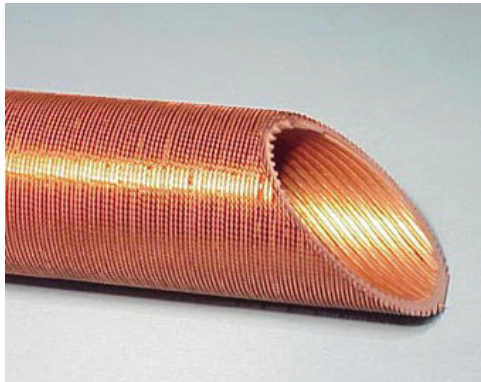




TURBO-C® **For Refrigerant Applications**

An Improved Refrigerant Condenser Tube

Turbo-C is designed for refrigerant condensers. The integral helical fins on the outside of the tube are modified to enhance the condensing heat transfer coefficient. The inside heat transfer coefficient is improved because of increased surface area and turbulence induced by integral helical ridges on the inside surface.



The availability of plain ends and intermediate lands makes Turbo-C especially suitable for shell and tube-side condensers.

Where there is a need for a low ID pressure drop, several sizes are available in Turbo-C. It may also be supplied with a smooth bore.

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.

Lengths

End finish shall be chamfered or brush deburred as specified by the customer. If not specified by the customer the end finish will be at the discretion of the producing plant.

Temper

Turbo-C 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 Per Inch	Finished Fin OD inch (mm)	Min. Wall Under Fins inch (mm)	Root Diameter inch (mm)
Turbo-C Enhanced ID - UNS C12200								
52-9740028	5/8 (15.88)	0.028 (0.711)	0.625 (15.88)	0.051 (1.30)	40	0.618 (15.70)	0.025 (0.635)	0.542 (13.77)
52-9740025	3/4 (19.05)	0.025 (0.635)	0.743 (18.87)	0.051 (1.30)	40	0.744 (18.90)	0.022 (0.559)	0.667 (16.94)
52-9740028	3/4 (19.05)	0.028 (0.711)	0.743 (18.87)	0.054 (1.37)	40	0.744 (18.90)	0.025 (0.635)	0.667 (16.94)
52-9740035	3/4 (19.05)	0.035 (0.889)	0.743 (18.87)	0.058 (1.47)	40	0.744 (18.90)	0.025 (0.635)	0.667 (16.94)
52-9740128	3/4 (19.05)	0.028 (0.711)	0.743 (18.87)	0.052 (1.32)	40	0.744 (18.90)	0.025 (0.635)	0.667 (16.94)
52-9740135	3/4 (19.05)	0.035 (0.889)	0.743 (18.87)	0.055 (1.40)	40	0.744 (18.90)	0.031 (0.787)	0.667 (16.94)
52-9740028	3/4 (19.05)	0.028 (0.711)	0.743 (18.87)	0.052 (1.31)	40	0.746 (18.95)	0.025 (0.635)	0.667 (16.94)
52-9740035	3/4 (19.05)	0.035 (0.889)	0.743 (18.87)	0.057 (1.45)	40	0.746 (18.95)	0.031 (0.787)	0.667 (16.94)
52-9740028	1 (25.40)	0.028 (0.711)	0.995 (25.27)	0.054 (1.37)	40	0.994 (25.25)	0.025 (0.635)	0.918 (23.32)
Turbo-C Enhanced ID - UNS C70600								
52-9740128	5/8 (15.88)	0.028 (0.711)	0.623 (15.82)	0.051 (1.30)	40	0.618 (15.70)	0.025 (0.635)	0.542 (13.77)
52-9740128	3/4 (19.05)	0.028 (0.711)	0.743 (18.87)	0.056 (1.42)	40	0.744 (18.90)	0.025 (0.635)	0.667 (16.94)
52-9750035	3/4 (19.05)	0.035 (0.889)	0.743 (18.87)	0.060 (1.52)	40	0.744 (18.90)	0.031 (0.787)	0.667 (16.94)
52-9750128	3/4 (19.05)	0.028 (0.711)	0.743 (18.87)	0.052 (1.32)	40	0.744 (18.90)	0.025 (0.635)	0.667 (16.94)
52-9752028	3/4 (19.05)	0.028 (0.711)	0.743 (18.87)	0.052 (1.32)	40	0.746 (18.95)	0.025 (0.635)	0.667 (16.94)
52-9752035	3/4 (19.05)	0.035 (0.889)	0.743 (18.87)	0.057 (1.45)	40	0.746 (18.95)	0.031 (0.787)	0.667 (16.94)
Turbo-C Smooth Bore - UNS C12200								
52-9759928	3/4 (19.05)	0.028 (0.711)	0.743 (18.87)	0.047 (1.19)	40	0.744 (18.90)	0.025 (0.635)	0.667 (16.94)
52-9759935	3/4 (19.05)	0.035 (0.889)	0.743 (18.87)	0.053 (1.35)	40	0.744 (18.90)	0.031 (0.787)	0.667 (16.94)
52-9759942	3/4 (19.05)	0.042 (1.067)	0.743 (18.87)	0.058 (1.47)	40	0.744 (18.90)	0.037 (0.940)	0.667 (16.94)
Turbo-C Smooth Bore - UNS C70600								
52-9759928	3/4 (19.05)	0.028 (0.711)	0.743 (18.87)	0.047 (1.19)	40	0.744 (18.90)	0.025 (0.635)	0.667 (16.94)
52-9759935	3/4 (19.05)	0.035 (0.889)	0.743 (18.87)	0.053 (1.35)	40	0.744 (18.90)	0.031 (0.787)	0.667 (16.94)
52-9759942	3/4 (19.05)	0.042 (1.067)	0.743 (18.87)	0.058 (1.47)	40	0.744 (18.90)	0.037 (0.940)	0.667 (16.94)

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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 ft²/ft (m²/m)	Actual Inside Surface Area ft²/ft (m²/m)	Nominal Outside Surface Area ft²/ft (m²/m)	Actual Outside Surface Area ft²/ft (m²/m)
Turbo-C Enhanced ID - UNS C12200							
52-9740028	0.329 (0.489)	0.489 (12.42)	0.020 (0.508)	0.128 (0.039)	0.214 (0.065)	0.162 (0.049)	0.562 (0.171)
52-9750025	0.362 (0.539)	0.489 (12.42)	0.016 (0.406)	0.127 (0.039)	0.196 (0.060)	0.164 (0.050)	0.560 (0.171)
52-9750028	0.467 (0.695)	0.602 (15.29)	0.017 (0.432)	0.158 (0.048)	0.235 (0.072)	0.196 (0.060)	0.685 (0.209)
52-9750035	0.435 (0.648)	0.602 (15.29)	0.015 (0.381)	0.158 (0.048)	0.222 (0.068)	0.196 (0.060)	0.685 (0.209)
52-9750128	0.482 (0.717)	0.602 (15.29)	0.016 (0.406)	0.151 (0.046)	0.230 (0.070)	0.196 (0.060)	0.685 (0.209)
52-9750135	0.460 (0.684)	0.602 (15.29)	0.017 (0.432)	0.158 (0.048)	0.212 (0.065)	0.196 (0.060)	0.685 (0.209)
52-9752028	0.460 (0.684)	0.602 (15.29)	0.015 (0.381)	0.158 (0.048)	0.206 (0.063)	0.196 (0.060)	0.685 (0.209)
52-9752035	0.428 (0.637)	0.612 (15.54)	0.020 (0.508)	0.160 (0.049)	0.251 (0.077)	0.196 (0.060)	0.681 (0.208)
52-9770028	0.406 (0.604)	0.612 (15.54)	0.017 (0.432)	0.160 (0.049)	0.234 (0.071)	0.196 (0.060)	0.681 (0.208)
Turbo-C Enhanced ID - UNS C70600							
52-9740128	0.410 (0.610)	0.612 (15.54)	0.019 (0.483)	0.160 (0.049)	0.221 (0.067)	0.196 (0.060)	0.681 (0.208)
52-9750028	0.443 (0.659)	0.612 (15.54)	0.018 (0.457)	0.160 (0.049)	0.242 (0.074)	0.196 (0.060)	0.681 (0.208)
52-9750035	0.411 (0.611)	0.612 (15.54)	0.016 (0.406)	0.160 (0.049)	0.229 (0.070)	0.196 (0.060)	0.681 (0.208)
52-9750128	0.414 (0.616)	0.612 (15.54)	0.017 (0.432)	0.160 (0.049)	0.215 (0.066)	0.196 (0.060)	0.681 (0.208)
52-9752028	0.402 (0.598)	0.618 (15.70)	0.020 (0.508)	0.160 (0.049)	0.253 (0.077)	0.196 (0.060)	0.681 (0.208)
52-9752035	0.556 (0.828)	0.866 (22.00)	0.020 (0.508)	0.227 (0.069)	0.331 (0.101)	0.260 (0.079)	0.927 (0.283)
Turbo-C Smooth Bore - UNS C12200							
52-9759928	N/D	0.607 (15.42)	N/A	0.159 (0.048)	0.159 (0.048)	0.196 (0.060)	0.681 (0.208)
52-9759935	0.413 (0.615)	0.598 (15.19)	N/A	0.157 (0.048)	0.157 (0.048)	0.196 (0.060)	0.685 (0.209)
52-9759942	0.457 (0.680)	0.589 (14.96)	N/A	0.154 (0.047)	0.154 (0.047)	0.196 (0.060)	0.685 (0.209)
Turbo-C Smooth Bore - UNS C70600							
52-9759928	0.374 (0.556)	0.607 (15.42)	N/A	0.160 (0.049)	0.160 (0.049)	0.196 (0.060)	0.681 (0.208)
52-9759935	0.418 (0.622)	0.598 (15.19)	N/A	0.158 (0.048)	0.158 (0.048)	0.196 (0.060)	0.681 (0.208)
52-9759942	0.464 (0.691)	0.589 (14.96)	N/A	0.153 (0.047)	0.153 (0.047)	0.196 (0.060)	0.681 (0.208)

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Engineering Data

Catalog Number	Sieder and Tate ² Constant STC ⁱ	Constants used in Calculating Darcy Friction Factor ¹	
		C	D

Turbo-C Enhanced ID - UNS C12200

52-9740028	N/A	N/A	N/A
52-9750025	N/A	N/A	N/A
52-9750028	0.054	2.904	0.391
52-9750035	0.054	N/A	N/A
52-9750128	0.050	0.637	0.260
52-9750135	N/A	N/A	N/A
52-9752028	0.058	0.968	0.286
52-9752035	0.058	4.309	0.427
52-9770028	0.055	2.450	0.386

Turbo-C Enhanced ID - UNS C70600

52-9740128	0.063	0.613	0.238
52-9750028	0.050	0.467	0.228
52-9750035	0.055	2.450	0.386
52-9750128	0.063	1.202	0.296
52-9752028	0.058	3.927	0.415
52-9752035	N/A	N/A	N/A

Turbo-C Smooth Bore - UNS C12200

52-9759928	0.027	0.316	0.250
52-9759935	0.027	0.316	0.250
52-9759942	0.027	0.316	0.250

Turbo-C Smooth Bore - UNS C70600

52-9759928	0.027	0.316	0.250
52-9759935	0.027	0.316	0.250
52-9759942	0.027	0.316	0.250

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

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