



Raw Material for DeeTee Tools

A large range of Alloy/Tool Steels are used for manufacturing DeeTee Tools. These alloy steels have various alloying elements which impart different properties to tools. Selection of a particular alloy steel for a tool depends upon the performance desired from a tool. This largely depends upon alloying elements in the alloy steels.

	C	Si	Mn	Cr	Mo	W	V	Ni
AISI-D3 (1.2080)	1.90/2.20	0.10/0.60	0.20/0.60	11.0/13.0	–	–	–	–
AISI-D2 (1.2379)	1.45/1.60	0.10/0.60	0.20/0.60	11.0/13.0	0.70/1.00	–	0.70/1.00	–
AISI-H-13 (1.2344)	0.35/0.42	0.80/1.20	0.25/0.50	4.80/5.50	1.20/1.50	–	0.85/1.15	–
AISI-H-13 (Modified)	0.40/0.55	0.80/1.20	0.20/0.40	4.75/5.50	1.25/1.75	–	0.80/1.20	–
AISI-H-11 (1.2343)	0.30/0.40	0.80/1.20	0.25/0.50	4.75/5.50	1.10/1.50	–	0.30/0.50	–
AISI-H-11 (Modified)	0.40/0.55	0.80/1.20	0.20/0.40	4.75/5.50	1.25/1.75	–	0.30/0.50	–
AISI-H-10 (1.2365)	0.28/0.35	0.10/0.40	0.15/0.45	2.70/3.20	2.50/3.00	–	0.40/0.70	–
AISI-M2 (1.3343)	0.78/0.88	0.45 max.	0.45 max.	3.75/4.50	4.70/5.20	5.50/6.75	1.70/2.10	–
SAE-52100 (EN-31)	0.90/1.00	0.10/0.35	0.25/0.45	1.30/1.60	–	–	–	–
3% Cr, En-31 (M)	0.80/0.90	0.15/0.45	0.15/0.45	2.80/3.20	–	–	–	–
Cr-V Steel	0.75/0.85	0.25/0.40	0.30/0.50	0.40/0.70	–	–	0.15/0.25	–
Ni-Cr Steel	0.75/0.85	0.35 max	0.50 max	0.20/0.50	–	–	–	0.70/1.30
AISI-S1 (1.2550)	0.55/0.65	0.70/1.00	0.15/0.45	0.90/1.20	–	1.80/2.10	0.10/0.20	–
EN-19 (1.7225)	0.36/0.44	0.10/0.35	0.70/1.00	0.90/1.20	0.25/0.35	–	–	–
OHNS (1.2510)	0.95/1.05	0.20/0.30	1.00/1.20	0.50/0.70	–	0.50/0.60	0.10/0.15	–
EN-9	0.50/0.60	0.15/0.35	0.50/0.70	–	–	–	–	–
EN-24	0.40	0.25	0.65	0.75	0.57	–	–	1.35
EN-19	0.38/0.45	0.40	0.6/0.90	0.9/1.20	0.15/0.30	–	–	–
EN-18	0.38/0.45	0.40	0.6/0.90	0.9/1.20	–	–	–	–
Forged alloy steel*	0.60/1.00	0.20/0.70	0.20/0.70	1.50/5.00	0.10/0.60	–	0.20 Max	–

* (upto 500 dia)
(> 500 dia, range & elements can vary)



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DeeTee stands for total quality movement



- AISI-D3** : Is standard grade of High carbon High Chromium steels, used for Tube Mill/Section Mill Rolls, Slitting Knives for lower thickness strip, Dies and Punches, Plastic Moulds, Shear Blades for cutting light gauge material, Thread Rolling Dies, Wood Working Tools, etc.
- AISI-D2** : Good for High Performance Cutting Tools having better toughness than AISI-D3, Slitting Knives for medium thickness strip. Forming rolls, Dies and Punches, Shear Blades for medium gauge strips, Thread Rolling Dies, Plastic Moulds, OASD, Wood Working Tools etc. It has 1% V. It can be quenched in oil as well as in air.
- AISI-M2** : Taps, Twist Drills, Reamers, Broaching Tools, Metal Slitting Saws, Milling Tools of all types, Wood Working Tools, Tube Cut Off Knives, COC Cutters etc. High hardness can be maintained at elevated temperature.
- AISI H-13** : It can withstand alternate heating and cooling without heat checks. Die casting Tools, Hot Shear Blades, Hot Forging Dies, Punches, Forming Dies, Extrusion Dies for aluminium and brass, Squeeze Rolls for welded tube mill, Slitting Cutters for high M.S. Strip thickness are made from H-13.
- SPZ-DeeTee Grade** : Specially developed for Drive Rolls/ Idler Rolls/ Intermediate Rolls of 20 Hi Mills where due to higher carbon percentage, higher hardness is achieved.
- 3% Cr DeeTee Grade** : This grade of steel has been developed specially by DeeTee for 4 Hi Mill rolls and is improvement over conventional SAE-52100. Surface hardness is good. in case of 3% Cr steel, wear resistance is better.
- EN-31** : Is basically 1% carbon steel with 1.5% Chromium. It can attain hardness up to 63 HRC but wear resistance is poor. Good for making Spacers, CR Mill Rolls etc. It is used for various applications when toughness is not important.

VARIOUS ALLOYING ELEMENTS WHICH PLAY IMPORTANT ROLE IN THE PROPERTIES OF ALLOY STEELS ARE AS FOLLOWS :

- CARBON (C)** - Carbon mainly imparts hardness in steel. The addition of carbon as an alloying element produces desired Mechanical strength and hardening properties in steel. Maximum as quench hardness of 65 Rockwell 'C' occurs at Carbon content approx. 0.65 %. By addition of other alloying elements the effect of carbon can be intensified, diminished or neutralised. Higher percentage of carbon reduces toughness and is principal cause of brittleness.
- SILICON (Si)** - Improves thermal shock and is oxidation resistant but decreases toughness and machinability. It Strengthens low alloy Steels.
- MANGANESE (Mn)** - Manganese is always present in steel. It is called alloying element, if its percentage is more than one percent. It increases toughness and impact strength.
- CHROMIUM (Cr)** - Is a strong carbide forming element. It increases hardenability, prevents corrosion. It improves abrasion resistance in high carbon steels. Chromium Carbides are hard, wear resistant and give good edge holding qualities. It reduces scaling. It improves polishability.
- MOLYBDENUM (Mo)** - The addition of molybdenum produces fine grain steel, increases depth of hardening and fatigue strength. Molybdenum produces secondary hardening effect during tempering of quenched steel. It also increases corrosion resistance. Molybdenum increases the ability to attain hardness in presence of chromium. Tempered brittleness is reduced. Mo-V-Cr steels are used for high Temperature service. It reduces retained austenite and guarantees uniformity for cross-section hardness.
- VANADIUM (V)** - Vanadium is an excellent deoxidizer, carbide former, grain refiner. Vanadium imparts strength and toughness and increases fatigue strength. Vanadium makes the steel structure finer. It also increases secondary hardening effect during tempering. It is also responsible for high yield strength and shock resistance capabilities.
- TUNGSTEN (W)** - It forms very hard abrasion resistant carbides. It improves hot strength, red hardness, toughness, prevents grain growth. All these properties put together makes it a very useful element.
- NICKEL (Ni)** - Nickel increases the mechanical characteristic and increases impact strength. It renders high Cr / Fe alloys austenite.
- COBALT (Co)** - Cobalt in habitates grain growth at high temperature and increases tool life. Cobalt is generally used in hot forming tools H.S.S., Creep resisting steels to get good hardness retention.

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.

