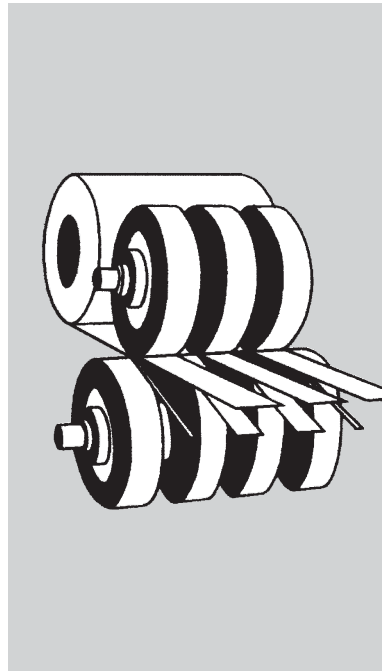




Guidelines For Raw Material Selection For Slitting Line Tooling



We, at Dee Tee are engaged in the manufacturing of tooling for various metal processing industries since 1975. While meeting the stringent quality and tough application requirements of our reputed customers, we have acquired sufficient expertise and experience in optimising the cost/benefit ratio of tooling consumed per ton of processing. This is a practical note, based on our long experience in the manufacture of slitting line tooling, which has been enriched by the meaningful customer feed back.



The thickness of the material to be cut can vary from 0.1 mm to 20 mm. Hence, the cutting load to which the knives are subjected vary considerably. Besides thickness, the tensile strength of the material to be cut also affects the loading on the slitting knives. In general, the thinner the material to be cut, the higher should be the hardness of the knife, for same knife material. Thickness of slitting knife should be 3/4 times the strip width. Summing up, the raw material selector would have the following parameters to be considered -

- **Hardness**
- **Wear resistance**
- **Impact Strength**
- **Dimensional stability**
- **Cutting edge retention under load.**
- **Toughness**

SLITTING KNIVES

In case of slitting knives, because steel is to be cut by steel, the cutting quality is the prime criterion for selection of its raw material. The knife material should necessarily be harder than the material to be cut. Along with hardness, the knife should be sufficiently tough so as not to deform during cutting. The knife should be in a position to retain the cutting edge under load. We also recommend cryogenic treatment for AISI-D2 knives which should increase life by 2 times, at least.

In addition, from the manufacturing point of view, the steel should be such that it can be hardened in depth, and should retain its dimensions for long.

There are four basic grades of steel which are used for slitting knives:

1. Tungsten Carbide
2. High Speed Steel
3. High Carbon High Chromium Steel
4. Shock Resistant/ Hot Die Steel

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DeeTee stands for total quality movement

Guidelines For Raw Material Selection For Slitting Knives

Tungsten Carbide

has a very long life, but it is not so common in use because of its initial high cost. Carbide being brittle, cannot sustain the impact which may be caused due to load variation. Hence it demands a high degree of accuracy in slitting line. Normally T.C. slitting knives are used for thin strips and long runs. Material to be slit should have uniformity.

High Speed Steel

can be hardened to a very high degree of hardness and is normally recommended for thinner gauges. We have found that mild steel upto 1.5 mm thickness can be very well slit with high speed steel knives. Longer life between two regrinds reduces the down time of the slitter. Recommended where long run slitting is required of same thickness and same material.

HCHCr Steel

has been found to be the most suitable family of steel for manufacturing slitting knives. All over the world, 85-90% of slitting knives are manufactured from HCHCr steel. It retains dimensions after hardening and long use. It maintains its cutting edge. Hardenability is excellent and the hardness obtained is uniform. We recommend AISI D-3/SKD-1/DIN 1.2080 for slitting mild steel upto 3.5 mm thickness. Upto 6 mm thickness, AISI D-2/SKD-II/DIN 1.2379 is recommended. If material to be slit has higher tensile strength than M.S. the capacity of slitting of thickness mentioned in M.S. will be proportionately reduced.

Shock Resistant/Hot Die Steel

Knives made out of Shock Resistant/Hot Die Steel are normally recommended for slitting mild steel above 6 mm thickness. This family of steel has a much lower wear resistance, and hence life is comparatively shorter but the cutters do not chip off when higher thickness material is slitted.

Apart from raw material selection, the hardness in the same grade plays an important role. In the same grade of steel, slightly more hardness would be better for lower thickness to be slit within the range. Hardness increases the life of the knife to a large extent.

Chemical Composition of Normally used Tool Steel for Slitting Knives

W.Nr.	DIN	AISI	C	Si	Mn	Cr	Mo	V	W	Others
1.2080	X210Cr12	D3	2.00	0.25	0.35	11.5	—	—	—	—
1.2379	X155CrVMo12-1	D2	1.55	0.30	0.40	11.8	0.75	0.75	—	—
1.2344	X40CrMoV5-1	H-13	0.40	1.00	0.30	5.10	1.50	1.00	—	—
1.3343	X82WMoV6 5	M-2	0.90	0.25	0.30	4.25	5.00	1.80	6.4	—

OVER ARM SEPARATOR DISCS

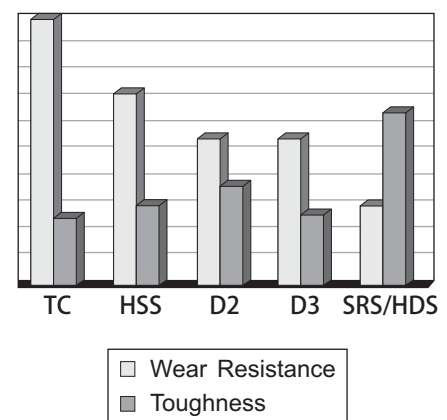
Both impact strength and wear resistance should be good for separator discs. The best recommended raw material is AISI-D2. In order of preference other raw materials are Cr-V / SAE 52100 / EN-24.

RUBBER RINGS / RUBBERISED SPACERS

In a slitting line, these rings come in close contact with the strip being cut which is normally smeared with oil and carries the coolant. Therefore, the rubber should be wear resistant, and should not get spoiled while in contact with different oils. Due to friction, a lot of heat is generated, so the rubber should be heat resistant as well.

Neoprene rubber is the right answer for the use mentioned above. Some times Nitrile and Silicon rubbers are also used.

Comparison of wear-resistance and toughness of different material used for slitting knives.



Tools WHICH LAST LONGER - Slitting Line Tooling, Tube/Section Mill Rolls, Tube Cut Off Knives, Cold Rolling Mill Rolls, Leveller Rolls, Fins, Steel Centers, Chipper Knives, Friction Saws, Shear Blades, H.S.S. Saws, C.T. Saw Bodies, 20 Hi Mill Rolls.

