1 December 2022

2022 CAPITAL AND SOLVENCY RETURN

STRESS/SCENARIO ANALYSIS – CLASS 3A

The Bermuda Monetary Authority (Authority or BMA) requires Class 3A insurers (insurers[1]) to conduct prescribed stress/scenario testing and analysis. The results are to be submitted to the Authority as part of the 2022 year-end capital and solvency return.

The objective of stress testing within the 2022 year-end capital and solvency return is to assess the capital adequacy of the insurers under adverse financial market and underwriting conditions and to provide a comprehensive understanding of the sector's general vulnerability to shocks. More specifically, the tests' purpose is to assess the impact of the losses, as determined using proprietary/vendor models, on the insurer's statutory balance sheet (i.e., statutory admitted assets, admitted liabilities, and capital and surplus). Thus, these tests help determine the financial capacity of insurers to absorb the manifestation of key financial risks, such as shocks to investment performance and projected losses arising from specific underwriting risks.

GENERAL INSTRUCTIONS

Measurement of impact: As noted above, the insurer is to provide the post-stress/scenario positions of the expected impact and effects on both statutory assets and liabilities.

Accounting treatment: The insurer is to use the accounting standard ordinarily used for statutory reporting so that the pre-stress/scenario statutory capital and surplus can be reconciled to the insurer's 2022 year-end statutory balance sheet.

Timing of impact: The stress/scenario impact and effects reported are those that would be observed immediately upon the occurrence of the event (stress/scenario) as determined by the insurer's internal or vendor model(s) (both with and without the effect of reinsurance and/or other loss mitigation instruments).

Balance sheet date: The insurer is to run the stress/scenario tests based on its balance sheet position and aggregate in-force exposures as of 1 January 2023.[2]

Reporting currency: All amounts reported concerning the stress/scenarios tests must be shown in the

[1] In this document, the terms "insurer" and "insurers" include "reinsurer" and "reinsurers", respectively.

[2] Where the fiscal year does not correspond to the calendar year, in-force exposures on the day following the fiscal year-end should be used rather than 1 January 2023.

reporting currency.

Vendor and/or internal model descriptions: To assist the Authority with comparability, the insurer is to describe the vendor model(s) used to perform the stress/scenario tests, identifying what model and version were used for each stress/scenario. The acquisition of a vendor package is not an obligation. Where an internal model is utilised, the description should also include information on the internal model's key assumptions and parameters.

Confirmation of no loss exposure: For instances where the insurer has no loss exposure to a particular financial market scenario(s), underwriting loss scenario(s) and/or "other underwriting loss scenarios", the Authority has created a new section that allows for the confirmation that fields left blank/omitted are the result of no loss exposure.

A. FINANCIAL MARKET SCENARIOS

The financial market scenarios comprise capital market-related single-factor shocks triggered by specific risk factors (equity returns, credit spreads and defaults). The calibration of these shocks is based on historical data about the evolution of interest rates, exchange rates and equity markets. Further, in light of continued sovereign risk concerns and their implications on the investment performance of insurers, the financial market scenarios include haircuts on sovereign bonds. In addition, the ongoing volatility due to political risk and the volatility of capital flows warrants shocks on foreign currency positions.

The insurer is to quantify the impact of the following stress events on its statutory balance sheet:

Stress Event	Interpretation
R1. Severe decline in equity prices	The stress test is a decrease of 40% of the value of equities in a portfolio. This stress scenario is consistent with the Black Monday crash of 1987. If there are hedging instruments for equity exposures, their hedging result should be recorded separately. If hedging is done through replication strategies or continuous rollover of assets, this should be mentioned in the stress test result. Short positions are considered hedging positions. Material equity derivative positions should also be included in the test.
R2. Alternative investments and real estate	This stress is related to investment holdings in hedge funds, insurance-linked securities, real estate, private placements, venture capital and other types of securities that cannot be characterised as equity, bonds, cash, foreign exchange and mutual funds in typical asset categories or participations to other corporations excluding venture capital. The usual characteristics of these assets are the low correlation with financial markets and the low or lower liquidity compared with typical financial assets. Such assets should be decreased in value by 40%. For assets such as hedge funds with lockup periods, venture capital and real estate in illiquid markets, the (re)insurer should report whether sudden decreases in their value could entail the inability for rapid sale and whether this effect has material consequences. **Level Three Assets** A shock of a 40.0% reduction in the value of level three assets should be performed. If level three assets can be found in alternative investments and real estate, equities or other categories, then those assets must be reported and stressed separately.
R3. Extreme US yield curve widening	This stress refers to an extreme movement upwards of the United States (US) yield curve. The (re)insurer will use the following risk-free yield curve for valuations of assets and liabilities. Corporates should be revalued as well, assuming constant credit spreads. For assets and liabilities with durations longer than 30 years, assume a constant rate of 5.0% from year 31.

Table 1 – Yield Curve (in per cent)

Year	1	2	3	4	5	6	7	8	9	10
	5.30	5.40	5.40	5.20	5.30	5.30	5.20	5.10	5.10	5.06
Year	11	12	13	14	15	16	17	18	19	20
	5.04	5.02	5.00	5.00	5.00	5.00	5.00	4.98	4.99	5.00
Year	21	22	23	24	25	26	27	28	29	30
	5.00	5.00	5.00	5.00	5.00	5.00	4.99	4.98	4.96	4.96

Source: BMA staff calculations and Bloomberg. Notes: This yield curve is a product of a bespoke BMA scenario generator. This yield curve represents the 99th percentile yield curve of all simulated paths of interest rates for each maturity.

R4. General widening of credit spreads

Credit spreads widen across different rating classes (see table 2). The widening reflects the increase of the perceived credit risk in the market. The table summarises the shocks.

Table 2. Credit Spread Widening
In basis points

Rating Category					
AAA	**AA**	**A**	**BBB**	**BB**	**Below BB**
199.6	249.0	241.5	276.4	947.5	3,113.6

Source: BMA staff calculations and Bloomberg. Notes: The 99.9th percentile was used for all but two scenarios. For AAA, the BMA used the 99th percentile; for junk bonds (ratings Below BB), the BMA used the 99.99th percentile. The spreads in these rating classes show high (for AAA) or low (for Below BB) variability compared to the intermediate rating classes. The 99th percentile would overestimate the reasonable stress scenario for AAA assets, and it would underestimate a reasonable stress scenario for Below BB. The BMA used Moody's bond indices for ratings from AAA to BBB and the J. P. Morgan bond indices for BB and Below BB rating classes. The reference risk-free rate was the 10-year US treasury rate.

All positions including those available for sale and held to maturity should be stressed. Structured finance products, asset-backed securities, agency and non-agency Mortgage-Backed Securities (MBS) must be included as well. If there is no rating for an asset, the (re)insurer must assume that the rating is Below BB. Catastrophe (Cat) Bonds are treated as alternative investments and not as assets susceptible to credit spread changes.

R5. Combine R1, R2, R3 and R4

Combine the extreme yield curve of table 1 and the credit spread widening of table 2. This means that corporate bonds must be revalued using the risk-free curve of table 1, the prevailing credit spread over today's curve, plus the widening of credit spreads in table 2. Together with corporate bonds, sovereigns are to be shocked as well, using the yield curve in table 1.

R6. Foreign currency shocks

An equal percentage of depreciation and/or appreciation of Foreign Exchange (FX) positions in both assets and liabilities when these shocks reduce the value of assets and increase the value of liabilities. When a FX liability is passed on to the party claiming the liability, the shock can be excluded for such positions. The following table provides the percentage depreciations/appreciations. Hedging of FX positions should be reported separately, especially if hedging is done with rollover strategies.

Table 3. Exchange Rate Shocks *(in per cent)*

	EUR/USD	**JPY/USD**	**GBP/USD**	**CHF/USD**	**AUD/USD**	*Avg.*
Shock	24.9	27.6	41.0	22.4	31.8	29.5

Source: BMA staff calculations and Bloomberg. Notes: The average appreciation/depreciation (rightmost column)

should be used for currencies other than those indicated. The scenario estimation horizon covers daily exchange rate movements from 2000 up to 2021. A GARCH(1,1) model was used to generate the scenarios. Due to Brexit, the GBP/USD shock increased by considering the 99.9th percentile of projected depreciation.

R7. Escalation of sovereign risk

In this test, assume that the weakest sovereigns will have to undergo a haircut in the face value of their debt. Both available for sale and held to maturity bonds should be stressed.

Table 4. Reductions in Current Value of Sovereign Bonds

	Time to Maturity				
	<1 year	**<3 years**	**<5 years**	**<7 years**	**>7 years**
Greece	50.0	50.0	50.0	50.0	50.0
Italy	50.0	50.0	50.0	50.0	50.0
Portugal	50.0	50.0	50.0	50.0	50.0
Ukraine	100.0	100.0	100.0	100.0	100.0
Argentina	50.0	50.0	50.0	50.0	50.0
Turkey	50.0	50.0	50.0	50.0	50.0
Russia	100.0	100.0	100.0	100.0	100.0

Source: BMA staff calculations and Bloomberg. The haircuts are based on the realisation of a prolonged pan-European banking crisis in Europe, which will cause sovereign defaults.

R8. Inflation and monetary policy risk

Inflation risk stems from the general increase of prices. Inflation decreases the value of loans and debts while it may increase the value of indemnities and claims.

Simulate a scenario similar to the 1973 inflationary scenario. The (re)insurer should apply each inflation scenario (low, medium, high, severe) for three years, assuming no initial action to curb inflation from the Federal Reserve. In year four, the Federal Reserve changes its stance and increases rates to maintain the current real interest rate. Therefore, the reinsurer should raise the yield curve across maturities for one year by 700, 1,000 and 1,500 basis points, respectively, for the medium, high and severe inflation scenario. From year five onwards, inflation and interest rates return to current levels. All assets and liabilities are to be shocked. If the (re)insurer holds TIPS or other inflation-sensitive securities, these securities should be indexed to the inflation scenarios.

Table 5: Inflation Scenarios (in percent)

Scenario	Inflation rate
Low inflation	6.0
Medium inflation	7.0
High inflation	10.0
Severe inflation	15.0

Source: BMA staff calculations and expert judgement.

B. MORTGAGE INSURANCE

The insurer is to quantify the impact of the following stress events on its statutory balance sheet:

Mortgage Loan Shock 1

Part 1 - (Re)insurers that write mortgage business are to shock their exposure for this business by increasing the default rate to 9.47% (equivalent to approximately 99.5% Tail Value at Risk (TVaR)) for their mortgage book and applied instantaneously. Assets and liabilities subject to mortgage-related default risk should be shocked.

	Part 2 - (Re)insurers holding agency MBS and real-estate securities as investment assets subject to prepayment risk are to shock these investments by assuming that the MBS will prepay at an annual Constant Prepayment Rate (CPR) of 40% instantaneously. If the 40% CPR produces capital gains, the insurer is to stress the CPR at 0%, 5% and 10%. The expectation is that if using a CPR of 40% produces a gain, then applying a substantially lower MBS prepayment shock rate of 10% or less will likely produce capital losses. If a registrant still reports capital gains even after applying the lower MBS prepayment rates, the registrant should provide sufficient comments.
Mortgage Loan Shock 2	Part 1 - (Re)insurers that write mortgage business are to shock their exposure for this business by assuming the default rate to be 5.5% (equivalent to approximately 90.0% TVaR) for their mortgage book and applied instantaneously. Assets and liabilities subject to mortgage-related default risk should be shocked. Part 2 - (Re)insurers holding agency MBS and real-estate securities as investment assets subject to prepayment risk are to shock these investments by assuming that the MBS will prepay at an annual CPR of 40% instantaneously. If the 40% CPR produces capital gains, the insurer is to stress the CPR at 0%, 5% and 10%. The expectation is that if using a CPR of 40% produces a gain, then applying a substantially lower MBS prepayment shock rate of 10% or less will likely produce capital losses. If a registrant still reports capital gains even after applying the lower MBS prepayment rates, the registrant should provide sufficient comments.

C. UNDERWRITING LOSS SCENARIOS

The insurer is to submit to the Authority three of its own underwriting loss scenarios and also use these in the calculation under Section F. Worst-Case Annual Aggregate Catastrophe Loss Scenario below.The insurer is to submit the following for each of the three scenarios:

a) Description of the scenarios and related key assumptions; and
b) The post- stress/scenario positions on aggregate statutory assets and statutory liabilities that would be observed immediately upon the occurrence of the event (stress/scenario) (both with and without the effect of reinsurance and/or other loss mitigation instruments).

Return Periods (Only for Class 3A insurers that write Property Catastrophe Business):

a) Occurrence return period of each event (e.g., 1-in-50 year event, 1-in-100 year event occurring the in the given year); and
b) Relative return period (or "aggregated return period") (i.e., use the underlying loss distribution of the aggregate net probable maximum loss (submitted in the BSCR) to calculate the corresponding return period (e.g., 1-in-50 year event, 1-in-100 year event) of the loss) of each event.

Example - the return period for a loss event of US$78 billion industry loss event may occur once every 300 years (i.e. occurrence basis). The stress scenarios are specifically selected to be extreme events that have a low probability of occurring. For the Occurrence return period the Authority is seeking a comparison to how

the insurer's losses under the stress scenarios compare to the insurers loss for the overall peril. For this relationship, looking at the insurer's stressed loss compared to the insurers Occurrence return period (OEP[3]) curve for the event is the most helpful. For the modeled events are selected based on the definitions below. This may be a single event from the catalog, or may be a small subset of events. The losses from these events are then simulated based on the exposures of the insurer. This will produce an expected loss cost to the insurer under the stress scenario. This US$400m loss is compared to the insurers OEP curve for all events and is found to be at the 98th percentile. The Occurrence return period would be given as 1 in 50 years.
For the Aggregate return period (AEP[4]) the Authority is trying to assess how the insurers' losses in a stress scenario will compare to the overall AEP curve of the company. The AEP curve used should be the same curve used to inform the calculation of the net probable maximum loss and reported in the Cat Return of the BSCR. For this same event, comparing the US$400m loss to the insurers' net AEP curve for all perils combined would be at the 92nd percentile. This would be reported as a relative return period of 1 in 12.5 years.
For the OEP, the net loss impact of the stress scenario modeled using the selected events should be compared to the insurers' net OEP curve for the specified peril using all events. For the Relative return period the net loss impact of the stress scenario modeled using the selected events for a specific peril should be compared to the insurers' overall net AEP curve that was used to inform the net Probable Maximum Loss and reported in the catastrophe returns in the BSCR.
The insurer is to include demand surge and storm surge for storm events, and demand surge and fire following for earthquakes. All lines of business and exposures should be included in the final estimates; any deviations from this requirement should be noted.

D. LIABILITY LOSS ACCUMULATION SCENARIOS

The insurer must complete the following scenarios, which estimate potential insurance loss accumulations relating to liability exposures. The scenarios aim to capture risk on liability exposures that are generally not adequately reflected by historical claims experience. Such risks tend to materialise slowly and impact many exposure years.

a) **Scenario 1 - New latent liability**

The scenario aims to cover a "mass tort" event, for example, following a court decision, a general and potentially legally enforceable opinion emerges that a specific product or substance causes observed or potential future adverse effects, such as bodily injury, property damage or environmental damage. This is expected to lead, during the year and later, to claims on the product liability insurance of the producers, followed by mass litigation against companies that are distributing or using or have distributed or used the product or substance, leading to an accumulation of potentially worldwide claims on general commercial liability and workers compensation/employers liability insurance policies. Losses not only arise from the current policy year but also prior years not excluded by policy terms such as "claims made" coverage or statutes of limitations. The scenario takes into consideration that the amount recognised at the end of the one-year time horizon is smaller than the maximum possible ultimate loss from the scenario due to the incompleteness of available information and uncertainty on the subsequent development.

The exposure measure for the scenario is the net written premium for the most recent underwriting year, onto

[3] The OEP represents the probability of seeing any single event within a defined period (one year in this case) with a particular loss size or greater.

[4] The AEP represents the probability of seeing total annual losses of a particular amount or greater.

which the following risk factors are applied.

Selected Factors	product liability	product liability	gen comm liability	gen comm liability	empl liab/ workers comp	empl liab/ workers comp
	P	NP	P	NP	P	NP
EEA and Switzerland	45%	90%	25%	50%	25%	50%
US/Canada	65%	130%	35%	75%	15%	30%
Japan	35%	65%	20%	35%	20%	35%
China	25%	50%	15%	30%	15%	30%
Other developed markets	30%	60%	15%	35%	15%	35%
Emerging markets	25%	50%	15%	30%	15%	30%

The risk factors are calibrated based on a 1-in-200 year market loss event that assumes to affect the eight most recent policy years for all latent liability segments with the exception of the line of business Employers' Liability/Workers Compensation (EL/WC) and the region "USA and Canada" (US/CA), for which it is three years, reflecting local statutes of limitations.

An adjustment is made to the loss calculation by applying a historical premium adjustment factor to reflect the number of prior years' exposed (subject to the pre-specified cap) and the material changes in exposures across the impacted policy years. This is approximated using the following two inputs:

1. Average annual growth in net written premium over the years affected
2. Specifying the years over which the annual growth is affected

The approximation assumes a constant growth factor year on year. If insurers have been writing business for a period of less than eight years (or three for US/CA EL/WC), this should be reflected in their inputs to the stress.

Insurers whose primary business is not writing "live" business (e.g., active runoff insurers), therefore, do not have material premium/Cat risk and do not need to calculate this scenario.

b) **Scenario 2 - Deterioration in existing US Asbestos and Environmental (A&E) and UK Asbestos reserves**

The scenario aims to reflect potential deterioration in existing US Asbestos, US Environmental and UK Asbestos reserves and is calculated over a number of steps detailed below. Insurers with total US A&E and UK Asbestos net reserves less than US$50 million do not need to calculate this scenario.

Calculation of US and A&E stress

1. Potential underserving in US A&E reserves – Studies of US market A&E reserves, performed by various parties (e.g., Fitch, AM Best) over a number of years, have identified potential underserving in the industry for both risks. The survival ratio is a widely used industry benchmark to asses US A&E reserve strength. Step one uses the insurer's own survival ratios and uplifts their latest year-end reserves to target survival ratios of 15 and 12 for A&E reserves, respectively. The information required is as follows:
    a) Insurer's own survival ratio for their latest year-end net Generally Accepted Accounting Principles (GAAP) reserves (companies should strive to minimise any distortions in their survival ratio calculation; for example, the acquisition of a new block of A&E reserves in the most recent year is likely to overstate the survival ratio if the annual payment amounts used to estimate the denominator do not also account for these newly acquired exposures)
    b) Net GAAP reserves for US Asbestos and US Environmental for the three most recent

year ends

c) Net paid over the last three years for US Asbestos and US Environmental and relating only to reserves/exposures present on the insurer's books at the beginning of the year[5]. Material commutations should also be excluded from the paid in order to prevent distortions, which would be "washed away" in the industry statistics.

2. Increase in projected claims due to medical advances – Over the last few years there have been developments in immunotherapy drugs that could potentially prolong the life expectancy of mesothelioma sufferers. As a result, more claimants have been requesting this treatment, which could potentially increase the mesothelioma claim severity (e.g., treatment, temporary accommodation, prolonged care costs). The stress applies a small uplift (10%) to explicitly allow for such medical advances. Insurers who already have an explicit loading for medical advances may use it to offset this uplift. Unless medical developments are explicitly considered in the derivation of the insurer's future medical inflation assumption, then this item is not considered to be part of the medical inflation parameter. The following information is required:
    a) Any explicit loading the insurer has included in their reserves for medical advances.
3. Increase in projected claims inflation for US A&E reserves – Assume an additive increase of 4% in the annual inflation applicable to all future claim payments. There are several potential sources of this increase, including an increase in the base indices, superimposed inflation, court inflation, etc. The following information is required:
    a) Latest year-end net GAAP reserves recalculated assuming an additive increase of 3% in the annual inflation applicable to all future claim payments for US Asbestos and US Environmental
    b) Effective duration of US Asbestos and US Environmental liabilities.
4. Converting to one-year loss – Insurers should provide an appropriate emergence factor to convert the stress loss from ultimate view to one-year view. The following information is required:
    a) Ultimate to one-year emergence factor

The one-year emergence factor is only applied to the claims inflation stress (3) component.

Calculation of UK Asbestos stress

1. New claims arising beyond 2050 - UK Asbestos models have historically understated the period over which new asbestos claims may arise. The initial models projected the cutoff date for new claims at 2040; this was later revised to 2050, while the latest studies suggest a further pushback of the cutoff date to 2060. This stress applies an uplift of 15% to account for new claims arising beyond 2050. Insurers who already reserve for new claims arising beyond 2050 may use this portion of the reserves to offset the stress factor. The following information is required:
    a) The insurer's proportion of Asbestos reserves relating to new claims arising beyond 2050.
2. Deterioration in the projected number of claims up to 2050 – The nature of the Asbestos risk makes it difficult to quantify with great certainty the number of future claims arising. An example of this uncertainty is the repeated revision of the peak year of mesothelioma deaths to a later year. This stress applies an uplift of 15% to account for an increase in claims reported up to 2050. No inputs from the insurer are required for this component.
3. Increase in projected claims due to medical advances – Over the last few years, there have been developments in immunotherapy drugs that could potentially prolong the life expectancy of mesothelioma sufferers. As a result, more claimants have been requesting this treatment, which could potentially increase the mesothelioma claim severity (e.g., treatment, temporary accommodation, prolonged care costs). The stress applies a small uplift (10%) to explicitly allow for such medical advances. Insurers who already have an explicit loading for medical advances

[5] This ensures that the payments are 'matched' to the opening reserves.

may use it to offset this uplift. Unless medical developments are explicitly considered in the derivation of the insurer's future medical inflation assumption, then this item is not considered to be part of the medical inflation parameter. The following information is required:

a) Any explicit loading the insurer has included in their reserves for medical advances.

4. Increase in projected claims inflation for UK Asbestos reserves – Assume an additive increase of 3% in the annual inflation applicable to all future claim payments. There are several potential sources of this increase, including an increase in the base indices, superimposed inflation, court inflation, etc. The following information is required:
    a) Latest year-end net GAAP reserves recalculated assuming an additive increase of 3% in the annual inflation applicable to all future claim payments for UK Asbestos
    b) Effective duration of UK Asbestos liabilities.
5. Converting to one-year loss – Insurers should provide an appropriate emergence factor in order to convert the stress loss from ultimate view to one-year view. The following information is required:
    a) Ultimate to one-year emergence factor

    The one-year emergence factor is only applied to the claims inflation stress (4) and the claims count stress (2) components.

c) **Scenario 3 – Insurer specific A&E reserve deterioration scenario**

Insurers with material A&E reserves should develop their own loss scenario(s) and include it in the "Other Underwriting Loss Scenarios" section. The assumptions underlying the scenario should also be attached.

E. RATING DOWNGRADE

The insurer is to submit detailed qualitative disclosure of the impact upon both its statutory statement of income and liquidity positions of a ratings downgrade of its Bermuda legal entity by two notches or below A-, whichever is lower. The disclosure should cover and provide an indication of the relative impact/severity of collateral requirements, loss payment triggers on in-force policy contracts, claw-backs, and/or other adverse financial and liquidity implications of the downgrade.

Upon reviewing the disclosure, the Authority may request additional information relating to the liquidity impact and potential losses.

F. WORST-CASE ANNUAL AGGREGATE CATASTROPHE LOSS SCENARIO

The insurer is to submit the following:

1. A combination of a financial market scenario and three largest underwriting scenarios

The aggregate impact of:

a) A financial market scenario under Section A above, which would result simultaneously in the occurrence of R5; and
b) An aggregation of the three largest net underwriting losses under Sections III above.

It is assumed that the underwriting loss events follow in quick succession, and there is the inability to engage in capital or other fundraising activities. Further, it is assumed that there is no geographic correlation between these non-economic events. The insurer is to disclose its assumptions, including any magnified demand surge, if applicable, from the multiple events.

2. Insurer specific worst-case scenario

The insurer is to submit a description of its own worst-case annual aggregate loss scenario and the underlying assumptions. The scenario should be at a level considered extreme but plausible by the insurer.

G. REVERSE STRESS TEST SCENARIO

If an insurer performs reverse stress testing (as outlined in the CISSA IX(b) question 4), then the insurer is to provide the key assumptions, which includes specific market risk scenarios, loss figures and return period that would cause such business failure. Such scenarios should be reported and should be contrasted with the scenarios in the current guidelines (i.e., whether worse or better scenarios than those provided by the BMA cause the (re)insurance company to fail).

If the insurer does not perform reserve stress tests, then insurers are to calculate the clearance between their available economic statutory capital and surplus and Enhanced Capital Requirement (ECR) to determine the size of loss that would cause them to breach their ECR and provide the occurrence and relative return period of such event.

H. TECHNOLOGY RISK

Section a) Cyber risk - underwriting

a) If the (re)insurer writes affirmative cyber risk policies, provide details for the policies written during the reporting period;
b) If the (re)insurer does not write any affirmative cyber policies, skip item 1 and proceed to item 2 to provide details of non-affirmative cyber exposures in all other policies written. This section must be completed by affirmative cyber writers as well, in addition to a).
c) For (re)insurers, unconsolidated results relate to the Bermuda standalone operations (excluding subsidiaries), and consolidated results relate to Bermuda entity level results (including subsidiaries).
d) For (re)insurers, answering item 1 below, please specify if you are consolidated by another Bermuda (re)insurer:

Below is additional guidance to complete this for **affirmative cyber underwriting risk**:

Line	Item	Description/Guidance

I	Cyber risk	If a (re)insurer writes **affirmative** cyber risk (re)insurance policies, it shall provide the number of policies written, premiums (on a gross and net basis) for the reporting period, details of the policy limit (on a gross and net basis) and if the policy has no limit, the estimated maximum loss for that business, and confirmation if the insurer is a reinsurer on the underlying policy. (Re)insurers that have (re)insurance policies that include cyber risk exposure by reason of not containing a cyber-exclusion clause (such as directors and officers policies that include cyber risk) shall provide an attachment in the BSCR model detailing the (re)insurance products that have these exposures.
I.a).1.d).	Name of the parent Bermuda (re)insurer	Please specify the immediate parent, which is another commercial (re)insurer.
(i)	Total number of cyber policies in force (units)	All information in relation to policies in force must be as of the first day of the month following year-end. For example, for the year ended 31 December 2023, the policies in-force date will be 1 January 2023.
	Reinsurance policies	For RAD policies, the(re)insurer is expected to make the necessary assumptions in relation to general terms of the policies written.
	Package	For cyber risk written as part of a package, indicate the data related to the cyber risk alone. In cases where the premium or other amounts specific to cyber risk are not broken out separately, indicate your best estimate amounts.
(ii)	Gross exposure for policies in force ('$000)	The amount reported should be the (re)insurer's total gross exposure for policies in force. Where a (re)insurer participates in syndicated policies, only the (re)insurer's share should form part of the reported amount.
(iii)	Net exposure for policies in force ($'000)	The amount reported should be gross exposure less reinsurance (to include QS and retro).
(vii)	Net loss reserves ($'000)	The amount reported should be gross loss reserves less reinsurance.
	Package	For cyber risk written as part of a package, indicate the data related to the cyber risk alone. In cases where the premium or other amounts specific to cyber risk are not broken out separately, indicate your best estimate amounts.
	Related party business	A (re)insurer must provide details related to the proportion of the business written in relation to related parties.
	Unrelated business (third party)	A (re)insurer must provide details related to the proportion of the business written in relation to unrelated parties.
(ii)	Gross exposure for policies in force ('$000)	The amount reported should be the (re)insurer's total gross exposure for policies in force. Where a (re)insurer participates in syndicated policies, only the (re)insurer's share should form part of the reported amount.
(iii)	Net exposure for policies in force ($'000)	The amount reported should be gross exposure less reinsurance.

	Location	This is the location where coverage is provided for. For example, if a policy is written in Bermuda to provide coverage for the US, then the location should be the US.
	Cyber underwriting risk appetite and limits	Please include as part of the BSCR attachments a document that shows the risk appetite and limits. If this is already included in the CISSA, you do not need to attach a separate document.
	Location	This is the location where coverage is provided for. For example, if a policy is written in Bermuda to provide coverage for the US, then the location should be the US.
	Cyber underwriting risk appetite and limits	Please include as part of the BSCR attachments a document that shows the risk appetite (both affirmative and non-affirmative) and limits. If this is already included in the CISSA or other attachments, you do not need to attach a separate document.

For all other non-cyber specific (re)insurance policies issued, provide the following on a **consolidated** basis (applicable to all insurers whether or not they write affirmative cyber policies):

Line	Item	Description/Guidance
2	Estimated potential gross exposure	A (re)insurer must provide an estimate of the potential exposure for each line of business exposed to **non-affirmative** cyber claims. Examples include: where there is a sublimit related to technology risks, the potential exposure may be the total sublimit, and for an all-risk policy, potential exposure might be the total limit for such a policy. All of this will be the (re)insurer's share only. Note: The BMA is aware that there are instances where it is not straightforward to make these estimates, given the nature of the risk and how policies are structured. In this case, companies are encouraged to use any other reasonable basis to come up with the potential exposure. A document specifying how the company determined the potential exposure should be included in the filing as an attachment.
	Cyber losses exclusion clause by line of business	If the entity has exclusion clause for a particular line of business, confirm if the exclusion is a full exclusion, partial exclusion or no exclusion available.

BMA Prescribed Cyber Stress Scenarios for insurers writing affirmative cyber covers or those that have material non-affirmative cyber exposures:

Line	Item	Description/Guidance
3	For the purpose of cyber stress scenarios, this section is applicable if at least one of the following is met: 1. Affirmative cyber gross written premiums represents 15% or more of the total gross written premiums for the current year 2. Gross estimated affirmative cyber loss accounts for 10% of the current Capital and Surplus (C&S) 3. Gross estimated non-affirmative cyber loss accounts for 5% of the current C&S 4. Cyber-related loss events (either arising from affirmative cyber policy or non-affirmative policy responding to a cyber-loss event) constitute 15% of the total losses incurred for the most recent year-end.	
	Assume cyber underwriting scenarios are generated by a perpetrator that is not a nation-state and that these scenarios do not trigger any cyberwar or other similar exclusions.	
	For reinsurers, please calculate separately on the basis that these attacks are deemed both as one event and as 10 separate events, returning whichever causes the largest net loss.	
	Cloud outage	Event Definition: a) A cyber-attack leading to the loss of availability of a company's cloud hosting services (i.e., the cloud-hosted services that a company uses), resulting in loss of availability of critical services and functions, and that disaster recovery is assumed to have failed to recover services; b) Impacts multinational organisations across industrial sector with the intention of causing major disruption and financial loss to organisations;

		c) The attacks target vulnerabilities in the cloud hosting systems, web-based applications and/or software used by these organisations; and d) Multiple systems and/or multiple organisations using the same cloud hosting providers are affected. <u>Stress Test Assumptions:</u> Assume the denial of service affects your top 10 policyholders (based on largest cyber net loss) due to an attack on a single cloud hosting company worldwide. The impact of the loss availability of all Information Technology (IT) services is for 72 weekday hours. All IT services mean both services hosted internally and externally by cloud hosting companies.
	Ransomware	<u>Event Definition:</u> a) A widespread malicious software attack that infects many policyholders' operations, resulting in ransom payments to recover compromised computer systems and internal data; b) Policyholder's operations are disrupted and may result in loss or corruption of sensitive data; c) All IT services become entirely unavailable for 72 weekday hours. All IT services can be taken to mean both services hosted internally and also those hosted externally by cloud hosting companies; d) Assume that disaster recovery efforts have failed to prevent the outage of services; and e) These outages cause severe disruption of the IT operations of the policyholders (severe is defined as no desktops, servers or IT services being available). <u>Stress Test Assumptions:</u> Assume the impact affects the top 10 policyholders based on the largest cyber net loss. Assume that all client data at these organisations is lost, pursuing class actions, resulting in the insurer facing first and third-party liability claims.
	Data breach	<u>Event Definition:</u> Both of the following two categories of data are exfiltrated from the company in large volume: a) Sensitive internal data; and b) Confidential client data, such as personally identifiable information (PII) at these organisations, are lost, and the company faces third-party liability claims. The organisation impacted face financial penalties arising from: a) Contracts with customers (customers can be taken to be both private individuals and companies); b) Fines from international regulators. <u>Stress Test Assumptions:</u> Impacts the top 10 policyholders by largest cyber net loss worldwide. The attack disrupts the policyholder's operations for a duration of 24 hours.

	Estimated gross loss	The amount reported should be the (re)insurer's total estimated loss impact from the prescribed stress scenario for both affirmative and non-affirmative covers before reinsurance/retrocession recoveries. Where a (re)insurer participates in syndicated policies, only the (re)insurer's share should form part of the reported amount.
	Estimated net loss	Gross exposure less any recoveries from reinsurance or retrocession.
	Total gross loss - affirmative cyber cover	Take into consideration the following: • First-party loss notification, associated costs and breach management costs, including crisis management • Business interruption (excluding physical damage) • Contingent business interruption • Third-party liability losses • Regulatory defence, legal fees and fines covered amounts • Other losses specified in the cyber policy
	Total net loss - affirmative cyber cover	Net loss relating to the portion of the total stress scenario, covered by affirmative covers, after reinsurance benefits
	Cyber gross premium written	Gross premiums written relating to a portion of the loss covered by affirmative cyber policies
	Cyber net premium written	Net premiums written relating to a portion of the loss covered by affirmative cyber policies
	Occurrence return period	Of each event (e.g., 1-in-50 year event, 1-in-100 year event), i.e. the likelihood of an event occurring in a given year. In this case, specify the return period of the estimated gross loss from the specific scenario against an insurer's own gross cyber catastrophe distribution.

Line	Item	Description/Guidance
4	Worst-case annual aggregate loss scenario description	Provide details of specific scenarios used to derive the "worst-case scenario loss" worst-case scenarios used, including average gross policy limits, the frequency and average severity assumptions used to develop the loss estimate. Scenarios should be used for affirmative cyber coverage only.