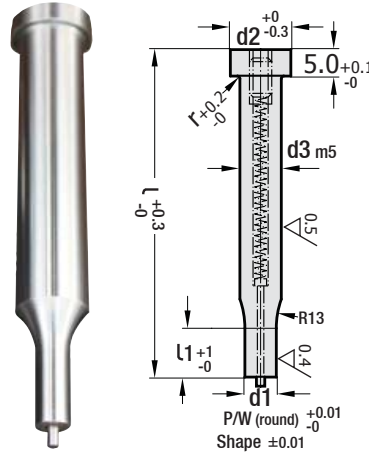


**Cylinder Head Punch with Ejector** Code: **SFZ**  
(Blank type) ISO 8020

**Material:** 1.3343 (M2) completely ground  
**Heat Treated:** 62 - 64 HRC  
**Head Hardness:** 52 ± 3 HRC  
**Surface:** ≥ 950 HV 0.3

d1	l	d2	k	r
5.0	63 71 80 100 125 160	8	5 mm	0.3
6.0		9		
8.0		11		
10		13		
13		16		
16		19		
20		23		
25		28		
32		35		

Order: **SFZ. d1 x l** Material: 1.3343 (M2) Hardness: 62 - 64 HRC



**Cylinder Head Stepped Punch with Ejector**

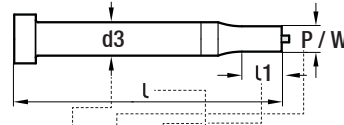
Order Codes: **SFY - SFO - SFK - SFD - SFA - SFM - SFX - SFP**

Please refer to the table on the right side

Order d3	Head d2	d1 / Shape		Standard l1	Alternative l1		l mm
		(SFY) Round P	Other Shapes W G/P		Min.	Max.	
SF..05	8	1.6 ~ 4.99	1.6 - 5.0	13	10	-	63
SF..06	9	2.5 ~ 5.99	2.5 - 6.0	13	10	-	
SF..08	11	3.2 ~ 7.99	3.2 - 8.0	19	13	19	71
SF..10	13	4.5 ~ 9.99	4.5 - 10	19	13	25	80
SF..13	16	6.0 ~ 12.99	6.0 - 13	19	13	25	90
SF..16	19	8.0 ~ 15.99	7.5 - 16	19	13	25	100
SF..20	23	10 ~ 19.99	8.0 - 20	19	13	25	125
SF..25	28	12 ~ 24.99	9.0 - 25	19	13	25	
SF..32	35	16 ~ 31.99	10 - 32	25	19	30	

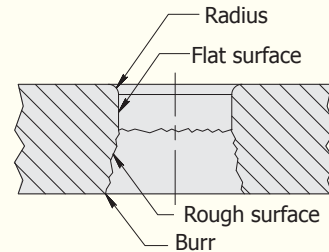
How to order:

Shape d3 P/W l1 l Material  
SFY x 10 x P7.0 x 13 x 80 - M2  
SFO x 10 x P8.2 x W5.2 x 25 x 100 - M2



**Definition of Gap Between Punch and Die**

Gap between punch and die depends on material type of stamped work pieces, material thickness, finish requirement of hole and desired tool life. This is indicated as total percentage of stamped material thickness. It should be remembered that hole diameter of punch specifies the dimension of part to be processed. Generally, ideal gap provides serial, clear and smooth punching process with minimum tool force. When insufficient gap is left, minimum radius and burrs are obtained. However, depending on high tool forces, it shortens tool life. As a result of excessive gap, wide radius creates deformation, but tool life is increased. Some general values are presented for different materials in the following table (it is an advisory). Expressed values are total die gap recommended for non-ejector punch holes. Increasing gap to 2 times by using ejector punch, will significantly increase estimated tool life. Abrasion occurring in the most of the punches occurs by scraper forces when the punch is pulled back. Increasing gap with using ejector punches will hold abrasion on tool surface in minimum. Punches used in dies should be mounted in perpendicular position as 90° completely.



Material	Soft	Hard
Aluminum	% 10	% 12
Brass / Copper	% 6	% 8
Low Carbon Steel	% 10	% 12
High Carbon Steel	% 18	% 20

The standard location of key flats is at 0°. Alternate locations of 90°, 180° or 270° can be specified.

**Shapes**

Standard Position  
90°  
135°  
180°  
225°  
270°  
315°