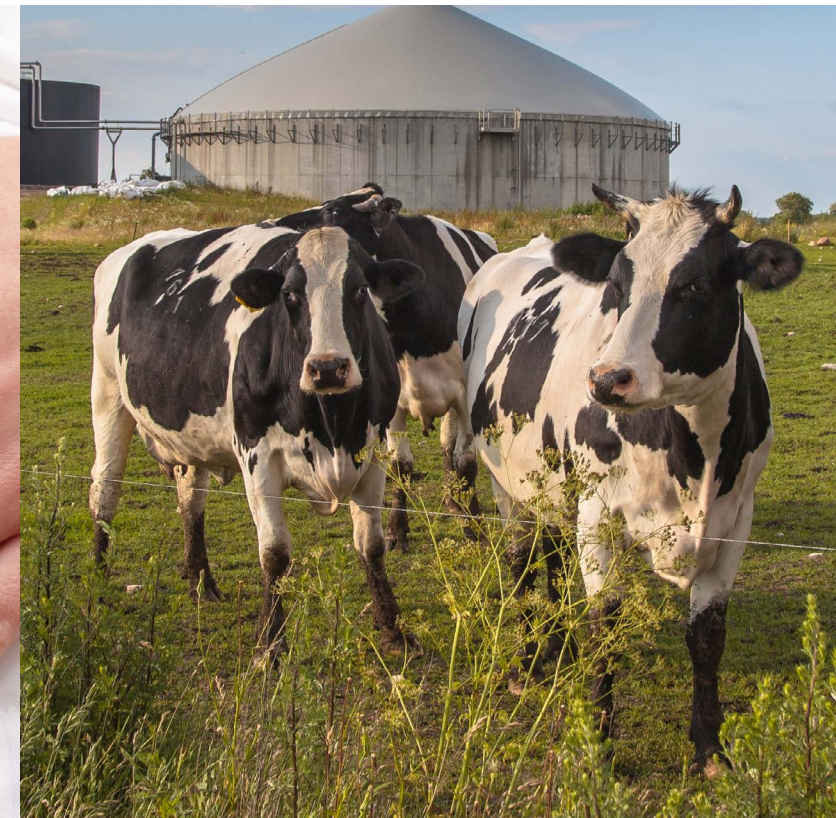
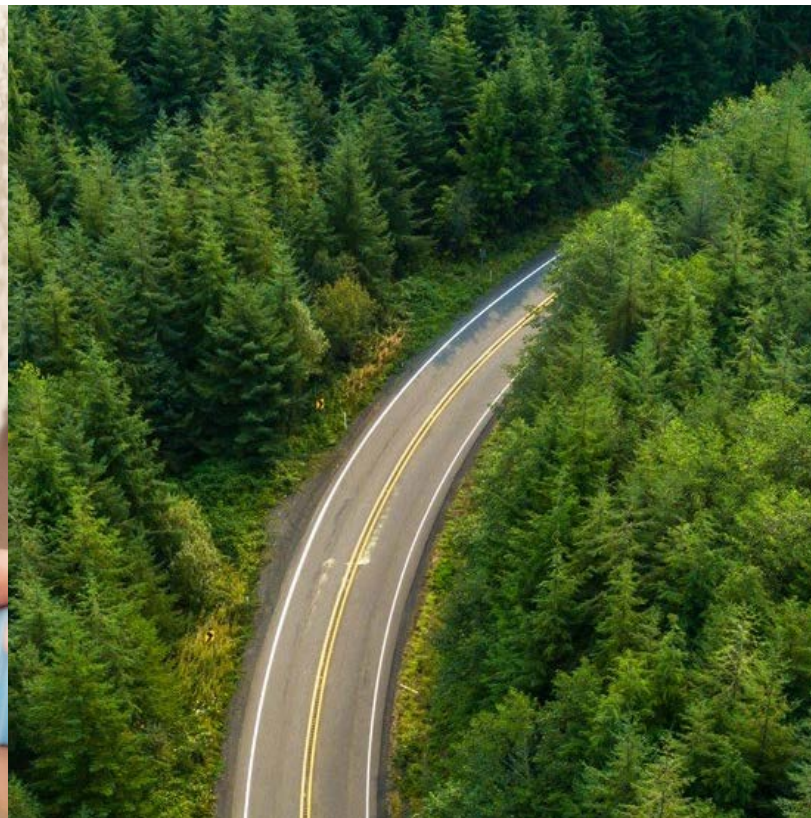


BIOMASS BALANCE ECO-B SUSTAINABLE SOLUTIONS

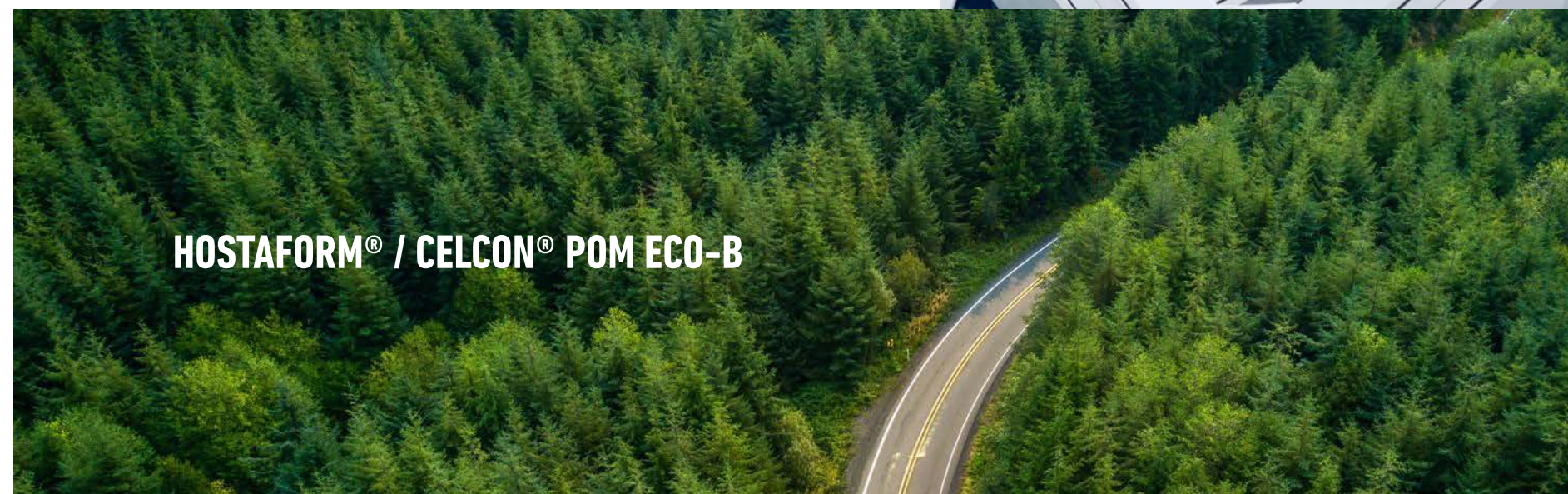
Hostaform® and Celcon® POM ECO-B



START



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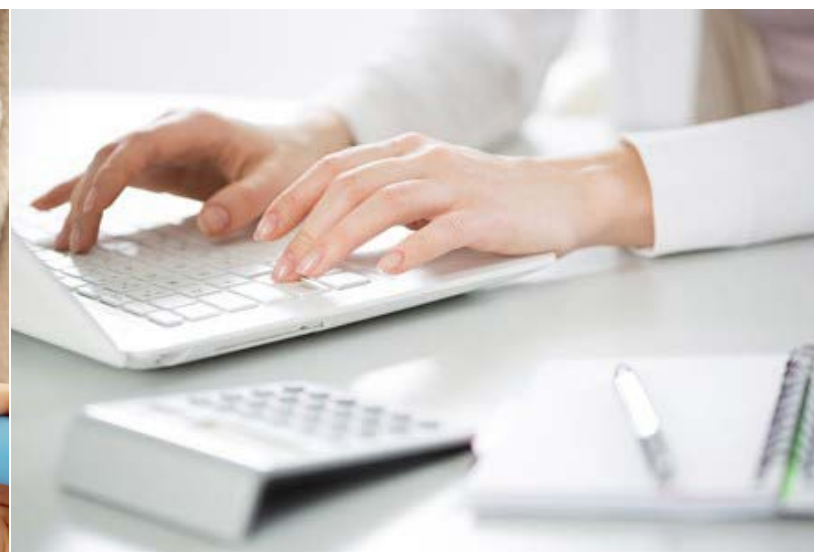
INDUSTRIES

At Celanese, we are focused on expanding our portfolio of sustainable offerings through market innovation to meet growing customer demand for more sustainable products. Our POM ECO-B is a noted solution for industry-leading companies searching to have a drop-in solution with no chemical or physical property performance changes while reducing their CO₂ footprint and increasing their usage of renewable feedstocks.

Celanese is supporting high interest and volumes across regions and multiple industries as we are able to produce POM ECO-B for all of our POM portfolio.



ORAL CARE



ELECTRICAL & ELECTRONICS



MEDICAL & PHARMA



AUTOMOTIVE & TRANSPORTATION



PERSONAL CARE & COSMETICS



APPLIANCES



INDUSTRIAL



CONSUMER GOODS



HELPING THE INDUSTRY REDUCE POM CARBON FOOTPRINT WITH A DROP-IN SOLUTION

Our POM ECO-B is the ideal material for a ready-to-use drop-in sustainable solution with up to 97% bio-content and a CO₂ footprint reduction of approximately 50% for your medical, cosmetics, consumer goods, industrial and automotive applications.

PRODUCTION & CERTIFICATIONS

Celanese is one of the global leaders in producing POM, fully integrated through the entire chain, and we are proud of our expertise and leadership in the industry.

Providing safe and sustainable solutions for our customers is an opportunity to innovate at our best. We've developed a sustainable polyoxymethylene that is chemically identical to our conventional POM, with up to 97% of bio-based content via a mass balance approach, certified by ISCC+.

Thanks to the bio-based mass balance approach, the use of fossil resources is reduced and the bio-based supply chain is supported.

We keep our manufacturing processes unchanged so no product requalification is necessary and no performance is sacrificed.

POM ECO-B IS CHEMICALLY IDENTICAL TO OUR STANDARD POM

The versatility of its properties combined with the reduced CO₂ values are some of the most common reasons for choosing POM ECO-B even over other engineered materials which have higher CO₂ values. Celanese can help your industry find the more sustainable polymer for your applications.

Check out where we get our bio-based materials, how we implement the manufacturing process, what the benefits are for you as our customer, and finally, how we can collaborate on sustainability.



HOSTAFORM® / CELCON® POM ECO-B

CUSTOMER VALUE

POM ECO-B is an exciting new product from Celanese that has tremendous value for our customers. Celanese is a leading global supplier providing one of the broadest portfolios of high-performance polymers and thermoplastic elastomers for innovative applications, and with POM ECO-B, one of the first to offer a more sustainable product. No matter if you are looking to reduce your global CO₂ footprint or wanting to brand your products as more eco-friendly, POM ECO-B can provide a solution that is easy to implement. The benefits of POM ECO-B are listed below. For further details, please contact your Celanese account manager.

DROP-IN REPLACEMENT

Both fossil- and bio-based Methanol are feeding the existing manufacturing equipment. As Celanese is backwards integrated, the resulting product has identical properties and performance that POM copolymer is known for.

REGULATORY CONSISTENCY

As a consequence, all regulatory certifications can be maintained, making the product ideally suited for strongly regulated end uses (Medical, Food Contact, Drinking Water).

NO REQUALIFICATION NEEDED

Customers already using POM don't need to retest and requalify POM ECO-B.

CARBON FOOTPRINT REDUCTION

Switching from conventional POM to POM ECO-B lowers CO₂ footprint by ~ 50% on polymer basis.

RENEWABLE CONTENT INCREASE

Depending on the POM ECO-B grade, a renewable content of up to 97% can be achieved.

SCALABILITY OF POM ECO-B

POM ECO-B versions can be produced on a global manufacturing basis. Global suppliers support the increasing demand of volumes available for POM ECO-B.





HOSTAFORM® / CELCON® POM ECO-B RENEWABLE SOURCING

Our POM ECO-B strategically uses certified bio-based waste streams to avoid impacting food or feed supply chains



Celanese orders equivalent
amount of bio-based methanol.

Following the Chain of Custody, our bio-methanol suppliers are ISCC+ certified. These key global players with sites in every region secure our increasing demand, following the strict quality and standards and specifications for our POM manufacturing global sites.



OUR BIOGAS COMES FROM THESE 5 SOURCES:

These sources are based on renewable materials according to the definition of waste or residue of the Renewable Energy Directive (RED).

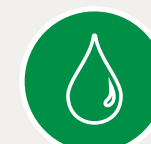
Municipal
waste



Food
waste



Waste water
treatment



Crop
waste



Livestock
waste

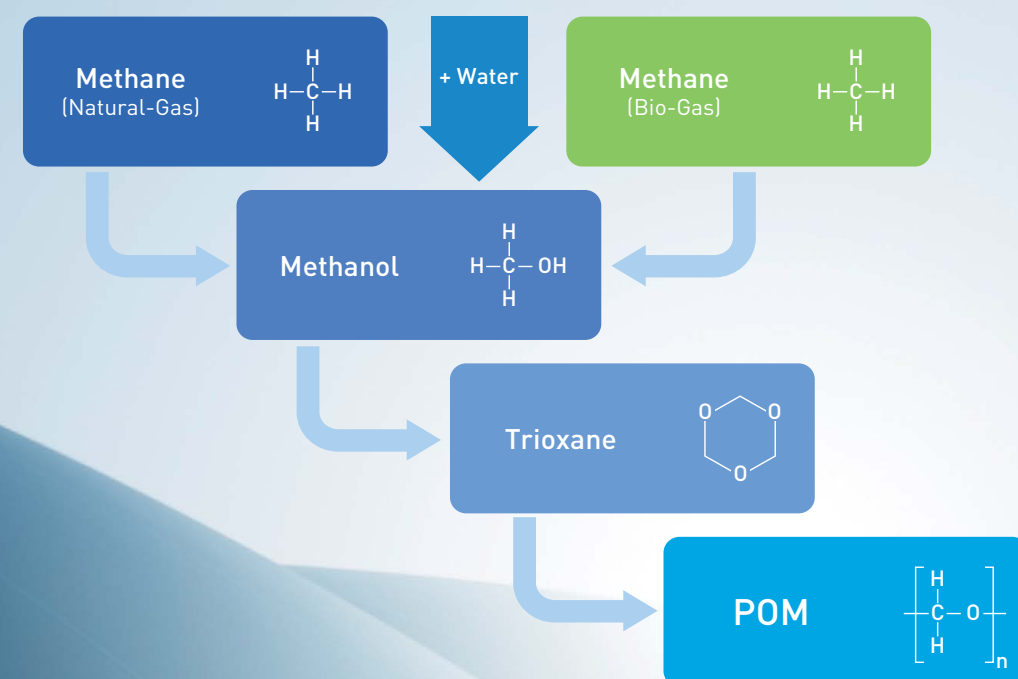


Bio-methanol material
is **certified and shipped**
to Celanese POM
manufacturing site.

* Polymer-only basis, compounded products may differ



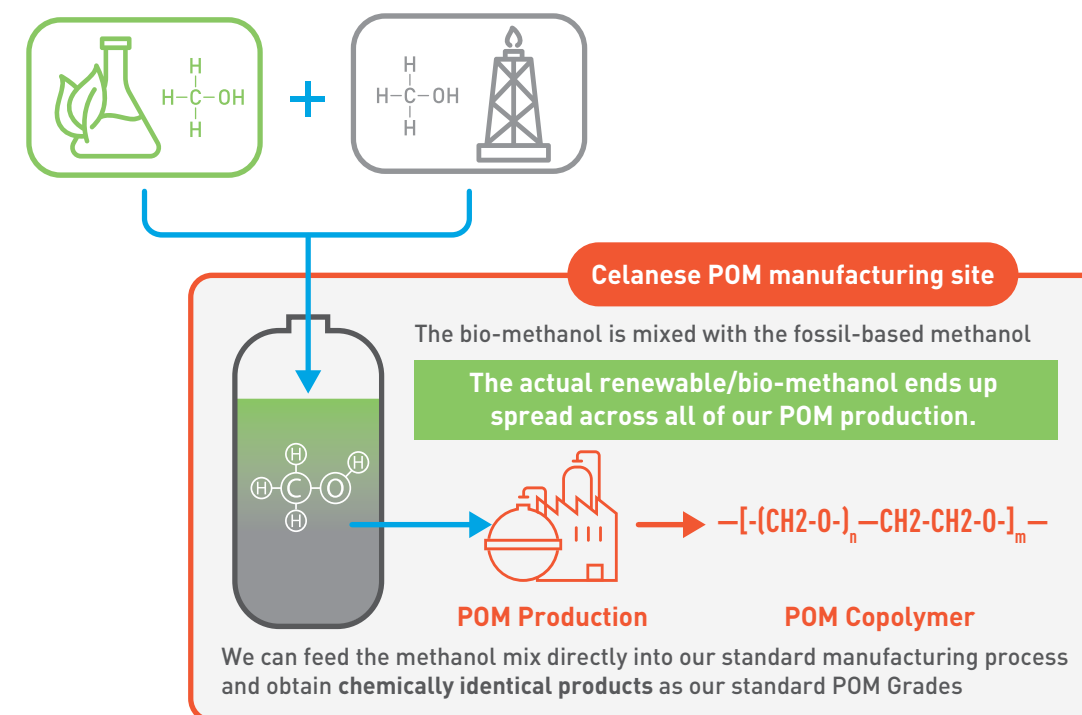
FROM METHANE TO POM



HOSTAFORM® / CELCON® POM ECO-B MANUFACTURING PROCESS



As our POM manufacturing plants are backwards integrated, we can feed the bio-methanol and mix directly into our standard manufacturing process. This allows Celanese to offer our customers POM ECO-B as the sustainable version of all our POM grades.



The bio-methanol is tracked and accounted for separately from the fossil-based methanol during the supply chain process. This allows us to produce a chemically identical product to our standard POM Grades.

The manufacturing processes are unchanged, so no product requalification or performance is sacrificed. POM ECO-B is chemically identical and even maintains all of the current regulatory certifications and approvals for uses as standard POM.

Our POM ECO-B is fully commercialized for all the grades we produce in our sites in Germany, US and China.

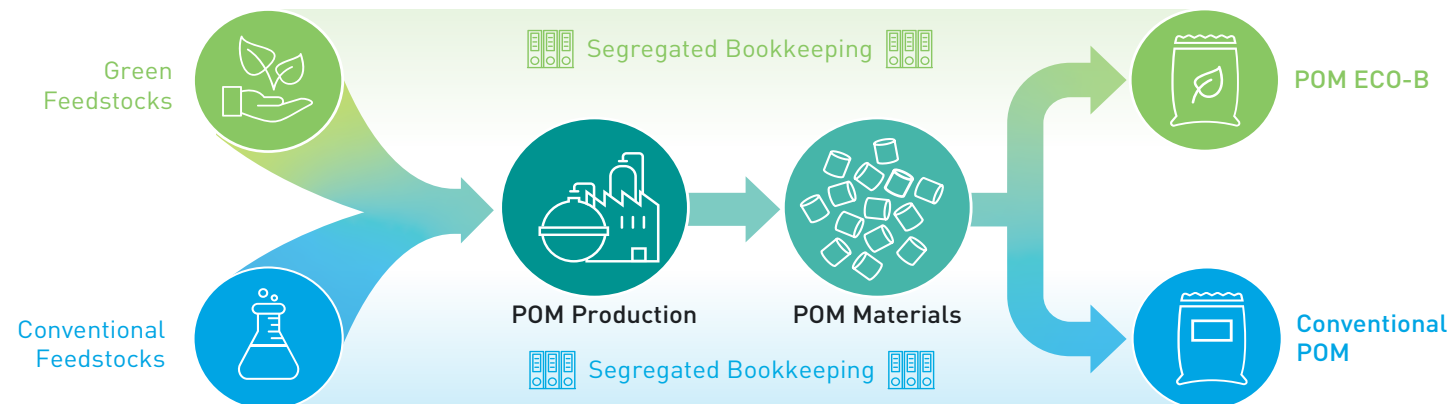


HOSTAFORM® / CELCON® POM ECO-B MASS BALANCE

FEEDSTOCK:

Mass balance approach means fossil- and bio-based feedstocks are mixed in production but accounted for separately

- Creates demand for non-fossil feedstocks
- Maintains efficiency and emissions benefits of large-scale production technologies



BOOKKEEPING:

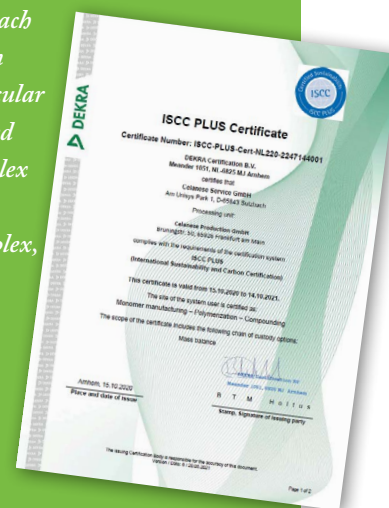
Celanese system to accurately account and track the feedstocks used to produce equivalent amounts of product

- Accounting process and data is certified by ISCC+ (International Sustainability and Carbon Certification), a leading and widely recognized certification body
- Celanese process is independently audited annually and the certificate can be found at www.iscc-system.org.

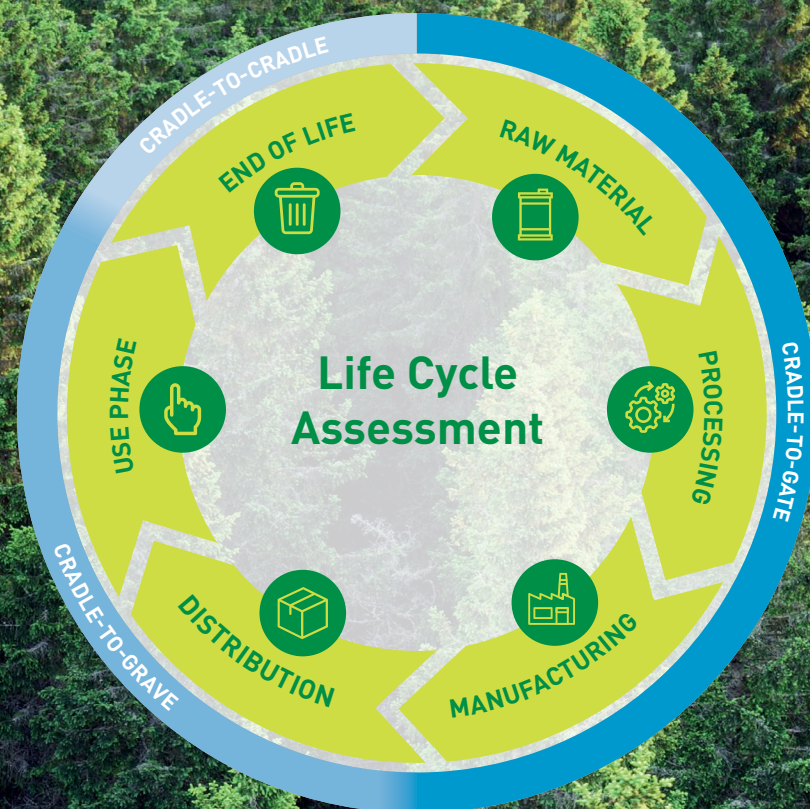
ISCC+

“Over the past years, the mass balance approach has prevailed in the chemical industry. As an important milestone on the pathway to a circular economy and bioeconomy, it has been designed to trace the flow of materials through a complex value chain. Since bio-based feedstocks are typically blended in the manufacturing complex, physical segregation of recycled content is often practically and economically infeasible. The mass balance approach makes it possible to track the amount and sustainability characteristics of circular and/or bio-based content in the value chain and attribute it based on verifiable bookkeeping”

Source: ISCC+ (International Sustainability & Carbon Certification)







HOSTAFORM® / CELCON® POM ECO-B

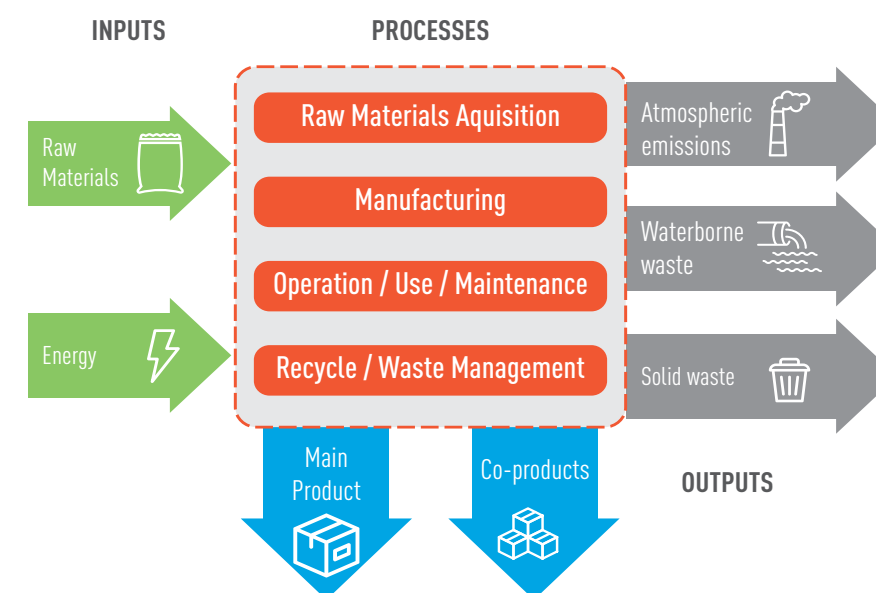
CUSTOMER ENGAGEMENT



We follow ISCC+ guidelines and pass their audits certifying the bio-content in our POM ECO-B through the implementation of the mass balance approach.

For Sustainability-related products, especially mass balanced products, “Chain of custody” is the key. It ensures that all parties along the supply chain follow the same rules as established in the certification procedures and they are certified by ISCC+ ensuring the same principles are followed by all participants.

The main stages and typical inflows and outflows considered in life cycle assessment (LCA) can be represented as follows:



These are some of the parameters that were used to conduct and certify the LCA analysis results for our POM ECO-B:

- Cradle-to-gate process. From incoming raw materials through to product exiting our plant
- LCA according to ISO 14040/14044 and ISO 14067 principles for 1 kg POM pellets
- CO₂ footprint based on GWP100 from IPCC AR 5
- Assessment method Environmental Footprint (EF) v3.0 without human and eco-toxicity
- Included critical review by external LCA expert according to ISO 14040/14044

To preserve the Chain of Custody, customers who want to pass the Bio-content claim to their own industrial customers, need to be also certified by ISCC+.

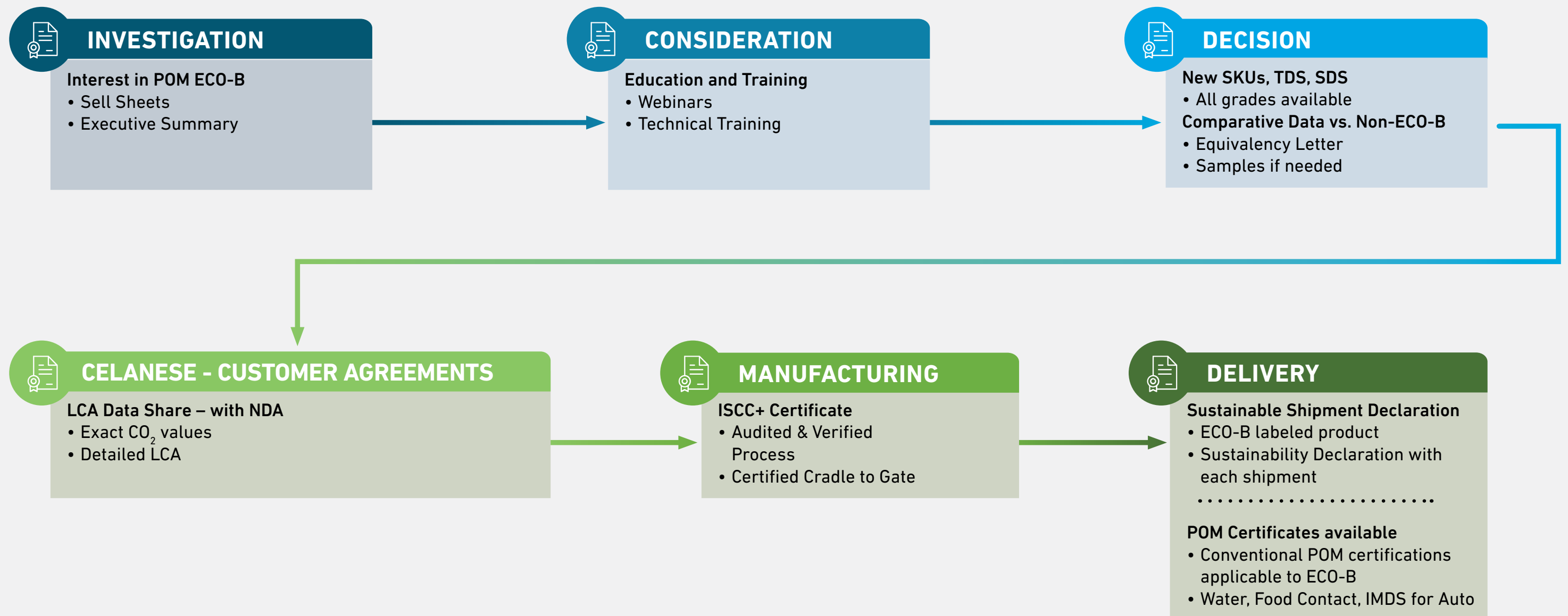
Conversely, our customers can include in their reports the POM ECO-B corresponding CO₂ savings without the need of any certification, and take this value as a basis for their own LCA calculation.



HOSTAFORM® / CELCON® POM ECO-B DOCUMENTS



The new product launch of POM ECO-B comes fully commercialized and with the same documentations and certifications as their equivalent conventional POM products. With POM ECO-B, we can provide data for your specific grade on CO₂ footprint and our LCA details for POM. For those customers who are in the Automotive sector, POM ECO-B is registered and follows the same procedures for IMDS (International Material Data System) which is a global data repository that contains information on materials used by the automotive industry. Also for water regulations, POM ECO-B has Drinking Water Approvals for WRAS, ACS and KTW-BWGL. Below see additional pertinent information and documents available for POM ECO-B. Reach out to your local Celanese contact for specific details.





HOSTAFORM® / CELCON® POM

POLYOXYMETHYLENE COPOLYMER

Polyoxymethylene (POM) homopolymer, chemical formula $(-O-CH_2-)_n$ was first introduced to the market back in the early 1960s as an engineering thermoplastic that could substitute for metal. Celanese is one of the world's first producers and a leading producer and innovator in today's POM industry.

Hostaform® | Celcon® Acetal Copolymer (POM) is a linear structure with highly crystalline content that provides a variety of characteristics: outstanding wear and slip properties, long-term fatigue, toughness and creep resistance as well as excellent resistance to moisture, solvents and strong alkalis.

High-quality raw materials, in-depth technical information, component design and process know-how have enabled us to become the leading supplier of POM globally.





HOSTAFORM® / CELCON® POM

GRADES PORTFOLIO

Celanese continues to expand its Hostaform®/Celcon® POM product line to complement its broad portfolio to fulfill application needs in ever-diversifying markets. Celanese also addresses new initiatives/directives in an ever-changing industry where we have a broad portfolio of:

- Grades with improved heat distortion temperature and stiffness
- Reinforced grades for improved heat distortion temperature and stiffness
- High-impact grades with step-change improvement in energy absorption
- Grades with improved media resistance
- Conductive grades to dissipate or conduct electrical charges
- Medical and pharmaceutical compliant grades where stringent requirements are enforced
- Low emission grades for automotive interior applications
- Appearance effects, laser marking, low gloss and metallic effect products
- Improved friction and wear grades



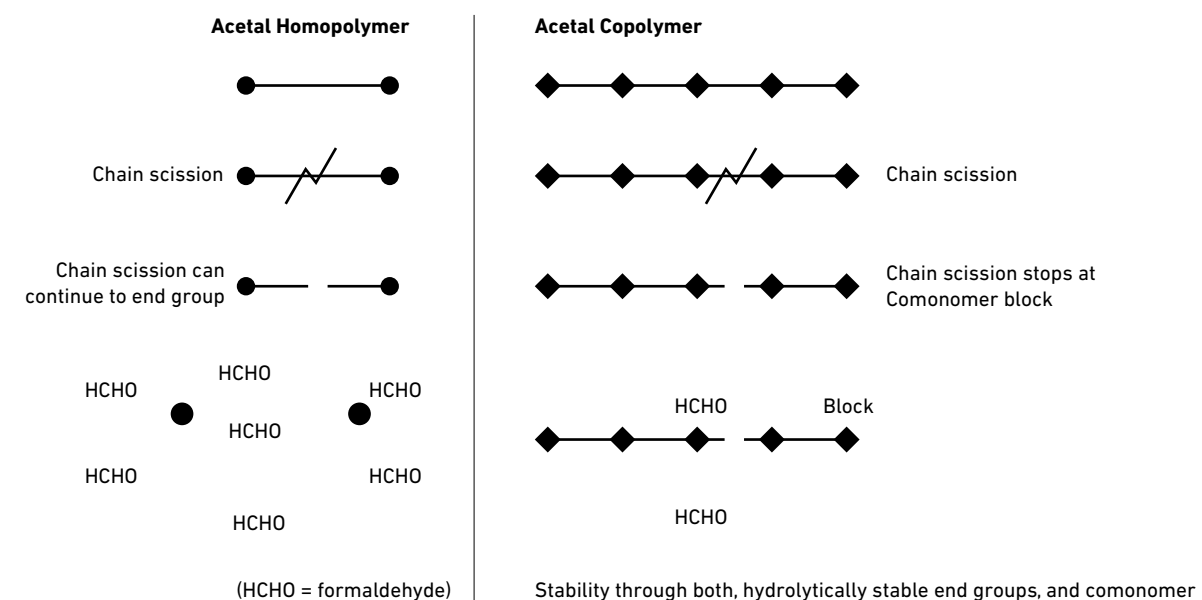


HOSTAFORM® / CELCON® POM

TYPICAL ATTRIBUTES



- Good mechanics – high stiffness-to-strength ratio
- Good dimensional stability over broad temperature range: -40 to 100 °C (-40 to 212 °F)
- Excellent electrical and dielectric properties > 550 V
- Inherent sliding properties
- Broad chemical resistance to solvents, cleaners, fuels, oils and strong alkalis, pH 4 to pH 14
- Maintains toughness (even at -40°C)
- No environmental stress cracking
- Excellent resilience – ability to recover to original shape after stress has been removed
- Excellent process robustness – good thermal stability



The Polyacetal Copolymer Backbone: -O-CH₂-O-CH₂-O-CH₂-CH₂-O-CH₂-



HOSTAFORM® / CELCON® POM COLORS

Celanese offers a broad range of colors for Hostaform®/Celcon® POM, basic grades and nearly all speciality products. Extensive experience in color formulation has positioned Celanese as a global leader in supplying pre-color and color masterbatches to various industries ranging from automotive to appliances. A broad selection of standard colors is maintained, as well as custom color matching and subsequent supply. Our vast color technology experience enables us to deliver superior UV resistance and special effect appearances (pearlescent, molded-in metallic and laser markable), while minimizing effects on product properties.

Celanese supplies colors in two primary forms: precolors of the grades themselves and pellet masterbatches (concentrates) to be used with our brands. The pre-colors offer the most ease of use and consistency of color by allowing the customer to use the material directly without further mixing. Pellet masterbatches can be purchased to mix at the press with natural grades to achieve the desired color. This sometimes minimizes inventories when multiple colors of the same grades are involved. In general, the same color is obtained as with using pre-color material, but no guarantee can be given as to the exact shade since this depends on correct mixing and process-related factors.

The nomenclature used by Celanese is described in the table. Also shown are some standard colors available as Hostaform®/Celcon® POM masterbatches.

Celanese also maintains a palette of color options matched to various industry and regulatory standards. Hundreds of colors are available in UV-resistant grades already matched to the requirements of major automotive OEMs. Matches exist in many standard grades to requirements such as RAL and Pantone.

Hostaform® POM Code	Color	Celcon® POM Code
10/xxx	Black	CD
20/xxx	White/Beige	CA, CB
30/xxx	Grey	CC
40/xxx	Red	CS
50/xxx	Yellow	CL
60/xxx	Brown	CY
70/xxx	Green	CJ
80/xxx	Blue	CG
90/xxx	Metallic	Cx4xxx
14	Std Black	CD3068, CD3501
10/1570	Exterior Black	
10/5358	FDA Black	CD7068
22	Std White	
Natur	Natural	CF2001, CF3500





HOSTAFORM® / CELCON® POM

ADVANCED PROCESSING



Hostaform® XAP®² POM

Celanese offers low-odor injection molding grades that meet automotive industry requirements for plastics used in vehicle interiors. Celanese is a leader in developing low emission technology; we formally launched the XAP® grades in 1998.

In addition to the natural and black grades of XAP®² C 2521, XAP®² C 9021, XAP®² C 13021 and XAP®² C 27021, Celanese maintains the broadest portfolio including many special grades based on C 9021 and C 27021.

The colors in XAP®² C 9021 LS and XAP®² C 27021 LS are light stabilized, while the grades XAP®² C 9021 AW LS, XAP®² C 9021 SW and XAP®² C 9021 TF, XAP®² C 9021 M also contain special additives to reduce the coefficient of friction, wear or noise.

All XAP®² grades are tested according to the VDA 275 test on injection molded plaques and the results are available through certificate of analysis. Minimal emission values can only be achieved under optimized injection molding conditions, especially low melt temperatures. More detailed information can be provided by our technical service team.



HOSTAFORM® / CELCON® POM CORE PRODUCTS PORTFOLIO

M15HP	C 2521 M25	C 9021 M90	C 13031	C 13021 M140	C 27021 M270	C 52021
Low Wear Reduced COF and Wear Rate	Glass Fiber Reinforced	Light-Stabilized UV-Stabilized Standard and Custom colors Molded in MetalX®		Impact Modified		Other Specialties
Aggressive Wear C 9021 TF, LW90FS-K	Extreme Glass Coupled XGC25, XGC10	Exterior Auto¹⁾ 2500+ kJ/m² C 9021 LS 10/1570, C 27021 LS 10/1570 WR90Z		Extreme Toughened XT20, XT90		Media Resistant Enhanced chemicals and fuels resistance grade
Reduced Wear LW90, LW90-S2, LW90-F2, LW90EW, XLW90BSX, C 9021 TF5, C 9021 TF2	Glass Fiber C 9021 GV1/30 (26%) C 9021 GV1/20 (20%) C 9021 GV1/10 (10%)	Interior Auto²⁾ 1200 kJ/m² C 9021 LS, C 27021 LS UV90Z, UV270Z LX90Z		High Impact S 9364, S 9363, S 9362		Mineral and Glass Bead High flatness and modulus grades
Reduced Noise M140-L1, C13031 RM, C 9021 SW	Glass Bead C 9021 GV3/30 (30%) C 9021 GV3/20 (20%) C 9021 GV3/10 (10%)	Industry and Window M25UV, M90UV, M270UV		Low Permeation Toughened S9364 LPI, S9364 LPB		Medical Technology Complete portfolio
Glass Fiber + Tribology C 9021 GV1/30 GT, C 9021 GV1/20 XGM XGC25 - LW01, XGC15- LW01		UV + Impact S 27072 WS 10/1570 SXT90Z -01, SXT90Z-02				ESD EC140XF,EC270TX, CF802, EC140CF10

¹⁾ per SAE J1960 (US Auto), ²⁾ per SAE J1885 (US Auto) / Contact your Celanese Account Manager



CIRCULAR ECONOMY



It is exciting to see our advancements support our customers’ climate objectives through our achievements in reducing greenhouse gas (GHG) emissions and improving the sustainability of our operations and products. Our growing range of solutions frequently factor in ESG concepts by design, including biological sources or renewable materials that can be recycled or composted at the end of their life. Additionally, we see significant growth opportunities for products supporting future mobility, vehicle light-weighting, and other end-product efficiencies, which enable balanced product solutions for a more sustainable world.

For further information, see our [ESG Report](#)



CELANESE ENGINEERED MATERIALS SUSTAINABLE SOLUTIONS

PRODUCTS

		BIOCONTENT	RECYCLED CONTENT	END-OF-LIFE
		Material solutions containing feedstocks made from a range of biobased waste, non-fossil and natural sources.	Post-consumer recycled (PCR) and post-industrial recycled (PIR) material. Both help drive sustainability by reducing the use of raw materials and amount of waste going to landfills.	Solutions and tools with the full life cycle of the product in mind. These include materials designed for recyclability or compostability.
Celanex® PBT ECO-B	A chemically identical alternative to traditional PBT made from mass balance bio-based waste feedstock			
Clarifoil® Cellulosic Film	Bio-based compostable film for packaging applications			
Ecomid® PA ECO-R	Nylon-based materials made from specified content of post-industrial recycled feedstocks			
GUR® UHMW-PE ECO-B	A chemically identical alternative to traditional UHMW-PE made from mass balance bio-based waste feedstock			
Hostaform® and Celcon® POM ECO-B	A chemically identical alternative to traditional POM made from mass balance bio-based waste feedstock			
Impet® PET ECO-R	PBT/PET-based materials made from specified content of post-consumer recycled feedstocks			
Santoprene® TPV ECO-R	TPV-based materials made from specified content of post-consumer recycled feedstocks			
Tecnoprene® PP ECO-R	PP-based materials made from specified content of post-industrial recycled feedstocks			



“Celanese is committed to improving the world and well-positioned to develop innovative customer solutions that help meet the world’s sustainability challenges. Our focus on making a difference guides our investments in our operations, our employees and our communities.”

*Lori Ryerkerk,
Celanese chairman,
chief executive officer and president*

SUSTAINABILITY HIGHLIGHTS



ADVANCING SAFE AND SUSTAINABLE CUSTOMER SOLUTIONS

- Announced the acquisition of the majority of DuPont’s M&M business, supporting growth in future mobility, connectivity and medical applications.
- Launched new, more sustainable product offerings that leverage the mass balance concept to produce products from bio and waste-based sources.
- Received a grant from the Bill & Melinda Gates Foundation to produce a refillable contraceptive implant prototype that could potentially expand global access to women’s health solutions.

INVESTING IN OUR PEOPLE AND COMMUNITIES

- Achieved 55% female or multicultural representation on our Board of Directors.
- Hosted the inaugural Women in Manufacturing (WiM) Virtual Conference, which aims to elevate Celanese female manufacturing colleagues.
- Introduced WorkABILITY, a hybrid work approach for our employees across the globe.
- Created community profiles that identify key categories and potential action items for each of our 11 U.S. sites.

PRESERVING THE ENVIRONMENT

- Extended our 2030 environmental goals to include a 30% reduction in Scope 1 and Scope 2 total GHG emissions intensity from our 2021 baseline.
- Engaged ERM CVS to provide a limited assurance of our environmental target baselines and 2022 CDP Climate and Water Security responses.
- Developed a low-carbon transition plan that focuses on enhancing energy efficiency, increasing renewable electricity consumption and exploring low-carbon technologies.

OPERATING WITH INTEGRITY

- Established full Board oversight of our Climate Policy and Strategy, and Committee oversight of our ESG metric reporting and DE&I.
- Added ESG-focused Enterprise Risk Management workshop to our corporate risk management process and reviewed and refined our priority topics.
- Added Cybersecurity as an ESG priority topic and launched a new comprehensive cybersecurity awareness course as part of our learning management program.

For a full list of our Sustainability Highlights, visit our [Index](#).

PRESERVING THE ENVIRONMENT

Celanese recognizes that our environmental initiatives play a key role in building solutions to support customers' sustainability objectives and improving the sustainability of our existing products.

To support our work to preserve the environment, we have set 2030 goals to reduce water, waste, energy and GHG intensity. These goals are based on the 2021 environmental metrics and we have taken the added step to have ERM CVS provide limited assurance of these baseline numbers. Our intensity-based environmental targets are founded on production for Celanese owned and operated assets, and provide increased transparency around the impact of future organic and inorganic growth opportunities through mergers and acquisitions.

[Click here for Awards and Recognitions from ESG Report 2021/2022](#)

2030 INTENSITY TARGETS⁽¹⁾

 **30%**
Reduction in Scope 1
and Scope 2 GHG Emissions

 **10%**
Reduction in
Net Energy

 **10%**
Reduction in
Water Consumption

 **15%**
Reduction in
Waste Disposal

⁽¹⁾From a 2021 baseline.



Forward-Looking Statements

IMPORTANT INFORMATION ABOUT DISCLOSURES

Statements in this Sustainability Report that are not historical facts or information are “forward-looking statements” within the meaning of the United States federal securities laws. These forward-looking statements include information concerning the Company’s plans, forecasts, objectives, goals, strategies, and other estimates regarding future events. These statements can generally be identified by words such as “believe,” “expect,” “intend,” “estimate,” “anticipate,” “project,” “plan,” “aim,” “strategy,” “commit,” “target,” “goal,” “pledge,” “may,” “can,” “could,” “might,” “will,” and similar expressions.

All forward-looking statements are aspirational and are based upon current expectations and beliefs and various assumptions, and are not guarantees of future performance or that targets or goals will be met. There are a number of risks and uncertainties that could cause actual results and events to differ materially from those reflected in the forward-looking statements contained in this report, and all forward-looking statements should be evaluated with consideration of those risks.

Any forward-looking statement speaks only as of the date of this report, and the Company undertakes no obligation to update any forward-looking statement to reflect events or circumstances occurring or information learned after the date of this report, whether to reflect new information, future events, changes in our expectations, or other occurrence of anticipated or unanticipated events or circumstances. However, any future public statements or disclosures by Celanese that modify or impact any of the forward-looking statements in this report shall modify or supersede such applicable statements in this report.

Important Information Regarding Product Information

This report contains information about certain Celanese products and processes that is provided in good faith and that we believe may be helpful to readers in understanding our initiatives and the impacts of certain of our commercial activities. No warranty, representation, guarantee, or legally binding product description of any kind is created by any such information.

ANY INFORMATION HEREIN REGARDING OUR PRODUCTS IS PROVIDED “AS IS,” AND CELANESE MAKES NO REPRESENTATION OR WARRANTY WHATSOEVER WITH RESPECT TO SUCH INFORMATION, WHETHER EXPRESS, IMPLIED, OR OTHERWISE, INCLUDING BUT NOT LIMITED TO, ITS ACCURACY, ITS FITNESS FOR A PARTICULAR PURPOSE, OR NONINFRINGEMENT.

No product information or references herein should be considered a promise or guarantee of any specific properties of any such product(s) or their suitability for a particular application. All customers and potential customers must make their own determinations as to any product(s)’ suitability for use for any desired application. Nothing in this report should be construed as an amendment to or modification of any terms and conditions of sale under any contract in place between Celanese and any third party, or any representation, guarantee, or warranty regarding any product(s) described herein or such product(s)’ characteristics, uses, suitability, safety, efficacy, hazards, or health effects. Any liability or responsibility for such product(s) shall be governed solely by, and any and all representations, guarantees, warranties regarding such product(s) shall be solely as set forth in, the sales contract or invoice documentation applicable to the sale of such product(s).



CONTACT

For more information, contact your local Celanese representative or email Customer Product Specialist at:

Americas: POMAmericas@Celanese.com

Europe: POMEMEA@Celanese.com

Asia: POMAsia@Celanese.com



Celanese Corporation Headquarters

222 W. Las Colinas Blvd., Suite 900N
Irving, Texas 75039
United States
Phone +1-972-443-4000

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