

## Technical Data Sheet HPS 990

April 2008

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### 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. The hardened resins exhibit superior chemical resistance and elevated temperature stability.

The microscopic voids, where potential leaks occur (between metal grains or ceramic plastic molecules) 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 workpiece. Residual adhesive film is water-washed from the part surfaces during rinsing.

The parts leave the impregnating process without surface residue and can then be used in production within a few short hours. 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 1 and 3**

**NSF International**

**Certified to ANSI/NSF 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 hour 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

- 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                | Amber fluorescent liquid |
| Viscosity @ 25°C, cP      | 8                        |
| Specific gravity          | 1.03                     |
| Surface Tension, Dynes/cm | 31.6                     |
| Flash point               | See MSDS                 |

### Cure Mechanism And Rate

**HPS 990** is anaerobic, curing in the absence of air where confined, to form a thermo-set 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.

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              | 75                      |
| Compressive Strength, psi      | 13,200                  |
| Compressive Modulus, psi       | 106,800                 |
| % Compression                  | 34.7                    |
| VCM, %                         | 0.30                    |
| Operating Temperature, °C (°F) | -55 to 150 (-65 to 300) |

### 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

**This product is not recommended for use in pure oxygen and/or oxygen rich systems and should not be selected as a sealant for chlorine or other strong oxidizing materials.**

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

#### **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 46°F to 82°F (8°C to 28°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.

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

**Impregnation Equipment**

**Hernon®** offers complete systems support for vacuum impregnation. A full selection of equipment and tank sizes is available. Each system is engineered to maximize quality control of the process to maximize productivity, economy of sealant usage, and energy efficiency. Contact **Hernon® Sales** for additional information.

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. Hernon's Quality Management System for the design and manufacture of high performance adhesives and sealants is registered to the ISO9001:2000 Quality Standard.