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| **RAPORT DIMENSIONARE SUPAPA SIGURANTA**  **PSV-002** | | | | | | | | |
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|  |  |  |  |  | |  |  | |
| 01 | 05.2022 | Emis pentru construire | DAN M. | NAN J.C. | | STAN C. | NAN J.C. | |
| 00 | 06.2021 | Emis pentru comentarii | DAN M. | NAN J.C. | | STAN C. | NAN J.C. | |
| **Rev. nr.** | **Data** | **Descriere** | **Intocmit** | **Verificat** | | **Sef proiect** | **Aprobat** | |
| **S.C.CONPET S.A** | | **RAPORT DIMENSIONARE SUPAPA SIGURANTA**  **PSV-002** | | | | | | |
| **Doc. no.: PR1193-ME27-01** | | | | | | **Rev.: 01** |
| **S.C. Team Oil s.r.l. PLOIEŞTI ROMâNIa** | | **Titlul proiectului:** | | | **Proiect nr.** | | | **Pag. nr.:** |
| **MODERNIZAREA STATIEI DE**  **POMPARE A TITEIULUI**  **SLOBOZIA JUD. PRAHOVA** | | | **PR1193**  **Faza:**  **PT** | | | **1 din 6** |

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# 1. INTRODUCERE

În prezent, datorita uzurii morale si fizice a utilajelor si instalatiilor din statiile de pompare mentionate mai sus, precum si a necesitatii corelarii parametrilor de pompare cu productiile de titei obtinute de Conpet S.A. in zonele analizate, se impune analizarea sistemului actual de pompare din punct de vedere al eficientei economice prin inlocuirea utilajelor, instalatiilor tehnologice si a altor obiecte aferente sistemelor de pompare a titeiului.

# 2. SCOPUL DOCUMENTULUI

Documentul prezinta metodologia folosita pentru dimensionarea supapelor de siguranta montate in urmatoarele puncte:

- pompele de vehiculare titei (cu cavitati progresive);

# 3. DESCRIEREA ALGORITMULUI DE CALCUL

Capacitatea de evacuare a unei supape se determina cu relatia:

- pentru lichide:

GM = 1,61 α A

unde:

Gm - capacitatea de evacuare (kg/h);

A - aria sectiunii minime de evacuare (mm2);

α - coeficient de scurgere atestat al supapei;

p - presiune maxima a mediului de lucru inaintea supapei de siguranta (bar);

pc - presiunea din conducta de evacuare (bar);

ɤ - densitatea mediului de lucru la "p" si "t" (kg/m3);

# 4. DATE DE CALCUL SI REZULTATE

Supapa montata pe conducta de refulare al pompei verticale de pe rezervorul de colectare scurgeri:

Date proiectare:

- debitul maxim: Q = 7.5 m3/h;

- densitate ρ = 820-1120 kg/m3

- presiunea de reglare p = 25 bar;

- contrapresiune pc = 0 bar.

- coeficientul de scurgere α = 0,65;

- temperatura de lucru t = 20-55°C;

Se alege supapa P1000 - 25x15x40. (Cu sectiune 177 >57.553 mm2)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sizing - Medium** | | | | | | | |
| 1000 | Designation | | Crude oil+rain water | | | | |
| 1004 | Formula | |  | | | | |
| 1005 | Density | | ρ | 820-1120 | | kg/m³ | |
| 1006 | Viscosity | | µ or ή |  | |  | |
|  | | | | | | | |
| **Sizing - Service condition** | | | | | | | |
| 1100 | Maximum allowable working pressure | |  | | 28 | | bar-g |
| 1101 | Set pressure | | p | | 25 | | bar-g |
| 1102 | Constant superimposed back pressure | | paf | |  | |  |
| 2102 | Variable superimposed back pressure | |  | |  | |  |
| 1103 | Built up back pressure | | pae | |  | |  |
| 1104 | Backpressure | |  | |  | |  |
| 1105 | Overpressure | | dp | | 10 | | % |
| 1106 | Environmental pressure | | pu | | 1.013 | | bar |
| 1107 | Relieving Temperature | | T | | 35 | | °C |
| 1111 | Operating Temperature | |  | | 30 | | °C |
| 1108 | Required massflow | | qm,ab | | 6.375 | | t/h |
| 1109 | Volume flow to be discharged (working condition) | | qvb,ab | | 7.5 | | m³/h |
|  | | | | | | | |
| **Sizing - Calculation** | | | | | | | |
| 1200 | Certified massflow | qm,zu | | 28187.015 | | kg/h | |
| 1201 | Certified volumeflow (operating condition) | qvb,zu | | 33.161 | | m³/h | |
| 1203 | Certified volumeflow (standard condition) | qvn,zu | |  | |  | |
| 1204 | Maximum mass flow | qm,max | | 31318.906 | | kg/h | |
| 1205 | Maximum volume flow (working condition) | qvb,max | | 36.846 | | m³/h | |
| 1206 | Maximum volume flow (standard condition) | qvn,max | |  | |  | |
| 1207 | Capacity exceed |  | | 342.15 | | % | |
| **Valve - Calculation** | | | | | | | |
| 1600 | Required actual discharge area | Ao, req | | 57.553 | | mm² | |
| 1601 | Required discharge diameter | do,req | | 8.56 | | mm | |
| 1618 | Cold differential test pressure | CDTP | | 25 | | bar-g | |
| 1620 | Cold differential test pressure, manually | CDTP | |  | |  | |

**DIMENSIUNI SUPAPE, conform API 526:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ORIFICE SIZES (Index is inverse area)** DIMENSIUNI SUPAPE | | | | | |  |
| Index | Size/ Dimensiune | Diameter/ Diametru | | Area/ Suprafata | | Usually |
| (in) | (mm) | (in2) | (mm2) | (in2) |
| 0.038462 | T | 5.754 | 146.152 | 26.000 | 16774.160 | 8x10 |
| 0.0625 | R | 4.514 | 114.656 | 16.000 | 10322.560 | 6x8 |
| 0.090498 | Q | 3.751 | 95.275 | 11.050 | 7129.018 | 6x8 |
| 0.15674 | P | 2.850 | 72.390 | 6.380 | 4116.121 | 4x6 |
| 0.230415 | N | 2.351 | 59.715 | 4.340 | 2799.994 | 4x6 |
| 0.277778 | M | 2.141 | 54.381 | 3.600 | 2322.576 | 4x6 |
| 0.350508 | L | 1.906 | 48.412 | 2.853 | 1840.641 | 3x4 |
| 0.54407 | K | 1.530 | 38.862 | 1.838 | 1185.804 | 3x4 |
| 0.777001 | J | 1.280 | 32.512 | 1.287 | 830.321 | 2x3 |
| 1.273885 | H | 1.000 | 25.400 | 0.785 | 506.451 | 2x3 |
| 1.988072 | G | 0.800 | 20.320 | 0.503 | 324.515 | 1,5x2,5 |
| 3.257329 | F | 0.625 | 15.875 | 0.307 | 198.064 | 1,5x2,5 |
| 5.102041 | E | 0.500 | 12.700 | 0.196 | 126.451 | 1x2 |
| 9.090909 | D | 0.374 | 9.500 | 0.110 | 70.968 | 1x2 |

**Nota: Calculul final va fi furnizat de catre producatorii supapelor de siguranta.**