HEXONIC | HEAT EXCHANGERS

DNA
SHELL AND TUBE HEAT EXCHANGERS

CHOOSE APPLICATION

LOW-PRESSURE STEAM HEATING SYSTEM

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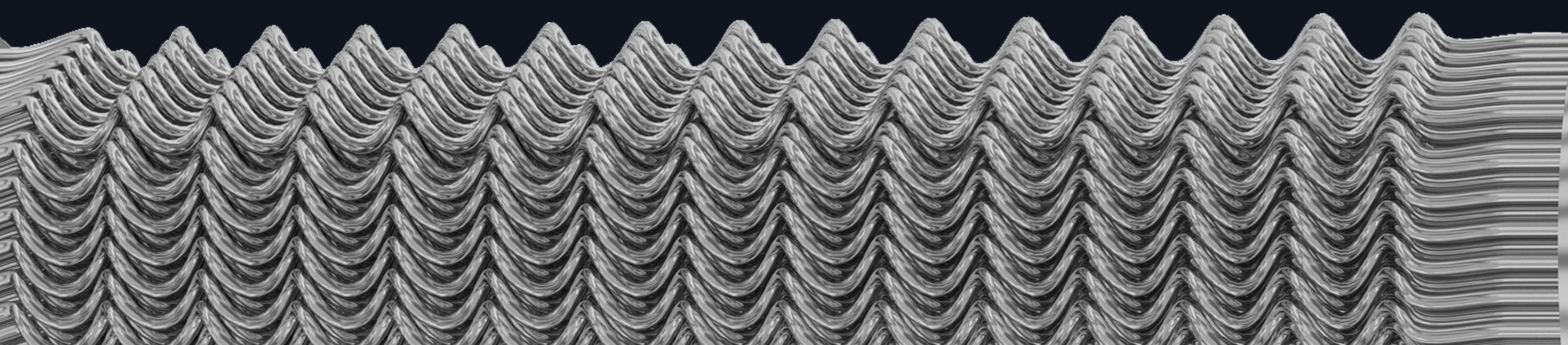
SHELL & TUBE HEAT EXCHANGER MADE ENTIRELY OF STAINLESS STEEL IN A LOW-PRESSURE STEAM HEATING SYSTEM.



MAIN APPLICATION DESCRIPTION

Steam boilers still play an important role in industrial power generation, providing a stable source of energy for various processes. Their main advantage is their extraordinary energy efficiency – modern devices can achieve efficiency ratings exceeding even 95%. This high efficiency translates into significant savings in fuel consumption and reduced operating costs, at the same time ensuring an environmentally friendly solution. Their versatile application options is another advantage of steam boilers. They are used in many industries, including the power industry, as well as the food or pharmaceutical industries. Steam can be used to drive turbines, heat production halls, sterilize medical equipment or as part of specialized processes.

The presented case involved the selection of a steam condenser for heating production halls. The heat source in the system was low-pressure (29 psig/250°F) saturated steam. Heating power demand of the heat exchanger was 5,188,000 BTU/h. The production hall heating system required a water temperature of 140°F. One of the requirements for the selected heat exchanger was to support control based on the condensate flooding level.

CHALLENGES

Selecting a heat exchanger to work as a low-pressure steam condenser.

Heating water from 140°F to 176°F using only 29 psig steam. Required heat load is 5,188,000 BTU/h.

A device design without gaskets was selected to increase heat exchanger durability Maintaining a low pressure drop on the water side.

The selected heat exchanger enabled the control process to be based on the condensate flooding level

RESULTS

DNA 324.10.S110.UM was selected as the best solution for the customer.

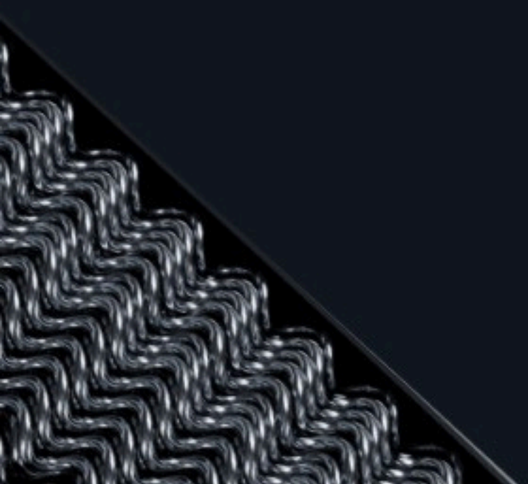
Its water side pressure drop is under 1,5 psi.

The selected exchanger allows for transferring 5,188,000 BTU/h (1520 kW) without the need for an extensive footprint. The total length of the exchanger is 53 inches, while the shell diameter is 12,75 inches.
Slip-On flanges allow for easy connection of the heat exchanger to a pipeline.

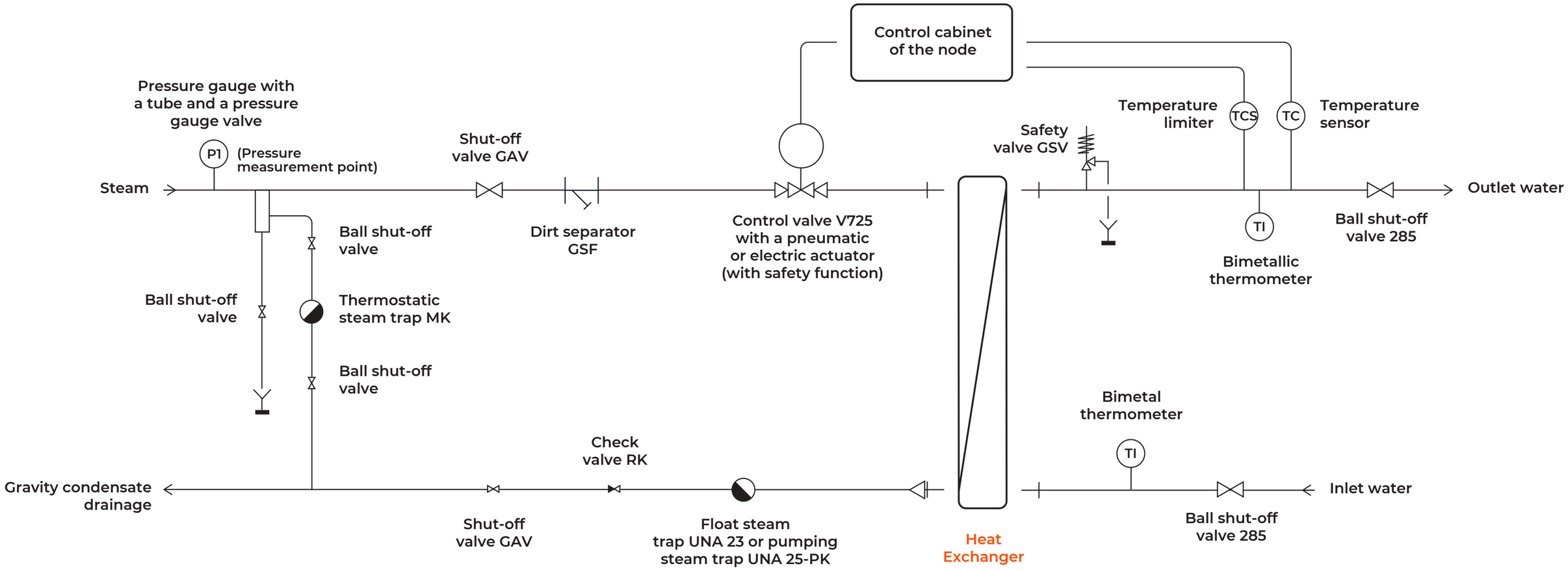
SOLUTIONS

A fully welded, DNA 324.10.S110.UM shell and tube heat exchanger was selected, ensuring the necessary water heating using low-pressure steam, while maintaining low-pressure drops and condensate according to the customer's requirements.

Appropriate tube design (helical shape) ensures high thermal efficiency of the device, achieved through effective turbulent vortex flow.



Steam at 29 psig/250°F is fed from the steam boiler and heats the water from 140°F to 176°F.
In case of lower heat demand, the entire process can be controlled depending on the condensate flooding level.



OPERATING CONDITIONS

CAIRO

Saturated Steam			
Water			
5.188.000,00			BTU/h
Condensing side		Liquid side	
248,430		140,000	°F
29,01			psi
5.484,292		144.426,145	lb/h
10.074,53		293,67	USGal/min
248,000		176,000	°F
11,62		296,90	USGal/min
		1,45	psi

HEAT EXCHANGER DETAILS

PRODUCT

SHELL & TUBE HEAT EXCHANGERS

MATERIAL TYPE
– STAINLESS STEEL AISI 316L / 1.4404

INSTALLATION TYPES
DNA heat exchangers can be installed **vertically** or **horizontally** depending on the application and available space. According to the calculation provided.

MEDIA
water, steam, glycol, flue gas, air, ammonia, acetone, toluene, synthetic oils and other media after consulting the manufacturer

STANDARD – ASME SEC VIII, DIV.1 or PED 2014/68/EU

RANGE PARAMETERS

MAXIMUM OPERATING PARAMETERS FOR THIS HEAT EXCHANGER TYPE

MAX. TEMPERATURE – 392°F

MIN. TEMPERATURE – -4°F

MAX. PRESSURE SHELL SIDE – 145 PSI

MAX. PRESSURE TUBE SIDE – 232 PSI

ADVANTEGES OF OUR SOLUTION

SIGNIFICANTLY HIGHER HEAT TRANSFER RATES COMPARED TO THE STANDARD SOLUTION.

EFFECTIVE HEAT TRANSFER AREA WITH A MORE HOMOGENEOUS DISTRIBUTION OF FLOW AND VELOCITY FIELD

TURBULENT VORTEX FLOW CAN EVEN DOUBLE THE HEAT TRANSFER COEFFICIENT DUE TO HELICAL TUBE GEOMETRY

LOW PRESSURE DROP

THE DESIGN OF THE DNA HEAT EXCHANGER ALLOWS FOR BUILDING A SMALLER AND LIGHTER DEVICE. AT THE SAME TIME, THE EXCHANGER RETAINS ALL THE ADVANTAGES OF A SHELL & TUBE HEAT EXCHANGER, ESPECIALLY ITS HIGH MECHANICAL STRENGTH

OTHER APPLICATIONS

LOW PRESSURE STEAM CONDENSERS (FLASH STEAM CONDENSERS)

INDUSTRIAL AND CHEMICAL PROCESSES

BIOGAS COOLER

GAS (EG. METHANOL) CONDENSER

WASTE HEAT RECOVERY – DIESEL AND GAS ENGINES, COGENERATION SYSTEMS

HEXONIC

BACK HOME