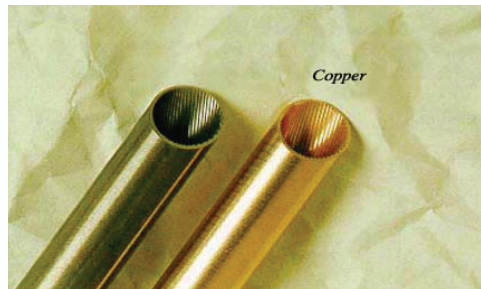




TURBO-DX® For Direct Expansion Chillers

Maximum Heat Transfer With Minimal Pressure Drop

Turbo-DX is a seamless, internally enhanced tube with 60 or 75 ridges. It is designed primarily for direct expansion shell-and-tube liquid coolers. Refrigerant evaporating on the inside tube surface absorbs heat from water circulation on the outside of the tubes. Turbo-DX has been optimized to give maximum heat transfer performance with minimum refrigerant-side pressure drop for all the commonly used refrigerants. The inside heat transfer coefficient of the Turbo-DX is typically 1.5 to 3 times the coefficient for smooth surface tube.



The compact ridge design of Turbo-DX is fully compatible with rolling-in of the product into heat exchanger tube sheets. This feature makes tube plain ends unnecessary and permits the use of Turbo-DX cut from level wound coils. Turbo-DX is 100% tested to insure full conformance with North American and European pressure vessel standards. It is available in OD sizes (mm) of 9.52, 12.70, and 15.9, to facilitate a wide range of heat exchanger designs.

Alloys Available

UNS C12200, DHP Copper
SF-CU, per DIN 1787

Applicable Standards

C12200 Alloy: ASME
SB75/SB359 Alloy: VdTUV
420/7

Product Formats Available

Rotary cut Straight Lengths: 600 mm to 4,000 mm
Level Wound Coils: 75 kg typical coil weight; Bulk Pack, with 610 mm Coil ID; Reel pack on Fiberboard Reels with 127 mm center hole diameter

Tempers Available

Straight Lengths - as-fabricated temper;
Level wound coils - as-fabricated temper, or annealed temper

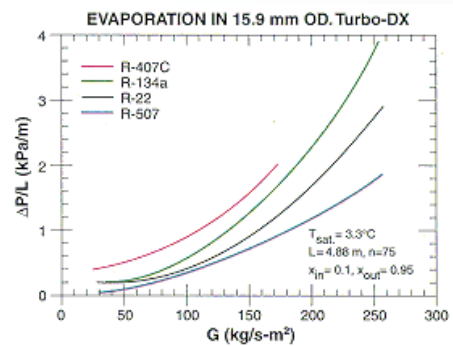
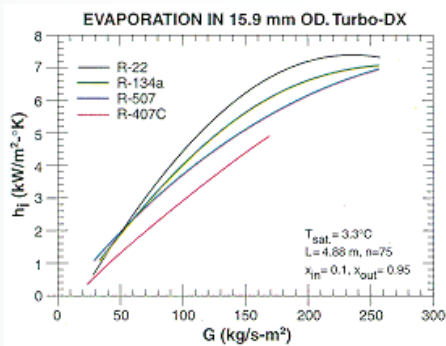
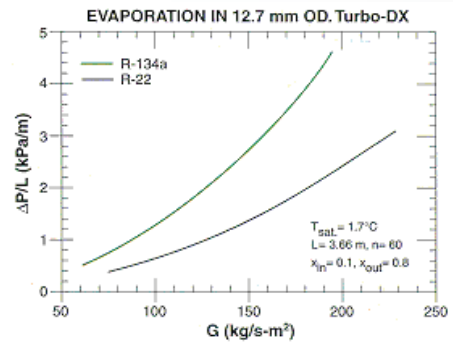
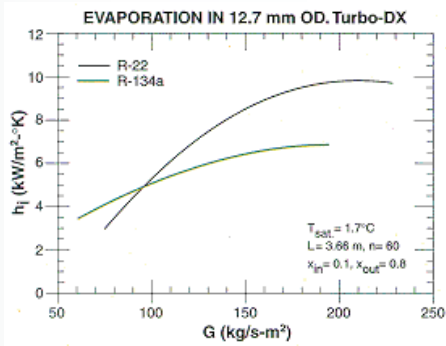
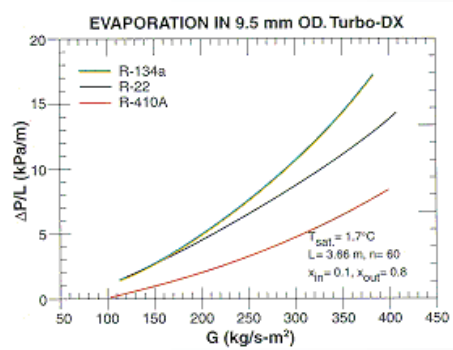
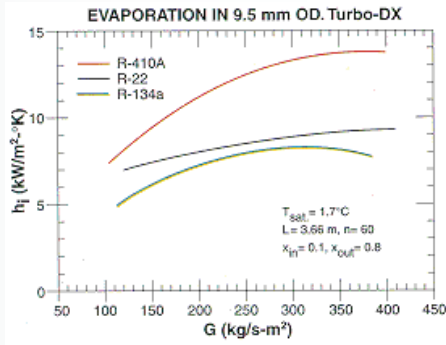
Testing

All Turbo-DX tubes are 100% eddy current tested and pressure tested, per the applicable standard.

TURBO-DX[®]

For Direct Expansion Chillers

Turbo-DX Performance



Note: All performance data were obtained with oil-free refrigerant.

G Tube-side fluid mass flux (kg/s·m²) = $m/A_{c,n}$
 h_i Average tube-side heat transfer coefficient (kW/m²·°K)
 T_{sat} Refrigerant saturation temperature (°C)
 $\Delta P/L$ Tube-side fluid pressure drop per unit length (kPa/m)

L Tube length
 X_{in} Inlet refrigerant quality
 X_{out} Outlet refrigerant quality

TURBO-DX®

For Direct Expansion Chillers

UNS C12200

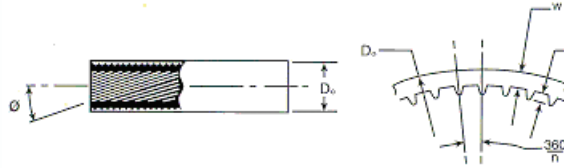
Catalog Number	Number of Ridges	Helix Angle degrees	Outside Diameter inch (mm)	Bottom Wall inch (mm)	Ridge Height inch (mm)	Nominal Inside Surface Area ft ² /ft (m ² /m)	Nominal Cross Sect. Flow Area inch ² (mm ²)	Weight Per Unit Length lb/ft (kg/m)
53-33751408	60	18	0.375 (9.53)	0.014 (0.356)	0.008 (0.203)	0.091 (0.028)	0.095 (61.03)	0.071 (0.106)
53-33751508	60	18	0.375 (9.53)	0.015 (0.381)	0.008 (0.203)	0.090 (0.028)	0.094 (60.32)	0.077 (0.115)
53-33751608	60	18	0.375 (9.53)	0.016 (0.406)	0.008 (0.203)	0.090 (0.027)	0.092 (59.61)	0.079 (0.118)
53-33761408	60	18	0.376 (9.55)	0.014 (0.356)	0.008 (0.203)	0.091 (0.028)	0.095 (61.35)	0.071 (0.106)
53-33761608	60	18	0.376 (9.55)	0.016 (0.406)	0.008 (0.203)	0.090 (0.027)	0.093 (59.94)	0.079 (0.118)
53-35001710	60	18	0.500 (12.70)	0.017 (0.432)	0.010 (0.254)	0.122 (0.037)	0.171 (110.06)	0.116 (0.172)
53-35001810	60	18	0.500 (12.70)	0.018 (0.457)	0.010 (0.254)	0.122 (0.037)	0.169 (109.10)	0.122 (0.181)
53-35001910	60	18	0.500 (12.70)	0.019 (0.483)	0.010 (0.254)	0.121 (0.037)	0.168 (108.13)	0.133 (0.198)
53-56232012	75	23	0.623 (15.82)	0.020 (0.508)	0.012 (0.305)	0.153 (0.047)	0.267 (172.19)	0.174 (0.259)
53-56232312	75	23	0.623 (15.82)	0.023 (0.584)	0.012 (0.305)	0.151 (0.046)	0.262 (168.71)	0.189 (0.281)
53-56232512	75	23	0.623 (15.82)	0.025 (0.635)	0.012 (0.305)	0.150 (0.046)	0.258 (166.39)	0.209 (0.311)
53-76232012	60	27	0.623 (15.82)	0.020 (0.508)	0.012 (0.305)	0.153 (0.047)	0.267 (172.19)	0.169 (0.252)
53-76232512	60	27	0.623 (15.82)	0.025 (0.635)	0.012 (0.305)	0.150 (0.046)	0.258 (166.39)	0.204 (0.304)
53-76232812	60	27	0.623 (15.82)	0.028 (0.711)	0.012 (0.305)	0.148 (0.045)	0.253 (162.90)	0.226 (0.337)
53-46252012	75	18	0.625 (15.88)	0.020 (0.508)	0.012 (0.305)	0.153 (0.047)	0.269 (173.42)	0.171 (0.254)
53-46252312	75	18	0.625 (15.88)	0.023 (0.584)	0.012 (0.305)	0.152 (0.046)	0.263 (169.87)	0.192 (0.286)
53-56252512	75	23	0.625 (15.88)	0.025 (0.635)	0.012 (0.305)	0.151 (0.046)	0.260 (167.55)	0.209 (0.312)
53-76252012	60	27	0.625 (15.88)	0.020 (0.508)	0.012 (0.305)	0.153 (0.047)	0.269 (173.42)	0.169 (0.252)
53-76253012	60	27	0.625 (15.88)	0.030 (0.762)	0.012 (0.305)	0.148 (0.045)	0.251 (161.74)	0.241 (0.358)

Wolverine Tube provides its products to a tremendous range of markets and applications. We provide both seamless tubing and welded inner groove technology for maximum flexibility in coil design, refrigerant use, and system performance. In all cases, we work hard to understand our customer's use of our products and how we can help contribute to maximum system performance.

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Tolerances: $D_o \pm 0.050$ mm Average
 w
 0.432 mm and Under: ± 0.0254 mm At A Point
 Over 0.432 mm to 0.610 mm, Inclusive: ± 0.051 mm At A Point
 Over 0.610 mm: ± 0.0635 mm At A Point
 $e \pm 0.0254$ mm Average



$A_{i,n}/L$ Nominal inside heat transfer surface area per unit length
 $(m^2/m) = \pi(D_o - 2w)L$
 $A_{c,n}$ Nominal cross sectional flow area $(m^2) = \pi(D_o - 2w)^2/4$

D_o Outside diameter (mm)
 e Ridge height (mm)
 m Tube-side fluid mass flow rate (kg/s)

w Bottom wall thickness (mm)
 θ Helix angle (°)
 n Number of ridges