

## GEWA-PB

### Enhanced boiling tube for the hydrocarbon industry

#### Applications

The GEWA-PB tube is a dual enhanced tube with a nucleate boiling structure on the shell side and a spiral fin structure on the tube side, which has been specially developed for shell-and-tube heat exchangers for the process industry:

- LNG C3 chillers
- Ethylene reboilers and condensers for C2 and C3 fractionation and splitting units
- Other C3 refrigeration systems

#### Benefits

- Best efficiency in class through optimized heat transfer coefficients and minimizing CO<sub>2</sub> emissions during operations
- Highest compactness of heat exchanger design
- Maximal savings in CAPEX and OPEX

#### Product Types

- Gas cooling in a gas processing unit or a feed gas stream in an LNG plant
- Liquid cooling, e.g. quenchwater as heating source
- Condensation of a mixed refrigerant or C2 resp. C3 overhead stream
- Other customized solutions, e.g. plain inside, upon request

#### Tube Material

Available carbon steel grades:

- CS (ASTM-A 179 | ASME-SA 179)
- LTCS (ASTM-A 334 Gr 1&6 | ASME-SA 334 Gr 1&6)
- LTCS 3.5 % Ni (ASTM-A 334 Gr 3 | ASME-SA334 Gr 3)

#### Codes/Quality and Testing/Certificates

- Bare tubes (ASTM-A 450 | ASME-SA 450 and ASTM-A 1016 | ASME-SA 1016)
- Finned tubes – NDT:
  - EC testing (mandatory)
  - Pressure testing in accordance to ASME BPVC Div. VIII Sect. 1 or related code (upon request)
  - Other related codes upon request
- Certificates 3.1 | 3.2 according to DIN EN 10204

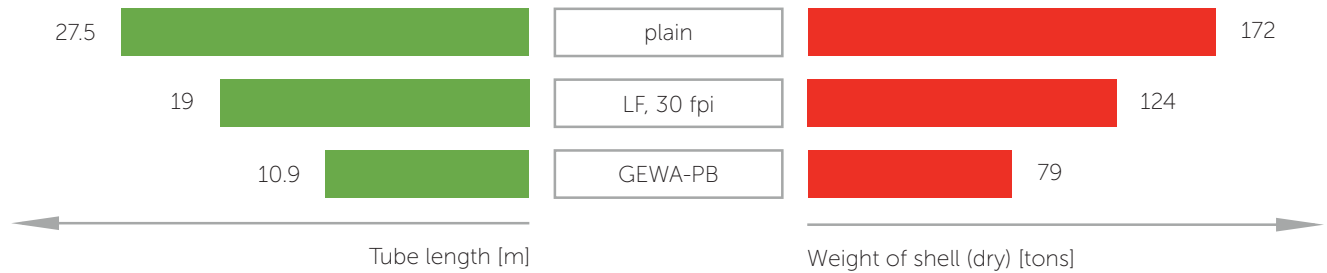
#### Engineering services

Wieland Thermal Solutions provides an engineering package for enhanced heat exchanger solutions with shell-and-tube heat exchangers. This covers thermal design, best practice design guidance as well as project management and documentation.

## Case study LNG precooling refrigeration system

Heat Duty	45 MW
Shell Design	NKN, 1-pass, bundle OD=1500mm, 3/4" GEWA-PB, tube count: 3745
Shell-side Fluid	Propane, $T_{sat} = -21.8\text{ °C}$
Tube-side Fluid	Mixed refrigerant, condensing, $T_{in/out} = -1.9 / -18.5\text{ °C}$

## Design comparison for propane chiller with different tube types: plain, low finned and double enhanced GEWA-PB



## GEWA-PB tube specification

### Plain tube dimensions

- outside diameter	3/4"	5/8"
- wall thickness at plain end	2.11 mm (nom.)	1.70 mm (nom.)

### Finned tube dimensions

- tube length	18.3 m (max.)	18.3 m (max.)
- wall thickness under the fins	1.4 mm (nom.)	1.0 mm (nom.)

Tube code	PB-8407.17140-49*	PB-8407.14100-49*
	PB-8407.17140-40**	

Material	ASTM A / ASME SA 179, ASTM A / ASME SA 334 Gr. 1, 3 (3.5 % Ni), 6
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### U-bends

- U-bends based on individual bending schedule
- Annealing of U-bend section feasible
- Pressure testing of U-bend upon request

\* gas cooling and condensation

\*\* liquid cooling