

Approved,  
Deputy General Manager – Chief Engineer

  
Dan Danulescu

26. 01 2016

**Technical Subject**  
**For Adsorbent Unloading/Loading from**  
**RC Plant HCl Removing System**

1. Beneficiary: PETROTEL-LUKOIL SA Ploiesti, Romania
2. Purpose: Unloading and loading the HCl removing adsorbent from hydrogen rich gases
3. Objective Location: RC Plant
4. Commercial Offer Submission Deadl: 15.02.2016
5. Initial Date: 5.1. The amounting of adsorbent and inert support material to unload is:

| Name              | Volume,<br>m <sup>3</sup> | Height,<br>mm |
|-------------------|---------------------------|---------------|
| <u>04-V13</u>     |                           |               |
| Ceramic balls ¾ ” | 0,570                     | 150           |
| Ceramic balls ¼ ” | 0,570                     | 150           |
| Catalyst          | 30,411                    | 8000          |
| Ceramic balls ¼ ” | 0,556                     | 150           |
| Ceramic balls ¾ ” | 0,758                     | 250           |

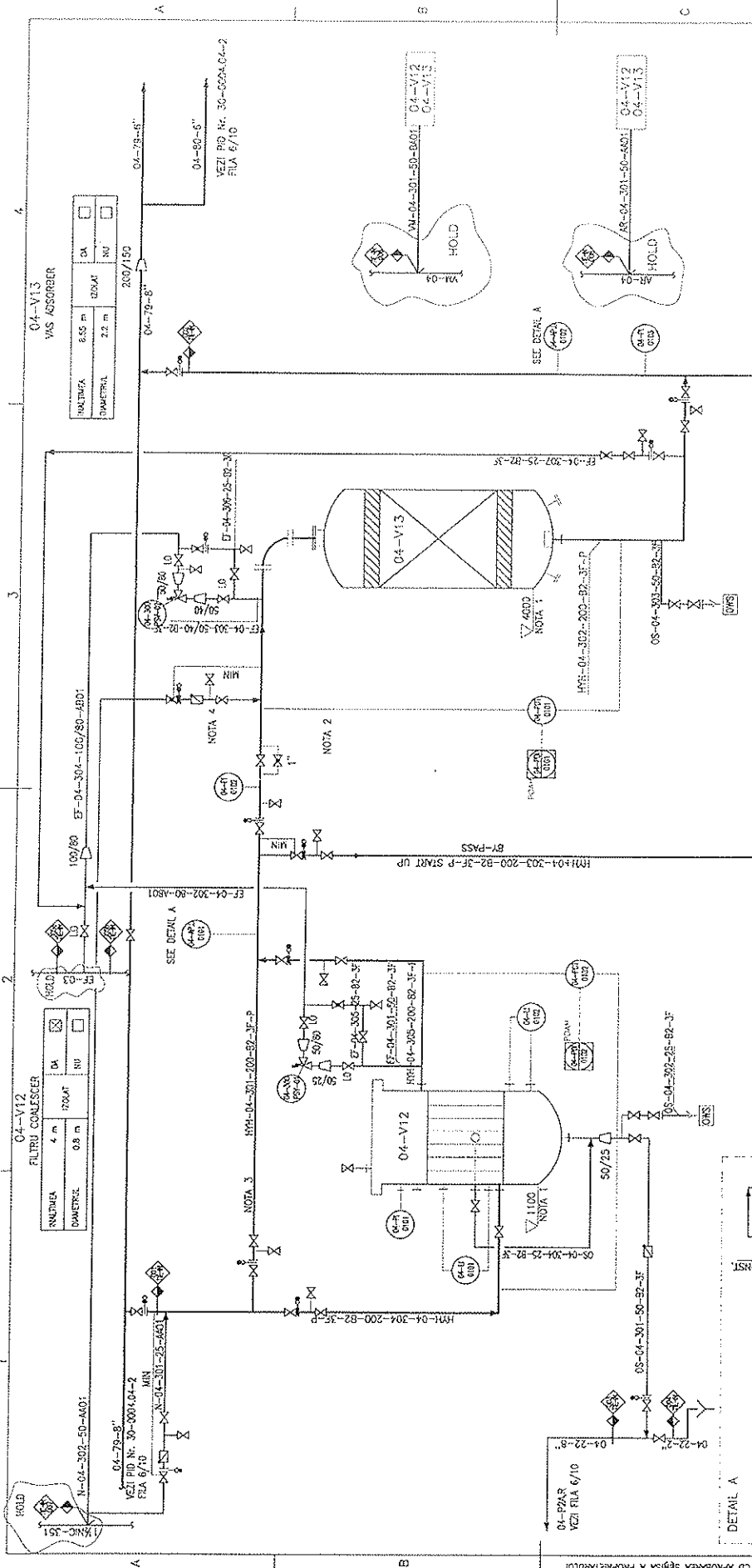
The catalyst shall be loaded by “sock” Method.

6. Main Requests:
  - 6.1. There should be submitted the Diagram on Stages for completing the unloading/loading operations scheduled;
  - 6.2. The vessel should be cleaned inside, after completing the unloading operation;
  - 6.3. Technical Offer should contain the necessary utilities (air, nitrogen) for completing the adsorbent unloading/loading operations.

- 6.4. There shall be submitted the Final Report of unloading/loading activity, including the loading diagram applied.
- 6.5. The entire logistics should be provided for completing unloading/loading works including crane, pillar and others.
- 6.6. The necessary gaskets should be provided.
- 6.7. Mechanical works should be provided, also blinding / unblinding, vessel opening / closing, activities of assembly / disassembly internal equipments, manholes, and after assembly, system sealing should be provided.
- 6.8. There should be avoided during the unloading/loading operations the formation of dust, working area should be maintained clean.

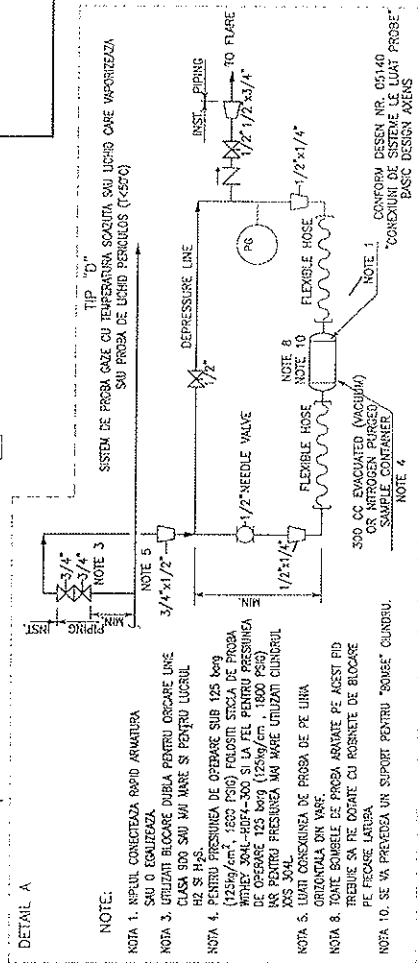
7. Observations:

- 7.1. When unloading, there should be permanently maintained a Nitrogen purge in the vessel for the obtaining the minimum reduction the possibility of atmospheric air entry;
- 7.2. Unloaded adsorbent should be separated from the ceramic balls and stored in metallic barrels sealed and marked accordingly;
- 7.3. There should be applied the Norms and Safe Regulations SSM-SU in force.



NOTE.

- NOTA 1  
NOTA 2  
NOTA 3  
NOTA 4
- s-a prezenta inchimarea suficienta pentru descurcare conductelor
  - FOT s-a realizat la punct fix
  - Lungimea conductei si caderile de presiune este minima
  - conexiunile va fi la partea superioara a conductei

[illegible]

CODE: 32.603E-0

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ROMANIAN ENGINEERING AND  
DESIGN INSTITUTE FOR  
OIL REFINERIES  
PLOESTI- ROMANIA

1247 DAYS 27.10.15

PROJECT SPECIFICATION

No. 0996.00-38-9000.PS-00

SHEET 1 OF 3

# VESSELS

| REV | DATE    | BY | CHK'D | APP'D |
|-----|---------|----|-------|-------|
| 1   | 06.2012 | HM | HM    | CPT   |
| 2   |         |    |       |       |
| 3   |         |    |       |       |
| 4   |         |    |       |       |

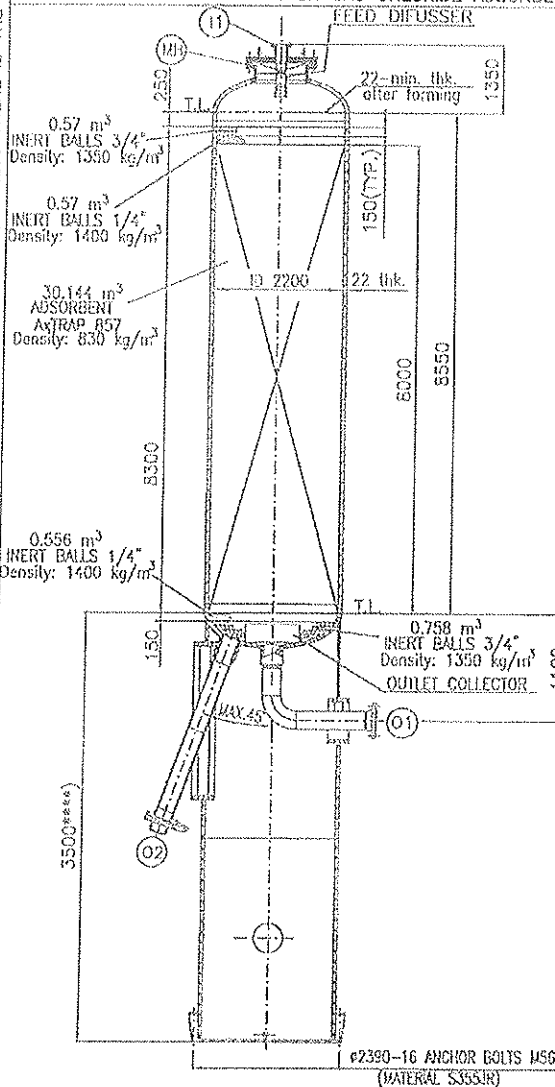
JOB 996/2011- CHLORIDE REMOVAL FROM HYDROGEN RICH GAS

CUSTOMER S.C. PETROTEL-LUKOIL S.A. PLOESTI

UNIT CCR PLATFORMING

NAME : HYDROGEN RICH GAS CHLORIDE ADSORBER

ITEM No.: 04-V13



CODE : ASME Code SEC.VIII Div.1; HG no. 584/2004; HG no.1165/2005

|                                  |          |              |
|----------------------------------|----------|--------------|
| Design Pressure                  | MPa(bar) | 1.97 (19.7)  |
| Operating Pressure               | MPa(bar) | 1.25 (12.5)  |
| Hydrst. Test Press.              | MPa(bar) | 2.9 (29.0)   |
| Design Temperature min/max °C    |          | 121/minus 20 |
| Operating Temperature max/min °C |          | 40/38        |
| Fluid                            |          | H2+HCl *) a) |
| Specific Gravity                 | Kg/m³    | **)          |
| Corrosion Allowance              | mm       | 3            |
| Joint Efficiency                 |          | 1            |
| Nondestructive examination       | %        | 100          |
| Postweld Heat Treat              |          | YES          |
| Thermal insulation               | mm       | --           |
| Capacity                         | m³       | 35.3         |

| MATERIALS FOR        | QUALITY                   | STANDARD           |
|----------------------|---------------------------|--------------------|
| Shell, Heads ***)    | SA-516 Gr.60              | ASME SA-516        |
| Supports             | SA-516 Gr.60/SA-283 Gr.60 | ASME SA-516/SA-283 |
| Flanges              | SA-350 Gr.LF2 Cl1         | ASME SA-350        |
| Fittings             | SA-420 Gr.WPL6            | ASME SA-420        |
| Pipes                | SA-333 Gr.6               | ASME SA-333        |
| Stud Bolts           | SA-320 Gr.L7              | ASME SA-320        |
| Nuts                 | SA-194 Gr.4               | ASME SA-194        |
| Spiral wound gaskets | SS TP 316/tearable filler | --                 |
| Internals            | b) SS TP 304L             | --                 |

## NOZZLES AND MANWAYS

| Mark | No | Size  | Rating | Facing | Service                  |
|------|----|-------|--------|--------|--------------------------|
| I1   | 1  | 8"    | 300#   | RF     | INLET                    |
| O1   | 1  | 8"    | 300#   |        | OUTLET                   |
| O2   | 2  | 8"    | 300#   |        | ASBESTOS REMOVING NOZZLE |
| MH   | 1  | ID24" | 300#   |        | MANHOLE                  |

a) Actual content of HCl in the gas rich in hydrogen.

Content of HCl (ppmv) : normal=2, max=5.

b) Internals according AXENS VESSEL PROCESS DATA SHEET (sheet 1-11) for vessel item: 04-V13.

## ESTIMATED WEIGHT

|               |          |
|---------------|----------|
| Empty         | 19600 Kg |
| In service    | 65000 Kg |
| Full of water | 66500 Kg |

## REMARKS:

Attachment: AXENS VESSEL PROCESS DATA SHEET (sheet 1-11)

for vessel item: 04-V13.

\*\*\* Material shall comply with requirements AXENS std. material specification no. IN-042.0 .

\*\*\* Will be confirmed by customer.

\*CHEMICAL COMPOSITION: H2:61.67 mol%; C1:5.41 mol%; C2:5.67 mol%; C3:4.19mol%; IC4:1.0 mol%; nC4:1.31 mol%; IC5:0.46 mol%; nC5:0.25mol%; mBC6:0.01 mol%; sBC6:0.02 mol%; nC6:0.01 mol%;  
\*) 69.93, 299.7, 355, 507.2, 562.5, 583.8, 622.1, 630.4, 665.7, 657.3, 663.3.

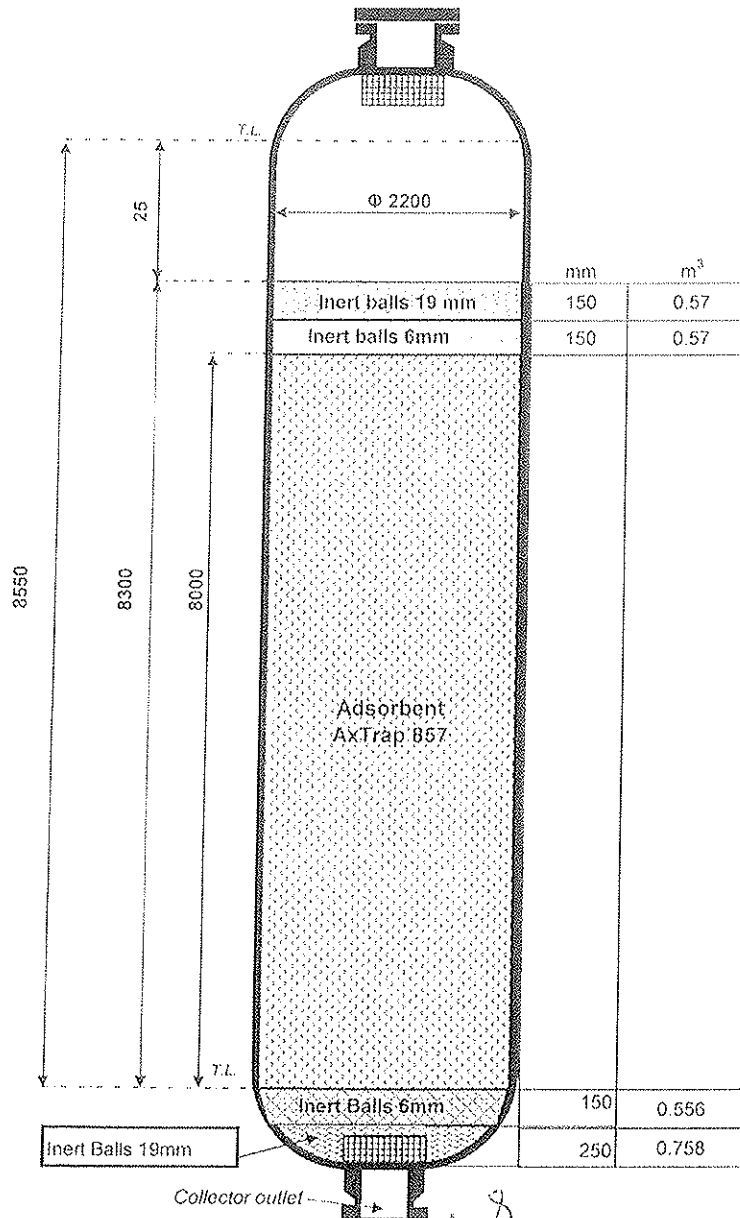
## ACCESSORIES APPLIED BY FABRICATOR

|                               |     |
|-------------------------------|-----|
| Ladder & Platform Clips       | Yes |
| Fireproofing Insulation Clips | Yes |
| Davit Support                 | --  |

Aprobat  
Prim Adj. al Directorului General  
Ing. Sef - D. Danulescu

# DIAGRAMA DE INCARCARE A ADSORBERULUI

04-V13  
DECEMBRIE 2012



Avizat:

Infocmit:

C. Niculescu

N. Sturzu