

Capex is a major supplier of tubing to the piping industry offering both mill produced random lengths for general use and also cut lengths for the heat exchanger, condenser and U tube manufacturers . Our mills provide seamless and welded tubing, both bare and finned, in carbon steel, stainless steels, low temperature steels, nickel alloys, chrome moly, titanium, aluminium and the exotic alloys.

Seamless and Welded Tubing , Average Wall . Weight per Foot .

CARBON TUBING

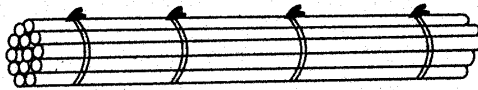
O.D.	22 GA 0.028	20 GA 0.035	19 GA 0.042	18 GA 0.049	17 GA 0.058	16 GA 0.065	15 GA 0.072	14 GA 0.083	13 GA 0.095	12 GA 0.109	11 GA 0.120	10 GA 0.134	9 GA 0.148
1/2"	0.141	0.174	0.205	0.236	0.274	0.302							
9/16"	0.160	0.197	0.234	0.269	0.313	0.346							
5/8"	0.179	0.221	0.262	0.301	0.351	0.389	0.425	0.481	0.538				
0.706"	0.203	0.251	0.298	0.344	0.401	0.445	0.488	0.552	0.620				
3/4"	0.216	0.267	0.318	0.367	0.429	0.476	0.521	0.591	0.665				
13/16"	0.235	0.291	0.346	0.400	0.468	0.519	0.570	0.647	0.728	0.820	0.888		
0.840"	0.246	0.301	0.358	0.414	0.484	0.538	0.591	0.671	0.756	0.851	0.923		
7/8"	0.253	0.314	0.374	0.432	0.506	0.562	0.618	0.702	0.791	0.892	0.968		
0.910"	0.264	0.327	0.389	0.451	0.528	0.587	0.644	0.733	0.827	0.932	1.012		
0.922"	0.267	0.332	0.395	0.457	0.535	0.595	0.654	0.744	0.839	0.946	1.028		
15/16"	0.272	0.338	0.402	0.465	0.545	0.606	0.666	0.758	0.855	0.965	1.048		
0.995"	0.289	0.347	0.428	0.495	0.580	0.646	0.710	0.808	0.913	1.031	1.121	1.232	
1"	0.295	0.361	0.430	0.498	0.584	0.649	0.714	0.813	0.918	1.037	1.128	1.239	
1.050"	0.306	0.379	0.452	0.524	0.615	0.684	0.752	0.857	0.969	1.095	1.192	1.268	
1 1/8"	0.328	0.407	0.486	0.563	0.661	0.736	0.810	0.924	1.045	1.183	1.288	1.418	1.544
1 1/4"	0.364	0.457	0.542	0.629	0.738	0.823	0.906	1.034	1.172	1.328	1.448	1.597	1.742
1 5/16"		0.487	0.570	0.662	0.777	0.866	0.954	1.090	1.236	1.402	1.529	1.687	1.841
1 3/8"		0.501	0.598	0.694	0.816	0.909	1.002	1.145	1.299	1.474	1.608	1.776	1.939
1.410"		0.514	0.614	0.712	0.838	0.934	1.029	1.175	1.334	1.515	1.653	1.826	1.995
1 7/16"		0.524	0.626	0.727	0.855	0.953	1.050	1.201	1.363	1.547	1.689	1.866	2.039
1 1/2"		0.548	0.654	0.759	0.893	0.996	1.098	1.256	1.426	1.619	1.769	1.955	2.137
1 5/8"						1.083	1.194	1.367	1.552	1.765	1.929	2.134	2.335
1.660"						1.107	1.221	1.398	1.588	1.806	1.974	2.184	2.341
1.690"						1.128	1.244	1.425	1.618	1.840	2.012	2.226	2.434
1 3/4"						1.170	1.290	1.478	1.679	1.910	2.089	2.313	2.532
1 7/8"						1.257	1.386	1.589	1.806	2.056	2.249	2.492	2.730
1.900"						1.274	1.406	1.610	1.831	2.085	2.281	2.527	2.769
2"						1.343	1.483	1.699	1.933	2.201	2.409	2.670	2.927
2 1/8"						1.430	1.579	1.810	2.060	2.347	2.570	2.849	3.125
2 1/4"						1.517	1.675	1.921	2.186	2.492	2.730	3.028	3.323
2 9/32"						1.538	1.699	1.948	2.218	2.529	2.770	3.073	3.372
2 3/8"						1.604	1.771	2.032	2.313	2.638	2.890	3.207	3.250
2 1/2"						1.690	1.867	2.143	2.440	2.783	3.050	3.386	3.718
2 3/4"						1.864	2.059	2.364	2.694	3.074	3.371	3.744	4.113
2 7/8"						1.950	2.155	2.474	2.820	3.220	3.530	3.923	4.310
3"						2.037	2.252	2.586	2.947	3.365	3.691	4.102	4.508
3 1/4"						2.211	2.444	2.807	3.201	3.657	4.011	4.459	4.903
3 1/2"						2.385	2.636	3.029	3.455	3.948	4.332	4.817	
4"						2.732	3.020	3.472	3.962	4.530	4.973	5.533	6.089

Conversion Factors	Carbon Steel	
Aluminium brass (Alloy 687)	X	1.057
Admiralty Brass (Alloy 443)	X	1.082
Cu/Ni 90/10 (Alloy 706)	X	1.133
Cu/Ni 70/30 (Alloy 715)	X	1.133
Stainless steel :	X	1.015
ALLOY 400	X	1.125
ALLOY 600	X	1.073
ALLOY 800	X	1.013
ALLOY 800 H	X	1.013
ALLOY 825	X	1.037
ALLOY B2	X	1.174
ALLOY C4	X	1.131

PACKING OF TUBING

STEEL TUBES AND PIPES FOR THE CHEMICAL INDUSTRY ARE PACKED AS SHOWN BELOW, ACCORDING TO SIZE REQUIRED FOR THE APPLICATION. SPECIAL PACKING IS AVAILABLE UPON REQUEST.

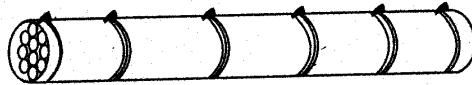
Bare bundle



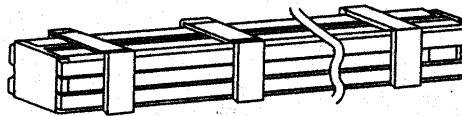
Both ends wrapped



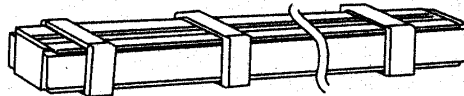
Overall length wrapped



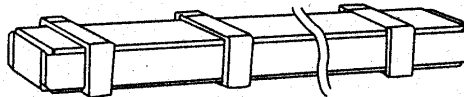
Wooden box (ends closed, open on four sides)

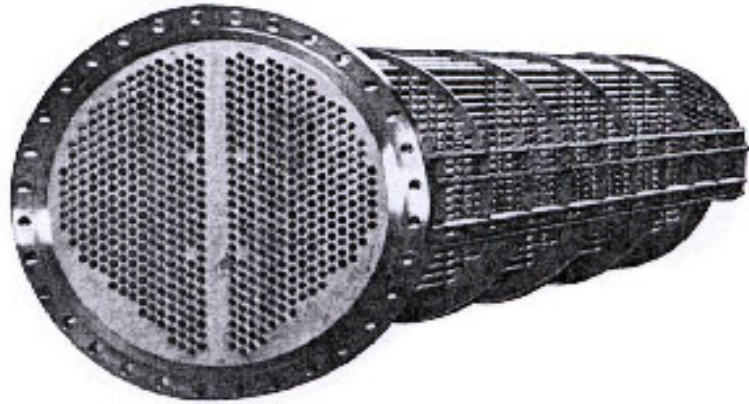


Wooden box (ends and sides closed, top and bottom open)



Completely closed wooden box



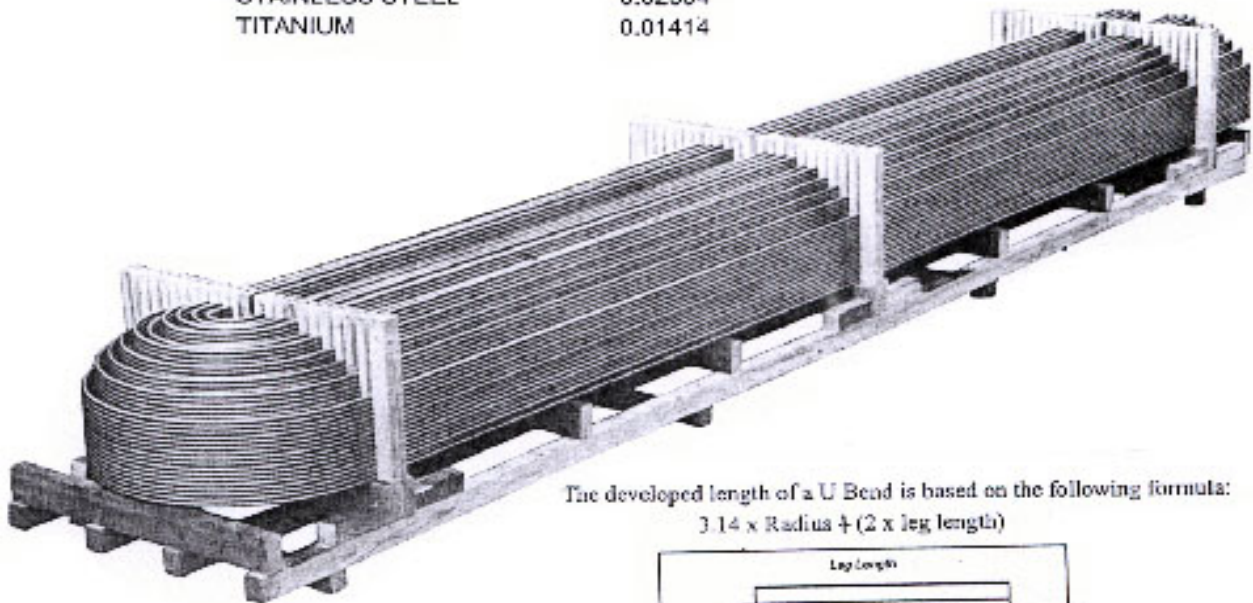


FOR WEIGHTS IN KILOGRAMS PER METER USE FORMULA:

WEIGHT = .0246615 (OD - WALL THICKNESS) X WALL THICKNESS
 (ALL DIMENSIONS ARE EXPRESSED IN MILLIMETERS)

FOR WEIGHTS PER METER OF PIPE AND TUBE OF OTHER MATERIALS,
 REPLACE THE CONSTANT .0246615 IN THE FORMULA AS FOLLOWS.

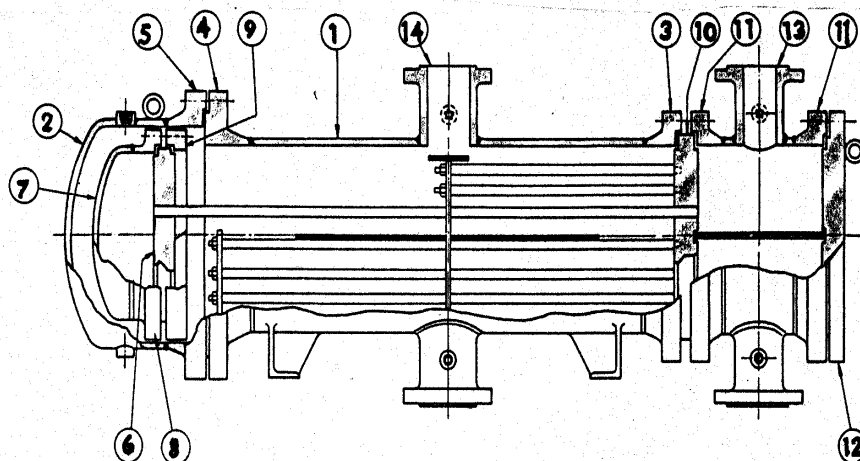
ALLOY 400	0.02765
ALLOY 600	0.02639
ALLOY 800	0.02513
ALUMINUM	0.00848
COPPER	0.02796
COPPER NICKEL	0.02796
DUPLEX	0.02450
STAINLESS STEEL	0.02504
TITANIUM	0.01414



The developed length of a U Bead is based on the following formula:
 $3.14 \times \text{Radius} + (2 \times \text{leg length})$



NOMENCLATURE OF TYPICAL HEAT EXCHANGER PARTS



- | | |
|--|---|
| 1 SHELL | 8 WELDING NECK FLANGE-FLOATING HEAD |
| 2 WELDING CAP OR HEAD-SHELL COVER | 9 FORGED STEEL RING FOR FLOATING HEAD |
| 3 WELDING NECK SHELL FLANGE-STATIONARY END | 10 STATIONARY TUBE SHEET- FORGED STEEL |
| 4 WELDING NECK SHELL FLANGE-COVER END | 11 WELDING NECK CHANNEL FLANGES |
| 5 WELDING NECK COVER FLANGE | 12 FORGED STEEL CHANNEL COVER |
| 6 FLOATING TUBE SHEET- FORGED STEEL | 13 TAYLOR FORGE WELDING NECK-CHANNEL NOZZLE |
| 7 WELDING CAP OR HEAD-FLOATING HEAD | 14 TAYLOR FORGE WELDING NECK-SHELL NOZZLE |

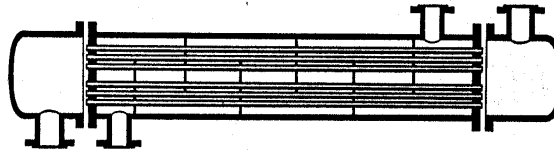
TYPES OF TUBULAR HEAT EXCHANGERS

HEAT EXCHANGERS ARE SUPPLIED IN:

- STAINLESS STEEL
- CARBON STEEL
- COPPER,COPPER ALLOYS AND VARIOUS TYPES OF BRASS
- FERRITIC AUSTENITIC STEELS
- HIGH ALLOY AUSTENITIC STEELS
- NICKEL AND NICKEL ALLOYS
- TITANIUM

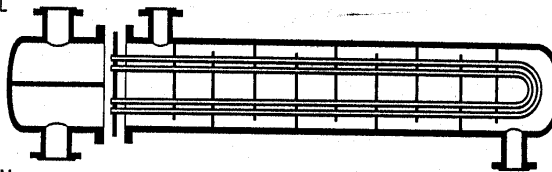
HEAT EXCHANGER WITH FIXED TUBE SHEETS

THIS IS THE MOST COMMON TYPE.IT PROVIDES A LOW INVESTMENT COST AND IS EXTREMELY SUITABLE WHERE THERE IS HIGH PRESSURE ON THE TUBE SIDE. IT CAN BE EQUIPPED WITH DOUBLE TUBE SHEETS. SEVERAL HEAT EXCHANGERS MAY EASILY BE STACKED ONE ON TOP OF THE OTHER. IT IS EASY TO CLEAN AND INDIVIDUAL TUBES ARE EASILY REPLACED. THE SHELL SIDE REQUIRES CHEMICAL CLEANING.



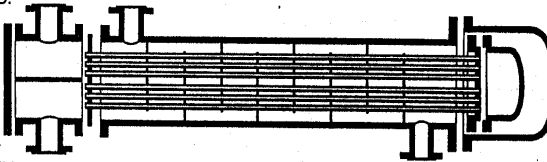
HEAT EXCHANGER WITH U-TUBE BUNDLE

THIS TYPE MAY VERY WELL BE USED WHEN THE PRESSURE ON THE TUBE SIDE IS EXTREMELY HIGH AND IS A VERY ADVANTAGEOUS CONSTRUCTION FROM AN ECONOMIC POINT OF VIEW.THE SHELL SIDE MAY BE CLEANED MECHANICALLY DUE TO THE REMOVABLE TUBE BUNDLE.THE TUBE SIDE IS, HOWEVER,DIFFICULT TO CLEAN AND INDIVIDUAL TUBES CANNOT BE REPLACED.



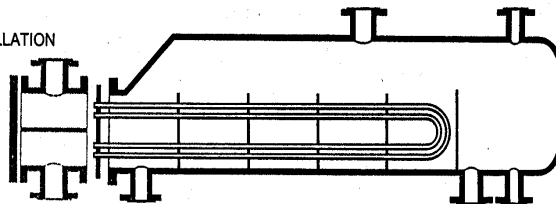
HEAT EXCHANGER WITH FLOATING HEAD

A FLOATING HEAD IS USED TO ABSORB DIFFERENCES IN THERMAL EXPANSION BETWEEN THE TUBES AND SHELL AND WHERE THERE IS A DANGER OF FOULING. THE FLOATING HEAD IS ALSO USED WHEN THE MEDIUM ON THE SHELL SIDE IS DANGEROUS AND WHEN NATIONAL STANDARDS REQUIRE THAT IS POSSIBLE TO INSPECT THE SHELL SIDE.THE TUBES AND SHELL MAY BE CLEANED MECHANICALLY.

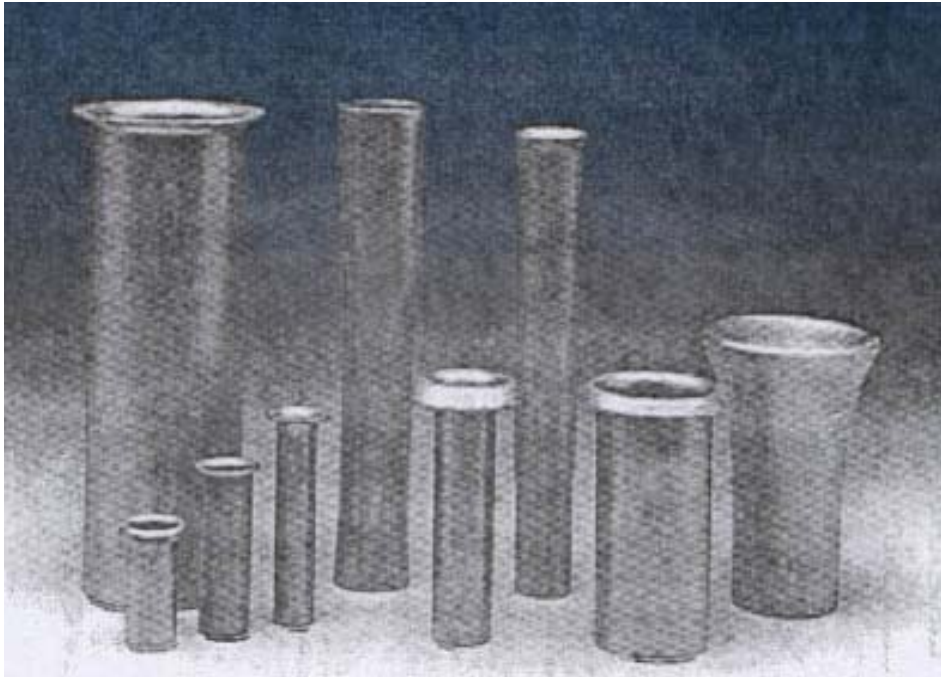


HEAT EXCHANGER OF KETTLE REBOILER TYPE WITH U-TUBE BUNDLE

THIS IS MAINLY USED AS A REBOILER IN DISTILLATION COLUMNS.



Exchanger Tube Ferrules



Materials Available Include

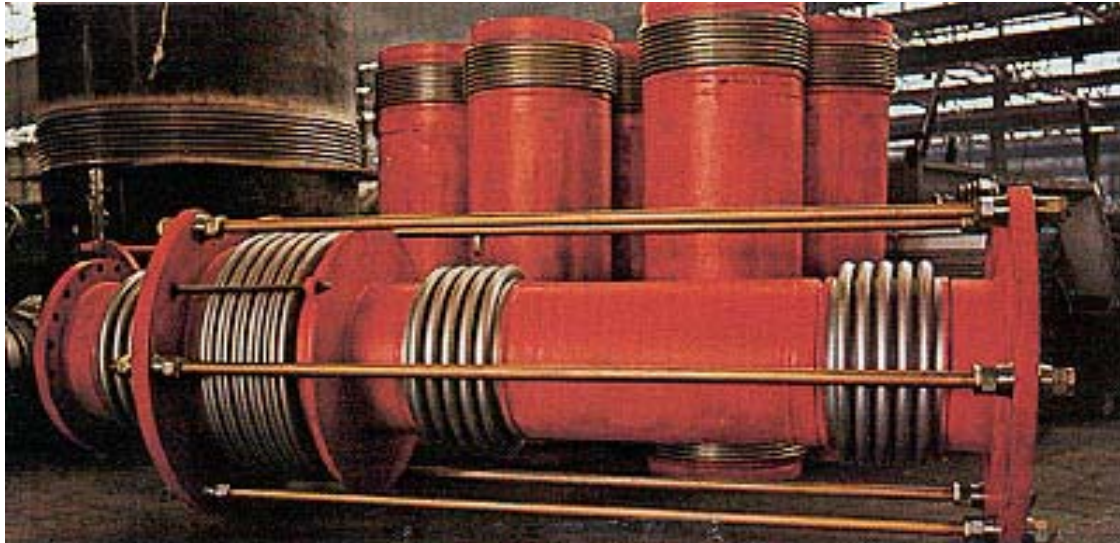
Stainless Steel

HIGH ALLOY / NICKEL BASE

COPPER ALLOY 90-10 AND 70-30 TO ASTM B-111

TITANIUM AND ALUMINUM TUBING

CARBON STEEL



GENERAL CONSIDERATIONS AND USE OF EXPANSION JOINTS

Any pipe connecting two points is subject to numerous types of actions which result in stresses on the wall.

Some of the causes of these stresses are:

- internal or external pressure at working temperature
- weight of the pipe itself and the parts supported on it
- movement imposed on pipe sections by external restraints. For example: the movement of equipment connected rigidly to the pipe, the yielding of a restraint or the vibration of equipment or structures to which the pipe is connected
- thermal expansion.

Given the importance of this stress cause we prefer to deal with it separately, even if, for what the stresses in the pipe are concerned, this cause can be considered as a movement imposed by an external restraint. However, if we imagine a section of piping connecting two fixed end points with no intermediate restraint, it will be seen that thermal expansion will induce the same stress as that caused by the movement of one end.

Leaving aside the first two causes, let us consider the stress due to the movement and thermal expansion; the stress on the wall of the piping is related to the force or movement exerted on it by external restraints and to the flexibility of the pipe itself.

When either the values of the stresses or the values of the external forces or moments exceed the maximum allowable values, the flexibility of the pipe must be increased artificially. This can be done either by altering the layout of the pipe or by inserting high flexibility sections into it.

This is precisely the function of expansion joints.

Depending on the type of movement to be absorbed, expansion joints can be classified as follows:

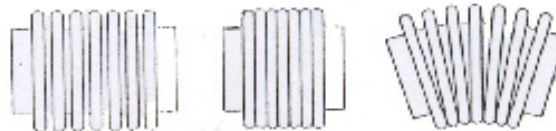
- axial
- universal
- angular (hinged)
- spherical angular (gimbal)
- lateral
- spherical lateral
- pressure balanced axial
- pressure balanced universal

Expansion joints

The main component of expansion joints is the metal bellows.

BELLOWS

The main feature of bellows is their high axial, lateral and angular flexibility.



Often, the use of such a flexible part is in practice undesirable and the flexibility of the bellows must be limited according to the requirements of each single case. This is achieved by means of special devices installed on the piping (anchors, guides, etc.) and, in many cases, by devices assembled on the expansion joints (tie-rods, hinges, etc.). Of course these must be designed so as to withstand the end thrust exerted on the pipe by internal or external pressure.