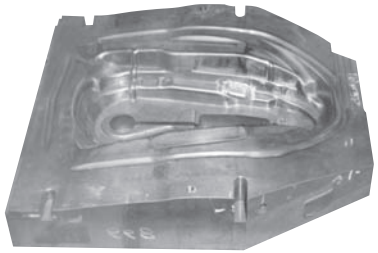
Outline of Die-Ace for Dies

DIE MATERIALS

ADDTION

What is Die Ace SO390, SO350 and SO330



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

■Features of Die Ace

(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 Die Ace is excellent in wear resistance and lubrication, the die life can be extended and the draw process can be reduced.

(3) Since Die Ace 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

Die Ace 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/cm³	7.2	7.6	7.6
Linear expansion coefficient	10^{-5}/°C	1.7	1.7	1.7
Thermal conductivity	W(m·K)	45.7～50.6	81.3～84.5	54.4～62.8
Melting point	°C	960～1030	985～1040	985～1040
Modulus of longitudinal elasticity	GPa	145	135	135

(3) Mechanical properties

		SO390	SO350	SO330
Hardness	HB	270～290	330～340	280～300
Elongation	%	0.5 or more	0.5 or more	1 or more
Tensile strength	N/mm²	600 or more	780 or more	850～950

■Machining conditions (Reference)

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

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

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

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

*Conditions may vary depending on the machine.

Die Ace

DIE MATERIALS

Order

Catalog No.
SO390
SO350
SO330

■For your order

(1) In principle, provide us the casting wood pattern of the die insert or the polystyrene foam pattern.
(2) 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	20/1000	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	18/1000	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

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

(mm)

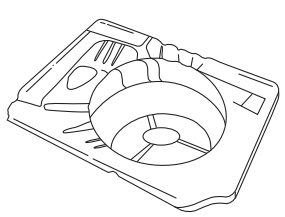
Catalog No.	Width	Length	Thickness	Remark
SO390	1,000 or less	1,000 or less	60 or more	500kg or less
SO350	1,000 or less	1,000 or less	60 or more	500kg or less
SO330	1,500 or less	2,000 or less	200 or less	1000kg or less

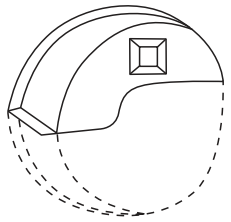
(6) Welding
◎Special electrode for SO330, 350, 390 is available.
◎Please contact the nearest sales office if there is any question on welding.

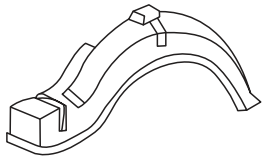
■Major Applications

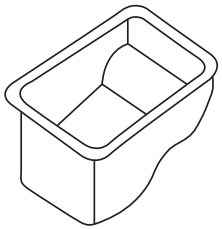
Die Ace can not only be used for the die face as draw die materials but also be used as a part of local forming die or as sectional block in the flange or restrike die material.

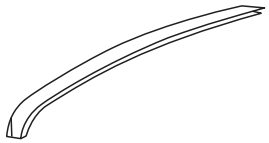
●Dies for Automotive

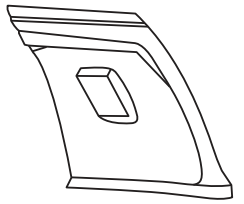

Rear floor


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.