



E-ZEE FLOW™ MARINE SERIES

MARINE ALLOY HEAT EXCHANGERS

INNOVATIVE PRODUCT SOLUTIONS

The DHT Marine Series is a line of completely welded, shell and tube heat exchangers made entirely of NICROM-24, a super austenitic marine alloy. Its compact structure is an integration of innovative material with detailed engineering for effective use with high fluid velocities and low pressure drops, designed specifically for the salt water pool market.

The versatility of this robust straight tube design covers a comprehensive range of capacities, suitable for all residential and commercial applications.

NICROM-24

NICROM-24 is a super austenitic alloy that for the past two decades has been tested and used in marine environments around the world.

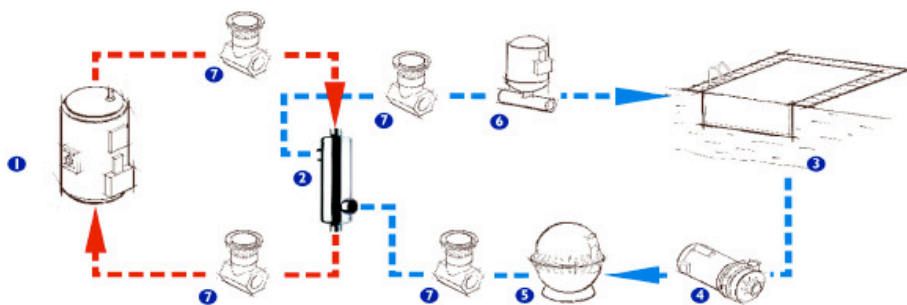
A low carbon, high purity, nitrogen-bearing alloy, it was originally engineered to be a seawater resistant material, but has since proven to be resilient in a wide range of corrosive environments.

OTHER MATERIALS: E-ZEE FLOW Heat Exchangers are also available in Stainless Steel for chloride pools and non-corrosive water conditions - 45,000 to 1 million BTU's. And they are available in Titanium as well.

MODELS	Surface Area	Overall Length	Shell OD	Connections	
	(ft ²)	(in)	(in)	Tubeside	Shellside
NPH-180	4.7	15.3	4.1	1" NPT	1.5" NPT
NPH-300	9.0	25.1	4.1	1" NPT	1.5" NPT
NPH-500	16.8	42.9	4.1	1" NPT	1.5" NPT

DESIGN PRESSURE: 150 PSI DESIGN TEMPERATURE: 406 °F
MATERIAL OF CONSTRUCTION: NICROM-24

TYPICAL POOL INSTALLATION



- 1 Boiler 2 Heat exchanger 3 Swimming Pool 4 Pump
- 5 Filter 6 Chlorine Feeder 7 Gate Valve



- Boiler/Heating Circuit through the TUBE SIDE
- Pool Circuit through the SHELL SIDE
- Connect in counter-current flow to achieve maximum effectiveness

TYPICAL APPLICATIONS

- Salt water swimming pools, spas, hot tubs
- Marine oil coolers
- Transmission and engine coolers
- Boiler sample coolers
- Waste water heat recovery

DISTINCT ADVANTAGES

- Superior corrosion resistance provides protection for salt water and other marine applications.
- High erosion corrosion resistance suitable for applications with high fluid velocities.
- High material strength for quality performance and long product life.



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SEAWATER ENVIRONMENT

Seawater environments are very corrosive due to their high concentration of chloride salts, dissolved oxygen, and carbon dioxide. In stagnant or polluted conditions, additional corrosive elements such as ammonia or sulfide ions are present. Such environments are damaging to the structural integrity of traditional copper-based alloys, and enhance the potential for localized pitting, crevice corrosion and chloride stress-corrosion cracking (SCC) in stainless materials.

NICROM-24 CORROSION RESISTANCE

Elevated levels of chromium, molybdenum, and the addition of nitrogen enhance the strength and resistance of NICROM-24 to chloride pitting, crevice corrosion, and SCC, making it the ideal material for use in such environments. Its chemical composition enables it to perform at levels only previously achieved by materials such as titanium.

Consistently, NICROM-24 has demonstrated its superior performance and strength over other commercially marketed 'marine alloys', such as 90/10 CuNi and 254SMo®, and is highly valued for use in the fabrication of seawater and salt water heat exchangers.

Material	PREn	Crevice Corrosion in Seawater (% of Sites Attacked)
254SMo®	46.8	6
NICROM-24	47.7	0

Pitting Resistance Equivalent number (PREn) of an alloy can be correlated to its chemical composition of chromium, molybdenum, and nitrogen, in terms of weight percentage.

Material	Corrosion ¹ (avg. mils/year)	Erosion Corrosion Rate ² (avg. mils/year)
90/10 CuNi	20.84	25.00
NICROM-24	0.00	1.00

1. Synthetic Seawater (pH=8.2) 168 hours at 149°F
2. 30 day exposure in natural seawater at 48-59°F

ALLOY STRENGTH COMPARISONS

Alloy	Min. Tensile Strength (Mpa)	Max. Stress @ 200 °F (Mpa)
90/10 CuNi	275	65.5
SS316	483	97.9
254SMo®	648	164.8
NICROM-24	690	180.6

254SMo® is a registered trademark of Avesta Sheffield AB

At DHT, we are committed to providing exceptional service and high quality heat exchangers for our valued clients. Our technical expertise, wide range of product design offerings, and readily available stock, enable us to be your sole source supplier of heat exchangers, and custom designed heat transfer solutions.



Diversified Heat Transfer, Inc.

Manufacturers and Designers Since 1938

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HEAT EXCHANGER SELECTION TABLE FOR QUICK SIZING REFERENCE

Swimming Pool

Hot Side: Boiler Water 180°F - 160°F

Pool Side: Maintained at 84°F

Pool Capacity Gallon	Boiler Output (Btu/hr)	1°F/hr Heat rise	Boiler Output (Btu/hr)	2°F/hr Heat rise
		Heat Exchanger Model		Heat Exchanger Model
8,000	67,000	NPH-180	134,000	NPH-180
10,000	83,000	NPH-180	166,000	NPH-180
12,000	100,000	NPH-180	200,000	NPH-300
14,000	117,000	NPH-180	234,000	NPH-300
16,000	133,000	NPH-180	266,000	NPH-300
18,000	150,000	NPH-180	300,000	NPH-300
20,000	166,000	NPH-180	332,000	NPH-500
22,000	182,000	NPH-300	364,000	NPH-500
24,000	200,000	NPH-300	400,000	NPH-500
26,000	215,000	NPH-300	430,000	NPH-500
28,000	232,000	NPH-300	464,000	NPH-500
30,000	248,000	NPH-300	496,000	NPH-500
32,000	265,000	NPH-300	530,000	2XNPH-300
34,000	282,000	NPH-300	564,000	2XNPH-300
36,000	298,000	NPH-300	596,000	2XNPH-300
38,000	315,000	NPH-500	630,000	2XNPH-300
40,000	331,000	NPH-500	662,000	2XNPH-300
42,000	348,000	NPH-500	696,000	2XNPH-500
44,000	364,000	NPH-500	728,000	2XNPH-500
60,000	497,000	NPH-500	994,000	2XNPH-500
80,000	662,000	2XNPH-300	1,324,000	3XNPH-500
100,000	830,000	2XNPH-500	1,660,000	4XNPH-500

Note: Table for reference only-contact DHT for specific sizing information.

HEAT EXCHANGER NOMINAL PERFORMANCE VALUES

Model	Nominal Capacity		Water Flow			
			Hot Water		Cold Water	
	kW	Btu/Hr	PSIG	USGPM	PSIG	USGPM
NPH-180	53	180,000	0.4	7.93	1.1	55.48
NPH-300	88	300,000	0.9	10.57	2.5	79.25
NPH-500	146	500,000	1.3	14.53	3.2	95.1

Model	Heat Transfer Area		Connection Shell	Connection Tubes
	m2	ft2	in	in
NPH-180	0.44	4.7	1-1/2"	1"
NPH-300	0.84	9	1-1/2"	1"
NPH-500	1.56	16.8	1-1/2"	1"

Design Parameters	TUBES	SHELL
TEMPERATURE	406°F (208°C)	406°F (208°C)
PRESSURE	150 PSI (1.03MPa)	150 PSI (1.03MPa)