

### Die clearance

Die clearance is the total space between die and punch.

A correct clearance between the punch and the die assures normal wear of the tool and punching without defect such as: burrs on the piece in the case of excessive clearance and premature wearing of the tool and increased punching force in the case clearance being too small.

Material				
Thickness mm	Mild steel 16-20%	Stainless steel 18-24%	Aluminum 12-16%	Copper 10-14%
0,5 – 0,6	0,08-0,1	0,1-0,12	0,06 - 0,08	0,05 – 0,06
0,8	0,14 - 0,16	0,15 - 0,2	0,1-0,14	0,08 - 0,1
1	0,16 - 0,2	0,18 - 0,24	0,12 - 0,16	0,1-0,14
1,2	0,2 - 0,24	0,24 - 0,3	0,15 – 0,2	0,12 - 0,15
1,5	0,25 – 0,3	0,27 – 0,35	0,18 - 0,24	0,15 - 0,2
2	0,34 - 0,4	0,36 – 0,45	0,24 – 0,3	0,2 – 0,25
2,5	0,45 – 0,5	0,45 – 0,55	0,32 – 0,35	0,25 – 0,3
3	0,5 – 0,6	0,6 - 0,7	0,35 -0,45	0,3 - 0,4
4	0,65 – 0,8	0,7 – 0,95	0,45 - 0,6	0,4 - 0,5
5	0,85 – 1	0,9 - 1,15	0,6-0,8	0,55 – 0,65
6	0,95 – 1,2	1,1 – 1,4	0,75 – 0,95	0,7 – 0,85

In case of blanking mild steel and stainless steel clearance is 15% of material thickness. In case of blanking aluminum and copper clearance is 10% of material thickness.

### **Dies lock slug**

SUCE lock slug dies eliminate slug pulling. This condition manifests where the slug returns to the top of the sheet during the stripping portion of the punching cycle. Because of this the slug comes between the punch and the top of the sheet on the next cycle, causing damage to the piece part and the tooling. How to avoid this problem?

The SUCE NO-SLUG has been designed with a reduction point of the shape below the surface so the slug cannot return once it passes through this point.



Once the slug is separated from the punch, it is free to fall through the die. Slug pulling is eliminated. This solution isn't suggested with slug exhaust system machines ; AS lock slug design with protrusions is best solution with thickness more than 3mm, minimum cl for AS system is 0.15mm. SUCE Lock slug E and A system is a standard for all Suce dies, AS is on request, reduced land is a standard for thick turret dies rt80x5 rt80x6 rt110x5 rt110x6.

Lock slug AS best option when thickness > 2.5mm



2017

different angles insures the locking of the slug

System E: 3 cuts with



### **Tools sharpening**

Before starting, make sure that punch and die cutting edge are in perfect condition. Accurate maintenance of the tools guarantees a normal wearing and the result of punching will be without residual burr and defects. Regular sharpening of the 0,1 mm punch and 0,2mm die guarantees a constant life time of tooling.

It is preferable that grinding operation is made with tangential grinding machine with adequate cooling in order to avoid tool tempering; after grinding it is necessary to demagnetize the tools with an appropriate demagnetizer. If a urethane ejectors is applied, restore the initial hole depth in such a way that the ejector can be compressed.

### **Punching force**

Before starting ensure that punching force doesn't exceed the capacity of punching machine. In order to calculate the punching force in kg, use the following formula:

### perimeter of the shape (mm) x thickness (mm) x 4/5 x shear strength\*

\*mild steel 40-50 kg/mm2 stainless steel 60-70 kg/mm2 aluminium 20-25 kg/mm2

A sharpening other than the flat one reduces both punching stress and punching noise. Therefore to ascertain the true punching force, multiply the pressure calculated using the above formula by the sharpening factor:

Sharpening height (mm)		Thickness (mm)											
	1-1,5	2	3	4	5	6							
1	0,75	0,9	1	1	1	1							
1,5*	0,5	0,6	0,7	0,95	1	1							
3**	0,5	0,5	0,5	0,6	0,7	0,75							
1,5* 3**	0,75 0,5 0,5	0,6 0,5	0,7 0,5	0,95 0,6	1 1 0,7	1 1 0,7							

\* standard shear height thick turret style

\*\* standard shear height Trumpf style

### The shear options

Double valley Cod 3P	Roof top Cod V	Inverted roof top Cod VR	<b>Whisper</b> Cod W	Four ways Cod 4P
Best option when shape is long, but susceptible to breakage	Best option when punching force is high, punching surface 75%	Best option for nibbling but inverted stresses could cause breakage	Recommended only for blanking (turret machine)	Recommended for round and square

Punches are flat, above shear are available upon request ;each type of sharpening reduces noise up to 50%



### **General rules**

In order to optimize the use of tooling we would recommend the following basic guidelines:

a) the punching surface must not be lower than 60% of the used punch surface, isn't recommended to punch the edge of the sheet less than 2.5 times material thickness

b) in case of nibbling, minimum feed must be 0,5 x thickness , smaller round punch with thickness 1mm is 4mm , smaller round punch with thickness 2mm is 6mm , smaller round punch with thickness 3mm is 8mm.

c) before exceeding tons capability calculate punching force with formula on page 3.

d) the tool dimension must not be lower than the material thickness and the shorter side must be at least 5% of the longest side.

e) the advantage of the technical improvements of some models of dies punching penetration should be at least 2.5mm.

f) slitting tools must be appropriately sharpened.

g) the use of the steels commonly called High Speed Steel for our punches allows the punching of any steel. However, in order to considerably increase the punching effectiveness and reduce cold welds, apply some type of coating, such as TICN, HDP, FNC and use oil lubricant on sheet surface.

h) ensure that tooling cutting edges are without seizing or cold welding material; if any , remove them with a diamond file.

i) radius on punch corner is 0.25mm, constant radius on the corner of the dies ensures proper wear and a uniform burr.

I) delivery time trumpf and thick turret tooling: 2/3 days standard, 5/7 coating tools, some items are available in stock.







# ISODUR

### A tough, "long distance runner" with an optimum chemical composition

**ESR electro slug remelting** : a tried and tested remelting technology developed by Bohler gives the material the homogeneity it needs. A prerequisite for the best performance

ESR Manufacture improved service life due:

- Least possible inclusion content
- Lower micro and macro segregation
- Good homogeneity and higher degree of purity
- A homogeneous structure throughout the entire cross-section and bar length
- Producing larger bar dimensions at a constant carbide distribution
- Uniform correction of dimensions
- A broad range of application due to a high degree of toughness



The new K360 isodur is a further development of the 8% chromium steels and has been developed to meet the needs of customers now more than ever. High toughness and, a remarkably high compressive strength, together with good resistance make this steel a real problem solver.

This steel is particularly outstanding when adhesive and abrasive wear resistance are necessary; it allows a considerable increase in performance , your productivity will increase and your costs per part will be reduced





## **Powder steel metallurgy**

Today Suce provides, in addition to the traditional HSS punches,

of new variety of tools, Trumpf style and Thick turret style made in powder steel metallurgical.



### One of them is **K490.**

Research shows that the **K490 Microclean**, thanks to its chemical composition, is the best steel in the punching market. If you compare it with other powder steels, for example M4 and PM23, you will find that it assures twice the toughness with the same wear resistance.

This new material is characterized by:

### - A high adhesive and abrasive wear resistance

More hits between regrind operations increases tool life , wear resistance double than traditional HSS M2

- A high toughness reduces risk of breaking the punch

In the catalogue POWDER STEEL punches are marked in RED , available items:



### Test result

In order to ensure the best choice of steel for our tools, are carried out periodically punching test with punching machine



200.000 hits stainless steel AISI 304 it doesn't need to be sharpened! Graphic shows nr of hits before first sharpening punching mild and stainless steel with HSS and PSM tool Tool tested square 6mm

suce





K490 Chemical	composition:
Carbonium	1,40%

Carbonnann	1,40 /0
Chromium	6,40%
Molybdenum	1,50%
Vanadium	3,70%
Tungsten	3,50%

### Coating

## HDP ACTION

## high density plasma

Among other innovations brought by the HDP technology is a very versatile coating which can be widely used for various applications. HDP was developed to find a universal solution for the most traditional machining processes and to guarantee a constant yield and best performance of the tools.



Available with punches:

Trumpf, Amada, Finn Power, Euromac, Lvd, Rainer, Salvagnini, Tecnology, Wiedemann, Boschert, Tailift, Danobat, Durma, Ermaksan...

Test result



Coating is intact after 125.000 hits nibbling 1mm stainless steel

### **CHARACTERISTICS:**

•Extraordinary toughness - this is the strong point of this coating and makes it versatile and particularly suitable for various applications

•Adhesion to the surface - the HDP technology makes it possible to obtain maximum adherence of the coating to the surface and makes the "tool/coating" combination become a whole.

• Microhardness - the very compact HDP Red layer, with a thickness of only 3 microns, gives a hardness which represents a solid barrier against wear and guarantees a unique performance.

•Low friction coefficient - this is another important characteristic, which becomes evident thanks to the glossy layer. The low friction coefficient has been made possible thanks to the HDP technology which makes the application of coatings almost "dropletfree" (residual macro-particles on the surface). If they are not removed, these droplets affect the surface roughness.

Structure	MicroHardness (HV 0.05)	Friction coefficient (100 cr6)	Thickness (micron)	Deposition temperature (°C)	Max temperature (max°C)	Colour
Multilayer	3.800	0.25	1-3	480	400	RED



### Coating

## Double coating **FNC**

The double coating is obtained by overlaying the traditional TICN with Movic self-lubricating coating.



MOVIC is a self-lubricating and anti-adhesive coating based on MoS2 (Molybdenum), which is produced by PVD sputtering Magnetron technology.

MOVIC has been developed in the aerospace to find alternatives to traditional oils (eg oil, grease) when their use is not permitted and it has shown excellent tribological features that made it very interesting for a variety of new applications.

Available with punches:

Trumpf, Amada, Finn Power, Euromac, Lvd, Rainer, Salvagnini, Tecnology, Wiedemann, Boschert, Tailift, Danobat, Durma, Ermaksan...

### **SPECIFICATIONS:**

•Self-lubricating single-phase coating based on MoS2.

•"Soft" coating with very low coefficient of friction (friction coefficient in dry air <0.05).

•Single-layer coating that can be combined with any hard coating.

•Functional Thickness of Coating <0.5 microns.

•Deposition temperature <150 ° C.

•Soft wear residues, lubricants (behavior Fail-safe: no abrasive particles from wear of the coating).

•Excellent running for rough surfaces. (Coating becomes smoother during the running in.)

•Positive transfer of lubricant film on the side in contact.

•can be easily re-covered without removal. If necessary the removal is easily achievable.

Structure	Micro-Hardness (HV 0.05)	Friction Coefficient (100 cr6)	Thickness (micron)	Deposition temperature (°C)	Max temperature (max°C)	Colour
Single layer	_	<0.1	1	<150	-	GREY



### MULTITOOL Index



- P11 multitool style Mate 20-8 & 24-8 , 10-16 , 6\_8-24 , die shims
- P12 multitool style Mate XMTE6 , XMTE12.7 , XMTE4 for EUROMAC
- P13 PRIMAPOWER MT20Ri , MT8Ri , MT3Ri , PASS style MT8Ri3-16
- P14 PRIMAPOWER MT8RI3-16 , ERMAKSAN multitool 6-22mm , DURMA multitool 6-24



MULTITOOL Mate style 20-8 & 24-8mm									
Data: Max size 8,00mm Regrinding life: Punch 1mm , Die 0,5mm Regrinding life*: Punch 2mm , Die 1,5mm *with Euromac MTE10					0				
item	PUNCH HSS	€	PUNCH PSM	€	STRIPPER	€	DIE ISODUR	€	
ROUND	AMA0PSM2006T		AMA0PSM2002T		AMA0PLM20T		AMA0MAM2001T		
STANDARD			AMA0PSM2002S		AMA0PLM20S		AMA0MAM2001S		
SPECIAL 0			AMA0PSM2002C		AMA0PLM20D		AMA0MAM2001D		
SPECIAL 1			AMA0PSM2002D		AMA0PLM20D		AMA0MAM2001D		
SPECIAL 2			AMA0PSM2002F		AMA0PLM20D		AMA0MAM2001D		
Coating HDP FN	IC								

MULTITOOL Mate style 10-16mm						
Data: Max size 16,00mm Regrinding life: Punch 1mm , Die 0,5mm					10.25	
item	PUNCH ISODUR	€	STRIPPER	€	DIE ISODUR	€
ROUND	AMA0PUM1606T		AMA0PLM16T		AMA0MAM1601T	
STANDARD	AMA0PUM1606S		AMA0PLM16S		AMA0MAM1601S	
SPECIAL 0	AMA0PUM1606C		AMA0PLM16D		AMA0MAM1601D	
SPECIAL 1	AMA0PUM1606D		AMA0PLM16D		AMA0MAM1601D	
SPECIAL 2	AMA0PUM1606F		AMA0PLM16D		AMA0MAM1601D	
Coating HDP FN	IC					

MULTITOOL Mate style 6-8-24mm						
Data: Max size 24,00mm Regrinding life: Punch 1mm , Die 0,5mm Regrinding life*: Punch 2mm , Die 1,5mm *with Euromac MTE10		Ţ	And Service		11.15E	
item	PUNCH ISODUR	€	STRIPPER	€	DIE ISODUR	€
ROUND	AMA0PUM2406T		AMA0PLM24T		AMA0MAM2401T	
STANDARD	AMA0PUM2406S		AMA0PLM24S		AMA0MAM2401S 0°-90°135°	
SPECIAL 0	AMA0PUM2406C		AMA0PLM24D		AMA0MAM2401D 0°-90°135°	
SPECIAL 1	AMA0PUM2406D		AMA0PLM24D		AMA0MAM2401D 0°-90°135°	
SPECIAL 2	AMA0PUM2406F		AMA0PLM24D		AMA0MAM2401D 0°-90°135°	
Coating HDP FN	VC					

DIE SHIMS						
	C		0		0	
item						
	Set n.24 pz Mt 24-8mm	€	Set n.10 pz Mt 10-16mm	€	Set n.6 pz Mt 6/8-24mm	€
0,1mm	AMA0MAM20SP10		AMA0MAM16SP10		AMA0MAM24SP01	
0,2mm	AMA0MAM20SP20		AMA0MAM16SP20		AMA0MAM24SP02	
0,5mm	AMA0MAM20SP60		AMA0MAM16SP60		AMA0MAM24SP05	



	<b></b>							
Noto ctulo XMTE6 24mm	EO							
Data: Regrinding life: Punch 2.6mm , *Adjustable 9mm Die 1,5mm Max size 24,00mm, Max size die is 24.4mm		11			U		100.3B	
item	PUNCH ISODUR	€	PUNCH ADJUSTABLE	€	STRIPPER	€	DIE ISODUR	€
ROUND	AMA0PUM24C6T		AMA0PUM24D6T		AMA0PLM24CT		AMA0MAM2401T	
STANDARD	AMA0PUM24C6S		AMA0PUM24D6S		AMA0PLM24CS		AMA0MAM24B1S	
SPECIAL 0	AMA0PUM24C6C		AMA0PUM24D6C		AMA0PLM24CD		AMA0MAM24B1D	
SPECIAL 1	AMA0PUM24C6D		AMA0PUM24D6D		AMA0PLM24CD		AMA0MAM24B1D	
SPECIAL 2	AMA0PUM24C6F		AMA0PUM24D6F		AMA0PLM24CD		AMA0MAM24B1D	
		ł						
		·						
		£	PUNCH HEAD	£				
	AMB105PST006T	· ·	AMA0TFM24	c				
					LI			
Coating PUNCH INSERT HDP	PUNCH INSERT	FNC	HDP		FNC			



EUROMAC MULTITOOL XMT	E4							
Mate style XMTE4 4B 31.7mm Data: Regrinding life: Punch 8mm , Die 2,5mm Max size 31,70mm Max tonnage: 22tons			H STRIPPER 11mi	m	H STRIPPER 7mm			
item	PUNCH SMART ISODUR	€	STRIPPER XMTE4	€	STRIPPER STD B	€	B DIE ISODUR	€
ROUND	AMB1IPLLNL6T		AMB1PLMT4T		AMB1PLWTT		AMB1MAT006T	
STANDARD	AMB1IPLLNL6S		AMB1PLMT4S		AMB1PLWTS		AMB1MAT006S	
SPECIAL 0	AMB1IPLLNL6D		AMB1PLMT4D		AMB1PLWTD		AMB1MAT006D	
SPECIAL 1	AMB1IPLLNL6C		AMB1PLMT4D		AMB1PLWTD		AMB1MAT006D	
SPECIAL 2	AMB1IPLLNL6F		AMB1PLMT4D		AMB1PLWTD		AMB1MAT006D	



PRIMA POWER MULTITOOL						
Wilson style MT20Ri , MT20i 8mm						
Data: Max size 8mm		ž	0			
item	PUNCH HSS	€	STRIPPER	€	DIE ISODUR	€
ROUND	AMA0PUM2006T		AMA0PLM20T		AMA0MAM2001T	
STANDARD	AMA0PUM2006S		AMA0PLM20S		AMA0MAM2001S	
SPECIAL 0	AMA0PUM2006C		AMA0PLM20D		AMA0MAM2001D	
SPECIAL 1	AMA0PUM2006D		AMA0PLM20D		AMA0MAM2001D	
SPECIAL 2	AMA0PUM2006F		AMA0PLM20D		AMA0MAM2001D	
Coating HDP FNC						

PRIMAPOWER MULTITOOL						
Wilson style MT8Ri , MT8i 16mm						
Data: Max size 16mm		l.	٢	-	10.2E	
item	PUNCH HSS	€	STRIPPER	€	DIE ISODUR	€
ROUND	AMA0PUM806T		AMA0PLM8T		AMA0MAM801T	
STANDARD	AMA0PUM806S		AMA0PLM8S		AMA0MAM801S	
SPECIAL 0	AMA0PUM806C		AMA0PLM8D		AMA0MAM801D	
SPECIAL 1	AMA0PUM806D		AMA0PLM8D		AMA0MAM801D	
SPECIAL 2	AMA0PUM806F		AMA0PLM8D		AMA0MAM801D	
Coating HDP ENC						

PRIMAPOWER MULTITOOL						
Wilson style MT3Ri 31.7mm						
Data: Max size 31.7mm	TH.		Cont			
item	PUNCH ISODUR	€	STRIPPER	€	DIE ISODUR	€
ROUND	AMB1IPWT06T		AMA0PLMT3T		AMB1MAMT306T	
STANDARD	AMB1IPWT06S		AMA0PLMT3S		AMB1MAMT306S	
SPECIAL 0	AMB1IPWT06C		AMA0PLMT3D		AMB1MAMT306D	
SPECIAL 1	AMB1IPWT06D		AMA0PLMT3D		AMB1MAMT306D	
SPECIAL 2	AMB1IPWT06F		AMA0PLMT3D		AMB1MAMT306D	

Coating HDP FNC

#### PRIMAPOWER MULTITOOL MT8Ri3-16 57 Data: Max size 16,00mm Max thickness 4ms , 3ss item PUNCH ISODUR € STRIPPER DIE ISODUR € € AMMTPU8RI06T AMMTPLM8T AMA0MAM1601T ROUND STANDARD AMMTPU8RI06S AMMTPLMTS AMA0MAM1601S SPECIAL 0 AMMTPU8RI06C AMMTPLMTD AMA0MAM1601D SPECIAL 1 SPECIAL 2 AMMTPU8RI06D AMMTPLMTD AMA0MAM1601D AMMTPU8RI06F AMMTPLMTD AMA0MAM1601D



ERMAKSAN MT	6 - 22									
Max 22mm Max thickness: 3mm Max punching force 9Kn, Grinding life mm: Punch 6, Die 0,5		/		P					127.30	
	PUNCH ISODUR	€	PUNCH ISODUR ASSEMBLY	€	GUIDE	€	PUNCH DRIVER	€	DIE ISODUR	€
ROUND	AMMTPU2206T		AMMTPA2206T		AMMTGU22T		AMMT6-22LL		AMA0MAM2401T	
STANDARD	AMMTPU2206S		AMMTPA2206S		AMMTGU22S		AMMT6-22LL		AMA0MAM24B1S	
SPECIAL 0	AMMTPU2206C		AMMTPA2206C		AMMTGU22D		AMMT6-22LL		AMA0MAM24B1D	
SPECIAL 1	AMMTPU2206D		AMMTPA2206D		AMMTGU22D		AMMT6-22LL		AMA0MAM24B1D	
SPECIAL 2	AMMTPU2206F		AMMTPA2206F		AMMTGU22D		AMMT6-22LL		AMA0MAM24B1D	
Coating HDP	ROUND		SHAPE							
Coating FNC	ROUND		SHAPE							

DURMA MULTITOOL						
Data: Max size 24,00mm, max size die is 24.4mm		6		447 3D		
item	PUNCH ISODUR	€	STRIPPER	€	DIE ISODUR	€
ROUND	AMA0PUM24B6T		AMA0PLM24BT		AMA0MAM2401T	
STANDARD	AMA0PUM24B6S		AMA0PLM24BS		AMA0MAM24B1S	
SPECIAL 0	AMA0PUM24B6C		AMA0PLM24BD		AMA0MAM24B1D	
SPECIAL 1	AMA0PUM24B6D		AMA0PLM24BD		AMA0MAM24B1D	
SPECIAL 2	AMA0PUM24B6F		AMA0PLM24BD		AMA0MAM24B1D	





### **Sales condition**

Availability of products in the catalogue is subject to change. Our sales department will check the availability of products before confirming your order.

#### **Delivery**:

The order confirmation provides an estimate of the date on which the order will be dispatched from the Suce warehouse. In the case of orders requiring an advanced payment we will provide an estimated delivery date as soon as we receive confirmation of payment.

### Minimum invoice value : €100

#### Payment :

Payment terms are detailed in the order confirmation. Our finance department may charge interest on payment received more than 10 working days after the payment dead line.

Freight : according to Incoterms rules and are detailed in order confirmation

### Cancellation, returns and complains:

Any claims will be considered if made within 2 weeks of receiving the goods. The return of materials must be authorized and managed by Suce. A return charge of 20% of the product's value will be applied to cover the costs of return.

Cancellations can be made free of charge up to 24h after order confirmation. Cancellations made after 24h could be subject to a charge.

#### Credit :

Customers with a credit account should be aware of their credit limit. Our finance department will provide instructions in the event that your order exceeds your credit limit.



notes







suce

Email:info@sucetool.com http.// www.sucetool.com

