NEWS VIEWS

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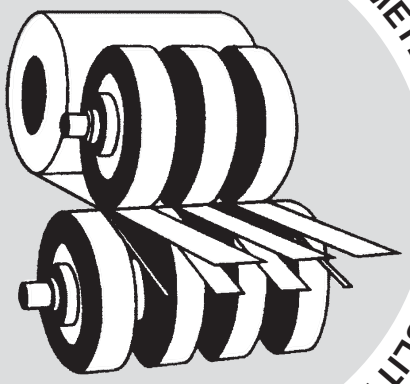
Determination to Establish Excellence
Through Efficiency and Expertise

Slitting Line Tooling

FLATNESS

SOME CRITICAL PARAMETERS AFFECTING SLITTING QUALITY



Flatness is also known as warpage. Flatness means total dial indicator reading while putting slitting cutter on surface plate below dial indicator. Flatness is the maximum variation obtained from surface plate on the upper face of Slitting Cutter.

In slitting line, flatness causes slitting knife to dance on arbor. If flatness is F then horizontal clearance of the knives will vary between (HC-F) & (HC+F) during every rotation of knife. This variation of horizontal clearance because of poor flatness, leaves burr on slit edges as clearance increases to (HC+F). Minimum horizontal clearance (HC-F) will create pressure on knife edge, causing chipping.

In case of slitting knife and spacer upto 5 mm thickness while tightening knives and spacers, they become flat. Hence flatness is less important in slitting cutters and spacers of thickness upto 5 mm.

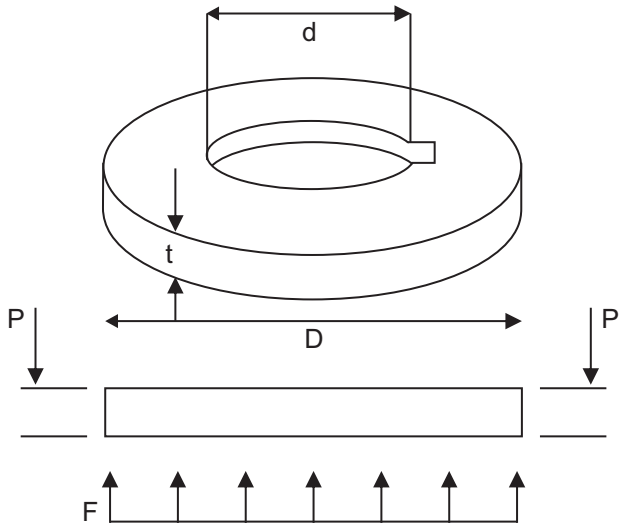


Fig. 1

For 200 O.D. × 125 bore × 10 thick, knife, Rep., Tole			
Outside Dia	D	=	within 0.020 mm
Inside Dia	d	=	G 7
Thickness	t	=	± 0.003 mm
Parallelity	P	=	0.003 mm
Flatness	F	=	0.010 mm
Concentricity	c	=	within 0.02 mm
Perpendicularity	p	=	0.01 mm/10 mm thick

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PARALLELISM

It is total variation of thickness in a knife/spacer. It can be easily measured with the help of double probe comparator or micrometer. Suppose in a 10 mm thick slitting knife minimum thickness measured is 9.996 mm and maximum thickness measured is 10.002 mm, then parallelity of the knife is 0.006 mm i.e. 6 microns. If thickness is higher on bore side and lower on O.D. side, it is not desirable. A knife though parallel may not be flat and in that case slitting performance will be adversely affected.

Parallelism of each and every knife and spacer is important and should be within 50% of thickness tolerance.

PERPENDICULARITY

In a slitting knife, bore should be square to face. In case of spacer it is not important because bore of spacer is generally loose on arbor.

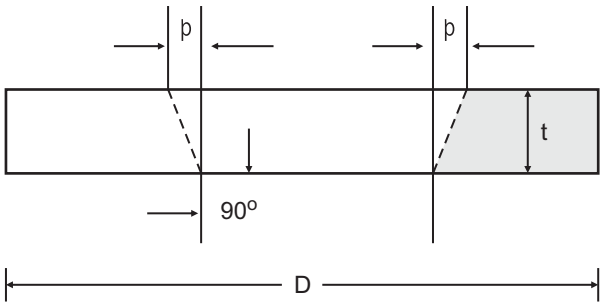

Fig.2

Slitting knife is mounted on slitter arbor on bore. Bore and face of slitter knife should be ideally square to each other so that knife runs perpendicular to slitter arbor. Maximum limit of perpendicularity *p* is defined, which should not be more than 0.01 mm per 10 mm thickness and maximum limit being 0.05 mm. Closer the perpendicularity limit, better it is, as variation in horizontal clearance will be smaller and burr at slit edges will be lesser.

Finally, let us understand, a part of out of perpendicularity is absorbed by clearance between slitter arbor O.D. and bore of knife.

CONCENTRICITY

Concentricity is the difference between centre point of O.D. of arbor and centre point of bore of slitting knife. Theoritically this should be zero. This causes variation in vertical clearance of slitting knife as cutter tends to move eccentric. If concentricity is 'C' then knife will move up and down by 2C.

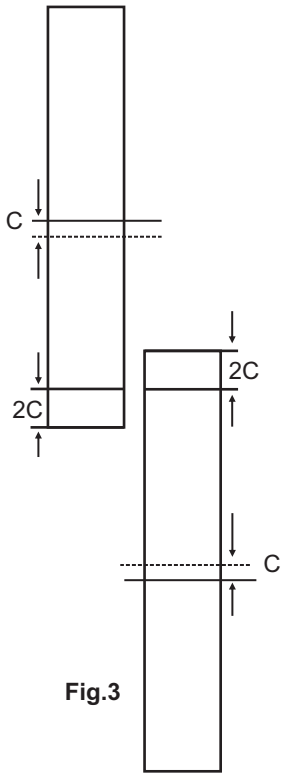

Fig.3

Normally bore is ground first while manufacturing slitting knives. Then cutters are mounted on a mandrill and O.D. is ground. For concentricity to be zero there should be zero gap between mandrill O.D. and cutter I.D. This is not practical. Bore itself is made in a tolerance and mandrill size is kept below the lower limit of bore of knife. Normally con-centricity within 0.03 is good.