EIOPA-14/211
30 April 2014

Annexes to the Technical Specification for Preparatory Phase

(Part I)

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ANNEX A - Definition of terms for the calculation of technical provisions

1. **Market consistency**: consistent with information provided by the financial markets and generally available data on underwriting risks (Article 76(3) of the Solvency II Framework Directive (Directive 2009/138/EC)).
2. **Undertaking specific**: Specific to the undertaking and thus with potential to differ from that of other market participants holding an obligation that is identical in all respects.
3. **Portfolio specific**: Dependent on the characteristics of the insurance portfolio, i.e. that the characteristic would apply irrespective of which undertaking holds the liability.
4. **Realistic**: Aimed at identifying scenarios or parameters as they are or will be in the future, without distorting the situations and by neither underestimating nor overestimating the value of the parameters.
5. **Stochastic asset model**: A stochastic asset model is a tool for producing meaningful future projections of market parameters. It is based on detailed studies of how markets behave, looking at statistic properties of various market and non market factors. The model estimates correlated probability distributions of potential outcomes by allowing for random variation in one or more inputs over time. It then produces economic scenario files (ESFs), economic scenario generator files (ESGs), which are inputs for stochastic asset-liability modelling.
6. **Deep, liquid and transparent financial market**: See the definition in the subsection regarding circumstances in which technical provisions should be calculated as a whole.
7. **Validation techniques**: The tools and processes used by the (re)insurance undertaking to ensure valuation methods, assumptions and results of the best estimate calculation are appropriate and relevant.
8. **Up-to-date (or current) information**: Recent or the latest available information which reflects the situation at the valuation date.
9. **Credible information**: Information for which it can be reasonably believed that the information is not manipulated nor distorted in any other way so that it can be used for valuation purposes
10. **Methodology**: The term valuation methodology (or methodology) is understood as a set of principles, rules or procedures for carrying out a valuation of technical provisions. A valuation methodology would include all stages of a valuation process, such as gathering and selecting the data, determining the assumptions, selecting an appropriate model for quantifying the technical provisions, assessing appropriateness of estimations and documentations and controls.
11. **Method(s)**: The term valuation method(s) or method(s) is used to denote a procedure or technique which is applied for calculating technical provisions.
12. **Projection horizon**: The length of the time used in the projection of cash-flows starting from the date the valuation refers to.
13. **Homogenous risk group**: Homogenous risk group is a set of (re)insurance obligations which are managed together and which have similar risk characteristics in terms of, for

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example, underwriting policy, claims settlement patterns, risk profile of policyholders, likely policyholder behaviour, product features (including guarantees), future management actions and expense structure. The risks in each group should be sufficiently similar and the group sufficiently large that a meaningful statistical analysis of the risks can be done. The classification is undertaking specific.

14. **Model points**: One of the important inputs of most life actuarial model is information about policies/policyholders. Examples of such data items include age of policyholder, original term of policy, outstanding term of policy, amount of benefit on maturity, amount of benefit on surrender etc. Information about similar policies can be grouped into single representative data vector known as model point.

15. **Going concern**: The assumption that undertaking is going to continue in operation for the foreseeable future and that it has neither the intention nor the necessity of liquidation.

16. **Best estimate:** The technical provisions should be equal to the sum of a best estimate and a risk margin, except in circumstances where they should be calculated as a whole. The best estimate is calculated gross, without deduction of the amounts recoverable from reinsurance contracts and special purpose vehicles. Unless otherwise specified, it is the gross best estimate.

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ANNEX B - Examples of techniques for the calculation of the best estimate of technical provisions

Simulation techniques

1. Rather than considering all possible future scenarios, (re)insurance undertakings can choose a suitably large number of scenarios which are representative of all possible future ones. This approach is referred to as a "simulation technique".
2. For certain life insurance liabilities, in particular the future discretionary benefits relating to participating contracts or other contracts with embedded options and guarantees, simulation may lead to a more appropriate and robust valuation of the best estimate liability.
3. Examples of simulation techniques:
    a) Monte-Carlo simulations: the value of the liabilities is calculated in a large number of scenarios where one or more assumptions are changed in each scenario. By simulating the behaviour of the random variable(s) in a very large number of scenarios, the model produces a distribution of possible outcomes so that a probability weighted average can be calculated ("mean of the distribution").
        - For example, the nature of the financial options and guarantees embedded in some life (re)insurance contracts, particularly those with profit participation, is such that a set of deterministic best estimate assumptions may not be sufficient to produce a best estimate liability. The application of closed form analytical solutions to value the options and guarantees may also be limited, if it is difficult to find market hedges that replicate the cash-flows under the contract, for example to reflect the use of management actions or the effects of path dependency. A deterministic or an analytical technique may therefore not be suitable for valuing such contracts, and a simulation technique may be needed.
        - Stochastic variation in non-market assumptions such as lapses and option take-up rates can have a material influence on the valuation of options and guarantees. One possible approach used is to assume that they are highly correlated with interest rates/market value which allows the insurer to include the relationship within the liability models without an additional stochastic variable.
    b) Bootstrapping: one of the most extended uses of bootstrap within actuarial work is associated with estimation of claims provisions. Starting from a model that explains how losses are paid, it consists of resampling residuals from that model and obtaining a large sample of estimated provisions required to pay future outstanding losses.
    c) Simulating losses above a certain threshold and up to a certain limit is also a frequently used technique by (re)insurers to calculate an estimated expected loss in respect of a given excess of loss programme.
    d) Bayesian approaches, where explicit prior assumptions are blended with observations resulting in an estimate for the ultimate claim.

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Analytical techniques

4. The (re)insurance undertaking may be able to use a valuation technique based on closed form solutions. Such techniques are referred to as analytical techniques and are based on the distribution of future cash-flows.

5. For the estimation of non-life best estimate liabilities as well as life insurance liabilities that do not need simulation techniques, deterministic and analytical techniques can be more appropriate.

6. Examples of analytical techniques:

    a) Stochastic variation in non-market assumptions (such as mortality).

    b) The time value of options and guarantees may be captured by reference to the market costs of fully hedging the option or guarantee; if the market price is not directly observable, it may be approximated using option pricing techniques, for example closed form solutions such as the Black-Scholes formula.

    c) Techniques which use an assumption that future claim amounts follow a given mathematical distribution (e.g. Bayesian). These techniques calculate an undiscounted probability weighted average set of cash-flows without explicitly considering each potential scenario. An example may be the Mack method, also known as the distribution free chain ladder.

Deterministic techniques

7. The (re)insurance undertaking may also be able to use a technique where the projection of the cash-flows is based on a fixed set of assumptions. The uncertainty is captured in some other way for example through the derivation of the assumptions. This is referred to below as a "deterministic approach".

8. For the estimation of non-life best estimate liabilities as well as life insurance liabilities that not need simulation techniques, deterministic and analytical techniques can be more appropriate.

9. At the current point in time, stochastic reserving techniques, especially in non-life insurance, are not considered as necessary valuation techniques to calculate best estimate values. The application of deterministic techniques and judgement can be far more important than the mechanical application of simulation methods.

10. (Re)insurance undertakings may consider deterministic techniques appropriate in circumstances such as:

    a) Where an alternative technique may require the calibration of parameters for which only inadequate data is available.

    b) Where the nature of the liability is complex but the complexity does not materially affect the result or the complexity cannot be captured better by other techniques.

    c) Where the nature of the liability is sufficiently simple or for other reasons the nature is such that cash-flow projections based on best estimate assumptions result in a best estimate liability.

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11. Examples of deterministic techniques:

a) Actuarial methods such as Chain ladder, Bornhuetter-Ferguson, average cost per claim method, etc…

b) Stress and scenario testing; for example, adjusting data for inflation and allowing inflation to vary, thus producing sensitivities around this parameter.

c) Influential observations or outliers have been allowed for appropriately, for example via case by case reserving.

d) Systematic as well as other random features are being captured through sensitivity testing, diagnostics or other techniques (this could be stochastic).

e) Where a calculation relies on assumptions of an even spread of risk over the policy year and this is not the case (e.g. seasonality such as due to weather or hurricane season) the proportions should be adjusted.

f) The use of relevant assumptions or other external/portfolio specific data as an input to the calculation when there is lack of data or as a benchmark for comparison.

g) Embedded options may be captured by considering different scenarios chosen to capture, as far as possible, the full range of future scenarios. An appropriate average or worst-case technique could be used to derive an initial estimate of the value of options embedded in the life insurance portfolio. A deterministic-to-stochastic adjustment could then be applied. This adjustment may be derived from any standardised method including flat benchmarked percentages.

Combination of techniques

12. A (re)insurance undertaking may use a combination of approaches when calculating the best estimate. For example:

a) The (re)insurance undertaking may use a valuation technique which fails to include one or more causes of uncertainty. The excluded/additional cause of uncertainty could then be valued accurately as a separate set of cash-flows or measured through the use of validation tools and appropriate adjustments made.

b) The (re)insurance undertaking may identify that much of the cause of uncertainty arises from one or more risk (e.g. investment returns) with the remaining risks making a much smaller contribution to the uncertainty (e.g. mortality experience). In this example, the (re)insurance undertaking may choose to use a valuation technique which combines a simulation approach for investment returns with either a deterministic or analytical approach for mortality experience provided the loss of accuracy is sufficiently small.

Special case of pure unit-linked contracts

13. Pure unit-linked contract [for these purposes] refers to case of a pure financial savings product, linked to the performance of a particular portfolio, with no financial guarantees

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attached, but which pays the market value of the units at the earlier of maturity, death or surrender. The underlying portfolio (used as reference to set out the amount to be paid in case of maturity, death or surrender), is composed of assets which are not traded on a deep, liquid and transparent market.

14. The calculation of technical provisions for these type of contracts will require modelling the assets set out as reference according the three building block scheme (discounted projected cash flows), considering that non traded assets need in any case a mark to model (which in most of cases implies stochastic modelling, at least to incorporate the non trade feature passed on to policyholders).

15. Where the proportionality principle is applicable, the guarantees of these contracts exclusively dependent on the value of the non-traded assets might be valued in a simplified manner, directly allowing for the valuation derived from an appropriate mark-to-model approach of the assets used as a reference.

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ANNEX C - Guidance on the definition on health insurance

1. The following table sets out the treatment of several insurance products in relation to the definition of health insurance.

Definition	Classification
Critical illness insurance = dread disease insurance An insurance policy that makes a lump sum payment in the event of the policyholder contracting one of a list of critical illnesses (e.g. cancer). Critical illness insurance can be sold as a separate health or life insurance policy, but can also be a rider to a (group) life or health insurance contract. Under this product different types of covers may exist (creditor insurance, individual protection...). Such different covers may need classification under SLT or non-SLT depending on the underlying risks.	Health insurance obligations
So called "Accelerated critical illness insurance" An insurance policy that makes a lump sum payment on the earlier of the following events: - The death of the policyholder - The policyholder contracting one of a list of critical illnesses (e.g. cancer) or (potentially) on disability because the main risk driver is usually death rather than contracting the illness.	Life insurance obligations, but not health insurance obligations
Permanent health insurance not subject to cancellation currently existing in Ireland and the United Kingdom An insurance policy that pays a monthly income if the policyholder become unable to	Health insurance obligations (SLT Health) – because it is income protection

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work because of illness or accidental injury for a given period Terminology: PHI is not just available in the UK and Ireland. It is just another term referring to disability insurance. It is also referred to as income protection (IP)	
Private medical insurance (as sold in the UK) An insurance policy that pays for the treatment for curable short-term illness or injury (commonly known as acute conditions). Cover is generally renewed annually	Health insurance obligations (Non-SLT Health)
Funeral cost insurance A life policy with a low sum assured intended to pay for the burial costs on the death of the insured. Also referred to as an assistance policy or rider to a health insurance policy	Life insurance obligations, but not health insurance obligations
Long term care insurance An insurance policy that makes periodic payments when the policyholder needs assistance for activities of daily living or medical care required to manage a chronic condition. The policy will generally cover some of, if not all, the costs associated with skilled nursing facilities, residential care homes, assisted living or other types of similar facilities.	Health insurance obligations
Health insurance as an alternative to social security (as defined in Article 206 of the Solvency II Framework Directive)	Health insurance obligations
Workers compensation insurance Insurance cover for the cost of medical care and rehabilitation for workers injured on the job, during the way to and from the job, or to work related diseases. Workers compensation insurance also compensates for wage loss and provides disability or death benefits for beneficiaries if	Health insurance obligations

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the insured person is killed or injured in work-related accidents.	
Annuities paid on non-life products which are not health insurance (e.g. stemming from third party liability claims or motor third party vehicle liability claims)	Life insurance obligations
Annuities related to income protection insurance and workers' compensation	Health insurance obligations (SLT Health)
Unemployment guarantees	Non-life insurance obligations, but not health insurance obligations
Assistance as defined in Article 6 of the Solvency II framework Directive	Non-life insurance obligations
Supplementary insurance underwritten in addition to life insurance, in particular: (1) insurance against personal injury including incapacity for employment, (2) insurance against death resulting from an accident and (3) insurance against disability resulting from an accident or sickness	Health insurance obligations
Preventive medical expenses	Health insurance obligations

Mortgage insurance contracts

2. In some cases, creditor insurance provides for the following guarantees: death guarantee, accidental death guarantee, disability/critical illness. In some markets, credit insurance is offered in connection with trade credits and insures against default of the debtor. It is usually purchased by companies and not individuals. The insurance pays in case of default:
    - Independent of the cause of default (subject to any restrictions mentioned in the insurance contract).
    - Dependant on the employment state.
3. For consumer credit, it usually insures against death, morbidity/disability and possibly unemployment. The mortality component is priced using life methodologies, whereas other components tend to be priced using non-life methodologies (but could also be based on life methodologies).

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4. For personal loans, the insurance covers mostly mortality risk (so that it is actually a term insurance with varying death benefit). It is also possible to add morbidity/disability protection as for consumer credits.
5. Mortgage insurance could be treated similarly to income insurance, although the risks could depend more on macroeconomic parameters than in other health insurance products.
6. In each case, mortgage insurance can in most or all cases be unbundled in:
    - Life insurance obligations, but not health insurance obligation (term insurance)
    - Health insurance obligations (disability insurance)
    - Non-life insurance obligations, but not health insurance obligation (unemployment insurance)

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ANNEX D - Examples on the boundary of insurance contracts

Benefits	Premiums	Contract boundary	
Whole life policy with a full medical assessment	Premiums on individual policies can be reviewed annually	All premiums and associated obligations beyond the next annual review date do not belong to the contract	Portfolio / policy level assessment
	The policy document makes it clear that premiums will not be increased with age, but may be increased annually across the whole portfolio where claims experience over the portfolio is higher than anticipated	When the policyholder decides to renew the contract and the undertaking has the ability to choose the premium only for a portfolio of contracts (i.e at *portfolio level*) but not independently for each individual contract , all future premiums belong to the contract since the individual risk assessment cannot be repeated before amending the premiums	
Whole life policy with guaranteed acceptance; policyholders answer 5 health related questions on the application form and are charged a higher premium if they answer yes to any of the questions		The medical survey constitutes an individual risk assessment; all future premiums belong to the contract	Interpretation of 'individual risk assesment'
Whole life policy with guaranteed acceptance; the application form asks the policyholder to state any pre-existing conditions, and doesn't use this inforamtion to vary premiums, but only to exclude the conditions listed		Even gathering and excluding pre-existing conditions constitutes an individual risk assessment; all future premiums belong to the contract	
Whole life policy with guaranteed acceptance and no use of medical information to establish premiums or benefits		If the insurer has a unilateral right to amend premiums under the contract, then no premiums beyond the next renewal date belong to the contract.	

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Term assurance policy with a full medical assessment	Fixed regular premiums for the full term; at maturity the policyholder may choose to renew the policy but the insurer is not restricted in the premium that may be charged on renewal	Only the premiums prior to renewal belong to the policy	Policy renewals
	Fixed regular premiums for the full term; at maturity the policy is automatically renewed, and the policyholder notified of the new premium payable; generally premiums remain level though the insurer is not restricted in the premium that may be charged at renewal	Only the premiums prior to renewal belong to the policy	
Group life policy - providing several benefits for all employees	The contract with the employer is annually reviewable	The boundary falls on the next review date	Group contracts
Automatically renewable general insurance policy	Premiums are annually reviewable on a portfolio level	The boundary falls on the next review date	Interpretation of 'portfolio'
General insurance policy with two parts: - a 5 year household cover benefit - a 1 year motor insurance benefit	Separate premiums for the individual benefits; premiums cannot be changed on individual policies, only at portfolio level; household cover premium reviewable in 5 years; motor premium reviewable in 1 year	The 'portfolio' should be interpreted by considering the first date on which premiums may be amended. For this policy, the portfolio should therefore not be taken as the combination of both benefits; rather each benefit should be considered separately. The boundary is 5 years for the household benefit and 1 year for the motor benefit.	

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Whole life unit-linked policy paying certain amount above of the unit value (e.g. 10000 euros or 1 %) on the death of the policyholder; no fixed guarantee of benefits	Fixed regular premiums and charges	The cover provides a discernible financial advantage to the beneficiary, and therefore future premiums would generally belong to the contract.	Interpretation of 'financial guarantee' & unbundling
Whole life unit-linked policy paying the higher of the unit value and the paid-in premiums on the death of the policyholder		A guaranteed return of premium will under a number of circumastances have an associated cost for the comapany, and therefore a discernible effect on the economics of the contract; future premiums would therefore generally belong to the contract in such cases	
Whole life unit-linked policy paying the maximum of a sum assured and the fund value		The unit-linked and assurance components of the contract should be unbundled where possible	
Whole life unit-linked policy paying the unit value on the death of the policyholder; 4% annual invesment return guarantee	Fixed regular premiums; annually reviewable charges	This policy includes a financial guarantee. The ability to amend charges may not be sufficient to fully reflect risk - if investment markets fall substantially then it may not be possible to make up losses by increasing charges. All future premiums therefore belong to the contract in this case.	Reviewable charges
Automatically reviewable health insurance contract	Premiums are annually reviewable in accordance with a national health risk equalisation system	All future premiums belong to the contract since the undertaking does not have the unilateral right to terminate the contract, to amend the premiums or to refuse the premiums	Interpretation of 'unilateral right'
5 year general insurance policy	Premiums are annually reviewable, subject to approval by an independent trustee who assesses whether the increases are fair	The ability of the trustee to veto a premium increase, even where this might reflect a fair view of the risk, suggests that the undertaking does not have a unilateral right to amend premiums; all future premiums belong to the contract	

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Automatically renewable general insurance policy	If there are no claims, premiums are guaranteed to remain level at renewal for a period of up to 3 years	The undertaking has a limited right to change premiums within the 3 year period; all premiums within the 3 year guaranteed period belong to contract

ANNEX E - Some technical aspects regarding the discount factors to be used in the calculation of the risk margin

1. The purpose of this annex is to explain in some detail the discount factors to be used in the calculation of the risk margin.

2. In a first step the usual formula for the calculation of the risk margin is presented. In a second step the corresponding scenario is described and thereby the appropriateness of the risk margin formula is verified.

Definition of the risk margin

3. The following nomenclature is applied:

   - Let the risk relating to the obligations run off within n years. Thus, it is sufficient to consider the time period which spans from $t = 0$ (valuation date) to $t = n$.

   - Let $CoCM_0$ be the risk margin for the transferred insurance obligations at the time of transfer. After transfer, the obligations run off. This has an effect on the risk margin that the reference undertaking has to reserve.

   - Let $CoCM_1,\ldots,CoCM_{n-1}$ be the Cost of capital margins at $t = 0,\ldots,n-1$ respectively.

   - Let $SCR_0, \ldots,SCR_{n-1}$ be the Solvency Capital Requirements of the reference undertaking in relation to the transferred insurance obligations at $t = 0,\ldots,n$ respectively.

   - Let CoC denote the Cost-of-Capital rate.

   - Let $r_{(1,0)},\ldots,r_{(n,0)}$ be the relevant risk-free rates at $t = 0$ for the maturities $1,\ldots,n$ respectively. Let $r_{(m,k)}$ ($k = 1,\ldots,n$ and $m = 1,\ldots,n-k$) be the corresponding risk-free forward rates at $t = k$ for maturity m.

4. The risk margin at $t = 0$ can be calculated according to the formula as follows:

$$CoCM_0 = CoC \cdot \sum_{s=0}^{n-1} \frac{SCR_s}{(1 + r_{(s+1,0)})^{s+1}} .$$

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5. The formula for the risk margin at $t = 0$ implies a similar formula for the risk margin at $t = k$ as follows:

$$CoCM_k = CoC \cdot \sum_{s=k}^{n-1} \frac{SCR_s}{(1 + r_{(s+1,k)})^{s+1}} .$$

6. If the reference undertaking covers $CoCM_k$ with risk-free assets that match the cash-flow pattern of the formula, then these assets earn during the year from $t = k$ to $t = k+1$ an interest of

$$CoC \cdot \sum_{s=k}^{n-1} r_{(s,k)} \frac{SCR_s}{(1 + r_{(s+1,k)})^{s+1}} ,$$

and the unwinding of the margin in that year (including the interest) yields an expected profit of $CoC \cdot SCR_k$ as can easily be calculated.

The capitalisation scenario

7. The reference undertaking receives the obligations as well as assets to cover best estimate and risk margin from the original insurer. The reference undertaking has no own funds to cover the SCR relating to the obligations. In order to meet the capital requirement, the reference undertaking requests external capital of the amount SCR_0 for one year. The interest on this capital is $CoC+r_{(1,0)}$, so in return, the reference undertaking has to pay back the amount $(1+CoC+r_{(1,0)}) \cdot SCR_0$ at the end of the year.

8. Under the assumption that the obligations run off according to best estitmate assumption, the position of the reference undertaking at the end of the year ($t = 1$) is as follows:

   - The development of the best estimate does not affect own funds: the assets covering the best estimate in $t = 0$ plus the risk-free rate earned during the year equal the claims payments during the year and best estimate at the end of the year.
   - The unwinding of the risk margin produces own funds of the amount $CoC \cdot SCR_0$.
   - The assets covering SCR_0 earn a risk-free rate of $r_{(1,0)} \cdot SCR_0$.
   - The repayment of the capital reduces own funds by $(1+CoC+r_{(1,0)})\ SCR_0$.

   To sum up, the own funds of the reference undertaking are reduced by the amount SCR_0, so that own funds are zero again.

9. Therefore, the reference undertaking is at $t = 1$ in the same situation as at $t = 0$. It has to raise new capital of the amount SCR_1 in order to meet the SCR. The process outlined above can be iterated until run-off of the liabilities. At $t = n$, the reference undertaking is relieved from the insurance obligation and no own funds will be left.

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10. This proves that the formula stated in these specifications is in line with the risk margin definition of the Level 1 text. In particular, the way of discounting is accurate because the payment of the amount $CoC \cdot SCR_s$ is made at $t = s+1$.[1]

[1] Indeed, the reference undertaking could agree with the capital provider to pay the spread $CoC \cdot SCR_s$ in advance at $t=s$. But then the value of the spread would be $CoC \cdot SCR_s/(1+r_{(1,s)})$.

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ANNEX F - Example to illustrate the first method of simplification to calculate the best estimate of incurred but not reported claims provision.

General formulation

1. The final estimate of this technical provision is derived from the following expression, where just for illustrative purposes a three-year period of observation has been considered (the adaptation of the formula for longer series is immediate):

$$\text{IBNR reserve year } t = C_t \times N_t \quad ,$$

where

C_t = average cost of IBNR claims, after taking into account inflation and discounting. This cost should be based on the average cost of claims reported in the year t. Since a part of the overall cost of claims reported in the year t comes from provisions, a correction for the possible bias should be applied.

and

$Nt = Rt * Av$, being

$$AV = [(N_{t-1} / p_1) + (N_{t-2} / p_2) + N_{t-3}] / [R_{t-1}+R_{t-2}+R_{t-3}]$$

2. Furthermore, in these expressions

N_{t-i} = number of claims incurred but not reported at the end of the year t-i, independently of the accident year (to assess the number of IBNR claims all the information known by the undertaking till the end of the year t should be included).

p_1= percentage of IBNR claims at the end of year t-3 that have been reported during the year t-2

p_2= percentage of IBNR claims at the end of year t-3 that have been reported during the years t-2 and t-1

R_{t-i}= claims reported in year t, independently of accident year.

3. It should be noted that the sufficiency of this method should be regularly checked using run-off results.

Numeric example

4. Assuming as date of reference of the valuation December the 31st of 2008, the undertaking has the following information:

N_2007 = 90

N_2006 = 100

N_2005 = 100 (85 reported in 2006 and 10 reported in 2007)

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furthermore

R_2008 = 10.500 ; R_2007 = 8.500

R_2006 = 8.200 ; R_2005 = 8.700

5. The overall cost of claims reported in 2008 amounts 11.000.000 €, from which 5.500.000 € are case reserves (with an estimated bias = 0.9).
6. The estimated inflation for 2009, 2010 and 2011 is 5 per cent (every year). The discounting rate is 4 per cent for the same years.
7. The claims reported every year are paid in a 50% the year of reporting, the year after is paid the 35%, and the third year is paid the 15% (this is an estimation based on entity experience or market experience).

A.1. Solution

Bias correction =	6.111.111		
	11.611.111		
50% =	5.805.556	6.095.833	5.861.378
35% =	4.063.889	4.480.438	4.142.416
15% =	1.741.667	2.016.197	1.792.392
After bias correction and inflation+discounting=			11.796.186
Overall cost of claims reported in 2008 =			11.796.186
		C2008 =	1.123
		p1=	0,85
		p2=	0,95
N2007/p1=	106	N2006/p2=	105
N2008=	129		
IBNR reserve =	144.501,20 €		

8. If the average cost of IBNR claims is different to the average cost of reported claims, C_t can be adjusted.
9. This method needs at least four years of experience. Thus, in case of new undertakings or a new line of business this simplification does not apply.

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ANNEX G - Examples for the allowance of reinsurance in the health and non-life catastrophe risk sub-modules

A 1 Country; Cat Excess of loss cover
Assume 850 excess 100 with 1 reinstatement cost 40

Gross loss	**1,000**
ri recovery	850
ri premium	40
Net loss	**190**

B 1 Country; Cat Excess of loss cover with 10% quota share
Assume 850 excess 100 with 1 reinstatement cost 40
Quota share applies after Cat XL programme

Gross loss	**1,000**
Cat XL ri recovery	850
net loss after Cat XL	150
QS ri recovery	15
Cat XL ri premium	40
Net loss	**175**

C 1 Country; Cat Excess of loss cover with 10% quota share
Nat Cat type event
Assume 800 excess 100 with 1 reinstatement cost 40
Quota share applies before Cat XL programme

Gross loss	**1,000**
QS ri recovery	100
net loss after Cat XL	900
Cat XL ri recovery	800
Cat XL ri premium	38
Net loss	**138**

D 2 countries; Global Cat Excess of loss
Nat Cat type event affects 2 countries
Same currency in each country
In this situation the firm aggregates its gross losses across countries using 3.4
It then applies its RI programme to the result.
Assume 1900 excess 100 with 1 reinstatement cost 100

Assume the 2 countries have a correlation of 75%

	Total	**Country A**	**Country B**

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Gross loss	**1,414**	**1,000**	**500**
RI recovery	1,314		
RI premium	69		
Net loss	**169**		

Note: need to take care if different currencies are used in different countries. This will depend on the details of the reinsurance treaty

E 2 countries; Separate Cat Excess of loss covers
Nat Cat type event affects 2 countries
Same currency in each country
In this situation the firm applies its RI programme to the gross loss in each country
Then aggregates the net results using 3.4
Assume 1350 excess 50 with 1 reinstatement cost 65 for country A
Assume 550 excess 50 with 1 reinstatement cost 35 for country B
Assume the 2 countries have a correlation of 75%

	Total	Country A	Country B
Gross loss	**1,414**	**1,000**	**500**
RI recovery		950	450
RI premium		46	29
Net loss	**163**	**96**	**79**

Note: need to take care if different currencies are used in different countries

F 2 countries; Global Cat Excess of loss
Nat Cat type event affects 2 countries
Same currency in each country
Allocating the RI cover pro-rata to the countries to get net results by country
Then aggregates the net results using 3.4
Assume 1266 excess 67 with 1 reinstatement cost 67 for country A, and appropriately scaled down for country B.

Assume the 2 countries have a correlation of 75%

	Total	Country A	Country B
Gross loss	**1,414**	**1,000**	**500**
RI recovery		933	467
RI premium		49	25
Net loss	**174**	**116**	**58**

Note: need to take care if different currencies are used in different countries
- will depend on the details of the reinsurance treaty
This is the same example as D, but aggregated in a different way

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ANNEX H - Adjustment factor for non-proportional reinsurance for the Non-SLT health and non-life premium and reserve risk sub-modules

(1) For the purpose of this annex, "excess of loss reinsurance contract" shall also denote arrangements with special purpose vehicles that provide risk transfer which is equivalent to that of an excess of loss reinsurance contract.

(2) An excess of loss reinsurance contract for a segment shall be considered recognisable if it meets the following conditions:

(a) it provides, to the extent that losses of the ceding undertaking that relate either to single insurance claims or all insurance claims under the same policy during a specified time period are larger than a specified retention, complete compensation for such losses up to a specified limit or without limit, (per risk excess of loss reinsurance);

(b) it covers all insurance claims that the insurance or reinsurance undertaking may incur in the segment during the following 12 months;

(c) it allows for a sufficient number of reinstatements;

(d) it applies to the gross claims, without deduction of the recoverables from other reinsurance contracts or special purpose vehicles;

(e) it meets the requirements set out in Articles SCRRM1 to SCRRM3 and SCRRM5.

(3) For the segments 1 to 9 set out in Annex NLUR1 of Regulation N°.../... and the segments 1 to 3 set out in Annex HUR1 of Regulation N°.../..., the adjustment factor for non-proportional reinsurance of a segment shall be calculated as set out in following paragraphs.

(4) Gross claim amounts are assumed to follow a lognormal probability distribution with density function:

$$f(y \mid \theta, \eta) = \frac{1}{y\eta\sqrt{2\pi}} \exp\left[-\frac{(\log y - \theta)^2}{2\eta^2} \right] \qquad y > 0$$

(5) The first and second raw moment are given by

$$\mu = \exp(\theta + \tfrac{1}{2}\eta^2) \qquad \text{and} \qquad \omega = \exp(2\theta + 2\eta^2)$$

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(6) The excess of loss reinsurance is designed by barrier values $0 < b_1 < b_2 < b_3 = \infty$ that define three layers: $[0,b_1)$, $[b_1,b_2)$ and $[b_2, \infty)$. The second layer has capacity $(b_2 - b_1)$.

(7) Define the following variables for $\ell = 1,2$ and 3:

$$q_\ell = (\log b_\ell - \theta)/\eta \qquad \text{auxiliary variable}$$

$$\mu_\ell = \mu N(q_\ell - \eta) + b_\ell N(-q_\ell) \qquad \text{right-censored first moment}$$

$$\omega_\ell = \omega N(q_\ell - 2\eta) + b_\ell^2 N(-q_\ell) \qquad \text{right-censored second moment}$$

Here $N(\ )$ denotes the standard Normal cumulative probability function.

Hence $\mu_3 = \mu$ and $\omega_3 = \omega$.

(8) Where insurance and reinsurance undertakings have concluded a recognisable excess of loss reinsurance contract for a segment, the adjustment factor *NP* for non-proportional reinsurance of the segment shall be equal to the following:

$$NP = \left(\frac{\omega_1 - \omega_2 + \omega_3 + 2(b_2 - b_1)(\mu_2 - \mu_3)}{\omega_3} \right)^{1/2} < 1$$

When the second layer is unlimited this boils down to:

$$NP = \left(\frac{\omega_1}{\omega_3} \right)^{1/2} < 1$$

(9) The parameters μ and ω are estimated by the methods of moments as :

$$\mu = \tfrac{1}{n} \sum_{i=1}^{n} Y_i \qquad \text{and} \qquad \omega = \tfrac{1}{n} \sum_{i=1}^{n} Y_i^2$$

from which follow $\theta = 2\log\mu - \frac{1}{2}\log\omega$ and $\eta = \sqrt{\log\omega - 2\log\mu}$.

Here n denotes the number of insurance claims that were reported to the insurance or reinsurance undertaking in segment s during the last $T \geq 5$ years and $Y_1, \ldots, Y_n$ denote the ultimate claim amounts as estimated in the year they were reported. The ultimate claim amounts shall be gross, without deduction of the amounts receivable from reinsurance contracts and special purpose vehicles. Where according to the conditions of the recognisable excess of loss reinsurance contract several of those insurance claims would have been considered together in order to assess whether the amount of claims are larger than the retention of the excess of loss reinsurance contract these claims shall be considered as a single claim.

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(10) Where insurance and reinsurance undertakings have not concluded a recognisable excess of loss reinsurance contract for a segment, the adjustment factor for non-proportional reinsurance of the segment shall be equal to 1.

(11) Where insurance and reinsurance undertakings have concluded several recognisable excess of loss reinsurance contracts and their combined reinsurance cover meets the requirements set out in paragraph 2, then they shall be considered as one recognisable reinsurance contract for the purpose of the calculation set out in paragraphs 4 to 10.

(12) Where an excess of loss reinsurance contracts meets the requirements set out in points (a) to (c) and (e) of paragraph 2 and does not apply to gross claims referred to in point (d) of paragraph 2, but to claims after deduction of the recoverables from certain other reinsurance contracts and special purpose vehicles, then it shall also be considered as recognisable and the adjustment factor for non-proportional reinsurance shall be calculated in the same way as set out in paragraphs 4 to 11 but with the following change: the ultimate gross claim amounts $Y_1,\ldots,Y_n$ referred to in paragraph 9 are after deduction of the amounts receivable from the certain reinsurance contracts and special purpose vehicles.

(13) Irrespective of paragraph 3, insurance and reinsurance undertakings may use an adjustment factor for non-proportional reinsurance of 1 for any of the segments 1 to 9 set out in Annex NLUR1 of Regulation N°.../... and any of the segments 1 to 3 set out in Annex HUR1 of Regulation N°.../... to calculate the non-life and NSLT health premium and reserve risk sub-module.

For the segments 10 to 12 set out in Annex NLUR1 of Regulation N°.../... and segment 4 set out in Annex HUR1 of Regulation N°.../...:, the adjustment factor for non-proportional reinsurance of a segment shall be equal to 1.

(14) In the situation that non-proportional reinsurance is purchased by homogeneous risk group, the adjustment factor should be estimated as follows: the adjustment factor *NPss* should be calculated by segment by using the formula set in above. The individual adjustment factors estimated by a homogeneous risk group level should be weighted by the premium volume measure specified in Article 82 at a homogeneous risk group level, in order to derive the non-proportional reinsurance adjustment for the segment; i.e.

$$NP_s = \frac{\sum_{ss} V_{(prem,ss)} NP_{ss}}{\sum_{ss} V_{(prem,ss)}}$$

where *V*(*prem*, *ss*) is calculated in accordance with [Article 82 of the draft implementing measure, at homogeneous risk group level.

(15) The standard deviation net of reinsurance for premium risk is the product of the gross standard deviation multiplied by the non-proportional factor NP_s.

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ANNEX I - Principles for recognising risk mitigation techniques in the SCR standard formula

Principle 1: Economic effect over legal form

- Risk mitigation techniques should be recognised and treated consistently, regardless of their legal form or accounting treatment, provided that their economic or legal features meet the requirements for such recognition.

- Where risk mitigation techniques are recognised in the SCR calculation, any material new risks shall be identified, quantified and included within the SCR. Where the risk mitigation technique actually increases risk, then the SCR should be increased.

- The calculation of the SCR should recognise risk mitigation techniques in such a way that there is no double counting of mitigation effects.

Principle 2: Legal certainty, effectiveness and enforceability

- The transfer of risk from the undertaking to the third party shall be effective in all circumstances in which the undertaking may wish to rely upon the transfer. Examples of factors which the undertaking shall take into account in assessing whether the transaction effectively transfers risk and the extent of that transfer include:
    - whether the relevant documentation reflects the economic substance of the transaction;
    - whether the extent of the risk transfer is clearly defined and beyond dispute;
    - whether the transaction contains any terms or conditions the fulfilment of which is outside the direct control of the undertaking. Such terms or conditions may include those which:
        - would allow the third party unilaterally to cancel the transaction, except for the non-payment of monies due from the undertaking to the third party under the contract;
        - would increase the effective cost of the transaction to the undertaking in response to an increased likelihood of the third party experiencing losses under the transaction;
        - would oblige the undertaking to alter the risk that had been transferred with the purpose of reducing the likelihood of the third party experiencing losses under the transaction;
        - would allow for the termination of the transaction due to an increased likelihood of the third party experiencing losses under the transaction;
        - could prevent the third party from being obliged to pay out in a timely manner any monies due under the transaction; or
        - could allow the maturity of the transaction to be reduced.

- An undertaking shall also take into account circumstances in which the benefit to the undertaking of the transfer of risk could be undermined. For instance, where the

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undertaking, with a view to reducing potential or actual losses to third parties, provides support to the transaction, including support beyond its contractual obligations.

- In determining whether there is a transfer of risk, the entire contract shall be considered. Further, where the contract is one of several related contracts the entire chain of contracts, including contracts between third parties, shall be considered in determining whether there is a transfer of risk. In the case of reinsurance, the entire legal relationship between the cedant and reinsurer shall be taken into account in this determination.

- The undertaking shall take all appropriate steps, for example a sufficient legal review, to ensure and confirm the effectiveness and ongoing enforceability of the risk mitigation arrangement and to address related risks. 'Ongoing enforceability' refers to any legal or practical constraint that may impede the undertaking from receiving the expected protection. In the case of financial risk mitigation, the allowance in the SCR of the 'counterparty default risk' derived from the 'financial risk mitigation technique' does not preclude the necessity of satisfying the 'ongoing enforceability'.

- In the case of financial risk mitigation, instruments used to provide the risk mitigation together with the action and steps taken and procedures and policies implemented by the undertaking shall be such as to result in risk mitigation arrangements which are legally effective and enforceable in all jurisdictions relevant to the arrangement and, where appropriate, relevant to the hedged asset or liability.

- Procedures and processes not materialized in already existing financial contracts providing protection at the date of reference of the solvency assessment, shall not be allowed to reduce the calculation of the SCR with the standard formula.

Principle 3: Liquidity and certainty of value

- To be eligible for recognition, the risk mitigation techniques shall be valued in line with the principles laid down for valuation of assets and liabilities, other than technical provisions. This value shall be sufficiently reliable and appropriate to provide certainty as to the risk mitigation achieved.

- Regarding the liquidity of the financial risk mitigation techniques, the following applies:
  - the undertaking should have written internal policy regarding the liquidity requirements that financial risk mitigation techniques should meet, according to the objectives of the undertaking's risk management policy;
  - financial risk mitigation techniques considered to reduce the SCR have to meet the liquidity requirements established by the undertaking; and
  - the liquidity requirements shall guarantee an appropriate coordination of the liquidity features of the hedged assets or liabilities, the liquidity of the financial risk mitigation technique, and the overall policy of the undertaking regarding liquidity risk management.

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Principle 4: Credit quality of the provider of risk mitigation

- Providers of risk mitigation instruments should have an adequate credit quality to guarantee with appropriate certainty that the undertaking will receive the protection in the cases specified by the contracting parties.

- Credit quality should be assessed using objective techniques according to generally accepted practices.

- The assessment of the credit quality of the provider of protection shall be based on a joint and overall assessment of all the features or contracts directly and explicitly linked to the financial risk mitigation technique. This assessment shall be carried out in a prudent manner, in order to avoid any overstatement of the credit quality.

- The correlation between the values of the instruments relied upon for risk mitigation and the credit quality of their provider shall not be unduly adverse, i.e. it should not be materially positive (known in the banking sector as 'wrong way risk'). As an example, exposures in a company belonging to a group should not be mitigated with CDS provided by entities of the same group, since it is very likely that a failure of the group will lead to falls in the value of the exposure and simultaneous downgrade or failure of the provider of protection. This requirement does not refer to the systemic correlation existing between all financial markets as a whole in times of crisis.

Principle 5: Direct, explicit, irrevocable and unconditional features

- Financial risk mitigating techniques can only reduce the capital requirements if:
  - they provide the undertaking with a direct claim on the protection provider;
  - they contain an explicit reference to specific exposures or a pool of exposures, so that the extent of the cover is clearly defined and incontrovertible;
  - they are not subject to any clause, the fulfilment of which is outside the direct control of the undertaking, that would allow the protection provider to unilaterally cancel the cover or that would increase the effective cost of protection as a result of certain developments in the hedged exposure; and
  - they are not subject to any clause outside the direct control of the undertaking that could prevent the protection provider from its obligation to pay out in a timely manner in the event that a loss occurs on the underlying exposure.

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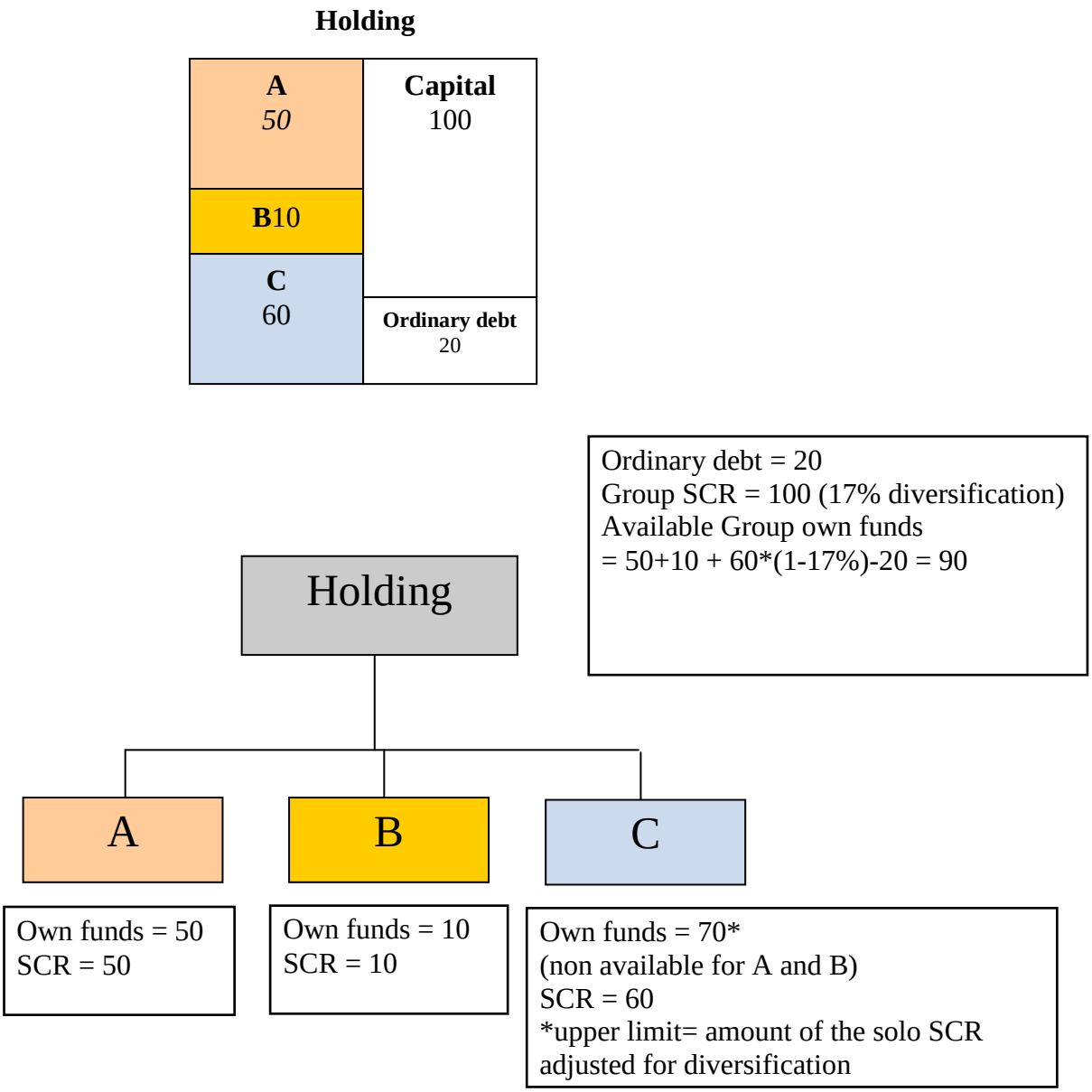
ANNEX J - Example for the contribution of non available own funds of the related undertakings to group own funds



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ANNEX K - Lines of Business

Non-life insurance obligations

1. *Medical expense insurance*

Medical expense insurance obligations where the underlying business is not pursued on a similar technical basis to that of life insurance, other than obligations included in the line of business 3.

2. *Income protection insurance*

Income protection insurance obligations where the underlying business is not pursued on a similar technical basis to that of life insurance, other than obligations included in the line of business 3.

3. *Workers' compensation insurance*

Health insurance obligations which relate to accidents at work, industrial injury and occupational diseases and where the underlying business is not pursued on a similar technical basis to that of life insurance.

4. *Motor vehicle liability insurance*

Insurance obligations which cover all liabilities arising out of the use of motor vehicles operating on land (including carrier's liability).

5. *Other motor insurance*

Insurance obligations which cover all damage to or loss of land vehicles (including railway rolling stock).

6. *Marine, aviation and transport insurance*

Insurance obligations which cover all damage or loss to sea, lake, river and canal vessels, aircraft, and damage to or loss of goods in transit or baggage irrespective of the form of transport. Insurance obligations which cover liabilities arising out of the use of aircraft, ships, vessels or boats on the sea, lakes, rivers or canals (including carrier's liability).

7. *Fire and other damage to property insurance*

Insurance obligations which cover all damage to or loss of property other than those included in the lines of business 5 and 6 due to fire, explosion, natural forces including storm, hail or frost, nuclear energy, land subsidence and any event such as theft.

8. *General liability insurance*

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Insurance obligations which cover all liabilities other than those in the lines of business 4 and 6.

9. Credit and suretyship insurance

Insurance obligations which cover insolvency, export credit, instalment credit, mortgages, agricultural credit and direct and indirect suretyship.

10. Legal expenses insurance

Insurance obligations which cover legal expenses and cost of litigation.

11. Assistance

Insurance obligations which cover assistance for persons who get into difficulties while travelling, while away from home or while away from their habitual residence.

12. Miscellaneous financial loss

Insurance obligations which cover employment risk, insufficiency of income, bad weather, loss of benefit, continuing general expenses, unforeseen trading expenses, loss of market value, loss of rent or revenue, indirect trading losses other than those mentioned above, other financial loss (non-trading) as well as any other risk of non-life insurance not covered by the lines of business 1 to 11.

B. Proportional non-life reinsurance obligations

The lines of business 13 to 24 shall include proportional reinsurance obligations which relate to the obligations included in lines of business 1 to 12 respectively.

C. Non-proportional non-life reinsurance obligations

13. Non-proportional health reinsurance

Non-proportional reinsurance obligations relating to insurance obligations included in lines of business 1 to 3.

14. Non-proportional casualty reinsurance

Non-proportional reinsurance obligations relating to insurance obligations included in lines of business 4 and 8.

15. Non-proportional marine, aviation and transport reinsurance

Non-proportional reinsurance obligations relating to insurance obligations included in line of business 6.

16. Non-proportional property reinsurance

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Non-proportional reinsurance obligations relating to insurance obligations included in lines of business 5, 7 and 9 to 12.

D. Life insurance obligations

17. Health insurance

Health insurance obligations where the underlying business is pursued on a similar technical basis to that of life insurance, other than those included in line of business 33.

18. Insurance with profit participation

Insurance obligations with profit participation other than obligations included in line of business 33 and 34.

19. Index-linked and unit-linked insurance

Insurance obligations with index-linked and unit-linked benefits other than those included in lines of business 33 and 34.

20. Other life insurance

Other life insurance obligations other than obligations included in lines of business 29 to 31, 33 and 34.

21. *Annuities stemming from non-life insurance contracts and relating to health insurance obligations*

22. *Annuities stemming from non-life insurance contracts and relating to insurance obligations other than health insurance obligations*

E. Life reinsurance obligations

23. Health reinsurance

Reinsurance obligations which relate to the obligations included in lines of business 29 and 33.

24. *Life reinsurance*

Reinsurance obligations which relate to the obligations included in lines of business 30 to 32 and 34.

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ANNEX L - Regions for the calculation of the factor for geographical diversification

	Region	Territories that the region consists of
1	Northern Europe	Denmark (except Greenland), Estonia, Finland, Guernsey, Iceland, Ireland, Isle of Man, Jersey, Latvia, Lithuania, Norway, Sweden, United Kingdom (except Anguilla, Bermuda, British Virgin Islands, Cayman Islands, Falkland Islands, Gibraltar, Montserrat, Pitcairn Islands, Saint Helena, Turks and Caicos Islands)
2	Western Europe	Austria, Belgium, France (except French Guiana, French Polynesia, Guadeloupe, Martinique, Mayotte, New Caledonia, Réunion, Saint Barthélemy, Saint Martin, Saint Pierre and Miquelon, Wallis and Futuna), Germany, Liechtenstein, Luxembourg, Monaco, Netherlands (except Aruba, Bonaire, Curaçao, Saba, Sint Eustatius, Sint Maarten), Switzerland
3	Eastern Europe	Belarus, Bulgaria, Czech Republic, Hungary, Moldova, Poland, Romania, Russia, Slovakia, Ukraine
4	Southern Europe	Albania, Andorra, Bosnia and Herzegovina, Croatia, Cyprus, the former Yugoslav Republic of Macedonia, Gibraltar, Greece, Italy, Malta, Montenegro, Portugal, San Marino, Serbia, Slovenia, Spain, Vatican City State
5	Central and Western Asia	Armenia, Azerbaijan, Bahrain, Georgia, Iraq, Israel, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Tajikistan, Turkey, Turkmenistan, United Arab Emirates, Uzbekistan, Yemen
6	Eastern Asia	China, Japan, Mongolia, North Korea, South Korea, Taiwan
7	South and South-Eastern Asia	Afghanistan, Bangladesh, Bhutan, Brunei, Burma/Myanmar, Cambodia, India, Indonesia, Iran, Laos, Malaysia, Maldives, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, East Timor, Vietnam
8	Oceania	American Samoa, Australia, Cook Islands, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Micronesia, Nauru, New Caledonia, New Zealand, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Pitcairn Islands, Samoa,

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		Solomon Islands, Tonga, Tuvalu, Vanuatu, Wallis and Futuna
9	Northern Africa	Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Côte d'Ivoire, Egypt, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Libya, Mali, Mauritania, Morocco, Niger, Nigeria, Saint Helena, Senegal, Sierra Leone, South Sudan, Sudan, Togo, Tunisia
10	Southern Africa	Angola, Botswana, Burundi, Comoros, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mayotte, Mozambique, Namibia, Congo, Réunion, Rwanda, São Tomé and Príncipe, Seychelles, Somalia, South Africa, Swaziland, Uganda, Tanzania, Zambia, Zimbabwe
11	Northern America excluding the United States of America	Bermuda, Canada, Greenland, Saint Pierre and Miquelon
12	Caribbean and Central America	Anguilla, Antigua & Barbuda, Aruba, Bahamas, Barbados, Belize, Bonaire, British Virgin Islands, Cayman Islands, Costa Rica, Cuba, Curaçao, Dominica, Dominican Republic, El Salvador, Grenada, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Nicaragua, Panama, Puerto Rico, Saint Barthélemy, Saba, Saint Kitts and Nevis, Saint Lucia, Saint Martin, Saint Vincent and the Grenadines, Sint Eustatius, Sint Maarten, Trinidad and Tobago, Turks and Caicos Islands, US Virgin Islands
13	Eastern South America	Brazil, Falkland Islands, French Guiana, Guyana, Paraguay, Suriname, Uruguay
14	Northern, southern and western South America	Argentina, Bolivia, Chile, Colombia, Ecuador, Peru, Venezuela
15	North-east United States of America	Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont
16	South-east United States of America	Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee, Virginia, West Virginia

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17	Mid-west United States of America	Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, Wisconsin
18	Western United States of America	Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington, Wyoming

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ANNEX M - Health catastrophe risk sub-module of the Solvency Capital Requirement standard formula

Geographical segmentation and risk factors for the mass accident risk sub-module

Country *s*	**r_s - Ratio of persons affected by the mass accident in country *s***
Republic of Austria	0.30 %
Kingdom of Belgium	0.25 %
Republic of Bulgaria	0.30 %
Republic of Croatia	0.40 %
Republic of Cyprus	1.30 %
Czech Republic	0.10 %
Kingdom of Denmark	0.35 %
Republic of Estonia	0.45 %
Republic of Finland	0.35 %
French Republic	0.05 %
Hellenic Republic	0.30 %
Federal Republic of Germany	0.05 %
Republic of Hungary	0.15 %
Republic of Iceland	2.45 %
Ireland	0.95 %
Italian Republic	0.05 %
Republic of Latvia	0.20 %
Republic of Lithuania	0.20 %
Grand Duchy of Luxemburg	1.05 %
Republic of Malta	2.15 %
Kingdom of the Netherlands	0.15 %
Kingdom of Norway	0.25 %
Republic of Poland	0.10 %
Portuguese Republic	0.30 %
Romania	0.15 %
Slovak Republic	0.30 %
Republic of Slovenia	0.40 %
Kingdom of Spain	0.10 %
Kingdom of Sweden	0.25 %
Swiss Confederation	0.25 %
United Kingdom of Great Britain and Northern Ireland	0.05 %

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ANNEX N - Regions and windstorm risk factors

Abbreviation of region *r*	**Region *r***	**Windstorm risk factor $Q_{(windstorm,r)}$**
AT	Republic of Austria	0.08 %
BE	Kingdom of Belgium	0.16 %
CZ	Czech Republic	0.03 %
CH	Swiss Confederation; Principality of Lichtenstein	0.08 %
DK	Kingdom of Denmark	0.25 %
FR	French Republic[2]	0.12 %
DE	Federal Republic of Germany	0.09 %
IS	Republic of Iceland	0.03 %
IE	Ireland	0.20 %
LU	Grand Duchy of Luxemburg	0.10 %
NL	Kingdom of the Netherlands	0.18 %
NO	Kingdom of Norway	0.08 %
PL	Republic of Poland	0.04 %
ES	Kingdom of Spain; Principality of Andorra	0.03 %
SE	Kingdom of Sweden	0.09 %
UK	United Kingdom of Great Britain and Northern Ireland	0.17 %

[2] except Guadeloupe, Martinique, the Collectivity of Saint Martin and Réunion

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GU	Guadeloupe	2.74 %
MA	Martinique	3.19 %
SM	Collectivity of Saint Martin	5.16 %
RE	Réunion	2.50 %

WINDSTORM RISK CORRELATION COEFFICIENTS FOR REGIONS

	AT	BE	CH	CZ	DE	DK	ES	FR	UK	IE	IS	LU	NL	NO	PL	SE	GU	MA	SM	RE
AT	1.00	0.25	0.50	0.25	0.25	0.00	0.00	0.25	0.00	0.00	0.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BE	0.25	1.00	0.25	0.25	0.50	0.25	0.00	0.50	0.50	0.25	0.00	0.75	0.75	0.00	0.25	0.00	0.00	0.00	0.00	0.00
CH	0.50	0.25	1.00	0.25	0.25	0.00	0.25	0.50	0.00	0.00	0.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CZ	0.25	0.25	0.25	1.00	0.25	0.00	0.00	0.25	0.00	0.00	0.00	0.25	0.25	0.00	0.25	0.00	0.00	0.00	0.00	0.00
DE	0.25	0.50	0.25	0.25	1.00	0.50	0.00	0.50	0.25	0.25	0.00	0.50	0.50	0.25	0.50	0.00	0.00	0.00	0.00	0.00
DK	0.00	0.25	0.00	0.00	0.50	1.00	0.00	0.25	0.25	0.00	0.00	0.25	0.50	0.50	0.25	0.50	0.00	0.00	0.00	0.00
ES	0.00	0.00	0.25	0.00	0.00	0.00	1.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FR	0.25	0.50	0.50	0.25	0.50	0.25	0.25	1.00	0.25	0.00	0.00	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UK	0.00	0.50	0.00	0.00	0.25	0.25	0.00	0.25	1.00	0.50	0.00	0.25	0.50	0.25	0.00	0.00	0.00	0.00	0.00	0.00
IE	0.00	0.25	0.00	0.00	0.25	0.00	0.00	0.00	0.50	1.00	0.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LU	0.25	0.75	0.25	0.25	0.50	0.25	0.00	0.50	0.25	0.25	0.00	1.00	0.50	0.25	0.25	0.00	0.00	0.00	0.00	0.00
NL	0.25	0.75	0.25	0.25	0.50	0.50	0.00	0.50	0.50	0.25	0.00	0.50	1.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00
NO	0.00	0.00	0.00	0.00	0.25	0.50	0.00	0.00	0.25	0.00	0.00	0.25	0.25	1.00	0.00	0.50	0.00	0.00	0.00	0.00
PL	0.00	0.25	0.00	0.25	0.50	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.00	1.00	0.00	0.00	0.00	0.00	0.00
SE	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	1.00	0.00	0.00	0.00	0.00
GU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00
MA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00
SM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00
RE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00

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ANNEX O - List of regions for which natural catastrophe risk is not calculated based on premiums

Member States of the European Union

Principality of Andorra

Republic of Croatia

Republic of Iceland

Principality of Lichtenstein

Principality of Monaco

Kingdom of Norway

Republic of San Marino

Swiss Confederation

Vatican City State

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ANNEX P - Regions and earthquake risk factors

Abbreviation of region *r*	**Region *r***	**Earthquake risk factor $Q_{(earthquake,r)}$**
AT	Republic of Austria	0.10 %
BE	Kingdom of Belgium	0.02 %
BG	Republic of Bulgaria	1.60 %
CR	Republic of Croatia	1.60 %
CY	Republic of Cyprus	2.12%
CZ	Czech Republic	0.10 %
CH	Swiss Confederation; Principality of Lichtenstein	0.25 %
FR	French Republic[3]	0.06 %
DE	Federal Republic of Germany	0.10 %
HE	Hellenic Republic	1.85 %
HU	Republic of Hungary	0.20 %
IT	Italian Republic; Republic of San Marino; Vatican City State	0.80 %
MT	Republic of Malta	1.00 %
PT	Portuguese Republic	1.20 %
RO	Romania	1.70 %
SK	Slovak Republic	0.15 %
SI	Republic of Slovenia	1.00 %

[3] except Guadeloupe, Martinique, the Collectivity of Saint Martin and Réunion

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GU	Guadeloupe	4.09 %
MA	Martinique	4.71 %
SM	Collectivity of Saint Martin	5.00 %

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EARTHQUAKE RISK CORRELATION COEFFICIENTS FOR REGIONS

	AT	BE	BG	CR	CY	FR	DE	HE	HU	IT	MT	PT	RO	SI	CZ	CH	SK	GU	MA	ST
AT	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00
BE	0.00	1.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BG	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CR	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00
CY	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FR	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00
DE	0.00	0.25	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00
HE	0.00	0.00	0.25	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SI	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
CZ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
CH	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
SK	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
GU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.75	0.75
MA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	1.00	0.75
ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.75	0.75

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ANNEX Q - Regions and flood risk factors

Abbreviation of region *r*	**Region *r***	**Flood risk factor $Q_{(flood,r)}$**
AT	Republic of Austria	0.13 %
BE	Kingdom of Belgium	0.10 %
BG	Republic of Bulgaria	0.15 %
CZ	Czech Republic	0.30 %
CH	Swiss Confederation; Principality of Lichtenstein	0.15 %
FR	French Republic[4]; Principality of Monaco	0.10 %
DE	Federal Republic of Germany	0.20 %
HU	Republic of Hungary	0.40 %
IT	Italian Republic; Republic of San Marino; Vatican City State	0.10 %
PL	Republic of Poland	0.16 %
RO	Romania	0.40 %
SK	Slovak Republic	0.45 %
SI	Republic of Slovenia	0.30 %
UK	United Kingdom of Great Britain and Northern Ireland	0.10 %

[4] except Guadeloupe, Martinique, the Collectivity of Saint Martin and Réunion

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Flood risk correlation coefficients for regions

	AT	BE	CH	CZ	FR	DE	HU	IT	BG	PL	RO	SI	SK	UK
AT	1.00	0.00	0.25	0.50	0.00	0.75	0.50	0.00	0.25	0.25	0.25	0.00	0.50	0.00
BE	0.00	1.00	0.00	0.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CH	0.25	0.00	1.00	0.00	0.25	0.25	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00
CZ	0.50	0.00	0.00	1.00	0.00	0.50	0.25	0.00	0.00	0.75	0.25	0.00	0.75	0.00
FR	0.00	0.25	0.25	0.00	1.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DE	0.75	0.25	0.25	0.50	0.25	1.00	0.25	0.00	0.00	0.75	0.25	0.00	0.25	0.00
HU	0.50	0.00	0.00	0.25	0.00	0.25	1.00	0.00	0.25	0.25	0.50	0.00	0.25	0.00
IT	0.00	0.00	0.25	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.25	0.00	0.00
BG	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.00	1.00	0.00	0.50	0.00	0.00	0.00
PL	0.25	0.00	0.00	0.75	0.00	0.75	0.25	0.00	0.00	1.00	0.25	0.00	0.25	0.00
RO	0.25	0.00	0.00	0.25	0.00	0.25	0.50	0.00	0.50	0.25	1.00	0.00	0.25	0.00
SI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	1.00	0.25	0.00
SK	0.50	0.00	0.00	0.75	0.00	0.25	0.25	0.00	0.00	0.25	0.25	0.25	1.00	0.00
UK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00

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ANNEX R - Regions and hail risk factors

Abbreviation of region *r*	Region *r*	Hail risk factor $Q_{(hail,r)}$
AT	Republic of Austria	0.08 %
BE	Kingdom of Belgium	0.03 %
CH	Swiss Confederation; Principality of Lichtenstein	0.06 %
FR	French Republic[5]; Principality of Monaco	0.01 %
DE	Federal Republic of Germany	0.02 %
IT	Italian Republic; Republic of San Marino; Vatican City State	0.05 %
LU	Grand Duchy of Luxemburg	0.03 %
NL	Kingdom of the Netherlands	0.02 %
ES	Kingdom of Spain; Principality of Andorra	0.01 %

[5] except Guadeloupe, Martinique, the Collectivity of Saint Martin and Réunion

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HAIL RISK CORRELATION COEFFICIENTS FOR REGIONS

	AT	BE	FR	DE	IT	LU	NL	CH	ES
AT	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BE	0.00	1.00	0.00	0.00	0.00	0.25	0.25	0.00	0.00
FR	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
DE	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
IT	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
LU	0.00	0.25	0.00	0.00	0.00	1.00	0.25	0.00	0.00
NL	0.00	0.25	0.00	0.00	0.00	0.25	1.00	0.00	0.00
CH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
ES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00

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ANNEX S - Arrangements and products that are generally outside the scope of ring-fenced funds

i. Conventional unit-linked products, i.e. where all of the benefits provided by a contract are directly linked to the value of units in an UCITS or to the value of assets contained in an internal fund held by the insurance undertakings, usually divided into units. The cash value of a policy varies according to the net asset value of the underlying investment assets and the technical provisions in respect of the benefits provided by the contract are represented as closely as possible by those units, as required by Article 132 (3) of Directive 2009/138/EC.

ii. Conventional index-linked products where all of the benefits provided by a contract are based on a share index or some other reference value. The technical provisions in respect of the benefits are represented as closely as possible either by the units deemed to represent the reference value, or in the case where units are not established, by assets of appropriate security and marketability which correspond as closely as possible with those on which the particular reference value is based, in accordance with Article 132 (3) of the Directive 2009/138/EC.

iii. Provisions (including technical provisions, equalisation provisions) and reserves set up in accounts or financial statements prepared under the requirements applying in a particular jurisdiction. These provisions and reserves do not constitute ring-fenced funds solely by virtue of being set up in such financial statements.

iv. Conventional reinsurance business, to the extent that individual contracts do not give rise to restrictions on the assets of the undertaking.

v. Coverage assets and similar arrangements that are established for the protection of policyholders in the case of winding-up proceedings, either for the policyholders of the undertaking as a whole or for separate sections or groups of policyholders of the undertaking; more specifically, assets identified in the register in accordance with Articles 275 (a) and 276 of Directive 2009/138/EC (the special register). These arrangements do not constitute a ring-fenced fund.

vi. The requirement for the separation of life and non-life business in composite undertakings which carry out simultaneously life and non-life and/or health insurance activities set out in Articles 73 and 74 of Directive 2009/138/EC. However, a ring-fenced fund may still arise within either or both of the component parts of a composite undertaking depending on the nature of the underlying business and arrangements affecting the business.

vii. Surplus funds are not ring-fenced solely by virtue of being surplus funds, but could be if they are generated within a ring-fenced fund.

viii. Transfer of a portfolio into an undertaking during a re-organisation of a business. The separation of assets in respect of the existing business of the receiving undertaking

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from the assets of the transferred portfolio does not constitute a ring-fenced fund if this separation has been put in place under national law to protect the existing business from the fund that is being transferred in only on a temporary basis.

ix. Experience funds, where policyholders are entitled to a share of the experience of the fund in a manner, typically a minimum predefined percentage, set out in the policy documentation, and have no rights to any amounts not allocated in accordance with that specified profit-sharing mechanism. Amounts allocated to policyholders are included in technical provisions. Amounts not allocated to policyholders are fully transferable, can be returned to the shareholders or other providers of capital, can be used to absorb losses as and when they occur or can be, but are not required to be, used to increase benefits to policyholders and can therefore form part of own funds not subject to restriction.

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ANNEX T - Examples for types of arrangement that give rise to ring-fenced funds according to national or EU legislation

National legislation

(i) Criteria that could lead to ring-fenced funds as exemplified in one Member State are the following:

a) assets are separately identified within the coverage assets (for the case of insolvency);

b) it has been contractually agreed between the undertaking and the policyholders of the fund (in most cases employees of a particular company) that only the profit of particular assets results in a profit for these policyholders; and

c) this profit may not be reduced because of a loss occurring outside the ring-fenced fund.

(ii) In some Member States legislation creates companies which comprise individual cells (protected cell companies). Although together they comprise a single legal entity, the cells operate as distinct units on both a going and gone concern basis. One cell cannot be called upon to support the liabilities of another, or of the undertaking as a whole. The assets of the general account or core are not normally available to meet liabilities of individual cells. However, the general account may in some cases be relied on to support an individual cell provided that the assets attributable to the relevant cell have been exhausted.

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ANNEX U - Example of the calculation of Solvency Capital Requirement and own funds in the presence of ring-fenced funds using the Standard Formula

(1) Assume an undertaking has two profit participation mechanisms that benefit different groups of policyholders (A) and (B). Those mechanisms are such that, by contractual laws, 80% of any future emerging profit (irrespective of the source, i.e., underwriting or financial) has to be allocated to the respective group of policyholders and technical provisions increase by the value of the 80% emerging profit. Only the remaining 20% can be released to shareholders.

(2) The blocks of business (A) and (B) constitute two ring-fenced funds. Within each ring-fenced fund, the expected value of future profit participation form part of the value of technical provisions (following Solvency II valuation rules). The amount of future discretionary benefits for groups (A) and (B) is 100 and 300 respectively.

(3) Additionally the undertaking writes a block of non-participating business (C).

(4) The undertaking should calculate the Solvency Capital Requirement on the basis of the methodology set out in these guidelines and summarised at (5) below.

(5) General procedure to calculate the Solvency Capital Requirement:

When performing the calculation of each individual capital charge, the corresponding impact at the level of sub-modules of assets and liabilities (those relevant to capture the effect of each ring-fenced fund) should be computed;

Where positive effects are observed at the level of a ring-fenced fund, the gross capital charge at such level should take into account any potential increase of liabilities (e.g. additional distribution of profits to policyholders) even though the overall impact of the shock on the undertaking is negative. In practice, this can only happen in those cases of bidirectional scenarios (interest rate risk, currently risk, lapse risk) where positive effects calculated at the level of a ring-fenced fund can be observed;

In parallel the capital charges at the level of each ring-fenced fund should be calculated net of the mitigating effect of future discretionary benefits. Where the ring-fenced fund relates to the existence of profit sharing mechanisms, the assumptions on the variation of future bonus rates

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should be realistic, with due regard to the impact of the shock at the level of the ring-fenced fund and to any contractual, legal or statutory clauses of the profit sharing mechanism. The relevant (downward) adjustment for the loss absorbing capacity of technical provisions should not exceed, in relation to a particular ring-fenced fund, the amount of future discretionary benefits within the ring-fenced fund;

For each of gross/net, the total capital charge for the individual risk is given by the sum of the capital charges calculated at the level of each ring-fenced fund and that calculated at the level of the remaining sub-portfolio of business;

For each of gross/net, the total capital charges for each individual risk are then aggregated using the usual procedure of the standard formula to derive the total Solvency Capital Requirement.

(6) For example, the calculation of the interest rate risk charge (Step (i) above – see SCR.10.28.) would require the computation of the impact of both the upward and downward scenarios at the level of each ring-fenced fund (A) and (B) and at the level of the remaining business (C).

	A	B	C
ΔNAV before any adjustment (per relevant segment)			
Upward shock	250	-100	-400
Downward shock	-80	200	500

(7) Step (ii) (see SCR.10.26.) requires the reduction of positive ΔNAV partial results due to profit participation at the level of the ring-fenced fund. In the current example, where positive, the ΔNAV results are reduced by 80% (such amount is retained in the ring-fenced fund and used to increase the benefits of the corresponding groups of policyholders).

	A	B	C
After increase of liabilities within the ring-fenced fund			
Upward shock	50	-100	-400
Downward shock	-80	40	500

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(8) Step (iii) (see SCR.10.26.) is concerned with the calculation of the net capital charges, and the assessment of the extent to which the management is able to reduce future discretionary bonuses at the level of each ring-fenced fund. In this example, it is assumed that the 1/3 of the negative ΔNAV results is mitigated by the reduction in future discretionary bonuses (note that on block of business (C) this is not applicable because it is non-participating business).

	A	B	C
Net charges - after adjustment for loss absorbency of TP			
Upward shock	50	-67	-400
Downward shock	-53	40	500

(9) Based on these results, the upward shock scenario is chosen to compute the notional Solvency Capital Requirement, as it corresponds to the worst case scenario at the level of the undertaking.

(10) Within each ring-fenced fund, the risk modules and sub-modules are aggregated to reflect diversification that exists within the ring-fenced fund. The example below assumes that the interest rate risk is the only risk in the market module and there is one further individual risk, mortality risk. A correlation of 50% between Interest rate risk and Mortality risk is assumed, for the purposes of this example.

(11) The notional Solvency Capital Requirements for each of the ring-fenced funds and the rest of the undertaking are then summed to given an overall Solvency Capital Requirement. The table below shows the breakdown of the Solvency Capital Requirement into the different components.

	A	B	C	Entity
Interest Rate Risk Shock	-50 (set to 0)	67	400	467
Mortality risk shock	10	125	200	335

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Calculation of Solvency Capital Requirement	10	169	529	708

(12) The above example shows the effects of diversification within each ring-fenced fund and diversification within the remaining part of the undertaking. There is no diversification between the ring-fenced funds and between the remaining parts of the undertaking.

Calculation of total eligible own funds in the presence of ring-fenced funds

Case 1: Ring-fenced fund in surplus after deducting notional Solvency Capital Requirement

(13) Where there are sufficient own funds within each ring-fenced fund to cover the respective notional Solvency Capital Requirement, the own funds in excess of the notional Solvency Capital Requirement must be excluded from the own funds of the undertaking as a whole.

(14) If this is the case any amount representing the value of future shareholder transfers is not restricted and therefore forms part of the own funds available to meet the Solvency Capital Requirement for the undertaking as a whole – see fund (B) below.

	A	B	C	Entity
Own Funds	200	400	1400	2000
Solvency Capital Requirement	10	169	529	708
Shareholder Value in ring-fenced fund	0	30	0	30
OF available to cover Solvency Capital Requirement of the undertaking as a whole	10	199	1400	1609
Own Funds unavailable to cover	190	201	0	391

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Solvency Capital Requirement of the undertaking as a whole				

Case 2: Ring-fenced fund in deficit after deducting notional Solvency Capital Requirement

(15) Where there are insufficient own funds within a ring-fenced fund to cover the notional Solvency Capital Requirement for that ring-fenced fund (fund (A) in this example):

There is no restriction on the amount of own funds in that ring-fenced fund;

The deficit in that ring-fenced fund is met by own funds outside the ring-fencing arrangements i.e. arising in non-participating business (C) in this example.

	A	B	C	Entity
Own Funds	5	400	1400	1805
Solvency Capital Requirement	10	169	529	708
Shareholder Value in ring-fenced fund	0	30	0	30
OF available to cover Solvency Capital Requirement	5	199	1400	1604
Own Funds unavailable to cover Solvency Capital Requirement	0	201	0	201

Case 3: Ring-fenced fund adjustment when a non-material ring-fenced fund is present

(16) Where the entity contains a ring-fenced fund that is non-material, undertakings may exclude the total amount of restricted own-fund items from the amount eligible to cover the Solvency Capital Requirement and the Minimum Capital requirement (in the case of ring-

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fenced fund D above, 0.01 is excluded). However whether a ring-fenced fund is non-material or not is driven by a number of factors and in this case it is only by calculating the notional Solvency Capital Requirement that the potential impact of this is observed – the figures here are exaggerated to illustrate the point.

Without non-material treatment:

	A	B	C	*D*	Entity
Own Funds	5	400	1400	*0.01*	1805.01
Solvency Capital Requirement	10	169	529	*1*	709
Shareholder Value in ring-fenced fund	0	30	0	*0*	0
Own Funds available to cover Solvency Capital Requirement	5	199	1400	*0.01*	1604.01
Own Funds unavailable to cover Solvency Capital Requirement	0	201	0	*0*	201

With non-material treatment:

	A	B	C	*D*	Entity
Own Funds	5	400	1400	*0.01*	1805.01
Solvency Capital Requirement	10	169	529	*0*	708
Shareholder Value in ring-fenced fund	0	30	0	*0*	0
Own Funds available to cover Solvency Capital Requirement	5	199	1400	*0*	1604
Own Funds unavailable to cover Solvency Capital Requirement	0	201	0	*0.01*	201.01

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ANNEX V – Schema for the treatment of participations in the solvency calculation

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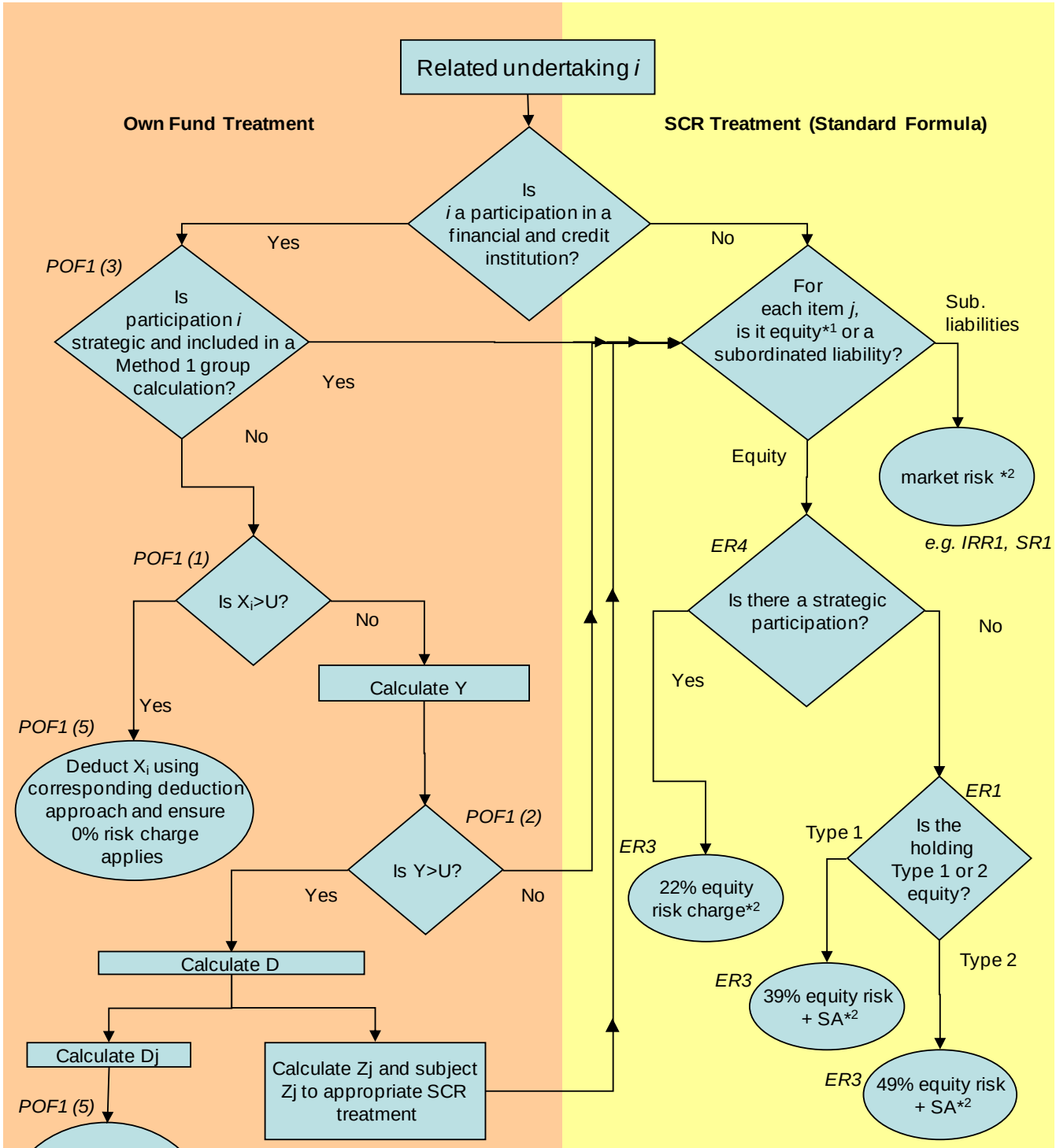

j	= an own fund item issued by the related undertaking *i* and held by the participating undertaking
R_j	= Value of own fund item j
X_i	= $\sum R_j$ = Sum of the value of all own fund items j held in related undertaking i
U	= 10% of items included in points (a), (b), (d) and (f) [Article 58(1)] of the participating undertaking
Y	= $\sum X_i$ where $X_i < U$
D	= (Y-U)/Y = Deduction factor
Dj	= D * Rj = Deduction corresponding to item j
Zj	= (1-D) * Rj = Remainder corresponding to item j
*1	the equity risk sub-module may also apply to preference shares and own fund items relating to mutual undertakings
*2	market stresses as appropriate (i.e. interest and spread risk in case of bonds).

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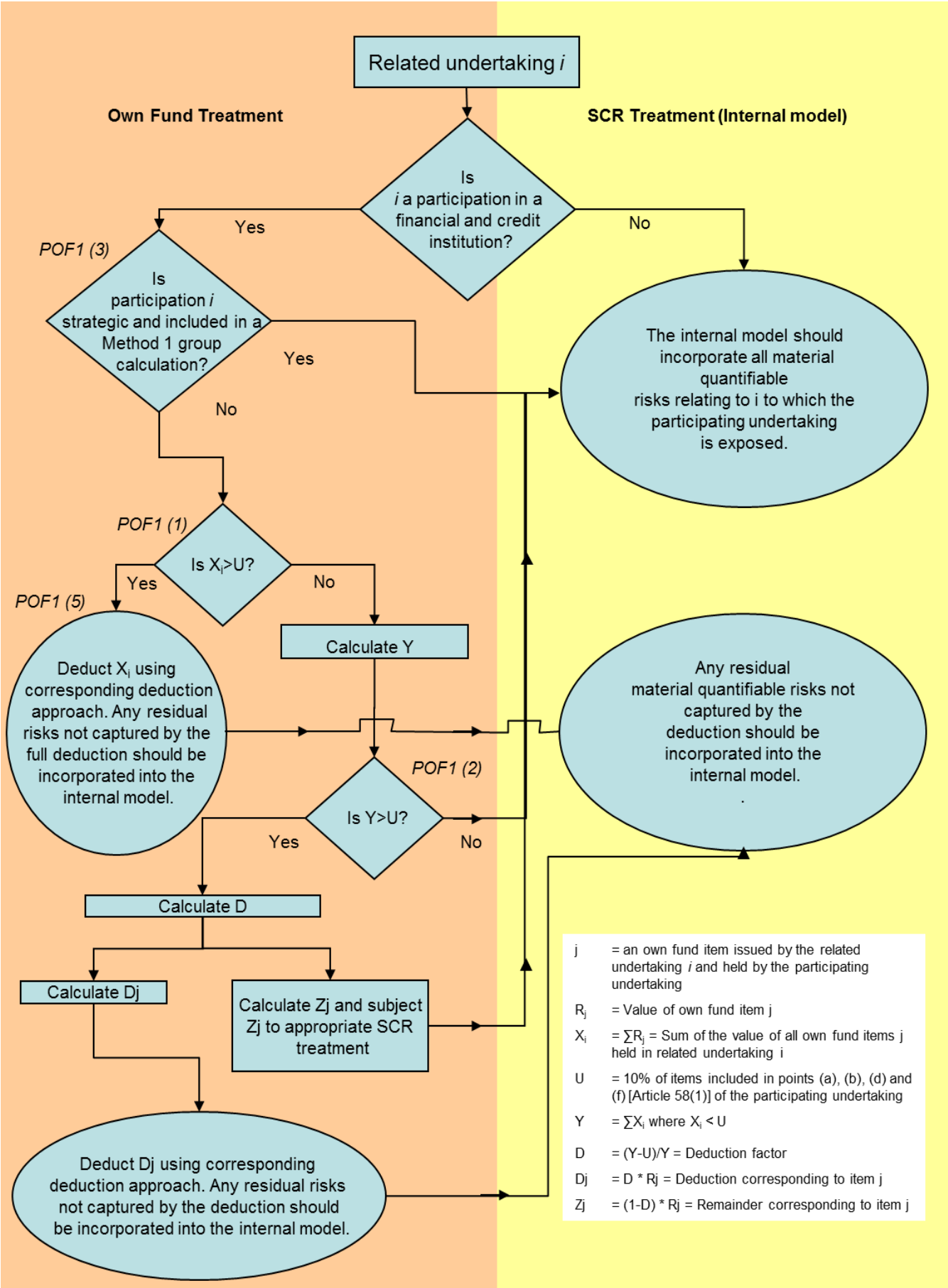
Related undertaking *i*
Own Fund Treatment
SCR Treatment (Internal model)
Is *i* a participation in a financial and credit institution?
Yes
No
POF1 (3)
Is participation *i* strategic and included in a Method 1 group calculation?
Yes
No
The internal model should incorporate all material quantifiable risks relating to i to which the participating undertaking is exposed.
POF1 (1)
Is X_i>U?
Yes
No
POF1 (5)
Calculate Y
Deduct X_i using corresponding deduction approach. Any residual risks not captured by the full deduction should be incorporated into the internal model.
Any residual material quantifiable risks not captured by the deduction should be incorporated into the internal model.
POF1 (2)
Is Y>U?
Yes
No
Calculate D
Calculate Dj
Calculate Zj and subject Zj to appropriate SCR treatment
Deduct Dj using corresponding deduction approach. Any residual risks not captured by the deduction should be incorporated into the internal model.
j = an own fund item issued by the related undertaking *i* and held by the participating undertaking
R_j = Value of own fund item j
X_i = $\sum R_j$ = Sum of the value of all own fund items j held in related undertaking i
U = 10% of items included in points (a), (b), (d) and (f) [Article 58(1)] of the participating undertaking
Y = $\sum X_i$ where X_i < U
D = (Y-U)/Y = Deduction factor
Dj = D * Rj = Deduction corresponding to item j
Zj = (1-D) * Rj = Remainder corresponding to item j

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