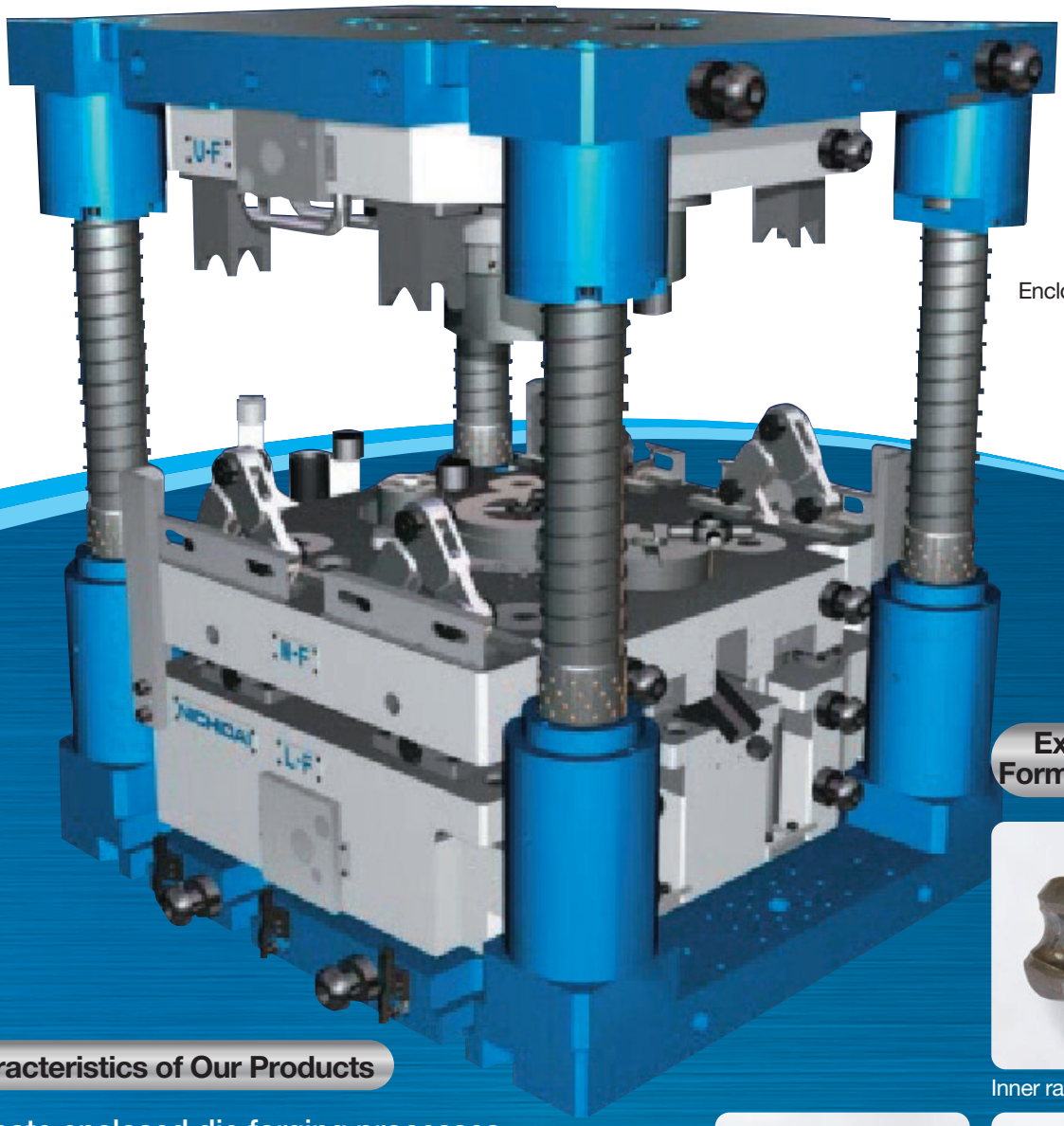
Enclosed Die Set

NICHIDAI

We created a net shaping process for our customers' complicated products by using the clients' presses and our Enclosed Forging Die Set that we developed on our own.



Enclosed Die Set

Characteristics of Our Products

- Create enclosed die forging processes by simply adding our dies to general purpose presses
- Utilize our proprietary link system
- Produce a variety of enclosed die forging products by merely changing the length of the pantograph

Examples of Formed Products

Inner races

Bevel gears

Cross joints

NICHIDAI CORPORATION
The best partner in precision forming technology

URL: https://www.nichidai.jp

Enclosed Die Set

Product Specification

Pantograph-type Hydraulic Enclosed Die Set

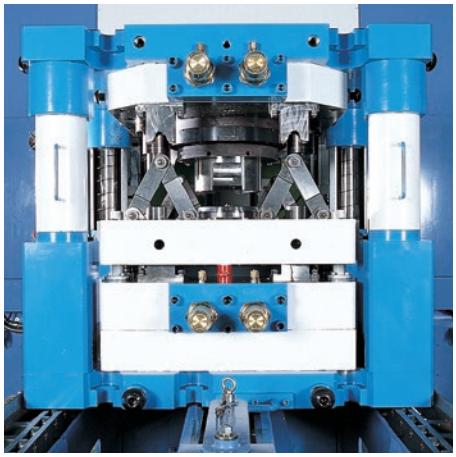
Specifications (actually used for manufacturing)

Enclosing load : MAX 1,960KN
Enclosing stroke : 20–30mm (two-sides)
: 20–50mm (one-side)
Press : 200–1,250ton
Die height : 500–1,200mm
Slide stroke : 200–400mm

Hydraulic Back Pressure Die Sets

Specifications (actually used for manufacturing)

Enclosing load : MAX 3,920KN
Enclosing stroke : 50–70mm
Press : 600–1,000ton
Die height : 900–1,200mm
Slide stroke : 400mm



Gas Pressure-type Enclosed Die Sets

Specifications (actually used for manufacturing)

Enclosing load : MAX 1,960KN
Enclosing stroke : 25–50mm (one-side)
Two-side type can be produced.
Press : 600–1,200ton
Die height : 600–1,200mm
Slide stroke : 400–500mm

Gas Pressure-type Back Pressure Die Sets

Specifications (actually used for manufacturing)

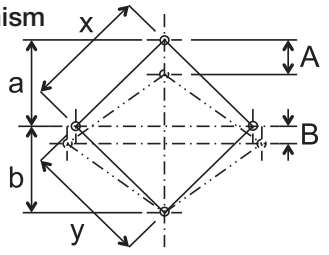
Enclosing load : MAX 4,340KN
Enclosing stroke : 45–55mm
Press : 600–1,000ton
Die height : 1,000mm
Slide stroke : 400mm

Features of Enclosed Die Set

Hydraulic Type vs. Gas-pressure Type Comparison Table

		Hydraulic type	Gas-pressure type
(1) Operating force		Mineral oil	N2 gas
(2) Cylinder / Piston		Specialty	General purpose
(3) Quantity		1	Multiple parts
(4) Capacity range		2,000KN	2,000KN
(Setup pressure)		∼20MPa	∼14MPa
(5) Pressure control		Available	Not available
(6) Enclosing stroke	One side	∼40mm	∼40mm
	Both sides	∼25mm	∼25mm
(7) Production speed		∼38spm	∼580mm/sec
(8) Peripheral equipment		Hydraulic system	—
(9) Other peripheral equipment		Piping, cooling water, etc.	Nothing

Pantograph Mechanism



a : Upper link height **X : Upper link length** **A : Swaging stroke**
b : Lower link height **y : Lower link length** **B : Lower die stroke**

From the diagram shown above,

$x^2 - a^2 = y^2 - b^2$ [1]

$x^2 - (a - A + B)^2 = y^2 - (b - B)^2$ [2]

Eliminating x and y from equations [1] and [2],

$$B = \frac{aA - A^2/2}{a+b-A} \quad [3]$$

Case I If speed ratio is 1 : 1 (top / bottom), we get A = 2B.
and, from equation [3], we get b = a.

Case II If speed ratio is 2 : 1 (top / bottom), we get A = 3B.
and b = 2a – A / 2.

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