



PRODUCT INFORMATION

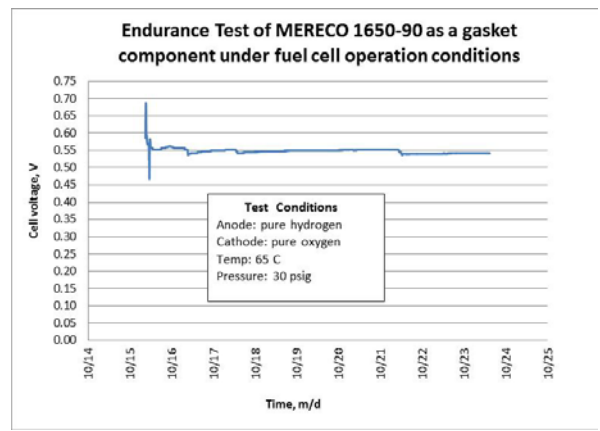
HIGH TECHNOLOGY MATERIALS

MERECO 1650 FC SERIES FLEXIBLE EPOXY ELASTOMERS FOR PEM FUEL CELL STACK SEALING

PRODUCTION DESCRIPTION

Mereco 1650 FC Series is a new class of low cost, non-silicone, moisture resistant flexible epoxy elastomers specifically designed for PEM Fuel Cell stack sealing applications here a wide choice of viscosity ranges is desirable. **Mereco 1650 FC Series** products are two-component, easy 1-1 mix ratio systems that provide sealing protection of PEM Fuel Cells as well as electronic components ranging from transducers, sensors, load cells, delicate magnetic coils and bobbins to power supply applications where no inductance drop after potting is desired. **Mereco 1650 FC Series** has excellent resistance to degradation in diesel fuel and other hydrocarbon environments and has passed over 500 temperature cycles from -40°C to +125°C. **Mereco 1650 FC Series** will not degrade after 4 days exposure to sulfur dioxide (SO₂) concentrations of 20 – 55 ppm.

An endurance test of the MERECO FC 1650-90 as a sealing gasket in a H₂/O₂ fuel cell



Diesel Fuel Resistance Consecutive Immersion Tests

Material	Hours	Temp.	Results
DF2	120	25°C	Pass
Vertex	144	125°C	Pass
Vertex	240	-40 - 125°C	Pass

H₂O IMMERSION FOR 24 HOURS

1650 FC Series 0.078% Weight Gain

H₂O IMMERSION FOR 7 Days

1650 FC Series 0.38% Weight Gain

STEAM AUTOCLAVE / 90 MINUTES

1650 FC Series 0.23% WEIGHT GAIN

A 50cm² n ElectroChem's multilayered fuel cell hardware consisting of graphite, stainless steel, and polycarbonate was used for conducting an endurance test of the **MERECO FC Series 1650-90** as the gasket at fuel cell operation conditions.

The fuel cell operated for more than 200 hours at 65°C and 30 psig under pure hydrogen and oxygen environment. It shows a continuous steady performance with no degradation due to the bonding material.

Technical information and recommendations made by Mereco Division and Metachem Resins Corporation concerning products and uses or applications thereof, are based on reliable laboratory tests and are believed to be accurate. No warranty, however, is expressed or implied, nor is any warranty expressed or implied as to results to be obtained from use of said materials, whether used singly or in combination with other products. No statements made are to be construed as constituting a license under any existing patent.

FORM 1105 REV. 0

TYPICAL PROPERTIES

Should not be used for specification purposes

Uncured Resin

Composition Epoxy resin
Color Translucent/Opaque/Requested

Mixed Viscosity Brookfield #7 spindle (25°C), cps

Product	5 RPM	50 RPM	Thixotropic Index
1650-00	350	300	1.1
1650-20	1,380	780	1.8
1650-30	2,600	1,130	2.3
1650-40	7,200	1,950	3.7
1650-50	14,800	3,600	4.1
1650-60	28,800	6,000	4.8
1650-70	73,000	12,200	6.0
1650-80	110,000	18,500	5.9
1650-90	272,000	36,000	7.6

TYPICAL PROPERTIES

Should not be used for specification purposes

Uncured Resin

Specific Gravity 1.08
Toxicity Low (See MSDS)
Flash Point, Activator °C 88 (190° F)
Flash Point, Base, °C 204 (400°F)
Working Life, 100 grams 3 hours
Shelf Life 6 months
Mix Ratio, pbw 1-1

Cured Resin Properties

Mechanical

Tensile Strength, psi 250
Lap shear Strength, psi
Aluminum to Aluminum 400-900
Elongation at Break, % 120
Hardness (Shore A) 60 +/-5
Glass Transition Temp. T_g -34°C (-30°F)
Bayshore Rebound, % 9

Electrical

Volume Resistivity 1.0 X 10¹⁴ Ohms-cm
Surface Resistivity 1.0 X 10¹² Ohms/sq
Dielectric Constant, 1MHz 4.01
Dielectric Strength 350 volts/mil

Thermal

Operating Temperature °C -60 to 150
Coefficient of Thermal Expansion 225–250 ppm/°C

PRODUCT BENEFITS

- ⇒ Easy, 1-1 mix ratio by weight or volume
- ⇒ Quick cure at common processing temps
- ⇒ Available in frozen or dual cartridges
- ⇒ Can be designed with any color
- ⇒ Low-cost replacement for silicone RTV
- ⇒ Excellent damping properties
- ⇒ Good coefficient of thermal expansion
- ⇒ Protects components from internal stresses
- ⇒ Prevents inductance drop after potting
- ⇒ Low modulus, E₀ est @ 3,500 psi

Recommended Time/Temperature Exposure to Achieve Cure in Infrared or Convection Oven

Minutes	Temp. °C	Temp °F
10	150	300
20	121	250
4 hrs	65	150
48 hrs	25	77

TYPICAL DAMPING PROPERTIES OF ELASTOMERIC MATERIALS

Product	Durometer	Bayshore Rebound, %
Butyl Rubber	75 Shore A	8
Mereco 1650-00	60 Shore A	9
Silicone Rubber	60 Shore A	12
Neoprene Rubber	60 Shore A	40
EPDM Rubber	60 Shore A	48

Preparation of Mixture

For product purchased in two-component kits, mix the entire contents of **Mereco 1650 FC** base and activator in their original shipping containers to a uniform consistency and color, each time, before dispensing. Take care to incorporate all material adhering to the bottom, sides and corners of the containers. Mechanical mixing of the components for two to three minutes is satisfactory. Measure only the approximate amount that can be applied in four hours. A four day quantity may be mixed if promptly packaged, air free, in sealed containers and stored at 0°C. The premixed, frozen packaging needs thawing before dispensing. This normally takes no longer than 5 minutes at 25°C.

Air Removal

Air entrapment during mixing may be removed in vacuum (5mm of mercury). The holding container should be no more than one-third full. Allow the mixture to foam and then subside. Maintain the low pressure for several more minutes, at which point most of the large bubbles have broken.

Application

The material can be poured in the required thickness after which the parts are set aside to cure using the recommended cure schedules listed at the top of this page.

STORAGE AND HANDLING

Mereco 1650 FC Series is a blend of epoxy resins and latent curing agents. Keep stored in the original container at temperatures from 0°C to 25°C. The product is uniform when packaged. Consult material safety data sheet before handling. Keep containers closed when not in use. Effective ventilation necessary. Goggles, gloves and protective clothing should be worn during handling or exposure. Refer to the product MSDS for more information.

Availability and Order Information

Mereco 1650 FC Series is available as a two-component kit consisting of separate equal weight containers of epoxy resin and curing agent. **Mereco 1650 FC Series** is available in pint, quart, two quart and two gallon kits. A two gallon kit contains 8 pounds of base and 8 pounds of activator. On special order, the product can also be made available in collapsible tubes in 2 oz. and 4 oz. Sizes.

Packaging Sizes & Types

Syringes 3cc, 5cc, 10cc, 30cc
Pints, Quarts, Gallons, 5 Gallons, 55 Gallon Drums

Mereco can also package **Mereco 1650 FC Series** in dual-pouch mixing packages, and in dual cartridges with a hand-held gun for hand dispensing. In both methods, the two components are premeasured, kept separate until needed, and do not need freezing.

For those customers who do not want to mix **Mereco 1650 FC Series**, premixed and frozen syringes (usually EFD style) and smaller plastic cups are available. The premixed syringes or cups are degassed and frozen (-40°C) at the factory. The package requires frozen storage and prompt action at the receiving platforms to ensure that the package contents do not thaw prematurely.

When ordering, specify the name, number, letter designation, color, quantity, container size and packaging form. The order should be placed with the Mereco order entry department at 1-800-556-7164 or by mail to the address listed on this bulletin. The minimum order size is \$100.00. Evaluation kits are available for \$40.00. The \$40.00 fee will be credited against the first order for the product