

## GC Pooling® – Margining Concept

As soon as the GC Pooling® trades are concluded on the Eurex Repo trading platform, Eurex Clearing performs the risk evaluation of the resulting positions. As opposed to a bilateral repo market, where typically only the collateral provider must pledge margin, in the form of additional collateral beyond the repo trade size, Eurex Clearing must guarantee against the non-performance or default of both parties.

The margining can be split into two parts: **Additional Margin (AM)** which guards against price changes in the security basket. The AM serves to cover through the next trading day any potential additional costs that could arise if the positions had to be liquidated immediately. The **Current Liquidating Margin (CLM)** covers losses that would occur in the case that a position was closed out on the respective trading day.

For margining purposes, the front and term legs for both buyer and seller of the repo are separated into a cash and security leg. To ensure the integrity of the Clearing House, a haircut is applied to the value of the bond basket, and the cash flows are conservatively discounted by the applicable interest rates for the number of days until settlement.

The haircut applied to the basket is the weighted sum of European Central Bank (ECB) haircuts for the selected and allocated bonds of the GC Pooling® basket. As the automated allocation of GC Pooling® collateral is taking place in Xemac®, the haircut is calculated and applied on this level. This haircut will effectively become the AM. As a consequence the cash taker has to allocate additional collateral to cover the AM requirement. In order to avoid double margining the Eurex Clearing AM is set to zero. The calculated AM for the cash provider based on the haircut as well is also delivered to Eurex Clearing and taken into account for the intraday and the end-of-day margining.

The CLM is calculated for the cash and securities part of the front and term leg. The CLM (securities) of the cash taker is already covered by the daily re-evaluation and automatic adjustment of the allocated securities within Xemac®. Therefore no further margin payments are required. Through this daily re-evaluation, it is ensured that always 100 percent of the claim that results from GC Pooling® trades is covered. In the event of an under-collateralization, Xemac® automatically allocates sufficient additional securities from the cash taker to the cash provider via Eurex Clearing. If a claim cannot be fully covered, that is, when the cash taker does not have sufficient collateral in his free holdings (collateral pool made up of Clearstream Banking Frankfurt (CBF) and/or Clearstream Banking Luxembourg (CBL) securities), the respective information is provided to Eurex Clearing, who potentially initiates an intraday margin call.

The CLM (securities) for the cash provider is based on the weighted sum of the ECB haircuts and is equal to the additional allocated securities from the cash taker. The cash provider may reuse the additional collateral for other GC Pooling® trades or open market operations with the Bundesbank (depending on the GC Pooling® basket). Therefore the cash provider has to pledge exactly the same margin amount as CLM to Eurex Clearing.

The CLM (cash) is calculated by Eurex Clearing after the trade is done until the settlement of the term leg. It consists of the Current Liquidating Value Cash (CLVC) and the Current Liquidating Value Security (CLVS). The Eurex Clearing CLM calculation is separate from the CLM (securities) computed by Xemac®. The CLM calculations by Eurex Clearing are very small compared to the applied ECB haircuts for the securities. The CLM (cash) is only the discounting of the cash and security value by the applicable interest rates. That means for the cash provider that the cash value of the front leg is discounted by the Risk Adapted Interest – Down (RAIRD) whereas the cash value of the term leg is discounted by the Risk Adapted Interest – Up (RAIRU).

Corresponding, the cash value of the front leg for the cash taker is discounted by RAIRU whereas the cash value of the term leg including the repo rate is discounted by RAIRD. For both, the cash provider and the cash taker the number of discounted days depends on the traded term. The security values of the front and term leg are discounted by the current interest rates for a standard of three days.

## Workflow

We provide the basic methodology of margining of a GC Pooling® trade.<sup>1</sup>

Cash provider: "A"  
Cash taker: "B"

Trade amount: X  
Haircut: H

Interest rate: I  
Repo rate: R

### Front Leg:

"B" delivers securities in excess by the haircut amount to Eurex Clearing (total  $X + H^2$ , and here H is the AM for "B"). The full amount is passed directly to "A", who in return delivers cash delivery versus payment (DVP). "A" pledges margins worth  $2 \times H$  (the haircut is doubled, once to reflect the extra collateral received that is CLM (securities), once as the AM of "A"). All the security and cash legs are discounted by I for the number of days until settlement. This  $2H$  of margin is required by Eurex Clearing in order to purchase the  $X + H$  of securities held by "A", subject to possible market moves of H, should "A" default.

Thus, Eurex Clearing has secured from both sides the haircut, H, worth of AM, which guards against a price developments of the collateral basket, and has conservatively calculated the cash and security values.

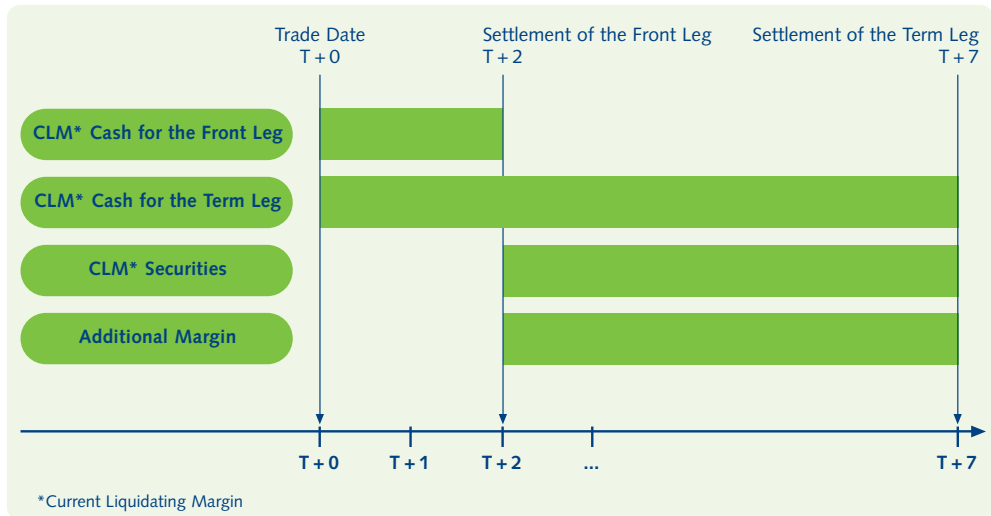
### Term Leg:

"A" transfers  $X + H$  of collateral to Eurex Clearing, and this is passed directly on to "B". "B" in return moves  $X + R$  of cash to "A". The cash for the front and term leg was discounted when the position was entered into by the number of days until final settlement. The security was discounted only by its standard settlement period.

<sup>1</sup> The calculation example does not include the additional collateral as technical buffer. This buffer currently amounts 1% but is subject to change.

<sup>2</sup> The resulting collateral amount exceeds  $X + H$  on a small scale:  
Collateral amount = Trade amount / Market Value  $\times (100 - \text{Haircut}) \times 100$   
To simplify the margin explanation " $X + H$ " will be referred to going forward.

## Margin Calculation of a Eurex Repo GC Pooling® Trade (One Week)



### Example:

Nominal Value (NV) Euro GC Pooling® trade	EUR 100 million for 1 week
ISIN	DE000A0AE077
Margin class	XE01
Repo rate	1%
Haircut	5% (Volume weighted haircuts of allocated collateral)
Current Interest Rate (CIR)	1.5%
Adjusted Interest Rate (AIR):	
Risk Adjusted Interest Rate – Down (RAIRD)	0.5% (CIR – 1%)
Risk Adjusted Interest Rate – Up (RAIRU)	2.5% (CIR + 1%)
Days Until Notional Settlement (DUTS)	standard 3 for security
Days Until Settlement (DUSD)	T + 2 for the front leg T + 7 for the term leg

## Additional Margin

The cash taker (“B”) is to give 100 million worth of GC Pooling® collateral. The ECB haircut of 5 percent is applied, and a total of 105 million worth of collateral is required. This 5 percent haircut on the securities reflects the Additional Margin pledged by “B”.

Eurex Clearing receives and forwards the entire 105 million of GC Pooling® collateral to the cash provider (“A”). “A” must also provide Additional Margin equivalent to the haircut. Thus “A” must pledge 5 million of Additional Margin to Eurex Clearing.

The Additional Margin is required after the settlement of the front leg until the final settlement of the GC Pooling® trade.

## Current Liquidating Margin

---

Typically, the majority of CLM is derived from the P&L of a trade, and is adjusted continuously. The GC Pooling® basket is always valued at 100 percent for CLM calculations, leaving only the discounting by the interest rates, and thus the CLM (cash) is very small. The margin is pledged from the conclusion of the trade onwards.

The formulas are:

$$\text{Current Liquidating Margin (CLM)} = \text{Current Liquidating Value Cash (CLVC)} + \text{Current Liquidating Value Security (CLVS)}$$

Where

$$\text{CLVC} = \text{NV} / (1 + \text{AIR} \times \text{DUSD} / 365)$$

$$\text{CLVS} = (\text{NV} / 100) / (1 + \text{CIR} \times \text{DUTS} / 365)$$

**"B"** as cash taker has to pledge the following amount for:

The front leg

$$\begin{aligned} & -100,000,000 / (1 + 2.5\% \times 2 / 365) + 100,000,000 / (1 + 1.5\% \times 3 / 365) = \\ & -99,986,303.25 + 99,987,672.75 = 1,369.51 \end{aligned}$$

The term leg:

$$\begin{aligned} & 100,019,444.44 / (1 + 0.5\% \times 7 / 365) + -100,000,000 / (1 + 1.5\% \times 3 / 365) = \\ & 100,009,854.46 - 99,987,672.75 = 22,181.71 \end{aligned}$$

The CLM (securities) is already paid by the daily re-evaluation and adjustment of allocated collateral and therefore displayed as credit on Eurex Clearing reports.

**"A"** as cash provider will receive the following amount for:

The front leg

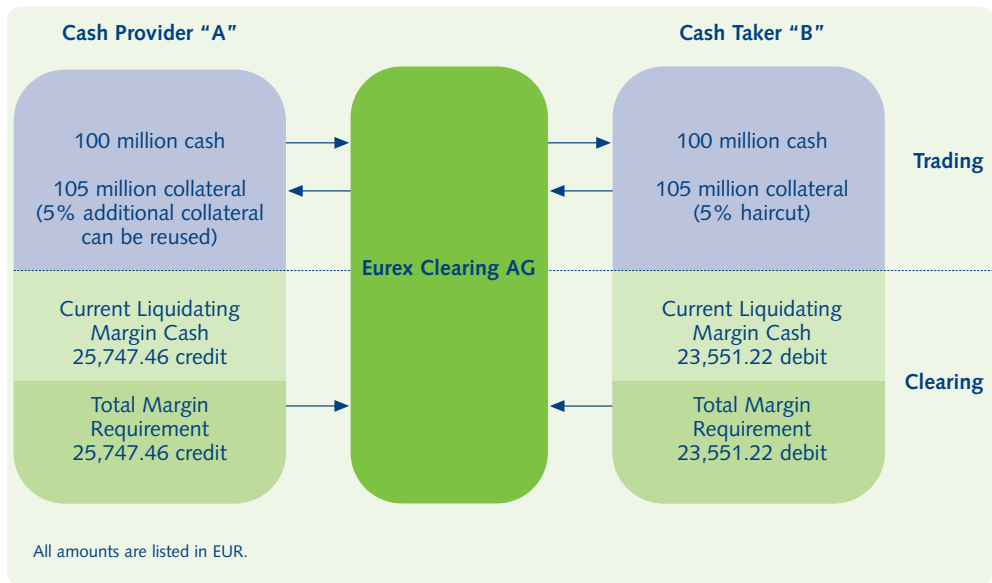
$$\begin{aligned} & 100,000,000 / (1 + 0.5\% \times 2 / 365) + -100,000,000 / (1 + 1.5\% \times 3 / 365) = \\ & 99,997,260.35 - 99,987,672.75 = 9,587.60 \end{aligned}$$

The term leg

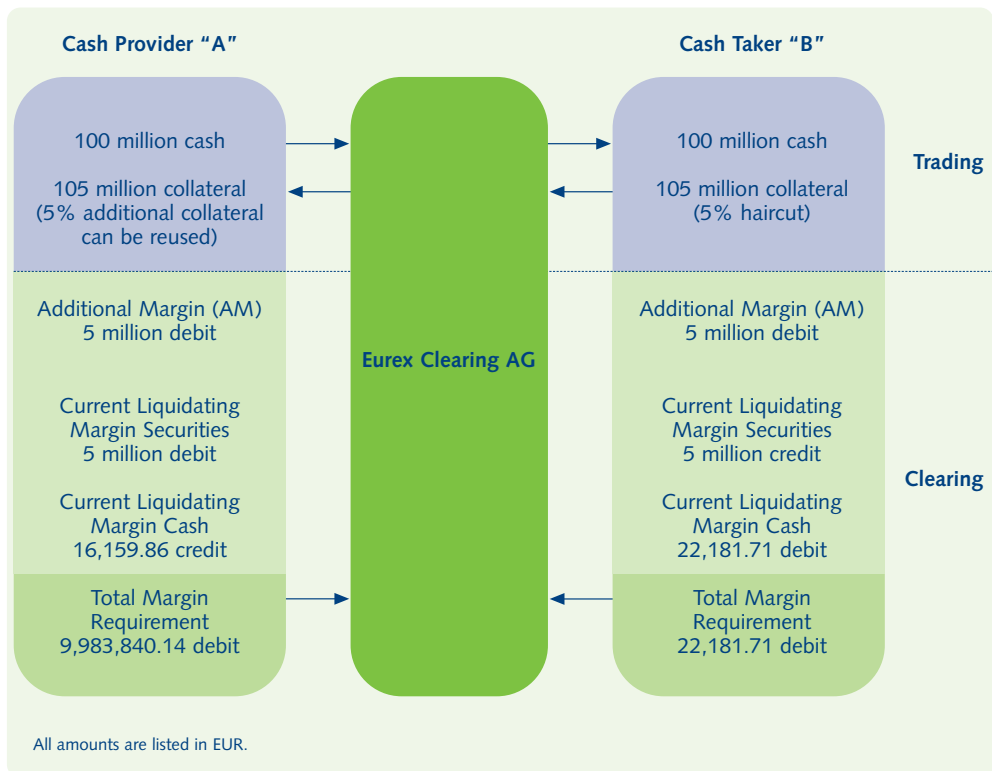
$$\begin{aligned} & -100,019,444.44 / (1 + 2.5\% \times 7 / 365) + 100,000,000 / (1 + 1.5\% \times 3 / 365) = \\ & -99,971,512.90 + 99,987,672.75 = 16,159.86 \end{aligned}$$

Due to the fact that the cash provider may reuse the additional allocated collateral provided by the cash taker, the cash provider has to pledge 5 million as CLM (securities) to Eurex Clearing.

**Overview on Margin Calculation until the settlement of the Front Leg**



**Overview on Margin Calculation after the settlement of the Front Leg**



## Get More Information

---

### Eurex Repo GmbH

#### Frankfurt Office

Gabriele Ristau

T +49-69-211-14193

F +49-69-211-14477

E-mail: [Gabriele.Ristau@eurexchange.com](mailto:Gabriele.Ristau@eurexchange.com)

[www.eurexrepo.com](http://www.eurexrepo.com)



© Eurex, July 2009

#### Published by

Eurex Repo GmbH  
Neue Börsenstraße 1  
60487 Frankfurt/Main  
Germany

Eurex Zürich AG  
Selnaustrasse 30  
8021 Zurich  
Switzerland

#### ARBN Number

Eurex Frankfurt AG ARBN 100 999 764

© Eurex 2009  
Deutsche Börse AG (DBAG), Clearstream Banking AG (Clearstream), Eurex Bonds GmbH (Eurex Bonds), Eurex Repo GmbH (Eurex Repo), Eurex Clearing AG (Eurex Clearing) and Eurex Frankfurt AG are public companies and are registered under German law. Eurex Zürich AG is a public company and is registered under Swiss law. Clearstream Banking S.A. (Clearstream) is a public company and is registered under Luxembourg law. The administering and operating institution of the Frankfurt Stock Exchange (FSE) is DBAG. The administering and operating institution of Eurex Deutschland is Eurex Frankfurt AG (Eurex). Eurex Deutschland and Eurex Zürich AG are in the following referred to as the "Eurex Exchanges". All intellectual property, proprietary and other rights and interests in this publication and the subject matter hereof (other than certain trademarks and service marks listed below) are owned by DBAG and its affiliates and subsidiaries including, without limitation, all patent, registered design, copyright, trademark and service mark rights. While reasonable care has been taken in the preparation of this publication to provide details that are accurate and not misleading at the time of publication DBAG, Eurex, Eurex Bonds, Eurex Repo, the Eurex Exchanges, Eurex Clearing, Clearstream and FSE and their respective servants and agents (a) do not make any representations or warranties regarding the information contained herein, whether express or implied, including without limitation any implied warranty of merchantability or fitness for a particular purpose or any warranty with respect to the accuracy, correctness, quality, completeness or timeliness of such information, and (b) shall not be responsible or liable for any third party's use of any information contained herein under any circumstances, including, without limitation, in connection with actual trading or otherwise or for any errors or omissions contained in this publication.

This publication is published for information only and shall not constitute investment advice. This brochure is not intended for solicitation purposes but only for use as general information. All descriptions, examples and calculations contained in this publication are for illustrative purposes only. Eurex offers services directly to members of the Eurex Exchanges. Those who desire to trade any products available on the Eurex market or who desire to offer and sell any such products to others, should consider legal and regulatory requirements of those jurisdictions relevant to them, as well as the risks associated with such products, before doing so. Eurex derivatives (other than Dow Jones EURO STOXX 50<sup>®</sup> Index Futures contracts, Dow Jones EURO STOXX<sup>®</sup> Select Dividend 30 Index Futures contracts, Dow Jones STOXX 50<sup>®</sup> Index Futures contracts, Dow Jones STOXX<sup>®</sup> 600 Index Futures contracts, Dow Jones STOXX<sup>®</sup> Large/Mid/Small 200 Index Futures contracts, Dow Jones EURO STOXX<sup>®</sup> Banks Futures contracts, Dow Jones STOXX<sup>®</sup> 600 Banks/Industrial Goods & Services/Insurance/Media/Personal & Household Goods/Travel & Leisure/Utilities Futures contracts, Dow Jones Global Titans 50 Index<sup>SM</sup> Futures contracts, DAX<sup>®</sup> Futures contracts, MDAX<sup>®</sup> Futures contracts, TecDAX<sup>®</sup> Futures contracts, SMIM<sup>®</sup> Futures contracts, SLI Swiss Leader Index<sup>®</sup> Futures contracts, Eurex inflation derivatives, and Eurex interest rate derivatives) are currently not available for offer, sale or trading in the United States or by United States persons.

#### Trademarks and Service Marks

Buxi<sup>®</sup>, DAX<sup>®</sup>, Eurex<sup>®</sup>, Eurex Bonds<sup>®</sup>, Eurex Repo<sup>®</sup>, Euro GC Pooling<sup>®</sup>, Eurex Strategy Wizard<sup>SM</sup>, FDAX<sup>®</sup>, GC Pooling<sup>®</sup>, iNAV<sup>®</sup>, MDAX<sup>®</sup>, ODAX<sup>®</sup>, SDAX<sup>®</sup>, Statistix<sup>®</sup>, TecDAX<sup>®</sup>, VDAX-NEW<sup>®</sup>, Xetra<sup>®</sup> and XTF Exchange Traded Funds<sup>®</sup> are registered trademarks of DBAG. Xemac<sup>®</sup> is a registered trademark of Clearstream Banking AG. Vestima<sup>®</sup> is a registered trademark of Clearstream International S.A. STOXX<sup>®</sup>, Dow Jones STOXX<sup>®</sup> 600 Index, Dow Jones STOXX<sup>®</sup> Mid 200 Index, Dow Jones STOXX<sup>®</sup> TMI Index, VSTOXX<sup>®</sup> Index and Dow Jones EURO STOXX<sup>®</sup>/STOXX<sup>®</sup> 600 Sector Indexes as well as the Dow Jones EURO STOXX 50<sup>®</sup> Index and the Dow Jones STOXX 50<sup>®</sup> Index are service marks of STOXX Ltd. and/or Dow Jones & Company, Inc. Dow Jones, Dow Jones Global Titans 50 Index<sup>SM</sup>, and Dow Jones Italy Titans 30 Index<sup>SM</sup> are service marks of Dow Jones & Company, Inc. The derivatives based on these indexes are not sponsored, endorsed, sold or promoted by STOXX Ltd. or Dow Jones & Company, Inc., and neither party makes any representation regarding the advisability of trading or of investing in such products. The names of other companies and third party products may be the trademarks or service marks of their respective owners.