



Maestro

One device.

Multiple innovative solutions.

Meet the presenters...



EMILY SHAFFER

Market Manager
Healthcare – Americas
Emily.Shaffer@covestro.com



ISAAC PLATTE

Senior Application Development
Engineer – Americas
Isaac.Platte@covestro.com



JOSH WAGNER

Application Development
Engineer – Americas
Joshua.Wagner@covestro.com

Covestro

Global plastics manufacturer



Strong and global

€12.9 bn in sales

17,600 employees

46 production sites

Game-changing and beneficial

Polymer materials of superior quality

Across numerous industry sectors

For global challenges



Innovative and sustainable

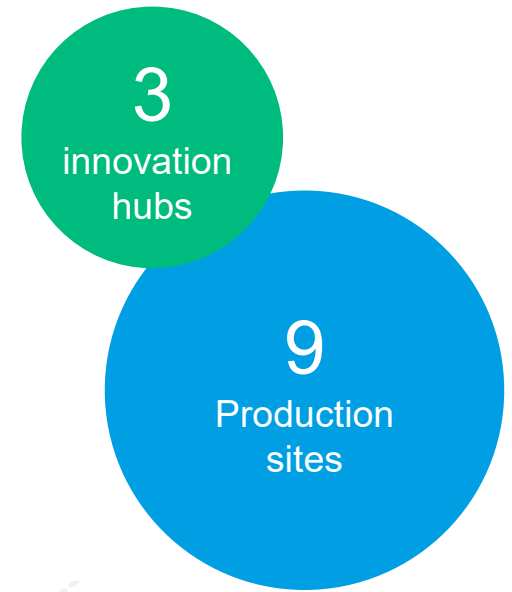
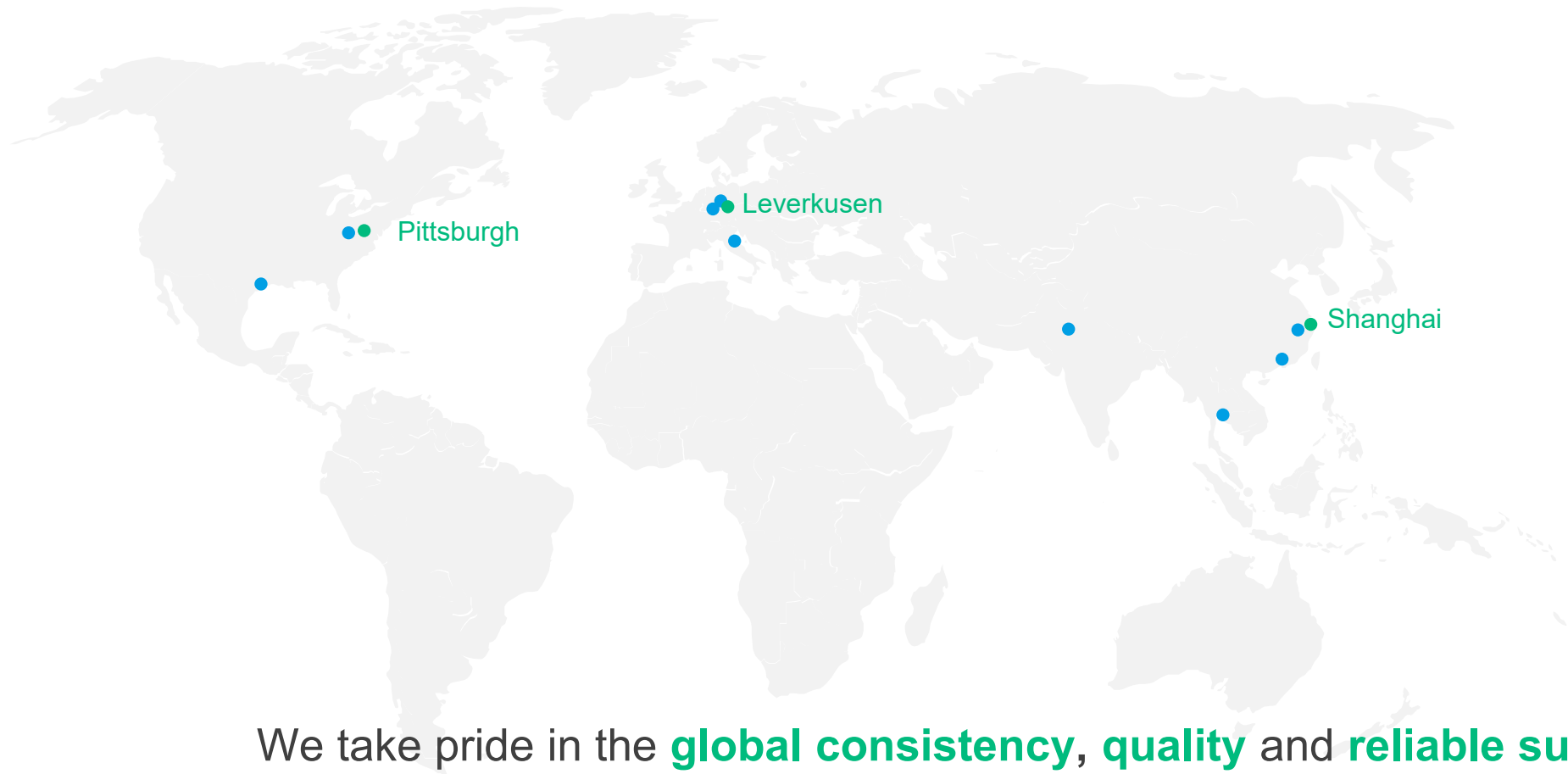
1,300 employees in research and development

80 years of ideas and inventions

Pioneer of the circular economy



You'll find us around the world ... and just around the corner



We take pride in the **global consistency, quality** and **reliable supply** of our polycarbonate materials

Leading polycarbonate supplier to the Healthcare industry



For over 50 years, Healthcare OEMs have relied on our materials and industry expertise:

- Consistency, quality and long-term reliable supply
- Global product availability from sites following GMP
- Innovative materials meeting rigorous Healthcare requirements
- Excellent technical and regulatory service

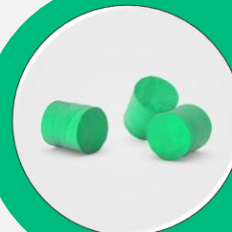
Materials portfolio



Makrolon[®]
polycarbonates (PC)
Medical devices, equipment housings



Bayblend[®]
PC+ABS
Drug delivery devices, equipment housings

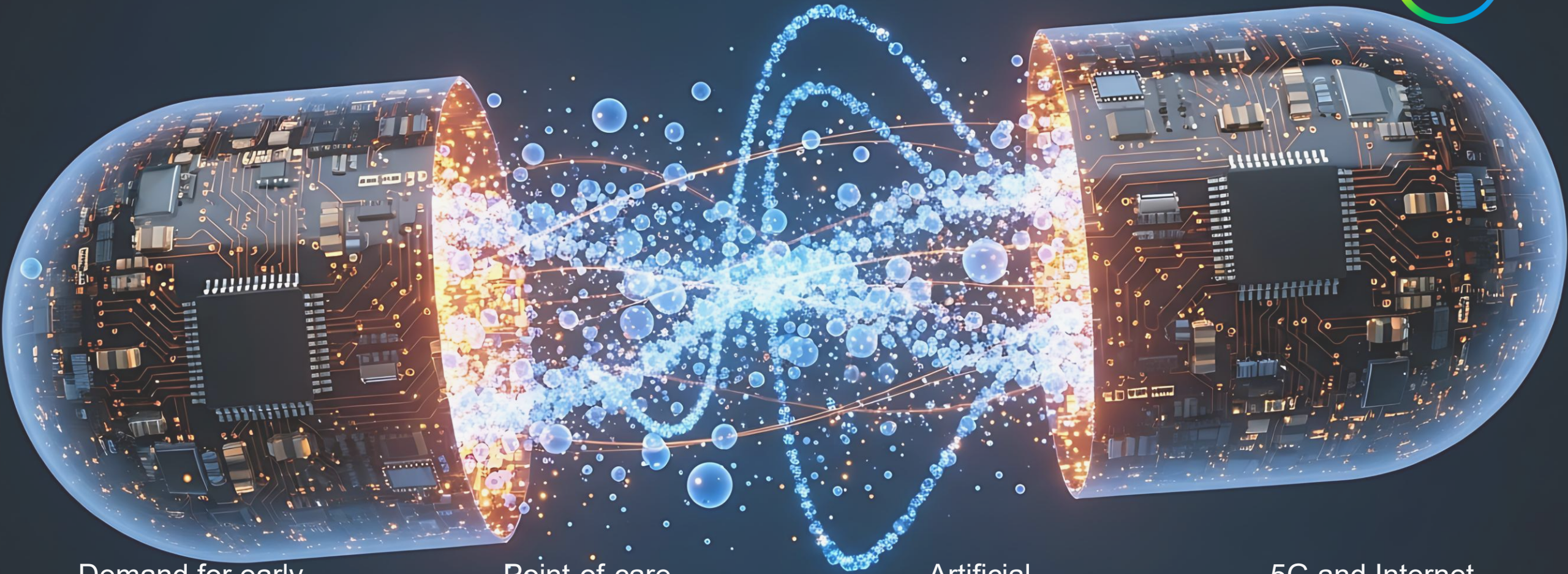


Makroblend[®]
PC+polyester
Durable monitors, wearable devices



Apec[®]
copolymers
High temperature devices

Where healthcare and electronics trends converge



Demand for early disease detection



Point-of-care (POC) testing



Artificial intelligence



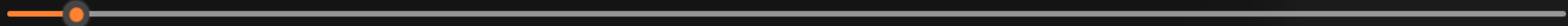
5G and Internet of Things (IoT)





One device. Multiple innovative solutions.

0:00:01



0:00:40

Maestro Final Video



Innovating together



Idea concept



Material selection
& development



Product design



Part & mold
design

Conveying industry trends on a material level and reliable partner through product development process

Multiple innovative solutions in one device



Seamless
design
aesthetic

Enhanced
chemical
resistance

Low
fluorescence
transparency

Electronics
integration

Next
generation
flame
retardants

Sustainability



Multiple innovative solutions in one device



Seamless
design
aesthetic

Enhanced
chemical
resistance

Low
fluorescence
transparency

Electronics
integration

Next
generation
flame
retardants

Sustainability



Next-generation sleek, modern form factors

Seamless design aesthetic

Functional benefits

- **Easy-clean design** – seamless surfaces
- **IMSE® (In-Mold Structural Electronics) technology** – smart surfaces
- **Durable construction** for extended product life
- **Laser welding** – efficient joining

Aesthetic capabilities

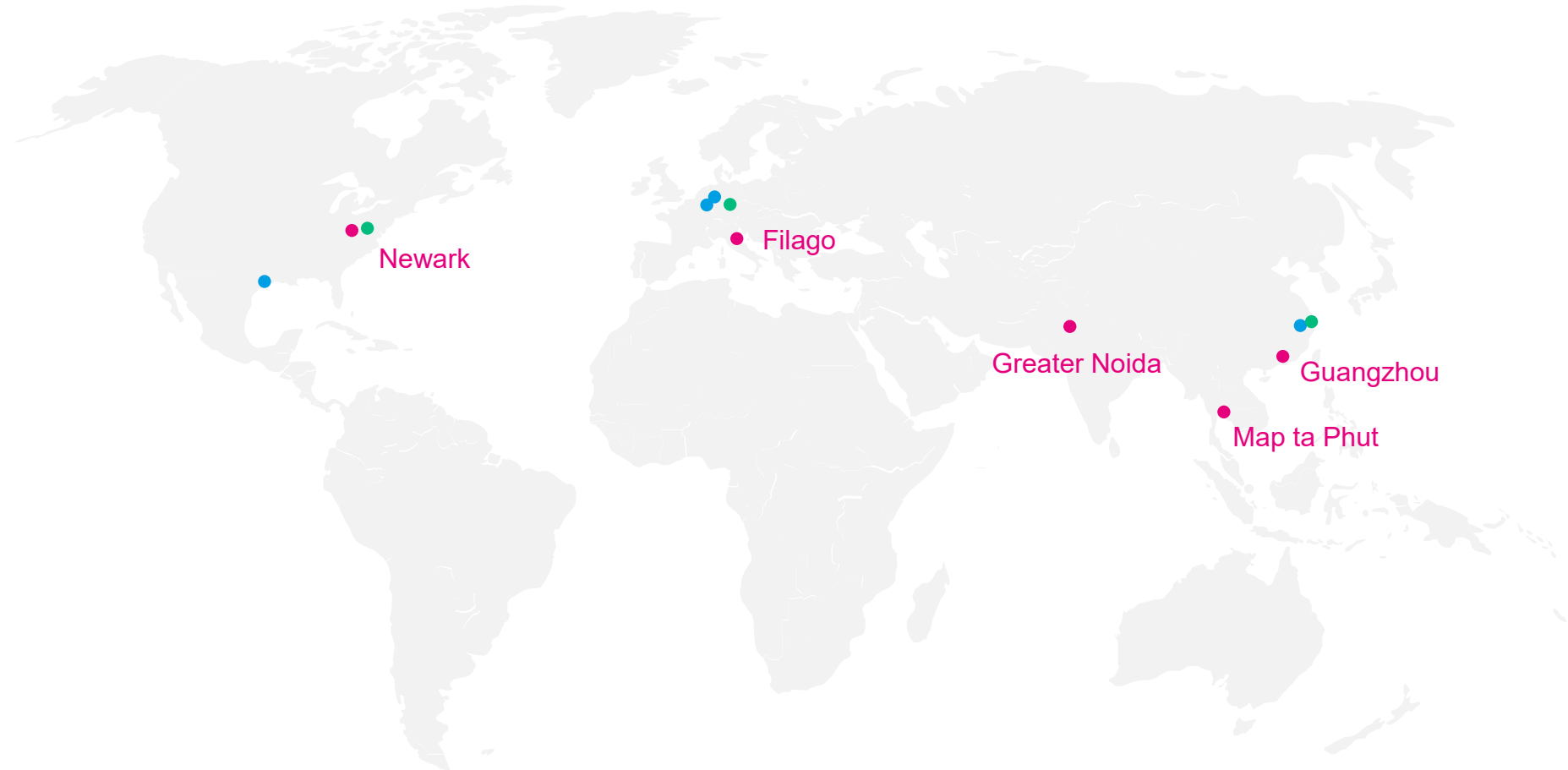
- **CMF (Color, Material, and Finish) solutions** – inspire with innovative aesthetics
- **Custom color development**
- **Global color consistency** with uniform production across international facilities





Global network of color development centers

Seamless design aesthetic



5
color & design
centers

Color developed in one location can be available in any with consistency

Covestro CMF overview

Seamless design aesthetic



Coloring services available globally

Digital sampling for photorealistic materials in rendering software



Faster development through digital prototyping



Laser welding joining technology

Seamless design aesthetic

Technology advantages

- **High performance** – Superior throughput, aesthetics, quality and consistency
- **Innovative colors** – Enable laser-weldable whites and colors beyond traditional carbon black
- **Design flexibility** – Expanded color options without sacrificing function

Goal for laser-weldable whites & colors:

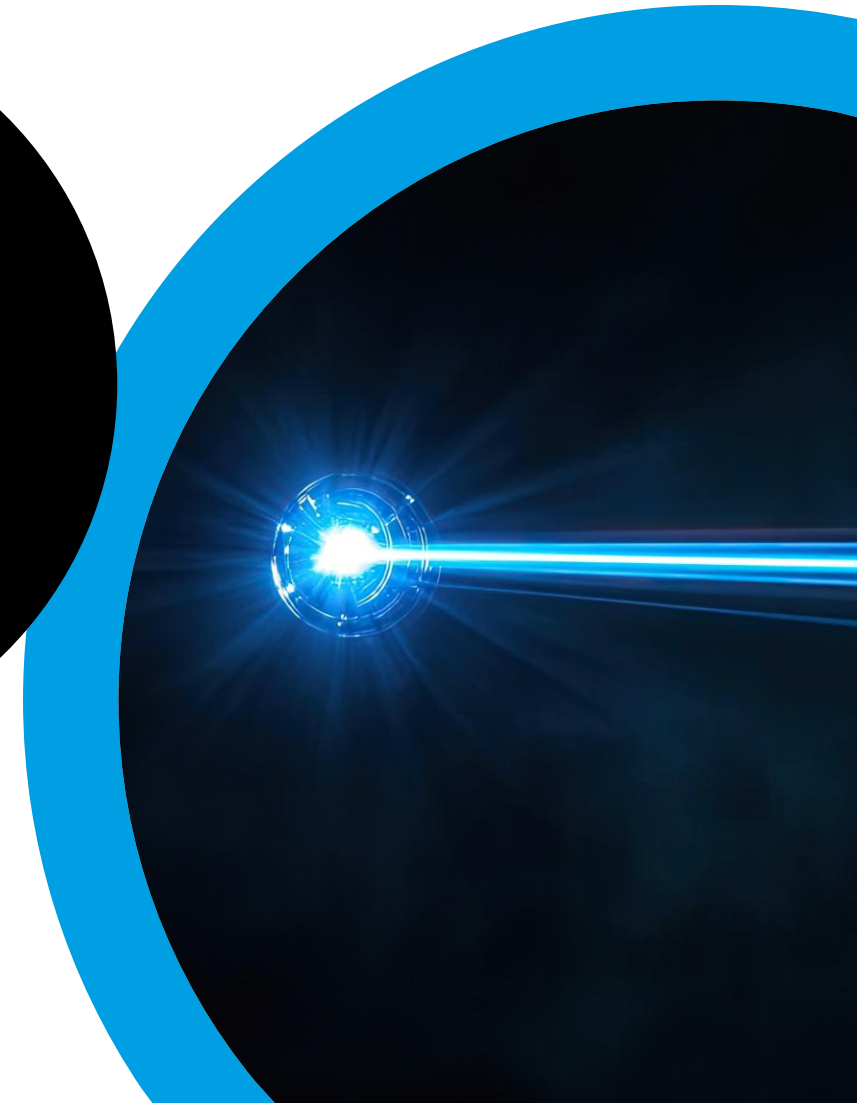
013771

100220

502230

Expert support

- **Technical consultation** – Access to application development specialists
- **Design optimization** – Customized recommendations



Multiple innovative solutions in one device



Seamless
design
aesthetic

Enhanced
chemical
resistance

Low
fluorescence
transparency

Electronics
integration

Next
generation
flame
retardants

Sustainability



Chemical resistance testing at Covestro

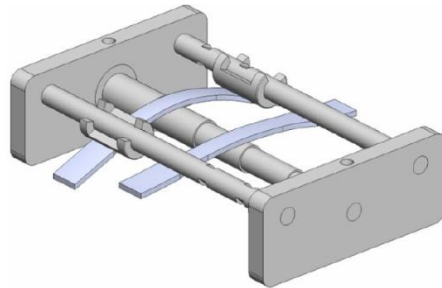


Enhanced chemical resistance

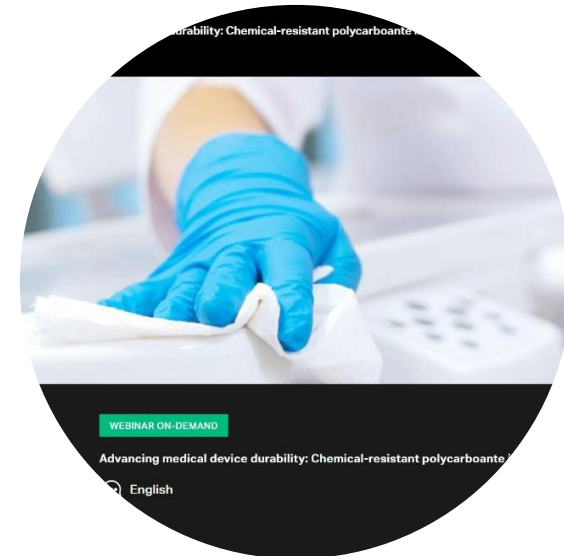
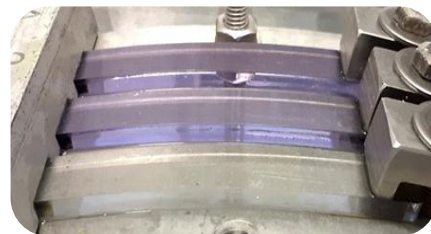
Testing resistance to cleaners and disinfectants

Webinars, white papers, conference presentations

Tensile bars in strain fixture



1% strain
10x wipe
cycles over 24
hours



Expertise that guides new product development and assists customers



Enhanced chemical resistance

Portfolio of solutions without sacrificing flame retardancy, toughness, heat resistance, tightness-of-fit over time, or productivity

	New Makrolon® IFR6005	Makrolon® M6011 FR	Makroblend® M325
Chemical resistance ¹	++++	++++	+++
Skin contact biocompatibility ²		✓	✓
Flame retardant	✓	✓	

¹ Relative Scale

² ISO10993 -5 and -10 for uncompromised skin

Multiple innovative solutions in one device



Seamless
design
aesthetic

Enhanced
chemical
resistance

Low
fluorescence
transparency

Electronics
integration

Next
generation
flame
retardants

Sustainability



Advancing point-of-care diagnostic accuracy



Low fluorescence transparency

- Point-of-care (POC) testing is expected to grow driven by demand for higher throughput and turnaround times
- Diagnostic tests use microfluidic cartridges to hold samples and employ several detection methods, often autofluorescence
- Autofluorescence chosen for its specificity and affordability





New!

**Makrolon[®] Dx225 polycarbonate
provides optical clarity and low
autofluorescence**

Internally developed fluorescence test

Illustrates high fluorescence of dyes and markers against non-fluorescing PC substrate



100 ppm
BSA-FITC

3 ppm
Rhodamine

200 ppm
Quinine
hemisulfate

Versatility of Makrolon[®] Dx225 polycarbonate for wide spectrum of fluorescent markers

Makrolon® Dx225 for better diagnostic consumables

offers superior versatility at an attractive price



Attribute	Which means...	Makrolon® Dx225	COC	COP	PS	PMMA
High optical transparency	Test sensitivity	o	o	+	-	+
Processing	Ability to mold	+	o	o	o	o
Ease of droplet formation	Ease of oil/surfactant combo	+	o	o	-	o
Heat resistance	Chip integrity during PCR cycling	+	o	o	-	-
Joining techniques	Ease of assembly	+	o	o	o	o
Fluorescence	For detection	o	o	+	-	+
		\$\$	\$\$\$	\$\$\$\$	\$	\$\$

+	o	-
Superior performance	Average	Below average

Multiple innovative solutions in one device



Seamless
design
aesthetic

Enhanced
chemical
resistance

Low
fluorescence
transparency

Electronics
integration

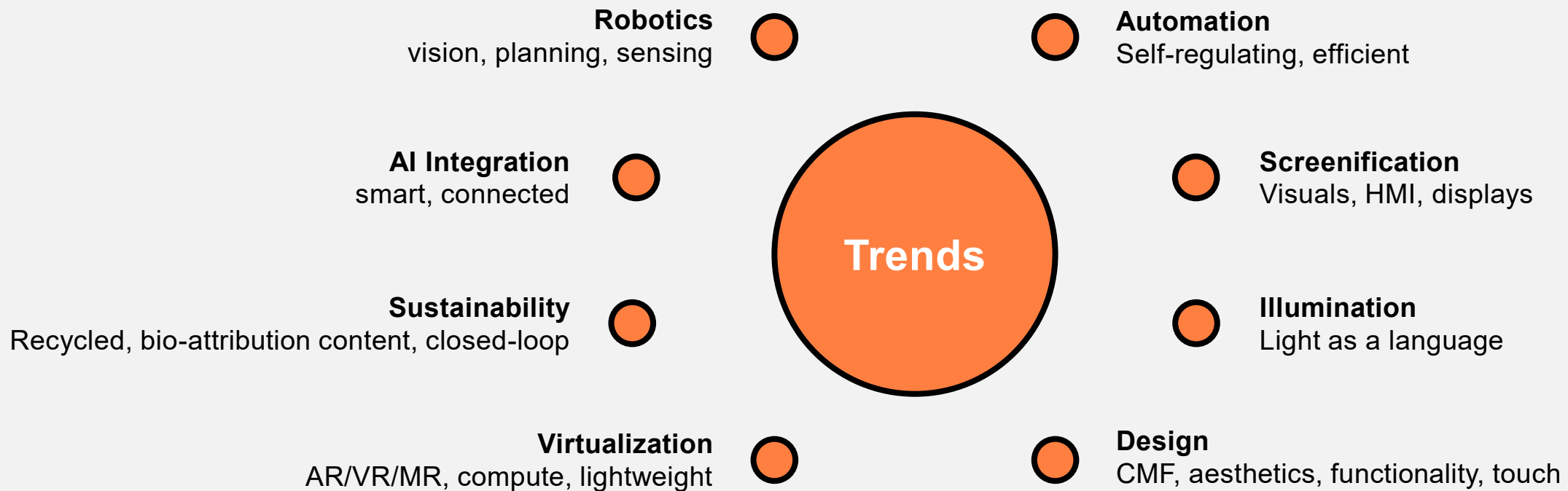
Next
generation
flame
retardants

Sustainability



Trends impacting electronics

Electronics integration



Trends impacting electronics

Electronics integration



Robotics
vision, planning, sensing

Automation
Self-regulating, efficient

AI Integration
smart, connected

Screenification
Visuals, HMI, displays

When light, information, & thin structural housings meet -

You will find Makrolon® polycarbonate & blends

Virtualization
AR/VR/MR, compute, lightweight

Design
CMF, aesthetics, functionality, touch

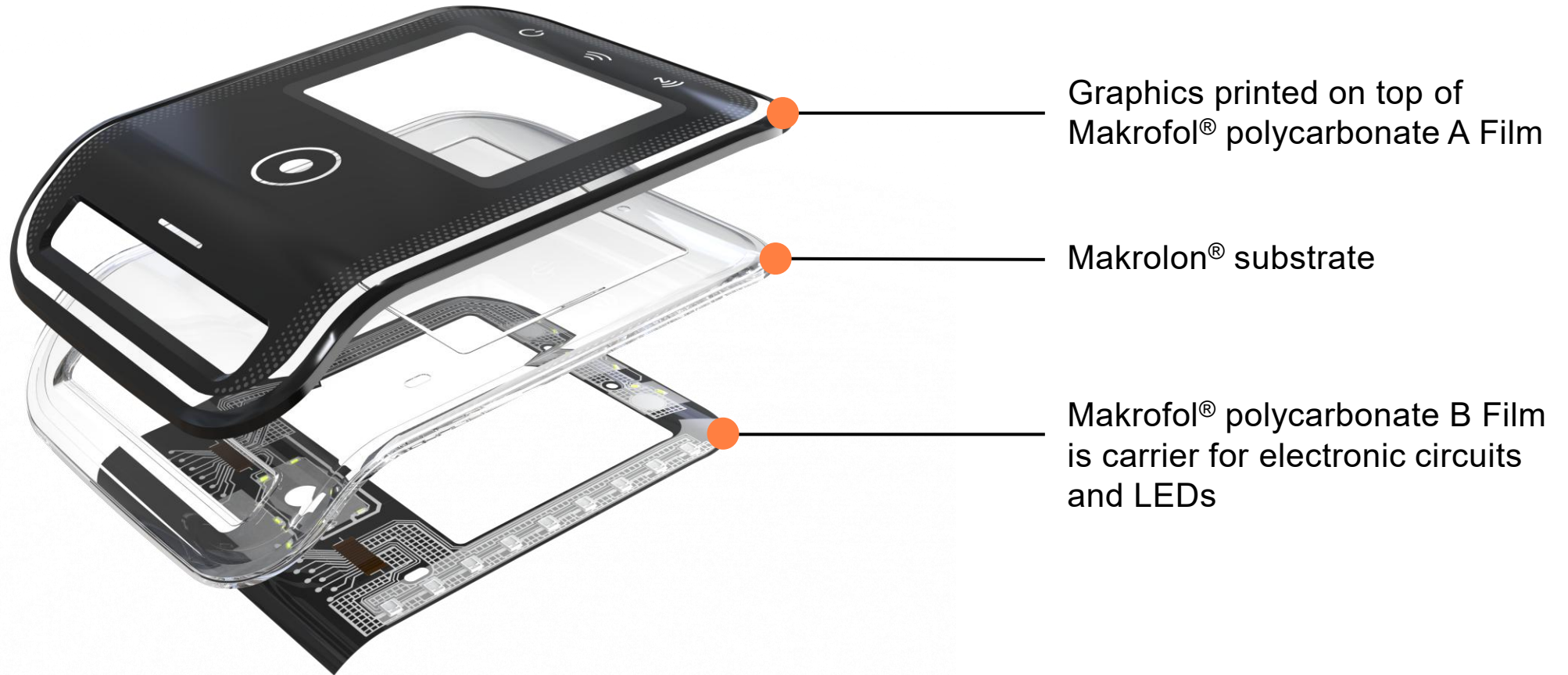
Recycled, bio-attraction content, closed-loop

Light as a language

IMSE[®] technology and high-performance materials



Electronics integration



Graphics printed on top of
Makrofol[®] polycarbonate A Film

Makrolon[®] substrate

Makrofol[®] polycarbonate B Film
is carrier for electronic circuits
and LEDs

Makrolon[®] polycarbonate: the material of choice



Electronics integration

- When structural parts are illuminated, they capture a user's attention, become multi-functional and create a lasting impression.
- Other optically transparent polymers can be brittle, warp at elevated temperatures, burn easily, or be cumbersome to integrate.
- Makrolon polycarbonate represents the intersection of transparency, toughness, flexibility, and dimensional stability; the ideal material for functional integration.



Makrolon® PC: Smart surface solutions

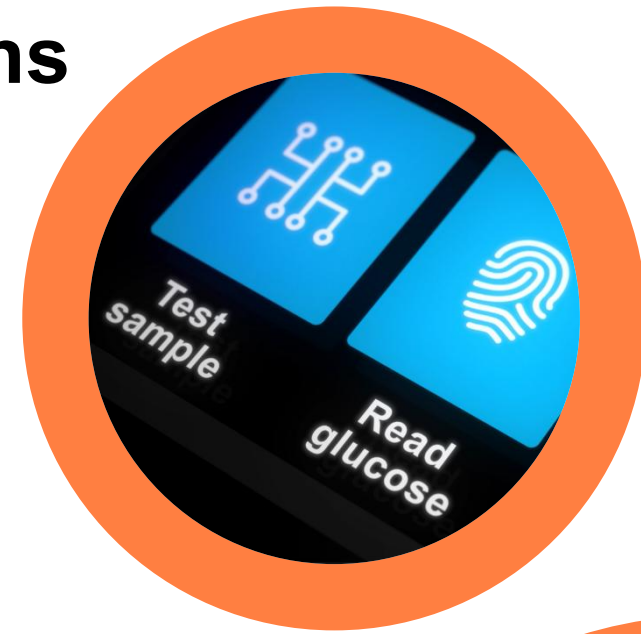
Electronics integration



Key features:

- Capacitive touch & illuminated buttons
- Touchscreen functionality
- Embedded connectivity
- RGB dynamic lighting

One part achieves high functional density, recapturing volume for designers with a 2.5 mm housing & light guide in a single part.



Multiple innovative solutions in one device



Seamless
design
aesthetic

Enhanced
chemical
resistance

Low
fluorescence
transparency

Electronics
integration

Next
generation
flame
retardants

Sustainability



Innovative flame retardancy solutions

Next generation flame retardants (FR)

Industry challenge:

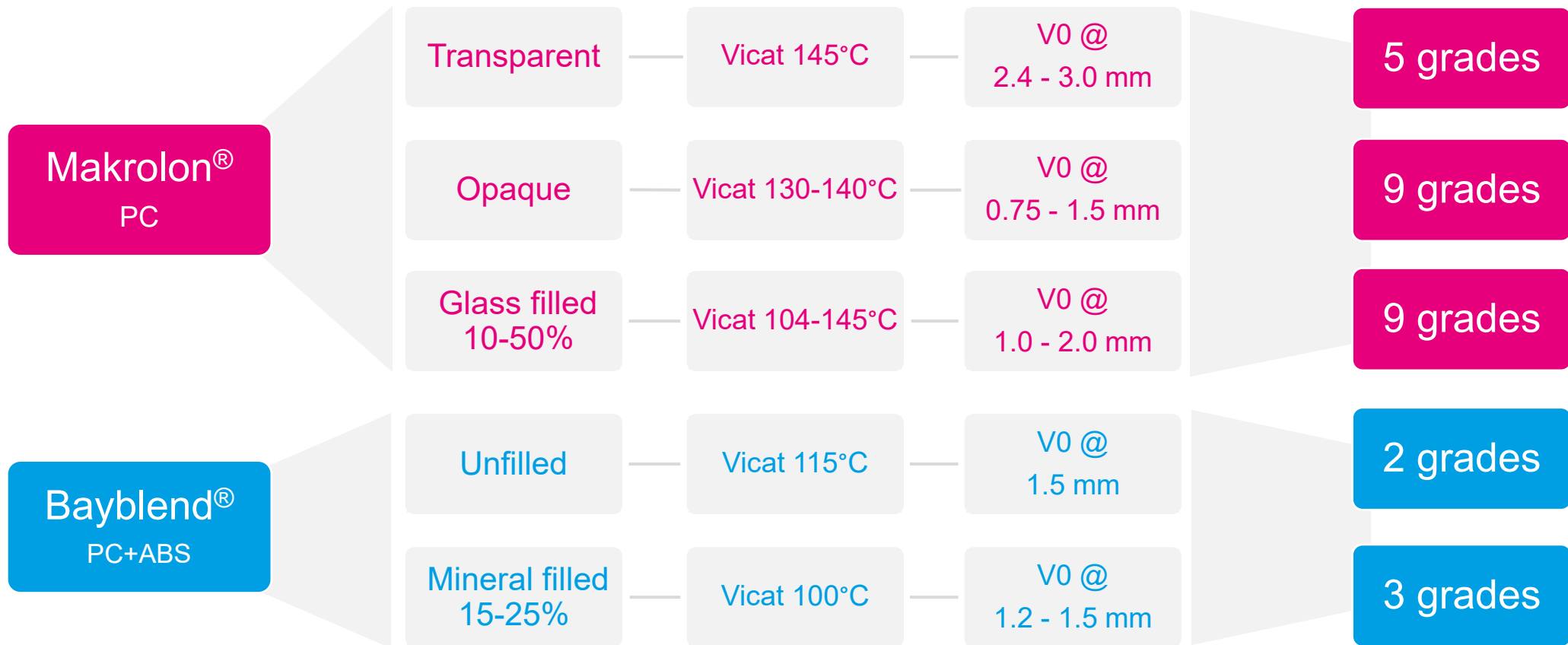
- **Safety standards** – UL 94 flammability requirements essential for many applications
- **Regulatory shift** – Increasing global restrictions on PFAS in FR materials
- **Market need** – Demand for high-performance

Our FR portfolio manufactured without intentionally added PFAS:

- UL 94 V-0 thin-wall rating achievement
- 25+ sampling ready grades available now
- Excellent mechanical properties and thermal stability maintained
- Designed to support customer needs within the evolving PFAS regulatory environment while delivering high-end PC performance



FR portfolio manufactured without intentionally added PFAS



Sustainable versions* available upon customer request

* Lower carbon footprint and mechanically recycled grades



Next generation flame retardants

A look at sample ready grades manufactured without intentionally added PFAS



Bayblend FR5010

Features:

- PC+ABS blend
- Robust UL94 V-0 performance at 1.5mm
- Good Vicat B of 110°C
- Balanced flow properties with good toughness

Circular (CQ) options

Bayblend FR5010 R50

Bayblend FR5010 RE

Makrolon IFR6005

Features:

- High impact PC
- Robust UL94 V-0 performance at 1.5mm
- High Vicat B of 140°C
- Improved notched izod impact performance to -20°C and medium flow

Circular (CQ) options

Makrolon IFR6005 R50

Makrolon IFR6005 RE

Multiple innovative solutions in one device



Seamless
design
aesthetic

Enhanced
chemical
resistance

Low
fluorescence
transparency

Electronics
integration

Next
generation
flame
retardants

Sustainability



Developed with more sustainable practices in mind



Sustainability

 RE - series



Bio-circular mass balanced RE series

- ✓ Certified by ISCC PLUS
- ✓ Drop-in solution that helps replace fossil resources and reduce carbon footprint more effectively than PCR

 RP - series



Post-consumer chemical recycling RP series

- ✓ Certified by ISCC PLUS
- ✓ Drop-in solution that helps to chemical recycle wastes that are hard to mechanical recycle

 R - series



Post-consumer mechanical recycling R series

- ✓ Certified by UL ECV
- ✓ High quality & traceability
- ✓ Reduce plastic waste

Design for disassembly

Sustainability

Utilize laser unwelding for disassembly

- Facilitating easier sorting prior to recycling
- Enabling circular business models with closed- / open- loop recycling*

Recycling collaboration

- Covestro and Allmed Partner to Pioneer Recycling of Artificial Kidney Filters
- Dell Technologies and Covestro work to move the closed loop forward

*Within open loop recycling the material goes after initial use into a different application. Within closed loop recycling the material goes after initial use into the same application.



Additional resources



Visit our [Solution Center](#)



- Product & safety datasheets
- Brochures
- Case studies
- Sterilization methods
- Regulatory information
- Chemical resistance data
- Design guides
- Upcoming events & webinars



New

[Healthcare Reference Guide](#)



Powering innovation. Reimagining healthcare.

Forward-looking statements and disclaimers



- This presentation may contain forward-looking statements based on current assumptions and forecasts made by Covestro AG.
- Various known and unknown risks, uncertainties and other factors could lead to material differences between the actual future results, financial situation, development or performance of the company and the estimates given here. These factors include those discussed in Covestro's public reports, which are available on the Covestro website at www.covestro.com.
- The company assumes no liability whatsoever to update these forward-looking statements or to adjust them to future events or developments.
- This document is provided for informational purposes only and the information contained herein is believed to be accurate as of the date of this document. Nonetheless, Covestro LLC (Covestro) makes no representations or warranties regarding the accuracy or completeness of the information in this document. Covestro has no duty to update this document for any reason. Covestro shall not be bound by any statement or recommendation herein or not contained herein and assumes no legal responsibility for use of or reliance upon the information in this document.
- The purpose for or manner in which you apply or utilize Covestro's products, technical assistance and information, whether verbal, written or by way of production evaluations, including any suggested formulations and recommendations, is beyond Covestro's control. It is imperative that you test Covestro's products to determine their suitability from a technical as well as health, safety, and environmental standpoint for your intended uses or applications. All information and technical assistance is given without warranty or guarantee, expressed or implied, and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release Covestro from all liability, in tort, contract or otherwise, incurred in connection with the use of its products, technical assistance and information. Nothing herein shall be construed as a recommendation to use any product in conflict with any claim of any patent relative to any material or its use.
- Before working with our products, you must read and become familiar with all available information on the risks, proper use, and handling. Information is available in several forms, e.g., safety data sheets, product labels and other safe use and handling literature for chemical substance(s). The most current health and safety information regarding our products, including safety data sheets, is available at the Product Safety First website (<https://solutions.covestro.com/en/productsafetyfirst>). For further information contact your Covestro representative or Covestro's Product Safety and Regulatory Affairs Department.

We welcome your questions...



EMILY SHAFFER

Market Manager
Healthcare – Americas
Emily.Shaffer@covestro.com



ISAAC PLATTE

Senior Application Development
Engineer – Americas
Isaac.Platte@covestro.com



JOSH WAGNER

Application Development
Engineer – Americas
Joshua.Wagner@covestro.com