

Only circular projection is valid for accessories orientation

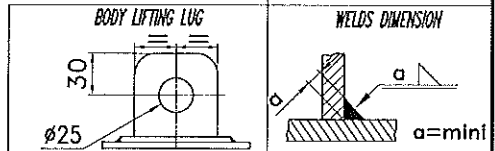
Calculation according to:
 -Section VIII
 -Division I
 -Edition 2007, Add 2008

N.D.E and other test requirements:
 -Corrosion: Shell= 0mm Cover= 1mm
 -Pneumatic test under water
 -Hydraulic test (each side independently)
 -M.D.M.T= -29°C
 Impact test exempted per UCS 66(a)

Customer and Alfa Laval requirements:
 -X ray= 100% external butt welds
 -Pickling= None
 -Dye penetrant test= 100% external welds no Xray
 -Helium test= None
 -Heat treatment= None
 -PMI= None
 -Painting= Painting Std AL paint system on body and covers
 -Ultrasonic test= None
 -Insulation= None

TOTAL WEIGHT
 (empty) ~1250 Kg
 (full of water) ~1550 Kg

COVER WEIGHT
 ~320 Kg



| CONNECTIONS SIZES - TYPES - MATERIAL | | | | | |
|--------------------------------------|------|------------------|-------------|---------|---------|
| Item | Rep. | HD | Flange type | Flanges | Collars |
| A1 | 200 | EN1092-1 02A+32A | PN16 | P245 GH | Ti Gr2 |
| A2 | 200 | EN1092-1 02A+32A | PN16 | P245 GH | Ti Gr2 |
| A3 | 25 | EN1092-1 02A+32A | PN16 | P245 GH | Ti Gr2 |
| B1 | 200 | EN1092-1 02A+32A | PN16 | P245 GH | Ti Gr2 |
| B2 | 200 | EN1092-1 02A+32A | PN16 | P245 GH | Ti Gr2 |
| B3 | 25 | EN1092-1 02A+32A | PN16 | P245 GH | Ti Gr2 |

| Detail drawing No. | Rev. | Size | General dwg. Rev. |
|----------------------|------|------|-------------------|
| N° 24447 DETAILDWG-1 | 0 | A3 | A |
| N° 24447 DETAILDWG-2 | 0 | A3 | A |
| N° | | | |

| MATERIAL | Shell-Heat. surf. | SB265 TiGr2 |
|----------|-------------------|--|
| | Covers | SA 516 GR60 |
| | Hookbolts | SA193 B7 |
| | Gaskets | A : Nitrile Bonded Fiber / 2 B : Nitrile Bonded Fiber / 2 |

| FLUID | Spacing mm | Temperature °C | | Pressure Barg | | | | |
|-----------------|------------|----------------|--------|---------------|-----------------|--|------|----|
| | | Working | Design | Working | M.A.W.P. P.M.S. | Design WAMP ± static head of water U2-21/32-23/36-38 | Test | |
| Inner channel A | 7 | In 102 | Out 62 | -29/105 | 10 | 10 | 10.1 | 13 |
| Water | | | | | | | | |
| Outer channel B | 22 | In 4 | Out 20 | -29/105 | 10 | 10 | 10.1 | 13 |
| Crude Oil | | | | | | | | |

Customer **BELARUSNEFT** Order N° **9HES24447**
 Serial N° **24447 To 24450** Item N° / A.L. M.C. Order N° **0900010458**

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Tolerances :
 Dimensions: **NE.RD.TOL.01**
 Form and position: **ISO 1101**
 Burrs removed

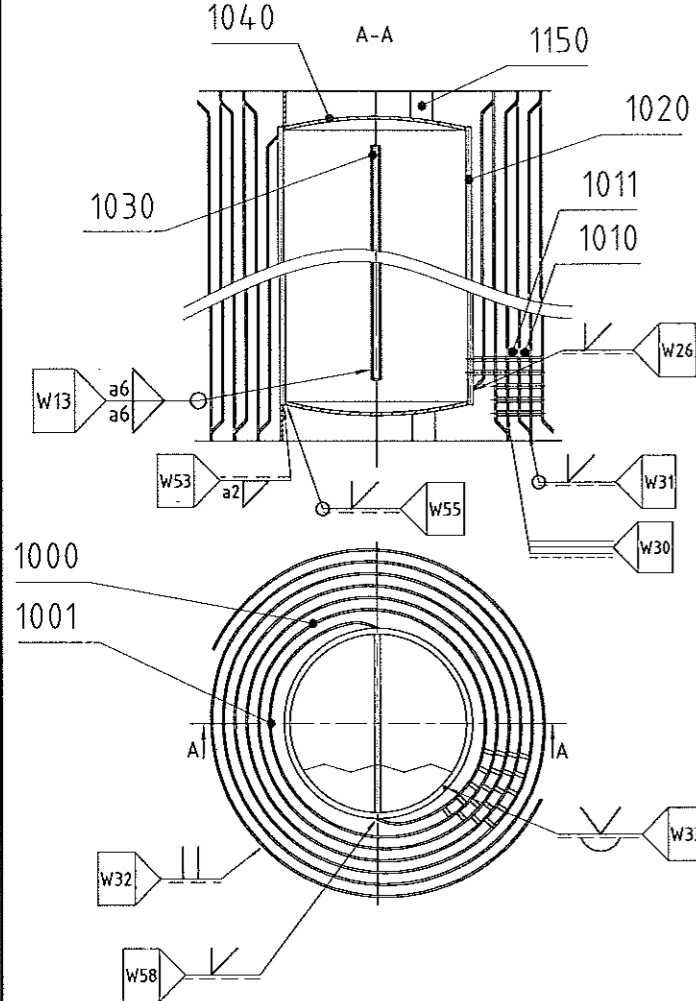
Flange tolerances :
 Incline of the flange facing with regard to theoretical plane 1/2°
 Localisation of the flange axis $\oplus \ominus \varnothing 10$

| | | | | | | |
|--------|--------------------------------------|----------|-------------|-----------------------------|-----------------|-------------------|
| E | | | | Draw | | |
| D | | | | Approved | | |
| C | | | | | | |
| B | | | | | | |
| A | Detailed drawing / Plan de detail | 09/04/09 | F. Rousseau | S.H.E. TYPE 1H-L-1T / 16.1m | | |
| O | Dimension sketch / plan dimensionnel | 26/02/09 | E. DAUDIN | 2 | | |
| Rev.No | Modification | Date | Name | Dwg No | 24447GENERALDWG | Rev. A Scale 1/17 |

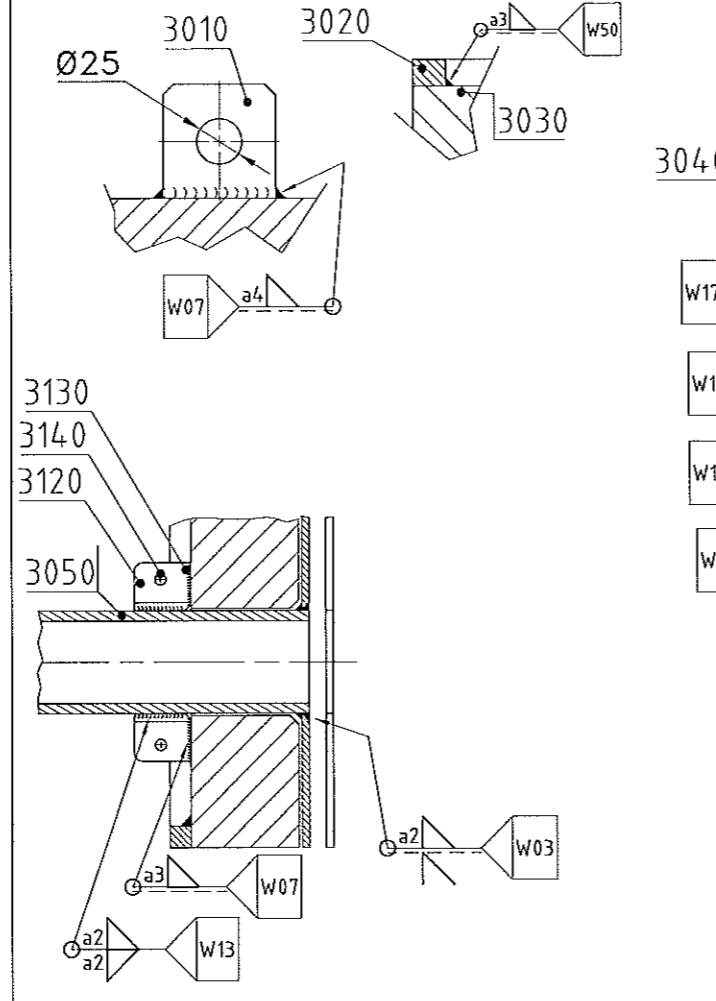
TN097-03

ALFA LAVAL
 Alfa Laval Spiral sas
 NEVERS - FRANCE

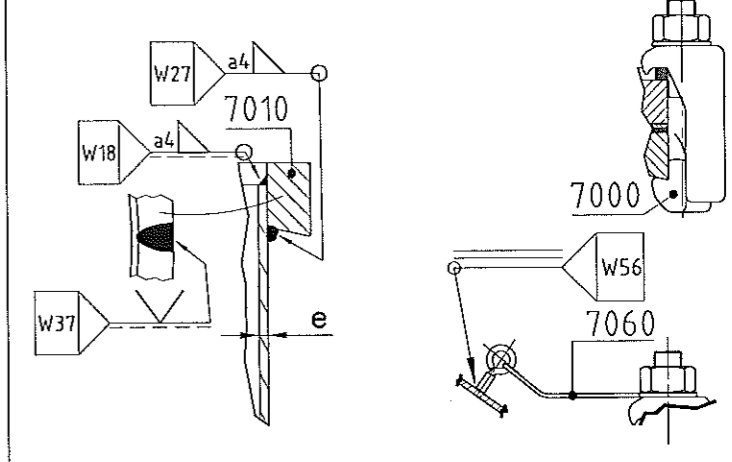
Rep.01 Centre



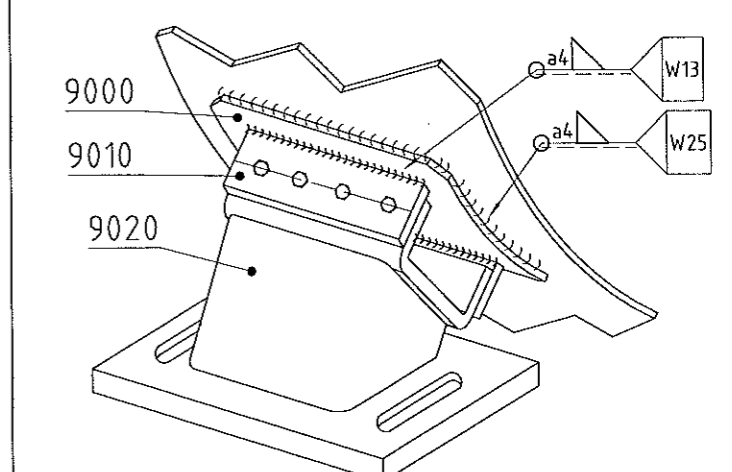
Rep.03 Cover / Couvercle



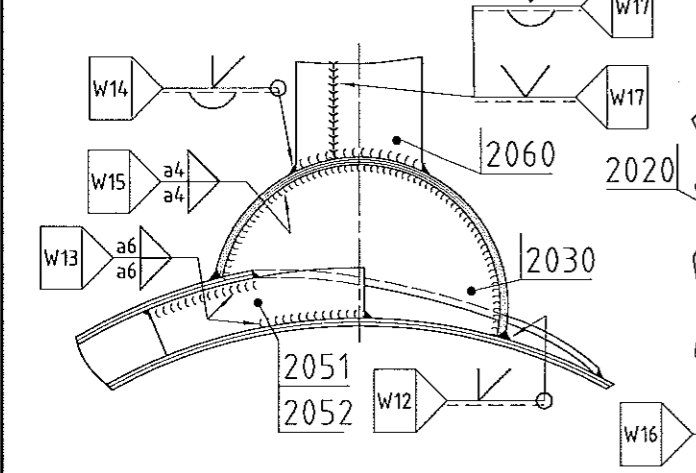
Rep.07 Tightening ring / Clamps avec cercle bride



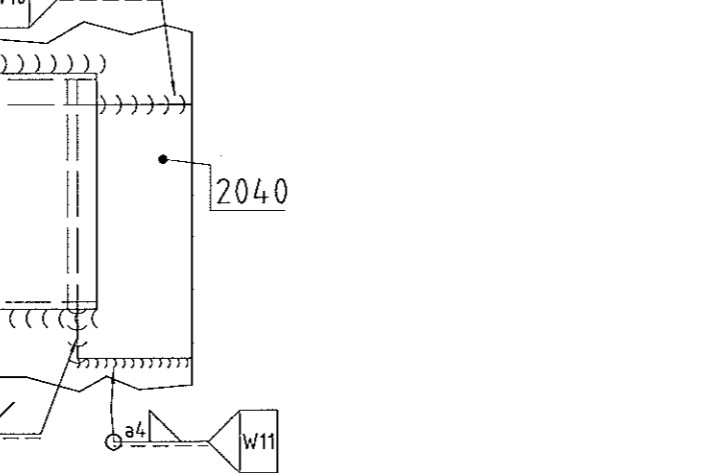
Rep.09 Feet support / Support pied



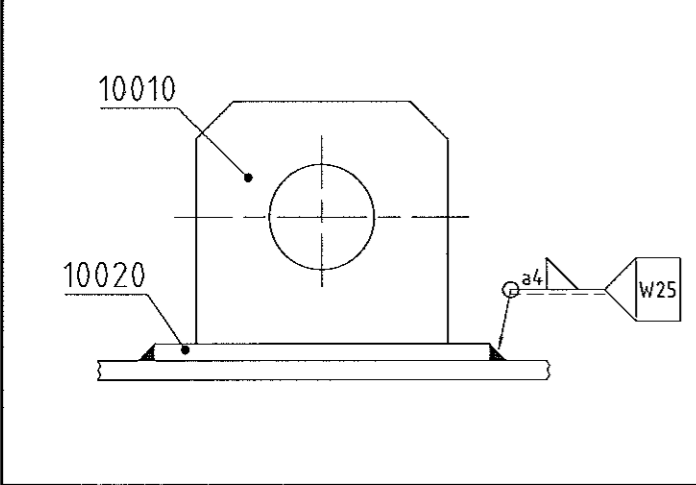
Rep.02 Collecteur / Collecting box



Rep.10 Lifting lug / Oreille de levage



Rep.11 Loose plate flange / Bride plate tournante



| | | | | | | | | | |
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| F | | | | | | | | | |
| E | | | | | | | | | |
| D | | | | | | | | | |
| C | | | | | | | | | |
| B | | | | | | | | | |
| A | | | | | | | | | |
| O | First issue / Emission originale | 06/04/2009 | F.Rousseau | | | | | | |
| Rev.No | Modification | Date | Name/Nom | | | | | | |

Dwg No 24447 DETAILDWG-1
 Rev. 0

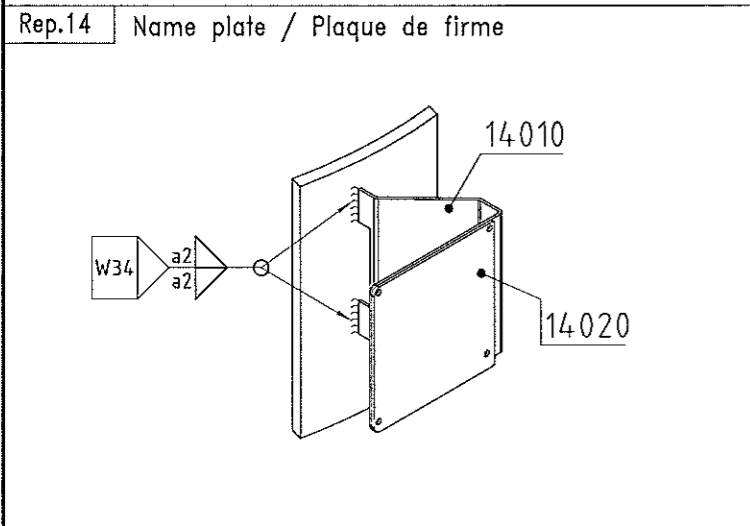
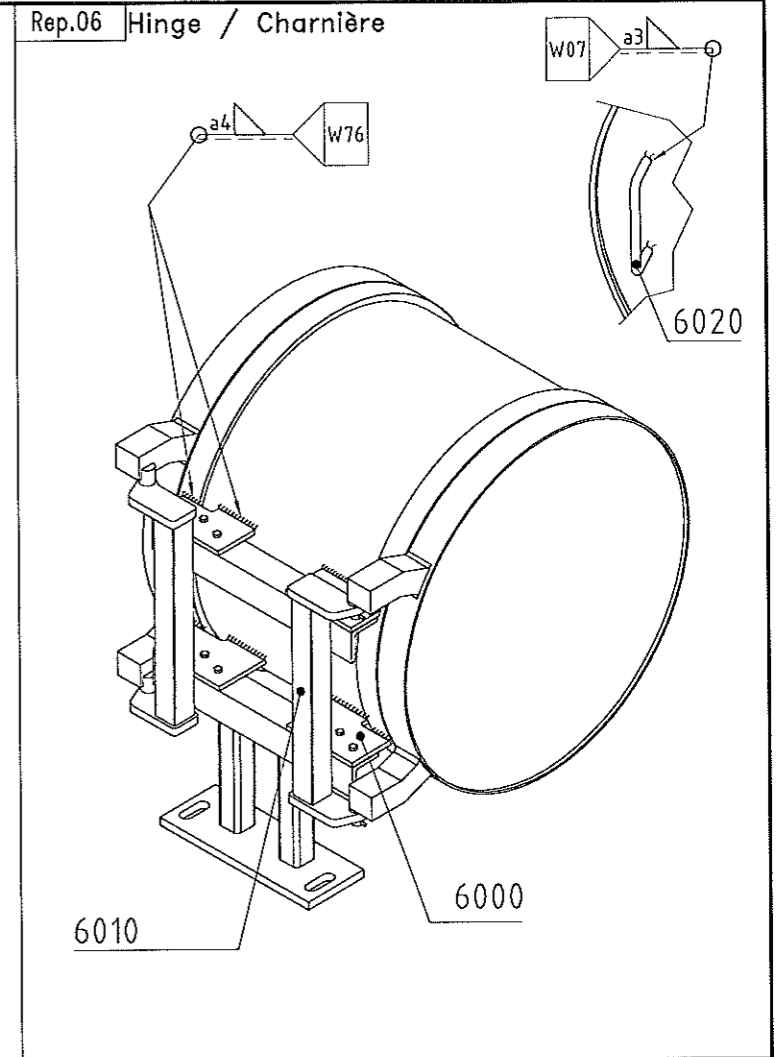
TN-099-01

ALFA LAVAL

| | | | | |
|----------------------|---|-----------|-----------------------------|------|
| Equipement title | SPIRAL HEAT EXCHANGER | | Type 1H-L-1T | |
| Code | Section VIII div 1 - Ed 2007 - Add 2008 | | | |
| Serial n° | * | Item n° / | | |
| | Channel A | | Channel B | |
| Fluid groupe | / | | / | |
| Fluid | Water | | Crude Oil | |
| Volume | 90 | Lit. | 210 | Lit. |
| Design pressure | 10.1 | barg | 10.1 | barg |
| MAWP | 10 | barg | 10 | barg |
| Test pressure | 13 | barg | 13 | barg |
| Gasket mat /Thick | Nitrile bonded fiber / 2 mm | | Nitrile bonded fiber / 2 mm | |
| Material | SB265 Gr2 | | Manufacturing year: 2009 | |
| Weight empty | 1250 | kg | Test date: | |
| Design mini/max temp | 0 / 105 | | °C | |
| Bolts per cover | 18 | | | |
| Size | 1"x10" | | | |
| Maximum torque | 780 | m.N | | |

Alfa Laval Spiral sas, Nevers, FRANCE
Service enquiries www.alfalaval.com

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|-------|
| * |
| 24447 |
| 24448 |
| 24449 |
| 24450 |



TN-099-01

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| A | | | | | | | |
| O | First Issue / Emission originale | 06/04/2009 | F.Rousseau | | | | |
| Rev.No | Modification | Date | Name/Nom | | | Dwg No 24447 DETAILDWG-2 | Rev. 0 |