

TPB
IN SERVICE OF STEAM USERS



**We offer the expertise of a very Large Company
with accessibility of a small company
at very Reasonable Costs.**

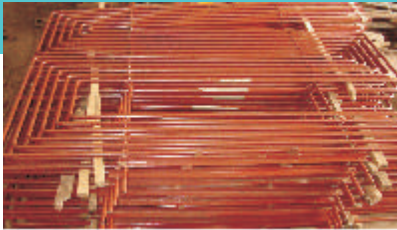
TPB
TPP BOILERS PVT. LTD.
(I.B.R. APPROVED)



Our Motto

To Engineer, Fabricate, Guarantee our Products, Deliver and Erect them at the right time is what we shall Excel at.

Welcome to TPB



TPB is a Manufacturer & Erector of High Temperature Steam Boiler Pressure Parts, Boiler Components and **Fabricator of Replacement Boiler Tubes**, Water Wall Tubes and Panels, Superheater & Economizer Tubes/ Coils and Assemblies, Wall or Steam headers, and other Boiler Pressure Parts and Heavy Structures for Large Steam Generator are Custom Fabricated to Precisely Fit your Boiler.

Our Promoters and Promoter Skilled Workers with **collective experience of 500 man-years** have a very deep knowledge and wide experience of Fabrication, Erection, Bending & Welding of all kinds of Plates, Tubes and Pipes like Seamless, ERW, and Rifle-Bore made of various kinds of Steels like Carbon Steels, Alloy Steels, and Stainless Steels in any Size and Length and to any Specification.

Facilities

We have capacity to manufacture any Equipment made from any type of steel having thickness of up to 50 mm. and any type of Tube/Pipe Bending up to 100 mm NB(114.3mm OD.) X Sch 160(33mm) .All Fabrication facilities are available using state of art manufacturing **Equipments at our 4000 Sq. Mtr. factory** and Innovations by our **Skilled Manpower in Plate/Tube Bending, Welding, Coiling, Assembling and Heat-Treatment** allows fast delivery of component without reducing its quality requirements.

We have excellent Managerial & Technical Personnel with support from a team of Engineers, Supervisors and of skilled and semiskilled workers for site and factory jobs and Design, Production and Quality are maintained by our Experts in their Fields.

We also **specialize in manufacturing Short Radius Tube Bends with $R \geq 0.6D$** , Heat-Exchangers, Steam Piping, Condensate Piping, Exhaust Gas Piping and any Type of Ducting Systems.



Quality:

Our stringent Quality Control Process have been developed over many decades of experience and **each Bend, Weld and Assembly produced is Serialized** and subjected to 100% Check and Recorded for Traceability with the main area of focus being Raw Materials, Ovality and Thinning at Bends, Welding Joints with Radiography/X- Rays, Dimensional Accuracy of the Assembly, Pressure Testing and finally Painting and Packing.

Fabrication Code:

We not only follow the latest Material and Fabrication codes like ASME, BSS, DIN, VGB, JIS, NF, GOST, ISO, EN etc. but we internally excel the requirements of these Codes.

All Boiler pressure parts are stamped in accordance with Indian Boiler Regulation / ASME Code/VGB/BSEEN etc. according our clients requirement.

SUPERHEATERS are the most critical Boiler Component of the modern day Thermal Power Plant and are subject to very high metal temperatures. In fact the capacity of the Superheater to work without failure at higher Temperatures is what determines the Boilers Capacity and it effects improvement in economy by reducing corrosion, erosion and steam consumption of the steam turbine.

We have fabricated thousands of Superheaters - **Radiant, Pendant, Final, Fluidized bed type, Reheaters** for all kinds of Boilers US, Germany, France, Belgium, Russian, UK, Swedish, Indian origins of GE, C.E., B&W, Alstom, Mitsubishi, BHEL, IJT, WIL, Thermax etc. having complicated very close and compact shapes with tube sizes ranging from 32mm OD to 76.2mm OD and thickness from 3 mm to 12 mm in all types of Boiler quality steel grades from Carbon, Alloy, Stainless Steels for metal temperature ranging up to 656°C and for Boilers of 10 to 500 MW.



ECONOMISERS:

These are Boiler feed-water heaters in which the heat from waste flue gases is recovered to raise the temperature of feed water supplied to the boiler, thereby increasing the Fuel economy, Steaming capacity, Life of the boiler and reducing Pollution.

We have fabricated various types **Economizer Coils (Plain Tubular Economizers, Finned Economizers, Cast Iron Gilled Economizers), Feed Water Heaters, Evaporator Coils etc.**

The main problem faced by Boiler engineers is the Erosion of the Eco-coil tubes and mainly at bends. We offer innovative solutions to extend the life of the coils by providing **Cassette baffles for Bends, Half Tube Sleeves** for upper tubes, SS full sleeved Tubes etc.



BEND PROCESS & FABRICATION CODE

Followed are ASME BPVC, BS-1113, VGB, ISO, IBR etc.

BOILER BANK TUBES:

Boiler bent to shape tubes or Steam generating tubes is where water is converted to Steam. Boiler Bank Tubes carry a mixture of water and steam. Fabricated from Tubes in various sizes and shapes, Bending of these tubes is generally to larger Radius hence they need some **Tube Bending Expertise to avoid Wrinkles, surface cracking or irregularities**, ensuring long life of tube resulting in smooth and efficient operation of the boiler. These tubes for replacements in boilers have been supplied by us to various industries like Sugar, Refineries, Steel Plants, Small and large Power Plants. These shaped tubes are generally fabricated from Seamless/ERW Tubes. The sizes of tubes having different shapes vary from 114.3 mm OD. X 8 Gauge to 50.8 mm OD. X 5.60 mm Thick with **Swaged Ends**.



Tube Bending Systems:

Cold Bending: We have adopted the American Mandrel system of pull/push tube over mandrel - Cold Bending of tubes which ensure much smoother Profile of Tube Bends with **improved Ovality and Thinning** thus prolonging their life, resulting in substantial economic advantage to the customer. We use **CNC Automatic Boiler Tube Bending Machine** to ensure Serialized Bending at a high rate of production of 200 Bends per day.

Tube Size range Min.- 19.05 mm OD x 2 mm thk. Max. 114.3 mm OD x 33 mm thk. Bending Radius Min. 1.25 x OD to Max. 6.0 x OD.

Hot Bending: We can give Shorter Radius bends up to Min. R = 0.6 x OD. By **Hot Squeezing** of the above cold formed Bends in our 300 M.T Hydraulic Press using **Specialized Press dies with Centralizers** Keeping Metal Temperature above 860°C.

WATER WALL PANELS WITH STEAM HEADERS:

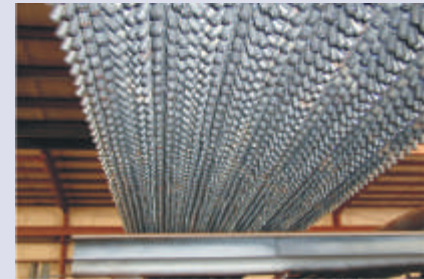
Water wall panels are used in modern day boilers in place of Steam Generating Tubes to reduce heat loss due to their gas tight nature and reduce insulation costs. We fabricate water wall panels using **automatic Fin to Tube welding** machines and large Tube Panel benders to achieve desired shape of panels which have Swaged Ends, Stub Welded to Headers. We supply Panels with **integrated manhole openings** in the panels.

We have fabricated panels made of Rifle Bore Tubes in Lengths of upto 24 mtrs. X max. 28 tubes (2 mtrs. wide).



STUDED TUBES:

Studded Tubes are used to increase the Surface Areas for higher heat Transfer. They are used in **Fluidized Bed Coils and Fluidized Bed Super Heaters**. They are also used in Refineries as **Reheaters**. We use automatic studding machines using Drawn Arc method capable of welding studs upto max. 13 mm Dia at a very close pitch of 63 Stud Planes Per Mtr. (cross-linear) . We can also do studding of U-Bends from both inside and outside. The stud and Tube steel can be similar or dissimilar of grade ranging from Carbon Steel to Alloy Steel (up to 9 Cr) to Stainless Steels. We can also give special **HVOF Chromium Carbide coating** on surfaces subject to High Erosion velocity of Flue gases to avoid frequent replacements.



RAW MATERIALS STOCKS:

We carry an **optimum stock of a range of Boiler Tubes and Pipes** to cater to our clients Emergency Boiler Shut down replacement jobs and we also supply these straight tubes with MTC to our regular clients for smaller quantities not serviced by the large tube and pipe manufacturers.

Some Common Formulaes for back of the envelope calculations (Not for Design Purposes)
 1) Hydro. Test Pressure = $100x(S/t/D)$ kg/sq. cm
 2) Tube weight = $(D-t) \times 0.02466$ Kg/mtr
 Where S = Min. Specified Yield Strength Kg/sq. mm
 t = Min. thickness of Tube mm
 D = OD of Tubes mm

STRESS				
Pa	Mpa(N/mm ²)	kgf/mm ²	lbf/in ²	
1	1x10 ⁻⁶	1.01972x10 ⁻⁷	1.45038x10 ⁻⁴	
1x10 ⁶	1	1.01972x10 ⁻¹	1.45038x10 ²	
9.80665x10 ⁶	9.80665	1	1.42233x10 ³	
6.89478x10 ³	6.89476x10 ³	7.03070x10 ⁻⁴	1	
LENGTH				
m	inch	feet	yard	mile
1	39.37	3.281	1.094	6.214x10 ⁻⁴
0.0254	1	0.0833	0.02778	1.578x10 ⁻⁵
0.3048	12	1	0.3333	1.894x10 ⁻⁴
0.9144	36	3	1	5.682x10 ⁻⁴
1609	63360	5280	1760	1

Nominal Pipe SIZE INCH	O.D. MM	Standard		Extra Strong		Double Extra Strong		Schedule 10	Schedule 20	Schedule 30	Schedule 40	Schedule 60	Schedule 80	Schedule 100	Schedule 120	Schedule 140	Schedule 160										
		Wall	Wt.	Wall	Wt.	Wall	Wt.	Wall	Wt.	Wall	Wt.	Wall	Wt.	Wall	Wt.	Wall	Wt.	Wall	Wt.								
1/2	21.34	2.77	1.26	3.73	1.62	7.47	2.54				2.77	1.26		3.73	1.62			4.75	1.95								
3/4	26.67	2.87	1.68	3.91	2.19	7.82	3.63				2.87	1.68		3.91	1.29			5.54	2.89								
1	33.40	3.38	2.50	4.55	3.23	9.08	5.45				3.38	2.50		4.55	3.23			6.38	4.23								
1 1/4	42.16	3.56	3.38	4.85	4.46	9.70	7.75				3.56	3.38		4.85	4.46			6.35	5.60								
1 1/2	48.26	3.68	4.05	5.08	5.40	10.2	9.54				3.68	4.05		5.08	5.40			7.14	7.23								
2	60.32	3.91	5.43	5.54	7.47	11.1	13.44				3.91	5.43		5.54	7.47			8.71	11.10								
2 1/2	73.02	5.16	6.62	7.01	11.40	14.0	20.39				5.16	6.62		7.01	11.40			9.52	14.90								
3	88.9	5.49	11.28	7.62	15.25	1.52	27.65				5.49	11.28		7.62	15.25			11.1	21.30								
3 1/2	101.6	5.74	13.56	8.08	16.62	16.15	34.00				5.74	13.56		8.08	16.62												
4	114.3	6.02	16.06	8.56	22.29	17.1	40.99				6.02	16.06		8.56	22.29		11.1	28.25	33.51								
5	141.3	6.55	21.76	9.52	30.92	19.0	57.37				6.55	21.76		9.52	30.92		12.7	40.24	49.04								
6	168.3	7.11	28.23	11.0	42.53	21.9	79.11				7.11	28.23		11.0	42.53		14.3	54.20	67.47								
8	219.1	8.18	42.49	12.7	64.57	22.2	107.76		6.35	33.28	7.04	36.76	8.18	42.49	10.3	53.07	12.70	64.57	15.1	75.79	18.2	90.67	20.6	100.89	23.0	111.18	
10	273.0	9.27	60.24	12.7	81.46				6.35	41.73	7.80	50.96	9.27	60.24	12.7	81.46	15.1	95.84	18.2	114.59	21.4	132.85	25.4	154.97	28.6	172.11	
12	323.8	9.52	73.76	12.7	97.36				6.35	49.68	8.38	65.14	10.3	75.71	14.3	108.97	17.4	131.81	21.4	158.67	25.4	186.75	28.6	207.87	33.3	238.60	
14	355.6	9.52	81.21	12.7	107.28			6.35	54.63	7.92	67.88	9.52	81.21	11.1	94.31	15.1	126.51	19.0	157.94	23.8	194.64	27.8	224.35	31.8	253.32	35.7	281.49
16	406.4	9.52	93.13	12.7	123.18			6.35	62.58	7.92	77.92	9.52	93.13	12.7	123.18	16.7	160.04	21.4	203.26	26.2	245.34	30.8	286.33	36.5	332.72	40.5	364.94
18	457.2	9.52	105.05	12.7	139.07			6.35	70.53	7.92	87.85	11.1	122.12	14.3	155.89	18.0	205.62	23.8	254.24	29.4	309.55	34.9	363.37	38.7	408.21	45.2	459.10
20	508.0	9.52	116.97	12.7	154.94			6.35	78.47	9.52	116.94	12.7	154.97	15.1	183.14	20.6	247.79	26.2	310.91	32.5	381.20	38.1	441.06	44.4	507.63	50.0	564.24
24	609.6	9.52	140.81	12.7	186.75			6.35	94.37	9.52	140.81	14.3	208.54	17.4	254.74	24.3	354.62	30.9	441.30	38.9	546.84	46.0	639.18	52.4	719.16	59.5	806.74

Recommended Metal Temperatures for Boiler Tube Grades.

Max. Metal Temperature	475 C 885 F			500 C 930 F		550 C 1020 F	560 C 1040 F	575 C 1065 F	600 C 1110 F			625 C 1155 F	650 C 1200 F
	Gr. A	Gr. B	Gr. C										
ASTM A 106 A 192 A 209-A 210 A213-A335	Gr. A A192		Gr. C										
BS 3059-3602-3604	360	410	440-460	490 Nb	243		620	621	622	660	629	762	
DIN 17175	St35.8	St45.8	17Mn4	19Mn5	15Mo3		13CrMo44			10CrMo9 10	14MoV63		X20CrMoV121
	1.0305	1.0405	1.0461	1.0482	1.5415	16Mo5	15NiCuMoNb5	1.7335		1.7380	1.7715		X12CrMo91
													1.7386
GOST TY 143-460-75		20					15XM	12X1MF					15X1M1F
JIS G 3456 G3458 G3461 G3462	STPT38 STB35	STPT42 STB42	STPT49			STPA12 STBA12	STPA20 STBA20	STPA22 STBA22		STPA23 STBA23	STPA24 STBA24		STPA26 STBA26
NF A49-213	TU37-C	TU42-C	TU48-C	TU52-C	TU15D3		TU15CD2.05	TU13CD4.04		TU10CD5.05	TU10CD9.10		TU10CD9
													TU12CDNbV9.2

Typical Steel Grades of Tubes fabricated by us.

WATER COOLED DUCT

We can fabricate any Steel component/equipment based on your drawing and with high dimensional accuracy to give you ease in replacement and ready to fit components shortening the down time.



We have the expertise to do **Reverse Engineering for your replacement boiler tube and pressure part projects** and we can suggest modification of design or change of materials to improve boiler efficiency or to reduce repetitive tube failures based on our 500 man-years of practical experience.

RAW MATERIALS USED:

ERW/SEAMLESS Boiler Tubes and Pipes

SIZES ranging from 12.7mm to 610 mm OD and thickness from 0.8 mm to 76 mm and all Ganges, Schedules, each tube Length upto 24 Mtrs.

STEEL GRADES in Carbon, Alloy and Stainless Steels

ASTM A 53, ASTM A 106, API 5L GRADE A, B, C.

ASTM A 179, ASTM A 192, ASTM A 210-Gr A1, C (Rifle Bore Tubes)

ASTM A 161, ASTM A 199, ASTM A 200, ASTM A 209,

ASTM A 213, ASTM A 335, ASTM A 423

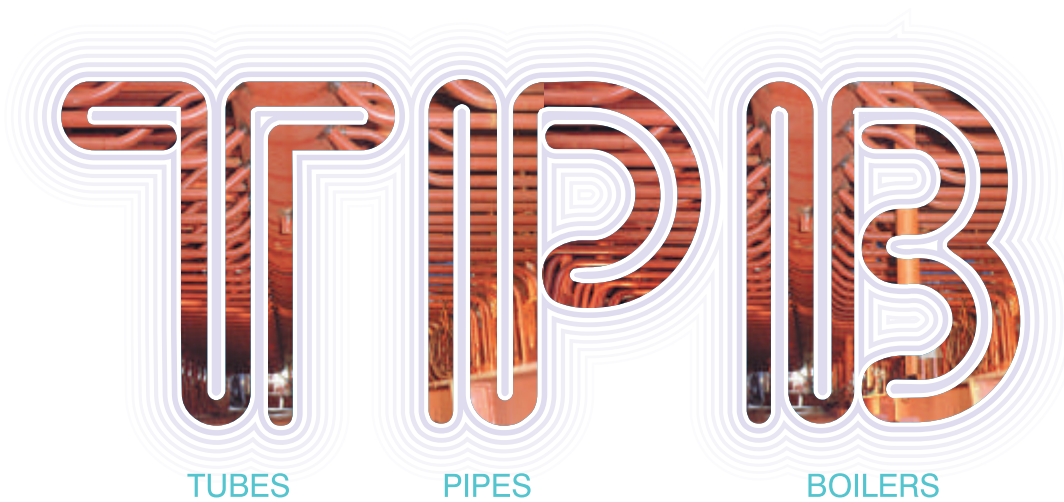
GRADES: T1 /T2/ T11 / T12 / T22, T5, T9, T91, T92

DIN : 17175 Gr III St 35.8,45.8,15Mo3, 13CrMo44, 10CrMo910, X20CrMoV121

BS : BS 3059 Ptl/PtII-S2-C2 Gr320, 360 440, 243, 620-460, 622-490.

GOST SPEC: 12X1MF,

A 213, A312, TP 347 H, 304 H, 316 L, 321H, 446 etc



TUBES

PIPES

BOILERS

OUR PRODUCTS

EVAPORATORS

REHEATERS

BED COILS

STEAM PIPING

BOILER MAINTENANCE &

ERECTION

SPIRAL COILS

HELICAL COILS

SAMPLE COOLERS

SEAMLESS PIPES

BOILER TUBES

CLIENTS:

We have serviced almost every Sector directly or indirectly both Public and Private in India, Far East, Middle East, Africa, Europe in Power Generation, Petrochemicals, Refineries, Fertilizers, Steel Plants, Aluminum/Copper/Zinc Smelters, Sugar Factories, OEM Boiler Manufacturers, Paper Factories, Cement Plants, Chemical Process Industries, Ship-Yards.



IN SERVICE OF STEAM USERS

OTHER PRODUCTS

Steam Headers, Steam Drums, De-Superheaters,

Spiral coils, Helical coils, HP/LP Tube Nest Steam Condensers, Spiral Finned Tubes

Steam Piping and other Tubular fabricated products for Refineries etc. like Sample Coolers, Condensate Pots, Studded Fired Heater Tubes, Steam Condensers, Heat Exchanger U-Tubes etc.

Heavy Boiler Structural- Star/ Plus-Columns, Beams etc.

Air PreHeaters Tubular /Baskets, Air Intake Modules for Gas Turbines.

Water Cooled Ducts, Hoods, Stacks of Metal Smelters



When you need answers, call on the Boiler Tube Experts.

Nobody has time for boiler problems. Boilers seem to sense this, and always fail when you can least afford it. So you want fast service, a prompt quote, and a reliable delivery, and tubes that fit.



TPP BOILERS PVT. LTD.

An ISO-9001-2008 COMPANY

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