

## HPS 990

### Product Description

**Hernon<sup>®</sup> Porosity Sealant (HPS) 990** is the solution to leak proof parts, improving machinability, in addition to increasing the durability and surface quality for painting and plating. **HPS 990** is also excellent for sealing leak paths in rigid electronic assemblies. The hardened resins exhibit superior chemical resistance and elevated temperature stability.

The microscopic voids, where potential leaks occur in the part are filled by the low viscosity resin during vacuum application. Sealed micropores cure without shrinkage to form tough cross-linked thermoset polymer, permanently sealing the piece. Excess residual adhesive is washed from the part surface during rinsing with water.

The parts leave the impregnating process without surface residue and can then be used in production within a few short hours. The resin polymerizes, sealing gaps in any assembly. This protects electrical components against leakage from air, water, coolants and oils. When used in preparation for plating or painting processes, the impregnation process also eliminates absorption of plating materials (like acids) or painting prep solvents that could otherwise later bleed out of pores causing finishes to discolor, bleed, pit or peel.

Sealed powdered metal parts exhibit better machinability, enhanced tool life and better dimensional control.

### Product Certification

#### **MIL-I-17563 Rev. C – Class 3**

Certified to NSF/ANSI Standard 61 for use in commercial and residential potable water systems not exceeding 82°C (180°F).

### Product Benefits

- High speed processing – impregnation cycles of 25 minutes with 1 to 3 hours room temperature full cures.
- Economical – quick room temperature cures coupled with efficient utilization of resin allows for excellent process economics.
- Reliability – hardened resin exhibits superior chemical and physical elevated temperature resistance and pressure sealability.

- Simplified processing of treated parts – immediate painting or machine of impregnated parts is possible because **HPS 990** resin treatment leaves no residue on part surfaces.

### Typical Applications

- Electrical components
- Pneumatic tool castings
- Automotive carburetors
- Engine blocks
- Water and fuel pumps
- Plastic molds
- Valves, manifolds
- Railway, truck brake parts
- Hydraulic pumps
- Steering gear components
- Compressor parts
- Powdered metal gun parts
- Regulators

### Typical Properties (Uncured)

Property	Value
Resin	Dimethacrylate blend
Appearance	Clear to Light Yellow Fluorescent Liquid
Viscosity @ 25°C, cP	10-30
Specific gravity	1.0432
Surface Tension, Dynes/cm	33.47
Flash point	See SDS

### Cure Mechanism and Rate

**HPS 990** is anaerobic, curing in the absence of air where confined, to form a thermoset polymer. Several factors influence the cure rate of the **HPS 990** system – chemical, thermal and ionic activity.

Chemically, **HPS 990** is accelerated by introduction of **Hernon<sup>®</sup> Accelerator 28** to the main resin tank. Conversely, addition of more un-accelerated **HPS 990** bulk to the main tank lowers the overall system activity. An alternate chemical influence is exerted by the addition of **Hernon<sup>®</sup> Stabilizer 27** to inhibit reactivity. Also, the presence of oxygen, introduced by aerators, inhibits the cure rate.

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The higher the system temperature (greater thermal energy) – the quicker the reaction of the impregnation system. Less energy or cooling slows reaction rates.

The activity of metals and other ionic properties of parts in contact with the **HPS 990** influence cure rate. Highly reactive materials like brass and copper promote faster cure rates. Whereas less active materials like stainless steel are slower.

### Typical Properties (Cured)

Property	Value
Hardness, Shore D ASTM D2240	75 - 85
Compressive Strength, psi ASTM D695	12,940
Compressive Modulus, psi ASTM D695	135,598
% Compression	26
Operating Temperature, °C (°F)	-55 to 150 (-65 to 300)

### Electrical Properties

Property	Value
Dielectric Strength, kV/mm	20
Dielectric Constant	100 Hz 1 kHz
	1.5 1.33
Volume Resistivity (ohm.cm)	15 x 10 <sup>15</sup>

### Typical Environmental Resistance

#### **Chemical/Solvent Resistance**

**HPS 990** has passed all requirements of MIL-I-17563 Rev. C and is QPL listed. The following solvent conditions were tested per Mil-I-17563 Rev. C- Class 3:

Chemical/Solvent	Result
Water	No Leakage
Oil	No Leakage
Hydraulic Fluid	No Leakage
Hydrocarbon Fluid	No Leakage
Carbon Removing Compound	No Leakage
Turbine Fuel	No Leakage
Lubricating Oil	No Leakage

**HPS 990** also exhibits excellent resistance to diesel fuel. A weight gain of only 0.09% was realized after immersing a cured sample of **HPS 990** in diesel fuel for 1000 hours at 22°C.

### General Information

**For safe handling information on this product, consult the Safety Data Sheet (SDS).**

#### **Parts Preparation**

##### **Cast Parts**

Porosity must be free of all cutting oils and dry prior to resin impregnation. Impregnate prior to any plating, anodizing, etc.

##### **Powdered Metal Parts**

The best way to impregnate the powdered metal parts is immediately after sintering and before any secondary operation. Tumbling and machining tend to smear over porosity making it more difficult for the resin to get into the porosity. Evidence indicates that the machinability of impregnated parts is substantially improved due to the reduction in surface irregularities.

##### **Directions for use**

Consult **Hernon®** Technical Service for specific process requirements.

1. Use any of the following vacuum impregnation methods to impregnate parts in **HPS 990**:

- Wet Vacuum
- Wet Vacuum/Pressure
- Dry Vacuum/Pressure
- Pressure Impregnation

2. Centrifuge or drip drain the parts to reclaim excess sealant from the parts.

3. Clean parts by washing in plain water.

4. Soak parts in activator rinse to initiate catalytic cure of sealant at porosity surface sites.

5. Soak parts in final rinse at 110°F (43°C) to remove activator rinse and warm the parts for quick drying upon removal. Note: Corrosion inhibitors may be added to final rinse if required.

##### **Disposal of Waste**

Wastes generated during the impregnation process can, in general, be adequately handled by conventional biological treatment methods. Since both the circumstances of use and local environmental requirements vary, waste disposal recommendations are somewhat application specific.

##### **Storage**

**HPS 990** should be stored in a cool, dry location in unopened containers at a temperature between 45°F to 85°F (7°C to 29°C) unless otherwise labeled. Optimal storage is at the lower half of this temperature range. To prevent contamination of unused material, do not return any material to its original container.

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Active **HPS 990** in an impregnation tank with normal use has unlimited pot life if recommended controls are maintained, including temperature controls and aeration.

These suggestions and data are based on information we believe to be reliable and accurate, but no guarantee of their accuracy is made. HERNON MANUFACTURING®, INC. shall not be liable for any damage, loss or injury, direct or consequential arising out of the use or the inability to use the product. In every case, we urge and recommend that purchasers, before using any product in full scale production, make their own tests to determine whether the product is of satisfactory quality and suitability for their operations, and the user assumes all risk and liability whatsoever, in connection therewith. Heron's Quality Management System for the design and manufacture of high-performance adhesives and sealants is registered to the ISO 9001 Quality Standard.