

ESDU Process Engineering Technology



The Source
for Critical Information and Insight™

Process Engineering



IHS ESDU International develops validated engineering software and design guides over a wide range of engineering disciplines. All ESDU's work is guided and approved for issue by international committees and working parties of engineers from industry, research and the universities.

ESDU's Process Engineering Technology series contain over 100 design guides and 17 programs, covering a wide range of practical heat transfer and fluid flow applications. Endorsed by professional institutions, ESDU data and software form an important part of the design operation of companies throughout the world.

Key tools include novel graphically based software for:

- Rapid design, rating, revamping, performance prediction and analysis of operability of shell-and-tube heat exchangers (EXPRESS™, see below),
- Assessment of enhancement benefits in tubular heat exchangers (ENTRANS™),
- Process integration for new design and retrofit of heat transfer networks (INTEGRITY™),
- Analysis of minimum freshwater use in industrial plant (AQUAINT™).

Introducing EXPRESS™ for Shell-and-Tubes

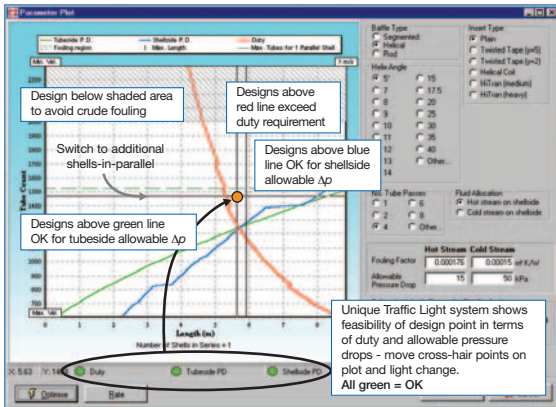
ESDU's powerful EXPRESS™ program was originally developed to support users of conventional design codes. Under the guidance of ESDU's Oil Industry Fouling Working Party, it developed into a unique tool that is used not only by engineers looking to assess design and retrofit opportunities, often using new equipment options such as Helixchangers and tube inserts, but also by engineers seeking to design-out fouling (particularly in pre-heat crude oil exchangers).

Oil Industry Fouling Solutions:

Recent work includes the development of industry-standard 'User Guides' to crude oil, seawater and freshwater fouling, with supporting software. These guides were developed under the guidance of the Oil Industry Fouling Working Party, with expert members representing some 70% of the world's refining capacity. Participating companies include:

- ABB Lummus Heat Transfer
- BP
- Brown Fintube
- Cal Gavin
- CB&I John Brown
- Chevron Texaco
- Conoco Phillips
- ExxonMobil
- Fluor
- Heatric
- Koch Industries
- Kvaerner
- Marathon Oil Company
- Mexel
- Nalco
- Statoil
- Total
- Wellman Graham

EXPRESS™ v.4: E-Shell Rapid Design, Rating, Revamp, Fouling Analysis (Including Crude Oil Preheat Train Fouling), Performance Prediction, Budget Costing...



EXPRESS™ draws the Parameter Plot for your preliminary design and duty data to show the full thermal design picture - design options are then clear.

Some Key Features

- Shellside geometries** select and switch between segmental, helical and rod baffles.
- Tubeside geometries** plain tube, various inserts (twisted tapes, helical coil, wire matrix)
- Units** SI, US or British, dynamic updating at any time
- Segmental shellside method** - Switch between stream analysis and Bell methods - useful to assess uncertainties
- Defaults** or user-specified values for many parameters, including clearances, baffle, and end-plate thicknesses
- EXPRESS™ uses minimum data input**

Instantly update the Parameter Plot for:

- Altered baffle cut – optimum spacing calculated automatically
- New helical baffle angle – spacing updated automatically in line with design practice
- Switching baffle type – segmental, helical or rod
- Assessment of effect of tube insert
- Changed tube pass arrangement
- Switching fluids (shellside to tubeside)
- Exploring effect of specified fouling factors and allowable pressure drops on design
- Shells in series.

Design away from Crude Oil Fouling in Preheat Exchangers

- Determine crude fouling threshold conditions to develop no-fouling designs
- Where no-fouling design not possible, assess opportunities for helical baffles, inserts, etc
- Evaluate fouling response of unit to changes in inlet temperatures and throughput.

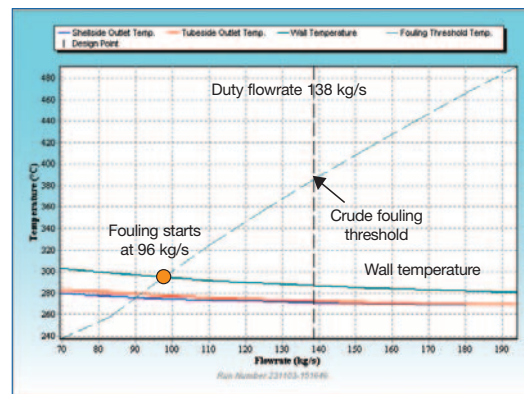
Cooling Water Fouling, Biofouling, Waxing...

Where in-tube fouling is dependent on flow velocity (eg, biofouling), tube wall temperature (eg, waxing or coking) use velocity or wall temperature fouling models in EXPRESS. All backed up by ESDU's industry-standard User Guide collection to common fouling problems in heat exchangers.

EXPRESS™ plots the performance of your design over ranges of operating conditions

Exchangers rarely operate at the design point. EXPRESS™ generates a range of response plots to show how your exchanger will really operate.

For example, a crude oil preheat exchanger is designed in the no-fouling zone. However, EXPRESS™ shows how fouling can occur in downturn...



Example response plot (effect of tubeside flowrate)



ESDU International PLC,
27 Corsham Street,
London, N1 6UA, UK
t: +44 (0) 1344 328000
f: +44 (0) 1344 328008
e: sales@ihstedu.com
w: www.ihstedu.com

IHS Corporate Headquarters
15 Inverness Way East
Englewood, CO 80112, USA
t: +1 303-736-3000
w: uk.ih.com