S&P Dow Jones Indices

A Division of S&P Global

iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index Guide

October 2022

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1) iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index

The iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index is designed to apply climate-based and values-based screens to the Markit iBoxx USD Liquid Investment Grade Index while reflecting the performance of USD denominated investment grade corporate debt issuers with average or above environmental, social, and governance (ESG) ratings relative to their sector peers. The climate-based screens remove issuers with an industry tie to fossil fuels (e.g., thermal coal, oil, and gas) including reserve ownership, related revenues and power generation (as captured by MSCI ESG Research data); issuers classified by IHS Markit in the Oil & Gas sector; and issuers scoring below a defined threshold for environmental controversy scores to invest in eligible companies to reduce carbon relative to the parent benchmark. The values based screens remove a variety of controversial business activities (as captured by MSCI ESG Research data) including adult entertainment, alcohol, civilian firearms, controversial weapons, conventional weapons, for profit prisons, gambling, genetically modified organisms, nuclear power, nuclear weapons, palm oil, predatory lending, and tobacco; and issuers violating the United Nations Global Compact. Additionally, the index removes issuers scoring below a defined threshold for MSCI ESG ratings and issuers below a defined threshold for overall controversy scores. The index is market-value weighted with an issuer cap of 3%.

The iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index is rebalanced once a month at the month-end and consists of investment grade USD denominated bonds issued by corporate issuers from developed countries and rated by at least one of three rating services: Fitch Ratings, Moody's Investors Service, or S&P Global Ratings.

The bonds in the iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index must meet all the criteria described below as of the close of business three business days prior to the rebalancing date provided that the relevant bond data can be verified as of such date (bond selection cut-off date). The new index composition becomes effective on the first business day of the next month.

All iBoxx indices are priced based on multiple data inputs. The iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index uses multi-source prices as described in the document *Markit iBoxx Pricing Rules* publicly available on www.ihsmarkit.com.

This document covers the index selection rules and calculation methodology.

2) Bond selection rules

The following selection criteria are applied to select the constituents for the iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index:

- Bond type
- Credit rating
- Expected remaining life
- Amount outstanding
- Lockout period
- Minimum run
- Market sector
- MSCI ESG Research

2.1) Bond type

Only fixed-rate bonds whose cash flow can be determined in advance are eligible for the indices. The indices are comprised solely of bonds. T-Bills and other money market instruments are not eligible. The iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index include only USD denominated bonds.

In particular, bonds with the following characteristics are included:

- Fixed coupon bonds
- Step-up bonds with coupon schedules known at issuance (or as functions of the issuer's rating)
- Sinking funds and amortizing bonds
- Medium term notes (MTNs)
- Senior fixed-to-float bonds issued by banks with a call option up to 25 months prior to maturity
- Rule 144A offerings with a registration right. Only 144A bonds where the Registration S version of the bond is eligible for the Markit iBoxx USD Benchmark Index are eligible.
- Callable bonds
- Putable bonds

The following instrument bond types are specifically excluded from the indices:

- Preferred shares
- Optionally and mandatory convertible bonds
- Subordinated bank or insurance debt with mandatory contingent conversion features or with any conversion options before the first call date is ineligible for the index
- Bonds with other equity features attached (e.g., options/warrants)
- Perpetual bonds
- Fixed-to-floater bonds (except Senior fixed-to-float bonds issued by banks with a call option up to 25 months prior to maturity)
- Floating rate notes
- Pay-in kind bonds (during the pay-in-kind period)
- Zero coupon bonds
- Zero step-ups (GAINS)
- Bonds with differences between accrual and coupon payment periods and monthly-paying bonds
- Private placements
- Retail bonds

For retail bonds and private placements, publicly available information is not always conclusive and the classification of a bond as a retail bond or a private placement will be made at IHS Markit's discretion based on the information available at the time of determination. IHS Markit may consult with the specific Index Advisory Committees to review potential retail bonds or private placements. Any bond classified as retail or private placement is added to the list of excluded private placements and retail bonds. The list is published on www.ihsmarkit.com under *Indices News* for future reference and to ensure decision's consistency.

In instances where a new bond type is not specifically excluded or included according to the published index rules, IHS Markit will analyse the features of such securities in line with the principles set out in 2.1 of this guide. IHS Markit may consult the specific Index Advisory Committees. Any decision as to the eligibility or ineligibility of a new bond type will be published and the index rules will be updated accordingly.

2.2) Credit rating

All bonds in the iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index must have an iBoxx Rating of investment grade. Ratings from the following three credit rating agencies are considered for the calculation of the iBoxx Rating:

- Fitch Ratings
- Moody's Investor Service
- S&P Global Ratings

Investment grade is defined as BBB- or higher from Fitch Ratings and S&P Global Ratings and Baa3 or higher from Moody's Investor Service.

If a bond is rated by more than one of the above agencies, then the iBoxx rating is the average of the provided ratings. The rating is consolidated to the nearest rating grade. Rating notches are not used. For more information on how the average rating is determined, please refer to the *iBoxx Rating Methodology* document. The methodology can be found on www.ihsmarkit.com under *Methodology*.

For corporate bonds, only issue ratings are considered in the bond selection process. Issuer ratings or MTN program ratings are not taken into account.

2.3) Expected remaining life

All bonds must have at the rebalancing day an expected remaining life:

- of at least three years, and
- all new insertions must have an expected remaining life of at least three years and 6 months.

The expected remaining life is expressed in years and calculated as follows:

- For plain vanilla bonds, the expected remaining life of the bond is its time to maturity, calculated as the number of days between the last calendar day of the current month and its maturity.
- For dated and undated callable hybrid capital bonds, the first call date is always assumed to be the expected redemption date. The expected remaining life is calculated as the number of days between the last calendar day of the month and the expected redemption date.
- For soft bullets, the expected remaining life of the bond is its time to the expected maturity and not to its final maturity date.

2.4) Amount outstanding

Issue amount outstanding

The outstanding face value of a bond must be greater than or equal to USD 750 million as of the bond selection cut-off date. Partial buybacks or increases affect the outstanding face value of a prospective bond. IHS Markit considers changes to the outstanding face value of a candidate bond as a result of partial or full buybacks or increases, provided that IHS Markit is aware of such changes as of the bond selection cut-off date. In the case of RegS securities that are registered as global securities, the remaining amount of the RegS version and the registered version are recombined if the bond is not exchanged in full and if the remaining amount of the RegS version reduces the amount outstanding below the eligibility threshold.

Issuer Amount Outstanding

The outstanding face value of all bonds denominated in USD from the issuer in the broader Markit iBoxx USD Investment Grade Corporate Index (excluding fixed-to-floater and perpetual bonds) must be greater than or equal to USD 2 billion as of the bond selection cut-off date.

2.5) Lockout period and Minimum run

Lockout period

A bond that drops out of the iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index at the rebalancing day is excluded from reentering the index for a three-month period unless the exclusion is due to a violation of an ESG screening criteria. The rule for the lockout period takes precedence over the other rules for the iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index selection. A locked out bond will not be selected, even if it qualifies for the index.

Minimum run

Any bond that enters the iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index must remain in the index for a minimum of six months provided it is not downgraded to sub-investment grade, defaulted, fully redeemed, or violating any of the ESG screening criteria in that period.

2.6) Market sector

Bonds classified as "Oil & Gas" using Level 5 market sector conventions are excluded from the index. Furthermore, "Oil & Gas" exclusions were supplemented historically prior to April 30, 2017 by using the April 30, 2017 starting universe of constituents to conservatively remove any bonds involved in "Oil & Gas" prior to the convention change.

2.7) MSCI ESG Research

The iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index screens out the constituents of the Markit iBoxx USD Liquid Investment Grade Index based on the following criteria:

MSCI ESG Business Involvement Screening – exclusion driven by exposure to the following activities and at the following involvement thresholds:

- *Adult Entertainment*
  - > all companies that produce, direct, or publish adult entertainment materials that fall into the following categories: producer of X-rated films, pay-per-view programming or channels, sexually

explicit video games, books or magazines with adult content, live entertainment of an adult nature, adults-only material on the internet.

  - all companies deriving 5% or more aggregate revenue from the production, distribution and retail of adult entertainment materials.
- *Alcohol*
  - all companies classified as a “Producer” that derive 5% or more in revenue from manufacturing, distributing, retailing, licensing, and supplying alcoholic products.
  - all companies classified as a “Producer” that derive USD 500 million or more in revenue from manufacturing, distributing, retailing, licensing, and supplying alcoholic products.
  - all companies deriving 15% or more aggregate revenue from the manufacture, distribution, retailing, licensing, and supply of alcoholic products.
- *Civilian Firearms*
  - all companies that manufacture firearms and small arms ammunitions for civilian markets. It does not include companies that cater to the military, government, and law enforcement markets.
  - all companies deriving 5% or more aggregate revenue from the production and distribution (wholesale or retail) of firearms or small arms ammunition intended for civilian use.
  - all companies deriving USD 20 million or more revenue from the production and distribution (wholesale or retail) of firearms or small arms ammunition intended for civilian use. Only excluded starting from May 31, 2014. Prior to May 31, 2014, exclusions were supplemented historically by using the May 31, 2014 starting universe of constituents to conservatively remove any issuers involved in the screen.
- *Controversial Weapons*
  - all companies that manufacture cluster munitions whole weapons systems, components, or delivery platforms.
  - all companies that manufacture landmines whole systems or components.
  - all companies involved in the production of depleted uranium (DU) weapons, ammunition, and armor, including companies that manufacture armor piercing, fin stabilized, discarding sabot tracing rounds (APFSDS-T); Kinetic Energy Missiles made with DU penetrators; and DU-enhanced armor, including composite tank armor.
- *Conventional Weapons*
  - all companies deriving 5% or more revenue from the production of conventional weapons and components.
  - all companies deriving 10% or more aggregate revenue from weapons systems, components, and support systems and services.
- *For Profit Prisons*
  - all companies deriving 50% or more revenue from involvement in the operation of “For Profit Prisons” or the provision of integral services to these types of facilities. These facilities may be alternatively known as private prisons. Only excluded starting from March 31, 2020. Prior to March 31, 2020, exclusions were supplemented historically by using the March 31, 2020 starting universe of constituents to conservatively remove any issuers involved in the screen.
- *Gambling*
  - all companies classified as involved in "Operations" that derive 5% or more in revenue from ownership or operation of gambling facilities, provision of key products or services fundamental to gambling operations, and licensing of gambling products.
  - all companies classified as involved in "Operations" that derive USD 500 million or more in revenue from ownership or operation of gambling facilities, provision of key products or services fundamental to gambling operations, and licensing of gambling products.
  - all companies deriving 15% or more aggregate revenue from ownership or operation of gambling facilities, provision of key products or services fundamental to gambling operations, and licensing of gambling products.

- *Genetically Modified Organisms*
  - all companies deriving more than 0% revenue from genetically modifying plants, such as seeds and crops, and other organisms intended for agricultural use or human consumption.
- *Nuclear Power*
  - all companies that own or operate nuclear power plants.
  - all companies that own or operate active uranium mines. Only excluded starting from August 31, 2017. Prior to August 31, 2017, exclusions were supplemented historically by using the August 31, 2017 starting universe of constituents to conservatively remove any issuers involved in the screen.
  - all companies that are involved in uranium enrichment and processing. Only excluded starting from May 31, 2014. Prior to May 31, 2014, exclusions were supplemented historically by using the May 31, 2014 starting universe of constituents to conservatively remove any issuers involved in the screen.
  - all companies that are involved in the design and engineering of nuclear power reactors.
  - all companies deriving 15% or more aggregate revenue from ownership or operation of nuclear power plants and supply of key nuclear-specific products or services. Only excluded starting from October 31, 2014. Prior to October 31, 2014, exclusions were supplemented historically by using the October 31, 2014 starting universe of constituents to conservatively remove any issuers involved in the screen.
- *Nuclear Weapons*
  - all companies that manufacture nuclear warheads and/or whole nuclear missiles. It includes assembly and integration of warhead and missile body, as well as companies with contracts to operate/manage government-owned facilities that manufacture nuclear warheads and missiles. Only excluded starting from May 31, 2016. Prior to May 31, 2016, exclusions were supplemented historically by using the May 31, 2016 starting universe of constituents to conservatively remove any issuers involved in the screen.
  - all companies that manufacture components that were developed or are significantly modified for exclusive use in nuclear weapons (warheads and missiles). It includes companies with contracts to operate/manage government-owned facilities that manufacture components for nuclear warheads and missiles. Only excluded starting from May 31, 2016. Prior to May 31, 2016, exclusions were supplemented historically by using the May 31, 2016 starting universe of constituents to conservatively remove any issuers involved in the screen.
  - all companies that manufacture or assemble delivery platforms that were developed or significantly modified for the exclusive delivery of nuclear weapons. Only excluded starting from May 31, 2016. Prior to May 31, 2016, exclusions were supplemented historically by using the May 31, 2016 starting universe of constituents to conservatively remove any issuers involved in the screen.
  - all companies that manufacture components that were not developed or not significantly modified for exclusive use in nuclear weapons (warheads and missiles) but can be used in nuclear weapons. Only excluded starting from May 31, 2016. Prior to May 31, 2016, exclusions were supplemented historically by using the May 31, 2016 starting universe of constituents to conservatively remove any issuers involved in the screen.
  - all companies that manufacture or assemble delivery platforms that were not developed or not significantly modified for the exclusive delivery of nuclear weapons but have the capability to deliver nuclear weapons. Only excluded starting from April 30, 2017. Prior to April 30, 2017, exclusions were supplemented historically by using the April 30, 2017 starting universe of constituents to conservatively remove any issuers involved in the screen.
  - all companies that manufacture components for nuclear-exclusive delivery platforms. Only excluded starting from April 30, 2017. Prior to April 30, 2017, exclusions were supplemented historically by using the April 30, 2017 starting universe of constituents to conservatively remove any issuers involved in the screen.
  - all companies that manufacture components for dual-use delivery platforms. Only excluded starting from March 31, 2019. Prior to March 31, 2019, exclusions were supplemented historically

by using the March 31, 2019 starting universe of constituents to conservatively remove any issuers involved in the screen.

- *Palm Oil*
  - > all companies deriving more than 0% revenue from cultivating oil palm trees and harvesting fresh fruit bunches (FFBs) used to produce palm oil products. Only excluded starting from March 31, 2020. Prior to March 31, 2020, exclusions were supplemented historically by using the March 31, 2020 starting universe of constituents to conservatively remove any issuers involved in the screen.
- *Predatory Lending*
  - > all companies deriving 5% or more revenue from products and services associated with certain controversial lending practice. Only excluded starting from March 31, 2020. Prior to March 31, 2020, exclusions were supplemented historically by using the March 31, 2020 starting universe of constituents to conservatively remove any issuers involved in the screen.
- *Tobacco*
  - > all companies that manufacture tobacco products, such as cigars, blunts, cigarettes, e-cigarettes, inhalers, beedis, kreteks, smokeless tobacco, snuff, snus, dissolvable and chewing tobacco. It includes companies that grow or process raw tobacco leaves.
  - > all companies deriving 5% or more aggregate revenue from the manufacture, distribution, retailing, licensing, and supply of tobacco products.

MSCI Climate Change Metrics

- *Fossil Fuels*
  - > all companies that have an industry tie to fossil fuels (thermal coal, oil and gas) – in particular, reserve ownership, related revenues and power generation. This list does not include companies providing evidence of owning metallurgical coal reserves. Only excluded starting from October 31, 2018. Prior to October 31, 2018, exclusions were supplemented historically by using the October 31, 2018 starting universe of constituents to conservatively remove any issuers involved in the screen.

MSCI ESG Ratings

- all issuers with an ESG rating of BB and below are excluded.

MSCI ESG Controversies and Global Norms – exclusion driven by the following measures:

- *Environmental Controversies Score*
  - > all companies that are involved in very serious and serious controversies involving the environmental impact of their operations and/or products and services. In particular, companies with an MSCI Environmental Controversies Score of less than 2 are excluded.
- *Overall Controversies Score*
  - > all companies that are involved in very serious controversies involving the environmental, social, or governance impact of their operations and/or products and services. In particular, companies with an MSCI ESG Controversies Score of 0 are excluded. MSCI's controversies framework organizes ESG controversies across the 3 pillars (Environmental, Social, Governance). Please refer to MSCI ESG documentation for further information.
- *UNGC Compliance*
  - > all companies that fail to comply with the United Nations Global Compact. Only excluded starting from July 31, 2015. Prior to July 31, 2015, exclusions were supplemented historically by using the July 31, 2015 starting universe of constituents to conservatively remove any issuers involved in the screen.

Corporate issuers that have incomplete MSCI ESG data coverage as of the bond selection cut-off date are excluded from the iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index.

In addition to the above, the following applies for:

- **MSCI ESG Business Involvement Screening** prior to 30th September 2019 issuers not covered under this screen are considered eligible as long as they do not breach any of the other selection criteria.
- **MSCI ESG Controversies and Global Norms** prior to 30th September 2019 issuers not covered under this screen are considered eligible as long as they do not breach any of the other selection criteria.
- **MSCI ESG Ratings** prior to 30th September 2019 issuers not covered under this screen are considered eligible as long as they do not breach any of the other selection criteria.
- **MSCI Climate Change Metrics** prior to 30th September 2019 issuers not covered under this screen are considered eligible as long as they do not breach any of the other selection criteria.

3) Bond classification

All bonds are classified based on the principal activities of the issuer and the main sources of the cash flows used to pay coupons and redemptions. In addition, a bond's specific collateral type or legal provisions are evaluated. Hence, it is possible that bonds issued from different subsidiaries of the same issuer carry different classifications.

The issuer classification is reviewed regularly based on updated information received by IHS Markit, and status changes are included in the index at the next rebalancing if necessary.

Where the sector classification of a specific entity is not very clear due to the diversified business of the entity, decision will be made at IHS Markit's discretion. IHS Markit will assign the IHS Markit classification according to its evaluation of the business risk presented in the security prospectus and annual reports, if available. IHS Markit will also compare the classification to peers in the potential sectors and may consult with the Index Advisory Committees. Membership lists including classification are published on the FTP server and in the *Indices* section on www.ihsmarkit.com for registered users.

3.1) Denomination

Bonds must be denominated in USD with clearance and settlement available through Depository Trust and Clearing Corporation (DDTC). The securities need to be either publicly registered in the U.S. with the Securities and Exchange Commission or Rule 144A offerings with registration rights. Eurobonds are excluded.

3.2) Issuer

The bond must be corporate credit, i.e., debt instruments backed by corporate issuers that are not secured by specific assets. Debt issued by governments, sovereigns, quasi-sovereigns, and government-backed or guaranteed entities is excluded.

For the purposes of selecting candidates for the index, an *issuer* is defined by the Bloomberg ticker (*i.e.,* all bonds sharing a ticker are attributed to the same issuer).

3.3) Corporates

Bonds issued by public or private corporations. Bonds secured by a 'floating charge' over some or all assets of the issuer are considered corporate bonds. Corporate bonds are further classified into Financials and Non-Financials bonds and then into their multiple-level economic sectors, according to the issuer's business scope. The category Guaranteed & Wrapped is added under Financials for corporate bonds whose timely coupon and/or principal payments are guaranteed by a non-affiliated insurer or through a letter of credit from a non-affiliated bank. Each bond in the index is assigned to one of the following sectors.

Table 1: Overview of Markit iBoxx Corporates Sectors

	Economic Sector	Market Sector	Market Sub-Sector
Financials	Core Financials	Banks	Banks
		Insurance	Life Insurance
			Nonlife Insurance

	Financial Services	Financial Services	General Financial
			Equity Investment Instruments
			Nonequity Investment Instruments
		Guaranteed & Wrapped	*
	Real Estate	Real Estate	Real Estate Investment & Services
			Real Estate Investment Trusts
Non-Financials	Oil & Gas	Oil & Gas	Oil & Gas Producers
			Oil Equipment / Services & Distribution
			Alternative Energy
	Basic Materials	Chemicals	Chemicals
		Basic Resources	Industrial Metals
			Mining
			Forestry & Paper
	Industrials	Construction & Materials	Construction & Materials
		Industrial Goods & Services	Aerospace & Defense
			Electronic & Electrical Equipment
			General Industrials
			Industrial Engineering
			Industrial Transportation
			Support Services
	Consumer Goods	Automobiles & Parts	Automobiles & Parts
		Food & Beverage	Beverages
			Food Producers
		Personal & Household Goods	Household Goods
			Personal Goods
			Tobacco
			Leisure Goods
	Health Care	Health Care	Pharmaceuticals & Biotechnology
			Health Care Equipment & Services
	Consumer Services	Retail	Food & Drug Retailers
			General Retailers
		Media	Media

		Travel & Leisure	Travel & Leisure
		Education	Academic & Educational Services
	Telecommunications	Telecommunications	Integrated Telecommunications
			Wireless Telecommunications
	Utilities	Utilities	Electricity
			Gas / Water & Multiutilities
	Technology	Technology	Software & IT Services
			Technology Hardware & Equipment

3.4) Additional classification

Corporate debt is further classified into senior and subordinated debt. Bank senior debt structure additionally differentiates between Bail-in and Preferred bonds. The Bail-in classification captures all senior notes which are subject to write-down or conversion into a subordinated instrument on the occurrence of a resolution event, as well as senior bank debt issued by bank holding companies.

Hybrid capital issued by banking and insurance institutions is further detailed into the respective tiers of subordination.

The market information on the tier of subordination for insurance capital is often less standardized and clear than the equivalent issues by banks. In these cases, the classification is based on the maturity, coupon payment and deferral provisions of the bond from the offering circulars of the bonds. The table below displays the seniority classification of debt issued by both financial and non-financial sectors.

Table 2: Overview of seniority levels

Market Sector	Seniority Level 1	Seniority Level 2	Seniority Level 3
Bank	SEN	Preferred	*
		Bail-in	*
	SUB	T2 (post-Jan '13 issuances)	T2 callable
			T2 non-callable
		T2 (pre-Jan '13 issuances)	LT2 callable
			LT2 non-callable
			UT2
		T1	T1 step
			T1 non-step
Insurance	SEN	*	*
	SUB	T3	*
		T2 dated	T2 dated callable
			T2 dated non-callable

Market Sector	Seniority Level 1	Seniority Level 2	Seniority Level 3
		T2 perpetual	*
		T1	*
Other sectors	SEN	*	*
	SUB	Other	Hybrid**
			Non-hybrid

** Bonds will be required to fulfil the following criteria to be considered hybrids:

- Subordinated
- Deferrable coupons
- First non-call period >= 5 years
- Either perpetual or 'long-dated', where 'long-dated' is defined as > 25 years of the time to maturity at issuance

3.5) Issuer country

Bonds from countries classified as developed markets based on the *Markit Global Economic Development Classification* are eligible for the index. The issuer or, in the case of a finance subsidiary, the issuer's guarantor, must be domiciled, incorporated and the country of risk must be in the countries listed as developed markets in *Markit iBoxx Country Classifications*.

The classification is available at: www.ihsmarkit.com under *Methodology*.

Inclusion and exclusion of countries

A new country is added to the index if it is classified as developed market based on the *Markit Global Economic Development Classification.* A country is no longer eligible for the index if it is classified as emerging market based on the *Markit Global Economic Development Classification*. The *Markit Global Economic Development Classification* is updated once per year. The results are published at the end of July. The inclusion/exclusion of a country becomes effective at the end of October.

4) Index calculation

4.1) Static data

Information used in the index calculation is sourced from offering circulars and checked against standard data providers.

4.2) Bond prices

For more details please refer to the *Markit iBoxx Pricing Rules* document, available in the *Methodology* section of the iBoxx Documentation page on www.ihsmarkit.com.

4.3) Rebalancing Process

The index is rebalanced monthly on the last business day of the month. Any inclusion after the index cut-off day (t-3) will not be considered in the rebalancing process, but will become effective at the end of the following month. New bonds issued are taken into account if they are publicly known to settle until the last calendar day of the month, inclusive, and if their rating and amount outstanding has become known at least three trading days before the end of the month.

Two business days before the end of each month, the rating and amount information for the constituents is updated and the list is adjusted for all rating and amount changes which are known to have taken place three business days before the end of the month which could also result in exclusion of the bond. However, if bonds which are part of broader US Dollar indices become eligible into the Index two business days prior to rebalancing because of rating and/or amount changes, will be included in the index.

4.4) Rebalancing procedure

In a first step the selection criteria set out in chapter 2 are applied to the universe of the broader Markit iBoxx USD Investment Grade Corporate Index.

- Bond ratings and amount outstanding are used as of the bond selection cut-off date
- Maturity dates remain fixed for the life of the bond
- Only bonds with a first settlement date on or before the rebalancing date are included in the selection process

4.5) Index Data

The calculation of the index is based on bid prices. New securities are included in the index at their respective ask prices when they enter the index. In the event that no price can be established for a particular security, the index continues to be calculated based on the last available price. This might be the case in periods of market stress, or disruption as well as in illiquid or fragmented markets. If the required inputs become impossible to obtain, IHS Markit may consult market participants prior to the next rebalancing date. Decisions are made publicly available on a timely basis and IHS Markit may refer back to previous cases.

The index is calculated if at least one bond matches all inclusion criteria. If no bonds qualify for the index, then its level remains constant. If at least one bond becomes available again, the index calculation resumes and is chained to the last calculated level. The index is computed and disseminated Monday to Friday (except during common US trading holidays). The index is based on end of day prices. The index is also calculated on the last calendar day of each month irrespective of holidays and weekends. If the index is calculated on a day that is a non-business day, then the prices from the previous trading day will be carried forward and the index will be calculated using those prices and the current accrued interest and coupon payment data.

On the last trading day of a rebalancing month, the rebalancing takes place after close of market.

4.6) Index weights

Once the eligible bond universe has been defined, the weight for each bond is determined and if necessary capped; applying an issuer cap of 3%. The weights and capping factors are determined on the last business day of each month using the end-of-month market values.

4.7) Index calculus

The components of the total return are price changes, accrued interest, coupon payments, and reinvestment income on cash flows received during the composition month.

$$TR_t = TR_{t-s}\,\frac{\sum_{i=1}^{n}\left(P_{i,t} + A_{i,t} + XD_{i,t-s}(CP_{i,t} + G_{i,t})\right)N_{i,t-s} + CASH_{t-1}\left(1 + \frac{Y_{LIBID,t-1}}{360}\right)}{\sum_{i=1}^{n}\left(P_{i,t-s} + A_{i,t-s} + (XD_{i,t-s}CP_{i,t-s})\right)N_{i,t-s}}$$

Where:

$A_{i,t}$ is the accrued interest of bond i at calculation day t

$A_{i,t-s}$ is the accrued interest of bond i on the previous rebalancing day t-s

$CASH_{t-1}$ is the cash at the previous business day

$CP_{i,t}$ is the value of the next coupon payment of bond i during an ex-dividend period. Outside the ex-dividend period, this value is 0

$G_{i,t}$ is the value of any coupon payment received from bond i at time t. If none the value is 0

$N_{i,t-s}$ is the amount outstanding of bond i at the previous rebalancing day t-s

$P_{i,t}$ is the clean price of bond i at time t

$P_{i,t-s}$ is the closing price of bond i on the last business day on or before the previous rebalancing day

TR_t is the total return index level at time t

TR_{t-s} is the closing total return index level on the previous rebalancing day

$XD_{i,t-s}$; the value is 0, if the bond enters the index at the ex-dividend period.The value is 1, if (a) coupon payments are not ex-dividend, (b) has not entered the index during an ex-dividend period, or (c) entered the index during a previous ex-dividend period

$Y_{LIBID,t-1}$ is the overnight interest rate for cash

For specific index formulae please refer to *Markit iBoxx Bond Calculus* document, available on www.ihsmarkit.com under *Methodology*.

4.8) Treatment of the special intra-month events

Data for the application of corporate actions in the index may not be fully or timely available at all times, e.g. the final call prices for make-whole calls or the actual pay-in-kind percentage for PIK-payment options. In such cases, IHS Markit will estimate the approximate value based on the available data at the time of calculation.

4.8.1) Full redemptions: exercised calls, puts and buybacks

If a bond is fully redeemed intra-month, the bond effectively ceases to exist. In all calculations, the redeemed bond is treated as cash based on the last price, the call price or repurchase price, as applicable. The redemption factor, redemption and the redemption price are used to treat these events in the index and analytics calculation. In addition, the clean price of the bond is set to the redemption price, and the interest accrued until the redemption date is treated as an irregular coupon payment.

4.8.2) Bonds trading flat of accrued

If a bond is identified as trading flat of accrued, the accrued interest of the bond is set to 0 in the total return index calculation and is excluded from the calculation of all bond and index analytical values.

Bonds will be considered trading flat of accrued in any of the following situations:

- a bond has been assigned a default rating and/or
- issuer has announced a failure to pay a coupon and/or
- issuer has announced an intention not to make a payment on an upcoming coupon (grace period).

4.8.3) Multi-coupon bonds

Some bonds have pre-defined coupon changes that lead to a change in the annual coupon over the life of the bond. In all instances, the coupon change must be a fixed amount on top of a fixed coupon, i.e. floating coupon bonds are not eligible for the indices. The two main categories of bonds are step-up bonds and event-driven bonds.

- **Step-up bonds:** These are bonds with a pre-defined coupon schedule that cannot change during the life of the bond. The coupon schedule is used in all bond calculations.
- **Event-driven bonds:** These are bonds whose coupon may change upon occurrence (or non-occurrence) of pre-specified events, such as rating changes, e.g. rating-driven bonds, failure to register (register-driven bonds), or failure to complete a merger (merger-driven bonds). In the calculation of the indices and the analytics, the coupon schedule as of the calculation date is used. That is to say, any events occurring after the calculation date are ignored in the determination of the applicable coupon schedule. *Example of an event-driven bond:* A bond's rating changes on 31 December 2003 from A- to BBB+ and the coupon steps up from 6% to 6.25% from 1 March 2004 onward. The coupon dates are 1 October and 1 April each year. The correct coupon schedule for the bond and index calculations is date dependent. The index calculation on 20 December 2003 uses the 6% coupon for the whole life of the bond, while the calculation on 31 January 2004 uses a 6% coupon for the current coupon period to 29 February 2004, and a 6.25% coupon for all later interest payments. The index calculation on 20 March uses a 6% coupon until 29 February, a 6.25% coupon for the remainder of the current coupon period and a 6.25% coupon for all future coupon payments. The index calculation after 1 April uses a 6.25% coupon.

4.8.4) Tender offers and calls

Any bond subject to a firm call or tender offer, with the exception of exchange offers, in the month immediately following the rebalancing date will be excluded from the index, provided that IHS Markit is aware of such tender offer or call as of the bond selection cut-off date.

4.9) Index history

The Index history starts on 31 December 2013. The index has a base value of 100 on that date.

4.10) Settlement conventions

All iBoxx indices are calculated using the assumption of T+0 settlement days.

4.11) Calendar

IHS Markit publishes an index calculation calendar in the *iBoxx Calendars* section of the iBoxx Documentation page on www.ihsmarkit.com. This calendar provides an overview of the index calculation holidays of the iBoxx bond index families in a given year.

4.12) Publication of the Index

The index is calculated at the end of each business day and re-balanced at the end of each month. The index is calculated on the basis of end-of-day prices on each trading day defined in the iBoxx USD Index calculation calendar. The index calculation calendar is available in the *Indices* section on www.ihsmarkit.com under Calendar for data subscribers. Index data and bond price information is also available from the main information vendors.

The index calculation calendar conforms to the recommendations of the Securities Industry and Financial Markets Association (SIFMA):

- Pricing Takes Place on All SIFMA Recommended US Trading Days
- Index Calculation Occurs on All SIFMA Recommended US Trading Days and the Last Calendar Day of the Month

4.13) Data publication and access

The table below summarizes the publication of iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index in the *Indices* section of the IHS Markit website www.ihsmarkit.com for registered users and on the FTP server.

Table 3: Data publication frequency, file types and access

Frequency	File Type	Access
Daily	Underlying file – Bond level	FTP Server
	Indices files – Index level	FTP Server / IHS Markit website / Bloomberg (index levels only)
Daily (6th calendar day of the month and onwards)	Preview components	FTP Server / IHS Markit website
Monthly	End of month components	FTP Server / IHS Markit website
	XREF files	FTP Server

Below is a summary of the identifiers for each publication channel:

Table 4: Index identifiers

Index Name	Ticker
iBoxx MSCI ESG Advanced USD Liquid Investment Grade Total Return Index	IBXXUQ3T
iBoxx MSCI ESG Advanced USD Liquid Investment Grade Clean Price Index	IBXXUQ3P

4.14) Index review

The rules for the Index are reviewed on a periodic basis during the public review and consultation process to ensure that the index provides a balanced representation of the USD denominated debt market. Decisions made following feedback from market participants, the index review and External Advisory Committees (EAC) will be published on www.ihsmarkit.com shortly after the EACs have been held. The publication will contain a detailed overview and timelines for implementation of any rules changes.

5) Summary of Key ESG Factors

Explanation of how ESG factors are reflected in the key elements of the benchmark methodology	
Item 1: Benchmark administrator	IHS Markit Benchmark Administration Ltd. ('IMBA UK')
Item 2: Type of benchmark	Fixed Income
Item 3: Name of benchmark or family of benchmarks	iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index
Item 4: Does the benchmark methodology take into account ESG factors	Yes
Item 5a: List of Environmental factors considered	Exclusion driven by exposure to the following factors: ● Environmental Controversy Score ● Ties to Fossil Fuels See section 'MSCI ESG Research' of this guide for details
Item 5b: List of Social factors considered	Exclusion driven by exposure to the following factors: ● Adult Entertainment ● Alcohol ● Civilian Firearms ● Controversial Weapons ● Conventional Weapons ● For Profit Prisons ● Gambling ● Genetically Modified Organisms ● Nuclear Power ● Nuclear Weapons ● Palm Oil ● Predatory Lending ● Tobacco See section 'MSCI ESG Research' of this guide for details
Item 5c: List of Governance factors considered	Exclusion driven by exposure to the following factors: N/A
Item 5d: List of any other overall ESG factors	Exclusion driven by additional factors: ● Overall ESG Rating ● Overall Controversy Score ● UNGC Compliance See section 'MSCI ESG Research' of this guide for details
Item 6: Hyperlink to ESG factors information	https://ihsmarkit.com/products/benchmark-administration-uk.html
Item 7a(i): Source of input	Data is sourced externally from MSCI ESG Research LLC ("MSCI ESG Research")
Item 7a(ii): Data input	MSCI ESG Research relies on a proprietary methodology informed by a range of data sources. a) Reported data ● Corporate documents: annual reports, proxy filings, environmental and social reports, securities filings, websites and Carbon Disclosure Project responses.

	Externally sourced data ● Government data: central bank data, U.S. Toxic Release Inventory, Comprehensive Environmental Response and Liability Information System (CERCLIS), RCRA Hazardous Waste Data Management System, etc. We continue to assess the value of other, similar information sources, particularly for European companies. ● Popular, trade, and academic journals: accessed through websites, subscriptions and searches of online databases. ● News media: major news publications globally, including local-language sources across a range of markets. ● Relevant organizations and professionals: reports from and interviews with trade groups, industry experts and nongovernmental organizations familiar with the companies' operations and any related controversies b) Modelled data For climate-related metrics, when data is not disclosed by companies, MSCI ESG Research uses proprietary GHG emission estimation model (full methodology is available for MSCI ESG Research clients). c) Internally sourced data For international standards and global norms violations, MSCI ESG Research uses data reported via media sources and NGO reports. MSCI ESG Research's assessment of this data is informed by international standards and global norms definitions. For top level scores (ESG Ratings, Environmental, Social and Governance pillars), MSCI ESG Research estimates macro-level risk exposure for companies' based on the type and location of operations, distribution of products. Data sources used in the exposure calculations include, but not limited to: ● Comprehensive Environmental Data Archive (CEDA) ● US Department of Energy; International Council on Clean Transportation ● Lamont-Doherty Earth Observatory, Columbia University ● Organization of Economic Co-Operation and Development (OECD) ● Canadian Industrial Water Survey ● University of New Hampshire's Water Systems Analysis Group (country data) ● Hoekstra, A.Y. and Mekonnen, M.M. (2011) ● Ecorisk ● World Development Indicators (WDI) ● Annual Change of Forest Resources – Food and Agriculture Organization (FAO) ● World Wildlife Fund (WWF) ● US EPA's Toxics Release Inventory (TRI) ● Risk-Screening Environmental Indicators (RSEI) ● US Bureau of Labor Statistics (BLS) ● International Labour Organization (ILO) ● US Occupational Health & Safety Administration (OSHA) ● UK Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) ● International Chemical Secretariat (ChemSec) Substitute It Now (SIN) List ● International Monetary Fund (IMF) ● World Health Organization (WHO) ● UN Principles for Responsible Investments (UN PRI)

	• World Resource Institute (WRI) • Consultative Group to Assist the Poor (CGAP) • US Census Bureau Current Population Survey Supplement • World Bank Governance Indicators (WGI) • Transparency International (TI) • World Bank (WB) • SNL Financial • Thomson Financial
Item 7b: Verification and quality of data	MSCI ESG Research relies on multiple steps to review the quality of the analysis as well as the consistency of the methodology and the ratings signal. Four groups are responsible for quality review: Industry and Team Leads; the ESG Ratings Methodology Committee; the ESG Methodology Committee; and the Quality Review Committee. MSCI ESG Research is committed to robust and transparent communication with all issuers in our coverage universe. This commitment includes: • A data review process that allows companies to comment on the accuracy of company data for all MSCI ESG Research reports. • Free access for issuers to published versions of all their MSCI ESG Research company reports. • Direct communication with a company concerning specific company ESG performance. • A timely response to company-initiated requests to discuss their MSCI ESG Research reports. Companies are invited to participate in the data review process prior to the annual update of their ESG rating. At that time, companies have the opportunity to review and comment on the facts contained in their existing MSCI ESG Ratings report, as well as to provide MSCI's ESG Research team any additional ESG information, if they wish. In addition, MSCI ESG Research analysts may follow up directly with a company to clarify questions concerning ESG performance data. Due to publication schedules and the extent of the MSCI ESG Ratings coverage universe, companies normally receive the newly updated ratings data to review at their convenience at the time of rating publication. All published companies automatically receive the data review reports, as long as MSCI ESG Research has accurate contact information. We are committed to updating a company profile as required in a timely manner and will consider comments and feedback at any time. This process is also in accordance with the objective of frequently updating company reports with the latest available information as provided by companies. Please note that updates to ESG data will not necessarily result in changes to a company's ESG rating. Companies are monitored on a systematic and ongoing basis, including daily monitoring of controversies and governance events. New information is reflected in reports on a weekly basis and significant changes in scores trigger analyst review and re-rating. Companies also receive an in-depth review at least annually. For companies in the MSCI ACWI, annual ratings are updated with their industry peers. All other companies are updated within a 12-month timeframe of their previous rating assessment, typically with their industry peers.
Item 7c: International reference standards	MSCI ESG Research does not explicitly mandate reporting along specific disclosure standards. Commonly utilized disclosure frameworks for data collected and used by MSCI ESG Research include GRI, SASB, UN Global Compact; and, for specific

	performance indicators, GHG Protocol, and applicable ISO standards.
Item 8a: Information updated on	July 28, 2021
Item 8b: Reason for update	New regulation

6) Governance and regulatory compliance

IHS Markit Benchmark Administration Limited (IMBA UK) is the Index Administrator of iBoxx indices. Information on IMBA UK's governance and compliance approach can be found here. This document covers:

- Governance arrangements, including external committees
- Input data integrity
- Conflicts of interest management
- Market disruption and Force Majeure
- Methodology changes and cessations
- Complaints
- Errors and restatements
- Reporting of infringements and misconduct
- Methodology reviews
- Business continuity

More details about IMBA UK can be found on the Administrator’s website.

7) Changes to the iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index

31 Oct 2022	• Clarification added to MSCI ESG Controversies section
30 Jun 2022	• Monthly forward start date updated from 10th calendar day to 6th calendar day
31 Mar 2022	Implementation of Annual Index Review 2021 • Introduction of new market sector classification "Education" with market sub-sector classification "Academic & Educational Services"
01 Sep 2021	• Monthly forward start date updated from 12th calendar day to10th calendar day
28 Jul 2021	• Launch of iBoxx MSCI ESG Advanced USD Liquid Investment Grade Index

8) Further information

Glossary of key terms

The Markit iBoxx Glossary document of key terms is available in the *Methodology* section of the iBoxx *Documentation* page on www.ihsmarkit.com.

Contractual and content issues

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Performance Disclosure/Back-Tested Data

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Please refer to the methodology for the Index for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations.

Information presented prior to an index's launch date is hypothetical back-tested performance, not actual performance, and is based on the index methodology in effect on the launch date. However, when creating back-tested history for periods of market anomalies or other periods that do not reflect the general current market environment, index methodology rules may be relaxed to capture a large enough universe of securities to simulate the target market the index is designed to measure or strategy the index is designed to capture. For example, market capitalization and liquidity thresholds may be reduced. In addition, forks have not been factored into the back-test data with respect to the S&P Cryptocurrency Indices. For the S&P Cryptocurrency Top 5 & 10 Equal Weight Indices, the custody element of the methodology was not considered; the back-test history is based on the index constituents that meet the custody element as of the Launch Date. Back-tested performance reflects application of an index methodology and selection of index constituents with the benefit of hindsight and knowledge of factors that may have positively affected its performance, cannot account for all financial risk that may affect results and may be considered to reflect survivor/look ahead bias. Actual returns may differ significantly from, and be lower than, back-tested returns. Past performance is not an indication or guarantee of future results.

Typically, when S&P DJI creates back-tested index data, S&P DJI uses actual historical constituent-level data (e.g., historical price, market capitalization, and corporate action data) in its calculations. As ESG investing is still in early stages of development, certain datapoints used to calculate certain ESG indices may not be available for the entire desired period of back-tested history. The same data availability issue could be true for other indices as well. In cases when actual data is not available for all relevant historical periods, S&P DJI may employ a process of using "Backward Data Assumption" (or pulling back) of ESG data for the calculation of back-tested historical performance. "Backward Data Assumption" is a process that applies the earliest actual live data point available for an index constituent company to all prior historical instances in the index performance. For example, Backward Data Assumption inherently assumes that companies currently not involved in a specific business activity (also known as "product involvement") were never involved historically and similarly also assumes that companies currently involved in a specific business activity were involved historically too. The Backward Data Assumption allows the hypothetical back-test to be extended over more historical years than would be feasible using only actual data. For more information on "Backward Data Assumption" please refer to the FAQ. The methodology and factsheets of any index that employs backward assumption in the back-tested history will explicitly state so. The methodology will include an Appendix with a table setting forth the specific data points and relevant time period for which backward projected data was used. Index returns shown do not represent the results of actual trading of investable assets/securities. S&P DJI maintains the index and calculates the index levels and performance shown or discussed but does not manage any assets.

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