sol epoxy

PRODUCT SELECTOR GUIDE

EPOXY MOLD COMPOUNDS

PRODUCTS APPLICATIONS DATA

SOLEPOXY SERVES THE WORLD

Corporate

Olean, NY, USA
Research & Development
Manufacturing
Customer Service

Amsterdam, NL
Marketing
Planning
Technical Sales

Warehouses

Olean, NY, USA
Rotterdam, NL
Calexico, CA, USA
Chennai, India
Manila, Philippines

Safety stock in cold-storage warehouses around the globe minimize shipping costs and delivery time.

Market Partners

Indian subcontinent
Greater China
Korea
Southeast Asia

Representatives fluent in local languages provide product information & technical support

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Thermal Shock Robustness

Ideal for large volume molding

Description

The MG6 and MH6 series are very tough epoxy mold compounds with excellent thermal shock and thermal cycle resistance.

Chemistry is well-suited for molding large parts, minimizing the potential for crack development.

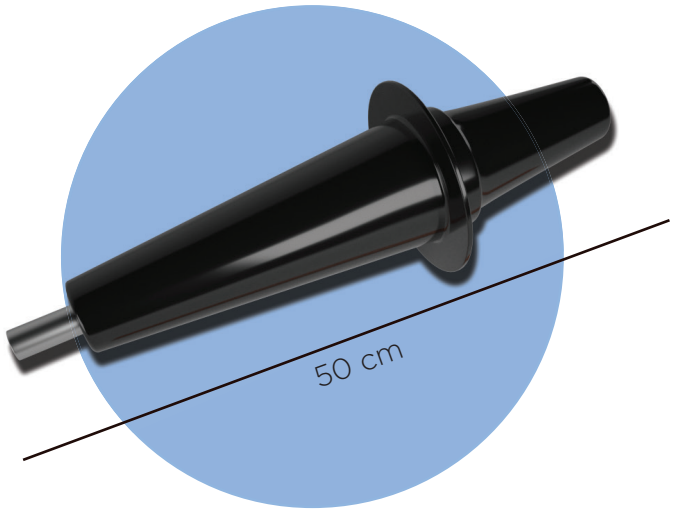
Benefits

- Excellent color stability up to 180°C
- MG6-0330 has the best price-to-performance ratio for high voltage applications
- MH6-0504 is fiber-reinforced to provide additional toughness

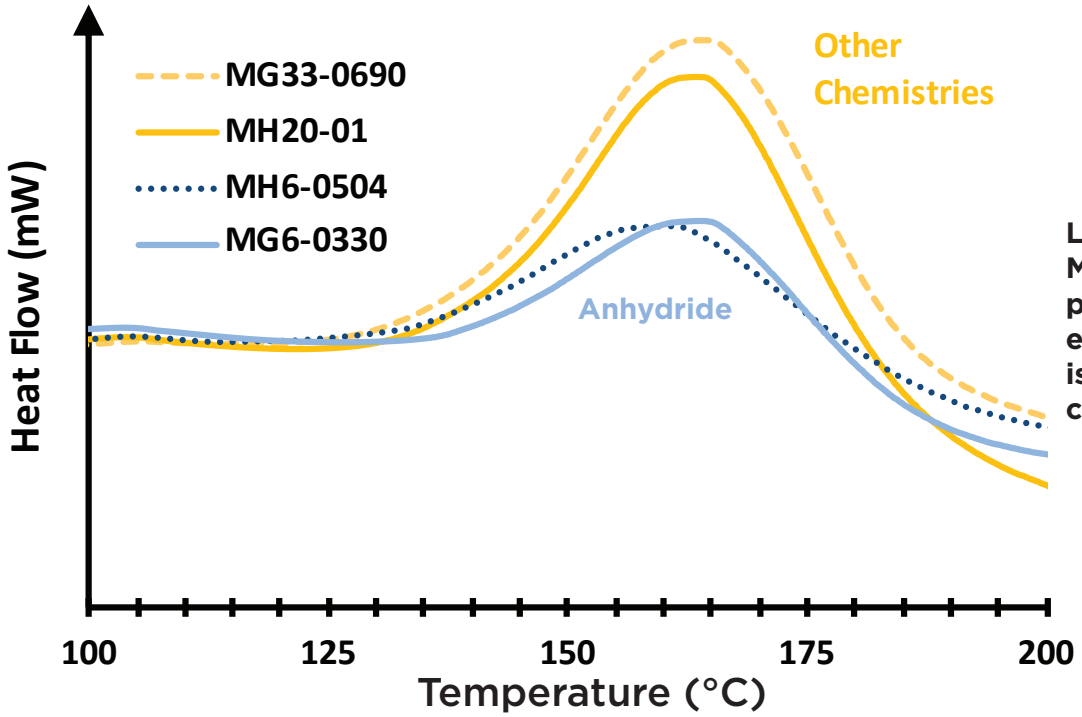
*All data after 60 minutes @150 °C		Units	MH6-0504	MG6-0330
Color		-	Black/Green	Black
Reinforced			Yes	No
Glass Transition Temperature (Tg)		°C	120	110
Coefficient of Thermal Expansion (CTE)				
	Alpha 1	ppm/°C	40	33
	Alpha 2	ppm/°C	120	88
Tensile Properties @25°C	Strength	psi	14000	12000
		MPa	96.5	82.7
	Modulus	kpsi	700	870
		GPa	4.83	6.00
Flexural Properties @25°C	Strength	psi	20000	19500
		MPa	138	134
	Modulus	Mpsi	2.0	2.1
		GPa	13.8	14.5
Dielectric Strength		V/mil	970	1127
		kV/mm	38	44
UL Ratings				
	Flammability		HB 75 (Black)	-
	RTI		130 (Black)	-
Halogen Free		-	No	No

Low Exotherm

- The anhydride chemistry of the MG6 and MH6 products is not as “hot” as other epoxy systems
- These materials are less brittle, so large parts can be molded without crack development
- MG6-0330 is ideal for large, high-voltage bushing & stand-off applications



DSC Analysis (Exo Up)



Lower height of MG6 and MH6 DSC peaks indicate less exothermic energy is produced during cure

Strong like steel

Light as plastic

Description

Why use steel when you can use a thermoset epoxy that is as strong as steel, but light as plastic.

This allows you to :

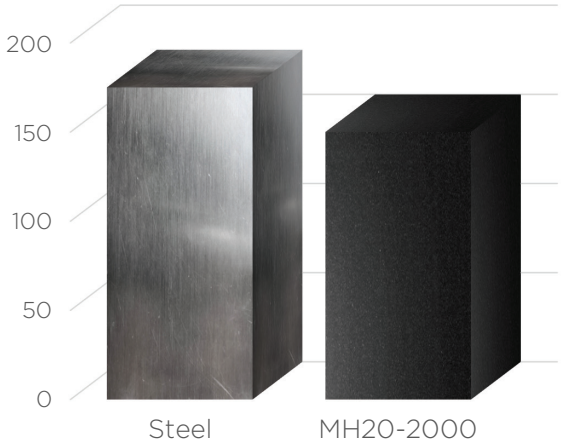
- Build cars with better gas mileage;
- Create parts at lower mold temperatures;
- Create parts you could make with steel.

Benefits

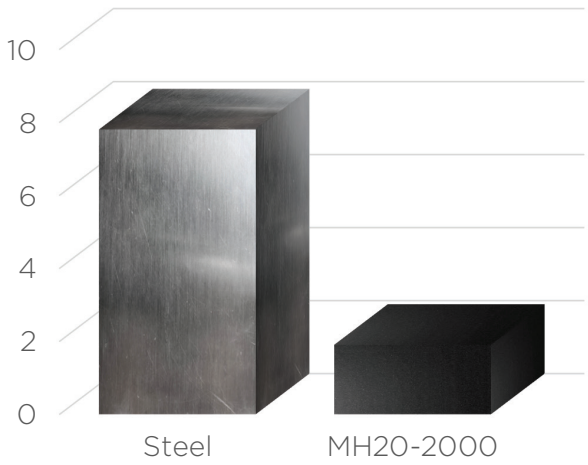
- **Very tough epoxy** mold compound
- **High Tg compound** designed for higher temperature applications
- Used on devices with an operating **temperature up to 200°C**

*All data after 2 hours at 177°C		Units	**MH20-2000**
Color			Black
Reinforced			Yes
Glass Transition Temperature (Tg)		°C	140
Coefficient of Thermal Expansion (CTE)	Alpha 1 Alpha 2	ppm/°C ppm/°C	17 50
Flexural Properties @25°C	Strength Modulus	psi MPa Mpsi GPa	21500 148 2.3 15.9
Tensile Properties @25°C	Strength Modulus	psi MPa kpsi GPa	12250 84.5 980 6.76
Dielectric Strength		V/mil kV/mm	1075 42
Specific Gravity		-	1.86
Halogen Free			Yes

Flexural Strength (MPa)

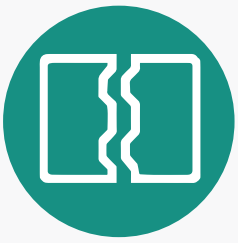


Specific Gravity



MH20-2000 has nearly the same strength as steel, but is much lighter.

MOLDABILITY



As a mold compound MH20-2000 gives the option to produce entire equipment pieces with one mold, so no entry options for dust or water.

MACHINABILITY

Due to its non-brittle properties, parts made with MH20-2000 can be machined.

Strong like steel

Insulates better than glass reinforced plastic

Description

Why use steel when you can use a thermoset epoxy that is as strong as steel, but insulates like epoxy.

This allows you to :

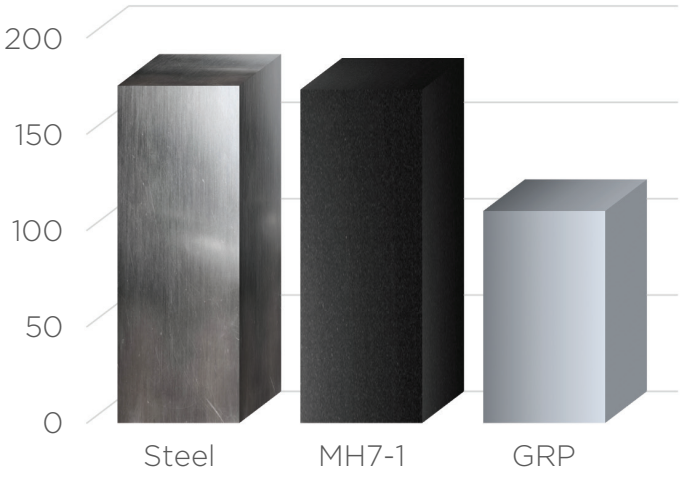
- Use epoxy with similar strength of steel
- Make parts that you couldn't otherwise make because of insufficient insulation
- Combine high strength of steel with superior insulation properties of epoxy

Benefits

- **Flexural strength similar to steel**
- Excellent **insulation**
- Designed applications with operating **temperature >180°C**
- **Isotropically strong** - uniform strength in all directions

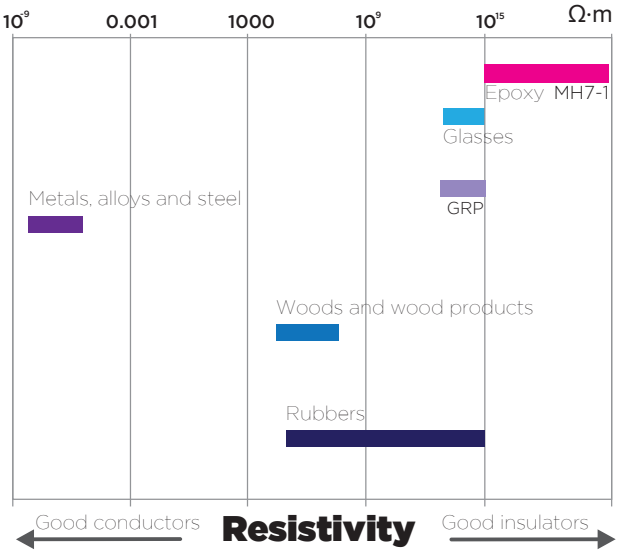
*All data after 2 hours at 177°C		Units	**MH7-1**
Color		-	Black
Reinforced			Yes
Glass Transition Temperature (Tg)		°C	105
Coefficient of Thermal Expansion (CTE)	Alpha 1 Alpha 2	ppm/°C ppm/°C	26 60
Flexural Properties	Strength	psi MPa	23000 159
	Modulus	Mpsi GPa	1.8 12.4
Tensile Properties	Strength	psi MPa	17000 117
	Modulus	kpsi GPa	790 5.4
CTI			Class 0
Dielectric Strength		V/mil kV/mm	1288 51
Specific Gravity			1.80
Halogen Free			Yes

Flexural Strength (MPa)



MH7-1 has comparable strength to steel and higher strength than GRP.

Insulation Comparison

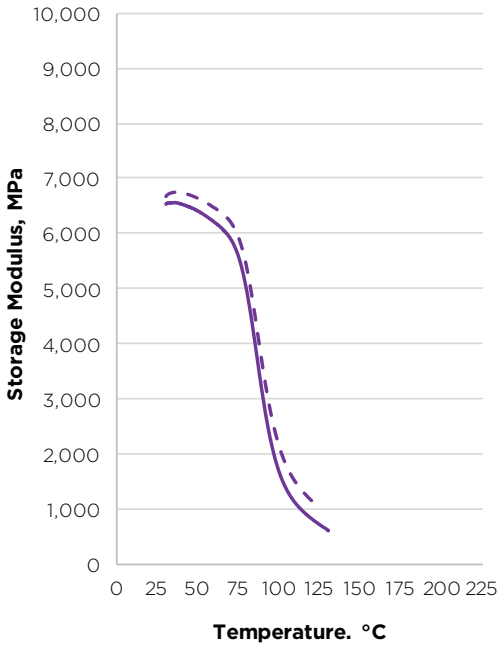


Unlike steel, MH7-1 has better electrical insulation than GRP.

DMA Results Indicate Random Fiber Orientation in Transfer Molded Parts

ISOTROPY

Epoxy has isotropic properties giving it a uniformal strength, modulus and toughness in all directions.



Nearly identical behavior of test specimens cut **parallel** and **perpendicular** to the flow direction demonstrates the isotropic performance of MH20-2100.

Perpendicular

Parallel

High Temperature Durability

Better than thermoplastics

Description

MH20, MG33, and MG51 products are excellent alternatives to thermoplastics in high temperature applications.

These epoxy molding compounds have superior versatility due to the following advantages:

- No creep at high temperatures
- Better chemical resistance
- High adhesion to substrates

Benefits

- Well-suited for operating temperatures as high as 200°C
- Fast cure for increased production efficiency
- Reinforced MH20 series has great thermal shock resistance

	Units	MH20-01	MG33F-0549	MG33F-0602	MG33-0690	MG51F
Color	-	Black/Gold	Gold	Black/Red	Black	Black
Reinforced	-	Yes	No	No	No	No
Glass Transition Temperature (Tg)	°C	140	177	160	165	145
Coefficient of Thermal Expansion (CTE)						
Alpha 1	ppm/°C	30	22	21	19	17
Alpha 2	ppm/°C	75	65	65	55	45
Flexural Properties						
Strength	psi	21000	20000	18500	19000	19000
	MPa	145	138	128	131	131
Modulus	Mpsi	2.0	1.9	1.9	2.2	2.6
	GPa	13.8	13.1	13.1	15.2	17.9
UL Ratings						
Flammability		V-0	-	V-0	-	-
RTI		130	-	130	-	-
Halogen Free		Yes	No	No	Yes	No*

*Halogen & antimony-free version is available

MH20-01, MG33 Series, and MG51F

Injection Moldable

Granular material with physical properties equivalent to MH20-01. Optimized for use in injection molding equipment to achieve higher production rates than transfer molding processes.

Meets AEC Q-200

MH20-01 and MG33-0690 have successfully qualified for use in automotive applications per the specified solvent resistance criteria.

Low CTE

MG33 and MG51 materials have thermal expansion properties similar to copper, CuSn6, and other leadframe metals. This minimizes the occurrence of part failures due to thermal stress.

Precision Micromolding

MG51F

MG51F

Specially designed for molding applications requiring precise design tolerances.

High filler content allows for molding of a denser, stronger package.

Long flow improves fill capability in thin wall packages.

Advantages

- CTE matched to copper
- Low in-mold shrinkage
- Withstands polishing operations

Cleaning and Conditioning

Maximize molding productivity

Description

Mold cleaners/conditioners are used to:

- Produce clean, void-free parts
- Extend the life of your molds
- Remove debris and residues from mold plunger, cavities and runners

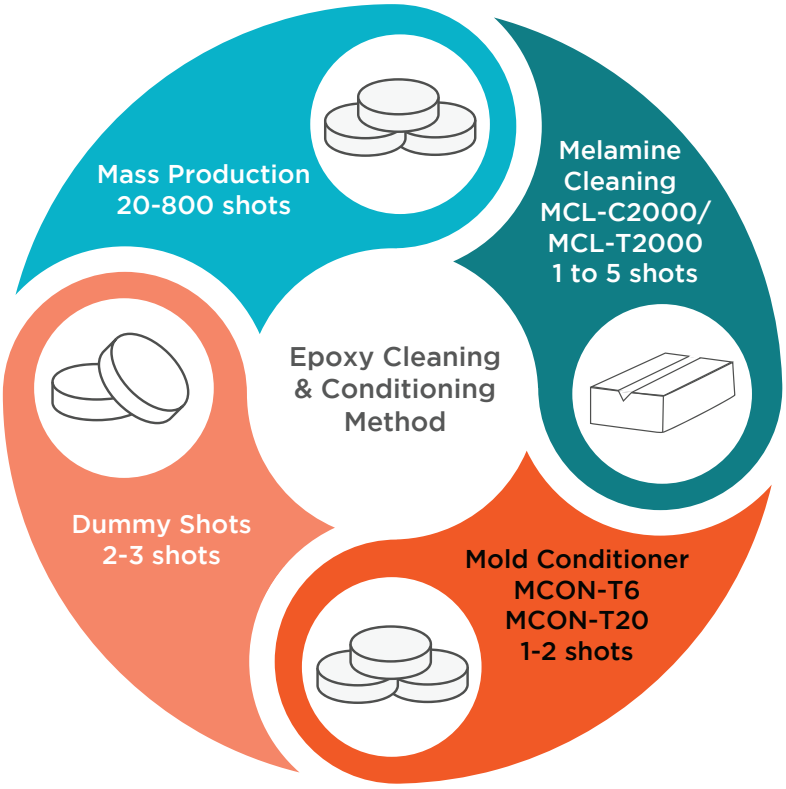
Benefits

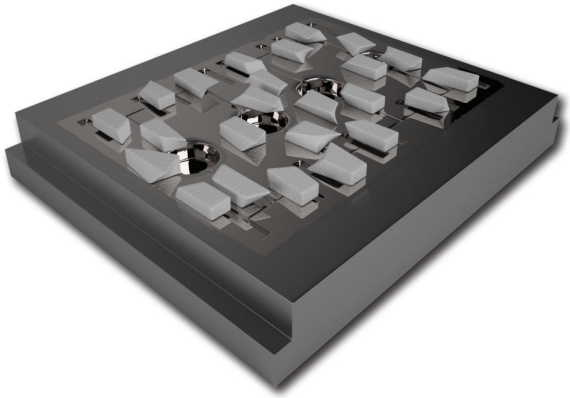
- Used for both phenolic and epoxy-based molding equipment
- Both transfer grade and compression grades available
- Typically used in a 1kg/100kg ratio with Epoxy Mold Compound

	MCL-C2000	MCL-T2000	MCON-T20
Product type	Mold Cleaner	Mold Cleaner	Mold Conditioner
Application Method	Compression Molding	Transfer Molding	Transfer Molding
Application Areas	Runner, Gate and Cavity (Especially mold contact points)	Plunger, Pot, Runner, Gate, Cavity and Air Vent	Plunger, Pot, Runner, Gate, Cavity and Air Vent
Compatible with Epoxy Resins	Yes	Yes	MG20/MH20-Series
Compatible with Phenolic Resins	Yes	Yes	MG20/MH20-Series
Color	Ivory white	Ivory white	Dark gray
Cure Condition	2-5 mins @ 170-190°C	2-5 mins @ 170-190°C	90s @ 175°C
Cleaning Efficiency	Excellent	Excellent	N/A Used for conditioning
Specific Gravity	1.5	1.5	1.93
Spiral Flow @ 177 °C	3 in (8cm)	40 in (101 cm)	65 in (165 cm)
Supplied as	2 inch (50mm) square preforms with easy break center “V-Groove” or as loose powder.	Conventional Pellets: 40mmx50g, 48mmx75g, 55mmx90g Mini Pellets: 9.8mm, 11mm, 13mm, 14mm, 16mm, 18mm Loose Powder	

ODUCTIVITY

MCON-T20, MCL-C2000, MCL-T2000, and MCL-IM20





Introducing MCL-IM20

MCL-IM20 is a non-hardening resin system designed to be a purge compound for the barrels of injection molding machines. This epoxy-based material is highly compatible with epoxy molding compounds. It was developed as a complementary product for use on equipment processing MH20-01 IM.

MCL-IM20 can be left in the feed tube during cool-down and start-up. Upon re-heating, this purge material can be displaced by the standard molding compound.

Advantages

- Highly compatible with molding compound, unlike other thermoplastic purge materials
- Can remain in the barrel during shut-down & start-up without consequence
- Does not require cold storage

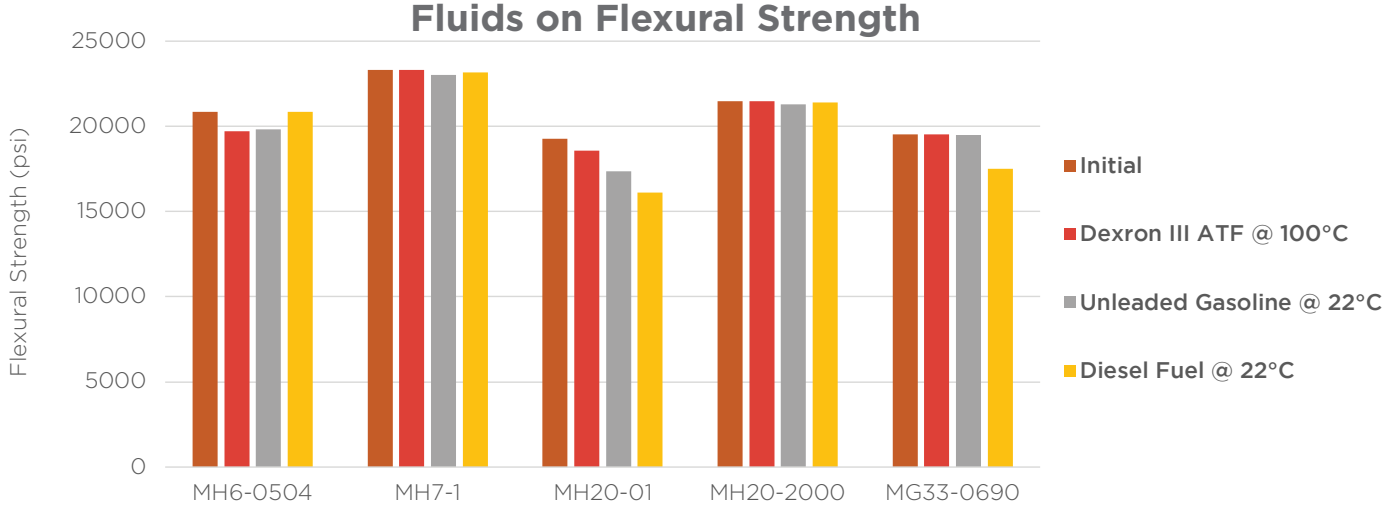
Solvent Resistant

Description

SolEpoxy molding compounds retain their properties when exposed to many chemicals and automotive fluids.

With strong performance demonstrated across all the MG and MH families, there is sure to be a product to meet your needs.

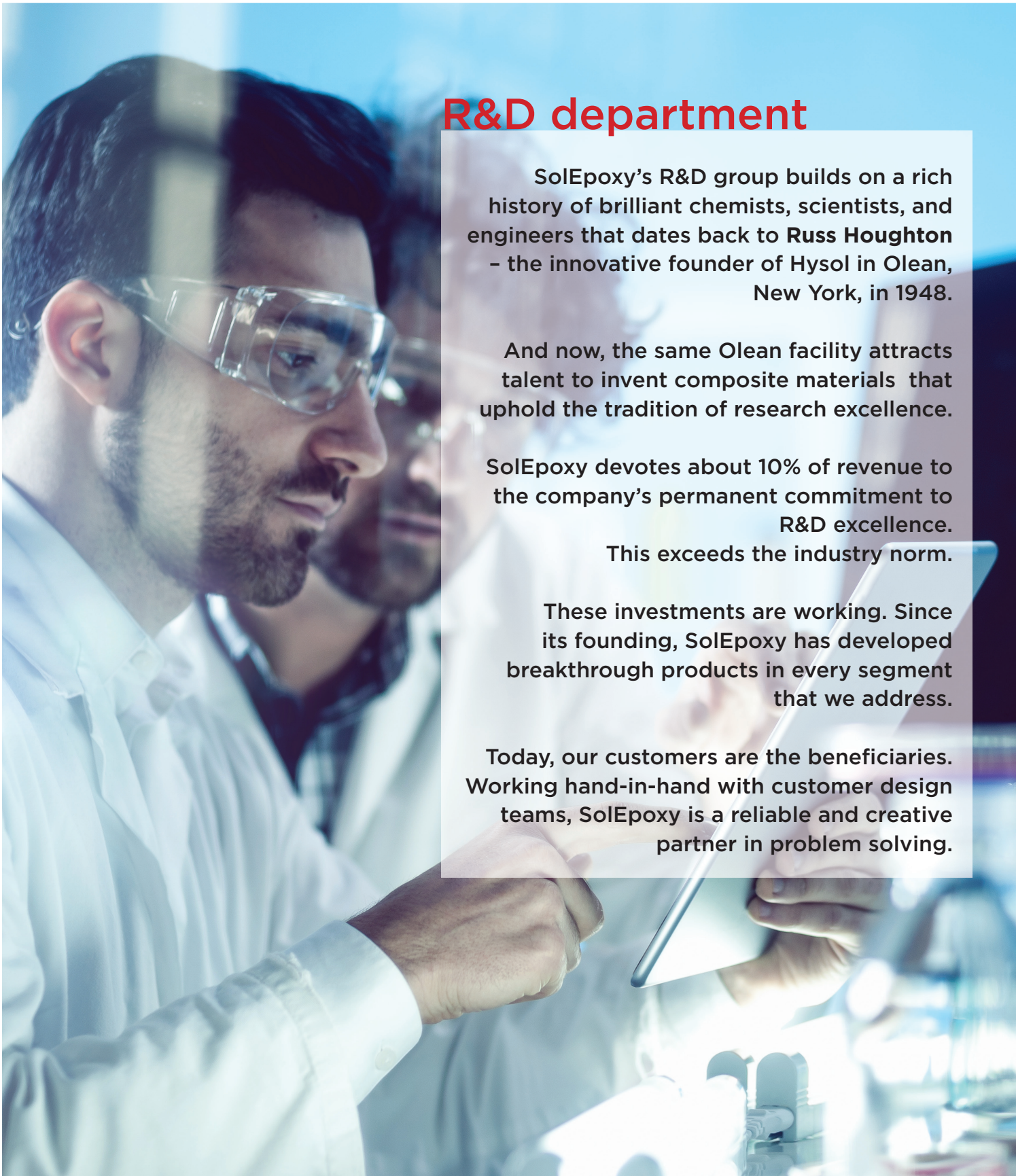
Effect of 6 Week Soak in Various Automotive Fluids on Flexural Strength



Property Retention (%) after 6 Week soak in various automotive fluids

		MH6-0504	MH7-1	MH20-01	MH20-2000	MG33-0690
Dexron III ATF @ 100°C						
	Flexural Strength	95	100	96	100	100
	Flexural Modulus	100	100	99	100	97
	Tg	100	100	100	100	100
Unleaded Gasoline @ 22°C						
	Flexural Strength	95	99	90	99	100
	Flexural Modulus	100	100	98	100	97
	Tg	90	100	92	99	100
Diesel Fuel @ 22°C						
	Flexural Strength	100	99	84	100	90
	Flexural Modulus	100	100	98	100	94
	Tg	88	100	91	96	97

SOLEPOXY TECHNOLOGY CAPABILITY



R&D department

SolEpoxy's R&D group builds on a rich history of brilliant chemists, scientists, and engineers that dates back to **Russ Houghton** – the innovative founder of Hysol in Olean, New York, in 1948.

And now, the same Olean facility attracts talent to invent composite materials that uphold the tradition of research excellence.

SolEpoxy devotes about 10% of revenue to the company's permanent commitment to R&D excellence.
This exceeds the industry norm.

These investments are working. Since its founding, SolEpoxy has developed breakthrough products in every segment that we address.

Today, our customers are the beneficiaries. Working hand-in-hand with customer design teams, SolEpoxy is a reliable and creative partner in problem solving.

SOLEPOXY IS YOUR PARTNER IN PROBLEM SOLVING

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