

## REFERENCES LIST 1999 - 2024



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**PRESSURE VESSELS**



**COLUMNS**



**HOPPERS**



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**FILTERS**



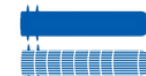
**MINING**



**SECONDARY STEEL**



**DUCT**



**HEAT EXCHANGERS**



**SKIDS**

# HEAT EXCHANGERS

1999



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| IDESA - TECHNIP                  | A-312-304L        | 1150                          | 3903                             |              | 559              | 12                | 8                             |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 165                              | BEM               | 31                            | 300                              |              |                  | SA-336-F304L      | SA-336-F304L                  |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| ECOLUBE                          | A 516-Gr60        | 2600                          | 3,7                              |              | 610              | 10                | 21 barg                       |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 350°C                            | BES               | 14 barg                       | 250°C                            | C            | 2                | A-266-Gr4         | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| INTECSA-UHDE                     | A-516 Gr.60       | 10,15 T                       | 7,5                              |              | 1150             | 13                | 10,5 Kg/cm2 (g)               |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 340                              |                   |                               |                                  |              |                  |                   | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| INTECSA-UHDE                     | A-516 Gr.60       | 12,75 T                       | 6,9                              |              | 1170             | 13                | 13 Kg/cm2                     |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 340                              |                   |                               |                                  |              |                  |                   | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| INTECSA-UHDE                     | A-516 Gr.60       | 21 T                          | 6,9                              |              | 1100             | 13                | 8,7 Kg/cm2/F. V.              |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 340                              |                   |                               |                                  |              |                  |                   | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL      | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|------------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| PRAXAIR IBERIA                   | A240 - 304L, A213-304L | 6,6 T                         | 4,55                             |              | 676              | 10                | 46 BARG                       |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA          | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 420                              | BEM                    |                               |                                  |              |                  |                   | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| INTECSA-UHDE                     |                   |                               |                                  |              |                  |                   |                               |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
|                                  |                   |                               |                                  |              |                  |                   |                               |





| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| REPSOL - DISEPROSA               | A 516-Gr60        | 5300                          | 6,9                              |              | 781              | 14                | 5 kg/cm2g / FULL VACUUM       |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 90°C                             | AES               | 7,5 kg/cm2g                   | 70°C                             | R            | 4                | A-266-CI1         | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm)  | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|--------------------|-------------------------------|
| ABB                              | SA 516-Gr60N      | 12600                         | 7,7                              |              | 731              | 31                 | 93,1 barg / FULL VACUUM       |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET      | 16. TUBES                     |
| 125°C / -20°C                    | BEM               | 93,1 barg / FULL VACUUM       | 125°C / -20°C                    | R            | 1                | CLASS 1, SA-350LF2 | SA-213-316L                   |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| REPSOL                           |                   |                               | 7,4                              |              | 1519             |                   |                               |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
|                                  |                   |                               |                                  |              |                  |                   |                               |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| FOSTER WHEELER                   |                   |                               |                                  |              |                  |                   |                               |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
|                                  |                   |                               |                                  |              |                  |                   |                               |



| 1. CLIENT                        | 2. MATERIAL SHELL     | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-----------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| REPSOL-YPF                       | A-234-WPB / A-106-GrB | 817                           | 4,9                              |              | 219              | 8,18              | 7,7 kgf/cm2g                  |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA         | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 165°C                            | AMU                   | 6 kgf/cm2g                    | 165°C                            | R            | 1                | A-266-Gr2         | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| REPSOL - YPF                     | A-516-70          | 3110                          | 4                                |              | 713              | 14                | 9,10 kg/cm2g                  |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 210°C                            | AJS               | 11,80 kg/cm2g                 | 315°C                            | R            | 6                | A-266-CI2         | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| REPSOL                           | A-570 Gr 70       | 3,1                           | 3,77                             |              | 713              | 28                | 11,8 kg/cm2 (g)               |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 315°C                            | AJS               |                               |                                  |              | 6                | A- 266 CL2        | A- 179                        |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm)                     | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|---------------------------------------|-------------------------------|
| REPSOL                           |                   | 17300                         | 7,4                              |              | 886              |                                       |                               |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET                         | 16. TUBES                     |
|                                  | DEU               | 156,5 kg/cm2                  | 304°C                            | R            | 2                | A-182-F11 Cl2 + OVERLAY<br>Tp 309/347 | A-789 UNS S31803              |





| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| HANOVER (GB) LTD                 | A-106 Gr.B        |                               | 3,7                              |              | 289              |                   |                               |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
|                                  |                   |                               |                                  |              |                  | A-266-2           | A-180                         |



| 1. CLIENT                        | 2. MATERIAL SHELL           | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-----------------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| HANNOVER (GB) LTD                | A-106-B                     | 1650                          | 3,8                              |              | 12"              | 17,45             | 85 barg                       |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA               | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 110°C                            | CONE-E-<br>CONE<br>Vertical | 85 barg                       | 110°C                            | R            | 1                | A-266-2           | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL           | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-----------------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| HANNOVER (GB) LTD                | A-106-B                     | 1900                          | 3,9                              |              | 12"              | 17,45             | 99 barg                       |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA               | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 110°C                            | CONE-E-<br>CONE<br>Vertical | 99 barg                       | 110°C                            | R            | 1                | A-266-2           | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL      | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|------------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| JACOBS NEDERLAND B.V             | A-333 Gr5 / A-516-Gr60 | 500                           | 3,4                              |              | 14"              | 15                | ATM.                          |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA          | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 100°C / -15°C                    |                        | 14,8 barg                     | 440°C/ -15°C                     |              |                  | A-333-Gr5         |                               |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| PETRESA                          | A-387 Gr.11 Cl.2  | 15 T                          | 8,2                              |              | 1091             | 0,16              |                               |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
|                                  |                   |                               |                                  |              |                  | A-268 Tp.410S     |                               |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| CFE                              | SA 516 Gr 70      | 6,3                           | 6                                |              | 926              | 16                | 35,4 bar                      |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
|                                  |                   |                               |                                  |              |                  | 35,4 bar          | AISI 316L                     |



| 1. CLIENT                        | 2. MATERIAL SHELL      | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|------------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| PRAXAIR IBERIA                   | A-240-304L, A-213-304L | 6600                          | 4,55                             |              | 676              | 10                | 46 barg                       |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA          | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 340                              |                        |                               |                                  |              |                  |                   |                               |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| HANNOVER (GB) LTD                | A-106-B           | 1650                          | 3,8                              |              | 12''             | 17,45             | 85 barg                       |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 110                              | Vertical          | 85 barg                       | 110                              | R            | 1                | A- 266-2          | A-179                         |





| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| HANNOVER (GB) LTD                | A-106-B           | 1900                          | 3,9                              |              | 12''             | 17,45             | 99 barg                       |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 110                              | Vertical          | 99 barg                       | 110                              | R            | 1                | A- 266-2          | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| HANNOVER (GB) LTD                | A-106-Gr.B        |                               | 3,7                              |              | 289              |                   |                               |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
|                                  |                   |                               |                                  |              |                  | A-266-2           | A-180                         |



| 1. CLIENT                        | 2. MATERIAL SHELL    | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|----------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| REPSOL-YPF                       | A-234-WPB/A-106-Gr B | 817                           | 4,9                              |              | 219              | 8,18              | 7.7 kg/cm2                    |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA        | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 165                              | AMU                  | 6 kg/cm2                      | 165                              | R            | 1                | A- 266-Gr2        | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL    | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|----------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| JACOBS NEDERLAND B.V             | A-333-Gr5/A 516-Gr60 | 500                           | 3,4                              |              | 14''             | 15                | ATM                           |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA        | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 100/-15                          |                      | 14,8 barg                     | 440/-15                          |              |                  | A-333-Gr5         |                               |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| PETRESA                          | A-387 Gr.11 Cl.2  | 15000                         | 8,2                              |              | 1091             | 0,16              |                               |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
|                                  |                   |                               |                                  |              |                  | A-268 Tp.410S     |                               |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| REPSOL-YPF                       | A-516-70          | 3110                          | 4                                |              | 713              | 14                | 9,1 kg/cm2                    |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 210                              | AIS               | 11.8kg/cm2                    | 315                              | R            | 6                | A- 266-CI2        | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| ECOLUBE                          | SA 516 Gr 60      | 2600                          | 3,7                              |              | 610              | 10                | 21 barg                       |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 350                              | BES               | 14 barg                       | 250                              | C            | 2                | SA 266 Gr 4       | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| INTECSA-UHDE                     | SA 516 Gr 60      | 10150                         | 7,5                              |              | 1150             | 13                | 10,5 kg/cm2                   |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 340                              |                   |                               |                                  |              |                  |                   | A-179                         |





| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| INTECSA-UHDE                     | SA 516 Gr 60      | 12750                         | 6,9                              |              | 1170             | 13                | 13 kg/cm2                     |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 340                              |                   |                               |                                  |              |                  |                   | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| INTECSA-UHDE                     | SA 516 Gr 60      | 21000                         | 6,9                              |              | 1100             | 13                | 8,7 kg/cm2                    |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 340                              |                   |                               |                                  |              |                  |                   | A-179                         |

# HEAT EXCHANGERS

2013



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| REPSOL-DISEPROSA                 | SA 516 Gr 60      | 5300                          | 6,9                              |              | 781              | 14                | 5 kg/cm2/FULL VACUUM          |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 90                               | AES               | 7,5kg/cm2                     | 70                               | R            | 4                | A-266-CI1         | A-179                         |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm)  | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|--------------------|-------------------------------|
| ABB                              | SA 516 Gr 60N     | 12600                         | 7,7                              |              | 731              | 31                 | 93,1 barg / FULL VACUUM       |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET      | 16. TUBES                     |
| 125/-20                          | BEM               | 93,1 barg / FULL VACUUM       | 125/-20                          | R            | 1                | CLASS 1, SA-350LF2 | SA-213-316L                   |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| CFE                              | SA 516 Gr 70      | 6300                          | 6                                |              | 926              | 16                | 35,4 bar                      |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
|                                  |                   |                               |                                  |              |                  | SA 516 Gr 70      | AISI 316L                     |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| INTECSA-UHDE                     |                   |                               |                                  |              |                  |                   |                               |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
|                                  |                   |                               |                                  |              |                  |                   |                               |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| REPSOL                           |                   |                               | 7,4                              |              | 1519             |                   |                               |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
|                                  |                   |                               |                                  |              |                  |                   |                               |



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| FOSTER WHEELER                   |                   |                               |                                  |              |                  |                   |                               |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
|                                  |                   |                               |                                  |              |                  |                   |                               |





| 1. CLIENT                        | 2. MATERIAL SHELL                           | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm)          | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|---|-------------------------------|----------------------------------|--------------|------------------|----------------------------|-------------------------------|
| REPSOL                           | A-336-F11<br>Cl2 +<br>OVERLAY<br>TP 309/347 | 17300                         | 7,4                              |              | 886              | 17300                      |                               |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA                               | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET              | 16. TUBES                     |
|                                  | DEU   | 156kg/cm2                     | 304                              | R            | 2                | A-182-F11 Cl2<br>+ OVERLAY | A-789 UNS<br>S31803           |

# HEAT EXCHANGERS

2015



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| INTECSA- NOVARGI                 | SA 516 Gr 70      | 15191                         | 3048                             |              | 1250             | 40                | 9,7                           |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 120                              | BEM               | 7,5                           | 360                              |              | 1                | SA 516 Gr 70      | Sa 192 or equiv               |

# HEAT EXCHANGERS

2020



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| AIR LIQUIDE - NOVARGI            | SA 516 Gr 60      | 26000                         | 14270                            |              |                  |                   | 85                            |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
| 300                              | BUNDLE - COIL     | 39,6                          | 250                              |              |                  | SA 516 Gr 60      | SA-106GR.B                    |

# HEAT EXCHANGERS

2020



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|-------------------------------|
| TECHNIP BRASIL                   | SA 516 GR 60      | 11649                         | 8458                             |              | 2340             | 10                |                               |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES                     |
|                                  |                   |                               |                                  |              |                  | SA 516 GR60       | A 106 GR. B                   |

# HEAT EXCHANGERS

2021



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm)               | 8. DESIGN PRESSURE SHELL SITE |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|---------------------------------|-------------------------------|
| PDVSA                            | SA 387 Cr 11 CL 2 | 22141,7                       | 4268                             |              | 1473,2           | 22                              | 37,97                         |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET                   | 16. TUBES                     |
| 426                              | BEU               | 27,42                         | -18                              |              | 2                | SA-336<br>K11572Gr. F11<br>CL.3 | SA-213<br>K11597 Gr.<br>T11   |

# HEAT EXCHANGERS

2021



| 1. CLIENT                        | 2. MATERIAL SHELL | 3. WEIGHT (kg)                | 4. LENGTH (mm)                   | 5. HIGH (MM) | 6. DIAMETER (mm) | 7. THICKNESS (mm) | 8. DESIGN PRESSURE SHELL SITE                     |
|----------------------------------|-------------------|-------------------------------|----------------------------------|--------------|------------------|-------------------|---|
| QATAR PETROLEUM - DF             | SA 516 70         | 31200                         | 9789                             |              | 2300             | 54                | 37,4  |
| 9. DESIGN TEMPERATURE SHELL SITE | 10. TYPE TEMA     | 11. DESIGN PRESSURE TUBE SITE | 12. DESIGN TEMPERATURE TUBE SITE | 13. CATEGORY | 14. PASSES       | 15. TUBESHEET     | 16. TUBES   |
| 343                              | N/A               | 56                            | 343                              |              |                  | SA 266 CL.2       | SA-213-T11 (outer tubes) and SA-192 (inner tubes) |