



TURBO-CSL®

Super Light Material for Condensing Applications

Condensers with Super-light Tube Material

Turbo-CSL has been designed for shell-side condensing of refrigerants and light hydrocarbons utilizing a lightweight tube. The interior surface of the tube has integral helical ridges that enhance tube-side fluid turbulence for better heat transfer. The exterior surface has integral helical fins that have been modified to enhance the condensing heat transfer coefficient.



External Standards

This product is produced in alloy C12200 to meet the mechanical, chemical, and testing requirements of ASTM B75/B359 and in alloy C70600 to meet the mechanical, chemical, and testing requirements of ASTM B111/B359. For applications to the ASME pressure vessel code, the product will be produced to meet the requirements of ASME SB75/SB359 for alloy C12200 and to SB111/SB359 for alloy C70600. Other applicable standards - DIN 1787, DIN 17671, DIN 17664, and ADW 6/2 WD TUV 420/5.

Plain Sections

Plain ends and lands of 1" (25.4 mm) and over are standard. For plain ends and lands down to 5/8" (15.9 mm), contact the Wolverine Marketing Department. Spacing between lands of 18" (457.2 mm) and over are supplied as standard.

Lengths

Overall lengths, with power brush deburred ends, are supplied from 4' (1.219 m) to 60' (18.288 m) as standard. Overall lengths, with chamfered ends, can be supplied from 3' (0.914 m) to 28' (8.534 m) as standard lengths.

Temper

Turbo-CSL is supplied as standard, in the "as finned" condition with plain ends and lands in the annealed condition. Material can be supplied in the annealed condition the entire length by special request.

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Standard Sizes			Plain End Dimensions		Finned Section Dimensions			
Catalog Number	Outside Diameter inch (mm)	Nominal Wall inch (mm)	Outside Diameter inch (mm)	Wall inch (mm)	Fin Height inch (mm)	Finished Fin OD inch (mm)	Min. Wall Under Fins inch (mm)	Root Diameter inch (mm)
UNS 12200								
112-4840025	5/8 (15.88)	0.025 (0.635)	0.623 (15.82)	0.043 (1.09)	0.037 (0.940)	0.619 (15.72)	0.022 (0.559)	0.546 (13.87)
112-4840028	5/8 (15.88)	0.028 (0.711)	0.623 (15.82)	0.045 (1.14)	0.037 (0.940)	0.619 (15.72)	0.025 (0.635)	0.546 (13.87)
112-4850025	3/4 (19.05)	0.025 (0.635)	0.748 (19.00)	0.044 (1.12)	0.037 (0.940)	0.745 (18.92)	0.022 (0.559)	0.672 (17.07)
112-4850028	3/4 (19.05)	0.028 (0.711)	0.748 (19.00)	0.045 (1.14)	0.037 (0.940)	0.744 (18.90)	0.025 (0.635)	0.672 (17.07)
112-4850035	3/4 (19.05)	0.035 (0.889)	0.743 (18.87)	0.052 (1.32)	0.037 (0.940)	0.745 (18.92)	0.031 (0.787)	0.672 (17.07)
112-4850042	3/4 (19.05)	0.042 (1.067)	0.743 (18.87)	0.059 (1.50)	0.037 (0.940)	0.746 (18.95)	0.037 (0.940)	0.672 (17.07)
112-4859935	3/4 (19.05)	0.035 (0.889)	0.743 (18.87)	0.048 (1.22)	0.037 (0.940)	0.745 (18.92)	0.031 (0.787)	0.672 (17.07)
112-4870025	1 (25.40)	0.025 (0.635)	0.995 (25.27)	0.043 (1.09)	0.037 (0.940)	0.994 (25.25)	0.022 (0.559)	0.922 (23.42)
112-4870028	1 (25.40)	0.028 (0.711)	0.995 (25.27)	0.046 (1.17)	0.037 (0.940)	0.994 (25.25)	0.025 (0.635)	0.922 (23.42)
112-4870035	1 (25.40)	0.035 (0.889)	0.995 (25.27)	0.053 (1.35)	0.037 (0.940)	0.994 (25.25)	0.031 (0.787)	0.922 (23.42)
UNS 70600								
112-4850028	3/4 (19.05)	0.028 (0.711)	0.743 (18.87)	0.046 (1.17)	0.037 (0.940)	0.745 (18.92)	0.025 (0.635)	0.672 (17.07)
112-4850035	3/4 (19.05)	0.035 (0.889)	0.743 (18.87)	0.052 (1.32)	0.037 (0.940)	0.745 (18.92)	0.031 (0.787)	0.672 (17.07)
112-4850049	3/4 (19.05)	0.049 (1.24)	0.743 (18.87)	0.066 (1.68)	0.037 (0.940)	0.745 (18.92)	0.044 (1.12)	0.672 (17.07)
112-4870028	1 (25.40)	0.028 (0.711)	0.995 (25.27)	0.046 (1.17)	0.037 (0.940)	0.994 (25.25)	0.025 (0.635)	0.922 (23.42)
112-4870035	1 (25.40)	0.035 (0.889)	0.995 (25.27)	0.053 (1.35)	0.037 (0.940)	0.994 (25.25)	0.031 (0.787)	0.922 (23.42)

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Standard Sizes		Inside Dimensions		Areas			
Catalog Number	Weight Per Unit Length lb/ft (kg/m)	Nominal Inside Diameter inch (mm)	Nominal Ridge Height inch (mm)	Nominal Inside Surface Area ft ² /ft (m ² /m)	Actual Inside Surface Area ft ² /ft (m ² /m)	Nominal Outside Surface Area ft ² /ft (m ² /m)	Actual Outside Surface Area ft ² /ft (m ² /m)
UNS 12200							
112-4840025	0.271 (0.403)	0.496 (12.60)	0.016 (0.406)	0.130 (0.040)	0.226 (0.069)	0.164 (0.050)	0.657 (0.200)
112-4840028	0.285 (0.424)	0.490 (12.45)	0.015 (0.381)	0.128 (0.039)	0.218 (0.066)	0.164 (0.050)	0.657 (0.200)
112-4850025	0.328 (0.488)	0.622 (15.80)	0.016 (0.406)	0.163 (0.050)	0.281 (0.086)	0.196 (0.060)	0.799 (0.244)
112-4850028	0.343 (0.510)	0.616 (15.65)	0.015 (0.381)	0.161 (0.049)	0.277 (0.084)	0.196 (0.060)	0.799 (0.244)
112-4850035	0.399 (0.594)	0.602 (15.29)	0.015 (0.381)	0.158 (0.048)	0.274 (0.084)	0.196 (0.060)	0.799 (0.244)
112-4850042	0.452 (0.673)	0.588 (14.94)	0.010 (0.254)	0.154 (0.047)	0.228 (0.070)	0.196 (0.060)	0.799 (0.244)
112-4859935	0.358 (0.533)	0.602 (15.29)	N/A	0.158 (0.048)	0.158 (0.048)	0.196 (0.060)	0.799 (0.244)
112-4870025	0.447 (0.665)	0.872 (22.15)	0.015 (0.381)	0.228 (0.069)	0.379 (0.116)	0.260 (0.079)	1.083 (0.330)
112-4870028	0.465 (0.692)	0.866 (22.00)	0.015 (0.381)	0.227 (0.069)	0.377 (0.115)	0.260 (0.079)	1.083 (0.330)
112-4870035	0.543 (0.808)	0.852 (21.64)	0.015 (0.381)	0.223 (0.068)	0.373 (0.114)	0.260 (0.079)	1.083 (0.330)
UNS 70600							
112-4850028	0.354 (0.527)	0.616 (15.65)	0.015 (0.381)	0.161 (0.049)	0.277 (0.084)	0.196 (0.060)	0.799 (0.244)
112-4850035	0.397 (0.591)	0.602 (15.29)	0.012 (0.305)	0.158 (0.048)	0.246 (0.075)	0.196 (0.060)	0.799 (0.244)
112-4850049	0.485 (0.722)	0.574 (14.58)	0.008 (0.203)	0.150 (0.046)	0.209 (0.064)	0.196 (0.060)	0.799 (0.244)
112-4870028	0.473 (0.704)	0.866 (22.00)	0.015 (0.381)	0.227 (0.069)	0.377 (0.115)	0.260 (0.079)	1.083 (0.330)
112-4870035	0.538 (0.801)	0.852 (21.64)	0.013 (0.330)	0.223 (0.068)	0.353 (0.108)	0.260 (0.079)	1.083 (0.330)

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Engineering Data

Catalog Number	Area Ratio Actual Outside / Nominal Inside	Sieder and Tate ² Constant STC ⁱ	Constants used in Calculating Darcy Friction Factor ¹	
			C	D

UNS 12200

112-4840025	5.05	0.070	2.662	0.375
112-4840028	5.13	0.067	1.328	0.309
112-4850025	4.90	0.070	0.865	0.271
112-4850028	4.96	0.068	1.005	0.284
112-4850035	5.06	0.063	0.992	0.293
112-4850042	5.19	0.055	0.847	0.284
112-4859935	5.06	0.027	0.316	0.250
112-4870025	4.75	0.068	0.758	0.262
112-4870028	4.77	0.068	0.631	0.248
112-4870035	4.86	0.067	0.820	0.274

UNS 70600

112-4850028	4.96	0.068	1.292	0.312
112-4850035	5.06	0.060	1.049	0.292
112-4850049	5.33	0.051	0.784	0.286
112-4870028	4.77	0.059	0.980	0.290
112-4870035	4.86	0.059	0.584	0.247

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

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