



Studiu de solutie – Proiect Conpet

**Baterie de filtrare tip SKID, cu 3 filtre tip “basket”
cu sita interschimbabila pe la partea superioara
(cu capac rabatabil)**

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1. SCOPUL PROPUȘ

Obiectivul studiului

- Realizarea unui studiu de ansamblu particularizat pe fiecare skid in parte.
- Lista celor 10 skid-uri disponibile:
 1. Skidul de masura de la Onesti A-10, D 016, PDM, Type1 (situat in Baicoi);
 2. Skidul de masura de la Onesti B-20, Y 016, TM, Type1 (situat in Baraganu);
 3. Skidul de masura de la Martinesti, Y 014, TM, Type 3 FMP (in locatie / Martinesti);
 4. Skidul de masura Astra A, D 019, PDM, Type 1 (situat in Baicoi);
 5. Skidul de masura Astra B, D 019/021, PDM, Type 1 (situat in Baicoi);
 6. Skidul de masura Petrotel A-10, D 020, PDM, Type 1 (in locatie in Petrotel);
 7. Skidul de masura Petrobrazii B-24, Y 018, TM, Type 1 (in locatie in Petrobrazii);
 8. Skidul de masura Vega relocat in Petrobrazii C, D 022, PDM, Type 1 (in locatie Petrobrazii)
 9. Skidul de masura Darmanesti relocat in Petrobrazii D, D 102, PDM, Type 1 (in locatie Petrobrazii);
 10. Skidul de masura Petrobrazii A-10, D 018, PDM, Type 2 (utilizat in locatie Petrobrazii).
- Studiul are ca obiectiv tratarea fiecarui skid de masura in parte, cu o detaliere a variantelor de reutilizare, identificarea parametrilor de proces, si prezentarea alternativelor de valorificare ale fiecarui skid in parte;
- Evaluarea starii de integritate a fiecarui skid in parte (uzura fizica si morala atat a componentelor de natura mecanica cat si a celor ce compun sistemul AMC) – NU FACE OBIECTUL ACESTUI STUDIU – skid-urile se presupun a fi complet/perfect functionale.
- Studiul propune si demersurile/solutiile de metrologizarea a skidurilor pentru care s-a decis modificarea/modernizarea/adaptarea la noi parametrii de proces, masurare si control. Solutile propuse trebuie sa conduca la fiscalizarea skidurilor nou modernizate.

2. Studiu de solutie – Proiect Conpet

Baterie de filtrare tip SKID, cu 3 filtre tip “basket” cu sita interschimbabila pe la partea superioara (cu capac rabatabil)

- care sa fie montata pe o linie de transport titei prin conducta, functionarea fiind facuta individual, pe unul din cele trei filtre:
 - unul in functionare;
 - unul in standby (operabil in orice moment);
 - iar al treilea in faza de curatare.

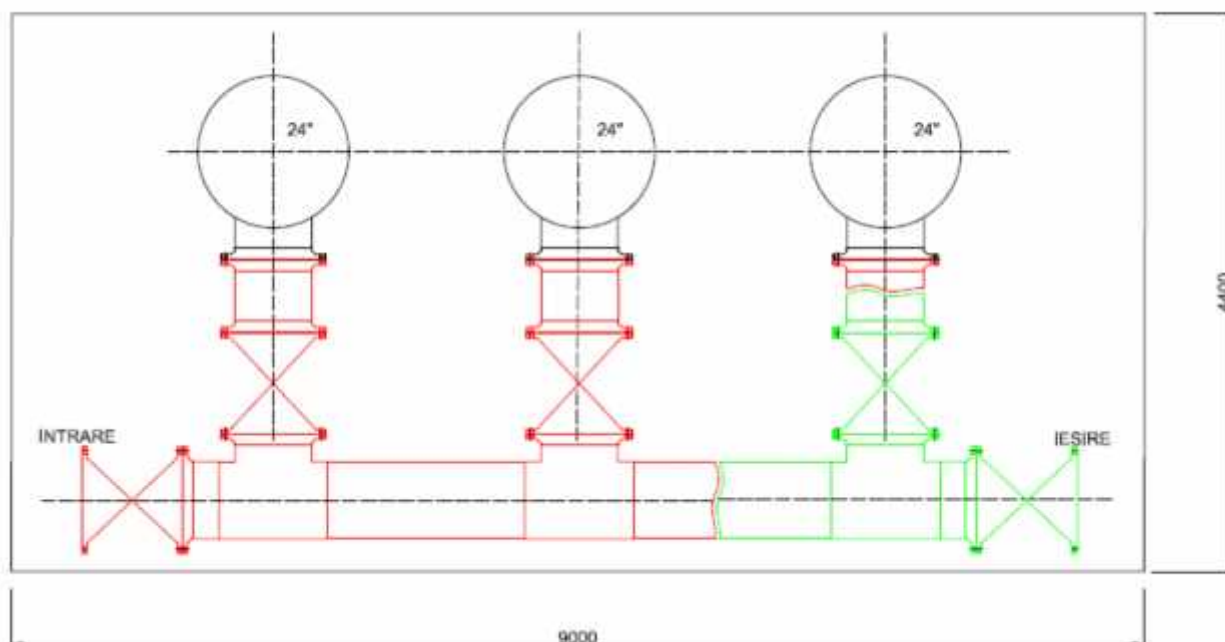
3. Caracteristici locatii din tara / Parametrii de process - (cf. Caiet de sarcini)

| Location | Density 15°C vacuum g/cm ³ | Viscosity range(cSt) 20°C | Operating pressure bar | Crude oil temperature | Flow m ³ /h (t/h) | Pipeline size | Cantitate/zi [t/zi] | Perioada de pompare |
|---------------|--|------------------------------|---------------------------|--------------------------|---------------------------------|------------------|------------------------|------------------------|
| Baicoi Centru | 0,8300 ÷ 0,8600 | 4,18 ÷ 50 | 1 ÷ 6 | 16 | 55 (47) | 7" SR (6"5/8) | 150 | zilnic |
| Moreni | 0,860 ÷ 0,905 | 13 ÷ 60 | 13 ÷ 28 | 13 | 52 ÷ 70 (46 ÷ 62) | | 750 | zilnic |
| Madulari | 0,7500 ÷ 0,7700 | 1,22 ÷ 1,4 | 8 | 36 | 110 (82) | 10" | 150 | 4x/sapt. |
| Varteju | 0,8300 ÷ 0,8407 | 3 ÷ 6,10 | 23 | 42 | 60(50) | 10" | 30 | 2x/sapt. |
| Bucsan | 0,8240 ÷ 0,8290 | 23,22 ÷ 28,71 | 8 ÷ 14 | 60 | 31 (25) | 4" | 50 | 4x/sapt. |
| Ochiuri | 0,8900 ÷ 0,9050 | 30 ÷ 60 | 17 | 47 | 56(65) | 6" | 220 | la 2 zile |
| Teis | 0,8600 ÷ 0,8620 | 14 ÷ 18 | 24 | 36 | 63 (53) | 6" | 120 | la 2 zile |
| Raca | 0,910 ÷ 0,912 | 37 ÷ 51 | 22 | 48 | 19 (17) | | 3 | lunar |
| Izvoru | 0,8530 ÷ 0,8550 | 3,67 ÷ 6,11 | 11 | 36 | 33 (27) | 6" | 11 | decadal |
| Padure II | 0,8485 ÷ 0,8550 | 9,00 ÷ 11,00 | 3 ÷ 15 | 43 | 65 | 6" | 290 | zilnic |
| Slobozia | 0,8400 ÷ 0,8450 | 7,00 ÷ 14,5 | 5 (max 30) | 45 ÷ 50 | 32 | 4" | 130 | la 3 zile |
| Aricesti | 0,8444 ÷ 0,8550 | 14,25 at 30° C | 8 | 48 ÷ 50 | 13 | 6" | 90 | la 6 zile |
| Saru | 0,875 ÷ 0,880 | 17,95 ÷ 20,00 | 8 ÷ 10 | 40 ÷ 45 | 65 | 6" | 600 | la 2 zile |
| Oarja | 0,8900 ÷ 0,8950 | 34,20 ÷ 42,57 | 8 ÷ 10 | 40 ÷ 46 | 62 | 6" | 250 | la 4 zile |
| Poeni | 0,915 ÷ 0,920 | 70,00 ÷ 212,30 | 8 ÷ 10 | 44 ÷ 46 | 135 | | 900 | la 2 zile |
| Poeni (2) | 0,890 ÷ 0,895 | 25,93 ÷ 40,69 | 8 ÷ 10 | 31 ÷ 40 | 135 | | 250 | la 4 zile |
| LACT Badesti | 0,825 ÷ 0,830 | 5,81 ÷ 6,13 | 10 | 35 ÷ 40 | 55 | | 190 | zilnic |
| Boldesti | 0,8385 ÷ 0,8485 | 8,55 ÷ 15,28 | 2 ÷ 5 | 40 ÷ 46 | 46 ÷ 60 | 8" | 220 | zilnic |

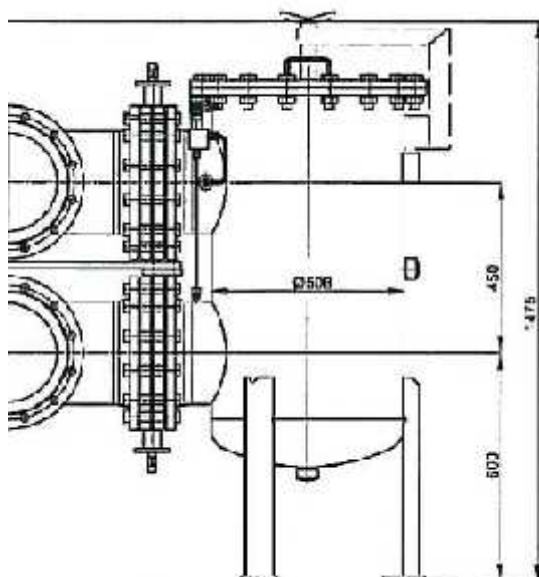
4. Partea tehnica a sistemelor de filtrare de tip skid cu trei linii de filtrare individuala, include:

- Proiectare: En 13445+PED pentru vase/filter basket si EN 13480+PED pentru conducte;
- Achizitia materialelor necesare pentru executia vaselor/filtrelor si a skidurilor;
- Executia vaselor/filtrelor, structura metalica si legaturi conducte skid (a se vedea listele de materiale pentru 2 skiduri propuse 4" si 24" , fara vase/filtre);
- Sablare si vopsire conform Normelor;
- Sitele de filtrare interioare conform specificatiei din tabelul corespunzator la 4" / 24".
- Control nedistructiv: 100%RT/100%PT pentru vase/filtre si 50%RT/100%PT la conducte
- Certificare: Cat. IV pentru vase/filtre si Cat. II-III pentru conducte.
- Certificare CE a vaselor cu TUV Romania.
- Probe hidraulice si de etanseitate asistate de TUV Romania si clientul Conpet.
- Documentatie tehnica

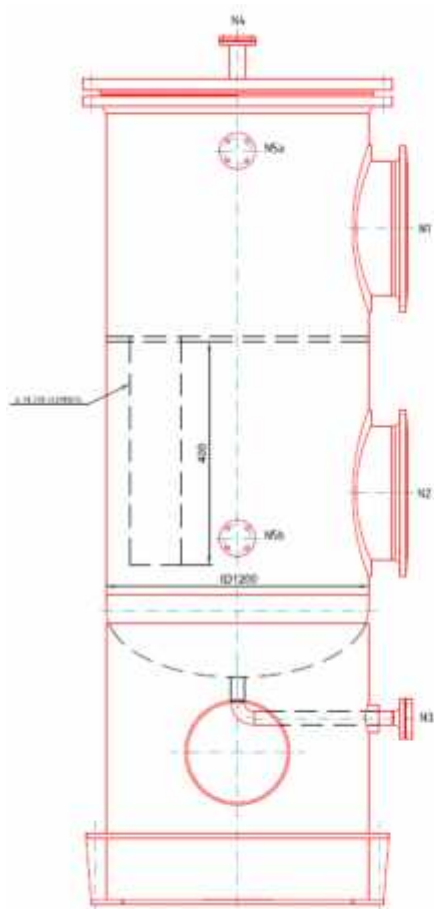
5. **SKID cu trei linii de filtrare individuale (24")**
Sistemul de Filtrare prevazut cu cele doua colectoare etajate
 (intrare pe sus / iesire pe jos)
 pentru liniile de transport de 24 " (Brazi 7 – import)



Schema de principiu a skidului, cu trei filtre basket de 24 inch
(Dimensiuni de gabarit: 9000 x 4400)



- Filtru basket cu intrare si iesire unilaterala

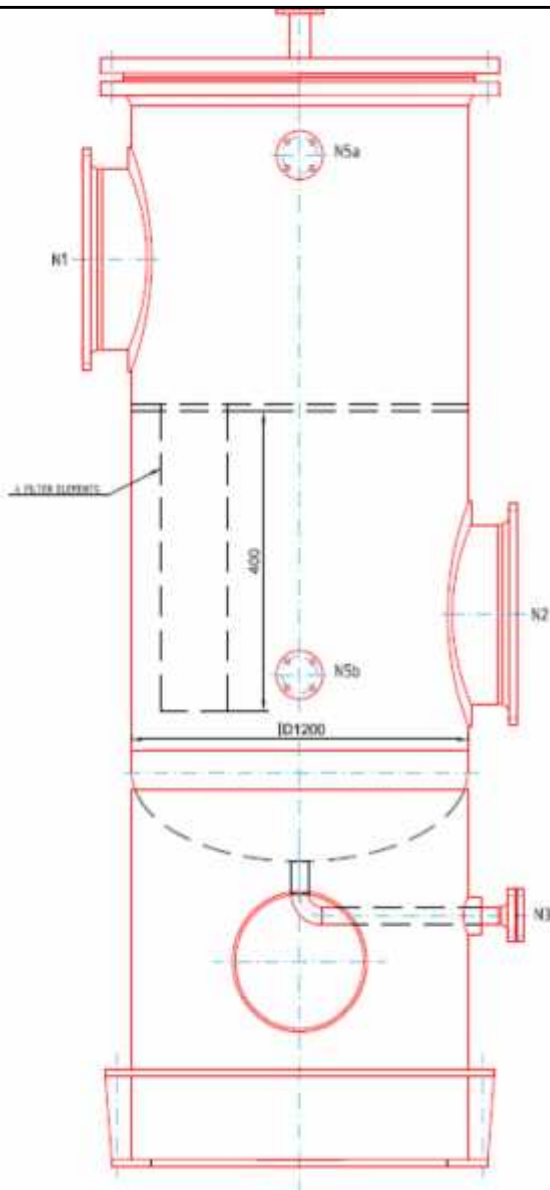


| MODEL | QTY. | DESCRIPTION | SIZE | UNIT |
|-------|------|-----------------------------------|------|------|
| N4 | 1 | Inlet | 600 | N |
| N5 | 1 | Outlet | 600 | N |
| N6 | 1 | Drain | 50 | N |
| N7 | 1 | Vent | 50 | N |
| N8a | 1 | Differential Pressure Transmitter | 50 | N |
| N8b | 1 | Differential Pressure Transmitter | 50 | N |

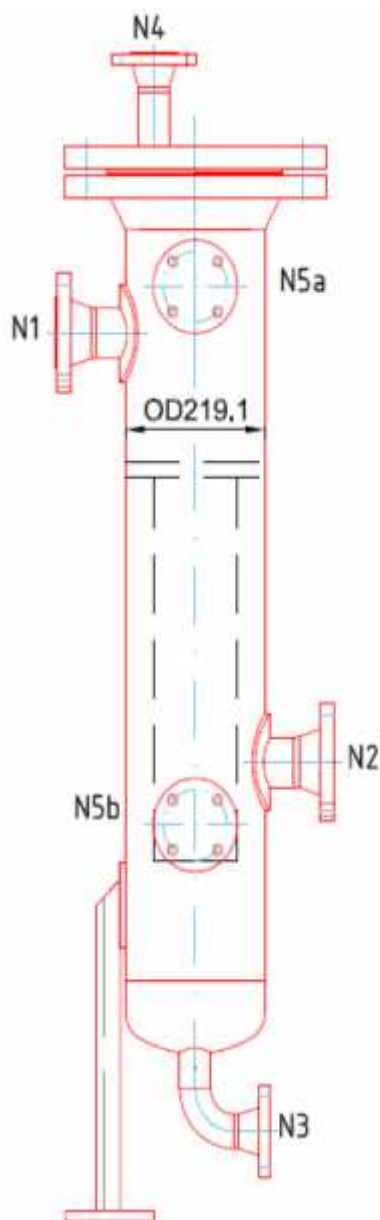
- Filtru basket cu intrarea/iesirea unilaterala

- Filtru DN600 (24") - Detalii si dimensiuni tehnico-construative

Modele tipodimensionale de filtre basket DN 600 (24") / DN 100 (4")

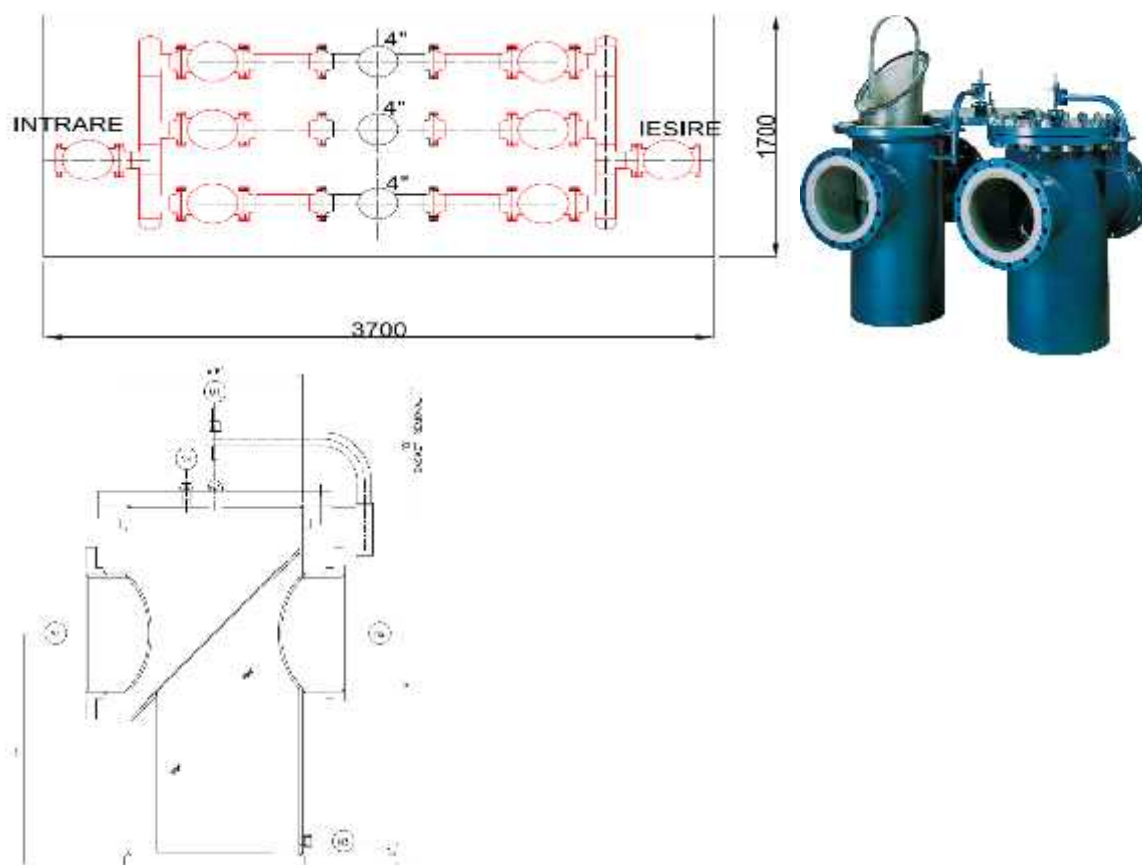


| NOZZLE | QTY | SERVICE | SIZE | RATING |
|--------|-----|-----------------------------------|------|--------|
| 80 | 1 | Boat | 800 | 5 |
| 82 | 1 | Bullet | 800 | 5 |
| 83 | 1 | Drum | 50 | 5 |
| 84 | 1 | Van | 50 | 5 |
| 85a | 1 | Differential Pressure Transmitter | 50 | 5 |
| 85b | 1 | Differential Pressure Transmitter | 50 | 5 |



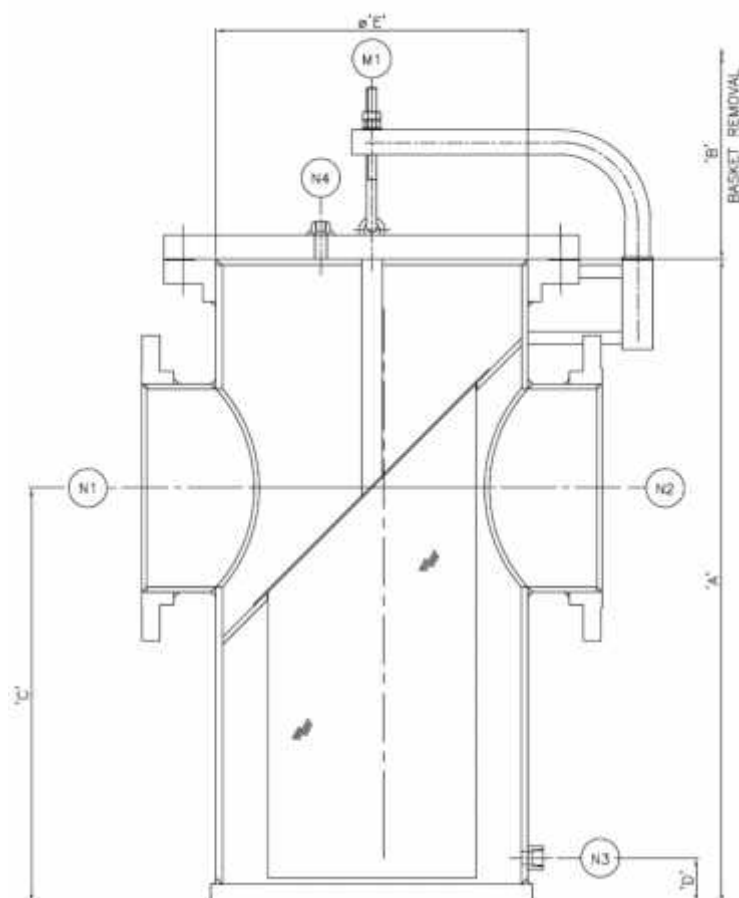
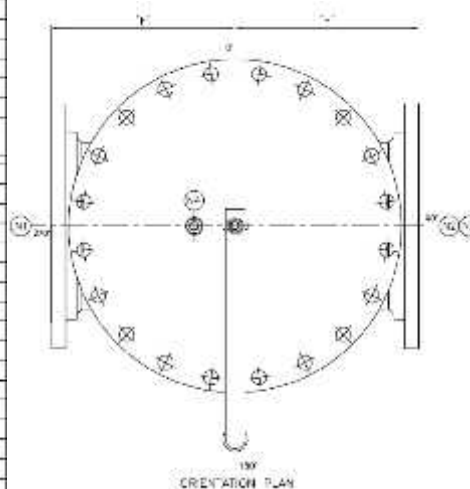
| NOZZLE | QTY. | SERVICE | SIZE | RATING |
|--------|------|-----------------------------------|------|--------|
| N1 | 1 | Inlet | 100 | 40 |
| N2 | 1 | Outlet | 100 | 40 |
| N3 | 1 | Drain | 50 | 40 |
| N4 | 1 | Vent | 50 | 40 |
| N5a | 1 | Differential Pressure Transmitter | 50 | 40 |
| N5b | 1 | Differential Pressure Transmitter | 50 | 40 |

Skid de filtrare cu 3 linii individuale paralele / Filtru Basket 4 inch - Slobozia



Schema de principiu a sistemului de filtrare ce poate fi montat pe linia de transport titei (fiecare filtru functionand individual la debitul maxim de fluid vehiculat) / (Dimensiuni de gabarit: 3700 x 1700)

| TABLE OF CONNECTIONS & OPENINGS | | | |
|---|-----------------------|--------------------|--------------------|
| REF | SIZE & DESCRIPTION | FLANGE RATING | SERVICE |
| N1 | SEE TABLE | ASME B16.5 CL150RF | INLET |
| N2 | SEE TABLE | ASME B16.5 CL150RF | OUTLET |
| N3 | SEE TABLE | ASME B16.5 CL150RF | DRAIN |
| N4 | SEE TABLE | ASME B16.5 CL150RF | VENT |
| N5 | 3/8" BSP | 3000# | 3P IN1 (OPTIONAL) |
| N6 | 3/8" BSP | 3000# | 3P LOR (OPTIONAL) |
| M1 | SEE TABLE | ASME B16.5 CL150RF | MAINTENANCE ACCESS |
| DESIGN DATA | | | |
| DESIGN CODE | : COMMERCIAL STANDARD | | |
| CLIENT SPECIFICATION | : - | | |
| DESIGN PRESSURE | : 19.6 BARG | | |
| DESIGN TEMPERATURE (MAX/MIN) | : 30°C | | |
| HYDRAULIC TEST PRESSURE | : 26.0 BARG | | |
| CORROSION ALLOWANCE | : 1.6mm | | |
| PROD. CONTROL TEST PLATE | : NOT REQD | | |
| POSTWELD HEAT TREATMENT | : NOT REQD | | |
| NON DESTRUCTIVE TESTING | : - | | |
| INTERNAL FINISH: CLEANED, DESCALED & UNPAINTED. | | | |
| EXTERNAL FINISH: PLUMPY STANDARD PS1 OR TO CLIENT SPECS | | | |



| SIZE | N1 | N2 | N3 | N4 | M1 | 'A' | 'B' | 'C' | 'D' | ø'E' | 'F' |
|---------------|-------|-------|---------|--------|-------|------|------|------|-----|-------|-----|
| 6"NB CL150RF | 6"NB | 6"NB | ½"BSPT | ¼"BSPT | 10"NB | 600 | 600 | 360 | 55 | 273 | 225 |
| 8"NB CL150RF | 8"NB | 8"NB | ½"BSPT | ¼"BSPT | 12"NB | 725 | 725 | 435 | 60 | 323.9 | 260 |
| 10"NB CL150RF | 10"NB | 10"NB | ½"BSPT | ¼"BSPT | 16"NB | 875 | 875 | 545 | 63 | 406.4 | 320 |
| 12"NB CL150RF | 12"NB | 12"NB | 1"BSPT | ¼"BSPT | 18"NB | 1025 | 1025 | 645 | 80 | 457.2 | 350 |
| 14"NB CL150RF | 14"NB | 14"NB | 1"BSPT | ½"BSPT | 20"NB | 1175 | 1175 | 750 | 85 | 508 | 390 |
| 16"NB CL150RF | 16"NB | 16"NB | 1"BSPT | ½"BSPT | 24"NB | 1250 | 1250 | 810 | 87 | 609.6 | 450 |
| 18"NB CL150RF | 18"NB | 18"NB | 1½"BSPT | ½"BSPT | 28"NB | 1350 | 1350 | 860 | 100 | 711.2 | 525 |
| 20"NB CL150RF | 20"NB | 20"NB | 1½"BSPT | ½"BSPT | 30"NB | 1500 | 1500 | 970 | 100 | 762 | 575 |
| 24"NB CL150RF | 24"NB | 24"NB | 1½"BSPT | ½"BSPT | 36"NB | 1750 | 1750 | 1125 | 110 | 914.4 | 650 |

6. Caracteristici locatii / Parametrii de process - Locatia Petrobrazi (cf. Caiet de sarcini)

| Location | Density 15°C vacuum g/cm3 | Vascozitate min (20°C) / max(5°C) | Operating pressure bar | Crude oil temperature | Flow m3/h (t/h) | Pipeline size | Cantitate /zi [t/zi] | Perioada de pompare |
|----------------|---------------------------|-----------------------------------|------------------------|-----------------------|-----------------|---------------|----------------------|---------------------|
| Brazi 1 | 0,830 ÷ 0,905 | 10 / 150 | 2 ÷ 3 | 5 °C ÷ 35 °C | 50 - 140 | 8" | | |
| Brazi 2 | 0,800 ÷ 0,930 | 10 / 150 | 2 ÷ 3 | 5 °C ÷ 35 °C | 30 ÷ 250 | 10" | | |
| Brazi 3 | 0,800 ÷ 0,930 | 50 / 800 | 2 ÷ 3 | 5 °C ÷ 35 °C | 50 ÷ 400 | 10" | | |
| Brazi 4 | 0,800 ÷ 0,920 | 10 / 100 | 2 ÷ 3 | 5 °C ÷ 35 °C | 30 ÷ 70 | 8" | | |
| Brazi 5 | 0,835 ÷ 0,920 | 10 / 200 | 2 ÷ 3 | 5 °C ÷ 35 °C | 30 ÷ 70 | 12" | | |
| Brazi 6 | 0,730 ÷ 0,960 | 50 / 800 | 2 ÷ 3 | 5 °C ÷ 35 °C | 30 ÷ 250 | 12" | | |
| Brazi 7 Import | 0,800 ÷ 0,960 | 75/150 | 2 ÷ 3 | 5 °C ÷ 35 °C | 150 ÷ 800 | 24" | | |
| Brazi 8 Total | 0,800 ÷ 0,960 | 50 / 800 | 2 ÷ 3 | 5 °C ÷ 35 °C | 100 ÷ 800 | 12" | | |



7. Caracteristicile materialelor/detalii proiectare ale Filtrelor – tip basket, destinate locatiei Petrobrazi (1,2,3, si 4)

BRAZI 1

8 in (200mm) NB Simplex Basket Strainer Model SN-8

Material: Cast steel ASTM A216 WCB

Flanges drilled to ANSI 150 or PN16 (RF)

With 2mm Perf SS316 Basket

Design pressure 10 barg @ 40 Deg C.

PED Compliant

CLEAN DP @ 140 M3/hr of 150 CST fluid = 0.067 Bar

BRAZI 2

10 in (250mm) NB Simplex Basket Strainer Model SN-10

Material: Cast steel ASTM A216 WCB

Flanges drilled to ANSI 150 or PN16 (RF)

With 2mm Perf SS316 Basket

Design pressure 10 barg @ 40 Deg C.

PED Compliant

CLEAN DP @ 250 M3/hr of 150 CST fluid = 0.066 Bar

BRAZI 5

12 in (300mm) NB Simplex Basket Strainer Model SN-12

Material: Cast steel ASTM A216 WCB

Flanges drilled to ANSI 150 or PN16 (RF)

With 2mm Perf SS316 Basket

Design pressure 10 barg @ 40 Deg C.

PED Compliant

CLEAN DP @ 70 M3/hr of 200 CST fluid = 0.02 Bar

BRAZI 6

12 in (300mm) NB Simplex Basket Strainer Model SN-12

Material: Cast steel ASTM A216 WCB

Flanges drilled to ANSI 150 or PN16 (RF)

With 2mm Perf SS316 Basket

Design pressure 10 barg @ 40 Deg C.

PED Compliant

CLEAN DP @ 250 M3/hr of 800 CST fluid = 0.13 Bar

BRAZI 3

10 in (250mm) NB Simplex Basket Strainer Model SN-10

Material: Cast steel ASTM A216 WCB

Flanges drilled to ANSI 150 or PN16 (RF)

With 2mm Perf SS316 Basket

Design pressure 10 barg @ 40 Deg C.

PED Compliant

CLEAN DP @ 400 M3/hr of 800 CST fluid = 0.15 Bar

BRAZI 4

8 in (200mm) NB Simplex Basket Strainer Model SN-8

Material: Cast steel ASTM A216 WCB

Flanges drilled to ANSI 150 or PN16 (RF)

With 2mm Perf SS316 Basket

Design pressure 10 barg @ 40 Deg C.

PED Compliant

CLEAN DP @ 70 M3/hr of 100 CST fluid = 0.02 Bar

BRAZI 7 – IMPORT

24" NB (600 mm) Fabricated Single Angled Basket Strainer

Model 150 - With 36"(900) Diameter body

With bolted type cover. AF2000 Gasket

Bolting ASTM A193-B7 & A194-2H

24" Inlet / Outlet: Flanged ANSI B16.5-150 RF (OR PN16)

Slip on flanges included

Material - Carbon steel (ASTM A106/A105/A516-GR70)

With 2mm perf SS 316L angled top basket

Design pressure 10 barg @ 40 Deg C.

PED Compliant

CLEAN DP @ 250 M3/hr of 800 CST fluid = LOW

BRAZI 8 – TOTAL

12 in (300mm) NB Simplex Basket Strainer Model SN-12

Material: Cast steel ASTM A216 WCB

Flanges drilled to ANSI 150 or PN16 (RF)

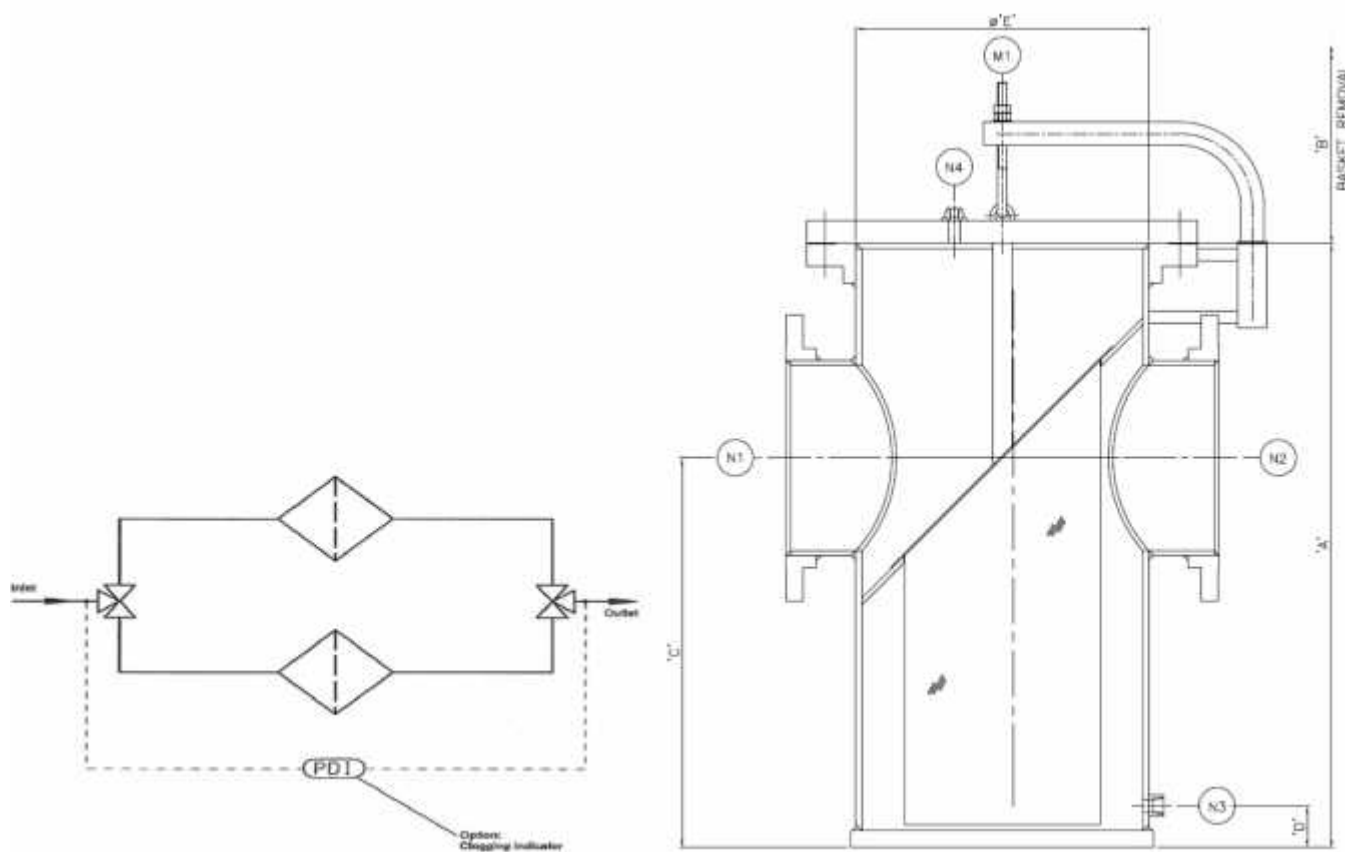
With 2mm Perf SS316 Basket

Design pressure 10 barg @ 40 Deg C.

PED Compliant

CLEAN DP @ ****400 M3/hr** of 800 CST fluid = 0.23 Bar

Obs: Pentru a putea atinge debitul maxim solicitat (800 m³/h) la filtrul de la **pozitia Brazi 8**, **conexiunea fiind 12 inch, este nevoie sa se foloseasca 2 filtre in parallel (sistem duplex) pe aceasi linie de flux. Practic vor rezulta 3 linii de filtrare , fiecare linie avand cate un sistem duplex cu 2 filter basket.**



Aranjamentul filtrelor in sistem duplex, corespunzatoare unui debit maxim de 800mc/h

Varianta constructiva a filtrului de tip basket, cu , capac rabatabil si schimbare usoara a sitei filtrante (mesh sita: 2 mm)

8. Mentenanta si conditii de operare

- La cererea beneficiarului la filtrele de tip basket poate fi montat un senzor (indicator) de colmatare.
- Filtrele de tip basket din proiectare prezinta o cadere presiune maxim admisa astfel incat pe baza instrumentatiei de presiune montata inainte si dupa filtru basket se poate identifica cu usurinta daca caderea de presiune este mai mare decat presiunea maxima admisa. In aceste conditii prin vanele de izolare inainte si dupa filtru linia de filtrare va fi izolata comutandu-se pe linia de filtrare situata in stand-by.
- Curatarea filtrului colmatat se face cu usurinta deschizand robinetul de drain de la baza filtrului pentru depresurizarea acestuia si golirea acestuia de produs.
- Schimbarea sitei filtrante se poate face prin desfacerea prezoanelor de la capacul superior al filtrului, rotirea capacului cu ajutorul bratului pivotant, scoaterea sitei colmatate si inlocuirea cu sita de rezerva.
- Curatarea sitei colmatate se face in jet de presiune cu abur (in atelier)
- Frecventa de schimbare (datorita colmatarii) a sitei filtrante se face prin monitorizarea in timp a caderii de presiune pe filtrul respectiv.

9. Concluzii:

- In functie de varianta tehnica agreata din punct de vedere dimensional (varianta cu colectoarele etajate si filtre de tip basket cu intrarea/iesirea unidirectionala sau varianta cu 3 linii de filtrare montate in paralel) se poate face o detaliere constructiva detaliata care sa include un necesar de materiale si echipamente complet.
- In functie de solicitarea Beneficiarului, la fiecare skid in cauza se pot adauga urmatoarele:
 - Izolatie termica;
 - Partea electrica si nivelul de automatizare cerut;
 - Transportul la locatia finala;
 - Montajul pe pozitie;
 - Legaturi conducte intre skiduri si traseul de conducta.
- Termenul de executie este de cca. 5 luni pentru skidul de 24inch si 3 luni pentru 4inch.