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Principles and Technical Specifications for the Common Framework

Annex 1 to Opinion on the practical implementation of the common framework for risk assessment and transparency for IORPs

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1. Introduction

- 1.1.1. This document provides principles and technical specifications for the common framework, as put forward in EIOPA's opinion to EU institutions on a common framework for risk assessment and transparency for IORPs.¹ It constitutes Annex 1 to the Opinion on the practical implementation of the common framework for risk assessment and transparency for IORPs.²
- 1.1.2. The common framework consists of two main parts:
- the valuation of the common framework's balance sheet ('common balance sheet'); and
 - the calculation of a standardised value at risk (SVaR), in the context of the standardised risk assessment (SRA);
- for which principles and technical specifications are provided in respectively Section 3 and Section 4 and of which a high-level description is provided below.
- 1.1.3. Section 2 provides overarching principles on data quality, proportionality and the use of simplifications that are relevant for both the valuation of the common balance sheet and the calculation of the SRA.
- 1.1.4. Annex 1 contains a list of definitions, including definitions for all types of security and benefit adjustment mechanisms.

Common balance sheet

- 1.1.5. The common balance sheet is valued on a market-consistent basis using a risk-free interest rate term structure³ and includes all mechanisms that either provide for security to the pension benefits or allow for adjusting the benefits, such as::
- Legally enforceable and non-legally enforceable sponsor support;
 - Pension protection schemes;
 - Conditional benefits, including ex ante benefit reductions;
 - Discretionary benefits;
 - Ex post benefit reductions;
 - Benefit reductions in case of sponsor default.
- 1.1.6. IORPs are asked to perform the valuation of the various components of the common balance sheet separately: technical provisions (distinguishing unconditional, conditional and discretionary benefits as well as benefit reductions), sponsor support, pension protection schemes, recoverables from (re)insurance and other assets and liabilities.
- 1.1.7. The principles and technical specifications put forward the general method to value the best estimate of technical provisions, and other items on the common

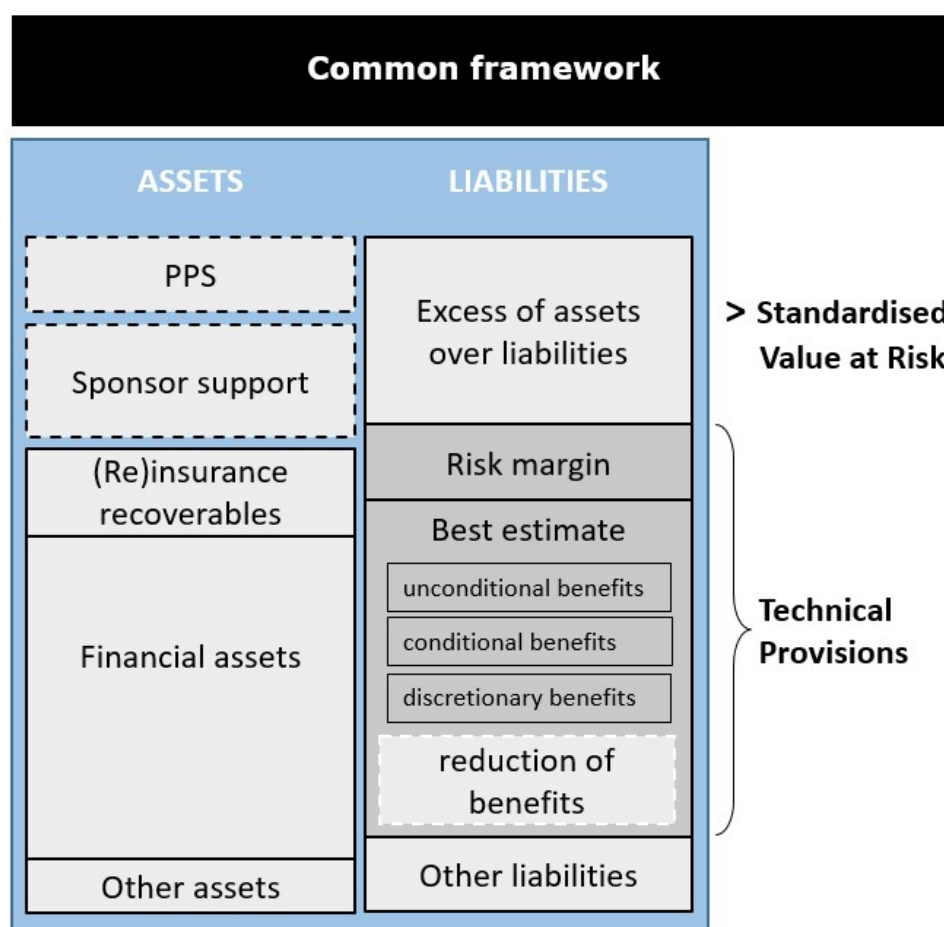
¹ EIOPA, Opinion to EU Institutions on a Common Framework for Risk Assessment and Transparency for IORPs, EIOPA-BoS-16/075, 14 April 2016: [https://eiopa.europa.eu/Publications/Opinions/EIOPA-BoS-16-075-Opinion to EU Institutions Common Framework IORPs.pdf](https://eiopa.europa.eu/Publications/Opinions/EIOPA-BoS-16-075-Opinion%20to%20EU%20Institutions%20Common%20Framework%20IORPs.pdf)

² EIOPA, Opinion on the practical implementation of the common framework for risk assessment and transparency for IORPs, EIOPA-BoS-19-246, 25 June 2019.

³ In line with EIOPA's Opinion to EU Institutions, there are no adjustments to the risk free interest rate curve, like matching adjustment or volatility adjustment. See section 10 of annex 1 of EIOPA's opinion, [https://eiopa.europa.eu/Publications/Opinions/EIOPA-BoS-16-075-Annex 1 Technical part.pdf](https://eiopa.europa.eu/Publications/Opinions/EIOPA-BoS-16-075-Annex%201%20Technical%20part.pdf)

balance sheet, by calculating the probability weighted average of the discounted value of future cash flows.

- 1.1.8. Technical provisions shown on the common balance sheet should consist of the best estimate of technical provisions plus a risk margin for liabilities that cannot be replicated on financial markets.
- 1.1.9. The principles and technical specifications include explanations on how to approach future cash flows in the calculation of the best estimate of technical provisions. They include rules on the benefits and contributions to be included in cash flows as well as general guidance with respect to the assumptions used in the valuation, such as with regard to behaviour of boards of IORPs, members and sponsors.
- 1.1.10. IORPs are provided with the possibility – if appropriate - to make use of the so-called balancing item approach, where the value of one security or benefit reduction mechanisms equals the value necessary to balance assets and liabilities on the common balance sheet.



PPS = Pension Protection Schemes

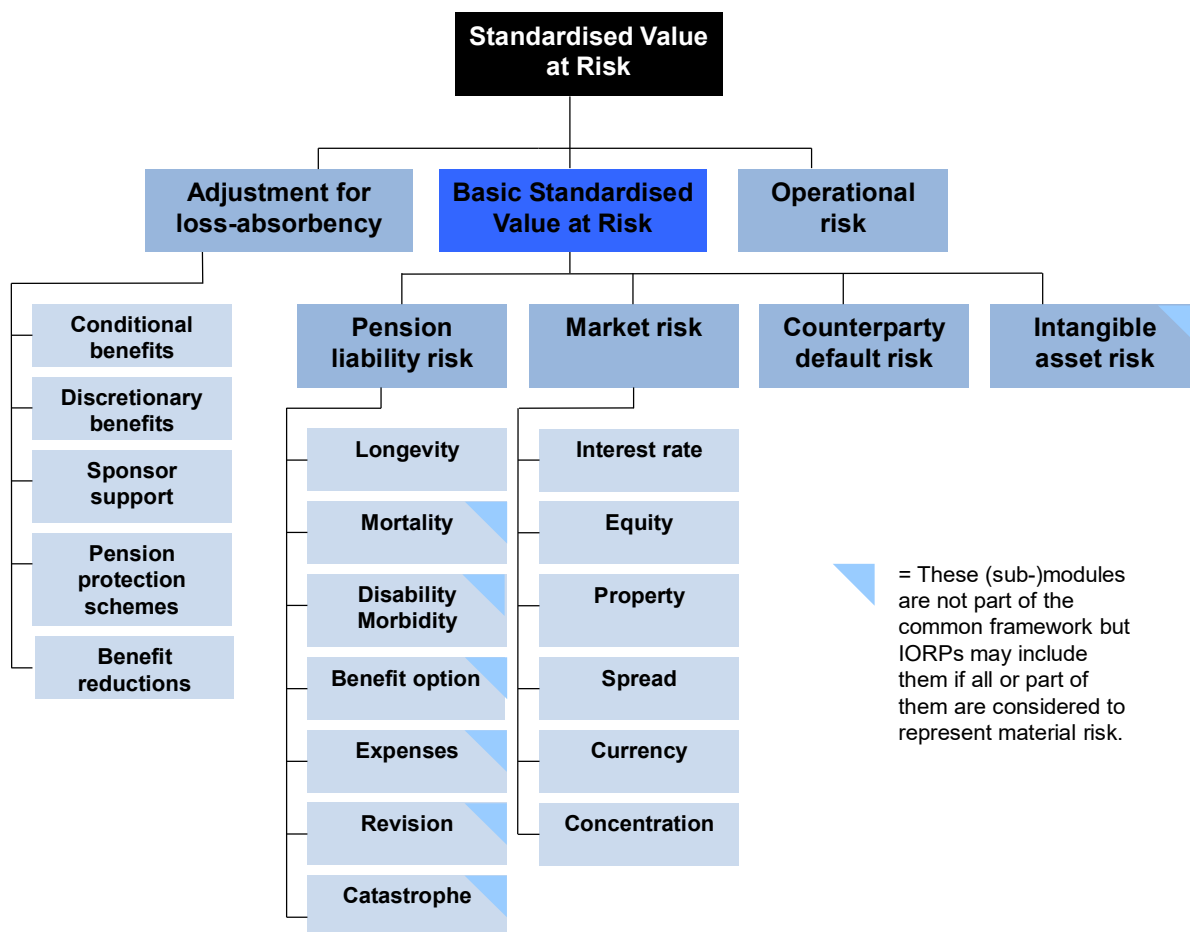
- 1.1.11. The valuation of sponsor support follows a principle-based approach. IORPs which do not satisfy the conditions to use the balancing item approach for (unlimited) sponsor support should value it explicitly.
- 1.1.12. The valuation of sponsor support should take into account the default probability of the sponsor and the maximum amount of support that the sponsor is able to afford. IORPs are provided with an elaborate set of possibilities to establish the default probability of the sponsor. Moreover, only broad principles for the calculation of the maximum amount of sponsor support are provided, supporting an IORP- and country specific assessment.

- 1.1.13. The technical specifications put forward three simplifications for the valuation of unlimited sponsor support. The simplifications may be used by IORPs which do not wish or are not able to perform their own principle-based valuation.

Standardised risk assessment (SRA)

- 1.1.14. The standardised risk assessment (SRA) analyses the impact of a common set of stress scenarios on each of the items on the common balance sheet and, correspondingly, the excess of assets over liabilities. The impact on the latter is called the Standardised Value at Risk (SVaR). The stress scenarios are calibrated based on 0.5% probability of occurrence within a one-year horizon.
- 1.1.15. The SRA contains the following risk modules: operational risk, pension liability risk, market risk, counterparty default risk (including default risk of the sponsor) and intangible assets risks. The market risk module can be subdivided into specific risks relating to the IORP's investment portfolio and pension liabilities: interest rate risk, equity risk, property risk, spread risk on bonds and loans, currency risk and concentration risk.
- 1.1.16. IORPs only have to apply the longevity stress scenario in the pension liability module. The sub-modules for mortality, disability-morbidity, benefit option, expenses, revision and catastrophe risk are not part of the common framework but could be included by IORPs, if they consider that these represent material risks. The same holds true for the intangible asset risk module.
- 1.1.17. The basic standardised value at risk (pension liability, market, counterparty default and intangible asset risk) and the value at risk for operational risk should be derived under a gross calculation and a net calculation, reflecting the loss-absorbing capacity of conditional benefits, discretionary benefits, benefit reductions, sponsor support and pension protection schemes.
- 1.1.18. IORPs should first calculate the gross values at risk for the various sub-modules. IORPs should do so by valuing a stressed common balance sheet for each (sub-)module without taking into account the loss-absorbing capacity of conditional benefits, discretionary benefits, benefit reductions, sponsor support and pension protection schemes. The basic standardised value at risk is obtained by aggregating the values at risk for each (sub-)module using correlation parameters, allowing for the effect of diversification between the various risk factors.
- 1.1.19. IORPs should also value the stressed common balance sheets for each (sub-)module including the loss absorbing capacity of conditional benefits, discretionary benefits, benefit reductions, sponsor support and pension protection schemes. In the counterparty default and operational risk modules, the gross values at risk follow from a pre-defined formula, instead of a stress scenario. The loss-absorbing capacity of benefit adjustment and security mechanisms for these modules should be calculated by applying a shock to the pre-stress balance sheet equal to the gross value at risk. The impact of the stress scenarios on the value of conditional benefits, discretionary benefits, benefit reductions, sponsor support and pension protection schemes should be assessed simultaneously, but IORPs should aggregate the loss-absorbency for each benefit adjustment and security mechanism separately.
- 1.1.20. IORPs may apply a simplification for the calculation of the loss-absorbing capacity, if the loss-absorbing capacity of benefit adjustment and security mechanisms is related to the IORP as a whole, rather than to the absorption of certain risks. In that case, a calculation of a stressed common balance sheet including the loss-absorbing capacity of security and benefit adjustment

mechanisms for every (sub-)module is not required. Instead, IORPs can estimate the combined loss-absorbency of security and benefit adjustment mechanisms by applying a shock equal to the gross basic standardised value at risk to the common balance sheet.



2. Data quality, proportionality and simplifications

2.1. Credibility of information, data quality and expert judgement

- 2.1.1. The quality of the valuation of the common balance sheet and the calculation of the standardised risk assessment relies on the use of credible information, appropriate, complete and accurate data and realistic assumptions, including the appropriate use of approximations and expert judgement.

Credibility of information

- 2.1.2. The valuation of the common balance sheet should be based on up-to-date and credible information.
- 2.1.3. Information should only be considered to be credible for the purposes of valuation of assets and liabilities and risk assessment where IORPs can provide evidence of the credibility of the information taking into account the consistency and objectivity of that information, the reliability of the source of the information and the transparency of the way in which the information is generated and processed.
- 2.1.4. IORPs should not rely on information of a third party without assessing that the information is current, reliable and credible.
- 2.1.5. Some criteria to assess the reliability of the information might be neutrality, prudence and completeness in all material aspects.
- 2.1.6. IORPs may consider for this purpose methods generally accepted and applied in financial markets, provided the financial information used in the calculations is sufficiently reliable and relevant for its purposes.

Data quality and application of approximations, including case-by-case approaches

- 2.1.7. IORPs should ensure the completeness, accuracy and appropriateness of the data used in the valuation of the common balance sheet and the standardised risk assessment.
- 2.1.8. Where, in specific circumstances, IORPs have insufficient data of appropriate quality to apply a reliable actuarial method to a set or subset of their pension obligations, or other items on the common balance sheet, appropriate approximations, including case-by-case approaches, may be used.

Expert judgement

- 2.1.9. IORPs should choose assumptions based on the expertise of persons with relevant knowledge, experience and understanding of the risks inherent in occupational pension provision (expert judgement). In certain circumstances expert judgement may be necessary when calculating the best estimate of technical provisions, or other items on the common balance sheet, among others:
- in selecting the data to use, correcting its errors and deciding the treatment of outliers or extreme events;
 - in adjusting the data to reflect current or future conditions, and adjusting external data to reflect the IORPs' features or the characteristics of the relevant portfolio of pension obligations;
 - in selecting the time period of the data;
 - in selecting realistic assumptions;

- in selecting the valuation technique or choosing the most appropriate alternatives existing in each methodology;
- in incorporating appropriately into the calculations the environment under which IORPs have to provide occupational pensions.

2.2. Proportionality and simplifications

- 2.2.1. IORPs may adopt simplifications for the valuation of the common balance sheet and the standardised risk assessment when these simplifications are proportionate to the nature, scale and complexity of the activities and the underlying risks.
- 2.2.2. The principle of proportionality is intended to support the consistent application of the common framework to all IORPs. IORPs should assess periodically the impact of simplifications on the application of the common framework.
- 2.2.3. Some elements of the technical specifications will not be relevant for IORPs in some member states, but have been included because they are relevant in other member states. In addition, the degree of materiality of many of the issues included within the specifications will vary depending on the nature of IORPs.
- 2.2.4. IORPs may have to choose methods and simplifications due to a lack of resources or expertise. For example, IORPs may apply a deterministic valuation method where a stochastic method seems more suitable. The latter is very time consuming and potentially costly, especially when the IORP does not already have the necessary data and modelling infrastructure in place.
- 2.2.5. IORPs may use simplified methods to calculate the Standardised Value at Risk, provided that the simplified method does not lead to a misstatement of the Standardised Value at Risk that could influence the decision-making or the judgement of the user of the information.
- 2.2.6. Simplifications are provided in these technical specifications and further simplifications can be adopted by IORPs as long as it is appropriate to do so and a description of the simplifications used can be provided by the IORPs.
- 2.2.7. The technical specifications include specific simplifications for the standardised risk assessment with regard to spread risk on bonds, counterparty default risk and longevity risk. IORPs may apply further simplifications, if appropriate, such as not calculating a stress for a particular risk when the exposure to that risk is considered to be negligible by the IORP.
- 2.2.8. IORPs should perform two steps to determine the appropriateness of a simplification.

Step 1: Nature, scale and complexity of the activities and underlying risks

- 2.2.9. The assessment of nature, scale and complexity of the activities of the IORP should include all risks which materially affect the amount or timing of cash flows.
- 2.2.10. The nature and complexity of risks – including the impact of future management actions and behaviour of members/beneficiaries and sponsors – determines the level of sophistication and expertise needed to value the items on the common balance sheet. In this respect, it is important to establish whether risks have a significant asymmetric impact on cash flows of pension obligations and sponsor support, in particular if pension schemes contain embedded options like caps and floors. If this is the case, a stochastic valuation may be more suitable than a deterministic valuation.

- 2.2.11. The measurement of scale allows IORPs to distinguish between 'large' and 'small' or material and non-material risks. It provides a threshold below which it would be justifiable not to take into account certain risks. IORPs should compare the size of risks against a benchmark – such as contributions or technical provisions – to assess the scale of risks in relative terms.

Step 2: Establish that model-error is not material

- 2.2.12. IORPs are not required to quantify the degree of model-error, or to re-calculate the value of the components of the common balance sheet using a more accurate method in order to demonstrate that the difference between the result of the chosen method and the result of a more accurate method is immaterial. Instead, it is sufficient if there is reasonable assurance that the model error implied by the application of the chosen method (and hence the difference between those two amounts) is immaterial. A voluntary use of the common framework may justify a lower degree of accuracy in the assessment of the model-error than financial and supervisory reporting.
- 2.2.13. IORPs may have to make assumptions which are uncertain or conjectural and cannot be validated due to data deficiencies. In this case it is recommended to document the limitations of the data and regularly compare the assumptions against experience.

3. Common balance sheet

3.1. General principles

Principle 1

- 3.1.1. The common balance sheet should be valued on a market-consistent basis, using the basic risk-free interest rate.
- 3.1.2. The calculation of items on the common balance sheet should make use of and be consistent with information provided by the financial markets and generally available data on underwriting risks (market consistency).

Principle 2

- 3.1.3. All available resources that can be used to support pension obligations, such as security and benefit adjustment mechanisms, including sponsor support, pension protection schemes, conditional and discretionary benefits and benefit reduction mechanisms should be recognised on the common balance sheet.

Principle 3

- 3.1.4. Items on the common balance sheet should be calculated in a prudent, reliable and objective manner.
- 3.1.5. The items on the common balance sheet should correspond to the probability-weighted average of discounted future cash flows in possible future scenarios.

Principle 5

- 3.1.6. The valuation of the common balance sheet should be consistent with existing national IORP systems and national prudential regulation.
- 3.1.7. This does not imply that the values of items on the common balance sheet will be the same as similar items on national prudential balance sheets. It does imply, though, that the cash flows relating to security and benefit adjustments should be consistent with existing pension arrangements and supervisory regimes.

3.1.1. Liabilities never exceed assets

Principle 6

- 3.1.8. The common balance sheet is either balanced or shows an excess of assets over liabilities. If otherwise an excess of liabilities over assets would be reported on the common balance sheet and no other balancing items are available, IORPs should assume that there are ex post benefit reduction mechanisms which would always balance the common balance sheet. This assumption should also be applied when according to national law benefits are reduced when an IORP is wound up due to liabilities exceeding assets.

Balancing item approach

- 3.1.9. The common balance sheet may, dependent on the characteristics of a pension scheme, or on social and labour law, include an element that will always ensure that liabilities do not exceed assets, i.e. will always 'balance the balance sheet'.
- 3.1.10. That element on the common balance sheet is called the "balancing item" because this element can in all cases provide additional assets to cover technical provisions, or because this element can in all cases decrease the technical provisions to such a level that the available assets can cover or equate the (amended) technical provisions.

- 3.1.11. There are several elements that could, under specific circumstances, serve as a balancing item:
- (a) Unlimited, legally enforceable sponsor support provided by a strong sponsor;
 - (b) A pension protection scheme that covers 100% of benefits and is valued separately (from sponsor support) on the common balance sheet;
 - (c) Unlimited benefit reductions. This could be ex ante benefit reductions, ex post benefit reductions, or benefit reductions in case of sponsor default.
- 3.1.12. Whether or not an element can in a specific case be valued using the balancing item approach depends on the characteristics of the element. The conditions which should be met for an element to qualify as a balancing item are specified in the respective sections of these specifications.
- 3.1.13. In case there are different elements available for an IORP which may in principle act as a balancing item, only one item can be valued using the balancing item approach. To determine which element should be the balancing item in this case, IORPs should check in the following order whether an element meets the conditions to qualify as a balancing item:
- (a) Sponsor support: If sponsor support qualifies as a balancing item, according to the conditions set out in paragraph 3.6.36, it should be included in the common balance sheet as a balancing item. This also means that neither benefit reductions nor the pension protection scheme should be valued on the common balance sheet.
 - (b) Pension protection scheme: If sponsor support does not qualify as a balancing item, it should be checked whether a pension protection scheme qualifies as a balancing item, according to the conditions set out in paragraph 3.7.6. If this is the case, sponsor support should be valued in accordance with regular valuation methods, the pension protection scheme should be the balancing item, and benefit reductions should not be valued on the common balance sheet.
 - (c) Benefit reduction mechanisms: If neither sponsor support nor a pension protection scheme qualify as a balancing item, according to the conditions, benefit reductions should be the balancing item. Sponsor support and a pension protection scheme (where applicable) should be valued in accordance with regular valuation methods.

Simplification

- 3.1.14. IORPs do not have to calculate the value of security and benefit reduction mechanisms if the IORP has sufficient assets, excluding sponsor support and pension protection schemes, to cover liabilities taking into account the standardised value at risk.

3.2. Technical provisions

Principle 7

- 3.2.1. The value of technical provisions should be equal to the sum of a best estimate and a risk margin or should be calculated "as a whole".

Calculation of the technical provisions as the sum of a best estimate and the risk margin

- 3.2.2. The best estimate should correspond to the probability-weighted average of discounted future cash flows using the basic risk-free interest rate term structure.

- 3.2.3. A more detailed description for the calculation of the best estimate is provided in Principles 8 to 16.
- 3.2.4. A risk margin should be added to the best estimate of technical provisions to ensure that the value of technical provisions is equal to the amount that a third party would be expected to require to take over and meet pension obligations. Specifications for the calculation of the risk margin are provided in Principle 17.

Circumstances in which technical provisions should be calculated “as a whole” and the method to be used

- 3.2.5. Where future cash flows associated with pension obligations can be replicated reliably, using financial instruments for which a reliable market value is observable, the value of technical provisions associated with those future cash flows should be determined on the basis of the market value of those financial instruments (“calculation of technical provisions as a whole”). In this case, separate calculations of the best estimate and the risk margin are not necessary.
- 3.2.6. The replication of cash flows should be considered to be reliable where those cash flows are replicated in amount and timing in relation to the underlying risks of those cash flows and in all possible scenarios. The following cash flows associated with pension obligations cannot be reliably replicated:
 - (a) cash flows associated with obligations that depend on the likelihood that members and beneficiaries will exercise contractual options, including lapses and surrenders;
 - (b) cash flows associated with obligations that depend on the level, trend, or volatility of mortality, disability, sickness and morbidity rates;
 - (c) all expenses that will be incurred in servicing the obligations.
- 3.2.7. Financial instruments for which a reliable market value is observable are those financial instruments that are traded on an active, deep, liquid and transparent market, as defined in Annex 1.
- 3.2.8. IORPs should determine the value of technical provisions on the basis of the market price of the financial instruments used in the replication.

3.3. Best estimate of technical provisions

3.3.1. Calculation methodology of the best estimate of technical provisions

Principle 8

- 3.3.1. The best estimate of technical provisions should correspond to the probability-weighted average of discounted future cash flows, taking account of the time value of money, using the basic risk free interest rate term structure specified in section 3.5.
- 3.3.2. The calculation of the best estimate of technical provisions should make use of and be consistent with information provided by the financial markets and generally available data on underwriting risks (market consistency).
- 3.3.3. The calculation of the best estimate should be based on actuarial and statistical techniques which appropriately reflect the risks that affect the cash flows. This may include simulation methods, deterministic techniques and analytical techniques.

- 3.3.4. No adjustment to take account of the own credit standing of the IORP should be made.
- 3.3.5. The best estimate should correspond to the probability-weighted average of future cash in- and outflows taking account of the time value of money.
- 3.3.6. The best estimate should be calculated gross, without deduction of the amounts recoverable from (re)insurance contracts and special purpose vehicles, which should be calculated separately.
- 3.3.7. The best estimate may be negative in certain specific circumstances (e.g. for some individual obligations under some types of IORP). This is acceptable and IORPs should not set to zero the value of the best estimate in those circumstances.
- 3.3.8. The projection horizon used in the calculation of the best estimate should cover the full lifetime of all the cash in- and out-flows⁴ required to settle the obligations related to existing pension schemes / contracts on the date of the valuation, unless an accurate valuation can be achieved otherwise.
- 3.3.9. The determination of the lifetime of pension obligations should be based on up-to-date and credible information and realistic assumptions about when the existing pension obligations will be discharged or cancelled or expired.

Simplifications

Calculation of technical provisions without cash flows

- 3.3.10. In cases where cash flows are not available or a calculation based on available cash flows is considered to be too burdensome a simplification can be used to determine the best estimate of technical provisions. For example, the best estimate of technical provisions can be determined based on the duration of the corresponding obligations.

Time horizon

- 3.3.11. IORPs may not be able to perform stochastic valuations of non-unconditional benefits over the full lifetime of the pension obligations due to model restrictions. In that case, IORPs may apply simplifications with regard to the projection horizon.

Cash flows and term structure

- 3.3.12. As a simplification to applying the risk-free curve to each maturity, an average maturity can be calculated and the relevant risk-free point used.

3.3.2. Uncertainty in cash flows

Principle 9

- 3.3.13. The best estimate calculation should allow for the uncertainty in the future cash flows. The calculation should consider the variability of the cash flows in order to ensure that the best estimate represents the mean of the distribution of cash flow values.
- 3.3.14. Allowance for uncertainty does not suggest that additional margins should be included within the best estimate.
- 3.3.15. The best estimate is the average of the outcomes of all possible scenarios,

⁴ The extent to which future contributions and benefits should be included in cash in- and out-flows is determined by the rules provided in paragraphs 3.3.23-3.3.24.

weighted according to their respective probabilities. Although, in principle, all possible scenarios should be considered, it may not be necessary, or even possible, to explicitly incorporate all possible scenarios in the valuation of the liability, nor to develop explicit probability distributions in all cases, depending on the type of risks involved and the materiality of the expected financial effect of the scenarios under consideration. Moreover, it is sometimes possible to implicitly allow for all possible scenarios, for example using explicit formulae.

3.3.16. Cash flow characteristics that should, in principle and where relevant, be taken into consideration in the application of the valuation technique include the following (non-exhaustive list):

- (a) Uncertainty in the timing, frequency and magnitude of benefit payments;
- (b) Uncertainty in member and sponsor behaviour;
- (c) Uncertainty in contributions.

3.3.17. More details on benefits, contributions and expenses to be included in cash flows can be found in Principles 11 and 12.

Simplifications

Timing of cash flows

3.3.18. As a simplification to calculate the best estimate, cash flows to/from the beneficiaries can occur either at the end of the year or in the middle of the year.

Contributions

3.3.19. A possible simplification is to assume that future contributions are paid independently of the financial markets and IORPs' specific information for the payments of contributions which also include lapses and contribution waivers (e.g. contribution waivers in case of disability of the member).

3.3.3. Homogeneous risk groups of pension obligations

Principle 10

3.3.20. The cash flow projections used in the calculation of the best estimate should be made separately for each contract or pension obligation.

Simplification

3.3.21. Where the separate calculation for each obligation would be an undue burden on the IORP, it may carry out the projection by grouping obligations, provided that the grouping complies with the following requirements:

- (a) There are no significant differences in the nature and complexity of the risks underlying the obligations that belong to the same group;
- (b) The grouping of obligations does not misrepresent the risk underlying the contracts and does not misstate their expenses;
- (c) The grouping of obligations is likely to give approximately the same results for the best estimate calculation as a calculation on a per contract basis, in particular in relation to financial guarantees and contractual options included in the obligations.

3.3.4. Recognition of cash flows

Principle 11

3.3.22. Cash flows relating to the IORP's obligations towards current members and beneficiaries should be included in the calculation of technical provisions, including those established at a future date, unless the IORP or the sponsor has a unilateral right to prevent the additional risks relating to these cash flows established at a future date from being introduced.

Benefits and contributions to be included in cash flows

3.3.23. For IORPs/schemes where obligations of the IORP to pay benefits are only established following payments of contributions to the IORP/scheme, cash flows to be included in the calculation of technical provisions should be determined as follows:

- (a) All cash flows relating to obligations of the IORP relating to current members and beneficiaries should be recognised in the calculation of technical provisions, unless otherwise stated below. Apart from the cases described below, obligations should include those obligations relating to current members and beneficiaries which result from contributions received by the IORP after the valuation date.
- (b) Any cash flows relating to obligations of the IORP relating to contributions received by the IORP after any of the following dates should not be recognised in technical provisions:
 - (i) The future date where the IORP has a unilateral right or obligation to terminate the agreement with the plan sponsor and/or the plan members to provide the pension benefits as agreed between plan sponsor and plan members;
 - (ii) The future date where the IORP has a unilateral right or obligation to reject additional contributions;
 - (iii) The future date where the IORP has a unilateral right or obligation to amend the contributions payable after this date or the benefits related to those contributions in such a way that the contributions fully reflect the risks related to them and the related benefits; or
 - (iv) The future date where the sponsor or sponsors have a unilateral right to terminate future accrual of benefits.

3.3.24. For IORPs/schemes where obligations of the IORP to pay benefits are established independently from payments of contributions to the IORP, cash flows to be included in the calculation of technical provisions should be determined as follows:

- (a) All cash flows relating to obligations of the IORP relating to current members and beneficiaries should be recognised in the calculation of technical provisions unless otherwise stated below. Apart from the cases described below, obligations should include those obligations relating to current members and beneficiaries which are established after the valuation date. Any contributions which are directly linked to the financing of certain obligations established after the valuation date should also be recognised in technical provisions, unless otherwise stated below.
- (b) Any cash flows relating to obligations established after any of the following dates should not be recognised in technical provisions:
 - (i) The future date where the IORP has a unilateral right or obligation to terminate the agreement with the plan sponsor and/or the plan members

to provide the pension benefits as agreed between plan sponsor and plan members;

- (ii) The future date where the IORP has a unilateral right or obligation to reject the establishment of additional obligations;
- (iii) In cases where contributions are directly linked to the financing of certain obligations established after the valuation date, the future date where the IORP has a unilateral right or obligation to amend those contributions or those obligations to fully reflect the risk; or
- (iv) The future date where the sponsor or sponsors have a unilateral right to terminate future accrual of benefits.

Simplification

- 3.3.25. Depending on the specifications in paragraphs 3.3.23 and 3.3.24 above, cash flows to be included in the calculation of technical provisions on the common balance sheet may only include accrued benefits the IORP is obliged to pay, whereas the IORP conducts a valuation based on an 'open modelling' assumption. In that case, IORPs may apply simplifications to determine the proportion of adjustment and security mechanisms that are attributable to accrued benefits.

3.3.5. Expenses

Principle 12

- 3.3.26. In determining the best estimate of technical provisions, the IORP should take into account all cash flows arising from expenses that will be incurred in servicing all future obligations related to existing pension schemes/contracts.
- 3.3.27. Expenses borne by the employer should be disregarded.
- 3.3.28. Expenses should be taken into account in the gross calculation of the best estimate. IORPs should split expenses between existing pension schemes/contracts and possible future schemes/contracts, while only the former should be included in the best estimate of technical provisions.
- 3.3.29. Expenses should include both allocated and overhead expenses. Allocated expenses are those expenses which the IORP incurs in servicing pension obligations and which are directly assignable to the source of expense. Overhead expenses comprise all other expenses which the IORP incurs in servicing pension obligations.
- 3.3.30. Overhead expenses should be allocated in a realistic and objective manner and on a consistent basis over time to the parts of the best estimate to which they relate.
- 3.3.31. IORPs should consider their own analysis of expenses and any relevant data from external sources such as average industry or market data.
- 3.3.32. For the assessment of the future expenses, IORPs should take into account all the expenses that are directly related to the on-going administration of obligations related to existing pension schemes/contracts, together with a share of the relevant overhead expenses. Overhead expenses should be split between existing and future schemes/contracts based on recent analyses of the operations of the business and the identification of appropriate expense drivers and relevant expense apportionment ratios. Cash flow projections should include, as cash out-flows, the recurrent overhead expenses

attributable to the existing business at the calculation date of the best estimate.

- 3.3.33. In order to determine which expenses best reflect the characteristics of the underlying portfolio and to ensure that the technical provisions are calculated in a reliable and objective manner, IORPs should consider the appropriateness of both market consistent expenses and IORP specific expenses. If sufficiently reliable, market consistent expenses are not available IORPs should use IORP-specific information to determine expenses that will be incurred in servicing pension obligations provided that the IORP-specific information is assessed to be appropriate.
- 3.3.34. Expenses that are determined by contracts between the IORP and third parties have to be taken into account based on the terms of the contract.

Simplifications

- 3.3.35. Simplifications may be used where expenses borne by IORPs are not material.
- 3.3.36. The possible simplification for expenses is to use an assumption built on simple models, using information from current and past expense loadings, to project future expense loadings, including inflation.

3.3.6. Valuation of financial guarantees and contractual options

Principle 13

- 3.3.37. When calculating the best estimate of technical provisions, IORPs should identify and take into account:
- (a) all contractual options and financial guarantees embedded in the pension scheme rules;
 - (b) all factors which may affect the value of the financial guarantees and the likelihood that members will exercise contractual options.
- 3.3.38. For each type of contractual option, IORPs are required to identify the risk drivers which have the potential to materially affect (directly or indirectly) the frequency of option take-up rates considering a sufficiently large range of scenarios, including adverse ones.
- 3.3.39. The best estimate of contractual options and financial guarantees should reflect both the intrinsic value and the time value.
- 3.3.40. The best estimate of contractual options and financial guarantees may be valued by using one or more of the following methodologies:
- (a) a stochastic approach using for instance a market-consistent asset model (includes both closed form and stochastic simulation approaches);
 - (b) a deterministic valuation based on expected cash flows in cases where this delivers a market-consistent valuation of the technical provision, including the cost of options and guarantees.
- 3.3.41. For the purposes of valuing the best estimate of contractual options and financial guarantees, a stochastic simulation approach would consist of an appropriate market consistent asset model for projections of asset prices and returns (such as equity prices, fixed interest rate and property returns), together with a dynamic model incorporating the corresponding value of liabilities (incorporating the stochastic nature of any relevant non-financial risk

drivers) and the impact of any foreseeable actions to be taken by management.

- 3.3.42. For the purposes of the stochastic approach, a range of scenarios or outcomes appropriate to both valuing the options or guarantees and the underlying asset mix, together with the associated probability of occurrence should be set. A stochastic approach typically uses a large number of projections (scenarios) with attributed probabilities. The number and type of scenarios are not prescribed but should be set so that a market consistent valuation is determined. The range of scenarios should be sufficiently wide, reflecting the range of possible outcomes.
- 3.3.43. When the valuation of the best estimate of contractual options and financial guarantees is not being done on a contract-by-contract basis, the considered grouping of contracts should not distort the valuation of technical provisions.
- 3.3.44. Assumptions for the valuation of options should be realistic. See also Principle 14 on data and assumptions.

Simplifications

- 3.3.45. IORPs are allowed to ignore an option if exercising the option would be actuarially neutral and second order effects are minimal. This could be the case, for example, if members have an option to choose to have the value of their pension benefits paid out in the form of a lump sum payment at pension date. Second order effects refer to, for instance, the impact of exercising the option on the value of other pension obligations and common balance sheet items. Where future member behaviour is difficult to estimate, as a simplification assumptions could be made assuming these changes are not in place.
- 3.3.46. A possible simplification for financial guarantees and contractual options is to approximate them by assuming a Black-Scholes type of environment, although its scope should be carefully limited to those cases where the underlying assumptions of such model are tested. Additionally, even stochastic modelling may demand some simplifications when facing extremely complex features.
- 3.3.47. The non-exhaustive list of possible simplifications for calculating the values of financial guarantees includes:
 - (a) assume non-path dependency in relation to management actions, regular contributions, cost deductions (e.g., management charges,...);
 - (b) use representative deterministic assumptions of the possible outcomes for determining the intrinsic values of extra benefits;
 - (c) assume deterministic scenarios for future contributions (when applicable), mortality rates, expenses,...;
 - (d) apply formulaic simplified approach for the time values if they are not considered to be material.
- 3.3.48. Possible simplifications for other options and guarantees are:
 - (a) ignore options and guarantees which are not material;
 - (b) group, for instance, guaranteed expense charges and/or guaranteed mortality charges with financial guarantees and approximate them as one single financial guarantee;
 - (c) use the process outlined in the previous paragraph in the absence of other valuation approaches, if appropriate.

- 3.3.49. Possible simplifications in relation to fund/account value projections (which is important for valuing financial guarantees and contractual options) are to:
- (a) group assets with similar features/use representative assets or indexes;
 - (b) assume independency between assets, for instance, between equity rate of return and interest rate.

3.3.7. Data and assumptions used in the calculation of technical provisions

Principle 14

3.3.50. Cash flow projections, which form the basis of the best estimate calculation, should reflect expected future demographic, legal, social or economic developments over the lifetime of the pension obligations. The cash flow projections should also take account of potential future management actions by the IORP and of potential behaviour of members/beneficiaries or sponsor(s).

Complete, accurate and appropriate data

- 3.3.51. Data used in the calculation of the technical provisions should only be considered to be complete where all of the following conditions are met:
- (a) the data include sufficient historical information to assess the characteristics of the underlying risks and to identify trends in the risks;
 - (b) the data are available for each of the relevant homogeneous risk groups used in the calculation of the technical provisions and no relevant data is excluded from being used in the calculation of the technical provisions without explanation.
- 3.3.52. Data used in the calculation of the technical provisions should only be considered to be accurate where all of the following conditions are met:
- (a) the data are free from material errors;
 - (b) data from different time periods used for the same estimation are consistent;
 - (c) the data are recorded in a timely manner and consistently over time.
- 3.3.53. Data used in the calculation of the technical provisions should only be considered to be appropriate where all of the following conditions are met:
- (a) the data are consistent with the purposes for which they will be used;
 - (b) the amount and nature of the data ensure that the estimations made in the calculation of the technical provisions on the basis of the data do not include a material estimation error;
 - (c) the data are consistent with the assumptions underlying the actuarial and statistical techniques that are applied to them in the calculation of the technical provisions;
 - (d) the data appropriately reflect the risks to which the IORP is exposed with regard to its obligations;
 - (e) the data were collected, processed and applied in a transparent and structured manner, based on a documented process that comprises all of the following:
 - (i) the definition of criteria for the quality of data and an assessment of the quality of data, including specific qualitative and quantitative standards for different data sets;

- (ii) the use of and setting of assumptions made in the collection, processing and application of data;
 - (iii) the process for carrying out data updates, including the frequency of updates and the circumstances that trigger additional updates;
 - (f) the data should be used consistently over time in the calculation of the technical provisions.
- 3.3.54. For the purposes of point (b) above, an estimation error in the calculation of the technical provisions should be considered to be material where it could influence the decision-making or the judgement of the users of the calculation result, including the competent authorities (CAs).
- 3.3.55. Where IORPs use data from an external source, they should derive assumptions on risks that are based on that data according to the following requirements:
- (a) IORPs are able to demonstrate that the use of data from an external source is more suitable than the use of data which are exclusively available from an internal source;
 - (b) IORPs know the origin of the data and the assumptions or methodologies used to process that data;
 - (c) IORPs identify any trends in the data from an external source and the variation, over time or across data, of the assumptions or methodologies in the use of the data;
 - (d) IORPs are able to demonstrate that the assumptions and methodologies referred to in points (b) and (c) appropriately reflect the characteristics of the portfolio of pension obligations.
- 3.3.56. Where IORPs have insufficient data of appropriate quality to apply a reliable actuarial method, they may use appropriate approximations to calculate the best estimate provided that all of the following requirements are met:
- (a) the insufficiency of data cannot be remedied by the use of external data;
 - (b) it would not be practicable for the IORP to adjust the data to remedy the insufficiency.
- 3.3.57. Where comparison of the best estimate, and the assumptions underlying the its calculation, against experience identifies systematic deviation between experience and the best estimate calculations, the IORP should make appropriate adjustments to the actuarial methods being used and/or the assumptions being made.

Price inflation and wage growth assumptions

- 3.3.58. For some IORPs, sponsor contributions and benefits may be linked to price inflation and wage growth. This is the case for the best estimate of unconditional benefits (such as in the case of guaranteed indexation), but also in the case of conditional or discretionary benefits (such as in the case of conditional indexation granting based on the solvency position of the IORP). Paragraph 3.3.23 and following define whether future inflation or salary increases should be taken into account in the best estimate of technical provisions.
- 3.3.59. Assumptions for price inflation should be based on the market-based inflation rate curves specified in section 3.5.

- 3.3.60. IORPs may apply an appropriate adjustment to the specified inflation rate curves if the inflation measure implied by the provided curve does not adequately reflect the inflation measure to which pension obligations are linked.
- 3.3.61. No readily available market indices exist for wage inflation. Where an estimate of salary growth is necessary, IORPs should increase the price inflation curve with a best estimate of real wage growth that adequately reflects the situation for the sector or country of their sponsor, or the situation of the sponsor itself.

Demographic assumptions

- 3.3.62. Demographic assumptions are based on biometric risk factors related to human life conditions, such as mortality/longevity rates, morbidity rates and disability rates. Demographic assumptions may differ between IORPs as biometric risk factors are different between Member States as well as between different IORPs, given the individual structure of the population of members and beneficiaries. However, the cash flow projections should be based on appropriate and recent biometric risk factors and include future trends (for instance in mortality rates).

IORP management actions assumptions

- 3.3.63. Assumed future management actions should be realistic and consistent with the IORPs current supervisory framework, business practice and business strategy and take due account of possible correlations with the financial position of the IORP. If there is sufficient evidence that the IORP will change its practices or strategy, the assumed future management actions should be consistent with the changed practices or strategy.
- 3.3.64. Assumed future management actions should be consistent with each other.
- 3.3.65. IORPs should not assume that future management actions would be taken that would be contrary to their obligations towards members/beneficiaries or sponsors or to legal provisions applicable to the IORPs. The assumed future actions should take account of any public indications by the IORP as to the actions that it would expect to take, or not take in the circumstances being considered.
- 3.3.66. Assumptions about future management actions should take account of the time needed to implement the actions and any expenses caused by them. IORPs should be able to verify that assumptions about future management actions are realistic through:
- (a) a comparison of assumed future management actions with actions actually taken previously by the IORP;
 - (b) a comparison of future management actions taken into account in the current and past calculations of the best estimate;
 - (c) an assessment of the impact of changes in the assumptions of future management actions on the value of the technical provisions.

Assumptions related to members/beneficiaries or sponsor behaviour

- 3.3.67. IORPs should identify members/beneficiaries or sponsor behaviour where it impacts on the calculation of the best estimate of technical provisions.
- 3.3.68. Any assumptions made by IORPs with respect to the likelihood that members/beneficiaries or sponsors will exercise contractual options, should be realistic and based on current and credible information. The assumptions should take account, either explicitly or implicitly, of the impact that future

changes in financial and non-financial conditions may have on the exercise of those options.

- 3.3.69. Assumptions about the likelihood that members/beneficiaries or sponsors will exercise contractual options should be based on analysis of past members/beneficiaries or sponsors' behaviour and a prospective assessment of expected members/beneficiaries or sponsors' behaviour. They should be appropriately founded in statistical and empirical evidence, to the extent that it is deemed representative of the future expected behaviour.
- 3.3.70. In general, members' and beneficiaries' behaviour should not be assumed to be independent of financial markets, an IORP's treatment of members and beneficiaries or publicly available information unless proper evidence to support the assumption can be observed.
- 3.3.71. IORPs should consider whether the following elements are relevant and material for the valuation of options and should take them into account accordingly, applying the principle of proportionality:
- (a) how beneficial the exercise of the options was and will be to the members under circumstances at the time of exercising the option;
 - (b) the influence of past and future economic conditions;
 - (c) the impact of past and future management actions;
 - (d) any other circumstances that are likely to influence decisions by members on whether to exercise the option.
- 3.3.72. Where it is not possible to determine whether assumptions are realistic, e.g. due to insufficient empirical evidence, assumptions should be chosen such as to avoid underestimation of values. The best estimate of contractual options and financial guarantees should capture the uncertainty of cash flows, taking into account the likelihood and severity of outcomes from multiple scenarios combining the relevant risk drivers.

Assumptions related to expenses

- 3.3.73. Assumptions with respect to future expenses arising from commitments made on or prior to the date of valuation have to be appropriate and take into account the type of expenses involved. IORPs should ensure that expense assumptions allow for future changes in expenses and such an allowance for inflation is consistent with the economic assumptions made. Future expense cash flows are usually assumed to vary with assumed rates of general level of expense inflation in a reasonable manner.
- 3.3.74. Relevant market data should be used to determine expense assumptions which include an allowance for future cost increase. Furthermore, expense inflation should be consistent with the types of expenses being considered.
- 3.3.75. Any assumptions about the expected cost reduction should be realistic, objective and based on verifiable data and information.

Assumptions related to financial markets and asset models

- 3.3.76. In order to calculate the best estimate of technical provisions of the IORP in line with the general principle for valuation, assumptions consistent with information about or provided by financial markets should be made.
- 3.3.77. When IORPs derive assumptions on future financial market parameters or scenarios, the choice of the assumptions should be appropriate and consistent with the valuation principles set out in section 3.9.

- 3.3.78. Where the IORP uses a model to produce future projections of market parameters (market consistent asset model, e.g. an economic scenario file), such model should meet the following conditions:
- (a) it generates asset prices that are consistent with deep, liquid and transparent financial markets;
 - (b) it assumes no arbitrage opportunity;
 - (c) the calibration of the parameters and scenarios is consistent with the risk-free term structure used to calculate the best estimate.
- 3.3.79. The following principles should be taken into account in determining the appropriate calibration of a market consistent asset model:
- (a) the asset model should be calibrated to reflect the nature and term of the liabilities, in particular of those liabilities giving rise to significant guarantee and option costs;
 - (b) the asset model should be calibrated to the risk-free term structure used to discount the cash flows;
 - (c) the asset model should be calibrated to a properly calibrated volatility measure.
- 3.3.80. In principle, the calibration process should use market prices only from financial markets that are deep, liquid and transparent. If the derivation of a parameter is not possible by means of prices from deep, liquid and transparent markets, other market prices may be used. In this case, particular attention should be paid to any distortions of the market prices. Corrections for the distortions should be made in a deliberate, objective and reliable manner.
- 3.3.81. The calibration of the above mentioned asset models may also be based on adequate actuarial and statistical analysis of economic variables provided they produce market consistent results. For example:
- (a) to establish the appropriate correlations between different asset returns;
 - (b) to determine probabilities of transitions between credit quality steps and default of corporate bonds;
 - (c) to determine property volatilities. As there is virtually no market in property derivatives, it is difficult to derive property implied volatility. Thus the volatility of a property index may often be used instead of property implied volatility.

Simplifications

Demographic assumptions

- 3.3.82. Possible simplifications for obtaining biometric risk factors, which could be used in combination, are:
- (a) assume that biometric risk factors are independent from any other variable (i.e. mortality is independent of future changes of the morbidity status of the member or beneficiary);
 - (b) use cohort or period data to analyse biometric risk factors;
 - (c) apply current tables in use adjusted by a suitable multiplier function. The construction of reliable mortality, morbidity/ disability tables and the modelling of trends could be based on current (industry standard or other) tables in use, adjusted by a suitable multiplier function. Industry-wide and other public data and forecasts should provide useful benchmarks for suitable multiplier functions.

Management actions

3.3.83. IORPs may exclude any allowance for management actions if they consider they would be immaterial.

Members/beneficiaries or sponsor behaviour

3.3.84. IORPs may exclude any allowance for members/beneficiaries or sponsor behaviour if they consider it would be immaterial.

3.3.8. Non-unconditional benefits and benefit reduction mechanisms

Principle 15

3.3.85. IORPs should recognise all available benefit adjustment mechanisms, including conditional and discretionary benefits, and show them separately on the common balance sheet.

Separate calculation of conditional and discretionary benefits

3.3.86. All non-unconditional benefits should be included in the common balance sheet. Two types of non-unconditional benefits are distinguished:

- (a) conditional benefits;
- (b) discretionary benefits.

3.3.87. The value of both types of non-unconditional benefits should be determined and shown separately on the common balance sheet.

3.3.88. The granting of discretionary benefits is a management/trustee action and assumptions about it should be realistic and verifiable. Assumptions about the granting of discretionary benefits should take the relevant and material characteristics of the mechanism for their distribution into account (See also Principle 4 on data quality and assumptions).

Valuation of conditional and discretionary benefits

3.3.89. The value of non-unconditional benefits depends on a wide range of factors, which includes future IORP management actions and sponsor behaviour. Valuing these benefits incorporates some degree of estimation, even when the benefits are not only subject to a discretionary decision-making process, but also to a conditionality which would in itself be capable of being objectively modelled. Obtaining a best estimate value includes a level of complexity in the necessary modelling. Furthermore, it may be difficult to model how the discretionary powers of the IORP management / sponsor will be exercised under different future scenarios. For example, past experience may not be a reliable guide for future behaviour.

3.3.90. For every non-unconditional benefit, IORPs should identify the risk drivers which have the potential to materially affect (directly or indirectly) the value of the benefit.

3.3.91. As a first step, the non-unconditional benefits could be valued separately as if unconditional, in order to provide an upper limit.

3.3.92. The best estimate of non-unconditional benefits may be valued by using one or more of the following methodologies:

- (a) a stochastic approach using for instance a market-consistent asset model (includes both closed form and stochastic simulation approaches);

- (b)a deterministic valuation based on expected cash flows in cases where this delivers a market-consistent valuation of the technical provision, including the cost of options and guarantees.
- 3.3.93. For the purposes of valuing the best estimate of non-unconditional benefits, a stochastic simulation approach would consist of an appropriate market consistent asset model for projections of risk-neutral returns (such as equity, fixed income and property returns), together with a dynamic model incorporating the corresponding value of liabilities (incorporating the stochastic nature of any relevant non-financial risk drivers).
- 3.3.94. For the purposes of the stochastic approach, a range of scenarios or outcomes appropriate to both valuing the benefits and the underlying asset mix, together with the associated probability of occurrence should be set. A stochastic approach typically uses a large number of projections (scenarios) with attributed probabilities. The number and type of scenarios are not prescribed but should be set so that a market consistent valuation is determined. The range of scenarios should be sufficiently wide, reflecting the range of possible outcomes.
- 3.3.95. If no marked-to-market model can be defined, the benefit should be marked-to-model. Assumptions, variables and parameters used in the model should be market consistent and IORPs should be able to explain them.
- 3.3.96. IORPs should take into account the discretionary element of discretionary benefits in their valuation. IORPs are expected to be able to clarify their assumptions regarding discretionary elements and to be able to explain the way that these elements are incorporated in the valuation. Given their discretionary nature, no methodology for the inclusion of discretionary elements is prescribed. IORPs may use simplifications in the valuation where appropriate.
- 3.3.97. Appropriate consideration should also be given to an increasing future awareness of policy options as well as members' and beneficiaries' possible reactions to a changed financial position of an IORP.
- 3.3.98. Given the pattern that is visible in the use of discretionary decision-making processes, IORPs may or may not find a correlation between their funding position and the granting of discretionary benefits.
- 3.3.99. When valuing non-unconditional benefits, IORPs should consider whether the following factors are relevant and material for the valuation of the benefits and take them into account accordingly, applying the principle of proportionality:
- (a) Allocation to groups: How is a benefit divided between groups of members? What constitutes a homogenous group of members and what are the key drivers for the grouping?
 - (b) Severe events: When is an IORP's national funding position so weak that granting the benefits is considered by the IORP to jeopardize the interests of the IORP or groups of members? How will the mechanism for the benefits be affected by a large change in the funding ratio? How is management / are trustees expected to behave in such a situation?
 - (c) Drivers and restrictions: What are the key drivers affecting the level of benefits? What is an IORP's investment strategy? How are benefits made available to members and what are the key drivers affecting for example conditionality, changes in smoothing practice, level of discretionary benefits provided by the IORP? What other restrictions are in place for determining the level of benefits?

- (d) Expectations: What is an expected level of the benefits? How will the experience from current and previous years affect the level of benefits? How will the expectations regarding years to come affect the level of benefits?

Separate calculation of benefit reductions

3.3.100. Three types of benefit reductions should be calculated and shown separately on the common balance sheet:

Ex ante benefit reductions

3.3.101. IORPs should include the value of ex ante benefit reductions on the common balance sheet in the valuation of the best estimate of technical provisions. The value should be calculated and shown separately from the rest of the best estimate. This way, the best estimate of technical provisions reflects under which conditions and to which extent reductions will take place following from contracts and bylaws.

Ex post benefit reductions

3.3.102. IORPs should include the value for ex post benefit reductions – when permitted by national law, f.i. in case of default of the IORP, and contractual arrangements - in the valuation of the best estimate of technical provisions. The value should be calculated and shown separately from the rest of the best estimate.

3.3.103. Ex post benefit reductions are per definition not explicit and will require an assessment under what circumstances benefits may be reduced and by how much. This assessment could among other things be based on 1) stipulations in national law and regulation, 2) rules or behaviour of the competent authority as regards to when reductions are allowed or required, 3) policy behaviour of the management of the IORP, and 4) historical evidence.

Reduction of benefits in case of sponsor default

3.3.104. National law and regulation or contractual arrangements (e.g. collective bargaining) may allow for the possibility to reduce pension benefits in the event of a default of the sponsor that provides unlimited support. This implies that such benefits are conditional on the sponsor continuing to exist.

3.3.105. IORPs should include the value of benefit reductions in case of sponsor default - when permitted by national law and contractual arrangements - in the valuation of the best estimate of technical provisions. The value should be calculated and shown separately from the rest of the best estimate. Two cases can be discerned:

- (a) The sponsor provides unlimited support and a pension protection scheme is in place that guarantees a reduced amount of benefits.
- (b) The sponsor provides unlimited support and there is no pension protection scheme in place.

3.3.106. In both cases, pensions are reduced in the event of sponsor default when assets, excluding sponsor support and pension protection schemes, plus amounts recoverable from the sponsor are insufficient to meet technical provisions.

Valuation of benefit reductions

3.3.107. The adjustment to technical provisions made in respect of benefit reductions should be consistent with the overall valuation methodology of the common

balance sheet, involving the valuation of projected future (negative) cash flows on a market consistent basis.

- 3.3.108. Benefit reduction mechanisms may be valued using the balancing item approach(see below).
- 3.3.109. By their nature, benefit reduction mechanisms will be the last mechanisms taken into account. Only where all security mechanisms are fully taken into account will benefit reductions be considered.
- 3.3.110. A direct approach to the calculation of the value of benefit reduction mechanisms is based on a modelling of future (negative) cash flows. Where the occurrence and amount of benefit reductions are reasonably predictable, probabilities can be assigned to different amounts of reductions and to put a total value on the effect of the adjustments.
- 3.3.111. The value of the reduction of benefits in case of sponsor default can be determined by calculating:
- (a) Where the sponsor provides unlimited support and a pension protection scheme is in place that guarantees a reduced amount of benefits, the difference between the value of the pension protection scheme guaranteeing the full level of benefits and its actual value, taking into account the level of assets, excluding sponsor support and pension protection schemes, in the IORP.
 - (b) Where the sponsor provides unlimited support and there is no pension protection scheme in place the difference between the value of sponsor support without default risk and its actual value including default risk

Benefit reductions as a balancing item

- 3.3.112. Benefit reduction mechanisms may be valued using the balancing item approach if there are no limits to the amount of the reductions, as any limitation would mean that there could be instances in which the benefit reduction mechanism would not be able to 'balance the balance sheet'.
- 3.3.113. If a benefit reduction mechanism can be recognised as a balancing item on the common balance sheet, other elements of the common balance sheet should then be valued using other valuation methods.

Simplifications

- 3.3.114. If appropriate, simplifications regarding the projection horizon may be applied because of model restrictions that prohibit stochastic valuations of non-unconditional benefits over the full lifetime of the pension obligations. Simplifications may also be applied to determine the proportion of adjustment and security mechanisms that are attributable to accrued benefits as valuations are conducted based on an 'open modelling' assumption, whereas the best estimate on the common balance sheet may only include accrued benefits (depending on the rules on benefits and contributions to be included in cash flows).
- 3.3.115. When there is insufficient data on which to base a more exact modelling a simplified approach could be applied. The objective of a simplification is that the benefit reduction to be valued in the technical provisions will be a best estimate of the average future annual reductions, consistent with the underlying market consistent assumptions. The simplification should take account of any past and foreseen policies and/or communications to members that would influence or determine the benefit. There should be consistency between the treatment of benefit reductions and discretionary and conditional benefits, as the economic effect of paying non-unconditional benefits only in

economically favourable times is similar to making reductions to unconditional benefits in economically unfavourable circumstances.

3.3.9. Pure defined contribution obligations

Principle 16

3.3.116. Pure defined contribution obligations, i.e. where there is no risk sharing between the sponsor, plan members and the IORP and all risks are borne by members and beneficiaries, should be shown separately from all other obligations on the common balance sheet.

3.3.117. Liabilities arising out of defined contribution schemes, where the sponsor or the IORP has no further obligations, should not be calculated according to the same principles as the technical provisions for obligations arising out of pension schemes which provide guarantees to members and beneficiaries.

3.3.118. The value of defined contribution obligations should be equal to the amount required to settle the obligation according to the rules of the pension scheme.

3.4. Calculation of the risk margin

Principle 17

3.4.1. In order to obtain a market consistent value of technical provisions when pension obligations cannot be replicated using financial instruments for which a market value is observable, a risk margin should be added to the best estimate of technical provisions to ensure that the value of technical provisions is equal to the amount that a third party would be expected to require to take over and meet pension obligations.

3.4.2. The determination of the risk margin takes into account the assumption that the common balance sheet is either balanced or shows an excess of assets over liabilities, in accordance with Principle 6. The latter may either occur if the value of security and/or benefit reduction mechanisms yields an excess of assets over liabilities when assets excluding sponsor support and pension protection schemes are lower than liabilities excluding benefit reductions or if assets excluding sponsor support and pension protection schemes exceed liabilities excluding benefit reductions. Two situations can be distinguished, both in the unstressed and stressed common balance sheet:

IORPs where assets (excluding sponsor support and pension protection schemes) are not larger than liabilities (excluding benefit reductions and risk margin)

3.4.3. For these IORPs the risk margin is zero because all risks are borne by security and/or benefit adjustment mechanisms.

All other IORPs

3.4.4. If IORPs have assets (excluding sponsor support and pension protection schemes) exceeding liabilities (excluding benefit reductions) then there will be a positive risk margin, because the IORP will have enough assets (excluding sponsor support and pension protection schemes) to fully or partly support the pension obligations over the lifetime thereof by itself.

3.4.5. For IORPs with assets (excluding sponsor support and pension protection schemes) exceeding liabilities (excluding benefit reductions), the risk margin should be 3% of the best estimate (calculated in accordance with Principles 8

to 15) of non-pure DC obligations.⁵ If this calculation yields a risk margin which is so large that the common balance sheet shows an excess of liabilities over assets, the risk margin should be determined as (assets – liabilities (excluding risk margin)).

3.5. Risk-free interest rate term structure and inflation rate term structure

Principle 18

- 3.5.1. The rates of the basic risk-free interest rate term structure should meet all of the following criteria:
 - (a) IORPs are able to earn the rates in a risk-free manner in practice;
 - (b) the rates are reliably determined based on financial instruments traded in a deep liquid and transparent financial market.
- 3.5.2. The rates of the basic risk-free interest rate term structure should be calculated separately for each currency and maturity, based on all information and data relevant for that currency and that maturity. They should be determined in a transparent, prudent, reliable and objective manner that is consistent over time.
- 3.5.3. The rates of the inflation rate term structure should be reliably determined based on financial instruments traded in a deep liquid and transparent financial market.
- 3.5.4. The rates of the inflation rate term structure should be calculated separately for each currency and maturity using a methodology consistent with the methodology for determining the basic risk-free interest rate term structure.

Relevant financial instruments to derive the basic risk-free interest rates

- 3.5.5. For each currency and maturity, the basic risk-free interest rates should be derived on the basis of interest rate swap rates for interest rates of that currency, adjusted to take account of credit risk.
- 3.5.6. For each currency, for maturities where interest rate swap rates are not available from deep, liquid and transparent financial markets the rates of government bonds issued in that currency, adjusted to take account of the credit risk of the government bonds, should be used to derive the basic risk free-interest rates, provided that, such government bond rates are available from deep, liquid and transparent financial markets.

Adjustment to swap rates for credit risk

- 3.5.7. The adjustment for credit risk referred to in paragraph 3.5.5 should be determined in a transparent, prudent, reliable and objective manner that is consistent over time. The adjustment should be determined on the basis of the difference between rates capturing the credit risk reflected in the floating rate of interest rate swaps and overnight indexed swap rates of the same maturity, where both rates are available from deep, liquid and transparent financial markets. The calculation of the adjustment should be based on 50 percent of the average of that difference over a time period of one year. The adjustment should not be lower than 10 basis points and not higher than 35 basis points.

⁵ See Annex 1 of EIOPA, Annex to IORP Stress Test 2017 Specifications – Technical Specifications Common Balance Sheet, EIOPA-BoS-17/076v2, 18 May 2017: https://eiopa.europa.eu/Publications/Surveys/BoS-17-076v2_Annex_TS_IORP_Stress_Test_2017.pdf

Extrapolation of the risk-free interest rate term structure

- 3.5.8. The determination of the basic risk-free interest rate term structure should take into account relevant financial instruments of those maturities where the markets for those financial instruments as well as for bonds are deep, liquid and transparent. For maturities where the markets for the relevant financial instruments or for bonds are no longer deep, liquid and transparent, the basic risk-free interest rate term structure should be extrapolated.
- 3.5.9. The extrapolated part of the basic risk-free interest rate term structure should be based on forward rates converging smoothly from one or a set of forward rates in relation to the longest maturities for which the relevant financial instrument and the bonds can be observed in a deep, liquid and transparent market to an ultimate forward rate.
- 3.5.10. The principles applied when extrapolating the basic risk free interest rate term structure should be the same for all currencies. This should also apply as regards the determination of the longest maturities for which interest rates can be observed in a deep, liquid and transparent market and the mechanism to ensure a smooth convergence to the ultimate forward rate.
- 3.5.11. For each currency, the ultimate forward rate should be stable over time and should only change as a result of changes in long-term expectations. The methodology to derive the ultimate forward rate should be clearly specified in order to ensure the performance of scenario calculations by IORPs. It should be determined in a transparent, prudent, reliable and objective manner that is consistent over time.
- 3.5.12. For each currency the ultimate forward rate should take account of expectations of the long-term real interest rate and of expected inflation, provided those expectations can be determined for that currency in a reliable manner. The ultimate forward rate should not include a term premium to reflect the additional risk of holding long-term investments.

Basic risk-free interest rate term structure of currencies pegged to the euro

- 3.5.13. For a currency pegged to the euro, the basic risk-free interest rate term structure for the euro, adjusted for currency risk, may be used, provided that all of the following conditions are met:
 - (a) the pegging ensures that the exchange rate between that currency and the euro stays within a range not wider than 20 % of the upper limit of the range;
 - (b) the economic situation of the euro area and the area of that currency are sufficiently similar to ensure that interest rates for the euro and that currency develop in a similar way;
 - (c) the pegging arrangement ensures that the relative changes in the exchange rate over a one-year-period do not exceed the range referred to in point (a) of this paragraph, in the event of extreme market events;
 - (d) one of the following criteria is complied with:
 - (i) participation of that currency in the European Exchange Rate Mechanism (ERM II);
 - (ii) existence of a decision from the Council which recognizes pegging arrangements between that currency and the euro;
 - (iii) establishment of the pegging arrangement by the law of the country establishing that country's currency.

For the purpose of point (c), the financial resources of the parties that guarantee the pegging should be taken into account.

- 3.5.14. The adjustment for currency risk should be negative and should correspond to the cost of hedging against the risk that the value in the pegged currency of an investment denominated in euro decreases as a result of changes in the level of the exchange rate between the euro and the pegged currency. The adjustment should be the same for all IORPs.

Publication of basic risk-free interest rate term structures

- 3.5.15. EIOPA will publish the basic risk-free interest rate term structures for the relevant currencies as well as the methodology consistent with the specifications set out in paragraphs 3.5.5-3.5.14.⁶

Inflation

- 3.5.16. The inflation rate term structure should be derived as follows:

- (a) The inflation rate term structure should be based on zero-coupon break-even inflation swap rates;
- (b) The zero-coupon break-even inflation swap rates should be extrapolated using the same methodology as for the risk-free interest rate term structure;
- (c) No credit risk adjustment should be applied;
- (d) The ultimate forward rate should be equal to the long-term inflation expectations for each currency as referred to in paragraph 3.5.12;
- (e) The inflation rate term structure for currencies pegged to the euro should be equal to the inflation rate term structure for the euro;
- (f) For currencies where no inflation swap rates are available, the inflation rate term structure should be equal to the long-term inflation expectations for each maturity.

- 3.5.17. EIOPA will publish the inflation rate term structures based on the methodology outlined in the above paragraph.

3.6. Sponsor support

Principle 19

- 3.6.1. Sponsor support should be recognised as an asset on the common balance sheet and valued on a market-consistent basis where the value of the sponsor support should be calculated as the probability weighted average of the discounted value of future cash flows that is expected to be paid by the sponsor in possible future scenarios.

Forms of sponsor support

- 3.6.2. Four forms of sponsor support can be distinguished which relate to the support that the sponsor may provide in addition to that committed for financing benefits on an ongoing basis:
- A – Increases in contributions
 - B – Subsidiary liability of the sponsor

⁶ Technical documentation is available on EIOPA's website to allow IORPs to apply the Smith-Wilson procedure themselves for the purpose of generating stochastic scenarios the basic risk-free interest rate. See EIOPA, Technical documentation of the methodology to derive EIOPA's risk-free interest rate term structures, EIOPA-BoS-15/035, 31 January 2018: <https://eiopa.europa.eu/regulation-supervision/insurance/solvency-ii-technical-information/risk-free-interest-rate-term-structures>

C – Contingent assets of the sponsor

D – Claims on the sponsor

- 3.6.3. Forms A & B can be valued by estimating the future cash flows of the sponsor that could be available to the IORP (Form A), or to pay the benefits directly to members and beneficiaries (Form B).
- 3.6.4. For reasons of simplicity the wording in the text below often takes into account Form A (payments to the IORP) only, but is meant to capture Form B (payments to members and beneficiaries) as well.
- 3.6.5. Form C relates to contingent assets of the sponsor. These assets are still in the possession of the sponsor at the valuation date, but are locked in a legally binding way for the purpose of flowing to the IORP under a predefined set of circumstances.
- 3.6.6. Contingent assets of the sponsor should be recognised separately on the common balance sheet and valued in accordance with the principles laid down in section 3.9. Where appropriate, the value of contingent assets should be deducted from the value of sponsor support where it would result in double counting.
- 3.6.7. Form D relates to claims on the sponsor on discontinuance of the IORP. In essence this form of support is what would be available to the IORP if the link between the IORP and the sponsor is broken.
- 3.6.8. A one-size-fits-all methodology to the valuation of sponsor support is not possible as the position of sponsors can vary significantly and the appropriate approach for one type of sponsor may not be appropriate for another - for example, understanding the affordability position of a commercial sponsor will require very different analysis to that of a sponsor in the not-for-profit sector. The specifics of how IORPs should do this are left to IORPs and CAs to decide on the most appropriate approach.
- 3.6.9. The value of sponsor support should be calculated as the probability weighted average of the discounted value of future cash flows, that would be required to be paid by the sponsor to the IORP in excess of its regular contributions for funding the cost of new accrual, in order to ensure assets in the IORP meet a required level (i.e. the gap between the total of all other assets of the IORP and the assumed target level of total assets). Where sponsor support is limited by contract or otherwise, the limit should be taken into account in the calculation of cash flows. Where the cost of new accrual is valued as part of the technical provisions (see Principle 11) IORPs may use their current policy as the basis for valuing the required contributions for future accrual. The risk free interest rate curve should be used for discounting cash flows.
- 3.6.10. The valuation of sponsor support should be consistent with the general principles and assumptions outlined in Principle 14 with respect to the incorporation of:
 - (a) IORP management actions;
 - (b) Members/beneficiaries or sponsor behaviour;
 - (c) Assumptions related to financial markets and asset models.
- 3.6.11. This approach may use elements of various modelling techniques (i.e. probabilistic or deterministic) relevant to the IORP's specific circumstances and overlaid with expert judgment relating to the specific circumstance of the sponsor.

3.6.12. In some circumstances a 'balancing item' approach may be applied (see below).

Contributions and timing of cash flows

3.6.13. Future contributions to be included in the valuation of sponsor support should take into account:

- (a) only contributions in excess of the cost of new accruals (see "Benefits and contributions to be included in cash flows" in paragraphs 3.3.23-3.3.24);
- (b) only future additional contributions with respect to existing obligations and accrued rights included in the best estimate of technical provisions at the calculation date;
- (c) Both contributions paid by the employer(s) and employees can be required to make additional contributions. The credit risk associated with employee contributions can be assumed to be the same as for the associated employer(s);
- (d) Possible restitutions (i.e. negative contributions) by the IORP to the employer(s) and employees in favourable scenarios where legislation allows for this.

3.6.14. IORPs should consider the timing of sponsor support when making projections of future cash flows. The distribution of sponsor support over time may depend on the pension scheme and/or social and labour law.

Legally and non-legally enforceable sponsor support

3.6.15. The value of legally and non-legally enforceable sponsor support should be determined and shown separately on the common balance sheet.

Overarching approach to probability of occurrence of future sponsor support

3.6.16. The probability of occurrence and default risk of future support of the sponsor to the IORP including any recoverables should be taken into account in order to derive the probability-weighted expected value. In order to do this it is important to take into account two key elements.

3.6.17. Firstly, the ability of the sponsor to make payments that includes the financial position of the sponsor and also its credit risk (financial constraints). When deriving the amounts and probabilities of future sponsor support cash flows, IORPs should appropriately take into account their own financial situation, as well as the quantitative uncertainty of this situation.

3.6.18. Secondly, the ability of the IORP/CA to demand payments from the sponsor (legal constraints).

3.6.19. Where sponsor support is non-legally enforceable, IORPs should take into account the likelihood of their sponsor(s) providing additional resources in future scenarios and be in a position to demonstrate the appropriateness of the modelling assumptions used for this purpose. This could be done, for example, by adjusting the default probability of the sponsor to reflect the additional risk that the sponsor may not provide the required cash flows. Where this is not possible, IORPs should use the sponsor's unadjusted default probability. Elements that could play a role in this assessment are the current financial strength of the sponsor, the level of cyclicity with economic scenarios of the sponsor's activities and the accounting consequences for the sponsor in case he would provide additional resources. IORPs should take into account past experience when assessing the likelihood of non-legally enforceable sponsor support being available.

Sponsor default probabilities

3.6.20. IORPs should use whatever method is most appropriate for their circumstances to derive the default probability for their sponsor. IORPs should take into account how the default probability will change over time. In case this is too difficult or burdensome, IORPs may assume that the probability of default remains constant over time.

3.6.21. To help IORPs assess the sponsor default probability, below methodologies may be used:

Option 1 – IORPs may use probabilities as implied by securities traded on financial markets, such as credit default swaps and corporate bonds.

Option 2 - Probability of default assessed according to the sponsor's credit rating. The following table can be used to derive a suitable default probability from a sponsor's credit quality step (see Annex 2 for a mapping of examples of ratings to credit quality steps).

Credit Step	Quality	PD
0		0.002%
1		0.01%
2		0.05%
3		0.24%
4		1.20%
5		4.20%
6		4.20%

Option 3 - IORPs can use data from their sponsors' financial accounts to derive a suitable default probability. IORPs may apply the first stage of the Alternative Simplified Approach (see paragraph 3.6.70) to derive an approximate credit rating. This approach is also possible for smaller and/or unrated sponsors. The above table can then be used to derive the probability of default. IORPs from the UK can use probabilities calculated by the UK Pension Protection Fund.

Recovery rate on sponsor default

3.6.22. The recovery rate of claims on the sponsor in the event of default of the sponsor should not exceed 50%. If IORPs have evidence as to why a different recovery rate would be more appropriate in their circumstances including for example allowing for the different recovery rates from different insolvency processes in different member states, this can be used. In particular, for some member states, a much smaller figure might be more appropriate under the circumstances in which insolvency occurs. IORPs should be able to demonstrate the appropriateness of the recovery rate used.

Scope of guarantees

3.6.23. In cases where there are legally enforceable guarantees protecting the sponsor and/or the support provided by it to an IORP, whether granted by other group- or parent-companies of the sponsor, or by third parties such as credit insurance, bank guarantees or government guarantees, those guarantees should be taken into account when calculating the value of sponsor support. Calculations for valuing sponsor support should in this case be done in the

same way as for “standard” sponsor support, but taking into account the financial strength and data of the respective guarantor(s). If the guarantee covers the full sponsor support, replacing the sponsor with the guarantor in calculating sponsor support will probably simplify the procedure, as the guarantor may be more likely to have a credit rating and there may be more easily available data for assessing credit quality. Where information from the sponsor (or from the sponsor’s accounts) is available on any material commitment of those guarantors towards other IORPs, as well as other on- or off-balance commitments, these should be taken into account, in order to avoid any multiple gearing. Where information on other commitments is not available or is likely to be immaterial, IORPs may ignore it.

Maximum value of sponsor support

- 3.6.24. In order to ensure that the valuation of sponsor support does not exceed an amount that the sponsor could reasonably afford, IORPs should derive an approximation of the maximum value of sponsor support.
- 3.6.25. This value is also used to test Condition 1 and Condition 2 of the balancing item approach (see below).
- 3.6.26. Where sponsor support is contractually limited to a certain value in some way, the value of maximum sponsor support should not exceed this limit.
- 3.6.27. IORPs are free to choose the most appropriate approach to the valuation of maximum sponsor support for their IORP. The aim of this assessment is to determine the maximum support the sponsor may be reasonably able to provide the IORP over an appropriate period of time.
- 3.6.28. IORPs can take a proportionate approach to the valuation. For example, where the sponsor is extremely strong and the relative size and risk of the IORP is small, a simple approach can be taken to valuing maximum sponsor support. This is left to IORPs to decide on and they should be in a position to explain the approach they have taken.
- 3.6.29. The approach to valuing maximum sponsor support will depend on the information available to the IORP from the sponsor and/or from the sponsor’s accounts.
- 3.6.30. Where IORPs have credible and sufficient information regarding the future business plans of the sponsor that will affect the estimation of future cash flows, then this should be taken into account.
- 3.6.31. The IORP should be able to demonstrate the validity of the assumptions and analysis used in this assessment.

Multi-employer IORPs

- 3.6.32. For multi-employer IORPs where the calculation of the maximum value of sponsor support for every single employer is not possible or would be too burdensome for the IORP, it is sufficient to do the calculations only for a sufficient number of (larger) employers for which data is available. If these results can be seen as being representative for all employers they can be grossed up to the level of all employers appropriately.
- 3.6.33. Alternatively, for example where the IORP is sponsored by a large number of small sponsors, it could be sufficient to determine the value of a sample of sponsors which collectively have a value larger than a multiple of the value of sponsor support included in the common balance sheet. One approach would then be to use a sample of, for example, the five largest sponsors which represent a specified percentage of the members of the IORP. However, this

approach could be modified, for example if there is a problem with availability of data. In this case the sample could be chosen in a different way.

- 3.6.34. The “normal” assessment of the maximum value of sponsor support could also be restricted to a sample of sponsors, which would provide a maximum value of sponsor support which is (collectively) assessed as larger than the value necessary to balance the common balance sheet.

Multi-IORP sponsors

- 3.6.35. For sponsors with multiple IORPs, IORPs should be able to use all of the sponsor support valuation approaches, subject to data availability, by using the same principles but adapted to the multiple IORP situation by taking account of the proportion (which might be considered to relate to each IORP of the sponsor) of what would be the maximum sponsor support of the sponsor if there were only one IORP. This information should be available from the sponsor and/or sponsors accounts. Where IORPs are unable to collect this data and/or it is regarded as immaterial, it can be ignored.

Sponsor support as a balancing item

- 3.6.36. The balancing item approach for sponsor support is only possible where sponsor support is legally enforceable and unlimited in nature. In addition, one of the below conditions should be fulfilled to be eligible to use the balancing item approach.

Balancing item - Condition 1

- 3.6.37. As a first sub-condition, the default rate of the sponsor should be 0.5% or lower.
- 3.6.38. In addition, the IORP should be able to demonstrate that the sponsor has sufficient financial strength to cover the value of sponsor support required to balance the stressed common balance sheet. For this purpose, the “value required to balance the common balance sheet” should be taken equal to (liabilities – assets (excluding sponsor support and pension protection schemes) on the stressed common balance sheet). This sub-condition would be fulfilled if the value required to balance the stressed common balance sheet would not exceed the maximum value of sponsor support. The liability should be the value of the liabilities in the common balance sheet.
- 3.6.39. If these two sub-conditions are fulfilled, sponsor support can be included in the common balance sheet as a balancing item.

Balancing item - Condition 2

- 3.6.40. Under this condition, the IORP should assess whether the maximum value of sponsor support (or the equivalent in the case of multi-employer IORPs) is larger than twice the value (of sponsor support) required to balance the stressed common balance sheet. For this purpose, the “value required to balance the stressed common balance sheet” should be taken equal to (liabilities – assets (excluding sponsor support and pension protection schemes) on the stressed common balance sheet). The liability should be the value of the liabilities in the common balance sheet.
- 3.6.41. If this condition is fulfilled, sponsor support can be included in the common balance sheet as a balancing item.

Simplified calculation of the maximum value of sponsor support

- 3.6.42. In general, valuing maximum sponsor support will involve valuing two broad components:

- (a) the wealth (or surplus) of the sponsor currently available for the IORP;
- (b) the wealth which can be foreseen to be made available for the IORP through future cash flows of the sponsor.

- 3.6.43. As a simplification, IORPs may take an approach that combines the valuation of these two areas accounting for any appropriate adjustments for double counting – for example where items valued on the balance sheet of the sponsor are present values of items included in future cash flow projections.
- 3.6.44. A helper spreadsheet is available to carry out the simplified calculation of maximum sponsor support using the below mentioned inputs.
- 3.6.45. The value of the inputs is should be determined by the IORPs considering what is the most appropriate for their sponsors. Also, there are differing metrics which IORPs may use for the current and future wealth (e.g. EBITDA, profits before taxes (PBT), shareholder funds). For non-profit or charitable sponsors, 'operating profit' type metrics may need to be replaced with 'operating surplus' metrics.
- 3.6.46. When using metrics from the sponsor's accounts, there may be a time lag between the reporting date of the sponsor's accounts and the valuation date of the common balance sheet. IORPs may ignore this unless there is evidence that the metrics require significant adjustment to allow for events having occurred since the data was reported. IORPs should use expert judgement in these scenarios as to how to adjust the data.
- 3.6.47. The maximum value of sponsor support (M_{ss}) can be derived as follows:

$$M_{ss} = \text{Min}(\text{Lim}M_{ss}; \sum_{t=1}^d i_t \cdot EC_t + (\xi \cdot z + y))$$

with the following inputs:

d = The expected duration of settlement of the sponsor support (when needed), i.e. the number of future years for which sponsor support cash flows are included in the assessment. This duration should correspond to the time (in years) the sponsor will have to pay to the IORP the full amount of required support. As a simplification, this could be set equal to the value of the average duration of the projected outgoing cash flows of the IORP relating to obligations as at the valuation date.

i_t = Discount factor for year t .

EC_t = Expected sponsor cash flow at year t . This figure should be the sum of:

- (i) current recovery plan contributions extended to year d ;
- (ii) a fixed percentage (which may be set to zero) of the expected future cash flows (e.g. EBITDA, PBT) from the current year to year d , adjusting for any double counting.

Z = The wealth (or surplus) of the sponsor (e.g. shareholder funds).

ξ = Proportion of this wealth that is available for the IORP (which may be set to zero).

y = The value of the liabilities already accounted for in the sponsor accounts (using IFRS where applicable or the national accounting standards).

$\text{Lim}M_{ss}$ = Any contractual limit on the maximum value of sponsor support available. If there is no limit, this value can be ignored.

Simplifications for the valuation of sponsor support

- 3.6.48. In principle, IORPs should perform their own calculations using a stochastic modelling approach. However, EIOPA recognises that many IORPs may not have access to such modelling techniques, or it may be too burdensome or costly to apply such an approach. IORPs may therefore develop their own simplified approaches consistent with the principles for valuation of sponsor support. These specifications also provide a number of simplified modelling approaches.
- 3.6.49. These simplifications, which are described in detail below, are:
- Simplification 1 – Simplified distribution approach
 - Simplification 2 – Deterministic cash flow approach
 - Simplification 3 – Alternative Simplified Approach (ASA)
- 3.6.50. For the first two of these approaches the maximum value of sponsor support is used as an input so that the ability of the sponsor to afford those payments is taken into account. IORPs should therefore ensure that the payments modelled are affordable to avoid overstating the valuation of sponsor support. For the calculation of maximum sponsor support see paragraph 3.6.24 and following.
- 3.6.51. The Alternative Simplified Approach does not require the use of maximum sponsor support since it takes into account the affordability position of the sponsor implicitly in the model.
- 3.6.52. These simplifications represent a standard methodology for valuing sponsor support and the individual circumstances of employers and IORPs can differ. If the IORP considers that these simplifications will lead to a significant misestimating of the value of sponsor support, due to a particular characteristic of the sponsor support arrangement or the sponsor itself that are not appropriately reflected, the IORP should carry out its own valuation of sponsor support, which should be consistent with the general principles set out in this section.

Simplified distribution approach to the valuation of sponsor support

- 3.6.53. This simplification uses the value of the assets and technical provisions on the common balance sheet and the maximum sponsor support to derive an estimate for sponsor support allowing for assumptions (within the simplification model) for the modelled volatility of the results. In carrying out this calculation a spreadsheet is provided by EIOPA meaning that IORPs should only provide the inputs.
- 3.6.54. This method is based on the following calculations⁷:
- Step 1: calculation of the estimated probability distribution of the eventual need for sponsor support in a run-off situation (= the final value of all payments made to the beneficiaries – the final value of all assets used to pay the pensions).
 - Step 2: calculation of the estimated probability distribution of the actual support provided by the sponsor to the IORP, conditional on an absence of

⁷ For a more elaborate description see Technical Specifications Quantitative Assessment of Further Work on Solvency of IORPs (EIOPA-BoS-15/070v2), Annex 1, <https://eiopa.europa.eu/Pages/Financial-stability-and-crisis-prevention/Occupational-pensions-stress-test-2015.aspx>

default of the sponsor. This distribution is obtained from the distribution in step 1 by applying:

- (i) a cap equal to the maximum sponsor support as calculated above;
- (ii) a floor equal to 0, if and only if the sponsor is never able to reduce its future contributions nor to take some assets back from the IORP, even in overfunding situations.

Step 3: calculation of the expected value of support received from the sponsor, without accounting for the default probability of the sponsor.

Step 4: the value obtained in step 3 is adjusted for the default risk of the sponsor, taking into account the expected timeframe of payment of the sponsor support (under the assumption that annual payments are all equal), the annual probability of default of the sponsor, and the recovery rate in case of default of the sponsor.

- 3.6.55. If the sponsor cannot, in any case, withdraw any assets from the IORP, nor suspend its contribution to the IORP in case of overfunding, then the market consistent/fair value of the sponsor support to the IORP (SS_{fv}) is given by the following formula:

$$SS_{fv} = SS_{exp} \cdot Adj_{def}$$

where

$$SS_{exp} = \mu_{ss} + Adj_{exp}$$

$$\mu_{ss} = TP - A$$

$$\sigma_{ss} = \sqrt{(\sigma_A \cdot A)^2 + (\sigma_{TP} \cdot TP)^2 - 2\rho \cdot A \cdot TP \cdot \sigma_A \cdot \sigma_{TP}}$$

$$Adj_{exp} = - \left[(\mu_{ss} - M_{ss}) \cdot \left(1 - \Phi \left(\frac{M_{ss} - \mu_{ss}}{\sigma_{ss}} \right) \right) + \sigma_{ss} \cdot \varphi \left(\frac{M_{ss} - \mu_{ss}}{\sigma_{ss}} \right) \right] - \left[\mu_{ss} \cdot \Phi \left(-\frac{\mu_{ss}}{\sigma_{ss}} \right) - \sigma_{ss} \cdot \varphi \left(\frac{\mu_{ss}}{\sigma_{ss}} \right) \right]$$

and

$$Adj_{def} = \frac{1}{d} \left[(1 - RR)(1 - p_{def}) \left(\frac{1 - (1 - p_{def})^d}{p_{def}} \right) + d \cdot RR \right]$$

Φ and φ are respectively the cumulative and non-cumulative Gaussian distribution functions with average 0 and variance 1.

- 3.6.56. If the sponsor can, in some cases, withdraw assets from the IORP, or suspend its contribution to the IORP (for instance in cases of overfunding), the same formula as above should be used, but using the following value for Adj_{exp} .

$$Adj_{exp} = - \left[(\mu_{ss} - M_{ss}) \cdot \left(1 - \Phi \left(\frac{M_{ss} - \mu_{ss}}{\sigma_{ss}} \right) \right) + \sigma_{ss} \cdot \varphi \left(\frac{M_{ss} - \mu_{ss}}{\sigma_{ss}} \right) \right]$$

3.6.57. This method requires the following input:

TP : the value of technical provisions, calculated according to sections 3.2-3.4.

A : the market value of assets, excluding sponsor support and pension protection schemes, valued according to section 3.9.

If part of assets is needed to cover liabilities other than technical provisions, IORPs should adjust the value of assets accordingly.

σ_A : the relative standard deviation of assets.

This factor corresponds to the ratio between the standard deviation of the value of assets and the value of assets itself. The relative standard deviation (RSD) value should be positive. The relative standard deviation depends on the actual composition of the assets:

- for a pure risk free asset, the RSD is 0;
- for a fixed income bond, it might be between 0 and 25%, depending on the rating of the bond;
- for equity, it might be between 40% and 60%.

IORPs should derive the appropriate value depending on their assets. Alternatively, IORPs can use a value of 30%.

σ_{TP} : the relative standard deviation of technical provisions.

This factor corresponds to the ratio between the standard deviation of technical provisions and technical provisions itself. The RSD value should be positive. The relative standard deviation should take into account all elements of uncertainty in technical provisions, including:

- actual mortality rates vs. assumed rates used for the calculation of technical provisions;
- sampling error;
- actual rates of expense vs. assumed rates used for the calculation of technical provisions;
- loss sharing and conditional benefits;

IORPs can use a default value of 10%.

σ_{ss} : the relative standard deviation of support needed (support needed defined as the difference between the assumed target level and the level of assets, this is calculated automatically by the provided spreadsheet)

ρ : the expected correlation between assets and liabilities.

This factor, between -100% and 100%, aims at capturing how the value of assets and pension liabilities vary together.

- For a DB scheme without any possibility of reduction of benefits, this parameter should be 0.
- For a pure DC scheme, this value should be 100%.
- For DB schemes with some conditional or discretionary benefits, the value should be in-between, depending on the part of variance of technical provisions explained by financial profit sharing within the global variance of technical provisions. IORPs can use a default value of 30%.

M_{ss} : the maximum value of sponsor support.

d : the expected duration of settlement of the sponsor support (when needed).

It should be the same as the one used in the simplified calculation of maximum sponsor support (see paragraph 3.6.42 and following).

p_{def} : the annual probability of default of the sponsor.

RR : the expected recovery rate of sponsor support in case of default of the sponsor (see paragraph 3.6.22).

Simplified deterministic approach to the valuation of sponsor support

3.6.58. This simplification is designed to provide a methodology for valuing sponsor support by taking the probability weighted average of future cash flows, where the only source of uncertainty is the default risk of the sponsor. This generates a probability tree in which each year the sponsor may default or not default. In carrying out this calculation a spreadsheet is provided by EIOPA meaning that IORPs should only provide the inputs for the calculation.

3.6.59. For this valuation, returns on all assets are assumed to be equal to the risk-free interest rate.

3.6.60. Sponsor contributions and restitutions are assumed to be symmetric, i.e. the sponsor contributes to recover shortfalls, but also receives any surpluses. This does not necessarily mean that the sponsor should be able to claim surpluses at any given time. A sufficient condition is that surpluses are ultimately reimbursed.

3.6.61. The market value of sponsor support is derived by taking the probability-weighted average of the discounted value of payments to the IORP during the duration of the settlement in the event the sponsor does and does not default. The annual payment to the IORP is assumed to be a constant annuity in present value terms to recover the shortfall in assets given the discount rate and the duration of the settlement.

3.6.62. The market value of sponsor support (SS_{FV}) is determined by the following formula:

$$SS_{FV} = (TP - A) \sum_{t=1}^d (1 - p_{def})^t \frac{1}{d} + (1 - p_{def})^{t-1} p_{def} RR \left[1 - \frac{t-1}{d} \right]$$

3.6.63. If the calculated value of unlimited sponsor support exceeds the maximum value of sponsor support then the market value should be set equal to the maximum value.

3.6.64. This method requires the following inputs:

TP: the value of technical provisions, calculated according to sections 3.2-3.4.

A: the market value of assets, excluding sponsor support and pension protection schemes, valued according to section 3.9.

If part of assets is needed to cover liabilities other than technical provisions, IORPs should adjust the value of assets accordingly.

d: the expected duration of settlement of the sponsor support.

It should be the same as the one used in the simplified calculation of maximum sponsor support (see paragraph 3.6.42 and following).

p_{def} : the annual probability of default of the sponsor.

RR : the expected recovery rate of sponsor support in case of default of the sponsor (see paragraph 3.6.22).

Mss : the maximum value of sponsor support.

Alternative simplified approach to the valuation of sponsor support

3.6.65. This simplification is designed to provide a methodology for valuing sponsor support based on an alternative approach to assessing the adjustment to be made for sponsor credit risk using sponsor credit ratios. The aim of this simplified approach is to provide IORPs – in particular small and medium-sized ones – with a practical and proportionate tool to do a sponsor support valuation.

3.6.66. The method as set out is applicable to IORPs with unlimited sponsor support, since the calculation is based on the shortfall between the assets and the technical provisions. However it could be adapted by IORPs who have limited sponsor support by reducing the value of the shortfall to be met by the sponsor support in the light of any legal or contractual limit.

3.6.67. Under this simplification, there is no need to:

(a) Calculate a maximum value of sponsor support; or

(b) Use external credit ratings to determine probabilities of default.

3.6.68. To carry out this calculation, EIOPA has provided a helper spreadsheet, so IORPs only have to insert the required inputs

3.6.69. This simplification consists of the following stages. IORPs should only provide the input data as in paragraph 3.6.76 and 3.6.77 below.

Stage 1

3.6.70. IORPs should use financial credit ratio techniques to assess the strength of the sponsor support relative to their financial obligations as valued in the common balance sheet on a six-step credit quality scale from "very strong" to "very weak".

3.6.71. The helper spreadsheet sets out a simplified way of doing this, using only four data input items which then are used to calculate the required two ratios and from these then derive the assessment on the 1-6 scale.

3.6.72. IORPs may consider that the specific ratios do not lead to a suitable assessment of their sponsor. The helper tab allows IORPs to choose and insert a scale value themselves.

Sponsor Strength – Credit ratio matrix							
		Income cover					
		<1	1x	3x	5x	7x	9x+
Asset Cover	9x+	Strong	Strong	Strong	Very Strong	Very Strong	Very Strong
	7x	Medium strong	Medium strong	Strong	Strong	Very Strong	Very Strong
	5x	Medium	Medium strong	Medium strong	Strong	Strong	Very Strong

	3x	Weak	Medium	Medium strong	Medium strong	Strong	Strong
	1x	Very Weak	Weak	Medium	Medium strong	Medium strong	Strong
	<1x	Very Weak	Very Weak	Weak	Medium	Medium strong	Strong

Stage 2

3.6.73. Based on that scale value for the strength of the sponsor, the helper spreadsheet calculates a factor which can be applied to the shortfall in the common balance sheet to allow for the credit risk of the sponsor. This is done by:

- Setting the period over which the sponsor could reasonably afford to make the payments to meet the required funding level. For very strong sponsors, this is a very short period. For very weak sponsors, this is assumed to be a longer period.
- Setting the assumed annual probability of default for the sponsor, i.e. the probability that the sponsor will not pay the contributions to the IORP.
- Calculating the level of annual contributions required to meet the required funding level. If this gives rise to an inappropriate level of annual contributions (e.g. because local regulations do not allow contributions above or below pre-defined limits) then the assumed period for these contributions can be adjusted
- Calculating the value of sponsor support as the present value of these contributions, adjusted to allow for the default risk of the sponsor.

3.6.74. The table above summarises these factors and the resulting reduction in the sponsor support to allow for credit risk.

3.6.75. The helper spreadsheet can in principle be used to assess any extra value of support available from any other entities that the legal sponsor may be associated with (e.g. parent companies), by changing the shortfall in the common balance sheet to the amount not covered by the legally enforceable sponsor support and assessing the value which may be available from such other sources.

Input

3.6.76. Required inputs:

To assess the strength of the sponsor the following data input items are required (IORPs may use expert judgement in selecting the most suitable metrics for this purpose). When using metrics from the sponsor's accounts, there may be a time lag between the reporting date of the sponsor's accounts and the valuation date of the common balance sheet. IORPs may ignore this unless there is evidence that the metrics require significant adjustment to allow for events having occurred since the sponsor data was reported. IORPs should use expert judgement in these scenarios as to how to adjust the data.

3.6.77. Net cash flow (PBT may be used or another equivalent measure of cash flow depending on the nature of the IORP's sponsor):

- Annual service cost (including interest on debt, rental payments, and the IORP deficit reduction contributions);
- Net Asset value of the sponsor (e.g. shareholder funds);

- (c) Deficit (shortfall between the assets, excluding sponsor support and pension protection schemes, and the technical provisions).

Output

- 3.6.78. The simplification produces the value of sponsor support in the common balance sheet.

Calculation

- 3.6.79. As stated above, the helper spreadsheet uses the accounting and IORP funding data to calculate the strength of the sponsor on a scale from 1 to 6 (i.e. from "Strong" to "Very Weak").
- 3.6.80. That scale score then defines the other key assumptions for the assumed default probability for the sponsor and the recovery plan period. Those assumptions are then used, together with the discount rates from the yield curve, to calculate the haircut to be applied to the implied recovery plan needed to meet the level of underfunding on the common balance sheet.
- 3.6.81. The table below shows the assumptions used and the level of the haircut based on assuming a discount rate of 3%. The relevant yield curve will be used in the helper tab so the resulting haircuts may differ slightly from those shown in this table.

Credit quality step	Definition	Recovery Plan period (years)	Annual probability of insolvency (%)	Value of Sponsor Support as % of common balance sheet financial shortfall (%)
1	Very strong	3	0.1	99.9
2	Strong	3	0.2	99.7
3	Medium strong	5	0.5	98.8
4	Medium	10	1.6	92.9
5	Weak	20	4.5	68.3
6	Very Weak	30	26.8	14.7

3.7. Pension protection schemes

Principle 20

- 3.7.1. Pension protection schemes should be recognised as an asset on the common balance sheet and valued on a market consistent basis by taking the probability-weighted average of discounted future cash flows to be paid by the pension protection scheme to support the protected level of benefits.
- 3.7.2. Where a pension protection scheme does not cover full members' benefits it cannot provide certainty that the full benefits will be paid, but only provides for certainty that a defined minimum level (the protected level) of benefits will be paid. Benefits above those payable by the pension protection scheme are then only payable based on the availability and limitation of the IORPs other assets and security mechanisms.
- 3.7.3. This would mean that the members' benefits between those covered by the pension protection scheme and those that would be paid if the pension

protection scheme was not required, are conditional on the availability of other assets and security mechanisms, consistent with the definition of 'conditional benefits'.

Valuation of a pension protection scheme

3.7.4. In principle, the valuation should take into account:

- (a) The probability of default of the sponsor, as derived for the valuation of sponsor support;
- (b) The level of benefits the pension protection schemes guarantees in the event of default of the sponsor;
- (c) The level of funding of the IORP at the time of default of the sponsor, i.e. assets, excluding sponsor support and pension protection schemes, plus recoverables from the sponsor, as derived for the valuation of sponsor support.

3.7.5. The value of future benefits guaranteed by the pension protection scheme at the time of default of the sponsor can be approximated by reference to the value of technical provisions. For example, if the pension protection scheme guarantees benefits for a full 100% then the present value equals the value of technical provisions. If the pension protection scheme guarantees benefits for (say) 90% then the present value equals 90% of the value of technical provisions at that time. In the valuation of technical provisions, the scenarios in which benefits below the full value are paid are taken into account in the best estimate of the liabilities.

Pension protection scheme as a balancing item

3.7.6. A pension protection scheme that guarantees 100% of benefits should be recognised as a balancing item on the common balance sheet, provided it fulfils the following criteria with regard to:

- (a) The certainty and permanence of the legal arrangement of the pension protection scheme: The legal arrangement could be considered certain, if it is based on national law and if the protection provided by the pension protection scheme is legally enforceable. The payment of contributions/levies to the pension protection scheme should be legally enforceable by the pension protection scheme, with no possibility of those required to pay those contributions/levies to "opt out" of the protection provided by the pension protection scheme and the obligation to pay contributions/levies. If the legal arrangement is based on national law then it should also be considered sufficiently permanent, because national law cannot be changed by the parties involved in the arrangement, but only by the appropriate national body (usually parliament), which will consider possible effects on members and beneficiaries, IORPs, and sponsors;
- (b) The financial strength of the pension protection scheme: A pension protection scheme should be considered financially strong, if the pension protection scheme can enforce the payment of levies/contributions and if the financial strength of the sponsors obliged to pay those levies/contributions is considered high (e.g. because those sponsors represent a large part of a national economy, which is considered itself as strong).

Simplified calculation of the value of pension protection scheme

3.7.7. IORPs may use the following simplification to determine the value of the pension protection scheme.

3.7.8. This valuation follows the principles used in the deterministic valuation of sponsor support (Simplification 2) and a helper spreadsheet is provided

meaning that only the inputs are required from IORPs.

3.7.9. The market value of the pension protection scheme equals the sum over time of the (cumulative) probability of sponsor default multiplied by the value of payments to be made by the pension protection scheme if that occurs. The value of these payments is equal to the value of benefits covered – approximated by the coverage rate multiplied by the value of technical provisions – minus the initial value of assets, excluding sponsor support and pension protection schemes, the sponsor payments made prior to default and the funds recovered from the sponsor after default. The value of payments to be made by the pension protection scheme cannot be negative. If the total value of assets, excluding sponsor support and pension protection schemes, after default exceeds the value of benefits covered then no payments have to be made by the pension protection scheme.

3.7.10. The market value (fair value) of the pension protection scheme (PPF_{FV}) is determined by the following formula:

$$PPF_{FV} = \sum_{t=1}^d (1 - p_{def})^{t-1} p_{def} \cdot \max \left[CR TP - \left\{ A + \frac{t-1}{d} (TP - A) + RR(TP - A) \left(1 - \frac{t-1}{d} \right) \right\}; 0 \right]$$

3.7.11. The formula does not take into account the possible default of the sponsor through limiting the value of sponsor support to the maximum value of sponsor support. However, the helper spreadsheet implementing this simplification increases the value of the pension protection scheme with the amount by which the value of sponsor support was capped through the imposition of maximum sponsor support, taking into account the coverage rate of the pension protection scheme.

3.7.12. This simplification requires one input in addition to the inputs needed in the Simplification 2 for a deterministic valuation of sponsor support:

CR: the coverage rate of the pension protection scheme.

For example, if the pension protection scheme guarantees 90% then the coverage rate equals 90%. If the amount payable from the pension protection scheme changes over time or if the pension protection scheme guarantees a fixed percentage but limits the amount payable in other ways, IORPs can allow for this using a suitable approximation method.

3.8. Recoverables from (re)insurance contracts and special purpose vehicles (SPVs)

Principle 21

3.8.1. IORPs should include the value of recoverables from (re)insurance contracts and special purpose vehicles as an asset on the common balance sheet.

3.8.2. As set out under Principle 8 the best estimate of the technical provisions should be calculated gross, without deduction of the amounts recoverable from reinsurance contracts and special purpose vehicles. Those amounts should be calculated separately, in accordance with this section. The result from that calculation should be adjusted to take account of expected losses due to default of the counterparty. That adjustment should be based on an assessment of the probability of default of the counterparty and the average loss resulting therefrom (loss-given-default).

Calculation of amounts recoverable

- 3.8.3. The calculation by IORPs of amounts recoverable from (re)insurance contracts and special purpose vehicles should follow the same principles and methodology for the calculation of technical provisions.
- 3.8.4. There is no need however to calculate a risk margin for amounts recoverable from (re)insurance contracts and special purpose vehicles because only one net calculation of the risk margin should be performed, rather than two separate calculations (i.e. one for the risk margin of the technical provisions and one for the risk margin of recoverables from (re)insurance contracts and special purpose vehicles).
- 3.8.5. When calculating amounts recoverable from (re)insurance contracts and special purpose vehicles, IORPs should take account of the time difference between recoveries and direct payments.
- 3.8.6. Where for certain types of (re)insurance and special purpose vehicles, the timing of recoveries and that for direct payments of IORP markedly diverge, this should be taken into account in the projection of cash flows. Where such timing is sufficiently similar to that for direct payments, the IORP should have the possibility of using the timing of direct payments.
- 3.8.7. The amounts recoverable from (re)insurance contracts and special purpose vehicles should be calculated consistently with the rules on benefits and contributions to be included in cash flows relevant for the contracts to which the amounts recoverable from (re)insurance contracts and special purpose vehicle relate.
- 3.8.8. For the purpose of calculating the amounts recoverable from (re)insurance contracts and special purpose vehicles, the cash flows should only include payments in relation to compensation of pension obligations. Other payments should not be accounted as amounts recoverable from (re)insurance contracts and special purpose vehicles. Where a deposit has been made for the mentioned cash flows, the amounts recoverable should be adjusted accordingly to avoid a double counting of the assets and liabilities relating to the deposit.
- 3.8.9. Debtors and creditors that relate to settled claims of members or beneficiaries should not be included in the recoverable.
- 3.8.10. A compensation for past and future benefits should only be taken into account to the extent it can be verified in a deliberate, reliable and objective manner.
- 3.8.11. Expenses which the IORP incurs in relation to the management and administration of (re)insurance and special purpose vehicle contracts should not be included in the recoverables but instead be allowed for in the best estimate, calculated gross, without deduction of the amounts recoverable from (re)insurance contracts and special purpose vehicles.

Counterparty default adjustment

- 3.8.12. The result from the calculation of the previous section should be adjusted to take account of expected losses due to default of the counterparty. That adjustment should be calculated separately by counterparty and should be based on an assessment of the probability of default (including as a result of insolvency or dispute) of the counterparty and the average loss resulting there from (loss-given-default). For this purpose, the change in cash flows should not take into account the effect of any risk mitigating technique that mitigates the credit risk of the counterparty, other than risk mitigating techniques based on collateral holdings. The risk mitigating techniques that are not taken into

account should be separately recognised without increasing the amount recoverable from (re)insurance contracts and special purpose vehicles.

- 3.8.13. The adjustment should be calculated as the present value of the change in cash flows underlying the amounts recoverable from that counterparty, resulting from a default of the counterparty at a certain point in time.

Probability of default (PD)

- 3.8.14. The determination of the adjustment for counterparty default should take into account possible default events over the lifetime of the rights arising from the corresponding (re)insurance contract or special purpose vehicle, i.e. during the whole run-off period of the recoverables, and the dependence on time of the probability of default.
- 3.8.15. In particular, if the run-off period of the recoverables is longer than one year, then it is not sufficient to multiply the expected loss in case of immediate default of the counterparty with the probability of default over the following year in order to determine the adjustment.
- 3.8.16. Such an approach is not appropriate because it ignores the risk that the counterparty may – after surviving the first year – default at a later stage during the run-off of the recoverables.

Example

For example, let the recoverables towards a counterparty correspond to deterministic payments of C_1 , C_2 , C_3 in one, two and three years respectively. Let PD_t be the probability that the counterparty defaults during year t . Furthermore, we assume that the counterparty will only be able to make 40% of the further payments in case of default (i.e. its recovery rate is 40%). For the sake of simplicity, this example does not consider the time value of money (However, its allowance, would not change the fundamental conclusions of the example). Then the losses-given-default are as follows:

<i>Default during year</i>	<i>Loss-given-default</i>
<i>1</i>	<i>$-60\% \cdot (C_1 + C_2 + C_3)$</i>
<i>2</i>	<i>$-60\% \cdot (C_2 + C_3)$</i>
<i>3</i>	<i>$-60\% \cdot C_3$</i>

For instance, in year two the value of the recoverables is equal to $C_2 + C_3$. If the counterparty defaults in year two the value of the recoverables changes from $C_2 + C_3$ to $40\% \cdot (C_2 + C_3)$. As 60% of the recoveries are lost, the loss-given-default is $-60\% \cdot (C_2 + C_3)$.

The adjustment for counterparty default in this example is the following:

$$Adj_{CD} = PD_1 \cdot (-60\% \cdot (C_1 + C_2 + C_3)) + PD_2 \cdot (-60\% \cdot (C_2 + C_3)) + PD_3 \cdot (-60\% \cdot C_3)$$

- 3.8.17. The assessment of the probability of default and the loss-given-default of the counterparty should be based upon current, reliable and credible information. Among the possible sources of information are: credit spreads, credit quality steps, information relating to the supervisory solvency assessment, and the financial reporting of the counterparty.
- 3.8.18. In the case of recoverables from a SPV, the probability of default of the SPV should be calculated according to the average credit quality step of assets held by the SPV, unless there is a reliable basis for an alternative calculation. When

the IORP has no reliable source to estimate its probability of default, (f.i. in the absence of a credit quality step) it should determine the probability of default as follows:

- (a) SPV authorised under EU regulations: the probability of default should be calculated according to the average rating of assets and derivatives held by the SPV in guarantee of the recoverable.
- (b) Other SPV where they are recognised as equivalent to those authorized under EU regulations: same treatment as in the case referred above.
- (c) Other SPV: They should be considered as unrated.

- 3.8.19. Where possible in a reliable, objective and prudent manner, point-in-time estimates of the probability of default should be used for the calculation of the adjustment. In this case, the assessment should take the possible time-dependence of the probability of default into account.
- 3.8.20. A usual assumption about probabilities of default is that they are not constant over time. In this regard it is possible to distinguish between point-in-time estimates which try to determine the current default probability and through-the-cycle estimates which try to determine a long-time average of the default probability.
- 3.8.21. In many cases only through-the-cycle estimates may be available. For example, the credit quality steps of rating agencies are usually based on through-the-cycle assessments. Moreover, the sophisticated analysis of the time dependence of the probability of default may be disproportionate in most cases. Hence, through-the-cycle estimates might be used if point-in-time estimates cannot be derived in a reliable, objective and prudent manner or their application would not be in line with the proportionality principle. If through-the-cycle estimates are applied, it can usually be assumed that the probability of default does not change during the run-off of the recoverables.
- 3.8.22. The assessment of the probability of default should take into account the fact that the cumulative probability increases with the time horizon of the assessment, f.i. the probability that the counterparty defaults during the next two years is higher than the probability of default during the next year.
- 3.8.23. Often, only the probability of default estimate PD during the following year is known.
- 3.8.24. If the probability is expected to be constant over time, then the probability PD_t that the counterparty defaults during year t can be calculated as $PD_t = PD \cdot (1 - PD)^{t-1}$.

Recovery rate (RR)

- 3.8.25. The recovery rate is the share of the debts that the counterparty will still be able to honour in case of default.
- 3.8.26. If no reliable estimate of the recovery rate of a counterparty is available, no rate higher than 50% should be used.
- 3.8.27. The degree of judgement that can be used in the estimation of the recovery rate should be restricted, especially where owing to a low number of defaults, little empirical data about this figure in relation to reinsurers is available, and hence, estimations of recovery rates are unlikely to be reliable.
- 3.8.28. The average loss resulting from a default of a counterparty should include an estimation of the credit risk of any risk-mitigating instruments that the counterparty provided to the IORP.

3.8.29. However, IORPs should consider the adjustment for the expected default losses of these mitigating instruments, i.e. the credit risk of the instruments as well as any other risk connected to them should also be allowed for. This allowance may be omitted where the impact is not material. To assess this materiality it is necessary to take into account the relevant features, such as the period of effect of the risk mitigating instrument.

Simplified calculation of the counterparty default adjustment

3.8.30. IORPs may calculate the adjustment for expected losses due to default of the counterparty for a specific counterparty and homogeneous risk group to be equal as follows:

$$Adj_{CD} = -\max\left(0.5 \cdot \frac{PD}{1 - PD} \cdot Dur_{mod} \cdot BE_{rec}; 0\right)$$

where:

- (a) PD denotes the probability of default of that counterparty during the following 12 months;
- (b) Dur_{mod} denotes the modified duration of the amounts recoverable from (re)insurance contracts with that counterparty in relation to that homogeneous risk group;
- (c) BE_{rec} denotes the amounts recoverable from (re)insurance contracts with that counterparty in relation to that homogeneous risk group.

3.8.31. In case an alternative method is used for the adjustment for recoverables, IORPs should be able to provide a clear description of this alternative method.

3.9. Valuation of other assets and liabilities other than technical provisions and security mechanisms

Principle 22

- 3.9.1. IORPs should value other assets and other liabilities on a market-consistent basis. No subsequent adjustment should be made to take account of the change in the own credit standing of the IORP when valuing financial liabilities.
- 3.9.2. IORPs should value other assets and other liabilities based on the assumption that the IORP will provide occupational retirement benefits as a going concern.
- 3.9.3. IORPs should value each individual asset and each individual liability separately.

Valuation methodology

- 3.9.4. IORPs should recognise and value assets and liabilities other than technical provisions and security mechanisms in conformity with international accounting standards endorsed by the Commission in accordance with Regulation (EC) No 1606/2002⁸ provided that those standards include valuation methods that are consistent with the valuation approach set out in paragraph 3.9.1. Where those standards allow for the use of more than one valuation method, only valuation methods that are consistent with paragraph 3.9.1 can be used.
- 3.9.5. Where the valuation methods included in these international accounting standards are either temporarily or permanently not consistent with the

⁸ Regulation (EC) No 1606/2002 of the European Parliament and of the Council of 19 July 2002 on the application of international accounting standards, OJ L 243, 11.9.2002, p. 1.

valuation approach set out in paragraph 3.9.1, IORPs should use other valuation methods that have been deemed to be consistent with paragraph 3.9.1.

- 3.9.6. By way of derogation from paragraph 3.9.4, and in particular by respecting the principle of proportionality, IORPs may recognise and value an asset or a liability based on the valuation method it uses for preparing its annual or consolidated financial statements provided that:
- (a) the valuation method is consistent with paragraph 3.9.1;
 - (b) the valuation method is proportionate with respect to the nature, scale and complexity of the risks inherent in the business of the IORP;
 - (c) the IORP does not value that asset or liability using international accounting standards endorsed by the Commission in accordance with Regulation (EC) No 1606/2002 in its financial statements;
 - (d) valuing assets and liabilities using international accounting standards would impose costs on the IORP that would be disproportionate with respect to the total administrative expenses.

Valuation hierarchy

- 3.9.7. IORPs should, when valuing assets and liabilities in accordance with paragraphs 3.9.4-3.9.5, follow the valuation hierarchy set out in paragraphs 3.9.8-3.9.13 below, taking into account the characteristics of the asset or liability where market participants would take those characteristics into account when pricing the asset or liability at the valuation date, including the condition and location of the asset or liability and restrictions, if any, on the sale or use of the asset.
- 3.9.8. As the default valuation method IORPs should value assets and liabilities using quoted market prices in active markets for the same assets or liabilities.
- 3.9.9. Where the use of quoted market prices in active markets for the same assets or liabilities is not possible, IORPs should value assets and liabilities using quoted market prices in active markets for similar assets and liabilities with adjustments to reflect differences. Those adjustments should reflect factors specific to the asset or liability including all of the following:
- (a) the condition or location of the asset or liability;
 - (b) the extent to which inputs relate to items that are comparable to the asset or liability; and
 - (c) the volume or level of activity in the markets within which the inputs are observed.
- 3.9.10. The use of quoted market prices should be based on the criteria for active markets, as defined in international accounting standards endorsed by the Commission in accordance with Regulation (EC) No 1606/2002.
- 3.9.11. Where the criteria referred to in paragraph 3.9.10 are not satisfied, IORPs should, unless otherwise stated, use alternative valuation methods.
- 3.9.12. When using alternative valuation methods, IORPs should rely as little as possible on IORP-specific inputs and make maximum use of relevant market inputs including the following:
- (a) quoted prices for identical or similar assets or liabilities in markets that are not active;

- (b) inputs other than quoted prices that are observable for the asset or liability, including interest rates and yield curves observable at commonly quoted intervals, implied volatilities and credit spreads;
- (c) market-corroborated inputs, which may not be directly observable, but are based on or supported by observable market data.

All those market inputs should be adjusted for the factors referred to in paragraph 3.9.9.

To the extent that relevant observable inputs are not available including in circumstances where there is little, if any, market activity for the asset or liability at the valuation date, IORPs should use unobservable inputs reflecting the assumptions that market participants would use when pricing the asset or liability, including assumptions about risk. Where unobservable inputs are used, IORPs should adjust IORP-specific data if reasonable available information indicates that other market participants would use different data or there is something particular to the IORP that is not available to other market participants.

When assessing the assumptions about risk referred to in this paragraph IORPs should take into account the risk inherent in the specific valuation technique used to measure fair value and the risk inherent in the inputs of that valuation technique.

3.9.13. IORPs should use valuation techniques that are consistent with one or more of the following approaches when using alternative valuation methods:

- (a) market approach, which uses prices and other relevant information generated by market transactions involving identical or similar assets, liabilities or groups of assets and liabilities. Valuation techniques consistent with the market approach include matrix pricing.
- (b) income approach, which converts future amounts, such as cash flows or income or expenses, to a single current amount. The fair value should reflect current market expectations about those future amounts. Valuation techniques consistent with the income approach include present value techniques, option pricing models and the multi-period excess earnings method;
- (c) cost approach or current replacement cost approach reflects the amount that would be required currently to replace the service capacity of an asset. From the perspective of a market participant seller, the price that would be received for the asset is based on the cost to a market participant buyer to acquire or construct a substitute asset of comparable quality adjusted for obsolescence.

Recognition and valuation of contingent liabilities

3.9.14. IORPs should recognise contingent liabilities in accordance with the general principles outlined in paragraphs 3.9.4-3.9.6 if they are material.

3.9.15. Contingent liabilities are material if information about the current or potential size or nature of those liabilities could influence the decision-making or judgement of the intended user of that information, including CAs.

3.9.16. The value of contingent liabilities should be equal to the expected present value of future cash flows required to settle the contingent liability over the lifetime of that contingent liability, using the basic risk-free interest rate term structure.

Valuation of goodwill and other intangible assets

3.9.17. IORPs should value the following assets at zero:

- (a) goodwill;
- (b) intangible assets, other than goodwill, unless the intangible asset can be sold separately and the IORP can demonstrate that there is a value for the same or similar assets that has been derived in accordance with paragraph 3.9.8, in which case the asset should be valued in accordance with paragraphs 3.9.7-3.9.13.

Valuation of financial liabilities

- 3.9.18. IORPs should value financial liabilities, as referred to in international accounting standards endorsed by the Commission in accordance with Regulation (EC) No 1606/2002, in accordance with paragraphs 3.9.4-3.9.6 upon initial recognition. There should be no subsequent adjustment to take account of the change in own credit standing of the IORP after initial recognition.

Recognition and valuation of deferred taxes

- 3.9.19. IORPs should recognise and value deferred taxes in relation to all assets and liabilities including technical provisions that are recognised for solvency or tax purposes in conformity with paragraphs 3.9.4-3.9.6.
- 3.9.20. Notwithstanding paragraph 3.9.19, IORPs should value deferred taxes, other than deferred tax assets arising from the carryforward of unused tax credits and the carryforward of unused tax losses, on the basis of the difference between the values ascribed to assets and liabilities including technical provisions, recognised and valued in accordance with paragraph 3.9.1 and the values ascribed to assets and liabilities as recognised and valued for tax purposes.
- 3.9.21. IORPs should only ascribe a positive value to deferred tax assets where it is probable that future taxable profit will be available against which the deferred tax asset can be utilised, taking into account any legal or regulatory requirements on the time limits relating to the carryforward of unused tax losses or the carryforward of unused tax credits.

Exclusion of valuation methods

- 3.9.22. IORPs should not value financial assets or financial liabilities at cost or amortised cost.
- 3.9.23. IORPs should not apply valuation models that value at the lower of the carrying amount and fair value less costs to sell.
- 3.9.24. IORPs should not value property, investment property, plant and equipment with cost models where the asset value is determined as cost less depreciation and impairment.
- 3.9.25. Where IORPs are lessees in a financial lease or lessors, the assets and liabilities in a lease arrangement should be valued as follows:
- (a) lease assets should be valued at fair value;
 - (b) for the purposes of determining the present value of the minimum lease payments market consistent inputs should be used and no subsequent adjustments to take account of the own credit standing of the IORP should be made;
 - (c) valuation at depreciated cost should not be applied.
- 3.9.26. IORPs should adjust the net realisable value for inventories by the estimated cost of completion and the estimated costs necessary to make the sale where those costs are material. Those costs should be considered to be material

where their non-inclusion could influence the decision-making or the judgement of the users of the common balance sheet, including the CAs. Valuation at cost should not be applied.

3.9.27. IORPs should not value non-monetary grants at a nominal amount.

3.9.28. When valuing biological assets, IORPs should adjust the value by adding the estimated costs to sell if the estimated costs to sell are material.

Simplifications

3.9.29. Based on the concept of materiality, IORPs can deviate from the provisions for the valuation of assets and liabilities for items which are, individually or collectively, not material, e.g. by using values based on national accounting standards.

4. Standardised risk assessment

4.1. General principles

Principle 23

- 4.1.1. The Standardised Risk Assessment consists of calculating a Standardised Value at Risk, corresponding to a 0.5% probability of occurrence over a one-year period.

Principle 24

- 4.1.2. The Standardised Risk Assessment should cover at least the following risks:

- (a) Longevity risk, as part of pension liability risk;
- (b) Market risk, distinguishing the following underlying risks:
 - (i) Interest rate risk, differentiating where appropriate between real interest rate and inflation risk;
 - (ii) Equity risk;
 - (iii) Property risk;
 - (iv) Spread risk;
 - (v) Market concentration risk;
 - (vi) Currency risk;
- (c) Counterparty default risk, including default risk of the sponsor;
- (d) Operational risk.

Principle 25

- 4.1.3. The Standardised Risk Assessment should take into account the loss-absorbing capacity of sponsor support, pension protection schemes, discretionary benefits, conditional benefits and benefit reductions.

Scenario based calculations

- 4.1.4. Where the calculation of a module or sub-module of the Basic Standardised Value at Risk is based on the impact of a scenario on the excess of assets over liabilities of IORPs, all of the following assumptions should be made in that calculation:

- (a) the scenario does not change the amount of the risk margin in technical provisions;
- (b) the scenario does not change the value of deferred tax assets and liabilities;
- (c) the scenario does not change the value of discretionary benefits, conditional benefits and benefit reductions included in technical provisions;
- (d) the scenario does not change the value of sponsor support and pension protection schemes;
- (e) no management actions are taken by the IORP during the scenario;

- 4.1.5. The calculation of technical provisions arising as a result of determining the impact of a scenario on the excess of assets over liabilities of IORPs as referred to in paragraph 4.1.4 should not change the value of discretionary benefits, conditional benefits and benefit reductions, and should take account of all of the following:

- (a) without prejudice to point (e) of paragraph 4.1.45, future management actions following the scenario, provided they comply with paragraphs 3.3.63-3.3.66;
 - (b) any material adverse impact of the scenario or the management actions referred to in point (a) on the likelihood that members and beneficiaries and sponsors will exercise contractual options.
- 4.1.6. The calculation of assets and liabilities arising as a result of determining the impact of a scenario as referred to in paragraph 4.1.4 should take account of the impact of the scenario on the value of any relevant risk mitigation techniques held by the IORP which comply with paragraphs 4.8.2 – 4.8.14 and 4.8.17-4.8.27.
- 4.1.7. Where the scenario would result in an increase in the excess of assets over liabilities of IORPs, the calculation of the module or sub-module should be based on the assumption that the scenario has no impact on the excess of assets over liabilities.

Look-through approach

- 4.1.8. The Standardised Value at Risk should be calculated on the basis of each of the underlying assets of collective investment undertakings and other investments packaged as funds (look-through approach).
- 4.1.9. The look-through approach should also apply to:
- (a) indirect exposures to market risk other than collective investment undertakings and investments packaged as funds;
 - (b) indirect exposures to pension liability risk;
 - (c) indirect exposures to counterparty risk.
- 4.1.10. Where a number of iterations of the look-through approach is required (e.g. where an investment fund is invested in other investment funds), the number of iterations should be sufficient to ensure that all material market risk is captured.
- 4.1.11. Where the look-through approach cannot be applied to collective investment undertakings or investments packaged as funds, the Standardised Value at Risk may be calculated on the basis of the target underlying asset allocation of the collective investment undertaking or fund, provided such a target allocation is available to the IORP at the level of granularity necessary for calculating all relevant sub-modules and scenarios, and the underlying assets are managed strictly according to this target allocation. For the purposes of that calculation, data groupings may be used, provided they are applied in a prudent manner and that they do not apply to more than 20% of the total value of the assets of the IORP.
- 4.1.12. Where a look-through approach is not possible and methods based on the target underlying asset allocation are not applied, IORPs should consider the underlying assets of the collective investment undertaking, investments packaged as funds and other indirect asset exposures as type 2 equities in the equity risk sub-module.

Regional governments and local authorities

- 4.1.13. IORPs should assume that there is no difference in risk between exposures to regional governments and local authorities and exposures to the central government, because the former have specific revenue-raising power, and

specific institutional arrangements exist, the effect of which is to reduce the risk of default.

Calculation of the Standardised Value at Risk

4.1.14. The Standardised Value at Risk is equal to the following:

$$SVaR = BSVaR + VaR_{Op} + Adj$$

where:

- (a) BSVaR denotes the Basic Standardised Value at Risk, as defined in paragraph 4.1.17;
- (b) VaR_{Op} denotes the value at risk for operational risk, as defined in section 4.6;
- (c) Adj denotes the adjustment for the loss-absorbing capacity of technical provisions, security mechanisms and deferred taxes, as defined in section 4.7.

Calculation of the basic standardised value at risk

4.1.15. The Basic Standardised Value at Risk comprises all of the following modules:

- (a) the pension liability risk module;
- (b) the market risk module;
- (c) the counterparty default risk module;
- (d) the intangible asset risk module.

4.1.16. IORPs do not have to include the intangible asset risk module. IORPs may include the intangible asset risk module if intangible assets are recognised and valued in accordance with point (b) in paragraph 3.9.17.

4.1.17. The Basic Standardised Value at Risk is equal to the following:

$$BSVaR = \sqrt{\sum_{i,j} Corr_{i,j} \cdot VaR_i \cdot VaR_j} + VaR_{intangibles}$$

where:

- (a) the sum covers all possible combinations (i,j) of the modules set out in points (a), (b) and (c) paragraph 4.1.15;
- (b) $Corr(i,j)$ denotes the correlation parameter for risk modules i and j, as determined in paragraph 4.1.18;
- (c) VaR_i and VaR_j denote the value at risk for risk module i and j respectively;
- (d) $VaR_{intangibles}$ denotes the value at risk for intangible asset risk.

4.1.18. The factor $Corr(i,j)$ referred to in paragraph 4.1.17 is equal to the item set out in row i and in column j of the following correlation matrix:

$\begin{matrix} & j \\ i \end{matrix}$	Market	Counterparty default	Pension liability
Market	1	0.25	0.25
Counterparty default	0.25	1	0.25
Pension liability	0.25	0.25	1

4.2. Pension liability risk module

4.2.1. Structure of the pension liability risk module

4.2.1. The pension liability risk module consists of all of the following sub-modules:

- (a) the longevity risk sub-module;
- (b) the mortality risk sub-module;
- (c) the disability/morbidity risk sub-module;
- (d) the expense risk sub-module;
- (e) the revision risk sub-module;
- (f) the benefit option risk sub-module;
- (g) the catastrophe risk sub-module.

4.2.2. IORPs do not have to include the sub-modules for mortality risk, disability-morbidity risk, expenses risk, revision risk, benefit option risk and CAT risk. IORPs that consider that all or part of these sub-modules represent material risk may include them in the calculations.

4.2.3. The value at risk for pension liability risk is equal to the following:

$$VaR_{pension} = \sqrt{\sum_{i,j} Corr_{(i,j)} \cdot VaR_i \cdot VaR_j}$$

where:

- (a) the sum covers all possible combinations (i,j) of the sub-modules set out in paragraph 4.2.1;
- (b) $Corr_{(i,j)}$ denotes the correlation parameter for pension liability risk for sub-modules i and j;
- (c) VaR_i and VaR_j denote the value at risk for risk sub-module i and j respectively.

4.2.4. The factor $Corr_{(i,j)}$ referred to in paragraph 4.2.3 is equal to the item set out in row i and in column j of the following correlation matrix:

i \ j	Longevity	Mortality	Disability	Expense	Revision	Benefit option	Catastrophe
Longevity	1	-0.25	0	0.25	0.25	0.25	0
Mortality	-0.25	1	0.25	0.25	0	0	0.25
Disability	0.25	0	1	0.5	0	0	0.25
Expense	0.25	0.25	0.5	1	0.5	0.5	0.25
Revision	0	0.25	0	0.5	1	0	0
Benefit option	0	0.25	0	0.5	0	1	0.25
Catastrophe	0.25	0	0.25	0.25	0	0.25	1

4.2.2. Longevity risk sub-module

4.2.5. Longevity risk is associated with pension obligations (such as annuities) where an IORP promises to make recurring series of payments until the death of the

member or beneficiary , or with pension obligations where an IORP promises to make a single payment in the event of the survival of the member of beneficiary for the duration of the pension scheme term.

- 4.2.6. This sub-module is relevant for pension obligations contingent on longevity risk, i.e. where there is no death benefit or the amount currently payable on death is less than the technical provisions held and, as a result, a decrease in mortality rates is likely to lead to an increase in the technical provisions without the risk margin.
- 4.2.7. The value at risk for longevity risk is equal to the loss in excess of assets over liabilities that would result from an instantaneous permanent decrease of 20% in the mortality rates used for the calculation of technical provisions.
- 4.2.8. The decrease in mortality rates should only apply to those contracts for which a decrease in mortality rates leads to an increase in technical provisions without the risk margin.
- 4.2.9. The identification of contracts for which a decrease in mortality rates leads to an increase in technical provisions without the risk margin may be based on the following assumptions:
 - (a) multiple contracts in respect of the same person may be treated as if they were one contract;
 - (b) where the calculation of technical provisions is based on groups of contracts, the identification of the contracts for which technical provisions increase under a decrease of mortality rates may also be based on those groups of contracts instead of single contracts, provided that it yields a result which is not materially different.

Simplified calculation of the value at risk for longevity risk

- 4.2.10. Where paragraph 2.2.5 is complied with, IORPs may calculate the value at risk for longevity risk as follows:

$$VaR_{longevity} = 0.2 \cdot q \cdot n \cdot 1.1^{(n-1)/2} \cdot BE_{long}$$

where, with respect to the contracts referred to in paragraph 4.2.8:

- (a) q denotes the expected average mortality rate of the covered persons during the following 12 months weighted by the sum assured;
- (b) n denotes the modified duration in years of the payments to members and beneficiaries included in the best estimate;
- (c) BE_{long} denotes the best estimate of obligations subject to longevity risk.

4.2.3. Mortality risk sub-module

- 4.2.11. Mortality risk is associated with pension obligations where an IORP promises to make a single or recurring series of payments in the event of the death of the member or beneficiary during the pension scheme term.
- 4.2.12. This sub-module is relevant for pension obligations contingent on mortality risk i.e. where the amount currently payable on death exceeds the technical provisions held and, as a result, an increase in mortality rates leads to an increase in technical provisions without the risk margin.
- 4.2.13. The value at risk for mortality risk is equal to the loss in excess of assets over liabilities that would result from an instantaneous permanent increase of 15% in the mortality rates used for the calculation of technical provisions.

- 4.2.14. The increase in mortality rates should only apply to those contracts for which an increase in mortality rates leads to an increase in technical provisions without the risk margin.
- 4.2.15. The identification of contracts for which an increase in mortality rates leads to an increase in technical provisions without the risk margin may be based on the following assumptions:
- (a) multiple contracts in respect of the same person may be treated as if they were one contract;
 - (b) where the calculation of technical provisions is based on groups of contracts, the identification of the contracts for which technical provisions increase under an increase of mortality rates may also be based on those groups of contracts instead of single contracts, provided that it yields a result which is not materially different.

Simplified calculation of the value at risk for mortality risk

- 4.2.16. Where paragraph 2.2.5 is complied with, IORPs may calculate the value at risk for mortality risk as follows:

$$VaR_{mortality} = 0.15 \cdot CAR \cdot q \cdot \sum_{k=1-0.5}^{n-0.5} \left(\frac{1-q}{1-i_k} \right)^k$$

where, with respect to pension schemes with a positive capital at risk:

- (a) CAR denotes the total positive capital at risk, meaning the sum over all contracts of the higher of zero and the difference between the following amounts:
 - (i) - the amount that the IORP would currently pay in the event of the death of the persons covered under the contract after the deduction of the amounts recoverable from (re)insurance contracts and special purpose vehicles;
 - the expected present value of amounts not covered in the previous indent that the IORP would pay in the future in the event of the immediate death of the persons covered under the contract after deduction of the amounts recoverable from (re)insurance contracts and special purpose vehicles;
 - (ii) the best estimate of the corresponding obligations after deduction of the amounts recoverable from (re)insurance contracts and special purpose vehicles;
- (b) q denotes the expected average mortality rate of the covered persons during the following 12 months weighted by the sum assured;
- (c) n denotes the modified duration in years of payments payable on death included in the best estimate;
- (d) i_k denotes the annualised spot rate for maturity k of the basic risk-free term structure as described in section 3.5.

4.2.4. Disability-morbidity risk sub-module

- 4.2.17. Disability-morbidity risk is the risk of loss, or of adverse changes in the value of liabilities, resulting from changes in the level, trend or volatility of disability and morbidity rates.
- 4.2.18. This sub-module is relevant for obligations subject to disability-morbidity risk, i.e. where upon the diagnosis of a disease or the member being unable to work as a result of sickness or disability, recurring payments are triggered. These payments may continue until the expiry of some defined period of time or until

either the recovery or death of the member/beneficiary. In the latter case, the IORP is also exposed to the risk that the member/beneficiary receives the payments for longer than anticipated i.e. that claim termination rates are lower than anticipated (recovery risk).

- 4.2.19. The value at risk for disability-morbidity risk is equal to the loss in excess of assets over liabilities that would result from the combination of the following instantaneous permanent changes:
- (a) an increase of 35% in the disability and morbidity rates which are used in the calculation of technical provisions to reflect the disability and morbidity experience in the following 12 months;
 - (b) an increase of 25% in the disability and morbidity rates which are used in the calculation of technical provisions to reflect the disability and morbidity experience for all months after the following 12 months;
 - (c) a decrease of 20% in the disability and morbidity recovery rates used in the calculation of technical provisions in respect of the following 12 months and for all months thereafter.
- 4.2.20. The changes in disability and morbidity rates should be applied irrespective of the time unit of the rate (annual, monthly, etc.). After an increase, the disability and morbidity rates should not exceed a value of 1. IORPs should not apply a decrease to recovery rates with a value of 1, which merely reflects the fact that the benefit payments end after a contractually fixed period.
- 4.2.21. Where rates of transition between several health statuses enter into the calculation of technical provisions, IORPs should consider all rates of transition from one status to a more severe one as disability and morbidity rates and all rates of transition from one status to a less severe one (including the status "healthy") as disability and morbidity recovery rates for the purpose of calculating the capital requirement for disability-morbidity risk, irrespective of the current status of the member or beneficiary for which a technical provision is calculated. Only the persistency rates should be adjusted to ensure that after the shock, the sum of transition rates from one state to others still adds up to 1.

Simplified calculation of the value at risk for disability-morbidity risk

- 4.2.22. Where paragraph 2.2.5 is complied with, IORPs may calculate the value at risk for disability-morbidity risk as follows:

$$VaR_{disability-morbidity} = \begin{cases} 0.35 \cdot CAR_1 \cdot d_1 \\ + 0.25 \cdot 1.1^{\frac{n-3}{2}} \cdot (n-1) \cdot CAR_2 \cdot d_2 \\ + 0.2 \cdot 1.1^{(n-1)/2} \cdot t \cdot n \cdot BE_{dis} \end{cases}$$

where with respect to pension schemes with a positive capital at risk:

- (a) CAR_1 denotes the total capital at risk, meaning the sum over all contracts of the higher of zero and the difference between the following amounts:
 - (i) the sum of:
 - the amount that the IORP would currently pay in the event of the death or disability of the persons covered under the contract after deduction of the amounts recoverable from (re)insurance contracts and special purpose vehicles;

- the expected present value of amounts not covered in the previous indent that the IORP would pay in the future in the event of the immediate death or disability of the persons covered by the contract after deduction of the amounts recoverable from (re)insurance contracts and special purpose vehicles;
- (ii) the best estimate of the corresponding obligations after deduction of the amounts recoverable from (re)insurance contracts and special purpose vehicles;
- (b) CAR₂ denotes the total capital at risk as defined in point (a) after 12 months;
- (c) d₁ denotes the expected average disability-morbidity rate during the following 12 months weighted by the sum assured;
- (d) d₂ denotes the expected average disability-morbidity rate in the 12 months after the following 12 months weighted by the sum assured;
- (e) n denotes the modified duration of the payments on disability-morbidity included in the best estimate;
- (f) t denotes the expected termination rates during the following 12 months;
- (g) BE_{dis} denotes the best estimate of obligations subject to disability-morbidity risk.

4.2.5. Expense risk sub-module

- 4.2.23. Expense risk arises from the variation in the expenses incurred in servicing pension obligations.
- 4.2.24. The value at risk for expense risk is equal to the loss in excess of assets over liabilities that would result from the combination of the following instantaneous permanent changes:
- (a) an increase of 10% in the amount of expenses taken into account in the calculation of technical provisions;
 - (b) an increase of 1 percentage point to the expense inflation rate (expressed as a percentage) used for the calculation of technical provisions.

Simplified calculation of the value at risk for expense risk

- 4.2.25. Where paragraph 2.2.5 is complied with, IORPs may calculate the value at risk for expense risk as follows:

$$VaR_{expenses} = 0.1 \cdot n \cdot E + E \cdot \left(\left(\frac{1}{i + 0.01} \right) \cdot ((1 + i + 0.01)^n - 1) - \frac{1}{i} ((1 + i)^n - 1) \right)$$

where:

- (a) E denotes the amount of expenses incurred in servicing pension obligations during the last year;
- (b) n denotes the modified duration in years of the cash flows included in the best estimate of those obligations;
- (c) i denotes the weighted average inflation rate included in the calculation of the best estimate of those obligations, where the weights are based on the present value of expenses included in the calculation of the best estimate for servicing existing pension obligations.

4.2.6. Revision risk sub-module

- 4.2.26. Revision risk is the risk of loss, or of adverse change in the value of liabilities, resulting from fluctuations in the level, trend, or volatility of revision rates applied to annuities, due to changes in the legal environment or in the state of health of the person covered.
- 4.2.27. This sub-module should be applied only to annuities where the benefits payable under the underlying contracts could increase as a result of changes in the legal environment or in the state of health of the person covered.
- 4.2.28. The value at risk for revision risk is equal to the loss in excess of assets over liabilities that would result from an instantaneous permanent increase of 3% in the amount of annuity benefits only on annuity obligations where the benefits payable under the underlying contracts could increase as a result of changes in the legal environment or in the state of health of the person covered.
- 4.2.29. The impact of the instantaneous permanent increase in the amount of annuity benefits should be assessed considering the remaining run-off period of the annuities.

4.2.7. Benefit option risk sub-module

- 4.2.30. Benefit option risk is the risk of loss due to an increase in the value of liabilities as a result of a change in the expected exercise rates of certain options of members and beneficiaries or sponsors. A comprehensive approach is taken in relation to members', beneficiaries' or sponsors' options that the benefit option sub-module covers. The sub-module assesses certain legal or contractual options of members, beneficiaries or sponsors which can significantly change the value of the future cash-flows.
- 4.2.31. The value at risk for benefit option risk is equal to the largest of the following values at risk:
 - (a) the value at risk for the risk of a permanent increase in option exercise rates;
 - (b) the value at risk for the risk of a permanent decrease in option exercise rates;
 - (c) the value at risk for the risk of a mass option exercise event.
- 4.2.32. The value at risk for the risk of a permanent increase in option exercise rates is equal to the loss in excess of assets over liabilities that would result from an instantaneous permanent increase of 50% in the option exercise rates of the relevant options set out in paragraph 4.2.34. Nevertheless, the increased option exercise rates should not exceed 100% and the increase in option exercise rates should only apply to those relevant options for which the exercise of the option would result in an increase of technical provisions without the risk margin.
- 4.2.33. The value at risk for the risk of a permanent decrease in option exercise rates is equal to the loss in excess of assets over liabilities that would result from an instantaneous permanent decrease of 50% in the option exercise rates of the relevant options set out in paragraph 4.2.34. Nevertheless, the decrease in option exercise rates should not exceed 20 percentage points and the decrease in option exercise rates should only apply to those relevant options for which the exercise of the option would result in an increase of technical provisions without the risk margin.
- 4.2.34. The relevant options for the purposes of paragraphs 4.2.32 and 4.2.33 are the following:

- (a) all legal or contractual options of members, beneficiaries and sponsors to fully or partly terminate, surrender, decrease, restrict or suspend cover provided by the IORP;
- (b) all legal or contractual options of members, beneficiaries and sponsors to fully or partially establish, renew, increase, extend or resume the cover provided by the IORP.

For the purpose of point (a), a legal or contractual option of the sponsor to terminate a pension promise as a whole/for all entitled members and beneficiaries, in a way that would lead to a windup of the scheme or IORP, should not be considered relevant.

For the purpose of point (b), the change in the option exercise rate referred to in paragraphs 4.2.32 and 4.2.33 should be applied to the rate reflecting that the relevant option is not exercised.

- 4.2.35. The value at risk for the risk of a mass option exercise event is equal to the loss in excess of assets over liabilities that would result from a discontinuance of 40% of all pension schemes for which discontinuance would result in an increase of technical provisions without the risk margin.

For the purpose of determining the loss in excess of assets over liabilities, the IORP should base the calculation on the type of discontinuance which most negatively affects the excess of assets over liabilities of the IORP on a per contract basis.

- 4.2.36. Where the largest of the values at risk referred to in points (a), (b) and (c) of paragraph 4.2.31 and the largest of the corresponding values at risk calculated in accordance with paragraph 4.7.17 (i.e. including the loss-absorbing capacity of technical provisions and security mechanisms) are not based on the same scenario, the value at risk for benefit option risk is the value at risk referred to in points (a), (b) and (c) of paragraph 4.2.31 for which the underlying scenario results in the largest corresponding value at risk calculated in accordance with paragraph 4.7.17.

Simplified calculation of the value at risk for benefit option risk

- 4.2.37. Where paragraph 2.2.5 is complied with, IORPs may calculate the value at risk for the risk of a permanent increase in option exercise rates as follows:

$$Option_{up} = 0.5 \cdot l_{up} \cdot n_{up} \cdot S_{up}$$

where:

- (a) l_{up} denotes the higher of the average option exercise rate of the contracts with positive surrender strains and 67%;
- (b) n_{up} denotes the average period in years over which the contracts with a positive surrender strain run off;
- (c) S_{up} denotes the sum of positive surrender strains.

- 4.2.38. Where paragraph 2.2.5 is complied with, IORPs may calculate the value at risk for the risk of a permanent decrease in option exercise rates as follows:

$$Option_{down} = 0.5 \cdot l_{down} \cdot n_{down} \cdot S_{down}$$

where:

- (a) l_{down} denotes the higher of the average option exercise rate of the contracts with negative surrender strains and 40%;

(b) n_{down} denotes the average period in years over which the contracts with a negative surrender strain run off;

(c) S_{down} denotes the sum of negative surrender strains.

4.2.39. The surrender strain of a pension scheme referred to in paragraphs 4.2.37 and 4.2.38 is the difference between the following:

(a) the amount currently payable by the IORP on discontinuance by the members, beneficiaries or sponsors, net of any amounts recoverable from members, beneficiaries, sponsors or intermediaries;

(b) the amount of technical provisions without the risk margin.

4.2.8. Catastrophe risk sub-module

4.2.40. The catastrophe sub-module is restricted to obligations which are contingent on mortality, i.e. where an increase in mortality leads to an increase in technical provisions.

4.2.41. Catastrophe risk stems from extreme or irregular events whose effects are not sufficiently captured in the other pension liability risk sub-modules. Examples could be a pandemic event or a nuclear explosion.

4.2.42. Catastrophe risk is mainly associated with schemes in which an IORP promises to make a single or recurring, periodic series of payments when a member or beneficiary dies.

4.2.43. The value at risk for catastrophe risk is equal to the loss in excess of assets over liabilities that would result from an instantaneous increase of 0.15 percentage points to the mortality rates (expressed as percentages) which are used in the calculation of technical provisions to reflect the mortality experience in the following 12 months.

4.2.44. The increase in mortality rates referred to in paragraph 4.2.43 should only apply to those contracts for which an increase in mortality rates which are used to reflect the mortality experience in the following 12 months leads to an increase in technical provisions.

4.2.45. The identification of contracts for which an increase in mortality rates leads to an increase in technical provisions without the risk margin may be based on the following assumptions:

(a) multiple contracts in respect of the same person may be treated as if they were one contract;

(b) where the calculation of technical provisions is based on groups of contracts as referred to in paragraph 3.3.21, the identification of the contracts for which technical provisions increase under an increase of mortality rates may also be based on those groups of contracts instead of single contracts, provided that it yields a result which is not materially different.

Simplified calculation of the value at risk for catastrophe risk

4.2.46. Where paragraph 2.2.5 is complied with, IORPs may calculate the value at risk for catastrophe risk as follows:

$$VaR_{\text{catastrophe}} = \sum_i 0.0015 \cdot CAR_i$$

where:

(a) the sum includes all contracts with a positive capital at risk;

(b) CAR_i denotes the capital at risk of the contract i , meaning the higher of zero and the difference between the following amounts:

(i) the sum of:

- the amount that the IORP would currently pay in the event of the death of the persons covered by the contract after deduction of the amounts recoverable from (re)insurance contracts and special purpose vehicles;
- the expected present value of amounts not covered in the previous indent that the IORP would pay in the future in the event of the immediate death of the persons covered by the contract after deduction of the amounts recoverable from (re)insurance contracts and special purpose vehicles;

(ii) the best estimate of the corresponding obligations after deduction of the amounts recoverable from (re)insurance contracts and special purpose vehicles.

4.3. Market risk module

4.3.1. Structure of the market risk module

4.3.1. Market risk arises from the level or volatility of market prices of financial instruments. Exposure to market risk is measured by the impact of movements in the level of financial variables such as stock prices, interest rates, real estate prices and exchange rates.

4.3.2. The market risk module consists of all of the following sub-modules:

- (a) the interest rate risk sub-module;
- (b) the equity risk sub-module;
- (c) the property risk sub-module;
- (d) the spread risk sub-module;
- (e) the currency risk sub-module;
- (f) the market risk concentrations sub-module.

4.3.3. The value at risk for market risk is equal to the following:

$$VaR_{Market} = \sqrt{\sum_{i,j} Corr_{(i,j)} \cdot VaR_i \cdot VaR_j}$$

where:

- (a) the sum covers all possible combinations i,j of the sub-modules of the market risk module;
- (b) $Corr(i,j)$ denotes the correlation parameter for market risk for sub-modules i and j ;
- (c) VaR_i and VaR_j denote the value at risk for risk sub-module i and j respectively.

4.3.4. The correlation parameter $Corr(i,j)$ referred to in paragraph 4.3.3 is equal to the item set out in row i and in column j of the following correlation matrix:

i \ j	Interest rate	Equity	Property	Spread	Concentration	Currency
Interest rate	1	A	A	A	0	0.25
Equity	A	1	0.75	0.75	0	0.25
Property	A	0.75	1	0.5	0	0.25
Spread	A	0.75	0.5	1	0	0.25
Concentration	0	0	0	0	1	0
Currency	0.25	0.25	0.25	0.25	0	1

The parameter A should be equal to 0 where the value at risk for interest rate risk is determined according to point (a) of paragraph 4.3.12, where IORPs do not dispose of inflation-linked obligations, or paragraph 4.3.19, where IORPs dispose of inflation-linked obligations. In all other cases, the parameter A should be equal to 0.5.

4.3.2. Interest rate risk sub-module

4.3.5. Interest rate risk exists for all assets and liabilities for which the excess of assets over liabilities is sensitive to changes in the term structure of interest rates or interest rate volatility.

4.3.6. The interest rate risk sub-module comprises the following two sub-modules:

- (a) a sub-module for the calculation of the value at risk for interest rate risk that should be applied by IORPs which do not dispose of inflation-linked obligations, in accordance with paragraph 4.3.7-4.3.17;
- (b) a sub-module for the calculation of the value at risk for interest rate risk that should be applied by IORPs which dispose of inflation-linked obligations, in accordance with paragraph 4.3.18-4.3.30;

IORPs which do not dispose of inflation-linked obligations

4.3.7. IORPs which do not dispose of inflation linked obligations should do the calculations for the interest rate risk sub-module as follows:

4.3.8. IORPs should include all interest rate sensitive assets and liabilities in the calculation of the value at risk for the interest rate risk sub-module. Assets sensitive to interest rate movements include fixed-income investments and interest rate derivatives.

4.3.9. The discounted value of future cash flows, in particular in the valuation of technical provisions, is also sensitive to a change in the basic risk-free interest rate at which those cash flows are discounted.

4.3.10. The technical provisions should be recalculated by applying the below mentioned stress scenarios to the basic risk free interest rate term structured used for discounting the cash flows.

4.3.11. The assets should be revalued under the shock scenarios by stressing only the basic risk free interest rate term structure. Any spreads over the basic risk free interest rate curve should remain unchanged. This may involve using a mark to model valuation for determining the value of the assets under the stresses.

4.3.12. The value at risk for interest rate risk referred to in paragraph 4.3.3 is equal to the larger of the following:

- (a) the value at risk for the risk of an increase in the term structure of interest rates

as set out in paragraphs 4.3.14 to 4.3.15;

(b) the value at risk for the risk of a decrease in the term structure of interest rates as set out in paragraphs 4.3.16 to 4.3.17.

4.3.13. Where the larger of the values at risk referred to in points (a) and (b) of paragraph 4.3.12 and the larger of the corresponding values at risk calculated in accordance with paragraph 4.7.17 (i.e. including the loss-absorbing capacity of technical provisions and security mechanisms) are not based on the same scenario, the value at risk for interest rate risk should be the value at risk referred to in points (a) or (b) of paragraph 4.3.12 for which the underlying scenario results in the largest corresponding capital requirement calculated in accordance with paragraph 4.7.17.

4.3.14. The value at risk for the risk of an increase in the term structure of interest rates for a given currency should be equal to the loss in excess of assets over liabilities that would result from an instantaneous increase in basic risk-free interest rates for that currency at different maturities in accordance with the following table:

Maturity (in years)	Increase	Maturity (in years)	Increase	Maturity (in years)	Increase
1	70%	8	47%	15	33%
2	70%	9	44%	16	31%
3	64%	10	42%	17	30%
4	59%	11	39%	18	29%
5	55%	12	37%	19	27%
6	52%	13	35%	20	26%
7	49%	14	34%	90	20%

For maturities not specified in the table above, the value of the increase should be linearly interpolated. For maturities shorter than 1 year, the increase should be 70%. For maturities longer than 90 years, the increase should be 20%.

4.3.15. In any case, the increase of basic risk-free interest rates at any maturity should be at least one percentage point.

4.3.16. The value at risk for the risk of a decrease in the term structure of interest rates for a given currency should be equal to the loss in excess of assets over liabilities that would result from an instantaneous decrease in basic risk-free interest rates for that currency at different maturities in accordance with the following table:

Maturity (in years)	Decrease	Maturity (in years)	Decrease	Maturity (in years)	Decrease
1	75%	8	36%	15	27%
2	65%	9	33%	16	28%
3	56%	10	31%	17	28%
4	50%	11	30%	18	28%
5	46%	12	29%	19	29%

6	42%	13	28%	20	29%
7	39%	14	28%	90	20%

For maturities not specified in the table above, the value of the decrease should be linearly interpolated. For maturities shorter than 1 year, the decrease should be 75%. For maturities longer than 90 years, the decrease should be 20%.

- 4.3.17. Notwithstanding paragraph 4.3.16, for negative basic risk-free interest rates the decrease should be nil.

Example

The altered term structures are derived by multiplying the current interest rate curve by (1+Increase) and (1+Decrease) for each individual maturity. For example, the "stressed" 15-year interest rate $R_1(15)$ in the upward stress scenario is determined as $R_1(15) = R_0(15) \cdot (1 + 0.33)$ where $R_0(15)$ is the 15-year interest rate based on the current term structure.

IORPs which dispose of inflation-linked obligations

- 4.3.18. For IORPs which dispose of inflation linked obligations, the calculation distinguishes explicitly between the two sources of (nominal) interest rate risk: real interest rate risk and inflation risk. This allows IORPs which dispose of inflation-linked obligations to include inflation risk in the calculation of the value at risk.
- 4.3.19. The value at risk for interest rate risk for IORPs which dispose of inflation-linked pension obligations is equal to the larger of the following:
- (a) the value at risk for the risk of a combination of an increase in the term structure of interest rates and an increase in the term structure of inflation rates in a real interest rate scenario and an inflation scenario as set out in paragraphs 4.3.21 to 4.3.25;
 - (b) the values at risk for the risk of a combination of a decrease in the term structure of interest rates and a decrease in the term structure of inflation rates in a real interest rate scenario and an inflation scenario as set out in paragraphs 4.3.26 to 4.3.30.
- 4.3.20. Where the larger of the values at risk referred to in points (a) and (b) of paragraph 4.3.19 and the larger of the corresponding values at risk calculated in accordance with paragraphs 4.7.17 (i.e. including the loss-absorbing capacity of technical provisions and security mechanisms) are not based on the same scenario, the value at risk for interest rate risk should be the value at risk referred to in points (a) or (b) of paragraph 4.3.19 for which the underlying scenario results in the largest corresponding capital requirement calculated in accordance with paragraphs 4.7.17.
- 4.3.21. The value at risk for the risk of a combination of an increase in the term structure of interest rates and an increase in the term structure of inflation rates in a real interest rate scenario and an inflation scenario for a given currency is equal to the following:

$$VaR_{interest}^{up} = \sqrt{(VaR_{real}^{up})^2 + (VaR_{inflation}^{up})^2}$$

where:

(a) VaR_{real}^{up} denotes the value at risk for the risk of an increase in the term structure of interest rates in accordance with paragraph 4.3.22;

(b) $VaR_{inflation}^{up}$ denotes the value at risk for the risk of an increase in the term structure of interest rates and the term structure of inflation rates in accordance with paragraph 4.3.23.

4.3.22. The value at risk for the risk of an increase in the term structure of interest rates as referred to in paragraph 4.3.21 should be equal to the loss in excess of assets over liabilities that would result from an instantaneous increase in basic risk-free interest rates at different maturities in accordance with paragraphs 4.3.24 and 4.3.25.

4.3.23. The value at risk for the risk of an increase in the term structure of interest rates and the term structure of inflation rates as referred to in paragraph 4.3.21 should be equal to the loss in excess of assets over liabilities that would result from the combination of the following instantaneous changes:

(a) an increase in basic risk-free interest rates at different maturities in accordance with paragraphs 4.3.24 and 4.3.25;

(b) an increase in inflation rates at different maturities equal to the absolute increase in percentage points in the basic risk-free rates at the corresponding maturities under point (a).

4.3.24. The instantaneous increase in basic risk-free interest rates at different maturities as referred to in paragraphs 4.3.22 and 4.3.23 should correspond to the values of the increase in the following table:

Maturity (in years)	Increase	Maturity (in years)	Increase	Maturity (in years)	Increase
1	49%	8	33%	15	23%
2	49%	9	31%	16	22%
3	45%	10	29%	17	21%
4	41%	11	27%	18	20%
5	39%	12	26%	19	19%
6	36%	13	25%	20	18%
7	34%	14	24%	90	14%

For maturities not specified in the table above, the value of the increase should be linearly interpolated. For maturities shorter than 1 year, the increase should be 49%. For maturities longer than 90 years, the increase should be 14%.

4.3.25. In any case, the increase of basic risk-free interest rates at any maturity should be at least 0.7 percentage point.

4.3.26. The value at risk for the risk of a combination of a decrease in the term structure of interest rates and a decrease in the term structure of inflation rates in a real interest rate scenario and an inflation scenario for a given currency is equal to the following:

$$VaR_{interest}^{down} = \sqrt{(VaR_{real}^{down})^2 + (VaR_{inflation}^{down})^2}$$

where:

- (a) VaR_{real}^{down} denotes the value at risk for the risk of a decrease in the term structure of interest rates in accordance with paragraph 4.3.27;
- (b) $VaR_{inflation}^{down}$ denotes the value at risk for the risk of a decrease in the term structure of interest rates and the term structure of inflation rates in accordance with paragraph 4.3.28.

- 4.3.27. The value at risk for the risk of a decrease in the term structure of interest rates as referred to in paragraph 4.3.26 should be equal to the loss in excess of assets over liabilities that would result from an instantaneous decrease in basic risk-free interest rates at different maturities in accordance with paragraphs 4.3.29 and 4.3.30.
- 4.3.28. The value at risk for the risk of an decrease in the term structure of interest rates and the term structure of inflation rates as referred to in paragraph 4.3.26 should be equal to the loss in excess of assets over liabilities that would result from the combination of the following instantaneous changes:
- (a) a decrease in basic risk-free interest rates at different maturities in accordance with paragraphs 4.3.29 and 4.3.30;
- (b) a decrease in inflation rates at different maturities equal to the absolute decrease in percentage points in the basic risk-free rates at the corresponding maturities under point (a).
- 4.3.29. The instantaneous decrease in basic risk-free interest rates at different maturities as referred to in paragraphs 4.3.27 and 4.3.28 should correspond to the values of the decrease in the following table:

Maturity (in years)	Decrease	Maturity (in years)	Decrease	Maturity (in years)	Decrease
1	53%	8	25%	15	19%
2	46%	9	23%	16	20%
3	39%	10	22%	17	20%
4	35%	11	21%	18	20%
5	32%	12	20%	19	20%
6	29%	13	20%	20	20%
7	27%	14	20%	90	14%

For maturities not specified in the table above, the value of the decrease should be linearly interpolated. For maturities shorter than 1 year, the decrease should be 53%. For maturities longer than 90 years, the decrease should be 14%.

- 4.3.30. Notwithstanding paragraph 4.3.29, for negative basic risk-free interest rates the decrease should be nil.

Simplified calculation of the value at risk for interest rate risk

- 4.3.31. Where paragraph 2.2.5 is complied with, and where the cash flows related to some or all fixed income assets or pension obligations are not available, IORPs may calculate the impact of the interest rate stress on those assets and obligations as follows:

- (a) the impact on the value of the fixed income assets equals minus their duration multiplied by the absolute change in the risk-free interest rate for that duration;
- (b) the impact on the best estimate of pension obligations equals minus their duration multiplied by the absolute change in the risk-free interest rate for that duration;

4.3.3. Equity risk sub-module

- 4.3.32. Equity risk arises from the level or volatility of market prices for equities. Exposure to equity risk refers to all assets and liabilities whose value is sensitive to changes in equity prices. IORPs should assume that the stresses applied in this sub-module do not impact on the interest rate curve used for valuing technical provisions.
- 4.3.33. For the calculation of the equity risk value at risk, hedging and risk transfer mechanisms should be taken into account according to the principles of section 4.8. However, as a general rule, hedging instruments should only be allowed with the average protection level over the next year unless they are part of a rolling hedging program that meets the requirements set out in paragraph 4.8.4. For example, where an equity option not part of such a rolling hedge program provides protection for the next six months, as a simplification, IORPs should assume that the option only covers half of the current exposure.
- 4.3.34. The equity risk sub-module includes a risk sub-module for type 1 equities and a risk sub-module for type 2 equities.
- 4.3.35. Type 1 equities should comprise equities listed in regulated markets in the countries which are members of the European Economic Area (EEA) or the Organisation for Economic Cooperation and Development (OECD).
- 4.3.36. Type 2 equities should comprise equities listed in stock exchanges in countries which are not members of the EEA or the OECD, equities which are not listed, commodities and other alternative investments. They should also comprise all assets other than those covered in the interest rate risk sub-module, the property risk sub-module or the spread risk sub-module, including the assets and indirect exposures referred to in paragraphs 4.1.8 and 4.1.9 where a look-through approach is not possible and the IORP does not make use of the provisions in paragraph 4.1.11.
- 4.3.37. The following equities should in any case be considered as type 1:
 - (a) equities held within collective investment undertakings which are qualifying social entrepreneurship funds as referred to in Article 3(b) of Regulation (EU) No 346/2013⁹ where the look-through approach set out in paragraphs 4.1.8 to 4.1.11 is possible for all exposures within the collective investment undertaking, or units or shares of those funds where the look through approach is not possible for all exposures within the collective investment undertaking;
 - (b) equities held within collective investment undertakings which are qualifying venture capital funds as referred to in Article 3(b) of Regulation (EU) No 345/2013¹⁰ where the look-through approach set out in paragraphs 4.1.8 to 4.1.11 is possible for all exposures within the collective investment undertaking,

⁹ Regulation (EU) No 346/2013 of the European Parliament and of the Council of 17 April 2013 on European social entrepreneurship funds, OJ L 115, 25.4.2013, p. 18.

¹⁰ Regulation (EU) No 345/2013 of the European Parliament and of the Council of 17 April 2013 on European venture capital funds, OJ L 115, 25.4.2013, p. 1

or units or shares of those funds where the look through approach is not possible for all exposures within the collective investment undertaking;

- (c) as regards closed-ended and unleveraged alternative investment funds which are established in the Union or, if they are not established in the Union, which are marketed in the Union in accordance with Articles 35 or 40 of Directive 2011/61/EU¹¹;
- (i) equities held within such funds where the look-through approach set out in paragraph 4.1.8 to 4.1.11 is possible for all exposures within the alternative investment fund;
- (ii) units or shares of such funds where the look-through approach is not possible for all exposures within the alternative investment fund.

4.3.38. The value at risk for equity risk is equal to the following:

$$VaR_{equity} = \sqrt{VaR_{type1equities}^2 + 2 \cdot 0.75 \cdot VaR_{type1equities} \cdot VaR_{type2equities} + VaR_{type2equities}^2}$$

where:

- (a) $VaR_{type1equities}$ denotes the value at risk for type 1 equities;
- (b) $VaR_{type2equities}$ denotes the value at risk for type 2 equities.

4.3.39. The value at risk for type 1 equities referred to paragraph 4.3.38 is equal to the loss in excess of assets over liabilities that would result from an instantaneous decrease equal to the sum of 39% and the symmetric adjustment, as referred to in paragraphs 4.3.41 to 4.3.46, in the value of type 1 equities.

4.3.40. The value at risk for type 2 equities referred to in paragraph 4.3.38 is equal to the loss in excess of assets over liabilities that would result from an instantaneous decrease equal to 49% and the symmetric adjustment, as referred to in paragraphs 4.3.41 to 4.3.46, in the value of type 2 equities.

4.3.41. The symmetric adjustment referred to in paragraphs 4.3.39 and 4.3.40 covers the risk arising from changes in the level of equity prices and should be based on a function of the current level of an equity index and a weighted average level of that index. The weighted average should be calculated over an appropriate period of time which should be the same for all IORPs.

4.3.42. The symmetric adjustment is equal to the following:

$$SA = \frac{1}{2} \cdot \left(\frac{CI - AI}{AI} - 8\% \right)$$

where:

- (a) CI denotes the current level of the equity index;
- (b) AI denotes the weighted average of the daily levels of the equity index over the last 36 months.

4.3.43. The equity index referred to in paragraphs 4.3.41 and 4.3.42 should comply with all the following requirements:

- (a) the equity index measures the market price of a diversified portfolio of equities;
- (b) the level of the equity index is publicly available;

¹¹ Directive 2011/61/EU of the European Parliament and of the Council of 8 June 2011 on Alternative Investment Fund Managers and amending Directives 2003/41/EC and 2009/65/EC and Regulations (EC) No 1060/2009 and (EU) No 1095/2010, OJ L 174, 1.7.2011, p. 1.

(c) the frequency of published levels of the equity index is sufficient to enable the current level of the index and its average value over the last 36 months to be determined.

4.3.44. For the purposes of calculating the weighted average of the daily levels of the equity index, the weights for all daily levels should be equal. The days during the last 36 months in respect of which the index was not determined should not be included in the average.

4.3.45. The symmetric adjustment should not be lower than -10% or higher than 10%.

4.3.46. EIOPA will calculate and publish the value of the symmetric adjustment using a methodology consistent with the specifications set out in paragraphs 4.3.41 to 4.3.45.

4.3.4. Property risk sub-module

4.3.47. Property risk arises as a result of sensitivity of the value of assets, liabilities and financial investments to the level or volatility of market prices of property. IORPs should assume that the stresses applied in this sub-module do not impact on the interest rate curve used for valuing technical provisions.

4.3.48. The following investments should be treated as property and their risks considered accordingly in the property risk sub-module:

- land, buildings and immovable-property rights;
- direct or indirect participations in real estate companies that generate periodic income or which are otherwise intended for investment purposes;
- property investment for the own use of the IORP.

4.3.49. Otherwise, the following investments should be treated as equity and their risks considered accordingly in the equity risk sub-module:

- an investment in a company engaged in real estate management, or
- an investment in a company engaged in real estate project development or similar activities.

4.3.50. The value at risk for property risk referred to in paragraph 4.3.3 is equal to the loss in excess of assets over liabilities that would result from an instantaneous decrease of 25% in the value of immovable property.

4.3.5. Spread risk sub-module

4.3.51. Spread risk results from the sensitivity of the value of assets, liabilities and financial instruments to changes in the level or in the volatility of credit spreads over the risk-free interest rate term structure. IORPs should assume that the stresses applied in this sub-module do not impact on the interest rate curve used for valuing technical provisions.

4.3.52. The spread risk sub-module applies in particular to the following classes of bonds:

- Corporate bonds;
- Subordinated debt investments, depending on the contractual terms;
- Investment instruments with equity and bond features;
- Covered bonds;
- Loans other than retail loans secured by a residential mortgage;

- Securitisation positions;
- Credit derivatives other than for hedging purposes.

4.3.53. The value at risk for spread risk is equal to the following:

$$VaR_{spread} = VaR_{bonds} + VaR_{securitisation} + VaR_{cd}$$

where:

- (a) VaR_{bonds} denotes the value at risk for spread risk on bonds and loans;
- (b) $VaR_{securitisation}$ denotes the value at risk for spread risk on securitisation positions;
- (c) VaR_{cd} denotes the value at risk for spread risk on credit derivatives.

Spread risk on bonds and loans

- 4.3.54. The value at risk for spread risk on bonds and loans is equal to the loss in the excess of assets over liabilities that would result from an instantaneous relative decrease of $stress_i$ in the value of each bond or loan i other than mortgage loans that meet the requirements in paragraphs 4.4.12 to 4.4.23, including bank deposits other than cash at bank referred to in paragraph 4.4.5(c).
- 4.3.55. The risk factor $stress_i$ should depend on the modified duration of the bond or loan i denominated in years (dur_i). dur_i should never be lower than 1. For variable interest rate bonds or loans, dur_i should be equivalent to the modified duration of a fixed interest rate bond or loan of the same maturity and with coupon payments equal to the forward interest rate.
- 4.3.56. Bonds or loans for which a credit assessment by a nominated ECAI is available should be assigned a risk factor $stress_i$ depending on the credit quality step and the modified duration dur_i of the bond or loan i according to the following table:

Credit quality step		0		1		2		3		4		5 and 6	
Duration (dur_i)	$stress_i$	a_i (%)	b_i (%)	a_i (%)	b_i (%)	a_i (%)	b_i (%)	a_i (%)	b_i (%)	a_i (%)	b_i (%)	a_i (%)	b_i (%)
up to 5	$b_i \cdot dur_i$	-	0.9	-	1.1	-	1.4	-	2.5	-	4.5	-	7.5
More than 5 and up to 10	$a_i + b_i \cdot (dur_i - 5)$	4.5	0.5	5.5	0.6	7.0	0.7	12.5	1.5	22.5	2.5	37.5	4.2
More than 10 and up to 15	$a_i + b_i \cdot (dur_i - 10)$	7.0	0.5	8.5	0.5	10.5	0.5	20.0	1.0	35.0	1.8	58.5	0.5
More than 15 and up to 20	$a_i + b_i \cdot (dur_i - 15)$	9.5	0.5	11	0.5	13.0	0.5	25.0	1.0	44.0	0.5	61.0	0.5
More than 20	$\min[a_i + b_i \cdot (dur_i - 0); 1]$	12.0	0.5	13.5	0.5	15.5	0.5	30.0	0.5	46.6	0.5	63.5	0.5

4.3.57. Bonds and loans for which a credit assessment by a nominated ECAI is not available and for which debtors have not posted collateral that meets the criteria set out in paragraphs 4.8.25 to 4.8.26 should be assigned a risk factor $stress_i$ depending on the duration dur_i of the bond or loan i according to the following table:

Duration (dur_i)	$stress_i$
up to 5	$3\% \cdot dur_i$
More than 5 and up to 10	$15\% + 1.7\% \cdot (dur_i - 5)$
More than 10 and up to 20	$23.5\% + 1.2\% \cdot (dur_i - 10)$
More than 20	$\min(35.5\% + 0.5\% \cdot (dur_i - 20); 1)$

4.3.58. Bonds and loans for which a credit assessment by a nominated ECAI is not available and for which debtors have posted collateral, where the collateral of those bonds and loans meet the criteria set out in paragraphs 4.8.25 to 4.8.26, should be assigned a risk factor $stress_i$ according to the following:

- (a) where the risk-adjusted value of collateral is higher than or equal to the value of the bond or loan i , $stress_i$ should be equal to half of the risk factor that would be determined in accordance with paragraph 4.3.57;
- (b) where the risk-adjusted value of collateral is lower than the value of the bond or loan i , and where the risk factor determined in accordance with paragraph 4.3.57 would result in a value of the bond or loan i that is lower than the risk-adjusted value of the collateral, $stress_i$ should be equal to the average of the following:
 - (i) the risk factor determined in accordance with paragraph 4.3.57;
 - (ii) the difference between the value of the bond or loan i and the risk-adjusted value of the collateral, divided by the value of the bond or loan i ;
- (c) where the risk-adjusted value of collateral is lower than the value of the bond or loan i , and where the risk factor determined in accordance with paragraph 4.3.57 would result in a value of the bond or loan i that is higher than or equal to the risk-adjusted value of the collateral, $stress_i$ should be determined in accordance with paragraph 4.3.57.

The risk-adjusted value of the collateral should be calculated in accordance with paragraphs 4.4.38-4.4.50.

Simplified calculation for spread risk on bonds and loans

4.3.59. Where paragraph 2.2.5 is complied with, IORPs may calculate the value at risk for spread risk on bonds and loans referred to in paragraphs 4.3.54 to 4.3.58 as follows:

$$VaR_{bonds} = MV^{bonds} \cdot \left(\sum_i \%MV_i^{bonds} \cdot stress_i + \%MV_{norating}^{bonds} \cdot \min[dur_{norating} \cdot 0.03; 1] \right) + \Delta Liab_{DC}$$

where:

- (a) VaR_{bonds} denotes the value at risk for spread risk on bonds and loans;

- (b) MV^{bonds} denotes the value in accordance with section 3.9 of the assets subject to the value at risk for spread risk on bonds and loans;
- (c) $\%MV_i^{bonds}$ denotes the proportion of the portfolio of assets subject to the value at risk for spread risk on bonds and loans with credit quality step i, where a credit assessment by a nominated ECAI is available for those assets;
- (d) $\%MV_{norating}^{bonds}$ denotes the proportion of the portfolio of the assets subject to the value at risk for spread risk on bonds and loans for which no credit assessment by a nominated ECAI is available;
- (e) $dur_{norating}$ denotes the modified duration denominated in years of the assets subject to the value at risk for spread risk on bonds and loans where no credit assessment by a nominated ECAI is available;
- (f) $stress_i$ denotes a function of the credit quality step i and of the modified duration denominated in years of the assets subject to the value at risk for spread risk on bonds and loans with credit quality step i, set out in paragraph 4.3.60;
- (g) $\Delta Liab_{DC}$ denotes the increase in the technical provisions less risk margin for contracts where the members and beneficiaries bear the investment risk with embedded options and guarantees that would result from an instantaneous decrease in the value of the assets subject to the value at risk for spread risk on bonds and loans of:

$$MV^{bonds} \cdot \left(\sum_i \%MV_i^{bonds} \cdot stress_i + \%MV_{norating}^{bonds} \cdot \min[dur_{norating} \cdot 0.03; 1] \right)$$

4.3.60. $stress_i$ as referred to in point (f) of paragraph 4.3.59, for each credit quality step i, should be equal to:

$$dur_i \cdot b_i$$

where dur_i is the modified duration denominated in years of the assets subject to the value at risk for spread risk on bonds and loans with credit quality step i, and b_i is determined in accordance with the following table:

Credit quality step i	0	1	2	3	4	5	6
b_i	0.9%	1.1%	1.4%	2.5%	4.5%	7.5%	7.5%

4.3.61. $Dur_{norating}$ referred to in point (e) of paragraph 4.3.59 and dur_i referred to in paragraph 4.3.60 should not be lower than 1 year.

Spread risk on securitisation positions: general provisions

4.3.62. The value at risk for spread risk on securitisation positions ($Var_{securitisation}$) should be the sum of the value at risk for type 1 securitisation positions, the value at risk for type 2 securitisation positions and the value at risk for resecuritisation positions.

4.3.63. Type 1 securitisation positions should include securitisation positions that meet all of the following criteria:

- (a) the position has been assigned to credit quality step 3 or better;
- (b) the securitisation is listed in a regulated market of a country which is a member of the EEA or the OECD, or is admitted to trading in an organised trading venue providing for an active and sizable market for outright sales which has the following features:

- i. historical evidence of market breadth and depth as proven by low bid-ask spreads, high trading volume and a large number of market participants;
 - ii. the presence of a robust market infrastructure;
- (c) the position is in the most senior tranche or tranches of the securitisation and possesses the highest level of seniority at all times during the ongoing life of the transaction; for these purposes, a tranche should be deemed the most senior where after the delivery of an enforcement notice and where applicable an acceleration notice, the tranche is not subordinated to other tranches of the same securitisation transaction or scheme in respect of receiving principal and interest payments, without taking into account amounts due under interest rate or currency derivative contracts, fees or other similar payments;
 - (d) the underlying exposures have been acquired by the securitisation special purpose entity (SSPE) within the meaning of Article 4(1)(66) of Regulation (EU) No 575/2013¹² in a manner that is enforceable against any third party and are beyond the reach of the seller (originator, SSPE's sponsor or original lender) and its creditors including in the event of the seller's insolvency;
 - (e) the transfer of the underlying exposures to the SSPE may not be subject to any severe clawback provisions in the jurisdiction where the seller (originator, SSPE's sponsor or original lender) is incorporated; this includes but is not limited to provisions under which the sale of the underlying exposures can be invalidated by the liquidator of the seller (originator, SSPE's sponsor or original lender) solely on the basis that it was concluded within a certain period before the declaration of the seller's insolvency or provisions where the SSPE can prevent such invalidation only if it can prove that it was not aware of the insolvency of the seller at the time of sale;
 - (f) the underlying exposures have their administration governed by a servicing agreement which includes servicing continuity provisions to ensure, at a minimum, that a default or insolvency of the servicer does not result in a termination of servicing;
 - (g) the documentation governing the securitisation includes continuity provisions to ensure, at a minimum, the replacement of derivative counterparties and of liquidity providers upon their default or insolvency, where applicable;
 - (h) the securitisation position is backed by a pool of homogeneous underlying exposures, which all belong to only one of the following categories, or by a pool of homogeneous underlying exposures which combines residential loans referred to in points (i) and (ii):
 - (i) residential loans secured with a first-ranking mortgage granted to individuals for the acquisition of their main residence, provided that one of the two following conditions is met:
 - the loans in the pool meet on average the loan-to-value requirement laid down in point (i) of Article 129(1)(d) of Regulation (EU) No 575/2013;
 - the national law of the Member State where the loans were originated provides for a loan-to-income limit on the amount that an obligor may borrow in a residential loan. The loan-to-income limit should be calculated on the gross annual income of the obligor, taking into account the tax obligations and other commitments of the obligor and the risk of changes in the interest rates over the

¹² Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012, OJ L 176, 27.6.2013, p. 1.

term of the loan. For each residential loan in the pool, the percentage of the obligor's gross income that may be spent to service the loan, including interest, principal and fee payments, does not exceed 45%.

- (ii) fully guaranteed residential loans referred to in Article 129(1)(e) of Regulation (EU) No 575/2013, provided that the loans meet the collateralisation requirements laid down in that paragraph and meet on average the loan-to-value requirement laid down in point (i) of Article 129(1)(d) of Regulation (EU) No 575/2013;
 - (iii) commercial loans, leases and credit facilities to undertakings to finance capital expenditures or business operations other than the acquisition or development of commercial real estate, provided that at least 80 % of the borrowers in the pool in terms of portfolio balance are small and medium-sized enterprises at the time of issuance of the securitisation, and none of the borrowers is an institution as defined in Article 4(1)(3) of Regulation (EU) No 575/2013;
 - (iv) auto loans and leases for the financing of motor vehicles or trailers as defined in points (11) and (12) of Article 3 of Directive 2007/46/EC¹³, agricultural or forestry tractors as referred to in Directive 2003/37/EC¹⁴, motorcycles or motor tricycles as defined in points (b) and (c) of Article 1(2) of Directive 2002/24/EC¹⁵ or tracked vehicles as referred to in point (c) of Article 2(2) of Directive 2007/46/EC. Such loans or leases may include ancillary insurance and service products or additional vehicle parts, and in the case of leases, the residual value of leased vehicles. All loans and leases in the pool should be secured with a first-ranking charge or security over the vehicle or an appropriate guarantee in favour of the SSPE, such as a retention of title provision;
 - (v) loans and credit facilities to individuals for personal, family or household consumption purposes.
- (i) the position is not in a resecuritisation or a synthetic securitisation as referred to in Article 242(11) of Regulation (EU) No 575/2013;
 - (j) the underlying exposures do not include transferable financial instruments or derivatives, except financial instruments issued by the SSPE itself or other parties within the securitisation structure and derivatives used to hedge currency risk and interest rate risk;
 - (k) at the time of issuance of the securitisation or when incorporated in the pool of underlying exposures at any time after issuance, the underlying exposures do not include exposures to credit-impaired obligors (or where applicable, credit-impaired guarantors), where a credit-impaired obligor (or credit-impaired guarantor) is a borrower (or guarantor) who:
 - i. has declared bankruptcy, agreed with his creditors to a debt dismissal or reschedule or had a court grant his creditors a right of enforcement or

¹³ Directive 2007/46/EC of the European Parliament and of the Council of 5 September 2007 establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (Framework Directive), OJ L 263, 9.10.2007, p. 1

¹⁴ Directive 2003/37/EC of the European Parliament and of the Council of 26 May 2003 on type-approval of agricultural or forestry tractors, their trailers and interchangeable towed machinery, together with their systems, components and separate technical units and repealing Directive 74/150/EEC, OJ L 171, 9.7.2003, p. 1.

¹⁵ Directive 2002/24/EC of the European Parliament and of the Council of 18 March 2002 relating to the type-approval of two or three-wheel motor vehicles and repealing Council Directive 92/61/EEC, OJ L 124, 9.5.2002, p. 1.

- material damages as a result of a missed payment within three years prior to the date of origination;
- ii. is on an official registry of persons with adverse credit history;
 - iii. has a credit assessment by a rating agency or has a credit score indicating a significant risk that contractually agreed payments will not be made compared to the average obligor for this type of loans in the relevant jurisdiction.
- (l) at the time of issuance of the securitisation or when incorporated in the pool of underlying exposures at any time after issuance, the underlying exposures do not include exposures in default within the meaning of Article 178(1) of Regulation (EU) No 575/2013;
- (m) the repayment of the securitisation position is not structured to depend predominantly on the sale of assets securing the underlying exposures; however, this should not prevent such exposures from being subsequently rolled-over or refinanced;
- (n) where the securitisation has been set up without a revolving period or the revolving period has terminated and where an enforcement or an acceleration notice has been delivered, principal receipts from the underlying exposures are passed to the holders of the securitisation positions via sequential amortisation of the securitisation positions and no substantial amount of cash is trapped in the SSPE on each payment date;
- (o) where the securitisation has been set up with a revolving period, the transaction documentation provides for appropriate early amortisation events, which should include at a minimum all of the following:
- i. a deterioration in the credit quality of the underlying exposures;
 - ii. a failure to generate sufficient new underlying exposures of at least similar credit quality;
 - iii. the occurrence of an insolvency-related event with regard to the originator or the servicer;
- (p) at the time of issuance of the securitisation, the borrowers (or, where applicable, the guarantors) have made at least one payment, except where the securitisation is backed by credit facilities referred to in point (h)(v);
- (q) in the case of securitisations where the underlying exposures are residential loans referred to in point (h)(i) or (ii), the pool of loans does not include any loan that was marketed and underwritten on the premise that the loan applicant or, where applicable intermediaries, were made aware that the information provided might not be verified by the lender;
- (r) in the case of securitisations where the underlying exposures are residential loans referred to in point (h)(i) or (ii), the assessment of the borrower's creditworthiness meets the requirements set out in paragraphs 1 to 4, 5(a), and 6 of Article 18 of Directive 2014/17/EU¹⁶ or equivalent requirements in countries that are not members of the Union;
- (s) in the case of securitisations where the underlying exposures are auto loans and leases and consumer loans and credit facilities referred to in point (h)(v), the

¹⁶ Directive 2014/17/EU of the European Parliament and of the Council of 4 February 2014 on credit agreements for consumers relating to residential immovable property and amending Directives 2008/48/EC and 2013/36/EU and Regulation (EU) No 1093/2010, OJ L 60, 28.2.2014, p. 34.

assessment of the borrower's creditworthiness meets the requirements set out in Article 8 of Directive 2008/48/EC¹⁷ or equivalent requirements in countries that are not members of the Union;

- (t) where the issuer, originator or SSPE's sponsor of the securitisation is established in the Union, it complies with the requirements laid down in Part Five of Regulation (EU) No. 575/2013 and discloses information, in accordance with Article 8b of Regulation (EU) No 1060/2009¹⁸, on the credit quality and performance of the underlying exposures, the structure of the transaction, the cash flows and any collateral supporting the exposures as well as any information that is necessary for investors to conduct comprehensive and well-informed stress tests; where the issuer, originator and sponsors are established outside the Union, comprehensive loan-level data in compliance with standards generally accepted by market participants is made available to existing and potential investors and regulators at issuance and on a regular basis.

4.3.64. Type 2 securitisation positions should include all securitisation positions that do not qualify as type 1 securitisation positions.

Spread risk on securitisation positions: calculation of the value at risk

4.3.65. The value at risk for spread risk on type 1 securitisation positions should be equal to the loss in the excess of assets over liabilities that would result from an instantaneous relative decrease of $stress_i$ in the value of each type 1 securitisation position i . The risk factor $stress_i$ should be equal to the following:

$$stress_i = \min(b_i \cdot dur_i; 1)$$

where:

- (a) dur_i denotes the modified duration of securitisation position i denominated in years;
- (b) b_i should be assigned depending on the credit quality step of securitisation position i according to the following table:

Credit quality step	0	1	2	3
b_i	2.1%	3%	3%	3%

4.3.66. The value at risk for spread risk on type 2 securitisation positions should be equal to the loss in the excess of assets over liabilities that would result from an instantaneous relative decrease of $stress_i$ in the value of each type 2 securitisation position i . The risk factor $stress_i$ should be equal to the following

$$stress_i = \min(b_i \cdot dur_i; 1)$$

where:

- (a) dur_i denotes the modified duration of securitisation position i denominated in years;
- (b) b_i should be assigned depending on the credit quality step of securitisation position i according to the following table:

¹⁷ Directive 2008/48/EC of the European Parliament and of the Council of 23 April 2008 on credit agreements for consumers and repealing Council Directive 87/102/EEC, OJ L 133, 22.5.2008, p. 66.

¹⁸ Regulation (EU) No 1060/2009 of the European Parliament and of the Council of 16 September 2009 on credit rating agencies, OJ L 302, 17.11.2009, p. 1.

Credit quality step	0	1	2	3	4	5	6
b_i	12.5%	13.4%	16.6%	19.7%	82%	100%	100%

4.3.67. The value at risk for spread risk on resecuritisation positions should be equal to the loss in the excess of assets over liabilities that would result from an instantaneous relative decrease of $stress_i$ in the value of each resecuritisation position i . The risk factor $stress_i$ should be equal to the following

$$stress_i = \min(b_i \cdot dur_i; 1)$$

where:

- (a) dur_i denotes the modified duration of resecuritisation position i denominated in years;
- (b) b_i should be assigned depending on the credit quality step of resecuritisation position i according to the following table:

Credit quality step	0	1	2	3	4	5	6
b_i	33%	40%	51%	91%	100%	100%	100%

4.3.68. The modified duration dur_i referred to in paragraphs 4.3.65 to 4.3.67 should not be lower than 1 year.

4.3.69. Securitisation positions for which a credit assessment by a nominated ECAI is not available should be assigned a risk factor $stress_i$ of 100%.

Spread risk on credit derivatives

4.3.70. The value at risk for spread risk on credit derivatives (VaR_{cd}) other than those referred to in paragraph 4.3.73 should be equal to the higher of the following values at risk:

- (a) the loss in the excess of assets over liabilities that would result from an instantaneous increase in absolute terms of the credit spread of the instruments underlying the credit derivatives;
- (b) the loss in the excess of assets over liabilities that would result from an instantaneous relative decrease of the credit spread of the instruments underlying the credit derivatives by 75%.

4.3.71. For the purposes of point (a) of paragraph 4.3.70, the instantaneous increase of the credit spread of the instruments underlying the credit derivatives for which a credit assessment by a nominated ECAI is available should be calculated according to the following table.

Credit quality step	0	1	2	3	4	5	6
Instantaneous increase in spread (in percentage points)	1.3	1.5	2.6	4.5	8.4	16.20	16.20

4.3.72. For the purposes of point (a) of paragraph 4.3.70, the instantaneous increase of the credit spread of the instruments underlying the credit derivatives for

which a credit assessment by a nominated ECAI is not available should be 5 percentage points.

- 4.3.73. Credit derivatives which are part of the IORP's risk mitigation policy should not be included in the value at risk for spread risk, as long as the IORP holds either the instruments underlying the credit derivative or another exposure with respect to which the basis risk between that exposure and the instruments underlying the credit derivative is not material in any circumstances.
- 4.3.74. Where the larger of the values at risk referred to in points (a) and (b) of paragraph 4.3.70 and the larger of the corresponding values at risk calculated in accordance with paragraph 4.7.17 (i.e. including the loss-absorbing capacity of technical provisions and security mechanisms) are not based on the same scenario, the value at risk for spread risk on credit derivatives should be the value at risk for which the underlying scenario results in the largest corresponding value at risk calculated in accordance with paragraph 4.7.17.

Specific exposures

- 4.3.75. Exposures in the form of bonds referred to Article 52(4) of Directive 2009/65/EC¹⁹ (covered bonds) which have been assigned to credit quality step 0 or 1 should be assigned a risk factor stress_i according to the following table:

Credit quality step \ Duration (dur_i)	0	1
Up to 5	$0.7\% \cdot dur_i$	$0.9\% \cdot dur_i$
More than 5 years	$\min(3.5\% + 0.5\% \cdot (dur_i - 5); 1)$	$\min(4.5\% + 0.5\% \cdot (dur_i - 5); 1)$

- 4.3.76. Exposures in the form of bonds and loans to the following should be assigned a risk factor stress_i of 0%:

- (a) the European Central Bank;
- (b) Member States' central government and central banks denominated and funded in the domestic currency of that central government and the central bank;
- (c) multilateral development banks referred to in paragraph 2 of Article 117 of Regulation (EU) No 575/2013;
- (d) international organisations referred to in Article 118 of Regulation (EU) No 575/2013;

Exposures in the form of bonds and loans that are fully, unconditionally and irrevocably guaranteed by one of the counterparties mentioned in points (a) to (d) above, where the guarantee meets the requirements set out in paragraph 4.8.27, should also be assigned a risk factor stress_i of 0%.

- 4.3.77. Exposures in the form of bonds and loans to central governments and central banks other than those referred to in point (b) of paragraph 4.3.76,

¹⁹ Directive 2009/65/EC of the European Parliament and of the Council of 13 July 2009 on the coordination of laws, regulations and administrative provisions relating to undertakings for collective investment in transferable securities (UCITS), OJ L 302, 17.11.2009, p. 32.

denominated and funded in the domestic currency of that central government and central bank, and for which a credit assessment by a nominated ECAI is available should be assigned a risk factor stress_i depending on the credit quality step and the duration of the exposure according to the following table:

Credit quality step		0 and 1		2		3		4		5 and 6	
Duration (dur _i)	stress _i	a _i (%)	b _i (%)	a _i (%)	b _i (%)	a _i (%)	b _i (%)	a _i (%)	b _i (%)	a _i (%)	b _i (%)
up to 5	$b_i \cdot dur_i$	-	0.0	-	1.1	-	1.4	-	2.5	-	4.5
More than 5 and up to 10	$a_i + b_i \cdot (dur_i - 5)$	0.0	0.0	5.5	0.6	7.0	0.7	12.5	1.5	22.5	2.5
More than 10 and up to 15	$a_i + b_i \cdot (dur_i - 10)$	0.0	0.0	8.4	0.5	10.5	0.5	20.0	1.0	35.0	1.8
More than 15 and up to 20	$a_i + b_i \cdot (dur_i - 15)$	0.0	0.0	10.9	0.5	13.0	0.5	25.0	1.0	44.0	0.5
More than 20	$\min[a_i + b_i \cdot (dur_i - 20); 1]$	0.0	0.0	13.4	0.5	15.5	0.5	30.0	0.5	46.5	0.5

4.3.78. Exposures in the form of bonds and loans to an insurance or reinsurance undertaking for which a credit assessment by a nominated ECAI is not available and where this undertaking meets its Minimum Capital Requirement, should be assigned a risk factor stress_i from the table in paragraph 4.3.56 depending on the undertaking's solvency ratio, using the following mapping between solvency ratios and credit quality steps:

Solvency ratio	196%	175%	122%	95%	75%	75%
Credit quality step	1	2	3	4	5	6

Where the solvency ratio falls in between the solvency ratios set out in the table above, the value of stress_i should be linearly interpolated from the closest values of stress_i corresponding to the closest solvency ratios set out in the table above. Where the solvency ratio is lower than 75%, stress_i should be equal to the factor corresponding to the credit quality steps 5 and 6. Where the solvency ratio is higher than 196% stress_i should be the same as the factor corresponding to the credit quality step 1.

For the purposes of this paragraph, 'solvency ratio' denotes the ratio of the eligible amount of own funds to cover the Solvency Capital Requirement and the Solvency Capital Requirement, using the latest available values.

4.3.79. Exposures in the form of bonds and loans to an insurance or reinsurance undertaking which does not meet its Minimum Capital Requirement should be assigned a risk factor stress_i according to the following table:

Duration (dur_i)	Risk factor stress _i
Up to 5	$7.5\% \cdot dur_i$
More than 5 and up to 10	$37.50\% + 4.20\% \cdot (dur_i - 5)$
More than 10 and up to 15	$58.50\% + 0.50\% \cdot (dur_i - 10)$
More than 15 and up to 20	$61\% + 0.5\% \cdot (dur_i - 15)$
More than 20	$\min(63.5\% + 0.5\% \cdot (dur_i - 20); 1)$

- 4.3.80. Exposures in the form of bonds and loans to a third country insurance or reinsurance undertaking for which a credit assessment by a nominated ECAI is not available, situated in a country whose solvency regime is deemed equivalent to that laid down in Directive 2009/138/EC²⁰ (Solvency II Directive), in accordance with Article 227 thereof, and which complies with the solvency requirements of that third country, should be assigned the same risk factor as the ones that would result from the application of paragraph 4.3.77 to exposures to an insurance or reinsurance undertaking whose solvency ratio is 100%.
- 4.3.81. Exposures in the form of bonds and loans to credit institutions and financial institutions within the meaning of points (1) and (26) of Article 4(1) of Regulation (EU) No 575/2013 which comply with the solvency requirements set out in Directive 2013/36/EU²¹ and Regulation (EU) No 575/2013, for which a credit assessment by a nominated ECAI is not available, should be assigned the same risk factor as the ones that would result from the application of paragraph 4.3.78 to exposures to an insurance or reinsurance undertaking whose solvency ratio is 100%
- 4.3.82. The value at risk for spread risk on credit derivatives where the underlying financial instrument is a bond or a loan to any exposure listed in paragraph 4.3.76 should be nil.
- 4.3.83. Type 1 securitisation positions which are fully, unconditionally and irrevocably guaranteed by the European Investment Fund or the European Investment Bank, where the guarantee meets the requirements set out in paragraph 4.8.27, should be assigned a risk factor stress_i of 0%.

4.3.6. Market risk concentrations risk sub-module

- 4.3.84. The scope of the market risk concentration sub-module excludes assets considered in the counterparty default risk module. As an example, risks derived from concentration in cash held at a bank are captured in the counterparty default risk module, while risks corresponding to concentration in other bank assets should be reflected in the concentration risk sub-module.
- 4.3.85. An appropriate assessment of concentration risks should consider both the direct and indirect exposures derived from the investments included in the scope of this sub-module.

²⁰ Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II), OJ L 335, 17.12.2009, p. 1.

²¹ Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC, OJ L 176, 27.6.2013, p. 338.

- 4.3.86. For the sake of simplicity and consistency, the definition of market risk concentrations regarding financial investments is restricted to the risk regarding the accumulation of exposures with the same counterparty. It does not include other types of concentrations (e.g. geographical area, industry sector, et cetera).

Single name exposure

- 4.3.87. The value at risk for market risk concentration should be calculated on the basis of single name exposures. For this purpose exposures to counterparties which belong to the same corporate group should be treated as a single name exposure. Similarly, immovable properties which are located in the same building should be considered as a single immovable property.
- 4.3.88. The exposure at default to a counterparty should be the sum of the exposures to this counterparty.
- 4.3.89. The exposure at default to a single name exposure should be the sum of the exposures at default to all counterparties that belong to the single name exposure.
- 4.3.90. The weighted average credit quality step on a single name exposure should be equal to the rounded-up average of the credit quality steps of all exposures to all counterparties that belong to the single name exposure, weighted by the value of each exposure.
- 4.3.91. For the purpose of paragraph 4.3.90, exposures for which a credit assessment by a nominated ECAI is not available should be assigned to credit quality step 5.

Calculation of the value at risk for market risk concentration

- 4.3.92. The value at risk for market risk concentration is equal to the following:

$$VaR_{conc} = \sqrt{\sum_i Conc_i^2}$$

where:

- (a) the sum covers all single name exposures i ;
 - (b) $Conc_i$ denotes the value at risk for market risk concentration on a single name exposure i .
- 4.3.93. For each single name exposure i , the value at risk for market risk concentration $Conc_i$ is equal to the loss in excess of assets over liabilities that would result from an instantaneous decrease in the value of the assets corresponding to the single name exposure i equal to the following:

$$XS_i \cdot g_i$$

where:

- (a) XS_i is the excess exposure referred to in paragraphs 4.3.94-4.3.96;
- (b) g_i is the risk factor for market risk concentration referred to in paragraphs 4.3.98-4.3.108.

Excess exposure

- 4.3.94. The excess exposure on a single name exposure i is equal to the following:

$$XS_i = \max(0; E_i - CT_i \cdot Assets)$$

where:

- (a) E_i denotes the exposure at default to single name exposure i that is included in the calculation base of the market risk concentrations sub-module;
- (b) Assets denotes the calculation base of the market risk concentrations sub-module referred to in paragraph 4.3.95;
- (c) CT_i denotes the relative excess exposure threshold referred to in paragraph 4.3.97.

4.3.95. The calculation base of the market risk concentration sub-module is equal to the value of all assets held by the IORP, excluding the following:

- a) assets held in respect of DC schemes where the investment risk is fully borne by the members and beneficiaries;
- b) exposures included in the scope of the counterparty default risk module;
- c) deferred tax assets;
- d) intangible assets.

4.3.96. The exposure at default on a single name exposure i should be reduced by the amount of the exposure at default to counterparties belonging to that single name exposure and for which the risk factor for market risk concentration referred to in paragraphs 4.3.98-4.3.108 is 0%

Relative excess exposure thresholds

4.3.97. Each single name exposure i should be assigned, in accordance with the following table, a relative excess exposure threshold depending on the weighted average credit quality step of the single name exposure i , calculated in accordance with paragraph 4.3.90.

Weighted average credit quality step of single name exposure i	0	1	2	3	4	5	6
Relative excess exposure threshold CT_i	3%	3%	3%	1.5%	1.5%	1.5%	1.5%

Risk factor for market risk concentration

4.3.98. Each single name exposure i should be assigned, in accordance with the following table, a risk factor g_i for market risk concentration depending on the weighted average credit quality step of the single name exposure i , calculated in accordance with paragraph 4.3.90.

Weighted average credit quality step of single name exposure i	0	1	2	3	4	5	6
Risk factor g_i	12%	12%	21%	27%	73%	73%	73%

4.3.99. Single name exposure to an insurance or reinsurance undertaking for which a credit assessment by a nominated ECAI is not available and where the undertaking meets its Minimum Capital Requirement, should be assigned a risk factor g_i for market risk concentration depending on the undertaking's solvency ratio in accordance with the following table:

Solvency ratio	95%	100%	122%	175%	196%
Risk factor g_i	73%	64.5%	27%	21%	12%

Where the solvency ratio falls in between the solvency ratios set out in the table above, the value of g_i should be linearly interpolated from the closest values of g_i corresponding to the closest solvency ratios set out in the table above. Where the solvency ratio is lower than 95%, the risk factor g_i should be equal to 73%. Where the solvency ratio is higher than 196%, the risk factor g_i should be equal to 12%.

For the purposes of this paragraph, 'solvency ratio' denotes the ratio of the eligible amount of own funds to cover the Solvency Capital Requirement and the Solvency Capital Requirement, using the latest available values.

- 4.3.100. Single name exposures to insurance or reinsurance undertakings which do not meet their Minimum Capital Requirement, should be assigned a risk factor g_i equal to 73%.
- 4.3.101. Single name exposures to a third country insurance or reinsurance undertaking, for which a credit assessment by a nominated ECAI is not available, situated in the country whose solvency regime is deemed equivalent pursuant to Article 227 of the Solvency II Directive, and which complies with the solvency requirements of that third country, should be assigned a risk factor g_i of 64.5%.
- 4.3.102. Single name exposures to credit institutions and financial institutions within the meaning of points (1) and (26) of Article 4(1) of Regulation EU No 575/2013 and which comply with the solvency requirements set out in Directive 2013/36/EU and Regulation (EU) No 575/2013, for which a credit assessment by a nominated ECAI is not available, should be assigned a risk factor g_i of 64.5%.
- 4.3.103. Single name exposures other than those identified in paragraphs 4.3.98-4.3.102 should be assigned a risk factor g_i of 73%.

Specific exposures

- 4.3.104. Exposures in the form of bonds as referred to in Article 52(4) of Directive 2009/65/EC (covered bonds) should be assigned a relative excess exposure threshold CT_i of 15%, provided that the corresponding exposures in the form of covered bonds have been assigned to credit quality step 0 or 1. Exposures in the form of covered bonds should be considered as single name exposures regardless of other exposures to the same counterparty as the issuer of the covered bonds, which constitute a distinct single name exposure.
- 4.3.105. Exposures to a single immovable property should be assigned a relative exposure threshold CT_i of 10% and a risk factor g_i of 12%.
- 4.3.106. Exposures to the following should be assigned a risk factor g_i of 0%:
- (a) the European Central Bank;
 - (b) Member States' central government and central banks denominated and funded in the domestic currency of that central government and central bank;
 - (c) multilateral development banks referred to in Article 117(2) of Regulation (EU) No 575/2013;

(d) international organisations as referred to in Article 118 of Regulation (EU) No 575/2013.

Exposures that are fully, unconditionally and irrevocably guaranteed by one of the counterparties mentioned in points (a) to (d), where the guarantee meets the requirements set out in paragraph 4.8.27, should also be assigned a risk factor g_i of 0%.

4.3.107. Exposures to central governments and central banks other than those referred to in point (b) of paragraph 4.3.106, denominated and funded in the domestic currency of that central government and central bank, should be assigned a risk factor g_i depending on their weighted average credit quality steps, in accordance with the following table:

Weighted average credit quality step of single name exposure i	0	1	2	3	4	5	6
Risk factor g_i	0%	0%	12%	21%	27%	73%	73%

4.3.108. Exposures in the form of bank deposits should be assigned a risk factor g_i of 0%, provided they meet all of the following requirements:

- (a) the full value of the exposure is covered by a government guarantee scheme in the Union;
- (b) the guarantee covers the IORP without any restriction;
- (c) there is no double counting of such guarantee in the calculation of the Standardised Value at Risk (SVaR).

4.3.7. Currency risk sub-module

4.3.109. Currency risk arises from changes in the level or volatility of currency exchange rates. IORPs should assume that the stresses applied in this sub-module do not impact on the interest rate curve used for valuing technical provisions.

4.3.110. IORPs may be exposed to currency risk arising from various sources, including their investment portfolios, liabilities, investments in related undertakings and other assets. The design of the currency risk sub-module is intended to take into account currency risk for an IORP arising from all possible sources.

4.3.111. For each relevant foreign currency, the currency position should include any investment in foreign instruments where the currency risk is not hedged. This is because the stresses for interest rate, equity, spread and property risks have not been designed to incorporate currency risk.

4.3.112. The value at risk for currency risk referred to paragraph 4.3.3 should be equal to the sum of the values at risk for currency risk for each foreign currency. Investments in type 1 equities referred to in paragraph 4.3.35 and type 2 equities referred to in paragraph 4.3.36 which are listed in stock exchanges operating with different currencies should be assumed to be sensitive to the currency of its main listing. Type 2 equities referred to in paragraph 4.3.36 which are not listed should be assumed to be sensitive to the currency of the country in which the issuer has its main operations. Immovable property should be assumed to be sensitive to the currency of the country in which it is located. For the purposes of the currency risk sub-module, foreign currencies

should be currencies other than the currency used for the preparation of the IORP's financial statements ('the local currency').

4.3.113. For each foreign currency, the value at risk for currency risk should be equal to the larger of the following values at risk:

- (a) the value at risk for the risk of an increase in value of the foreign currency against the local currency;
- (b) the value at risk for the risk of a decrease in value of the foreign currency against the local currency.

4.3.114. The value at risk for the risk of an increase in value of a foreign currency against the local currency should be equal to the loss in the excess of assets over liabilities that would result from an instantaneous increase of 25% in the value of the foreign currency against the local currency.

4.3.115. The value at risk for the risk of a decrease in value of a foreign currency against the local currency should be equal to the loss in the excess of assets over liabilities that would result from an instantaneous decrease of 25% in the value of the foreign currency against the local currency.

4.3.116. Where the larger of the values at risk referred to in points (a) and (b) of paragraph 4.3.113 and the largest of the corresponding values at risk calculated in accordance with paragraph 4.7.17 (i.e. including the loss-absorbing capacity of technical provisions and security mechanisms) are not based on the same scenario, the value at risk for currency risk on a given currency should be the value at risk referred to in points (a) and (b) of paragraph 4.3.113 for which the underlying scenario results in the largest corresponding value at risk calculated in accordance with paragraph 4.7.17.

Simplified calculation of the value at risk for currency risk

4.3.117. Where paragraph 2.2.5 is complied with, and where foreign currency exposure of liabilities of the IORP is immaterial, IORPs may calculate the value at risk for currency risk directly as the loss in excess of assets over liabilities that would result from an instantaneous decrease of 25% in the value of the foreign currency against the local currency, as referred to in paragraph 4.3.115.

4.4. Counterparty default risk module

4.4.1. General provisions

4.4.1. Counterparty default risk is the risk of loss due to unexpected default or deterioration in the credit standing of the counterparties and debtors of IORPs over the forthcoming twelve months. The scope of the counterparty default risk module includes risk-mitigating contracts, such as (re)insurance arrangements, securitisations and derivatives, and receivables from intermediaries, as well as any other credit exposures which are not covered in the spread risk sub-module. The scope also includes sponsor support.

4.4.2. For each counterparty, the counterparty default risk module should take account of the overall counterparty risk exposure of the IORP concerned to that counterparty, irrespective of the legal form of its contractual obligations to that IORP.

4.4.3. A differentiation of two kinds of exposures, in the following denoted by type 1 and type 2 exposures, and a different treatment according to their characteristics should be applied.

4.4.4. The value at risk for counterparty default risk is equal to the following:

$$VaR_{def} = \sqrt{VaR_{(def,1)}^2 + 1.5 \cdot VaR_{(def,1)} \cdot VaR_{(def,2)} + VaR_{(def,2)}^2}$$

where:

- (a) $VaR_{(def,1)}$ = denotes the value at risk for counterparty default risk on type 1 exposures as set out in paragraph 4.4.5;
- (b) $VaR_{(def,2)}$ = denotes the value at risk for counterparty default risk of type 2 exposures as set out in paragraph 4.4.6.

4.4.5. Type 1 exposures should consist of exposures in relation to the following:

- (a) Sponsor support;
- (b) Risk-mitigation contracts including reinsurance arrangements, special purpose vehicles, insurance securitisations and derivatives;
- (c) Cash at bank as defined in Article 6 item F of Council Directive 91/674/EEC²²;
- (d) Deposits with ceding undertakings, where the number of single name exposures does not exceed 15;
- (e) Commitments received by an IORP which have been called up but are unpaid, where the number of single name exposures does not exceed 15, including called up but unpaid ordinary share capital and preference shares, called up but unpaid legally binding commitments to subscribe and pay for subordinated liabilities, called up but unpaid initial funds, sponsor contributions, called up but unpaid guarantees, called up but unpaid letters of credit, called up but unpaid claims which IORPs may have against their sponsors by way of a call for supplementary contributions;
- (f) Legally binding commitments which the IORP has provided or arranged and which may create payment obligations depending on the credit standing or default on a counterparty including guarantees, letters of credit, letters of comfort which the IORP has provided.

For the purpose of point (a), sponsor support should not be taken into account as a type 1 exposure where the IORP is eligible to the balancing item approach in the valuation of legally enforceable unlimited sponsor support.

4.4.6. Type 2 exposures should consist of all credit exposures which are not covered in the spread risk sub-module and which are not type 1 exposures, including the following:

- (a) Receivables from intermediaries;
- (b) Members and beneficiaries debtors;
- (c) Mortgage loans which meet the requirements in paragraphs 4.4.13-4.4.23;
- (d) Deposits with ceding undertakings, where the number of single name exposures exceeds 15;
- (e) Commitments received by an IORP which have been called up but are unpaid as referred to in paragraph 4.4.5(e), where the number of single name exposures exceeds 15.

²² Council Directive 91/674/EEC of 19 December 1991 on the annual accounts and consolidated accounts of insurance undertakings, OJ L 374, 31.12.1991, p. 7.

- 4.4.7. IORPs may, at their discretion, consider all exposures referred to in points (d) and (e) of paragraph 4.4.6 as type 1 exposures, regardless of the number of single name exposures.
- 4.4.8. Where a letter of credit, a guarantee or an equivalent risk mitigation technique has been provided to fully secure an exposure and this risk mitigation technique complies with the requirements of paragraphs 4.8.2-4.8.14 and 4.8.17-4.8.27, then the provider of that letter of credit, guarantee or equivalent risk mitigation technique may be considered as the counterparty on the secured exposure for the purposes of assessing the number of single name exposures.
- 4.4.9. The following credit risks should not be covered in the counterparty default risk module:
- (a) the credit risk transferred by a credit derivative;
 - (b) the credit risk on debt issuance by special purpose vehicles;
 - (c) the credit risk on mortgage loans which do not meet the requirements in paragraphs 4.4.13-4.4.20.
- 4.4.10. Investment guarantees on insurance contracts provided to members and beneficiaries by a third party and for which the IORP would be liable should the third party default should be treated as derivatives in the counterparty default risk module.

Single name exposures

- 4.4.11. The value at risk for counterparty default risk should be calculated on the basis of single name exposures. For that purpose exposures to undertakings which belong to the same corporate group should be treated as a single name exposure.

Mortgage loans

- 4.4.12. Retail loans secured by mortgages on residential property (mortgage loans) should be treated as type 2 exposures under the counterparty default risk module provided the requirements in paragraphs 4.4.13-4.4.23 are met.
- 4.4.13. The exposure should be either to a natural person or persons or to a small or medium sized enterprise.
- 4.4.14. The exposure should be one of a significant number of exposures with similar characteristics such that the risks associated with such lending are substantially reduced.
- 4.4.15. The total amount owed to the IORP, including any exposure in default, by the counterparty or other connected third party, should not, to the knowledge of the IORP, exceed EUR 1 million. The IORP should take reasonable steps to acquire this knowledge.
- 4.4.16. The residential property is or will be occupied or let by the owner.
- 4.4.17. The value of the property does not materially depend upon the credit quality of the borrower.
- 4.4.18. The risk of the borrower does not materially depend upon the performance of the underlying property, but on the underlying capacity of the borrower to repay the debt from other sources, and as a consequence, the repayment of the facility does not materially depend on any cash flow generated by the underlying property serving as collateral. For those other sources, the IORP

should determine a maximum loan-to-income ratio as part of its lending policy and obtain suitable evidence of the relevant income when granting the loan.

4.4.19. All of the following requirements on legal certainty should be met:

- (a) a mortgage or charge is enforceable in all jurisdictions which are relevant at the time of the conclusion of the credit agreement and should be properly filed on a timely basis;
- (b) all legal requirements for establishing the pledge have been fulfilled;
- (c) the protection agreement and the legal process underpinning it enable the IORP to realise the value of the protection within a reasonable timeframe.

4.4.20. All of the following requirements on the monitoring of property values and on property valuation should be met:

- (a) the IORP monitors the value of the property on a frequent basis and at a minimum once every three years. The IORP carries out more frequent monitoring where the market is subject to significant changes in conditions;
- (b) the property valuation is reviewed when information available to the IORP indicates that the value of the property may have declined materially relative to general market prices and that review is external and independent and carried out by a valuer who possesses the necessary qualifications, ability and experience to execute a valuation and who is independent from the credit decision process.

4.4.21. For the purposes of paragraph 4.4.20, IORPs may use statistical methods to monitor the value of the property and to identify property that needs revaluation.

4.4.22. The IORP should clearly document the types of residential property they accept as collateral and their lending policies in this regard. The IORP should require the independent valuer of the market value of the property, as referred to in paragraph 4.4.48, to document that market value in a transparent and clear manner.

4.4.23. The IORP should have in place procedures to monitor that the property taken as credit protection is adequately insured against the risk of damage.

Loss-given-default

4.4.24. The loss-given-default on a single name exposure should be equal to the sum of the loss-given-default on each of the exposures to counterparties belonging to the single name exposure. The loss-given-default should be net of the liabilities towards counterparties belonging to the single name exposure provided that those liabilities and exposures are set off in the case of default of the counterparties and provided that paragraphs 4.8.2-4.8.8 are complied with in relation to that right of set-off. No offsetting should be allowed for if the liabilities are expected to be met before the credit exposure is cleared.

4.4.25. The loss-given-default on the sponsor should be equal to the following:

$$LGD = \max[95\% \cdot (SponsorSupport + LAC_{SPS}); 0]$$

where:

- (a) SponsorSupport denotes the value of sponsor support calculated in accordance with section 3.6;
- (b) LAC_{SPS} denotes the amount of the loss absorbing capacity of sponsor support.

4.4.26. The loss-given-default on a reinsurance arrangement or insurance securitisation should be equal to the following:

$$LGD = \max[50\% \cdot (Recoverables + 50\% \cdot RM_{re}) - F \cdot Collateral; 0]$$

where:

- (a) Recoverables denotes the best estimate of amounts recoverable from the reinsurance arrangement or insurance securitisation and the corresponding debtors;
- (b) RM_{re} denotes the risk mitigating effect on pension liability risk of the reinsurance arrangement or securitisation;
- (c) Collateral denotes the risk-adjusted value of collateral in relation to the reinsurance arrangement or securitisation;
- (d) F denotes a factor to take into account the economic effect of the collateral arrangement in relation to the reinsurance arrangement or securitisation in case of any credit event related to the counterparty.

Where the reinsurance arrangement is with an insurance or reinsurance undertaking or a third country insurance or reinsurance undertaking and 60% or more of that counterparty's assets are subject to collateral arrangements, the loss-given-default should be equal to the following:

$$LGD = \max[90\% \cdot (Recoverables + 50\% \cdot RM_{re}) - F' \cdot Collateral; 0]$$

where:

F' denotes a factor to take into account the economic effect of the collateral arrangement in relation to the reinsurance arrangement or securitisation in the case of a credit event related to the counterparty.

4.4.27. The loss-given-default on a derivative should be equal to the following:

$$LGD = \max[90\% \cdot (Derivative + RM_{fin}) - F' \cdot Collateral; 0]$$

where:

- (a) Derivative denotes the value of the derivative in accordance with section 3.9;
- (b) RM_{fin} denotes the risk mitigating effect on market risk of the derivative;
- (c) Collateral denotes the risk-adjusted value of collateral in relation to the derivative;
- (d) F' denotes a factor to take into account the economic effect of the collateral arrangement in relation to the derivative in case of a credit event related to the counterparty.

4.4.28. The loss-given-default on a mortgage loan should be equal to the following:

$$LGD = \max(Loan - 80\% \cdot Mortgage; 0)$$

where:

- (a) Loan denotes the value of the mortgage loan in accordance with section 3.9;
- (b) Mortgage denotes the risk-adjusted value of the mortgage.

4.4.29. The loss-given-default on a legally binding commitment as referred to in paragraph 4.4.5 should be equal to the difference between its nominal value and its value in accordance with section 3.9.

4.4.30. The loss-given-default on cash at bank as defined in Article 6 item F of Council Directive 91/674/EEC, of a deposit with a ceding undertaking, of an item listed

in paragraph 4.4.5(e) or paragraph 4.4.6(e), or of a receivable from an intermediary or member or beneficiary debtor, as well as any other exposure not listed elsewhere in paragraphs 4.4.24-4.4.29 should be equal to its value in accordance with section 3.9.

Simplified calculation — grouping of single name exposures

4.4.31. Where paragraph 2.2.5 is complied with, IORPs may calculate the loss-given-default set out in paragraphs 4.4.24-4.4.30 for a group of single name exposures. In that case, the group of single name exposures should be assigned the highest probability of default assigned to single name exposures included in the group in accordance with paragraphs 4.4.51-4.4.60.

Risk mitigating effect

4.4.32. The risk-mitigating effect on pension liability or market risks of a (re)insurance arrangement, securitisation or derivative should be the larger of zero and the difference between the following values at risk:

- (a) the hypothetical value at risk for pension liability or market risk of the IORP that would apply if the (re)insurance arrangement, securitisation or derivative did not exist;
- (b) the value at risk for pension liability or market risk of the IORP.

Simplified calculation of the risk mitigating effect for (re)insurance arrangements or securitisation

4.4.33. Where paragraph 2.2.5 is complied with, IORPs may calculate the risk-mitigating effect on pension liability risk of a (re)insurance arrangement or securitisation referred to in paragraph 4.4.32 as follows:

$$RM_{re,all} \cdot \frac{Recoverables_i}{Recoverables_{all}}$$

where:

- (a) $RM_{re,all}$ denotes the risk mitigating effect on pension liability risk of the (re)insurance arrangements and securitisations for all counterparties calculated in accordance with paragraph 4.4.34;
 - (b) $Recoverables_i$ denotes the best estimate of amounts recoverable from the (re)insurance arrangement or securitisation and the corresponding debtors for counterparty i and $Recoverables_{all}$ denotes the best estimate of amounts recoverable from the (re)insurance arrangements and securitisations and the corresponding debtors for all counterparties.
- 4.4.34. The risk mitigating effect on pension liability risk of the (re)insurance arrangements and securitisations for all counterparties referred to in paragraph 4.4.33 is the difference between the following values at risk:
- (a) the hypothetical value at risk for pension liability risk of the IORP if none of the (re)insurance arrangements and securitisations exist;
 - (b) the value at risk for pension liability risk of the IORP.

Simplified calculation of the risk mitigating effect for proportional (re)insurance arrangements

4.4.35. Where paragraph 2.2.5 is complied with, IORPs may calculate the risk-mitigating effect on pension liability risk j of a proportional (re)insurance arrangement for counterparty i referred to in paragraph 4.4.32 as follows:

$$\frac{Recoverables_i}{BE - Recoverables_{all}} \cdot VaR_j$$

where:

- (a) BE denotes the best estimate of pension obligations gross of the amounts recoverable;
- (b) Recoverables_i denotes the best estimate of amounts recoverable from the proportional (re)insurance arrangement and the corresponding debtors for counterparty i;
- (c) Recoverables_{all} denotes the best estimate of amounts recoverable from the proportional (re)insurance arrangements and the corresponding debtors for all counterparties;
- (d) VaR_j denotes the value at risk for pension liability risk j of the IORP.

Simplified calculation of the risk mitigating effect

4.4.36. Where paragraph 2.2.5 is complied with, IORPs may calculate the risk-mitigating effect on pension liability and market risk of a (re)insurance arrangement, securitisation or derivative referred to in paragraph 4.4.32 as the difference between the following values at risk:

- (a) the sum of the hypothetical value at risk for the sub-modules of the pension liability and market risk modules of the IORP affected by the risk-mitigating technique, as if the (re)insurance arrangement, securitisation or derivative did not exist;
- (b) the sum of values at risk for the sub-modules of the pension liability and market risk modules of the IORP affected by the risk-mitigating technique.

Loss absorbing capacity of sponsor support

4.4.37. The amount of loss-absorbing capacity of sponsor support should be the difference between the following values at risk:

- (a) the hypothetical Standardised Value at Risk of the IORP that would apply if sponsor support did not exist;
- (b) the Standardised Value at Risk of the IORP without taking into account the counterparty default risk of the sponsor.

Risk-adjusted value of collateral

4.4.38. The risk-adjusted value of collateral provided by way of security should be equal to the difference between the value of the assets held as collateral, valued in accordance with section 3.9, and the adjustment for market risk, as referred to in paragraph 4.4.42, provided both of the following requirements are fulfilled:

- (a) the IORP has (or is a beneficiary under a trust where the trustee has) the right to liquidate or retain, in a timely manner, the collateral in the event of a default, insolvency or bankruptcy or other credit event relating to the counterparty (the counterparty requirement);
- (b) the IORP has (or is a beneficiary under a trust where the trustee has) the right to liquidate or retain, in a timely manner, the collateral in the event of a default, insolvency or bankruptcy or other credit event relating to the custodian or other third party holding the collateral on behalf of the counterparty (the third party requirement).

- 4.4.39. Where the counterparty requirement is met and the criteria set out in paragraphs 4.8.25-4.8.26 are met and the third party requirement is not met, the risk-adjusted value of a collateral provided by way of security should be equal to 90% of the difference between the value of the assets held as collateral in accordance with section 3.9 and the adjustment for market risk, as referred to in paragraph 4.4.42.
- 4.4.40. Where either the counterparty requirement is not met or the requirements in paragraphs 4.8.25-4.8.26 are not met, the risk-adjusted value of collateral provided by way of security should be zero.
- 4.4.41. The risk-adjusted value of a collateral of which full ownership is transferred should be equal to the difference between the value of the assets held as collateral, valued in accordance with section 3.9, and the adjustment for market risk, as referred to in paragraph 4.4.42, provided the requirements in paragraphs 4.8.25-4.8.26 are fulfilled.
- 4.4.42. The adjustment for market risk is the difference between the following values at risk:
- (a) the hypothetical value at risk for market risk of the IORP that would apply if the assets held as collateral were not included in the calculation;
 - (b) the hypothetical value at risk for market risk of the IORP that would apply if the assets held as collateral were included in the calculation.
- 4.4.43. For the purposes of paragraph 4.4.42, the currency risk of the assets held as collateral should be calculated by comparing the currency of the assets held as collateral against the currency of the corresponding exposure.
- 4.4.44. Where in case of insolvency of the counterparty, the determination of the IORP's proportional share of the counterparty's insolvency estate in excess of the collateral does not take into account that the IORP receives the collateral, the factors F and F' referred to in paragraphs 4.4.26 and 4.4.27 should both be 100%. In all other cases these factors should be 50% and 90% respectively.

Simplified calculation of the risk adjusted value of collateral

- 4.4.45. Where paragraph 2.2.5 is complied with, and where the counterparty requirement and the third party requirement referred to in paragraph 4.4.38 are both met, IORPs may, for the purposes of paragraphs 4.4.38-4.4.44, calculate the risk-adjusted value of a collateral provided by way of security as 85% of the value of the assets held as collateral, valued in accordance with section 3.9.
- 4.4.46. Where paragraph 2.2.5 and paragraphs 4.8.25-4.8.26 are complied with, and where the counterparty requirement referred to in paragraph 4.4.38 is met and the third party requirement referred to in paragraph 4.4.38 is not met, IORPs may, for the purposes of paragraphs 4.4.38-4.4.44, calculate the risk-adjusted value of a collateral provided by way of security as 75% of the value of the assets held as collateral, valued in accordance with section 3.9.

Risk-adjusted value of mortgage

- 4.4.47. The risk-adjusted value of mortgage should be equal to the difference between the value of the residential property held as mortgage, valued in accordance with paragraph 4.4.48, and the adjustment for market risk, as referred to in paragraph 4.4.49.

- 4.4.48. The value of the residential property held as mortgage should be the market value reduced as appropriate to reflect the results of the monitoring required in paragraphs 4.4.20 and 4.4.21 and to take account of any prior claims on the property. The external, independent valuation of the property should be the same or less than the market value calculated in accordance with section 3.9.
- 4.4.49. The adjustment for market risk referred to in paragraph 4.4.47 should be the difference between the following values at risk:
- (a) the hypothetical value at risk for market risk of the IORP that would apply if the residential property held as mortgage were not included in the calculation;
 - (b) the hypothetical value at risk for market risk of the IORP that would apply if the residential property held as mortgage were included in the calculation.
- 4.4.50. For the purposes of paragraph 4.4.48, the currency risk of the residential property held as mortgage should be calculated by comparing the currency of the residential property against the currency of the corresponding loan.

4.4.2. Type 1 exposures

Probability of default

- 4.4.51. The probability of default on a single name exposure should be equal to the average of the probabilities of default on each of the exposures to counterparties that belong to the single name exposure, weighted by the loss-given-default in respect of those exposures.
- 4.4.52. Single name exposure i for which a credit assessment by a nominated ECAI is available should be assigned a probability of default PD_i in accordance with the following table:

Credit quality step	0	1	2	3	4	5	6
Probability of default PD_i	0.002%	0.01%	0.05%	0.24%	1.20%	4.2%	4.2%

- 4.4.53. Single name exposures i to an insurance or reinsurance undertaking for which a credit assessment by a nominated ECAI is not available and where this undertaking meets its Minimum Capital Requirement, should be assigned a probability of default PD_i depending on the undertaking's solvency ratio, in accordance with the following table:

Solvency ratio	196%	175%	150%	125%	122%	100%	95%	75%
Probability of default	0.01%	0.05%	0.1%	0.2%	0.24%	0.5%	1.2%	4.2%

Where the solvency ratio falls in between the solvency ratios specified in the table above, the value of the probability of default should be linearly interpolated from the closest values of probabilities of default corresponding to the closest solvency ratios specified in the table above. Where the solvency ratio is lower than 75%, the probability of default should be 4.2%. Where the solvency ratio is higher than 196%, the probability of default should be 0.01%.

For the purposes of this paragraph, 'solvency ratio' denotes the ratio of the eligible amount of own funds to cover the Solvency Capital Requirement and the Solvency Capital Requirement, using the latest available values.

- 4.4.54. Exposures to an insurance or reinsurance undertaking that do not meet its Minimum Capital Requirement should be assigned a probability of default equal to 4.2%.
- 4.4.55. Exposures to a third country insurance or reinsurance undertaking for which a credit assessment by a nominated ECAI is not available, situated in a country whose solvency regime is deemed equivalent to that laid down in the Solvency II Directive in accordance with Article 227 thereof, and which complies with the solvency requirements of that third-country, should be assigned a probability of default equal to 0.5%.
- 4.4.56. Exposures to credit institutions and financial institutions within the meaning of points (1) and (26) of Article 4(1) of Regulation (EU) No 575/2013 which comply with the solvency requirements set out in Directive 2013/36/EU and Regulation (EU) No 575/2013, for which a credit assessment by a nominated ECAI is not available, should be assigned a probability of default equal to 0.5%.
- 4.4.57. Exposures to counterparties referred to in points (a) to (d) of paragraph 4.3.76 should be assigned a probability of default equal to 0%.
- 4.4.58. The probability of default on single name exposures other than those identified in paragraphs 4.4.51-4.4.57 should be equal to 4.2%.
- 4.4.59. Where a letter of credit, a guarantee or an equivalent arrangement is provided to fully secure an exposure and this arrangement complies with paragraphs 4.8.2-4.8.14 and 4.8.17-4.8.27, the provider of that letter of credit, guarantee or equivalent arrangement may be considered as the counterparty on the secured exposure for the purposes of assessing the probability of default of a single name exposure.
- 4.4.60. For the purposes of paragraph 4.4.59, exposures fully, unconditionally and irrevocably guaranteed by regional governments and local authorities should be treated as exposures to the central government provided that there is no difference in risk between such exposures.

Probability of default of the sponsor

- 4.4.61. For the purpose of calculating the value at risk for counterparty default risk of the sponsor the same rules for determining the probabilities of default as in paragraphs 4.4.51-4.4.60 for other counterparties should be applied.

Calculation of value at risk for type 1 exposures

- 4.4.62. Where the standard deviation of the loss distribution of type 1 exposures is lower than or equal to 7% of the total losses-given-default on all type 1 exposures, the value at risk for counterparty default risk on type 1 exposures should be equal to the following:

$$VaR_{def,1} = 3 \cdot \sigma$$

where σ denotes the standard deviation of the loss distribution of type 1 exposures, as defined in paragraph 4.4.65.

- 4.4.63. Where the standard deviation of the loss distribution of type 1 exposures is higher than 7% of the total losses-given-default on all type 1 exposures and lower than or equal to 20% of the total losses-given-default on all type 1 exposures, the value at risk for counterparty default risk on type 1 exposures should be equal to the following:

$$VaR_{def,1} = 5 \cdot \sigma$$

where σ denotes the standard deviation of the loss distribution of type 1 exposures.

4.4.64. Where the standard deviation of the loss distribution of type 1 exposures is higher than 20% of the total losses-given-default on all type 1 exposures, the value at risk for counterparty default risk on type 1 exposures should be equal to the total losses-given-default on all type 1 exposures.

4.4.65. The standard deviation of the loss distribution of type 1 exposures should be equal to the following:

$$\sigma = \sqrt{V}$$

where V denotes the variance of the loss distribution of type 1 exposures.

Variance of the loss distribution of type 1 exposures

4.4.66. The variance of the loss distribution of type 1 exposures as referred to in paragraph 4.4.65 should be equal to the sum of V_{inter} and V_{intra} .

4.4.67. V_{inter} should be equal to the following:

$$V_{inter} = \sum_{(j,k)} \frac{PD_k \cdot (1 - PD_k) \cdot PD_j \cdot (1 - PD_j)}{1.25 \cdot (PD_k + PD_j) - PD_k \cdot PD_j} \cdot TLGD_j \cdot TLGD_k$$

where:

- (a) the sum covers all possible combinations (j,k) of probabilities of default on single name exposures in accordance with paragraphs 4.4.51-4.4.60;
- (b) $TLGD_j$ and $TLGD_k$ denote the sum of losses-given-default on type 1 exposures from counterparties bearing a probability of default PD_j and PD_k respectively.

4.4.68. V_{intra} should be equal to the following:

$$V_{intra} = \sum_j \frac{1.5 \cdot PD_j \cdot (1 - PD_j)}{2.5 - PD_j} \cdot \sum_{PD_j} LGD_i^2$$

where:

- (a) the first sum covers all different probabilities of default on independent counterparties in accordance paragraphs 4.4.51-4.4.60;
- (b) the second sum covers all independent counterparties that have a probability of default equal to PD_j ;
- (c) LGD_i denotes the loss-given-default on the independent counterparty i.

4.4.3. Type 2 exposures

Calculation of value at risk for type 2 exposures

4.4.69. The value at risk for counterparty default risk on type 2 exposures should be equal to the loss in the excess of assets over liabilities that would result from an instantaneous decrease in value of type 2 exposures by the following amount:

$$90\% \cdot LGD_{receivable\ s>3months} + \sum_i 15\% \cdot LGD_i$$

where:

- (a) $LGD_{receivables>3months}$ denote the total losses-given-default on all receivables from intermediaries which have been due for more than three months;

- (b) the sum is taken on all type 2 exposures other than receivables from intermediaries which have been due for more than three months;
- (c) LGD_i denotes the loss-given-default on the type 2 exposure i .

4.5. Intangible asset risk module

4.5.1. Intangible assets are exposed to two types of risks:

- Market risks, as for other balance sheet items, derived from the decrease of prices in the active market, and also from unexpected lack of liquidity of the relevant active market, that may result in an additional impact on prices, even impeding any transaction;
- Internal risks, inherent to the specific nature of these assets (e.g. linked to either failures or unfavourable deviations in the process of finalisation of the intangible asset, or any other features in such a manner that future benefits are no longer expected from the intangible asset or its amount is reduced; risks linked to the commercialisation of the intangible asset, triggered by a deterioration of the public image of the IORP).

4.5.2. The value at risk for intangible asset risk is equal to the following:

$$VaR_{intangible} = 0.8 \cdot V_{intangible}$$

where $V_{intangible}$ denotes the amount of intangible assets as recognised and valued in accordance with point (b) in paragraph 3.9.17.

4.6. Operational risk module

4.6.1. Operational risk is the risk of loss arising from inadequate or failed internal processes, personnel or systems, or from external events.²³ Operational risk includes compliance/legal risks, but excludes reputational, strategic and political/regulatory risks. The operational risk module is designed to address operational risks to the extent that these have not been explicitly covered in other risk modules.

4.6.2. The value at risk for operational risk should be equal to the following:

$$VaR_{Op} = \min(0.3 \cdot BSVaR; Op) + 0.25 \cdot Exp_{DC}$$

where:

- (a) BSVaR denotes the Basic Standardised Value at Risk;
- (b) Op denotes basic value at risk for operational risk;
- (c) Exp_{DC} denotes the amount of expenses incurred during the previous 12 months in respect of pension obligations of DC schemes where the investment risk is fully borne by members and beneficiaries.

4.6.3. The basic value at risk for operational risk should be calculated as follows:

$$Op = \max(Op_{contributions}; Op_{provisions})$$

where:

- (a) $Op_{contributions}$ denotes the value at risk for operational risks based on contributions received;

²³ See EIOPA, Opinion on the supervision of the management of operational risks faced by IORPs, EIOPA-BoS-19-247, 25 June 2019.

(b) $Op_{provisions}$ denotes the value at risk for operational risk based on technical provisions.

4.6.4. The value at risk for operational risks based on contributions received should be calculated as follows:

$$Op_{contributions} = 0.04 \cdot (Contr_{pension} - Contr_{pension-dc}) + \max(0; 0.04 \cdot (Contr_{pension} - 1.2 \cdot pContr_{pension} - (Contr_{pension-dc} - 1.2 \cdot pContr_{pension-dc})))$$

where:

- (a) $Contr_{pension}$ denotes the contributions received during the last 12 months for pension obligations;
- (b) $Contr_{pension-dc}$ denotes the contributions received during the last 12 months for pension obligations of DC schemes where the investment risk is fully borne by members and beneficiaries;
- (c) $pContr_{pension}$ denotes the contributions received during the 12 months prior to the last 12 months for pension obligations;
- (d) $pContr_{pension-dc}$ denotes the contributions received during the 12 months prior to the last 12 months for pension obligations of DC schemes where the investment risk is fully borne by members and beneficiaries.

For the purpose of this paragraph, contributions received should be gross, without deduction of premiums for (re)insurance contracts.

4.6.5. The value at risk for operational risk based on technical provisions should be calculated as follows:

$$Op_{provisions} = 0.0045 \cdot \max(0; TP_{pension} - TP_{pension-dc})$$

where:

- (a) $TP_{pension}$ denotes the technical provisions for pension obligations;
- (b) $TP_{pension-dc}$ denotes the technical provisions for pension obligations of DC schemes where the investment risk is fully borne by the members and beneficiaries.

For the purpose of this paragraph, technical provisions should not include the risk margin, and should be calculated without deduction of recoverables from (re)insurance contracts and special purpose vehicles.

4.7. Loss-absorbing capacity of technical provisions, security mechanisms and deferred taxes

Principle 26

4.7.1. The adjustment for the loss-absorbing capacity of technical provisions, security mechanisms and deferred taxes should reflect potential compensation of unexpected losses through a simultaneous decrease in technical provisions, increase in the value of security mechanisms or decrease in deferred taxes or a combination;

4.7.2. The adjustment should take account of the risk mitigating effect provided by:

- (a) conditional benefits;
- (b) discretionary benefits;
- (c) ex post benefit reductions and benefit reductions in case of sponsor default;
- (d) sponsor support;

(e) pension protection schemes;

(f) deferred taxes.

- 4.7.3. IORPs should be able to establish that a reduction in conditional and discretionary benefits, an increase in sponsor support and a transfer of pension obligations to the pension protection scheme may be used to cover unexpected losses when they arise.
- 4.7.4. Technical provisions for conditional and discretionary benefits may have the ability to absorb losses in a stress situation, meaning that their value is reduced in such a situation and as such partly or fully compensates the adverse effect of the scenario. This loss-absorbing capacity can only be considered, if the respective types of benefits are included on the common balance sheet to the extent IORPs can establish that a reduction in such benefits may be used to cover unexpected losses when they occur.
- 4.7.5. All types of conditional benefits, whether based on comprehensive benefit adjustment mechanisms, indexation mechanisms or other, may have a loss absorbing capacity. Determining the extent of the loss absorbing capacity may not be easy in all cases. In general, the more complex the conditions are, under which the conditional benefits are paid, the more difficult this will be. In general, discretionary benefits will have full loss absorbing capacity, i.e. the maximum loss absorbing capacity is equal to their value.
- 4.7.6. Ex post benefit reductions and benefit reductions in case of sponsor default will have a loss absorbing capacity, depending on the conditions for reducing benefits in a stress situation. Ex post benefit reductions have a loss absorbing capacity in any case when the IORP disposes of a shortfall of assets over liabilities and all other security and benefit adjustment mechanisms have been exhausted.
- 4.7.7. Security mechanisms refer to all types of sponsor support and pension protection schemes.
- 4.7.8. The loss absorbing capacity of sponsor support will depend on the type of sponsor support (unlimited, limited, etc.), but also on the financial capacity of the sponsor to make additional contributions to the IORP or pay directly to members and beneficiaries.
- 4.7.9. The loss absorbing capacity of pension protection schemes will be the overall value of the level of pension benefits covered by the pension protection scheme.
- 4.7.10. The adjustment referred to in paragraph 4.1.14 for the loss-absorbing capacity of technical provisions, security mechanisms and deferred taxes should be the sum of the following items:
- (a) the adjustment for the loss-absorbing capacity of technical provisions and security mechanisms;
 - (b) the adjustment for the loss-absorbing capacity of deferred taxes.

Adjustment for the loss-absorbing capacity of technical provisions and security mechanisms

- 4.7.11. The adjustment for the loss-absorbing capacity of technical provisions and security mechanisms should be the sum of the following items:
- (a) the adjustment for the loss-absorbing capacity of conditional benefits;

- (b) the adjustment for the loss-absorbing capacity of discretionary benefits;
- (c) the adjustment for the loss-absorbing capacity of sponsor support;
- (d) the adjustment for the loss-absorbing capacity of pension protection schemes;
- (e) the adjustment for the loss-absorbing capacity of ex post benefit reductions and benefit reductions in case of sponsor default.

4.7.12. The adjustment for the loss-absorbing capacity of conditional benefits should be equal to the following:

$$Adj_{CB} = -\max(\min(BSVaR + VaR_{Op} - (nBSVaR_{CB} + nVaR_{Op,CB}); FCB); 0)$$

where:

- (a) BSVaR denotes the Basic Standardised Value at Risk in accordance with paragraph 4.1.17;
- (b) VaR_{Op} denotes the value at risk for operational risk in accordance with paragraph 4.6.2;
- (c) nBSVaR_{CB} denotes the net Basic Standardised Value at Risk taking into account the loss-absorbing capacity of conditional benefits as referred to in paragraph 4.7.17;
- (d) nVaR_{Op,CB} denotes the net value at risk for operational risk taking into account the loss-absorbing capacity of conditional benefits as referred to in paragraph 4.7.18;
- (e) FCB denotes the technical provisions without risk margin in relation to conditional benefits.

4.7.13. The adjustment for the loss-absorbing capacity of discretionary benefits should be equal to the following:

$$Adj_{DB} = -\max(\min(BSVaR + VaR_{Op} - (nBSVaR_{DB} + nVaR_{Op,DB}); FDB); 0)$$

where:

- (a) BSVaR denotes the Basic Standardised Value at Risk in accordance with paragraph 4.1.17;
- (b) VaR_{Op} denotes the value at risk for operational risk in accordance with paragraph 4.6.2;
- (c) nBSVaR_{DB} denotes the net Basic Standardised Value at Risk taking into account the loss-absorbing capacity of discretionary benefits as referred to in paragraph 4.7.17;
- (d) nVaR_{Op,DB} denotes the net value at risk for operational risk taking into account the loss-absorbing capacity of discretionary benefits as referred to in paragraph 4.7.18;
- (e) FDB denotes the technical provisions without risk margin in relation to discretionary benefits.

4.7.14. The adjustment for the loss-absorbing capacity of sponsor support should be equal to the following:

$$Adj_{SS} = -\max(\min(BSVaR + VaR_{Op} - (nBSVaR_{SS} + nVaR_{Op,SS}); MSS_{available}); 0)$$

where:

- (a) BSVaR denotes the Basic Standardised Value at Risk in accordance with paragraph 4.1.17;

- (b) VaR_{Op} denotes the value at risk for operational risk in accordance with paragraph 4.6.2;
- (c) $nBSVaR_{SS}$ denotes the net Basic Standardised Value at Risk taking into account the loss-absorbing capacity of sponsor support as referred to in paragraph 4.7.17;
- (d) $nVaR_{Op,SS}$ denotes the net value at risk for operational risk taking into account the loss-absorbing capacity of sponsor support as referred to in paragraph 4.7.18;
- (e) $MSS_{available}$ denotes the maximum value of sponsor support available to absorb losses as referred to in paragraph 4.7.19.

4.7.15. The adjustment for the loss-absorbing capacity of pension protection schemes should be equal to the following:

$$Adj_{PP} = -\max(\min(BSVaR + VaR_{Op} - (nBSVaR_{PP} + nVaR_{Op,PP}); MPP_{available}); 0)$$

where:

- (a) $BSVaR$ denotes the Basic Standardised Value at Risk in accordance with paragraph 4.1.17;
- (b) VaR_{Op} denotes the value at risk for operational risk in accordance with paragraph 4.6.2;
- (c) $nBSVaR_{PP}$ denotes the net Basic Standardised Value at Risk taking into account the loss-absorbing capacity of pension protection schemes as referred to in paragraph 4.7.17;
- (d) $nVaR_{Op,PP}$ denotes the net value at risk for operational risk taking into account the loss-absorbing capacity of pension protection schemes as referred to in paragraph 4.7.18;
- (e) $MPP_{available}$ denotes the maximum value of the pension protection scheme available to absorb losses as referred to in paragraph 4.7.20.

4.7.16. The adjustment for the loss-absorbing capacity of ex post benefit reductions and benefit reductions in case of sponsor default should be equal to the following:

$$Adj_{BR} = -\max(\max(BSVaR + VaR_{Op} - (nBSVaR_{BR} + nVaR_{Op,BR}); BSVaR + VaR_{Op} + Adj_{CB} + Adj_{DB} + Adj_{SS} + Adj_{PP} - EAL); 0)$$

where:

- (a) $BSVaR$ denotes the Basic Standardised Value at Risk in accordance with paragraph 4.1.17;
- (b) VaR_{Op} denotes the value at risk for operational risk in accordance with paragraph 4.6.2;
- (c) $nBSVaR_{BR}$ denotes the net Basic Standardised Value at Risk taking into account the loss-absorbing capacity of ex post benefit reductions and benefit reductions in case of sponsor default as referred to in paragraph 4.7.17;
- (d) $nVaR_{Op,BR}$ denotes the net value at risk for operational risk taking into account the loss-absorbing capacity of ex post benefit reductions and benefit reductions in case of sponsor default as referred to in paragraph 4.7.18;
- (e) Adj_{CB} is the adjustment for the loss-absorbing capacity of conditional benefits as defined in paragraph 4.7.12;

- (f) Adj_{DB} is the adjustment for the loss-absorbing capacity of discretionary benefits as defined in paragraph 4.7.13;
- (g) Adj_{SS} is the adjustment for the loss-absorbing capacity of sponsor support as defined in paragraph 4.7.14;
- (h) Adj_{PP} The adjustment for the loss-absorbing capacity of pension protection schemes as defined in paragraph 4.7.15;
- (i) EAL denotes the excess of assets over liabilities.

4.7.17. The net Basic Standardised Value at Risk taking into account the loss-absorbing capacity of conditional benefits, discretionary benefits, sponsor support, pension protection schemes and benefit reductions should be calculated in accordance with sections 4.1 to 4.5 with all the following modifications:

- (a) where the calculation of a module or sub-module of the Basic Standardised Value at Risk is based on the impact of a scenario on the excess of assets over liabilities of IORPs, the scenario can change the value of conditional and discretionary benefits as well as ex post benefit reductions and benefit reductions in case of sponsor default included in technical provisions and the value of sponsor support and pension protection schemes;
- (b) the scenario-based calculations of the pension liability risk module, the market risk module and the counterparty default risk module as well as the scenario-based calculation set out in points (c) and (d) should take into account the impact of the scenario on the value of conditional and discretionary benefits as well as ex post benefit reductions and benefit reductions in case of sponsor default included in technical provisions and the value of sponsor support and pension protection schemes; this should be done on the basis of assumptions on members, beneficiaries and sponsor behaviour that comply with paragraphs 3.3.67-3.3.72 and on IORP management actions that comply with paragraphs 3.3.63-3.3.66;
- (c) instead of the value at risk for counterparty default risk on type 1 exposures referred to in paragraphs 4.4.62-4.4.64, the calculation should be based on the value at risk that is equal to the loss in excess of assets over liabilities that would result from an instantaneous loss, due to default events relating to type 1 exposures, of the amount of the value at risk for counterparty default risk on type 1 exposures referred to in paragraphs 4.4.62-4.4.64;
- (d) where the IORP uses a simplified calculation for a specific value at risk as set out in paragraphs 4.2.10, 4.2.16, 4.2.22, 4.2.25, 4.2.37-4.2.38, 4.2.46, 4.3.59-4.3.60 the IORP should base the calculation on the value at risk that is equal to the loss in excess of assets over liabilities that would result from an instantaneous loss of the amount of the value at risk referred to in the relevant paragraph(s) and should assume that the instantaneous loss is due to the risk that the value at risk referred to in the relevant paragraph(s) captures.
- (e) The net Basic Standardised Value at Risk taking into account the loss-absorbing capacity of:
 - (i) conditional benefits should be determined under the assumption that the value of discretionary benefits, sponsor support, pension protection schemes, ex post benefit reductions and benefit reductions in case of sponsor default did not change in the calculations referred to in point (b);
 - (ii) discretionary benefits should be determined under the assumption that the value of conditional benefits, sponsor support, pension protection schemes, ex post

benefit reductions and benefit reductions in case of sponsor default did not change in the calculations referred to in point (b);

(iii) sponsor support should be determined under the assumption that the value of conditional benefits, discretionary benefits, pension protection schemes, ex post benefit reductions and benefit reductions in case of sponsor default did not change in the calculations referred to in point (b);

(iv) pension protection schemes should be determined under the assumption that the value of conditional benefits, discretionary benefits, sponsor support, ex post benefit reductions and benefit reductions in case of sponsor default did not change in the calculations referred to in point (b); and

(v) ex post benefit reductions and benefit reductions in case of sponsor default should be determined under the assumption that the value of conditional benefits, discretionary benefits, sponsor support and pension protection schemes did not change in the calculations referred to in point (b).

4.7.18. The net value at risk for operational risk taking into account the loss-absorbing capacity of conditional benefits, discretionary benefits, sponsor support, pension protection schemes and benefit reductions should be calculated in accordance with section 4.6 with all the following modifications:

(a) the scenario-based calculation set out in points (b) should take into account the impact of the scenario on the value of conditional and discretionary benefits as well as ex post benefit reductions and benefit reductions in case of sponsor default included in technical provisions and the value of sponsor support and pension protection schemes; this should be done on the basis of assumptions on members, beneficiaries and sponsor behaviour that comply with paragraphs 3.3.67-3.3.72 and on IORP management actions that comply with paragraphs 3.3.63-3.3.66;

(b) instead of the value at risk for operational risk referred to in paragraph 4.6.2, the calculation should be based on the value at risk that is equal to the loss in excess of assets over liabilities that would result from an instantaneous loss, due to operational risk, of the amount of the value at risk for operational risk referred to in paragraph 4.6.2;

(c) The net value at risk for operational risk taking into account the loss-absorbing capacity of:

- i. conditional benefits should be determined under the assumption that the value of discretionary benefits, sponsor support, pension protection schemes and ex post benefit reductions and benefit reductions in case of sponsor default did not change in the calculations referred to in point (a);
- ii. discretionary benefits should be determined under the assumption that the value of conditional benefits, sponsor support, pension protection schemes and ex post benefit reductions and benefit reductions in case of sponsor default did not change in the calculations referred to in point (a);
- iii. sponsor support should be determined under the assumption that the value of conditional benefits, discretionary benefits, pension protection schemes and ex post benefit reductions and benefit reductions in case of sponsor default did not change in the calculations referred to in point (a);
- iv. pension protection schemes should be determined under the assumption that the value of conditional benefits, discretionary benefits, sponsor support and ex post benefit reductions and benefit reductions in case of sponsor default did not change in the calculations referred to in point (a); and

- v. ex post benefit reductions and benefit reductions in case of sponsor default should be determined under the assumption that the value of conditional benefits, discretionary benefits, sponsor support and pension protection schemes did not change in the calculations referred to in point (a).
- 4.7.19. The maximum value of sponsor support available to absorb losses should be equal to the maximum value of sponsor support in accordance with paragraphs 3.6.24-3.6.31 minus the value of sponsor support on the common balance sheet.
 - 4.7.20. The maximum value of the pension protection scheme available to absorb losses should be equal to the maximum value of the pension protection scheme minus the value of the pension protection scheme on the common balance sheet. IORPs can determine the maximum value of pension protection schemes as the product of the average coverage rate of the pension protection scheme and the value of technical provisions for benefits protected by the pension protection scheme. The maximum value of the pension protection scheme should not exceed the value of the pension obligations covered by the pension protection scheme.
 - 4.7.21. For the purpose of point (b) in paragraph 4.7.17 and point (a) in paragraph 4.7.18, IORPs should take into account any legal, regulatory or contractual obligations and restrictions in the distribution of conditional and discretionary benefits, on ex post benefit reductions and benefit reductions in case of sponsor default, on sponsor support and the transfer of pension obligations to a pension protection scheme.
 - 4.7.22. Notwithstanding the previous paragraph, if the scenario-based calculations referred to in point (b) in paragraph 4.7.17 and point (a) in paragraph 4.7.18, result in a loss in excess of assets over liabilities that exceeds the excess of assets over liabilities then the IORP should increase the loss-absorbing capacity of ex post benefit reductions with an amount that ensures that the loss in excess of assets over liabilities equals the excess of assets over liabilities.

Simplified calculation for the combined amounts of the net Basic Standardised Value at Risk and the net value at risk for operational risk taking into account the loss-absorbing capacity of conditional benefits, discretionary benefits, sponsor support, pension protection schemes and benefit reductions

- 4.7.23. Where the loss-absorbing capacity of technical provisions and security mechanisms depends on losses of the IORP as a whole, IORPs may, for the purpose of calculating the adjustment for the loss-absorbing capacity of technical provisions and security mechanisms in paragraph 4.7.11, calculate the combined value of the net Basic Standardised Value at Risk and the net value at risk for operational risk taking into account the loss-absorbing capacity of conditional benefits, discretionary benefits, sponsor support, pension protection schemes and benefit reductions in accordance with paragraphs 4.7.24-4.7.27.
- 4.7.24. The combined amounts of the net Basic Standardised Value at Risk and the net value at risk for operational risk taking into account the loss-absorbing capacity of conditional benefits, discretionary benefits, sponsor support, pension protection schemes and benefit reductions referred to in paragraph 4.7.23 should be equal to the loss in excess of assets over liabilities that would result from the instantaneous loss of an amount that is equal to the sum of the following:
 - (a) the Basic Standardised Value at Risk referred to in paragraph 4.1.17;

(b) the value at risk for operational risk referred to in paragraph 4.6.2.

4.7.25. The scenario-based calculation set out in paragraph 4.7.24 should take into account the impact of the scenario on the value of conditional and discretionary benefits as well as ex post benefit reductions and benefit reductions in case of sponsor default included in technical provisions and the value of sponsor support and pension protection schemes; this should be done on the basis of assumptions on members, beneficiaries and sponsor behaviour that comply with paragraphs 3.3.67-3.3.72 and on IORP management actions that comply with paragraphs 3.3.63-3.3.66.

4.7.26. The net Basic Standardised Value at Risk and the net values at risk for operational risk taking into account the loss-absorbing capacity of:

- (i) conditional benefits should be determined under the assumption that the value of discretionary benefits, sponsor support, pension protection schemes, ex post benefit reductions and benefit reductions in case of sponsor default did not change in the calculations referred to in paragraph 4.7.25;
- (ii) discretionary benefits should be determined under the assumption that the value of conditional benefits, sponsor support, pension protection schemes, ex post benefit reductions and benefit reductions in case of sponsor default did not change in the calculations referred to in paragraph 4.7.25;
- (iii) sponsor support should be determined under the assumption that the value of conditional benefits, discretionary benefits, pension protection schemes, ex post benefit reductions and benefit reductions in case of sponsor default did not change in the calculations referred to in paragraph 4.7.25;
- (iv) pension protection schemes should be determined under the assumption that the value of conditional benefits, discretionary benefits, sponsor support, ex post benefit reductions and benefit reductions in case of sponsor default did not change in the calculations referred to in paragraph 4.7.25; and
- (v) ex post benefit reductions and benefit reductions in case of sponsor default should be determined under the assumption that the value of conditional benefits, discretionary benefits, sponsor support and pension protection schemes did not change in the calculations referred to in paragraph 4.7.25.

4.7.27. For the purpose of paragraph of 4.7.23, the IORP should not consider sponsor support to absorb losses of the IORP as a whole unless the IORP fulfils the conditions to apply the balancing item approach to the valuation of sponsor support in accordance with paragraphs 3.6.36-3.6.41 and as referred to in paragraph 4.4.5.

Adjustment for loss-absorbing capacity of deferred taxes

4.7.28. The adjustment for the loss-absorbing capacity of deferred taxes should be equal to the change in the value of deferred taxes of IORPs that would result from an instantaneous loss of an amount that is equal to the sum of the following:

- a) the Basic Standardised Value at Risk referred to in paragraph 4.1.17;
- b) the adjustment for the loss-absorbing capacity of technical provisions and security mechanisms referred to paragraph 4.7.11;
- c) the value at risk for operational risk referred to in paragraph 4.6.2.

4.7.29. For the purpose of paragraph 4.7.28, deferred taxes should be valued in accordance with paragraphs 3.9.19-3.9.21. Where the loss referred to in

paragraph 4.7.28 would result in an increase in deferred tax assets, IORPs should not utilise this increase for the purpose of the adjustment unless they are able to demonstrate that future profits will be available in accordance with paragraph 3.9.21, taking into account the magnitude of the loss referred to in paragraph 4.7.28 and its impact on the IORP's current and future financial situation.

- 4.7.30. For the purposes of paragraph 4.7.28, a decrease in deferred tax liabilities or an increase in deferred tax assets should result in a negative adjustment for the loss-absorbing capacity of deferred taxes.
- 4.7.31. Where the calculation of the adjustment in accordance with paragraph 4.7.28 results in a positive change of deferred taxes, the adjustment should be nil.
- 4.7.32. Where it is necessary to allocate the loss referred to in paragraph 4.7.28 to its causes in order to calculate the adjustment for the loss-absorbing capacity of deferred taxes, IORPs should allocate the loss to the risks that are captured by the Basic Standardised Value at Risk and the value at risk for operational risk. The allocation should be consistent with the contribution of the modules and sub-modules to the Basic Standardised Value at Risk.

4.8. Risk mitigation techniques

Principle 27

- 4.8.1. When calculating the Standardised Value at Risk, IORPs should take account of the effect of financial and (re)insurance risk-mitigation techniques, provided that credit risk and other risks arising from the use of such techniques are properly reflected in the Standardised Value at Risk.

Qualitative criteria

- 4.8.2. When calculating the Basic Standardised Value at Risk, IORPs should only take into account risk mitigating techniques where all of the following qualitative criteria are met:
 - (a) the contractual arrangements and transfer of risk are legally effective and enforceable in all relevant jurisdictions;
 - (b) the IORP has taken all appropriate steps to ensure the effectiveness of the arrangement and to address the risks related to that arrangement;
 - (c) the IORP is able to monitor the effectiveness of the arrangement and the related risks on an ongoing basis;
 - (d) the IORP has, in the event of a default, insolvency or bankruptcy of a counterparty or other credit event set out in the transaction documentation for the arrangement, a direct claim on that counterparty;
 - (e) there is no double-counting of risk-mitigation effects in the excess of assets over liabilities and in the calculation of the Standardised Value at Risk or within the calculation of the Standardised Value at Risk.
- 4.8.3. Only risk-mitigation techniques that are in force for at least the next 12 months and which meet the qualitative criteria set out in this section should be fully taken into account in Basic Standardised Value at Risk. In all other cases, the risk-mitigation effect of risk-mitigation techniques that are in force for a period shorter than 12 months and which meet the qualitative criteria set out in this section should be taken into account in the Basic Standardised Value at Risk in proportion to the length of time involved for the shorter of the full term of the risk exposure or the period that the risk-mitigation technique is in force.

Example

For example, where an equity option provides protection for the next six months, IORPs should assume that the option only provides half of the risk mitigating effect that it does if the shock takes place immediately.

- 4.8.4. Where contractual arrangements governing the risk-mitigation techniques will be in force for a period shorter than the next 12 months and the IORP intends to replace that risk-mitigation technique at the time of its expiry with a similar arrangement, the risk-mitigation technique should be fully taken into account in the Basic Standardised Value at Risk provided all of the following qualitative criteria are met:
- (a) the IORP has a written policy on the replacement of that risk-mitigation technique;
 - (b) the replacement of the risk-mitigation technique should not take place more often than every three months;
 - (c) the replacement of the risk-mitigation technique is not conditional on any future event, which is outside of the control of the IORP. Where the replacement of the risk-mitigation technique is conditional on any future event, that is within the control of the IORP, then the conditions should be clearly documented in the written policy referred to in point (a);
 - (d) the replacement of the risk-mitigation technique should be realistic based on replacements undertaken previously by the IORP and consistent with its current practice and strategy;
 - (e) the risk that the risk-mitigation technique cannot be replaced due to an absence of liquidity in the market is not material;
 - (f) the risk that the cost of replacing the risk-mitigation technique increases during the following 12 months is reflected in the Standardised Value at Risk;
 - (g) the replacement of the risk-mitigation technique would not be contrary to requirements that apply to future management actions set out in paragraphs 3.3.63-3.3.66.

Effective transfer of risk

- 4.8.5. The contractual arrangements governing the risk-mitigation technique should ensure that the extent of the cover provided by the risk-mitigation technique and the transfer of risk is clearly defined and incontrovertible.
- 4.8.6. The contractual arrangement should not result in material basis risk or in the creation of other risks, unless this reflected in the calculation of the Standardised Value at Risk.
- 4.8.7. Basis risk is material if it leads to a misstatement of the risk-mitigating effect on the IORP's Basic Standardised Value at Risk that could influence the decision-making or judgement of the intended user of that information, including CAs.

Example

Material basis risk may materialise, for example, when payments of risk-mitigating arrangement are made according to external indicators rather than directly related to losses.

The following 'financial risk mitigation techniques' should be considered to involve material basis risk:

- equity derivatives whose underlying equities or indexes have not a correlation nearby 1 with the hedged asset or liability, especially in case of stressed situations.*
- CDS referred to names different than the hedged name, or with a correlation not nearby 1, with a different tenor or a different nominal.*

4.8.8. The determination that the contractual arrangements and transfer of risk is legally effective and enforceable in all relevant jurisdictions in accordance with paragraph 4.8.2(a) should be based on the following:

- (a) whether the contractual arrangement is subject to any condition which could undermine the effective transfer of risk, the fulfilment of which is outside the direct control of the IORP;
- (b) whether there are any connected transactions which could undermine the effective transfer of risk.

Example

Examples of factors which the IORP should 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 IORP. 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 IORP to the third party under the contract;*
 - would increase the effective cost of the transaction to the IORP in response to an increased likelihood of the third party experiencing losses under the transaction;*
 - would oblige the IORP 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.*

Risk mitigation techniques using (re)insurance contracts or special purpose vehicles

4.8.9. Where IORPs transfer pension liability risk using (re)insurance contracts or special purpose vehicles, in order for them to take into account the risk-mitigation technique in the Basic Standardised Value at Risk, the qualitative criteria set out in paragraphs 4.8.2-4.8.4 and paragraphs 4.8.5-4.8.8 and those set out in paragraphs 4.8.10-14 should be met.

- 4.8.10. In the case of (re)insurance contracts the counterparty should be any of the following:
- (a) an insurance or reinsurance undertaking which complies with the Solvency Capital Requirement;
 - (b) third-country insurance or reinsurance undertaking, situated in a country whose solvency regime is deemed equivalent or temporarily equivalent to that laid down in the Solvency II Directive in accordance with Article 172 thereof and which complies with the solvency requirements of that third-country;
 - (c) a third country insurance or reinsurance undertaking that is not situated in a country whose solvency regime is deemed equivalent or temporarily equivalent in accordance with Article 172 of the Solvency II Directive that has been assigned to credit quality step 3 or better.
- 4.8.11. Where a counterparty to a (re)insurance contract is an insurance or reinsurance undertaking which ceases to comply with the Solvency Capital Requirement after the (re)insurance contract has been entered into, the protection offered by the (re)insurance risk-mitigation technique may be partially recognised, provided that the IORP can demonstrate that the counterparty has submitted a realistic recovery plan to its supervisory authorities and compliance with the Solvency Capital Requirement will be restored within the timeframe defined in the recovery plan referred to in Article 138 of the Solvency II Directive. For that purpose, the effect of the risk-mitigation technique should be reduced by the percentage by which the Solvency Capital Requirement is breached.
- 4.8.12. IORPs should only take into account the risk-mitigation technique in the Basic Standardised Value at Risk where the special purpose vehicle to which risk is transferred has been authorised in accordance with Article 211(2) of the Solvency II Directive. Where the special purpose vehicle ceases to be fully-funded as required by Article 326 of Delegated Regulation (EU) 2015/35²⁴ after the arrangement has been entered into, the protection offered by the (re)insurance risk-mitigation technique may be partially recognised, provided that the IORP can demonstrate that compliance with the fully-funded requirement will be restored within three months. For this purpose, the effect of the risk-mitigation technique should be reduced by the percentage of the aggregated maximum risk exposure of the special purpose vehicle, referred to in Article 326 of Delegated Regulation (EU) 2015/35 not covered by the assets of the special purpose vehicle or by an equivalent amount in case the special purpose vehicle was authorised before 31 December 2015.
- 4.8.13. Where risk is transferred to a special purpose vehicle authorised before 31 December 2015, the risk-mitigation technique should only be taken into account in the Basic Standardised Value at Risk where the law of the Member State is equivalent to that set out in Article 211(2) of the Solvency II Directive and that law is complied with by the special purpose vehicle.
- 4.8.14. Where risk is transferred to special purpose vehicle that is regulated by a third country supervisory authority, the risk-mitigation technique should only be taken into account in the Basic Standardised Value at Risk where requirements equivalent to those set out in Article 211(2) of the Solvency II Directive are met by the special purpose vehicle.

²⁴ Commission Delegated Regulation (EU) 2015/35 of 10 October 2014 supplementing Directive 2009/138/EC of the European Parliament and of the Council on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II), OJ L 12, 17.1.2015, p. 1.

Methods and assumptions

- 4.8.15. Where IORPs transfer pension liability risk using (re)insurance contracts or special purpose vehicles that meet the requirements set out in paragraphs 4.8.2-4.8.4, paragraphs 4.8.9-4.8.14 and paragraphs 4.8.23-4.8.24 and where these arrangements provide for protection in several of the scenario-based calculations in the standardised risk assessment, the risk-mitigating effects of these contractual arrangements should be allocated to the scenario-based calculations in a manner that, without double-counting, captures the economic effect of the protections provided. In particular, the economic effect of the protections provided should be captured in determining the loss in excess of assets over liabilities in the scenario-based calculations.
- 4.8.16. Where IORPs transfer pension liability risk using finite reinsurance as defined in Article 210(3) of the Solvency II Directive, that meet the requirements set out in paragraphs 4.8.2-4.8.4, paragraphs 4.8.9-4.8.14 and paragraphs 4.8.23-4.8.24, these contracts should be recognised in the scenario-based calculations in the standardised risk assessment only to the extent that pension liability risk is transferred to the counterparty of the contract.

Financial risk mitigation techniques

- 4.8.17. Where IORPs transfer risk, in other cases than in the cases referred to in paragraph 4.8.9, including transfers through the purchase or issuance of financial instruments, in order for the risk-mitigation technique to be taken into account in the Basic Standardised Value at Risk, the qualitative criteria provided in paragraphs 4.8.18-4.8.22 should be met, in addition to the qualitative criteria set out in paragraphs 4.8.2-4.8.4 and paragraphs 4.8.5-4.8.8.
- 4.8.18. The risk-mitigation technique should be consistent with the IORP's adopted risk management strategies, as referred to in Article 25 of Directive (EU) 2016/2341²⁵.
- 4.8.19. The IORP should be able to value the assets and liabilities that are subject to the risk-mitigation technique and, where the risk-mitigation technique includes the use of financial instruments, the financial instruments reliably in accordance with section 3.9.
- 4.8.20. Where the risk-mitigation technique includes the use of financial instruments, the financial instruments should have a credit quality which has been assigned to credit quality step 3 or better.
- 4.8.21. Where the risk-mitigation technique is not a financial instrument, the counterparties to the risk-mitigation technique should have a credit quality which has been assigned to credit quality step 3 or better.

Example

The following are examples of financial risk mitigation techniques:

- Interest rate swaps to cover the risk of lower interest rates;*
- Currency swaps and forwards to cover currency risk in relation to assets or liabilities;*
- Put options bought to cover the risk of falls in assets;*

²⁵ Directive (EU) 2016/2341 of the European Parliament and of the Council of 14 December 2016 on the activities and supervision of institutions for occupational retirement provision (IORPs), OJ L 354, 23.12.2016, p. 37.

- *Protection bought through credit derivatives or collateral to cover the risk of failure or downgrade in the credit quality of certain exposures;*
- *Swaptions acquired to cover variable/fixed risks.*

4.8.22. Financial risk mitigation techniques do not include the risk mitigating effect provided by conditional and discretionary benefits.

Status of the counterparties

4.8.23. In the event that the qualitative criteria in paragraph 4.8.9, or paragraphs 4.8.20-4.8.21 are not met, IORPs should only take into account the risk-mitigation techniques when calculating the Basic Standardised Value at Risk where one of the following criteria is met:

- (a) the risk-mitigation technique meets the qualitative criteria set out in paragraphs 4.8.2-4.8.4, paragraphs 4.8.5-4.8.8 and paragraphs 4.8.18-4.8.19 and collateral arrangements exist that meet the criteria provided in paragraphs 4.8.25-4.8.26;
- (b) the risk-mitigation technique is accompanied by another risk-mitigation technique, where the other technique when viewed in combination with the first technique meets the qualitative criteria in paragraphs 4.8.2-4.8.4, paragraphs 4.8.5-4.8.8 and paragraphs 4.8.18-4.8.19 and where the counterparties to the other technique meet the criteria provided in paragraph 4.8.9 and paragraphs 4.8.20-4.8.21.

4.8.24. For the purposes of point (a) of paragraph 4.8.23, where the value, in accordance with section 3.9, of the collateral is less than the total risk exposure, the collateral arrangement should only be taken into account to the extent that the collateral covers the risk exposure.

Collateral arrangements

4.8.25. In the calculation of the Basic Standardised Value at Risk, collateral arrangements should only be recognised where, in addition to the qualitative criteria in paragraphs 4.8.2-4.8.4 and paragraphs 4.8.5-4.8.8, the following criteria are met:

- (a) the IORP should have the right to liquidate or retain, in a timely manner, the collateral in the event of a default, insolvency or bankruptcy or other credit event of the counterparty;
- (b) there is sufficient certainty as to the protection achieved by the collateral because of either of the following:
 - (i) it is of sufficient credit quality, is of sufficient liquidity and is sufficiently stable in value;
 - (ii) it is guaranteed by a counterparty, other than a counterparty referred to in paragraph 4.3.108 and paragraph 4.3.95, which has been assigned a risk factor for concentration risk of 0%;
- (c) there is no material positive correlation between the credit quality of the counterparty and the value of the collateral;
- (d) the collateral is not securities issued by the counterparty or a related undertaking of that counterparty.

4.8.26. Where a collateral arrangement involves collateral being held by a custodian or other third party, the collateral arrangement should only be recognised where all of the following criteria are met:

- (a) the relevant custodian or other third party segregates the assets held as collateral from its own assets;
- (b) the segregated assets are held by a deposit-taking institution that has a credit quality which has been assigned to credit quality step 3 or better;
- (c) the segregated assets are individually identifiable and can only be changed or substituted with the consent of the IORP or a person acting as a trustee in relation to the IORP's interest in such assets;
- (d) the IORP has (or is a beneficiary under a trust where the trustee has) the right to liquidate or retain, in a timely manner, the segregated assets in the event of a default, insolvency or bankruptcy or other credit event relating to the custodian or other third party holding the collateral on behalf of the counterparty;
- (e) the segregated assets should not be used to pay, or to provide collateral in favour of, any person other than the IORP or as directed by the IORP.

Guarantees

4.8.27. In the calculation of the Basic Standardised Value at Risk, guarantees should only be recognised where explicitly referred to, and where in addition to the qualitative criteria in paragraphs 4.8.2-4.8.4 and paragraphs 4.8.5-4.8.8, all of the following criteria are met:

- (a) the credit protection provided by the guarantee is direct;
- (b) the extent of the credit protection is clearly defined and incontrovertible;
- (c) the guarantee does not contain any clause, the fulfilment of which is outside the direct control of the lender, that:
 - i. would allow the protection provider to cancel the protection unilaterally;
 - ii. would increase the effective cost of protection as a result of a deterioration in the credit quality of the protected exposure;
 - iii. could prevent the protection provider from being obliged to pay out in a timely manner in the event that the original obligor fails to make any payments due;
 - iv. could allow the maturity of the credit protection to be reduced by the protection provider;
- (d) on the default, insolvency or bankruptcy or other credit event of the counterparty, the IORP has the right to pursue, in a timely manner, the guarantor for any monies due under the claim in respect of which the protection is provided and the payment by the guarantor should not be subject to the IORP first having to pursue the obligor;
- (e) the guarantee is an explicitly documented obligation assumed by the guarantor;
- (f) the guarantee fully covers all types of regular payments the obligor is expected to make in respect of the claim.

5. Annexes

Annex 1: Definitions

For the purposes of these principles and specifications, the following definitions should apply:

- (1) 'basic risk-free interest rate term structure' means a risk-free interest rate term structure which is derived in the same way as the relevant risk-free interest rate term structure as referred to in Article 77(2) of the Solvency II Directive but without application of a matching adjustment or a volatility adjustment or a transitional adjustment to the relevant risk-free rate structure as referred to in Article 308c of that Directive;
- (2) 'basis risk' means the risk resulting from the situation in which the exposure covered by the risk-mitigation technique does not correspond to the risk exposure of the IORP;
- (3) 'benefit adjustment mechanisms' are mechanisms to reduce accrued pension rights in order to resolve a situation of insolvency of the IORP. It consists of ex ante benefit reductions, ex post benefit reductions and benefit reductions in the event of sponsor default/sponsor insolvency. By their nature, conditional benefits and discretionary benefits are also considered in this category;
- (4) 'benefit reductions in the event of sponsor default/sponsor insolvency' means the possibility to reduce pension benefits in the event of a default of the sponsor, in particular in cases when it provides unlimited support and/or when there are not enough assets to cover liabilities. The benefit reduction could occur as part of a transfer to a pension protection scheme or another institution, or as part of a recovery plan of the IORP, if the IORP continues to exist after the default of the sponsor;
- (5) 'biological asset' is a living animal or plant, in accordance with Commission Regulation (EU) 2015/2113²⁶, and includes f.i. trees in a timber plantation;
- (6) 'central bank' means central bank within the meaning of Article 4(1)(46) of Regulation (EU) No 575/2013²⁷;
- (7) 'collateral arrangements' means arrangements under which collateral providers do one of the following:
 - (a) transfer full ownership of the collateral to the collateral taker for the purposes of securing or otherwise covering the performance of a relevant obligation;
 - (b) provide collateral by way of security in favour of, or to, a collateral taker, and the legal ownership of the collateral remains with the collateral provider or a custodian when the security right is established;
- (8) 'collective investment undertaking' means an undertaking for collective investment in transferable securities (UCITS) as defined in Article 1(2) of

²⁶ Commission Regulation (EU) 2015/2113 of 23 November 2015 amending Regulation (EC) No 1126/2008 adopting certain international accounting standards in accordance with Regulation (EC) No 1606/2002 of the European Parliament and of the Council as regards International Accounting Standards 16 and 41, OJ L 306, 24.11.2015, p. 11-12.

²⁷ Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012, OJ L 176, 27.6.2013

Directive 2009/65/EC²⁸ or an alternative investment fund (AIF) as defined in Article 4(1)(a) of Directive 2011/61/EU²⁹;

- (9) 'concentration risk' means all risk exposures with a loss potential which is large enough to threaten the solvency or the financial position of IORPs;
- (10) 'conditional benefits' are benefits which are granted based on certain "objective" conditions without a realistic discretionary power of the IORP to deviate from that policy. This means that conditional benefits have a payoff that can be objectively linked to some observable realisation. The following examples of conditional benefits may illustrate the concept:
 - (a) benefits that are granted on the basis of legally or contractually established policies which only contain certain "objective" conditions;
 - (b) benefits that are legally or contractually based on the performance of the pension scheme, the IORP or a defined set of assets;
 - (c) benefits that are subject to an ex ante benefit adjustment mechanism, i.e. a mechanism based on a contract concluded beforehand and which describes precisely under which conditions and to which extent adjustments will take place; and
 - (d) benefits that are granted on the basis of a specified policy of adjusting the accrued benefits without a realistic discretionary power of the IORP to deviate from that policy;
- (11) 'continuity options' mean all legal or contractual rights which allow the member of sponsoring undertaking to fully or partly establish, renew, increase, extend or resume pension cover;
- (12) 'contractual option' is defined as a right to change the benefits, to be taken at the choice of its holder (generally the member), on terms that are established in advance. Thus, in order to trigger an option, a decision of its holder is necessary;
- (13) 'credit risk' means the risk of loss or of adverse change in the financial situation, resulting from fluctuations in the credit standing of issuers of securities, counterparties and any debtors to which IORPs are exposed, in the form of counterparty default risk, or spread risk, or market risk concentrations;
- (14) 'deep market' means a market where transactions involving a large quantity of financial instruments can take place without significantly affecting the price of the instruments.
- (15) 'discontinuance' of a pension scheme means surrender, lapse without value, making a contract paid-up, automatic non-forfeiture provisions or exercising other discontinuity options or not exercising continuity options;
- (16) 'discontinuity options' mean all legal or contractual rights which allow the member or sponsoring undertaking to fully or partly terminate, surrender, decrease, restrict or suspend pension cover or permit the pension scheme to lapse;
- (17) 'discretionary benefits' are benefits which are either granted based only on a "subjective" decision making process or based on "objective" conditions as part

²⁸ Directive 2009/65/EC of the European Parliament and of the Council of 13 July 2009 on the coordination of laws, regulations and administrative provisions relating to undertakings for collective investment in transferable securities (UCITS), OJ L 302, 17.11.2009.

²⁹ Directive 2011/61/EU of the European Parliament and of the Council of 8 June 2011 on Alternative Investment Fund Managers and amending Directives 2003/41/EC and 2009/65/EC and Regulations (EC) No 1060/2009 and (EU) No 1095/2010, OJ L 174, 1.7.2011,

of a “subjective” decision making process in which the IORP has a realistic discretionary power to deviate from the conditions. The results of this process are not concluded beforehand, but the fact that there is such a process may be. The granting of those benefits can be based upon financial or demographic developments, but does not have any a-priori link to these developments. Discretionary benefits are typically granted by means of a periodical decision of the IORP based on non-formalised criteria.

There may be no recurrent practice or expectation of granting those benefits. In other cases, discretionary benefits may have a specified or perceived policy of adjusting benefits, but also a realistic discretionary power to deviate from that policy. The realistic discretionary power is closely linked to the communication to members and beneficiaries, as it should be clear for them that no legal rights can be derived from possible “objective” conditions (for example a specified or perceived policy of adjusting benefits) to obtain these benefits.

In cases where an objective measure (explicit policy), or a series of historical decisions and/or communications from which a pattern can be derived (implicit policy), is available to assist in a discretionary decision-making process, it may not always be completely clear whether the IORP has a realistic discretionary power to deviate from the policy. In such cases, CAs may provide guidance to IORPs on the distinction between discretionary and conditional benefits;

- (18) ‘ex ante benefit reduction’ mechanism is a mechanism based on a contract/bylaws, concluded beforehand and which describes precisely under which conditions and to which extent reductions will take place;
- (19) ‘ex post benefit reduction’ is a measure of last resort (i.e. to be used when no other means are available), which may be allowed by national law and regulation;
- (20) ‘external credit assessment institution’ or ‘ECAI’ means a credit rating agency that is registered or certified in accordance with Regulation (EC) No 1060/2009³⁰ or a central bank issuing credit ratings which are exempt from the application of that Regulation;
- (21) ‘financial guarantee’ is present when there is the possibility to pass losses to the IORP or to receive additional benefits as a result of the evolution of financial variables (solely or in conjunction with non-financial variables). In the case of guarantees, the trigger is generally automatic (the mechanism would be set in the contract’s terms and conditions) and thus not dependent on a decision of the holder. In financial terms, a guarantee is linked to option valuation. The case of defined benefits paid until the death of the beneficiary should not be regarded as an implicit financial guarantee which has to be valued separately as part of the technical provisions;
- (22) ‘insurance undertaking’ means a direct life or non-life insurance undertaking which has received authorisation in accordance with Article 14 of the Solvency II Directive;
- (23) ‘intangible asset’ is an identifiable non-monetary asset without physical substance, in accordance with Commission Regulation (EC) No 1126/2008, and includes f.i. costs of development, concessions, patents, licenses, trade mark and similar rights and assets ³¹;

³⁰ Regulation (EU) No 1060/2009 of the European Parliament and of the Council of 16 September 2009 on credit rating agencies, OJ L 302, 17.11.2009, p. 1.

³¹ Commission Regulation (EC) No 1126/2008 of 3 November 2008 adopting certain international accounting standards in accordance with Regulation (EC) No 1606/2002 of the European Parliament and of the Council, OJ L 320, 29.11.2008, p. 253.

- (24) 'legally enforceable sponsor support' constitutes sponsor support where there is a legal obligation to provide sponsor support. The obligation could be laid down in national social and labour law or in a contractual agreement between IORP and plan sponsor or between plan sponsor and members and beneficiaries;
- (25) 'liquid market' means a market where financial instruments can readily be converted through an act of buying or selling without causing a significant movement in the price;
- (26) 'market risk' means the risk of loss or of adverse change in the financial situation resulting, directly or indirectly, from fluctuations in the level and in the volatility of market prices of assets, liabilities and financial instruments;
- (27) 'non-legally enforceable sponsor support' constitutes sponsor support where there is no legal or contractual obligation to provide sponsor support;
- (28) 'operational risk' means the risk of loss arising from inadequate or failed internal processes, personnel or systems, or from external events;
- (29) 'originator' means an originator within the meaning of Article 4(1)(13) of Regulation (EU) No 575/2013;
- (30) 'pension liability risk' means the risk of loss or of adverse change in the value of pension liabilities, due to inadequate pricing and provisioning assumptions;
- (31) 'pension protection scheme' are a sort of guarantee funds established at the level of a Member State. Its purpose is to provide members with an assured level of benefits if there is no further recourse to a sponsor or the assets of the IORP are insufficient to pay out the benefits due;
- (32) 'regulated market' means either of the following:
 - (a) in the case of a market situated in a Member State, a regulated market as defined in Article 4(1)(21) of Directive 2014/65/EC³²; or
 - (b) in the case of a market situated in a third country, a financial market which has been considered equivalent by the European Commission pursuant to Art. 25(4)(a) of Directive 2014/65/EC; or in absence of such an equivalence decision when it fulfils the following conditions:
 - i. it is recognised by the home Member State of the IORP and fulfils requirements comparable to those laid down in Directive 2014/65/EC; and
 - ii. the financial instruments dealt in on that market are of a quality comparable to that of the instruments dealt in on the regulated market or markets of the home Member State;
- (33) 'reinsurance' means either of the following:
 - (a) the activity consisting in accepting risks ceded by an insurance undertaking or third-country insurance undertaking, or by another reinsurance undertaking or third-country reinsurance undertaking; or
 - (b) in the case of the association of underwriters known as Lloyd's, the activity consisting in accepting risks, ceded by any member of Lloyd's, by an insurance or reinsurance undertaking other than the association of underwriters known as Lloyd's; or
 - (c) the activity consisting of providing reinsurance cover to an IORP.

³² Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU, OJ L 173, 12.6.2014, p. 349.

- (34) 'reinsurance undertaking' means an undertaking which has received authorisation in accordance with Article 14 of the Solvency II Directive to pursue reinsurance activities;
- (35) 'resecuritisation position' means an exposure to a resecuritisation within the meaning of Article 4(1)(63) of Regulation (EU) No 575/2013;
- (36) 'risk-mitigation techniques' means all techniques which enable IORPs to transfer part or all of their risks to another party;
- (37) 'securitisation position' means an exposure to a securitisation within the meaning of Article 4(1)(61) of Regulation (EU) No 575/2013;
- (38) 'security mechanisms' are mechanisms that provide protection to the IORP and/or its members in the context of the fulfilment of the funding requirement and the paying out the benefits due. It consists of sponsor support and pension protection schemes;
- (39) 'special purpose vehicle' means any undertaking, whether incorporated or not, other than an existing insurance or reinsurance undertaking or IORP, which assumes risks from IORPs and which fully funds its exposure to such risks through the proceeds of a debt issuance or any other financing mechanism where the repayment rights of the providers of such debt or financing mechanism are subordinated to the reinsurance obligations of such an undertaking;
- (40) 'sponsor' means the sponsoring undertaking within the meaning of Article 6(3) of the IORP II Directive;
- (41) 'sponsor support' consists of mechanisms that call upon the sponsor and/or the members to provide supplementary financing or other means of security to the IORP and/or that call upon the sponsor to make benefit payments to the members and beneficiaries;
- (42) 'SSPE's sponsor' means sponsor within the meaning of Article 4(1)(14) of Regulation (EU) No 575/2013;
- (43) 'surrender' means all possible ways to fully or partly terminate a pension scheme, including the following:
 - (a) voluntary termination of the pension scheme with or without the payment of a surrender value;
 - (b) change of IORP by the sponsoring undertaking or member;
 - (c) termination of the pension scheme resulting from the member or sponsoring undertaking's refusal to pay the premium;
- (44) 'third-country insurance undertaking' means an undertaking which would require authorisation as an insurance undertaking in accordance with Article 14 if its head office were situated in the Community;
- (45) 'third-country reinsurance undertaking' means an undertaking which would require authorisation as a reinsurance undertaking in accordance with Article 14 of the Solvency II Directive if its head office were situated in the Community;
- (46) 'tranche' means tranche within the meaning of Article 4(1)(67) of Regulation (EU) No 575/2013;
- (47) 'transparent market' means a market where current trade and price information is readily available to the public, in particular to the insurance or reinsurance undertakings.

Annex 2: Mapping of ratings to credit quality steps

IORPs may use ratings produced by external credit assessment institutions (ECAIs). ECAIs use different rating scales. The table below illustrates how examples of ratings can be mapped to the “credit quality steps” referred to in these principles and technical specifications.

Examples of Ratings		Credit Quality Step associated
AAA	Aaa	0
AA	Aa	1
A	A	2
BBB	Baa	3
BB	Ba	4
B	B	5
CCC or lower	Caa or lower	6