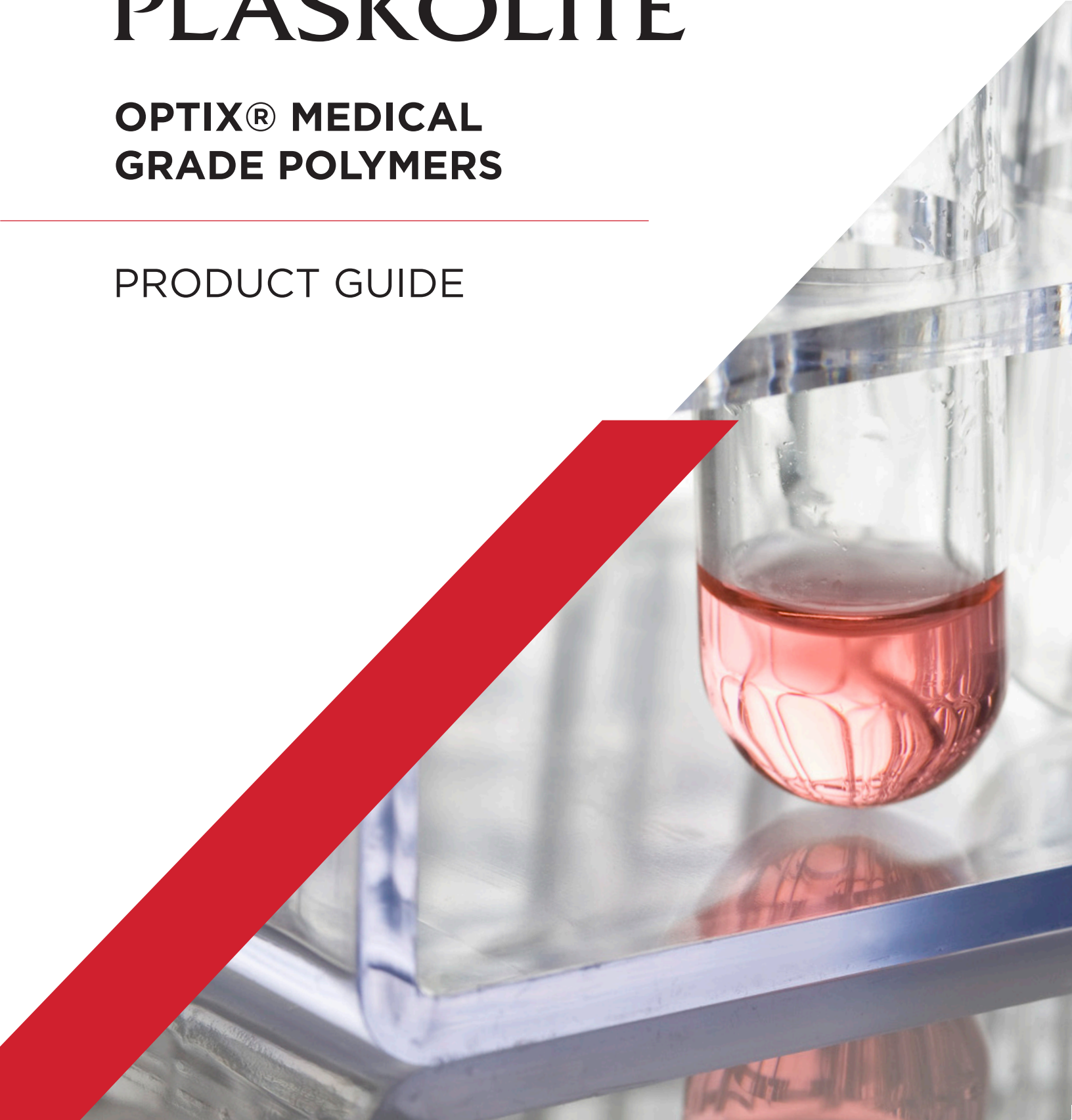


PLASKOLITE

**OPTIX® MEDICAL
GRADE POLYMERS**

PRODUCT GUIDE





OPTIX MEDICAL GRADE POLYMERS - “THE CLEAR ADVANTAGE”

OPTIX Medical Grade Polymers from PLASKOLITE are designed for single or repeated use medical parts and offer notable advantages to both the processor and end user.

These resins are noted for unsurpassed clarity and quality. Each batch is manufactured in a controlled environment maintaining strict quality control standards for medical grades and boasts maximized light transmission.

OPTIX Medical Grade Polymers are resistant to a wide range of chemicals including salt, bases, alcohols, antiseptics, and most inorganic chemicals. The medical grade resins offer a wide range of melt flows with excellent stability.

Strong bonding is easily achieved from use of cements or ultrasonic welding. End use products made with OPTIX Medical Grade Polymers are resistant to gamma ray or ethylene oxide sterilization. Typical applications made from OPTIX Medical Grade Polymers: cuvettes, vials, test tubes, respiratory connectors, and medical trays.

OPTIX Medical Grade Polymers are:

- » Clear
- » FDA 21 CFR, Section 177.1010 (a) and (b)
- » USP Class VI

PRODUCT SELECTION

OPTIX CA-924 G	Injection molding grade with medium impact and medium melt flow
OPTIX CA-927 G	Injection molding grade with medium impact and medium melt flow
OPTIX CA-927 GHF	Injection molding grade with medium impact and high melt flow
OPTIX CA-1000 IG	Injection molding grade with high impact and low melt flow
OPTIX CA-41 UVT	Injection molding grade, unmodified, UV transmission with maximum melt
OPTIX CA-51 UVT	Injection molding grade, unmodified, UV transmission with medium melt flow
OPTIX CA-82 UVT	Injection molding grade, unmodified, UV transmission with medium melt flow

TYPICAL PROPERTIES

PROPERTIES	TEST METHODS	UNITS	OPTIX GENERAL-PURPOSE GRADES			OPTIX IMPACT MODIFIED MEDICAL GRADES			
			CA-41 UVT	CA-51 UVT	CA-82 UVT	CA-924 G	CA-927 G	CA-927 GHF	CA-1000 IG
			Injection molding grade: maximum flow with exceptional UV transmission	Injection molding and extrusion grade Medium flow with exceptional UV transmission	Injection molding and extrusion grade: Good heat resistance and medium flow with exceptional UV transmission	Injection molding grade: Medical and food use. Gamma ray sterilizable.	Injection molding grade: Medical and food use. Gamma ray sterilizable.	Injection molding grade: High flow version of CA-927 G	Injection molding grade: Medical and food use. Gamma ray sterilizable. Excellent fracture toughness and recovery time
Light Transmittance	ASTM D1003	%	92.0	92.0	92.0	92.0	91.0	91.0	91.0
Melt Flow Rate	ASTM D1238 (230/3.8)	g/10 min.	25	15	2.5	6.3	4.5	12	1.6
Impact Strength Izod (Notched)	ASTM D256	ft.-lb./in. (J/m)	0.3 (16)	0.3 (16)	0.35 (19)	0.6 (32)	0.9 (48)	0.9 (48)	1.1 (59)
Falling Weight	ASTM D5420GB	in.-lbf. (J)	2.0 (0.23)	2.0 (0.23)	2.0 (0.23)	20 (2.3)	30 (3.4)	30 (3.4)	80 (9)
Tensile Strength	ASTM D638	psi (MPa)	7,800 (54)	8,100 (56)	10,500 (72)	8,500 (59)	7,600 (52)	7,300 (50)	5,800 (40)
Tensile Modulus	ASTM D638	psi (MPa)	408,000 (2,800)	419,000 (2,900)	450,000 (3,100)	320,000 (2,200)	270,000 (1,900)	280,000 (1,900)	200,000 (1,400)
Flexural Strength	ASTM D790	psi (MPa)	11,700 (81)	14,000 (97)	17,100 (118)	12,500 (86)	11,000 (76)	11,000 (76)	9,000 (62)
Elongation	ASTM D638	%	2.5	2.6	4.0	5.0	6.0	5.0	20
Rockwell Hardness	ASTM D785		84	89	92	76	55	53	26
Specific Gravity	ASTM D792	-	1.19	1.19	1.19	1.17	1.16	1.15	1.15
Flammability	UL 94	-	HB	HB	HB	HB	HB	HB	HB
Heat Deflection Temp. Under Load	ASTM D648 (264 PSI)	°F (°C)	163 (73)	177 (81)	204 (96)	187 (76)	190 (88)	154 (68)	180 (82)
Vicat Softening Temp.	ASTM D1525	°F (°C)	182 (83)	196 (91)	211 (100)	207 (97)	205 (96)	178 (81)	187 (86)



MANUFACTURING QUALITY

Our Ohio and California plants produce the polymer with the bulk batch process.

This production method enables PLASKOLITE to produce not only large volumes of inherently clean resins, but also provides the flexibility to run smaller, custom batches to meet specific customer needs. Small volume specialty products and smaller scale runs are easily produced. Products with special lubricants, impact modifiers or colorants easily fit into our production process.

Our modern manufacturing facilities produce uniform melt-flow acrylic polymer. This uniformity, combined with formulations specifically designed for injection molding or extrusion and tailored to your needs, makes OPTIX the best choice for the medical industry. In addition, careful attention to cleanliness provides the highest quality product.

CHARACTERISTICS OF OPTIX IMPACT MODIFIED AND GENERAL PURPOSE POLYMERS

OPTIX Medical Grade Polymers, both impact modified and general purpose, offer notable advantages to the processor and end-user - clarity and brilliance, chemical and impact resistance, biocompatibility, and ease of assembly. Impact modified formulations provide up to 10 times greater impact resistance than general purpose grades.

CLARITY AND BRILLIANCE

Product purity is critical when providing the medical industry with superior acrylic products. Throughout the manufacturing process, we maintain the strictest quality control standards for medical grades. This commitment to effective contamination control has earned OPTIX the reputation for unsurpassed clarity and quality — maximum light transmission in standard grades.

BIOCOMPATIBILITY

OPTIX Medical Grade Polymers have passed rigorous biological testing procedures: United States Pharmacopoeia Class VI and FDA regulation 21.CFR.177.1010. OPTIX Medical Grade Polymers are resistant to many biological and chemical agents.

CHEMICAL RESISTANCE

OPTIX Medical Grade Polymers resist a wide range of chemicals including salts, bases, alcohols, aliphatic hydrocarbons and most inorganic chemicals. It is not recommended with strong acids, chlorinated and aromatic hydrocarbons, ketones, and esters. Specific tests should be run to determine the appropriate limits of operation.

EASE OF ASSEMBLY

Cementing and ultrasonic welding easily provide strong bonds.

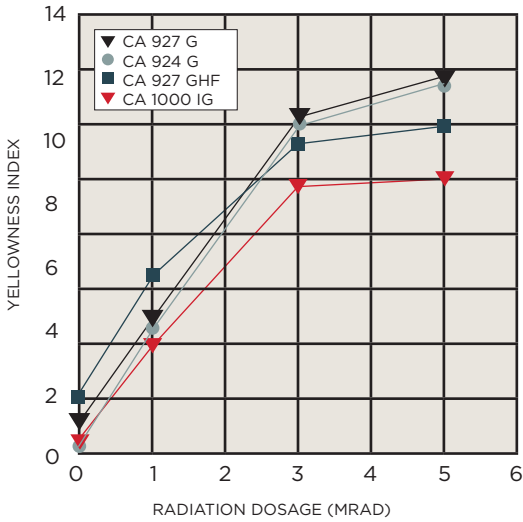
EFFECTS OF STERILIZATION ON OPTIX IMPACT MODIFIED POLYMERS

Gamma ray radiation generated by cobalt-60 isotopes, and electron beam radiation (E-beam), which generates electrons via a linear accelerator, have been used for sterilization. The main attractions of E-beam are its speed and the lack of any lingering radioactivity when the E-beam generator is shut down. Impact modified OPTIX Medical Grade Polymers can be radiation sterilized by either E-beam, gamma ray or dry ethylene oxide gas. Wet ethylene oxide should not be used due to the risk of the part crazing during sterilization.

Gamma ray sterilization has a tendency to discolor (yellow) most acrylics. For OPTIX Medical Grade Polymers, however, this yellowing is temporary and recovery is accomplished with time, temperature, or both. The following graphs illustrate the effect of the E-beam radiation upon the impact modified OPTIX Medical Grade Polymers, and how quickly they recover over time and temperature.

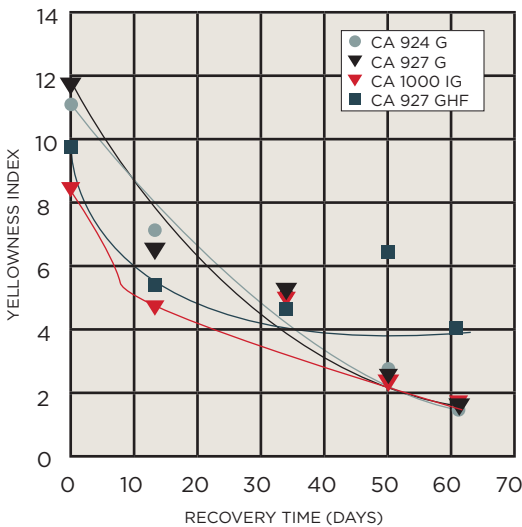
YELLOWNESS

YELLOWNESS INDEX VS. RADIATION DOSAGE



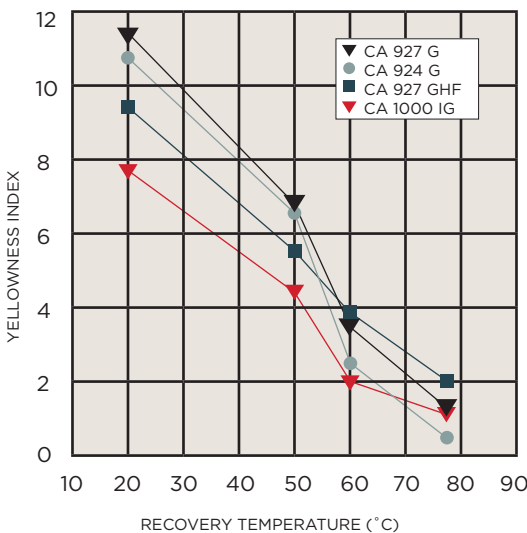
The higher the radiation dosage, the greater the yellowing. Please note that 5 MRAD are nearly twice the amount required to stabilize most disposable medical devices. (ASTM D 1925)

YELLOWNESS INDEX VS. RECOVERY TIME AT 25°C AFTER 5 MRAD



Even if left at room temperature, the yellowness index is cut in half after 20 days and almost non-existent after 60 days.

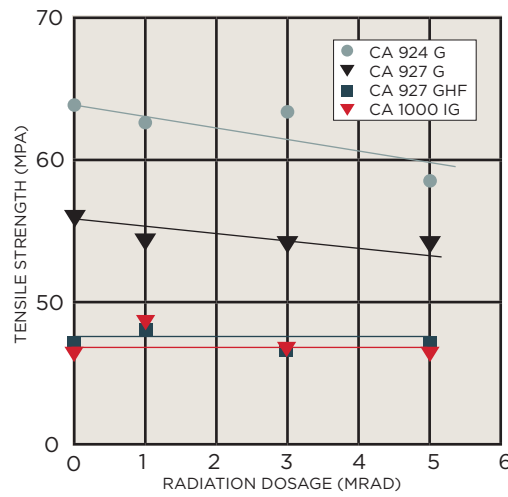
YELLOWNESS INDEX VS. RECOVERY TEMPERATURE FOR 24 HOURS (5 MRAD)



The higher the dosage, the greater the yellowing & the longer the time of recovery. As the temperature increases, the yellowness index is drastically and quickly reduced over the 24 hour time period.

PHYSICAL PROPERTIES

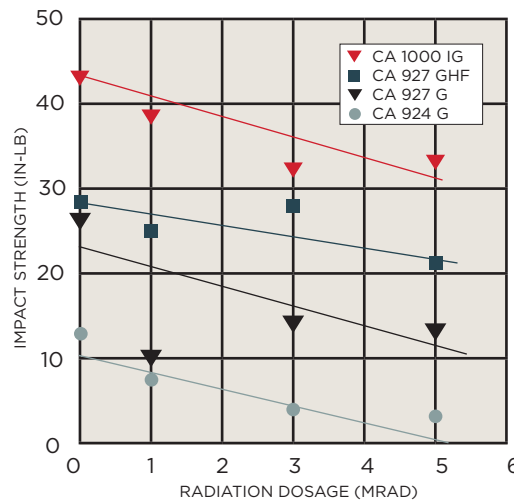
TENSILE STRENGTH VS. RADIATION DOSAGE



After radiation doses of 5 MRAD the tensile strength shows little change. (ASTM D 638)

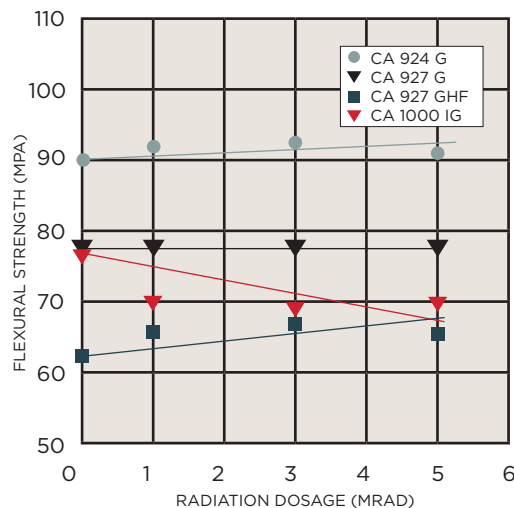
IMPACT RESISTANCE

IMPACT STRENGTH VS. RADIATION DOSAGE



In spite of a 5 MRAD dosage, the impact modified grades show very little change in impact strength. (ASTM D 3029 GB, 4 lbs. falling weight)

FLEXURAL STRENGTH VS. RADIATION DOSAGE



After radiation doses of 5 MRAD, the flexural strength shows little change. (ASTM D 790)

PLASKOLITE

A GLOBAL LEADER IN THE PRODUCTION OF THERMOPLASTIC SHEET

FOUNDED IN 1950

Our Mission: to deliver superior thermoplastic sheet, coatings and polymers to the world, through long-lasting customer relationships and hands-on customer service.

MANUFACTURING LOCATIONS



From our founding, PLASKOLITE strives to treat our employees, our customers, our community and the world, with kindness, dignity and respect. This drives our continuing effort to create sustainable products, in a sustainable manner, for future generations. This on-going commitment is expressed in the

PLASKOLITE Sustainable Ecosystem:

QUICK FACTS

STATUS: Privately held

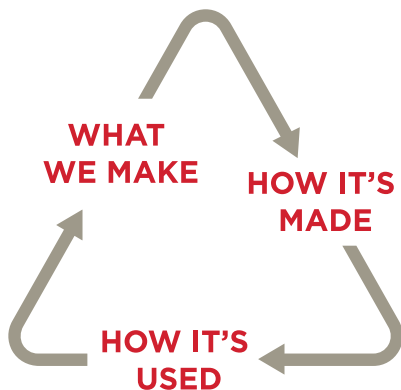
GLOBAL HEADQUARTERS: Columbus, OH

EMPLOYEES: 1900 Worldwide

MARKETS SERVED: Signage, Lighting, Retail Display, Construction, Transportation, Security, Bath & Spa, Industrial, Architecture, Green Houses

OUR PILLARS OF SUSTAINABILITY

EACH CONTRIBUTES TO MAKING THE WORLD A BETTER PLACE



WHAT WE MAKE

Versatile, high-quality, durable thermoplastic materials...not single-use plastics

HOW IT'S MADE

How we make our products reflects our overall philosophy of continuous environmental improvement

HOW IT'S USED

Our thermoplastics play an important role in advancing human well-being, energy conservation and quality of life

These suggestions and data are based on information we believe to be reliable. They are offered in good faith, but without guarantee, as conditions and methods of use are beyond our control. We recommend that the prospective user determines the suitability of our materials and suggestions before adopting them on a commercial scale.

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