

# INTRODUCING PORCERAX II

*Pre-Hardened  
(35/38 HRC)*

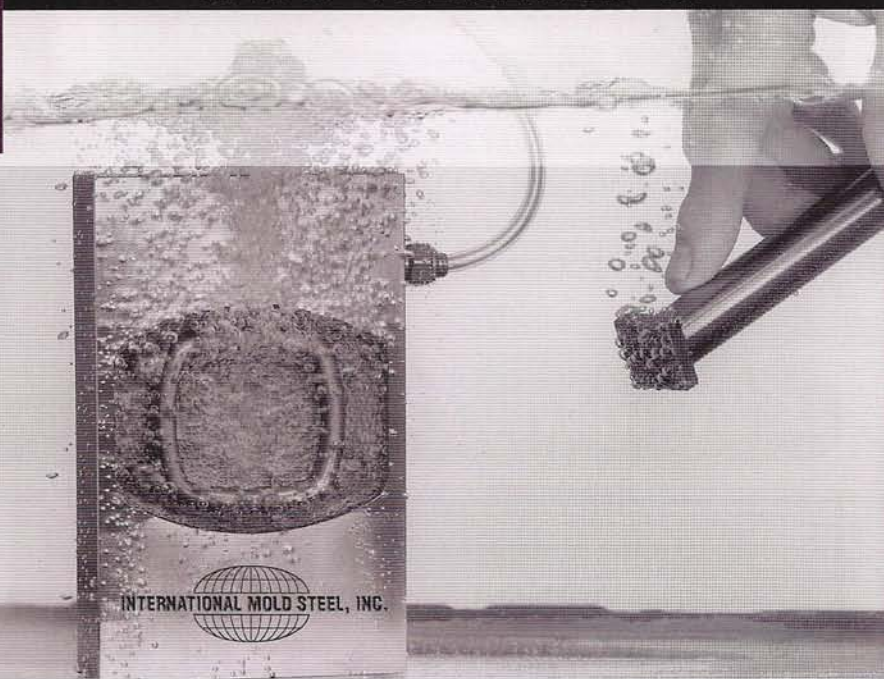
*Sintered, Porous Metal  
7 or 20 Micron Pore Size*

# BREATHE EASY

## WITH PORCERAX II

**PLASTIC INJECTION  
MOLDING**

**OTHERS...**



## *Benefits*

- Prevention of gas burning
- Eliminates visibility & strengthens weld lines
- Eliminates gas build up
- Reduces scrap and reject rates
- Lowers cycle times
- Prevention of short shots
- Reduction of injection pressure
- Reduction of gloss levels

**Sintokogio, LTD**

*Porcerax II is distributed by  
Lindquist Steels, Inc.*

[www.porcerax.com](http://www.porcerax.com)



**LINDQUIST STEELS, INC.**  
TOOL STEEL SPECIALISTS

*Corporate Office: Lindquist Steels, Inc.  
1050 Woodend Road  
Stratford, CT 06615*

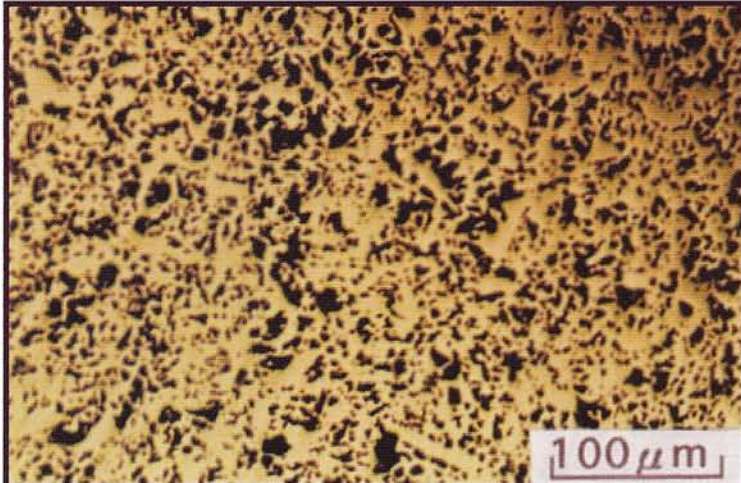
800-243-9637 • FAX: 203-386-0132

*Lindquist Steels, Inc.  
1950 Old Dunbar Road  
West Columbia, SC 29172*

800-845-7052 • FAX: 803-794-6658

[www.lindquiststeels.com](http://www.lindquiststeels.com)

# Quality Characteristics I - Physical Properties



Microphotograph of  
Porcerax II Material Surface

**Fig. 1** Porcerax II is a sintered, porous material with porosity in the range of 20 to 30% by volume. A system of interconnected pores with an average of 7 or 20 microns is dispersed throughout the material.

Properties	Type	PM35
Average Pore Diameter		20 $\mu$ m, 7 $\mu$ m depending on use
Porosity		About 25%
Density		$6.0 \sim 6.2 \times 10^3 \text{ kg/m}^3$
Coefficient of Linear Expansion		$12 \sim 12.5 \times 10^{-6}$
Thermal Conductivity		$30 \sim 33 \text{ W/(m+k)}$
Bending Strength (MPa)		700 – 750
Tensile Strength (MPa)		450 – 500
Base Hardness (HRC)		35 – 38
Machinability by High Speed Steel		Good

Mechanical Properties of Porcerax II

**Fig. 2** Porcerax II is supplied at 35/38 HRC. It can be heat treated, but is only recommended for extreme cases. The thermal conductivity of Porcerax II is similar to a 400 Series stainless material.

# Quality Characteristics II - Design Issues

- Resin Being Molded
- Size of Problem Area
- Cooling Considerations
- Proximity of Water Lines
- Surface Finish Required
- Slide/Lifter Applications
- Ease of Removal
- Reverse-Blow Considerations

Design Considerations

**Fig. 3** When inserting Porcerax II these design conditions need to be followed. By applying these design guidelines they will greatly enhance Porcerax II's ability to vent properly over the life of the mold.

## "Friendly"

- Polypropylene
- PVC (Soft Type)
- Nylon (-6, -66, etc.)
- Polystyrene
- Biodegradable Polymer
- ABS
- NPPE
- Polyethylene
- Acrylic
- Polyurethane

## "Resins to Watch"

- Phenol \*
- PVC (Drain Pipe, etc.)
- Polycarbonate (clear)
- Natural Rubber \*
- Liquid Silicone
- Talc Filled Resins\*\*
- Foaming Urethanes

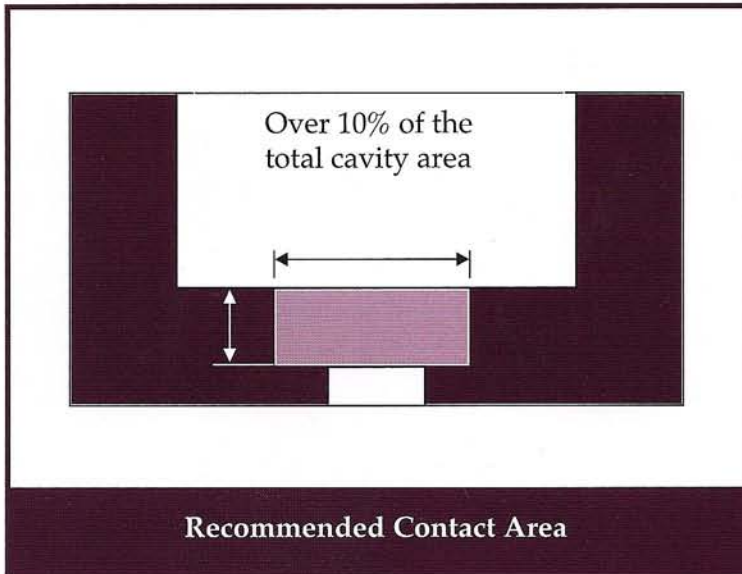
\* indicates may be used with reverse blow system

\*\* indicates that some resins will work depending on manufacturer

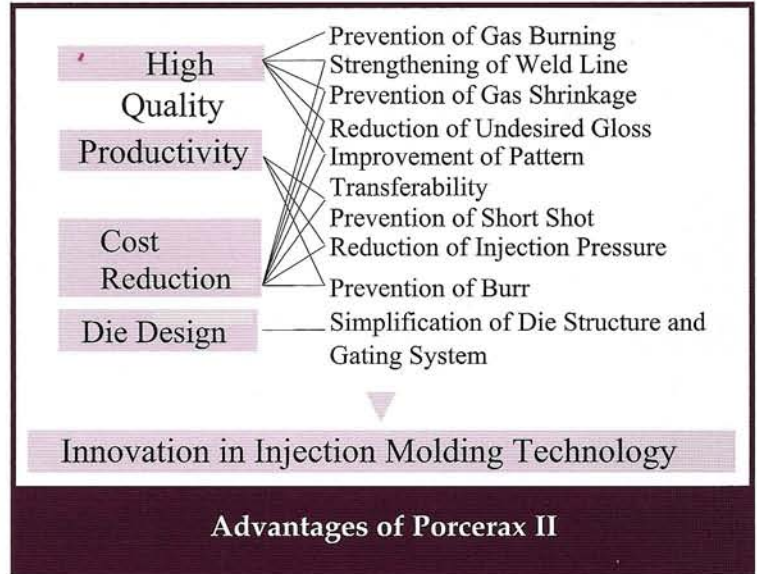
Resins-A Key to Success

**Fig. 4** Depending on the emissions or gas residue given off during the molding process, the molder will have to evaluate whether to use a 7 or 20 micron pore size. The "Friendly" resins are types that work well with Porcerax II, whereas the "Resins to Watch" will need more evaluation and design considerations before working with Porcerax II. Contact IMS for more information.

# Quality Characteristics II - Design Issues

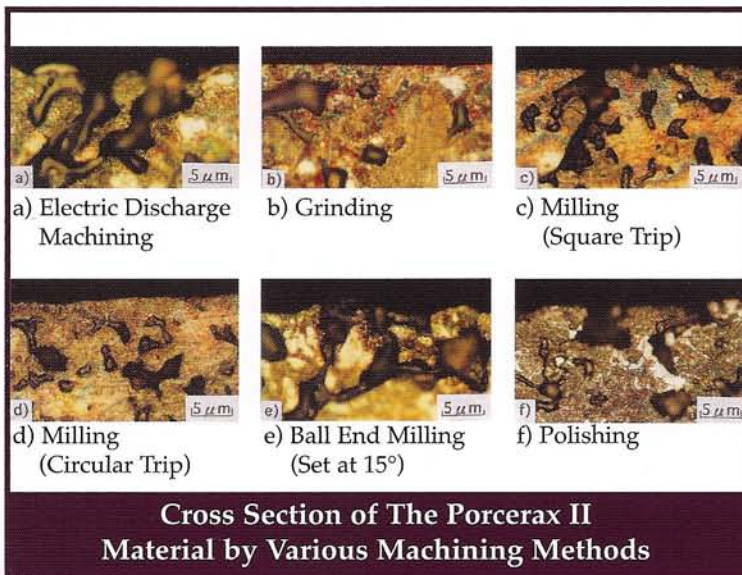


**Fig. 5** The Mill recommends that at least 10% of the core and cavity area be Porcerax II to insure proper venting. It is important to remember that the larger the insert, the lower the back pressure will be in the cavity. Also, due to the larger surface area, the insert will not require as much cleaning as a smaller piece.

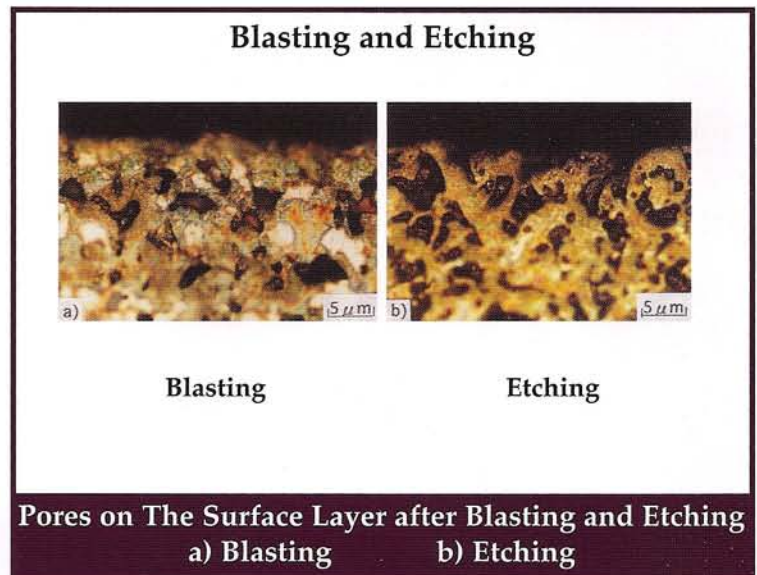


**Fig. 6** Installing Porcerax II into your mold can have far reaching affects. Scrap, molding pressure and secondary operations can all be affected by using Porcerax II. The important affect seen by using Porcerax II is "Cost Reduction".

# Quality Characteristics III - Permeability

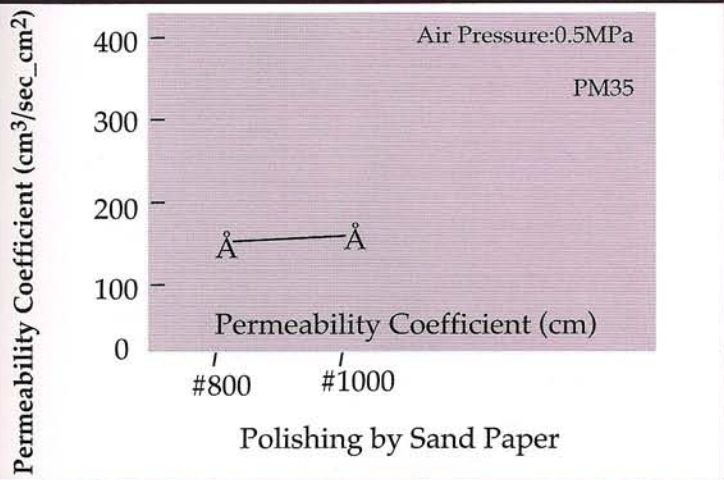


**Fig. 7** Porcerax II can be machined like any other stainless material. However, to achieve maximum venting, EDM is recommended for 7 micron material and machining is recommended for 20 micron material.



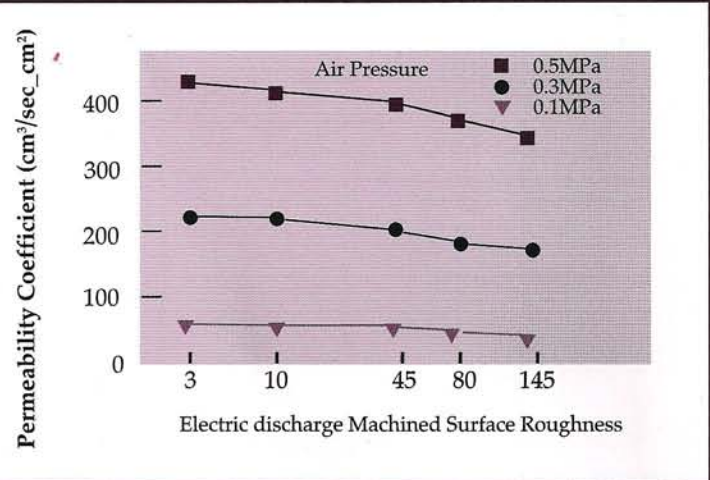
**Fig. 8** Porcerax II (7 micron) can be textured. It is imperative that the chosen texturing source understands that they are working with Porcerax II. Contact IMS for more information. Any type of blasting will close the surface porosity.

# Quality Characteristics III - Permeability



Permeability After Polishing

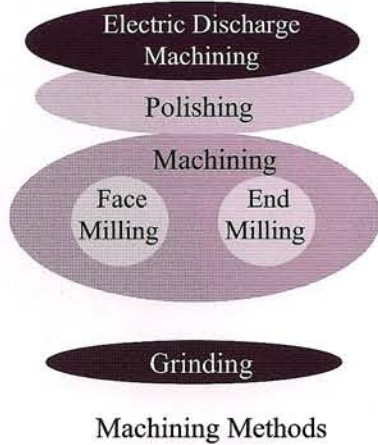
Fig. 9 Porcerax II (7 Micron) can be polished to achieve a #800 – #1000 Grit Finish.



Permeability after Electric Discharge Machining

Fig. 10 EDM is the best way to open the pores of Porcerax II. The finer the surface finish of the EDM'd surface the more airflow through the Porcerax II material.

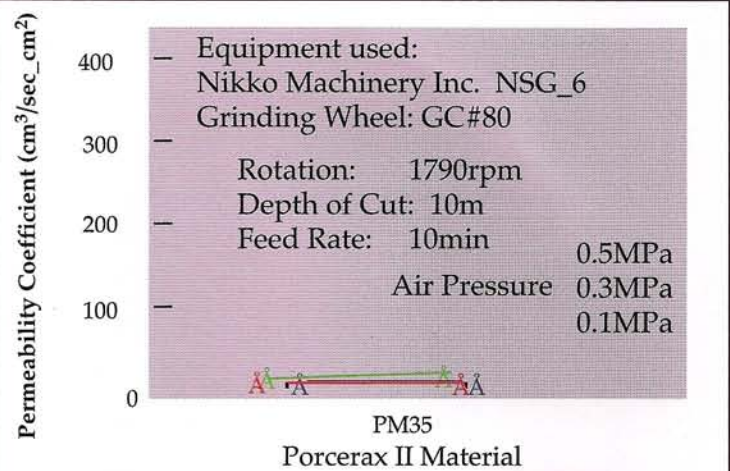
## Permeability



Machining Methods

Summary of the Relationship between the Permeability of The Porcerax II material and the Machining Methods

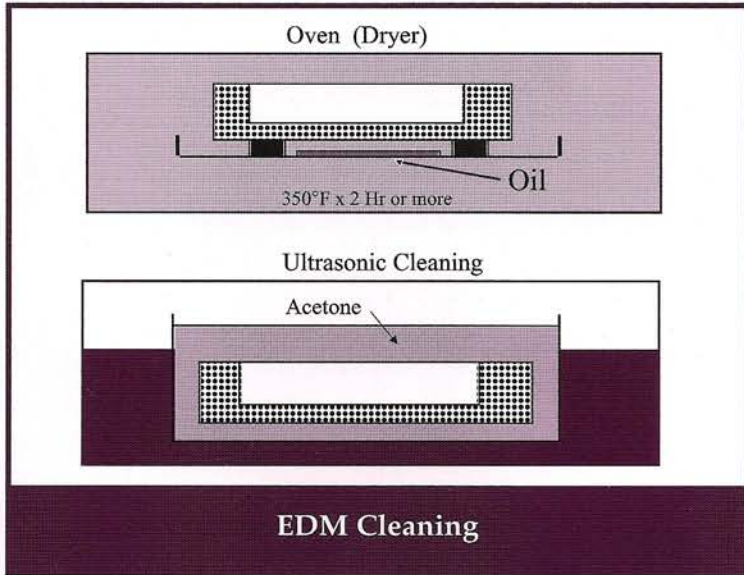
Fig. 11 The chart shows the relationship between permeability and machining methods. EDM and polishing are the most widely used methods of achieving permeability in Porcerax II.



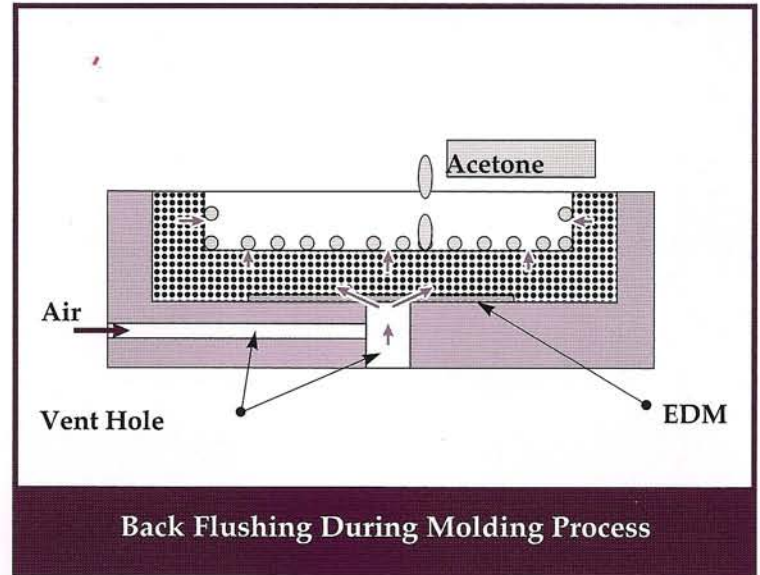
Permeability after Grinding

Fig. 12 All types of grinding will close the pores of Porcerax II, both on 7 and 20 micron materials.

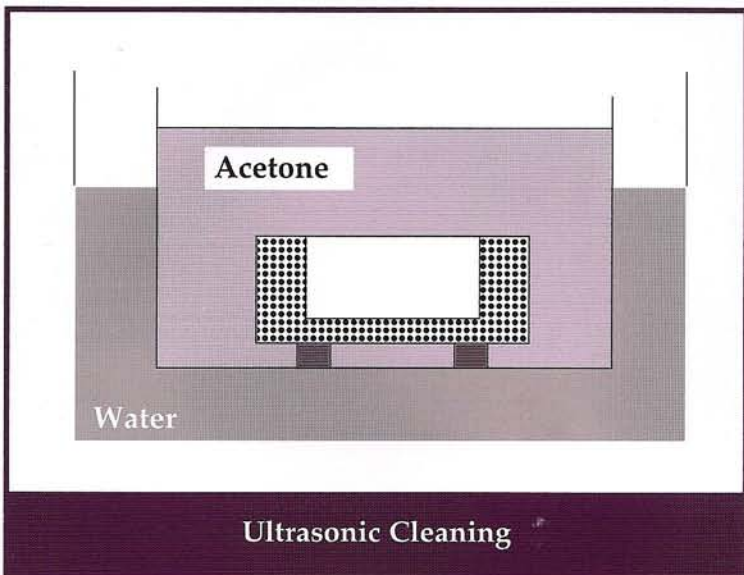
# Quality Characteristics IV - Cleaning



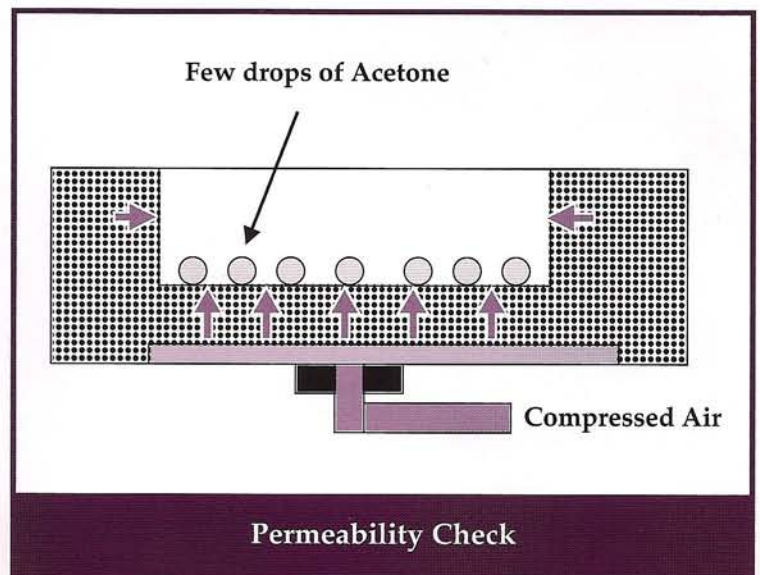
**Fig. 13** During the EDM process, the pores will fill up with EDM Fluid. This fluid must be removed before inserting Porcerax into the mold. It is very important that the insert be cooled to room temperature before ultrasonic cleaning. The ultrasonic cleaning unit must be built for flammable solvents.



**Fig. 14** Back flushing during the molding process is an excellent method for cleaning any resin residue that might build up on the surface of Porcerax II insert. This will also extend the cycle of removing the insert and cleaning it ultrasonically.

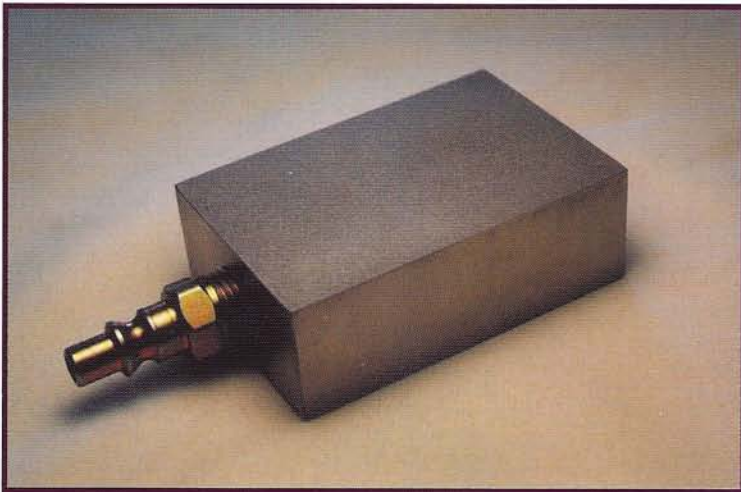


**Fig. 15** The preferred way to clean Porcerax II is to place the insert in an ultrasonic cleaning unit filled with acetone. The ultrasonic cleaning unit must be built for flammable solvents and is the only recommended type of cleaning for Porcerax II.



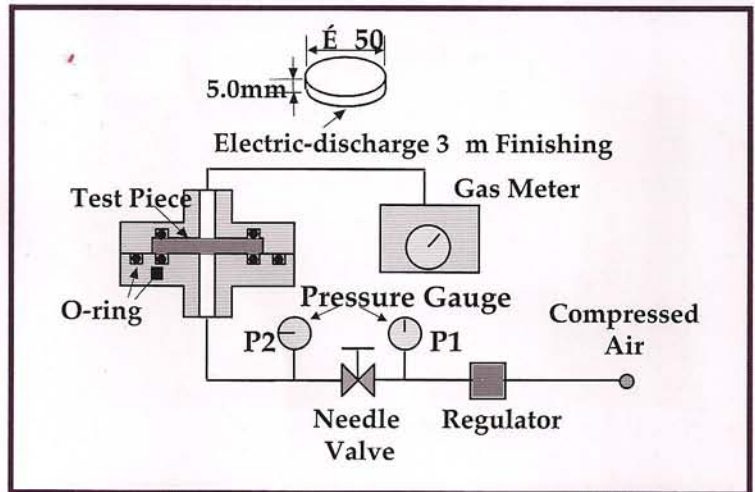
**Fig. 16** Checking permeability of the Porcerax II insert can be done using compressed air and a few drops of acetone on the surface of the material.

# Quality Characteristics IV - Cleaning



Drill, Tap & EDM a Back-Flush Hole for Cleaning

Fig. 17 Making sure the Porcerax II insert is large enough for an air fitting is critical for cleaning and checking permeability after EDM and when material is about to be replaced in the mold.



Permeability Measurement Instrument

Fig. 18 Measuring instrument used for measuring airflow through the Porcerax II Material.

For more Porcerax II information, please visit [www.imsteel.com](http://www.imsteel.com)

## We Offer a Complete Line of Mold & Die Solutions

**INTRODUCING PX5 MODIFIED P20**  
The High Performance Alternative for:  
PLASTIC MOLDS  
RUBBER MOLDS  
PRESS PLATENS  
DIES

**INTRODUCING DC53**  
Harden-able 62/63 HRC  
High Hardness without being brittle  
RUBBER MOLDS  
PLASTIC MOLDS

**INTRODUCING DH2F MODIFIED H-13 PREHARDENED 37-41 HRC**  
APPLICATIONS:  
Plastic Molds  
Zinc Diecasting Dies  
Silent Run Aluminum Die Casting Dies  
Plunger Tips, Spray Bushings  
Die Plastic Strippers  
Dies for Aluminum Extrusions  
Patterns and Core Boxes  
Others

**INTRODUCING PORCERAX II**  
Pre-Hardened (35/38 HRC)  
Sintered, Porous Metal  
7 or 20 Micron Pore Size  
PLASTIC INJECTION MOLDING  
OTHERS...

**INTRODUCING NAK55**  
40 HRC Pre-Hardened  
High Performance High Precision Mold Steel  
PLASTIC MOLDS  
RUBBER MOLDS  
JIGS & FIXTURES  
PRESS DIES

1050 Woodend Road • Stratford, CT 06615 • Phone: 800-243-9637 • [www.lindquiststeels.com](http://www.lindquiststeels.com)  
Sintokogio LTD and Lindquist Steels, Inc. shall not be held responsible for damage caused by misunderstanding or improper use of the technical information contained in this brochure. The contents of this brochure may be subject to change without notice. Please inquire for the latest information. No portion of this brochure may be reproduced without the express permission of Sintokogio LTD and International Mold Steel, Inc.



INTERNATIONAL MOLD STEEL, INC.

[www.porcerax.com](http://www.porcerax.com)  
[www.imsteel.com](http://www.imsteel.com)