



Titanium Finned Tubes

S/T Trufin® S/T Turbo-Chil®

Titanium Type S/T Trufin and S/T Turbo-Chil are integral finned tubes from welded or seamless tube of Grade 1 or Grade 2 Titanium manufactured in accordance to ASTM B-338 or ASME SB-338. S/T Trufin is available in fin counts of 30, 32, 36, and 43 fins per inch (FPI). S/T Turbo-Chil is available in fin counts of 32, 36, and 40 FPI configurations. All of the S/T Turbo-Chil products provide external surface enhancements along with internal helical ridges. The 32 FPI S/T Turbo-Chil has 10 internal helical ridges, the 36 FPI has 20 internal helical ridges, and the 40 FPI has 28 internal helical ridges. The S/T Turbo-Chil products provide both shell-side and tube-side surface area enhancement.

All Trufin and Turbo-Chil which meet the requirement of Paragraph UG-8(b), ASME Boiler and pressure

Vessel Code, Section VIII, are made to an average wall in the fin area. When a minimum wall size is specified, the next larger average wall size should be ordered.

Testing After Finning

Air Test at 250 PSI, Encircling Coil Eddy Current Test, per ASTM/ASME standards.

Tempers

Trufin and Turbo-Chil are supplied in the "as finned" Temper. Unfinned sections are supplied in the condition as described by the governing plain tube ASTM or ASME standard.

Plain tube mechanical properties per governing ASTM and/or ASME standard – minimum tensile strength, 50 KSI (345 Mpa); minimum yield

strength, 40 KSI (275 Mpa). The UNS number for this alloy is R50400.

Plain Section Requirements

Plain end lengths 1" (25.4 mm) and over are supplied as standard. If plain ends less than 1" (25.4 mm) are required, contact the Wieland Marketing Department.

Land Lengths 1" (25.4 mm) and over are supplied as standard. If land lengths down to 5/8" (15.9 mm) minimum are required, contact the Wieland Marketing Department.

Distances of 18" (457.2 mm) and over between lands are supplied as standard.

Range of available Dimensions

S/T Trufin[®] Enhanced Surface Tubes UNS Titanium

Catalog Number	Plain Ends		Finnend Section			Area		Weight per Unit Length lbs/ft (kg/m)
	Outside Diameter inch (mm)	Wall Thickness inch (mm)	Min. Wall Under Fins inch (mm)	Finned Section Nom. Root Diam. inch (mm)	Nominal Inside Diameter inch (mm)	Actual Outside Surface ft ² /ft (m ² /m)	Ratio Actual Outside/Nominal Inside	

30 Fins per inch

70-304028	5/8 (15.88)	0.049 (1.245)	0.025 (0.635)	0.556 (14.12)	0.505 (12.83)	0.411 (0.125)	3.114	0.155 (0.231)
70-304035	5/8 (15.88)	0.058 (1.473)	0.031 (0.787)	0.556 (14.12)	0.491 (12.47)	0.411 (0.125)	3.186	0.188 (0.280)
70-304042	5/8 (15.88)	0.065 (1.651)	0.037 (0.940)	0.556 (14.12)	0.477 (12.12)	0.411 (0.125)	3.288	0.200 (0.298)
70-304049	5/8 (15.88)	0.072 (1.829)	0.044 (1.118)	0.556 (14.12)	0.463 (11.76)	0.411 (0.125)	3.397	0.219 (0.326)
70-305028	3/4 (19.05)	0.049 (1.245)	0.025 (0.635)	0.686 (17.42)	0.630 (16.00)	0.500 (0.152)	3.030	0.189 (0.281)
70-305035	3/4 (19.05)	0.058 (1.473)	0.031 (0.787)	0.686 (17.42)	0.616 (15.65)	0.500 (0.152)	3.106	0.221 (0.329)
70-305042	3/4 (19.05)	0.065 (1.651)	0.037 (0.940)	0.686 (17.42)	0.602 (15.29)	0.500 (0.152)	3.165	0.245 (0.365)
70-305049	3/4 (19.05)	0.072 (1.829)	0.044 (1.118)	0.686 (17.42)	0.552 (14.02)	0.500 (0.152)	3.247	0.269 (0.400)
70-306028	7/8 (22.23)	0.049 (1.245)	0.025 (0.635)	0.802 (20.37)	0.755 (19.18)	0.587 (0.178)	2.965	0.223 (0.332)
70-306035	7/8 (22.23)	0.058 (1.473)	0.031 (0.787)	0.802 (20.37)	0.741 (18.82)	0.587 (0.178)	3.026	0.261 (0.388)
70-306042	7/8 (22.23)	0.065 (1.651)	0.037 (0.940)	0.802 (20.37)	0.727 (18.47)	0.587 (0.178)	3.089	0.290 (0.432)
70-306049	7/8 (22.23)	0.072 (1.829)	0.044 (1.118)	0.802 (20.37)	0.713 (18.11)	0.587 (0.178)	3.139	0.318 (0.473)
70-307028	1 (25.40)	0.049 (1.245)	0.025 (0.635)	0.932 (23.67)	0.880 (22.35)	0.671 (0.204)	2.917	0.269 (0.400)
70-307035	1 (25.40)	0.058 (1.473)	0.031 (0.787)	0.932 (23.67)	0.866 (22.00)	0.671 (0.204)	2.956	0.301 (0.448)
70-307042	1 (25.40)	0.065 (1.651)	0.037 (0.940)	0.932 (23.67)	0.852 (21.64)	0.671 (0.204)	3.009	0.335 (0.499)
70-307049	1 (25.40)	0.072 (1.829)	0.044 (1.118)	0.932 (23.67)	0.838 (21.29)	0.671 (0.204)	3.064	0.368 (0.548)

For S/T Trufin[®] 30 FPI, the average fin height is 0.032" (0.813mm)

32 Fins per inch

70-324028	5/8 (15.88)	0.049 (1.245)	0.025 (0.635)	0.557 (14.15)	0.501 (12.73)	0.415 (0.127)	3.130	0.156 (0.232)
70-324035	5/8 (15.88)	0.058 (1.473)	0.031 (0.787)	0.557 (14.15)	0.487 (12.37)	0.415 (0.127)	3.250	0.181 (0.269)
70-325028	3/4 (19.05)	0.049 (1.245)	0.025 (0.635)	0.675 (17.15)	0.624 (15.85)	0.503 (0.153)	3.070	0.192 (0.286)
70-325035	3/4 (19.05)	0.058 (1.473)	0.031 (0.787)	0.675 (17.15)	0.610 (15.49)	0.503 (0.153)	3.140	0.231 (0.344)
70-325049	3/4 (19.05)	0.072 (1.829)	0.044 (1.118)	0.675 (17.15)	0.582 (14.78)	0.503 (0.153)	3.290	0.275 (0.382)
70-326042	7/8 (22.23)	0.065 (1.651)	0.037 (0.940)	0.802 (20.37)	0.718 (18.24)	0.591 (0.180)	3.120	0.304 (0.452)
70-327028	1 (25.40)	0.049 (1.245)	0.025 (0.635)	0.925 (23.50)	0.870 (22.10)	0.679 (0.207)	2.960	0.260 (0.387)
70-327042	1 (25.40)	0.065 (1.651)	0.037 (0.940)	0.925 (23.50)	0.842 (21.39)	0.679 (0.207)	3.050	0.314 (0.467)

For S/T Trufin[®] 32 FPI, the average fin height is 0.032" (0.813mm)

36 Fins per inch

70-365028	3/4 (19.05)	0.049 (1.245)	0.025 (0.635)	0.696 (17.68)	0.640 (16.26)	0.500 (0.152)	2.980	0.170 (0.253)
70-365035	3/4 (19.05)	0.049 min.	0.031 (0.787)	0.696 (17.68)	0.626 (15.90)	0.500 (0.152)	3.050	0.206 (0.307)
70-367042	1 (25.40)	0.065 (1.651)	0.037 (0.940)	0.943 (23.95)	0.859 (21.82)	0.684 (0.209)	3.040	0.341 (0.723)
70-367049	1 (25.40)	0.072 (1.829)	0.044 (1.118)	0.943 (23.95)	0.845 (21.46)	0.684 (0.209)	3.090	0.375 (0.558)

For S/T Trufin[®] 36 FPI, the average fin height is 0.026" (0.660mm)

43 Fins per inch

70-435023	3/4 (19.05)	0.035 (0.889)	0.020 (0.508)	0.704 (17.88)	0.658 (16.71)	0.499 (0.152)	2.900	0.142 (0.211)
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For S/T Trufin[®] 43 FPI, the average fin height is 0.021" (0.533mm)

S/T Trufin[®] Enhanced Surface Tubes UNS Titanium

Catalog Number	Plain Ends		Finned Section			Area		Weight per Unit Length lbs/ft (kg/m)
	Outside Diameter inch (mm)	Wall Thickness inch (mm)	Min. Wall Under Fins inch (mm)	Finned Section Nom. Root Diam. inch (mm)	Nominal Inside Diameter inch (mm)	Actual Outside Surface ft ² /ft (m ² /m)	Ratio Actual Outside/Nominal Inside	
32 Fins per inch								
56-3250525	3/4 (19.05)	0.052 (1.321)	0.022 (0.559)	0.684 (17.37)	0.634 (16.10)	0.503 (0.153)	2.790	0.200 (0.298)
56-3250528	3/4 (19.05)	0.053 (1.345)	0.025 (0.635)	0.684 (17.37)	0.628 (15.95)	0.503 (0.153)	2.820	0.204 (0.304)
For S/T Turbo-Chil [®] 32 FPI, the average fin height is 0.032" (0.813mm)								
36 Fins per inch								
56-3652025	3/4 (19.05)	0.049 (1.245)	0.022 (0.559)	0.698 (17.73)	0.648 (16.46)	0.500 (0.152)	2.940	0.189 (0.281)
56-3652028	3/4 (19.05)	0.053 (1.346)	0.025 (0.635)	0.698 (17.73)	0.642 (16.31)	0.500 (0.152)	2.980	0.203 (0.302)
For S/T Turbo-Chil [®] 36 FPI, the average fin height is 0.026" (0.660mm)								
40 Fins per inch								
56-4052825	3/4 (19.05)	0.049 (1.245)	0.022 (0.559)	0.696 (17.68)	0.646 (16.41)	0.529 (0.161)	3.130	0.160 (0.238)
56-4052828	3/4 (19.05)	0.053 (1.346)	0.025 (0.635)	0.696 (17.68)	0.640 (16.26)	0.529 (0.161)	3.160	0.176 (0.262)
For S/T Turbo-Chil [®] 40 FPI, the average fin height is 0.026" (0.660mm)								

Engineering Data

Catalog Number	Wall in Finned Portion inch (mm)	Sieder and Tate ² Constant		Constants used in Calculating Darcy Friction Factor ¹	
		STC ¹		C	D
56-3250525					
56-3250528	0.025 (0.635)	0.041		0.701	0.269
56-3652025	0.028 (0.711)	0.042		0.559	0.245
56-3652028	0.025 (0.635)	0.053		1.182	0.306
56-4052825	0.028 (0.711)	0.049		0.994	0.304
56-4052828	0.025 (0.635)	0.053		0.806	0.264
56-4052828	0.028 (0.711)	0.051		1.028	0.293

¹ Constants applicable to Reynolds numbers greater than 20,000. $f_{Darcy} = C(Re)^{-D}$

² To calculate inside heat transfer coefficient: $hi = (k/D_{i, nom}) (STC) Re^{0.8} Pr^{1/3} (\mu/\mu_{wall})^{0.14}$

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