



DeeTee Industries Pvt. Ltd.
TOOLING SOLUTIONS FOR METAL INDUSTRY

EXCELLENCE... EFFICIENCY... EXPERTISE



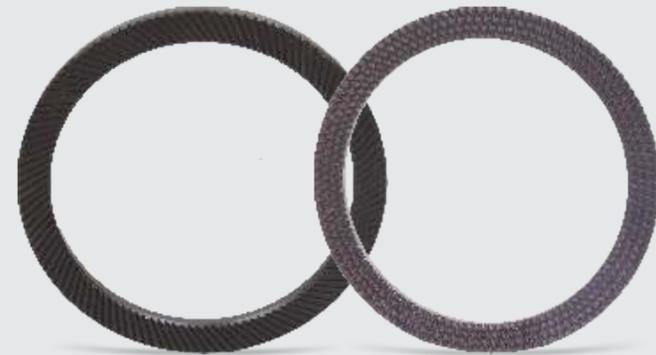
Corporate Philosophy

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 **D**etermination to **E**stablish **E**xcellence **T**hrough **E**fficiency and **E**xpertise. 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.

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

Leading with technological superiority,
Growing by making precision top priority,
Providing tooling solutions for metal industry.



Travelling Through 5

Incorporated around five decades ago as an ancillary unit named Dewas Tools, having started as a slitter tooling and tube forming rolls manufacturer in 1975, the journey of DeeTee Industries has been driven by the wheels of hard work and the fuel of determination. Today it has established itself as a giant in the segment with an export network sprawling over 64 countries and a driving workforce of more than 400 employees.

Trust is Our Core Strength...

Through our quality, technological superiority and highly motivated workforce, DeeTee has been officially recognized by the grant of coveted ISO 9001:2015 certification.

Quality is Our Core Value...

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. The organization lays stress on the personal and professional upgradation of team members through regular workshops and seminars.

Decades of Dedicated Efforts

Assuring Quality, Every Step of the Way

Raw Material

Most of raw materials directly sourced from renowned manufacturers from across the globe. The materials are checked for composition, micro & macro structures and heat treatment response.

Heat Treatment

DeeTee is equipped with best quality in-house heat treatment facilities which 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 & 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.



Partnership with European Slitter tooling manufacturer- Emmebi-DeeTee SRL, jointly marketing products in Europe & North Africa.

The Timeline of Prosperity

- Incorporated in 1975 as an ancillary unit in Dewas.
- Started producing Cold Rolling Mill Rolls with second unit in 1983.
- Shipped our first export to Gulf in 1986.
- Started our 3rd unit for Tube Mill Rolls & Bar Mill Tooling in 2002.
- In the year 2012, the company diversified into packaging. It started making Polyester, Straps, under the brand 'Giraffe Packaging'.

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

- ◆ Cold roll formed sections for automobiles, power, construction and engineering industries
- ◆ SS sections for the railways
- ◆ Heavy duty industrial storage systems
- ◆ CNC Punched Tubes; precision ERW Tubes; Tubular & Laser Cut components for automobile & engineering industries.

Slitter Tooling

Slitting Knives

Our knives are capable to slit all kinds of applications- Carbon Steels, Stainless Steels, Silicon Steels, Non-ferrous Metals, Hardened and Tempered Grades, High Tensile Grades, Special Alloys etc.

The most important parameters in a Slitter Knife are-

- Maximum Wear Resistance
- Adequate Toughness
- Dimensional Stability
- Chipping Resistance

Our specialty to select right material grade and hardness to suit the customer's application. Cryogenic treated knives have good wear resistance, exceptional dimensional stability, life & excellent slit edge quality.

Size Range- DeeTee offers knives upto Ø 650mm (25.6"). Knives upto Ø 400mm (16") can be supplied in lapped condition with +/- 0.001 mm thickness tolerance.

Spacers

The tolerances on Spacers are equally important like knives. Spacers are made from 100Cr6 / SAE52100 / 1.2067 material which is a thorough hardening grade and gives more dimensional stability compared to carburizing steels. Stainless Steel & higher chrome spacers can also be supplied for corrosion resistance.



Light Weight Spacers

These are specially designed to reduce the weight of particularly bigger dia spacers for easy handling and to reduce fatigue. The weight reduction can be upto 40-60%. It is achieved by having a maximum recessed inner diameter and making holes on the diameter throughout the periphery. Material and tolerances are similar to normal steel spacers.



General Slitting Knives Materials	
Tool Steel Grades	Applications
DT-22	Thin gauges of low carbon steels and non ferrous material.
DT-15	Medium gauges of low carbon steels, thin gauges of SS, Silicon Steels, thick gauges of non ferrous material, lower gauges of high strength low alloy steels.
DT-55	Heavy gauges of Mild steels, medium gauges of SS, Structural steel grades, High strength low alloy steel, medium gauges of medium carbon and high carbon steels.
DT-81	For lower gauges of SS, medium gauges of high strength low alloy steels.
DTN-14	Medium carbon steels of lower and medium gauges with high UTS upto 1200 Mpa.
DTW-2	For heavy gauges and strong material having higher strength
DT2M	For thin and extra thin gauges having very high strength, non ferrous material. With higher speed lines and close tolerances higher runs
DT-23/DT-30	For special applications with very high runs and thin gauges
DTN-4	For high gauge thickness and very strong grades
DTN4 V	Extra life for very high gauge thickness and very strong grades.
Carbides	For processing very hard /soft material tonnage between two redressings is very high



Tolerances for Slitting Tools										
OD Size	Extra Precision Grade*				Precision Grade*					
	Thickness Tolerances	Flatness within (mm)			Thickness Tolerances in microns			Flatness within (mm)		
		microns	1 to 2 mm Thick	above 2 to 5 mm Thick	above 5 mm Thick	1 to 2 mm Thick	above 2 to 5 mm Thick	above 5 mm Thick	1 to 2 mm Thick	above 2 to 5 mm Thick
OD upto 155 mm	+/- 1	0.040	0.020	0.005	+/- 3	+/- 3	+/- 3	0.040	0.040	0.015
above 155 mm to 205	+/- 1	0.045	0.020	0.005	+/- 3	+/- 3	+/- 3	0.045	0.040	0.015
above 205 mm to 255	+/- 1	-	0.020	0.005	-	+/- 3	+/- 3	-	0.040	0.020
above 255 mm to 305	+/- 1	-	0.025	0.006	-	+/- 4	+/- 4	-	0.050	0.025
above 305 mm to 360	+/- 1	-	0.030	0.008	-	+/- 4	+/- 4	-	0.050	0.030
above 360 mm to 410	+/- 1	-	0.040	0.010	-	+/- 5	+/- 5	-	0.060	0.030
above 410 mm to 460	-	-	-	-	-	-	+/- 6	-	0.090	0.040
above 460 mm to 510	-	-	-	-	-	-	+/- 8	-	-	0.050
above 510 mm to 560	-	-	-	-	-	-	+/- 8	-	-	0.050
above 560 mm to 610	-	-	-	-	-	-	+/- 10	-	-	0.070
above 610 mm to 660	-	-	-	-	-	-	+/- 12	-	-	0.080
Bore Tolerance	G6/F7/H6/H7				G7/F7/H7					
OD Tolerance	upto 255 mm +/-0.015				upto 255 mm +/-0.020					
	above 255 mm +/-0.025				above 255 mm +/-0.030					
Surface Finish on Thickness	Within 0.25 Ra				Within 0.6 Ra					

*Tolerance mentioned in charts are indicative figures, Tighter tolerance can also be achieved on request. Specified tolerances are mainly indicated for knives, for metallic spacers, tolerance are slightly different.

Bonded & Loose Stripper Rings

Loose stripper rings can be easily 'stripped-on' over the metal spacers. In case of **bonded stripper rings**, the rubber rings are adequately bonded with special adhesives over the OD of the precisely ground /lapped steel cores.

The commonly used rubber grades are Nitrile / Perbunan; Polyurethane; Neoprene in different colours. Loose stripper rings can be supplied in single or dual hardness as per requirement.



Overarm Separator Tooling

Separator Discs- The discs are subject to heavy wear & impact, hence the raw material should be wear & shock resistant. Also they should not be so hard that they damage coils edges. Most common grades are CrV Alloy Steel, 100Cr6, SAE4340/EN24, 1.2379/D2. The separator discs can be supplied with TiN coating or chrome plating to improve their wear resistance. Generally hardness of 52/56 HRC works well.

Separator Spacers- These are generally made from alloy steels. To reduce weight, these spacers can also be made from Polyamide. Rubber bonded steel spacers are made for soft & surface sensitive coils.

Shimless Tooling

Modern day slitting lines are designed for higher accuracies as well as for quick tool setup and fast change overs. Our shimless tooling design helps in achieving both these objectives. The exact spacing can be achieved with these metallic spacers. Thickness tolerance is maintained within +/- 0.001 mm.

Benefits of Shimless Tooling

- Helps in avoiding the use of plastic shims
- Reduced setup times
- Increased strip/product quality
- Infinite variable possibility to establish the setting

With our tool setup software, the operator can directly assemble the spacers on the arbor as per the arrangement generated by the software. This helps to minimize the setup time.

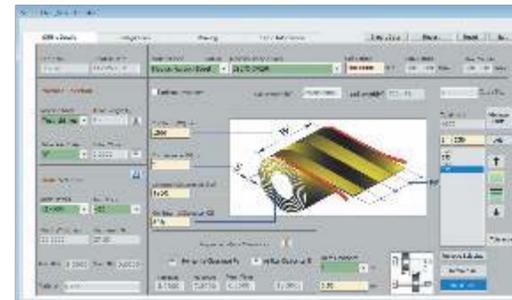


Tooling Management Software



Smart Slit is an industry oriented software that is easy to setup and is operator friendly. The software has been designed to offer accurate setup by easy data entry in inch/mm. It intelligently selects the optimum sizes of spacers from the inventory.

Smart Slit is being used globally by many satisfied customers.



Smart Slit Features:

- Measurement System: Metric and Imperial
- Calculation support: Metric-upto 3 decimal; Imperial- upto 4 decimal
- Minimum clearance option: Metric- 1/5/10 microns; Imperial: 0.1/0.5/1 thou
- Database Management: local or cloud hosting
- Slitter and over-arm management
- Male-Female and progressive slitting
- Setup Creation: Shimless and with shim
- Rubber tool selection: Rubberized spacer (BSR) and Loose rubber ring
- Re-grinding management of knives and BSR
- Life monitoring of knives through history card
- Alternate knife selection
- Optimized selection of BSR according to selected knives and strip thickness
- Optimized selection of Rubber Rings according to metallic spacers
- Slit width tolerance compensation
- Tolerance wise Inventory (+, -, 0, =) management
- Slitting Arbor pair alignment & startup spacer management
- Reverse printing of report for turret head slitter
- Material and Grade Master
- Knife Clearance Master: Horizontal and vertical clearance suggestions
- Bar code organized reports
- Data Archiving: Graphical report, bill of material, setup-information



Shear Blades & Straight Knives

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.

Following parameters are of prime importance to Blades and Knives:

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

Dee Tee offers wide range of Shear Blades and Flat Knives- Crop Shears, Flying Shears, Rotary Shears, Hot & Cold Shear Blades, Bar Shears, Scrap Choppers, Bow Type Shear Blades, Billet Shears, Divide Shears, Dead Knives etc.

Commonly used raw material grades are AISI D2 (1.2379); AISI D3 (1.2080); AISI H13 (1.2344); AISI S1 (1.2550); 1.2767; 1.2746; 1.2601 etc. with appropriate hardness according to application.





Cold Rolling Mill Rolls

DeeTee, 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 etc. The rolls are prone to very tough working conditions and have to be perfect in terms of wear resistance toughness and hardness. Rolls are checked for surface cracks by Magnetic Particle Test (MPT). Sub-surface defects like inclusions are checked by Ultrasonic Testing with Angular Probes including hardness.

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. 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. The 1st and 2nd intermediate rolls are mostly made of 5% Cr. tool steel grades (Din 1.2362 or H11 or H13) 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.

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, bimetal etc. It includes Work Rolls, Intermediate Rolls, Backup Rolls and Skin Pass Rolls.

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 3.5 meters, maximum dia 550 mm, maximum weight 3 tons.

Rolls Conversion

DeeTee also takes jobs for roll conversion from old rolls.



STEEL COMPOSITION
Commonly used raw material grades for CRM Rolls-

DIN	AISI/SAE	JIS	C	Si	Mn	Cr	Mo	V	W	Co	Nb
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	-	-	-	-	-
ASP 2023	-	-	1.28	-	-	4.1	5.0	3.1	6.4	-	-
ASP 2030	-	-	1.28	-	-	4.1	5.0	3.1	6.4	8.5	-
ASP 2055	-	-	1.69	-	-	4.0	4.6	3.2	6.3	9.0	2.1
8% Cr.	-	-	0.56	1	0.55	8	1.3	0.65	1.2	-	-

Leveller/Flattener Rolls

DeeTee applies its pioneering spirit and innovative approach 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 scratch 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 be toughened to avoid any bending and the case is hardened to avoid wear and tear. Smaller dia rolls are induction hardened.

- Raw Material- Generally EN31/ 100Cr6/ SUJ2/ 1.2067 are used for the Leveler Rolls. EN24 is used for hot applications like rolls for Plate Mills. DeeTee can make minimum 30 mm dia Leveler Rolls to maximum 500 mm dia plate Mill Flattener Rolls.



Tube/Section Mill Rolls & Solution

DeeTee is a renowned solution provider for tube & section mill tooling.

Many OEM world wide trust on DeeTee products.

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 – 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/welding shoes of BRONZE ALLOYS are also used.

Range – We make roll sets for pipes upto 12" NB.

Fins- Fin conditions the strip edges for proper welding. It holds 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)/AISI-D3 (1.2080).



Tube Straightening Rolls

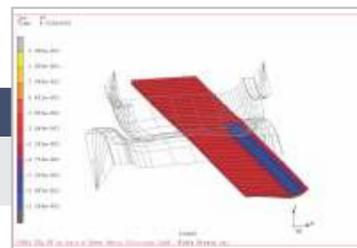
Tube Straightening Machine Rolls need complete precision since they are used in finishing stage of tube manufacturing. DeeTee offers both single piece and Shrink Fitted Rolls. In case of Shrink Fitted Rolls, the shaft is generally made out of EN24 /EN19 material. The material of the rolls is mostly AISI D3 /D2 due to their high wear and impact resistance properties.

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. Due to high heat & heavy reduction case of push bench rolls, H10 (1.2365) material is used. For S.R.M. rolls, generally D2 (1.2379) or sometimes D3 is also used. DeeTee also makes Piercing Bush which is generally in 1.2714 material.

DeeTee has got expertise

- Roll designing & FE analysis
- Rolls for special welded section
- Carbide inserted rolls
- Floating flanges
- Gripping / holding jaw



Tube Cutting Blades & Knives

Punch Type Tube Cut-off Knives

The punch-type tube cutting technology is used in high speed tube mills which operates at > 75 mtr./min. up to 200 mtr./min. 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 best suited material is High Speed Steel– AISI M2 (1.3343). Raw material directly sourced 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 (C.O.C.) Cutters

C.O.C. is a 3 or 4 cutter assembly. The cutters keep rotating and come closer to part off 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- Commonly used grades are H13, EN24 and 1.2714.



Bar Mill & Wire Rod Mill Tooling

Bar Mill & Wire Rod Mills are continuous production lines with capacities of few thousand tons to a couple of million tons/annum. Each tool/consumable product used in the mill has to be of very high quality as a small breakdown costs hundred of tons production loss. Being used in hot application and at very high speeds, tools must withstand high temperatures & must have high degree of wear resistance and toughness.

DeeTee makes a wide range of high quality product for Bar & Wire Rod Mills for both ferrous & non ferrous applications-

- Guide Box Rolls
- Slitter Rolls
- Pinch Rolls
- Looper Rolls
- Main Stand Rolls (for Copper/Aluminium wire rod mills)
- Cold Shear Blades
- Hot Shear Blades

Commonly used raw material grades

Guide Box Rolls- H13 is most common grade for the initial stands where temperatures are very high. For intermediate & finishing stands, D2 is mostly used.

Pinch Rolls- In this application, due to the high speeds, wear resistance is most important. D2 is mostly used. Powder metallurgy rolls are also used for very long life.

Hot Shear Blades- Because of high heat, H13 is the best suited material. Special 8% Cr tool steel is used for shearing higher diameter bars.

Cold Shear Blades- H13 being a tough grade, it work well in cold shearing upto 20 mm bars. For higher diameters, nickel based special tool steels are used.

Copper/Aluminium Wire Rod Mill Rolls- Due to extremely high temperatures & Copper/Aluminium being very soft, the rolls material becomes very critical. Commonly used grade is H13. DeeTee has developed a special tool steel grade which gives much higher wear & adhesion resistance at such high temperature compared to H13.



