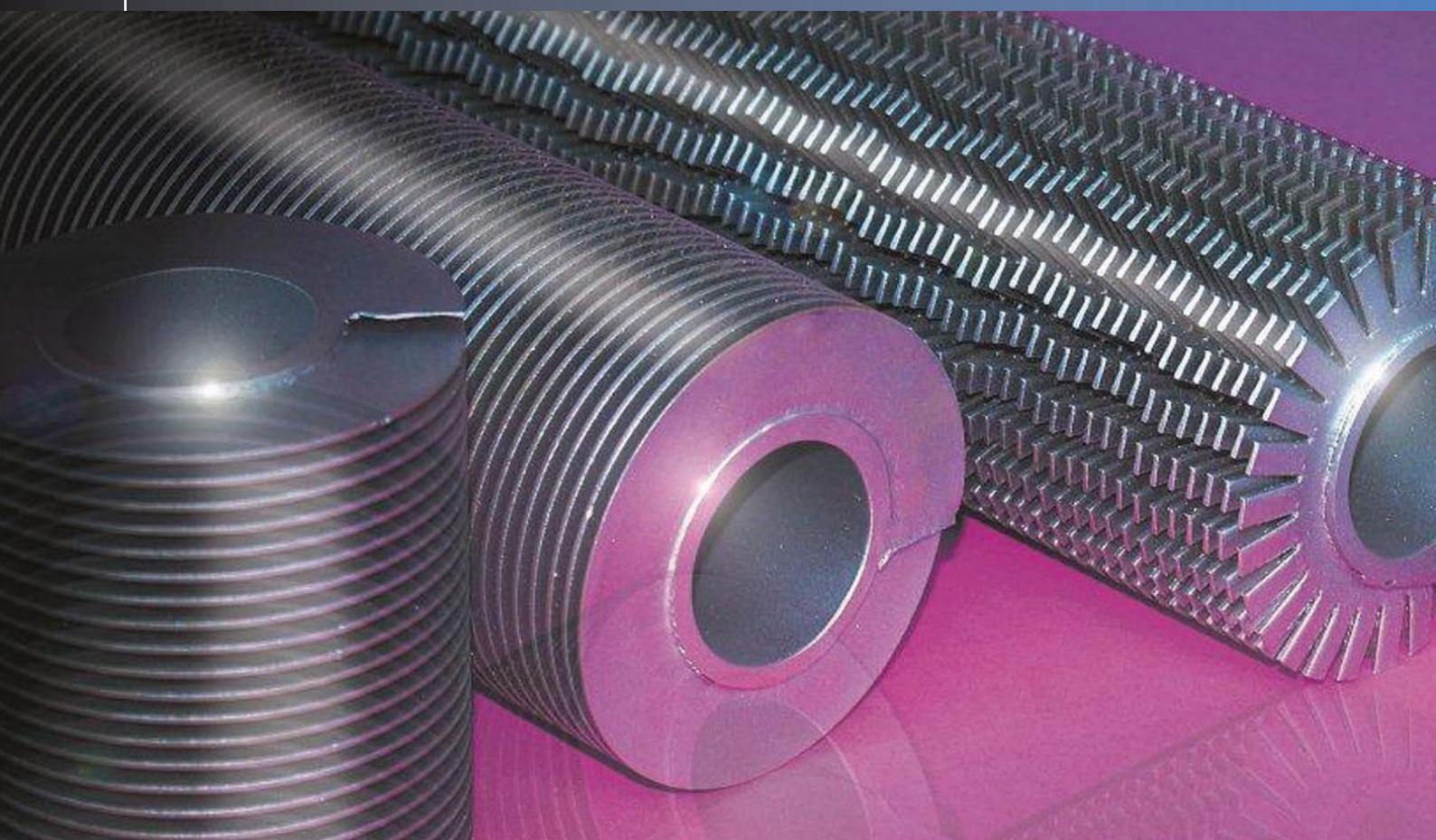


WELDED FINNED TUBE



Finned tubes are major components of economizers, heat recovery boilers and many other industrial heat exchanger applications. They are available with solid/plain or serrated fins.

All finned tube configurations are tailored to the customers' specific requirements and flue gas characteristics: serrated fins are mainly used for clean applications such as natural gas firing and solid fins where dusty or abrasive conditions exist.

Finned Tube Capabilities

Tube materials

All common tube materials can be used including: carbon steel, low and high alloy steel and stainless steel. The tube specification can be seamless or welded according to any recognized standard (i.e. ASTM or ASME, DIN, NF, etc) The tubes can be supplied by Salem Tube or be provided as free issue by the customer. The most common materials used are listed below:

STEEL TYPE	MATERIAL NO:	DESIGNATION ACC. TO EN STANDARD	ASTM	GRADE
Carbon Steel	1.0305	P235 GH TC1 or TC2	A53 + A 106	A
			A192	
	1.0405	P265 GH TC1 or TC2	A106	B
			A210	A-1
Low and Medium Alloy Steels	1.5415	16Mo3	-	-
	1.5423	16Mo5	A 209	T1
			A335	P1
	1.7335	13 CrMo4-5	A213	T12
			A335	P12
	-	-	A213	T11
			A335	P11
	1.7380	10 CrMo9-10	A213	T22
			A335/ A369	P22
	1.7362	12CrMo 19-5	A213	T5
			A335	P5
	1.7386	X12CrMo 9-1	A213	T9
		A335	P9	
High Alloy Steels	1.4903	X10CrMoVNB9-1	A213	T91
			A335	P91
	1.4301	X 5 CrNi 18 10	A312/A213	TP304
	1.4306	X 2 CrNi 19 11	A312/A213	TP304L
	1.4948	X 6 CrNi 18 11	A312/A213	TP304H
	1.4401	X 5 CrNiMo 17 12 2	A312/A213	TP316
	1.4404	X 2 CrNiMo 17 13 2	A312/A213	TP316LN
	1.4435	X 2 CrNiMo 18 14 3	A312/A213	TP316L
	1.4571	X 6 CrNiMoTi 17 12 2	A312/A213	TP316Ti
	1.4919	X 6 CrNiMo 17 13	A312/A213	TP316H
	1.4541	X 6 CrNiTi 18 10	A312/A213	TP321
	1.4941	X 8 CrNiTi 18 10	A312/A213	TP321H
	1.4878	X 12 CrNiTi 18 9	-	TP321H
	1.4550	X 6 CrNiNb 18 10	A312/A213	TP347
				TP37H
	1.4876	X 10 CrNiAlTi 32 20		Alloy 800(H)
	1.4877	X 5 NiCrCeNb 32 27	-	-

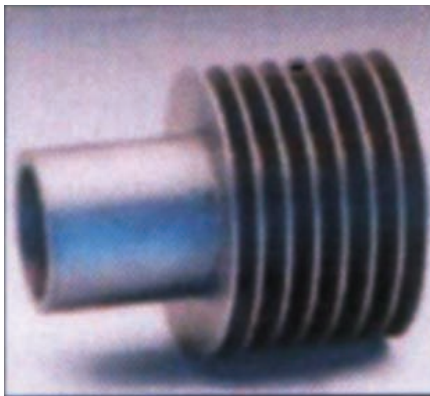
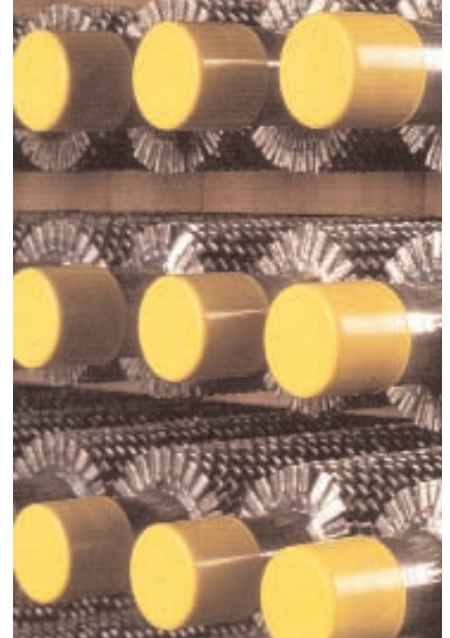
Fin Materials

Almost every combination of tube and fin material can be welded. The most common material are however:-

Material Grade	Max. Fintip Temperature
DC01-04 (EN10130) ASTM A1008	490°C
1.4512 (EN10088-2) / TP409 (ASTM A240)	650°C
1.4301 (EN 10088-2)/ TP304 (ASTM A240)	850°C

Stainless Steel like 1.4571 (TP316Ti) or 1.4541 (TP321) are also common fin materials. Should you have a requirement where another material is required, please do not hesitate to contact us.

If needed, we can also produce stainless and carbon steel combinations. By the use of the appropriate filler materials the increase of the hardness values is reduced resp. hardness peaks are avoided.



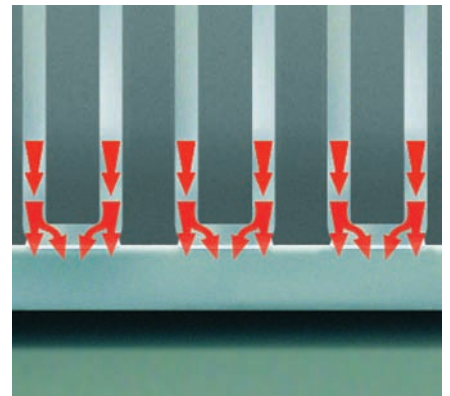
Solid Fins

These are attached to the tube by HF or GMAW welding. The pressure applied while winding the finstrip onto the tube may lead to a slight thinning of the fintip. The finfoot has a width of up to 120% of the nominal fin thickness because of the compression and added filler metal.



Serrated Fins

Serrated fins are produced by slitting the finstrip equally spaced during the production process. A base 5mm (0.19") high remains unslitted to form the continuous finfoot. When the finstrip is helically wound onto the tube the serrated part of the finstrip divides the outer end thus forming rectangular segments.



U-Shaped Finning

The serrating process as described above is applied on both sides of the finstrip after which the fins are formed with the specified finpitch.

Dimensions

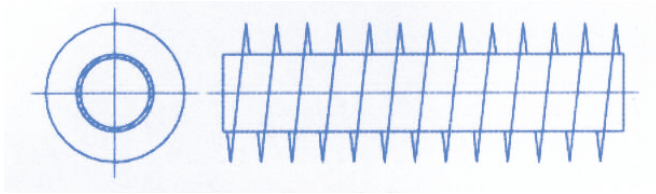


Fig. 1: Tube with solid fins

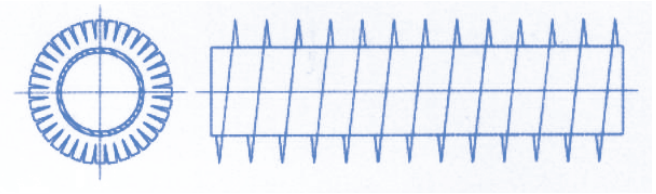


Fig. 2: Tube with serrated fins

ASA Nominal Pipe	OD	Fin height min / max l-fin solid	Fin height min / max l-fin serrated
1/2"	21.3mm	6.5 – 10mm	6.5 – 32mm
	25mm	6.5 – 13mm	
	25.4mm	6.5 – 13mm	
3/4"	26.9mm	6.5 – 14mm	
	31.8mm	6.5 – 19mm	
1"	33.7mm	6.5 – 19mm	
	38mm	6.5 – 25mm	
1 1/4"	42.4mm	6.5 – 27mm	
	44.5mm	6.5 – 29mm	
1 1/2"	48.3mm	6.5 – 31mm	
	51mm	6.5 – 32mm	
	57mm	6.5 – 32mm	
2"	60.3mm	6.5 – 32mm	
2 1/2"	76.1mm	6.5 – 32mm	
3"	88.9mm	6.5 – 32mm	
	101.6mm	6.5 – 38mm	
4"	114.3mm	6.5 – 38mm	
5"	139.7mm	6.5 – 38mm	
	141.3mm	6.5 – 38mm	
6"	168.3mm	6.5 – 38mm	
8"	219.1mm	6.5 – 38mm	

Tube wall thickness:

min 2mm for O/D 26.9mm resp. 2.3mm for O/D → 26.9mm

The fin height can be determined in steps of 0.1mm

Finned Dimensions

Max.fin density For fin thickness	I-fins	U-fins
1.25mm	303fpm	
1.0mm	345 fpm	
0.9mm	357 fpm	370 fpm
0.8mm	370 fpm	385 fpm
0.7mm		400 fpm
0.6mm		417 fpm
0.5mm		435 fpm

The fin thickness can be determined in steps of 0.5mm, the max, fin thickness is 2.5mm for solid fins. For serrated fins the maximum fin thickness is 1.5mm for carbon steel and 1.3mm for 1.4512 (TP409)

For other dimensions please contact us.

Finned Tolerances

Finned tubes are produced following the International Standard for Dimensions, Tolerances and Tests of welded fins.

Different Fin Pitch

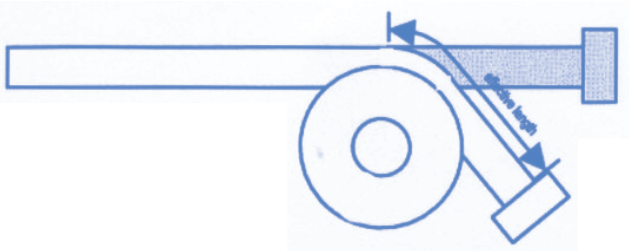
It is also possible to have different fin pitches on one tube.



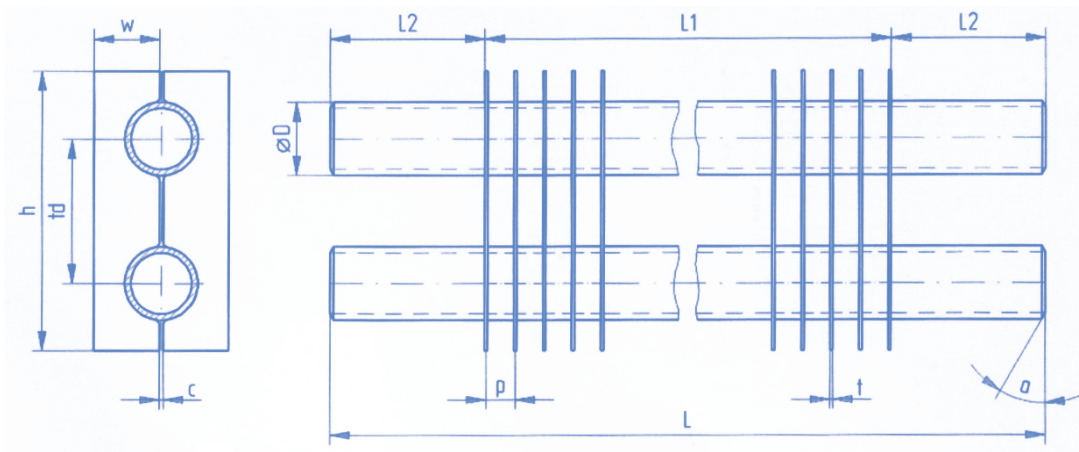
It is also possible to have different fin pitches on one If, for instance, the fin pitch chosen is too big to use thin tube sheets, it can also be decreased locally in certain areas in order to avoid the necessity of alternative and expensive support structures.

Tube Bending

Salem Tube can offer the bending of the tube ends up to 90°



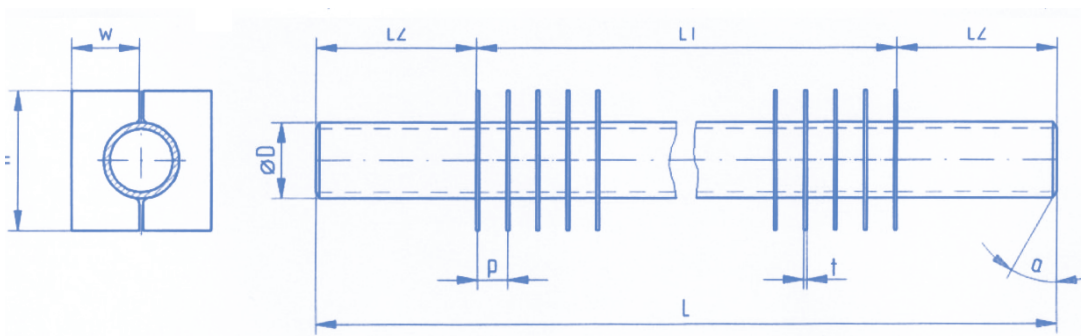
Double Finned Tubes



Dimensions (mm)

D mm	L (max) mm	L2 (min) mm	h mm	w mm	c mm	t mm	td mm	p mm
31.8	16000	100	125	27	6	2.0 + 2.5	65	9 - 40
31.8	16000	100	145	32	6	2.0 + 2.5	75	9 - 40
38.0	16000	100	145	32	6	2.0 + 2.5	75	9 - 40
38.0	16000	100	180	40	10	2.0 + 2.5	92	9 - 40
44.5	16000	100	196	45	6	2.0 + 2.5	100	9 - 40

Single Finned Tubes



Dimensions (mm)

D Mm	L (max) mm	L2 (min) mm	h mm	w mm	c mm	l mm	p mm
31.8	16000	100	60	27	6	2.0 + 2.5	9 - 40
31.8	16000	100	70	32	6	2.0 + 2.5	9 - 40
38,0	16000	100	70	32	6	2.0 + 2.5	9 - 40
44.5	16000	100	96	45	6	2.0 + 2.5	9 - 40

For other dimensions please contact us.



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