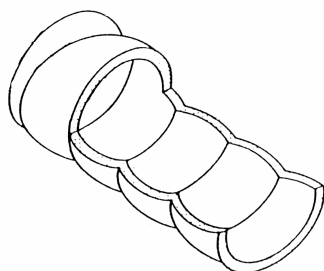


# CORRUGATED TUBULAR HEAT EXCHANGERS

MULTITUBE INDUSTRIAL SERIE

# CROSSFLO





## THE CORRUGATION

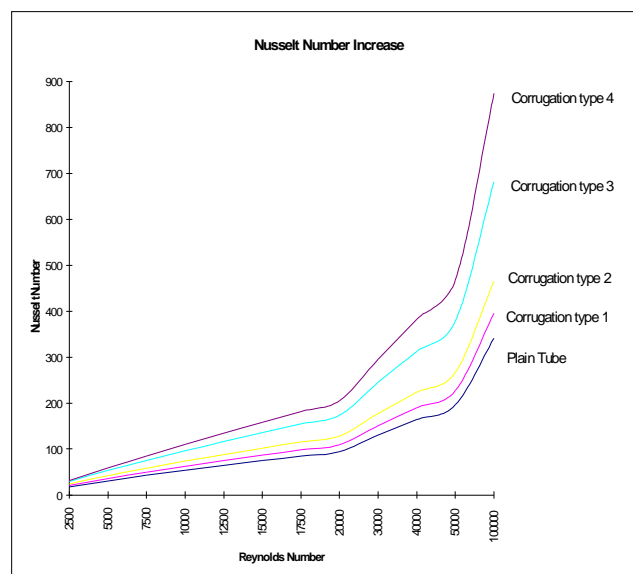
Corrugation is a particular processing applied on plain tubes to induce dynamic turbulence during the liquids flowing allowing thermal exchange optimization.

With corrugated tubes the thermal exchange efficiency can be enhanced by 40% up to 90% according to the following parameters:

- type of product
- selected profile
- type of application

## ADVANTAGES

- reduced exchange surfaces
- reduced contact and standing product time inside the element
- reduced washing time thanks to a higher action produced by turbulence
- vertical or horizontal installation
- working possibilities with high pressures and temperatures
- gaskets-free design so lower maintenance costs
- easy to install and exchanger modularity



The Multitube CROSSFLO Heat Exchanger consists of small diameter corrugated tubes fitted inside an external jacket and welded on tube plates at end sides. An expansion joint is fitted on external jacket.

The product to be thermally processed flows inside small diameter tubes while service fluid flows inside the external jacket.

Multitube CROSSFLO Heat Exchanger is fully welded.

### **Application range**

Particularly suited for thermal exchange process of industrial products having a low or medium viscosity even with particulates.

### **Standard materials**

Stainless steel AISI 304 / 316 L  
(Other kind of materials are available on request)

### **Standard pressure project**

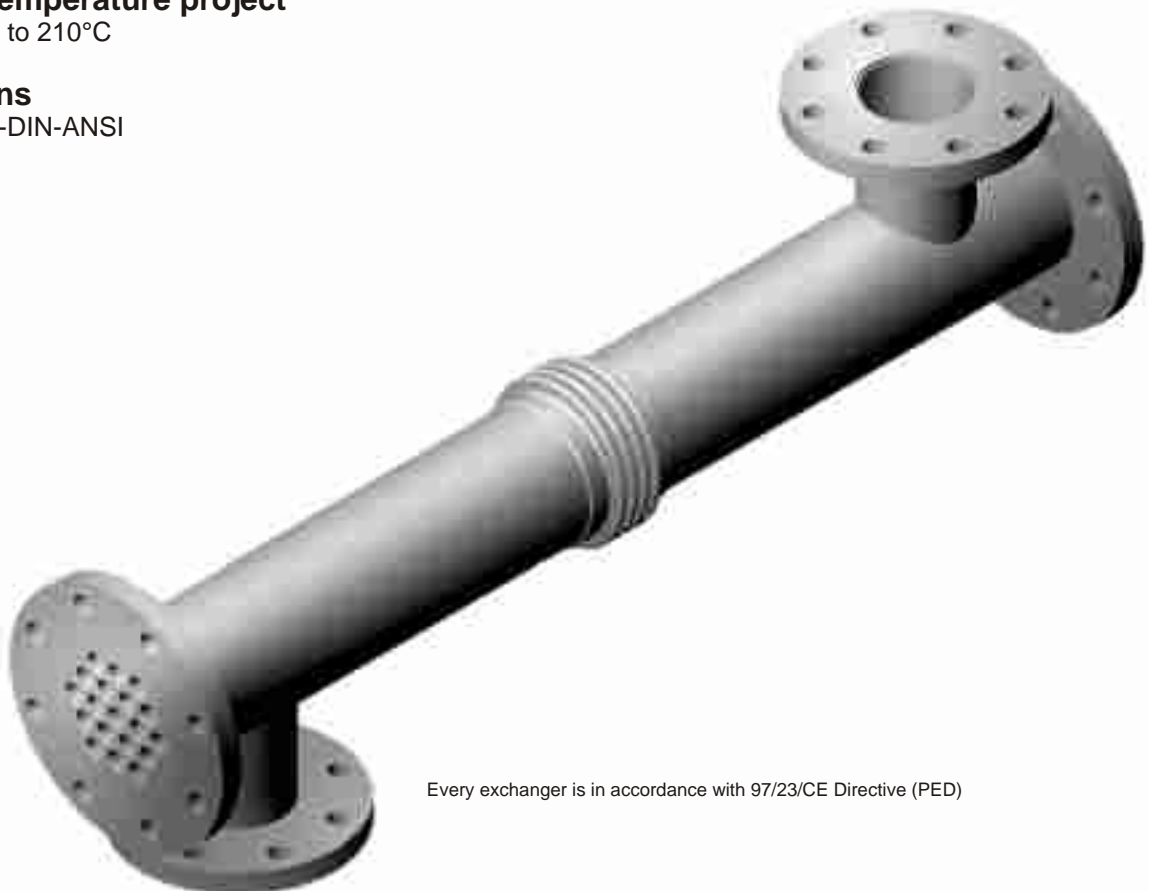
12/16 bar  
(Higher pressures are available depending on utilized connections)

### **Standard temperature project**

From 193° up to 210°C

### **Connections**

FLANGE UNI-DIN-ANSI



Every exchanger is in accordance with 97/23/CE Directive (PED)

### Codification

|                            |    |   |    |   |      |   |   |   |                                  |   |
|----------------------------|----|---|----|---|------|---|---|---|----------------------------------|---|
| MLI                        | 76 | 7 | 12 | 1 | 3000 | F | F | S | A                                | A |
|                            |    |   |    |   |      |   |   |   | Material                         |   |
|                            |    |   |    |   |      |   |   |   | Product / Service                |   |
|                            |    |   |    |   |      |   |   |   | A - EN 1.4301 - AISI 304         |   |
|                            |    |   |    |   |      |   |   |   | B - EN 1.4404 - AISI 316 L       |   |
|                            |    |   |    |   |      |   |   |   | Gaskets Material                 |   |
|                            |    |   |    |   |      |   |   |   | T - TEFLON                       |   |
|                            |    |   |    |   |      |   |   |   | W - WITHOUT ASBESTOS FREE        |   |
|                            |    |   |    |   |      |   |   |   | R - GASKET'S REINFORCED GRAPHITE |   |
|                            |    |   |    |   |      |   |   |   | - GASKET'S NOT INCLUDED          |   |
|                            |    |   |    |   |      |   |   |   | Element connections              |   |
|                            |    |   |    |   |      |   |   |   | Product / Service                |   |
|                            |    |   |    |   |      |   |   |   | D - DIN 11851                    |   |
|                            |    |   |    |   |      |   |   |   | F - FLANGE EN - ANSI             |   |
|                            |    |   |    |   |      |   |   |   | G - GAS UNI 338 - RJT            |   |
|                            |    |   |    |   |      |   |   |   | Lenght [ mm ]                    |   |
|                            |    |   |    |   |      |   |   |   | Expansion joint                  |   |
|                            |    |   |    |   |      |   |   |   | 0 - Excluded                     |   |
|                            |    |   |    |   |      |   |   |   | 1 - Included                     |   |
|                            |    |   |    |   |      |   |   |   | Product diameter [ mm ]          |   |
|                            |    |   |    |   |      |   |   |   | Inner tubes number               |   |
|                            |    |   |    |   |      |   |   |   | Sheet diameter [ mm ]            |   |
| Multitube version          |    |   |    |   |      |   |   |   |                                  |   |
| MLI - Total welded version |    |   |    |   |      |   |   |   |                                  |   |



| MODEL          | SHELL VOLUME [ litres ] | TUBES VOLUME [ litres ] | EXCHANGE AREA [ m <sup>2</sup> ] | SHELL SECTION [ mm <sup>2</sup> ] | TUBES SECTION [ mm <sup>2</sup> ] | WEIGHT [ kg ] |
|----------------|-------------------------|-------------------------|----------------------------------|-----------------------------------|-----------------------------------|---------------|
| MLI 60 12 1000 | 1.89                    | 0.50                    | 0.24                             | 1787.0                            | 549.8                             | 5.7           |
| MLI 60 12 1500 | 2.79                    | 0.78                    | 0.37                             | 1787.0                            | 549.8                             | 7.7           |
| MLI 60 12 2000 | 3.68                    | 1.05                    | 0.51                             | 1787.0                            | 549.8                             | 9.8           |
| MLI 60 12 3000 | 5.47                    | 1.60                    | 0.77                             | 1787.0                            | 549.8                             | 13.8          |
| MLI 60 12 6000 | 10.83                   | 3.25                    | 1.56                             | 1787.0                            | 549.8                             | 26.0          |

Category calculation for second group's fluids - Gas, melted gas and liquids with a steam tension at maximum temperature > 0.5 bar

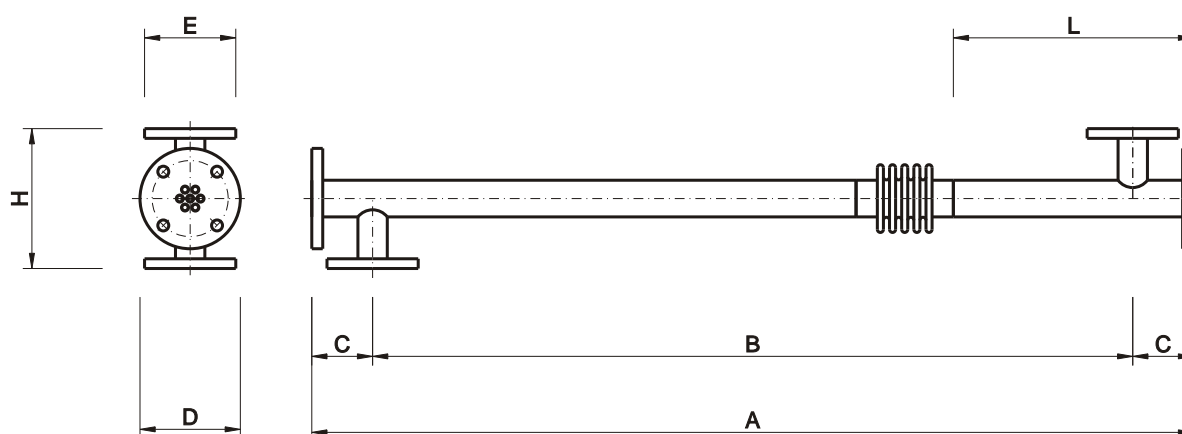
Article 3.3

1<sup>st</sup> Category

2<sup>nd</sup> Category

| MODEL          | VOLUME [ litres ] | PRESSURE [ bar ] * |   |   |     |   |   |   |   |     |    |    |    |
|----------------|-------------------|--------------------|---|---|-----|---|---|---|---|-----|----|----|----|
|                |                   | 1                  | 2 | 3 | 4   | 5 | 6 | 7 | 8 | 9   | 10 | 11 | 12 |
| MLI 60 12 1000 | Shell / Tubes     |                    |   |   |     |   |   |   |   |     |    |    |    |
| MLI 60 12 1500 | Shell / Tubes     |                    |   |   |     |   |   |   |   |     |    |    |    |
| MLI 60 12 2000 | Shell / Tubes     |                    |   |   |     |   |   |   |   |     |    |    |    |
| MLI 60 12 3000 | Shell / Tubes     |                    |   |   |     |   |   |   |   | 9.1 |    |    |    |
| MLI 60 12 6000 | Shell / Tubes     |                    |   |   | 4.6 |   |   |   |   |     |    |    |    |

\* for higher pressure contact MBS



| MODEL          | DIMENSIONS [ mm ] |      |     |   |   |     |     |
|----------------|-------------------|------|-----|---|---|-----|-----|
|                | A                 | B    | C   | D   | E   | H   | L   |
| MLI 60 12 1000 | 950               | 750  | 100 | EN 1092-1 DN 50 PN.16<br>more connections on demand | EN 1092-1 DN 40 PN.16<br>more connections on demand | 230 | 395 |
| MLI 60 12 1500 | 1450              | 1250 |     |   |   |     |     |
| MLI 60 12 2000 | 1950              | 1750 |     |   |   |     |     |
| MLI 60 12 3000 | 2950              | 2750 |     |   |   |     |     |
| MLI 60 12 6000 | 5950              | 5750 |     |   |   |     |     |

Not binding technical datas; may be modified by the Manufactures without advise



| MODEL       | SHELL VOLUME [ litres ] | TUBES VOLUME [ litres ] | EXCHANGE AREA [ m <sup>2</sup> ] | SHELL SECTION [ mm <sup>2</sup> ] | TUBES SECTION [ mm <sup>2</sup> ] | WEIGHT [ kg ] |
|-------------|-------------------------|-------------------------|----------------------------------|-----------------------------------|-----------------------------------|---------------|
| MLI 60 1000 | 1.69                    | 0.74                    | 0.21                             | 1560.8                            | 804.2                             | 5.5           |
| MLI 60 1500 | 2.47                    | 1.14                    | 0.32                             | 1560.8                            | 804.2                             | 7.4           |
| MLI 60 2000 | 3.25                    | 1.54                    | 0.43                             | 1560.8                            | 804.2                             | 9.4           |
| MLI 60 3000 | 4.81                    | 2.34                    | 0.66                             | 1560.8                            | 804.2                             | 13.2          |
| MLI 60 6000 | 9.49                    | 4.76                    | 1.34                             | 1560.8                            | 804.2                             | 24.7          |

Category calculation for second group's fluids - Gas, melted gas and liquids with a steam tension at maximum temperature > 0.5 bar

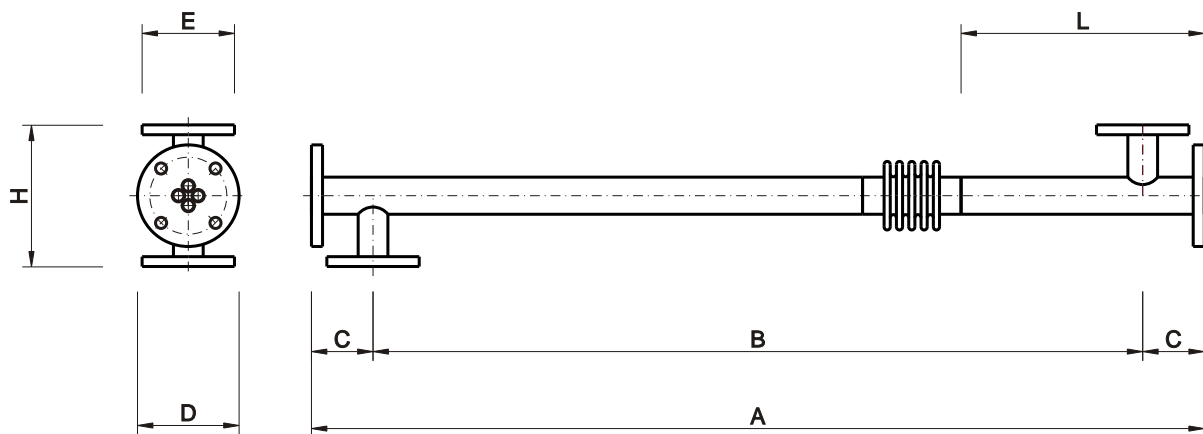
Article 3.3

1<sup>st</sup> Category

2<sup>nd</sup> Category

| MODEL       | VOLUME [ litres ] | PRESSURE [ bar ] * |   |   |   |     |   |   |   |   |      |      |    |  |
|-------------|-------------------|--------------------|---|---|---|-----|---|---|---|---|------|------|----|--|
|             |                   | 1                  | 2 | 3 | 4 | 5   | 6 | 7 | 8 | 9 | 10   | 11   | 12 |  |
| MLI 60 1000 | Shell / Tubes     |                    |   |   |   |     |   |   |   |   |      |      |    |  |
| MLI 60 1500 | Shell / Tubes     |                    |   |   |   |     |   |   |   |   |      |      |    |  |
| MLI 60 2000 | Shell / Tubes     |                    |   |   |   |     |   |   |   |   |      |      |    |  |
| MLI 60 3000 | Shell / Tubes     |                    |   |   |   |     |   |   |   |   | 10.3 |      |    |  |
| MLI 60 6000 | Shell / Tubes     |                    |   |   |   | 5.2 |   |   |   |   |      | 10.5 |    |  |

\* for higher pressure contact MBS



| MODEL       | DIMENSIONS [ mm ] |      |     |   |   |     |     |
|-------------|-------------------|------|-----|---|---|-----|-----|
|             | A                 | B    | C   | D   | E   | H   | L   |
| MLI 60 1000 | 950               | 750  | 100 | EN 1092-1 DN 50 PN.16<br>more connections on demand | EN 1092-1 DN 40 PN.16<br>more connections on demand | 230 | 395 |
| MLI 60 1500 | 1450              | 1250 |     |   |   |     |     |
| MLI 60 2000 | 1950              | 1750 |     |   |   |     |     |
| MLI 60 3000 | 2950              | 2750 |     |   |   |     |     |
| MLI 60 6000 | 5950              | 5750 |     |   |   |     |     |

Not binding technical datas; may be modified by the Manufactures without advise



| MODEL          | SHELL VOLUME [ litres ] | TUBES VOLUME [ litres ] | EXCHANGE AREA [ m <sup>2</sup> ] | SHELL SECTION [ mm <sup>2</sup> ] | TUBES SECTION [ mm <sup>2</sup> ] | WEIGHT [ kg ] |
|----------------|-------------------------|-------------------------|----------------------------------|-----------------------------------|-----------------------------------|---------------|
| MLI 76 12 1000 | 3.13                    | 0.72                    | 0.34                             | 2951.8                            | 785.4                             | 9.0           |
| MLI 76 12 1500 | 4.61                    | 1.11                    | 0.53                             | 2951.8                            | 785.4                             | 12.2          |
| MLI 76 12 2000 | 6.08                    | 1.50                    | 0.72                             | 2951.8                            | 785.4                             | 15.3          |
| MLI 76 12 3000 | 9.03                    | 2.29                    | 1.10                             | 2951.8                            | 785.4                             | 21.7          |
| MLI 76 12 6000 | 17.89                   | 4.64                    | 2.23                             | 2951.8                            | 785.4                             | 40.7          |

Category calculation for second group's fluids - Gas, melted gas and liquids with a steam tension at maximum temperature > 0.5 bar

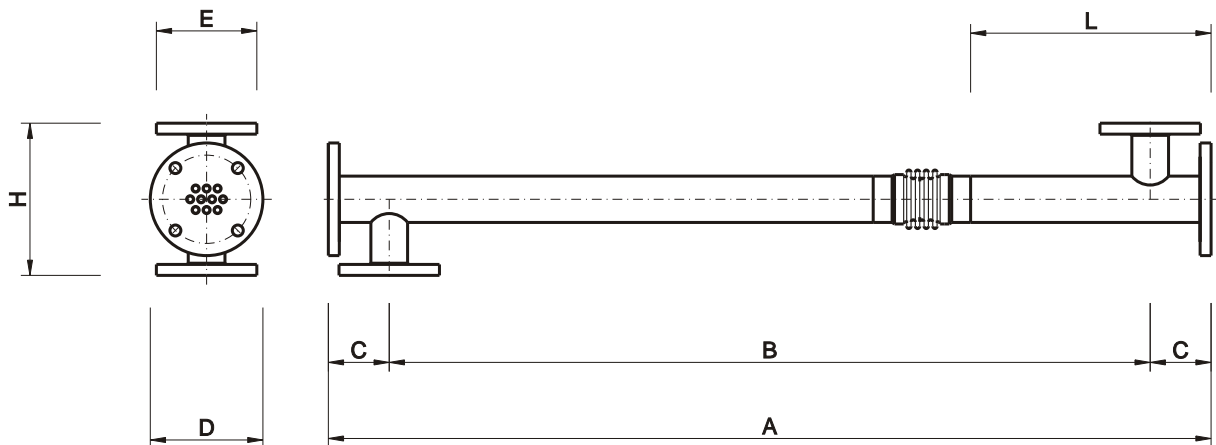
Article 3.3

1<sup>st</sup> Category

2<sup>nd</sup> Category

| MODEL          | VOLUME [ litres ] | PRESSURE [ bar ] * |     |   |   |     |   |   |     |   |      |      |      |  |
|----------------|-------------------|--------------------|-----|---|---|-----|---|---|-----|---|------|------|------|--|
|                |                   | 1                  | 2   | 3 | 4 | 5   | 6 | 7 | 8   | 9 | 10   | 11   | 12   |  |
| MLI 76 12 1000 | Shell / Tubes     |                    |     |   |   |     |   |   |     |   |      |      |      |  |
| MLI 76 12 1500 | Shell / Tubes     |                    |     |   |   |     |   |   |     |   | 10.8 |      |      |  |
| MLI 76 12 2000 | Shell / Tubes     |                    |     |   |   |     |   |   | 8.2 |   |      |      |      |  |
| MLI 76 12 3000 | Shell / Tubes     |                    |     |   |   | 5.5 |   |   |     |   |      |      |      |  |
| MLI 76 12 6000 | Shell / Tubes     |                    | 2.7 |   |   |     |   |   |     |   |      | 10.7 | 11.1 |  |

\* for higher pressure contact MBS



| MODEL          | DIMENSIONS [ mm ] |      |     |   |   |     |     |
|----------------|-------------------|------|-----|---|---|-----|-----|
|                | A                 | B    | C   | D   | E   | H   | L   |
| MLI 76 12 1000 | 950               | 750  | 100 | EN 1092-1 DN 65 PN.16<br>more connections on demand | EN 1092-1 DN 50 PN.16<br>more connections on demand | 250 | 395 |
| MLI 76 12 1500 | 1450              | 1250 |     |   |   |     |     |
| MLI 76 12 2000 | 1950              | 1750 |     |   |   |     |     |
| MLI 76 12 3000 | 2950              | 2750 |     |   |   |     |     |
| MLI 76 12 6000 | 5950              | 5750 |     |   |   |     |     |

Not binding technical datas; may be modified by the Manufactures without advise



| MODEL       | SHELL VOLUME [ litres ] | TUBES VOLUME [ litres ] | EXCHANGE AREA [ m <sup>2</sup> ] | SHELL SECTION [ mm <sup>2</sup> ] | TUBES SECTION [ mm <sup>2</sup> ] | WEIGHT [ kg ] |
|-------------|-------------------------|-------------------------|----------------------------------|-----------------------------------|-----------------------------------|---------------|
| MLI 76 1000 | 2.54                    | 1.29                    | 0.36                             | 2301.5                            | 1407.4                            | 9.2           |
| MLI 76 1500 | 3.69                    | 1.99                    | 0.56                             | 2301.5                            | 1407.4                            | 12.5          |
| MLI 76 2000 | 4.84                    | 2.69                    | 0.76                             | 2301.5                            | 1407.4                            | 15.8          |
| MLI 76 3000 | 7.14                    | 4.10                    | 1.15                             | 2301.5                            | 1407.4                            | 22.3          |
| MLI 76 6000 | 14.04                   | 8.32                    | 2.34                             | 2301.5                            | 1407.4                            | 42.0          |

Category calculation for second group's fluids - Gas, melted gas and liquids with a steam tension at maximum temperature > 0.5 bar

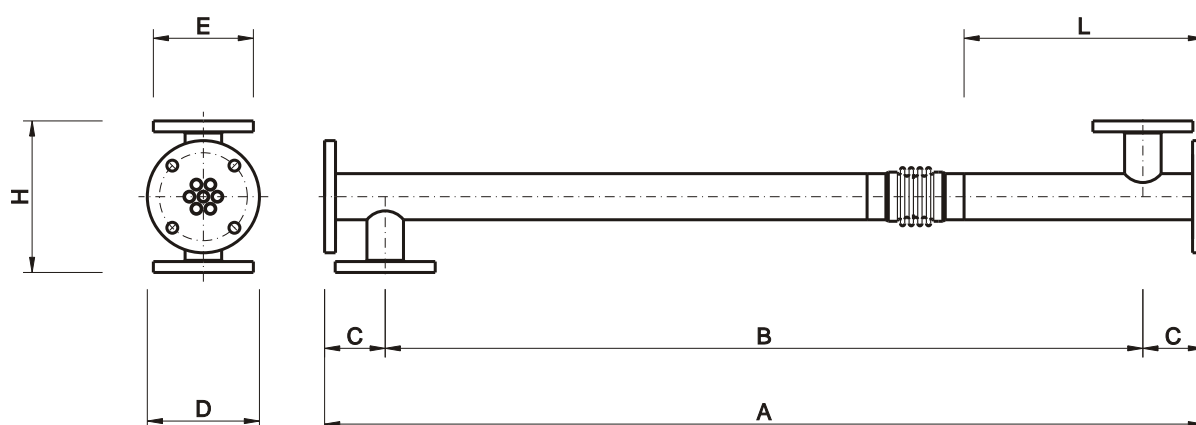
Article 3.3

1<sup>st</sup> Category

2<sup>nd</sup> Category

| MODEL       | VOLUME [ litres ] | PRESSURE [ bar ] * |   |     |   |   |   |     |   |      |    |    |    |      |
|-------------|-------------------|--------------------|---|-----|---|---|---|-----|---|------|----|----|----|------|
|             |                   | 1                  | 2 | 3   | 4 | 5 | 6 | 7   | 8 | 9    | 10 | 11 | 12 |      |
| MLI 76 1000 | Shell / Tubes     |                    |   |     |   |   |   |     |   |      |    |    |    |      |
| MLI 76 1500 | Shell / Tubes     |                    |   |     |   |   |   |     |   |      |    |    |    |      |
| MLI 76 2000 | Shell / Tubes     |                    |   |     |   |   |   |     |   | 10.3 |    |    |    |      |
| MLI 76 3000 | Shell / Tubes     |                    |   |     |   |   |   | 7.0 |   |      |    |    |    | 12.1 |
| MLI 76 6000 | Shell / Tubes     |                    |   | 3.5 |   |   |   | 6.0 |   |      |    |    |    |      |

\* for higher pressure contact MBS



| MODEL       | DIMENSIONS [ mm ] |      |     |   |   |     |     |
|-------------|-------------------|------|-----|---|---|-----|-----|
|             | A                 | B    | C   | D   | E   | H   | L   |
| MLI 76 1000 | 950               | 750  | 100 | EN 1092-1 DN 65 PN.16<br>more connections on demand | EN 1092-1 DN 50 PN.16<br>more connections on demand | 250 | 395 |
| MLI 76 1500 | 1450              | 1250 |     |   |   |     |     |
| MLI 76 2000 | 1950              | 1750 |     |   |   |     |     |
| MLI 76 3000 | 2950              | 2750 |     |   |   |     |     |
| MLI 76 6000 | 5950              | 5750 |     |   |   |     |     |

Not binding technical datas; may be modified by the Manufactures without advise





| MODEL          | SHELL VOLUME [ litres ] | TUBES VOLUME [ litres ] | EXCHANGE AREA [ m <sup>2</sup> ] | SHELL SECTION [ mm <sup>2</sup> ] | TUBES SECTION [ mm <sup>2</sup> ] | WEIGHT [ kg ] |
|----------------|-------------------------|-------------------------|----------------------------------|-----------------------------------|-----------------------------------|---------------|
| MLI 88 12 1000 | 3.98                    | 1.36                    | 0.65                             | 3512.3                            | 1492.3                            | 13.0          |
| MLI 88 12 1500 | 5.73                    | 2.10                    | 1.01                             | 3512.3                            | 1492.3                            | 17.7          |
| MLI 88 12 2000 | 7.49                    | 2.85                    | 1.37                             | 3512.3                            | 1492.3                            | 22.4          |
| MLI 88 12 3000 | 11.00                   | 4.34                    | 2.08                             | 3512.3                            | 1492.3                            | 31.8          |
| MLI 88 12 6000 | 21.54                   | 8.82                    | 4.23                             | 3512.3                            | 1492.3                            | 60.0          |

Category calculation for second group's fluids - Gas, melted gas and liquids with a steam tension at maximum temperature > 0.5 bar

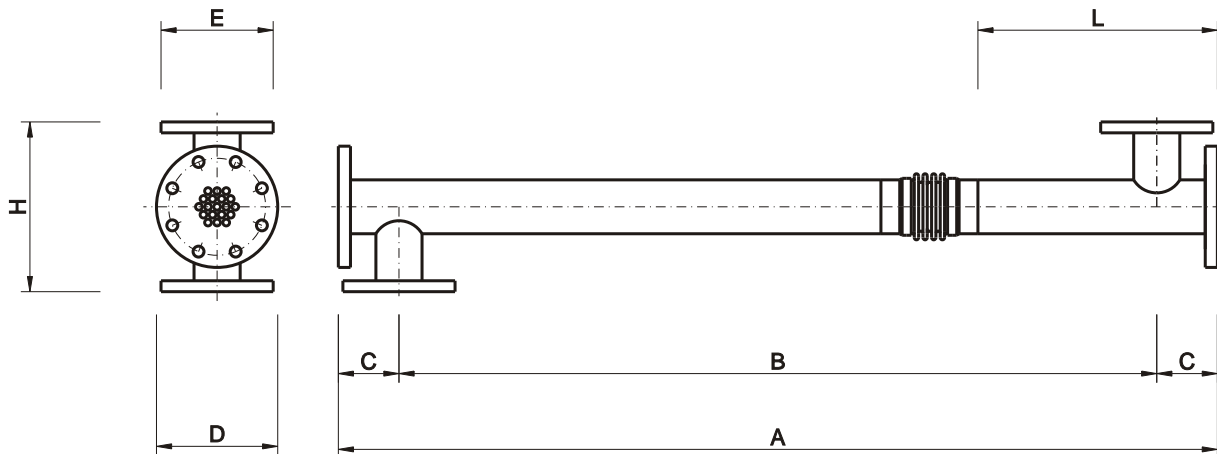
Article 3.3

1<sup>st</sup> Category

2<sup>nd</sup> Category

| MODEL          | VOLUME [ litres ] | PRESSURE [ bar ] * |     |   |     |   |     |   |     |   |     |    |      |      |
|----------------|-------------------|--------------------|-----|---|-----|---|-----|---|-----|---|-----|----|------|------|
|                |                   | 1                  | 2   | 3 | 4   | 5 | 6   | 7 | 8   | 9 | 10  | 11 | 12   |      |
| MLI 88 12 1000 | Shell / Tubes     |                    |     |   |     |   |     |   |     |   |     |    |      | 12.5 |
| MLI 88 12 1500 | Shell / Tubes     |                    |     |   |     |   |     |   | 8.7 |   |     |    |      |      |
| MLI 88 12 2000 | Shell / Tubes     |                    |     |   |     |   | 6.6 |   |     |   |     |    |      |      |
| MLI 88 12 3000 | Shell / Tubes     |                    |     |   | 4.5 |   |     |   |     |   |     |    | 11.5 |      |
| MLI 88 12 6000 | Shell / Tubes     |                    | 2.3 |   |     |   | 5.6 |   |     |   | 9.2 |    |      |      |

\* for higher pressure contact MBS



| MODEL          | DIMENSIONS [ mm ] |      |     |   |   |     |     |
|----------------|-------------------|------|-----|---|---|-----|-----|
|                | A                 | B    | C   | D   | E   | H   | L   |
| MLI 88 12 1000 | 950               | 750  | 100 | EN 1092-1 DN 80 PN.16<br>more connections on demand | EN 1092-1 DN 65 PN.16<br>more connections on demand | 280 | 395 |
| MLI 88 12 1500 | 1450              | 1250 |     |   |   |     |     |
| MLI 88 12 2000 | 1950              | 1750 |     |   |   |     |     |
| MLI 88 12 3000 | 2950              | 2750 |     |   |   |     |     |
| MLI 88 12 6000 | 5950              | 5750 |     |   |   |     |     |

Not binding technical datas; may be modified by the Manufactures without advise



| MODEL       | SHELL VOLUME [ litres ] | TUBES VOLUME [ litres ] | EXCHANGE AREA [ m <sup>2</sup> ] | SHELL SECTION [ mm <sup>2</sup> ] | TUBES SECTION [ mm <sup>2</sup> ] | WEIGHT [ kg ] |
|-------------|-------------------------|-------------------------|----------------------------------|-----------------------------------|-----------------------------------|---------------|
| MLI 88 1000 | 3.62                    | 1.83                    | 0.51                             | 3116.5                            | 2010.6                            | 12.1          |
| MLI 881500  | 5.17                    | 2.83                    | 0.80                             | 3116.5                            | 2010.6                            | 16.3          |
| MLI 88 2000 | 6.73                    | 3.84                    | 1.08                             | 3116.5                            | 2010.6                            | 20.5          |
| MLI 88 3000 | 9.85                    | 5.85                    | 1.65                             | 3116.5                            | 2010.6                            | 29.0          |
| MLI 88 6000 | 19.20                   | 11.88                   | 3.34                             | 3116.5                            | 2010.6                            | 54.3          |

Category calculation for second group's fluids - Gas, melted gas and liquids with a steam tension at maximum temperature > 0.5 bar

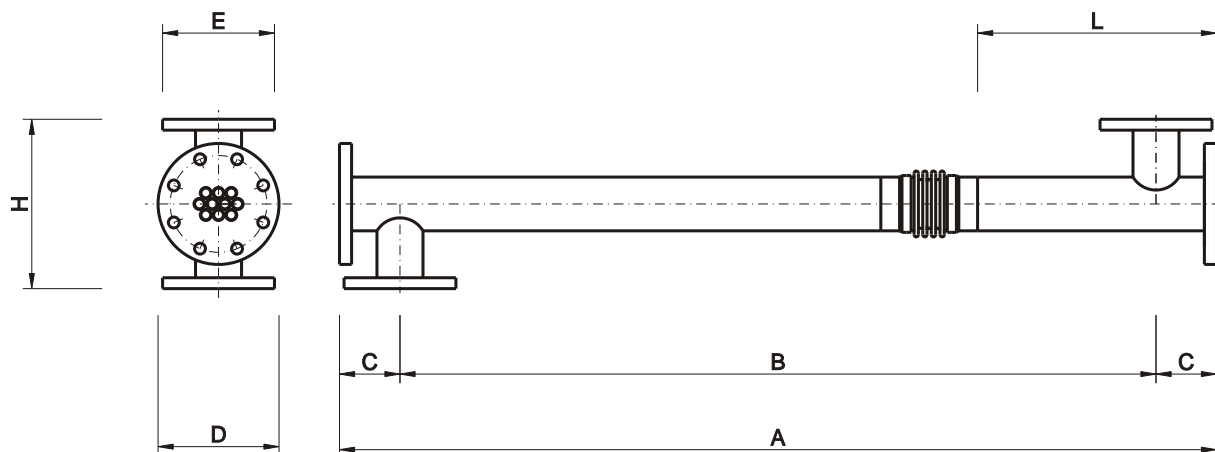
Article 3.3

1<sup>st</sup> Category

2<sup>nd</sup> Category

| MODEL       | VOLUME [ litres ] | PRESSURE [ bar ] * |     |   |   |     |   |     |     |     |      |    |    |
|-------------|-------------------|--------------------|-----|---|---|-----|---|-----|-----|-----|------|----|----|
|             |                   | 1                  | 2   | 3 | 4 | 5   | 6 | 7   | 8   | 9   | 10   | 11 | 12 |
| MLI 88 1000 | Shell / Tubes     |                    |     |   |   |     |   |     |     |     |      |    |    |
| MLI 88 1500 | Shell / Tubes     |                    |     |   |   |     |   |     |     | 9.6 |      |    |    |
| MLI 88 2000 | Shell / Tubes     |                    |     |   |   |     |   | 7.4 |     |     |      |    |    |
| MLI 88 3000 | Shell / Tubes     |                    |     |   |   | 5.0 |   |     | 8.5 |     |      |    |    |
| MLI 88 6000 | Shell / Tubes     |                    | 2.6 |   |   | 4.2 |   |     |     |     | 10.4 |    |    |

\* for higher pressure contact MBS



| MODEL       | DIMENSIONS [ mm ] |      |     |   |   |     |     |
|-------------|-------------------|------|-----|---|---|-----|-----|
|             | A                 | B    | C   | D   | E   | H   | L   |
| MLI 88 1000 | 950               | 750  | 100 | EN 1092-1 DN 80 PN.16<br>more connections on demand | EN 1092-1 DN 65 PN.16<br>more connections on demand | 280 | 395 |
| MLI 88 1500 | 1450              | 1250 |     |   |   |     |     |
| MLI 88 2000 | 1950              | 1750 |     |   |   |     |     |
| MLI 88 3000 | 2950              | 2750 |     |   |   |     |     |
| MLI 88 6000 | 5950              | 5750 |     |   |   |     |     |

Not binding technical datas; may be modified by the Manufactures without advise



| MODEL           | SHELL VOLUME [ litres ] | TUBES VOLUME [ litres ] | EXCHANGE AREA [ m <sup>2</sup> ] | SHELL SECTION [ mm <sup>2</sup> ] | TUBES SECTION [ mm <sup>2</sup> ] | WEIGHT [ kg ] |
|-----------------|-------------------------|-------------------------|----------------------------------|-----------------------------------|-----------------------------------|---------------|
| MLI 114 12 1000 | 5.92                    | 2.63                    | 1.26                             | 5370.6                            | 2906.0                            | 21.4          |
| MLI 114 12 1500 | 8.60                    | 4.09                    | 1.96                             | 5370.6                            | 2906.0                            | 29.2          |
| MLI 114 12 2000 | 11.29                   | 5.54                    | 2.66                             | 5370.6                            | 2906.0                            | 36.9          |
| MLI 114 12 3000 | 16.66                   | 8.44                    | 4.05                             | 5370.6                            | 2906.0                            | 52.5          |
| MLI 114 12 6000 | 32.77                   | 17.16                   | 8.24                             | 5370.6                            | 2906.0                            | 99.1          |

Category calculation for second group's fluids - Gas, melted gas and liquids with a steam tension at maximum temperature > 0.5 bar

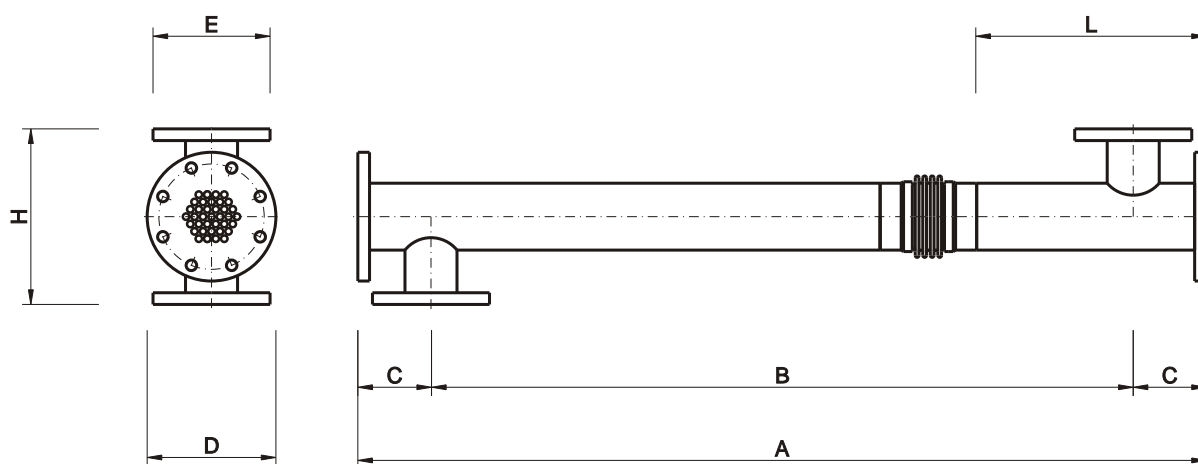
Article 3.3

1<sup>st</sup> Category

2<sup>nd</sup> Category

| MODEL           | VOLUME [ litres ] | PRESSURE [ bar ] * |     |     |     |     |     |     |     |     |    |    |      |
|-----------------|-------------------|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|----|----|------|
|                 |                   | 1                  | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10 | 11 | 12   |
| MLI 114 12 1000 | Shell / Tubes     |                    |     |     |     |     |     |     | 8.4 |     |    |    |      |
| MLI 114 12 1500 | Shell / Tubes     |                    |     |     |     | 5.8 |     |     |     |     |    |    | 12.2 |
| MLI 114 12 2000 | Shell / Tubes     |                    |     |     | 4.4 |     |     |     |     | 9.0 |    |    |      |
| MLI 114 12 3000 | Shell / Tubes     |                    |     | 3.0 |     |     | 5.9 |     |     |     |    |    | 12.0 |
| MLI 114 12 6000 | Shell / Tubes     | 1.5                | 2.9 |     |     |     |     | 6.1 |     |     |    |    | 11.6 |

\* for higher pressure contact MBS



| MODEL           | DIMENSIONS [ mm ] |      |     |  |   |     |       |
|-----------------|-------------------|------|-----|--|---|-----|-------|
|                 | A                 | B    | C   | D  | E   | H   | L     |
| MLI 114 12 1000 | 950               | 700  | 125 | EN 1092-1 DN 100 PN.16<br>more connections on demand | EN 1092-1 DN 80 PN.16<br>more connections on demand | 300 | 392.5 |
| MLI 114 12 1500 | 1450              | 1200 |     |  |   |     |       |
| MLI 114 12 2000 | 1950              | 1700 |     |  |   |     |       |
| MLI 114 12 3000 | 2950              | 2700 |     |  |   |     |       |
| MLI 114 12 6000 | 5950              | 5700 |     |  |   |     |       |

Not binding technical datas; may be modified by the Manufactures without advise



| MODEL        | SHELL VOLUME [ litres ] | TUBES VOLUME [ litres ] | EXCHANGE AREA [ m <sup>2</sup> ] | SHELL SECTION [ mm <sup>2</sup> ] | TUBES SECTION [ mm <sup>2</sup> ] | WEIGHT [ kg ] |
|--------------|-------------------------|-------------------------|----------------------------------|-----------------------------------|-----------------------------------|---------------|
| MLI 114 1000 | 5.33                    | 3.46                    | 0.97                             | 4720.3                            | 3820.2                            | 19.5          |
| MLI 114 1500 | 7.69                    | 5.37                    | 1.51                             | 4720.3                            | 3820.2                            | 26.2          |
| MLI 114 2000 | 10.05                   | 7.28                    | 2.05                             | 4720.3                            | 3820.2                            | 33.0          |
| MLI 114 3000 | 14.77                   | 11.10                   | 3.12                             | 4720.3                            | 3820.2                            | 46.4          |
| MLI 114 6000 | 28.93                   | 22.56                   | 6.35                             | 4720.3                            | 3820.2                            | 86.8          |

Category calculation for second group's fluids - Gas, melted gas and liquids with a steam tension at maximum temperature > 0.5 bar

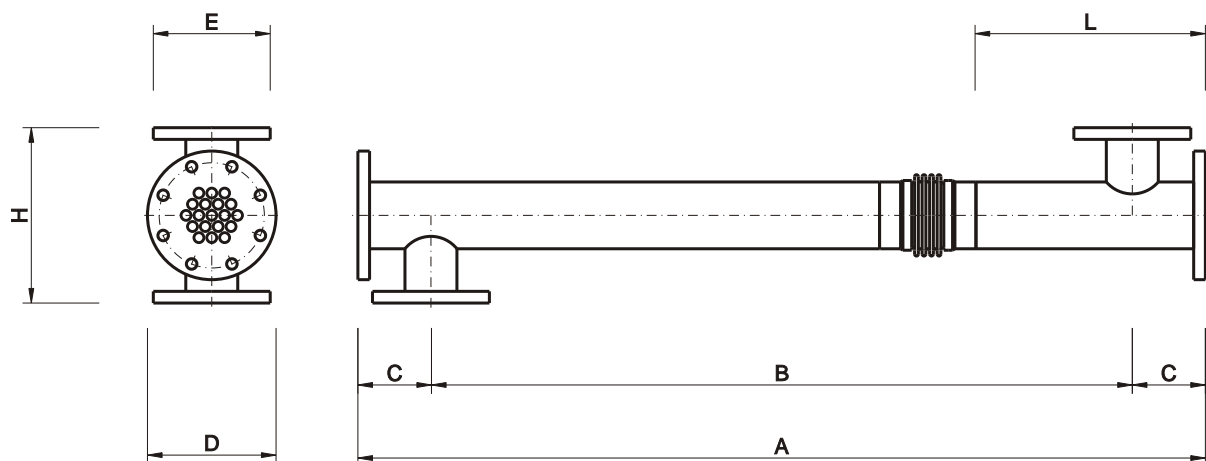
Article 3.3

1<sup>st</sup> Category

2<sup>nd</sup> Category

| MODEL        | VOLUME [ litres ] | PRESSURE [ bar ] * |     |     |     |   |     |   |     |     |    |    |    |
|--------------|-------------------|--------------------|-----|-----|-----|---|-----|---|-----|-----|----|----|----|
|              |                   | 1                  | 2   | 3   | 4   | 5 | 6   | 7 | 8   | 9   | 10 | 11 | 12 |
| MLI 114 1000 | Shell / Tubes     |                    |     |     |     |   |     |   |     | 9.3 |    |    |    |
| MLI 114 1500 | Shell / Tubes     |                    |     |     |     |   | 6.5 |   |     | 9.3 |    |    |    |
| MLI 114 2000 | Shell / Tubes     |                    |     |     | 4.9 |   | 6.8 |   |     |     |    |    |    |
| MLI 114 3000 | Shell / Tubes     |                    |     | 3.3 | 4.5 |   |     |   |     |     |    |    |    |
| MLI 114 6000 | Shell / Tubes     | 1.7                | 2.2 |     |     |   | 6.9 |   | 8.8 |     |    |    |    |

\* for higher pressure contact MBS



| MODEL        | DIMENSIONS [ mm ] |      |     |  |   |     |       |
|--------------|-------------------|------|-----|--|---|-----|-------|
|              | A                 | B    | C   | D  | E   | H   | L     |
| MLI 114 1000 | 950               | 700  | 125 | EN 1092-1 DN 100 PN.16<br>more connections on demand | EN 1092-1 DN 80 PN.16<br>more connections on demand | 300 | 392.5 |
| MLI 114 1500 | 1450              | 1200 |     |  |   |     |       |
| MLI 114 2000 | 1950              | 1700 |     |  |   |     |       |
| MLI 114 3000 | 2950              | 2700 |     |  |   |     |       |
| MLI 114 6000 | 5950              | 5700 |     |  |   |     |       |

Not binding technical datas; may be modified by the Manufactures without advise



| MODEL           | SHELL VOLUME [ litres ] | TUBES VOLUME [ litres ] | EXCHANGE AREA [ m <sup>2</sup> ] | SHELL SECTION [ mm <sup>2</sup> ] | TUBES SECTION [ mm <sup>2</sup> ] | WEIGHT [ kg ] |
|-----------------|-------------------------|-------------------------|----------------------------------|-----------------------------------|-----------------------------------|---------------|
| MLI 139 12 1000 | 9.65                    | 3.68                    | 1.77                             | 8581.6                            | 4084.1                            | 29.8          |
| MLI 139 12 1500 | 13.95                   | 5.73                    | 2.75                             | 8581.6                            | 4084.1                            | 40.2          |
| MLI 139 12 2000 | 18.24                   | 7.77                    | 3.73                             | 8581.6                            | 4084.1                            | 50.6          |
| MLI 139 12 3000 | 26.82                   | 11.85                   | 5.69                             | 8581.6                            | 4084.1                            | 71.5          |
| MLI 139 12 6000 | 52.56                   | 24.10                   | 11.57                            | 8581.6                            | 4084.1                            | 134.0         |

Category calculation for second group's fluids - Gas, melted gas and liquids with a steam tension at maximum temperature > 0.5 bar

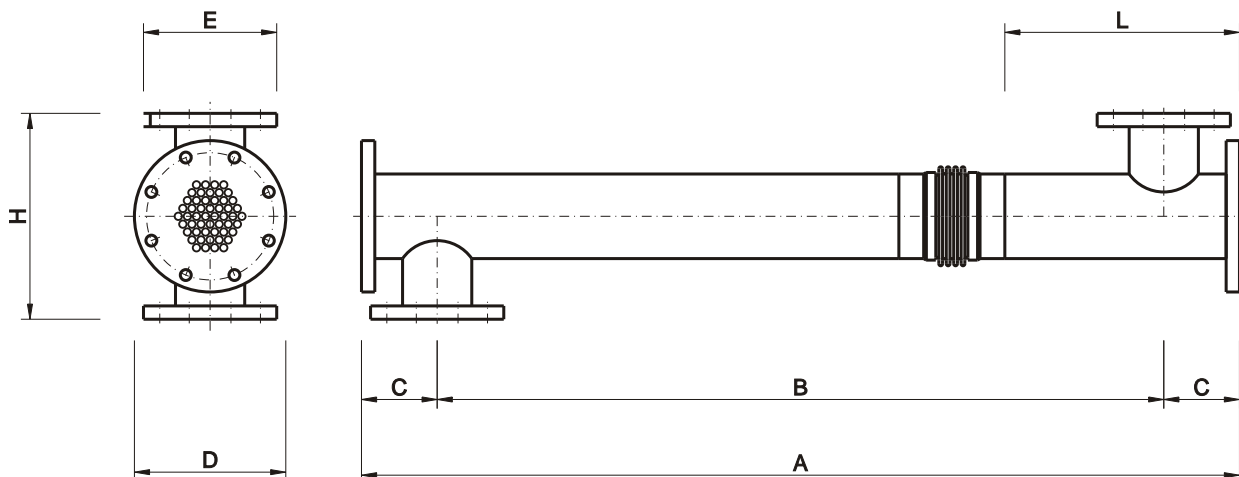
Article 3.3

1<sup>st</sup> Category

2<sup>nd</sup> Category

| MODEL           | VOLUME [ litres ] | PRESSURE [ bar ] * |     |     |   |     |     |     |     |   |      |    |    |
|-----------------|-------------------|--------------------|-----|-----|---|-----|-----|-----|-----|---|------|----|----|
|                 |                   | 1                  | 2   | 3   | 4 | 5   | 6   | 7   | 8   | 9 | 10   | 11 | 12 |
| MLI 139 12 1000 | Shell / Tubes     |                    |     |     |   | 5.1 |     |     |     |   |      |    |    |
| MLI 139 12 1500 | Shell / Tubes     |                    |     | 3.5 |   |     |     |     | 8.7 |   |      |    |    |
| MLI 139 12 2000 | Shell / Tubes     |                    | 2.7 |     |   |     | 6.4 |     |     |   | 10.9 |    |    |
| MLI 139 12 3000 | Shell / Tubes     | 1.8                |     |     |   | 4.2 |     | 7.4 |     |   |      |    |    |
| MLI 139 12 6000 | Shell / Tubes     |                    | 2.0 | 3.8 |   |     |     |     | 8.2 |   |      |    |    |

\* for higher pressure contact MBS



| MODEL           | DIMENSIONS [ mm ] |      |     |  |  |     |       |
|-----------------|-------------------|------|-----|--|--|-----|-------|
|                 | A                 | B    | C   | D  | E  | H   | L     |
| MLI 139 12 1000 | 950               | 700  |     |  |  |     |       |
| MLI 139 12 1500 | 1450              | 1200 |     |  |  |     |       |
| MLI 139 12 2000 | 1950              | 1700 |     |  |  |     |       |
| MLI 139 12 3000 | 2950              | 2700 |     |  |  |     |       |
| MLI 139 12 6000 | 5950              | 5700 | 125 | EN 1092-1 DN 125 PN.16<br>more connections on demand | EN 1092-1 DN 100 PN.16<br>more connections on demand | 340 | 387.5 |

Not binding technical datas; may be modified by the Manufactures without advise



| MODEL        | SHELL VOLUME [ litres ] | TUBES VOLUME [ litres ] | EXCHANGE AREA [ m <sup>2</sup> ] | SHELL SECTION [ mm <sup>2</sup> ] | TUBES SECTION [ mm <sup>2</sup> ] | WEIGHT [ kg ] |
|--------------|-------------------------|-------------------------|----------------------------------|-----------------------------------|-----------------------------------|---------------|
| MLI 139 1000 | 8.76                    | 4.90                    | 1.38                             | 7592.0                            | 5428.7                            | 27.2          |
| MLI 139 1500 | 12.56                   | 7.61                    | 2.14                             | 7592.0                            | 5428.7                            | 36.3          |
| MLI 139 2000 | 16.35                   | 10.33                   | 2.90                             | 7592.0                            | 5428.7                            | 45.3          |
| MLI 139 3000 | 23.95                   | 15.75                   | 4.43                             | 7592.0                            | 5428.7                            | 63.4          |
| MLI 139 6000 | 46.72                   | 32.04                   | 9.01                             | 7592.0                            | 5428.7                            | 117.5         |

Category calculation for second group's fluids - Gas, melted gas and liquids with a steam tension at maximum temperature > 0.5 bar

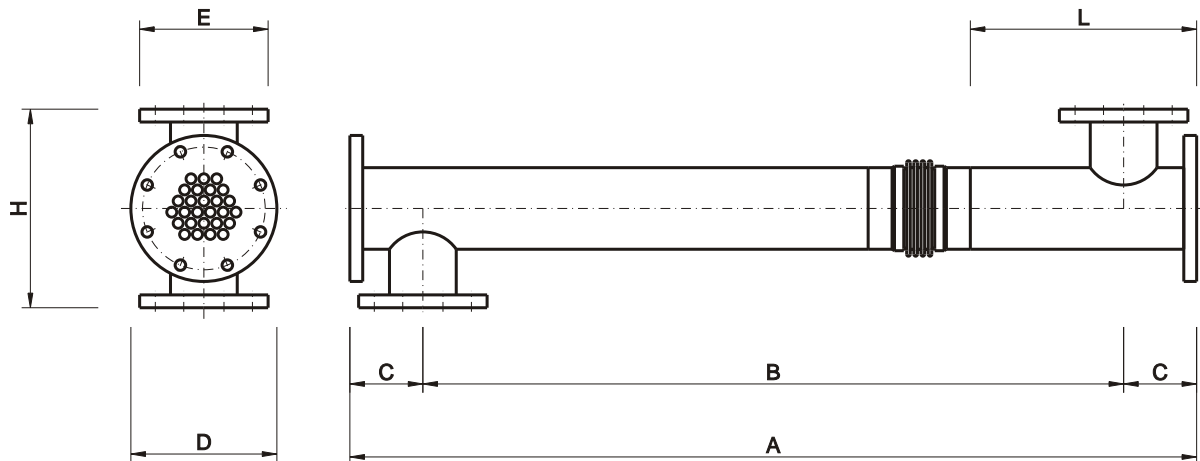
Article 3.3

1<sup>st</sup> Category

2<sup>nd</sup> Category

| MODEL        | VOLUME [ litres ] | PRESSURE [ bar ] * |     |     |     |     |   |     |     |   |     |    |      |  |  |      |
|--------------|-------------------|--------------------|-----|-----|-----|-----|---|-----|-----|---|-----|----|------|--|--|------|
|              |                   | 1                  | 2   | 3   | 4   | 5   | 6 | 7   | 8   | 9 | 10  | 11 | 12   |  |  |      |
| MLI 139 1000 | Shell / Tubes     |                    |     |     |     | 5.7 |   |     |     |   |     |    | 10.2 |  |  |      |
| MLI 139 1500 | Shell / Tubes     |                    |     | 3.9 |     |     |   | 6.5 |     |   |     |    |      |  |  |      |
| MLI 139 2000 | Shell / Tubes     |                    |     | 3.0 |     | 4.8 |   |     |     |   |     |    |      |  |  | 12.2 |
| MLI 139 3000 | Shell / Tubes     |                    | 2.0 |     | 3.1 |     |   |     |     |   | 8.3 |    |      |  |  | 12.6 |
| MLI 139 6000 | Shell / Tubes     | 1.0                | 1.5 |     |     | 4.2 |   |     | 6.2 |   |     |    |      |  |  |      |

\* for higher pressure contact MBS



| MODEL        | DIMENSIONS [ mm ] |      |     |                        |                        |     |       |
|--------------|-------------------|------|-----|------------------------|------------------------|-----|-------|
|              | A                 | B    | C   | D                      | E                      | H   | L     |
| MLI 139 1000 | 950               | 700  | 125 | EN 1092-1 DN 125 PN.16 | EN 1092-1 DN 100 PN.16 | 340 | 387.5 |
| MLI 139 1500 | 1450              | 1200 |     |                        |                        |     |       |
| MLI 139 2000 | 1950              | 1700 |     |                        |                        |     |       |
| MLI 139 3000 | 2950              | 2700 |     |                        |                        |     |       |
| MLI 139 6000 | 5950              | 5700 |     |                        |                        |     |       |

Not binding technical datas; may be modified by the Manufactures without advise



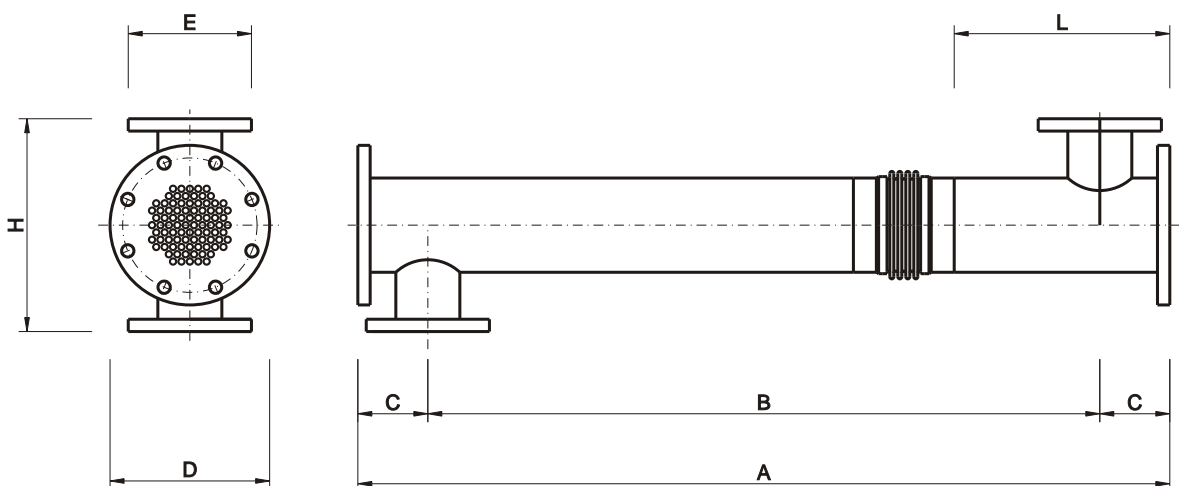
| MODEL           | SHELL VOLUME [ litres ] | TUBES VOLUME [ litres ] | EXCHANGE AREA [ m <sup>2</sup> ] | SHELL SECTION [ mm <sup>2</sup> ] | TUBES SECTION [ mm <sup>2</sup> ] | WEIGHT [ kg ] |
|-----------------|-------------------------|-------------------------|----------------------------------|-----------------------------------|-----------------------------------|---------------|
| MLI 168 12 1000 | 11.71                   | 6.23                    | 2.99                             | 10735.8                           | 6911.5                            | 48.5          |
| MLI 168 12 1500 | 17.07                   | 9.69                    | 4.65                             | 10735.8                           | 6911.5                            | 66.5          |
| MLI 168 12 2000 | 22.44                   | 13.15                   | 6.31                             | 10735.8                           | 6911.5                            | 84.5          |
| MLI 168 12 3000 | 33.18                   | 20.06                   | 9.63                             | 10735.8                           | 6911.5                            | 120.5         |
| MLI 168 12 6000 | 65.39                   | 40.79                   | 19.58                            | 10735.8                           | 6911.5                            | 228.5         |

Category calculation for second group's fluids - Gas, melted gas and liquids with a steam tension at maximum temperature > 0.5 bar

Article 3.3      1<sup>st</sup> Category      2<sup>nd</sup> Category      3<sup>rd</sup> Category

| MODEL           | VOLUME [ litres ] | PRESSURE [ bar ] * |     |     |     |   |     |     |   |     |    |     |      |  |
|-----------------|-------------------|--------------------|-----|-----|-----|---|-----|-----|---|-----|----|-----|------|--|
|                 |                   | 1                  | 2   | 3   | 4   | 5 | 6   | 7   | 8 | 9   | 10 | 11  | 12   |  |
| MLI 168 12 1000 | Shell / Tubes     |                    |     |     | 4.2 |   |     |     |   | 8.0 |    |     |      |  |
| MLI 168 12 1500 | Shell / Tubes     |                    | 2.9 |     |     |   | 5.1 |     |   |     |    |     | 11.7 |  |
| MLI 168 12 2000 | Shell / Tubes     |                    | 2.2 |     | 3.8 |   |     |     |   | 8.9 |    |     |      |  |
| MLI 168 12 3000 | Shell / Tubes     | 1.5                |     | 2.4 |     |   |     | 6.0 |   |     |    | 9.9 |      |  |
| MLI 168 12 6000 | Shell / Tubes     |                    | 1.2 |     | 3.0 |   | 4.9 |     |   |     |    |     |      |  |

\* for higher pressure contact MBS



| MODEL           | DIMENSIONS [ mm ] |      |     |                        |                        |     |     |
|-----------------|-------------------|------|-----|------------------------|------------------------|-----|-----|
|                 | A                 | B    | C   | D                      | E                      | H   | L   |
| MLI 168 12 1000 | 950               | 700  | 125 | EN 1092-1 DN 150 PN.16 | EN 1092-1 DN 100 PN.16 | 380 | 385 |
| MLI 168 12 1500 | 1450              | 1200 |     |                        |                        |     |     |
| MLI 168 12 2000 | 1950              | 1700 |     |                        |                        |     |     |
| MLI 168 12 3000 | 2950              | 2700 |     |                        |                        |     |     |
| MLI 168 12 6000 | 5950              | 5700 |     |                        |                        |     |     |

Not binding technical datas; may be modified by the Manufactures without advise



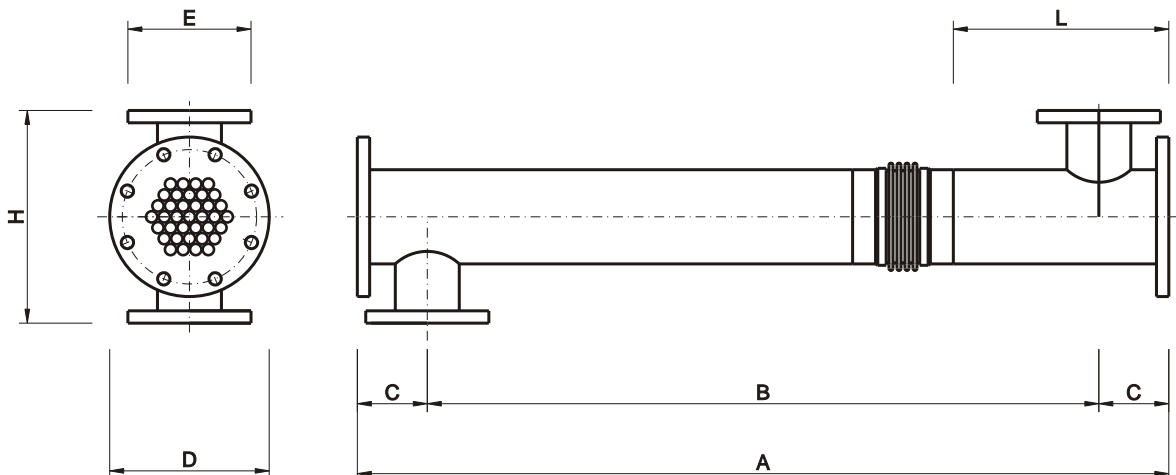
| MODEL        | SHELL VOLUME [ litres ] | TUBES VOLUME [ litres ] | EXCHANGE AREA [ m <sup>2</sup> ] | SHELL SECTION [ mm <sup>2</sup> ] | TUBES SECTION [ mm <sup>2</sup> ] | WEIGHT [ kg ] |
|--------------|-------------------------|-------------------------|----------------------------------|-----------------------------------|-----------------------------------|---------------|
| MLI 168 1000 | 10.20                   | 8.49                    | 2.10                             | 9064.5                            | 9415.4                            | 42.5          |
| MLI 168 1500 | 14.73                   | 13.20                   | 3.26                             | 9064.5                            | 9415.4                            | 57.3          |
| MLI 168 2000 | 19.26                   | 17.91                   | 4.42                             | 9064.5                            | 9415.4                            | 72.0          |
| MLI 168 3000 | 28.33                   | 27.32                   | 6.75                             | 9064.5                            | 9415.4                            | 101.5         |
| MLI 168 6000 | 55.52                   | 55.57                   | 13.72                            | 9064.5                            | 9415.4                            | 189.9         |

Category calculation for second group's fluids - Gas, melted gas and liquids with a steam tension at maximum temperature > 0.5 bar

Article 3.3
  1<sup>st</sup> Category
  2<sup>nd</sup> Category
  3<sup>rd</sup> Category

| MODEL        | VOLUME [ litres ] | PRESSURE [ bar ] * |     |     |     |     |   |     |     |      |      |    |    |
|--------------|-------------------|--------------------|-----|-----|-----|-----|---|-----|-----|------|------|----|----|
|              |                   | 1                  | 2   | 3   | 4   | 5   | 6 | 7   | 8   | 9    | 10   | 11 | 12 |
| MLI 168 1000 | Shell / Tubes     |                    |     |     | 4.9 | 5.8 |   |     |     |      |      |    |    |
| MLI 168 1500 | Shell / Tubes     |                    |     | 3.3 | 3.7 |     |   |     |     |      |      |    |    |
| MLI 168 2000 | Shell / Tubes     |                    | 2.5 | 2.7 |     |     |   |     |     | 10.3 | 11.1 |    |    |
| MLI 168 3000 | Shell / Tubes     | 1.7                | 1.8 |     |     |     |   | 7.0 | 7.3 |      |      |    |    |
| MLI 168 6000 | Shell / Tubes     |                    |     | 3.6 | 3.5 |     |   |     |     |      |      |    |    |

\* for higher pressure contact MBS



| MODEL        | DIMENSIONS [ mm ] |      |     |                       |                       |     |     |
|--------------|-------------------|------|-----|-----------------------|-----------------------|-----|-----|
|              | A                 | B    | C   | D                     | E                     | H   | L   |
| MLI 168 1000 | 950               | 70   | 100 | EN 1092-1 DN 65 PN.16 | EN 1092-1 DN 50 PN.16 | 250 | 395 |
| MLI 168 1500 | 1450              | 1200 |     |                       |                       |     |     |
| MLI 168 2000 | 1950              | 1700 |     |                       |                       |     |     |
| MLI 168 3000 | 2950              | 2700 |     |                       |                       |     |     |
| MLI 168 6000 | 5950              | 5700 |     |                       |                       |     |     |

Not binding technical datas; may be modified by the Manufactures without advise





| MODEL           | SHELL VOLUME [ litres ] | TUBES VOLUME [ litres ] | EXCHANGE AREA [ m <sup>2</sup> ] | SHELL SECTION [ mm <sup>2</sup> ] | TUBES SECTION [ mm <sup>2</sup> ] | WEIGHT [ kg ] |
|-----------------|-------------------------|-------------------------|----------------------------------|-----------------------------------|-----------------------------------|---------------|
| MLI 219 12 1000 | 20.08                   | 10.09                   | 4.84                             | 19493.3                           | 11231.2                           | 9.0           |
| MLI 219 12 1500 | 29.83                   | 15.70                   | 7.54                             | 19493.3                           | 11231.2                           | 12.2          |
| MLI 219 12 2000 | 39.58                   | 21.32                   | 10.23                            | 19493.3                           | 11231.2                           | 15.3          |
| MLI 219 12 3000 | 59.07                   | 32.55                   | 15.62                            | 19493.3                           | 11231.2                           | 21.7          |
| MLI 219 12 6000 | 117.55                  | 66.24                   | 31.80                            | 19493.3                           | 11231.2                           | 40.7          |

Category calculation for second group's fluids - Gas, melted gas and liquids with a steam tension at maximum temperature > 0.5 bar

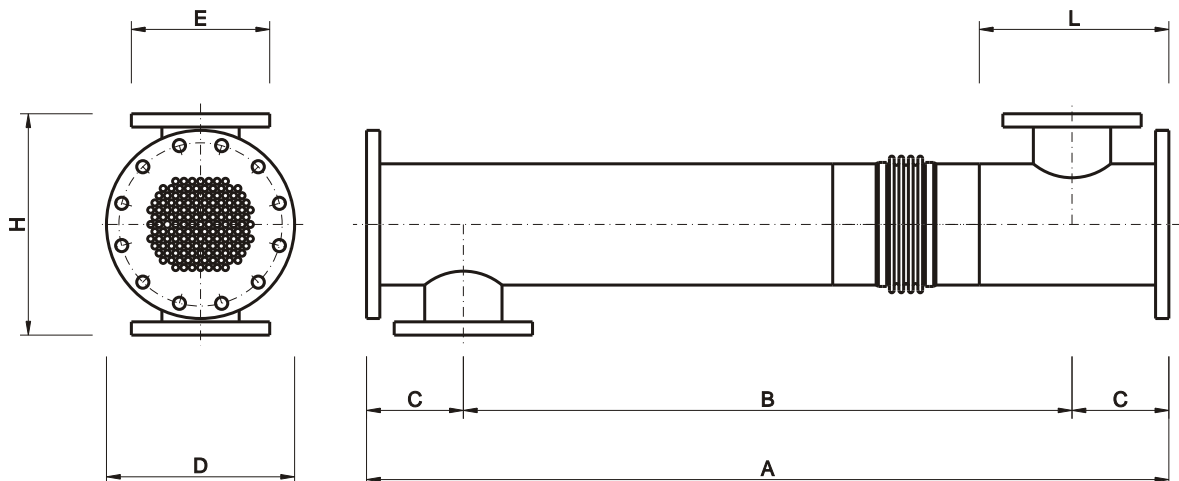
Article 3.3

1<sup>st</sup> Category

2<sup>nd</sup> Category

| MODEL           | VOLUME [ litres ] | PRESSURE [ bar ] * |     |     |     |     |     |     |     |   |     |     |    |      |
|-----------------|-------------------|--------------------|-----|-----|-----|-----|-----|-----|-----|---|-----|-----|----|------|
|                 |                   | 1                  | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9 | 10  | 11  | 12 |      |
| MLI 219 12 1000 | Shell / Tubes     |                    | 2.4 |     |     | 4.9 |     |     |     |   | 9.9 |     |    |      |
| MLI 219 12 1500 | Shell / Tubes     | 1.6                |     |     | 3.1 |     |     | 6.7 |     |   |     |     |    | 12.7 |
| MLI 219 12 2000 | Shell / Tubes     | 1.2                |     | 2.3 |     |     | 5.0 |     |     |   |     | 9.3 |    |      |
| MLI 219 12 3000 | Shell / Tubes     |                    | 1.5 |     | 3.3 |     |     |     | 6.1 |   |     |     |    |      |
| MLI 219 12 6000 | Shell / Tubes     | 1.7                |     |     | 3.0 |     |     |     |     |   | 8.5 |     |    |      |

\* for higher pressure contact MBS



| MODEL           | DIMENSIONS [ mm ] |      |     |                        |                        |     |       |
|-----------------|-------------------|------|-----|------------------------|------------------------|-----|-------|
|                 | A                 | B    | C   | D                      | E                      | H   | L     |
| MLI 219 12 1000 | 950               | 600  | 175 | EN 1092-1 DN 200 PN.16 | EN 1092-1 DN 125 PN.16 | 400 | 342.5 |
| MLI 219 12 1500 | 1450              | 1100 |     |                        |                        |     |       |
| MLI 219 12 2000 | 1950              | 1600 |     |                        |                        |     |       |
| MLI 219 12 3000 | 2950              | 2600 |     |                        |                        |     |       |
| MLI 219 12 6000 | 5950              | 5600 |     |                        |                        |     |       |

Not binding technical datas; may be modified by the Manufactures without advise



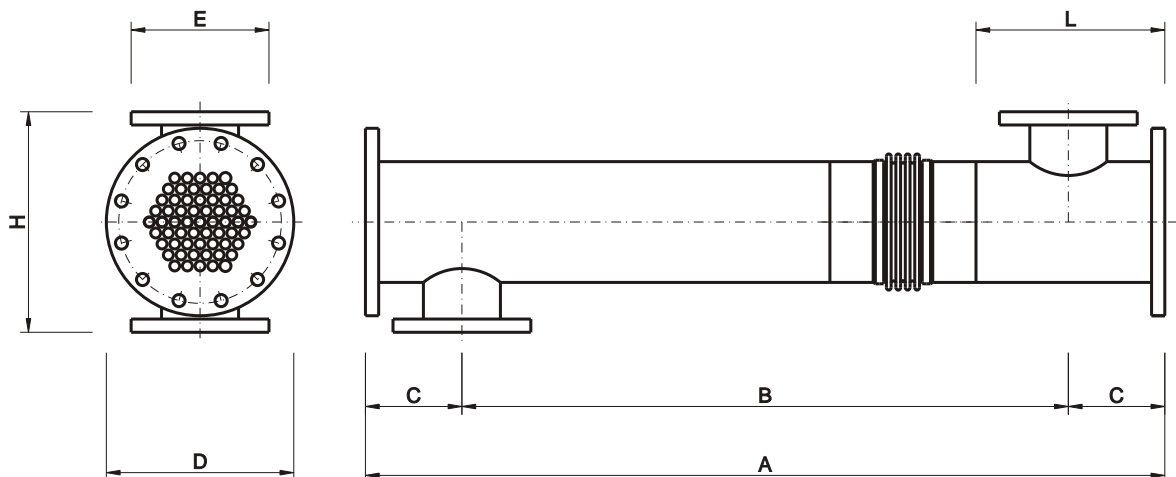
| MODEL        | SHELL VOLUME [ litres ] | TUBES VOLUME [ litres ] | EXCHANGE AREA [ m <sup>2</sup> ] | SHELL SECTION [ mm <sup>2</sup> ] | TUBES SECTION [ mm <sup>2</sup> ] | WEIGHT [ kg ] |
|--------------|-------------------------|-------------------------|----------------------------------|-----------------------------------|-----------------------------------|---------------|
| MLI 219 1000 | 17.40                   | 13.94                   | 3.44                             | 16502.5                           | 15522.6                           | 67.0          |
| MLI 219 1500 | 25.65                   | 21.70                   | 5.36                             | 16502.5                           | 15522.6                           | 89.3          |
| MLI 219 2000 | 33.90                   | 29.46                   | 7.27                             | 16502.5                           | 15522.6                           | 111.5         |
| MLI 219 3000 | 50.40                   | 44.98                   | 11.11                            | 16502.5                           | 15522.6                           | 155.9         |
| MLI 219 6000 | 99.91                   | 91.55                   | 22.61                            | 16502.5                           | 15522.6                           | 289.1         |

Category calculation for second group's fluids - Gas, melted gas and liquids with a steam tension at maximum temperature > 0.5 bar

Article 3.3
1<sup>st</sup> Category
2<sup>nd</sup> Category
3<sup>rd</sup> Category

| MODEL        | VOLUME [ litres ] | PRESSURE [ bar ] * |     |     |     |     |     |     |   |     |      |      |    |
|--------------|-------------------|--------------------|-----|-----|-----|-----|-----|-----|---|-----|------|------|----|
|              |                   | 1                  | 2   | 3   | 4   | 5   | 6   | 7   | 8 | 9   | 10   | 11   | 12 |
| MLI 219 1000 | Shell / Tubes     |                    | 2.8 | 3.5 |     |     |     |     |   |     |      | 11.4 |    |
| MLI 219 1500 | Shell / Tubes     | 1.9                | 2.3 |     |     |     |     | 7.7 |   | 9.2 |      |      |    |
| MLI 219 2000 | Shell / Tubes     | 1.4                | 1.6 |     |     | 5.8 | 6.7 |     |   |     |      |      |    |
| MLI 219 3000 | Shell / Tubes     |                    | 1.1 | 3.9 | 4.4 |     |     |     |   |     |      |      |    |
| MLI 219 6000 | Shell / Tubes     |                    | 2.0 | 2.1 |     |     |     |     |   |     | 10.0 | 10.9 |    |

\* for higher pressure contact MBS



| MODEL        | DIMENSIONS [ mm ] |      |     |                        |                        |     |       |
|--------------|-------------------|------|-----|------------------------|------------------------|-----|-------|
|              | A                 | B    | C   | D                      | E                      | H   | L     |
| MLI 219 1000 | 950               | 600  | 175 | EN 1092-1 DN 200 PN.16 | EN 1092-1 DN 125 PN.16 | 400 | 342.5 |
| MLI 219 1500 | 1450              | 1100 |     |                        |                        |     |       |
| MLI 219 2000 | 1950              | 1600 |     |                        |                        |     |       |
| MLI 219 3000 | 2950              | 2600 |     |                        |                        |     |       |
| MLI 219 6000 | 5950              | 5600 |     |                        |                        |     |       |

Not binding technical datas; may be modified by the Manufactures without advise

