



Vermeer Eemhaven Group

Helixchanger[®] Heat Exchanger
Helitower[®] & Helifin[®]



Vision

Vermeer Eemhaven Group to be recognized as a quality, global supplier of special type heat exchangers.

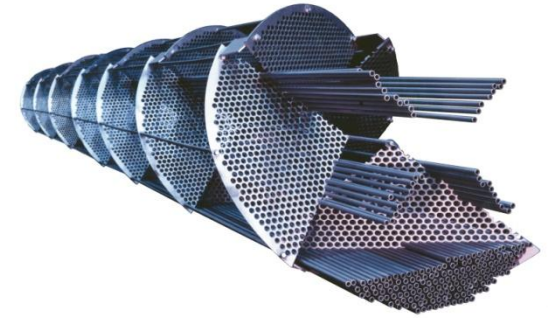
Licensee Agreements with Premier Technology providers are the fundament to serve our customers with the best possible technical heat exchanger solution based on Total Life Cycle Cost.



Mission

On time delivery, quality, excellent project execution and dedication for the products are Vermeer's key drivers.

To become world's best in class Helixchanger® supplier.



Portfolio Equipment Supply

- TEMA type Shell and Tube (S&T) Heat Exchangers
- CB&I's Lummus Technology Heat Transfer Helixchanger®
- Koch Heat Transfer's Twisted Tube®
- Klaren Self-Cleaning Technology
- S&T's provided with Low-fin tubes
- S&T's provided with High Flux double enhanced tubes
- Aircooled type exchangers provided with high fin tubes
- Box coolers
- Waste Heat Boilers
- Vessels
- Basket Filters & Strainers

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Our Clients (see also our reference list)



End-users

- Shell, BP, Statoil, ExxonMobil, TOTAL, KINEF, BASF and others

EPC Contractors

- CB&I Lummus, Fluor, Jacobs, Kvaerner and others

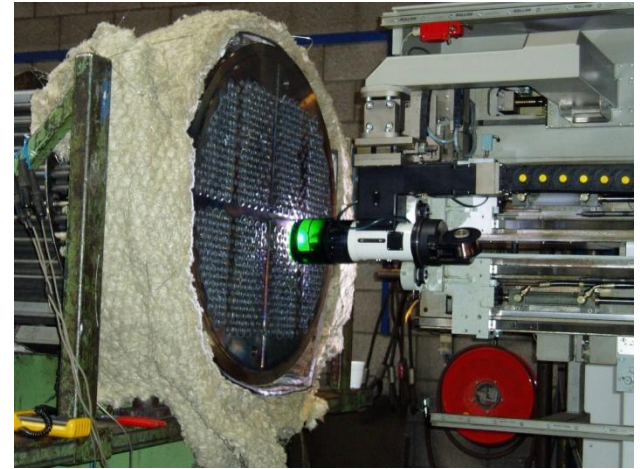


Why Clients choose for Vermeer Eemhaven?

- High Value for €
- Reliable
- High Quality
- On time delivery through dedicated project management
- In-house thermal & mechanical design & engineering
- State-of-Art Automatic Tube-tubesheet orbital welding
- State-of-Art Automatic Multi-spindle drilling machine



MAUS MA-2500 in action



Automatic rolling, facing and orbital welding machine

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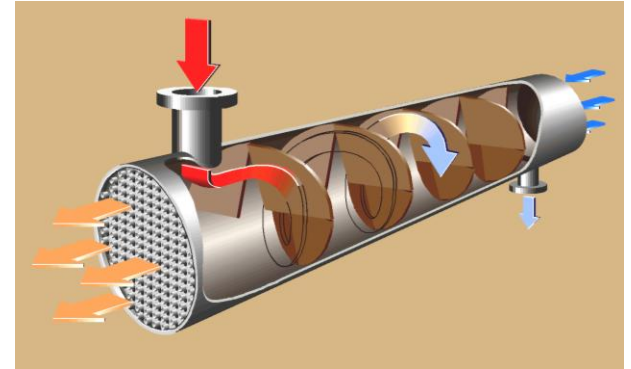


Multi-Spindle Drilling Machine Galbiati



Multi-Spindle drilling
Machine Model FMM 3272

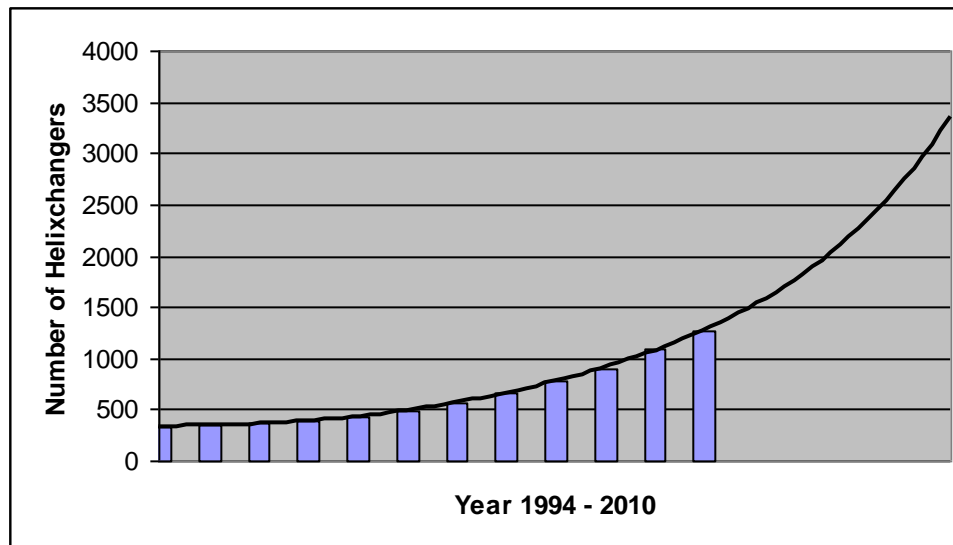
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Helixchanger® Heat Exchanger

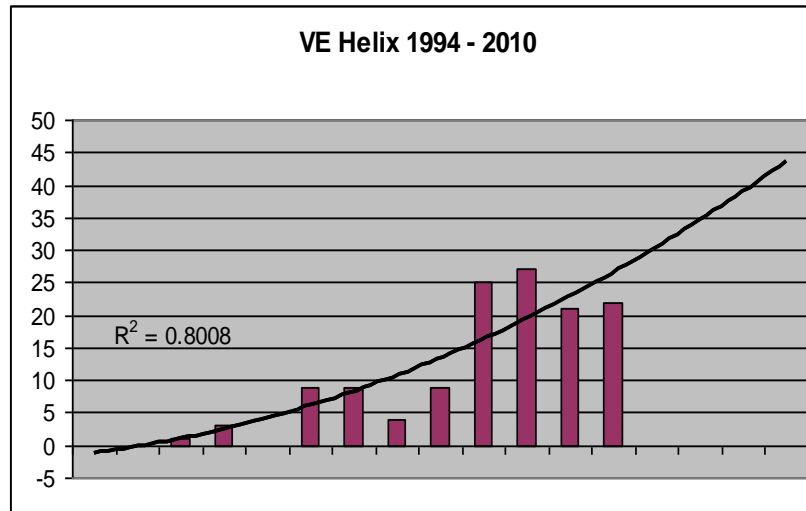
- Proven performance and more than 2000 units in operation
- World standard in Shell & Tube design
- ISO 16812 includes Helixchanger®

CB&I's Helixchanger® Historical Growth & Future Trending



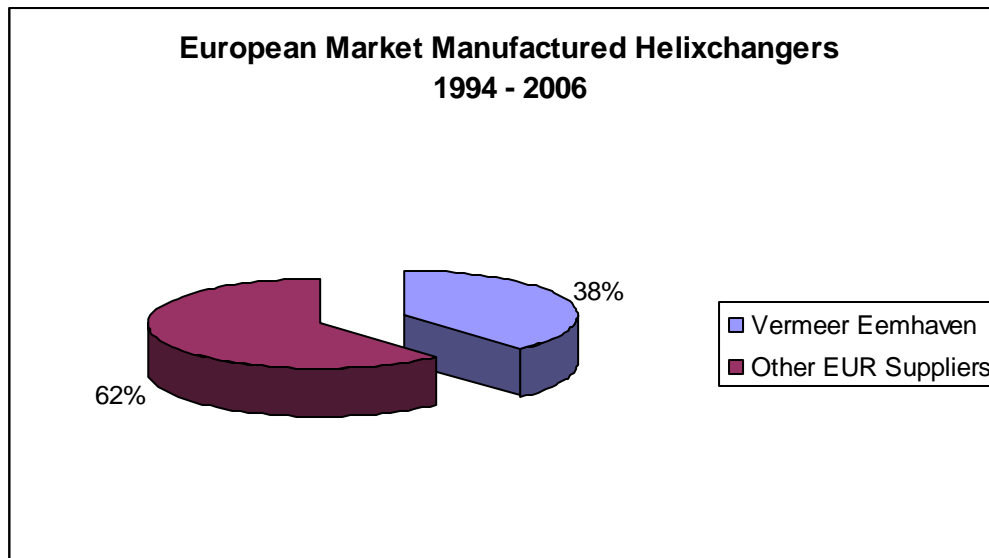
VE's Helixchanger® Historical Growth & Future Trending

- Helixchanger® Sales 1998 - 2010 : **157**
- Western Hemisphere market leader of Helixchanger®

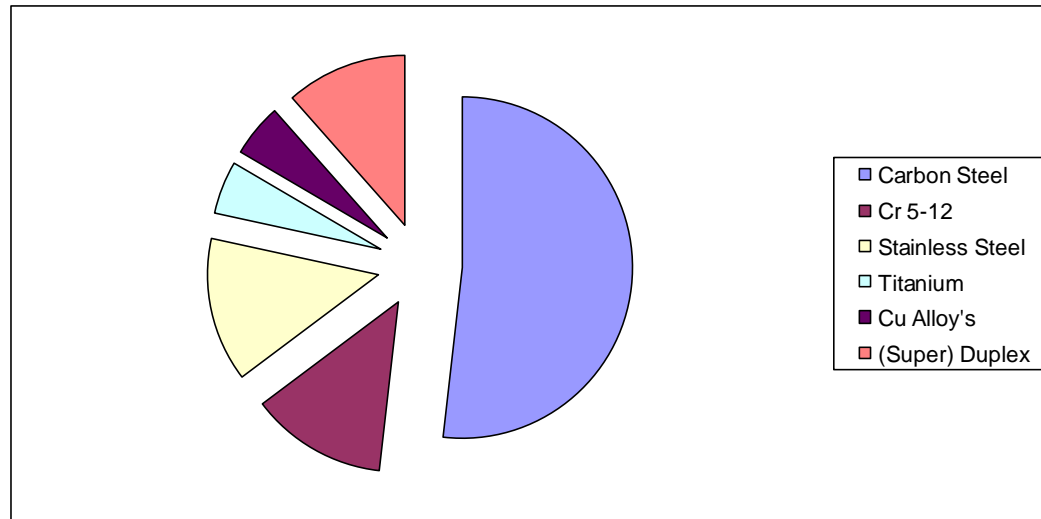




Vermeer is Helixchanger® European Market Leader



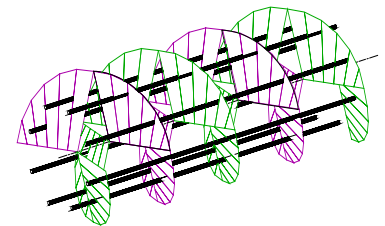
Helixchanger® Break-down in material supply/item

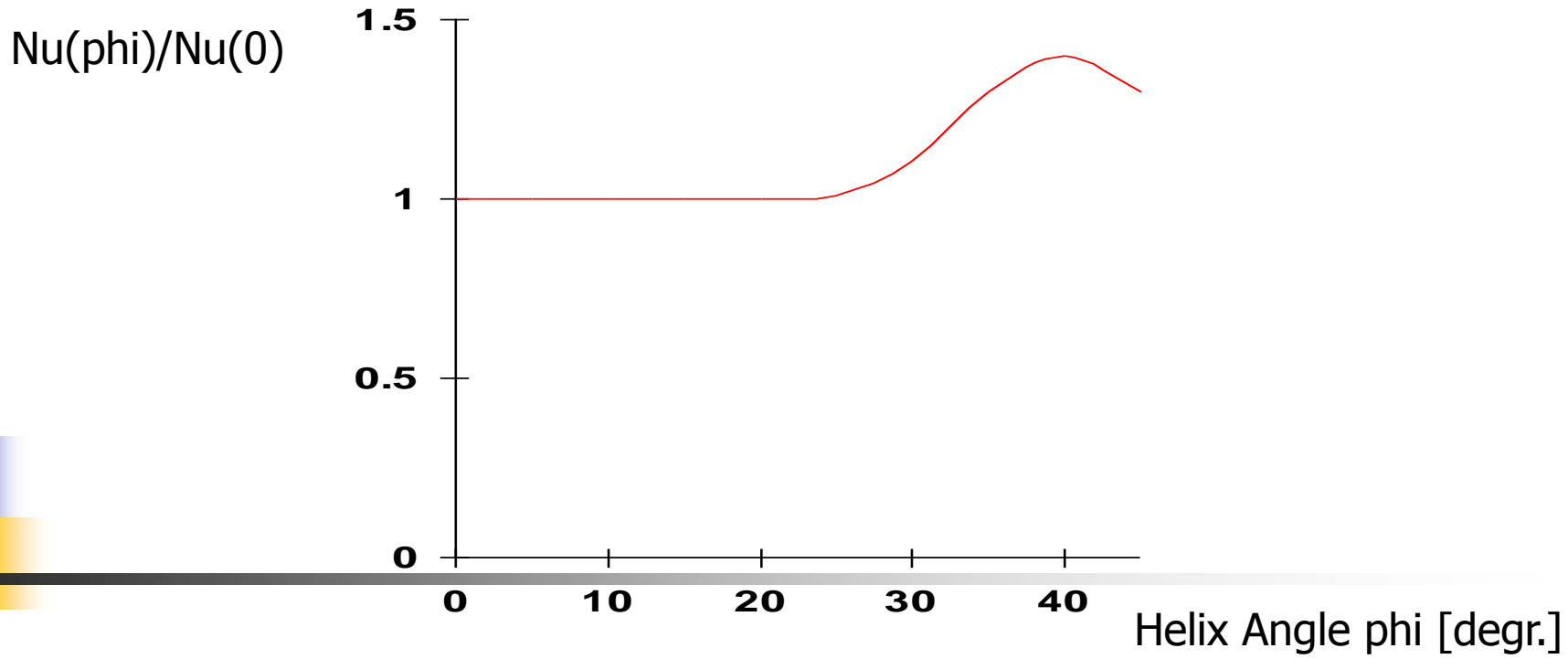




Helixchanger® Heat Exchanger Characteristics

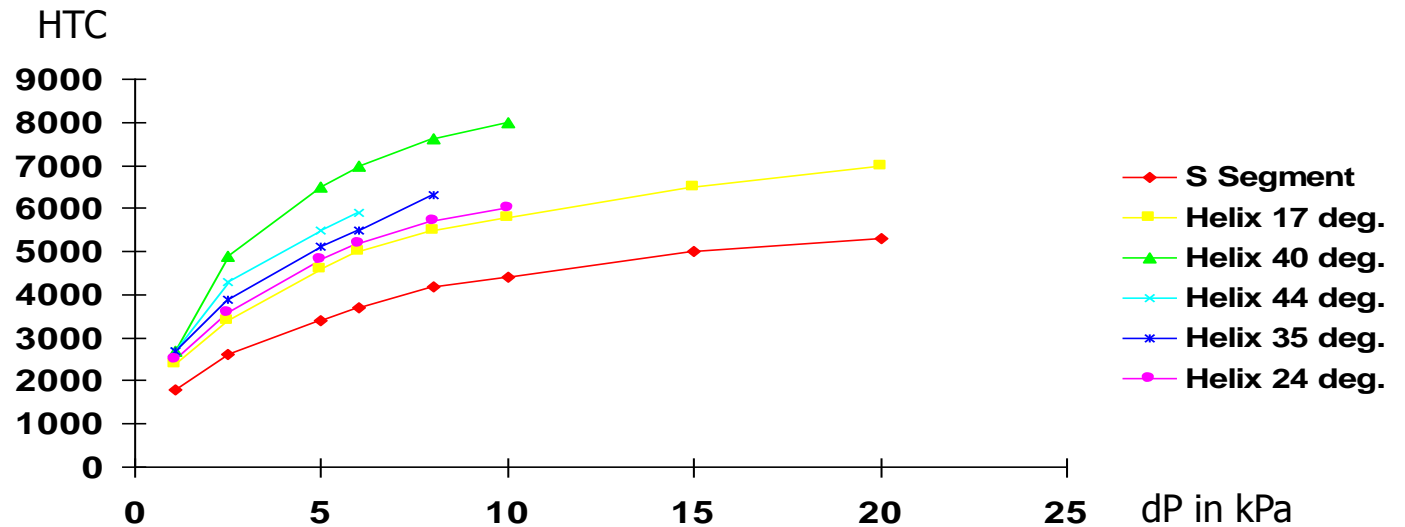
- Enhanced Heat Transfer
- Lower Pressure drops
- Higher conversion pressure drop into heat transfer
- Smaller (plot)size and heat transfer area
- Lower residence time (reactor heating/cooling)
- Lower Fouling
- Longer run-length saving down-time
- Protection against vibration






Y10 Factor (HTRI Report S-SS-3-12)

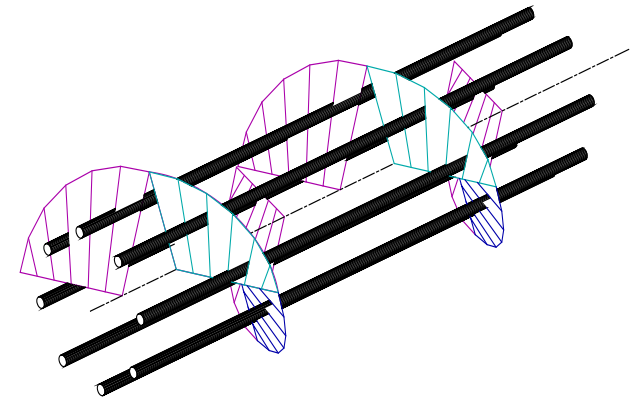
Helixchanger® Heat Exchanger Conversion dP-HT





ExxonMobil Europe Ltd.	Shellside	Tubeside
Fluid	Flex Feed	BPA
Flow rate, kg/h	60,000	100,000
Temp. in/out, C	70/230	326/247
Heat duty, kW	6200	
Op. pr., bara	3.0	6.0
All. pr. drop, bar	0.6	1.0
Fouling resistance, m ² C/W	0.0007	0.0007
Material of construction	CS + SS304 clad	SS304L

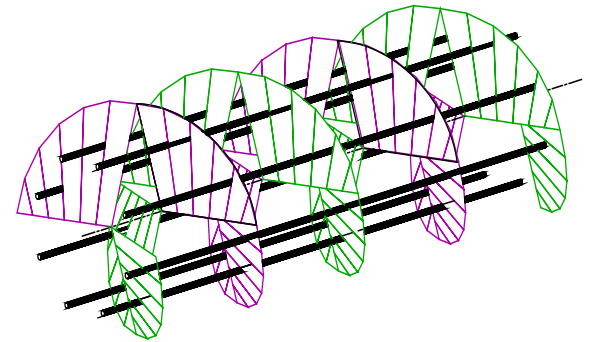
ExxonMobil Europe Ltd.	Single-Segm	Helical Baffle
Shell ID, mm	800	750
No. of tubes x NTP * Length	306 x 4 * 6.1	266 x 4 * 4.88
Baffle sp. mm x cut, % Helix angle degrees	225 x 25	8 dg. single helix
Total Area, m ²	292	200
Shellside pr. drop, bar.	0.6	0.6
Cross velocity, m/s	0.43	0.8
Number of shells	2	2



Helixchanger® Heat Exchanger Single Helix



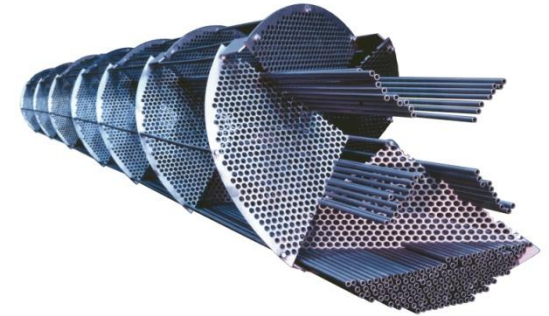
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Helixchanger® Heat Exchanger Double Helix

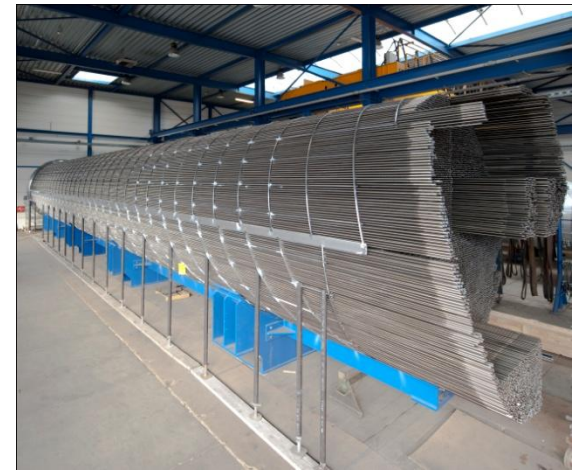


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Helixchanger® Special Experience

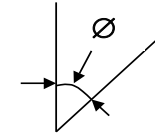
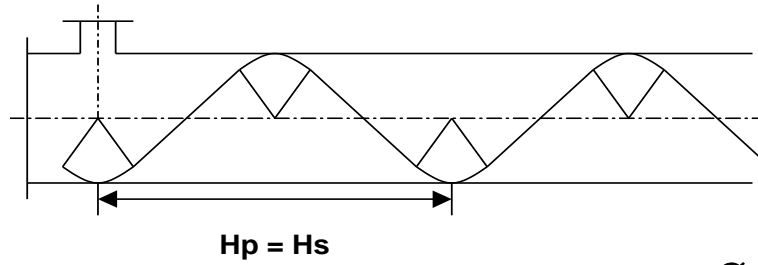
- Single Helix and Double Helix baffle structure and mix of both
- Helixchanger® in TEMA E and J type
- Helixchanger® in TEMA rear head type M, U, S and T type
- Helitower® with internal bellow
- Vapor Belt constructions (Nerefco, TOTAL, BP Chembel, Statoil)
- Smooth tubes with close fit tolerances (ExxonMobil, Statoil)
- Adhere to stringent tube-tubesheet connection specifications
- Helix Angle drilling from 5 – 45 degrees
- Supplied World's 1st & 2nd largest high alloy Helixchanger®
- Fixed Tubesheet with Shell Bellow



Helixchanger® Titanium Experience

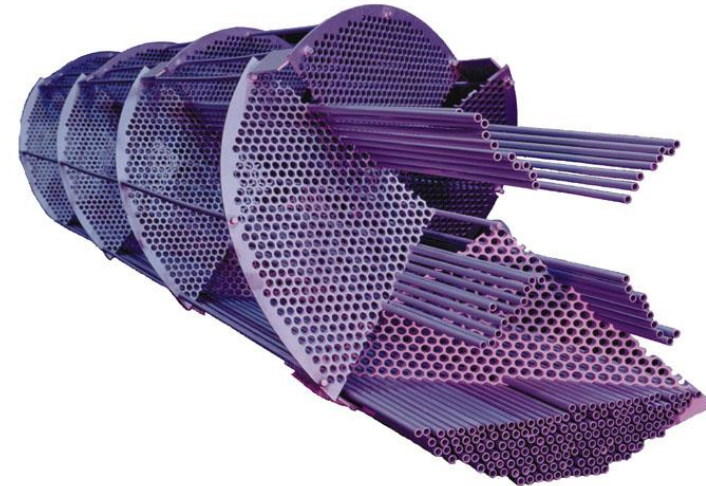
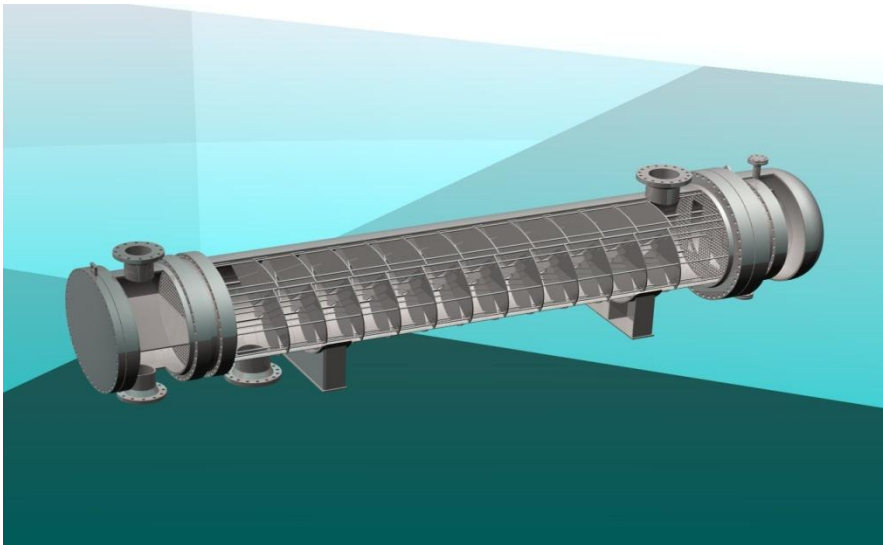
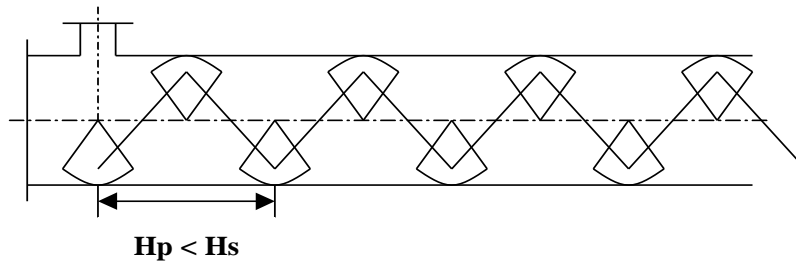
- Fabrication experience with 8 Helixchangers ® in Titanium
- Ti helix units supplied for TOTAL and Nerefco (BP/Texaco)
- 24248 Ti tubes fitted in helical baffled systems (~ 25% of total)
- Close-fit tolerances for 6 Titanium Helixchangers® for Nerefco
- Close-fit tolerances for 1 Titanium Helifin® for StatoilHydro
- TEMA E and J including annular distributor
- StatoilHydro / Linde Worlds Largest Helifin Duty 176,7 MW

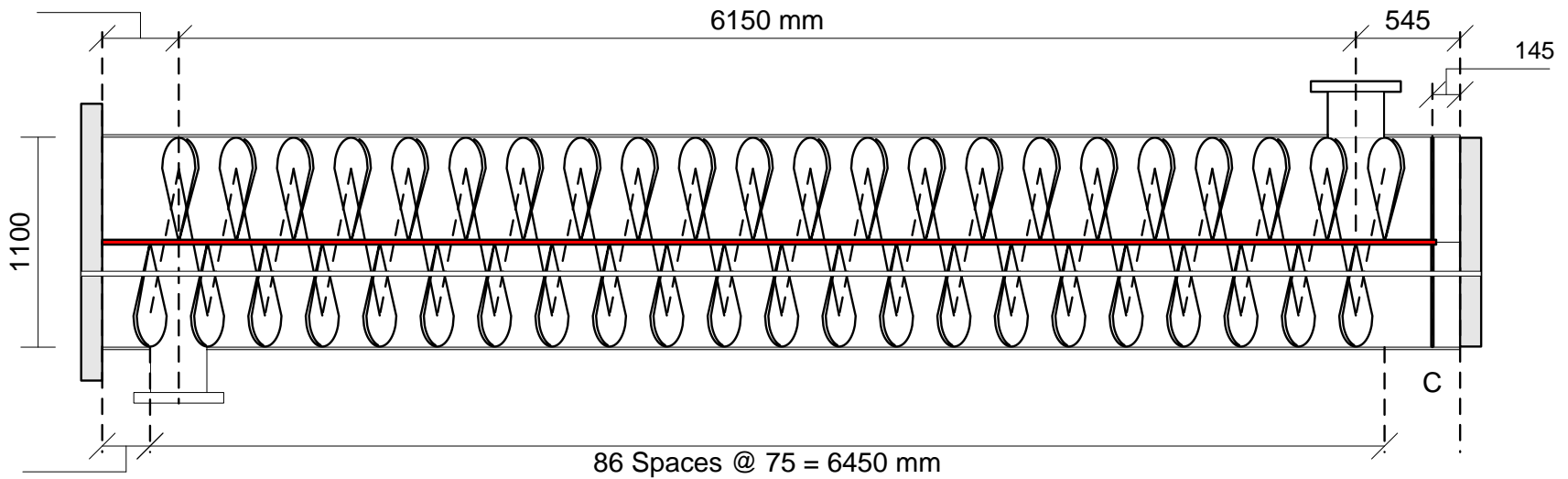
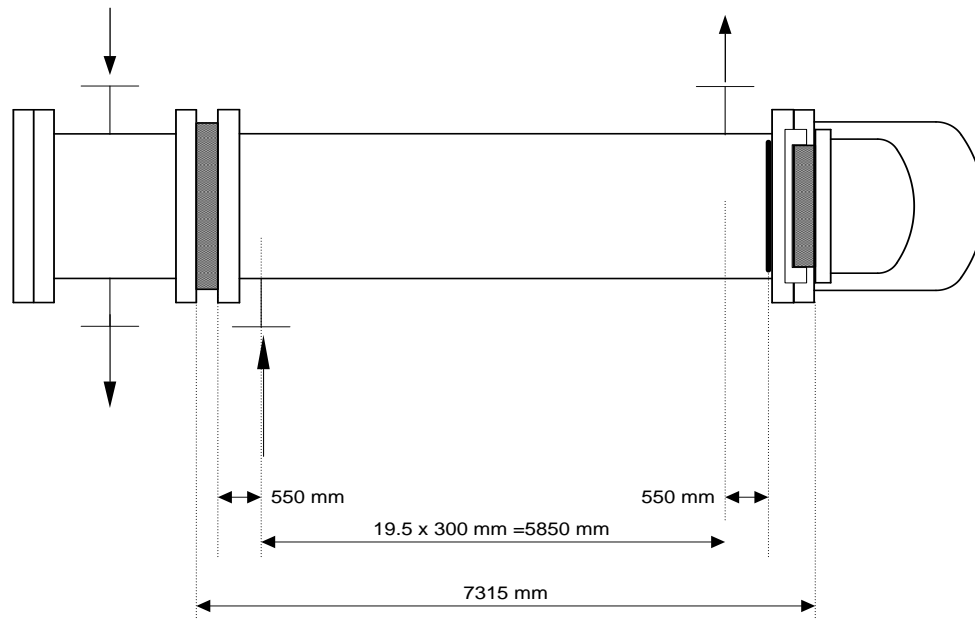
Baffles touch at the perimeter



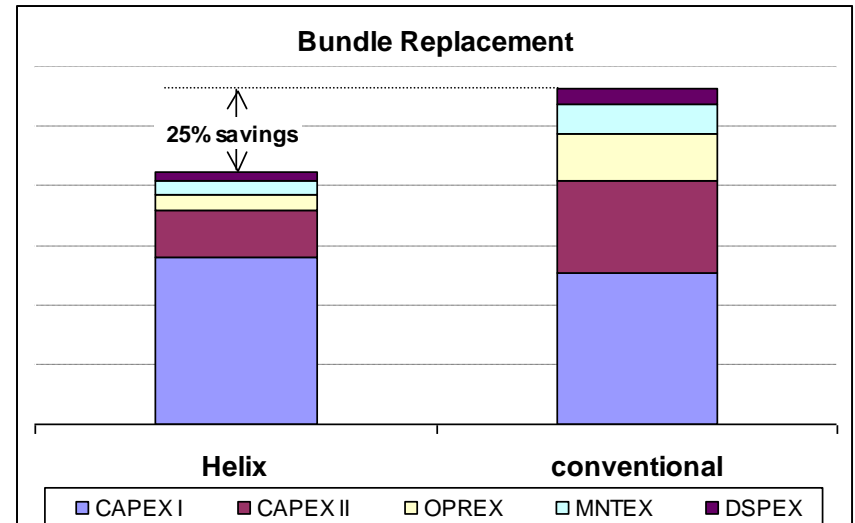
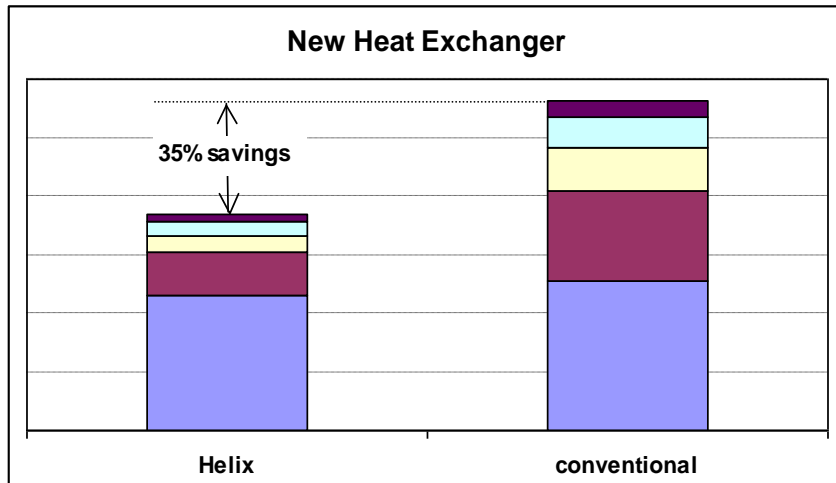
\emptyset = Baffle inclination angle
 H_p = Baffle Spacing
 H_s = Helix Lead

Overlapping Baffles





Helixchanger® Heat Exchanger Total Life Cycle Cost



Helixchanger® in Carbon Steel



Shell Netherland Refinery
VEBA Oel
Conoco
OMV
KINEF, Russia
Dow
Esso Benelux
Petro Canada
TOTAL

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Helixchanger® in (S)Duplex



Kuwait Petroleum
Ruhr Oel GmbH

Repeat Orders:

Shell Nederland Chemie
BASF

Vermeer Eemhaven B.V.

Helixchanger® in Cu Alloy's



Nerefco (BP/Texaco)
Naphtachimie
Shell Netherland Refinery

Vermeer Eemhaven B.V.



Helitower® in Carbon Steel



OMV Burghausen

- EPC Contractor CB&I Wiesbaden
- Helitower 18 meter tubelength
- Empty weight 60 tons
- Surface Area 2086 m²

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Helixchanger® in Stainless Steel Part 1

BP Chembel Geel, Belgium

- Helixchanger 9 meter tubelength
- World's 2nd largest high alloy Helix
- Surface Area 1483 m²
- Empty weight 60 ton
- Tubematerial SS316 & Hastelloy



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Helixchanger® in Stainless Steel Part 2



BP Chembel Geel, Belgium

- EPC Contractor Technip Italy
- Shell Bellow
- Annular Distributors
- Conical heads
- Exchanger under slope

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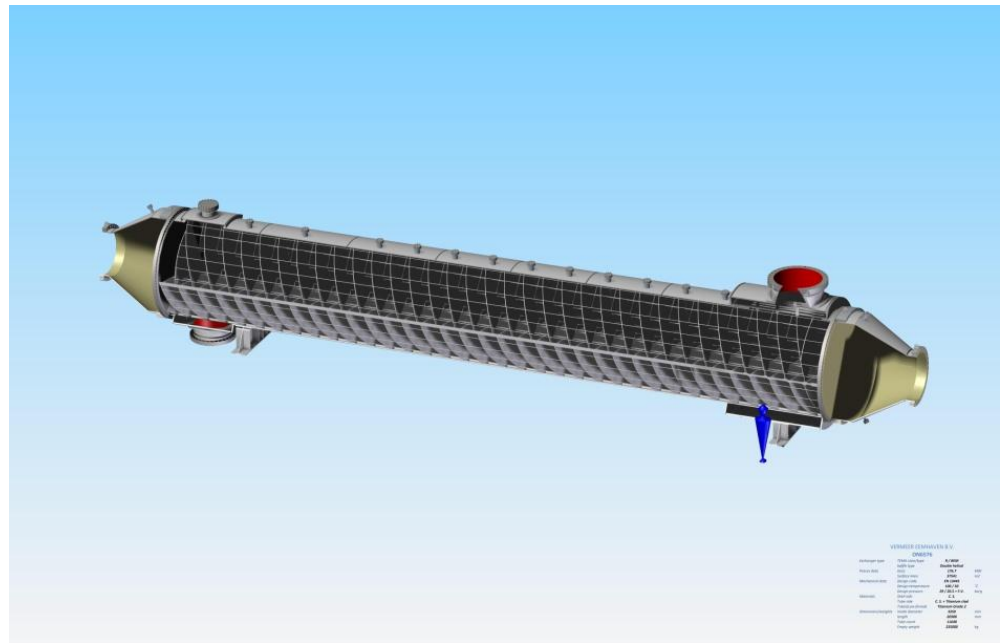


Helifin® in Titanium Part 1



StatoilHydro Hammerfest, Norway

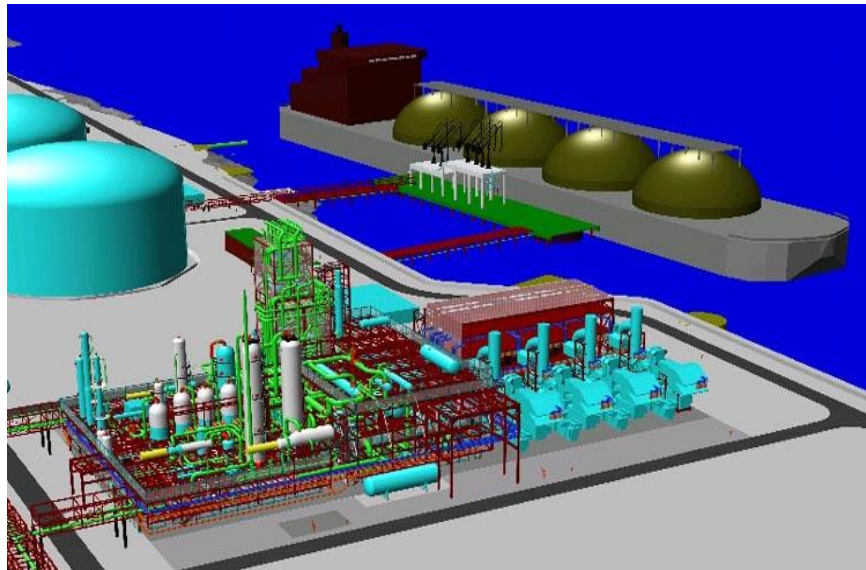
- Most Northern LNG Liquifaction
- Final Hx Selection : Helifin®



StatoilHydro / CB&I	Conventional	Helifin®
Shell ID, m X T.Length, m	3,9 X 22	3,25 X 22
No. of tubes, HPT type	14001 , PN365035	11640 , PN365049
Baffle Type / Helix Type,dg	S.Segm/NTIW	Double Helix, 20
Total Extended Area, m ²	51000	38000
Thermal Duty, MW	176,7	176,7
Weight, tons	282	235
Cost Factor	1	0.75



Helifin® in Titanium Part 2



StatoilHydro Hammerfest, Norway

- LNG modular design
- Part of the island

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Helifin® in Titanium Part 3



StatoilHydro Hammerfest, Norway

- Extensive auditing process
- Competitive global tendering
- VE Group selected by EPC Linde & StatoilHydro and full support by CB&I Licensor Helifin® Technology

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Helifin® in Titanium Part 4



StatoilHydro Hammerfest, Norway

- Helifin 22 meter tubelength
- World's largest high alloy Helix
- Ext. Surface Area 38000 m²
- Empty weight 235 ton
- Tubematerial Titanium fine-fin

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Operational Feed-back



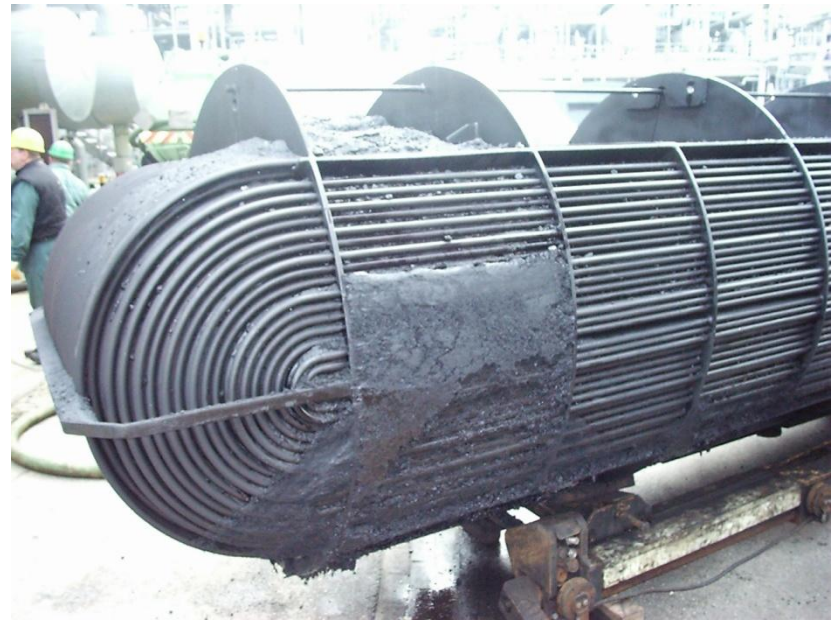
DOW Benelux

- No fouling
- More uniform velocity
- Longer Run Length

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Operational Feed-back



BASF NV Belgium

- Less fouling
- No dead zones
- Longer Run Length

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Operational Feed-back



ESHA Amsterdam

- Less fouling, no dead zones
- More uniform velocity
- Less maintenance



Operational Feed-back UOP Hydrobon® Process



TOTAL The Netherlands

- Low fouling
- Low pressure drop
- Longer run-length (3-4 times)
- 25% higher flowrate same ΔP
- Easy jet-cleaning at 1000 bar

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Reduce shellside fouling &
Extend run length to
3- 4 times

**Average Capital
Cost Savings
25%**

**Dutch Subsidy
up to 20%**

Reduce heat
transfer surface
up to 35%

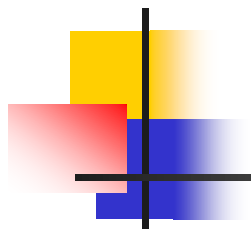
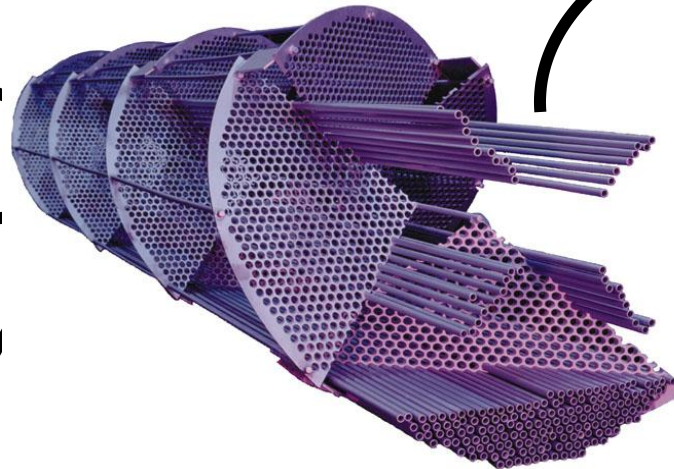
Increase
process
capacity up to
40%

Reduce shellside
pressure drop
& Save pumping costs
and downstream
heating costs

Eliminate vibration and
acoustic rumbling

Reduce
Maintenance
related down
time

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your

Helixchanger® Heat Exchanger Supplier

Thank you

