

Delivering Precision...
Globally.



DeeTee Industries Limited, India

Tooling for Metal Industry

Corporate Philosophy

Leading with technological superiority
Growing by making precision top priority.

It is said that fortune favors the enterprising and it comes true in context of our dedicated efforts at DeeTee. We are driven by the single minded

Determination to Establish Excellence Through Efficiency and Expertise. We started out with a set of defined positive values and blazed a trail of meteoric growth, standing firm through the changing times and delivering to the customer's satisfaction every time.

The core values that govern our group help in achievement of the goals and desires of all those, who are a part of our success story- our workforce, our suppliers and our clients. Our beliefs form our philosophy. We believe in

- Achieving exceptional standards of precision and accuracy
- Working to customer's satisfaction to exceed their demands for quality and response time
- Providing cost effective solutions
- Constantly upgrading technology to maintain superiority
- Encouraging innovation through creativity
- Ensuring sustainable global growth

Travelling through 4 Decades of Dedicated Efforts

It was unflinching hard work from day one when DeeTee commenced operations with its flagship company **Dewas Tools** as an ancillary unit with 2 lathes, 1 furnace and a grinder to manufacture slit tooling and tube forming rolls in 1975. With a zeal to excel, DeeTee started its second unit for making cold rolling mill rolls in 1983. DeeTee made a mark with its first export to Gulf in the year 1986.

The success saga continued with its 3rd unit for Saws in 1995, ascending another step towards success.

Today DeeTee is a beacon of growth with a driving workforce of 500+ dedicated team members led by the committed and visionary technocrats.

Inspired by a vision to excel, DeeTee group has touched new heights in major sectors like-

- Cold formed sections for automobiles, power, construction and engineering industries
- SS sections for the railways
- Heavy duty industrial storage systems
- Punched tubes, tubular and laser cut components for super market shelving, automobile and engineering industries.

In the year 2012 the company has diversified into packaging industry using latest technology for manufacturing high quality PET and PP straps under the brand name Giraffe Packaging.



Trust is our Core Strength...

DeeTee has been officially recognized by the grant of coveted ISO 9001:2000 certification. Through our quality, technological superiority and highly motivated workforce, we have always excelled on customers expectations creating the bonds of unshakable trust.

Quality is our Core Value...

DeeTee decided to lead with international quality standards and sure enough growth has followed. To surpass the expectations of our customers worldwide, we undertake stringent quality checks in pre and post manufacturing processes, right from the procurement of raw material to processing and final delivery.

Workmanship is our Driving Force...

DeeTee is one big techno-commercial team and hence every individual is considered to be an equal contributor in the collective efforts. We feel proud to say that highly competitive and dynamic personnel form the backbone of DeeTee. The organization lays stress on the personal and professional upgradation of team members through regular workshops and seminars.

Assuring Quality, Every Step of the Way

Raw Material

The most important aspect of tool making is selection of raw material from right source. DeeTee purchases most of its raw materials directly from renowned manufacturers from across the globe. A unique code is given to every bar for traceability up to the customer's end. The materials are checked for composition, micro & macro structures and heat treatment response.

Heat Treatment

It's one of the most crucial process in precision tool making. In-house heat treatment facilities provide a better control. A modern set-up consisting of salt baths, programmable electric tempering furnaces, induction hardening, cryogenic sub-zero treatment, steam treatment etc. contribute to superior quality of the finished product.

In-Process and Final Inspection

The company applies state-of-the-art technology to make sure that the final product reaches the desired standards. At final stage, all jobs undergo a tight quality control procedure which includes-

- Dimensional Inspection
- Hardness Testing
- Non-Destructive Tests like –
- Magnetic Particle Testing
- Ultrasonic Testing
- Die Penetrant Testing

Floating inspection does ensure right production and immediate corrective action of the process, going out of control.



Where Precision Becomes Obvious

Several renowned customers worldwide place their trust in our products. So, when it's about Slitting Line Tooling, precision doesn't come as a surprise. DeeTee offers a complete range of Slitting Line Tooling that conforms to high international standards. Manufactured with finest alloy steel and precision ground to close tolerances, every Slitting Line Tool that bears the stamp of DeeTee, talks quality.

DeeTee manufactures Slitting Line Tooling in two grades of tolerances, i.e. ■ Precision ■ Extra Precision. Precision grade of tolerance is suitable for slitting strip above 1 mm thickness, whereas for slitting thin foils up to 0.01 mm thickness, extra precision grade of tolerance is recommended. Extra precision grade is ground as well as lap finished.

Slitting Knives

Slitting Knives with superior quality and finish are manufactured from quality raw material to suit a wide range of slitting applications. Our cutters are capable of slitting all ferrous and non-ferrous metals like steel, SS, aluminum, copper, brass, special alloys etc., whether HR or CR. Slitting Lines which are finished to perfection can cut foils as thin as 0.01 mm and coils as thick as 25 mm.

Size Range – DeeTee can make cutters up to 600 mm diameter. Cutters up to 400 mm diameter can also be manufactured within +/-1 micron thickness tolerance by lapping.

DeeTee's cryogenic treated cutters have a good wear resistance, exceptional dimensional stability and excellent slit edge quality.

Slitting Line Tooling



Raw material – the common grades used are :

AISI D3/ DIN 1.2080	For thinner CR, ferrous like MS and non-ferrous like Brass/ Copper up to 3 mm thickness
AISI D2/ DIN 1.2379	For MS up to 6 mm or SS up to 3 mm thickness
AISI S1/ DIN 1.2550	For MS of 5 to 10 mm or SS 3-6 mm thickness
AISI H13/ DIN 1.2344	For thicker slitting MS up to 25 mm thickness
HSS M2/ DIN 1.3343	Generally used for very thin and narrow slitting, where long runs are required



For special applications, DeeTee also makes knives in powder metallurgy grades, 8% Cr Steels, Carbide etc.

Slitting Line Tooling



Spacers

The spacers, which are manufactured by DeeTee have a global acceptance because of sustainable durability. We make all kinds of spacers which include- ■ Steel Spacers ■ Stripper Rings - Rubber and Steel ■ Rubber Bonded Steel Spacers ■ Plastic Shims.

We stick to prime quality raw material for the manufacture of spacers. Raw material for various spacers are-

■ Steel Spacers – Made out of 100Cr6 / SAE52100 / EN31 / 1.2067 grade. ■ Rubber Rings – Nitrile (Perbunan) and Neoprene are generally used for normal applications like HR, CR, pickled and galvanized surfaces. Polyurethane for SS, aluminum, non-ferrous materials and painted surfaces etc. Rubber Rings can be made in various colours.

■ Ultralight Weight Spacers- Special ultra light weight design made from Polyamide and Steel. Weight reduction up to 70 %.

The tolerances, particularly on thickness and parallelism are equally important as in cutters.

Over Arm Separator Tooling

■ Separator Discs - This is an important component of Slitting Line Tooling. The slitted coils are nicely wrapped and packed without spoiling edges if Over Arm Separator Discs are of good quality. These discs are subject to heavy wear and impact, hence raw material should be wear and shock resistant. Also, they should not be so hard that they damage the coil's edges. A right combination of material and hardness is therefore very important. AISI D2 (DIN 1.2379) is generally the most suitable material. Other common grades are CrV steel and EN24 (SAE 4340)

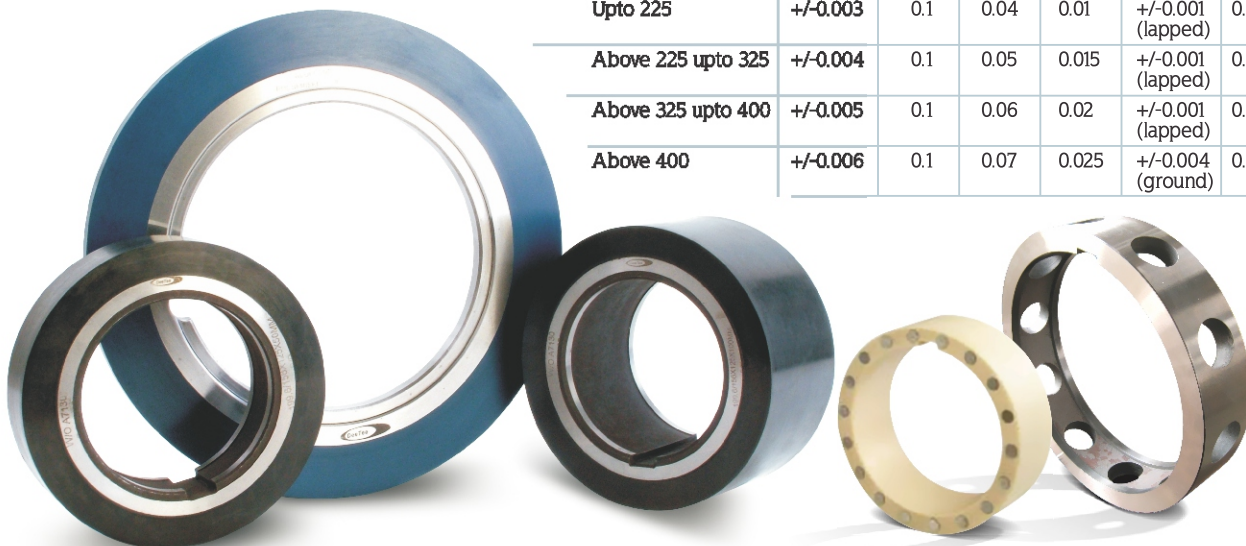
■ Separator Spacers – These can be of steel or can be rubber bonded.

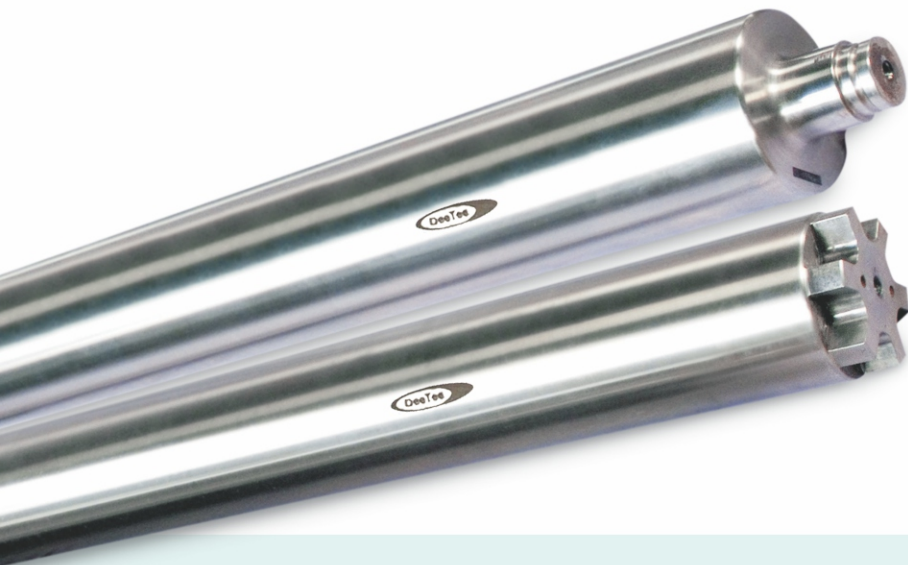
Shimless Tooling

DeeTee is well equipped to meet the requirements of modern day Shimless Slitter Tooling by achieving an accuracy of +/-1 micron on the thickness. DeeTee can also provide software for Shimless Tooling.

Achievable manufacturing tolerances-Slitter Knives/Steel Spacers.

O.D. in mm	Thickness Tolerance	Precision Grade			Extra Precision Grade		
		Flatness (within) depends on thickness			Flatness (within) depends on thickness		
		< 2 mm	> 2mm < 5mm	> 5 mm		> 2mm ≤ 5mm	> 5 mm
Upto 225	+/-0.003	0.1	0.04	0.01	+/-0.001 (lapped)	0.02 mm	0.005 mm
Above 225 upto 325	+/-0.004	0.1	0.05	0.015	+/-0.001 (lapped)	0.03 mm	0.005 mm
Above 325 upto 400	+/-0.005	0.1	0.06	0.02	+/-0.001 (lapped)	0.04 mm	0.006 mm
Above 400	+/-0.006	0.1	0.07	0.025	+/-0.004 (ground)	0.05 mm	0.010 mm





Rolling from Strength to Strength

At DeeTee, our RMR Division is responsible for rolling out world class Cold Rolling Mill Rolls of high quality and precision which includes Sendzimir Mill Rolls, 4Hi & 6Hi Mill Rolls, Skin Pass Rolls, Shrink Fitted Back-Up Rolls etc. The rolls are prone to very tough working conditions and have to be perfect in terms of wear resistance and hardness. All the rolls are checked for hardness at multiple places immediately after heat treatment as well as before despatch. Rolls are checked for surface cracks by Magnetic Particle Test (MPT). Sub-surface defects like inclusions are checked by Ultrasonic Testing with Angular Probes.

Sendzimir Mill Rolls

20 Hi Rolls

Sendzimir Mills are mostly used in SS and non-ferrous Cold Rolling. The small diameter rolls allow superior reductions on very hard materials to very thin gauges. Also, they help to maintain very close gauge tolerances. Due to high mill speeds and materials rolled being hard, the rolls have to be tough with good wear resistance.

The work rolls are generally made of AISI D2 (1.2379), M1 (1.3346), M2 (1.3343) grades. For some high end applications, powder metallurgy grades are also used. Cryogenic treated work rolls have many advantages. They increase dimensional stability, wear resistance and surface hardness. As the coefficient of friction increases, the grindability improves and so finishing on coil gets better. The 1st and 2nd intermediate rolls are mostly made of AISI H11 (1.2362), H12 (1.2606) and sometimes D2 (1.2379) material.

The hardness configuration of the rolls in the assembly is very important. The work rolls should be 3-4 hrc higher than the intermediate rolls. Generally the pattern is – Work rolls ■ 61/63 hrc or higher
 ■ 1st intermediate rolls – 57-59 hrc ■ 2nd intermediate rolls – 58-60 hrc. The rolls are heat-treated in salt baths which impart good uniformity of hardness.

Cold Rolling Mill Rolls





Cold Rolling Mill Rolls



Z Hi Rolls

The work rolls are mostly made of AISI D2, M1, M2 grades. Support rolls are in D2. Drive rolls are made from 3% Cr steel, sometimes 1.2362.

4 Hi, 6 Hi Rolls

DeeTee manufactures 4 Hi/6 Hi Rolls with multiple advantages of long life and higher performance under pressure for cold rolling of almost all types of metals-ferrous, non-ferrous, SS, aluminum, silver, gold etc. It includes Work Rolls, Intermediate Rolls, Backup Rolls and Skin Pass Rolls.

The rolls are subject to high wear and tear, heavy bending loads and high roll separation forces.

Mill incidents and accidents are a common phenomenon and induce heavy amount of stresses in the rolls. The roll material therefore has to be of very good quality. DeeTee mostly purchases raw material directly from renowned manufacturers having integrated melting-forging facilities.

Grades – 52100, 3% Cr, 1.2327, D3, D2

Size Range – Maximum length 4 meters, maximum dia 550 mm, max weight 5 tons.

Shaft Fitted Rolls

DeeTee has an expertise in manufacturing Shaft Fitted Rolls. These rolls have to function under high torque loading therefore proper interference between sleeve and shaft is a key factor.

Higher interference may lead to cracking of the sleeve. Lower may result in slippage during operation. A perfect interference is therefore a must.

Size Range - Max dia up to 700 mm. Max barrel length up to 1000 mm.

Commonly used raw material grades for CRM Rolls -

Steel Composition

	AISI/SAE	JIS	C	Si	Mn	Cr	Mo	V	W
1.2080	D-3	SKD-1	1.9-2.2	0.1-0.6	0.2-0.6	11-13	-	-	-
1.2379	D-2	SKD-11	1.45-1.6	0.1-0.6	0.2-0.6	11-13	0.7-1.0	0.7-1.0	-
1.2343	H-11	SKD-6	0.33-0.41	0.8-1.2	0.2-0.5	4.8-5.5	1.1-1.5	0.3-0.5	-
1.2606	H-12	SKD-62	0.32-0.4	0.9-1.2	0.3-0.6	5-5.6	1.3-1.6	0.15-0.4	1.2-1.4
1.2362	-	-	0.6-0.65	1.0-1.2	0.3-0.5	5.0-5.5	1.0-1.3	0.25-0.35	-
1.3346	M-1	-	0.75-0.85	0.2-0.4	0.2-0.4	3.75-4.5	7.75-9.25	0.9-1.3	1.15-1.85
1.3343	M-2	SKH-51	0.78-0.95	0.2-0.4	0.2-0.4	3.75-4.5	4.5-5.5	1.6-2.2	5.5-6.75
1.2067	52100	SUJ-2	0.95-1.1	0.15-0.35	0.2-0.4	1.35-1.6	-	-	-
1.2327	-	-	0.83-0.9	0.15-0.35	0.3-0.45	1.6-1.9	0.25-0.35	0.05-0.15	-
3% Cr.	-	-	0.8-0.85	0.15-0.45	0.15-0.45	2.8-3.2	-	-	-





Raising the Levels

DeeTee applies its pioneering spirit and innovative approaches to manufacture Leveler Rolls of desired international standards. Leveler Rolls are used in finishing stages of HR/CR coil production or in steel service centers. DeeTee manufactures levelers with such perfection that it does not leave any scratches on the coils during operation. High degree of uniformity and accuracy are required on all the rolls in a set. Cylindricity, set tolerance, surface finish, uniformity of hardness, etc. are equally important. The core should therefore be toughened to avoid any bending and the case is hardened to avoid wear and tear. Smaller dia rolls are generally induction hardened.

Raw Material - Generally EN31/100Cr6/SUJ2/1.2067 is used for the Leveler Rolls. EN24 is used for hot applications like rolls for Plate Mills.

DeeTee also produces Chrome Plated Rolls. Refurbishing/reconditioning (regrinding and chrome plating) is also done by DeeTee for a better customer service.

DeeTee can make minimum 25 mm dia Leveler Rolls to maximum 500 mm dia plate Mill Flattener Rolls.

Maximizing Torque (Shafts and Arbours)

Shafts are the machine members which support the revolving parts of a machine and also transmit torque. The shaft is subjected to bending as well as torsion stresses. DeeTee makes arbours for Slitter Tooling, Shafts for Tube and Section Mills, Shafts for Tube Str Rolls with high degree of toughness. The accuracy of the shafts/arbours affect the quality of output. Other than the dimensional accuracy, it is important that they don't get bent during usage. The skin is generally induction hardened to avoid wear and tear or scratch marks. The materials generally used are EN24 & EN19 sometimes EN31.

Leveler/ Flattener Rolls, Shafts and Arbours



Shear Blades and Flat Knives



Cutting to Perfection

DeeTee manufactures Shear Blades with best quality alloy steel. These blades outperform in every operation with extended blade life. It results in increased productivity as machine down time for blade changes is significantly reduced.

Shear Blades and Flat Knives demand a high degree of accuracy, impact resistance and durability as they are required for both, hot and cold operations. Special care is taken for the selection of their raw material and for imparting perfect hardness, compression strength, wear and shock resistance. Used for specialized cutting operations in a plethora of industries, our shear blades are manufactured up to a length of 3200 mm.

Shear Blades and Flat Knives find applications in all types of industries dealing with steel/non-ferrous alloys, cellulose, fiber boards, paper and plastic.

Following parameters are of prime importance to Blades and Knives :

- Hardness ■ Compression Strength ■ Wear Resistance ■ Long Cutting Life ■ Toughness
- Shock Resistance ■ Close Tolerance

DeeTee manufactures wide range of Shear Blades and Flat Knives - Crop Shears, Flying Shears, Chipper Knives, Cold Shear Blades, Paper Cutting Knives, Bar Shears, Scrap Choppers, Wearing Plates, Hot Shear Blades, Bow Type Shear Blades, Billet Shears, Divide Shears, Dead Knives etc.

Raw Material – The commonly used grades are :

AISI D3 (1.2080) Generally used for cutting cellulose, fiber boards, paper, plastic, etc. Non ferrous alloys and mild steel upto 5 mm thickness.

AISI D2 (1.2379) It is suitable to shear mild steel up to 8 mm and SS up to 5 mm thickness.

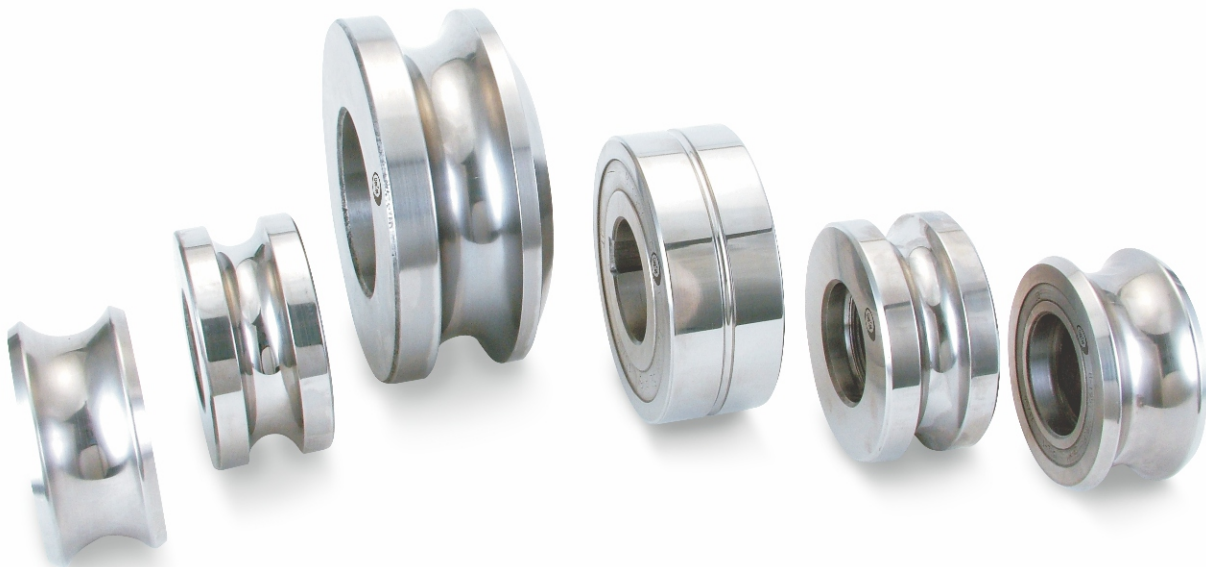
AISI S1 (1.2550) Suitable for cutting mild steel of 8-15 mm and SS of 4-8 mm thickness.

AISI H13 (1.2344) It is used for hot shearing of ferrous billets, bars, rods etc. It is also used for mild steel above 15 mm thickness.

Bar/ Rod Mill Tooling

- Guide Rolls, Pinch Rolls etc. used in Bar/Wire Rod Mill for both ferrous and non ferrous application.
- Shear Knives like Cobble Shear, Toggle Shear, Crop shear, Hot and Cold Shear Blades etc.
- Supplying to OEMs.





Rolling Out Perfection

With the uncompromising commitment to quality, DeeTee manufactures Tube and Section Forming Rolls, Tube Straightening Rolls, Bar/Wire Mill Rolls and Rolls for Seamless Tubes.

Tube & Section Forming Rolls

DeeTee has a rich experience in designing of roll sets for a wide variety of tubular and open sections.

To ensure complete precision and accuracy, the company employs expertise of latest COPRA software for designing. Profiling is done on high precision CNC lathes, giving high degree of accuracy. CNC wire-cut templates made out of SS are also available on request. These are generally required for re-profiling.

Raw-Material – To give rolls durability and longer life, we recommend that the rolls are made out of AISI D3 (DIN 1.2080) or AISI D2 (DIN 1.2379). SAE 52100 may be used where the volumes are low and mill speeds are less. For the welding rolls, H13 (1.2344) is recommended as the temperatures are high. In high speed mills, rolls of bronze alloys are also used.

In high speed mills, rolls / welding shoes of bronze alloys are also used.

Range – Rolls can be made up to 800 mm outer diameter.

Fins - These are a vital component for tube making. Fin conditions the strip edges for proper welding. It gilds the edges of strip and squares the edges for butt welding. It also directs the tube to squeeze rolls for perfect welding. Fins should be wear resistant and tough. Best raw material for Fin is AISI-D2 (1.2379).

Profiled Rolls





Profiled Rolls

Tube Straightening Rolls

Tube Straightening Machine Rolls need complete precision since they are used in finishing stage of tube manufacturing.

DeeTee offers both single piece and Shrink Fitted Rolls. In case of Shrink Fitted Rolls, the shaft is generally made out of EN24 /EN19 material. The material of the rolls is mostly AISI D3 / D2 due to their high wear and impact resistance properties. For low speed machines, EN31 rolls are also used. Profile of the rolls is hyperbolic and is done on high precision CNC Machines.

Bar/Wire Rod Mill Rolls

DeeTee is "Winning the World Over" with quality and service in the roll manufacturing industry for Wire Rod Mills Rolls.

DeeTee makes various types of rolls such as Guide Box Rollers, Pinch Rolls etc. used in bar mills and wire rod mills for both ferrous and non-ferrous applications. Since these are continuous production lines having capacities of few thousand tons to couple of million tons per annum, the rolls have to be of really good quality. Being used in hot application, the material of the rolls must withstand high temperatures and also should have a high degree of wear resistance. The rolls are made of fine quality tool steels like AISI D2 and H13.

Rolls for Seamless Tubes

DeeTee rolls are also used in the Seamless Tube manufacturing (through hot processing). It includes Push Bench Fixed and Adjustable Rolls, Stretch Reducing Mill Rolls etc. In such applications, H10 (1.2365) material is also used. DeeTee also makes Piercing Bush which is generally in 1.2714 material.





Really Really Sharp

Friction Saws

Friction Saw operation is based on strength of the frictional heat, which is generated between the saw teeth and work piece when the saw runs at high speed. DeeTee's Friction Saws are made from imported Chrome-Vanadium Steel (Cr-V) steel, 1.2235 material. They perform with maximum stability at surface speed of 60-90 mtr./second. To cut aluminum, non-ferrous metals, plastics etc., higher speed of (80-120 mtr./second) is recommended.

DeeTee Friction Saws retain their toughness and have ability to resist the stresses of high operating speeds. The most suitable hardness is 40-44 hrc. Its teeth sharpness retention quality is ensured by closely controlled heat treatment and accuracy of teeth profile. ■ Range - 350 mm dia to 1000 mm dia.

HSS Metal Slitting Saws

HSS Slitting Saws are manufactured for ferrous metal and for non-ferrous metal industry. These are specifically suited for use in manual, semi-automatic and fully automatic sawing operations. The Metal Slitting Saws have the following exclusive features-

- Made from imported High Speed Steel-M2 ■ In house laser cutting helps in quick deliveries
 - Controlled heat treatment for uniform hardness and excellent metallurgy ■ Steam treatment adds to their cutting capacity ■ Proper tooth geometry is maintained on CNC teeth profiling machines.
 - Chip Breaker feature improves performance during operation. ■ Saws can also be supplied duly TiN coated.
- Range 25 mm dia-400 mm dia

Tube Cutting, Metal Slitting Saws





Blades And Knives, COC Cutters



Edging Towards Versatility

Punch Type Tube Cut-off Knives

Punch Type Tube Cut Off Knives are the latest in tube cutting technology. The technology is much faster and gives a burr-free cutting. Flatness, hardness, wear resistance, toughness, edge retention, and impact resistance are the parameters of prime importance for Tube Cut Off Knives.

The punch-type tube cutting technology is used in high speed tube mills which operates at > 75mtr./min. up to 200 mtr./min.

With experience of more than three decades, DeeTee manufactures Tube Cut Off Knives in various shapes and sizes to fulfill the requirement of the Tube Industry. The best suited material is High Speed Steel – AISI M2 (1.3343). Prompt delivery is DeeTee's highlight as most of the raw material is in stock.

The raw material is generally sourced directly from renowned European suppliers.

DeeTee offers knives with special coatings which are very hard and wear resistant.

They help in reducing the friction during operation. Commonly used coatings are TiN (Titanium Nitride) and AlTiN (Aluminum Titanium Nitride) coatings.

Cut Off Carriage Cutters (C.O.C. CUTTERS)

It is a 3 or 4 cutter assembly.

The cutters keep rotating and come closer to part of the tube. The cutting head is rotating around the tube. This method is used up to 75 mtr./min. of mill speed.

It is an effective method for cutting bigger diameter tubes and for tubes of higher wall thickness.

The performance of the C.O.C. Cutters depends upon alignment of the cutters in one plane. Hence thickness of the cutters should be maintained within close tolerances.



Raw Material

For thin walled tubes, HSS M2 is the best material. D3/D2 are also used.

For higher wall thicknesses (N.B. pipes), H13 is good. EN24 and 1.2714 are also used.

Incredible Infrastructure



Cryogenic Treatment



CNC Lathes



CNC Lapping Machines



In house Heat-Treatment Facility



4 CNC Laser Cutting Machines



CNC Wirecut Machines



CNC Turning M/c



6 mtr. Long
Surface Grinder



HSS Heat-Treatment Facility



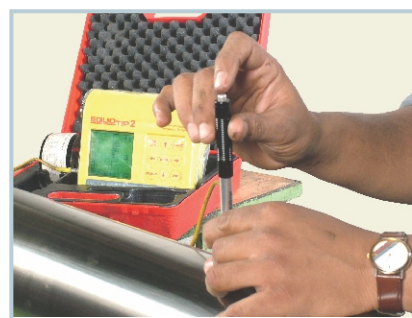
Cylindrical Grinders



4 Production Units With
Approx. 1,75,000 sqft. Constructed Area



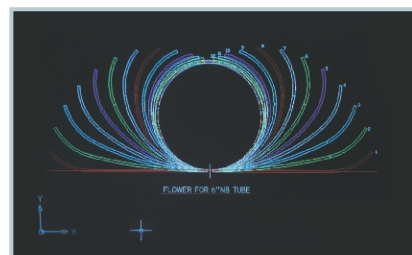
Ultrasonic Testing



Hardness Testing



Microscopic Testing



COPRA Software for Roll Designing



Raw Material



CNC Thickness Grinders



Roughness Tester



Thickness Comparator

Touching 65 Countries



ISO-9001



DeeTee Industries Limited, India

28/33, Pologround Industrial Estate, Indore-452 015 (INDIA)

Phone : (0091-731) 429 6777

Fax : (0091-731) 4296766 | E-mail : deetee@deeteegroup.com

www.deeteegroup.com