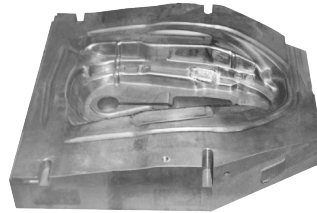


Outline of DieAce for Dies

DIE MATERIALS

What is DieAce SO390, SO350 and SO330

DieAce is a material developed for draw dies for press stamping. It is a highly hardened special copper alloy casting. DieAce can smoothly function without lubrication in harsh areas where scoring or seizure may occur. This die material has an excellent durability.



■ Features of DieAce

- (1) Since the material is a special copper alloy casting which can be built to precision, a desired shape can be designed and machining allowance is small. This can accordingly reduce the manufacturing hours.
- (2) Since DieAce is excellent in wear resistance and lubrication, the die life can be extended and the draw process can be reduced.
- (3) Since DieAce has good heat conductivity and sliding property. There is no scoring on panels or dies.

SO390 - The material is good for cutting and is excellent in wear resistance and self-lubrication.

SO350 - The material is highly hardened and is suitable for forming stainless steel or high strength steel.

SO330 - The material is good for welding. It is the most popular material.

■ Features

- (1) Metal microstructure

DieAce is an aluminum bronze casting consisting of 5 elements; Cu, Al, Mn, Fe and Ni. The main structure consists of 3 elements; Cu, Al and Mn. With addition of Fe, a fine structure is achieved. With addition of Ni, corrosion resistance is improved.

- (2) Physical properties

		SO390	SO350	SO330
Specific gravity	g/cm ³	7.2	7.6	7.6
Linear expansion coefficient	10 ⁻⁵ /°C	1.71	1.71	1.70
Thermal conductivity	cal/(cm·sec)	0.11 to 0.12	0.20	0.13 to 0.15
Melting point	°C	960 to 1030	985 to 1040	985 to 1040
Modulus of longitudinal elasticity	Gpa	145	135	135

- (3) Mechanical properties

		SO390	SO350	SO330
Hardness	HB	280 or more	330 or more	280 or more
Elongation	%	0.5 or more	0.5 or more	1 or more
Tensile strength	N/mm ²	600 or more	780 or more	850 to 950

■ Machining conditions (Reference)

Machining Classification	Cutter	Machining conditions		
			SO390 Dry machining	SO350/SO330 Wet machining
Drilling	Super hard type K	Cutting speed	35 to 40	20 to 40
		Feed	0.1 to 0.15	0.1 to 0.15
Milling	Rough cutting	Cutting speed	125 to 150	70 to 80
	High speed cutter (Super hard type K)	Feed(Notes)	0.5 to 0.8	0.1 to 0.15
		Cut	1.0 to 2.0	1.0 to 2.0
	Finish machining	Cutting speed	150 to 160	150 to 160
		Normal tip (Super hard type K)	Feed(Notes)	0.1 to 0.2
		Cut	0.2 to 0.5	0.2 to 0.5
End milling (side machining)	Rough cutting	Cutting speed	250 to 350	20 to 40
	Chipping type (Super hard type K)	Feed(Notes)	0.15 to 0.25	0.15 to 0.25
		Cut	3.5 to 5.0	1.0 to 2.0
	Finish machining	Cutting speed	150 to 180	20 to 40
		Solid (Super hard type K)	Feed(Notes)	0.05 to 0.1
	Cut	0.05 to 0.1	0.05 to 0.1	
Tapping	High speed steel	Cutting speed	1 to 2	1 to 2
Reaming	High speed steel	Cutting speed	10 to 15	1 to 3
		Feed	0.1 to 0.15	0.05 to 0.1
Ball end mill machining	Rough cutting	Cutting speed	150 to 200	50 to 70
	φ50 (Super hard type K)	Feed(Notes)	0.3 to 0.7	0.1 to 0.3
		Cut	<10.0	<5.0
	Finish machining	Cutting speed	<200	<100
		φ10 (Super hard type K)	Feed(Notes)	0.3 to 0.5
	Cut	<0.3	<0.3	

Unit: Speed (m/min), Feed (mm/rev), Cut (mm)

(Note) Feed unit of milling (mm/cutter)

$$V = \frac{\pi \cdot dn}{1000} \quad d: \text{Cutter diameter (mm)}, n: \text{Revolution}$$

*Conditions may vary depending on the machine.

■ Notes:

Always machine the surface with a sticker, which is put on the surface of each DieAce at the time of delivery, indicating "Please use the surface with a sticker as the sliding surface". Machining the other surfaces may result in quality issues.



Order

Catalog No.

SO390
SO350
SO330

For your order

- In principle, provide us the casting wood pattern of the die insert or the polystyrene foam pattern.
- The finish allowance (one side) is as shown in the table below. Allow shrinkage of 18/1000. (mm)

Catalog No.	Assembly allowance	Casting size	≤300	≤500	≤800	> 800
SO390	25/1000	Surface used for die stamping	5.0	5.0	7.5	7.5
		Machining surface other than die stamping	5.0	5.0	7.5	7.5
SO350 SO330	22/1000	Surface used for die stamping	5.0	7.5	10.0	10.0
		Machining surface other than die stamping	5.0	5.0	5.0	7.5

- The appearance for delivery shows finishing allowance of 5 to 10 mm on the die face casting.
- If a drawing is supplied, we will be able to manufacture wood pattern or polystyrene foam pattern.
- Please order the products within the range in the table below: (mm)

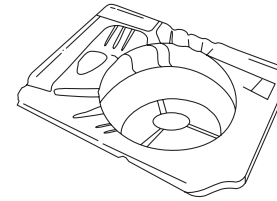
Catalog No.	Width	Length	Thickness	Remark
SO390	1,000 or less	1,000 or less	60 to 200	500kg or less
SO350	1,000 or less	1,000 or less	60 to 200	500kg or less
SO330	1,000 or less	1,500 or less	60 to 200	500kg or less

Please contact your local sales representative if your request is out of above conditions.

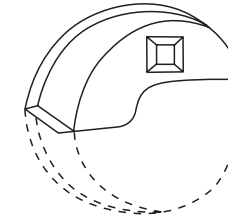
Major Applications

Die Ace can not only be used for the die face as draw die materials but also be used as a part of local forming die or as sectional block in the flange or restrike die material.

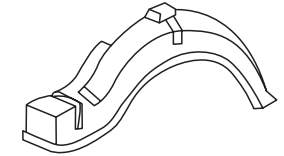
Dies for Automotive



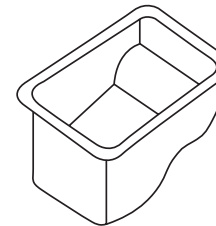
Rear floor



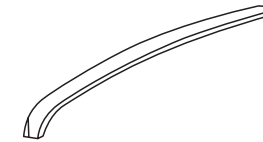
Wheel house (inner)



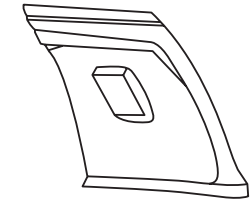
Wheel house (outer)



Oil pan



Roof side inner



Rear pillar (outer)

Others...Rear floor, bumper side, side sill outer, front bumper, center pillar outer, pillar outer lower, radiator grille, rear fender, rear seat back

Other dies

Draw die for kitchen: Dies for sink, dies for kitchen, dies for table ware, etc.

Draw die for air conditioner: Draw dies for gas water heater front cover, kerosene heater tank, etc.

Draw die for electric appliances: Dies for refrigerator, electronic microwave oven, washing machine, pot, electric rice cooker, gas burner table, lighting appliances, etc.

Draw die for heavy electric machines: Draw dies for control panel box, motor case, motor cover, etc.

Draw die for washing and water equipment: Draw die for wash basin, dies for washing equipment, draw die for bath, dies for various water equipment, etc.

Roll forming die: Car door sash roll forming, pipe roll forming, window sash roll forming

Forming die for steel pipes: Tool for pipe bender, pipe joint draw die, bend die for various steel pipes, etc.

Other dies: Draw dies for governor cleaner, air cleaner house, stainless steel, etc.