PROTAVIC 1650 SERIES FLEXIBLE EPOXY ELASTOMERS

PRODUCTION DESCRIPTION

The 1650 series is a new class of highly damped flexible epoxy elastomers specifically designed for demanding customer applications where a wide choice of viscosity ranges is desirable. **The 1650** series are two-component, easy 1-1 mix ratio systems that provide excellent protection of 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. **The 1650** has excellent resistance to degradation in diesel fuel and other hydrocarbon environments and has passed over 500 temperature cycles from -40ºC to +125ºC. **The 1650** will not degrade after 4 days exposure to sulfur dioxide (SO_2) concentrations of 20 – 55 ppm. **The 1650 MA50** is an extremely low shrinkage version of the 1650 series.

Diesel Fuel Resistance
Consecutive Immersion Tests

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

TYPICAL PROPERTIES

Should not be used for specification purposes

Uncured Resin

Composition	Epoxy resin
Color	Translucent/Opaque Any requested

Mixed Viscosity
Brookfield #7 spindle (25ºC), centipoise

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 ºC	88 (190º F)
Flash Point, Base, ºC	204 (400ºF)
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	-34ºC (-30ºF)
Bayshore Rebound, %	9

Electrical

Volume Resistivity	1.0 X 10^{14} Ohms-cm
Surface Resistivity	1.0 X 10^{12} Ohms/sq
Dielectric Constant, 1MHz	4.01
Dielectric Strength	350 volts/mil

Thermal

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

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, E_0 est @ 3,500 psi

Protavic America, Inc.

www.protavicamerica.com / 603.623.8626

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

Minutes	Temp. ^{0}C	Temp ^{0}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
Protavic 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 **Protavic 1650** 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 0ºC. The premixed, frozen packaging needs thawing before dispensing. This normally takes no longer than 5 minutes at 25ºC.

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

The 1650 is a blend of epoxy resins and latent curing agents. Keep stored in the original container at temperatures from 0ºC to 25ºC. 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

The 1650 is available as a two-component kit consisting of separate equal weight containers of epoxy resin and curing agent. **The 1650** 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

Protavic can also package **the 1650** 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 **the 1650**, premixed and frozen syringes (usually EFD style) and smaller plastic cups are available. The premixed syringes or cups are degassed and frozen (-40ºC) 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 Protavic order entry department. 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