

iSTOXX® Osmosis Indices Methodology Guide

[STOXX.com](https://www.stoxx.com)



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1. INTRODUCTION TO THE STOXX INDEX GUIDES

The STOXX index guides are separated into the following sub-sets:

- » The **STOXX Calculation guide** provides a general overview of the calculation of the STOXX equity indices, the dissemination, the index formulas and adjustments due to corporate actions
- » The **STOXX Index Methodology guide** contains the equity index specific rules regarding the construction and derivation of the portfolio based indices, the individual component selection process and weighting schemes
- » The **STOXX World Equity Index Methodology guide** contains the index specific rules regarding the construction and derivation of the STOXX World portfolio based indices, the individual component selection process and weighting schemes
- » The **STOXX Strategy Index guide** contains the formulas and description of all strategy indices
- » The **STOXX DVP Calculation guide** describes the dividend points products
- » The **STOXX Distribution Points Calculation guide** describes the distribution points products
- » The **iSTOXX Fund Indices Methodology guide** contains the index specific rules regarding the construction and derivation of the iSTOXX Fund indices, the individual component selection process and weighting schemes
- » The **iSTOXX Strategy Indices Methodology guide** contains the index specific rules regarding the construction and derivation of the iSTOXX Strategy indices, the individual component selection process and weighting schemes
- » The **iSTOXX Decrement Indices Methodology guide** contains the index specific rules regarding the construction and derivation of the iSTOXX Decrement indices, the individual component selection process and weighting schemes
- » The **iSTOXX Equity Indices Methodology guide** contains the index specific rules regarding the construction and derivation of the iSTOXX Equity indices, the individual component selection process and weighting schemes
- » The **STOXX Reference Rates guide** contains the rules and methodologies of the reference rate indices
- » The **Guide to Reference Calculations used by STOXX Ltd.** provides a detailed view of definitions and formulas of the calculations as utilized in the reports, factsheets, indices and presentations produced by STOXX
- » The **Guide to Industry Classifications Used By STOXX** contains general information pertaining to industry classifications used in STOXX indices, together with any references and links to third-parties that create the data.
- » The **STOXX Eligible Market Segments guide** contains the list of stock exchanges and market segments.
- » The **STOXX Digital Asset Methodology guide** contains the index specific rules regarding the construction and calculation of the STOXX Digital Asset Indices.

All rule books are available for download on <http://www.stoxx.com/indices/rulebooks.html>

2. CHANGES TO THE GUIDE BOOK

2.1. HISTORY OF CHANGES TO THE ISTOXX OSMOSIS INDICES METHODOLOGY GUIDE

September 2026: Creation of 'iSTOXX® Osmosis Indices Methodology Guide' and addition of iSTOXX Osmosis Single Factor Indices, iSTOXX Osmosis Multi Factor Indices and iSTOXX Osmosis Multi Factor Transition Indices

3. GENERAL PRINCIPLES

3.1. INDEX RATIONALE

STOXX defines the index rationale as the basis for applying a certain methodology in order to achieve the index objective. STOXX performs intensive research and may conduct conversations with market participants and third parties for this purpose. STOXX discloses the index objective in every case.

3.2. METHODOLOGY REVIEW POLICIES

STOXX constantly monitors the execution of the index calculation rules in order to ensure the validity of the index methodology. STOXX also conducts general methodology reviews in a periodic and ad-hoc basis, to reflect economic and political changes and developments in the investment industry. As result of these activities, STOXX introduces changes to the methodology books. Material changes are notified to subscribers and the media through the usual communication channels. Clarifications of the methodology are updated in the rulebook. All changes are tracked in the section 2 CHANGES TO THE GUIDE BOOK HISTORY OF CHANGES TO THE iSTOXX OSMOSIS .

3.3. INDEX TERMINATION POLICY

For the termination of an index or index family for which outstanding products are present in the market to the knowledge of STOXX, a market consultation with the involved clients will be initiated by STOXX to take into account their views and concerns related to the termination or transition. A consultation period will be opened. Its duration depends on the specific issue. After the consultation period and in case of further action needed, a notification will be issued and the process defined above will be followed. In the case of a transition, STOXX will launch the alternative index and will notify of its character as a suitable replacement for an existing index whose calculation should be discontinued in the future. This notification advises clients on the alternative recommended by STOXX as replacement. The timeframe in which both indices will be calculated in parallel will be disclosed in the notification's text and will be no shorter than three months.

For the termination of an index or index family for which, to the knowledge of STOXX, no listed financial products are issued in the market, a press release notification or e-mail notification to subscribers will be communicated at least three months before coming into force. Clients or third parties with interest in the index or index family are urged to communicate as soon as possible their concerns to STOXX. Based on the feedback collected, STOXX may alter the index termination decision. For the termination of an index without financial product issued on there will be no market consultation. Changes to the original notification will be communicated in the same manner.

3. GENERAL PRINCIPLES

3.4. REPLACEMENT FOR INDICES WITH FIXED NUMBER OF CONSTITUENTS

When referred to this section the below applies only during review implementation month:

During review implementation month, the published review report in combination with the selection list will be used to select a replacement. With the public announcement of the review report in the review implementation month, the highest ranked non-component from the selection list, which is not announced an addition to the affected index from the review report at the review effective date, will replace the deleted stock ("next viable replacement").

For certain replacements occurring during review month and before the rebalancing date:

- If a deleted stock was scheduled for a deletion in an (size) index at the review effective date to a lower size index or entirely, the afore-mentioned process of adding the next viable replacement applies. However, to balance the number of additions and deletions at the review effective date, the lowest ranked index component on the selection list, within the same (size) index and which was not announced a deletion from the review report, will be deleted at the review effective date.

- If a deleted stock was scheduled for an addition in an (size) index at the review effective date, the afore-mentioned process of adding the next viable replacement applies. However, to balance the number of additions and deletions at the review effective date, the highest ranked index component on the selection list, within the same (size) index and which was not announced an addition from the review report, will replace the deleted addition at the review effective date.

4. iSTOXX OSMOSIS INDICES

4.1. iSTOXX OSMOSIS REGIONAL SINGLE FACTOR INDICES

4.1.1. OVERVIEW

The iSTOXX Osmosis Regional Single-Factor indices are designed to provide exposure to Value, Momentum, Low Volatility and Quality risk-premium factors, with style factor scores provided by Osmosis Investment Management. The indices track the STOXX AC World regional indices, while ensuring tradability, diversification, and liquidity. A Global single-factor index is constructed by aggregating the six regional indices using the regional weights of the STOXX AC World Index. A DM World single-factor index is constructed by aggregating the five regional indices (minus Emerging Markets) using the regional weights of the STOXX DM World Index. See Table below for more details.

Region/Index	Value	Quality	Low Volatility	Momentum
DM North America	x	x	x	x
DM Europe ex UK	x	x	x	x
United Kingdom	x	x	x	x
DM Asia Pacific ex JP	x	x	x	x
Japan	x	x	x	x
Emerging Markets	x	x	x	x
DM World - region neutral	x	x	x	x
AC World (Global) - region neutral ¹	x	x	x	x

Universe: STOXX AC World regional indices including:

- STOXX DM North America
- STOXX DM Europe ex UK
- STOXX Japan
- STOXX United Kingdom
- STOXX DM Asia Pacific ex JP
- STOXX Emerging Markets

Weighting scheme: The indices are weighted using a two-step approach involving tilt and optimization.

Base values and dates: 100 on March 18th, 2002²

¹ The global region-neutral version is constructed by using the weights of the regional sleeves in the STOXX AC World benchmark. The DM region-neutral version is constructed by using the weights of the regional sleeves in the STOXX DM World index.

² The historical Backtest simulation used the regional sleeves of STOXX World Universal Indices from March 2002 to March 2012. From June 2012, it uses the regional sleeves of STOXX Investable Market Indices (IMI). See Table below for details.

	March 2002 - March 2012	June 2012 onwards
DM North America	STOXX DM North America Universal	STOXX DM North America
DM Europe ex UK	STOXX DM Europe ex UK Universal	STOXX DM Europe ex UK
United Kingdom	STOXX United Kingdom Universal	STOXX United Kingdom
Japan	STOXX Japan Universal	STOXX Japan
DM Asia Pacific ex JP	STOXX DM Asia Pacific ex JP Universal	STOXX DM Asia Pacific ex JP
Emerging Markets	STOXX Emerging Markets Universal	STOXX Emerging Markets
DM World	STOXX Developed World Universal	STOXX DM World

4. ISTOXX OSMOSIS INDICES

Index types and currencies: Price, net, and gross return in EUR, GBP, and USD.

Dissemination calendar: STOXX Global calendar

4.1.2. INDEX REVIEW

Constituent Selection: Portfolio construction is performed using Osmosis's Value, Momentum, Low Volatility and Quality factor scores, along with Axioma's portfolio optimization software and risk models.

Axioma Risk Model: The following Axioma Medium-Horizon Fundamental Factor Risk Models are used by region:

Region	Risk Model
DM North America	NA4-MH
DM Europe ex UK	EU4-MH
United Kingdom	EU4-MH
DM Asia Pacific ex JP	APxJP4-MH
Japan	JP4-MH
Emerging Markets	EM4-MH

If the regional model is unavailable on a rebalance date due to a public holiday, the risk model from the last business day is used instead.

Factor Scores: The Osmosis factor scores are constructed from a combination of regional and sector z-scores and range from -3 to 3. Osmosis provides the scores on the last business day of the month preceding the review. For example, the March factor scores are provided at the end of February and so on. A description of the Osmosis factor scores can be found at [Osmosis Factor Suite Methodology - Osmosis IM](#).

A **Factor Tilt portfolio** for Value, Momentum, Low Volatility, and Quality factors is first calculated by tilting the Free Float Market Capitalization of each security as:

$$\bar{w}_i = w_{b,i} * (1 + \frac{1}{3} \text{Factor Score}_i)^k$$

where:

- $\bar{w}_i$ is the weight of security i in the Factor Tilt Portfolio
- $w_{b,i}$ is the weight of security i in the Parent Index
- Factor Score_i is the Osmosis Style Factor z-score for the ith security
- k is the tilt strength.

AC World	STOXX World AC Universal	STOXX AC World
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4. ISTOXX OSMOSIS INDICES

The tilt strength k starts at 2 and is incremented by one until the Active Share of the Factor Tilt portfolio vs the parent index is equal to, or higher than, 40%.

An optimized factor portfolio for Value, Momentum, Low Volatility, and Quality is then constructed by minimizing the following objective function:

$$\sum_i |w_i - \bar{w}_i| + 0.1 \sqrt{\sum_i (w_i - \bar{w}_i)^2}$$

where w_i and $\bar{w}_i$ are the optimized and factor-tilt portfolio weights for the i th asset. The first term minimizes the active share of the optimized portfolio relative to the factor-tilt portfolio. The 2nd term minimizes the sum of squares distance of the optimized portfolio to the factor-tilt portfolio – it regularizes the objective function and ensures that the portfolio model has a unique solution.

The portfolio model also includes the following constraints to ensure diversification and control for unintended systematic exposures and tradability.

Do Not Hold (Exclusions)	Bottom 5% market cap with lowest factor exposure
Min Industry Exposure	50% of Parent Index
Active Industry Bounds	+/- 5% ICB Industries (Level 1)
Active Country Bounds	+/- 5% (STOXX Country)
Active Untargeted Style Exposures	+/- 0.25 std except targeted style factors
Liquidity	Percentile Days to Trade
Turnover	30% Annual one-way
Max Ex-ante Tracking Error	3.5%
Max Asset Weight	20x Parent Index Weight
Active Asset Weight Bounds	+/- 3%
Max Total Weight of Top 10 Holdings	1.5 x Total Weight of Parent Index Top 10 Holdings
Issuer Diversification	4.5%/8%/35%
Min Threshold Holding (Ex-post)	1bp
Max Active Share to Parent Index	40%
Max Active Share to Factor Tilt Portfolio	15%

A brief description of the portfolio constraints is given below:

Exclusions: Do not hold the bottom 5% of stocks by market capitalization with the lowest targeted style factor exposure.

Minimum Industry Exposure: The percentage exposure to each ICB Industry must be at least half of the Parent Index.

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Active Industry Weights: The percentage exposure to each ICB Industry must be within +/- 5% of the Parent Index.

Active Country Weights: The percentage exposure to each country must be within +/- 5% of the Parent Index value. Each company's country assignment is based on the STOXX Country classification.

Active Untargeted Style Exposures: The exposure to each of the untargeted Osmosis factors as well as the Axioma Risk Model style factors must be within 0.25 standard deviations of the Parent Index's factor exposures.

Limit turnover: The Index has an annual one-way turnover limit of 30%.

Active Risk: The active risk of the index relative to the Parent Index is constrained to a maximum of 3.5%.

Maximum Asset Weight: Restricted to 20 times its weight in the Parent Index.

Asset Holding Limits: The maximum weight of each asset in the index is +/- 3% of its weight in the Parent Index.

Maximum Total Weight of Top 10 Holdings: The maximum total weight of the top 10 holdings is limited to 1.5 times the total weight of the top 10 holdings in the Parent Index.

Issuer Diversification: The maximum weight of each issuer in the index is 8%. Moreover, the sum of the weights of the issuers above 4.5% cannot exceed 35%.

Minimum Threshold Holding (Ex-post): Any security with an optimized weight below 1bp is excluded ex-post from the index, and the weights are assigned pro-rata among the remaining constituents.

Maximum Active Share to Parent Index: The maximum Active Share of the index with respect to the Parent is 40%.

Maximum Active Share to Factor Tilt Portfolio: The maximum Active Share of the index with respect to the Factor Tilt Portfolio is 15%.

Percentile days to trade/liquidity constraint: The maximum weight of each component in the Index is limited to twenty times its 60-day median daily trading volume multiplied by the ratio of benchmark weight and 60-day median daily trading volume of the representative stock p. The representative asset is the 10th percentile of all constituents in the Parent Index when sorted by the ratio of 60-day median trading volume divided by the Parent Index weight.

$$w_k \leq S V_k \frac{b_p}{V_p}$$

where:

- w_k is the weight of the k^{th} asset in the portfolio

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- p = the asset with the 10-th percentile of $\frac{V_k}{b_k}$
- b_k = the weight of the k^{th} asset in the benchmark
- V_k = the daily trading volume for the k^{th} asset
- $S = 20$ (Strength)

Infeasibility Handling: If a solution that satisfies the above constraints cannot be found, the following constraints are relaxed using Axioma's proprietary constraint hierarchy procedure.

1. Maximum Turnover, Percentile days to trade, and Min Threshold Holding in Level 1, and
2. Active Share to Factor tilt portfolio and Active Asset Weight in Level 2.

Constraints in Level 1 have precedence over the constraints in Level 2 in the amount that they are relaxed (softened).

The constraint hierarchy is set up so that the optimization can find a relaxed solution if necessary. If the optimizer is still unable to find a solution after this additional stage of constraint relaxation, STOXX will liaise with Osmosis in order to find a solution.

Review frequency: Reviews are conducted quarterly in March, June, September, and December. The implementation is conducted after the close of the third Friday in the review months and is effective the next trading day. The weighting factors are calculated based on closing prices from the Wednesday before the second Friday of the review month. Weighting factor = (stock's target weight $\times$ 1.000.000.000 / closing price of the stock in EUR) rounded to the nearest integer.

4.1.3. ONGOING MAINTENANCE

Replacements: Deleted companies are not replaced.

Fast exit: Not applicable.

Fast entry: Not applicable.

Spin-offs: Spin-off stocks are not added permanently.

Corporate Actions: All components are maintained for corporate actions as outlined in the STOXX calculation guide available on stoxx.com.

Regions: The regions considered and their construction are detailed below:

Regional Basket	STOXX Regional/Country Index	Axioma Risk Model
North America	STOXX DM North America - XXDNA	NA4-MH
DM Europe ex UK	STOXX DM Europe ex UK - XXDXA	EU4-MH
United Kingdom	STOXX United Kingdom - XXGBA	EU4-MH
DM Asia Pacific ex JP	STOXX DM Asia Pacific ex JP - XXDAA	APxJP4-MH
Japan	STOXX Japan - XXJPA	JP4-MH
Emerging Markets	STOXX Emerging Markets - XXEMA	EM4-MH
DM World	STOXX DM World - XXDMA	-
AC World (Global)	STOXX AC World - XXACA	-

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Each DM World single-factor portfolio is constructed by aggregating the regional DM North America, DM Europe ex UK, UK, Japan, and DM Asia Pacific single-factor sleeves using the regional weights in the STOXX DM World index. Each World AC (Global) single-factor portfolio is constructed by aggregating the regional DM North America, DM Europe ex UK, UK, Japan, DM Asia Pacific, and Emerging Markets single-factor sleeves using the regional weights in the STOXX AC World index.

4. ISTOXX OSMOSIS INDICES

4.2. iSTOXX OSMOSIS REGIONAL MULTIFACTOR INDICES

4.2.1. OVERVIEW

The iSTOXX Osmosis Multifactor index is designed to provide exposure to regional Value, Momentum, Low Volatility, and Quality risk-premia factors, with style factor scores provided by Osmosis Investment Management. The indices track the STOXX AC World regional indices, while ensuring tradability, diversification, and liquidity. A Global Multifactor index is constructed by aggregating the six regional indices using the regional weights of the STOXX AC World Index. A DM World Multifactor index is constructed by aggregating the five regional indices (minus Emerging Markets) using the regional weights of the STOXX DM World Index. See the table below for more details.

Region/Index	Multifactor
North America	x
Europe ex UK	x
UK	x
Asia Pacific ex Japan	x
Japan	x
Emerging Markets	x
DM World - region neutral	x
Global - region neutral ³	x

Universe: STOXX AC World regional indices including:

- DM North America
- DM Europe ex UK
- Japan
- United Kingdom
- DM Asia Pacific ex JP
- Emerging Markets

Weighting scheme: The indices are weighted using an optimization model.

Base values and dates: 100 on March 18th, 2002⁴

³ The global region-neutral version is constructed by using the weights of the regional sleeves in the STOXX AC World benchmark. The DM region-neutral version is constructed by using the weights of the regional sleeves in the STOXX DM World index

⁴ The historical Backtest simulation used the regional sleeves of STOXX World Universal Indices from March 2002 to March 2012. From June 2012, it uses the regional sleeves of STOXX Investable Market Indices (IMI). See Table below for details.

	March 2002 - March 2012	June 2012 onwards
DM North America	STOXX DM North America Universal	STOXX DM North America
DM Europe ex UK	STOXX DM Europe ex UK Universal	STOXX DM Europe ex UK
United Kingdom	STOXX United Kingdom Universal	STOXX United Kingdom
Japan	STOXX Japan Universal	STOXX Japan
DM Asia Pacific ex JP	STOXX DM Asia Pacific ex JP Universal	STOXX DM Asia Pacific ex JP
Emerging Markets	STOXX Emerging Markets Universal	STOXX Emerging Markets
DM World	STOXX Developed World Universal	STOXX DM World
AC World	STOXX World AC Universal	STOXX AC World

4. ISTOXX OSMOSIS INDICES

Index types and currencies: Price, net, and gross return in EUR, GBP, and USD.

Dissemination calendar: STOXX Global calendar.

4.2.2. INDEX REVIEW

Constituent Selection: The portfolio construction is performed using Osmosis's Value, Momentum, Low Volatility, and Quality factor scores and Axioma's portfolio optimization software and risk models.

Axioma Risk Model: The following Axioma Medium-Horizon Fundamental Factor Risk Models are used by region:

Region	Risk Model
DM North America	NA4-MH
DM Europe ex UK	EU4-MH
United Kingdom	EU4-MH
DM Asia Pacific ex JP	APxJP4-MH
Japan	JP4-MH
Emerging Markets	EM4-MH

If the regional model is unavailable on a rebalance date due to a public holiday, the risk model from the last business day is used instead.

Factor Scores: The Osmosis factor scores are constructed from a combination of regional and sector z-scores and range from -3 to 3. Osmosis Multifactor scores are constructed with equal risk contribution across the targeted factors, on a regional basis and accounting for factor correlations. Osmosis provides the scores on the last business day of the month preceding the review. For example, the March factor scores are provided at the end of February. A description of the Osmosis factor scores can be found at [Osmosis Factor Suite Methodology - Osmosis IM](#).

A **Factor Tilt portfolio** for Value, Momentum, Low Volatility, and Quality is first calculated by tilting the Free Float Market Capitalization of each security as:

$$\bar{w}_i = w_{b,i} * (1 + \frac{1}{3} \text{Factor Score}_i)^k$$

where:

- $\bar{w}_i$ is the weight of security i in the Factor Tilt Portfolio
- $w_{b,i}$ is the weight of security i in the Parent Index
- Factor Score is the Osmosis Style Factor z-score for the ith security
- k is the tilt strength

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The tilt strength k starts at 2 and is incremented by one until the Active Share of the Factor Tilt Portfolio vs the parent index is equal to, or higher than, 40%.

Second, the Multifactor score provided by Osmosis is constructed as a weighted average of the Value, Momentum, Low Volatility, and Quality factor scores, where the weight of each factor score is chosen according to TE parity (equal active risk contribution), i.e.,

$$\frac{\omega_i(\Sigma\omega)_i}{\omega^T\Sigma\omega} = \frac{1}{4}, i = 1, \dots, 4$$

where Σ is the active covariance matrix of the four single-factor tilt portfolios against their parent index and $\sum_{i=1}^4 \omega_i = 1$. This non-linear system is solved using a numerical optimizer to construct the factor weights $\omega_i, i = 1, \dots, 4$.

The Multifactor score is then calculated as

$$\text{Multifactor score} = \sum_i \omega_i * \text{Factor score for the } i\text{th factor},$$

where ω_i is the weight applied to the i th factor score in each region.

A **Multifactor Tilt portfolio** $\overline{w}$ is then calculated by tilting the Free Float Market Capitalization of each security as:

$$\overline{w}_i = w_{b,i} * (1 + \frac{1}{3} \text{Multifactor Score}_i)^k$$

where:

- $\overline{w}_i$ is the weight of security i in the Factor Tilt Portfolio
- $w_{b,i}$ is the weight of security i in the Parent Index
- Multifactor Score is the Osmosis Multifactor z-score for the i th security
- k is the tilt strength

The tilt strength k starts at 2 and is incremented by one until the Active Share of the Multifactor Tilt Portfolio vs the parent index is equal to, or higher than, 40%.

Third, the Multifactor optimized factor portfolio is constructed by minimizing the following objective function:

$$\sum_i |w_i - \overline{w}_i| + 0.1 \sqrt{\sum_i (w_i - \overline{w}_i)^2}$$

where w_i and $\overline{w}_i$ are the optimized and Multifactor tilt portfolio weights for the i th asset. The first term minimizes the active share of the optimized portfolio relative to the Multifactor tilt portfolio. The 2nd term minimizes the sum of squares distance of the optimized portfolio to the Multifactor tilt portfolio – it regularizes the objective function and ensures that the portfolio model has a unique solution.

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The Multifactor optimized portfolio is constructed by minimizing the active share to the Multifactor tilt portfolio.

The portfolio model also includes the following constraints to ensure diversification and control for unintended systematic exposures and tradability.

Do Not Hold (Exclusions)	Bottom 5% market cap with lowest factor exposure
Min Industry Exposure	50% of Parent Index
Active Industry Bounds	+/- 5% ICB Industries (Level 1)
Active Country Bounds	+/- 5% (STOXX Country)
Active Untargeted Style Exposures	+/- 0.25 std except targeted style factors
Liquidity	Percentile Days to Trade
Turnover	30% Annual one-way
Ex-ante Tracking Error	3.5%
Max Asset Weight	20x Parent Index Weight
Active Asset Weight Bounds	+/- 3%
Max Total Weight of Top 10 Holdings	1.5 x Total Weight of Parent Index Top 10 Holdings
Issuer Diversification	4.5%/8%/35%
Min Threshold Holding (ex-post)	1bp
Max Active Share to Parent Index	40%
Max Active Share to Factor Tilt Portfolio	15%
Equal Factor Active Risk contribution	Value, Momentum, Quality, and Low Vol contribute 25% to the ex-ante TE disregarding correlations between factors.

A brief description of the portfolio constraints is given below:

Exclusions: Do not hold the bottom 5% of stocks by market capitalization with the lowest targeted style factor exposure.

Minimum Industry Exposure: The percentage exposure to each ICB Industry must be at least half of the Parent Index.

Active Industry Weights: The percentage exposure to each ICB Industry must be within +/- 5% of the Parent Index.

Active Country Weights: The percentage exposure to each country must be within +/- 5% of the Parent Index value. Each company's country assignment is based on the STOXX Country classification.

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Active Untargeted Style Exposures: The exposure to each of the untargeted Osmosis factors as well as the Axioma Risk Model style factors must be within 0.25 standard deviations of the Parent Index's factor exposures.

Limit turnover: The Index has an annual one-way turnover limit of 30%.

Active Risk: The active risk of the index relative to the Parent Index is constrained to a maximum of 3.5%.

Maximum Asset Weight: Restricted to 20 times its weight in the Parent Index.

Asset Holding Limits: The maximum weight of each asset in the index is +/- 3% of its weight in the Parent Index.

Maximum Total Weight of Top 10 Holdings: The maximum total weight of the top 10 holdings is limited to 1.5 times the total weight of the top 10 holdings in the Parent Index.

Issuer Diversification: The maximum weight of each issuer in the index is 8%. Moreover, the sum of the weights of the issuers above 4.5% cannot exceed 35%.

Minimum Threshold Holding (Ex-post): Any security with an optimized weight below 1bp is excluded ex-post from the index, and the weights are assigned pro-rata among the remaining constituents.

Maximum Active Share to Parent Index: The maximum Active Share of the index with respect to the Parent is 40%.

Maximum Active Share to Factor Tilt Portfolio: The maximum Active Share of the index with respect to the Factor Tilt Portfolio is 15%.

Equal Factor Active Risk: Each targeted style factor contributes 25% to the ex-ante TE excluding correlations. We briefly describe the modeling between each pair of factors below.

Let $\sigma_i = \sqrt{(\bar{w} - b)^T Q (\bar{w} - b)}$ be the ex-ante TE of the i th factor tilt portfolio from the parent index, where w and b denote the portfolio and benchmark weights, respectively, and Q is the covariance matrix associated with the regional Axioma risk model.

The equal factor active risk contribution between Value and Momentum (say) is then expressed as

$$\sigma_v \sum_i v_i (w_i - b_i) = \sigma_m \sum_j m_j (w_j - b_j)$$

where v_i denotes the Value exposure for the i th asset and m_j denotes the momentum exposure for the j th asset. Two other constraints are added to the model to equalize the factor active risk contributions between the (Value, Quality) and (Value, Low Volatility) pairs.

Percentile days to trade/liquidity constraint: The maximum weight of each component in the Index is limited to twenty times its 60-day median daily trading volume multiplied by the ratio of benchmark weight and 60-day median daily trading volume of the representative stock p . The

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representative asset is the 10th percentile of all constituents in the Parent Index when sorted by the ratio of 60-day median trading volume divided by the Parent Index weight.

$$w_k \leq S V_k \frac{b_p}{V_p}$$

where:

- w_k is the weight of the k^{th} asset in the portfolio
- p = the asset with the 10-th percentile of $\frac{V_k}{b_k}$
- b_k = the weight of the k^{th} asset in the benchmark
- V_k = the daily trading volume for the k^{th} asset
- $S = 20$ (Strength).

Infeasibility Handling: If a solution that satisfies the above constraints cannot be found, the following constraints are relaxed using Axioma's proprietary constraint hierarchy procedure.

1. Maximum Turnover, Percentile days to trade, and Min Threshold Holding in Level 1, and
2. Active Share to Factor tilt portfolio and Active Asset Weight in Level 2.

Constraints in Level 1 have precedence over the constraints in Level 2 in the amount that they are relaxed (softened).

The constraint hierarchy is set up so that the optimization can find a relaxed solution if necessary. If the optimization still fails to find a solution after this additional stage of constraint relaxation, then STOXX will liaise with Osmosis in order to find a solution.

Review frequency: Reviews are conducted quarterly in March, June, September, and December. The implementation is conducted after the close of the third Friday in the review months and is effective the next trading day. The weighting factors are calculated based on closing prices from the Wednesday before the second Friday of the review month. Weighting factor = (stock's target weight $\times$ 1.000.000.000 / closing price of the stock in EUR) rounded to the nearest integer.

4.2.3. ONGOING MAINTENANCE

Replacements: Deleted companies are not replaced.

Fast exit: Not applicable.

Fast entry: Not applicable.

Spin-offs: Spin-off stocks are not added permanently.

Corporate Actions: All components are maintained for corporate actions as outlined in the STOXX calculation guide available on [stoxx.com](https://www.stoxx.com).

Regions: The regions considered and their construction are detailed below:

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Regional Basket	STOXX Regional/Country Index	Axioma Risk Model
North America	STOXX DM North America - XXDNA	NA4-MH
DM Europe ex UK	STOXX DM Europe ex UK - XXDXA	EU4-MH
United Kingdom	STOXX United Kingdom - XXGBA	EU4-MH
DM Asia Pacific ex JP	STOXX DM Asia Pacific ex JP - XXDAA	APxJP4-MH
Japan	STOXX Japan - XXJPA	JP4-MH
Emerging Markets	STOXX Emerging Markets - XXEMA	EM4-MH
Global	STOXX AC World - XXACA	-

The DM World Multifactor portfolio is constructed by aggregating the regional DM North America, DM Europe ex UK, UK, Japan, and DM Asia Pacific Multifactor sleeves using the regional weights in the STOXX DM World index. The World AC (Global) Multifactor portfolio is constructed by aggregating the regional DM North America, DM Europe ex UK, UK, Japan, DM Asia Pacific, and Emerging Markets Multifactor sleeves using the regional weights in the STOXX AC World index.

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4.3. iSTOXX OSMOSIS REGIONAL MULTIFACTOR TRANSITION INDICES

4.3.1. OVERVIEW

The iSTOXX Osmosis Multifactor Transition indices are designed to provide regional exposures to Value, Momentum, Low Volatility, and Quality risk-premia factors, greater exposure to the Transition scores provided by Osmosis, while achieving sustainable carbon reduction in greenhouse gas emission intensities over time. The indices track the STOXX World regional indices, while ensuring tradability, diversification, and liquidity. A Global Multifactor Transition index is constructed by aggregating the six regional indices using the regional weights of the STOXX AC World Index. A DM World Multifactor Transition index is constructed by aggregating the five regional indices (minus Emerging Markets) using the regional weights of the STOXX DM World Index. See the table below for more details.

Region/Index	Multifactor Transition
DM North America	x
DM Europe ex UK	x
United Kingdom	x
DM Asia Pacific ex JP	x
Japan	x
Emerging Markets	x
DM World - region neutral	x
Global - region neutral ⁵	x

Universe: STOXX AC World regional indices include:

- North America
- Developed Europe ex United Kingdom
- Japan
- United Kingdom
- Developed Asia Pacific ex Japan
- Emerging Markets

Weighting scheme: The indices are weighted according to an optimization model.

Base values and dates: 100 on March 18th, 2002⁶

⁵ The global region-neutral version is constructed by using the weights of the regional sleeves in the STOXX AC World benchmark. The DM region-neutral version is constructed by using the weights of the regional sleeves in the STOXX DM World index

⁶ The historical Backtest simulation used the regional sleeves of STOXX World Universal Indices from March 2002 to March 2012. From June 2012, it uses the regional sleeves of STOXX Investable Market Indices (IMI). See Table below for details.

	March 2002 - March 2012	June 2012 onwards
DM North America	STOXX DM North America Universal	STOXX DM North America
DM Europe ex UK	STOXX DM Europe ex UK Universal	STOXX DM Europe ex UK
United Kingdom	STOXX United Kingdom Universal	STOXX United Kingdom

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Index types and currencies: Price, net, and gross return in EUR, GBP, and USD.

Dissemination calendar: STOXX Global calendar.

4.3.2. INDEX REVIEW

Constituent Selection: The portfolio construction is performed using Osmosis's Value, Momentum, Low Volatility, Quality factor scores, Osmosis' Transition scores, and Axioma's portfolio optimization software and risk models.

Axioma Risk Model: The following Axioma Medium-Horizon Fundamental Factor Risk Models are used by region:

Region	Risk Model
DM North America	NA4-MH
DM Europe ex UK	EU4-MH
United Kingdom	EU4-MH
DM Asia Pacific ex JP	APxJP4-MH
Japan	JP4-MH
Emerging Markets	EM4-MH

If the regional model is unavailable on a rebalance date due to a public holiday, the risk model from the last business day is used instead.

Factor Scores: The Osmosis factor scores are constructed from a combination of regional and sector z-scores and range from -3 to 3. Osmosis Transition scores use a proprietary methodology and range between -3 and 3, comparable to style factor scores. Osmosis provides the scores on the last business day of the month preceding the review. For example, the March factor scores are provided at the end of February. A description of the Osmosis factor scores can be found at [Osmosis Factor Suite Methodology - Osmosis IMI](#), and the Osmosis Transition scores at [Transition Methodology - Osmosis IMI](#).

A **Tilt portfolio** for Value, Momentum, Low Volatility, Quality, and Transition is first calculated by tilting the Free Float Market Capitalization of each security as:

$$\overline{w}_i = w_{b,i} * (1 + \frac{1}{3} \text{Asset Score}_i)^k$$

Japan	STOXX Japan Universal	STOXX Japan
DM Asia Pacific ex JP	STOXX DM Asia Pacific ex JP Universal	STOXX DM Asia Pacific ex JP
Emerging Markets	STOXX Emerging Markets Universal	STOXX Emerging Markets
DM World	STOXX Developed World Universal	STOXX DM World
AC World	STOXX World AC Universal	STOXX AC World

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where:

- w_i is the weight of security i in the Tilt Portfolio
- $w_{b,i}$ is the weight of security i in the Parent Index
- Score is the Osmosis Style z-score for the i^{th} factor including Transition
- k is the tilt strength

The tilt strength k starts at 2 and is incremented by one until the Active Share of the Factor Tilt Portfolio vs the parent index is equal to, or higher than, 40%.

Secondly, the Multifactor score provided by Osmosis is constructed as a weighted average of the Value, Momentum, Low Volatility, and Quality factor scores, where the weight of each factor score is chosen according to risk parity (equal active risk contribution), i.e.,

$$\frac{\omega_i(\Sigma\omega)_i}{\omega^T\Sigma\omega} = \frac{1}{4}, i = 1, \dots, 4$$

Where Σ is the active covariance matrix of the four single-factor tilt portfolios against their parent index and $\sum_{i=1}^4 \omega_i = 1$. This non-linear system is solved using a numerical optimizer to construct the factor weights $\omega_i, i = 1, \dots, 4$.

The Multifactor score is then calculated as

$$\text{Multifactor score} = \sum_i \omega_i * \text{Factor score for the } i^{\text{th}} \text{ factor},$$

where ω_i is the weight applied to the i -th factor score in each region.

Third, the **Multifactor Transition** score is again provided by Osmosis and calculated using an 80-20 risk adjustment between the Multifactor and Transition scores, accounting for their recent correlation structure.

Fourth, the **Multifactor Transition Tilt Portfolio** is constructed by tilting the weight of each security in the parent index minus exclusions as:

$$\overline{wmr}_i = \overline{w}_{bExList,i} * (1 + \frac{1}{3} \text{Multifactor Transition Score}_i)^k$$

where:

- $\overline{wmr}_i$ is the weight of security i in the Multifactor Transition Tilt Portfolio
- $\overline{w}_{bExList,i}$ is the weight of security i in the parent minus exclusions assigned pro-rata to sum to 100%
- Multifactor Transition Score _{i} is the Osmosis Multifactor Transition score for asset i
- k is the tilt strength.

The tilt strength k starts at 2 and increases until the Active Share of the Factor Tilt Portfolio vs the parent index is equal to, or higher than, 40%.

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Fifth, the Multifactor Transition optimized portfolio is constructed by minimizing the following objective function:

$$\sum_i |w_i - \overline{w}m\overline{r}_i| + 0.1 \sqrt{\sum_i (w_i - \overline{w}m\overline{r}_i)^2}$$

where w_i and $\overline{w}_i$ are the optimized and Multifactor Transition tilt portfolio weights for the i th asset. The first term minimizes the active share of the optimized portfolio to the Multifactor Transition tilt portfolio. The second term minimizes the sum of squares distance of the optimized portfolio to the Multifactor Transition tilt portfolio – it regularizes the objective function, ensuring that the portfolio model has a unique solution.

The portfolio model also includes the following constraints to ensure diversification and control for unintended systematic exposures and tradability.

Do Not Hold (Exclusions)	Bottom 5% market cap with lowest factor exposure
	UNGC and Tobacco Exclusions
Min Industry Exposure	50% of Parent Index
Active Industry Bounds	+/-5% ICB Industries (Level 1)
Active High Emitting Industry Bounds	+/-6% ICB Industries (Level 1)
Active Country Bounds	+/- 5% (STOXX Country)
Active Untargeted Style Exposures	+/- 0.25 std except targeted style factors
Liquidity	Percentile Days to Trade
Turnover	30% Annual one-way
Ex-ante Tracking Error	3.5%
Max Asset Weight	20x Parent Index Weight
Max Active Asset Weight Bound	+ 3%
Min Active Asset Weight of Low Emitters	- 3%
Min Active Asset Weight of High Emitters	max (Relative Carbon Intensity Target x Parent Index Weight, 0.01%)
Max Total Weight of Top 10 Holdings	1.5 x Total Weight of Parent Index Top 10 Holdings
Issuer Diversification	4.5%/8%/35%
Min Threshold Holding (Ex-post)	1bp
Max Active Share to Parent Index	40%
Max Active Share to Multifactor Transition Tilt Portfolio	15%
Equal Factor Active Risk contribution	RE is also counted as a factor with Value, Momentum, Quality, and Low Vol, and each factor contributes 20% to the ex-ante TE, disregarding correlations.
Minimum Scope 1+2 GHG intensity reduction compared to the Parent Index	30% vs parent index
RE Score Improvement	10%

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A brief description of the Osmosis Transition scores and exclusions is given below:

Osmosis Transition score: The **Transition Score** is Osmosis' proprietary measure of how effectively a company converts natural resources into economic value relative to its peers. The score ingests resource metrics which may include (but not limited to) greenhouse gas emissions, water consumption, energy consumption and waste generation, each measured relative to revenue and evaluated within proprietary Osmosis Sector peer groups. By normalising environmental impacts for both company size and industry characteristics, the score seeks to identify businesses that generate comparable economic output while using fewer resources. A higher Transition Score indicates stronger Transition relative to peers. It reflects the belief that companies that manage resources more effectively may benefit from lower operating costs, greater resilience to environmental and regulatory pressures, and stronger long-term financial performance. The methodology can be downloaded from [Transition Methodology - Osmosis IM](#).

UNGC Exclusions: Companies identified as non-compliant based on a Global Standards Screening assessment. Global Standards Screening identifies companies that violate or are at risk of violating commonly accepted international norms and standards enshrined in the United Nations Global Compact (UNGC) Principles, the Organization for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises, the UN Guiding Principles on Business and Human Rights (UNGPs), and their underlying conventions.

Tobacco Exclusions: Companies that are Tobacco Producers (> 0% revenue) are excluded.

Controversial Weapons: Companies involved in Controversial Weapons activities, such as Anti-Personnel Mines, Biological Weapons, Chemical Weapons, and Cluster Munitions, are excluded from the portfolio.

Short descriptions of other data elements used in the Carbon Reduction constraints are given below:

Scope 1 and 2 emissions: The GHG Protocol Corporate Standard classifies companies' greenhouse gas (GHG) emissions as direct and indirect emissions⁷. Direct emissions, also known as Scope 1 emissions, refer to GHG waste produced and consumed by the reporting entity. For instance, on-site generation and use of energy is tracked under Scope 1. In contrast, Scope 2 emissions are indirect emissions attributed to the reporting company but generated by another entity. Scope 2 includes acquired/ purchased energy brought into the company's reporting boundary as a form of electricity, steam, heating, and cooling. Scope 1 and 2 data is obtained from ISS ESG.

Enterprise Value Including Cash (EVIC): EVIC is a measure of a company's total value, often used as a more comprehensive alternative to equity market capitalization. EVIC includes, in its calculation, a company's market capitalization, short- and long-term debt, and any cash on the company's balance sheet. EVIC data used in index construction is based on fiscal year data for the end of the previous calendar year. EVIC is provided in EUR.

A brief description of the portfolio constraints is given below:

⁷ https://ghgprotocol.org/sites/default/files/standards/Scope%20%20Guidance_Final_Sept26.pdf

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Low Factor Exposure Exclusions: Do not hold the bottom 5% of stocks by market capitalization with the lowest targeted style factor exposure.

Minimum Industry Exposure: The percentage exposure to each ICB Industry must be at least half of the Parent Index.

Active Industry Weights: The percentage exposure to each ICB Industry must be within +/- 5% of the Parent Index. An exception applies to industries with a Carbon Intensity greater than 50% of the Parent Index Carbon Intensity. Their weight deviation is +/- 6%.

Active Country Weights: The percentage exposure to each country must be within +/- 5% of the Parent Index value. Each company's country assignment is based on the STOXX Country classification.

Active Untargeted Style Exposures: The exposure to each of the untargeted Osmosis factors as well as the Axioma Risk Model style factors must be within 0.25 standard deviations of the Parent Index's factor exposures.

Limit turnover: The Index has an annual one-way turnover limit of 30%.

Active Risk: The active risk of the index relative to the Parent Index cannot exceed 3.5%.

Maximum Asset Weight: Restricted to 20 times its weight in the Parent Index.

Asset Holding Limits: The maximum weight of each asset in the index is +/- 3% of its weight in the Parent Index. An exception is applied to securities with a Carbon Intensity Contribution of 20% or more of the Parent Index Carbon Intensity. Their weight is floored at the maximum of the Relative Carbon Intensity Target * Parent Index weight, and 0.01%, i.e., the 3% negative deviation to the Index Universe does not apply. Their weight cap, however, remains unchanged.

Maximum Total Weight of Top 10 Holdings: The maximum total weight of the top 10 holdings is limited to 1.5 times the total weight of the top 10 holdings in the Parent Index.

Issuer Diversification: The maximum weight of each issuer in the index is 8%. Moreover, the sum of the weights of those issuers above 4.5% cannot exceed 35%.

Minimum Threshold Holding (Ex-post): Any security with an optimized weight below 1bp is excluded ex-post from the index, and the weights are assigned pro-rata among the remaining constituents.

Maximum Active Share to Parent Index: The index maintains a maximum Active Share of 40% with respect to the Parent.

Maximum Active Share to Factor Tilt Portfolio: The index maintains a maximum Active Share of 15% with respect to the Factor Tilt Portfolio.

Equal Factor Active Risk: Each targeted style factor, including Transition, contributes 20% to the ex-ante TE excluding correlations. We briefly describe the modeling between each pair of factors below.

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Let $\sigma_i = \sqrt{(\bar{w} - b)^T Q (\bar{w} - b)}$ be the ex-ante TE of the i th factor tilt portfolio from the parent index, where w and b denote the portfolio and benchmark weights, respectively, and Q is the covariance matrix associated with the regional Axioma risk model.

The equal factor active risk contribution between Value and Momentum (say) is then expressed as

$$\sigma_v \sum_i v_i (w_i - b_i) = \sigma_m \sum_j m_j (w_j - b_j)$$

where v_i denotes the Value exposure for the i th asset and m_j denotes the momentum exposure for the j th asset. Three other constraints are added to the model to equalize the factor active risk contributions between the (Value, Quality), (Value, Low Volatility), and (Value, Transition) pairs.

Percentile days to trade/liquidity constraint: The maximum weight of each component in the Index is limited to twenty times its 60-day median daily trading volume multiplied by the ratio of benchmark weight and 60-day median daily trading volume of the representative stock p . The representative asset is the 10th percentile of all constituents in the Parent Index when sorted by the ratio of 60-day median trading volume divided by the Parent Index weight.

$$w_k \leq S V_k \frac{b_p}{V_p}$$

where:

- w_k is the weight of the k^{th} asset in the portfolio
- p = the asset with the 10-th percentile of $\frac{V_k}{b_k}$
- b_k = the weight of the k^{th} asset in the benchmark
- V_k = the daily trading volume for the k^{th} asset
- $S = 20$ (Strength)

GHG Intensity (WACI) Reduction: The security-level GHG Intensity is defined as (Scope 1+2 emissions from ISS ESG / Enterprise value including cash (EVIC)). The index maintains a minimum 30% reduction in GHG intensity over the parent index from March 2018.

Osmosis Transition exposures: Each Osmosis Transition score is first converted to a positive score between [0, 100]. The index targets a 10% improvement over the total Transition exposure of the Parent Index.

Infeasibility Handling: If a solution that satisfies the above constraints cannot be found, the following constraints are relaxed using Axioma's proprietary constraint hierarchy procedure.

1. Maximum Turnover, Percentile days to trade, and Min Threshold Holding in Level 1, and
2. Active Share to Factor tilt portfolio and Active Asset Weight in Level 2.

Constraints in Level 1 have precedence over the constraints in Level 2 in the amount that they are relaxed (softened).

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The constraint hierarchy is set up so that the optimization can find a relaxed solution if necessary. If the optimizer is still unable to find a solution after this additional stage of constraint relaxation, then STOXX will liaise with Osmosis in order to find a solution.

Review frequency: Reviews are conducted quarterly in March, June, September, and December. The implementation is conducted after the close of the third Friday in the review months and effective the next trading day. The weighting factors are calculated based on closing prices from the Wednesday before the second Friday of the review month. Weighting factor = (stock's target weight × 1.000.000.000 / closing price of the stock in EUR) rounded to the nearest integer.

The review cut-off date for the Parent Index and Axioma data is the Wednesday before the second Friday of the review months. The cut-off date for Osmosis data is the fifth trading day before the end of the months preceding the review months. The cut-off date for ISS ESG data is the end of the month preceding the review month. The cut-off date for EVIC data is the end of the previous calendar year. The underlying announcements are published after the close of the second Friday of the review month.

Missing Data Treatment: Securities missing Osmosis Factor Scores and/or Transition scores are assigned the neutral score of 0 where Factor and Transition scores are in the [-3,3] range. Securities missing ISS carbon emissions and/or EVIC data are assigned a Carbon Intensity score equal to the median Carbon Intensity of the securities' ICB Industry.

4.3.3. ONGOING MAINTENANCE

Replacements: Deleted companies are not replaced.

Fast exit: Not applicable.

Fast entry: Not applicable.

Spin-offs: Spin-off stocks are not added permanently.

Corporate Actions: All components are maintained for corporate actions as outlined in the STOXX calculation guide available on [stoxx.com](https://www.stoxx.com).

Regions: The regions considered and their construction are detailed below:

Regional Basket	STOXX Regional/Country Index	Axioma Risk Model
North America	STOXX DM North America - XXDNA	NA4-MH
DM Europe ex UK	STOXX DM Europe ex UK - XXDXA	EU4-MH
United Kingdom	STOXX United Kingdom - XXGBA	EU4-MH
DM Asia Pacific ex JP	STOXX DM Asia Pacific ex JP - XXDAA	APxJP4-MH
Japan	STOXX Japan - XXJPA	JP4-MH
Emerging Markets	STOXX Emerging Markets - XXEMA	EM4-MH
DM World	STOXX DM World - XXDMA	-
AC World	STOXX AC World - XXACA	-

The DM World Multifactor Transition portfolio is constructed by aggregating the regional DM North America, DM Europe ex UK, UK, Japan, and DM Asia Pacific Multifactor Transition sleeves using the

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regional weights in the STOXX DM World index. The World AC (Global) Multifactor Transition portfolio is constructed by aggregating the regional DM North America, DM Europe ex UK, UK, Japan, DM Asia Pacific, and Emerging Markets Multifactor Transition sleeves using the regional weights in the STOXX AC World index.