



Securities Services

Service Description SIX x-clear Ltd

Clearing Services for Bonds

xcl-802

September 2015





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Clearing Services for Bonds

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1.0 Introduction

SIX x-clear partners with trade flow providers to offer post-trade services for a broad range of government and corporate bonds on a pan-European basis.

The core benefits of using SIX x-clear as a central counterparty (CCP) include:

- **Reduced counterparty risk:** SIX x-clear automatically acts as the counterparty for all its members that trade clearing-eligible securities; when facing SIX x-clear as a counterparty, members are facing an AA-rated company.
- **Post-trade anonymity:** As a clearing house, SIX x-clear occupies an intermediary position between the trading parties, which ensures full post-trade anonymity.
- **Real-time risk management:** SIX x-clear employs a unique real-time risk management model combining market risk based on the VaR of the traded security and credit risk based on the risk rating of the clearing member. Individual risk positions and margin requirements of clients are calculated and updated in real time throughout the trading day.
- **Post-trade efficiency:** Through netting, settlement cycle compression and optimization of settlement liquidity (including transaction splitting), operational efficiency can be increased.

SIX x-clear is a wholly-owned subsidiary of SIX Group Ltd, the integrated Swiss financial market infrastructure provider.

This service description illustrates the main functionalities and features of the SIX x-clear central counterparty service for bond transactions in a CCP-centric post-trade model.

To access the service descriptions for cash equities, please refer to the download center published at www.six-securities-services.com > Clearing > Download center.

2.0 Concept of the Central Counterparty (CCP)

2.1 Clearing

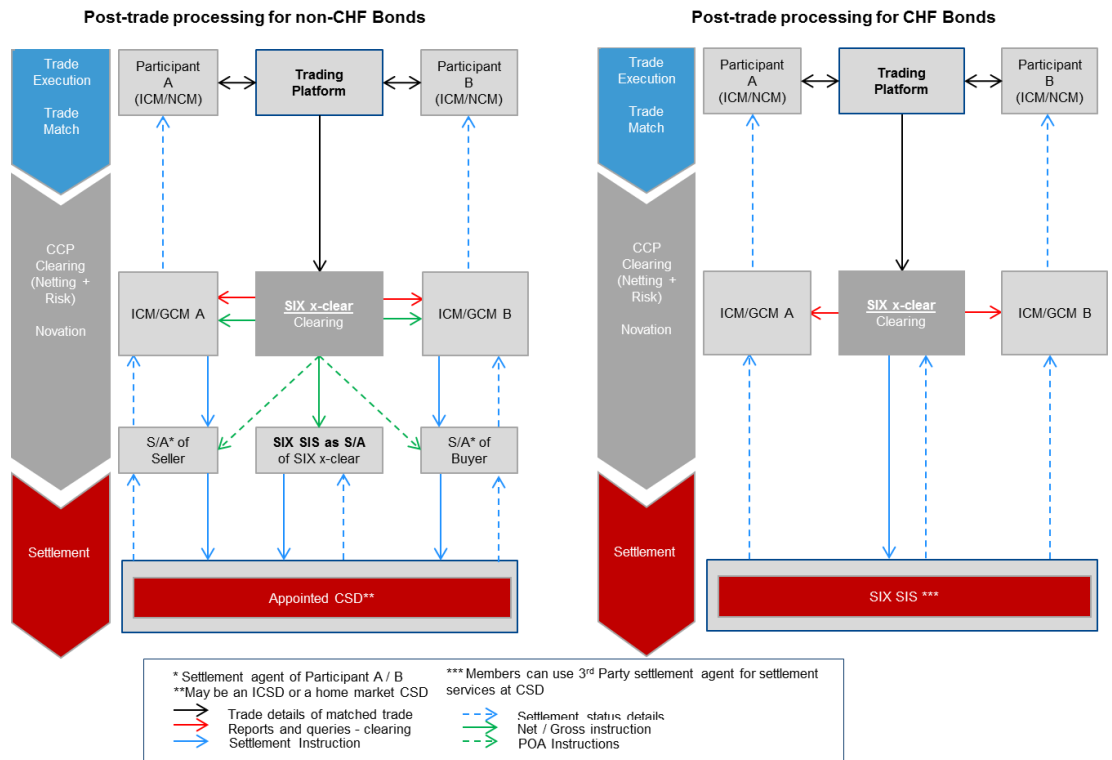
As a post-trade process, clearing involves the efficient handling of risks inherent in concluded (matched), but still unfulfilled (trading) contracts (not yet settled). The CCP steps into the contracts as an intermediary and represents the buyer to each seller and the seller to each buyer to eliminate the counterparty risk.

2.2 Clearing and settlement model

SIX x-clear offers clearing services to its clearing members for their trades executed and also reported (off-order book trades) across pan-European market segments. The diagram below depicts the business model applicable to the members of SIX x-clear.

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2.2.1 SIX x-clear post-trade processing overview



2.2.2 Process steps

1. Bond is traded and matched on the trading platform.
2. Matched trade is sent to SIX x-clear for clearing and optional netting.
3. At the end of the day, the gross or net settlement instructions are sent to SIX SIS Ltd, which acts as the settlement agent for SIX x-clear.
4. SIX SIS Ltd forwards the SIX x-clear leg of settlement instruction to the appointed CSD for matching and settlement.
5. The Clearing member/Settlement Agent of clearing member forwards settlement instruction for matching against the SIX x-clear instruction at the appointed CSD.

2.2.3 Settlement Organization

SIX x-clear will match and settle against its Members at Appointed CSDs. The Appointed CSDs may be domestic (home market) or international CSDs (ICSDs) depending on the settlement market structure requested by the trading venue.



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SIX x-clear offers bridge settlement for its members between the ICSDs Euroclear Bank and Clearstream Banking Luxembourg when these ICSDs form part of the settlement market structure.

Subsequent sections of this document provide details of the service offering in respect of netting, settlement and reporting for members utilizing the SIX x-clear pan-European bond offering.

2.3 **SIX x-clear as a Central Counterparty**

SIX x-clear is recognized by the Bank of England in the UK under the Financial Services and Market Act 2000 (FSMA) as a Recognized Overseas Clearing House (ROCH). SIX x-clear has had this designation since 2004. The company also has a banking license under Swiss law and is thus regulated and supervised by the Swiss Financial Market Supervisory Authority (FINMA) and under the oversight of the Swiss National Bank (SNB). SIX x-clear started business operations in May 2003.

Along with its bond clearing capability, SIX x-clear offers clearing services for derivatives, as well as equities and exchange-traded funds (ETF) on-exchange and off-exchange. SIX x-clear partners include the London Stock Exchange (LSE), SIX Swiss Exchange, numerous multilateral trading facilities (MTFs), broker crossing systems (BCS) and over-the-counter matching services (OTC). Integrated clearing services across different European markets enable SIX x-clear to provide cost-efficient services for its clearing members without the need to have additional interfaces.

3.0 **SIX x-clear as a sole-CCP in the model**

In contrast to the standard equity model, interoperability does not feature in the bond clearing models of SIX x-clear today. Therefore, the relationship between SIX x-clear and other clearing houses is not relevant when using SIX x-clear's clearing services for bonds.

4.0 **Membership requirements**

4.1 **General requirements**

The general membership requirements are published in the download center at www.six-securities-services.com > Clearing > Clients > How to become a client.

SIX x-clear members may be natural persons and legal entities which are commercially active in securities trading or settlement for third parties and which are participants of SIX SIS.

In addition, each member must comply with various requirements related to hardware, software and the overall system. The specifications of the technical infrastructure (such as information technology or communications) are described separately in below **Chapter 10.0 Member interface with SIX x-clear** and published at www.six-securities-services.com > Login > SIX SIS Private > Quick Navigation > Business Partner Specification.



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4.2 Member structure

Two categories of clearing membership are available at SIX x-clear:

- Individual Clearing Member (ICM)
- General Clearing Member (GCM)

Unlike ICMs, GCMs may provide clearing services for other participants that do not have a clearing membership (Non-Clearing Members, NCMs).

4.3 Individual Clearing Members (ICMs)

ICMs provide clearing for their own transactions and transactions effected by their clients. These include group-internal transactions effected for affiliated companies provided that the member is fully consolidated within the group and that the other affiliated companies have no securities dealer license and/or no admission to listing on the trading venues. These include group-internal transactions effected for affiliated companies provided that the member is fully consolidated within the group and that the other affiliated companies have no securities dealer license and/or no admission to listing on the trading venues.

4.4 General Clearing Members (GCMs)

GCMs provide clearing for their own transactions as well as transactions effected by their clients and third parties, i.e. trading participants without direct access to a clearing house. The GCM is responsible for its NCMs' compliance with all rules and regulations of SIX x-clear. GCMs clear trades by having contractual relationships with the CCP on a principal basis.

4.4.1 Margining

The GCM is obliged to demand margins that equal or exceed its own margins from its NCMs.

4.4.2 Operational capabilities

Since GCMs are also responsible for clearing transactions of third parties (i.e. for its NCMs), they must ensure the working operation of their trading, operating and settlement systems as well as the availability of sufficient human resources.

4.4.3 Duty of disclosure

The GCM is obliged to disclose the identity of the NCMs to SIX x-clear.

4.5 Minimum rating

An external, long-term counterparty minimum rating of A-/A3 for ICMs and A+/A1 for GCMs is required. The second highest rating available from the rating agencies is considered. If no external rating is available, an internal rating is defined by means of benchmarking. Although



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the rating represents no criterion for exclusion, it has an impact on the pricing and the determination of the amount of collateral to be provided (margining).

4.6 **Default Fund**

Please refer to chapter 6.11 Default Fund.

4.7 **Margining**

The risk model of SIX x-clear uses a product-specific margin calculation which considers the risk factors in the respective asset class. SIX x-clear calculates the open positions and margins for bonds and equities separately. The total margin requirement is the sum of margin requirements for bonds and equities. The margining process for bonds is specified below:

The initial margin for bonds is calculated in real time based on the net exposure of all open contracts per security (bonds cleared) and the currency combination held in the clearing account by the member. The open positions are computed by considering the net position resulting from trades in listed securities. The margin requirement is calculated on the basis of market and member-specific risk factors. Market-specific risk is measured according to a Value-at-Risk (VaR) based risk model, using a historical approach. The member's risk rating is used to calculate the member-specific risk factor. For the calculation of the initial margin, the bonds are allocated to different bond risk buckets, depending on a security's VaR. The VaR for bonds is derived on the basis of historic changes in bond yields and the modified duration of the security.

Opposing positions within and across a bond risk bucket are netted using intra- and inter-bucket netting coefficients, respectively. The process of computing the initial margin for bonds is explained in detail subsequently in this Service Description. Depending on the member's rating, the margins are increased by the applicable risk rating coefficient.

The variation margin for bonds is calculated periodically during trading hours on the basis of the mark-to-market valuation of the net positions of all open contracts per security held by a member in a clearing account.

A member's total margin requirement is computed by considering the margin requirement in equities and bonds together. For details on the equity margining model, please refer to the published Service Description for equities published at www.six-securities-services.com > Clearing > Download center.

4.8 **General notification requirements**

In the following cases, members are obliged to provide SIX x-clear with a written notification:

- the member's regulatory status has changed;
- new circumstances emerge that may substantially affect the member's financial stability or creditworthiness;



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- the member appoints an additional or another CSD for the settlement of its trades or changes any post-trade details;
- the member is no longer in a position to meet the technical specifications.

All members are obliged to submit their annual reports without prior request.

5.0 Account structure

5.1 Clearing

5.1.1 Clearing accounts

The members' open positions are recorded in clearing accounts. They are maintained at asset class level within the clearing accounts and are segregated into bonds and equities.

The members have the option to clear their own trades in a "House" clearing account and client trades in a "Client" clearing account.

5.2 Margining

Members must maintain money and custody accounts for collateral management to clear trades via SIX x-clear. This allows for the management of collateral for margin and Default Fund requirements. A separate collateral account is kept per Default Fund. The members can use the same collateral accounts for the clearing of all trades executed on the different trading venues supported by SIX x-clear. The money and custody accounts listed below are to be kept with SIX SIS on behalf and for the account of SIX x-clear for collateral management purposes.

The sections below solely describe the collateral management facility at SIX SIS.

5.3 Collateral accounts for margins (initial and variation margin)

SIX x-clear opens collateral accounts with SIX SIS in the name of SIX x-clear for members using the collateral management facility at SIX SIS to meet the margin requirements. The same can be used for clearing equity and bond trades. These accounts are used to transfer the margins provided. The collateral is transferred to SIX x-clear as an irregular pledge with the right of SIX x-clear to re-use it.

The member can use the following collateral accounts:

1. Custody collateral account for margin-eligible securities

Securities collateral can be provided by transferring it from the member's custody account at SIX SIS.

2. Cash collateral account for margin-eligible currencies



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- Cash can be provided from a GBP or EUR account opened/held by a clearing member at a UK Protected Payment System bank (PPS bank).
- Cash can be provided from accounts held at SIX SIS or at Swiss Interbank Clearing (SIC) as per the Lending norms for SIX x-clear Ltd and SIX SIS Ltd published at www.six-securities-services.com > Clearing > Download center.

3. Dispo collateral account

SIX x-clear opens dispo collateral accounts with SIX SIS for each member. These accounts are held in the name of the member and are linked with the member's SIX x-clear collateral accounts.

5.4 Default Fund collateral account

To enable members to meet the Default Fund requirements, SIX x-clear opens a collateral account (custody and/or cash) with SIX SIS for the Default Fund. These accounts are held in the name of the member and are used to transfer the collateral provided. SIX SIS is the pledge holder. The contents of these collateral accounts will be pledged to SIX x-clear by means of a regular pledge.

The member can use the following collateral accounts:

5.4.1 Custody Default Fund collateral account

Securities collateral can be provided by transferring it from the member's custody account at SIX SIS.

5.4.2 Cash Default Fund collateral account

- Cash can be provided from a GBP or EUR account opened/held by a clearing member at a UK Protected Payment System bank (PPS bank).
- Cash can be provided from accounts held at SIX SIS or at Swiss Interbank Clearing (SIC).

6.0 Risk management

As a CCP, SIX x-clear assumes the risk on the buy/sell side and is liable towards the respective members for the fulfillment of obligations (both on the cash and the securities side) arising from trades routed by trading venues. SIX x-clear guarantees the fulfillment of these obligations even in the event of default of a member; however, it does not guarantee the timely execution of the transactions on the settlement date.

Clearing information such as open positions, margin details and the collateral placed for margins as well as the collateral utilizations can be viewed via online queries sent from the user's SIX x-clear interface. The clearing members also have the option of receiving this information using different reporting options available at SIX x-clear.

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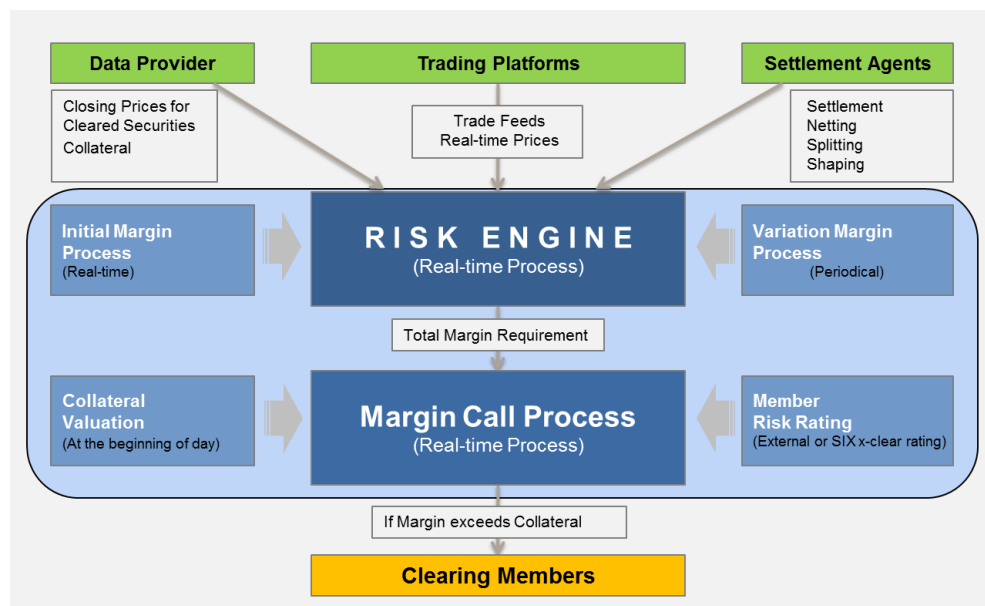
6.1 Objectives/Overview

The primary objective is to minimize potential risks through effective and accurate risk management. In the event of the default of a member, the risk should be primarily borne by the defaulting member itself. Correspondingly, the following measures are employed to minimize risk:

- Safeguarding against the market risk to be expected subsequent to any default of a member by means of the collateral deposited by the member for margins.
- Pledging of collateral in the Default Fund to cover unpredictable losses.

6.2 Risk management process

The following diagram provides a high-level overview of the risk management process:



6.3 Open positions

Initial and variation margins are applied on a clearing account's open positions. All unsettled trades on a member's clearing account are summarized per security and currency (of trade) into one position called an "open position". The unsettled trades may be the result of trading on different trading venues. Hence, a clearing account normally has one open position per traded security and currency combination. Open positions are computed in real time by SIX x-clear and also include unsettled corporate action claims.

The following transactions impact a clearing account's open positions:

- A new clearing-eligible trade received from a trading venue



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- Settlement of such trades
- Corporate action claim when the transaction becomes eligible for claims/compensation due to an appropriate corporate action
- Settlement/Booking of such claims/compensation
- Cancellation of settlement order (possible due to netting and during corporate action transformation)

The process of computing open positions nets all unsettled trades, provided they are on the same security, clearing account and currency. Hence, the open positions for a clearing account are the same whether a member opts for settlement netting or not. A clearing member can get details of its open positions at end of day by subscribing to a daily data format report, RDXL040 or RDXL050, respectively.

6.4 Margins

The total margin required is the result of the initial margin multiplied by the risk rating coefficient, plus the variation margin.

Risk management consists of the following processes:

- Calculation of margin requirements
- Valuation of collateral
- Checking of margin coverage
- Margin call in case of insufficient margins

The daily valuation of the collateral is normally based on the previous day's closing price. Depending on market conditions, valuation may be done more frequently.

The initial margin is an estimate of the market risk inherent in a clearing member's open positions. It is designed to cover the CCP for the market risk it becomes exposed to for the period between the last margin cycle prior to a member's default and the close-out of the defaulting member's unsettled positions by the CCP.

The variation margin covers the mark-to-market fluctuations for a clearing member's open positions. The variation margin helps a CCP to protect itself against losses to a clearing member's open positions. In case of gains to a clearing member's open positions due to favorable price movements, the variation margin offsets the initial margin requirement.

The margin requirement of the member is computed in CHF. SIX x-clear takes into account the currency risk during the mark-to-market process and applies the latest foreign exchange rates to compute the total margin requirement of members. The foreign exchange rates are received using a near-real-time feed. The total margins are recomputed periodically during business hours using the latest foreign exchange rates.



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6.5 Calculation of margins

Open positions are computed in real time by SIX x-clear and also include unsettled corporate action claims. Such open positions form the basis on which the initial margin and the variation margin are computed. Please note that the initial margin and the variation margin are always calculated on a consolidated basis for all exchanges serviced by SIX x-clear.

6.6 Real-time initial margin (IM)

Calculation of the real-time initial margin is based on the VaR of the underlying securities. According to this model, margins are computed in real time using the VaR of the security. SIX x-clear adopts cross-margining while computing the margin requirements.

SIX x-clear calculates the open positions and margins for bonds and equities separately. The VaR for bonds is derived on the basis of historic changes in bond yields and their modified duration.

The procedure for the calculation of the VaR of a bond is as follows:

- A 7-day yield VaR is periodically calculated for every clearing-eligible bond on the basis of the historical yield-to-maturity. In addition to the long-term yield VaR based on yields over the past two years, a short-term yield VaR based on yields over the past three months will also be determined. The procedure for calculating the yield VaR for a bond is as follows:
 - Calculate 7-day historic yield differences using a 2-year or 3-month yield history
 - Arrange such 7-day yield differences in descending order (largest positive return on top)
- Assume that, for 500 7-day yield differences, the sixth largest positive yield difference is the one which has not been exceeded more than 1% of the time.

Determination of both the long-term and the short-term yield VaR is based on a confidence level of 99%. If the short-term and the long-term yield VaR deviate, the higher of the two will be applied as the yield VaR per bond ISIN.

In a next step, the yield VaR is transformed into a price VaR through multiplying it by the modified duration of the respective bond. Therefore:

Price VaR of the bond = Yield VaR of the bond * Modified duration of the bond

The VaR is recalculated and adjusted at least on a weekly basis. In case of difficult market conditions, it may also be calculated daily, if required.

6.7 Risk buckets

Securities are grouped in risk buckets based on their VaR values. The same risk bucket structure is used for grouping the securities which are cleared by SIX x-clear, irrespective of



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the exchanges on which they are traded. For bonds there are six dedicated risk buckets with the following parameters. (However, this setup may undergo changes based on back testing results.)

Risk bucket	VaR (%) lower	VaR (%) upper	Initial margin (%)
BU01	0.00	1.50	1.00
BU02	1.50	3.00	2.30
BU03	3.00	4.50	3.80
BU04	4.50	6.00	5.40
BU05	6.00	7.50	7.20
BU06	7.50	and above	13.90

The process of forming the risk buckets always follows the computation of VaR, which is calculated on a weekly basis during normal market conditions.

Risk netting coefficient I (intra-bucket netting coefficient or intra-BNC)

Opposing open positions on different securities within a risk bucket have the effect of reducing the market risk posed by such open positions. Intra-BNC is designed to give effect to the high level of correlation between various securities comprised in a risk bucket, especially during volatile market moves. Hence opposing open positions within a risk bucket are netted off using the intra-BNC. The following example uses an intra-BNC value of 0.80 (the current value):

Risk bucket	Bond	Long or short	Open amount (CHF)	Initial margin (%)	Initial margin (CHF)	Bucket initial margin (CHF)
BU02	A	Long	1000	2.30	23	23-(16.10*0.80) = 10.12
	B	Short	-700		-16.10	
BU03	C	Long	400	3.80	15.2	30.4-(15.2*0.80) = 18.24
	D	Short	-800		-30.4	

Formula: Initial Margin of Risk Bucket = The higher of "bucket IM_{Long}" or "bucket IM_{Short}", less "intra-bucket margin offset", where

- bucket IMLong is the absolute sum of IM for all long positions within a risk bucket;
- bucket IMShort is the absolute sum of IM for all short positions within a risk bucket;
- "intra-bucket margin offset" is the reduction of margin due to opposing positions within a risk bucket. This is equal to (the lower of bucket IMLong or bucket IMShort) X Intra BNC.

Risk netting coefficient II (inter-bucket netting coefficient, or Inter- BNC)

Similar to opposing positions within a risk bucket, opposing net positions across buckets also have the effect of reducing the market risk. Inter-BNC is applied to net positions across risk buckets and has the effect of reducing the initial margin in the case of opposing net positions across different risk buckets. Inter-BNC is applied at the level of margins. The objective of introducing Inter-BNC is to reduce margins to account for the existence of predominantly



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opposing positions in different risk buckets. The following example uses an Inter-BNC value of 0.40 (the current value):

Risk bucket	Bond	Long or short	Open amount (CHF)	Initial margin (%)	Initial margin (CHF)	Bucket initial margin (CHF)	Net bucket margin (CHF)	Inter-bucket margin offset (CHF)	Total initial margin (CHF)
BU02	A	Long	1000	2.30	23	23-(16.10*0.80)	6.90	6.90* 0.40 = 2.76	10.12+18.24-2.76 = 25.60
	B	Short	-700		-16.1	= 10.12			
BU03	C	Long	400	3.80	15.2	30.4-(15.2*0.80)	-15.2		
	D	Short	-800		-30.4	= 18.24			

Each bucket would have one "net bucket IM" which could be either positive or negative. Positive values of "net bucket IM" should be added across all risk buckets to arrive at the "total net long IM". Similarly, negative values of "net bucket IM" should be added across all risk buckets to arrive at the "total net short IM". The smaller of these two figures (in absolute terms) multiplied by the Inter-BNC is the value by which margins would have to be offset (inter-bucket reduction).

Total IM = \sum (IM for each bucket) less "inter-bucket margin offset", where

- " \sum (IM for each bucket)" is the sum of margins for all risk buckets. "IM for each bucket" incorporates the effect of Intra-BNC.
- "inter-bucket margin offset" is the amount by which margins would be reduced to account for the opposing nature of net positions across buckets = (lesser of "total net long IM" or "total net short IM") * Inter-BNC;
- "total net long IM" is the absolute sum of the net bucket IM where the net bucket IM is positive;
- "total net short IM" is the absolute sum of the net bucket IM where the net bucket IM is negative;
- "net bucket IM" is the arithmetic sum of the IM of all securities within a risk bucket (with plus/minus sign).

6.7.1 Initial margin validation and calibration

The real time initial margin computation is supplemented by a margin validation and calibration process performing up to six daily (and if required on an ad hoc basis) risk-factor-based Monte Carlo simulations of the margin requirement. This approach allows for an independent and comprehensive portfolio-based assessment of the margin requirement and a comparison with the initial margins calculated by the real-time margining module. SIX x-clear reserves the right to adjust the margin requirements based on the outcome of this margin validation.

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6.7.1.1 Simulation technique

The real-time initial margin computation is mainly based on historical volatilities of the underlying instruments, volatility buckets and static intra-bucket and inter-bucket netting. SIX x-clear's margin validation and calibration module employs a risk-factor-based Monte Carlo simulation technique for a state-of-the-art portfolio-based assessment of the replacement risk of the clearing portfolios. This technique takes into account the prevailing volatilities and correlations between the risk factors. It further reflects the prevailing regression mapping of the returns of the underlying securities within the clearing portfolios to the returns of the risk factors, as well as the residual intrinsic risk of the securities.

The methodology underlying x-clear's initial margin validation and calibration module is described in greater detail in the Clearing Terms of SIX x-clear.

6.7.1.2 Adjustment of initial margins

SIX x-clear may adjust the initial margin requirement based on the outcome of the margin validation process mentioned in chapter 5.7.1.1 *Simulation technique*.

For this purpose a scaling factor λ (lambda) has been implemented in order to align the initial margins with the portfolio VaR (calculated by the margin validation module) of the open positions of the clearing member.

The adjustment of the margin requirement through lambda is based on a comparison of the initial margin (computed in the real-time margining process) with the portfolio VaR resulting from the margin validation module. That is to say, the real-time initial margin (IM) is compared to the Portfolio VaR of the open positions and the lambda value to be used to adjust the margin requirement is:

$$\lambda = \frac{VaR}{IM}$$

Example: Assume a member's initial margin (as computed in the real-time margining process) is CHF 5 million whereas the portfolio VaR resulting from the margin validation module equals CHF 5.5 million. In order to adjust the initial margin requirement to the level of the portfolio VaR the member's initial margin will be scaled by the factor 1.1 (= CHF 5.5 million / CHF 5 million) so that the adjusted initial margin equals CHF 5.5 million.

To avoid procyclical effects the lambda-value applied to scale the initial margins will never be smaller than 1.

Adjustments of lambda and the risk rating coefficient are principally independent of each other, i.e. the regime for adjusting the risk rating coefficient is not affected by the margin calibration through the lambda factor.

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6.7.1.3 Decomposition of the initial margin requirement in client reporting

Once the initial margin for a member has been computed using the real-time margining model (= clean initial margin), the below formulas will be used to derive the additional margins applying the lambda factor and the risk rating coefficient.

$$IM_{\lambda} = IM_{CL} \times (\lambda - 1)$$

$$IM_{RC} = (IM_{CL} + IM_{\lambda}) \times (RC - 1)$$

The total initial margin as reported to the clearing members will be broken down into the following three additive components:

$$IM = IM_{CL} + IM_{RC} + IM_{\lambda}$$

where:

λ = Lambda factor for the member credit group

RC = Risk rating coefficient of the clearing member

IM_{CL} = Clean initial margin computed by the real-time margining module

IM_{λ} = Incremental initial margin due to lambda

IM_{RC} = Incremental initial margin due to RC

For a more detailed explanation of the margin calibration through lambda please refer to the respective chapter of the Clearing Terms of SIX x-clear.

6.8 Variation margin (VM)

The variation margin is calculated periodically during the trading day and also during end-of-day processing. The VM is calculated on the basis of trade price or bid/offer prices, depending on the trading venue.

6.9 Total margin

If the member trades both equities and bonds, the total margin requirement for each clearing account is calculated as follows:

Total margin = total initial margin + variation margin equity + variation margin bond, where

Total initial margin = (initial margin equities + initial margin bonds) x risk rating coefficient

Hence, if a member has a "gain" from the variation margin due to favorable market movements, this has the effect of reducing the total margin; however, the total margin cannot sink below zero.

A risk rating coefficient of 1.0 is usually applied, provided that the rating of the clearing member is at least A-. The risk rating coefficient may be increased for members with a lower

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rating. It may also be temporarily increased during periods with extraordinary market conditions or due to instructions from regulators.

It may also be temporarily increased for members with extreme net long or short open positions. Such measures are communicated to the member verbally and are valid only for the duration of these net open positions.

For details on the margining of equities, please refer to the published Service Description for equity clearing.

6.10 **Margin calls**

If margin requirements exceed the collateral value, a margin call is automatically triggered in real time to settle the difference.

A margin call must be met within one hour at the latest, which is exclusively done by direct debit (money side) of the SIC account or an account held with SIX SIS (by means of direct debit authorization). A member that fails to meet a margin call may be declared in default by SIX x-clear.

6.11 **Default Fund**

The initial margin and the variation margin combined should cover all expected market risks that may arise due to the default of a member. However, there is no guarantee that an initial margin calculated from historic data will withstand all future price developments under extreme market conditions. Therefore, the Default Fund is also used to cover unpredictable risks and losses. This Default Fund serves in particular to cover any systemic risk (domino effect).

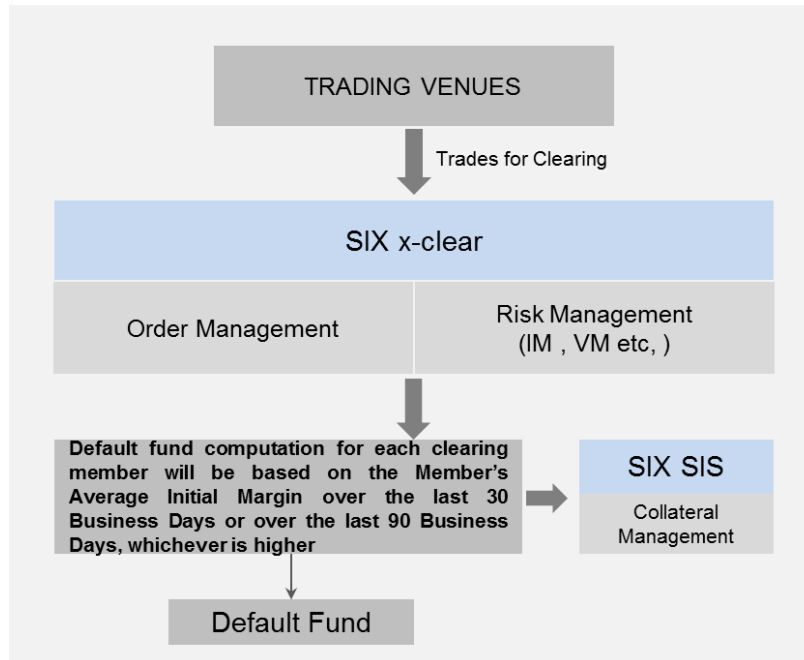
SIX x-clear has established one single default fund with two ring-fenced default fund segments along the following product lines:

- a. Cash markets (equities/bonds)
- b. Derivatives (derivatives/securities lending & borrowing).

The sizes of the default fund segments are defined to cover the default of the two participants or participant groups which cause the largest potential loss.

The Default Fund is supported by contributions from members who use clearing services of SIX x-clear for trading venues or exchanges. The amount to be contributed is, on the one hand, determined by the membership category (ICM/GCM) and, on the other hand, by the Average Initial Margin over the last 30 Business Days or over the last 90 Business Days, whichever is higher, considering cleared trades from the various trading venues and re-adjusted with a monthly periodicity.

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Contributions to the SIX x-clear Default Fund are to be made in the form of money or securities. Members must meet the Default Funds requirement within the specified number of days from the date and time of the Default Fund requirement notice. If the member does not maintain the required Default Fund contribution, a direct debit is executed on the member's UK payment bank account, SIC account or an account held with SIX SIS.

Contributions to the Default Fund can be made by depositing securities eligible as collateral in a safe custody account. The securities are subject to daily mark-to-market valuation and must not fall below the value of the contributions required. The value of the deposited securities is calculated on the basis of their market value less a haircut, and not on the basis of their par value.

Should the mark-to-market valuation reveal that market values have fallen below the minimum value; the member is required to replenish the Default Fund contribution by a given deadline, i.e. within two days of notification. Default Fund contributions are secured by means of a regular pledge.

6.11.1 Adjustment duty

Each member is obliged to make additional contributions to the Default Fund. On the one hand, changes in the average Initial Margin over the last 30 Business Days or over the last 90 Business Days entail adjustments to the Default Fund contributions. On the other hand, price fluctuations resulting in a negative value change entail the member's obligation to make additional contributions.



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Any drawdown – be it partial or full – of the Default Fund segment effected by an x-clear member default gives rise to an obligation on each non-defaulting x-clear member to replenish this Default Fund segment by supplementary contributions and thus restore its total amount to the level as required at the time of its reassessment (“Replenishment Obligation”). The reassessment will be effected 5 business days prior to the end of the cooling-off period (as defined hereafter).

The replenishment obligation of the respective Default Fund segment continues throughout the entire Membership of an x-clear Member.

Following any full or partial drawdown of a Default Fund Segment, a grace period (“cooling-off period”) sets in for a time of 20 business days. During this period, non-defaulting x-clear members are relieved from making supplementary contributions in respect of that drawdown.

6.11.2 Defense lines

The initial margin, variation margin and Default Fund are not the only means for SIX x-clear to absorb losses.

The defense lines of SIX x-clear are applied in the following order:

- Margins, i.e. the collateral provided by the defaulting member itself
- Contributions, i.e. the collateral provided by the defaulting member in favor of the Default Fund
- Per calendar year, a maximum of 25% of SIX x-clear's capital
- Default Fund (i.e. contributions from other clearing members)
- Additional collateral to the Default Fund arising from the replenishment of the Default Fund
- Remaining provisions/reserves, profit and surplus capital from SIX x-clear

The defense lines and the Default Fund, respectively, are intended to help prevent systemic risks (domino effect) for the entire financial market.

6.12 Accepted collateral types

SIX-clear will generally accept different types of collateral as permissible collateral. For further details see the separate lending norm rules which are described in the "Lending Norms" published at www.six-securities-services.com > Clearing > Download center.

Permissible collateral deposited is accounted for at market value and subject to a haircut. Due to applicable Laws, Securities and other instruments issued in the United States of America cannot be accepted as permissible collateral.

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Permissible collateral must be replaced 15 days prior to maturity of the respective instrument deposited as collateral. If an instrument submitted as collateral reaches maturity, it shall no longer be considered as sufficient to fulfill the margin requirements of the SIX x-clear Member.

In principle, bonds must be capable for repo transactions with the Swiss National Bank (SNB).

Upon request, other types of collateral can be examined for eligibility by SIX x-clear.

7.0 Formation of contract

SIX x-clear extends the Open Offer as well as the Novation concept for the formation of contract depending on the venue. A detailed legal explanation of the Open Offer and Novation facilities and their attendant mechanisms are given in the General Terms and Conditions of SIX x-clear published at www.six-securities-services.com > Clearing > Download center.

8.0 Settlement

8.1 Settlement organization

SIX x-clear allows clearing participants to settle Swiss bond segment trades via SIX SIS since SIX SIS is the sole settlement organization admitted by SIX Swiss Exchange for the Swiss bond segment.

In general, SIX x-clear allows clearing participants to settle non-Swiss bond segment trades in the home CSDs of each security. SIX x-clear has appointed SIX SIS as its designated settlement agent. This allows SIX x-clear to use the market connectivity infrastructure of SIX SIS through its local agents or direct market participation for settlements. In certain markets, SIX x-clear has direct market connectivity. In such cases, SIX SIS acts as the account operator on behalf of SIX x-clear.

Non-Swiss bonds are sent via SIX SIS to Euroclear Bank Brussels for settlement. If the clearing member representing the counterparty has an account with Clearstream Banking Luxemburg, the bridge settlement functionality supported by Euroclear Bank Brussels and Clearstream Banking Luxemburg will be used.

The member must indicate its settlement details in the CSSI form ("Clearing and Settlement Standing Instructions"). For further information about the onboarding process please contact your relationship manager or the customer onboarding team. The relevant contacts are published at www.six-securities-services.com > Clearing > Contacts.

For further details on market-specific post trade information, please refer to the relevant User Guides. These are published at www.six-securities-services.com > Clearing > Member Information > Market Information > User Guides.



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Each transaction cleared by SIX x-clear has an intended settlement date (ISD). The ISD is based on the local market practices. The member must ensure that a sufficient amount of funds or securities as required is available on ISD.

SIX x-clear offers its members clearing of executed trades in clearing-eligible securities that are concluded within the clearing timeframe defined by the respective trading venue. The transactions concluded on securities that are excluded from clearing are settled according to the non-CCP settlement model of the trading venue, whereby the trading parties have to settle directly between themselves bilaterally.

8.2 Settlement netting

The settlement netting model offered by SIX x-clear to its clearing members is trade date netting (TDN) and is explained below.

8.3 Settlement mode

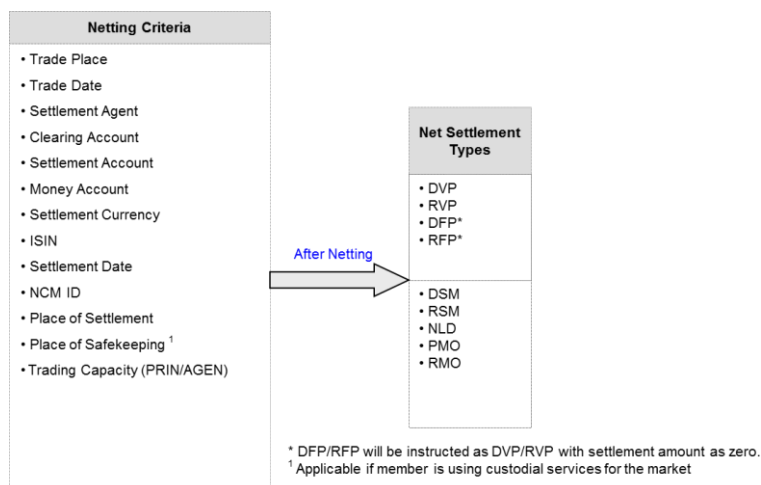
SIX x-clear offers optional net settlement to its members for the transactions on trading venues which follow the CCP-centric post-trade model. Net settlement reduces the settlement transactions to one or more transactions per security/currency and trade date. Settlement netting will have no impact on the margining of the open positions.

The member must indicate the netting preference details in the static data form of SIX x-clear published at www.six-securities-services.com > Clearing > Member Information > Forms.

8.3.1 Trade date netting (TDN)

SIX x-clear offers optional TDN to its clearing members for trades on trading venues which follow the CCP-centric model. The netting parameters used for such trades are as follows:

Trade date netting @ x-clear CCP-centric post-trade model on Swiss Securities



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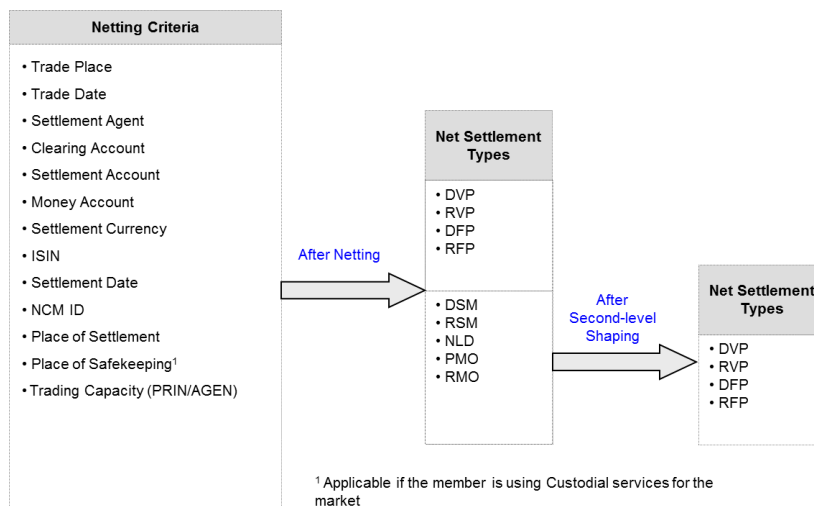
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Netting will be performed after the clearing window once the trading venue is closed for the trading day. For Swiss securities all exotic settlement types such as DSM (delivery of security and money), RSM (receipt of security and money), PMO (pay money only), RMO (receive money only), NLR (null receipt) or NLD (null deliveries) are supported.

8.3.2 TDN and second-level shaping

SIX x-clear offers optional TDN to its clearing members for trades on trading venues which follow the CCP-centric model. The netting parameters used for such trades are as follows:

Trade date netting @ x-clear for CCP-centric post-trade model on non-Swiss Securities



Netting will be performed after the clearing window at the trading venue is closed for the trading day.

In the event the netting results in exotic settlement types such as DSM (delivery of security and money), RSM (receipt of security and money), PMO (pay money only), RMO (receive money only) or NLD (null deliveries), then these net orders will be further shaped to break them into a combination of **versus payment** and **free of payment** instructions.

For Swiss securities all exotic settlement types such as DSM (delivery of security and money), RSM (receipt of security and money), PMO (pay money only), RMO (receive money only) or NLD (null deliveries) are supported. It is optional for member to choose second-level shaping for place of settlement – Sega Inter Settle (SIS). For other places of settlements, netting mandatorily considers second-level shaping.

8.3.3 Shaping

As a result of the offsetting of gross settlement transactions, the net settlement transaction may be worth an undesirably large amount of money. To prevent such large amounts, the

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member may instruct SIX x-clear to define a maximum amount per currency. If the net transaction amount exceeds this cap, a "shaping" process takes place in which the net transaction is divided into net transactions with smaller amounts. The shaping amount specified will be applied against all settlement instructions, irrespective of the place of settlement.

Example: The netting process results in a net DVP transaction with a payment amount of EUR 120 m. The cap for shaping is fixed at EUR 100 m. This net transaction is divided into two transactions of EUR 60 m each.

Shaping is part of the netting process which takes place at the end of each clearing day.

8.3.4 Second-level shaping – aggregation model

The aggregation model resolves the strange net positions by unwinding the strange net settlement types and performing aggregation of the delivery and receipt transactions separately in order to instruct them as independent DVP and RVP orders. In this model the member has the flexibility to restrict the strange net processing for null deliveries.

Members are required to choose between two different parameters:

- Strange net model
- Instruct NLD/NLR or not

For example, consider the following member:

Member	Trading place (MIC)	Strange net model	NLD/NLR instructed	Member type
B124	ABCD	Aggregation model	Yes	GCM

Assume that the following transactions are sent to the system for each of the clearing members (other parameters such as trade date, settlement date, etc. are assumed to be the same for the clearing member, trading place and ISIN).

Member	Trade place	TRX type	ISIN	Quantity	Currency	Amount
B124	ABCD	DVP	ISIN1	50	GBP	500
B124	ABCD	DVP	ISIN1	50	GBP	500
B124	ABCD	RVP	ISIN1	100	GBP	1,050
B124	ABCD	DVP	ISIN2	100	GBP	1,000
B124	ABCD	RVP	ISIN2	50	GBP	500
B124	ABCD	RVP	ISIN2	45	GBP	500
B124	ABCD	DVP	ISIN3	100	GBP	1,030
B124	ABCD	RVP	ISIN3	100	GBP	1,030

After the first level of netting, the transactions above would result in the following strange nets:

Member	Trade place	TRX type	ISIN	Quantity	Amount	Net references (pre aggregation)
B124	ABCD	PMO	ISIN1	0	-50	ABC01
B124	ABCD	DFP	ISIN2	-5	0	ABD01

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Member	Trade place	TRX type	ISIN	Quantity	Amount	Net references (pre aggregation)
B124	ABCD	NLD	ISIN3	0	0	ABE01

None of these transactions are acceptable for settlement, therefore they have to be further shaped into acceptable transaction formats.

As per the aggregation model, DVP and RVP are aggregated to two instructions per ISIN and clearing member and passed on for settlement.

Member	Trade place	TRX type	ISIN	Quantity	Amount	Net references (pre aggregation)
B124	ABCD	DVP	ISIN1	100	1,000	ABC01001
B124	ABCD	RVP	ISIN1	100	1,050	ABC01002
B124	ABCD	DVP	ISIN2	100	1,000	ABD01001
B124	ABCD	RVP	ISIN2	95	1,000	ABD01002
B124	ABCD	DVP	ISIN3	100	1,030	ABE01001
B124	ABCD	RVP	ISIN3	100	1,030	ABE01002

8.4 Generation of settlement instruction

The generation of settlement instructions for Swiss securities happens on a locked-in basis.

SIX x-clear will send the net result from trade date netting for both the seller and the buyer leg with a net settlement instruction to SIX SIS for settlement. The member leg is instructed, followed by the SIX x-clear leg. The member is shown the acceptance of the member leg with a status intimation. The member then receives information about the matching status within the terms of the option chosen at SIX SIS.

For the generation of settlement instructions for non-Swiss securities, SIX x-clear will send the net result for the x-clear leg with a net settlement instruction to SIX SIS for settlement. SIX SIS will then forward the instruction to the desired PSET. The member is expected to instruct his leg of the settlement instruction on an OTC basis to his agent or PSET for settlement.

8.5 Bridge settlement for non-Swiss bonds

SIX SIS as the designated settlement agent for SIX x-clear maintains an account with Euroclear Bank; therefore all x-clear settlement instructions for non-Swiss bonds are sent to Euroclear Bank for settlement. In the event the counterparty maintains an account with Clearstream Banking Luxembourg, the bridge settlement functionality between Euroclear Bank and Clearstream Banking Luxembourg will be used to allow the transaction to settle.

8.6 Settlement transaction splitting

SIX x-clear supports the auto-splitting of settlement transactions if the place of settlement offers such a service. SIX x-clear also reserves the right to initiate manual splitting for settlement transactions.



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9.0 Member reporting

SIX x-clear offers a comprehensive suite of reporting options to its clearing members, with a variety of delivery options available. Numerous reports exist for capturing trade details, open positions, clearing status intimations, settlement details, fee details, and for the purpose of gross/net trade reconciliation. Members also have a choice to opt for receiving reports based on the asset class. Further details on the reports can be found in the Business Partner Specifications published at www.six-securities-services.com > Login > SIX SIS Private > Quick Navigation > Business Partner Specification > SIX x-clear Business Partner Specifications – Volume 5 > Member Specifications.

Form 002B 'Member reporting for clearing and settlement standing instructions notification form' is used for report selection.

For more details about the reports provided by SIX x-clear to its Members, please refer to the Reporting Details Description published at www.six-securities-services.com > Clearing > Member Information > Customer Reporting.

10.0 Member interface with SIX x-clear

webMAX is the interface provided for members using SIX x-clear as their CCP for different trading venues. Members can use this interface with SIX x-clear to perform online queries and receive clearing reports and margin call notices. Further details on the reports can be found in the Business Partner Specifications published at www.six-securities-services.com > Login > SIX SIS Private > Quick Navigation > Business Partner Specification > SIX x-clear Business Partner Specifications – Volume 5 > Member Specifications.

For receiving settlement instructions, the member or the settlement agent of the member can use SWIFT connectivity or any existing messaging interface with SIX SIS.

11.0 Late delivery and buy-in

The introduction of the late settlement regime is at the discretion of SIX x-clear in consultation with the trading venue. The buy-in matrix can be found in the Late Settlement and Buy-in Rules published at www.six-securities-services.com > Clearing > Download center.

12.0 Corporate Actions

SIX x-clear mandates the settlement agent of SIX x-clear in the domestic market of the security to handle the corporate action processing on the open trades which are eligible for corporate action benefits.

The execution of corporate actions is different for securities that are already held in a custody account (existing positions) and for securities that have been purchased but not yet delivered (open transactions). Distributions on existing positions are made in accordance with the rules of the settlement organization with which the securities are deposited.



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Distributions on positions deposited with SIX x-clear as collateral are directly credited by the main paying agent to the members of SIX x-clear (not via SIX x-clear).

With respect to distributions on open transactions, two types of corporate actions must be distinguished:

- Mandatory corporate actions, such as cash dividends or bonus shares
- Corporate actions with a choice of options (elective corporate events), such as takeover offers, repurchase offers, rights issues/capital increases.

For further details on corporate action processing, please refer the country specific User Guides published at www.six-securities-services.com > Clearing > Member Information > Market Information > User Guides.

12.1 **Mandatory corporate actions**

In the case of transactions concluded on a "cum" basis (i.e. with the trade date before the ex date) and settled on an "ex" basis (i.e. with the settlement date on or after the ex date), compensation procedures are applied to ensure that entitlements arising from corporate actions are transferred from the seller to the buyer. The necessary transactions are automatically generated by the respective settlement organizations.

SIX x-clear always acts as the counterparty in its members' compensation transactions, and therefore these transactions fall under SIX x-clear's risk management until they are booked/settled.

Timeline for bookings of compensations

Compensation transactions are booked at the times fixed by the individual settlement organizations. SIX SIS books compensations on the later of the two pay dates of the corporate action or on the settlement date of the open transaction.

Withholding tax rates for claims/compensations

All taxable compensations are taxed at the same default tax rate (non-treaty default rate) in both settlement organizations.

Rounding down of compensations in the form of securities

In corporate actions involving the distribution of securities, decimal places may be handled in different ways (rounding up, rounding down etc.). In the case of SIX Swiss Exchange transactions, however, they are rounded down.

12.2 **Corporate actions with a choice of options**

Corporate actions with a choice of options are also executed in accordance with the rules of the settlement organizations. Under certain circumstances, however, SIX x-clear is exposed

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to risks that are not covered by the margins provided by the members. This occurs in case of so-called "buyer elections", i.e. options a buyer can choose in open transactions with SIX x-clear as the seller. Special processing rules (explained in this chapter) apply for buyer elections.

12.3 Claims

Compensation/Claims on outstanding transactions due to corporate actions are handled by the settlement organizations according to the local market practices. The compensation procedure applied could be based on the ex date or record date, depending on local market practices. The necessary transactions are automatically generated by the respective settlement organizations.

SIX x-clear always acts as the counterparty in its members' compensation transactions, and therefore these transactions fall under SIX x-clear's risk management until they are booked/settled.

Compensation transactions are booked as per the market practices of the place of settlement.

Further details are available in the country specific User Guides published at www.six-securities-services.com > Clearing > Member Information > Market Information > User Guides.

12.4 Buyer election

In the case of corporate actions with a choice of options, SIX x-clear is late in delivering securities to a member and, as a result, the member is not able to deliver the securities to the main paying agent on time, the buyer has the ability to protect himself through a buyer election.

Available buyer election facilities at the settlement location will be mandated by SIX x-clear.

If no buyer election facility is available at the settlement location, the buyer election process will follow the below procedure.

The member may contact SIX x-clear and choose its preferred option via SIX x-clear. SIX x-clear, in turn, obligates the selling member that is responsible for the delay to perform the option chosen by the buyer (delivery of securities or the corporate action related to it).

The buyer has to send his choice with a Liability Request Notice by fax to SIX x-clear's settlement desk. SIX x-clear will forward the buyer's choice to the failing seller. The seller is obliged to execute the instruction and to deliver the outcome according to the buyer's choice.

The Liability Request Notice and the Liability Allocation Notice is published at www.six-securities-services.com > Clearing > Member Information > Forms.

The following conditions apply:



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Trades entitling buyers to buyer election with SIX x-clear:

- The buyer has to be eligible according to the conditions of the corporate action
- Election deadline = deposit date
- Contractual (intended) settlement date = delivery date (deposit date) or earlier
- The actual settlement does not take place until or on the deposit date

Time window for buyers to contact SIX x-clear with a Liability Request Notice:

No later than 10 am CET on the delivery date (deposit date) +1

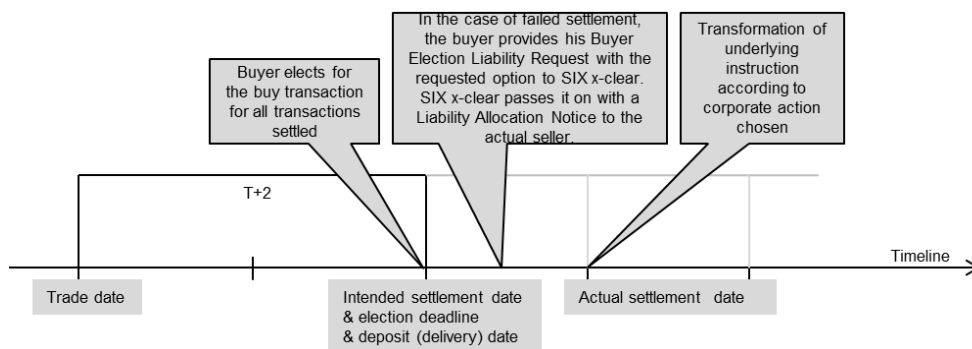
Time window for SIX x-clear to contact sellers with a Liability Allocation Notice:

No later than 12 noon CET on the delivery date (deposit date) +1.

A seller shall deliver the underlying stock on the deposit date at the latest. A buyer/SIX x-clear is not obliged to accept delivery of the stock after such date. Therefore the delivery could be returned to the seller. The seller still has the obligation to fulfill the executable buyer's choice.

Settlement of the chosen option

Sellers designated by SIX x-clear must perform a delivery on the pay date according to the option chosen. The delivery must be effected in accordance with the conditions applicable to the corporate action. The sellers have to ensure that the funds/securities required for settlement are available on the pay date. The subsequent settlement between SIX x-clear and the buyer also takes place on the pay date and in accordance with the conditions applicable to the corporate action. In case the attendant settlement instructions are not automatically generated by the market, settlement instructions will be agreed on a bilateral basis between SIX x-clear and the counterparty and generated manually through SIX x-clear.



13.0

Default

The default procedure applied by SIX x-clear corresponds to the existing regulations and is summarized as follows:

A member that fails to fulfill its obligations under conditions defined in the General Terms and Conditions of Business (GTCB) can be declared a "defaulting member" by SIX x-clear upon



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consultation with the trading venue, or will be declared in default by the respective trading venue(s). After having declared a member a "defaulting member", SIX x-clear issues a default notice and transmits it to the member. The consequences of a default notice take immediate effect.

After issuance of the default notice or the occurrence of an automatic close-out event, SIX x-clear does not register any new contracts of the defaulting member. In order to liquidate existing positions, close-out netting is done.

To compensate for any losses caused by the default of a member, the collateral of SIX x-clear is used, as described in chapter 6.11.2 Defense lines.

14.0 Operating calendar

SIX x-clear accepts trades for clearing purposes on all days on which trading venues are open for trading.

SIX x-clear accepts settlement information from the different settlement locations on all operating days of the market (business day of the CSD in the domestic market). An overview of the settlement holiday calendar per market is published at www.six-securities-services.com > Clearing > Products > Market Information.

Margins are calculated and margin calls sent on all operating days of SIX x-clear.

The SIX x-clear settlement calendar for different markets is published on the SIX Swiss Exchange website at www.six-swiss-exchange.com > Participants > Trading > Exchange Hours > Trading and Settlement Calendar.

15.0 Pricing

The SIX x-clear pricing structure is published at www.six-securities-services.com > Clearing > Products > Pricing SIX x-clear.

In this context, SIX x-clear Ltd draws the Members' attention to clauses **7.1 lit. f. and 25.3** General Terms and Conditions of SIX x-clear Ltd stipulating that the Member bears responsibility for the tax requirements and consequences of clearing with x-clear pursuant to the Applicable Law and that SIX x-clear Ltd assumes no liability for any charges or other negative consequences arising in conjunction with clearing through SIX x-clear Ltd. that are a result of tax laws or ordinances issued by tax authorities pursuant to the Applicable Law.

Please note that references to external sources, e.g. to websites or links of third parties, are provided solely for information purposes and do not imply any recommendations whatsoever. SIX SIS Ltd has neither provided nor processed the contents of the sources in question. Furthermore, SIX SIS Ltd has not verified, reviewed or updated the contents of these sources and therefore disclaims all liability for the information contained therein.

SIX x-clear Ltd
Brandschenkestrasse 47
CH-8002 Zurich

Mailing address:
P.O. Box 1758
CH-8021 Zurich

T +41 58 399 4311
F +41 58 499 4311
www.six-securities-services.com