

# SINTO

## PORCERAX II®

PERMEABLE METAL DIE MATERIAL



In 1994, PORCERAX II® received one of the most prestigious Japanese industrial awards, the Ministry of International Trade and Industry (MITI) Award.

Due to its excellent permeability, PORCERAX II® is ideal for injection molding applications.

This permeability is a result of Porcerax's porosity, which allows gases and air to be extracted through the material itself, eliminating gas-related defects.

When used as a die material for injection molding, PORCERAX II® can be worked and machined just like conventional die materials using processes such as EDM machining, etching, cutting and grinding.

# INJECTION MOLDING INNOVATION

## WHAT BENEFITS DOES PORCERAXII® BRING TO YOU?

PORCERAXII® offers many improvements and benefits over conventional die materials, in every aspect of injection molding.

- 1. Improved product quality**  
PORCERAXII® permeability eliminates common die casting problem such as gas burning, weld lines, short shot, and burrs.
- 2. Reduced rejection rate**  
PORCERAXII® allows air and gases to be extracted through the die material itself, eliminating gas-related defects and greatly reducing casting rejects.
- 3. Improved casting precision**  
PORCERAXII® dies create high quality castings with better pattern duplication, finer casting appearance, and less need for finishing after casting.
- 4. Reduced energy consumption**  
PORCERAXII® porosity decreases back-pressure within the die cavity. This allows for a reduction in injection pressure, which lowers energy consumption.
- 5. Reduced material consumption**  
Highly accurate PORCERAXII® dies and the elimination of burning defects cuts down on amount of casting material needed.
- 6. Reduced labor costs**  
PORCERAXII® is easy to use and produces castings that require very little post-casting treatment. This reduces the amount of labor necessary, which lowers labor costs.

## PORCERAXII® SOLVES YOUR PROBLEMS.

Avoids irregular luster



conventional casting



PORCERAXII®

Avoids short shot

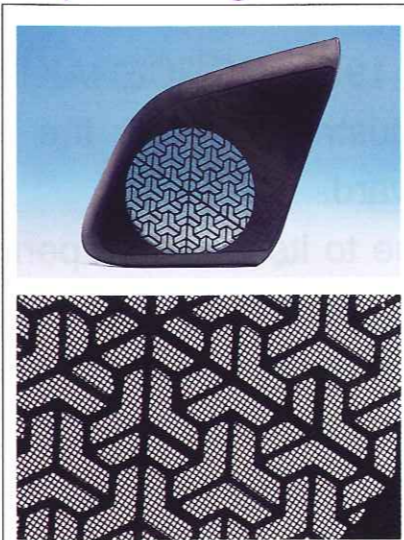


conventional casting



PORCERAXII®

Intricately detailed one piece forming



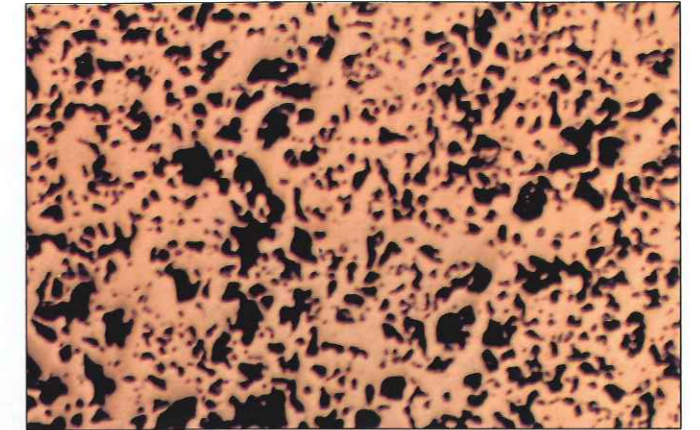
enlarged

PORCERAXII®

## WHAT IS PORCERAXII®?

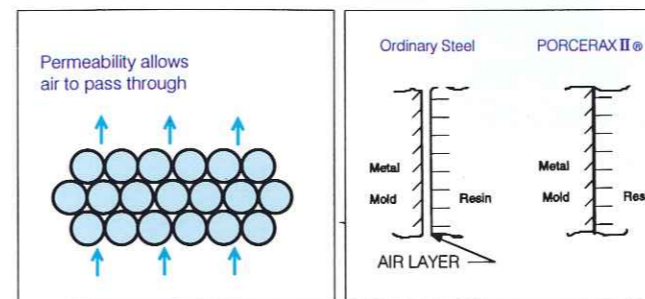
### Porous Composition

PORCERAXII® is a metal with a pumice-like composition. PORCERAXII® metallic dies are 20-30% porous by volume due to a system of interconnected pores. Average pore diameter is 10  $\mu\text{m}$ .



Magnified Photo PORCERAXII® Material

### Effective Gas Release



Resin shrinkage generally occurs when a layer of air or gas is trapped between the mold surface and the resin. PORCERAXII® allows the extraction of this gas, avoiding the problems of shrinkage and uneven luster due to irregular adhesion of the resin to the mold surface.

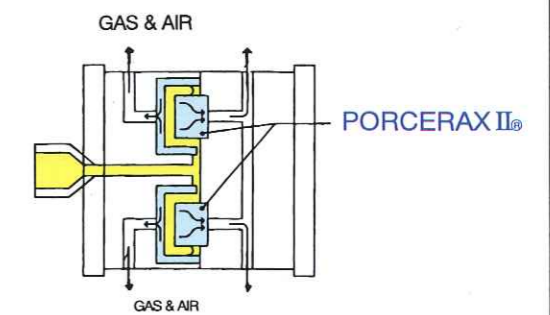
### One Piece Forming

PORCERAXII® simplifies die structure and gating systems through one piece forming.

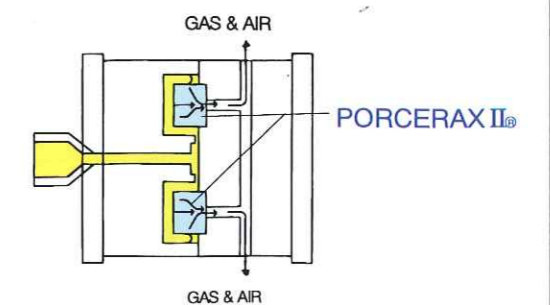
### Partial Usage

PORCERAXII® can be used as part of a die. PORCERAXII® is used at specifically chosen points in order to release gases during injection.

#### FULL DIE USE



#### PARTIAL DIE USE



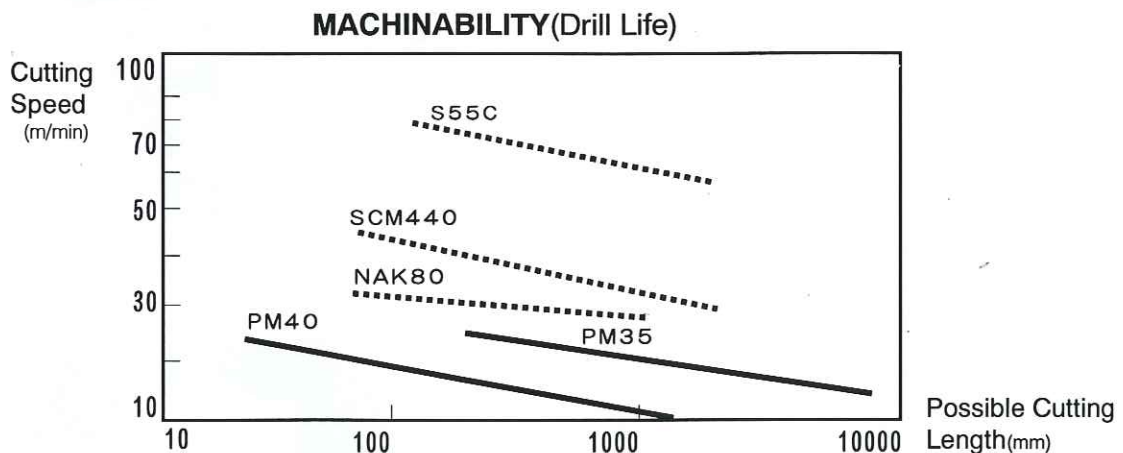
## ● CHARACTERISTICS

ITEM \ TYPE	PM40	PM35
Average Pore Size	7 $\mu$ m	20 $\mu$ m, 7 $\mu$ m, 3 $\mu$ m
Porosity	~25%	
Density	6.0~6.2 g/cm <sup>2</sup>	
Linear Expansion Coefficient (at 20~150°C)	12.0~12.5 $\times$ 10 <sup>-6</sup> /°C	
Heat Transfer Coefficient (at Room Temp.)	0.07~0.08 cal/cm $\cdot$ sec $\cdot$ °C	
Bending Strength (MPa)	800~850	700~750
Tensile Strength(MPa)	500~550	450~500
Hardness (HMV)	400~450	350~400
HSS Machinability	fair	good

7 $\mu$ m is adequate for general applications. 3 $\mu$ m is recommended when rubber is being cast, thermosetting is desired, or when a minute grain or mirror finish is required. Please refer to the attached data for the difference in maximum extraction rates between 3 and 7 $\mu$ m.

## ● COMPARATIVE CUTTING DATA

PORCERAX II<sup>®</sup> has the equivalent mechanical strength of normal molds.



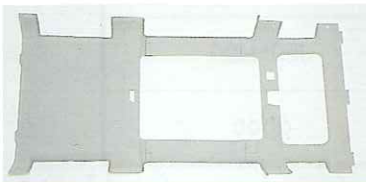
TEST CONDITION TOOL:SKH51 drill, SHAPE:  $\phi$  10mm standard bit angle (118°) FEED: 0.15mm/rev DEPTH: 30mm  
CUTTING OIL:none ASSESSMENT OF TOOL LIFE:until tool melts

# Sinto Meets All of Your Forming Needs.

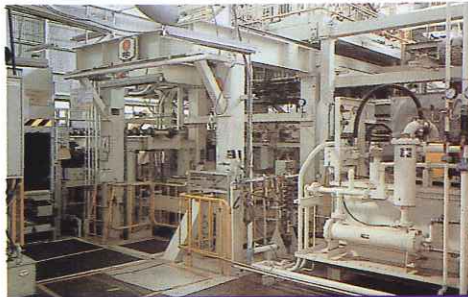
## "Forming Equipment, Molds and Forming Software"

Sinto can supply a total forming system, including permeable dies, vacuum forming machinery, vacuum-pressure forming machinery, and application software to fulfill all of your forming technology requirements.

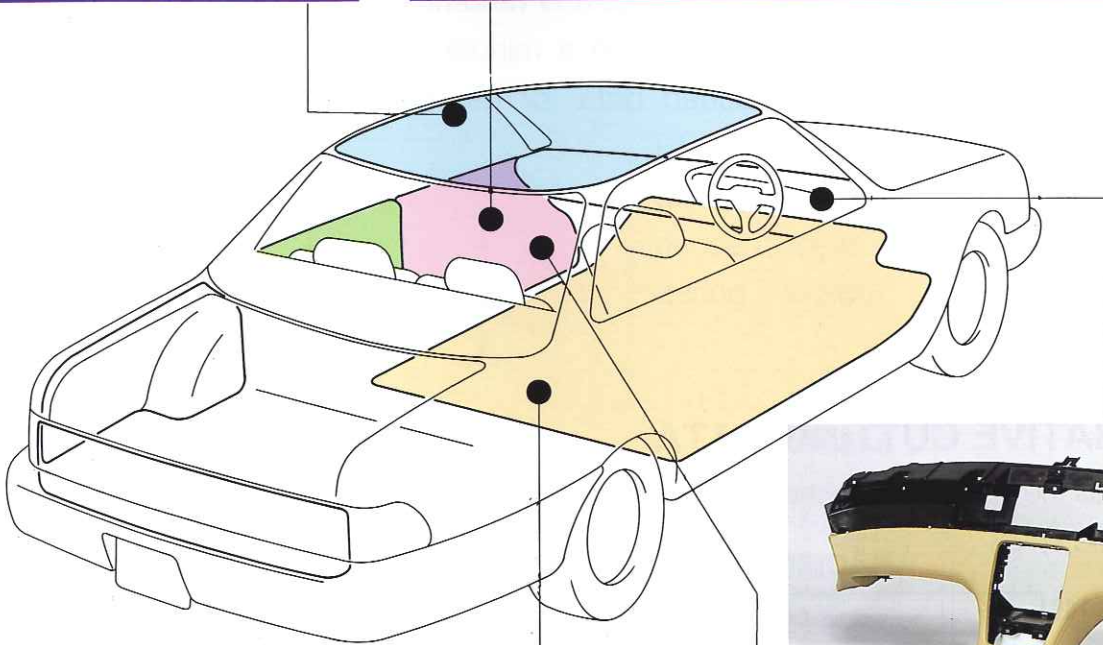
For the automotive industries, Sinto offers the VPM series. The VPM series covers the entire spectrum of machinery necessary to produce individual pieces or full production runs for automobile interiors.



Ceiling Panels



Door trim



Surface sheet of instrument panel

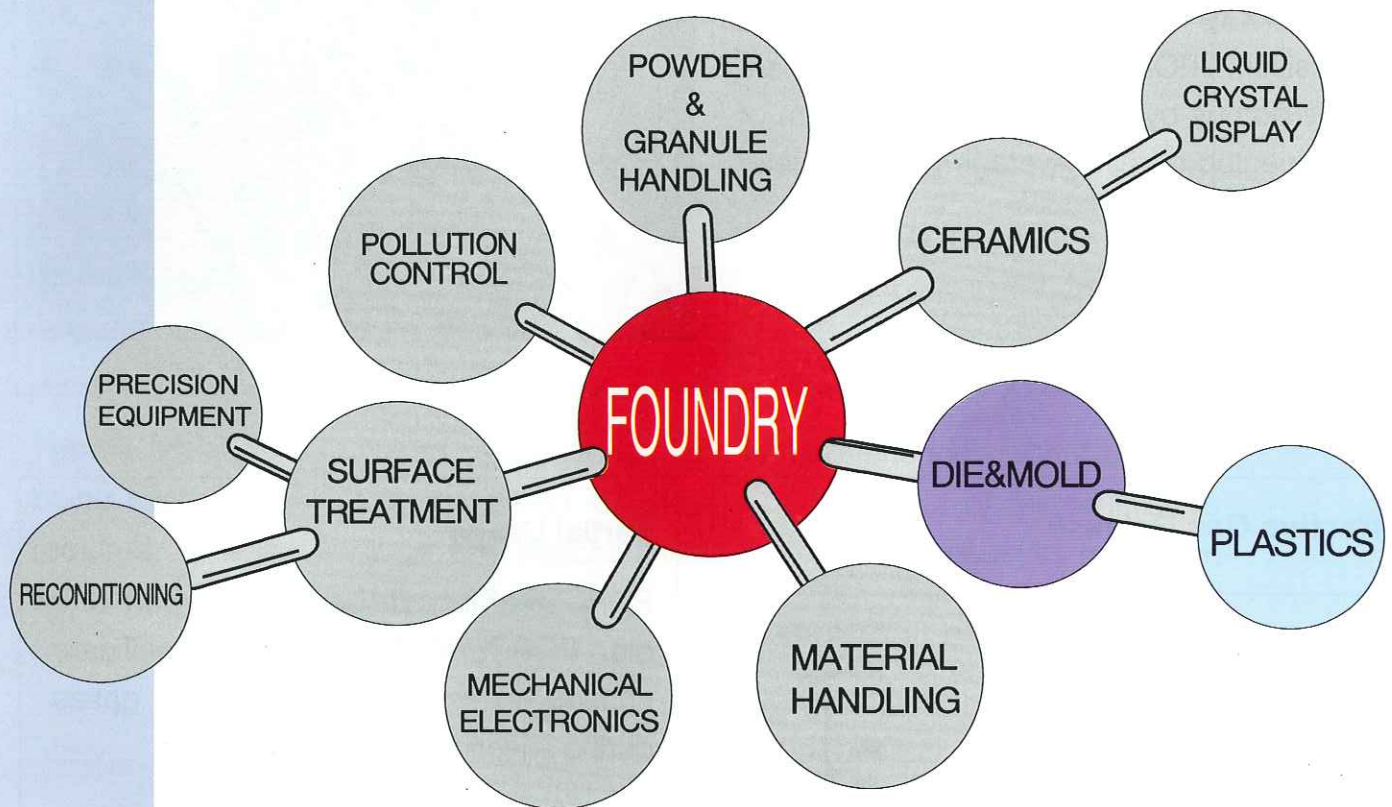


Floor carpeting



Trimming piercing (Door trim)

# Giving Form and Life To Process Materials



Since 1934, Sintokogio, Ltd. has understood the importance of continually striving for technological excellence and manufacturing products to meet the needs of its customers. As a result of this focus on advancing technology and customer satisfaction, Sinto has grown from foundry equipment manufacturing into a wide variety of foundry-related industries. PORCERAXII® is one of the latest technological developments from Sintokogio, Ltd. and the Sinto Group of companies.



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