



EQUITIES & EQUITY DERIVATIVES RISK ENGINE

File set for margin calculation replication

Content and format specifications

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1 Introduction

The present document contains the content and format specifications of the public risk data files which can be employed to replicate Equities/Equity derivatives EOD margins.

It covers both Borsa Italiana and Euronext legacy markets, for which two distinct sets of files will be produced.

2 What's new

REVISION NO./ VERSION NO.	DATE	CHANGE DESCRIPTION
1.0	26/05/2023 (Borsa Italiana), 30/06/2023 (Euronext Legacy)	Publication of the first version of the specifications of the public margin replication (risk data) files (two distinct specifications for Borsa Italiana and Euronext Legacy markets)
2.0	22/11/2023	<ul style="list-style-type: none"> • Merge of the specifications into a unique specification • Review of the format of the 'RF01' (model parameters) file and simplification • Optimization of the 'RF02' (instrument scenario prices) file (moving of static data to the dedicated 'RF04' file and reworking) • Reworking of the 'RF03' (FX scenario values) file • Addition of a 'RF04' (instrument static data) file for Borsa Italiana markets • Reworking of such 'RF04' file • Addition of the Euronext Legacy contract code information ('RF04' file) • Addition of a new <i>und_instr_id_deco</i> field for grouping for <i>Decorrelation risk add-on</i> calculation purposes (in place of <i>und_instr_id</i>) ('RF04' file) • Addition of three new files for Euronext Legacy <u>markets only</u> (containing information not needed for margin replication- 'RF05', 'RF06', 'RF07' files)



3.0	01/02/2024	Typo correction: removal of <i>und_curcy_deco</i> field from 'RF04' file
4.0	23/02/2024	<ul style="list-style-type: none">• Changing of structure of the specifications: addition of the current Euronext Legacy markets and Borsa Italiana market file sets• Addition of the file naming conventions• Addition of the <i>und_price</i> field to the 'RF05F' file• Introduction of some refinements to the specifications
5.0	05/04/2024	<ul style="list-style-type: none">• Adding of more details in the Description for <i>value</i> field of the 'RF02F' file

3 Scope of replicable margin components

- *Mark-to-market/Premium Margins;*
- *Variation Margins;*
- *Initial Margins;*
- *Decorrelation risk add-on.*

4 Euronext Legacy markets – Current file set

The current file set is adopted to replicate margins on Euronext Legacy markets' equity portfolios, and will be dismissed from the start of clearing of Euronext Legacy markets' equity derivatives.

4.1 Model parameters ('RF01')

4.1.1 Content

Model parameters for the calculation of the *Initial Margins* and of the *Decorrelation risk add-on*.

.txt file composed by 8 rows containing the model parameter name followed by its value:

```
holding_period: 2
scaling_window: 60
lambda: 0.98
ordinary_confidence_level: 0.995
stressed_confidence_level: 0.995
decorrelation_parameter: 0.8
ordinary_weight: 0.75
stressed_weight: 0.25
```

holding_period, *scaling_window* and *lambda* model parameters are already 'embedded' into the prices of the instrument scenario price file.

4.2 Instrument scenario prices ('RF02')

4.2.1 Content

Instrument scenario prices (including current scenario, which must be employed to compute instrument scenario profits/losses) for the calculation of the *Initial Margins* and of the *Decorrelation risk add-on*.

A product is represented by the **instr_id-settl_curcy** combination.

.csv file composed by a first header row + *n* value rows (delimiter: comma; decimal separator: dot):

Field name	Field type	Possible field values	Field description
eval_dt	Integer		Evaluation date YYYYMMDD
scenario	String	'S', 'U'	Scenario type, ordinary (scaled) 'S' or stressed (unscaled) 'U'
instr_id	String		Product ISIN code
asset_type	String	'C', 'F', 'O'	Product type, cash (‘C’), futures (‘F’) or option (‘O’)
option_type	String	'C', 'P', 'N'	Option type, call (‘C’) or put (‘P’) (‘N’ for cash and futures products)
und_instr_id	String		Underlying product ISIN code
mat_dt	Integer		Product expiry date YYYYMMDD (0 for cash products)
mult	Float		Product multiplier
strike	Float		Option strike price (0.0 for cash and futures products)
settl_curcy	String		Product denomination currency
ref_dt	Integer		Scenario date YYYYMMDD (= eval_dt for current scenario)
value	Float		Scenario value

File will be produced even if empty.

4.2.2 Minimum scope of instruments contained in the file

Instruments with non-0 EOD O/I.

4.3 FX scenario values ('RF03')

4.3.1 Content

Exchange rate scenario values (including current scenario) for the calculation of the *Initial Margins* and of the *Decorrelation risk add-on*.

Current scenario exchange rates can be employed to compute *Mark-to-market/Premium Margins*.

An FX is represented by the **base_curcy-counter_curcy** combination.

.csv file composed by a first header row + *n* value rows (delimiter: comma; decimal separator: dot):

Field name	Field type	Possible field values	Field description
eval_dt	Integer		Evaluation date YYYYMMDD
base_curcy	String		ISO product currency code (e.g. 'USD')
counter_curcy	String		ISO clearing currency code (i.e. 'EUR')
scenario	String	'S', 'U'	Scenario type, ordinary (scaled) 'S' or stressed (unscaled) 'U'
ref_dt	Integer		Scenario date YYYYMMDD (= eval_dt for current scenario)
value	Float		Scenario value

File will be produced even if empty.

4.3.1 Minimum scope of FXs contained in the file

Based on RF02's **settl_curcy** list (RF03's **base_curcy** – RF03's **counter_curcy** will always equal 'EUR').

4.4 Instrument prices & referential data ('RF04')

4.4.1 Content

Instrument price and referential (static) data.

A product is represented by the **instr_id-trade_curcy** combination.

.csv file composed by a first header row + *n* value rows (delimiter: comma; decimal separator: dot):

Field name	Field type	Possible field values	Field description
ref_dt	Integer		Reference date YYYYMMDD
instr_id	String		Product ISIN code
trade_curcy	String		ISO product denomination currency (ISO 4217, 3 chars code)
asset_type	String	'C', 'F', 'O'	Product type, cash ('C'), futures ('F') or option ('O')
cfi	String		Product CFI code (ISO 10962, 6 chars code)
mat_date	Integer		Product expiry/maturity date YYYYMMDD (0 for non-bond cash products)
mult	Float		Product Multiplier
settl_type	String	'C', 'P'	Product settlement type, cash settlement ('C') or physical delivery ('P')
option_type	String	'C', 'P', 'N'	Option type, call ('C') or put ('P') ('N' for cash and futures products)
option_exercise_style	String	'A', 'E', 'N'	Option exercise style, American ('A') or European ('E') ('N' for cash and futures)
option_strike_price	Float		Option strike price (0.0 for cash and futures products)
option_implied_volatility	Float		Option implied volatility

			(0.0 for cash and futures products)
und_instr_id	String		Underlying product ISIN
und_currency	String		ISO underlying product currency (ISO 4217, 3 chars code)
price	Float		Product settlement/closing price
accr_int	Float		Bond accrued interest (0.0 for non-bond products)

File will be produced even if empty.

4.4.2 Minimum scope of instruments contained in the file

Based on RF02's instrument list.

4.5 File naming convention

Archive file: '<yyyymmdd>.zip', e.g. '20230223.zip'

Data files:

- 'RF01': 'RF01.txt';
- 'RF02': '<yyyymmdd>_rf02.csv', e.g. '20230223_rf02.csv';
- 'RF03': '<yyyymmdd>_rf03.csv', e.g. '20230223_rf03.csv';
- 'RF04': '<yyyymmdd>_rf04.csv', e.g. '20230223_rf04.csv'.

5 Euronext Legacy markets – Enhanced file set

The enhanced file set will be adopted from the start of clearing of Euronext Legacy markets' equity derivatives.

5.1 Model parameters ('RF01F')

5.1.1 Content

Model parameters for the calculation of the *Initial Margins* and of the *Decorrelation risk add-on*.

.csv file composed by a first header row + 1 value row (delimiter: comma; decimal separator: dot):

Field name	Field type	Possible field values	Field description	Notes on the enhancement
ord_cl	Float	$\in (0, 1)$	Ordinary <i>Initial Margins</i> confidence level	Currently: <i>ordinary_confidence_level</i>
stress_cl	Float	$\in (0, 1)$	Stressed <i>Initial Margins</i> confidence level	Currently: <i>stressed_confidence_level</i>
deco	Float	$\in [0, 1]$	<i>Decorrelation risk add-on</i> parameter	Currently: <i>decorrelation_parameters</i>
ord_w	Float	$\in [0, 1]$	Ordinary weight	Currently: <i>ordinary_weight</i>
stress_w	Float	$\in [0, 1]$	Stressed weight	Currently: <i>stressed_weight</i>

5.1.2 Status and potential changes description (w.r.t. current file)

- Change of name;
- Change of format;
- Removal of unnecessary information (*holding-period*, *scaling_window* and *lambda* model parameters are already 'embedded' into the prices of the instrument scenario price file).

5.2 Instrument scenario prices ('RF02F')

5.2.1 Content

Instrument scenario prices (including current scenario, which must be employed to compute instrument scenario profits/losses) for the calculation of the *Initial Margins* and of the *Decorrelation risk add-on*.

A product is represented by the **instr_id-instr_curcy** combination.

.csv file composed by a first header row + *n* value rows (delimiter: comma; decimal separator: dot):

Field name	Field type	Possible field values	Field description	Notes on the enhancement
scenario	String	'C', 'S', 'U'	Scenario type, current ('C' – single record per product), ordinary (scaled, 'S' – multiple records per product) or stressed (unscaled, 'U' – multiple records per product)	Adding of 'C' value (single record per product)
instr_id	String		Product ISIN code	
instr_curcy	String		Product denomination currency code (ISO 4217, 3 chars)	Renamed from settl_curcy
ref_dt	Integer		Evaluation date YYYYMMDD for (current) scenario = 'C' (single record)/scenario date YYYYMMDD for both scenario = 'S' and scenario = 'U' (multiple records each – the number of ordinary and	Dropping of one of the two duplicate current scenario price values

			stressed scenarios may differ)	
value	Float		Product scenario value (dirty / 100 for bonds)	

File will be produced even if empty.

5.2.2 Minimum scope of instruments contained in the file

Instruments with non-0 EOD O/I. Also underlyings of physical delivery futures expired and unsettled and of exercised/assigned options will be included.

5.2.3 Status and potential changes description

Structural change aimed at file optimization (leaving of all static data in the dedicated 'RF04F' file and reworking):

- Dropping of *asset_type*, *option_type*, *und_instr_id*, *mat_dt*, *mult* and *strike* fields;
- Drop of *eval_dt* field: the evaluation date will be the *ref_dt* when *scenario* = 'C';
- For every product there will be a single record with *scenario* = 'C' and *ref_dt* equal to the evaluation date (in YYYYMMDD format) and multiple records with *scenario* = 'S'/'U' and *ref_dt* equal to the scenario date (again in YYYYMMDD format) in both cases.

5.3 FX scenario values ('RF03F')

5.3.1 Content

Exchange rate scenario values (including current scenario) for the calculation of the *Initial Margins* and of the *Decorrelation risk add-on*.

Current scenario exchange rates can be employed to compute *Mark-to-market/Premium Margins*.

A FX is represented by the **base_curcy-counter_curcy** combination.

.csv file composed by a first header row + *n* value rows (delimiter: comma; decimal separator: dot):

Field name	Field type	Possible field values	Field description	Notes on the enhancement
scenario	String	'C', 'S', 'U'	Scenario type, current ('C' – single	Adding of 'C' value (single

			record per FX), ordinary (scaled, 'S' – multiple records per FX) or stressed (unscaled, 'U' – multiple records per FX)	record per FX)
base_curcy	String		Product currency code (ISO 4217, 3 chars, e.g. 'USD')	
counter_curcy	String	'EUR'	Clearing currency code (ISO 4217, 3 chars, i.e. 'EUR')	
ref_dt	Integer		Evaluation date YYYYMMDD for (current) scenario = 'C' (single record)/scenario date YYYYMMDD for both scenario = 'S' and scenario = 'U' (multiple records each – the number of ordinary and stressed scenarios may differ)	Dropping of one of the two duplicate current scenario price values
value	Float		FX scenario value	

File will be produced even if empty.

5.3.2 Minimum scope of FXs contained in the file

Based on RF02F's **instr_curcy** list (RF03F's **base_curcy** – RF03F's **counter_curcy** will always equal 'EUR').

5.3.3 Status and potential changes description

Structural change aimed at file optimization and consistency with new 'RF02F' file (reworking):

- Drop of *eval_dt* field: the evaluation date will be the *ref_dt* when *scenario* = 'C';
- For every FX there will be a single record with *scenario* = 'C' and *ref_dt* equal to the evaluation date (in YYYYMMDD format) and multiple records with *scenario* =

'S'/'U' and *ref_dt* equal to the scenario date (again in YYYYMMDD format) in both cases.

5.4 Instrument prices & referential data ('RF04F')

5.4.1 Content

Instrument price and referential (static) data.

A product is represented by the **instr_id-instr_curcy** combination.

.csv file composed by a first header row + *n* value rows (delimiter: comma; decimal separator: dot):

Field name	Field type	Possible field values	Field description	Notes on the enhancement
instr_id	String		Product ISIN code	
instr_curcy	String		Product denomination currency code (ISO 4217, 3 chars)	Renamed from trade_curcy
symbol_code	String		Euronext contract code	
asset_type	String	'C', 'F', 'O', 'B'	Product type, cash ('C'), futures ('F'), option ('O'), bond ('B')	Adding of 'B' value
mat_dt	Integer		Product expiry/maturity date YYYYMMDD (0 for non-bond cash products)	Renamed from mat_date
mult	Float		Product multiplier	
settl_type	String	'C', 'P'	Product settlement type, cash settlement ('C') or physical delivery ('P')	
option_type	String	'C', 'P', 'N'	Option type, call ('C') or put ('P') ('N' for cash, bond)	

			and futures products)	
strike	Float		Option strike price (0.0 for cash, bond and futures products)	Renamed from option_strike_price
und_instr_id	String		Underlying product ISIN code	
und_curcy	String		Underlying product currency code (ISO 4217, 3 chars)	Renamed from und_currency
und_instr_id_deco	String		Underlying product ISIN code for <i>Decorrelation risk add-on</i> grouping	This field will have to be employed for <i>Decorrelation risk add-on</i> grouping instead of und_instr_id
price	Float		Product settlement/closing price (dirty / 100 for bonds)	

File will be produced even if empty.

5.4.2 Minimum scope of instruments contained in the file

Based on RF02F's instrument list, plus underlyings of derivatives which are included in that file. Also physical delivery futures expired and unsettled and exercised/assigned options (expired or not) will be included.

5.4.3 Status and potential changes description

- Adding of *symbol_code* field;
- Adding of *und_instr_id_deco* → methodological update for the replication of margin figures: the *und_instr_id_deco* field will be employed in place of *und_instr_id* field for *Decorrelation risk add-on* grouping;
- Drop of *ref_dt*, *cfi*, *option_exercise_style*, *option_implied_volatility*, *accr_int* fields.

5.5 Derivative instrument expiry prices ('RF05F')

5.5.1 Content

Final settlement price and underlying price (taken as reference for option exercise) of derivative instruments expiring on evaluation date.

.csv file composed by a first header row + *n* value rows (delimiter: comma; decimal separator: dot):

Field name	Field type	Possible field values	Field description
instr_id	String		Product ISIN code
instr_curcy	String		Product denomination currency code (ISO 4217, 3 chars)
price	Float		Product final settlement price
und_price	Float		Product underlying price (taken as reference for option exercise)

File will be produced even if empty

5.5.2 Minimum scope of instruments contained in the file

All derivative instruments expired on evaluation date.

5.5.3 Status and potential changes description

New.

5.6 Stock index values ('RF06F')

5.6.1 Content

Closing value of stock indices.

.csv file composed by a first header row + *n* value rows (delimiter: comma; decimal separator: dot):

Field name	Field type	Possible field values	Field description
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index_id	String		Stock index ISIN code
index_curcy	String		Stock index denomination currency code (ISO 4217, 3 chars)
value	Float		Stock index closing value

File will be produced even if empty.

5.6.2 Minimum scope of stock indices contained in the file

Stock indices underlying derivative instruments with non-0 EOD O/I.

5.6.3 Status and potential changes description

New.

5.7 Option deltas ('RF07F')

5.7.1 Content

Delta of options.

.csv file composed by a first header row + *n* value rows (delimiter: comma; decimal separator: dot):

Field name	Field type	Possible field values	Field description
instr_id	String		Product ISIN code
instr_curcy	String		Product denomination currency code (ISO 4217, 3 chars)
delta	Float		Option delta

File will be produced even if empty.

5.7.2 Minimum scope of instruments contained in the file

Options with non-0 EOD O/I.

5.7.3 Status and potential changes description

New.

5.8 File naming convention

Archive file: 'EQDER_<yyyymmddhhmmss>.zip'

Data files: 'EQDER_<yyyymmdd>_rf<id>_STD.csv', with:

- <id> ∈ ['01', '02', '03', '04', '05', '06', '07'].

Example:

'EQDER_20240223233015.zip'\ 'EQDER_20240223_rf02_STD.csv'

6 Borsa Italiana markets – Current file set

The current file set is adopted to replicate margins on Borsa Italiana market's equity/equity derivatives portfolios. Any potential enhancement will be communicated in due time.

6.1 Model parameters ('RF01')

6.1.1 Content

Model parameters for the calculation of the *Initial Margins* and of the *Decorrelation risk add-on*.

.txt file composed by 8 rows containing the model parameter name followed by its value:

```
holding_period: 2
scaling_window: 60
lambda: 0.98
ordinary_confidence_level: 0.995
stressed_confidence_level: 0.995
decorrelation_parameter: 0.8
ordinary_weight: 0.75
stressed_weight: 0.25
```

holding_period, *scaling_window* and *lambda* model parameters are already 'embedded' into the prices of the instrument scenario price file.

6.2 Instrument scenario prices ('RF02')

6.2.1 Content

Instrument scenario prices (including current scenario, which must be employed to compute instrument scenario profits/losses) for the calculation of the *Initial Margins* and of the *Decorrelation risk add-on*.

A product is represented by the **instr_id-settl_curcy** combination.

.csv file composed by a first header row + *n* value rows (delimiter: comma; decimal separator: dot):

Field name	Field type	Possible field values	Field description
eval_dt	Integer		Evaluation date YYYYMMDD
scenario	String	'S', 'U'	Scenario type, ordinary (scaled) 'S' or stressed (unscaled) 'U'
instr_id	String		Product ISIN code
asset_type	String	'C', 'F', 'O'	Product type, cash (‘C’), futures (‘F’) or option (‘O’)
option_type	String	'C', 'P', 'N'	Option type, call (‘C’) or put (‘P’) (‘N’ for cash and futures products)
und_instr_id	String		Underlying product ISIN code
mat_dt	Integer		Product expiry date YYYYMMDD (0 for cash products)
mult	Float		Product multiplier
strike	Float		Option strike price (0.0 for cash and futures products)
settl_curcy	String		Product denomination currency
ref_dt	Integer		Scenario date YYYYMMDD (= eval_dt for current scenario)
value	Float		Scenario value

File will be produced even if empty.

6.2.2 Minimum scope of instruments contained in the file

Instruments with non-0 EOD O/I. Also underlyings of physical delivery futures expired and unsettled and of exercised/assigned options will be included.

6.3 FX scenario values ('RF03')

6.3.1 Content

Exchange rate scenario values (including current scenario) for the calculation of the *Initial Margins* and of the *Decorrelation risk add-on*.

Current scenario exchange rates can be employed to compute *Mark-to-market/Premium Margins*.

An FX is represented by the **base_curcy-counter_curcy** combination.

.csv file composed by a first header row + *n* value rows (delimiter: comma; decimal separator: dot):

Field name	Field type	Possible field values	Field description
eval_dt	Integer		Evaluation date YYYYMMDD
base_curcy	String		ISO product currency code (e.g. 'USD')
counter_curcy	String		ISO clearing currency code (i.e. 'EUR')
scenario	String	'S', 'U'	Scenario type, ordinary (scaled) 'S' or stressed (unscaled) 'U'
ref_dt	Integer		Scenario date YYYYMMDD (= eval_dt for current scenario)
value	Float		Scenario value

File will be produced even if empty.

6.3.2 Minimum scope of FXs contained in the file

Based on RF02's **settl_curcy** list (RF03's **base_curcy** – RF03's **counter_curcy** will always equal 'EUR').

6.4 Instrument prices & referential data ('RF04')

Instrument prices and referential (static) data can be found in the s.c. 'Risk Array' .zip file at Risk Array | euronext.com ('YYMMDD.zip'), containing .txt/.xml files such as e.g. **SERINF** and **CLASSFILE** files.

Details on the structure of the files in the ‘Risk Array’ .zip file can be retrieved at [Operations | euronext.com](#), *Manuals, Public Data Service* .pdf file.

6.5 File naming convention

Archive file: ‘<yyyymmdd>.zip’, e.g. ‘20230223.zip’ (‘VAR<yyyymmdd>.zip’, e.g. ‘VAR20230223.zip’, for the publication at [Risk Array | euronext.com](#))

Data files:

- ‘RF01’: ‘RF01.txt’;
- ‘RF02’: ‘<yyyymmdd>_rf02.csv’, e.g. ‘20230223_rf02.csv’;
- ‘RF03’: ‘<yyyymmdd>_rf03.csv’, e.g. ‘20230223_rf03.csv’.