

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 (Text with EEA relevance)

[^{X1}PART THREE

CAPITAL REQUIREMENTS

TITLE IV

OWN FUNDS REQUIREMENTS FOR MARKET RISK

[^{X1}CHAPTER 5

Use of internal models to calculate own funds requirements

Section 1

Permission and own funds requirements

Article 362

Specific and general risks

Position risk on a traded debt instrument or equity instrument or derivative thereof may be divided into two components for purposes of this Chapter. The first shall be its specific risk component and shall encompass the risk of a price change in the instrument concerned due to factors related to its issuer or, in the case of a derivative, the issuer of the underlying instrument. The general risk component shall encompass the risk of a price change in the instrument due in the case of a traded debt instrument or debt derivative to a change in the level of interest rates or in the case of an equity or equity derivative to a broad equity-market movement unrelated to any specific attributes of individual securities.

Article 363

Permission to use internal models

1 After having verified an institution's compliance with the requirements of Sections 2, 3 and 4 as relevant, competent authorities shall grant permission to institutions to calculate their own funds requirements for one or more of the following risk categories by using their internal models instead of or in combination with the methods in Chapters 2 to 4:

- a general risk of equity instruments;
- b specific risk of equity instruments;
- c general risk of debt instruments;
- d specific risk of debt instruments;

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- e foreign-exchange risk;
- f commodities risk.

2 For risk categories for which the institution has not been granted the permission referred to in paragraph 1 to use its internal models, that institution shall continue to calculate own funds requirements in accordance with those Chapters 2, 3 and 4 as relevant. Permission by the competent authorities for the use of internal models shall be required for each risk category and shall be granted only if the internal model covers a significant share of the positions of a certain risk category.

3 Material changes to the use of internal models that the institution has received permission to use, the extension of the use of internal models that the institution has received permission to use, in particular to additional risk categories, and the initial calculation of stressed value-at-risk in accordance with Article 365(2) require a separate permission by the competent authority.

Institutions shall notify the competent authorities of all other extensions and changes to the use of those internal models that the institution has received permission to use.

- 4 EBA shall develop draft regulatory technical standards to specify the following:
- a the conditions for assessing materiality of extensions and changes to the use of internal models;
 - b the assessment methodology under which competent authorities permit institutions to use internal models;
 - c the conditions under which the share of positions covered by the internal model within a risk category shall be considered significant as referred to in paragraph 2.

EBA shall submit those draft regulatory technical standards to the Commission by 31 December 2014.

Power is delegated to the Commission to adopt the regulatory technical standards referred to in the first subparagraph in accordance with Articles 10 to 14 of Regulation (EU) No 1093/2010.

Article 364

Own funds requirements when using internal models

1 Each institution using an internal model shall fulfil, in addition to own funds requirements calculated in accordance with Chapters 2, 3 and 4 for those risk categories for which permission to use an internal model has not been granted, an own funds requirement expressed as the sum of points (a) and (b):

- a the higher of the following values:
 - (i) its previous day's value-at-risk number calculated in accordance with Article 365(1) (VaR_{t-1});
 - (ii) an average of the daily value-at-risk numbers calculated in accordance with Article 365(1) on each of the preceding sixty business days (VaR_{avg}), multiplied by the multiplication factor (m_c) in accordance with Article 366;
- b the higher of the following values:
 - (i) its latest available stressed-value-at-risk number calculated in accordance with Article 365(2) ($sVaR_{t-1}$); and

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- (ii) an average of the stressed value-at-risk numbers calculated in the manner and frequency specified in Article 365(2) during the preceding sixty business days ($sVaR_{avg}$), multiplied by the multiplication factor (m_s) in accordance with Article 366;

2 Institutions that use an internal model to calculate their own funds requirement for specific risk of debt instruments shall fulfil an additional own funds requirement expressed as the sum of the following points (a) and (b):

- a the own funds requirement calculated in accordance with Article 337 and 338 for the specific risk of securitisation positions and nth to default credit derivatives in the trading book with the exception of those incorporated in an own funds requirement for the specific risk of the correlation trading portfolio in accordance with Section 5 and, where applicable, the own funds requirement for specific risk in accordance with Chapter 2, Section 6, for those positions in CIUs for which neither the conditions in Article 350(1) nor Article 350(2) are fulfilled;
- b the higher of:
 - (i) the most recent risk number for the incremental default and migration risk calculated in accordance with Section 3;
 - (ii) the average of this number over the preceding 12 weeks.

3 Institutions that have a correlation trading portfolio, which meets the requirements in Article 338(1) to (3), may fulfil an own funds requirement on the basis of Article 377 instead of Article 338(4), calculated as the higher of the following:

- a the most recent risk number for the correlation trading portfolio calculated in accordance with Section 5;
- b the average of this number over the preceding 12-weeks;
- c 8 % of the own funds requirement that would, at the time of calculation of the most recent risk number referred to in point (a), be calculated in accordance with Article 338(4) for all those positions incorporated into the internal model for the correlation trading portfolio.

Section 2

General requirements

Article 365

VaR and stressed VaR Calculation

1 The calculation of the value-at-risk number referred to in Article 364 shall be subject to the following requirements:

- a daily calculation of the value-at-risk number;
- b a 99th percentile, one-tailed confidence interval;
- c a 10-day holding period;
- d an effective historical observation period of at least one year except where a shorter observation period is justified by a significant upsurge in price volatility;
- e at least monthly data set updates.

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The institution may use value-at-risk numbers calculated according to shorter holding periods than 10 days scaled up to 10 days by an appropriate methodology that is reviewed periodically.

2 In addition, the institution shall at least weekly calculate a ‘stressed value-at-risk’ of the current portfolio, in accordance with the requirements set out in the first paragraph, with value-at-risk model inputs calibrated to historical data from a continuous 12-month period of significant financial stress relevant to the institution's portfolio. The choice of such historical data shall be subject to at least annual review by the institution, which shall notify the outcome to the competent authorities. EBA shall monitor the range of practices for calculating stressed value at risk and shall, in accordance with Article 16 of Regulation (EU) No 1093/2010, issue guidelines on such practices.

Article 366

Regulatory back testing and multiplication factors

1 The results of the calculations referred to in Article 365 shall be scaled up by the multiplication factors (m_c) and (m_s).

2 Each of the multiplication factors (m_c) and (m_s) shall be the sum of at least 3 and an addend between 0 and 1 in accordance with Table 1. That addend shall depend on the number of overshootings for the most recent 250 business days as evidenced by the institution's back-testing of the value-at-risk number as set out in Article 365(1).

TABLE 1

Number of overshootings	addend
Fewer than 5	0,00
5	0,40
6	0,50
7	0,65
8	0,75
9	0,85
10 or more	1,00

3 The institutions shall count daily overshootings on the basis of back-testing on hypothetical and actual changes in the portfolio's value. An overshooting is a one-day change in the portfolio's value that exceeds the related one-day value-at-risk number generated by the institution's model. For the purpose of determining the addend the number of overshootings shall be assessed at least quarterly and shall be equal to the higher of the number of overshootings under hypothetical and actual changes in the value of the portfolio.

Back-testing on hypothetical changes in the portfolio's value shall be based on a comparison between the portfolio's end-of-day value and, assuming unchanged positions, its value at the end of the subsequent day.

Back-testing on actual changes in the portfolio's value shall be based on a comparison between the portfolio's end-of-day value and its actual value at the end of the subsequent day excluding fees, commissions, and net interest income.

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4 The competent authorities may in individual cases limit the addend to that resulting from overshootings under hypothetical changes, where the number of overshootings under actual changes does not result from deficiencies in the internal model.

5 In order to allow competent authorities to monitor the appropriateness of the multiplication factors on an ongoing basis, institutions shall notify promptly, and in any case no later than within five working days, the competent authorities of overshootings that result from their back-testing programme.

Article 367

Requirements on risk measurement

1 Any internal model used to calculate capital requirements for position risk, foreign exchange risk, commodities risk and any internal model for correlation trading shall meet all of the following requirements:

- a the model shall capture accurately all material price risks;
- b the model shall capture a sufficient number of risk factors, depending on the level of activity of the institution in the respective markets. Where a risk factor is incorporated into the institution's pricing model but not into the risk-measurement model, the institution shall be able to justify such an omission to the satisfaction of the competent authority. The risk-measurement model shall capture nonlinearities for options and other products as well as correlation risk and basis risk. Where proxies for risk factors are used they shall show a good track record for the actual position held.

2 Any internal model used to calculate capital requirements for position risk, foreign exchange risk or commodities risk shall meet all of the following requirements:

- a the model shall incorporate a set of risk factors corresponding to the interest rates in each currency in which the institution has interest rate sensitive on- or off-balance sheet positions. The institution shall model the yield curves using one of the generally accepted approaches. For material exposures to interest-rate risk in the major currencies and markets, the yield curve shall be divided into a minimum of six maturity segments, to capture the variations of volatility of rates along the yield curve. The model shall also capture the risk of less than perfectly correlated movements between different yield curves;
- b the model shall incorporate risk factors corresponding to gold and to the individual foreign currencies in which the institution's positions are denominated. For CIUs the actual foreign exchange positions of the CIU shall be taken into account. Institutions may rely on third party reporting of the foreign exchange position of the CIU, where the correctness of that report is adequately ensured. If an institution is not aware of the foreign exchange positions of a CIU, this position shall be carved out and treated in accordance with Article 353(3);
- c the model shall use a separate risk factor at least for each of the equity markets in which the institution holds significant positions;
- d the model shall use a separate risk factor at least for each commodity in which the institution holds significant positions. The model shall also capture the risk of less than perfectly correlated movements between similar, but not identical, commodities and the exposure to changes in forward prices arising from maturity mismatches. It shall also take account of market characteristics, notably delivery dates and the scope provided to traders to close out positions;
- e the institution's internal model shall conservatively assess the risk arising from less liquid positions and positions with limited price transparency under realistic market

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scenarios. In addition, the internal model shall meet minimum data standards. Proxies shall be appropriately conservative and shall be used only where available data is insufficient or is not reflective of the true volatility of a position or portfolio.

3 Institutions may, in any internal model used for purposes of this Chapter, use empirical correlations within risk categories and across risk categories only if the institution's approach for measuring correlations is sound and implemented with integrity.

Article 368

Qualitative requirements

1 Any internal model used for purposes of this Chapter shall be conceptually sound and implemented with integrity and, in particular, all of the following qualitative requirements shall be met:

- a any internal model used to calculate capital requirements for position risk, foreign exchange risk or commodities risk shall be closely integrated into the daily risk-management process of the institution and serve as the basis for reporting risk exposures to senior management;
- b the institution shall have a risk control unit that is independent from business trading units and reports directly to senior management. The unit shall be responsible for designing and implementing any internal model used for purposes of this Chapter. The unit shall conduct the initial and on-going validation of any internal model used for purposes of this Chapter, being responsible for the overall risk management system. The unit shall produce and analyse daily reports on the output of any internal model used for calculating capital requirements for position risk, foreign exchange risk and commodities risk, and on the appropriate measures to be taken in terms of trading limits;
- c the institution's management body and senior management shall be actively involved in the risk-control process and the daily reports produced by the risk-control unit are reviewed by a level of management with sufficient authority to enforce both reductions of positions taken by individual traders as well as in the institution's overall risk exposure;
- d the institution shall have sufficient numbers of staff skilled in the use of sophisticated internal models, and including those used for purposes of this Chapter, in the trading, risk-control, audit and back-office areas;
- e the institution shall have established procedures for monitoring and ensuring compliance with a documented set of internal policies and controls concerning the overall operation of its internal models, and including those used for purposes of this Chapter;
- f any internal model used for purposes of this Chapter shall have a proven track record of reasonable accuracy in measuring risks;
- g the institution shall frequently conduct a rigorous programme of stress testing, including reverse stress tests, which encompasses any internal model used for purposes of this Chapter and the results of these stress tests shall be reviewed by senior management and reflected in the policies and limits it sets. This process shall particularly address illiquidity of markets in stressed market conditions, concentration risk, one way markets, event and jump-to-default risks, non-linearity of products, deep out-of-the-money positions, positions subject to the gapping of prices and other risks that may not be captured appropriately in the internal models. The shocks applied shall reflect the nature of the portfolios and the time it could take to hedge out or manage risks under severe market conditions;

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- h the institution shall conduct, as part of its regular internal auditing process, an independent review of its internal models, and including those used for purposes of this Chapter.

2 The review referred to in point (h) of paragraph 1 shall include both the activities of the business trading units and of the independent risk-control unit. At least once a year, the institution shall conduct a review of its overall risk-management process. The review shall consider the following:

- a the adequacy of the documentation of the risk-management system and process and the organisation of the risk-control unit;
- b the integration of risk measures into daily risk management and the integrity of the management information system;
- c the process the institution employs for approving risk-pricing models and valuation systems that are used by front and back-office personnel;
- d the scope of risks captured by the risk-measurement model and the validation of any significant changes in the risk-measurement process;
- e the accuracy and completeness of position data, the accuracy and appropriateness of volatility and correlation assumptions, and the accuracy of valuation and risk sensitivity calculations;
- f the verification process the institution employs to evaluate the consistency, timeliness and reliability of data sources used to run internal models, including the independence of such data sources;
- g the verification process the institution uses to evaluate back-testing that is conducted to assess the models' accuracy.

3 As techniques and best practices evolve, institutions shall apply those new techniques and practices in any internal model used for purposes of this Chapter.

Article 369

Internal Validation

1 Institutions shall have processes in place to ensure that all their internal models used for purposes of this Chapter have been adequately validated by suitably qualified parties independent of the development process to ensure that they are conceptually sound and adequately capture all material risks. The validation shall be conducted when the internal model is initially developed and when any significant changes are made to the internal model. The validation shall also be conducted on a periodic basis but especially where there have been any significant structural changes in the market or changes to the composition of the portfolio which might lead to the internal model no longer being adequate. As techniques and best practices for internal validation evolve, institutions shall apply these advances. Internal model validation shall not be limited to back-testing, but shall, at a minimum, also include the following:

- a tests to demonstrate that any assumptions made within the internal model are appropriate and do not underestimate or overestimate the risk;
- b in addition to the regulatory back-testing programmes, institutions shall carry out their own internal model validation tests, including back-testing, in relation to the risks and structures of their portfolios;
- c the use of hypothetical portfolios to ensure that the internal model is able to account for particular structural features that may arise, for example material basis risks and concentration risk.

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2 The institution shall perform back-testing on both actual and hypothetical changes in the portfolio's value.

Section 3

Requirements particular to specific risk modelling

Article 370

Requirements for modelling specific risk

An internal model used for calculating own funds requirements for specific risk and an internal model for correlation trading shall meet the following additional requirements:

- (a) it explains the historical price variation in the portfolio;
- (b) it captures concentration in terms of magnitude and changes of composition of the portfolio;
- (c) it is robust to an adverse environment;
- (d) it is validated through back-testing aimed at assessing whether specific risk is being accurately captured. If the institution performs such back-testing on the basis of relevant sub-portfolios, these shall be chosen in a consistent manner;
- (e) it captures name-related basis risk and shall in particular be sensitive to material idiosyncratic differences between similar but not identical positions;
- (f) it captures event risk.

Article 371

Exclusions from specific risk models

1 An institution may choose to exclude from the calculation of its specific risk own funds requirement using an internal model those positions for which it fulfils an own funds requirement for specific risk in accordance with Article 332(1)(e) or Article 337 with exception of those positions that are subject to the approach set out in Article 377.

2 An institution may choose not to capture default and migration risks for traded debt instruments in its internal model where it is capturing those risks through the requirements set out in Section 4.

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Section 4

Internal model for incremental default and migration risk

Article 372

Requirement to have an internal IRC model

An institution that uses an internal model for calculating own funds requirements for specific risk of traded debt instruments shall also have an internal incremental default and migration risk (IRC) model in place to capture the default and migration risks of its trading book positions that are incremental to the risks captured by the value-at-risk measure as specified in Article 365(1). The institution shall demonstrate that its internal model meets the following standards under the assumption of a constant level of risk, and adjusted where appropriate to reflect the impact of liquidity, concentrations, hedging and optionality:

- (a) the internal model provides a meaningful differentiation of risk and accurate and consistent estimates of incremental default and migration risk;
- (b) the internal model's estimates for potential losses play an essential role in the risk management of the institution;
- (c) the market and position data used for the internal model are up-to-date and subject to an appropriate quality assessment;
- (d) the requirements in Article 367(3), Article 368, Article 369(1) and points (b), (c), (e) and (f) of Article 370 are met.

EBA shall issue guidelines on the requirements in Articles 373 to 376.

Article 373

Scope of the internal IRC model

The internal IRC model shall cover all positions subject to an own funds requirement for specific interest rate risk, including those subject to a 0 % specific risk capital charge under Article 336, but shall not cover securitisation positions and n-th-to-default credit derivatives.

The institution may, subject to permission by the competent authorities, choose to consistently include all listed equity positions and derivatives positions based on listed equities. The permission shall be granted if such inclusion is consistent with how the institution internally measures and manages risk.

Article 374

Parameters of the internal IRC model

1 Institutions shall use the internal model to calculate a number which measures losses due to default and internal or external ratings migration at the 99,9 % confidence interval over a time horizon of one year. Institutions shall calculate this number at least weekly.

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2 Correlation assumptions shall be supported by analysis of objective data in a conceptually sound framework. The internal model shall appropriately reflect issuer concentrations. Concentrations that can arise within and across product classes under stressed conditions shall also be reflected.

3 The internal IRC model shall reflect the impact of correlations between default and migration events. The impact of diversification between, on the one hand, default and migration events and, on the other hand, other risk factors shall not be reflected.

4 The internal model shall be based on the assumption of a constant level of risk over the one-year time horizon, implying that given individual trading book positions or sets of positions that have experienced default or migration over their liquidity horizon are re-balanced at the end of their liquidity horizon to attain the initial level of risk. Alternatively, an institution may choose to consistently use a one-year constant position assumption.

5 The liquidity horizons shall be set according to the time required to sell the position or to hedge all material relevant price risks in a stressed market, having particular regard to the size of the position. Liquidity horizons shall reflect actual practice and experience during periods of both systematic and idiosyncratic stresses. The liquidity horizon shall be measured under conservative assumptions and shall be sufficiently long that the act of selling or hedging, in itself, would not materially affect the price at which the selling or hedging would be executed.

6 The determination of the appropriate liquidity horizon for a position or set of positions is subject to a floor of three months.

7 The determination of the appropriate liquidity horizon for a position or set of positions shall take into account an institution's internal policies relating to valuation adjustments and the management of stale positions. When an institution determines liquidity horizons for sets of positions rather than for individual positions, the criteria for defining sets of positions shall be defined in a way that meaningfully reflects differences in liquidity. The liquidity horizons shall be greater for positions that are concentrated, reflecting the longer period needed to liquidate such positions. The liquidity horizon for a securitisation warehouse shall reflect the time to build, sell and securitise the assets, or to hedge the material risk factors, under stressed market conditions.

Article 375

Recognition of hedges in the internal IRC model

1 Hedges may be incorporated into an institution's internal model to capture the incremental default and migration risks. Positions may be netted when long and short positions refer to the same financial instrument. Hedging or diversification effects associated with long and short positions involving different instruments or different securities of the same obligor, as well as long and short positions in different issuers, may only be recognised by explicitly modelling gross long and short positions in the different instruments. Institutions shall reflect the impact of material risks that could occur during the interval between the hedge's maturity and the liquidity horizon as well as the potential for significant basis risks in hedging strategies by product, seniority in the capital structure, internal or external rating, maturity, vintage and other differences in the instruments. An institution shall reflect a hedge only to the extent that it can be maintained even as the obligor approaches a credit or other event.

2 For positions that are hedged via dynamic hedging strategies, a rebalancing of the hedge within the liquidity horizon of the hedged position may be recognised provided that the institution:

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- a chooses to model rebalancing of the hedge consistently over the relevant set of trading book positions;
- b demonstrates that the inclusion of rebalancing results in a better risk measurement;
- c demonstrates that the markets for the instruments serving as hedges are liquid enough to allow for such rebalancing even during periods of stress. Any residual risks resulting from dynamic hedging strategies shall be reflected in the own funds requirement.

Article 376

Particular requirements for the internal IRC model

1 The internal model to capture the incremental default and migration risks shall reflect the nonlinear impact of options, structured credit derivatives and other positions with material nonlinear behaviour with respect to price changes. The institution shall also have due regard to the amount of model risk inherent in the valuation and estimation of price risks associated with such products.

2 The internal model shall be based on data that are objective and up-to-date.

3 As part of the independent review and validation of their internal models used for purposes of this Chapter, inclusively for purposes of the risk measurement system, an institution shall in particular do all of the following:

- a validate that its modelling approach for correlations and price changes is appropriate for its portfolio, including the choice and weights of its systematic risk factors;
- b perform a variety of stress tests, including sensitivity analysis and scenario analysis, to assess the qualitative and quantitative reasonableness of the internal model, particularly with regard to the treatment of concentrations. Such tests shall not be limited to the range of events experienced historically;
- c apply appropriate quantitative validation including relevant internal modelling benchmarks.

4 The internal model shall be consistent with the institution's internal risk management methodologies for identifying, measuring, and managing trading risks.

5 Institutions shall document their internal models so that its correlation and other modelling assumptions are transparent to the competent authorities.

6 The internal model shall conservatively assess the risk arising from less liquid positions and positions with limited price transparency under realistic market scenarios. In addition, the internal model shall meet minimum data standards. Proxies shall be appropriately conservative and may be used only where available data is insufficient or is not reflective of the true volatility of a position or portfolio.

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Section 5

Internal model for correlation trading

Article 377

Requirements for an internal model for correlation trading

1 Competent authorities shall grant permission to use an internal model for the own funds requirement for the correlation trading portfolio instead of the own funds requirement in accordance with Article 338 to institutions that are allowed to use an internal model for specific risk of debt instruments and that meet the requirements in paragraphs 2 to 6 of this Article and in Article 367(1) and (3), Article 368, Article 369(1) and points (a), (b), (c), (e) and (f) of Article 370.

2 Institutions shall use this internal model to calculate a number which adequately measures all price risks at the 99,9 % confidence interval over a time horizon of one year under the assumption of a constant level of risk, and adjusted where appropriate to reflect the impact of liquidity, concentrations, hedging and optionality. Institutions shall calculate this number at least weekly.

3 The following risks shall be adequately captured by the model referred to in paragraph 1:

- a the cumulative risk arising from multiple defaults, including different ordering of defaults, in tranching products;
- b credit spread risk, including the gamma and cross-gamma effects;
- c volatility of implied correlations, including the cross effect between spreads and correlations;
- d basis risk, including both of the following:
 - (i) the basis between the spread of an index and those of its constituent single names;
 - (ii) the basis between the implied correlation of an index and that of bespoke portfolios;
- e recovery rate volatility, as it relates to the propensity for recovery rates to affect tranche prices;
- f to the extent the comprehensive risk measure incorporates benefits from dynamic hedging, the risk of hedge slippage and the potential costs of rebalancing such hedges;
- g any other material price risks of positions in the correlation trading portfolio.

4 An institution shall use sufficient market data within the model referred to in paragraph 1 in order to ensure that it fully captures the salient risks of those exposures in its internal approach in accordance with the requirements set out in this Article. It shall be able to demonstrate to the competent authority through back testing or other appropriate means that its model can appropriately explain the historical price variation of those products.

The institution shall have appropriate policies and procedures in place in order to separate the positions for which it holds permission to incorporate them in the own funds requirement in accordance with this Article from other positions for which it does not hold such permission.

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5 With regard to the portfolio of all the positions incorporated in the model referred to in paragraph 1, the institution shall regularly apply a set of specific, predetermined stress scenarios. Such stress scenarios shall examine the effects of stress to default rates, recovery rates, credit spreads, basis risk, correlations and other relevant risk factors on the correlation trading portfolio. The institution shall apply stress scenarios at least weekly and report at least quarterly to the competent authorities the results, including comparisons with the institution's own funds requirement in accordance with this Article. Any instances where the stress test results materially exceed the own funds requirement for the correlation trading portfolio shall be reported to the competent authorities in a timely manner. EBA shall issue guidelines on the application of stress scenarios for the correlation trading portfolio.

6 The internal model shall conservatively assess the risk arising from less liquid positions and positions with limited price transparency under realistic market scenarios. In addition, the internal model shall meet minimum data standards. Proxies shall be appropriately conservative and may be used only where available data is insufficient or is not reflective of the true volatility of a position or portfolio.]

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