

4.3.5.3 An insurer must calculate the foreign currency mismatching risk requirement as —

a) for any insurance fund (or MA portfolio, where applicable), 12% of the foreign currency risk exposure of the fund calculated in paragraphs 4.3.5.6 and 4.3.5.7; and

b) in any other case, zero.

4.3.5.4 An insurer must calculate for each currency (other than for the Singapore Dollar) the net open position of the insurer in the currency as the absolute value of the aggregate of the following:

a) the amount of all assets less all liabilities denominated in the currency;

b) the aggregate of amounts in the currency to be received by the insurer less the aggregate of amounts in the currency to be paid by the insurer in relation to the currency positions arising from any futures contract or forward contract, including a forward contract associated with cross-currency swaps or other derivatives; and

c) net positions in products denominated in the currency in relation to any non-currency futures contract, forward contract and other derivatives, excluding —

(i) any asset or exposure for which the insurer has calculated a risk requirement equal to 100% of the value of the asset or the full contract value, as appropriate, under this Notice; and

(ii) any position the insurer holds to hedge against a foreign currency position referred to in sub-paragraph (i), where the hedging contract is clearly earmarked as a hedge, to the extent that the nominal amount underlying each hedging contract matches the nominal amount of the contract being hedged.

4.3.5.5 An insurer must convert its net open position in each currency to the Singapore Dollar (preserving the sign) at the prevailing market spot rate at valuation date.

4.3.5.6 In the case of any insurance fund (or MA portfolio, where applicable) that an insurer establishes and maintains in respect of Singapore policies, the insurer must calculate its foreign currency risk exposure as the higher of —

a) the aggregate of net open positions of the insurer in currencies which net open position is positive; or

b) the absolute value of the aggregate of net open positions of the insurer in currencies which net open position is negative,

less 10% of the (total value of assets less reinsurers' share of policy liabilities in the insurance fund (or MA portfolio, where applicable)), subject to a minimum of zero.

4.3.5.7 In the case of any insurance fund (or MA portfolio, where applicable) that an insurer establishes and maintains in respect of offshore policies, the insurer must calculate its foreign currency risk exposure as the higher of —

a) the aggregate of net open positions of the insurer in currencies which net open position is positive; or

b) the absolute value of the aggregate of net open positions of the insurer in currencies which net open position is negative,

less 20% of the (total value of assets less reinsurers' share of policy liabilities in the insurance fund (or MA portfolio, where applicable)), subject to a minimum of zero.

4.3.5.8 In the calculation of the net open positions of the insurer in currencies, an insurer must derive the position in relation to every derivative to be —

a) in relation to a purchased call option or a written put option, a long position in the commodity currency and a short position in the term currency, each of an amount equivalent to the notional face value of the underlying contract;

b) in relation to a purchased put option or a written call option, a short position in the commodity currency and a long position in the term currency, each of an amount equivalent to the notional face value of the underlying contract; and

c) in relation to a futures contract or forward contract, two notional positions, being —

(i) a long position in the commodity currency of an amount equivalent to the notional value of the underlying contract; and

(ii) a short position in the term currency of an amount equivalent to the notional value of the underlying contract.

4.3.5.9 To avoid doubt, positions in gold must be deemed as positions in a separate foreign currency.

4.3.6 Counterparty Risk Requirement

4.3.6.1 An insurer must calculate all of the following sub-risks for the counterparty risk requirement:

a) Loan counterparty risk;

b) Derivative counterparty risk;

c) Reinsurance recoverable counterparty risk;

d) Outstanding premiums counterparty risk;

e) Bank deposit counterparty risk;

f) Letter of credit counterparty risk;

g) Other counterparty risk for exposures that have not been addressed by the credit spread risk module, including but not limited to:

(i) intra-group balances not related to a contract of insurance;

(ii) any general guarantee of indebtedness and acceptance originating from the insurer which has not been accounted for as a liability in respect of policies;

(iii) any contingent liability relating to any specific transaction to the insurer, other than any guarantee or acceptance that has been accounted for as a liability in respect of policies,

but excluding balances due from other insurance funds, shareholders fund and overseas branches.

[MAS Notice 133 (Amendment) 2020]

Guidelines:

4.20A. While inter-fund balances are not included in the computation of counterparty default risk requirement, an insurer should follow MAS Notice 101 paragraph 6 on maintenance of insurance funds.

[MAS Notice 133 (Amendment) 2020]

4.3.6.2 To calculate the counterparty default risk requirement, an insurer must do all of the following:

a) an insurer must calculate the risk exposures for each counterparty in paragraph 4.3.6.1 in accordance with the Regulations and paragraphs 4.3.6.4 to 4.3.6.5 of this Notice;

b) an insurer must calculate the risk requirement for each counterparty as the product of the risk exposure to a particular counterparty in sub-paragraph a) and the relevant counterparty default risk charge and the relevant counterparty default risk charge must be determined as follows:

(i) in the case of Reinsurance Recoverables that are less than or equal to 1 year, an insurer must determine the counterparty default risk charge in accordance with Table 4H based on the Counterparty Risk Class (as set out in **Appendix 4L**) of the counterparty;

(ii) in the case of Reinsurance Recoverables that are more than 1 year, an insurer must apply a 100% risk charge;

(iii) in the case of Outstanding Premiums (Direct/General/Facultative Reinsurance Business) and Agents' Balances that are less than or equal to 1 year, an insurer must determine the counterparty default risk charge in accordance with Table 4H based on the Counterparty Risk Class (as set out in **Appendix 4L**) of the counterparty;

(iv) in the case of Outstanding Premiums (Direct/General/ Facultative Reinsurance Business) and Agents' Balances that are more than 1 year, an insurer must apply a 100% risk charge;

(v) in the case of Outstanding Premiums from Treaty Reinsurance Business that are less than or equal to 2 years, an insurer must determine the counterparty default risk charge in accordance with Table 4H based on the Counterparty Risk Class (as set out in **Appendix 4L**) of the counterparty;

(vi) in the case of Outstanding Premiums from Treaty Reinsurance Business that are more than 2 years, an insurer must apply a 100% risk charge;

(vii) in the case of deposits with a bank or deposit-taking institution that can be unconditionally withdrawn within 6 months, an insurer must determine the counterparty default risk charge in accordance with Table 4H based on the Counterparty Risk Class (as set out in **Appendix 4L**) of the counterparty and must apply a factor of 50% to the counterparty default risk charge;

(viii) in the case of deposits with a bank or deposit-taking institution that cannot be unconditionally withdrawn within 6 months, an insurer must determine the counterparty default risk charge in accordance with Table 4H based on the Counterparty Risk Class (as set out in **Appendix 4L**) of the counterparty;

(ix) in the case of intra-group balances (arising from any transaction which is not related to a contract of insurance or balances due from head office, overseas branches or related corporations) outstanding less than or equal to 90 days, an insurer must determine the counterparty default risk charge in accordance with Table 4H based on the Counterparty Risk Class (as set out in **Appendix 4L**) of the counterparty;

(x) in the case of intra-group balances (arising from any transaction which is not related to a contract of insurance or balances due from

head office, overseas branches or related corporations) outstanding for more than 90 days, an insurer must apply a 100% risk charge;

(xi) in the case of any other counterparty exposures, an insurer must determine the counterparty default risk charge in accordance with Table 4H based on the Counterparty Risk Class (as set out in **Appendix 4L**) of the counterparty.

Table 4H: Counterparty default risk charge for various counterparty risk classes

Counterparty Risk Class	Counterparty Default Risk Charge (%)
Class A	0.5
Class B	1.0
Class C	2.0
Class D	5.0
Class E	10.5
Class F	20.0
Class G	48.5

c) an insurer must repeat the same calculation mentioned in sub-paragraph b) for all counterparties, and calculate the total counterparty default risk requirement as the aggregate of the values obtained for all counterparties.

d) An insurer must treat unrated counterparties as having a rating of between Counterparty Risk Class D and Class E and apply a counterparty default risk charge of 7.75%.

e) An insurer must ensure that ageing of outstanding premium for annual and multi-year policies of direct life and general insurance business starts from the billable date and excludes the effects of the delays by the insurer in policy issuance and billing.

f) An insurer must ensure that ageing of outstanding premiums for reinsurance business starts from accrual date for reinsurers (except for facultative reinsurance where the insurer must use the billable date).

4.3.6.3 An insurer must refer to **Appendix 4F** to determine the counterparty risk requirement when there are guarantees and collaterals in place.

4.3.6.4 For Derivative Counterparty risk requirement

a) An insurer must calculate a counterparty exposure for any over-the-counter derivatives contract (other than an option written by the insurer)

or derivatives contract traded on an exchange which is dependent on the issuer for performance of the contract as the credit equivalent amount of the contract.

b) The insurer shall calculate the derivative counterparty risk requirement as the aggregate of the products of —

(i) the counterparty exposure calculated in accordance with sub-paragraph a); and

(ii) the relevant counterparty default risk charge determined in accordance with Table 4H based on the Counterparty Risk Class (as set out in **Appendix 4L**) of the counterparty,

for all contracts where the derivative counterparty risk requirement is applicable.

c) In determining the derivative counterparty risk requirement, an insurer may reduce the counterparty exposure calculated by the amount of any acceptable collateral.

d) In this paragraph —

"credit equivalent amount" of a contract means —

(i) in the case of an over-the-counter foreign exchange contract with an original maturity of 14 days or less, zero; or

(ii) in any other case —

A. if the replacement cost of the contract is positive, the sum of the replacement cost of the contract and the potential credit exposure of the contract; or

B. if the replacement cost of the contract is negative, the potential credit exposure;

"potential credit exposure" means the product of —

(i) the nominal or notional principal underlying the contract; and

(ii) the relevant credit exposure factor as specified in **Appendix 4H**; and

"replacement cost of the contract" means the current market value of the contract.

4.3.6.5 Ageing of Outstanding Premium

a) When computing the counterparty default risk requirements for outstanding premium, an insurer must use the billable date, and exclude the effects of any delay by the insurer in policy issuance and billing, as the start date for ageing of outstanding premium for annual and multi-year policies of direct life and general insurance business.

b) For the purposes of paragraph a), "Billable date" refers to the date which part or all of each premium can first be billed without taking into consideration any credit period given.

Guidelines:

4.21 For example, in the case of an annual paying policy with an inception date of 1.1.2018, the premium will be considered billable on 1.1.2018, 1.1.2019 etc. regardless of whether insurers may send the bill to policyholders earlier or later. Similarly, for a monthly paying policy with an inception date of 1.1.2018, the premium will be considered billable on 1.1.2018, 1.2.2018, 1.3.2018 etc.

c) An insurer must ensure that ageing of outstanding premium for reinsurance business starts from accrual date for reinsurance business, except for facultative reinsurance business, where the insurer must ensure that ageing is on a billable date basis.

4.3.7 Miscellaneous Risk Requirement

4.3.7.1 An insurer must calculate, for each asset for which no equity investment risk requirement, interest rate mismatch risk requirement, credit spread risk requirement, property investment risk requirement or counterparty risk requirement has been calculated (other than cash and any financial asset to which paragraph 4.3.1.12 applies), the product of —

a) 8% risk factor; and

b) the value of the asset.

[MAS Notice 133 (Amendment) 2020]

4.3.7.2 An insurer must calculate the miscellaneous risk requirement as the aggregate of the amounts obtained for each asset referred to in paragraph 4.3.7.1.

4.3.8 Alternative method of calculating C2 requirement

4.3.8.1 An insurer may use any alternative method to calculate the C2 requirement if the method results in a C2 requirement which is no less than that determined in the manner provided in this Notice, and in such a case, the Authority may require the insurer to provide documentary evidence of that fact.

4.4 Operational Risk Requirement

4.4.1 An insurer incorporated in Singapore must determine the operational risk requirement arising from any insurance business of the insurer that does not belong to any insurance fund established and maintained under the Act in the same manner as its insurance business relating to an insurance fund established and maintained under the Act.

4.4.2 An insurer must calculate the operational risk requirement for an adjusted fund as —

a) the lower of:

(i) the amount calculated according to the formula in paragraph 4.4.3; and

(ii) 10% of the TRR (after diversification benefits and excluding operational risk requirement) of the same adjusted fund for the insurer, or

b) zero

whichever is higher.

4.4.3 For the purposes of paragraph 4.4.2a)(i) above, an insurer must calculate the amount of operational risk requirement as the sum of the amount calculated for each insurance fund established and maintained under the Act within the adjusted fund based on the following:

a) The higher of:

(i) 4% of GP_1 + Max(0, 4% x ((GP_1 - GP_0) - 20% x GP_0))

(ii) 0.5% of policy liability (gross of reinsurance)

b) For purposes of paragraph 4.4.3a),

(i) GP_1 means the:

A. Gross weighted premium income for the 12 months preceding the valuation date (without deducting premium ceded to reinsurance) for individual direct life business and an insurer must use the same basis of the submission of business statistics to the Life Insurance Association of Singapore ("LIA") in determining the basis of deriving the weighted premium; and

B. Gross written premium income for the 12 months preceding the valuation date (without deducting premium ceded to

reinsurance) for life business (other than individual direct life) and general business.

(ii) GP_0 means:

A. Gross weighted premium income for the 12 months preceding GP_1 for individual direct life business and an insurer must use the same basis of the submission of business statistics to LIA in determining the basis of deriving the weighted premium; and

B. Gross written premium income for the 12 months preceding GP_1 for life business (other than individual direct life) and general business.

(iii) Policy liability (gross of reinsurance) —

A. in the case of a participating fund, means the minimum condition liability; and

B. in all other cases, means policy liability (gross of reinsurance) calculated in accordance with regulations 19A and 20A of the Regulations.

Guidelines:

4.22 The basis of deriving the weighted premium should follow the same basis of the submission of business statistics to the LIA.

4.23 The prevailing formula used by the LIA for the calculation of weighted premium is as follows:

a) For single premium, 10% of single premium;

b) For annual premium, 100% of annual premium;

c) Where premium obligation is less than 10 years, weighted premium will be based on the number of years of payment x 10%. For example, an annual premium policy with a 7-year limited premium payment term will calculate its weighted premium as 70% of annual premium.

4.5 Description for Risks

4.5.1 For the purposes of risk requirements covered in Section 4, the type of risks specified in the first column of Table 4I has the description specified in the second column of the same table.

Table 4I: Description of risks

First column	***Second column***
Type of risk	**Description of risk**
Claim liability risk	Claims liability risk is associated with incurred claims and is the risk that the amount set aside for claims that have already occurred will prove inadequate.
Conversion of options risk	Conversion of options risk is the risk associated with the variability in liability cash flows due to the incidence of policyholders exercising available options (for example, convertible term).
Counterparty default risk	Counterparty default risk is the risk of economic loss due to unexpected default of the counterparties and debtors of insurers.
Credit spread risk	Credit spread risk is the risk of change in value due to movements in the market price of credit risk. This includes both the credit default as well as credit spread widening risk.
Disability risk	Disability risk is the risk associated with the variability in liability cash flows due to the incidence of policyholder's disability claims, as well as recovery or termination rates.
Dread disease risk	Dread disease risk is the risk associated with the variability in liability cash flows due to the incidence of dread disease claims, as well as recovery or termination rates.
Equity investment risk	Equity investment risk is the risk of economic loss due to changes in the price of equity exposures.
Expense risk	Expense risk is the risk associated with the variability in liability cash flows due to the incidence of expenses incurred.
Foreign currency mismatch risk	Foreign currency mismatch risk is the risk of economic loss due to adverse movements in the value of foreign currencies against the Singapore dollar.
General insurance catastrophe risk	General insurance catastrophe risk is the risk associated with extreme or irregular events which effects are not sufficiently captured in requirements for premium liability risk and claim liability risk.

First column	*Second column*
Type of risk	**Description of risk**
Interest rate mismatch risk	Interest rate mismatch risk is the risk arising from changes in market interest rates, which affect the prices of debt securities and policy liabilities where the valuation of policy liabilities requires discounting of future policy liability cash flows using the market yield of the relevant yield curve.
Lapse risk	Lapse risk is the risk associated with the variability in liability cash flows due to the incidence of lapses (including forfeitures, surrenders etc) by policyholders. Includes consideration of a mass lapse event.
Life insurance catastrophe risk	Life insurance catastrophe risk is the risk associated with extreme or irregular events which effects are not sufficiently captured in the other risk requirements under C1 for life business.
Longevity risk	Longevity risk is the risk associated with the variability in liability cash flows due to increasing life expectancy.
Miscellaneous risk	Miscellaneous risk covers risk of loss in value for fixed assets and assets that are non-financial instruments. It excludes: • Risks that have been covered in the other C2 risk requirements • Non-standard instruments as described under paragraph 4.3.1.12
Mortality risk	Mortality risk is the risk associated with the variability in liability cash flows due to the incidence of death.
Operational risk	Operational risk refers to the risk of loss arising from complex operations, inadequate internal controls, processes and information systems, organisational changes, fraud or human errors, (or unforeseen catastrophes including terrorist attacks).
Other insured events (Accident & Health) risk	Other insured events (Accident & Health) risk is the risk associated with the variability in liability cash flows due to the incidence of accident and health claims as well as recovery or termination rates.
Premium liability risk	Premium liability risk is associated with future claims and is the risk that the amount set aside for claims and expenses against unearned premiums will prove inadequate.
Property investment risk	Property risk is the risk of economic loss due to changes in the price of property exposures.

5 FINANCIAL RESOURCES

5.1 An insurer must determine financial resources in the following manner:

a) an insurer must determine financial resources in relation to an insurance fund established and maintained by an insurer under the Act —

(i) in the case of a participating fund, as the sum of the balance in the surplus account and regulatory adjustment; or

(ii) in the case of any other insurance fund, as the sum of—

(A) the surplus of the assets of the fund over its liabilities; and

(B) regulatory adjustment,

less any reinsurance adjustment, any financial resource adjustment, and any adjustment for asset concentration; and

b) an insurer must determine financial resources in relation to an insurer, as the sum of the following items:

(i) Tier 1 Capital calculated in accordance with paragraph 5.2;

(ii) where it is an insurer incorporated in Singapore, Tier 2 Capital calculated in accordance with paragraph 5.5; and

(iii) regulatory adjustment.

Tier 1 Capital

5.2 "Tier 1 Capital" as referred to in sub-paragraph 5.1b)(i) of an insurer means the sum of the following items:

a) the aggregate of the surpluses of the assets over the liabilities of all insurance funds (other than a participating fund) established and maintained under the Act by the insurer;

b) the balance in the surplus account of each participating fund; and

c) where it is an insurer incorporated in Singapore, the sum of—

(i) its paid-up ordinary share capital which qualify for inclusion as CET1 Capital in accordance with **Appendix 5A**;

(ii) Surplus of overseas branch operations;

(iii) Retained earnings; and

(iv) any Additional Tier 1 ("AT1") Capital, which means the sum of the capital instruments issued by the insurer that qualify for inclusion as AT1 Capital in accordance with **Appendix 5B,**

less the aggregate of the reinsurance adjustments of all insurance funds established and maintained under the Act by the insurer, any financial resource adjustment and any adjustment for asset concentration.

5.3 An insurer must determine the regulatory adjustment, reinsurance adjustment, financial resource adjustment and adjustment for asset concentration referred to in paragraphs 5.1 and 5.2 in accordance with **Appendix 5E**.

5.4 For the purposes of paragraphs 5.1 and 5.2, the insurer must not apply the adjustment for asset concentration to —

a) in the case where an insurer is a reinsurer incorporated in Singapore and is headquartered outside of Singapore,

(i) any insurance fund established and maintained under the Act in respect of offshore policies; and

(ii) assets and liabilities of any of its branches located outside of Singapore; or

b) in the case where an insurer is a reinsurer incorporated outside of Singapore, any insurance fund established and maintained under the Act in respect of offshore policies.

Tier 2 Capital

5.5 "Tier 2 Capital" of an insurer incorporated in Singapore as referred to in sub-paragraph 5.1b)(ii) means the sum of capital instruments issued by the insurer that qualify for inclusion as Tier 2 Capital in accordance with **Appendix 5C.**

Common Equity Tier 1 Capital

5.6 Where an insurer is an insurer incorporated in Singapore, the insurer must calculate Common Equity Tier 1 ("CET1") Capital as Tier 1 Capital calculated in accordance with paragraph 5.2 less AT1 Capital as defined in paragraph 5.2(c)(iv).

CET1 Capital Ratio and Tier 1 Capital Ratio

5.7 An insurer must ensure that at all times:

a) where it is an insurer incorporated in Singapore, the CET1 Capital ratio which is determined as the ratio of the CET1 Capital over the sum of total risk requirements (excluding the risk requirements of participating funds) is not less than *60%*; and

b) the Tier 1 Capital ratio which is determined as the ratio of the Tier 1 Capital over the sum of total risk requirements (excluding the risk requirements of participating funds) is not less than *80%*.

Submission requirements for CET1 Capital, AT1 Capital and Tier 2 Capital

5.8 An insurer intending to issue or recognise any paid-up ordinary share, AT1 Capital instrument or Tier 2 Capital instrument for the purposes of inclusion as CET1 Capital, AT1 Capital or as Tier 2 Capital respectively, must comply with the submission requirements stated in **Appendix 5D**.

5.9 Where at any time before 31 March 2020,

a) the Authority approved a capital instrument as a Tier 1 resource, an insurer may recognise such a capital instrument as Tier 1 Capital; and

b) the Authority approved a capital instrument as a qualifying Tier 2 instrument, an insurer may recognise such a capital instrument as Tier 2 Capital.

6 VALUATION OF ASSETS AND LIABILITIES (CAPTIVE INSURERS, MARINE MUTUAL INSURERS AND SPRVS)

6.1 Valuation of liabilities for life business

Valuation of Participating Policies

6.1. 1 For the purposes of the Regulations, when calculating the value of expected future payments arising from "non-guaranteed benefits" of policies of a participating fund, an insurer must—

a) include projected future allocations to participating policies by way of bonuses, including dividends, under section 17(6)(b) of the Act;

b) include projected future allocations to the surplus account of the participating fund under section 17(6)(c) of the Act; and

c) take into account the policy assets of the participating fund and the insurer's internal policy on bonus allocation.

Valuation of Universal Life ("UL") Policies

6.1. 2 An insurer must value the policy liability of a UL policy as the higher of the following amounts:

a) the value obtained by projecting the liability cash flows under the policy (including any provision for adverse deviation ("PAD") from the expected experience) at the minimum guaranteed crediting rate and discounted at the risk-free discount rate determined in accordance with paragraph 6.3.4 (which represents the liability for guaranteed benefits); and

b) the value obtained by projecting the liability cash flows under the policy at the current crediting rate and discounted at the best estimate investment return determined in accordance with paragraph 6.3.3 (which represents the liability for total benefits).

Valuation of Long-term Medical Policies

6.1. 3 An insurer must value the liabilities in respect of a portfolio of long-term medical policies as the sum of the following components:

a) an amount which is adequate to cover the value of expected future payments less expected future receipts, and any PAD from the expected experience. An insurer must determine the term of projection of future cash flows based on contract boundary considerations set out at paragraphs 6.1. 4 and 6.1. 5 below; and

b) the value of expected payments arising from claims which has already been incurred prior to the valuation date which must comprise reported but not settled ("RBNS") claims and incurred but not reported ("IBNR") claims, including any PAD from the expected experience.

Contract Boundary Considerations

6.1. 4 An insurer must consider the boundary of an insurance contract when valuing a long-term medical policy, and must determine the boundary of the insurance contract as follows:

a) An insurer must treat cash flows as being within the boundary of the insurance contract if they arise from rights and obligations that exist during the period in which the insurer has a substantive obligation to provide the policyholder with the contracted insurance coverage or other services.

b) For the purposes of sub-paragraph a), a substantive obligation ends when all of the following criteria are satisfied:

(i) the insurer has the unconstrained practical ability to reassess the risks of the contract or a portfolio of contracts to which the contract that is being valued belongs, and, as a result, can set a price or level of benefits that fully reflects the reassessed risk of that contract or portfolio; and

(ii) the pricing of premiums for the coverage up to the date when risks are reassessed, do not reflect risks related to periods beyond the reassessment date.

c) In assessing whether the criteria in sub-paragraph b)(i) has been satisfied, an insurer must consider all the risks that it would normally consider when underwriting equivalent contracts on the renewal date for the remaining coverage.

d) An insurer must disclose the boundary of the insurance contract it has used in its valuation of a long-term medical policy, including its justification on how the criteria in sub-paragraph b)(i) has been satisfied, in every actuarial investigation report lodged with the Authority.

e) The insurer must regularly assess if there is any change in circumstances that may affect its practical ability to reprice (per sub-paragraph b)(i)). Where an insurer assesses that there has been a change in circumstances,

the insurer must revalue the portfolio based on the new boundary arising from the change in circumstances, from the next valuation date after such change.

Guidelines:

6.1. For instance, if the insurer foresees restrictions to such practical ability to reassess the risk and to set a price or level of benefits accordingly, it should then value the liabilities of the portfolio based on a longer term of projection (i.e. up to the natural expiry of the policies within the portfolio).

6.1. 5 For medical riders attached to long-term medical policies, an insurer must determine the contract boundary in accordance with paragraph 6.1. 4 save that the contract boundary of a rider must not be longer than that of the long-term medical policy the rider is attached to.

Valuation of Investment-Linked Policies

6.1. 6 For the purposes of valuing the liability of an investment-linked policy, an insurer must project the unit reserves and value the non-unit reserves at the risk-free discount rate determined in accordance with paragraph 6.3.4 of this Notice.

Guidelines:

*6.2. For guidelines on the valuation of policy liabilities relating to the life business of an insurer, refer to **Appendix 6A**.*

6.2 Valuation of liabilities for general business

Guidelines:

*6.3. For guidelines on the valuation of policy liabilities relating to the general business of an insurer, refer to **Appendix 6B**.*

6.3 Discount rates

Life business

6.3.1 An insurer must use the risk-free discount rate in determining —

a) the liability in respect of a non-participating policy;

b) the liability for guaranteed benefits of a UL policy;

c) the non-unit reserves of an investment-linked policy; and

d) the minimum condition liability of a participating fund.

6.3.2 An insurer must use the best estimate investment return as the discount rate in determining —

a) the liability in respect of a participating policy; and

b) the liability for total benefits in respect of a UL policy.

6.3.3 For the purposes of paragraph 6.3.2, an insurer must derive the best estimate investment return based on the expected investment return of policy assets in the case of 6.3.2a), and the expected investment return of assets backing the UL policies in the case of 6.3.2b).

6.3.4 An insurer must determine the risk-free discount rate in the manner specified in **Appendix 3C** of this Notice.

General business

6.3.5 For general insurance business—

a) an insurer need not carry out any discounting for liability durations of more than one year, if the insurer deems that the impact of discounting is not material; and

b) an insurer need not carry out any discounting for liability durations of one year or less.

6.3.6 Where an insurer carries out discounting for general insurance business, the insurer must use the same discount rate that would have been applicable for life business.

Guidelines:

6.4. The Authority has provided a workbook ("Discount Rate Workbook") which can be used to generate the risk-free discount rates for SGD and USD denominated liabilities. The workbook may be used or modified to derive the risk-free discount rates for liabilities denominated in other currencies.

6.4 Treatment in relation to reinsurance arrangement with head office, branch and subsidiary

6.4.1 An insurer:

a) must not recognise reinsurance arrangement between a Head Office and its branch in Singapore. The insurer must not apply any reduction when valuing its liabilities that results from any arrangements between branch and Head Office, unless—

(i) there is one or more collaterals from the reinsurance counterparty that each satisfies the requirements in **Appendix 6C**, by the risk-adjusted value of each collateral as specified in **Appendix 6C**; or;

(ii) there is a letter of credit issued in favour of the insurer and where the insurer meets the requirements in **Appendix 6D**, or a trust in which the insurer is a beneficiary that satisfies such requirements as the Authority may specify in directions,

and the insurer satisfies any other requirements as the Authority may specify by notice in writing;

b) may recognise reinsurance arrangement between the insurer and its subsidiary, where—

(i) there is one or more collaterals from the reinsurance counterparty that each satisfies the requirements in **Appendix 6C**, by the risk-adjusted value of each collateral as specified in **Appendix 6C**; or

(ii) there is a letter of credit issued in favour of the insurer and where the insurer meets the requirements in **Appendix 6D**, or a trust in which the insurer is a beneficiary that satisfies such requirements as the Authority may specify in directions,

and the insurer satisfies any other requirements as the Authority may specify by notice in writing ; and

c) may recognise reinsurance arrangements between a Singapore branch and its Head Office where risks written by the Singapore branch are included in the Head Office's reinsurance arrangements with third party reinsurers, regardless of whether the branch has a legal right to receive the recoveries directly from the third party reinsurers. This is subject to the insurer providing a written confirmation from the Head Office confirming that the Singapore branch is covered within the Head Office's reinsurance arrangements with third party reinsurers, as well as details on the arrangements relating to how reinsurance recoverable to the branch will

be determined, and other requirements that the Authority may specify by notice in writing.

6.4.2 For the purposes of paragraph 6.4.1, ”reduction when valuing its liabilities”, refers to reinsurer’s share of policy liabilities, premium liabilities and claim liabilities calculated in the manner specified in regulation 16A of the Regulation, for policies ceded to the reinsurance counterparty.

Guidelines:

6.5. An insurer that recognises a reinsurance arrangement between the insurer and its subsidiary mentioned in paragraph 6.4.1b) must also comply with regulation 21A of the Regulations when valuing liabilities. The reinsurance arrangement was previously termed as reinsurance arrangement between insurer and its downstream entities during the consultation phase. As such, it includes a Singapore subsidiary reinsuring with its subsidiary, or a Singapore branch reinsuring with a subsidiary of its Head Office.

6.6. Please note that the reinsurance arrangements between an insurer and its subsidiary will not include situations where a Singapore subsidiary reinsures to another subsidiary of the parent company or another subsidiary within the group, nor where a Singapore subsidiary reinsures to a branch of the parent company or another branch within the group.

Notes on History of Amendments:

1. MAS Notice 133 (Amendment) 2020 dated 23 December 2020 with effect from 31 Dec 2020.
2. MAS Notice 133 (Amendment) 2021 dated 28 June 2021 with effect from 1 July 2021.
3. MAS Notice 133 (Amendment) 2022 dated 29 March 2022 with effect from 31 March 2022.
4. MAS Notice 133 (Amendment No.2) 2022 dated 19 December 2022 with effect from 31 December 2022.

Appendix 3A

GUIDELINES ON THE VALUATION OF POLICY LIABILITIES RELATING TO THE LIFE BUSINESS OF AN INSURER

DATA AND VALUATION SYSTEM

1. The data used in the valuation should be appropriate. An insurer should take the necessary steps to verify the consistency, completeness and accuracy of the data collated.

2. The data used in the investigation should be consistent with the data collated to the audited accounts. Any weaknesses in the data should be adjusted for.

3. The valuation system used in the calculation of policy liabilities should apply the methods and assumptions correctly.

VALUATION METHODOLOGY

General approach to be taken by the life insurer

4. In determining the liability in respect of a policy relating to the life business of the insurer (other than the unit reserves of the investment-linked policy), an insurer should derive the value of expected future payments less expected future receipts using a discounted prospective cash-flow method.

5. The discounted prospective cash flow method requires explicit projection of expected future payments and receipts over the durations of the policy. This should include, where applicable, the following parameters:

   (a) mortality and morbidity benefits;

   (b) survival and maturity benefits;

   (c) surrender benefits;

   (d) distribution costs;

   (e) management expenses;

   (f) claims expenses if not already included as part of management expenses;

   (g) premiums payment to and claims recoveries from reinsurance counterparty;

   (h) cost of options.

6. Parameters that are immaterial to the valuation of policy liabilities may be excluded from being included explicitly in the projection.

7. The assumptions used in the projection should be based on the best estimate assumptions and in accordance with paragraphs 17 to 29 of this Appendix.

8. Further allowance for the uncertainty of the best estimate value derived above will be provided through the PAD. The PAD should be derived using the same method outlined above but with more conservative assumptions containing a buffer against fluctuations of the best estimate experience.

9. The PAD should be derived in accordance with paragraphs 30 to 33 of this Appendix.

10. An insurer should account for the outstanding incurred claims and IBNR claims in determining the liability of a policy in its life business.

Term of Liabilities

11. The starting point to derive the term of a policy's liabilities is the contractual term of the policy. An insurer should then take account of any options in the contract when deciding whether the term of a policy's liabilities should be extended beyond the contract term.

12. The term of a policy's liabilities takes account of all adjustments made to the policy on renewal before the valuation date, and future adjustments if appropriate.

13. In determining the term of liabilities, regard should be had to the contract boundary considerations in this Notice and any relevant professional standard, where applicable.

Approximations and simplified methods

14. Where model points representing groups of homogeneous insurance policies are used in determining policy liabilities, goodness of fit tests should be conducted to ensure the appropriateness of approximations used and the approximations do not lead to any understating of policy liabilities.

15. Simplified methods may be used for products that are immaterial, products that are not of a long term guaranteed nature or yearly renewable term products. Where simplified methods are used in determining policy liabilities, the appointed actuary should ensure that the use of such methods are appropriate and do not lead to any understating of policy liabilities.

16. For the purpose of determining whether the use of the simplified method, in particular the unearned premium reserves ("UPR"), mentioned in regulation 20(8) or regulation 20A(9) of the Regulations is appropriate, the insurer should first assess if such a method is appropriate based on the nature of the risks covered under the policies. Consideration should be given to the timing that the risks are expected to occur over the remaining term of the coverage. For example, if the risks are not expected to be broadly evenly spread, it may not be appropriate to use a portion of premiums (corresponding to the remaining term of the coverage) to approximate the liability.

VALUATION ASSUMPTIONS

Best Estimate

17. The expected future payments and receipts should be determined using best estimate assumptions for all relevant parameters.

18. The best estimate assumptions made should have regard to the experience of the insurer, with particular reference to significant aspects of recent experience.

Expenses

19. Separate assumptions should be identified for the distribution expenses and management expenses. Management expenses should include maintenance and claims handling expenses, based on the insurer's actual recent experience.

20. If the future experience is likely to be different from actual experience, allowance should be made for any potential deterioration or improvement in the future experience relating to management expenses. However, any allowance for the improvement in the projected management expenses should be supported by strong justification and should be based on projections not extending beyond 3 years from the valuation date.

Inflation Rate

21. The inflation rate should be factored into the projection of the management expenses.

22. Standard inflation is not specific to an insurer's portfolio. It is an external factor operating in the economy at large. It is appropriate to refer to publicly available information on historic wage and price inflation and economists' forecasts to estimate the future wage and price inflation rates.

Mortality and Morbidity

23. There may be an insufficient amount of claim experience data on which to reliably derive the best estimate assumptions. Partial or full weight may be given to assumptions drawn from industry data, if satisfied that such an approach is appropriate.

24. The mortality and morbidity assumptions should be broken down into appropriate grouping by sex and smoking status according to the way the premium rates are differentiated.

25. Where there are selective lapses by healthy lives for certain types of guaranteed renewable products, the deterioration of mortality and morbidity experience after the renewal of these policies should be factored in.

Lapse and Surrender rates

26. In the selection of the expected lapse and surrender rates, the insurer's experience data should be considered. The changing company practices and market conditions that may affect the lapse and surrender pattern of the policies in the future should also be taken into account.

27. Regard should be had to guaranteed renewable products where the lapse rates are likely to show a sudden and temporary increase when the premium rates are increased at renewal date.

Bonus and Dividend Rates

28. The future bonus and dividend rates assumed in the valuation should take into account the policy assets and bonus policy of the participating fund.

29. In setting the bonus and dividend rates, reference should be made to the latest bonus investigation study that supports the derivation of the current applicable bonus and dividend rates, and consider the fairness and equity among different policies.

Provision for Adverse Deviation ("PAD")

30. The PAD is the component of the value of the insurance liabilities that relates to the inherent uncertainty in the best estimate experience. As the PAD represents an additional component of the liability value, it is therefore aimed at ensuring that the value of the insurance liabilities is established at an adequate level.

31. In the valuation of any policy that provides accident and health benefits, the life insurer should calculate the PAD in respect of the part of the policy relating to accident and health benefits based on the 75 per cent level of sufficiency.

32. Where an insurer uses the simplified method, in particular the UPR, referred to in regulation 20(8) or regulation 20A(9) of the Regulations, the insurer should determine PAD in respect of premium liability as the amount of UPR in excess of best estimate liability for the purpose of computing C1 requirement.

33. Where approximations and simplifications are made, there should be additional PAD to ensure that such methods do not understate the policy liabilities.

Appendix 3B

GUIDELINES ON THE VALUATION OF POLICY LIABILITIES RELATING TO THE GENERAL BUSINESS OF AN INSURER

1. The certifying actuary should, in conducting an investigation for the purposes of section 37(1)(b) of the Act into an insurer's liabilities in respect of general insurance policies, follow the guidance set out in this Appendix in the calculation of URR and CL.

2. While the investigation carried out by the certifying actuary is conducted annually, an insurer will still need to determine the value of its policy liabilities for quarterly reporting to the Authority and to satisfy itself that it has complied with the fund solvency requirement and the capital adequacy requirement on an on-going basis. It would generally be acceptable for the insurer to assume that the results calculated by the certifying actuary for the annual investigation remains valid throughout the next accounting period if the insurer's business volume and profile, underwriting and claims process and policy, and the general business conditions have not changed significantly. Otherwise, the insurer should, depending on the extent of such change, make adjustments to the certifying actuary's calculations or conduct a full re-valuation of the policy liabilities where appropriate.

Valuation Principles

3. The valuations of an insurer's URR and CL should be made based on realistic estimates, and should reflect the individual circumstances of each insurer.

4. The BE of URR and BE of CL represent the mean value in the range of possible values for URR and CL respectively. The determination of the BEs should be based on assumptions as to future experience which reflect the experience and circumstances of the insurer and which is:

   a) made using judgment and experience;

   b) made having regard to reasonably available statistics and other information; and

   c) neither deliberately overstated nor deliberately understated.

5. No material information should be omitted from the valuation process. The Authority would consider a particular piece of information to be material to the overall result of a calculation when its misstatement or omission would cause the result to be misleading to the users of the valuation results.

6. The Authority takes the view that materiality should always be a matter requiring exercise of judgment. The level at which a difference becomes material can be considerably lower than a statistically significant difference. In these circumstances, careful exercise of judgment is expected. While it is reasonable to omit individual items on the grounds of materiality, thought should be given to the cumulative impact. Individual items should not be omitted if the overall result would be materially affected by the omissions.

Basis of Data

7. The data used in the investigation should be consistent with the data collated to the audited accounts. Any weaknesses in the data should be adjusted for.

8. The statistics should be compiled on both gross and net of reinsurance bases. Statistics on direct and indirect claims handling expenses should also be collated, where material.

Data Source and Verification

9. The data used should be appropriate for the estimation of policy liabilities.

Grouping of Risks

10. The valuation of the policy liabilities of the insurer may require the subdivision of risks into lines or divisions of lines of business with similar characteristics. The most appropriate subdivision for the purposes of the valuation should therefore be determined.

Data Adjustment

11. Where appropriate, adjustments to the data collated should be made to account for abnormal items, such as large losses.

Business Profile

12. The nature of coverage the insurer provides and the mix of risks the insurer has underwritten should be taken into account.

Underwriting Policy

13. Any change in the underwriting policy for each major line of business of the insurer should be considered. Changes in underwriting policy include changes to the selection of risks, delegation of authority, key underwriting personnel, rate levels and premium rating methodology.

Claims Policy

14. The insurer's case reserving policy, including the policy in setting initial case reserves, should be considered. Consideration should also be given to any change in the case reserving and other claims policy for each major line of business of the insurer such as the establishment of claim files, closing of claims, use of loss adjusters or loss solicitors, department structure and case load, claim authority limits and defence of complex claims.

General Business and Industry Conditions

15. The economic, technological, medical, legal, judicial and social trends within the broader community that may have an impact upon the valuation of policy liabilities should be considered.

Analysis of Experience

16. The assumptions used in the valuation process should take into account the impact of social, economic, environmental, legislative and court precedent factors. Care should also be given to any assumption that is implicit in the valuation method selected.

17. The business environment within which the insurer operates in should be factored into the assumptions on premium rate changes.

18. In relation to recoveries, the nature and spread of reinsurance arrangements, including significant changes to the arrangements and non-performance of reinsurance, should be taken into account. Non-reinsurance recoveries like salvage and subrogation should also be considered.

Deriving Best Estimates

19. In view of the inherent uncertainty in insurance business, it may often be appropriate to use more than one method to determine the BE of URR and BE of CL.

20. It is recognised that a full actuarial valuation of the URR is essentially a reunderwriting of the portfolio. Consideration should be had on whether it is appropriate or possible to complete such a valuation as is necessary for determining the CL.

21. For a reasonably stable portfolio, it is often possible to extend the CL valuation models to estimate the URR, on the basis of claims frequency, average costs, and ultimate loss ratios. If this is done, the assumptions used should be adjusted to

reflect the changes in risk exposure, underwriting standards, rate levels, and other factors on the expected claims experience.

Deriving Provision for Adverse Deviation

22. Professional judgement is often applied to determine the PAD for the insurer as a whole, and for each class of business. In determining the PAD, regard should be had to this Notice, and any other guidance note or relevant professional standard, where applicable.

Appendix 3C

DETERMINATION OF RISK-FREE DISCOUNT RATE

1. An insurer must use the risk-free discount rate in valuing liabilities in respect of non-participating policies, non-unit reserves of investment-linked policies, as well as the minimum condition liability of participating funds for the purpose of statutory reporting required under MAS Notice 129.

2. An insurer must use a three-segment approach to determine the risk-free discount rate, where the segments and discount rates within each segment must be determined as follows:

   (a) **Segment 1: Valuation date to LLP**

   For this segment, an insurer must determine the discount rate based on market information on government bonds and use an LLP set as 20 years for SGD and 30 years for USD denominated liabilities.

   (b) **Segment 2: From LLP to end of Convergence Period**

   For this segment, an insurer must determine the discount rate is based on extrapolating the risk-free forward rates between first segment and third segment. The length of Segment 2 is known as the convergence period and an insurer must set it as 40 years for SGD and 30 years for USD denominated liabilities.

   (c) **Segment 3: From the end of convergence period onwards**

   For this segment, an insurer must determine the discount rate is based on a UFR.

3. An insurer must determine the UFR as the sum of expected real interest rate and expected inflation rate. For both SGD and USD denominated liabilities:

   (a) The expected real interest rate is 1.8%; and

   (b) The expected inflation rate is 2.0%

   An insurer must use a UFR of 3.8%.

4. An insurer must obtain the risk free forward rates in Segment 2 by extrapolation using the Smith-Wilson method except that where the insurer is able to satisfy the cash flow matching requirement beyond the LLP, an insurer may commence the extrapolation immediately after the point where liability cash flows are matched.

5. For the purposes of the Smith-Wilson method, for the alpha parameter which measures the speed of convergence towards UFR, an insurer must use the lowest value (rounded up to the next 0.05) that produces a risk-free forward rate at the

commencement of Segment 3) that differs from the UFR by not more than 0.5 basis point.

6. For liabilities in other currencies, an insurer must use LLP and UFR as provided in the table below:

Table 1: LLP, Convergence Period and UFR to use liabilities denominated in other currencies besides SGD and USD

Currency		LLP	Convergence Period	UFR
AUD	Australian Dollar	30	30	3.8%
CAD	Canadian Dollar	30	30	3.8%
CHF	Swiss Franc	20	40	2.8%
CNY	Yuan Renminbi	10	50	6.0%
DKK	Danish Krone	20	40	3.8%
EUR	Euro	20	40	3.8%
GBP	Pound Sterling	50	30	3.8%
HKD	Hong Kong Dollar	15	45	4.4%
IDR	Rupiah	10	50	8.0%
INR	Indian Rupee	10	50	7.0%
JPY	Yen	30	30	3.8%
KRW	Won	20	40	4.4%
MYR	Malaysian Ringgit	15	45	5.0%
NOK	Norwegian Krone	10	50	5.0%
NZD	New Zealand Dollar	20	40	4.8%
PHP	Philippine Peso	10	50	7.0%
SAR	Saudi Riyal	15	45	6.0%
SEK	Swedish Krona	10	50	3.8%
THB	Baht	10	50	5.0%
TWD	New Taiwan Dollar	10	50	4.4%
ZAR	Rand	30	30	7.0%

Appendix 3D

CONDITIONS TO BE MET BY THE MATCHING ADJUSTMENT PORTFOLIO

1. An insurer must ensure that the liabilities for guaranteed benefits of the products within the MA portfolio, and assets assigned to back the liabilities for the guaranteed benefits of products in the MA portfolio, meet the conditions set out in this Appendix.

Area	Conditions to be Met by the MA Portfolio
Eligible Assets	(1) An insurer may, subject to the conditions set out below, assign the following assets to meet the cash flow matching requirement specified in sub-paragraphs (19) to (24) and must not assign any other assets to meet the cash flow matching requirement: (a) Singapore Government Debt Securities ("SGS") or SGD corporate debt securities of investment grade quality, including SGD debt securities issued by any Singapore Statutory Board. Where an insurer includes SGD debt securities issued by a Singapore Statutory Board, the insurer must ensure that the modified MA computation takes into account that the credit spread adjustment applied for SGD debt securities issued by a Singapore Statutory Board is only half of the credit spread adjustment for a corporate debt security in Class A; (b) US treasury securities or USD corporate debt securities of investment grade quality; (c) Cash denominated in SGD or USD; and (d) Bonds without a rating from a recognised ECAI (and this may include private debt), where the insurer has an internal rating model or process which can meet the criteria set out in **Appendix 4D**. ***Guidelines:*** *1. Eligible assets only need to be held to meet the cash flow matching requirement specified in sub-paragraphs (19) to (24). Other assets (e.g. equities) which are not considered eligible assets can be counted towards meeting the guaranteed liabilities that are in excess of the eligible assets.*

Area	Conditions to be Met by the MA Portfolio
	Guidelines: *2. The computation of the modified MA taking into account the credit spread adjustment for SGD debt securities issued by a Singapore Statutory Board has been built into the MA workbook.* (2) An insurer may use USD Treasury Securities or USD corporate debt securities to back SGD liabilities, subject to the insurer putting in place a currency swap to convert the resulting USD payments to SGD cash flows. An insurer must ensure that the currency swap is only recognised up to its expiry, and must not assume the currency swap will be rolled forward. Where there is no currency swap, or after the expiry of a currency swap, the insurer must apply a 12% haircut to cash flows would be imposed in the assessment of the cash flow mismatch test specified in sub-paragraphs (19) – (24). ***Guidelines:*** *3. Other currency-hedging instruments which impose a contractual obligation to deliver the underlying currencies (such as currency forwards and futures) may be recognised in addition to currency swaps. The Authority will consider the acceptability of such combinations of assets on a case-by-case basis.*
	(3) An insurer must ensure that eligible assets only have fixed cash flows (in terms of timing and currency). Fixed cash flows refers to cash flows that would not vary from that specified by the contractual agreement of the instrument. Instruments with cash flows that vary in accordance to interest rate changes would not meet the criteria of fixed cash flows. (4) Instruments with cash flows that are not contractually fixed are not eligible on a standalone basis.

Area	Conditions to be Met by the MA Portfolio
	Guidelines: *4. Combinations of instruments may produce outcomes that are deemed equivalent to being contractually certain, and be considered eligible assets. For example, a floating rate bond may be paired with an interest rate swap. Where such a combination of assets is used, the cash flows from the combination of assets will only be recognised up to the point of being equivalent to contractually certain. The Authority will consider the acceptability of such combinations of assets on a case-by-case basis.* (5) (a) In relation to callable bonds, an insurer must only recognise cash flows before the first call in the cash flow matching criteria. (b) In relation to floating rate bonds, an insurer must only recognise fixed cash flows before the first coupon reset date in the cash flow matching criteria.
	(6) An insurer must explicitly identify and separately manage assets in the MA portfolio (consisting of eligible assets and other assets) from the other assets in the insurance fund, to ensure that the assets in the MA portfolio are not exposed to the risk of forced sale to support liabilities other than that within the MA portfolio. An insurer need not separately manage assets to meet non-guaranteed benefits as they are not required to be a part of the MA portfolio. ***Guidelines:*** *5. Ring-fencing in the legal sense such as establishing a separate insurance fund for a MA portfolio, is not necessary, as long as the insurer is able to explicitly identify and manage the assets separately from the other assets in the insurance fund, to ensure that these assets are not exposed to the risk of forced sale to support other liabilities.* (7) An insurer must manage the eligible assets as close as possible to a buy-and-hold strategy, with the objective of holding the assets to maturity. An insurer must ensure that eligible assets meet the

Area	Conditions to be Met by the MA Portfolio
	constraints on extent of cash flow matching as specified in sub-paragraphs (19) – (24). An insurer may meet the portion of the liabilities for guaranteed benefits above the value of the eligible assets using other assets. An insurer must determine guaranteed liabilities as the minimum condition liability calculated using risk-free discount rate including MA, but before the inclusion of the provision for adverse deviation ("PAD") and an insurer may value guaranteed liabilities as less than zero. ***Guidelines:*** *6. Under the buy-and-hold strategy, one would expect to hold the bond to maturity. However, there may be valid circumstances under which assets may be transferred out of the MA portfolio:* *a) When there is a significant likelihood of the asset being downgraded over the next 3 months;* *b) When the liability cash flows used in the cash flow matching requirement are revised due to changes in assumptions; or* *c) When actual claims could not be met by cash and scheduled asset payments in the MA portfolio.* (8) Where there are significant asset or liability movements in the MA portfolio within the month, the insurer must update the calculation of the MA on a monthly basis. An insurer must specify the threshold for significant asset or liability movements in the insurer's governance documentation that the insurer is required to submit to the Authority in accordance with **Appendix 3E**. ***Guidelines:*** *7. Under the MA framework, where liabilities have predictable cash flows and the assets backing these liabilities can be held to maturity, insurers should not be affected by short-term market volatility. When an asset is removed from the MA portfolio, for example by selling the asset or transferring the asset out of the portfolio, the insurer will be exposed to market volatility, and hence the liabilities would no longer be able to "earn" the*

Area	Conditions to be Met by the MA Portfolio
	original spread associated with the MA. Hence there is a need to recompute the MA on a more frequent basis.
Eligible products	(9) An insurer may only apply MA to direct life insurance business written in participating and non-participating insurance funds, save that an insurer must not apply MA to investment-linked products. (10) An insurer may only apply MA to products denominated in SGD or USD and must not apply MA to any other products.
	(11) An insurer must apply a predictability test each calendar quarter to ensure liabilities remain eligible. An insurer may perform the predictability test using data at an earlier point in time than the valuation date, but an insurer must not apply the predictability test earlier than one month prior to the valuation date. Where data at an earlier point is used, an insurer must make adjustments to take into account significant transactions in the intervening period. An insurer must submit the results of the predictability test to the Authority together with the Quarterly Returns, and Annual Returns which must be submitted in hard copy, as specified in MAS Notice 129. ***Guidelines:*** *8. The insurer may submit the results of the predictability test in the MA Workbook provided by the Authority.* (12) An insurer may structure MA portfolios according to specific investment pools. An insurer may define assets and liabilities in each investment pool. (13) An insurer must evaluate predictability based on the aggregate change in the liabilities of the MA portfolio, measured against future cash outflows as specified in sub-paragraph (17) in response to the following shocks: (a) Mortality; (b) Longevity;

Area	Conditions to be Met by the MA Portfolio
	(c) Disability; (d) Dread Disease; (e) Other Insured Events; and (f) Lapse (excluding mass lapse event) (14) An insurer must value the liabilities for non-participating products as the sum of the liabilities corresponding to the products, before the application of the PAD, based on the risk-free discount rate, and an insurer may value the liabilities for non-participating products as less than zero. (15) An insurer must value the liabilities for participating products based on guaranteed benefits using the sum of the minimum condition liabilities, before the application of the PAD, based on the risk-free discount rate, and an insurer may value the liabilities for participating products as less than zero. (16) An insurer must apply a magnitude of the shocks that is the same as the corresponding C1 shocks. An insurer must use the same correlation matrix used to determine the diversified C1 requirements for life business to determine the net increase in liabilities. (17) An insurer must ensure that the MA portfolio as a whole meets the following thresholds: Change in Liabilities/ Present Value of Benefits and Expenses <=15% for MA portfolios consisting entirely of single premium policies, fully paid-up policies, or both; or <=10% for others
	(18) An insurer must value the liabilities for the eligible products net of reinsurance ceded.
Constraints on extent of cash flow mismatching	(19) An insurer must perform cash flow matching up to the LLP following each valuation date. An insurer may satisfy the cash flow matching requirement using data at an earlier point in time than the valuation date, but an insurer must not use data from earlier than one month prior to the valuation date. Where data

Area	Conditions to be Met by the MA Portfolio
	at an earlier point is used, an insurer must make adjustments to take into account transactions in the intervening period. An insurer must ensure that cash flows are net of reinsurance. (20) An insurer may roll forward or reallocate excess cash flows from the matching assets over liabilities, excess premium income, or both to meet shortfalls in later years but the yield of the MA portfolio used to determine the MA must be adjusted accordingly. (21) An insurer can compute interest at the corresponding risk-free forward rates on any excess cash flows or excess premium income reallocated. ***Guidelines:*** *9. The key risk is that excess cash flows in earlier years may not be available to meet shortfalls in later years. This can happen for example, if the excess cash flows were not maintained in cash but were instead invested in instruments such as corporate debt securities. This may then require such bonds be liquidated at some point in the future to meet the expected cash flow shortfalls (or part of it), which exposes the insurer to market risk or credit spread fluctuations. The adjustment to the yield of the MA portfolio is then made to reflect this risk.* *10. An example has been included in **Appendix 3H** to illustrate how the yields can be adjusted due to the reallocation of excess cash flows to subsequent years.* *11. The impact of excess cash flow reallocation is taken into account in the calculation of MA in the MA Workbook.* (22) An insurer must ensure that revised MA arising from the reallocation is not higher than the original MA. (23) An insurer must ensure that the cash flow shortfall does not exceed 15% in aggregate.

<table>
<tr><th>Area</th><th>Conditions to be Met by the MA Portfolio</th></tr>
<tr><td></td><td>(24) Where an insurer has relied on the reallocations of excess asset cash flows or excess premium income or both to meet the cash flow matching criteria specified above, the insurer must adjust the MA calculation is downwards to reflect the risk that these cash flows could only be invested in eligible assets that earn less than the full spread of the MA portfolio. An insurer must perform this adjustment by recognising the excess asset cash flows and excess premium income that are reallocated, as a notional asset class that earns less than the full spread of the assets in the MA portfolio. An insurer must ensure that the excess asset cash flows and excess premium income that are reallocated will only earn 75% of the spread in the MA portfolio.</td></tr>
<tr><td>Other Requirements</td><td>(25) For a particular MA portfolio, an insurer must determine the MA as the average yield of the assets backing the liabilities for guaranteed benefits over the average risk-free discount rate, less the spreads for default and downgrade set out in the MA workbook.

(26) An insurer shall apply the MA in full up to the LLP, as a parallel upward adjustment to the spot risk-free discount rate. An insurer must value the MA as 10 basis points from year 10 onwards after the LLP.

(27) Within the period of 10 years immediately after the LLP, the insurer must amortise the difference between the MA and 10 bps downwards in accordance with the following table:

<table>
<tr><td>Year</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr>
<tr><td>Factor</td><td>95%</td><td>90%</td><td>80%</td><td>70%</td><td>55%</td><td>40%</td><td>25%</td><td>12%</td><td>3%</td><td>0%</td></tr>
</table>
However, where the insurer is able to satisfy the cash flow matching requirement beyond the LLP, an insurer may commence the tapering over 10 years immediately after the last point where liability cash flows can be matched.

<u>Guidelines:</u>

12. The calculation of the MA has been built into the MA workbook.</td></tr>
</table>

Area	Conditions to be Met by the MA Portfolio
	(28) Credit Spread Widening Test: (a) Under this test, an insurer must apply a credit spread widening scenario ("scenario") of 150 bps to the MA portfolio. An insurer must revalue the assets and liabilities within the MA portfolio accordingly. Under the scenario, the insurer must correspondingly increase the IP floor by 75 bps for corporate debt securities (as specified and calculated in accordance with paragraph 3.4.14). (b) An insurer must compare the net difference between the assets and liabilities ("net difference") of the MA portfolio before the application of the scenario ("pre-stress net difference") and after the application of the scenario ("post-stress net difference"). (c) An insurer must ensure that the post-stress net difference must not exceed the pre-stress net difference. Where the post-stress net difference is larger than the pre-stress net difference, the insurer must make the necessary adjustments to the asset and/or liability cash flows in the MA portfolio such that the post-stress net difference does not exceed the pre-stress net difference. ***Guidelines:*** *13. The adjustments specified in sub-paragraph (28)(c) may include actions such as increasing the eligible assets of the MA portfolio.* *Other methods may be considered, such as applying a haircut to the MA. The insurer is should consult the Authority on the appropriateness of the adjustments.* (d) An insurer must submit the pre-stress and post-stress results to the Authority each calendar quarter together with the Quarterly Returns, and Annual Returns which must be submitted in hard copy, as specified in MAS Notice 129. Where the MA is updated more frequently than quarterly,

Area	Conditions to be Met by the MA Portfolio
	an insurer must make an assessment to ensure the outcome in (c) continues to be met within the calendar quarter.

Appendix 3E

GOVERNANCE REQUIREMENTS ON USE OF MATCHING ADJUSTMENT

1. An insurer must put in place the following:

   a) Governance process for ensuring that the assets in the MA portfolio continually meet the requirements set out in **Appendix 3D**. At the minimum, this must include the following:

      (i) Process for selecting and maintaining the assets in the MA portfolio;

      (ii) Process for managing the assets in the MA portfolio, including circumstances where assets can be sold or added to the portfolio; and

      (iii) Process for maintaining the replication of expected cash flows.

   b) For MA portfolios open to new business, the process for determining the inclusion of new assets into the MA portfolio to replicate the expected cash flows of new policies added to the MA portfolio.

   c) Governance processes to properly identify and manage the assets and liabilities of the MA portfolio separately from other assets and liabilities of the insurance fund, to ensure that the assets of the MA portfolio are not exposed to the risk of forced sale to support other liabilities other than that within the MA portfolio.

   d) Governance processes to ensure that MA is computed correctly.

   e) Steps which can be taken to restore compliance, should the insurer be unable to comply with the conditions in **Appendix 3D**, and any conditions imposed by the Authority as specified in paragraph 3.4.7.

2. The team of executive officers or committee delegated with responsibility over the MA portfolio must approve the governance requirements as set out in paragraph 1 of this Appendix. The governance requirements must be confirmed by the external auditor to be adequate annually. For the purpose of obtaining the approval from the Authority as specified in paragraph 3.4.7, the confirmation can be provided by an independent and qualified reviewer;

Guidelines:

1. A reviewer is "independent" where the reviewer is not involved in the MA portfolio management and computation, and may be a person from local/regional teams with the required level of expertise.

2. A "qualified" reviewer will include (but is not limited to) a person who has experience in areas such as investment management and actuarial valuation.

3. For every calendar quarter other than the year-end calendar quarter, an insurer must conduct reviews to ensure that:

   a) The insurer complies with the criteria in **Appendix 3D**; and

   b) The insurer has managed the MA portfolio in accordance with the governance requirements in paragraph 1 of this Appendix.

   The insurer must engage personnel who are not involved with the management of the MA portfolio, and who possess sufficient expertise to conduct the review.

Guidelines:

3. The review should be conducted by a person who is not involved in the MA portfolio management and computation, and may be conducted by a person from local/regional teams with the required level of expertise.

4. A person who possesses "sufficient expertise" will include (but is not limited) a person who has experience in areas such as investment management and actuarial valuation.

5. The review may be outsourced to an external party. Where this has been done, there should be qualified personnel independent of the management of the MA portfolio to assess the quality of work done by the external party. The insurer is ultimately responsible for the outcome of the review.

4. For every calendar year-end quarter, the insurer must engage an external auditor to conduct reviews to ensure to ensure that:

   a) The insurer complies with the criteria in **Appendix 3D**; and

   b) The insurer has managed the MA portfolio in accordance with the governance requirements in paragraph 1 of this Appendix.

Guidelines:

6. *In conducting the review specified in paragraphs 3 and 4, the thoroughness of the review should commensurate with the nature and complexity of the MA portfolio. For example, if the MA portfolio is more significant and complex, more sampling may need to be done to ensure the accuracy of the source data and the calculation of the MA. As a guide, the review should include sample checks which cover the following at the minimum:*

a) *Asset and liability cash flows used in the cash flow matching requirement;*

b) *Results of predictability test;*

c) *Value of eligible assets used to determine asset yield component of MA;*

d) *Value of liabilities used to determine liability yield component of MA;*

e) *Correct risk-free forward rates have been used accumulating cash flows for the purpose of cash flow matching;*

f) *Correct asset yields have been used to calculate the average spreads for default and downgrade;*

g) *Correct asset weights have been used to calculate the average spreads for default and downgrade and MA'*

Appendix 3F

SUBMISSION REQUIREMENTS FOR APPROVAL OF USE OF MATCHING ADJUSTMENT

1. For the purpose of obtaining the Authority's approval for the use of MA on a MA portfolio:

   a) An insurer must provide the Authority the following in respect of the MA portfolio:

      (i) Two completed MA Workbooks as follow:

         A. A MA workbook containing information based on a recent point in time (to be specified by the insurer); and
         B. A separate MA workbook containing information after the application of the Credit Spread Widening test specified in **Appendix 3D**.

      (ii) The completed Asset and Simplified Balance Sheet Workbook containing details of:

         A. The eligible assets assigned to the MA portfolio, with details based on the same point in time as that referred to in sub-paragraph a)(i)A; and
         B. The simplified balance sheet of the MA portfolio containing information based on the same point in time as in sub-paragraph a)(i)A, and information after the application of the Credit Spread Widening test specified in **Appendix 3D**.

      (iii) A description of the products in the MA portfolio, and whether the portfolio is open or closed to new business;

      (iv) Proportion of business included in the MA portfolio. The proportion may be determined based on a suitable metric such as amount of coverage, or guaranteed liabilities;

      (v) Expected increase in CAR arising from the application of MA to the products in the MA portfolio;

      (vi) A copy of the governance processes set out in paragraph 1 of **Appendix 3E**;

      (vii) Evidence of approval from the team of executive officers or committee delegated with responsibility over the MA portfolio as specified in

paragraph 2 of **Appendix 3E** and evidence of deliberation on the insurer's MA portfolio management;

Guidelines:

1. The approval may be granted by the insurer's Asset Liability Committee or Investment Committee, which has responsibility of the MA portfolio. Evidence of such approval can be in the form of meeting minutes that show the discussion and approval of the relevant documentations.

(viii) Confirmation from an independent and qualified reviewer as specified in paragraph 2 of **Appendix 3E**;

(ix) Any other relevant information that the insurer considers to be necessary for assessment and decision by the Authority;

(x) An appropriate memorandum stating how the MA portfolio meets the conditions in **Appendix 3D** and how the insurer intends to meet the conditions in **Appendix 3D**; and

(xi) Confirmation from an independent and qualified reviewer stating that the insurer has met with the conditions set out in **Appendix 3D**, which is accompanied by the following:

A. Description by the reviewer of the review conducted (including the checks done); and

B. Summary of the results of the review by the reviewer.

Guidelines:

2. A reviewer is "independent" where the reviewer is not involved in the MA portfolio management and computation, and may be a person from local/regional teams with the required level of expertise.

3. A person with the "required level of expertise" will include (but is not limited to) a person who has experience in areas such as investment management and actuarial valuation.

b) Where an insurer seeks approval for more than one MA portfolio, the insurer must provide the required information as specified in sub-paragraph a) in respect of each MA portfolio.

c) Where an insurer fails to provide all of the requested information and documents as set out in sub-paragraph a), the application will be deemed to be incomplete.

Guidelines:

4. The Authority's assessment will commence from the date of complete submission of all information and documents to the Authority.

5. The Authority's assessment may take up to 10 weeks from the date of complete submission of all information and documents to the Authority. Where approval is sought for more than one MA portfolio, a longer time period may be required.

d) Notwithstanding the submission requirements specified in sub-paragraph a), the Authority may request for additional information or documentation during the course of its review.

2. For the purpose of obtaining the Authority's approval for the use of MA on a MA portfolio, where the insurer adds a product (which was not previously included in the portfolio) to the MA portfolio or where the insurer adds an asset class (which was not previously included in the portfolio) into the MA portfolio. An insurer must submit the items in paragraph 1.a) to the Authority with updates in tracked changed format.

Guidelines:

5. The Authority' assessment process may take up to 4 weeks from the date of submission of all documents to the Authority. A longer time may be required depending on the nature of the change.

Guidelines:

6. The documents specified in this Appendix should be submitted via an email attachment to the insurer's liaison officer, using AES 256 encryption or higher. The insurer should deliver the corresponding alphanumeric password of minimum 12 characters in length or encryption key via a separate transmission channel (e.g. telephone) to the Authority.

Appendix 3G

DETERMINATION OF ILLIQUIDITY PREMIUM

Determination of IP

1. An insurer must calculate the actual IP applicable to it at the insurance fund level taking into account of the Strategic Asset Allocation ("SAA") extracted from the latest board-approved investment policy ("calculated fund level IP"). Where a range exists for the strategic asset allocation for each of the asset class, an insurer must use the central allocation. Where the SAA is differentiated by product segment or product line, an insurer may apply an IP that varies by product segment or product line ("segment-specific IP").

2. An insurer must apply the calculated fund level IP, or segment-specific IP as the case may be, to the spot risk-free discount rates for eligible products in the insurance fund.

3. For corporate debt securities, an insurer must apply an IP of 65 basis points for valuation dates on or after 31 December 2022. The IP for prior valuation dates were:

Valuation Dates	**Applicable IP**
On or after 31 March 2022, and prior to 31 December 2022	75 basis points
Prior to 31 March 2022	55 basis points

[MAS Notice 133 (Amendment) 2022]

[MAS Notice 133 (Amendment No.2) 2022]

Guidelines:

Assuming an IP of 55 bps, the following example illustrates how the fund level IP is determined up to the LLP, for a participating fund and non-participating fund with SAAs that are differentiated by the respective fund. Where the SAA is differentiated by product segment or product line, the IP may vary by product segment or product line. In such cases, the IP is determined in a similar manner to the above example, but at the product segment or product line level instead of the fund level:

	Participating Fund		Non-Participating Fund	
	SAA (%)	IP (%)	SAA (%)	IP (%)
Corporate Debt Securities	40%	0.55%	60%	0.55%
Government Debt Securities	25%	0%	25%	0%
Equities	20%	0%	10%	0%
Property	5%	0%	0%	0%
Policy Loan	5%	0%	0%	0%
Cash and deposits	5%	0%	5%	0%
Fund Level IP (Weighted Average)	**100%**	**0.22%**	**100**	**0.33%**

From the example above, the fund level IPs are 22 bps and 33 bps for the participating fund and non-participating fund respectively.

[MAS Notice 133 (Amendment No.2) 2022]

Duration of IP

4. An insurer must apply the in full up to the LLP, as a parallel upward adjustment to the spot risk-free discount rate.

5. An insurer must apply an IP of 10 basis points from year 10 onwards after the LLP.

6. Within the period of 10 years immediately after the LLP, an insurer must amortise the difference between the IP and 10 basis points in accordance with the following table:

Year	1	2	3	4	5	6	7	8	9	10
Factor	95%	90%	80%	70%	55%	40%	25%	12%	3%	0%

Appendix 3H

EXAMPLE OF ROLLOVER OF EXCESS CASH FLOWS TO LATER YEARS AND IMPACT TO MA PORTFOLIO YIELD

In the first example below, there is an excess cash flow in year 1 of $26. The second example allows for this excess to be reallocated to meet future cash flow shortfalls of 30 from years 6 - 10. Costs of default and downgrade are ignored in this example. Excess premium income from liability cash flows can be reallocated to meet future shortfalls, though not shown here. The reallocated excess cash flow will further result in a reduction in MA to reflect the risk that excess cash flows could only be invested in eligible assets that earn less than the full spread of the MA portfolio, but not shown here for simplicity.

Note that the total asset cash flows (1,276) is less than liability cash flows (1,280), but the excess cash flow at time 1 has been rolled forward with interest (assumed here to be 2%) to meet future cash flow shortfalls. The details of how excess cash flows can be utilised to meet future cash flow shortfalls have been built in the MA Workbook.

Example 1: No rolling forward of Excess

			Cash Flow										
	Yield	**Value**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
Asset Cash Flow	3.74%	-1,000	76	50	50	50	100	190	190	190	190	190	1,276
Liability Cash Flow	2.24%	-1,100	50	50	50	50	100	195	195	195	195	200	1,280
Cash Flow Shortfall			0	0	0	0	0	5	5	5	5	10	30
Excess Cash Flow			26	0	0	0	0	-5	-5	-5	-5	-10	

Example 2: Allow rolling forward of Excess

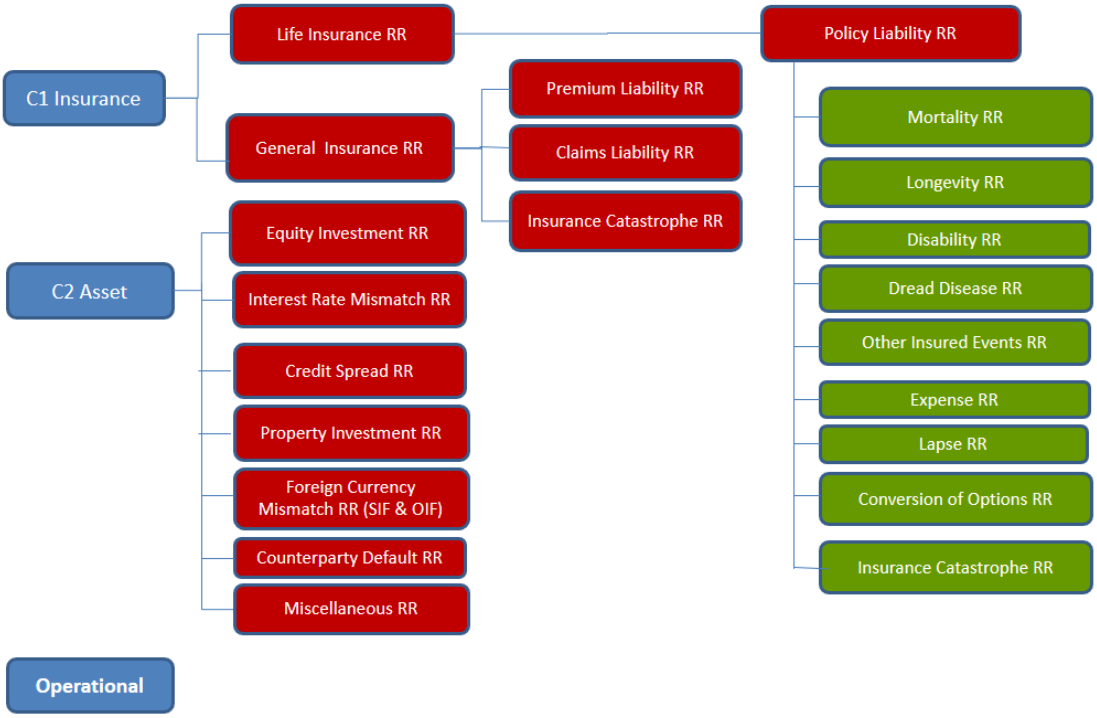
			Cash Flow										
	Yield	**Value**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
Asset Cash Flow	3.74%	-1,000	76	50	50	50	100	190	190	190	190	190	1,276
Adj Asset Cash Flow	3.70%	-1,000	50	50	50	50	100	195	195	195	195	200	1,280
Liability Cash Flow	2.24%	-1,100	50	50	50	50	100	195	195	195	195	200	1,280
Cash Flow Shortfall			0	0	0	0	0	0	0	0	0	0	
Accumulated excess cash flow			26.00	26.52	27.05	27.59	28.14	23.71	19.18	14.56	9.86	0.05	
MA	1.46% = Adjusted Asset Yield (3.70%) - Liability Yield (2.24%)												

Excess cash flow at time 1 accumulated with interest

Appendix 4-I

SCHEMATIC OVERVIEW OF RISK REQUIREMENTS

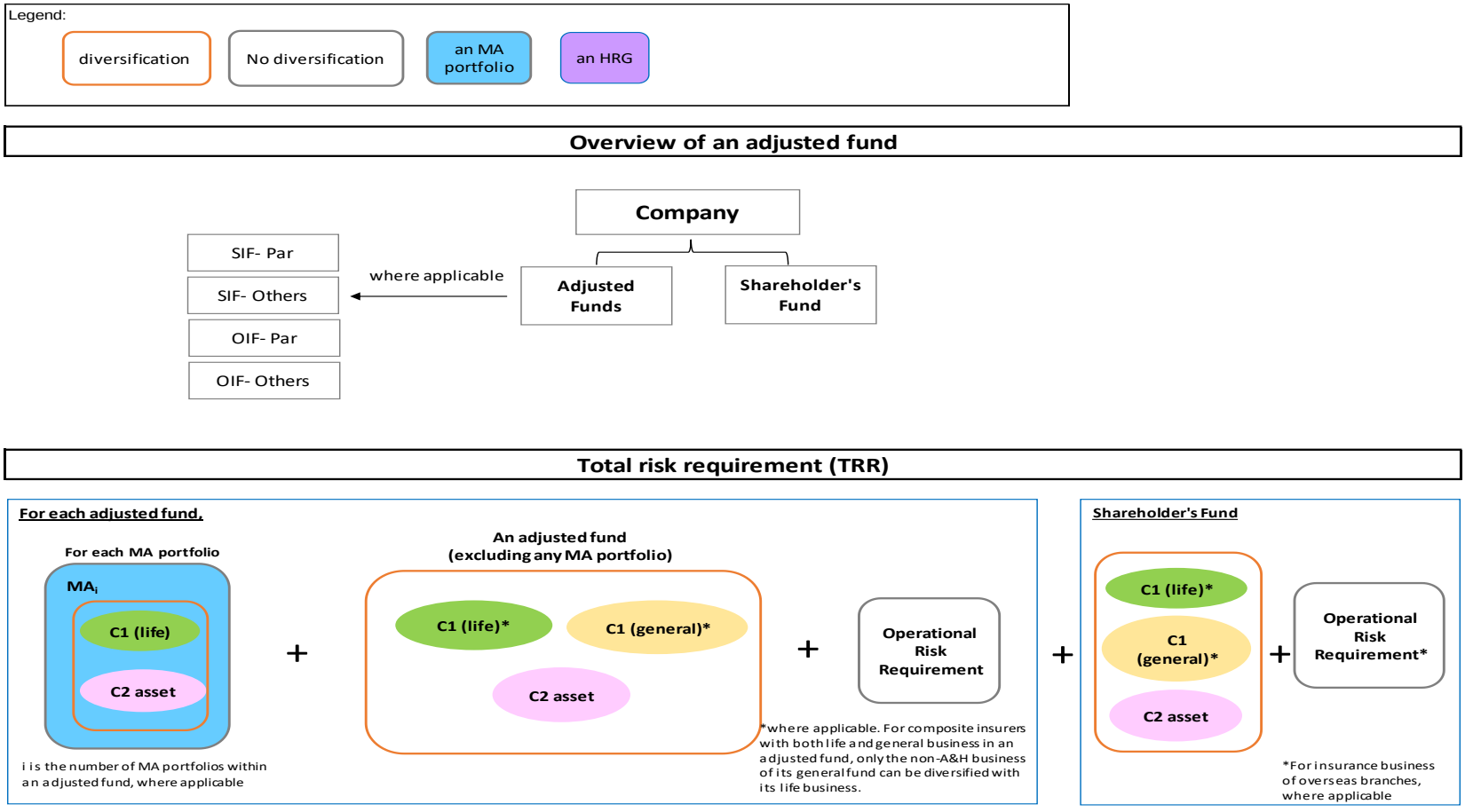
Diagram 1: Risk Modules Making up Total Risk Requirement under Section 4



Note: RR refers to Risk Requirements

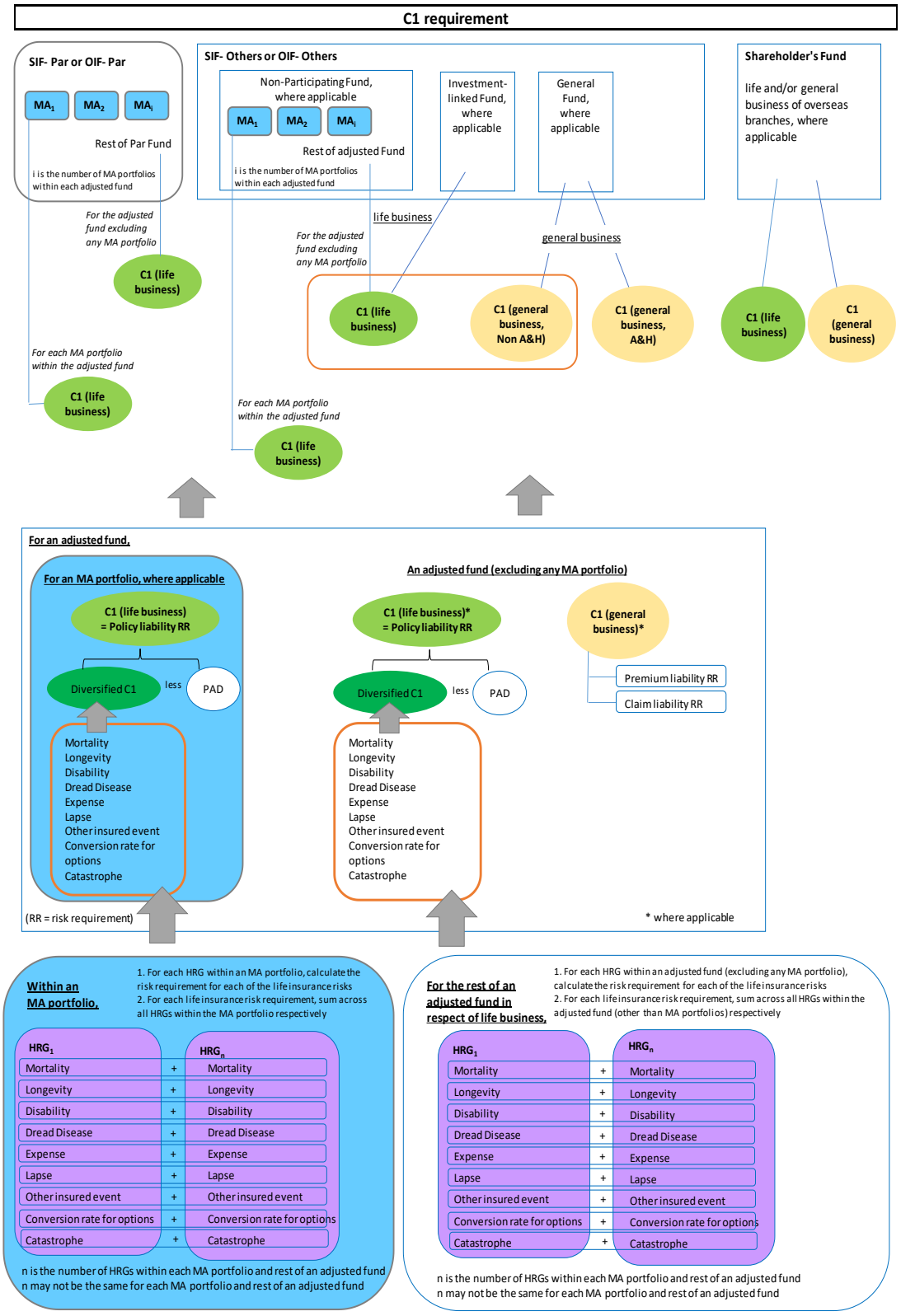
Appendix 4-II

SCHEMATIC VIEW OF CALCULATING TOTAL RISK REQUIREMENT FOR AN INSURER



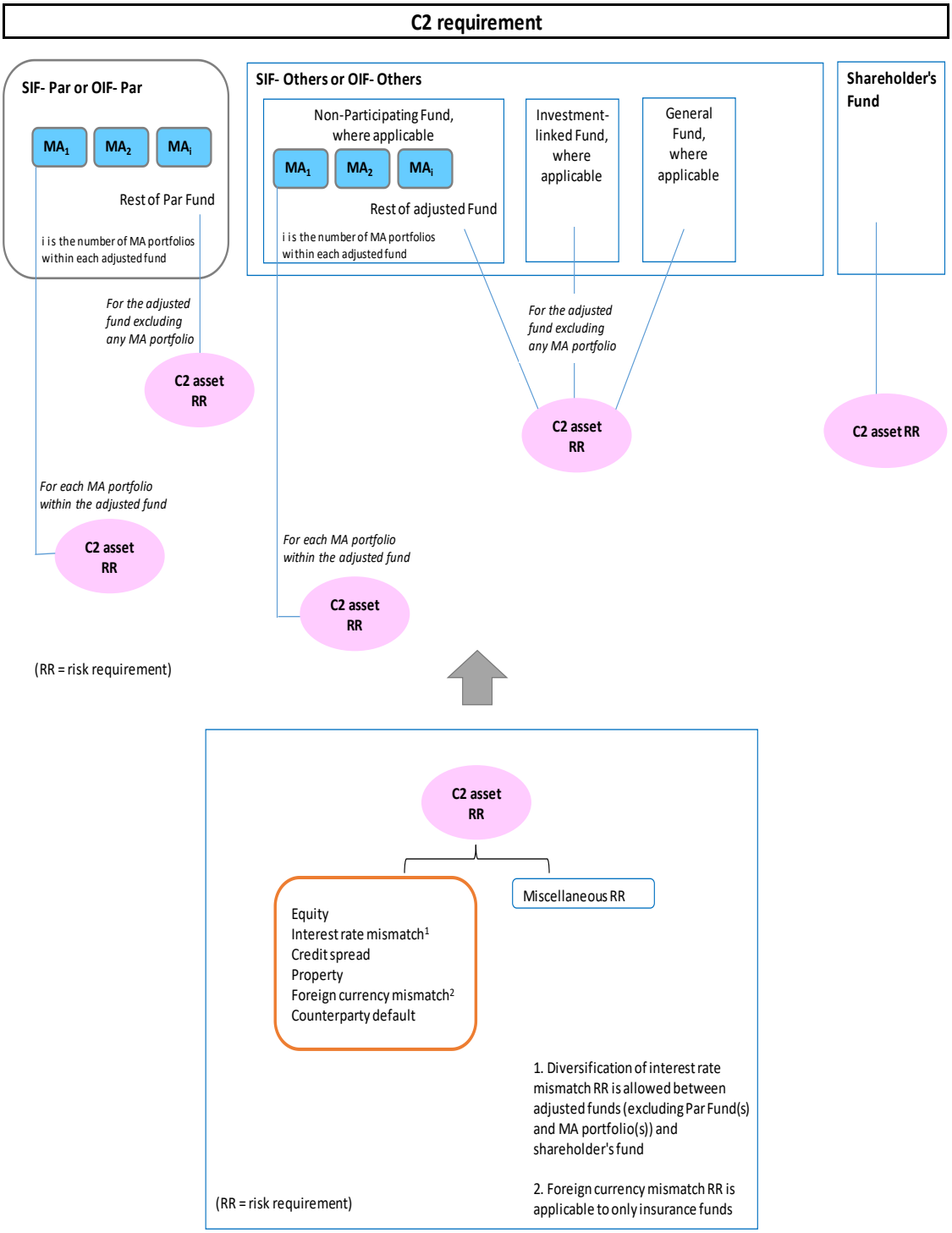
Appendix 4-III

SCHEMATIC VIEW OF AGGREGATING C1 REQUIREMENT



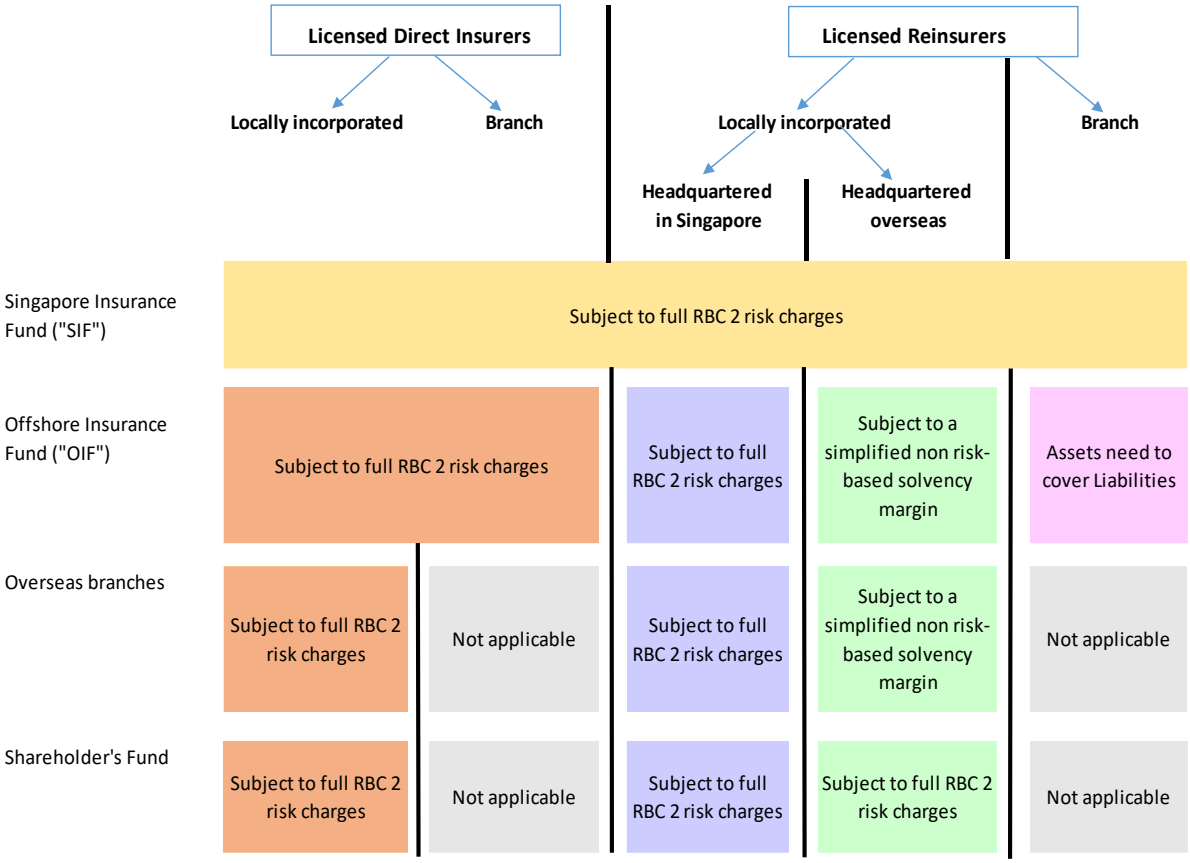
Appendix 4-IV

SCHEMATIC VIEW OF AGGREGATING C2 REQUIREMENT



Appendix 4-V

SCHEMATIC OVERVIEW OF APPLICABILITY OF RBC 2



[MAS Notice 133 (Amendment) 2020]

Appendix 4A

PREMIUM LIABILITY AND CLAIM LIABILITY RISK FACTORS BY VOLATILITY CATEGORIES

TABLE 1 — PREMIUM LIABILITY RISK FACTOR AND CLAIM LIABILITY RISK FACTOR

Volatility Category	Premium Liability Risk Factor	Claim Liability Risk Factor
Low	124%	120%
Medium	130%	125%
High	136%	130%

TABLE 2 — VOLATILITY CATEGORY (EXCLUDING POLITICAL RISK)

Volatility Category	*Business lines — Singapore insurance fund*	*Business lines — Offshore insurance fund*
Low	a) Personal Accident b) Health c) Property	
Medium	a) Cargo b) Motor c) Employers' Liability d) Surety e) Engineering f) Credit/Credit-Related (excluding Mortgage) g) Others — Non-liability class	a) Cargo b) Property c) Credit/Credit-Related (excluding Mortgage) d) Engineering
High	a) Marine Hull b) Aviation Hull c) Professional Indemnity d) Public Liability/Product Liability e) Others – Liability class	a) Marine Hull b) Aviation Hull c) Motor d) Liability and others (excluding political risk).

Note:

In this Table -

"Aviation Hull", "Cargo", "Credit/Credit Related", "Employers' Liability", "Engineering", "Health", "Marine Hull", "Motor", "Personal Accident", "Product Liability", "Professional Indemnity", "Property", "Public Liability", and "Surety" have the same respective meanings given in paragraph 2 of MAS Notice 129

"Mortgage" means an insurer's insurance business in Singapore relating to mortgage insurance policies

TABLE 3— VOLATILITY CATEGORY
(POLITICAL RISK)

Volatility Category	*Domicile of the risk — in Singapore*	*Domicile of the risk — outside Singapore*
Low	Political risk	
High		Political risk

Appendix 4B

TREATMENT OF COLLECTIVE INVESTMENT SCHEMES

1. For Collective Investment Schemes ("CIS"), an insurer may calculate the asset risk charge by looking-through to the underlying assets held by the CIS and treating the asset holdings as separate and distinct investments. An insurer shall use updated data to conduct the look-through. An insurer must then subject each of these assets to the relevant C2 risk module.

[MAS Notice 133 (Amendment) 2020]

2. An insurer may perform the look-through using data at an earlier point in time than the valuation date, but no earlier than one month prior to the valuation date, unless otherwise approved by the Authority.

Guidelines:

1A. For property funds, the data used for the look-through should not be earlier than 1 month prior to the valuation date. However, the valuations of the properties used in the look-through data may be older than 1 month, provided that the most recent property value is used, and the real estate investment trusts ("REITs") comply with the Code on CIS for property funds.

[MAS Notice 133 (Amendment) 2020]

3. For CIS which invests a portion or entirely in debt securities or debt derivatives, an insurer may treat the underlying debt securities which are of the same currency as a single debt security and calculate the risk charges based on the relevant risk modules by assuming the average maturity, coupon and credit quality of the debt securities or debt derivatives.

Guidelines:

1. For the purposes of paragraph 3,

a) where groupings are according to duration bands, an insurer should ensure that the durations assigned to the bands are demonstrably prudent.

b) where groupings across different credit quality steps are used, an insurer should ensure that the credit quality steps assigned to the groups are demonstrably prudent.

4. An insurer may allocate the underlying exposures with reference to the investment mandate of the scheme subject to the insurer ensuring that for the purposes of the

risk requirement computation, the allocation is done in such a manner that produces the maximum overall capital requirement. In computing the risk requirement, the insurer must assume that the CIS invests, to the maximum extent allowed, in the asset class that attracts the highest risk requirement, and that the CIS thereafter continues making investments in descending order until the maximum total investment level is reached.

5. Where an insurer chooses not to adopt the look-through approach, either based on the actual allocation of the underlying exposures or the investment mandate, the insurer must apply a 50% risk charge to the market value of the CIS.

6. Where an insurer adopts a look-through approach, the insurer must retain evidence to demonstrate that the proposed allocation of the investment exposure of the CIS into the relevant asset class meets the requirement in paragraph 4. An insurer must provide such evidence to the Authority upon request.

Guidelines:

2. *Below illustrates an example on how an insurer should make reference to the investment mandate of the CIS when deriving a suitable risk charge.*

   A CIS has a mandate that states that it invests 20-30% in listed Singapore equities and 70-80% in equities listed in Other Markets.

   For risk charging purposes, since equities that are listed in "Other markets" attract a higher risk charge,it should be assumed that the CIS invests 20% in listed Singapore equities and 80% in equities listed in Other Markets in order to produce the maximum overall capital requirement for the CIS.

   The resulting risk charge for the entire CIS is therefore (20% x 35%) + (80% x 50%) = 47%

3. *The insurer should consult the Authority should there be any uncertainty on the risk requirement treatment for its CIS holdings.*

Appendix 4C

RECOGNISED MULTILATERAL AGENCIES

Name of Multilateral Agency

1. The African Development Bank
2. The Asian Development Bank
3. The Bank for International Settlements
4. The European Bank for Reconstruction and Development
5. [Deleted by MAS Notice 133 (Amendment) 2020]
6. The European Investment Bank
7. The Inter-American Development Bank
8. The International Bank for Reconstruction and Development (The World Bank)
9. The International Finance Corporation
10. The International Monetary Fund

Appendix 4D

APPROACHES FOR RECOGNISING INSURER'S INTERNAL CREDIT RATING MODEL AND PROCESS FOR UNRATED CORPORATE DEBT SECURITIES

1. An insurer may recognise the internal credit rating of its corporate debt securities derived based on its internal credit rating model, in accordance with Approach 1. An insurer may use an internally derived credit rating for its unrated corporate debt security, derived based on its internal credit rating process, in accordance with Approach 2 below. An insurer must apply the internal credit rating derived under either approach to the credit spread risk adjustment for credit spread risk requirement computation, computed in accordance with paragraph 4.3.3.3. For avoidance of doubt, for bonds issued by Singapore statutory boards and recognised multilateral agencies, an insurer must apply a credit spread of 50% of that proposed for corporate debt securities with Credit Quality Class A, unless the insurer is of the view that it would not be prudent to do so.

Guidelines:

1. In assessing whether it will be prudent to apply a credit spread of 50% of that proposed for corporate debt securities with Credit Quality Class A, an insurer should consider applying a higher credit spread for bonds issued by Singapore statutory boards and recognised multilateral agencies, than what is stated above, where the insurer's internal credit rating model or internal credit rating process yields a poorer credit quality.

For example, if the internal credit rating process rates a bond issued by Singapore statutory boards and recognised multilateral agencies to be of Credit Quality Class D, then the insurer may consider using a credit spread risk adjustment for Credit Quality Class D.

A. Approach 1: Full recognition under internal credit rating model

2. An insurer that wishes to adopt an internal credit rating model to recognise the internal credit rating of its corporate debt securities must apply in writing to the Authority.

3. Upon receiving an application under paragraph 2, the Authority may—

(a) Grant approval subject to such conditions or restrictions as may be imposed by the Authority; or

(b) Refuse to grant approval.

4. Without affecting any other matter that the Authority may consider relevant, the Authority may in determining whether to grant its approval under paragraph 3(a), have regard to the following criteria:

   (a) The application and definition of default under the model;

   (b) The definition of model parameters and their derivation, such as probability of default, and where relevant, loss given default and exposure after default;

   (c) The minimum requirements on information and data used for deriving estimates of model parameters;

   (d) The model validation standards.

5. The Authority shall not grant approval under paragraph 3(a) unless the insurer has derived the probability of default parameter used in the insurer's internal credit rating model.

6. An insurer that has received approval under paragraph 3(a) to adopt an internal credit rating model must apply the internal credit rating derived from such model to all its externally rated and unrated corporate bonds and must not apply the default credit spread risk adjustment in between Credit Quality Class D and Class E for unrated corporate debt securities, as specified in paragraph 4.3.3.3f).

7. An insurer that has received approval to adopt an internal credit rating model under paragraph 3(a) must comply with such other conditions as may be specified by the Authority by notice in writing in respect of the adoption of such a model.

Guidelines:

2. MAS is an integrated supervisor and the criteria to fulfil for full recognition of internal credit rating should be aligned where relevant across different types of financial institutions. The requirements for a full recognition of internal credit rating model will be similar to those set out in MAS Notice 637, including but not limited to Annex 7X, 7Y, 7AA, 7AB.

3. Interested insurers intending to seek approval for such an internal credit rating model are encouraged to engage MAS early.

B. **Approach 2: Partial recognition under internal credit rating process**

8. Subject to paragraphs 9 and 10, an insurer with an internal credit rating process may recognise a credit rating derived from such internal credit rating process for any

unrated corporate debt security (other than investments in unrated infrastructure debt security and unrated structured product), where the insurer satisfies all of the following conditions:

(a) The insurer must satisfy all the governance-based criteria set out in **Appendix 4E**;

(b) The insurer must notify the Authority at least 3 months prior to recognising any credit rating derived from its internal credit rating process;

(c) The insurer must provide the Authority with written confirmation at least 3 months prior to recognising any credit rating derived from its internal credit rating process that the governance criteria set out in **Appendix 4E** have been met;

(d) The insurer must only use scoresheets developed by or with ECAIs recognised by the Authority set out in **Appendix 4J** for insurers in the internal credit rating process unless the Authority has directed by notice in writing that an alternative approach be used;

Guidelines:

4. Insurer should have an established internal credit rating process and the ratings should be used pervasively in internal credit risk management and other significant business decisions of the insurer relating to credit risk.

9. Notwithstanding paragraph 8, an insurer must not recognise any internal rating that is better than Credit Quality Class D equivalent (as set out **Appendix 4K**) for any unrated corporate debt security, even if the internal credit rating is better. Where the insurer's internal credit rating process results in an internal credit rating that is worse than the default rating of average of Credit Quality Class D and Class E (as set out in **Appendix 4K**), the insurer must use its internal credit rating.

10. The Authority may derecognise the insurer's internal credit rating process, if the insurer does not, or subsequently does not, comply with the criteria set out in **Appendix 4E.** Upon being notified in writing of the Authority's derecognition, an insurer must cease to recognise any internal credit rating derived from any such derecognised internal credit rating process immediately.

Guidelines:

5. Reasons for the carve out of investments in unrated infrastructure debt security and unrated structured product are mainly due to the lack of expertise on insurers for rating such investments compared to a plain vanilla corporate bonds, as well as less pool of similar assets that are externally rated for insurers to back-test against their own rating methodology to meet validation requirements.

6. The Authority will separately consult on the treatment of infrastructure investments and structured products.

Appendix 4E

CRITERIA FOR RECOGNITION OF INTERNAL CREDIT RATING PROCESS ("PROCESS") FOR UNRATED DEBT SECURITIES UNDER PROPOSED APPROACH 2

1. Board Oversight

a) The Board must be responsible for ensuring that the governance around the process is adequate, including ensuring that process is being used for its intended purpose and that applicable controls are put in place, and that these controls remain adequate on an ongoing basis. An insurer must inform its Board and ensure that the Board understands the objectives, basis and the controls in place for the process. The insurer must ensure that the information provided to the Board is adequate for the Board to perform its roles effectively.

b) The Board may delegate some of its responsibilities with respect to the process to senior management or staff, or committees comprising senior management or staff. However, the Board must continue to exercise oversight to ensure that its delegated responsibilities are effectively carried out.

c) The insurer must inform the Board of any material changes to the process. The insurer must also inform the Board of any material exceptions from established policies and procedures, or weakness, in respect of process.

Guidelines:

1. For example, persistent occurrences of material differences between realised and predicted outcomes of ratings should be reported. This could happen when back-testing of internal ratings consistently differ from external ratings.

2. Senior Management Oversight

a) The insurer must ensure that the senior management of the insurer exercises active oversight to ensure the continuing appropriateness of the process and its use.

b) The insurer must inform its senior management and ensure that the senior management understands the design and operation of the process and its use. The insurer must ensure that material aspects of these areas and material differences between established procedure and actual practice, are approved by the senior management and significant issues are reported by the senior management to the Board on a regular and timely basis.

c) The insurer must establish comprehensive and adequate written policies and procedures relating to the oversight and control of the process and its use. At a minimum, these policies and procedures must include –

i) The roles and responsibility of the Board, senior management and other personnel involved in the process;

ii) The internal control processes and independent oversight of the design and operation of the process and its use;

iii) The matters which the insurer considers material and the authority and approval levels for these matters; and

iv) The frequency and level of detail of reporting to the Board.

d) The senior management must ascertain, on an ongoing basis, that the process –

i) Provides for an assessment of the characteristics of the debt security exposures of the insurer, and a differentiation of risk; and

ii) is consistent with all applicable rules and regulations as well as established internal policies.

e) The senior management and staff in the credit risk control function must meet regularly to discuss the consistency of rating assignments, areas for improvement, and the status of efforts to improve previously identified deficiencies.

Guidelines:

2. The senior management and staff in the credit risk control function should meet at least annually to discuss the consistency of rating assignments, areas for improvement; and at least quarterly on the status of efforts to improve previously identified deficiencies.

f) The senior management must ensure that the staff responsible for any aspect of the model, including rating assignments, credit risk control and internal validation, are adequately qualified and trained to undertake their respective roles.

3. Regular reporting to Board and Senior Management

a) The insurer must integrate internal ratings into regular reporting to the Board and senior management on the changes in risk profile of its corporate debt securities. The insurer must ensure that the depth and frequency of information provided to its Board and senior management is commensurate with the operations, size and risk profile of the insurer.

b) At a minimum, the insurer must ensure that the Board and senior management get regular reports on the following material bond portfolios –

i) Risk profile by internal grade;

ii) Risk rating migration across grades with emphasis on unexpected results;

iii) Results of internal validation, including results of replication tests performed to check for systemic biases in rating assignments; and

iv) Reports from internal audit and credit risk control functions on material issues.

Guidelines:

3. Reports for the purposes of paragraphs 3a) and 3b) should be given to the Board and senior management on a quarterly basis.

4. Credit Risk Control Function

a) The insurer must establish a credit risk function that is responsible for the design or selection, implementation and rating assignment activities and reporting on the effectiveness of the framework. The insurer must ensure that the credit risk function is structurally and functionally independent from the personnel and management functions responsible for originating exposures.

b) The insurer must ensure that the evaluation of the performance and remuneration of the credit risk control unit takes into consideration how well the credit risks are managed.

Guidelines:

4. For example, insurer should consider the reliability of ratings derived and consistency of ratings.

c) The credit risk control function must have oversight and supervision responsibilities of the process, and ultimate responsibilities for the ongoing assessments of the performance of and alterations to the process.

5. Internal validation

a) An insurer must be able to demonstrate to the satisfaction of the Authority upon request, that its internal validation process enables it to assess the performance of its internal rating process consistently, and its internal validation is robust and likely to remain so. For the purposes of this paragraph, "internal validation process" refers to the range of processes and activities that contribute to the internal assessment of the insurer of whether it is capable of deriving consistent and appropriate ratings.

b) The insurer must perform regular internal validation of its process (at least annually).

c) The insurer must ensure that the internal credit rating process is consistent with external ratings by ECAIs recognised by the Authority set out in **Appendix 4J** and must back-test samples of internal ratings for externally rated corporate debt securities. The insurer must also ensure that the internal credit rating process is consistent across portfolios. For the purposes of this paragraph, the internal credit rating process is consistent across portfolios if the internal rating derived from the internal credit rating process across portfolios are comparable and reflects the risk level consistently across different portfolios.

Guidelines:

5. For example, the internal credit ratings should reflect risk levels consistently across different portfolios, such as across sectors or geographical locations.

d) The insurer must ensure that no person responsible for the design or implementation of the process for a class of exposures participates in the validation work relating to that class of exposure.

6. Independent review of internal validation

a) The insurer must ensure that the Internal Audit reporting to the Audit Committee reviews the internal validation processes and that the Internal Audit ascertains that, that the validation processes are implemented as designed and are effective. In performing this role, Internal Audit may seek

the assistance of other internal or third party specialists, as long as overall responsibility remains with Internal Audit. Internal Audit must not use any internal or third party specialists that are involved in or are responsible for –

i) the design, selection or implementation of the process used for that class of exposures; and

ii) the origination of exposures for that class of exposures.

b) The insurer must ensure that Internal Audit conducts regular reviews (at least annually) of the ongoing validation of internal ratings.

7. <u>Documentation</u>

a) The insurer must ensure that the all internal validation checks are comprehensively documented.

b) The insurer must keep documentation of the rating criteria, which at the minimum, must include all of the following:

i) The rationale for the choice of rating criteria, including analysis demonstrating that the rating criteria and procedures are likely to result in ratings that differentiate risk, and that the rating criteria have taken all relevant and material transaction characteristics into account;

ii) The rationale for assigning a corporate debt security to a particular rating where more than one rating methodology is used;

iii) The relationship between corporate debt security grades in terms of the level of risk each grade implies, and the risk of each grade in terms of both a description of the probability of default typical for corporate debt securities assigned to that grade and the criteria used to distinguish that level of credit risk;

iv) Any report produced in respect of any periodic review of rating criteria and procedures to determine whether the rating criteria remain fully applicable to the current portfolio taking into account external conditions.

c) The insurer must keep documentation of the rating process, which at the minimum, must include all of the following:

i) The responsibilities of the parties that rate and approve rating grades;

ii) The definition of what constitutes a rating exception and override, and the situations where exceptions and overrides can be used and the approval authorities for such exceptions and overrides;

iii) The frequency of rating reviews, including the policy on refreshing relevant criteria;

iv) The history of significant changes in the rating process to enable easy identification of any changes made to the rating process; and

v) The organisation of rating assignment, including the internal control structure.

Appendix 4F

TREATMENT OF COLLATERAL AND GUARANTEES

1. Where the insurer holds eligible collateral against an asset or an asset has been guaranteed, the insurer may recognise the effects of these risk mitigants and may reduce risk requirements accordingly in accordance with this Appendix.

Collateral

2. Where collateral satisfies all of the requirements in paragraph 3 ("eligible collateral"), an insurer may consider such eligible collateral held against an asset in place of the asset. Where the risk-adjusted value of the collateral, as calculated in paragraphs 4 and 5, does not fully cover the full value of the asset an insurer may only replace the covered portion and must not replace the uncovered portion.

3. For the purposes of paragraph 2, the requirements are as follows:

   (a) the collateral must be held by the insurer as security for the whole of the liabilities of the reinsurance counterparty under the contracts of reinsurance to which the collateral relates;

   (b) under the terms of the agreement under which the collateral is provided, the reinsurance counterparty must not withdraw the collateral so long as any liability mentioned in sub-paragraph (a) is secured on the collateral but may reduce the value of the collateral in the event of, and in proportion to, a reduction in such liability;

   (c) in the case of an insurer licensed to carry on life business, the collateral must only relate to that business and the deduction must relate to liabilities secured thereon; and

   (d) in the case of an insurer licensed to carry on general business, the collateral must only relate to that business and the deduction must relate to liabilities secured thereon.

4. An insurer must determine the risk-adjusted value of eligible collateral by multiplying the value of the collateral in column 1 in the table below and with the collaterisation factor in column 3:

Table 1: Table of Collaterals with Corresponding Collaterisation Factors

Collateral (Column 1)	Haircut (Column 2)	Collaterisation Factor (Column 3)
Cash or cash value of a policy loan	0%	100%

Collateral (Column 1)	Haircut (Column 2)	Collaterisation Factor (Column 3)
Security issued by a government or a public authority	5%	95%
Corporate debt securities in Credit Quality Class A and Class B	10%	90%
Corporate debt securities in Credit Quality Class C and Class D	15%	85%
Security listed on a securities exchange	30%	70%
None of the above	100%	0%

[MAS Notice 133 (Amendment) 2020]

5. Where the collateral is denominated in a different currency from that the liabilities secured are denominated in, an insurer must reduce its risk-adjusted value further by 12%.

Guidelines:

An example of how collateral should be treated:

Assuming -

Value of asset = $600, and

Collateral is in the form of cash of $500

Risk adjusted value of collateral = $500 (based on 100% x $500)

The insurer would need to compute counterparty default risk requirement on the cash collateral. The remaining $100 of the asset shall be risk-charged accordingly.

6. For the purposes of this Appendix, "security issued by a government or a public authority" means a debt security which -

(a) is issued or fully guaranteed by the Government;

(b) is issued or fully guaranteed by a central government or central bank of a country or territory which has a sovereign rating of investment grade; or

(c) is issued or fully guaranteed by a central government or central bank of a country or territory which does not have a sovereign rating of investment

grade, is denominated in the national currency of that country, and has a residual maturity of 12 months or less.

Guarantees

7. An insurer may take credit for a guarantee where the guarantee is—

   (a) Direct;

   (b) Explicit;

   (c) Irrevocable;

   (d) Unconditional; and

   (e) Legally enforceable for the remaining term to maturity of the asset.

8. The insurer may use the credit rating of the third party guarantor when determining the stresses to be applied to the asset under credit spread risk sub-module and counterparty default risk sub-module.

9. Where a guarantee does not cover the full value of the asset, an insurer must determine the risk requirements on the unprotected portion using the credit rating of the original counterparty.

Appendix 4G

TREATMENT OF STRUCTURED PRODUCTS AND DERIVATIVES

Structured Products

1. For the purposes of this Appendix, "structured products" refer to investments that—

   a) provide exposure to an underlying reference portfolio of assets or risks, where the risks can be in the form of any security, index or currency; and

   b) typically take the form of a tranche exposure, and includes credit-related securitisation exposures and insurance linked securities.

Guidelines:

1. Examples of structured products include Residential Mortgage-Backed Securities, Asset-Backed Securities and catastrophe bonds.

2. An insurer must apply counterparty default risk requirement to structured products and compute the counterparty default risk requirement based on the credit rating of the product offeror. An insurer must apply the counterparty default risk charge to the market value of each structured product.

3. In calculating the market-related risk requirements for structured products, an insurer must do either of the following:

   a) An insurer must adopt a look-through approach and apply the relevant risk module. To account for volatility and illiquidity risk of structured product, an insurer must apply a 50% premium on the derived market risk requirement;

   b) An insurer must apply a fixed 50% risk charge on the entire marked-to-market value of the investment.

Guidelines:

2. Where a look-through approach is adopted, structured product can be decomposed into different equivalent bundles of cash and derivative holdings.

4. An insurer must retain evidence to demonstrate that the proposed allocation of market risk exposure of the structured product into the relevant risk charge requirements in section 4.3 on C2 requirement in this Notice reflects the risk nature of the asset. An insurer must provide such evidence to the Authority upon request.

Equity Derivatives

5. An insurer must convert its equity derivative instruments into notional positions in the relevant underlying equity instruments and use the current market value of the underlying instruments to calculate its market risk capital requirement for equity position risk.

a) In the case of an equity derivative instrument that is an equity option, the insurer must calculate its market risk capital requirement for an equity option by –

(i) Identifying the option and the associated underlying financial instrument;

(ii) Calculating the market risk capital requirement for combination of long put and long outright position in underlying instrument by calculating the product of the market value of the outright position and the equity risk stress factor, and subtracting the amount that the option is in-the-money from that product;

(iii) Calculating the market risk capital requirement for each long call or long put as-

A. Market value of underlying instruments multiplied by equity risk stress factor; or

B. market value of option,

whichever is lower; and

(iv) Summing the market risk capital requirements determined in (ii) and (iii) above.

b) In the case of an equity swap,

(i) where the insurer receives an amount based on change in value of a single equity or equity index, the insurer must assume a notional long position in the equity or equity index in calculating the market risk capital requirement; and

(ii) where the insurer pays an amount based on change in value of another equity or equity index, the insurer must assume a notional short position in the equity or equity index in calculating the market risk capital requirement.

Interest Rate Derivatives

6. An insurer must convert its interest rate-related derivatives into notional positions in the relevant underlying instruments, and use the current market value of the principal amount of the underlying instruments to calculate its interest rate mismatch risk requirement.

7. An insurer must convert its credit derivatives into notional positions in the relevant reference obligations, and use the current market value of the principal amount of the reference obligations to calculate its interest rate mismatch risk requirement.

8. In the case of an interest rate swap, where an insurer receives fixed rate and pays floating rate, an insurer must treat the interest rate swap as the sum of the following:

   a) notional short position in a government debt with coupon equal to floating rate and maturity equal to next reset date; and

   b) notional long position in government debt with coupon equal to fixed rate of swap and maturity equal to maturity of swap.

Credit Derivatives

9. In the case of a credit derivative which is part of an insurer's risk mitigation policy, the insurer need not subject the credit derivative to a capital requirement for spread risk, where the insurer holds either of the following:

   a) the instrument underlying the credit derivative;

   b) another exposure with respect to which the basis risk between that exposure and the instrument underlying the credit derivative is less than 10%at all times.

10. In all other cases, an insurer must apply a capital treatment founded on the substitution approach, to a credit derivative, where the protected portion of a counterparty exposure is assigned the credit quality class of the guarantor or protection provider, while the uncovered portion retains the credit quality class of the underlying counterparty.

Foreign Currency Derivatives

11. In the case of a foreign exchange forward or futures contract, an insurer must treat the foreign exchange forward or futures contract (as the case may be) as two notional currency positions:

a) A long notional position in the currency which the insurer has contracted to buy; and

b) A short notional position in the currency which the insurer has contracted to sell,

where each notional position has a value equal to the present value of the amount of each currency to be exchanged in the case of a foreign exchange forward or futures contract, as the case may be.

All Derivatives

12. To avoid doubt, the counterparty default risk requirement will still apply for all derivatives.

Appendix 4H

CREDIT EXPOSURE FACTORS

1. An insurer must determine the "credit exposure factor" in accordance with the table below, and paragraphs 2 and 3.

Type of transaction	Residual maturity of contract	Credit exposure factor
(1) Physical commodity contracts	(a) 12 months or less 10%	10%
	(b) more than one year but not more than 5 years	12%
	(c) more than 5 years	15%
(2) Equity contracts	(a) 12 months or less	6%
	(b) more than one year but not more than 5 years	8%
	(c) more than 5 years	10%
(3) Foreign exchange contracts *(other than leveraged foreign exchange contracts which are subject to margin requirements)* or gold contracts	(a) a contract with original maturity of 14 calendar days or less	0%
	(b) 12 months or less, except a contract with original maturity of 14 calendar days or less	1%
	(c) more than one year but not more than 5 years	5%
	(d) more than 5 years	7.5%
(4) Interest rate contracts	(a) 12 months or less	0%
	(b) more than one year but not more than 5 years	0.5%
	(c) more than 5 years	1.5%

2. In the case of contracts with multiple exchange of principals, an insurer must multiply the credit exposure factor obtained from the table above by the number of remaining payments in the contract.

3. In the case of a single currency floating or floating interest rate swap, an insurer must apply a credit exposure factor of zero.

Appendix 4I

RECOGNITION OF EXTERNAL CREDIT ASSESSMENT INSTITUTIONS ("ECAI")

1. The Authority may recognise an ECAI if the Authority –

(a) is satisfied that the ECAI meets the recognition criteria set out under paragraph 5[3] below; and

(b) has received a letter of support from an insurer stating that it intends to use the external credit assessments of that ECAI for the purpose of calculating regulatory capital requirements pursuant to this Notice.

2. The recognition of an ECAI by the Authority is for the sole purpose of enabling an insurer to calculate regulatory capital requirements pursuant to this Notice, and must not be taken as regulation of the ECAI or licensing or approval of the ECAI to do business in Singapore.

3. The Authority may revoke its recognition of an ECAI if the ECAI no longer meets the criteria set out in this Notice.

4. The list of recognised ECAIs for insurers is currently set out in **Appendix 4J**.

5. **Recognition Criteria**

5.1 Objectivity: The methodology for assigning credit assessments of a recognised ECAI must be rigorous, systematic and subject to validation based on historical experience. Credit assessments must be subject to ongoing review and responsive to changes in financial condition of the entity assessed. An assessment methodology for each market segment, including rigorous backtesting, must have been established for at least one year, and preferably at least three years. In this regard –

(a) the ECAI must document and have procedures in place to ensure that its assessment methodologies are applied consistently in the formulation of all credit assessments in a given asset class, industry sector or region[4];

(b) the ECAI must establish a credit assessment committee with formalised terms of reference to approve credit assessments that have been recommended by credit assessment analysts. The ECAI must also have an independent internal

[3] For this purpose, the Authority will consider, among others, the ECAI's adherence to the "Code of Conduct Fundamentals for Credit Rating Agencies" issued by IOSCO (revised May 2008).

[4] "Asset class" refers to categories such as loans, asset-backed securities, collateralised debt obligations, etc., "industry sector" refers to categories such as utilities, financial institutions, telecommunications, etc., and "region" refers to categories such as emerging markets, Asia ex-Japan, Europe, etc.

audit function (or a function that plays a similar role and carries out similar tasks) to assess the compliance of the ECAI with its internal policies and procedures;

(c) the assessment methodologies of the ECAI must incorporate factors that are relevant in determining an entity's creditworthiness. To the extent possible, the ECAI must be able to demonstrate that its assessment methodologies have produced accurate credit assessments in the past;

(d) the assessment methodologies of the ECAI must be based on both qualitative and quantitative approaches;

(e) the assessment methodologies of the ECAI are subject to robust and quantitative backtesting based on at least one year of historical data, and preferably three years. Other statistical studies such as transition and default matrices must be carried out periodically by the ECAI to validate its assessment methodologies over time and across different asset classes. Any systematic assessment errors identified through backtesting and other statistical reviews must be incorporated in the assessment methodologies; and

(f) the ECAI must have procedures that are written and implemented to ensure that its credit assessments are reviewed and updated at least annually or upon the occurrence of material events.

5.2 Independence: A recognised ECAI should not be subject to economic, political and any other pressures that may influence its credit assessments. The credit assessment process should be as free as possible from any constraints which could arise in situations where the composition of the board of directors or the shareholder structure of the ECAI may be seen as creating a conflict of interest. In this regard –

(a) the ECAI should have in place and implement adequate processes and safeguards to ensure that its ownership structure and board composition do not prejudice the objectivity of its credit assessments;

(b) the ECAI should not conduct any business transactions with any of the entities it assesses that could undermine the objectivity of its credit assessments;

(c) the ECAI should be able to demonstrate that its businesses, other than those incidental or synergistic to the issuance of credit assessments, are operationally separated from its credit assessment business;

(d) the ECAI should be able to demonstrate that its financial viability is not dependent on revenue generated from a few key customers;

(e) the ECAI should provide adequate disclosure of its pricing policy and any fee charged should not be dependent on the credit assessment issued;

(f) credit assessments should be made by a credit assessment committee composed of adequately qualified and experienced individuals, in accordance with the established criteria and methodology of the ECAI; and

(g) employees of the ECAI should not be in an executive position in any of the entities assessed by the ECAI and should not be compensated in a way that could lead a compromise in the objectivity of the credit assessments.

5.3 International Access and Transparency: The individual credit assessments of a recognised ECAI, the key elements underlying the assessments and whether the issuer participated in the assessment process must be publicly available on a non-selective basis, unless they are private assessments. In addition, the general procedures, methodologies and assumptions for arriving at assessments used by a recognised ECAI must be publicly disclosed.

5.4 International Access and Transparency: The individual credit assessments of a recognised ECAI, the key elements underlying the assessments and whether the issuer participated in the assessment process must be publicly available on a non-selective basis, unless they are private assessments. In addition, the general procedures, methodologies and assumptions for arriving at assessments used by a recognised ECAI must be publicly disclosed. In this regard, the individual credit assessments of the ECAI must be accessible to any insurer which intends to use them for regulatory capital calculations pursuant to this Notice and included in the ECAI's transition matrix.

5.5 Disclosure: A recognised ECAI should publicly disclose its code of conduct, the general nature of its compensation arrangements with assessed entities, its assessment methodologies (including the definition of default, the time horizon and the meaning of each credit assessment), the actual default rates experienced in each credit assessment category, and the transitions of the assessments, for example, the likelihood of "AA" ratings becoming "A" over time. In this regard –

(a) the ECAI should make public the principles of its assessment methodologies;

(b) the ECAI should publicly disclose in a timely manner, any material changes made to its assessment methodologies or any significant event that could affect its performance on any of the criteria set out in paragraphs 5.1 to 5.7;

(c) the ECAI should publicly disclose information regarding the meaning of each credit assessment category, actual default rates, transition matrices, definition of default and the time horizon for which a default is considered.

For credit assessments of securitisations, loss and cash-flow analysis as well as sensitivity of ratings to changes in the underlying ratings assumptions should be made publicly available; and

(d) the ECAI should publicly disclose whether a credit assessment was solicited or unsolicited. For the latter, the ECAI should make public its definition of an unsolicited credit assessment.

5.6 Resources: A recognised ECAI should have sufficient resources to carry out credit assessments properly. These resources should allow for sufficient ongoing contact with senior and operational levels within the entities assessed in order to add value to the credit assessments. In this regard –

(a) the ECAI should possess a sufficient number of staff members with the requisite level of analytical skills and professional experience necessary for them to perform credit assessments competently;

(b) the ECAI should be financially sound and have enough resources to invest in the necessary infrastructure required for the efficient processing of data and timely release of reliable credit assessments; and

(c) the ECAI should establish recruitment and training policies for each level of analysts under its employment.

5.7 Credibility: To some extent, credibility is derived from the criteria above. In addition, the reliance on an ECAI's external credit assessments by independent parties (e.g. investors, insurers, trading partners) would be evidence of the credibility of the assessments of the ECAI. The credibility of an ECAI is also underpinned by the existence of internal procedures to prevent the misuse of confidential information. Considerations assessed by the Authority to determine if the ECAI satisfies this criterion include:

(a) the financial viability and market share of the ECAI, especially in the market for which the ECAI is operating and is to be recognised;

(b) the level of market acceptance and reliance on the credit assessments of the ECAI;

(c) statistical data that demonstrates market reliance on the credit assessments of the ECAI (e.g. market movements in response to changes in credit assessments); and

(d) the presence of internal procedures to detect misuse or unauthorised disclosure or leakage of confidential information.

6. **Mapping Process**

6.1 The Authority will map the external credit assessments of a recognised ECAI to the credit quality classes set out in **Appendix 4K**, taking into account the quantitative and qualitative factors set out in paragraphs 6.2 to 6.5 below.

6.2 In determining the credit quality classes to which the external credit assessments of a recognised ECAI are mapped, information considered by the Authority includes –

(a) the two most recent three-year CDRs ("Cumulative Default Rate"); and

(b) the ten-year average of the three-year CDRs,[5]

of the ECAI for each of its credit assessment categories (eg. AAA, AA, A, BBB and so on), against the benchmarks recommended by BCBS set out in Tables 4I-I and 4I-II respectively.

Table 4I-I: BCBS[6] Benchmark for Comparing Two Most Recent Three-year CDRs

S&P Credit Ratings Moody's Credit Ratings	AAA-AA Aaa-Aa	A A	BBB Baa	BB Ba	B B
Monitoring Level	0.8%	1.0%	2.4%	11.0%	28.6%
Trigger Level	1.2%	1.3%	3.0%	12.4%	35.0%

Table 4I-II: BCBS Benchmark for Comparing Ten-year Average of Three-year CDRs

S&P Credit Ratings Moody's Credit Ratings	AAA-AA Aaa-Aa	A A	BBB Baa	BB Ba	B B
20-Year Average of Three-Year CDR	0.10%	0.25%	1.00%	7.50%	20.00%

6.3 Where any of the two most recent three-year CDRs exceed the 'monitoring' level set out in Table 4I-I, this implies that the ECAI's current default experience is higher than the international default experience. The Authority may consult with the relevant ECAI to understand the reason behind the higher default rates experienced by the ECAI, and may

[5] The three-year CDR refers to the sum of all defaults that have occurred in a given three-year period for all entities that have been assessed by the ECAI as belonging to the same credit assessment category. For example, in 2008, the two most recent three-year CDRs will be for the periods 2004-2006 and 2005-2007, and the ten-year average of the three-year CDRs will be the average of the three-year CDRs for the three year periods ending on each of the ten years from 1998-2007. For newly established ECAIs, the Authority may consider information on three-year CDRs for whatever number of years the ECAI has been in operation and the ECAI's projection of its long-run average of three-year CDRs.

[6] Basel Committee on Banking Supervision

adjust the mapping to the credit quality classes set out in **Appendix 4K** if the Authority considers it appropriate to do so.

6.4 Where any of the two most recent three-year CDRs exceed the 'trigger' level set out in Table 4I-I, this implies that the ECAI's current default experience is significantly higher than the international default experience. In such cases, there would be a presumption that the ECAI's credit assessment standards are weak or inappropriately applied and the Authority will generally adjust the mapping to the credit quality classes set out in **Appendix 4K**. However, the Authority may maintain the existing mapping set out in **Appendix 4K** if it is assessed that the higher CDRs experienced by the ECAI is not due to weak credit assessment standards. In such cases, the Authority may require an insurer to maintain additional capital imposed in pursuant to Section 18(4) of the Insurance Act.

6.5 While the above comparisons form the central basis for the mapping process, qualitative factors considered by the Authority that affect the comparability of CDRs include -

(a) the pool of issuers covered by the ECAI;

(b) the range of credit assessments assigned by the ECAI;

(c) the definition of each credit assessment category;

(d) the definition of default used by the ECAI;

(e) the dynamic properties and characteristics of the rating system or methodology; and

(f) the geographical coverage (i.e. use of regional or global data).

Appendix 4J

RECOGNISED ECAIS

1. The following entities are recognised as ECAIs by the Authority pursuant to **Appendix 4I**:

   a) Moody's Investor Services;

   b) Standard and Poor's Corporation;

   c) Fitch, Inc;

   d) A. M. Best Company, Inc.

Appendix 4K

CREDIT QUALITY CLASS CLASSIFICATION BY CREDIT RATING

Table 1 – Long-term credit rating scales:

Long-Term Credit Quality Class	External Credit Rating Agencies			
	Moody's Investors Services	Standard & Poor's Ratings Services	Fitch Ratings	A. M. Best Company, Inc.
Class A	Aaa	AAA	AAA	aaa
Class B	Aa1, Aa2, Aa3	From AA+ to AA-	From AA+ to AA-	From aa+ to aa-
Class C	A1, A2, A3	From A+ to A-	From A+ to A-	From a+ to a-
Class D	Baa1, Baa2, Baa3	From BBB+ to BBB-	From BBB+ to BBB-	From bbb+ to bbb-
Class E	Ba1, Ba2, Ba3	From BB+ to BB-	From BB+ to BB-	From bb+ to bb-
Class F	B1, B2, B3	From B+ to B-	From B+ to B-	From b+ to b-
Class G	Caa1 and below	CCC+ and below	CCC+ and below	ccc+ and below

Table 2 – Short-term credit rating scales:

Short-Term Credit Quality Class	External Credit Rating Agencies			
	Moody's Investors Services	Standard & Poor's Ratings Services	Fitch Ratings	A. M. Best Company, Inc.
Class A1	Not applicable	A-1+	F1+	AMB-1+
Class B1	P-1	A-1	F1	AMB-1
Class C1	P-2	A-2	F2	AMB-2
Class D1	P-3	A-3	F3	AMB-3
Class E1	NP	B and below	B and below	AMB-4

Notes:

1. An insurer may calculate its total risk requirement using ratings from one or more of the rating agencies listed above.
2. For any particular rating agency used by the insurer, the insurer must use all publicly available ratings from that agency in calculating the total risk requirement.
3. Where more than one rating agency is used by the insurer and more than one rating is available on a particular security or entity, an insurer must use the second best rating of the security or entity in calculating the total risk requirement.
4. Where the particular security or entity is not rated by any of the rating agencies used by the insurer, an insurer must not treat the security or entity as investment grade.
5. In the case where the debt security is unsecured and unsubordinated, the credit rating of the issuer of the debt security may be used in lieu of the credit rating of the debt security itself.

Appendix 4L

COUNTERPARTY RISK CLASS CLASSIFICATION BY CREDIT RATING

Table 1 on counterparty risk classes

	External Credit Rating Agencies			
Counterparty Risk Class	**Moody's Investors Services**	**Standard & Poor's Ratings Services**	**Fitch Ratings**	**A. M. Best Company, Inc.**
Class A	Aaa	AAA	AAA	aaa
Class B	Aa1, Aa2, Aa3	From AA+ to AA-	From AA+ to AA-	From aa+ to aa-
Class C	A1, A2, A3	From A+ to A-	From A+ to A-	From a+ to a-
Class D	Baa1, Baa2, Baa3	From BBB+ to BBB-	From BBB+ to BBB-	From bbb+ to bbb-
Class E	Ba1, Ba2, Ba3	From BB+ to BB-	From BB+ to BB-	From bb+ to bb-
Class F	B1, B2, B3	From B+ to B-	From B+ to B-	From b+ to b-
Class G	Caa1 and below	CCC+ and below	CCC+ and below	ccc+ and below

Notes:

1. An insurer may calculate its total risk requirement using ratings from one or more of the rating agencies listed above.
2. For any particular rating agency used by the insurer, the insurer must use all publicly available ratings from that agency in calculating the total risk requirement.
3. Where more than one rating agency is used by the insurer and more than one rating is available on a particular security or entity, an insurer must use the second best rating of the security or entity in calculating the total risk requirement.
4. Where the particular security or entity is not rated by any of the rating agencies used by the insurer, an insurer must not treat the security or entity as investment grade.

Appendix 4M

REQUIREMENTS FOR RECOGNITION OF LETTER OF CREDIT

(1) Eligible Issuers	An insurer must not recognise a letter of credit ("LC") unless it is issued by a guarantor or protection seller which is: (a) a central government, a central bank, the Bank for International Settlements, the International Monetary Fund, the European Central Bank or the European Community; (b) a Multilateral Development Bank ("MDB") as listed in **Appendix 4N**; (c) a public sector entity ("PSE"); (d) a banking institution; or (e) in the case where the credit protection is – (i) not provided for a securitisation exposure, any other entity with an external credit assessment by a recognised credit rating agency; or (ii) provided for a securitisation exposure, any other entity which has a Counterparty Risk Class C or better as set out in **Appendix 4L** at the time the credit protection was provided, and a Counterparty Risk Class D or better as set out in **Appendix 4L** during the period of recognition of the LC.
(2) Recognition of LC	An insurer must not recognise the use of an LC unless – (a) all documentation relating to the LC is binding on all relevant parties and legally enforceable in all relevant jurisdictions; (b) the insurer complies with the requirements set out in Criteria for Recognition of Guarantees at paragraph (5) below; and (c) the insurer complies with all the public disclosure requirements in Notice 124
(3) Use of Multiple Risk Mitigation Methods	An insurer must ensure that the reduction in the reinsurance adjustment, where applicable, does not exceed the notional amount of credit protection. Where the LC is denominated in a different currency from that of the secured liabilities, an insurer must reduce the notional amount of credit protection by 12% in determining the reduction in the reinsurance adjustment.

	Where an insurer uses multiple risk mitigation methods for a single exposure, the insurer must sub-divide the exposure into portions covered by each risk mitigation method and must calculate the exposure amount of each portion separately. ***Guidelines:*** *Multiple risk mitigation methods for a single exposure may include for example, both collateral and guarantee. The exposure should be sub-divided into the portion covered by each risk mitigation method, i.e. portion covered by collateral, and portion covered by the LC.* An insurer must apply the same approach when recognising eligible credit protection by a single protection provider where the eligible credit protection has differing maturities. [MAS Notice 133 (Amendment) 2020]
(4) Inadequate Compliance with the Authority's Requirements	The Authority may prohibit an insurer from fully recognising the effects of an LC if— (a) the Authority is not satisfied that the insurer has complied with the requirements in the section on Recognition of LC above; or (b) the Authority is not satisfied with the effectiveness of the LC in mitigating credit risk exposure, and the insurer must not recognise the effect of any LC to the extent of any such prohibition, and must comply with such other actions that the Authority may specify by notice in writing.
(5) Criteria for Recognition of Guarantees	For the purposes of paragraph (2), the insurer must ensure that all of the following conditions are satisfied: (a) The guarantee must be an explicitly documented obligation assumed by the guarantor; (b) The guarantee must represents a direct claim on the guarantor; (c) The guarantee must explicitly refer to a specific coverage so that the extent of the credit protection cover is clearly defined; (d) Other than in the event of non-payment by the ceding insurer in respect of the guarantee if applicable, there must be an irrevocable obligation on the part of the guarantor to pay out a

	pre-determined amount upon the occurrence of a credit event, as defined under the guarantee; (e) The guarantee must not contain any clause, the fulfilment of which is outside the direct control of the ceding insurer, that— (i) will allow the guarantor to unilaterally cancel the guarantee; (ii) will increase the effective cost of the guarantee as a result of deteriorating credit quality of the underlying exposure; (iii) may prevent the guarantor from being obliged to pay out in a timely manner in the event that the underlying obligor fails to make any payment due; or (iv) may allow the maturity of the guarantee agreed ex-ante to be reduced ex-post by the guarantor; (f) the ceding insurer must be able to pursue the guarantor for any monies outstanding under the documentation governing the transaction upon the default of, or non-payment by, the underlying obligor, and must have the right to receive such payments from the guarantor without first having to take legal action to pursue the obligor for payment; (g) the guarantee must cover all types of payments that the underlying obligor is expected to make under the documentation governing the transaction; (h) the term of the guarantee must be at least one year; and (i) the guarantee must be renewed at least 90 days prior to expiration, otherwise the guarantee must no longer be recognised in the 90 days immediately prior to the expiration of the guarantee.

Appendix 4N

QUALIFYING MULTILATERAL DEVELOPMENT BANK ("MDB")

The following entities are recognised as MDBs by the Authority pursuant to **Appendix 4M:**

1. the African Development Bank;
2. the Asian Development Bank;
3. the Asian Infrastructure Investment Bank;
4. the Caribbean Development Bank;
5. the Council of Europe Development Bank;
6. the European Bank for Reconstruction and Development;
7. the European Investment Bank;
8. the European Investment Fund;
9. the Inter-American Development Bank;
10. the Islamic Development Bank;
11. the Nordic Investment Bank;
12. the International Finance Facility for Immunisation; or
13. the World Bank Group, including the International Bank for Reconstruction and Development, the International Development Association, the International Finance Corporation and the Multilateral Investment Guarantee Agency.

Appendix 5A

MINIMUM REQUIREMENTS FOR PAID-UP ORDINARY SHARES

1. An insurer must not include a paid-up ordinary share of the insurer as CET1 Capital unless all of the following conditions are satisfied –

(a) in the event the insurer is liquidated, the holder of the ordinary share must have the most subordinated claim;

(b) in the event the insurer is liquidated the entitlement of ordinary shareholders to a claim on the residual assets must be proportional to their share of issued share capital. The claims of ordinary shareholders to residual assets must be unlimited and variable and must not be fixed or capped;

(c) the amount paid-up by ordinary shareholders must be perpetual and must not be repaid outside of liquidation but an insurer may—

(i) carry out discretionary repurchases; or

(ii) reduce capital in any discretionary manner,

that is allowable under written law;

(d) the insurer must not create an expectation at issuance that the ordinary shares will be bought back, redeemed or cancelled, and the insurer must not enter into any contract when issuing the ordinary shares, where the terms of the contract might give rise to any such right or expectation;

(e) an insurer must only pay distributions in respect of ordinary shares ("distributions") to the extent that the insurer has profits distributable under written law. The level of distributions must not be tied or linked to the amount paid-up at issuance, and must not be subject to a contractual cap, except to the extent that the insurer is unable to pay distributions that exceed the level of profits distributable under written law;

(f) there must be no circumstances under which the insurer is obliged to pay distributions and the non-payment of distributions must not be an event of default;

(g) an insurer must only pay distributions after the insurer has satisfied all its other legal and contractual obligations, and after the insurer has made payments on AT1 capital instruments and Tier 2 capital instruments. An insurer must not make any preferential distributions, including in respect of other CET1 Capital;

(h) the ordinary share takes the first and proportionately greatest share of any losses as they occur. To avoid doubt, in cases where capital instruments have a permanent write-down feature, the insurer must ensure that it meets this requirement in respect of ordinary shares. In this regard, it absorbs losses on a going concern basis proportionately and *pari passu* with all other CET1 capital instruments;

(i) the insurer must recognise the amount paid-up by ordinary shareholders as equity and must not recognise the amount paid-up by ordinary shareholders as a liability, for the purpose of determining balance sheet insolvency;

(j) the amount paid-up by ordinary shareholders must be classified as equity under the Accounting Standards;

(k) the ordinary share must be directly issued and fully paid-up in cash, and the insurer must not directly or indirectly fund the purchase of the ordinary share;

(l) the amount paid-up by ordinary shareholders must not be secured or covered by a guarantee of the insurer or any of its related corporations or other affiliates. The ordinary share must also not be subject to any other arrangement that legally or economically enhances the seniority of the claim;

(m) the ordinary share must be issued with the approval of the ordinary shareholders. The approval must either be given directly by the ordinary shareholders or, if permitted by written law, given by the board of the insurer or by other persons duly authorised by the ordinary shareholders; and

(n) the insurer must clearly and separately disclose the ordinary share on the insurer's balance sheet.

2. In the case where the insurer issues non-voting ordinary shares as part of CET1 Capital, an insurer must ensure that the non-voting ordinary shares are identical to the voting ordinary shares of the insurer in all respects, except the absence of voting rights.

Appendix 5B

MINIMUM REQUIREMENTS FOR AT1 CAPITAL INSTRUMENTS

1. An insurer must not include a capital instrument of the insurer as AT1 Capital unless all of the following conditions are satisfied:

(a) the instrument must be issued and fully paid-up in cash, and an insurer must only include the net proceeds received from the issuance of the instrument as financial resources of the insurer;

(b) the holder of the instrument must have a priority of claim, in respect of the principal and interest of the instrument in the event of a winding up of the insurer, which is lower than that of policy owners, other creditors of the insurer and holders of qualifying Tier 2 instruments, except where such persons rank equally with, or behind the holder of the instrument;

(c) the paid-up amount must not be secured or covered by a guarantee of the insurer or any of its related corporations or other affiliates, or any other arrangement, that legally or economically enhances the priority of the claim of any holder of the instrument vis-a-vis the persons set out in sub-paragraph (b);

(d) the holder of the instrument must waive the holder's right, if any, to set off any amounts the holder owes the insurer against any subordinated amount owed to him due to the instrument and the holder must commit to return any set-off amounts or benefits received to the liquidator;

(e) subject to sub-paragraph (f), the subordination provisions of the instrument must be governed by the laws of Singapore;

(f) notwithstanding sub-paragraph (e), the subordination provisions of the instrument may be subject to the laws of a jurisdiction other than Singapore, if the insurer satisfies itself that all the conditions specified in this Appendix, other than in sub-paragraphs (e) and (f), are met under the laws of that jurisdiction;

(g) the principal must be perpetual. For the purposes of this paragraph—

(i) the principal is perpetual if there is be no maturity date, and there are no step-ups or other provisions that mandate or create an incentive for the insurer to redeem the capital instrument; and

(ii) each of the following is considered an incentive to redeem:

(A) a call option combined with an increase in the credit spread of the capital instrument if the call option is not exercised;

(B) a call option combined with a requirement or an investor option to convert the capital instrument into ordinary shares if the call is not exercised; or

(C) a call option combined with a change in reference rate where the credit spread over the second reference rate is greater than the initial payment rate less the swap rate.

Guidelines:

1. *For example, if the initial reference rate is 0.9%, the credit spread over the initial reference rate is 2% (i.e. the initial payment rate is 2.9%), and the swap rate to the call date is 1.2%, a credit spread over the second reference rate greater than 1.7% (2.9% - 1.2%) would be considered an incentive to redeem.*

For avoidance of doubt, a conversion from a fixed rate to a floating rate or vice versa in combination with a call option without any increase in credit spread is not deemed an incentive to redeem. The insurer must, however, not do anything to create an expectation that the call will be exercised;

(h) subject to paragraph 2 of this Appendix, the capital instrument must be callable at the option of the insurer only after a minimum of five years from the issue date, and the insurer must comply with all of the following requirements when exercising any call option:

(i) the insurer must not exercise the call option without the prior approval of the Authority;

(ii) the insurer must not create an expectation that the call option will be exercised; and

Guidelines:

2. *For example, the Authority is not likely to grant approval for redemption where an insurer calls a capital instrument and replaces it with another capital instrument that is more costly (e.g. with a higher credit spread).*

(iii) the insurer must not exercise a call option unless -

(A) The instrument is replaced by the insurer with capital of the same or better quality, and the replacement of this capital is done at conditions which are sustainable for the income capacity of the insurer. The insurer must replace the instrument concurrently with the call of the capital

instrument, but must not replace the instrument after the capital instrument is called; or

(B) The insurer demonstrates to the Authority before the call that its capital position meets the fund solvency requirement and capital adequacy requirement as specified in regulation 4 of the Regulations and any directives issued by the Authority pursuant to section 18(4) of the Act, where applicable, after the call option is exercised.

(i) an insurer must only repay the principal with the prior approval of the Authority. The insurer must not assume or create any expectation that approval will be given by the Authority. Without prejudice to any other matter that the Authority may consider relevant, the Authority may, in determining whether to grant its approval, consider whether the insurer's capital position is likely to remain adequate after repayment;

Guidelines:

3. The repayment of principal may be done through for example, repurchases or redemptions.

(j) with regard to the dividend or coupon on the instrument—

(i) The insurer must have full discretion at all times to cancel distributions or payments. To avoid doubt, the insurer must not have any obligation to make distributions or payments in kind upon the cancellation of any distributions or payments. For the purposes of this sub-paragraph:

(A) An insurer must ensure that the instrument does not have any mechanism that obliges the insurer to make a dividend or coupon payment on the instrument, if it has made a payment on another (typically more junior) capital instrument or share ("dividend pusher");

Guidelines:

4. A dividend pusher feature is inconsistent with the requirement for the insurer to have full discretion at all times to cancel distributions or payments.

(B) To avoid doubt, the instrument may have a mechanism that stops the insurer from making a dividend on its ordinary shares or other AT1 capital instruments if a dividend or coupon payment is not paid on its AT1 capital instruments ("dividend stoppers"), provided that the insurer retains full discretion at all times to cancel distributions or payments.

(ii) any cancellation of dividend or coupon must not be an event of default;

(iii) the insurer must have full access to cancelled payments to meet obligations as they fall due; and

(iv) any cancellation of dividend or coupon must not result in restrictions being imposed on the insurer, except in relation to distributions to ordinary shareholders

Guidelines:

5. For example, restrictions which impede the insurer's ability to restructure or improve its capital position.

(k) an insurer must only pay any dividend or coupon on the instrument to the extent that the insurer has profits distributable under any written law, determined from the latest statements of account lodged with the Authority in accordance with section 36 of the Act or such other subsequent audited statements of account provided to the Authority;

(l) the instrument must not have a credit sensitive dividend feature, including a dividend or coupon that is reset periodically, based in whole or in part on the credit standing of the insurer or any insurance group entity;

(m) the instrument must not contribute to liabilities exceeding assets, if such a balance sheet test forms part of any national insolvency law governing the provisions of the instrument;

(n) where the instrument is classified as a liability under the Accounting Standards, the instrument must have either of the following principal loss absorption features–

(i) a provision under which the instrument converts to ordinary shares if the CET1 Capital of the insurer falls below 55% of the total risk requirements (excluding participating funds); or

(ii) a write-down mechanism that allocates losses to the capital instrument if the CET1 Capital of the insurer falls below 55% of the total risk requirements (excluding participating funds). The write-down must have all of the following effects:

(A) it must reduce the claim of the holder of the instrument in liquidation of the insurer;

(B) it must reduce the amount to be repaid when a call option is exercised; and

(C) it must partially or fully reduce dividend or coupon payments on the instrument;

For the purposes of this paragraph—

1. a conversion under the provision mentioned in sub-paragraph (n)(i) or a write-down under the mechanism mentioned in sub-paragraph (n)(ii) must generate CET1 Capital;

2. any aggregate amount converted in accordance with the provision mentioned in sub-paragraph (n)(i) or written down under the mechanism mentioned in sub-paragraph (n)(ii) must be at least equivalent to the amount needed to immediately return the insurer's CET1 Capital to 55% of the total risk requirements (excluding participating funds) or, if this is not possible, the amount of the full principal value of the instruments;

3. where an insurer writes down an aggregate amount under the mechanism mentioned in sub-paragraph (n)(ii), the insurer must not write the aggregate amount back up at any later point in time; and

4. the insurer must trigger the principal loss absorption features if the insurer is unable to maintain a CET1 capital of 55% or more via other means including capital injection.

(o) where an insurer issues the instrument in a foreign currency, the insurer must revalue the instrument periodically (at least monthly) in terms of Singapore dollars at the prevailing exchange rates. Where the insurer intends to use a swap to hedge the foreign exchange exposure arising from the foreign currency instrument, the insurer must consult the Authority on the capital treatment applicable to the hedge prior to such use;

(p) the insurer and all of its insurance group entities and associates must not purchase the instrument, and the insurer must not directly or indirectly fund the purchase of the capital instrument;

(q) the instrument must not have any feature that hinders recapitalisation, including provisions that require the issuer to compensate investors if a new instrument is issued at a lower price during a specified time frame. For the purposes of this paragraph, where there is a dividend stopper as defined in sub-paragraph (j)(i)(B) within the terms and conditions of the AT1 capital instrument, such a feature must not hinder the recapitalisation of the insurer.

Guidelines:

6. For example, a dividend stopper on an AT1 capital instrument must not

(a) attempt to stop payment on another capital instrument where such payments are not fully discretionary;

(b) prevent distributions to ordinary shareholders for a period that extends beyond the point in time that dividend or coupon payments on the AT1 capital instrument are resumed; or

(c) impede the normal operation of the insurer or any restructuring activity such as acquisitions or disposals.

(r) if the instrument is not issued out of an operating entity or the holding company of the insurer, the proceeds from the issuance of the instrument must be immediately available without limitation to an operating entity or the holding company of the insurer in a form which meets or exceeds all of the other requirements set out in this Appendix, for inclusion in AT1 Capital;

Guidelines:

7. For example, the instrument may be issued out of a special purpose entity.

(s) the insurer must disclose the main features of the instrument clearly and accurately to the investors of the instrument;

(t) the agreement governing the issuance of the instrument must not be amended or varied without the prior approval of the Authority where the amendment or variation may impact the instrument's eligibility as AT1 Capital.

2. The Authority may grant approval for redemption of an instrument within the first five years from the issue date where–

(a) there is a change in tax status of the instrument due to changes in applicable tax laws of the country or territory in which the instrument was issued; or

(b) there is a change relating to the recognition of the instrument as an AT1 capital instrument,

and provided that the requirements set out in paragraph 1 of this Appendix are met.

The Authority will, in determining whether to grant approval, consider whether the insurer was in a position to anticipate the event at the issuance of the instrument.

Appendix 5C

MINIMUM REQUIREMENTS FOR TIER 2 CAPITAL INSTRUMENTS

1. An insurer must not include a capital instrument of the insurer as Tier 2 Capital unless all of the following conditions are satisfied–

(a) the instrument must be issued and fully paid-up in cash, and an insurer must only include the net proceeds received from the issuance of the instrument as financial resources of the insurer;

(b) the holder of the instrument must have a priority of claim in respect of the principal and interest of the instrument, in the event of a winding up of the insurer, which is lower than that of policy owners and other creditors of the insurer, except where such persons rank equally with, or behind, the holder of the instrument ;

(c) the paid-up amount must not be secured or covered by a guarantee of the insurer or any of its related corporations or other affiliates, or any other arrangement, that legally or economically enhances the priority of the claim of any holder of the instrument vis-a-vis the persons set out in sub-paragraph (b);

(d) the holder of the instrument must waive the holder's right, if any, to set off any amounts the holder owes the insurer against any subordinated amount owed to him due to the instrument and the holder must commit to return any set-off amounts or benefits received to the liquidator;

(e) subject to sub-paragraph (f), the subordination provisions of the instrument must governed by the laws of Singapore.

(f) notwithstanding sub-paragraph (e), the subordination provisions of the instrument may be subject to the laws of a jurisdiction other than Singapore, if the insurer satisfies itself that all the conditions specified in this Appendix, other than in sub-paragraphs (e) and (f), are met under the laws of that jurisdiction.

(g) with regard to the maturity of the capital instrument:

(i) the instrument must have a minimum original maturity of at least 5 years. Where the agreement governing the issuance of the capital instrument provides for the loan to be drawn down in a series of tranches, the minimum original maturity for each tranche must be 5 years from the date of its first draw-down;

(ii) recognition of the instrument in Tier 2 Capital in its final five years to maturity must be amortised on a straight-line basis by 20% per annum in accordance with the Table 1 below. Where the capital instrument is repayable in separate

tranches, each tranche must be amortised individually, as if it were a separate loan; and

Table 1: Amortisation Schedule for a Tier 2 capital instrument

Years to maturity (x)	Amortised amount eligible to be included in Tier 2 Capital
x > 4	100%
3 < x ≤4	80%
2 < x ≤ 3	60%
1 < x ≤ 2	40%
x ≤ 1	20%

(iii) there must be no step-ups or other provisions that mandate or create an incentive for the insurer to redeem the capital instrument.

(iv) For the purposes of this sub-paragraph each of the following is considered an incentive to redeem:

(A) a call option combined with an increase in the credit spread of the capital instrument if the call option is not exercised;

(B) a call option combined with a requirement or an investor option to convert the capital instrument into ordinary shares if the call is not exercised; or

(C) a call option combined with a change in reference rate where the credit spread over the second reference rate is greater than the initial payment rate less the swap rate.

Guidelines:

1. *For example, if the initial reference rate is 0.9%, the credit spread over the initial reference rate is 2% (i.e. the initial payment rate is 2.9%), and the swap rate to the call date is 1.2%, a credit spread over the second reference rate greater than 1.7% (2.9% - 1.2%) would be considered an incentive to redeem.*

For avoidance of doubt, a conversion from a fixed rate to a floating rate or vice versa in combination with a call option without any increase in credit spread is not deemed an incentive to redeem. The insurer must, however, not do anything to create an expectation that the call will be exercised;

(h) subject to paragraph 2 of this Appendix, the capital instrument must be callable at the option of the insurer only after a minimum of five years from the issue date, and the insurer must comply with all of the following requirements when exercising any call option:

(i) the insurer must not exercise the call option without the prior approval of the Authority;

(ii) the insurer must not create an expectation that the call option will be exercised. Where this requirement is met, an option to call the capital instrument after five years but prior to the start of the amortisation period is not deemed an incentive to redeem;

Guidelines:

2. For example, the Authority is not likely to grant approval for redemption where an insurer calls a capital instrument and replaces it with another capital instrument that is more costly (e.g. with a higher credit spread).

(iii) the insurer must not exercise a call option unless -

(A) The instrument is replaced by the insurer with capital of the same or better quality, and the replacement of this capital is done at conditions which are sustainable for the income capacity of the insurer. The insurer must replace the instrument concurrently with the call of the capital instrument, but must not replace the instrument after the capital instrument is called; or

(B) The insurer demonstrates to the Authority before the call that its capital position meets the fund solvency requirement and capital adequacy requirement as specified in regulation 4 of the Regulations and any directives issued by the Authority pursuant to section 18(4) of the Act, where applicable, after the call option is exercised.

(i) the holder of the capital instrument must not have any rights to accelerate the repayment of future scheduled payments (either coupon or principal), except in a bankruptcy or liquidation of the insurer;

(j) the instrument must not have a credit sensitive dividend feature, including a dividend or coupon that is reset periodically, based in whole or in part on the credit standing of the insurer or any insurance group entity;

(k) where the insurer issues the instrument in a foreign currency, the insurer must revalue the instrument periodically (at least monthly) in terms of Singapore dollars at the prevailing exchange rates. Where the insurer intends to use a swap to hedge

the foreign exchange exposure arising from the foreign currency instrument, the insurer must consult the Authority on the capital treatment applicable to the hedge prior to such use;

(l) the insurer and all of its insurance group entities and associates must not purchase the instrument, and the insurer must not directly or indirectly fund the purchase of the capital instrument;

(m) if the instrument is not issued out of an operating entity or the holding company of the insurer, the proceeds from the issuance of the instrument must be immediately available without limitation to an operating entity or the holding company of the insurer in a form which meets or exceeds all of the other requirements set out in this Appendix, for inclusion in Tier 2 Capital;

> ***Guidelines:***
>
> *3. For example, the instrument may be issued out of a special purpose entity.*

(n) the insurer must disclose the main features of the instruments clearly and accurately to the investor of the instrument;

(o) the agreement governing the issuance of the instrument must not be amended or varied without the prior approval of the Authority where the amendment or variation may impact the instrument's eligibility as Tier 2 Capital.

2. The Authority may grant approval for redemption of an instrument within the first five years from the issue date where–

(a) there is a change in tax status of the instrument due to changes in applicable tax laws of the country or territory in which the instrument was issued; or

(b) there is a change relating to the recognition of the instrument as a Tier 2 capital instrument,

and provided that the requirements set out in paragraph 1 of this Appendix are met.

The Authority will, in determining whether to grant approval, consider whether the insurer was in a position to anticipate the event at the issuance of the instrument.

Appendix 5D

SUBMISSION REQUIREMENTS FOR AN INSURER INTENDING TO ISSUE OR RECOGNISE A CAPITAL INSTRUMENT AS CET1, AT1 OR TIER 2 CAPITAL

1. An insurer must -

(a) consult the Authority at least 3 months prior to the issuance of any capital instrument which has additional features which are not explicitly addressed in **Appendix 5A** for paid-up ordinary share as CET1 Capital, **Appendix 5B** for AT1 Capital, or **Appendix 5C** for Tier 2 Capital; and

[MAS Notice 133 (Amendment) 2020]

(b) submit all of the following documents to the Authority at least 1 month before including any issuance as CET1 Capital, AT1 Capital or Tier 2 Capital:

(i) a declaration signed by the Chief Executive of the insurer confirming –

(A) that the insurer is responsible for complying with the requirements for inclusion of the issuance of the paid-up ordinary share as CET1 Capital, issuance of the AT1 capital instrument as AT1 Capital, or the issuance of the Tier 2 capital instrument as Tier 2 Capital;

(B) that all the requirements for the inclusion of the issuance of the paid-up ordinary share capital instrument, AT1 capital instrument or Tier 2 capital instrument set out in **Appendix 5A, Appendix 5B or Appendix 5C**, as the case may be, have been met;

(C) the expected date on which the issuance would be included as CET1 Capital, AT1 Capital or Tier 2 Capital; and

(D) that the insurer is aware that the Authority may take such necessary action against the insurer, including requiring the exclusion of the issuance for inclusion as CET1 Capital, AT1 Capital or as Tier 2 Capital, if the issuance does not, or subsequently does not, comply with the requirements set out in **Appendix 5A, Appendix 5B or Appendix 5C**, as the case may be ;

(ii) all the executed agreements and offering documents governing the issuance of the paid-up ordinary share capital instrument, AT1 capital instrument or Tier 2 capital instrument;

(iii) all external legal opinions obtained in respect of the issuance of the paid-up ordinary share capital instrument, AT1 capital instrument or the Tier 2 capital instrument stating that the requirements in **Appendix 5A**, **Appendix 5B** or **Appendix 5C**, as the case may be, have been met;

(iv) a memorandum of compliance stating how the issuance complies with each of the requirements set out in **Appendix 5A, Appendix 5B** or **Appendix 5C**, as the case may be, and identifying the relevant portions of the agreements and offering documents governing the issuance of the paid-up ordinary share capital instrument, AT1 capital instrument or Tier 2 capital instrument which address each requirement;

(v) where the agreements and offering documents governing the issuance of the paid-up ordinary share capital instrument, AT1 capital instrument or Tier 2 capital instrument are governed by the laws of a jurisdiction other than Singapore, a written external legal opinion from an advocate and solicitor qualified to practise Singapore law, that he has reviewed all the agreements and offering documents governing the issuance, including any legal opinion from foreign law practitioners provided pursuant to sub-paragraph (iii) and the memorandum of compliance, and confirms that the memorandum of compliance read together with such agreements, offering documents, legal opinions and any letter of undertaking provided by the insurer or any insurance group entity address the requirements of **Appendix 5A, Appendix 5B** or **Appendix 5C**, as the case may be.

[MAS Notice 133 (Amendment) 2020]

2. For the purposes of sub-paragraph 1 (b)(iii), the written external legal opinion must not be qualified, in particular with respect to the prohibition on provisions which mandate or create incentives for the redemption of the instrument, and other requirements relating to loss absorption, priority of claims, waiver of set-off amounts or benefits and subordination.

Appendix 5E

COMPONENTS OF FINANCIAL RESOURCES RELATING TO REGULATORY ADJUSTMENT, REINSURANCE ADJUSTMENT, FINANCIAL RESOURCE ADJUSTMENT AND ADJUSTMENT FOR ASSET CONCENTRATION

A. Regulatory adjustment

1. An insurer must calculate regulatory adjustment as the sum of the following:

   (a) Allowance for provision for non-guaranteed benefits; and

   (b) Allowance for negative reserves

B. Allowance for provision for non-guaranteed benefits

2. For the purposes of paragraph 1(a), an insurer must calculate the allowance for provision for non-guaranteed benefits of a participating fund as —

   (a) the difference between —

      (i) the liability (net of reinsurance) in respect of the policies of the participating fund determined in accordance with regulation 20(6) of the Regulations; and

      (ii) the minimum condition liability of the participating fund; or

   (b) the aggregate of the values of expected payments arising from non-guaranteed benefits of each participating policy and any provision for adverse deviation from the expected experience for each participating policy of the participating fund, determined in accordance with regulation 20 (3)(b) and (c) of the Regulations,

   whichever is the lower.

3. For the purposes of paragraph 1(a), an insurer must calculate the allowance for provision for non-guaranteed benefits of a licenced insurer as follows:

   (a) in the case where the direct insurer is incorporated outside Singapore and has not established and maintained any insurance fund other than participating funds, the same amount as that calculated in accordance with paragraph 2;

   (b) in all other cases, the amount calculated in accordance with paragraph 2 with the necessary adjustments to ensure that the unadjusted capital ratio of the insurer is not greater than its adjusted capital ratio.

C. Allowance for negative reserves

4. For an HRG in respect of an insurer's life business, where the sum of the liability (net of reinsurance) for each policy calculated by the application of paragraph 4.2.20a) is less than zero ("negative reserve"), the insurer may recognise the negative reserve for the HRG as a positive regulatory adjustment in the manner specified in paragraphs 5 to 7.

5. An insurer must determine the negative reserve for the HRG recognised as positive regulatory adjustment by applying the insurance shocks for the C1 requirement to each policy in the HRG, in the same manner for determining the C1 requirement in accordance with paragraphs 4.2.18 to 4.2.28, to derive the amount of negative reserve for the HRG after the application of the C1 shocks. An insurer must calculate the positive regulatory adjustment as the negative reserve for the HRG remaining after the application of the C1 shocks.

[MAS Notice 133 (Amendment) 2020]

6. An insurer must not recognise as positive regulatory adjustment, the amounts of negative reserves recognised from the application of regulation 20(4) of the Regulations, to prevent double recognition.

7. An insurer must determine the allowance for negative reserves in the following manner:

   (a) in relation to an insurance fund established and maintained by an insurer under the Act, the sum of the negative reserve recognised as positive regulatory adjustment in respect of each HRG in the insurance fund; and

   (b) in relation to an insurer, the sum of the negative reserve recognised as positive regulatory adjustment in respect of each insurance fund.

Guidelines:

1A. A reinsurer may recognise negative reserves from an offshore insurance fund and an overseas branch as a positive regulatory adjustment. However, the determination of the amount of negative reserves to be recognised as positive regulatory adjustment must follow the requirements in paragraphs 5 to 7 of this Appendix.

[MAS Notice 133 (Amendment) 2020]

D. Reinsurance Adjustment

8. An insurer must calculate the reinsurance adjustment for a reinsurance counterparty as follows:

C = A x B, where—

A is the reinsurance reduction, which is reinsurer's share of policy liabilities, premium liabilities and claim liabilities calculated in the manner prescribed in regulation 16A of the Regulations, for policies ceded to the reinsurance counterparty

B is the appropriate counterparty default risk charge set out in Table 4H of the Counterparty Default Risk Requirement**,** which shall be determined based on the Counterparty Risk Class of the reinsurance counterparties that contributes to the reinsurance reduction. To avoid doubt, the treatment for counterparties that are unrated must be consistent to that specified in paragraph 4.3.6.2d).

9. For the purposes of paragraph 8 –

(a) item A may be reduced, where there is one or more collaterals from the reinsurance counterparty that each satisfies the requirements in **Appendix 4F**, by the risk-adjusted value of each collateral as specified in **Appendix 4F;**

(b) where there is a letter of credit issued in favour of the insurer and where the insurer meets the requirements in **Appendix 4M**, or a trust in which the insurer is a beneficiary that satisfies such requirements as the Authority may specify in directions, item A may, in addition to any reduction under sub-paragraph (a), be reduced by such amount as the Authority may specify in directions. The insurer must set up a corresponding counterparty default risk charge to account for the counterparty risk exposure to the issuer of the letter of credit; and

(c) where item C calculated in accordance with paragraph 8 exceeds item A, the reinsurance adjustment must be taken to be item A

10. For the purpose of computing reinsurance reduction (item A) in paragraph 8, an insurer--

(a) must not recognise reinsurance arrangement between a Head Office and its branch in Singapore. An insurer must not—

(i) apply any reduction when valuing the insurer's liabilities; or

(ii) apply any reinsurance adjustment,

that results from any arrangements between branch and Head Office, unless –

(iii) there is one or more collaterals from the reinsurance counterparty that each satisfies the requirements in **Appendix 4F**, by the risk-adjusted value of each collateral as specified in **Appendix 4F**; or

(iv) there is a letter of credit issued in favour of the insurer and where the insurer meets the requirements in **Appendix 4M**, or a trust in which the insurer is a beneficiary that satisfies such requirements as the Authority may specify in directions,

and the insurer satisfies any other requirements as the Authority may specify by notice in writing;

(b) may recognise reinsurance arrangement between the insurer and its subsidiary, where—

(i) there is one or more collaterals from the reinsurance counterparty that each satisfies the requirements in **Appendix 4F**, by the risk-adjusted value of each collateral as specified in **Appendix 4F**; or

(ii) there is a letter of credit issued in favour of the insurer and where the insurer meets the requirements in **Appendix 4M**, or a trust in which the insurer is a beneficiary that satisfies such requirements as the Authority may specify in directions,

and the insurer satisfies any other requirements as the Authority may specify by notice in writing; and

(c) may recognise reinsurance arrangements between a Singapore branch and its Head Office where risks written by the Singapore branch are included in the Head Office's reinsurance arrangements with third party reinsurers, regardless of whether the branch has a legal right to receive the recoveries directly from the third party reinsurers. This is subject to the insurer providing a written confirmation from the Head Office confirming that the Singapore branch is covered within the Head Office's reinsurance arrangements with third party reinsurers, as well as details on the arrangements relating to how reinsurance recoverable to the branch will be determined, and other requirements that the Authority may specify by notice in writing.

Guidelines:

1. *An insurer that recognises a reinsurance arrangement between the insurer and its subsidiary mentioned in paragraph* 10*(b) must also comply with regulation 21A of the Regulations when valuing liabilities. The reinsurance arrangement was previously termed as reinsurance arrangement between insurer and its downstream entities during the consultation phase. As such, it includes a Singapore subsidiary reinsuring with its subsidiary, or a Singapore branch reinsuring with a subsidiary of its Head Office.*
2. *Please note that the reinsurance arrangements between an insurer and its subsidiary will not include situations where a Singapore subsidiary reinsures to another subsidiary of the parent company or another subsidiary within the group, nor where a Singapore subsidiary reinsures to a branch of the parent company or another branch within the group.*

11. An insurer may use any alternative method to calculate the reinsurance adjustment if the method results in a reinsurance adjustment which is no less than that calculated in accordance with paragraphs 8, 9 and 10, and in such a case, the Authority may require the insurer to provide documentary evidence of the fact.

12. An insurer must calculate the reinsurance adjustment of an insurance fund established and maintained by an insurer under the Act as the aggregate of the reinsurance adjustments for each reinsurance counterparty calculated in accordance with paragraphs 8, 9 and 10 or in accordance with paragraph 11, to whom the insurer cedes its liabilities in respect of the policies of the fund.

E. Financial Resource Adjustment

13. An insurer must calculate financial resource adjustment as the sum of the following items:

(a) the sum of the product of the appropriate counterparty risk factor set out in paragraph 15 and each of the following (if any) —

(i) all deposits placed with a related corporation, unless where these deposits aggregated with all other deposits placed with that related corporation and other related corporations which are —

(A) banks licensed under the Banking Act; and

(B) in Counterparty Risk Class A, B or C as set out in **Appendix 4L**

are less than or equal to 5% of the total assets of the respective insurance fund established and maintained under section 17 of the Act (referred to in this paragraph as "insurance fund"), or of the total assets that do not belong to any insurance fund established and maintained under the Act (referred to in this paragraph as "other funds");

[MAS Notice 133 (Amendment) 2021]

(ii) any loan to or guarantee granted for a related corporation, except where such loan or guarantee arises from a contract of insurance; and

(iii) any other unsecured amount owed by a related corporation or reflected in the books of the insurer to be due and owing from the head office of the insurer to that insurer, except where such unsecured amount arises from a contract of insurance;

(b) where the deposits referred to in sub-paragraph (a)(i) as aggregated, are more than 5% of the total assets of the respective insurance fund, or of the total assets of the other funds, the product of the amount exceeding 5% and the counterparty risk factor of the related corporation with the lowest rating (such rating being the credit rating set out in **Appendix 4L**);

(c) any charged asset, except where —

(i) the charge was created to secure a credit facility and the insurer has not fully drawn down on the credit facility, in which case only the amount drawn down and that has not been recognised as a liability on the balance sheet of the insurer shall be included as a charged asset;

(ii) a liability is incurred by the insurer in respect of the charged asset for use in the conduct of the insurance business of the insurer, in which case only the amount of the liability shall be included as a charged asset;

(iii) the asset is provided as a collateral for a transaction for which the insurer is required to calculate a derivative counterparty risk requirement in accordance with paragraph 4.3.6.4, in which case only the amount in excess of the amount of the liability that is incurred and recognised as a liability on the balance sheet of the insurer as a result of the derivative transaction shall be included as a charged asset;

(d) any deferred tax asset;

Guidelines:

3. Deferred tax assets that do not rely on future profitability of the insurer can be included in financial resources. An over-instalment of tax or current year tax losses carried back to prior years may give rise to a claim or receivable from the government or relevant tax authority. Such amounts are usually classified as current tax assets for accounting purposes. The recovery of such a claim or receivable does not rely on the future profitability of the insurer or any insurance group entity, and can be recognised in financial resources.

(e) any intangible asset (including goodwill);

(f) any investment in securities in a multi-class issue, where the securities are not of investment grade and the investment is a form of credit enhancement to the special purpose vehicle or trust used for the issue of the securities;

(g) where it relates to an insurance fund established and maintained by an insurer under the Act and the insurer is required to maintain contingency reserves in respect of that fund under the Regulations, the negative of the lower of —

(i) 50% of the contingency reserves in each insurance fund established and maintained by the insurer in accordance with regulation 22A of the Regulations; and

(ii) 50% of the C1 requirement of that fund;

(h) where it relates to an insurance fund established and maintained by an insurer under the Act, the negative of the exchange translation reserves resulting from the translation of the financial statements of that insurance fund from a non-Singapore dollar denominated functional currency to the presentation currency in Singapore dollars;

(i) where it relates to the "Tier 1 Capital" of an insurer, the sum of —

(i) the amounts referred to in sub-paragraphs (g) and (h) in respect of all insurance funds maintained by the insurer; and

(ii) the negative of the exchange translation reserves resulting from the translation of the financial statements of all assets and liabilities that do not belong to any insurance fund maintained by the insurer from a non-Singapore dollar denominated functional currency to the presentation currency in Singapore dollars;

(j) any equity security held in a related corporation;

(k) where it relates to the components of "Other Reserves" of an insurer as specified in MAS Notice 129 with a negative value, excluding contingency reserves (as specified in sub-paragraph (g)) and excluding exchange translation reserves (as specified in sub-paragraph (h)), the negative of such components; and

(l) any other adjustments that the Authority may specify to an insurer for the purposes of this sub-paragraph.

13A. For the purpose of paragraph 13(a)(i), the total assets of the insurance fund must not include the reinsurers' share of policy liabilities, and in the case of an investment-linked fund, the part of the fund relating to the unit reserves of the policies of the fund.

[MAS Notice 133 (Amendment) 2020]

14. The Authority may, if it considers fit in the circumstances of a particular insurer or class of insurers, issue a direction under section 64(2) of the Act for an amount to be the financial resource adjustment in relation to that insurer or class of insurers for the purposes of this paragraph.

15. For the purposes of paragraph 13, the counterparty risk factor corresponding to the counterparty risk class (as defined in **Appendix 4L**) is set out in the following table:

Table 1: Counterparty risk factor by counterparty risk class

Counterparty Risk Class	Counterparty Risk Factor (%)
Class A to Class B	20
Class C	50
Class D and below	100

F. Adjustment for Asset Concentration

16. An insurer must calculate the adjustment for asset concentration as the difference between –

(a) the total asset value (less the reinsurers' share of policy liabilities); and

(b) the value of assets that do not exceed any concentration limit set out in the following tables.

16A. For the purpose of paragraph 16, an insurer must not include the part of the fund relating to the unit reserves of the policies of an investment-linked fund.

[MAS Notice 133 (Amendment) 2020]

Table 2-I: Table of concentration limits

Item	Description of limit	As % of total assets (excluding reinsurers' share of policy liabilities)
(1)	Counterparty exposure limit to a counterparty or a group of related counterparties (except any transaction related to a contract of insurance):	
	(a) where the counterparty is the Government, any central government or central bank of a country or territory which has a sovereign rating of investment grade or higher, any company wholly owned by the Government, or any statutory board in Singapore	100%
	(b) where the counterparty is an approved financial institution	20%
	(c) where the counterparty is not an entity specified in sub-paragraph (a) or any approved financial institution, and is listed on any securities exchange	10%
	(d) where the counterparty is not an entity specified in sub-paragraph (a) or any approved financial institution, and is not listed on any securities exchange	5%
(2)	Equity securities limit:	
	(a) exposure to any equity security (other than a collective investment scheme) that is listed on a securities exchange	5%
	(b) exposure to any unlisted equity (other than any collective investment scheme)	2.5%
	(c) exposure to unlisted equities (other than any collective investment scheme) in aggregate	10%

Item	Description of limit	As % of total assets (excluding reinsurers' share of policy liabilities)
	(d) where the equity security is a collective investment scheme	10%
(3)	Unsecured loans limit: (a) to a single counterparty (b) in aggregate	 1% 2.5%
(4)	Property exposure limit	35%
(5)	Foreign currency risk exposure calculated under paragraph 4.3.5.6 of the Section 4 in this Notice for any insurance fund established and maintained under the Act in respect of Singapore policies	40%
(6)	Limit on the aggregate value of assets to which the miscellaneous risk factor set out in paragraph 4.3.7.1 of the Section 4 in this Notice applies	2.5%

Table 2-II: Table of concentration limits

Item	Description of limit	In absolute terms
(7)	For an insurance fund established and maintained by an insurer under the Act in respect of general business and relating to Singapore policies, limit on aggregate value of assets that are not liquid assets	Total assets of the fund (less reinsurers' share of policy liabilities in respect of the fund and 30% of claim liabilities (net of reinsurance)).

17. An insurer must determine the adjustment for asset concentration at the following levels of granularity

(a) each participating fund; and

(b) for funds other than a participating fund, the adjusted fund

17A. For the purposes of Table 2-I and Table 2-II –

"approved financial institution" means any bank or finance company licensed by the Authority or merchant bank licensed by the Authority or any other commercial bank licensed in a foreign country;

[MAS Notice 133 (Amendment) 2021]

"liquid assets" means any security issued by the Government and public authorities of Singapore, any cash and deposit in Singapore dollars in approved financial institutions, or any bill of exchange in Singapore dollars accepted or endorsed by a bank licensed under the Banking Act (Cap. 19) which arises from a bona fide commercial transaction and which is payable within 3 months;

"property corporation" means any body corporate where —

(a) more than 50% of the total turnover of the body corporate is derived from property-related activities; or

(b) more than 50% of the total assets of the body corporate comprise interests in or rights over immovable property situated in Singapore, other than such immovable property or any part thereof which is used —

(i) as premises for the conduct of any business carried on by body corporate;

(ii) for the business of a hotel or hostel; or

(iii) for community, charity or educational purposes;

"property-related activities" means —

(a) the construction of or the causing of the construction of any building on, over or under any land in Singapore for the purpose of sale by the person carrying out or causing such construction, of any right or interest in the land which would be appurtenant to such building, other than a building or part thereof constructed for use —

(i) for the business of a hotel or hostel; or

(ii) for community, charity or educational purposes;

(b) the acquisition or holding of any interest in or right over immovable property situated in Singapore for the purposes of rental, or for the purposes of securing a profit from its sale, other than such immovable property or part thereof used or to be used —

(i) by the person acquiring or holding the immovable property for occupation by himself or members of his family or as premises for any business carried on by him;

(ii) for the business of a hotel or hostel; or

(iii) for community, charity or educational purposes;

(c) the financing of any activity referred to in paragraph (a) or (b);

(d) the making of loans to any property corporation;

(e) the acquisition or holding as beneficial owner of shares or debentures issued by any property corporation; and

(f) the acquisition or holding as beneficial owner of debentures the payment of principal or interest of which is contingent, directly or indirectly, on the turnover, profits or cash flow from any activity under paragraph (a), (b), (c), (d) or (e);

"property exposure" means the aggregate of —

(a) value of immovable property held, excluding such portion of the value as may be attributable to any interest in or right over immovable property or any part thereof used for the purpose of conducting the business of the insurer in Singapore or housing or providing amenities for its officers;

(b) amounts of shares and debentures beneficially held by the insurer and issued by any property corporation;

(c) amounts of debentures beneficially held by the insurer and issued by any person other than a property corporation, where the payment of principal or interest is contingent, whether in whole or in part, on the turnover, profits or cash flow from any property-related activity;

(d) amounts outstanding, or will potentially be outstanding, to the insurer under any form of lending or guarantees (except in the case of a debenture) to any property corporation or to any related corporation of a property corporation for use by the property corporation; and

(e) amounts outstanding, or will potentially be outstanding, to the insurer under any form of lending or guarantees (except in the case of a debenture) to any person other than a property corporation —

(i) in a case where such person is a corporation, for the purpose of financing or facilitating the property-related activities of that person or any of its related corporations; and

(ii) in any other case, for the purpose of financing or facilitating the property-related activities of that person,

but does not include any amounts in respect of —

(A) credit facilities granted by the licensed insurer to the Government or to any statutory board; or

(B) any instrument or transaction described in sub-paragraphs (a) to (e) to the extent that the insurer would be indemnified or otherwise protected from losses that may be incurred by it under that instrument or transaction pursuant to a guarantee issued by any bank or any credit derivative entered into by the insurer with any person other than a property corporation.

[MAS Notice 133 (Amendment) 2020]

17B. For each limit stated in Table 2-I, where the amount of assets falling within the limit is calculated to be less than $5 million, a limit of $5 million shall apply.

[MAS Notice 133 (Amendment) 2020]

18. An insurer may use any alternative method to calculate the adjustment for asset concentration if the method results in an amount which is no less than that determined in the manner specified above, and in such a case, the Authority may require the insurer to provide documentary evidence of that fact.

Appendix 6A

GUIDELINES ON THE VALUATION OF POLICY LIABILITIES RELATING TO THE LIFE BUSINESS OF A CAPTIVE INSURER AND SPRV

DATA AND VALUATION SYSTEM

1. The data used in the valuation should be appropriate. An insurer should take the necessary steps to verify the consistency, completeness and accuracy of the data collated.

2. The data used in the investigation should be consistent with the data collated to the audited accounts. Any weaknesses in the data should be adjusted for.

3. The valuation system used in the calculation of policy liabilities should apply the methods and assumptions correctly.

VALUATION METHODOLOGY

General approach to be taken by the life insurer

4. In determining the liability in respect of a policy relating to the life business of the insurer (other than the unit reserves of the investment-linked policy), an insurer should derive the value of expected future payments less expected future receipts using a discounted prospective cash-flow method.

5. The discounted prospective cash flow method requires explicit projection of expected future payments and receipts over the durations of the policy. This should include, where applicable, the following parameters:

   (a) mortality and morbidity benefits;

   (b) survival and maturity benefits;

   (c) surrender benefits;

   (d) distribution costs;

   (e) management expenses;

   (f) claims expenses if not already included as part of management expenses;

   (g) premiums payment to and claims recoveries from reinsurance counterparty;

   (h) cost of options.

6. Parameters that are immaterial to the valuation of policy liabilities may be excluded from being included explicitly in the projection.

7. The assumptions used in the projection should be based on the best estimate assumptions and in accordance with paragraphs 17 to 29 of this Appendix.

8. Further allowance for the uncertainty of the best estimate value derived above will be provided through the PAD. The PAD should be derived using the same method outlined above but with more conservative assumptions containing a buffer against fluctuations of the best estimate experience.

9. The PAD should be derived in accordance with paragraphs 30 and 31 of this Appendix.

10. An insurer should account for the outstanding incurred claims and IBNR claims in determining the liability of a policy in its life business.

Term of Liabilities

11. The starting point to derive the term of a policy's liabilities is the contractual term of the policy. An insurer should then take account of any options in the contract when deciding whether the term of a policy's liabilities should be extended beyond the contract term.

12. The term of a policy's liabilities takes account of all adjustments made to the policy on renewal before the valuation date, and future adjustments if appropriate.

13. In determining the term of liabilities, regard should be had to the contract boundary considerations in this Notice and any relevant professional standard, where applicable.

Approximations and simplified methods

14. Where model points representing groups of homogeneous insurance policies are used in determining policy liabilities, goodness of fit tests should be conducted to ensure the appropriateness of approximations used and the approximations do not lead to any understating of policy liabilities.

15. Simplified methods may be used for products that are immaterial, products that are not of a long term guaranteed nature or yearly renewable term products. Where simplified methods are used in determining policy liabilities, the insurer should ensure that the use of such methods are appropriate and do not lead to any understating of policy liabilities.

16. For the purpose of determining whether the use of the simplified method, in particular the unearned premium reserves ("UPR"), mentioned in regulation 20(8) or regulation 20A(9) of the Regulations is appropriate, the insurer should first assess if such a method is appropriate based on the nature of the risks covered under the policies. Consideration should be given to the timing that the risks are expected to occur over the remaining term of the coverage. For example, if the risks are not expected to be broadly evenly spread, it may not be appropriate to use a portion of premiums (corresponding to the remaining term of the coverage) to approximate the liability.

Valuation Assumptions

Best Estimate

17. The expected future payments and receipts should be determined using best estimate assumptions for all relevant parameters.

18. The best estimate assumptions made should have regard to the experience of the insurer, with particular reference to significant aspects of recent experience.

Expenses

19. Separate assumptions should be identified for the distribution expenses and management expenses. Management expenses should include maintenance and claims handling expenses, based on the insurer's actual recent experience.

20. If the future experience is likely to be different from actual experience, allowance should be made for any potential deterioration or improvement in the future experience relating to management expenses. However, any allowance for the improvement in the projected management expenses should be supported by strong justification and should be based on projections not extending beyond 3 years from the valuation date.

Inflation Rate

21. The inflation rate should be factored into the projection of the management expenses.

22. Standard inflation is not specific to an insurer's portfolio. It is an external factor operating in the economy at large. It is appropriate to refer to publicly available information on historic wage and price inflation and economists' forecasts to estimate the future wage and price inflation rates.

Mortality and Morbidity

23. There may be an insufficient amount of claim experience data on which to reliably derive the best estimate assumptions. Partial or full weight may be given to assumptions drawn from industry data, if satisfied that such an approach is appropriate.

24. The mortality and morbidity assumptions should be broken down into appropriate grouping by sex and smoking status according to the way the premium rates are differentiated.

25. Where there are selective lapses by healthy lives for certain types of guaranteed renewable products, the deterioration of mortality and morbidity experience after the renewal of these policies should be factored in.

Lapse and Surrender rates

26. In the selection of the expected lapse and surrender rates, the insurer's experience data should be considered. The changing company practices and market conditions that may affect the lapse and surrender pattern of the policies in the future should also be taken into account.

27. Regard should be had to guaranteed renewable products where the lapse rates are likely to show a sudden and temporary increase when the premium rates are increased at renewal date.

Bonus and Dividend Rates

28. The future bonus and dividend rates assumed in the valuation should take into account the policy assets and bonus policy of the participating fund.

29. In setting the bonus and dividend rates, reference should be made to the latest bonus investigation study that supports the derivation of the current applicable bonus and dividend rates, and consider the fairness and equity among different policies.

Provision for Adverse Deviation (PAD)

30. The PAD is the component of the value of the insurance liabilities that relates to the inherent uncertainty in the best estimate experience. As the PAD represents an additional component of the liability value, it is therefore aimed at ensuring that the value of the insurance liabilities is established at an adequate level.

31. Where approximations and simplifications are made, there should be additional PAD to ensure that such methods do not understate the policy liabilities.

Appendix 6B

GUIDELINES ON THE VALUATION OF POLICY LIABILITIES RELATING TO THE GENERAL BUSINESS OF A CAPTIVE INSURER, MARINE MUTUAL INSURER AND SPRV

Valuation Principles

1. The valuations of an insurer's URR and CL should be made based on realistic estimates, and should reflect the individual circumstances of each insurer.

2. The BE of URR and BE of CL represent the mean value in the range of possible values for URR and CL respectively. The determination of the BEs should be based on assumptions as to future experience which reflect the experience and circumstances of the insurer and which is:

   a) made using judgment and experience;

   b) made having regard to reasonably available statistics and other information; and

   c) neither deliberately overstated nor deliberately understated.

3. No material information should be omitted from the valuation process. The Authority would consider a particular piece of information to be material to the overall result of a calculation when its misstatement or omission would cause the result to be misleading to the users of the valuation results.

4. The Authority takes the view that materiality should always be a matter requiring exercise of judgment. The level at which a difference becomes material can be considerably lower than a statistically significant difference. In these circumstances, careful exercise of judgment is expected. While it is reasonable to omit individual items on the grounds of materiality, thought should be given to the cumulative impact. Individual items should not be omitted if the overall result would be materially affected by the omissions.

Basis of Data

5. The data used in the investigation should be consistent with the data collated to the audited accounts. Any weaknesses in the data should be adjusted for.

6. The statistics should be compiled on both gross and net of reinsurance bases. Statistics on direct and indirect claims handling expenses should also be collated, where material.

Data Source and Verification

7. The data used should be appropriate for the estimation of policy liabilities.

Grouping of Risks

8. The valuation of the policy liabilities of the insurer may require the subdivision of risks into lines or divisions of lines of business with similar characteristics. The most appropriate subdivision for the purposes of the valuation should therefore be determined.

Data Adjustment

9. Where appropriate, adjustments to the data collated should be made to account for abnormal items, such as large losses.

Business Profile

10. The nature of coverage the insurer provides and the mix of risks the insurer has underwritten should be taken into account.

Underwriting Policy

11. Any change in the underwriting policy for each major line of business of the insurer should be considered. Changes in underwriting policy include changes to the selection of risks, delegation of authority, key underwriting personnel, rate levels and premium rating methodology.

Claims Policy

12. The insurer's case reserving policy, including the policy in setting initial case reserves, should be considered. Consideration should also be given to any change in the case reserving and other claims policy for each major line of business of the insurer such as the establishment of claim files, closing of claims, use of loss adjusters or loss solicitors, department structure and case load, claim authority limits and defence of complex claims.

General Business and Industry Conditions

13. The economic, technological, medical, legal, judicial and social trends within the broader community that may have an impact upon the valuation of policy liabilities should be considered.

Analysis of Experience

14. The assumptions used in the valuation process should take into account the impact of social, economic, environmental, legislative and court precedent factors. Care should also be given to any assumption that is implicit in the valuation method selected.

15. The business environment within which the insurer operates in should be factored into the assumptions on premium rate changes.

16. In relation to recoveries, the nature and spread of reinsurance arrangements, including significant changes to the arrangements and non-performance of reinsurance, should be taken into account. Non-reinsurance recoveries like salvage and subrogation should also be considered.

Deriving Best Estimates

17. In view of the inherent uncertainty in insurance business, it may often be appropriate to use more than one method to determine the BE of URR and BE of CL.

18. It is recognised that a full actuarial valuation of the URR is essentially a re-underwriting of the portfolio. Consideration should be had on whether it is appropriate or possible to complete such a valuation as is necessary for determining the CL.

19. For a reasonably stable portfolio, it is often possible to extend the CL valuation models to estimate the URR, on the basis of claims frequency, average costs, and ultimate loss ratios. If this is done, the assumptions used should be adjusted to reflect the changes in risk exposure, underwriting standards, rate levels, and other factors on the expected claims experience.

Deriving Provision for Adverse Deviation

20. Professional judgement is often applied to determine the PAD for the insurer as a whole, and for each class of business. In determining the PAD, regard should be had to this Notice, and any other guidance note or relevant professional standard, where applicable.

Appendix 6C

TREATMENT OF COLLATERAL (CAPTIVE INSURERS, MARINE MUTUAL INSURERS AND SPRVS)

1. Where the insurer holds eligible collateral, the insurer's liabilities may be reduced by the risk-adjusted value of the collateral determined in accordance with paragraphs 3 and 5.

2. For the purposes of paragraph 1, collateral is eligible where it satisfies all of the following requirements:

   (a) the collateral must be held by the insurer as security for the whole of the liabilities of the reinsurance counterparty under the contracts of reinsurance to which the collateral relates;

   (b) under the terms of the agreement under which the collateral is provided, the reinsurance counterparty must not withdraw the collateral so long as any liability mentioned in sub-paragraph (a) is secured on the collateral but may reduce the value of the collateral in the event of, and in proportion to, a reduction in such liability;

   (c) in the case of an insurer licensed to carry on life business, the collateral must only relate to that business and the deduction must relate to liabilities secured thereon; and

   (d) in the case of an insurer licensed to carry on general business, the collateral must only relate to that business and the deduction must relate to liabilities secured thereon.

3. An insurer must determine risk-adjusted value of eligible collateral by using the value of the collateral in column 1 in the table below and multiplied by the collaterisation factor in column 3:

Table 1: Collaterisation factor by type of collateral

Collateral (Column 1)	Haircut (Column 2)	Collaterisation Factor (Column 3)
Cash or cash value of a policy loan	0%	100%
Security issued by a government or a public authority	5%	95%
Corporate debt securities in Credit Quality Class A and Class B	10%	90%

Collateral (Column 1)	Haircut (Column 2)	Collaterisation Factor (Column 3)
Corporate debt securities in Credit Quality Class C and Class D	15%	85%
Security listed on a securities exchange	30%	70%
None of the above	100%	0%

[MAS Notice 133 (Amendment) 2020]

4. For the purposes of this Appendix, "security issued by a government or a public authority" means a debt security which -

   (a) is issued or fully guaranteed by the Government;

   (b) is issued or fully guaranteed by a central government or central bank of a country or territory which has a sovereign rating of investment grade; or

   (c) is issued or fully guaranteed by a central government or central bank of a country or territory which does not have a sovereign rating of investment grade, is denominated in the national currency of that country, and has a residual maturity of 12 months or less.

5. Where the collateral is denominated in a different currency from that the liabilities secured are denominated in, an insurer must reduce its risk-adjusted value further by 12%.

Appendix 6D

REQUIREMENTS FOR RECOGNITION OF LETTER OF CREDIT (CAPTIVE INSURERS, MARINE MUTUAL INSURERS AND SPRVS)

(1) Eligible Issuers	An insurer must not recognise a letter of credit ("LC") unless it is issued by a guarantor or protection seller which is: (a) a central government, a central bank, the Bank for International Settlements, the International Monetary Fund, the European Central Bank or the European Community; (b) a Multilateral Development Bank ("MDB") as listed in **Appendix 4N**; (c) a public sector entity ("PSE"); (d) a banking institution; or (e) in the case where the credit protection is – (i) not provided for a securitisation exposure, any other entity with an external credit assessment by a recognised credit rating agency; or (ii) provided for a securitisation exposure, any other entity which has a Counterparty Risk Class C or better as set out in **Appendix 4L** at the time the credit protection was provided, and a Counterparty Risk Class D or better as set out in **Appendix 4L** during the period of recognition of the LC.
(2) Recognition of LC	An insurer must not recognise the use of an LC unless – (a) all documentation relating to the LC is binding on all relevant parties and legally enforceable in all relevant jurisdictions; and (b) the insurer complies with the requirements set out in Criteria for Recognition of Guarantees at paragraph (5) below.
(3) Use of Multiple Risk Mitigation Methods	An insurer must ensure that the recognition of the reinsurance arrangement, does not exceed the notional amount of credit protection. Where the LC is denominated in a different currency from that of the secured liabilities, an insurer must reduce the notional amount of credit protection by 12% in determining the recognition of the reinsurance arrangement. Where an insurer uses multiple risk mitigation methods for a single exposure, the insurer must sub-divide the exposure into portions

	covered by each risk mitigation method and must calculate the exposure amount of each portion separately. ***Guidelines:*** *Multiple risk mitigation methods for a single exposure may include for example, both collateral and guarantee. The exposure should be sub-divided into the portion covered by each risk mitigation method, i.e. portion covered by collateral, and portion covered by the LC.* An insurer must apply the same approach when recognising eligible credit protection by a single protection provider where the eligible credit protection has differing maturities. [MAS Notice 133 (Amendment) 2020]
(4) Inadequate Compliance with the Authority's Requirements	The Authority may prohibit an insurer from fully recognising the effects of an LC if— (a) the Authority is not satisfied that the insurer has complied with the requirements in the section on Recognition of LC above; or (b) the Authority is not satisfied with the effectiveness of the LC in mitigating credit risk exposure, and the insurer must not recognise the effect of any LC to the extent of any such prohibition, or any other actions that the Authority may specify.
(5) Criteria for Recognition of Guarantees	For the purposes of paragraph (2), the insurer must ensure that all of the following conditions are satisfied: (a) The guarantee must be an explicitly documented obligation assumed by the guarantor; (b) The guarantee must represent a direct claim on the guarantor; (c) The guarantee must explicitly refer to a specific coverage so that the extent of the credit protection cover is clearly defined; (d) Other than in the event of non-payment by the ceding insurer in respect of the guarantee if applicable, there must be an irrevocable obligation on the part of the guarantor to pay out a pre-determined amount upon the occurrence of a credit event, as defined under the guarantee; (e) The guarantee must not contain any clause, the fulfilment of which is outside the direct control of the ceding insurer, that

	(i) will allow the guarantor to unilaterally cancel the guarantee; (ii) will increase the effective cost of the guarantee as a result of deteriorating credit quality of the underlying exposure; (iii) may prevent the guarantor from being obliged to pay out in a timely manner in the event that the underlying obligor fails to make any payment due; or (iv) may allow the maturity of the guarantee agreed ex-ante to be reduced ex-post by the guarantor; (f) the ceding insurer must be able to pursue the guarantor for any monies outstanding under the documentation governing the transaction upon the default of, or non-payment by, the underlying obligor, and must have the right to receive such payments from the guarantor without first having to take legal action to pursue the obligor for payment; (g) the guarantee must cover all types of payments that the underlying obligor is expected to make under the documentation governing the transaction; (h) the term of the guarantee must be at least one year; and (i) the guarantee must be renewed at least 90 days prior to expiration, otherwise the guarantee must no longer be recognised in the 90 days immediately prior to the expiration of the guarantee.