ELEKTRO NORDIC

Contents:

With five decades of experience in heat exchanger design and manufacture, our expertise is second-to-none. Our heat exchangers are used in many industries including military and aerospace, medical and industrial lasers, medical imaging, analytical instrumentation, power electronics, semiconductor equipment, machine tools and telecommunications.

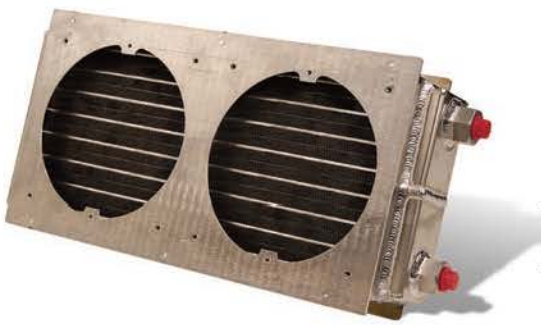
Any of our heat exchanger technologies can be customized to your exact requirements. We also supply heat exchanger subassemblies, adding fittings, hoses, fans, sensors, and other instrumentation to your specification. And our seven product ranges with over 130 standard parts ensure that when you need an off-the-shelf part we are likely to have something that meets your requirements.

Our broad range of heat exchanger technologies combined with five decades of thermal transfer experience enables us to offer tailored solutions for a wide range of applications. Our four types of heat exchangers can all be customized and integrated into subassemblies.

Tube-Fin Heat Exchangers

EN6000 *Series, OEM Coils, Aspen, and* ***EN4000*** *Series*

Our tube-fin heat exchangers consist of copper or stainless steel tubes expanded into copper or aluminum fin. Tube-fin heat exchangers are cost effective and offer good heat removal for a wide range of applications including lasers, electronics, compressor cooling, semiconductor processing equipment, and solder reflow ovens. Our copper tubed EN6000 Series and OEM coils, and stainless steel tubed Aspen and EN4000 Series offer compatibility with a wide range of common coolants.



Flat Tube Oil Coolers

NS *Series*

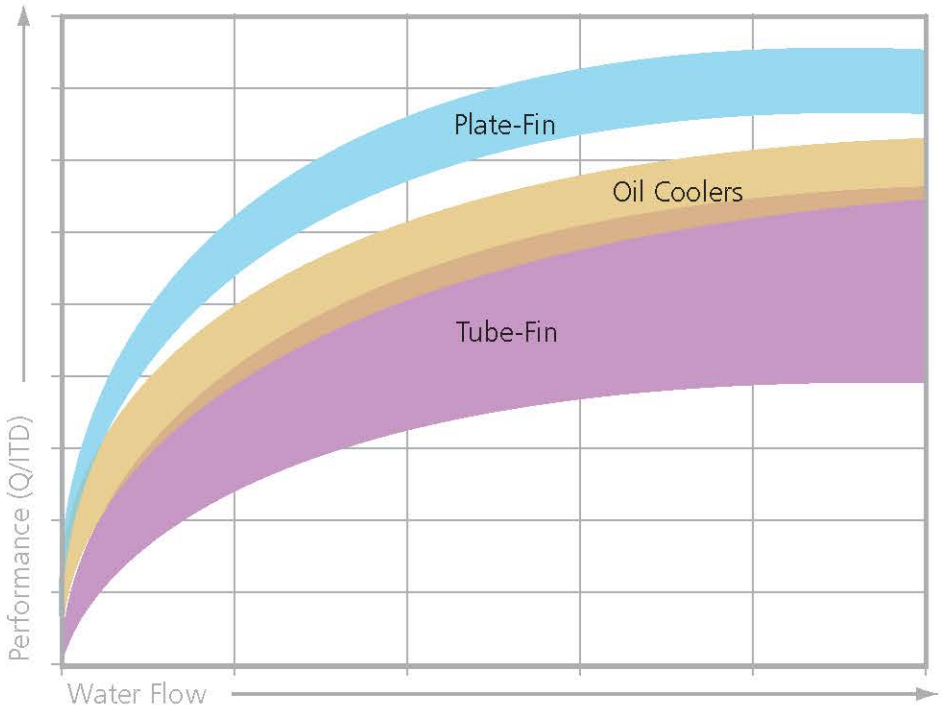
NS series oil coolers are designed for optimum cooling with poor heat transfer fluids such as oil and ethylene gly-col/water mixture (EGW). The aluminum flat tube fluid channels are vacuum-brazed with aluminum fin and a frame for a rugged and lightweight construction. They are ideal for cooling x-ray tubes, aircraft engines, hydraulic fluid, and high speed spindles.

Plate-Fin Heat Exchangers

Vacuum-brazed aluminum plate-fin heat exchangers are our highest performing heat exchanger. They can be used for air-to-air, air-to-liquid, and liquid-to-liquid cooling. All plate-fin heat exchangers are custom designed to match your precise performance and size requirements. Applications include condensers, evaporators, environmental cooling systems, and radar cooling. Their high performance/weight ratio also makes them popular for airborne applications such as cooling gearbox oil and transmission oil with ram air or jet fuel.

Liquid-to-Liquid Brazed Plate Heat Exchangers

Liquid-to-liquid brazed plate heat exchangers utilize stainless steel plates brazed together in a counterflow configuration. This offers high liquid-to-liquid cooling capacity in a compact package. We offer both copper-brazed and nickel-brazed versions for compatibility with a wide range of coolants. Applications include district heating/cooling, heat recovery, and laser cooling.



Performance comparison

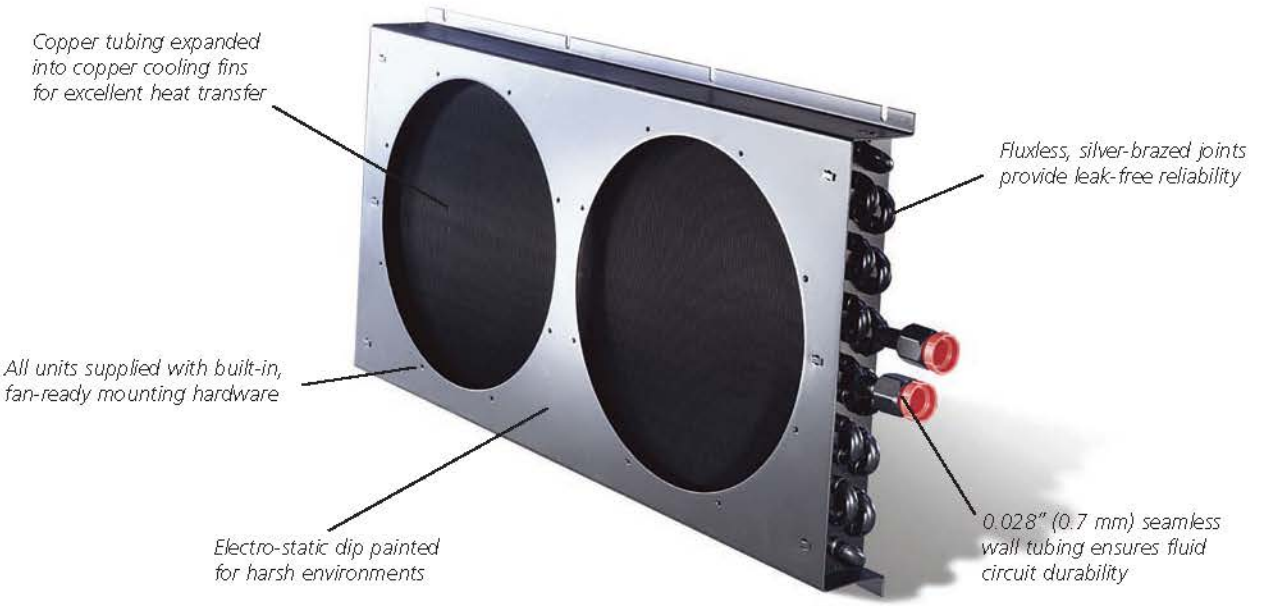
This chart compares the performance of different heat exchanger technologies. Performance is shown as Q/ITD, the heat load divided by the difference in incoming temperature of the liquid and air. Units are not shown so that technologies can be compared regardless of size.

As many heat exchangers are customized, a range of typical values is shown for each technology. All performances are compared using water as the cooling fluid.

Fluid compatibility

Coolant compatibility with wetted surfaces must be considered when selecting a heat exchanger technology. A copper fluid path is compatible with water and most common coolants. A stainless steel fluid path is necessary when using deionized water and other corrosive fluids. Aluminum offers excellent performance with ethylene glycol/water mixture (EGW), oils and other fluids, but is not compatible with untreated water. The table below shows fluid/heat exchanger compatibility.

	Water	EGW	Corrosive fluids (e.g. Deionized water)	Oil	Dielectric fluids (e.g. Fluorinert™)	Polyalphaolefin (PAO)
Tube-fin heat exchangers with copper tubing (EN6000 Series, OEM Coils)	•	•				
Tube-fin heat exchangers with stainless steel tubing (EN4000 Series, Asspen)		•	•			
Aluminum flat tube heat exchangers (NS Series)		•		•	•	•
Aluminum plate-fin heat exchangers		•		•	•	•
Copper-brazed liquid-to-liquid heat exchangers	•	•		•	•	•
Nickel-brazed liquid-to-liquid heat exchangers			•			



SELECT 89
GRAPHS 64
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SPECS 68
Standard Heat Exchangers

The EN6000 Series is a high performance heat exchanger with copper tubes and fin. It delivers efficient heat transfer and maximum reliability in a compact package.

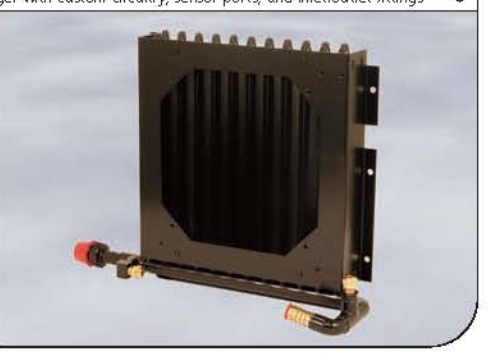
High cooling capacity in a small envelope: The EN6000 Series is engineered for performance. Its high tube density results in maximum heat transfer. The seamless copper tubes are expanded into copper fin (aluminum for the 6340) with an extruded full collar which ensures excellent metal-to-metal contact and improves the thermal performance.

Integrated fan plate for improved performance and convenience: The EN6000 Series' integral fan plate acts as a plenum to distribute the air flow uniformly through the core, thus maximizing performance. It also enables easy fan installation.

Reliable, leak-free, and robust: our heat exchangers are designed for reliability. Our thick-walled (0.028"/0.7 mm) seamless copper tubing and fluxless silver-brazed joints ensure the integrity of the fluid path. The unit is painted for long life, even in corrosive environments. All EN6000 Series heat exchangers are pressure tested to 150 psi (10.3 bar) to guarantee reliability.

Compatible with water, ethylene glycol/water mixture (EGW), and other common coolants.

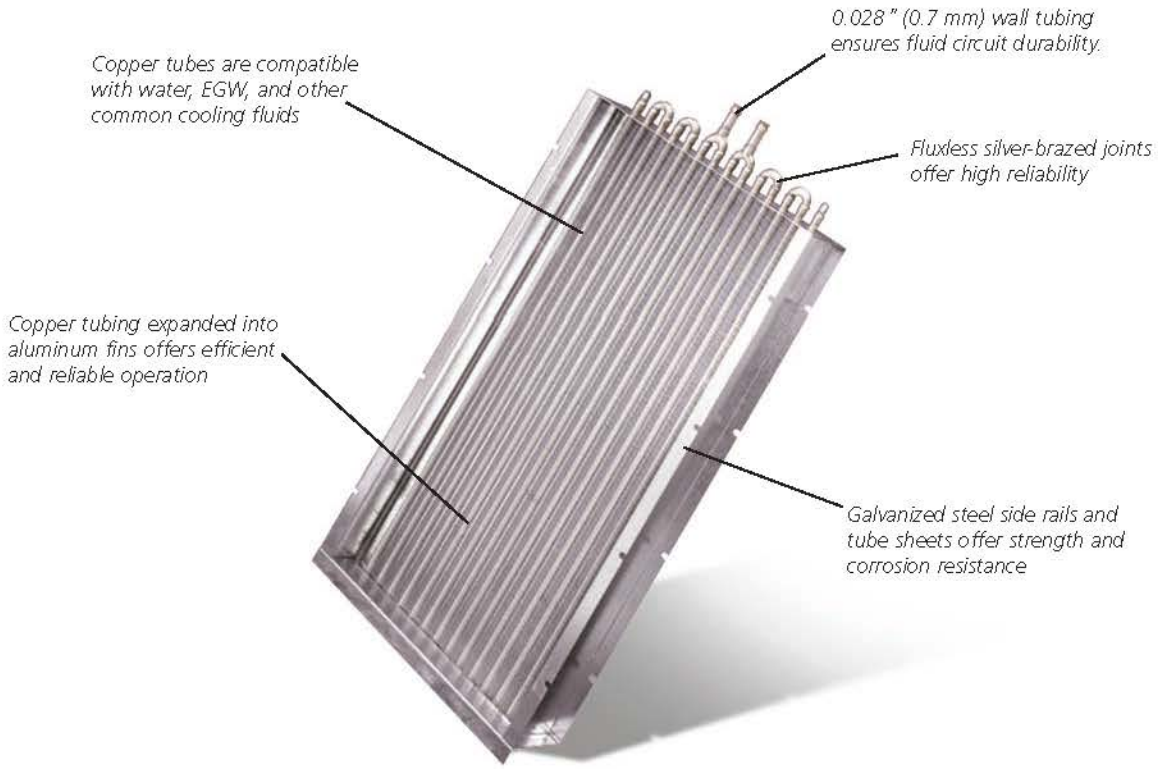
EN6000 Series heat exchanger with custom circuitry, sensor ports, and inlet/outlet fittings



Customization Options

Custom EN6000-Series style heat exchangers can be manufactured in any size and tube configuration to match your demanding thermal requirements. Variations in inlet/outlet position and/or fittings can be accommodated and a selection of paints and other coatings is available. Assemblies including fans and other components can also be supplied.

See page 92 for more custom heat exchangers.



SELECT 89
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OEM coils are the ideal solution for large volume, price sensitive users who need a high quality, cost-effective part but do not require the additional features of the EN6000 Series.

Great value: We carefully selected the materials, tube layout, and fin for low manufacturing cost, and eliminated some of the cosmetic features found in the EN6000 Series. All these cost savings have been passed on to you!

Leak-free, reliable, and robust: Our OEM coils use the same thick (0.028"/0.7 mm) walled copper tubing and fluxless silver-brazed joints as our EN6000 Series to ensure the integrity of the fluid circuit. Galvanized side plates provide superior strength and are corrosion-resistant. All of our OEM coils are 100% leak tested to 150 psi (10.3 bar).

Compatible with water, ethylene glycol/water mixture (EGW), and other common coolants.

Both the EN6000 Series and OEM coils offer high performance and reliability. The EN6000 Series uses copper fins, is painted black for corrosion resistance, and includes a fan-plate. The OEM coil has a different tube configuration, uses aluminum fins, and is unpainted with galvanized side plates. OEM coils are best suited for the price-sensitive, high volume customer where the appearance is not critical, for example where the heat exchanger is hidden in the equipment.

» *OEM Coil subassembly supplied with fan, finger guard, and hosing*

Customization Options

OEM coils are designed for flexibility. Modified standards are available in three standard widths and any length up to 48". For high volume applications we can customize dimensions, tube configuration, fittings, etc. to meet your precise thermal requirements and size envelope. Assemblies including fans and other components can also be supplied.

See page 92 for more custom heat exchangers.

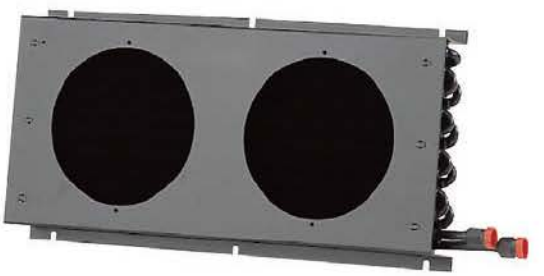
EN6105

EN6110

EN6120

EN6210

EN6220



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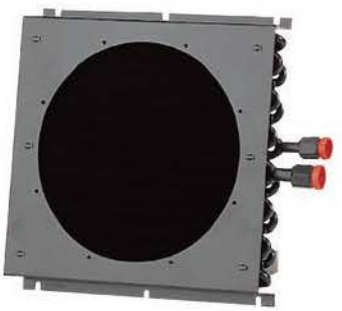

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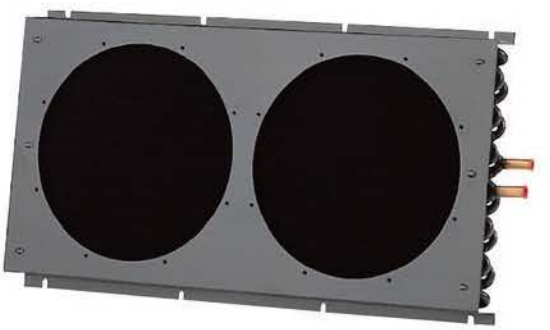

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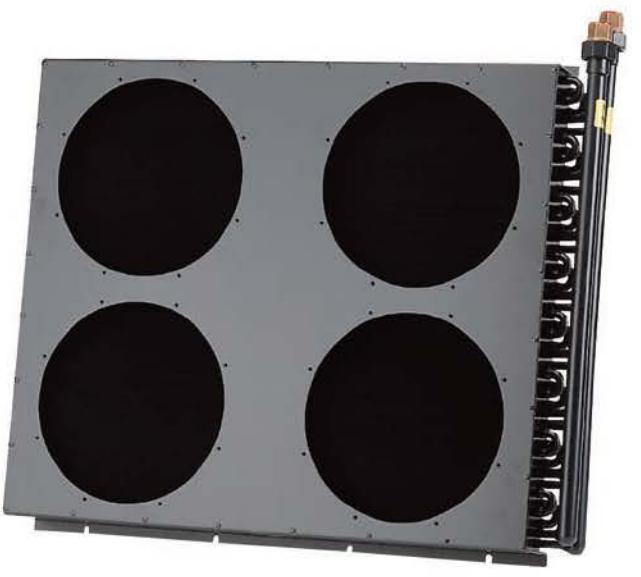


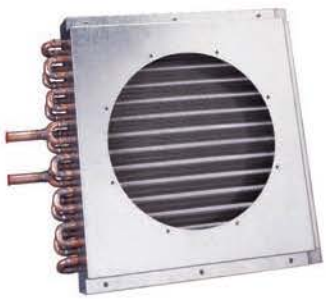
ENM05-050

ENM05-100

ENM10-080

ENM10-160

ENM14-120



ENM14-240

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Standard Heat Exchangers

SELECT 89
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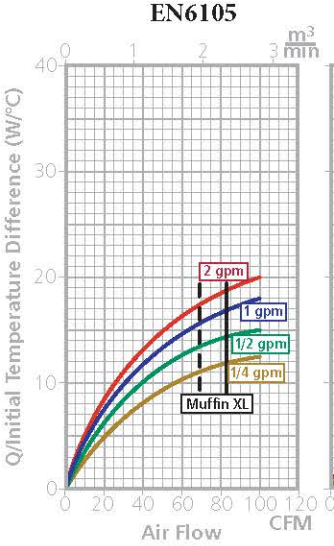
DWG 66
SPECS 68
Standard Heat Exchangers

EN6105



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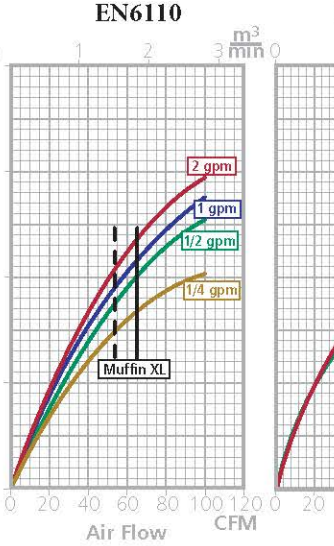

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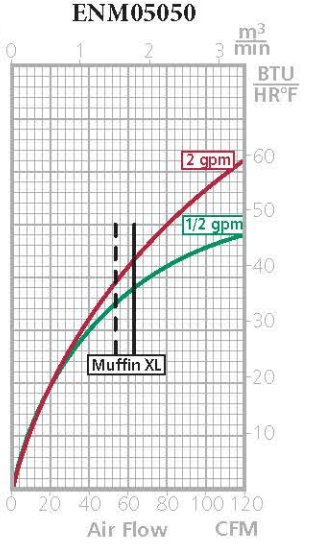

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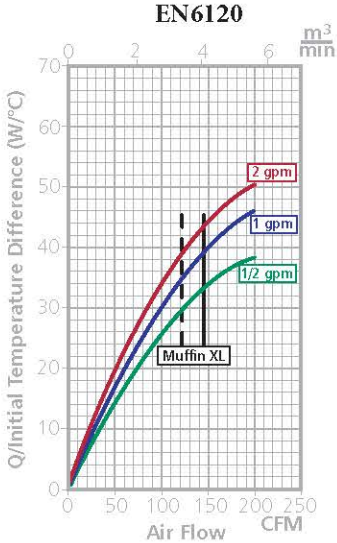

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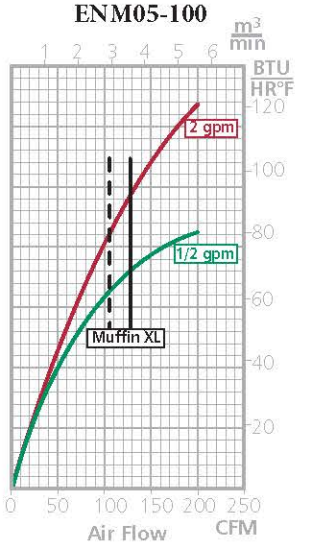

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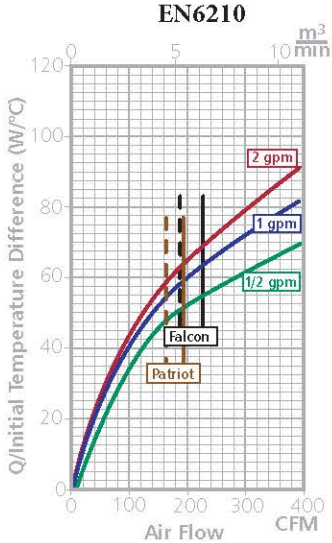

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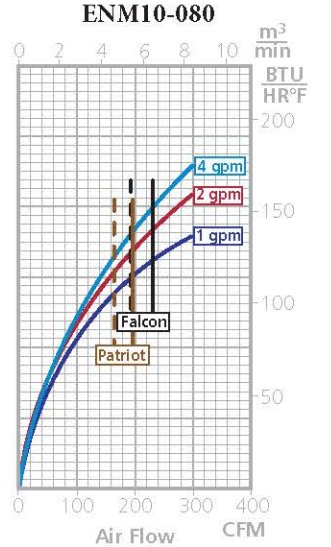

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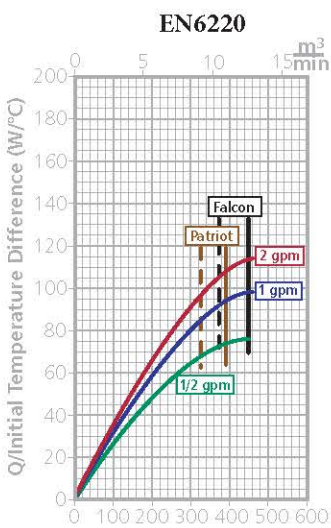

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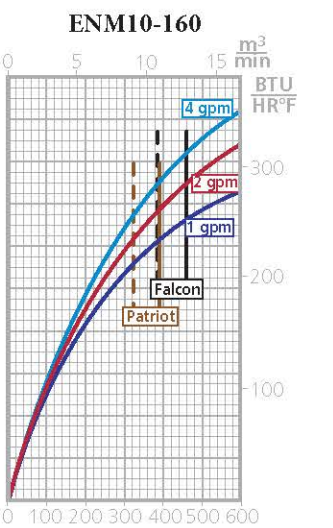

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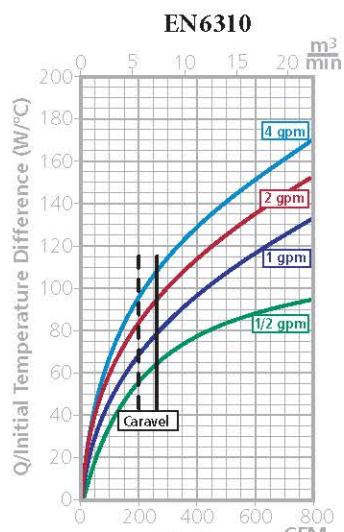

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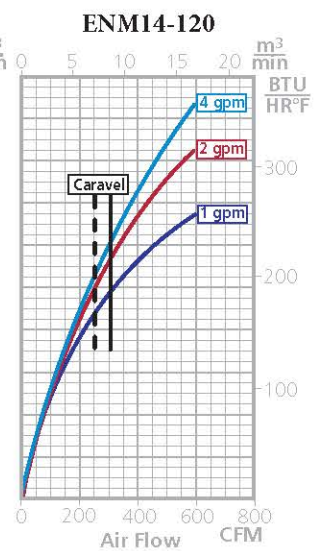

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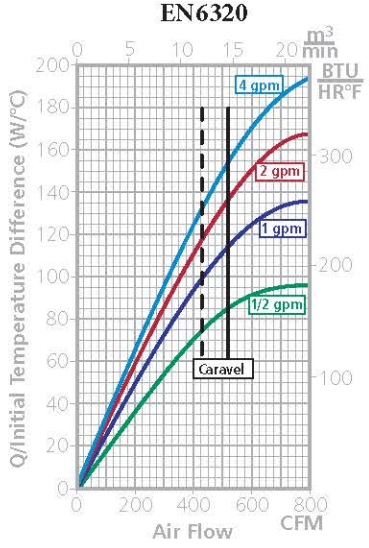

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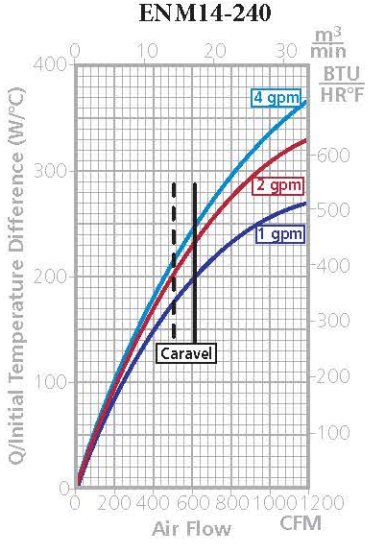

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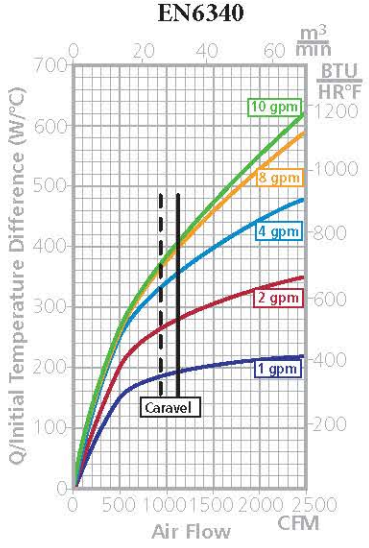
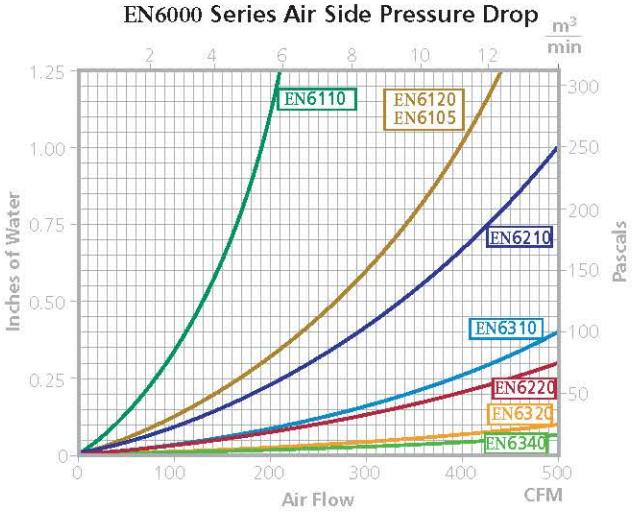
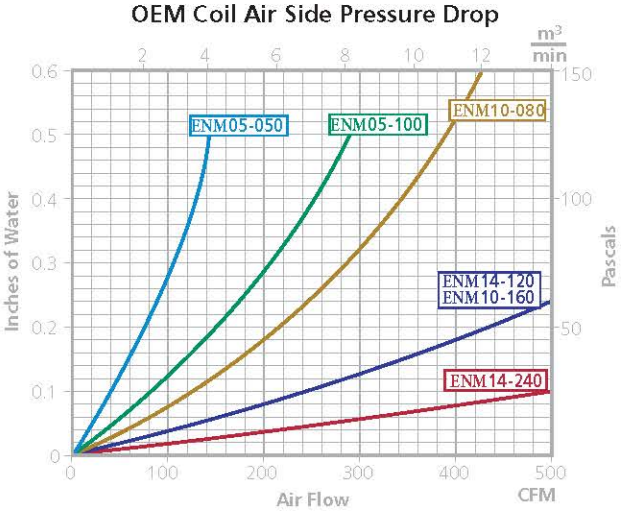


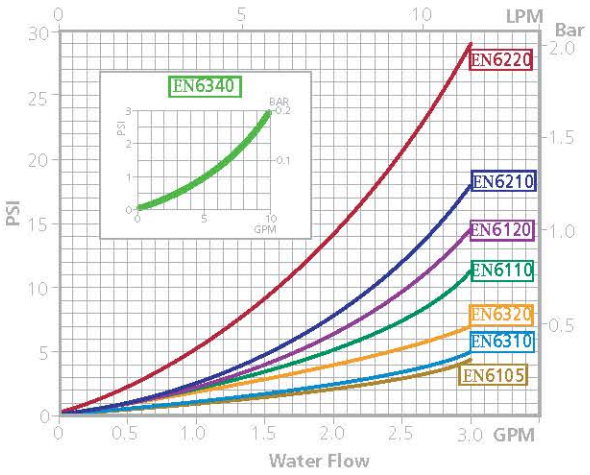
EN6000 Series Air Side Pressure Drop



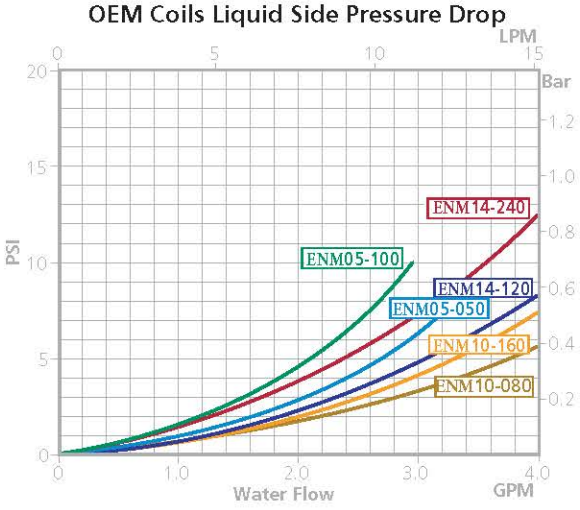
OEM Coil Air Side Pressure Drop



EN6000 Series Liquid Side Pressure Drop



OEM Coils Liquid Side Pressure Drop



[1] *The solid vertical lines indicate the performance provided by our standard fans at 60 Hz and 20°C. Dashed fan lines represent fan performance at 50 Hz and 20°C.*

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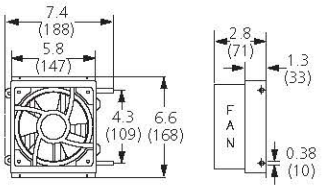
Standard Heat Exchangers

EN6105



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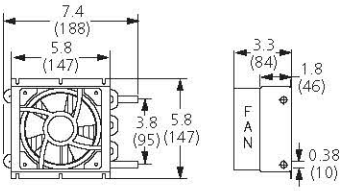

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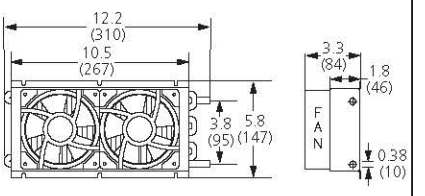

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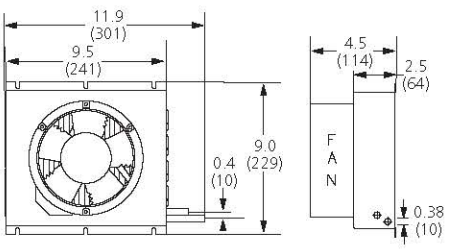

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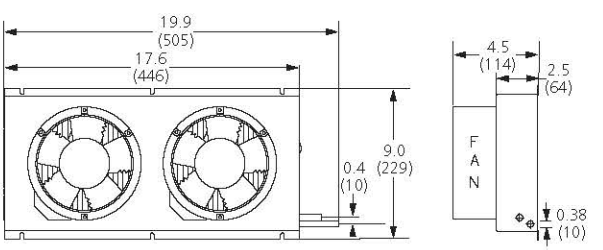

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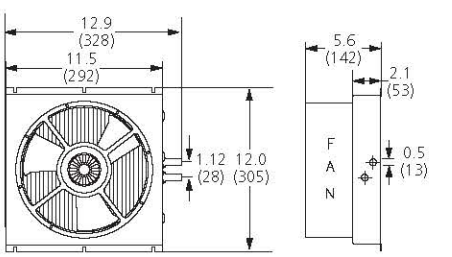

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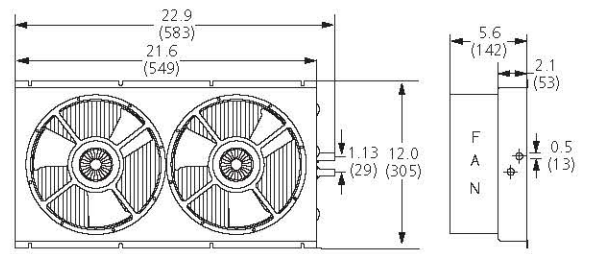

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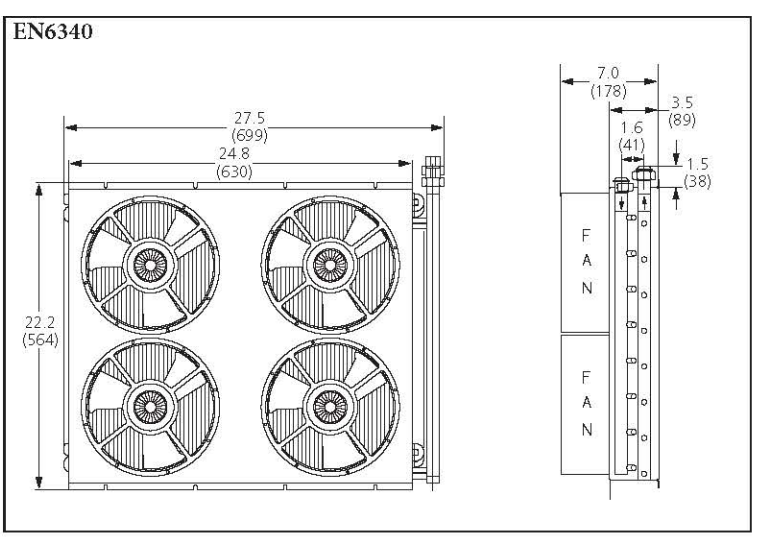
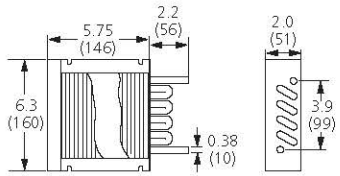


PDFs, IGS files, and eDrawings of standard heat exchangers are available.
Main dimensional label is inches. Dimension in parentheses is mm.

ENM05-050



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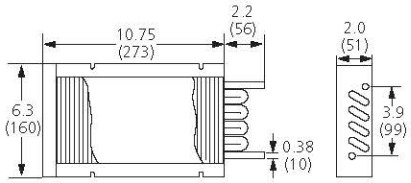

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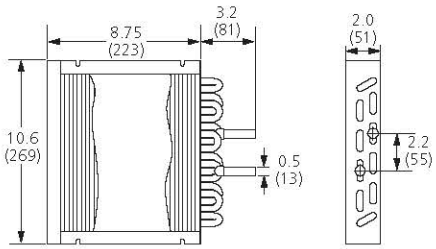

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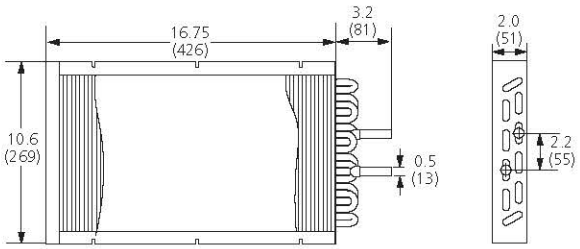

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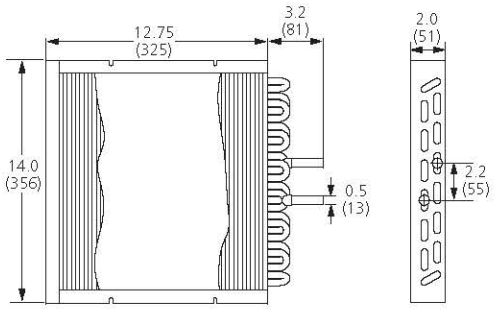

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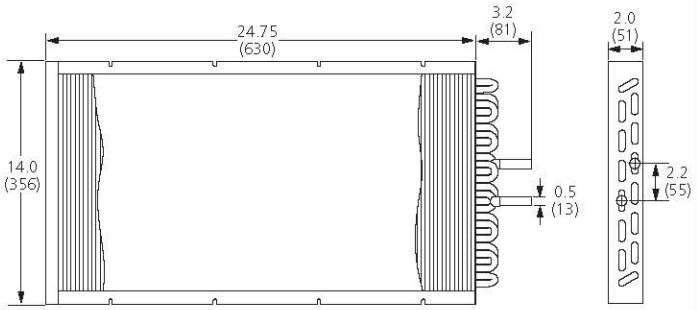

PDFs, IGS files, and eDrawings of standard heat exchangers are available.
Main dimensional label is inches. Dimension in parentheses is mm.

SELECT 89
GRAPHS 64
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SPECS 68
Standard Heat Exchangers

EN6000 Series

First select core number

Next, select a fitting option

Add a fan plate if desired

To arrive at a part number[1]

Finally, order fans if desired

EN6000 Series Core Number		EN6105G1	EN6110G1	EN6120G1	EN6210G1	EN6220G1	EN6310G3	EN6320G3	EN6340G1/G2
Fluid path		copper							
Fin material		copper							aluminum
Dry weight	lbs	1.5	2.0	3.5	5.0	8.5	8.5	14.0	30.0
	kg	0.7	0.9	1.6	2.3	3.9	3.9	6.4	13.6
Fluid volume	in^3	3	8	12.5	17.5	30.5	29.5	51.5	106
	ml	50	131	205	288	500	483	844	1737
Max. operating temp.		400°F/200°C							
Fitting Options (see page 88)									
SB: stub end		•	•	•	•	•	•	•	
BD: beaded fitting		•	•	•	•	•	•	•	
AN: 37° AN flare		•	•	•	•	•	•	•	
Leave blank: 0.875" O.D. union fitting									•
Fan plate		included	included	included	included	included	included	included	EN6340G1 no fan plate EN6340G2 includes plate
Recommended Fans									
Muffin XL		•	•	•					
Patriot					•	•			
Falcon					•	•			
Caravel							•	•	•
# of fans		1	1	2	1	2	1	2	4

EN6120G1 BD 6120 with beaded fittings

[1] *Note: fans, fan plugs, and fingerguards must be ordered separately. Assembly available on orders of 10+ pieces—ask for details.*

Fan Specifications

Description	Size	Voltage	Current		Fan Part Number	Fingerguard Part Number	Fan Plug Number
			50Hz	60Hz			
Muffin XL	4.71" (120 mm) square	115	0.20	0.18	102076	101467	101466
Muffin XL	4.71" (120 mm) square	230	0.10	0.09	102076-01	101467	101466
Patriot	6.75" (171.5 mm) round	115	0.27	0.26	101116-01	101116-03	101466
Patriot	6.75" (171.5 mm) round	230	0.14	0.13	101116-02	101116-03	101466
Falcon	6.75" (171.5 mm) round	115	0.48	0.50	102070-01	101116-03	101466
Falcon	6.75" (171.5 mm) round	230	0.16	0.16	102070-02	101116-03	101466
Caravel	10.00" (254 mm) round	115	0.48	0.50	100236-01	101434	101466
Caravel	10.00" (254 mm) round	230	0.24	0.25	100236-02	101434	101466

Other Accessories

Item	Suitable for		Part Number
Push to connect adapters for • Materials: acetel bodies, nitrile o-rings, and acetel/stainless steel collets • Temp. range: -14 to 167°F (-25 to 75°C) for air; 33 to 140°F (0 to 60°C) for water. • Maximum pressure: 150 psi (10.3 bar) for air, 250 psi (1,724 kP) for water. • Packaging: 10 fittings per pack.	EN6105 EN6110 EN6120 EN6210 EN6220	Straight Union ⅜" O.D.	**430-0448**
		Union Elbow ⅜" tubing O.D.	**102190-01**
		Transition Union ⅜" – ½" tubing O.D.	**102189-01**
	EN6310 EN6320	Transition Union ½" – ⅜" tubing O.D.	**102189-01**
		Union Elbow ½" tubing O.D.	**102190-02**
Tube to Hose Adapter Requires a push-to-connect adapter of the same OD to mate with heat exchanger.		⅜" tubing O.D. to ⅜" hose barb	**102191-01**
		½" tubing O.D. to ⅜" hose barb	**102191-02**
		½" tubing O.D. to ½" hose barb	**102191-03**

OEM Coils

First select core number

Next, select a fitting option

Add a fan plate if desired

To arrive at a part number[1]

Finally, order fans if desired

OEM Coil Core Number		ENM05-050	ENM05-100	ENM10-080	ENM10-160	ENM14-120	ENM14-240
Fluid Path		copper					
Fin Material		aluminum					
Dry Weight	lbs	2.0	4.0	5.0	8.0	10.0	16.0
	kg	0.9	1.8	2.3	3.6	4.5	7.3
Fluid Volume	in³	7	11.5	19.5	33.5	37	66.5
	ml	115	188	320	549	606	1090
Max. operating temp.		400°F/200°C					
Fitting Options (see page 88)							
SB: stub end		•	•	•	•	•	•
BD: beaded fitting		•	•	•	•	•	•
AN: 37° AN flare		•	•	•	•	•	•
Fan Plate							
0: no fan plate		•	•	•	•	•	•
1: fan plate attached		•	•	•	•	•	•
Recommended Fans							
Muffin XL•		•					
Patriot				•	•		
Falcon				•	•		
Caravel						•	•
# of fans		1	2	1	2	1	2

ENM05-100 SB 1 ENM05-100 with stub end fittings and fan plate

[1] *Note: fans, fan plugs, and fingerguards must be ordered separately. Assembly available on orders of 10+ pieces—ask for details.*

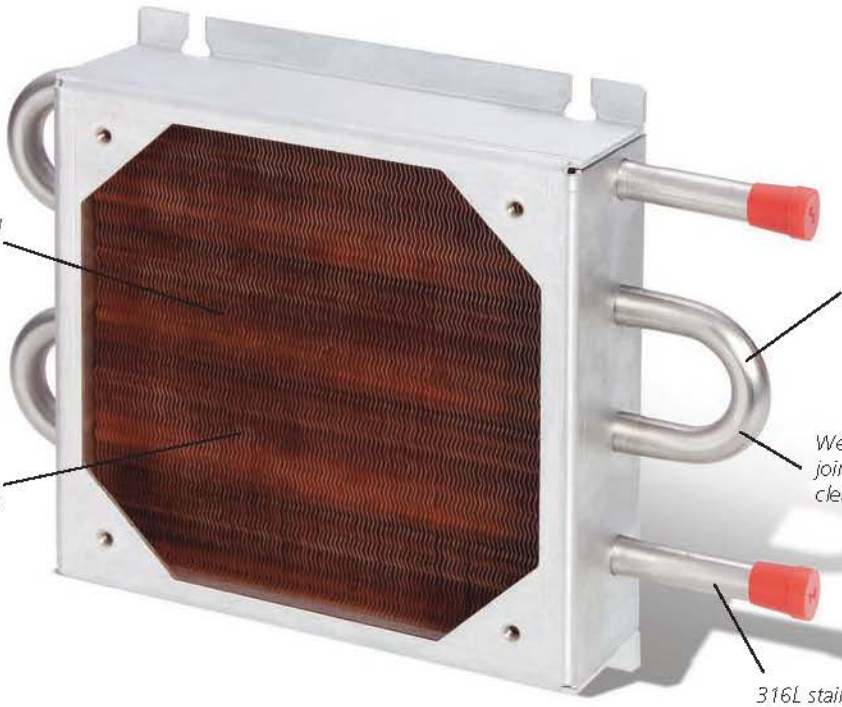
Fan Specifications

Description	Size	Voltage	Current		Fan Part Number	Fingerguard Part Number	Fan Plug Number
			50Hz	60Hz			
Muffin XL	4.71″ (120 mm) square	115	0.20	0.18	102076	101467	101466
Muffin XL	4.71″ (120 mm) square	230	0.10	0.09	102076-01	101467	101466
Patriot	6.75″ (171.5 mm) round	115	0.27	0.26	101116-01	101116-03	101466
Patriot	6.75″ (171.5 mm) round	230	0.14	0.13	101116-02	101116-03	101466
Falcon	6.75″ (171.5 mm) round	115	0.48	0.50	102070-01	101116-03	101466
Falcon	6.75″ (171.5 mm) round	230	0.16	0.16	102070-02	101116-03	101466
Caravel	10.00″ (254 mm) round	115	0.48	0.50	100236-01	101434	101466
Caravel	10.00″ (254 mm) round	230	0.24	0.25	100236-02	101434	101466

Other Accessories

Item	Suitable for		Part Number
Push to connect adapters for • Materials: acetel bodies, nitrile o-rings, and acetel/stainless steel collets • Temp. range: -14 to 167°F (-25 to 75°C) for air; 33 to 140°F (0 to 60°C) for water. • Maximum pressure: 150 psi (10.3 bar) for air, 250 psi (1,724 kP) for water. • Packaging: 10 fittings per pack.	ENM05-050 ENM05-100	Straight Union ⅜″ O.D.	**430-0448**
		Union Elbow ⅜″ tubing O.D.	**102190-01**
		Transition Union ⅜″ – ½″ tubing O.D.	**102189-01**
	ENM10-080 ENM10-160 ENM14-120 ENM14-240	Transition Union ½″ – ⅜″ tubing O.D.	**102189-01**
		Union Elbow ½″ tubing O.D.	**102190-02**
Tube to Hose Adapter Requires a push-to-connect adapter of the same OD to mate with heat exchanger.		⅜″ tubing O.D. to ⅜″ hose barb	**102191-01**
		½″ tubing O.D. to ⅜″ hose barb	**102191-02**
		½″ tubing O.D. to ½″ hose barb	**102191-03**

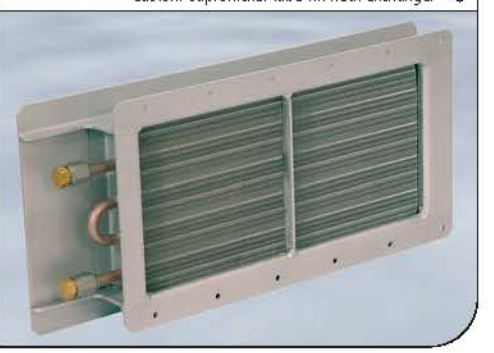
SELECT 89
GRAPHS 74
DWG 76
SPECS 78
Standard Heat Exchangers



The Asspen stainless steel tubed heat exchanger combines low price and low pressure drop with excellent heat transfer and superior fluid integrity.

- **Our best value stainless steel tubed heat exchanger:** The Asspen offers excellent value—80-90% the performance of competitive products at approximately half the price. We achieved this by using fewer tubes and increasing the fin density to balance the air and liquid sides. Our single piece formed aluminum frame/fan plate further reduces cost and weight.
- **Highly reliable:** like all our heat exchangers, the Asspen is designed for reliability. 316L stainless steel fluid path with 0.02″ (0.5 mm) wall thickness maintains deionized water and will not react with corrosive liquids. Asspen heat exchangers are 100% leak tested to 150 psi (10.3 bar).
- **Extremely clean:** Our proprietary manufacturing process expands the tubes into the copper fin without the use of oils and our liquid return design eliminates potential particle trapping sites, which can contaminate cooling fluid. Argon-purged welded joints further ensure cleanliness.
- **Low air and liquid side pressure drop:** The short fluid path minimizes the liquid side pressure drop, and our tube spacing and high performance fin reduce air side pressure drop.

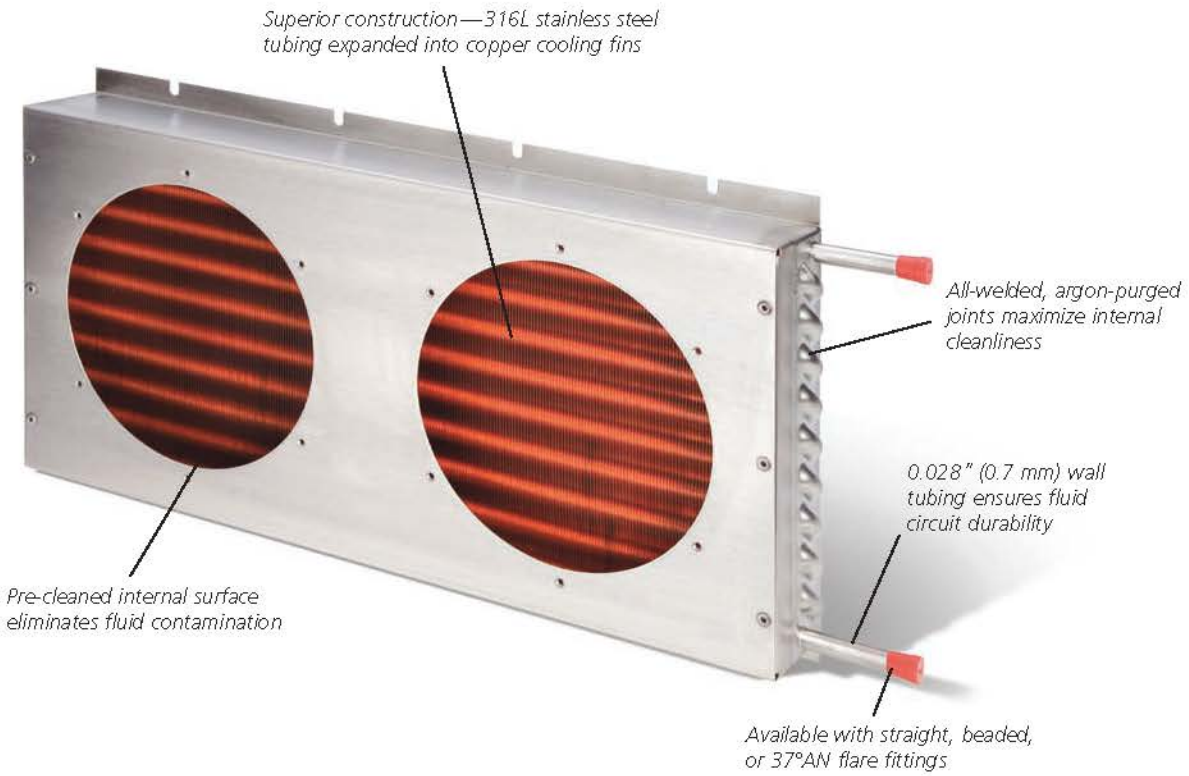
Custom cupronickel tube-fin heat exchanger



Customization Options

Custom Asspen style heat exchangers can be manufactured in various sizes and tube configurations to match your thermal and size requirements. Variations in inlet/outlet position and/or fittings can be accommodated and a selection of paints and other coatings is available. Assemblies including fans and other components can also be supplied.

See page 92 for more custom heat exchangers.



The EN4000 Series is our highest performing stainless steel tubed heat exchanger. It is ideal for applications where deionized water or corrosive fluids are used, and a high efficiency, compact unit is required.

- **High cooling capacity in a small envelope:** The EN4000 series is engineered for performance. It has a high tube density for maximum heat transfer. Heavy-walled (0.028"/0.7 mm), seamless stainless steel tubes are expanded into copper fin with an extruded full collar. The copper fin and the excellent metal-to-metal contact between the tube and the fin collar further increase performance.
- **Compatible with deionized water and corrosive liquids:** All the wetted surfaces in the EN4000 Series are 316L stainless steel, so it is ideal for use with high purity and/or corrosive coolants such as deionized water.
- **Integrated fan plate for improved performance and convenience:** The EN4000 Series' integral fan plate acts as a plenum to ensure uniform air-flow distribution through the core, thus maximizing performance. It also enables easy fan installation.
- **Rugged and reliable:** The argon-purged welded stainless steel frame and fan plate offer durability and strength. EN4000 Series heat exchangers are 100% leak tested to 150 psi (10.3 bar).

Asspen or EN4000 Series? The Asspen offers 80% the performance of the EN4000 Series at approximately 50% the cost. Where high performance in a small envelope is required, the EN4000 Series is the best option. However, when a slightly lower performance/size ratio is acceptable, the Aspen offers better value. The Asspen also has lower air and liquid side pressure drops.

Stainless steel heat exchanger with custom inlet/outlet fittings

Customization Options

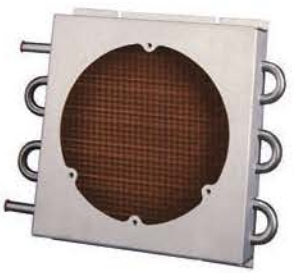
Custom EN4000 Series style heat exchangers can be manufactured in any size and circuiting to match your demanding thermal requirements. Variations in inlet/outlet position and/or fittings can be accommodated and a selection of paints and other coatings is available. Assemblies including fans and other components can also be manufactured.

See page 92 for more custom heat exchangers.

EN04-05

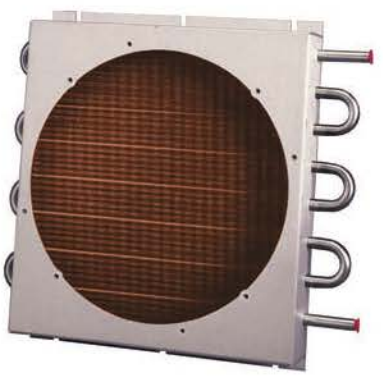
EN04-10

EN06-08



EN06-16

EN08-10



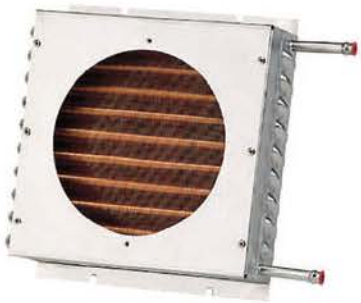
EN08-20

EN4105

EN4110

EN4120

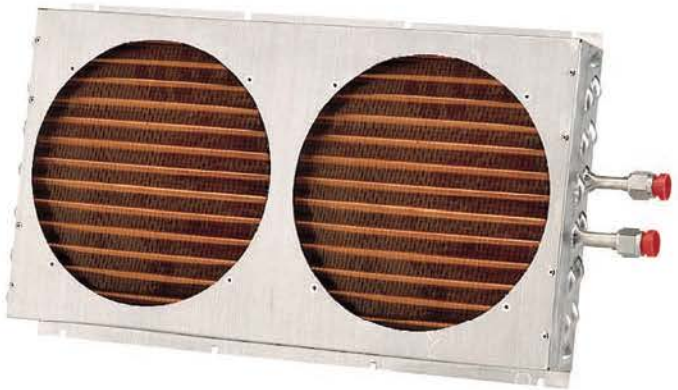
EN4210



EN4220

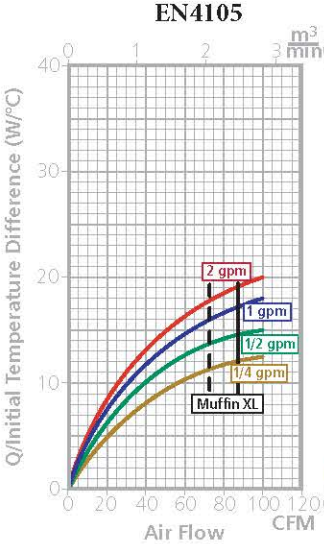
EN4310

EN4320

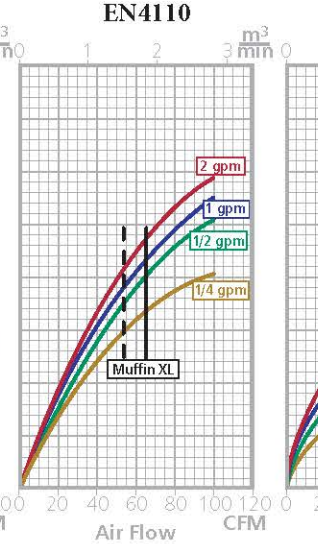


SELECT 89
GRAPHS 74
DWG 76
SPECS 78
Standard Heat Exchangers

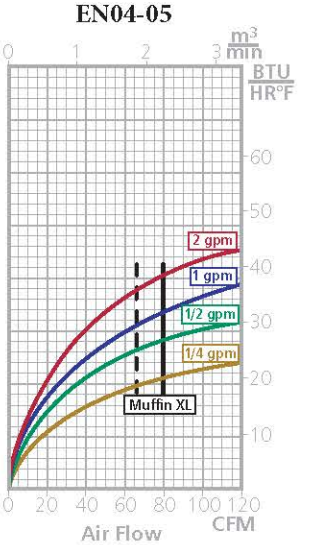
EN4105



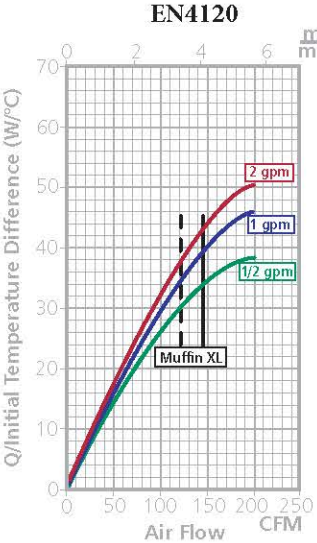
EN4110



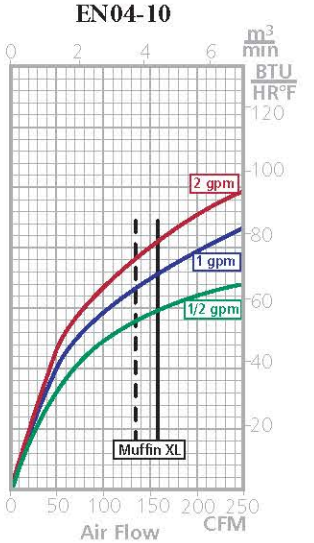
EN04-05



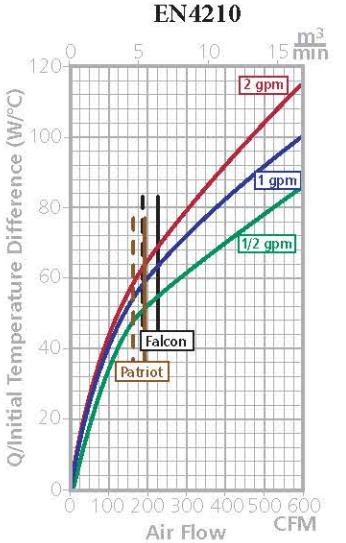
EN4120



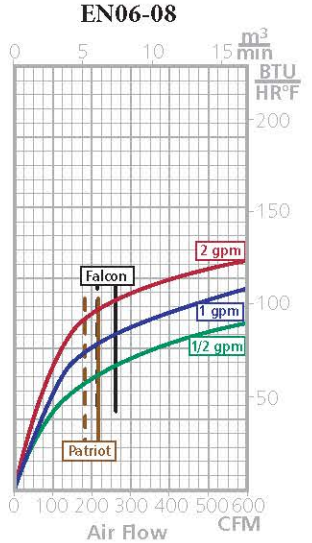
EN04-10



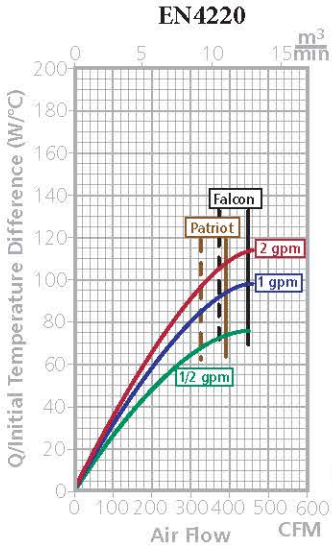
EN4210



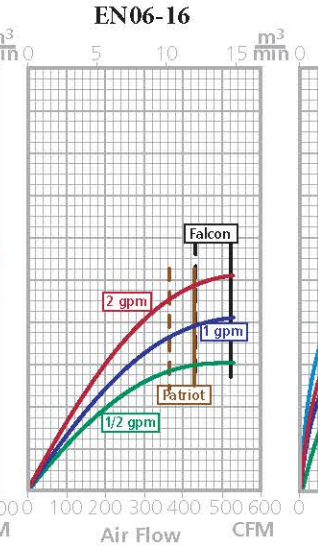
EN06-08



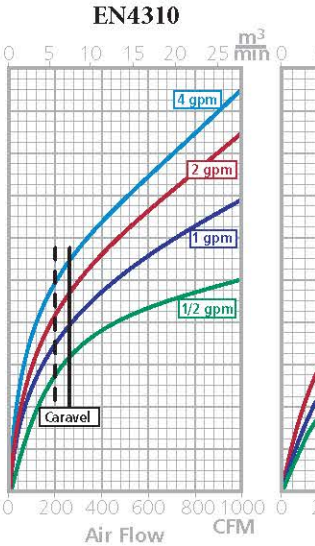
EN4220



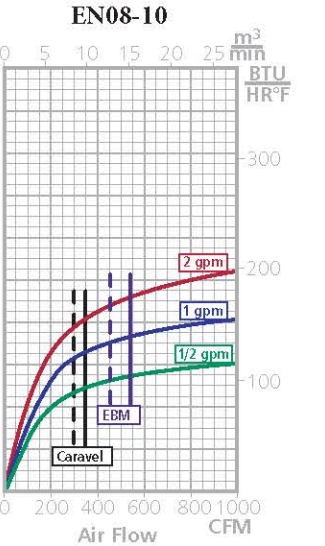
EN06-16

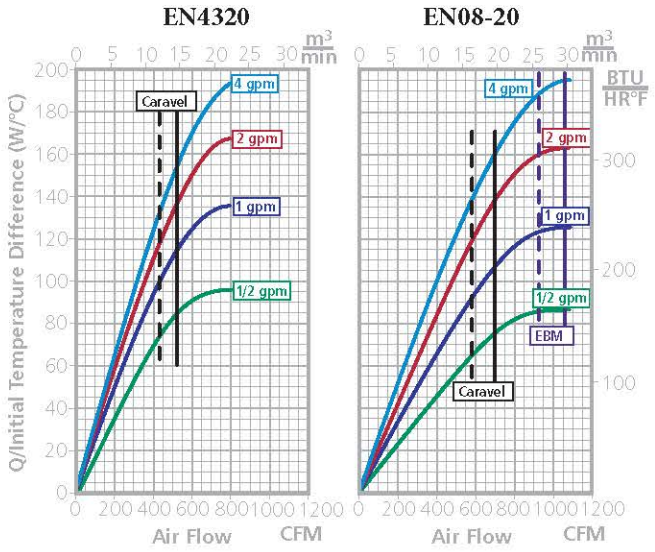


EN4310



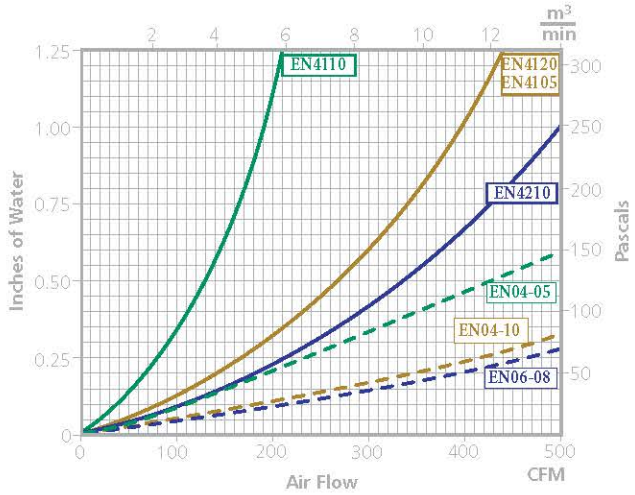
EN08-10



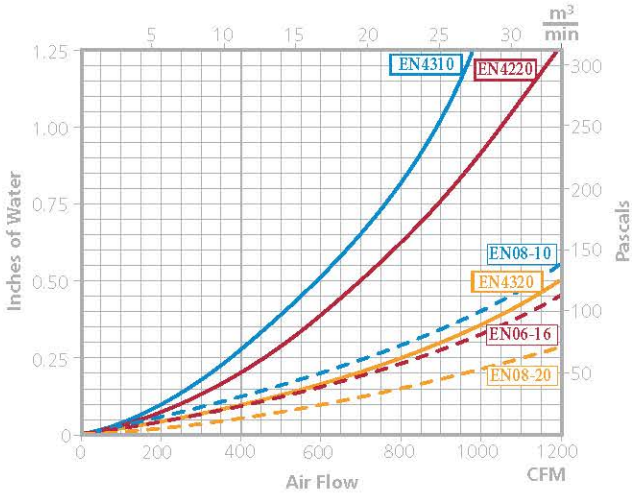


[1] *The solid vertical lines indicate the performance provided by our standard fans at 60 Hz and 20°C. Dashed fan lines represent fan performance at 50 Hz and 20°C.*

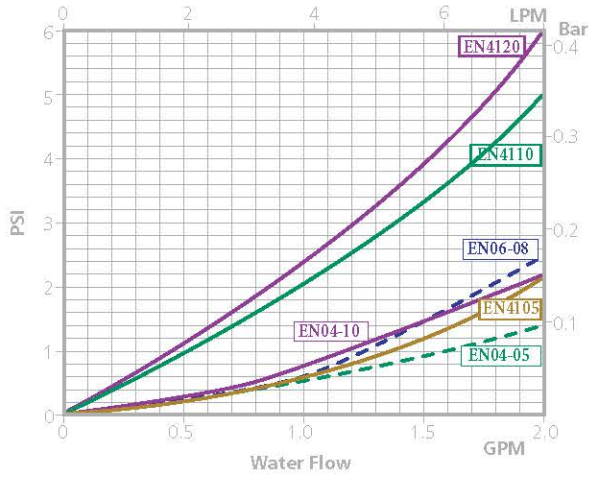
Air Side Pressure Drop



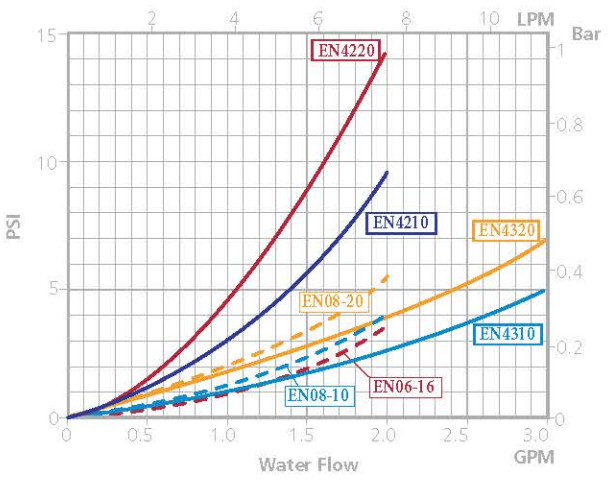
Air Side Pressure Drop



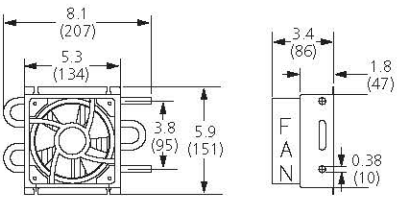
Liquid Side Pressure Drop



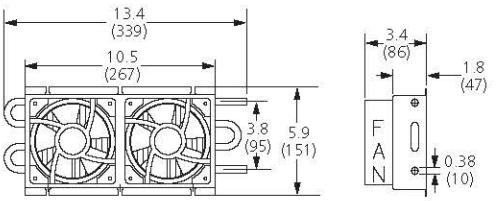
Liquid Side Pressure Drop



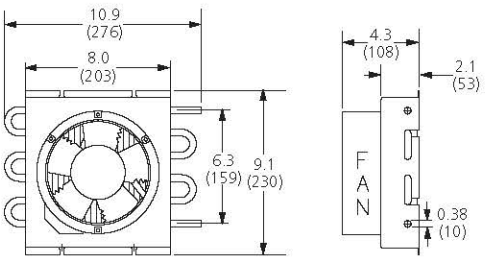
EN04-05



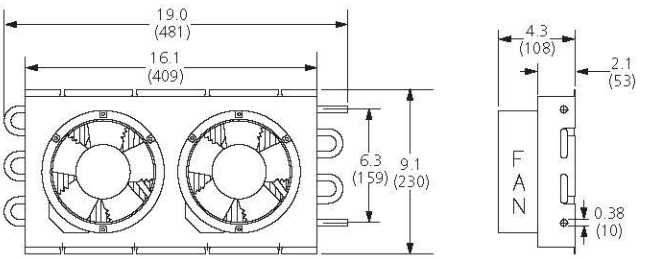
EN04-10



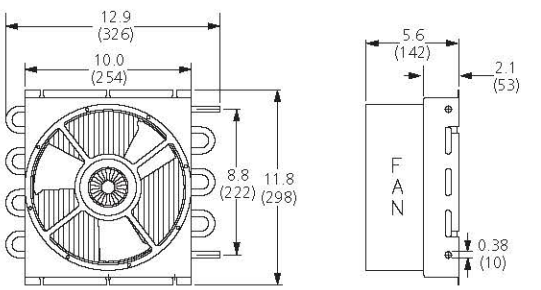
EN06-08



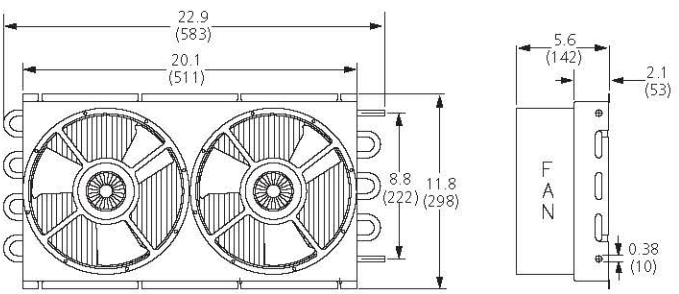
EN06-16



EN08-10

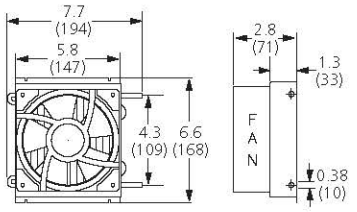


EN08-20

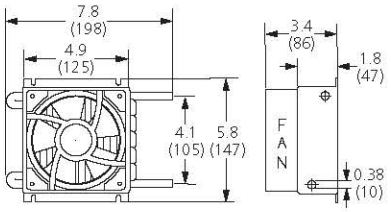


Main dimensional label is inches. Dimension in parentheses is mm.

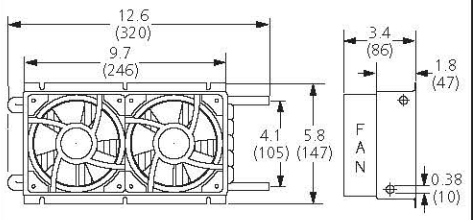
EN4105



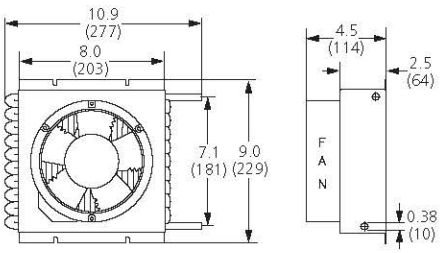
EN4110



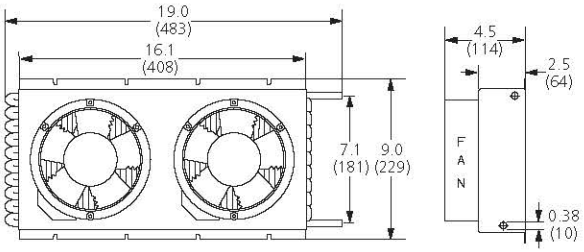
EN4120



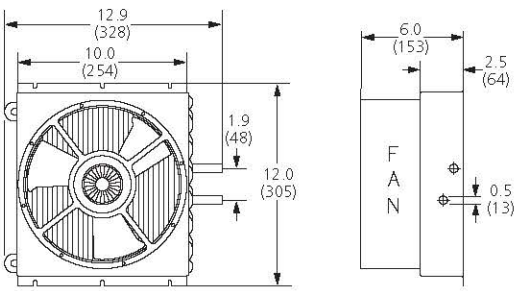
EN4210



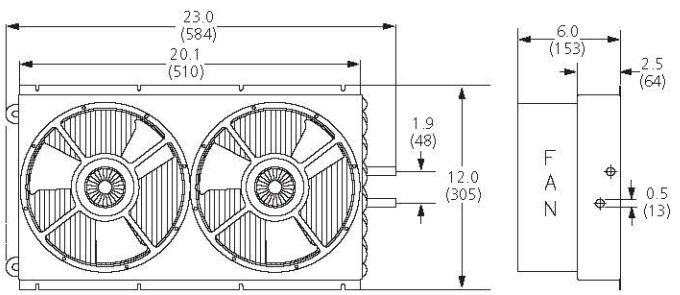
EN4220



EN4310



EN4320



Main dimensional label is inches. Dimension in parentheses is mm.

Asspen Series

First select core number

Next, select a fitting option

To arrive at a part number[1]

Finally, order fans if desired

Core Number		EN04-05G01	EN04-10G01	EN06-08G01	EN06-16G01	EN08-10G01	EN08-20G01
Fluid path		stainless steel					
Fin material		copper					
Dry weight	lbs	1.4	2.7	3.3	6.3	5.3	10.1
	kg	0.6	1.2	1.5	2.9	2.4	4.6
Fluid volume	in³	2.8	4.6	5.6	9.9	8.9	16.0
	ml	45.9	75.4	91.8	162.2	145.8	262.2
Max. operating temp.		400°F/200°C					
Fitting options (see page 88)							
SB: stub end		•	•	•	•	•	•
BD: beaded fitting		•	•	•	•	•	•
Fan plate		included	included	included	included	included	included
Recommended Fans							
Muffin XL		•	•				
Patriot				•	•		
Falcon				•	•		
Caravel					•	•	•
EBM 8.5						•	•
# of fans		1	2	1	2	1	2

EN08-10 G01 SB EN08-10 with stub end fittings

[1] *Note: fans, fan plugs, and fingerguards must be ordered separately. Assembly available on orders of 10+ pieces—ask for details.*

Fan Specifications

Description	Size	Voltage	Current		Fan Part Number	Fingerguard Part Number	Fan Plug Number
			50Hz	60Hz			
Muffin XL	4.71″ (120 mm) square	115	0.20	0.18	102076	101467	101466
Muffin XL	4.71″ (120 mm) square	230	0.10	0.09	102076-01	101467	101466
Patriot	6.75″ (171.5 mm) round	115	0.27	0.26	101116-01	101116-03	101466
Patriot	6.75″ (171.5 mm) round	230	0.14	0.13	101116-02	101116-03	101466
Falcon	6.75″ (171.5 mm) round	115	0.48	0.50	102070-01	101116-03	101466
Falcon	6.75″ (171.5 mm) round	230	0.16	0.16	102070-02	101116-03	101466
Caravel	10.00″ (254 mm) round	115	0.48	0.50	100236-01	101434	101466
Caravel	10.00″ (254 mm) round	230	0.24	0.25	100236-02	101434	101466
EBM[2]	8.85″ (225 mm) square	115	0.58	0.70	102105-01	102106	102175
EBM[2]	8.85″ (225 mm) square	230	0.29	0.35	102105-03	102106	102175

[2] *Requires adapter ring. Part number 508520.*

Other Accessories

Item	Suitable for		Part Number
Push to connect adapters for • Materials: acetel bodies, nitrile o-rings, and acetel/stainless steel collets • Temp. range: -14 to 167°F (-25 to 75°C) for air; 33 to 140°F (0 to 60°C) for water. • Maximum pressure: 150 psi (10.3 bar) for air, 250 psi (1,724 kP) for water. • Packaging: 10 fittings per pack.	**All Aspen Series**	Straight Union ⅜″ O.D.	**430-0448**
		Union Elbow ⅜″ tubing O.D.	**102190-01**
		Transition Union ⅜″ – ½″ tubing O.D.	**102189-01**
Tube to Hose Adapter Requires a push-to-connect adapter of the same OD to mate with heat exchanger.		⅜″ tubing O.D. to ⅜″ hose barb	**102191-01**
		½″ tubing O.D. to ⅜″ hose barb	**102191-02**
		½″ tubing O.D. to ½″ hose barb	**102191-03**

EN4000 Series

First select core number

Next, select a fitting option

To arrive at a part number[1]

Finally, order fans if desired

Core Number		EN4105G10	EN4110G10	EN4120G10	EN4210G10	EN4220G10	EN4310G10	EN4320G10
Fluid path		stainless steel						
Fin material		copper						
Dry Weight	lbs	1.5	2.0	3.5	5.0	8.5	8.5	14.0
	kg	0.7	0.9	1.6	2.3	3.9	3.9	6.4
Fluid volume	in^3	3	8	12.5	17.5	30.5	29.5	51.5
	ml	50	131	205	288	500	483	844
Max. operating temp.		400°F / 200°C						
Fitting options (see page 88)								
SB: stub end		•	•	•	•	•	•	•
BD: beaded fitting		•	•	•	•	•	•	•
AN: 37° AN flare		•	•	•	•	•	•	•
Fan plate		included	included	included	included	included	included	included
Recommended Fans								
Muffin XL		•	•	•				
Patriot					•	•		
Falcon					•	•		
Caravel							•	•
# of fans		1	1	2	1	2	1	2

EN4220G10 AN EN4220 with AN fittings

[1] *Note: fans, fan plugs, and fingerguards must be ordered separately. Assembly available on orders of 10+ pieces—ask for details.*

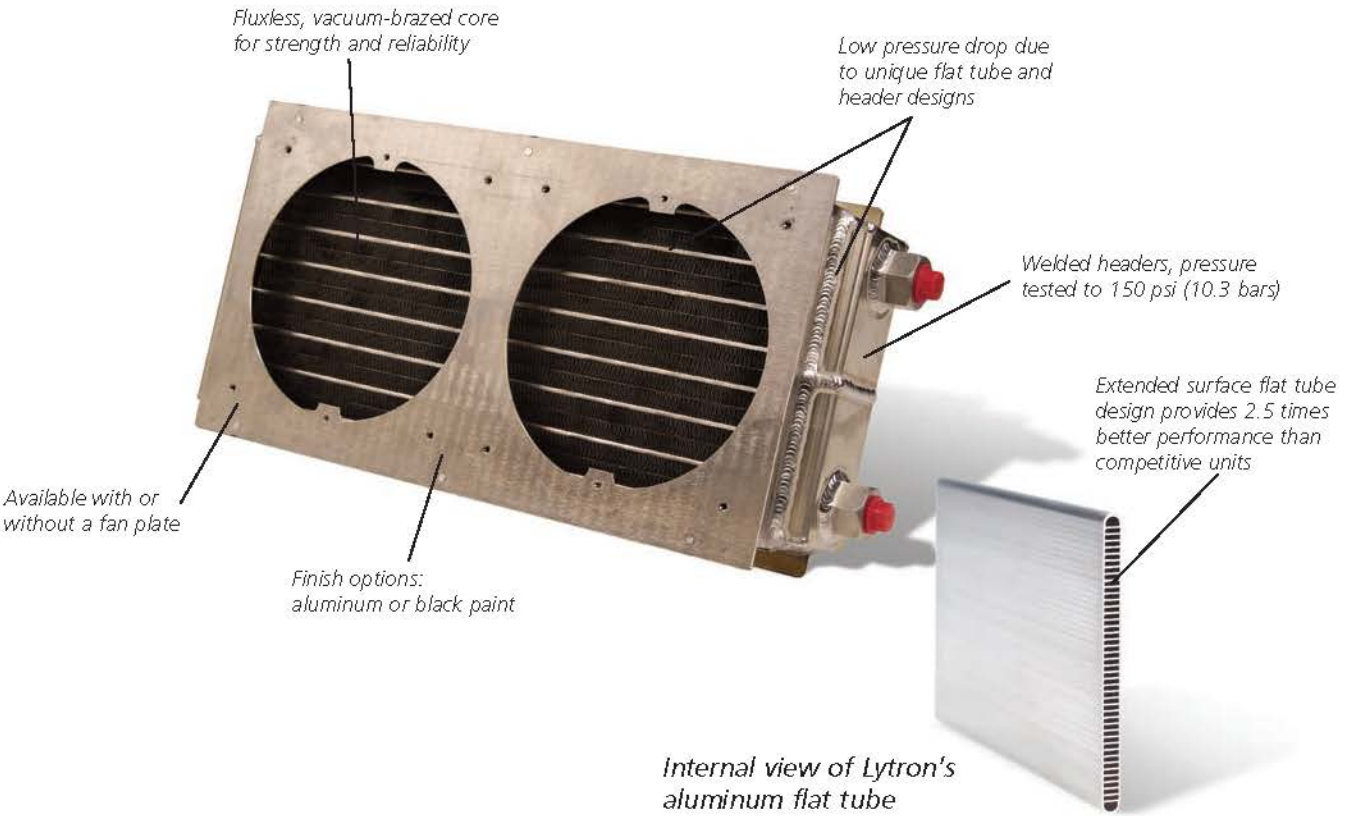
Fan Specifications

Description	Size	Voltage	Current		Fan Part Number	Fingerguard Part Number	Fan Plug Number
			50Hz	60Hz			
Muffin XL	4.71″ (120 mm) square	115	0.20	0.18	102076	101467	101466
Muffin XL	4.71″ (120 mm) square	230	0.10	0.09	102076-01	101467	101466
Patriot	6.75″ (171.5 mm) round	115	0.27	0.26	101116-01	101116-03	101466
Patriot	6.75″ (171.5 mm) round	230	0.14	0.13	101116-02	101116-03	101466
Falcon	6.75″ (171.5 mm) round	115	0.48	0.50	102070-01	101116-03	101466
Falcon	6.75″ (171.5 mm) round	230	0.16	0.16	102070-02	101116-03	101466
Caravel	10.00″ (254 mm) round	115	0.48	0.50	100236-01	101434	101466
Caravel	10.00″ (254 mm) round	230	0.24	0.25	100236-02	101434	101466

Other Accessories

Item	Suitable for		Part Number
Push to connect adapters for • Materials: acetel bodies, nitrile o-rings, and acetel/stainless steel collets • Temp. range: -14 to 167°F (-25 to 75°C) for air; 33 to 140°F (0 to 60°C) for water. • Maximum pressure: 150 psi (10.3 bar) for air, 250 psi (1,724 kP) for water. • Packaging: 10 fittings per pack.	4105 4110 4120 4210 4220	Straight Union ⅜″ O.D.	430-0448
		Union Elbow ⅜″ tubing O.D.	102190-01
		Transition Union ⅜″ – ½″ tubing O.D.	102189-01
	4310 4320	Transition Union ½″ – ⅜″ tubing O.D.	102189-01
		Union Elbow ½″ tubing O.D.	102190-02
Tube to Hose Adapter Requires a push-to-connect adapter of the same OD to mate with heat exchanger.		⅜″ tubing O.D. to ⅜″ hose barb	102191-01
		½″ tubing O.D. to ⅜″ hose barb	102191-02
		½″ tubing O.D. to ½″ hose barb	102191-03

SELECT 89
GRAPHS 74
DWG 76
SPECS 78
Standard Heat Exchangers



SELECT 89
GRAPHS 82
DWG 81
SPECS 83
Standard Heat Exchangers

NS Series oil coolers are engineered for high performance with poor heat transfer fluids such as oils and EGW. They provide up to 2.5 times greater thermal performance per unit volume than competitive models.

- **High performance:** The NS Series uses Lytron's unique aluminum flat tube technology, which has multiple extended surface channels in each tube. These tubes provide maximum cooling by having a large surface area in contact with the fluid (approximately 12 in^2 (77 cm^2)/linear inch of tube). Lytron's air-side fin geometry efficiently channels air across the fin surface to further boost heat transfer capability.
- **Clean and reliable:** The fluxless vacuum-brazed construction results in a clean, rugged, and highly reliable part with excellent thermal contact and mechanical strength.
- **Low pressure drop:** Our flat tube fluid channels and efficient header manifold result in a very low pressure drop so smaller, less expensive pumps can be used.
- **Lightweight:** The all-aluminum, vacuum-brazed construction is lightweight.

Custom oil cooler with curved tubes

Customization Options

Oil coolers can be manufactured in different sizes and tube widths, and with custom inlet/outlet configurations. Curved heat exchangers can be manufactured as the flat tube can be bent without buckling or damaging the internal channels. Assemblies including fans and other components can also be supplied.

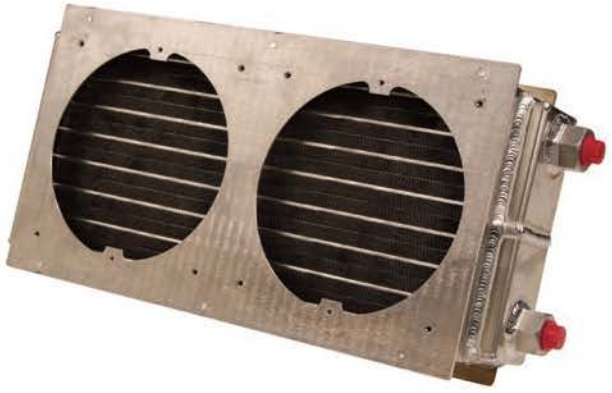
See page 92 for more custom heat exchangers.

NS 0505[1]

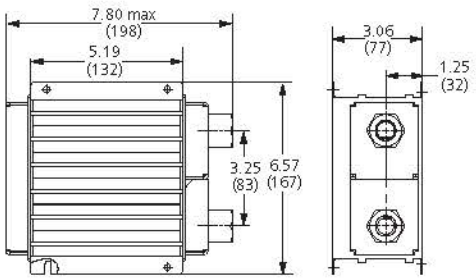
NS 0510

NS 0707

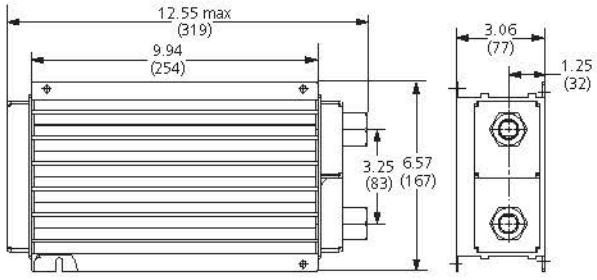
NS 0714[2]



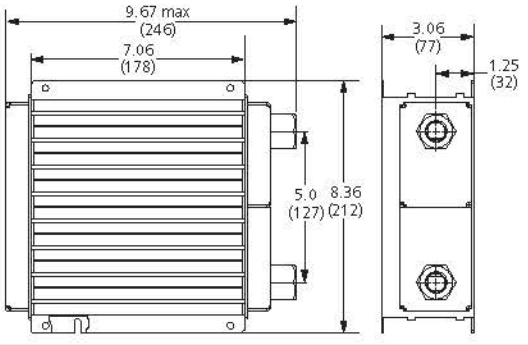
NS 0505



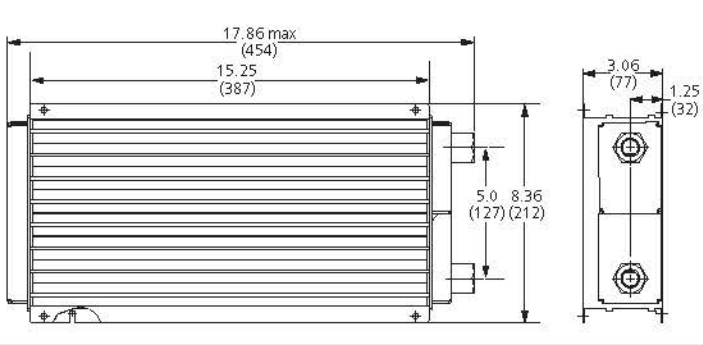
NS 0510



NS 0707



NS 0714

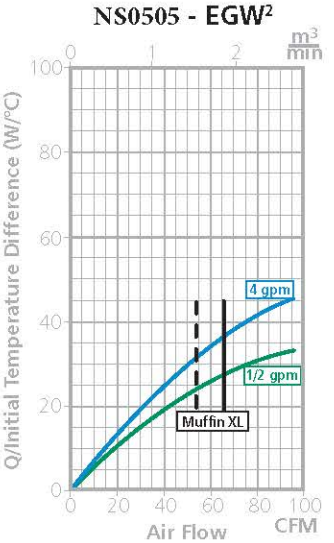


[1] Includes optional fan plate and black paint

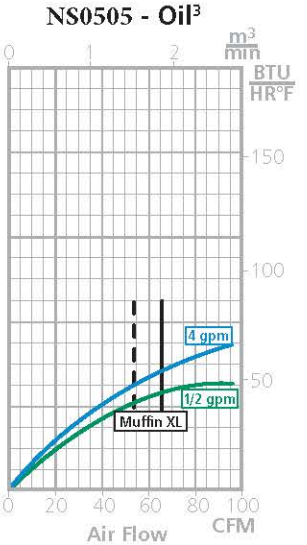
[2] Includes optional fan plate

Main dimensional label is inches. Dimension in parentheses is mm.

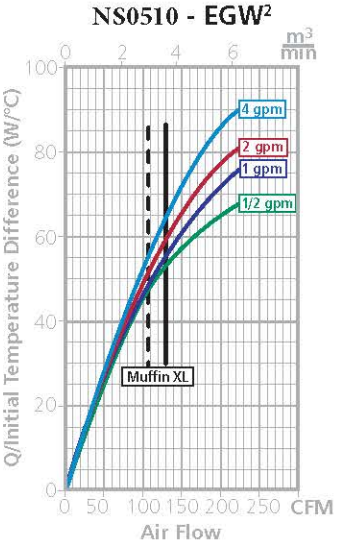
NS0505 - EGW[2]



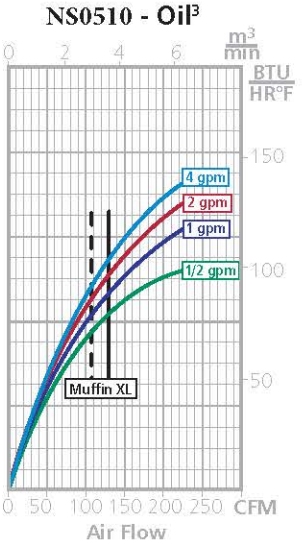
NS0505 - Oil[3]



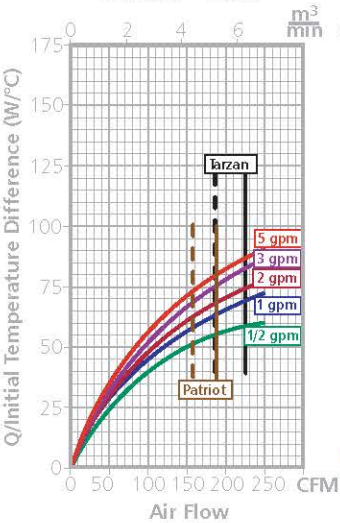
NS0510 - EGW[2]



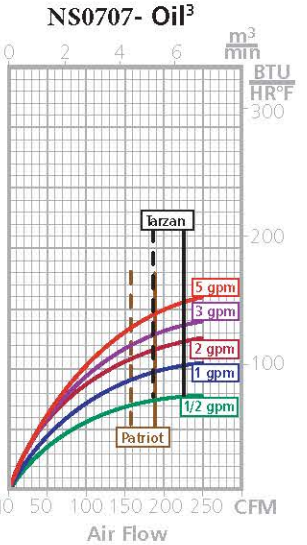
NS0510 - Oil[3]



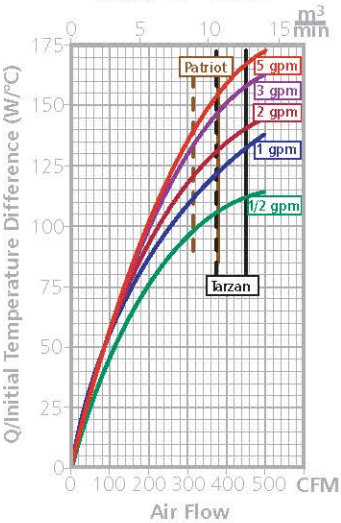
NS0707- EGW[2]



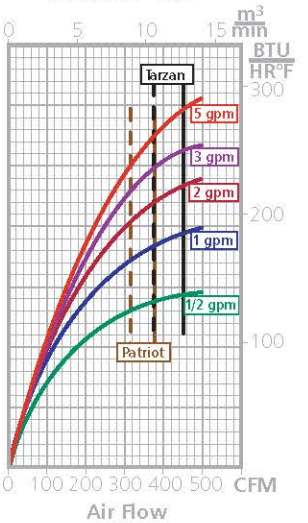
NS0707- Oil[3]



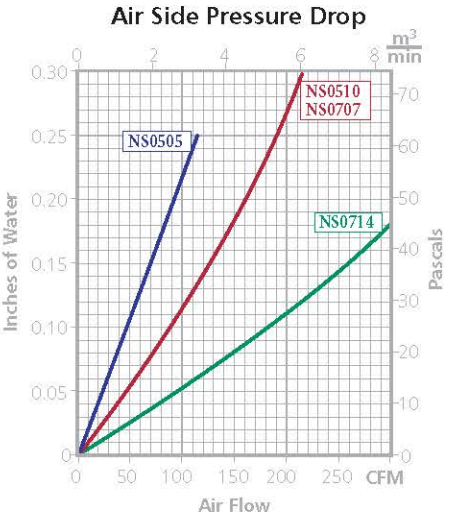
NS0714 - EGW[2]



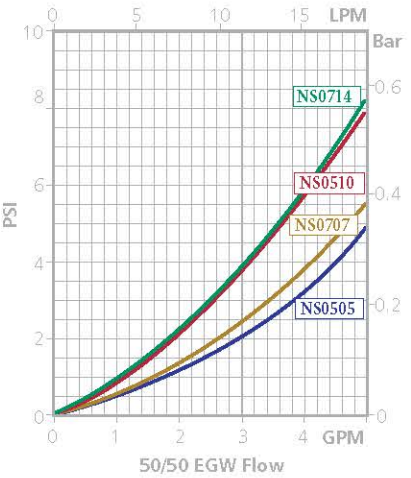
NS0714- Oil[3]



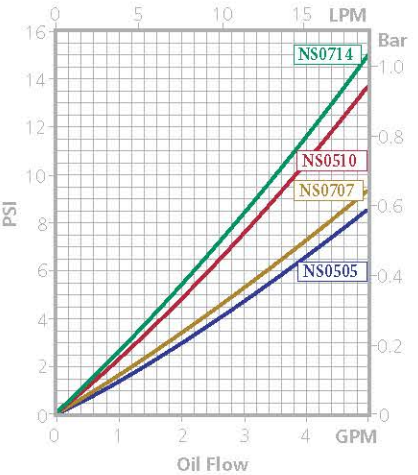
Air Side Pressure Drop



Liquid Side Pressure Drop - EGW



Liquid Side Pressure Drop - Oil



[1] The solid vertical lines indicate the performance provided by our standard fans at 60Hz and 70°F. Dashed lines represent fan performance at 50 Hz and 20°C.
[2] 50/50 EGW at 160°F. [3] Diala® at 170°F.

First select core number

Next, select an option

To arrive at a part number[1]

Finally, order fans if desired

Core Number		NS0505G	NS0510G	NS0707G	NS0714G
Fluid path		aluminum			
Fin material		aluminum			
Dry weight	lbs kg	2.0 0.91	2.85 1.30	2.85 1.30	5.53 2.51
Fluid volume	in^3 ml	14 229	17 278	24 393	31 508
Fittings (see page 88)		3/8 – 18 NPT			
Max. operating temp.		400°F/200°C			
Options					
21: no paint, no fan plate		•	•	•	•
22: black paint, no fan plate		•	•	•	•
23: no paint, fan plate attached		•	•	•	•
24: black paint, fan plate attached		•	•	•	•
Recommended Fans					
Muffin XL		•	•		
Patriot				•	•
Tarzan				•	•
# of fans		1	2	1	2

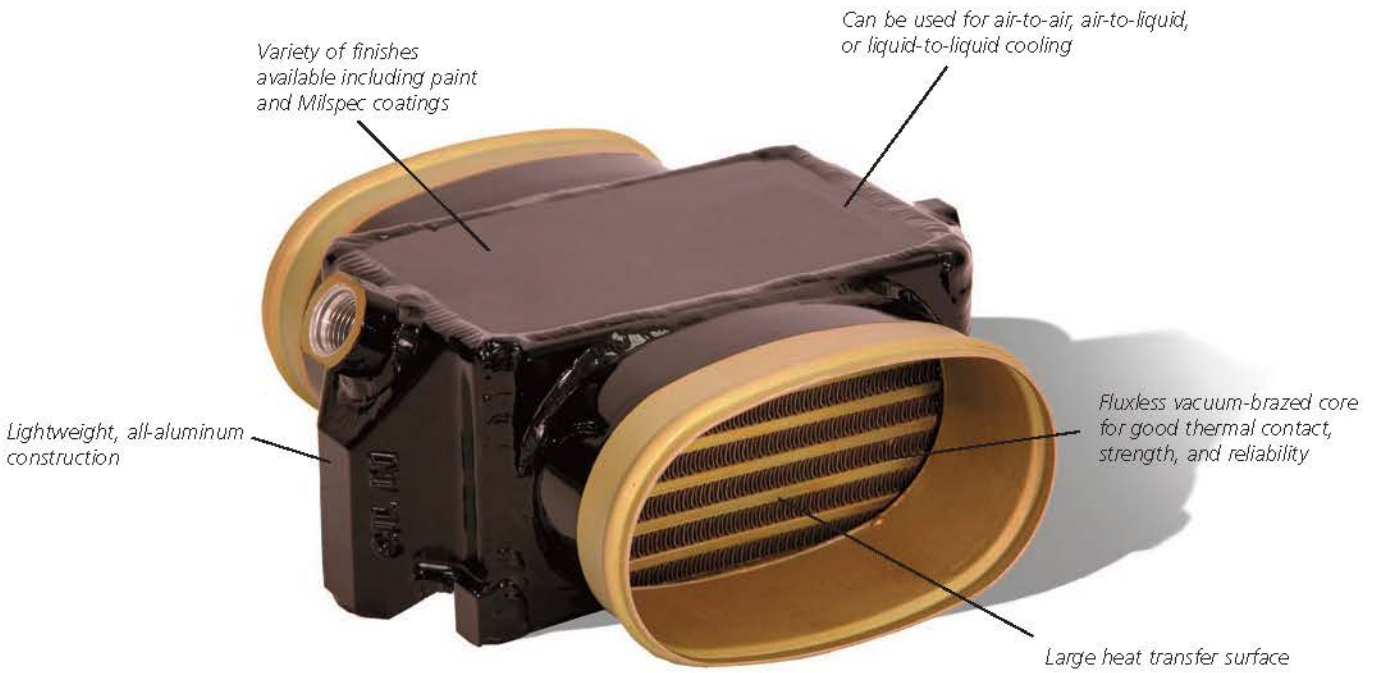
NS0510G24 EN0510 with black paint and fan plate attached

[1] *Note: fans, fan plugs, and fingerguards must be ordered separately. Assembly available on orders of 10+ pieces—ask for details.*

Fan Specifications

Description	Size	Voltage	Current		Fan Part Number	Fingerguard Part Number	Fan Plug Number
			50Hz	60Hz			
Muffin XL	4.71" (120 mm) square	115	0.20	0.18	102076	101467	101466
Muffin XL	4.71" (120 mm) square	230	0.10	0.09	102076-01	101467	101466
Patriot	6.75" (171.5 mm) round	115	0.27	0.26	101116-01	101116-03	101466
Patriot	6.75" (171.5 mm) round	230	0.14	0.13	101116-02	101116-03	101466
Tarzan	6.91" (175 mm) square	115	1.40	1.20	101578-01	101741	101466
Tarzan	6.91" (175mm) square	230	0.63	0.54	101578-02	101741	101466

SELECT 89
GRAPHS 82
DWG 81
SPECS 83
Standard Heat Exchangers



Aluminum vacuum-brazed plate-fin heat exchangers are widely used in military, aerospace, and other high performance applications because they offer excellent thermal transfer capacity combined with small size and weight. They are all custom designed as every requirement is different.

- **Superior performance:** This heat exchanger technology, which consists of finned chambers separated by flat plates, offers our highest thermal performance. The plates and fins create a large surface area for heat transfer, and the fins create turbulence in the fluid to further improve performance.
- **Lightweight:** The all-aluminum construction offers superior performance/weight ratio.
- **Completely customizable:** All our plate-fin products are custom designed so that we can supply you with the most efficient, compact, and lightweight part possible. The number of plate and fin layers, the size of the plates and fin, the height of the fin, and the type of fin are carefully selected for optimum performance. Manifold ducting and mounting brackets are welded in place as required, and a wide variety of paint, Milspec, and other coatings are available. Contact us to discuss your requirements.
- **High reliability and cleanliness:** The plates and fin are assembled in an environmentally-controlled room for maximum reliability and cleanliness. Also, our numerically controlled vacuum brazing process and robust fixture designs ensure complete metallurgical bonding between the fins and separator plates for ruggedness and quality.
- **Custom testing/certification:** Complete shock and vibration testing and agency approvals are also available.

Custom titanium plate-fin heat exchanger

Now Available in Titanium

We have developed the technology to make titanium plate-fin heat exchangers. These combine excellent thermal performance, high strength, and light weight and can be used at temperatures up to 1000°F (537°C), overcoming the temperature limitation of aluminum products.

See page 92 for more custom heat exchangers.

Internal view of liquid-to-liquid brazed plate heat exchanger

SELECT 89
GRAPHS 87
DWG 86
SPECS 87

Our brazed-plate heat exchangers are unsurpassed for liquid-to-liquid heat transfer. Their innovative design packs maximum performance into a compact and reliable package.

- **High performance in a small package:** Our liquid-to-liquid heat exchangers are up to 80-90% smaller in volume and weight than a conventional shell-and-tube design. The counterflow design utilizes stainless steel sheets stamped with a herringbone pattern of grooves, stacked in alternating directions to form separate flow channels for the two liquid streams. This allows 90% of the material to be used for heat transfer, making it extremely efficient.
- **High reliability:** The plates are brazed together at the edges and at a matrix of contact points between sheets, ensuring that the heat exchangers are highly reliable and rugged.
- **Copper- and nickel-brazed versions for compatibility with a wide range of fluids:** We offer copper-brazed units for use with water, EGW, and other common coolants. Our nickel-brazed units are appropriate for use with deionized water, high purity, and corrosive fluids.
- **High operating temperatures and pressures:** Copper-brazed units can be operated at temperatures of up to 383°F (195°C) and pressures up to 450 psig (31 bar). Nickel-brazed units can be operated at temperatures of up to 662°F (350°C) and pressures up to 232 psig (16 bar).

Liquid-to-liquid heat exchanger subassembly with custom hoses and fittings

Customization Options

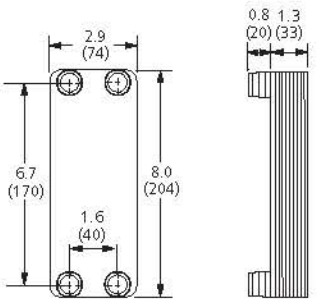
Liquid-to-liquid heat exchangers can be supplied as subassemblies with fittings, hoses, and other accessories.

See page 92 for more custom heat exchangers.

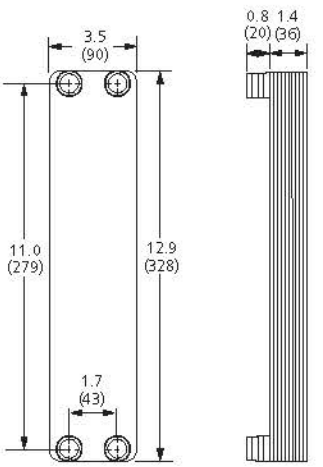
LN510 and LN520

LN810 and LN820

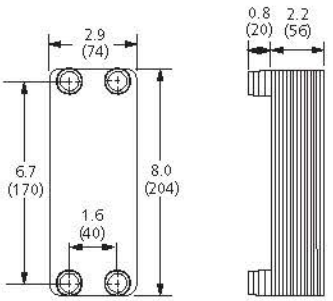
LN510



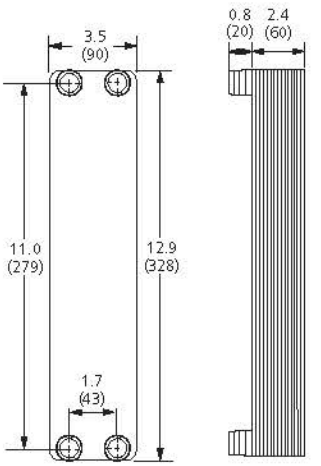
LN810



LN520



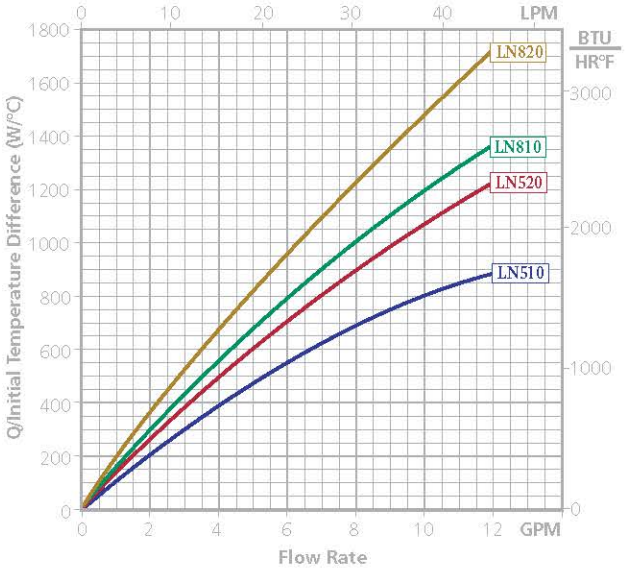
LN820



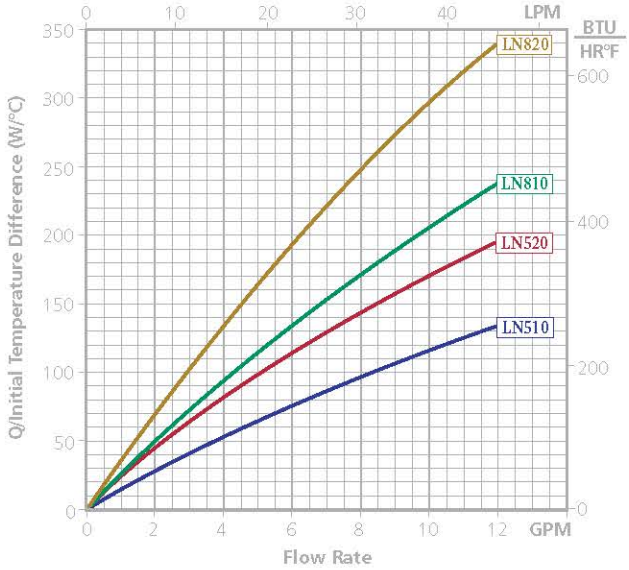
Performance

The performance of our liquid-to-liquid heat exchangers vary with the fluid type, flow rate, and temperature of each fluid. The charts below show the thermal performance for water and water (left) and water and oil (right).

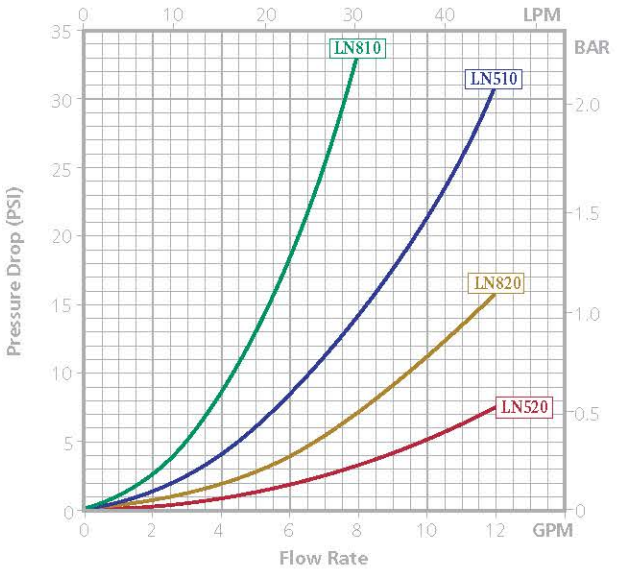
Thermal Performance Using Water and Water



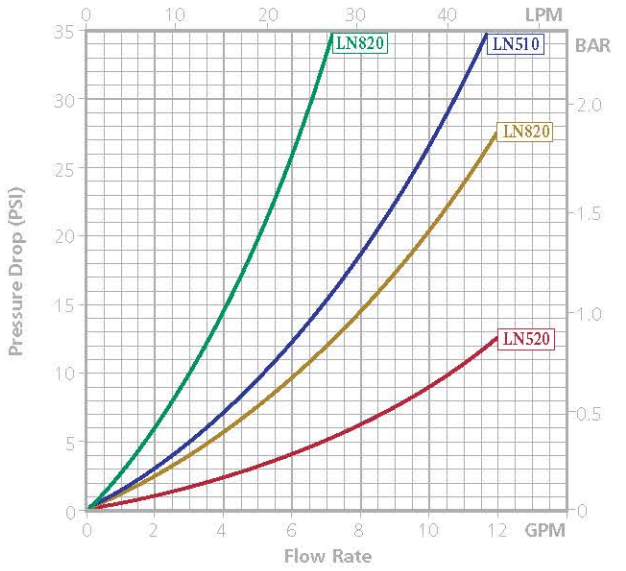
Thermal Performance Using Water and Oil



Pressure Drop Using Water



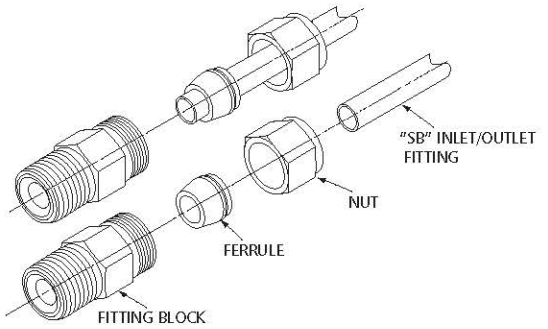
Pressure Drop Using Oil



Part Numbers

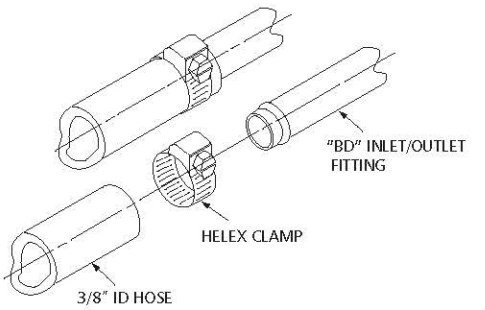
Core Number		LN510G12	LN520G12	LN810G12	LN820G12	LN510G14	LN520G14	LN810G14	LN820G14
Plate material		AISI 316L stainless steel							
Braze material		copper 99.9%				nickel 99.7%			
Number of plates		10	20	10	20	10	20	10	20
Dry Weight	lbs	2.6	3.7	4.9	6.7	2.6	3.7	4.9	6.7
	kg	1.2	1.7	2.1	2.9	1.2	1.7	2.1	2.9
Fittings		¾" MNPT							
Max. operating pressure		450 psi/31 bar				232 psi/16 bar			
Max. operating temp.		383°F/195°C				662°F/350°C			
Min. operating temp.		-319°F/-195°C							
Max. flow rate		20 gpm/76 lpm							

SB Fitting–Stub End



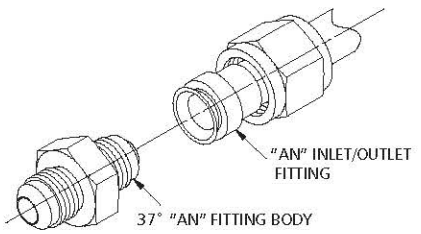
A unit with a straight tube fitting can be welded into your system or used with a ⅜″ self-locking torque-free fitting such as Swagelok® or Cajon™.

BD Fitting–Beaded End



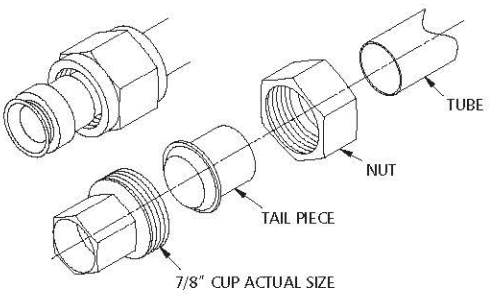
For a leak-free joint, Lytron's beaded tube fitting mates with a ⅜″ ID hose that is secured with a clamp.

AN Fitting–37°AN Flare



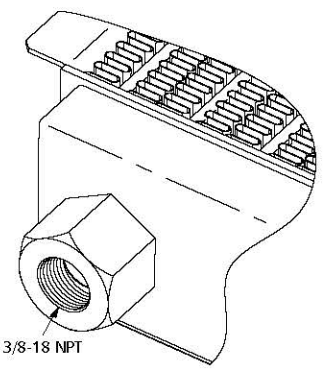
Our AN fitting, 37° AN female flare nut (AN-818), mates with male JIC-SAE 37° flare fitting, 9/16-18 UN/UNF-2A thd for ⅜″ tubing and ¾-16 UN/UNF-2A thd for ½″ tubing.

AN Fitting on EN6340



Note: the AN fitting on the EN6340 is an 0.875″ I.D. actual union and tail piece only.

ES Series Fitting



The fitting on our ES Series oil coolers is a ⅜-18 NPT thread.

1. Cooling Liquid

In order to select the correct heat exchanger or oil cooler, you must first determine the required thermal performance for your application. Use the example shown below:

Step 1: Application Data

Liquid type:	Water
Required heat load (Q):	3,300 W (11,263 BTU/Hr)
Temp. of incoming liquid ($T_{liquid\ in}$):	80°C (176°F)
Temp. of incoming air ($T_{air\ in}$):	21°C (70°F)
Rate of liquid flow:	2 gpm (7.6 lpm)

Step 2: Select the heat exchanger product series

Choose an aluminum, copper, or stainless steel heat exchanger based on the fluid compatibility. Aluminum tubing is usually used with light oils, or ethylene glycol and water solutions. Copper is normally used with water. Stainless steel is used with deionized water or corrosive fluids.

Step 3: Calculate the initial temperature difference

Subtract the temperature of the incoming air from the temperature of the incoming liquid as it enters the heat exchanger.

$ITD = T_{liquid\ in} - T_{air\ in}$
$= 80°C - 21°C = 59°C$ (or $176°F - 70°F = 106°F$)

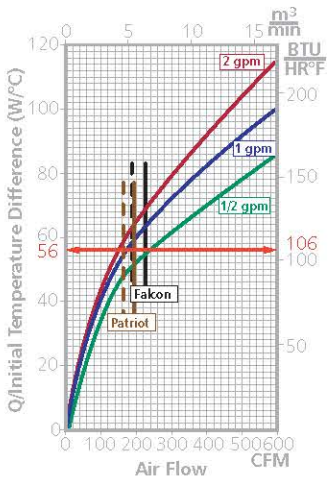
Step 4: Calculate the required performance capability (Q/ITD)

Divide the required heat load (Q) by the ITD found above in step 3.

$$\text{Performance capability} = \frac{Q}{ITD} = \frac{3{,}300\ W}{59°C} = 56\ W/°C \text{ or } \frac{11{,}263\ BTU/HR}{106°F} = 106\ BTU/Hr°F$$

Step 5: Select the appropriate heat exchanger model

Refer to the thermal performance graphs for the heat exchangers selected (Performance graphs for copper heat exchangers, stainless steel heat exchangers, and oil coolers can be found on pages 64, 74, and 82 respectively.) Any heat exchanger that exceeds 56 W/°C at 2 gpm (using a standard fan) would be acceptable. As shown in the following graph, EN6210 exceeds the required performance.



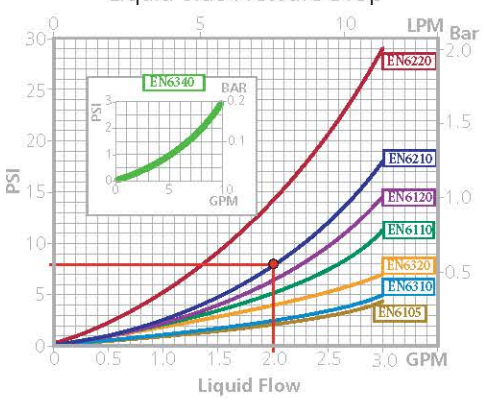
Step 6: Determine the liquid pressure drop

From the data given, we know our pump needs to supply water at 2 gpm. Using the liquid side pressure drop chart for the EN6210 curve, the point where a vertical line at the 2 gpm point on the x-axis intersects with the 6210 curve reveals that the liquid pressure drop through the EN6210 is 8 psi (0.55 bars). The pump selected must overcome this pressure drop to ensure a 2 gpm flow.

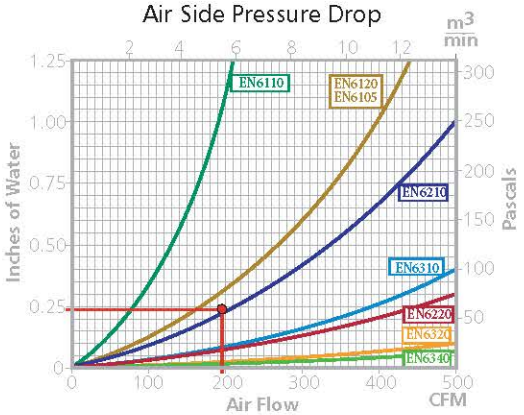
Step 7: Determine the air pressure drop

The vertical line on the thermal performance chart indicates the air flow rate (190 CFM for the Patriot fan) as provided by our standard fans at 60 Hz. The intersection point of this air flow rate and the 6210 graph on the air side pressure drop reveals that the air side pressure drop through the 6210 is 0.24 inches of water (55 pascals).

Liquid Side Pressure Drop



Air Side Pressure Drop



2. Cooling Air

In cabinet cooling applications, the air is hotter than the liquid. In this case, the ITD is the difference between the hot air entering the heat exchanger and the cold liquid entering the heat exchanger. You may need to calculate the temperature rise using the heat load and the temperature of the cool air entering the cabinet.

Example: Cabinet Cooling application

You are cooling a cabinet containing electronic components that generate 2400 W of heat. The air in the cabinet must not exceed 55°C. What heat exchanger should be selected, and what is the temperature of the cool air entering the electronics cabinet?

Step 1: Application Data

Liquid type:	Water
Required heat load (Q):	2,400 W (8,189 BTU/Hr)
Temp. of incoming liquid ($T_{liquid\ in}$):	20°C
Max. temp of air in cabinet ($T_{air\ in}$):	55°C (131°F) —— *This is the temperature of the hot air entering the heat exchanger*
Rate of liquid flow:	2 gpm (7.6 lpm)

Step 2: Calculate the initial temperature difference

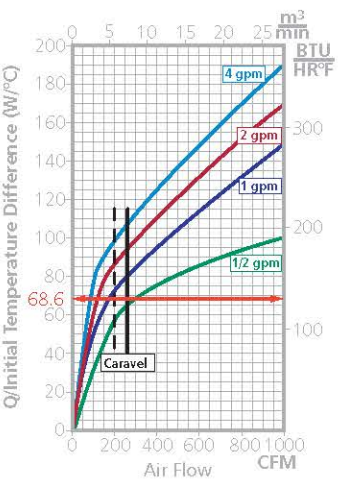
Subtract the temperature of the incoming liquid from the temperature of the incoming air as it enters the heat exchanger.

$ITD = T_{air\ in} - T_{liquid\ in} = 55°C - 20°C = 35°C$ (or 131°F – 68°F = 63°F)

Step 3: Calculate the required performance capability (Q/ITD)

Divide the required heat load (Q) by the ITD found above in step 2.

$$\text{Performance capability} = \frac{Q}{ITD} = \frac{2{,}400\ W}{35°C} = 68.6\ W/°C \text{ or } \frac{8{,}189\ BTU/HR}{63°F} = 130\ BTU/HR°F$$



Step 4: Select the appropriate heat exchanger model

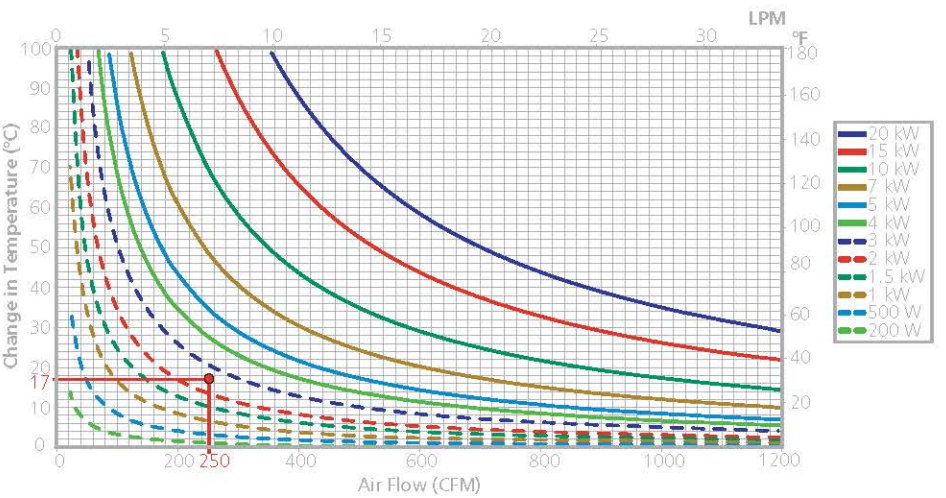
Refer to the thermal performance graphs for the heat exchangers selected (Performance graphs for copper heat exchangers, stainless steel heat exchangers and oil coolers can be found on pages 64, 74, and 82 respectively.) Any heat exchanger that exceeds 68.6 W/°C at 2 gpm (using a standard fan) would be acceptable. Using water as the coolant, a copper heat exchanger is recommended. As shown in the following graph, Lytron's 6310 exceeds the required performance, offering a Q/ITD of approx. 96 W/°C using our Caravel fan.

Liquid and air pressure drop can be determined the same way as in the previous example.

Step 5: Calculating the temperature of the cool air entering the cabinet

Now, to calculate the temperature of the cool air entering the cabinet, use the temperature change graph for air (page 96). With a heat load of 2,400 W, and a flow rate of 250 CFM (the flow rate of the standard Caravel fan recommended for use with the 6310) we can see that the temperature change is 17°C. This means that the cool air entering the cabinet will be:

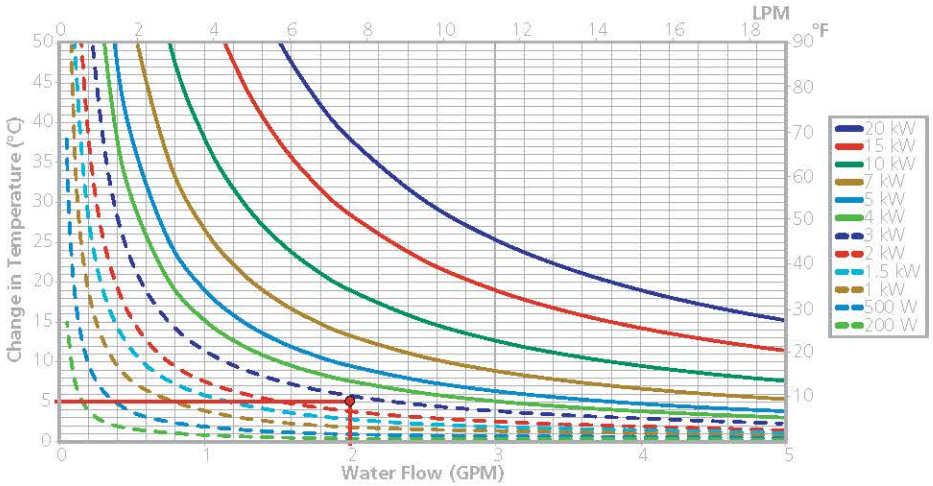
55°C – 17°C = 38°C



[1] These graphs offer a simple graphical way of estimating fluid temperature change if you know your heat load and flow, without having to do calculations. The graphs for water, air, 50/50 ethylene glycol/water and oil allow you to calculate temperature changes for air and liquid for all types of heat exchangers.

Step 6: Calculating the outgoing water temperature

To determine the outgoing temperature of the water we use the 'Water Flow' chart to find that the change in temperature is approximately 5°C. Therefore the outgoing water temperature is 20°C + 5°C = 25°C.



Alternative Sizing Equation

The general heat transfer equation can be used to calculate the heat load and the fluid temperature change given the fluid flow rate and the specific heat.

$$Q = \dot{m} \times C_p \times \Delta T$$

Where:
- Q = heat load
- $\dot{m}$ = mass flow rate of the fluid
- C_p = specific heat of the fluid
- ΔT = temperature difference between the liquid in and the liquid out

$\dot{m}$ can be calculated for water and air using the following equations:

Water: $\dot{m}\left(\frac{lbs}{hr}\right) = \dot{v}\left(\frac{gal}{min}\right) \times \left(\frac{60\ min}{hr}\right) \times \rho\left(\frac{lbs}{ft^3}\right) \times \left(\frac{ft^3}{7.5\ gal}\right)$ where $\dot{v}$ = volumetric flow rate

or

Water: $\dot{m}\left(\frac{kg}{hr}\right) = \dot{v}\left(\frac{liters}{min}\right) \times \left(\frac{60\ min}{hr}\right) \times \rho\left(\frac{kg}{m^3}\right) \times \left(\frac{m^3}{1{,}000\ liters}\right)$ where $\dot{v}$ = volumetric flow rate

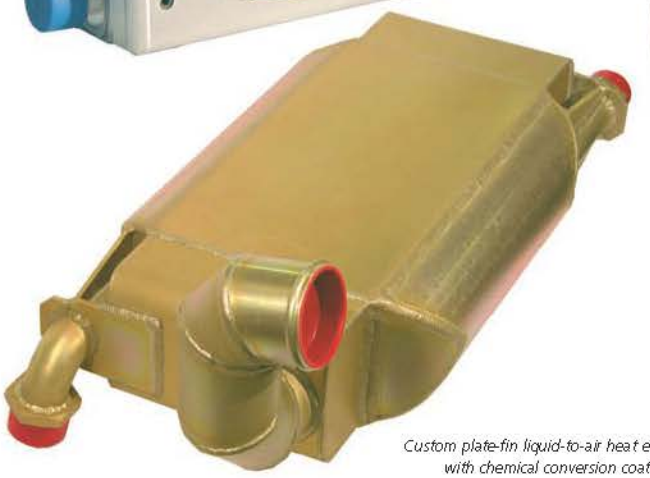
Air: $\dot{m}\left(\frac{lbs}{hr}\right) = \dot{v}\left(\frac{ft^3}{min}\right) \times \left(\frac{60\ min}{hr}\right) \times \rho\left(\frac{lbs}{ft^3}\right)$

or

Air: $\dot{m}\left(\frac{kg}{hr}\right) = \dot{v}\left(\frac{m^3}{min}\right) \times \left(\frac{60\ min}{hr}\right) \times \rho\left(\frac{kg}{m^3}\right)$

The temperature change graphs on pages 96 and 97 plot the above equation for common heat transfer media (air, water, oil, and a 50% EGW mixture) providing a simple way to look up ΔT if you know your heat load and fluid flow rate.

High capacity oil cooler



Custom plate-fin liquid-to-air heat exchanger with chemical conversion coating

Heat exchanger with stainless steel tubes and nickel fin

Custom heat exchangers for every application

With 50 years of experience designing and building heat exchangers for performance-critical applications, our expertise is second-to-none. We have designed and built small ultra-lightweight plate-fin heat exchangers for airborne military applications, large flat-tube oil coolers for medical equipment, stainless steel tubed heat exchangers for lasers, and everything in between. Our strong engineering expertise and experience with all of the thermal components in a liquid cooling loop makes us the ideal partner for all your heat exchanger needs.

Our streamlined design process relies on a combination of advanced modeling and analysis software, and hundreds of man-years of experience. Our heavy investment in engineering results in designs that not only meet your performance and size requirements, but are also reliable and cost effective to build. With design and manufacturing housed under the same roof, products transition smoothly from design, through prototyping, to production. We carry out all performance-critical manufacturing processes in-house, from fin stamping, machining, and tube bending to vacuum brazing and heat treating. This guarantees us total control over the finished product, as well as increased flexibility and shorter lead times.

Our engineering laboratory and well-equipped, in-house test facility enable us to fully test and validate all our custom heat exchangers. Our facilities include three wind tunnels (including a 21,000 CFM test tunnel that can accommodate parts up to 6´ x 6´ (1.8 m x 1.8 m)), flow stations, data acquisition stations, refrigeration test equipment, and various flow, temperature, and pressure instruments. Complete shock/vibration testing and agency approvals are also available.

Getting started

Your design will benefit the most by involving us early in the engineering process. While our continual investment in capital equipment for our factory enables us to competitively bid 'build-to-print' jobs, when we design to a performance specification you realize the greatest cost savings. Get started today by calling your sales engineer, or filling out the 'Request a Heat Exchanger Quote' form on our website.

Custom cupronickel tube-fin heat exchanger

Custom tube-fin heat exchangers

The building blocks of a tube-fin heat exchanger are tubes, fin, and frame. We have a variety of fin patterns to choose from, and can customize the tube configuration and frame. We frequently work with specialty materials, such as cupronickel, nickel, Hastelloy®, and Inconel®. To meet the stringent shock and vibration requirements of some military applications, we can provide ruggedized frames and fluid connections, and insert additional tube sheets as supporting elements within the core. Paints and coatings, including Milspec paints, are available. Fluid inlets and outlets can be customized with bends, fittings, hoses, etc., and additional sensors and instrumentation can also be added.

Custom oil coolers

Our vacuum-brazed, flat tube oil coolers offer many customization possibilities. Three different flat tube widths are available, and the length and the number of tubes can be varied. The flat tube can be bent into a ⅜" (3 mm) inside radius without buckling, so heat exchangers can be manufactured in a curved shape if needed. Custom fittings and manifolds can be added, and oil coolers can be painted or anodized for extra protection.

Custom oil cooler with curved tubes

Miniature 3"(8 cm) heat exchanger with Chemfilm® coating

Large 4' (1.2 m) heat exchanger with nickel tubes and copper fin

Commercial condenser with single-piece aluminum flat tube

Aircraft oil cooler

Air-to-air plate-fin inner cooler

Titanium plate-fin heat exchangers

Heat exchanger subassembly with integrated fans

Custom plate-fin heat exchanger with paint and chemical conversion coating

Custom plate-fin heat exchangers

All our aluminum, vacuum-brazed, plate-fin heat exchangers are custom-designed, as every requirement is unique. They are widely used in military, aerospace, and other high performance applications because they offer excellent thermal transfer capacity combined with small size and weight. Plate-fin heat exchangers can be designed for use with any combination of gas, liquid, and two-phase fluids.

We carefully select the number of plate and fin layers, the size of the plates and fin, the height of the fin and the type of fin for optimum performance. The core is assembled and vacuum brazed in our environmentally-controlled room to ensure high quality and reliability. Manifold ducting and mounting brackets are welded in place as specified, and any required paint or coating (including Milspec) added.

We also offers titanium plate-fin heat exchangers for high temperature operation. Titanium heat exchangers offer performance similar to stainless steel or nickel-alloy plate-fin heat exchangers, but at 30-50% the weight.

Clear anodized heat exchanger subassembly including fan and temperature sensor

Value-added assemblies

Our extensive experience in the design and build of complete cooling systems and subassemblies makes us your ideal partner when you need to add components such as fans, sensors, fittings, and hoses. We can add whatever accessories you need, or build your entire subassembly, so that your heat exchanger arrives ready to drop into your system. This saves you time and effort.