NEWS VIEWS

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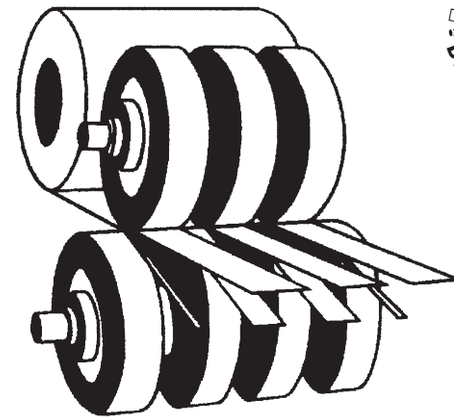
Determination to Establish Excellence
Through Efficiency and Expertise

Tolerance on Slitter Tooling

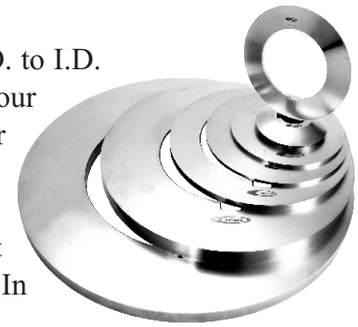
Importance of different Parameters and Tolerance of Slitter Tooling.



Outer Diameter (O.D.) :

Technically speaking, the outer diameter of the slitting knife should be kept as large as possible to get more life. Nevertheless, design parameter of slitting line will limit its size for obtaining stable slitting, because when O.D. of knife increases, cutting force increases, outness of knife also increases. Generally the O.D. of knife is about 50 to 60 times the thickness of sheet metal. Slitting knives are generally used for gang slitting. More than one knives are used at a time. Vertical clearance in the knives is set with reference to outer diameter of knives. Ideally, the O.D. of all the knives should be same. The tolerance on O.D. should be closer. Tolerance on O.D. becomes more important while slitting thinner strip. It is recommended to have O.D. tolerance within 30 microns (0.0012"). For thinner strips this may be limited up to 20 microns (0.0008").

Bore :



For good slitting, the bore of knife should be bigger. For better results, O.D. to I.D. ratio should be kept as small as possible. The knife is fitted over the slitting arbour and it should slide easily. Simultaneously, the bore should not be loose on arbour because if there is clearance between shaft diameter and bore of a knife, then while assembling, the knife will fit loose on the arbour and after tightening the knives and spacers the knives shall move eccentrically. This would mean that vertical clearance between knives will keep changing while knives rotate. In general bore of knife should be 60% of O.D. for better stability of knife.

Normally same base dimension is specified for spindle diameter and bore of slitting knife, i.e. minimum bore size and maximum spindle size is specified as same. If the bore is produced on lower side and spindle has been ground on higher side, then the slitting engineer would find it difficult to slide the knife on spindle. Our experience says that we should provide a clearance of 10-15 microns (0.0004" to 0.0006") between bore of knife and spindle O.D. This can be achieved by providing G-7 class of fit on bore of knife.

In case of spacers, they should be loose on spindle with F-7 fit.

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Thickness of Knife :

The cost of slitting knife goes up in relation to increase in thickness. Hence, thickness of knife should be kept minimum. But lower thickness introduces warpage, which ultimately reflects on the quality of slitting. Also, the knife is subjected to crushing force against its thickness. Generally knife thickness is kept 3 to 4 times of strip thickness. With our experience, for good quality slitting, the following thickness is recommended :-

Knife O.D.		Recommended Knife Thickness
upto 150 mm	(6")	4 mm (1/6")
above 150 mm to 250 mm	(10")	10 mm (3/8")
above 250 mm to 300 mm	(12")	12 mm (1/2")
above 300 mm to 350 mm	(14")	15 mm (5/8")
above 350 mm to 400 mm	(16")	20 mm (3/4")
above 400 mm	(18")	25 mm (1")

The thickness tolerance should be close, but one should keep in mind that closer the thickness tolerance, costlier is the knife. We recommend the following thickness tolerances for knives:

Diameter	Tolerance
upto 9" (225 mm) O.D.	± 2 microns
above (225 mm) O.D. to 13" (325 mm) O.D.	± 3 microns
above (325 mm) O.D. to 16" (400 mm) O.D.	± 4 microns
above (400 mm) O.D.	± 5 microns

In case of thickness, two more parameters are equally important, i.e. parallelity and flatness. Parallelity is variation in thickness of a single knife, which should be within half of thickness tolerance.

Overall flatness is measured by the help of dial gauge, after keeping knife on Surface Plate.

Flatness of a knife is the extent to which the knife is out of face, when rotating on its axis. Flatness should be ideally zero because horizontal clearance between knives keep changing, if knives are not flat. Width of strip may vary and there will be burr at the edges of strip. Knife should be as flat as possible. For thinner strips, flatness is more important.

In case of thinner knife more flatness is allowed as the knife tends to get straightened while it is tightened on spindle.

*Extra Precision Grade of Tolerances on thickness is desired for slitting foils and for Shimless tooling.

For more details on tolerances please refer to our News Views No. 1.