

Technical Data Sheet HPS 991R

October 2019

Page 1 of 3

Product Description

Hernon® Porosity Sealant (HPS) 991 is the solution to leak proof parts, improving machinability, in addition to increasing the durability and surface quality for painting and plating. The required addition of **HPS Initiator 91** activates **HPS 991R** enabling the system to cure at elevated temperatures (**HPS 991**). 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 when exposed to elevated temperature 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 immediately. 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

Product Benefits

- Single component
- Cost effective
- Provides superior stability and reliability
- High speed processing, parts are ready in 30 minutes from floor to floor
- Reliability – Hardened resin exhibits superior chemical and physical, elevated temperature resistance and pressure sealability.
- A simplified process permitting processing of treated parts: immediate painting or machining of impregnated parts is possible because **HPS 991** resin leaves no residue.

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	Clear fluorescent liquid
Viscosity @ 25°C, cP	1-10
Specific gravity	1.03
Surface Tension, Dynes/cm	30.94
Flash point	See SDS

Cure Mechanism and Rate

HPS 991 cures to form a thermoset polymer when exposed to elevated temperature. Thermal content and coefficient of thermal transfer in the workpieces influence the cure rate of the **HPS 991** system.

Higher temperatures produce quicker cure rates. **HPS 991** cures within the range of 177°F (80°C) to 205°F (96°C).

Proper cure requires the workpiece to uniformly attain full cure temperature. Parts that do not transfer heat well will required longer processing times. Efficient thermal conductivity yields shorter processing cycles. Parts with heavier cross sections require longer exposure at heat to attain sufficient temperature internally. Carefully consider part geometry.

Typical Properties (Cured)

Property	Value
Hardness, Shore D	70-85

VCM, %	0.07
Operating Temperature, °C (°F)	-55 to 150 (-65 to 300)

Typical Environmental Resistance

Chemical/Solvent Resistance

HPS 991 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 1:

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
Ethylene Glycol	No Leakage

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 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.

Activation Instructions

HPS Initiator 91 must be added to **HPS 991R** in order to form the active system **HPS 991**.

Activate using the following mixing proportions:

<u>HPS 991R</u>	<u>HPS Initiator 91</u>
1 Gallon	63 grams
5 Gallons	315 grams

Mix thoroughly until the initiator is completely dissolved before use.

Directions for use

When determining adequate heat cure processing times, the heat transfer characteristics of the processed parts must be carefully considered. Effective cure time should be measured from the time the entire part reaches the desired curing temperature.

1. Use any of the following vacuum impregnation methods to impregnate parts in **HPS 991**:

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

2. After impregnation procedure, use a centrifuge or drip station to reclaim excess resin.

3. Clean parts by washing /agitating in plain water. Parts can be inspected with UV light to ensure removal of excess resin.

4. To Cure the resin, soak parts in a hot water tank. Allow sufficient time for sealant to cure within the parts. A corrosion inhibitor can be added to the hot water tank to provide part protection from rust or corrosion.

NOTE: At 90°C sealant will cure in four to ten minutes but allow sufficient time for interior sections of parts to reach that temperature.

5. Remove parts from the hot water tank and allow sufficient time for parts to thoroughly cool.

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

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 991R 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. **Activated resin must be stored under refrigeration at a temperature of 40°F ± 5°F.** Optimal storage is at the lower half of these temperature ranges. To prevent contamination of unused material, do not return any material to its original container.

HPS 991 in an active impregnation system with normal use has unlimited pot life if recommended controls are maintained, including temperature controls. Do not allow continuous exposure to ultraviolet light. **HPS 991** does not require 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 ISO 9001 Quality Standard.