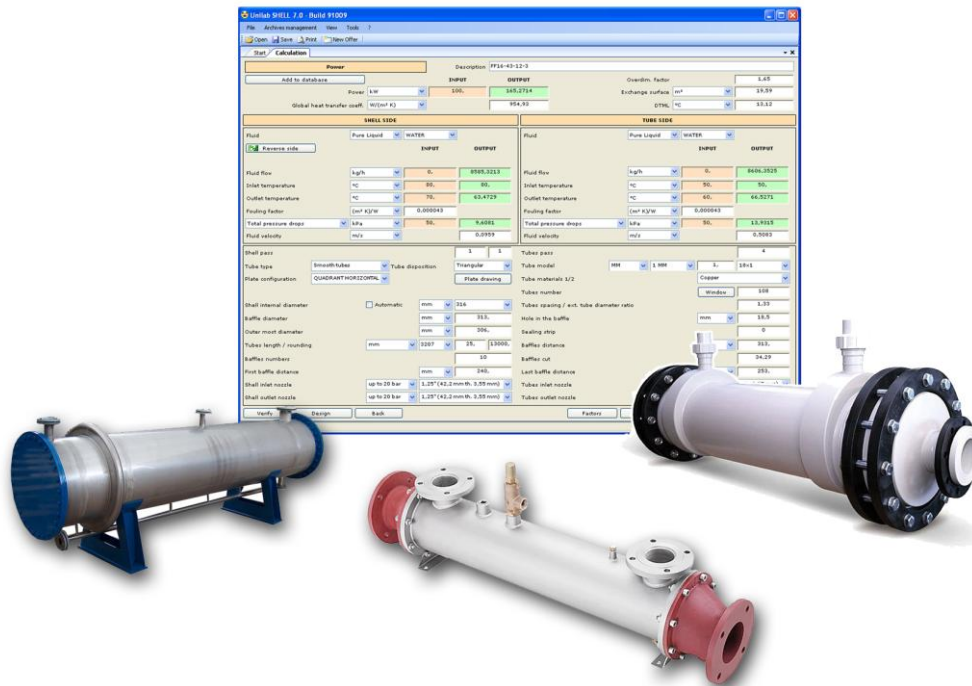


UNISUITE SHELL



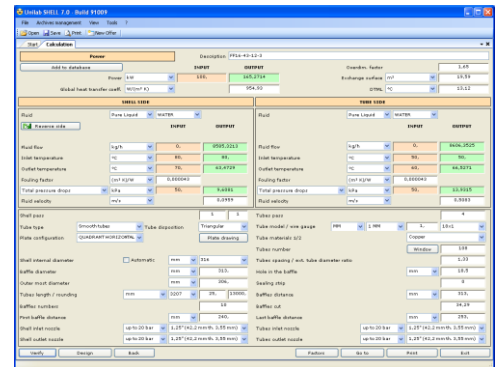
An easy-to-use software for the design and rating of Shell & Tube heat exchangers

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Software overview

UNISUITE SHELL is a software for the design, the rating and the selection of shell and tube heat exchangers suited for those companies that operate in the air conditioning, refrigeration, pharmaceutical, energy power and chemical fields. Unlike other software such as HTRI, we offer a user-friendly interface software, with detailed printouts and logo management. This is the only software giving the possibility to design an exchanger from scratch according to the "TEMA Normative Std 9th edition". All our software have a wide thermo-physics library, with the possibility to insert new fluids and mixtures. The fluid libraries now include more than 140 refrigerants and 440 fluids among pure liquids, pure gas and liquid or gas mixtures.



Software highlights

- user-friendly interface
- design, rating and selection of 7 different exchangers typologies
- a wide thermo-physics library, with the possibility to add new fluids and mixtures
- design from scratch according to the TEMA Normative Standard 9th Edition
- automatic selection of the nozzles
- detailed printouts with logo customization
- offer management
- tube-sheet plate automated design & customization with a graphical interface

Calculation modalities

Shell can calculate heat exchangers in the following typologies:

- Fluid – fluid
- Evaporation inside tubes
- Condensation inside tubes
- Condensation outside tubes
- Flooded evaporators
- Steam inside tubes
- Steam outside tubes

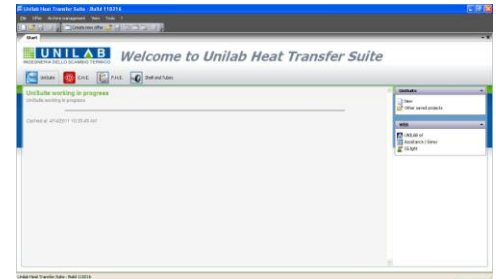
For each typology, it is possible to:

- rate an exchanger stored in the archive (the user can rate the power and the pressure drops knowing all the geometrical parameters of the exchanger and the working conditions, by changing one or more input variables at the same time – for example: tubes length, temperatures, fluid, baffles cut and distance, tubes layout etc)
 - with a predefined tube-sheet plate already stored in the archive (called "Calculation with a plate")
 - without a predefined tube-sheet plate (called "Free calculation")
- design a new exchanger (in this modality it is possible to insert the working conditions and the power required without knowing the geometrical parameters, obtaining an optimization of the exchanger according to the constrains and rules of the software)
 - using a predefined tube-sheet plate
 - from scratch (without any tube-sheet plate or other geometrical information known, the program uses TEMA Normative Standard)
- select an exchanger from the archive by the working conditions and the required power for a specific situation

- from the list of exchangers
- from the list of the tube-sheet plates stored in the archive

User-friendly interface

Thanks to the experience gained with our most popular software Coils 6, we have arranged a very user-friendly interface for UNISUITE SHELL. Every calculation is stored as a lightweight project file, which handles all the information of the exchanger and the working conditions of the calculation. This means that you can recalculate a project even if you have accidentally deleted the exchanger from the archive, or if you are on a different PC where that exchanger has not been stored in the archive.

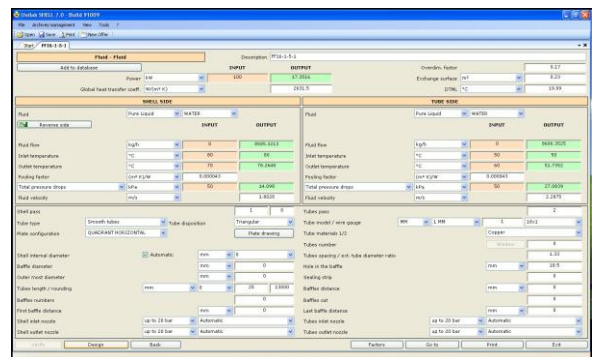


When the program starts, it shows a list of the recent projects that has been calculated, ordered by date. In every project it is possible to write a brief description, useful to quickly find it from the projects list. On the same window, you can find some buttons which will create a new project in two clicks of the mouse.

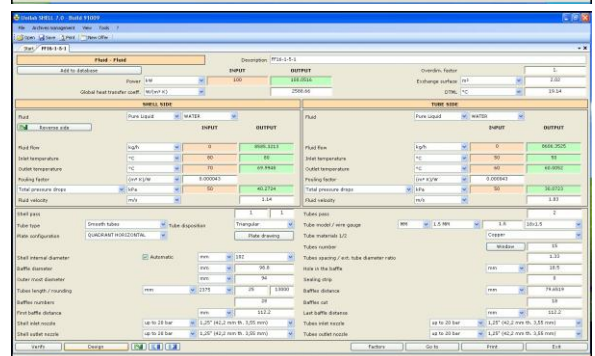
Speaking about the project window, it is well organized: all the geometrical parameters, fluids, working conditions, etc. are on the same window. Two big buttons on the top of the program lets you open and save a project quickly, or even create a new offer in a second. One single menu lets you manage everything in the program archive. In conclusion, everything is handy on UNISUITE SHELL.

Design an exchanger “from scratch” and automatic selection of the nozzles

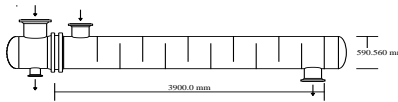
One of the most exciting new features of UNISUITE SHELL is the possibility to design a brand new exchanger in just one click of the mouse. Imagine that you have to design a special exchanger and you have no time to open a complex program, then set all parameters, then do the first calculation, then change some wrong parameters, then try again, etc. With UNISUITE SHELL you just have to select the fluids, set the working conditions and the required power, then check the “Automatic” box and you’re done: the program has created a new exchanger in just one second that perfectly suites the project requirements. The new exchanger perfectly fits the TEMA Standard 9th Edition normative in all of its requirements: the exchanger’s length, tube-sheet plate’s diameter, baffles’ diameter and cut, etc. In addition, if the required power is so big that no TEMA exchanger can handle it, the program will calculate the number of TEMA exchangers required.



A feature that has been renewed is the automatic selection of the nozzles. According to the fluid pressure drops of each side of the exchanger, the program is capable to select automatically the best nozzles. In addition, the nozzles have been divided into two categories: “Up to 20 bar” and “Up to 60 bar”.



Printout sheet example

UNILAB		HEAT EXCHANGER SPECIFICATION SHEET			
INGEGNERIA DELLO SCAMBIO TERMICO					
Company					
Address					
Location			Job Nr		
Service			Our Reference		
Item Nr			Your Reference		
Date	28/10/2009	Rev			
Size	590 x 3900 mm	Type	BEU	Horz.	Connected In [] Parallel [] Series
Surf/Unit	98,36 m2	Shell/Unit	1	Surf/Shell	98,36 m2
PERFORMANCE OF ONE UNIT					
		Shell Side		Tube Side	
Fluid Name					
Fluid Quantity, Total	kg/h	170899,99		15.800,00	
Vapor (In/Out)		0,00	0,00	15800,00	1403,20
Liquid		170899,99	170899,99	0,00	14396,80
Steam		0,00	0,00	3002,00	187,21
Water		170900,00	170900,00	0,00	2814,79
Noncondensable		0,00	0,00	0,00	0,00
Temperature (In/Out)	C	70,00	86,14	114,50	88,00
Density	kg/m3	977,20	968,10		847,20
Viscosity	cP	0,4080	0,3306	0,0114	0,0156 V/L 0,3108
Specific Heat	kcal/kg °C	0,998	0,999	0,3796	0,3166 V/L 0,5669
Thermal Conductivity	kcal/h m °C	0,558	0,563	0,0180	0,0209 V/L 0,1925
Latent Heat	kcal/kg	0,0000	0,000	164,1430	207,5390
Molecular Weight, Vapor					
Molecular Weight, Noncondensable					
Inlet Pressure	kgf/cm2	10,20		1,53	
Velocity	m/s	0,65		13,68	
Pressure Drop, Allow/Calc	kgf/cm2	0,51	0,31	0,8160	0,1270
Fouling Resistance (min)	m2 h °C/kcal	0,00008		0,00005	
Heat Exchanged	kcal/h	1.000.000	MTD (Corrected)	27,7 C	
Transfer Rate, Service	1022,57 kcal/m2 h °C	Clean	1449 kcal/m2 h °C	Actual	1209,79 kcal/m2 h °C
CONSTRUCTION OF ONE SHELL				Sketch (Bundle/Nozzle Orientation)	
		Shell Side	Tube Side		
Design/Test Pressure	kgf/cm2	10,55	10,54		
Design Temperature	C				
No Passes per Shell		1	2		
Corrosion Allowance	mm				
Connections	In mm	1 x 254,509	1 x 336,551		
Size & Rating	Out mm	1 x 254,509	1 x 154,051		
Tube No	223	OD 18,000 mm	Thk(Avg) 1,000 mm	Length 3900,0 mm	Pitch 24,000 mm
Tube Type	Smooth	Material 304 STAINLESS STEEL (18 CR, 8 NI)			
Shell internal diam.	590,560 mm	Shell Cover			
Channel or Bonnet		Channel Cover			
Tubesheet-Stationary		Tubesheet-Floating			
Floating Head Cover		Impingement Plate		None	
Baffles-Cross	Type SEGMENTAL	%Cut (Diam) 22,6	Spacing(c/c) 335,322	Inlet 495,937 mm	
Baffles-Long		Seal Type			
Supports-Tube		U-Bend	Type		
Bypass Seal Arrangement		Tube-Tubesheet Joint			
Expansion Joint		Type			
Gaskets-Shell Side		Tube Side			
-Floating Head					
Code Requirements		TEMA Class			
Weight/Shell	2389,17	Filled with Water	3864,33	Bundle	931,70 kg
Remarks:					

Automated tube-sheet plate design & customization

UNISUITE SHELL gives you a separate interface for the design and the customization of the tube-sheet plate. The process of the design is completely automated, but you can customize the geometrical parameters so they fit your requirements. When ready, you just have to click one button and the tube-sheet plate is designed.

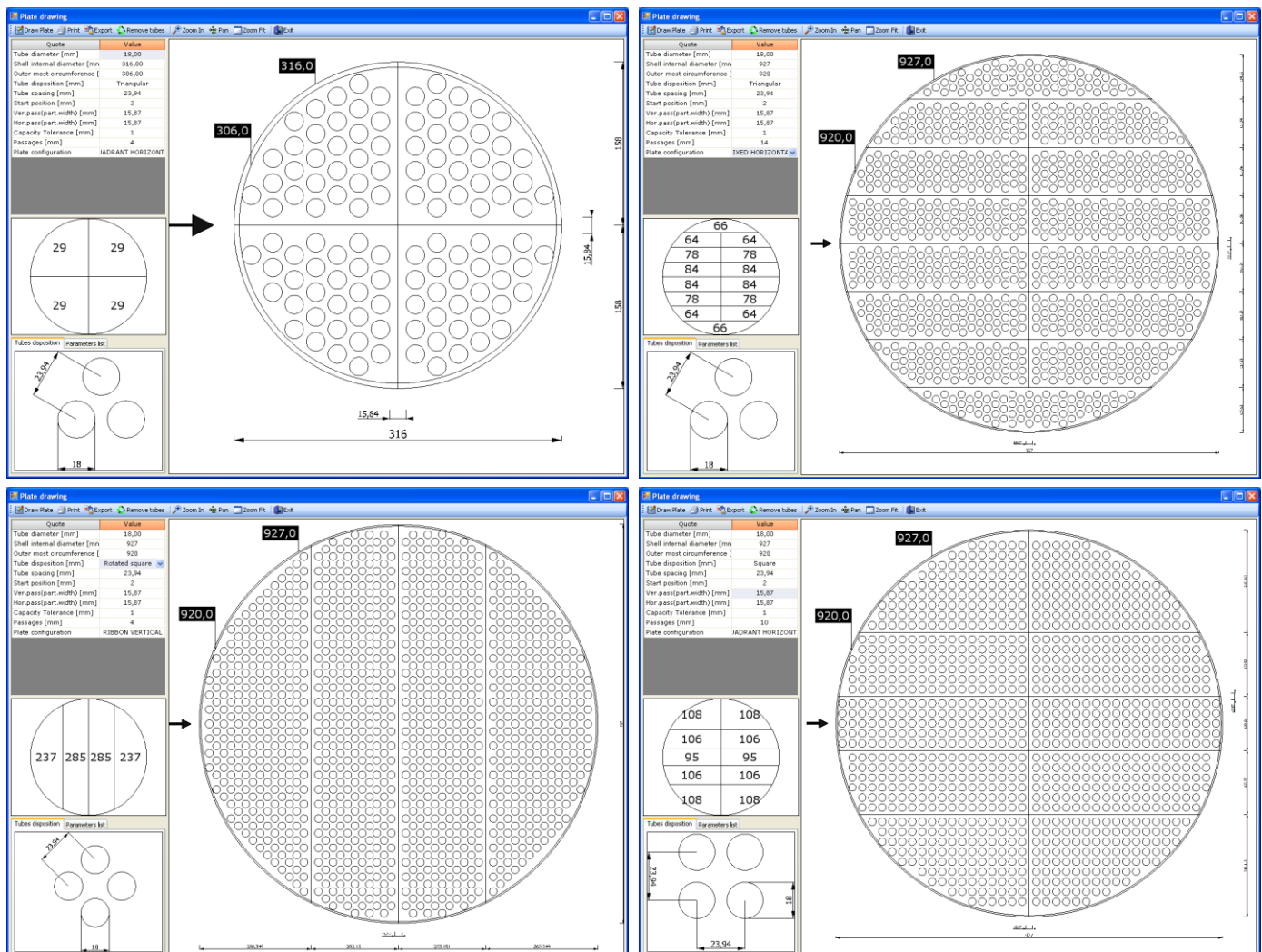
Input parameters are:

- The plate configuration
- Tube diameter, tubes spacing and disposition
- Shell internal diameter and outer most circumference
- Vertical and horizontal pass
- Number of passages (up to 20)

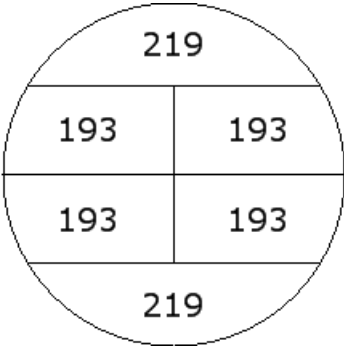
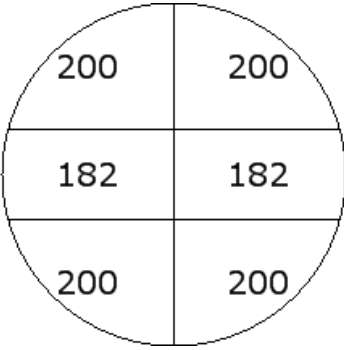
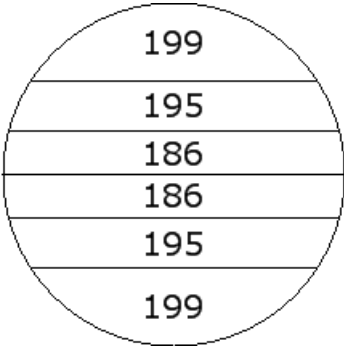
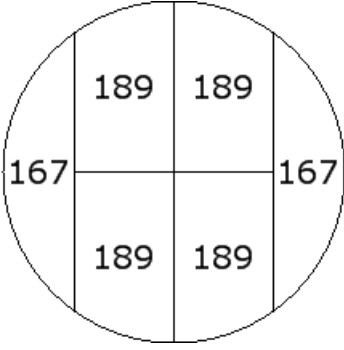
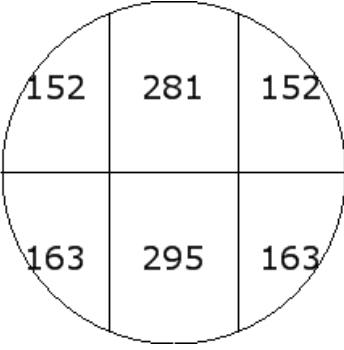
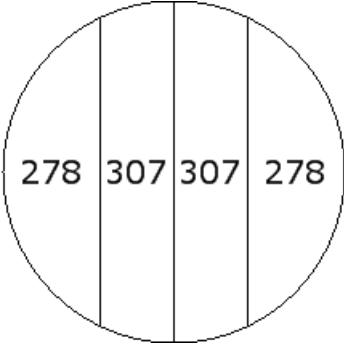
The plate configuration can be chosen between:

- Mixed horizontal and vertical
- Quadrant horizontal and vertical
- Ribbon horizontal and vertical

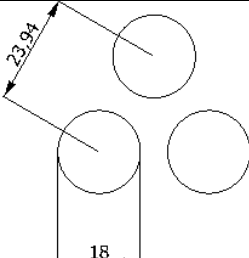
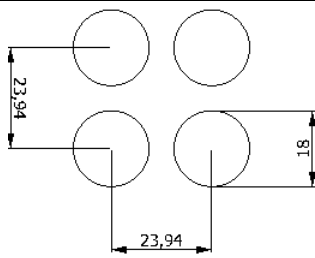
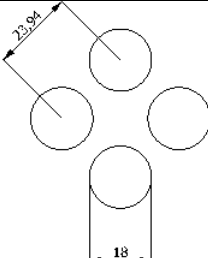
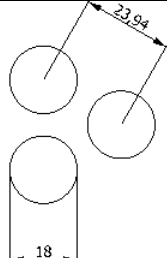
Some examples of the plate design:



Some examples of the plate configurations (shell internal diameter: 927 mm, 6 passages):

		
<p>Mixed horizontal</p>	<p>Quadrant horizontal</p>	<p>Ribbon horizontal</p>
		
<p>Mixed vertical</p>	<p>Quadrant vertical</p>	<p>Ribbon vertical (4 passages)</p>

The tubes disposition supported are:

			
<p>Triangular</p>	<p>Square</p>	<p>Rotated square</p>	<p>Rotated triangular</p>