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صلاحیت، انرژی، کیفیت

HELICAL COIL HEAT EXCHANGER

COMPACT HIGH-EFFICIENCY
HEAT TRANSFER SOLUTION

مبدل حرارتی لوله مارپیچ

- COMPACT DESIGN
- HIGH HEAT TRANSFER
- CUSTOM ENGINEERED
- LIQUID–LIQUID SERVICE
- PROCESS HEATING & COOLING

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HOW IT WORKS

Helical Coil Heat Exchanger | Working Principle

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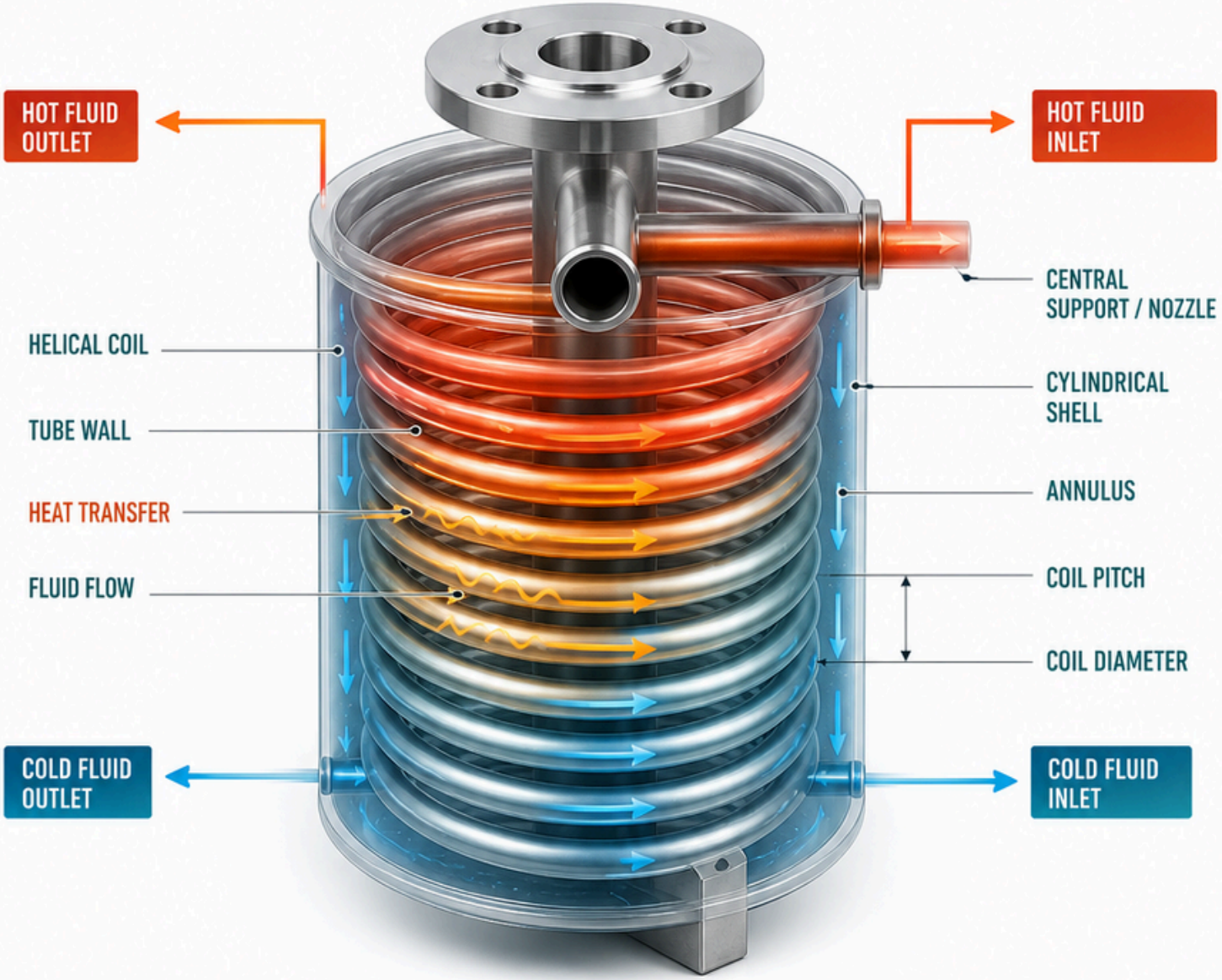
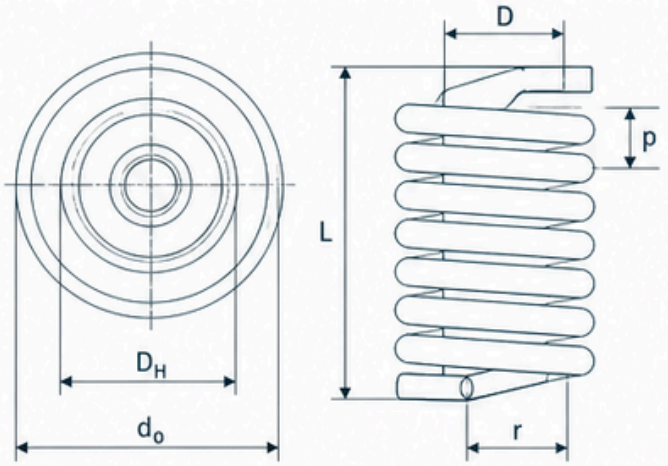


HELICAL COIL GEOMETRY



D = Inside Diameter of Tube
d_o = Outside Diameter of Tube
D_H = Average Diameter of Helix
p = Coil Pitch
r = Average Helix Radius
L = Helical Coil Length
N = Number of Turns

“در مبدل حرارتی لوله مارپیچ، یکی از سیالات درون کویل مارپیچ و سیال دیگر در فضای اطراف کویل جریان پیدا می کند. حرارت از طریق دیواره لوله منتقل شده و هندسه مارپیچی امکان ایجاد سطح انتقال حرارت مناسب در حجم نسبتاً فشرده را فراهم می کند.”

COMPACT GEOMETRY
+
EXTENDED FLOW PATH
+
EFFICIENT HEAT TRANSFER

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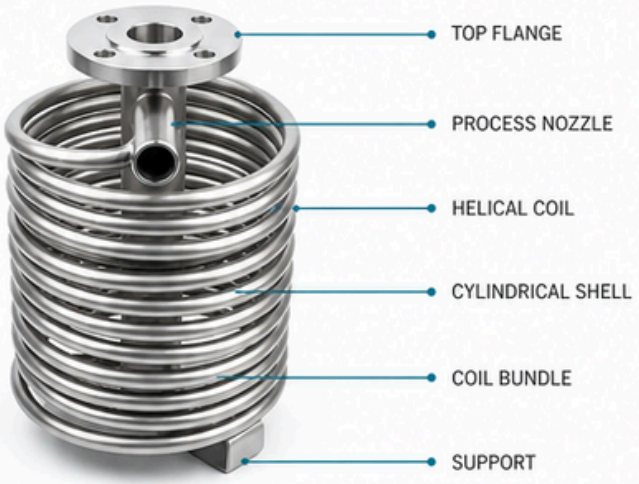
HELICAL COIL HEAT EXCHANGER

TECHNICAL SPECIFICATIONS



01 GENERAL CONFIGURATION

Equipment Type	HELICAL COIL HEAT EXCHANGER
Configuration	CUSTOM ENGINEERED
Heat Transfer Geometry	INDIRECT
Flow Arrangement	SHELL SIDE / COIL SIDE
Shell Geometry	CYLINDRICAL
Coil Geometry	HELICAL COIL
Construction	WELDED
Service	PROJECT SPECIFIC

04 PROJECT SPECIFIC FIELDS

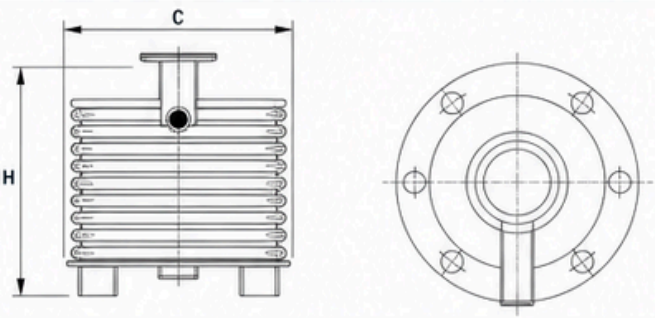
Heat Duty	TO BE DETERMINED BY THERMAL DESIGN
Flow Rate	TO BE DETERMINED BY THERMAL DESIGN
Operating Temperature	TO BE DETERMINED BY THERMAL DESIGN
Pressure	TO BE DETERMINED BY THERMAL DESIGN
Pressure Drop	TO BE DETERMINED BY THERMAL DESIGN
Tube Material	PROJECT SPECIFIC
Shell Material	PROJECT SPECIFIC
Tube Thickness	PROJECT SPECIFIC
Coil Diameter (D_H)	TO BE DETERMINED BY THERMAL DESIGN
Number of Turns (N)	TO BE DETERMINED BY THERMAL DESIGN

02 HELICAL COIL GEOMETRY

D	Tube Inside Diameter	mm	TO BE DETERMINED BY THERMAL DESIGN
d_o	Tube Outside Diameter	mm	TO BE DETERMINED BY THERMAL DESIGN
D_H	Average Helix Diameter	mm	TO BE DETERMINED BY THERMAL DESIGN
r	Average Helix Radius	mm	TO BE DETERMINED BY THERMAL DESIGN
p	Coil Pitch	mm	TO BE DETERMINED BY THERMAL DESIGN
L	Helical Coil Length	mm	TO BE DETERMINED BY THERMAL DESIGN
N	Number of Turns	–	TO BE DETERMINED BY THERMAL DESIGN
C	Shell Diameter	mm	TO BE DETERMINED BY THERMAL DESIGN
H	Cylinder Height	mm	TO BE DETERMINED BY THERMAL DESIGN
V_c	Coil Volume	m^3	TO BE DETERMINED BY THERMAL DESIGN
V_a	Annulus Volume	m^3	TO BE DETERMINED BY THERMAL DESIGN
V_f	Available Flow Volume	m^3	TO BE DETERMINED BY THERMAL DESIGN
D_e	Equivalent Diameter	mm	TO BE DETERMINED BY THERMAL DESIGN

03 THERMAL DESIGN PARAMETERS

Q	Heat Duty	W	TO BE DETERMINED BY THERMAL DESIGN
A	Heat Transfer Area	m^2	TO BE DETERMINED BY THERMAL DESIGN
U	Overall Heat Transfer Coefficient	$W/m^2 \cdot K$	TO BE DETERMINED BY THERMAL DESIGN
Δt_{lm}	LMTD	°C	TO BE DETERMINED BY THERMAL DESIGN
Δt_c	Corrected Temperature Difference	°C	TO BE DETERMINED BY THERMAL DESIGN
h_o	Shell-Side Heat Transfer Coefficient	$W/m^2 \cdot K$	TO BE DETERMINED BY THERMAL DESIGN
h_i	Coil-Side Heat Transfer Coefficient	$W/m^2 \cdot K$	TO BE DETERMINED BY THERMAL DESIGN
h_{io}	Coil-Side Coefficient Based on Outside Diameter	$W/m^2 \cdot K$	TO BE DETERMINED BY THERMAL DESIGN
R_a	Shell-Side Fouling Factor	$m^2 \cdot K/W$	TO BE DETERMINED BY THERMAL DESIGN
R_t	Tube-Side Fouling Factor	$m^2 \cdot K/W$	TO BE DETERMINED BY THERMAL DESIGN
k	Thermal Conductivity	$W/m \cdot K$	TO BE DETERMINED BY THERMAL DESIGN
ρ	Fluid Density	kg/m^3	TO BE DETERMINED BY THERMAL DESIGN
μ	Fluid Viscosity	Pa·s	TO BE DETERMINED BY THERMAL DESIGN
M	Mass Flow Rate	kg/s	TO BE DETERMINED BY THERMAL DESIGN
q	Volumetric Flow Rate	m^3/s	TO BE DETERMINED BY THERMAL DESIGN
G_s	Mass Velocity	$kg/m^2 \cdot s$	TO BE DETERMINED BY THERMAL DESIGN
N_{Re}	Reynolds Number	–	TO BE DETERMINED BY THERMAL DESIGN
N_{Pr}	Prandtl Number	–	TO BE DETERMINED BY THERMAL DESIGN



ENGINEERING DESIGN BASIS

$$L = N\sqrt{(2\pi r)^2 + p^2} \qquad V_c = \frac{\pi}{4} d_0^2 L \qquad V_f = V_a - V_c$$

$$D_e = \frac{4V_f}{\pi d_0 L} \qquad Q = U A \Delta t_c \qquad \frac{1}{U} = \frac{1}{h_o} + \frac{1}{h_{io}} + \frac{x}{k_c} + R_t + R_a$$

ظرفیت حرارتی، ابعاد کویل، تعداد دور، سرعت سیال، افت فشار و سطح انتقال حرارت بر اساس شرایط واقعی پروژه و فرآیند تعیین می‌شوند.

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HELICAL COIL
HEAT EXCHANGER

CUSTOM ENGINEERED FOR YOUR PROCESS

01 CUSTOM ENGINEERED CAPACITY

LOW DUTY → MEDIUM DUTY → HIGH DUTY → PROJECT-SPECIFIC DESIGN

THERMAL CAPACITY IS DETERMINED BY PROCESS CONDITIONS

- HEAT DUTY
- FLOW RATE
- INLET / OUTLET TEMPERATURE
- FLUID PROPERTIES
- HEAT TRANSFER AREA
- PRESSURE DROP

02 DESIGN VARIABLES

- HEAT DUTY
- FLOW RATE
- INLET TEMPERATURE
- OUTLET TEMPERATURE
- PRESSURE
- ALLOWABLE PRESSURE DROP
- TUBE DIAMETER
- COIL DIAMETER
- COIL PITCH
- NUMBER OF TURNS
- HEAT TRANSFER AREA
- FOULING FACTOR
- MATERIAL SELECTION

03 APPLICATIONS


PROCESS COOLING


PROCESS HEATING


LIQUID–LIQUID HEAT TRANSFER


OIL COOLING


WATER HEATING


CHEMICAL PROCESSING


PETROCHEMICAL


OIL & GAS


POWER GENERATION


FOOD & BEVERAGE


PHARMACEUTICAL


INDUSTRIAL PROCESS SYSTEMS

04 ENGINEERING CONFIGURATION

- COMPACT HEAT TRANSFER GEOMETRY
- PROJECT-SPECIFIC THERMAL DESIGN

مبدل حرارتی لوله مارپیچ اکسرژی بر اساس شرایط واقعی فرآیند، سیال، دبی، دمای ورودی و خروجی، بار حرارتی، محدودیت افت فشار و فضای نصب طراحی و ساخته می‌شود.

ENGINEERED FOR YOUR PROCESS

- THERMAL DESIGN
- MECHANICAL DESIGN
- MATERIAL SELECTION
- FABRICATION
- QUALITY CONTROL

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