



Havel Composites CZ s.r.o.  
Svédlice 67  
783 54 Přáslavice; Olomoucký kraj; CZ  
IČ: 25907379  
Telephone: International: +420 585 129 021  
E-mail: [info@havel-composites.com](mailto:info@havel-composites.com)  
[www.havel-composites.com](http://www.havel-composites.com)

## LAMINATING AND CASTING RESIN

### HAVELPOL 4

#### Instruction for use, technical specifications

<b>Characteristics</b>	
<b>Description:</b>	Unaccelerated polyester resin modified with methyl methacrylate
<b>Application:</b>	Casting or lamination Hand brush
<b>Operational temperature:</b>	+15 ° C - +25 ° C
<b>Processing:</b>	Coating the layer, casting into the mold
<b>Special properties:</b>	Excellent resistance to water and weather Styrene content of ~ 40% Geltime (100g+2% M50 +1% cobalt) 4 min Temperature resistance up to 120 ° C

#### **Introduction**

Havelpol 4 is light stabilized polyester resins containing styrene and methyl methacrylate. Its use is recommended in the manufacture of maximally clear manually

GRP-produced film or casting and potting art objects. Fully cured laminates made from Havelpol 4 and powder associated mat of glass fibers "E" in quality for the production of films can exhibit light transmittance of more than 80%. They exhibit excellent resistance to weathering and stable appearance even after prolonged exposure.

## Application

The temperature of Havelpol 4 before use should reach a workshop temperature (18 ° C to 20 ° C). To start the curing reaction is necessary to add the catalyst and accelerator. The recommended catalyst is a peroxide K1 (or Butanox M50), which should add to the resin in an amount of 1-2%. The catalyst must be thoroughly dispersed in the resin and the mixture is usable for about 24 hours at the workshop (18 ° C to 20 ° C). Shortly before use, the catalyzed resin blended into the proper amount of the accelerator 1% cobalt in addition 0.5-1%.

Attention! The catalyst and accelerator should not be mixed together directly, as they may react with explosive violence.

Pot-Pot life at 1% cobalt and 1% 2% peroxide K1

Temperature	Pot life in min
15°C	3-4
20°C	1,5
25°C	1

Weather resistance and light transmission: For maximum transmittance should laminates made using product Havelpol 4 show the ratio of resin to glass of at least 3: 1.

For optimum weather resistance and durability laminates must be fully cured. After shaping should laminates were aged at 20 ° C for at least three weeks before being circulated. Additional curing at elevated temperatures is not recommended.

## Casting

It is a special section in which it is necessary to pay attention to its own findings regarding the dosage and temperature control. For casting procedures carefully the properties and we recommend to do any samples with various proportions of catalyst and accelerator.

## Additives

Havelpol 4 can be colored by adding small amounts of transparent colors, stable to light. The user should perform tests to ensure an even distribution of color.

## Physical properties

Data from testing to BS 2782 methods.

Property	Unit	Liquid Resin
Appearance		The clear, yellowish
Viscosity at 25 ° C	poise	1.7
Density at 25 ° C,	kg / dm <sup>3</sup>	1.12
Volatile content		40%
Stability in the dark at 20 ° C	Months	6
Gel time at 25 ° C (2% Butanox M50)	min	4-5

The properties of the cured casting \*

Hardness (Barcol GYZJ 934-1)	48
Water absorption. 24 hours at 23 ° C,	20 mg
The temperature flexural campaign **	68 ° C
Elongation at break of	1.2%
Tensile strength MPa	47
Modulus of strength MPa	4600
Volume shrinkage	9.7%
The refractive index N 25 / d	1548

\* Curing 24 hours at 20 ° C, 3 hours at 80 ° C

\*\* Curing 24 hours at 20 ° C for 5 hours at 80 ° C for 3hrs at 120 ° C

The properties of the cured laminate fiberglass \*

Glass content	27%
Flexural modulus of	5480 MPa
The breaking strength of	170 MPa, flexural
Elongation at break of	1.8%
Tensile strength	MPa 98
Modulus of strength	7062 MPa

### Storage

The resin can be stored for at least 3 month in the carefully sealed containers at temperatures +20°C to +25°C. Temperature should not be over +30°C.

If resin create gel, do not use gel parts. Use only "liquid" resin.

Do not warm up over an open flame! While stirring up use safety equipment (gloves, eyeglasses, respirator).

### Mixture ratios

The specified mixture ratios must be observed as exactly as possible. Adding more or less hardener will effect a faster or slower reaction. The mixture of resin and katalyst must be mixed very thoroughly. Mix until no clouding is visible in the mixing container. Pay special attention to the walls and the bottom of the mixing container.

The optimal processing temperature is in the range between 20 and 25°C. Higher processing temperatures are possible, but will shorten pot life. A rise in temperature of 10°C will halve the pot life. Different temperatures and humidities during processing have no significant effect on the strength of the hardened product.

### Warning

Do not mix large quantities, especially if highly reactive systems are used. The heat flow from the mixing container is very low, so the contents will be warmed up very fast because of the reaction heat (exothermic resin – katalyst reaction). This can cause temperatures > 200°C which causes smoke intensive burning of the mixture.

For more read Safety data sheet of this product.