



What started 100 years ago as a small family run business in indigenous financing is today a \$1.5 billion corporate with diversified interests in abrasives, engineering, sanitaryware, farm inputs, plantations, sugar, bio-products, chemicals, nutraceuticals, insurance and financial services.

The Murugappa Group is an industry leader in many fields and enjoys a high degree of credibility in the market place. The group is also one of the first Indian corporates to begin the process of transformation from being a family-owned business to a professionally run organization.

MANUFACTURING UNIT:

Tube Products of India
Post Box. No 4
Avadi, Chennai 600 054
Ph: +91-044-42291999
Fax: +91-044-42291990

SALES OFFICES:

Tube Investments of India Ltd.
Unit: Tube Products of India
Post Box. No 4
Avadi, Chennai 600 054
Ph: +91-044-42291999
Fax: +91-044-42291990

Tube Investments of India Ltd.
Unit: Tube Products of India
S-421, South Block, Rear Wing
Manipal Centre, Bangalore 560 042
Ph: +91-080-25590834
Fax: +91-080-25590835

Tube Investments of India Ltd.
Unit: Tube Products of India
203, MPJ Chambers
Wakdevadi, Shivaji Nagar
Mumbai - Pune Road
Pune 411 003
Ph: +91-020-25819149
Fax: +91-020-25818447

Tube Investments of India Ltd.
Unit: Tube Products of India
1st Floor, Jeevan Deep Building
10, Parliament Street
New Delhi 110 001
Ph: +91-011-23748166
Fax: +91-011-23369232

Tube Investments of India Ltd.
Unit: Tube Products of India
Pradip Estates
II Floor, 6-A, Middleton Street
Kolkata 700 071
Ph: +91-033-22830406
Fax: +91-033-22830406

UNIQUE STEEL SYMPHONIES PLAYED SOLELY ON YOUR REQUEST





About Us



Tube Products of India (TPI), a unit of Tube Investments of India Limited (TII), commenced production of Cold Rolled Close Annealed Steel Strips (CRCA) in 1957. It now manufactures a wide range of CRCA steel strips that find application in Fine Blanking, Bearing, Automobile, Auto Ancillaries and General Engineering industries.

The Cold Rolled Division has a unique application driven approach to manufacturing steel strips. It develops application specific products that meet the precise requirements of the customer. The Division adapts the manufacturing process to provide customized solutions for each and every esteemed client.

The Cold Rolled Division is guided by a strong development team, technical expertise, a keen knowledge of the customer specific requirements and a stringent adherence to quality. Propelled by a unique model of manufacturing practices and customer satisfaction, Cold Rolled Steel Division is all set to become a leading force in the specialty CRCA steel strips market.



Fine Blanking

Product Applications

The Cold Rolled Steel Division manufactures the widest range of strips for a variety of industries such as bearing, auto and auto ancillary, electrical stamping, bicycle, general engineering and consumer goods.

With strips in thickness ranging from 0.1* mm to 8.00 mm and width of 10 mm to 1000 mm, TPI is a unique manufacturer, providing a comprehensive product range in terms of dimensions and grades.

The collaborative approach with manufacturers and end users has enabled TPI to develop steel strips for a variety of applications and customer-specific requirements.

**Less than 0.2 mm on specific applications*



Bearings



Chains

Our Specialty Products

Fine Blanking Applications	Automobile Computer Cutlery Tools and Hardware
Bearing Applications	Engine Bearing Ball Bearing cages Taper Rolling cages
Chain Applications	Inner and Outer Plates Rollers Bushes
Automotive and General Applications	Door Frames Clutch Assembly Seat Frames Door hinges and Latches Internal Body Parts Oil Filters



Automotive & General

Process

Pickling

Pickling is a preparatory step where scales are completely removed from the surface of hot rolled coils. Pickling is done at TPI through a push-pull high quality pickling line. Pickled coils are passed on to rolling mills after slitting or dispatched to users as HRPO after oiling.



Cold Rolling

Cold rolling is the process where strips are reduced to achieve the desired thickness, mechanical properties and surface finish. At TPI, this process is done using both 6Hi & 4Hi mills. Cold rolling mills are fitted with hydraulic automatic gauge control systems, which ensure uniform & close thickness tolerances. At TPI, Cold rolling mill capability is enhanced to produce CRCA strips up to 5.50 mm thickness in low carbon, medium carbon & alloys steels.



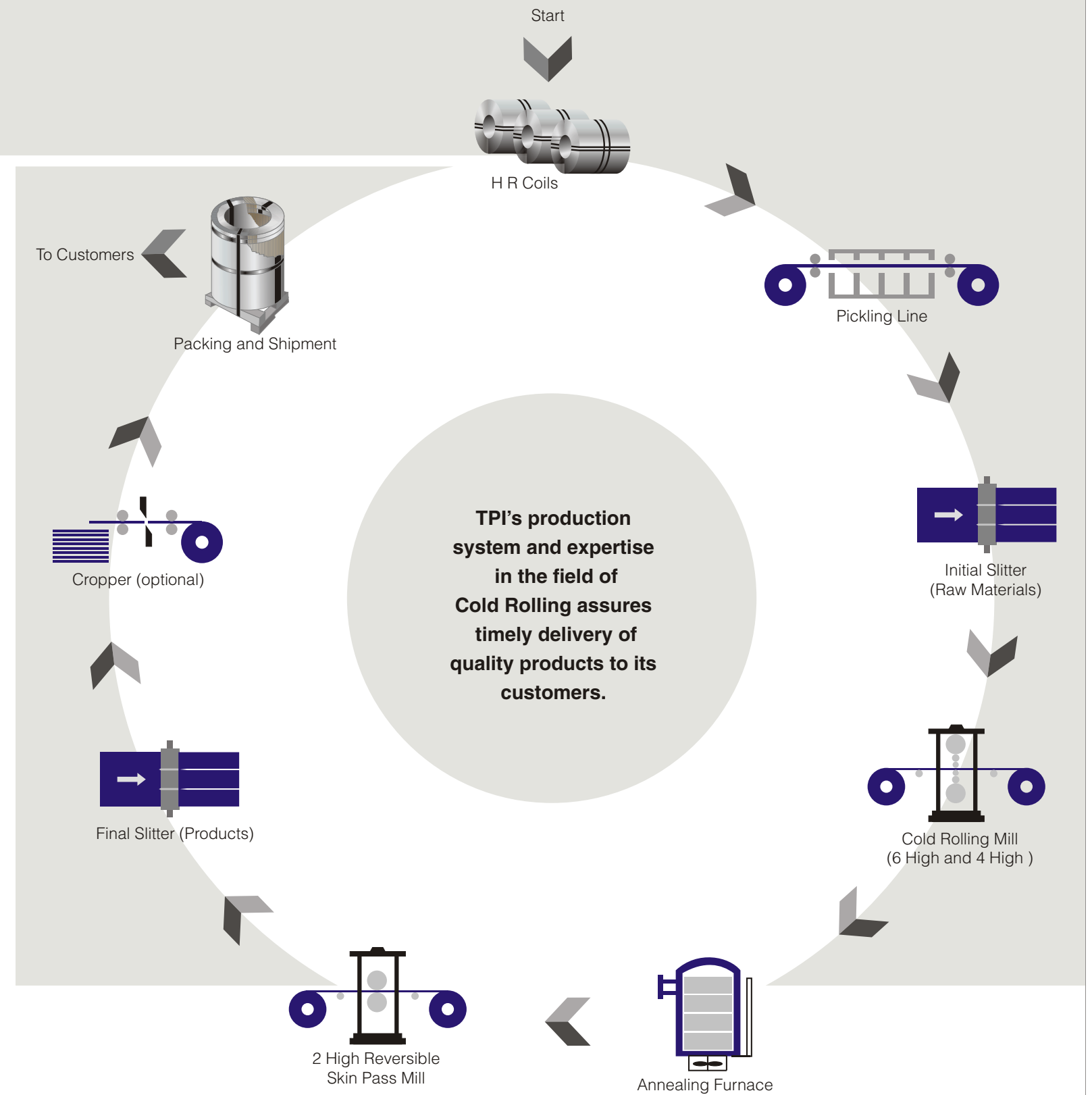
Annealing

Annealing is the process of heating, holding at a suitable temperature and then cooling at a suitable rate, for such purposes as reducing hardness, facilitating cold working and producing a desired micro structure. For obtaining the desired mechanical, metallurgical, physical or other properties, TPI is equipped with Bell Furnaces for annealing under controlled atmosphere of N_2 and H_2 .



Packing and Shipment

Strips in coil and cut-to-length form are wrapped with waterproof kraft paper, and packed with VCI paper on a wooden pallet as per customer's packaging requirements.



Product Range

Fine Blanking

Typical Grades for Fine Blanking

Low Carbon Steels

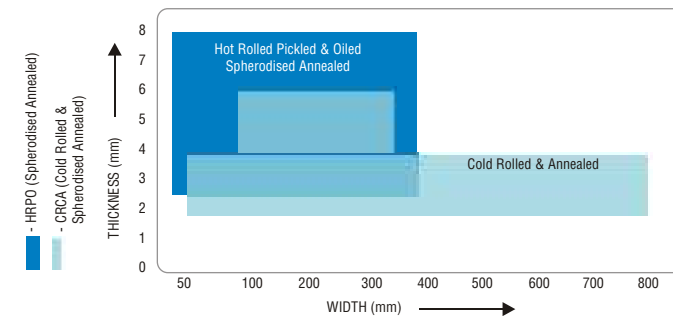
Grades	%C	%Mn	%Si (Max)	%S(Max)	%P(Max)	UTS (N/mm ² Max)	%EL 50mm GL (Min)	YS/UTS (Approx)	%SPHN (Min)
SAE1010	0.08 - 0.13	0.30 - 0.60	0.35	0.03	0.03	370	36	0.65	95
SAE1018	0.14 - 0.20	0.60 - 0.90	0.35	0.03	0.03	380	32	0.65	95
SAE1020	0.18 - 0.23	0.40 - 0.70	0.35	0.03	0.03	410	30	0.65	95

Medium Carbon Steels

Grades	%C	%Mn	%Si	%S(Max)	%P(Max)	UTS (N/mm ² Max)	%EL 50mm GL (Min)	YS/UTS (Approx)	%SPHN (Min)
SAE1035	0.32 - 0.39	0.50 - 0.80	0.15 - 0.35	0.03	0.03	510	28	0.7	95
SAE1040	0.35 - 0.45	0.50 - 0.80	0.15 - 0.35	0.03	0.03	510	28	0.7	95
SAE1045	0.42 - 0.50	0.50 - 0.80	0.15 - 0.35	0.03	0.03	530	28	0.7	95
SAE1050	0.47 - 0.55	0.60 - 0.90	0.15 - 0.35	0.03	0.03	550	26	0.7	95
SAE1055	0.50 - 0.60	0.60 - 0.90	0.15 - 0.35	0.03	0.03	550	26	0.7	95
SAE1060	0.57 - 0.65	0.60 - 0.90	0.15 - 0.35	0.03	0.03	570	24	0.7	95

Alloy Steels

Grades	%C	%Mn	%Si	%S(Max)	%P(Max)	%Cr	%Mo	%Ni (Max)	UTS (N/mm ² Max)	%EL 50mm GL (Min)	YS/UTS (Approx)	%SPHN (Min)
15Cr3	0.12 - 0.18	0.40 - 0.80	0.15 - 0.35	0.03	0.03	0.40 - 0.70	-	-	420	26	0.65	95
16MnCr5	0.14 - 0.19	1.00 - 1.30	0.15 - 0.35	0.03	0.03	0.80 - 1.10	-	-	470	24	0.65	95
SCM415	0.13 - 0.18	0.60 - 0.85	0.15 - 0.35	0.03	0.03	0.90 - 1.20	0.15 - 0.30	0.25	470	22	0.7	95
SCM435	0.33 - 0.38	0.60 - 0.85	0.15 - 0.35	0.03	0.03	0.90 - 1.20	0.15 - 0.30	0.25	550	18	0.7	95
50CrV4	0.47 - 0.55	0.70 - 1.00	0.15 - 0.35	0.03	0.03	0.90 - 1.20	V: 0.1 - 0.2	-	750	18	0.7	95



Automotive & General

Low Carbon Steel

Specification	Grades	%C (Max)	%Mn (Max)	%S (Max)	%P (Max)	%Al (Max)	%Si (Max)	Micro-Alloy (Max)	Hardness (Max)	UTS (N/mm ²)	YS (N/mm ²)	%EL 80mm GL (Min)
IS 513 or BS 1449 or JISG 3141 or DIN 1623 and EQUIVALENTS	O	0.15	0.60	0.05	0.05	-	-	-	-	-	-	-
	D	0.12	0.50	0.035	0.035	-	-	-	65 RB	270 / 410	280 max	28
	DD	0.10	0.45	0.03	0.03	-	-	-	57 RB	270 / 370	250 max	32
	EDD	0.08	0.40	0.025	0.025	-	-	-	50 RB	270 / 350	220 max	36

Plain Carbon High Strength Steel

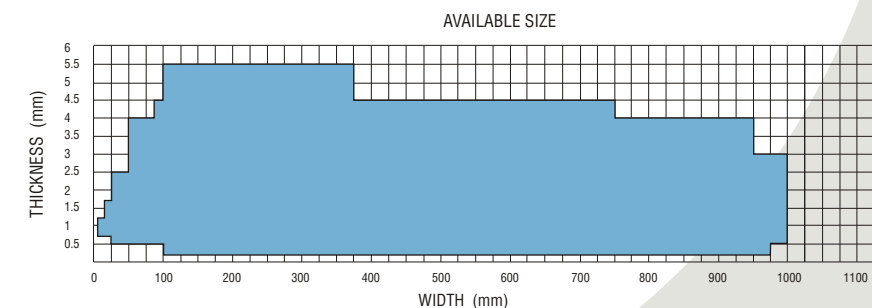
Grades	Standard	Description	%C (Max)	%Mn (Max)	%S (Max)	%P (Max)	%Si (Max)	%Al (Max)	Others	UTS (N/mm ²)	YST (N/mm ² Min)	%ELG (80mm GL)
ST42	IS 5986	General structural steel	0.2	1.3	0.045	0.045	-	-	-	410 - 520	255	17
ST52	IS 5986	General structural steel	0.2	1.5	0.045	0.045	-	-	-	510 - 620	355	16
SAPH 38P	JIS G 3113	Structural steels for automobiles	-	-	0.04	0.04	-	-	-	370 min	230	32
SAPH 41P	JIS G 3113	Structural steels for automobiles	-	-	0.04	0.04	-	-	-	400 min	255	30
SAPH 45P	JIS G 3113	Structural steels for automobiles	-	-	0.04	0.04	-	-	-	440 min	300	28

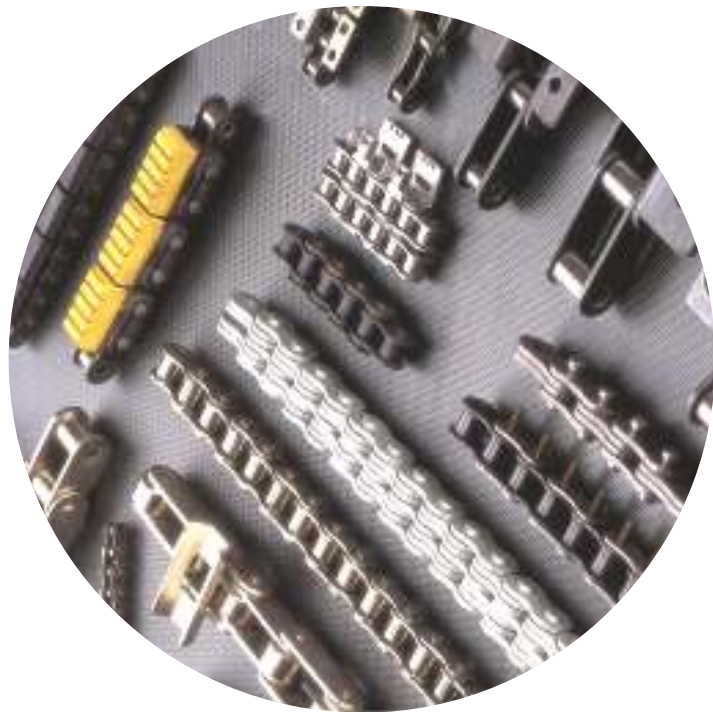
High strength formable grades (Micro alloyed steel)

Grades	Standard	Description	%C (Max)	%Mn (Max)	%S (Max)	%P (Max)	%Si (Max)	Others	UTS (N/mm ²)	YST (N/mm ² Min)	%ELG (80mm GL)
HR43F35	BS1449 SEC1.4	High strength formable grades	0.12	1.2	0.03	0.03	-	Nb+Ti Treated	430 min	350	23
HR46F40	BS1449 SEC1.4	High strength formable grades	0.12	1.2	0.03	0.03	-	-	460 min	400	20
ZSTE340TM	EN10149	High strength formable grades	0.12	1.5	0.025	0.015	0.5	Nb - 0.09 max V - 0.20 max Ti - 0.15 max	430 - 550	340	19
QSTE500TM	En10149	High strength formable grades	0.12	1.5	0.025	0.015	-	-	550-700	500	16



1/8 HARD	115 VPN MAX	(10 Kg load)
1/4 HARD	115 / 135 VPN	(10 Kg load)
1/2 HARD	135 / 165 VPN	(10 Kg load)
FULL HARD	165 VPN MIN	(10 Kg load)





Chains

Typical Grades for Chain Plates

Grades	%C	%Mn	%S (Max)	%P (Max)	Hardness (HRC)
SAE1040	0.35 - 0.45	0.50 - 0.80	0.03	0.030	18 - 25
SAE1045	0.42 - 0.50	0.50 - 0.80	0.03	0.035	18 - 25
SAE1050	0.47 - 0.55	0.60 - 0.90	0.03	0.035	18 - 25
SAE1055	0.50 - 0.60	0.60 - 0.90	0.03	0.035	18 - 25

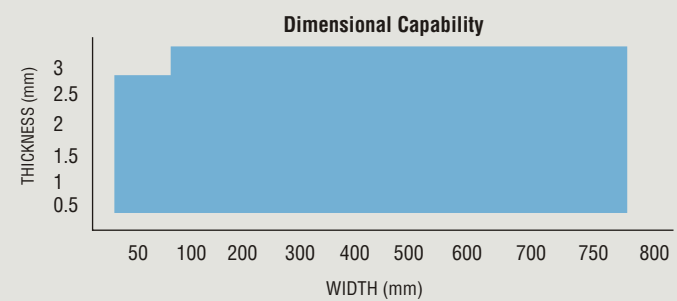
Note: Any special requirement on hardness can be mutually agreed. Hardness is equivalent to 95-105 HRB / 59-63 HRA / tensile strength of 70-90 kg/sq.mm

Steel for Roller Links

Grades	%C	%Mn	%S (Max)	%P (Max)	Hardness (HRB)	Grain size (ASTM)
SAE1010	0.08 - 0.13	0.30 - 0.60	0.035	0.035	50 - 60	6 - 8

Steel for Bushes

Grades	%C	%Mn	%S (Max)	%P (Max)	%Cr	%Si	Hardness (HRB)	UTS (N/mm ²)	Grain size (ASTM)
15Cr3	0.12 - 0.18	0.40 - 0.80	0.03	0.03	0.40 - 0.70	0.10 - 0.35	50 - 60	35 - 45	6 & finer



Bearings

Typical Grades for Engine Bearings

Grades	%C	%Mn	%S (Max)	%P (Max)	%Al	%Si (Max)	Hardness (HRB)	UTS (N/mm ²)	YS (N/mm ²)	%El 50mm GL	Grain Size ASTM No.	Surface Finish Ra (Microns)
SAE1008*	0.08 max	0.45 max	0.035	0.03	0.02 - 0.07	0.03	85 min	370 min	247 min	-	-	-0.50 max (Bright)
SAE1008	0.08 max	0.45 max	0.035	0.03	0.02 - 0.07	0.03	50 - 65	270 - 330	-	-	6 & finer	0.50 max (Bright)
SAE1010*	0.08-0.13	0.30 - 0.60	0.035	0.03	0.02 - 0.07	0.03	85 min	370 min	247 min	-	-	0.50 max (Bright)
SAE1010 (Si)*	0.08-0.13	0.30 - 0.60	0.035	0.03	-	0.10 - 0.35	85 min	370 min	247 min	-	-	0.50 max (Bright)

* Full hard

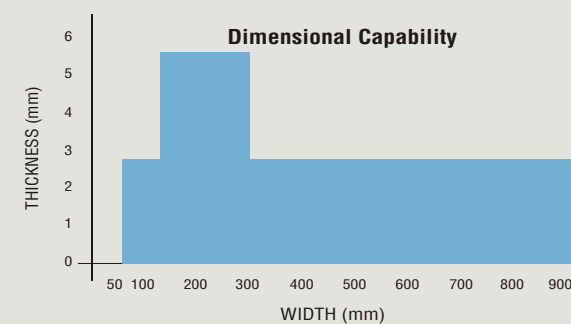
Typical Grades for Deep Groove Ball Bearing Cages (DGBB)

Grades	%C (Max)	%Mn (Max)	%S (Max)	%P (Max)	%Al	%Si (Max)	Hardness VPn (HV5)	Hardness (HRB-30T)	UTS (N/mm ²)	YST (N/mm ² Max)	%El 50mm GL	Grain Size ASTM No.	Surface Finish Ra (Microns)
EDD	0.08	0.4	0.035	0.03	0.02 - 0.07	0.03	85 - 100	44 - 55	270 - 350	220	36 min	6 & finer	0.50 max (Bright)
Din 1624-ST4	0.08	0.4	0.035	0.03	0.02 - 0.07	0.03	85 - 100	44 - 55	270 - 350	220	36 min	6 & finer	0.50 max (Bright)

Note: Guarantee on Erichssen Cupping Value as per standards

Typical Grades For Taper Roller Bearing Cages (TRB)

Grades	Type	%C (Max)	%Mn (Max)	%S (Max)	%P (Max)	%Al	%Si (Max)	Hardness (HRB)	Grain Size ASTM No.	Surface Finish Ra (Microns)
Non earring grade										
SAE1008	Cold Rolled & Annealed	0.10	0.50	0.035	0.03	0.02 - 0.07	0.03	50 - 65	6 & finer (Equiaxed)	0.50 max (Bright)
SAE1008 (M)	Hot Rolled & Gauge corrected	0.05 - 0.08	0.20 - 0.50	0.035	0.03	0.02 - 0.07	0.03	50 - 70	8 & finer (Equiaxed)	Dull
SAE1010	Hot Rolled & Gauge corrected	0.08 - 0.13	0.30 - 0.60	0.035	0.03	0.02 - 0.07	0.03	58 - 70	8 & finer (Equiaxed)	Dull
Standard grade (IS 4397 equivalent)										
SAE1008	Cold Rolled & Annealed	0.08	0.40	0.035	0.03	0.02 - 0.07	0.03	50 - 65	6 & finer	0.50 max (Bright)
SAE1008 (M)	Hot Rolled & Gauge corrected	0.05 - 0.08	0.20 - 0.50	0.035	0.03	0.02 - 0.07	0.03	50 - 70	7 & finer	0.50 max (Bright)
SAE1010	Hot Rolled & Gauge corrected	0.08 - 0.13	0.30 - 0.60	0.035	0.03	0.02 - 0.07	0.03	58 - 70	7 & finer	0.50 max (Bright)





Tolerance

Tolerance on width (+/-) mm

Thickness	With Slit Edge					With Mill Edge	
	Upto 160	161 to 250	251 to 400	401 to 500	501 to 1000	CR	HR
Upto 0.60	0.13	0.13	0.25	0.30	1.00	2.00	5.00
0.61 to 1.00	0.13	0.13	0.25	0.30	1.00	2.00	5.00
1.01 to 1.60	0.15	0.20	0.30	0.40	1.50	2.50	6.00
1.61 to 2.50	0.25	0.25	0.40	0.50	2.00	3.00	7.00
2.51 to 4.00	0.40	0.40	0.45	0.50	2.50	3.00	8.00

Tolerance on thickness (+/-) mm

Thickness	Width	
	Upto 350	351 to 1000
Upto 0.30	0.020	0.015
0.31 to 0.60	0.025	0.020
0.61 to 1.00	0.030	0.025
1.01 to 2.00	0.040	0.030
2.01 to 3.00	0.050	0.035
3.01 to 4.00	0.060	0.040
4.01 to 5.00	0.070	
5.01 to 6.00	0.080	

Tolerance on Edge Camber (mm)

Edge Camber Measured in any 2m length				
Nominal Width		Nominal Thickness		Deviation
Over	Upto & inclg	Over	Upto & inclg	
-	25	-	2	13.0
25	50	-	2	10.0
-	50	2		13.0
50	250	-	2	6.5
50	250	2		13.0
250	600	-	2	6.5
250	600	2	-	13.0

Coil Weight

Mild Steel	16 Kg/mm width max
Carbon & Alloy Steel	3.5 to 8 Kg/mm width Smaller coils on mutual agreement
Coil Inner Diameter	350, 400, 508 mm

Others

Length Tolerance	+5-0mm
Surface Finish	Bright / Matt
Packing	Hessian Wooden Metallic Pallet

Note: Any special requirement on tolerance can be mutually agreed.

Customers who use our products

Logos included: BHEL, HYUNDAI, LT, KING ENGINE BEARING, MARUTI SUZUKI, TVS, SKF, BAJAJ, LMW, TATA, Valeo, MICO BOSCH Group, Autoliv IFB, Kinloskar, LUK, LGB.



R & D Strength

World-class products require world-class R&D. At the Cold Rolled Steel Division, a well-equipped R&D centre and a competent team ensures that every customer gets the benefit of cutting edge technology and expertise.

Corporate R&D, a division of TII, supports development of unique CRCA applications.

The key objectives of the R & D wing are:

- To understand the manufacturing process and application of the product.
- Customise products to provide improved level of performance - move away from specification driven approach to application driven approach.
- Lend technical support to customers.
- Extend the usage of TPI resources including testing resources to solve customer application issues.



Testing Facilities

- Schimadzu UTM - 200 KN with extensometer
- ZEIS metallurgical microscope with Clemax Image Analyser (1600X)
- Schimadzu Micro Vickers hardness tester
- High strain rate impact testing machine

ISO 9001

Quality

At the Cold Rolled Division, quality assurance is an integral part of the manufacturing process. Every product is processed according to the norms sequenced by the process control engineers and monitored through uncompromising quality control tests at every stage.

Our strict adherence to quality at every stage of manufacturing has earned us the prestigious ISO 9001 certification.

Certificates

- Our Manufacturing Units comply with:
 - ISO 9001:2000
 - ISO 14001:1996
- Proud winner of the Sword of Honor - the ultimate accolade for outstanding safety performance from the British Safety Council.

