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| **طرح نگهداشت و افزایش تولید 27 مخزن** | | | | | | | |
| **DATA SHEETS FOR DIESEL GENERATOR**  **نگهداشت و افزایش تولید میدان نفتی بینک** | | | | | | | |
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| D02 | Mar. 2023 | IFA | H.Shakiba | M.Fakharian | M.Mehrshad |  |
| D01 | Aug. 2022 | IFA | H.Shakiba | M.Fakharian | M.Mehrshad |  |
| D00 | May. 2022 | IFC | H.Shakiba | M.Fakharian | M.Mehrshad |  |
| **Rev.** | **Date** | **Purpose of Issue/Status** | **Prepared by:** | **Checked by:** | **Approved by:** | **Client Approval** |
| **Class: 2** | | **Client Doc. Number: F0Z-709020** | | | | |
| **Status:** | **IDC: Inter-Discipline Check**  **IFC: Issued For Comment**  **IFA: Issued For Approval**  **AFD: Approved For Design**  **AFC: Approved For Construction**  **AFP: Approved For Purchase**  **AFQ: Approved For Quotation**  **IFI: Issued For Information**  **AB-R: As-Built for Client Review**  **AB-A: As-Built –Approved** | | | | | |

**REVISION RECORD SHEET**

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| **PAGE** | **D00** | **D01** | **D02** | **D03** | **D04** |  | **PAGE** | **D00** | **D01** | **D02** | **D03** | **D04** |
| **1** | X | X | X |  |  | **51** |  |  |  |  |  |
| **2** | X | X | X |  |  | **52** |  |  |  |  |  |
| **3** | X | X |  |  |  | **53** |  |  |  |  |  |
| **4** | X | X | X |  |  | **54** |  |  |  |  |  |
| **5** | X |  |  |  |  | **55** |  |  |  |  |  |
| **6** | X | X | X |  |  | **56** |  |  |  |  |  |
| **7** | X | X |  |  |  | **57** |  |  |  |  |  |
| **8** | X | X |  |  |  | **58** |  |  |  |  |  |
| **9** | X | X | X |  |  | **59** |  |  |  |  |  |
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| **Technical Data Sheet for Diesel Generator of Compressor Station** | | | |
| --- | --- | --- | --- |
| **Item** | **Description** | **Purchaser Requirement** | **Manufacturer Data** |
| **1. Environmental Conditions (Process Basis Design, BK-GNRAL-PEDCO-000-PR-DB-0001)** | | | |
| 1.1 | Location | Binak Oilfield in Bushehr Province |  |
| 1.2 | Installation | Outdoor Under Shelter, Safe Area |  |
| 1.3 | Installation Elevation | 12.5m (Above Sea Level) |  |
| 1.4 | Seismic Loads | Zone 3 UBC |  |
| 1.5 | Relative Humidity | 100% |  |
| 1.6 | Ambient Temperature Range | 5 ~ 52°C |  |
| 1.7 | Atmosphere | Corrosive & Hot |  |
| **2.Generel** | | | |
| 2.1 | Manufacturer's Name | By Vendor |  |
| 2.2 | Model | By Vendor |  |
| 2.3 | Quantity/Tag Number | 1 /GCS-DG-001 |  |
| 2.4 | Electrical Standard | IPS-E-EL-100(1)  IPS-M-EL-138 (1)  BK-GNRAL-PEDCO-000-EL-SP-0009 |  |
| 2.5 | Mechanical Standard | IPS-M-PM-290 (2)  BK-GCS-PEDCO-120-ME-SP-0012 |  |
| 2.6 | References | Calculation Note for Diesel Generator Sizing  (BK-GCS-PEDCO-120-EL-CN-0007) |  |
| 2.7 | Description of Equipment | Gen Set with Diesel Engine Prime Mover (Diesel Generator) |  |
| **3. Engine Specifications** | | | |
| 3.1 | Genset Operation Mode (Single or Parallel) | Single |  |
| 3.2 | Duty | Emergency Standby  (Calculated for continuous operation) |  |
| 3.3 | Aspiration | Turbo Charged, Intercooler |  |
| 3.4 | Cylinder configuration | By Vendor |  |
| 3.5 | Number of Cylinders | By Vendor |  |
| 3.6 | Type | Industrial, 4 strokes, Direct Injection |  |
| 3.7 | Displacement (liter) | By Vendor |  |
| 3.8 | Bore/Stroke (mm) | By Vendor |  |
| 3.9 | Compression Ratio | By Vendor |  |
| 3.10 | Governor Type | Electronic |  |
| 3.11 | Air Cleaner Type | Heavy Duty |  |
| 3.12 | Engine speed (rpm) | 1500 |  |
| 3.13 | Derating Factor for Working at Site Conditions (55°C) | 0.97  (Vendor Shall Advise This Value) |  |
| 3.14 | ISO Gross Shaft Power at (kw)  Continuous  Prime  Maximum Standby | By Vendor  >445  >555 | D02 |
| 3.15 | Cooling Fan Power Requirement (kw) | 10 |  |
| 3.16 | ISO Net Shaft Power at (kw)  Continuous  Prime  Maximum Standby | By Vendor  >549  >510 |  |
| 3.17 | Piston Speed (m/s) | By Vendor |  |
| 3.18 | Starting System | Electrical |  |
| 3.19 | Type of Batteries | Vented Ni-Cd |  |
| 3.20 | Number of Batteries (Cell) | 20 Number Cells |  |
| 3.21 | Size of Batteries (Ah) | Not less than 200 Ah |  |
| 3.22 | Max Startup & Loading Time  up to Full Load (Sec) | 10 Sec |  |
| **4.Lubricating System** | | | |
| 4.1 | Type | Forced Feed by Gear Oil Pump |  |
| 4.2 | Total Oil Capacity Min/Max (liter) | By Vendor |  |
| 4.3 | Oil Filter | By Vendor |  |
| 4.4 | Oil Cooler | Water Cooled |  |
| 4.5 | Oil Type Required | By Vendor |  |
| 4.6 | Lube Oil Consumption at: (gr/h)  Continuous Power  Prime Power  Standby POWER | By Vendor |  |
| **5 .Fuel System** | | | |
| 5.1 | Type of Fuel | Gas oil |  |
| 5.2 | Fuel Filter Type | By Vendor |  |
| 5.3 | Permissible Suction Head | By Vendor |  |
| 5.4 | Permissible Return Head | By Vendor |  |
| 5.5 | Specified Fuel Consumption at: (gr/kwh)  100% Maximum Standby Power  Prime Power  100% Continuous Power | By Vendor |  |
| 5.6 | Daily Tank | For 8 Hours Operation |  |
| **6. Cooling System** | | | |
| 6.1 | Total Coolant Capacity (liter) | By Vendor |  |
| 6.2 | Water Pump Type | Centrifugal |  |
| 6.3 | Temp. Rise Across Engine at: ºC  Continuous Power  Prime Power  Standby Power | By Vendor |  |
| 6.4 | Heat Rejection to Exhaust  (Prime Power) (kw) | By Vendor |  |
| 6.5 | Heat Rejection to Coolant  (Prime Power) (kw) | By Vendor |  |
| 6.6 | Heat Rejection to Intercooler  (Prime Power) (kw) | By Vendor |  |
| 6.7 | Heat Rejection by Radiation From Engine Surface (Prime Power) (kw) | By Vendor |  |
| 6.8 | Cooling Air Required for Radiator  (Prime Power) (kw) | By Vendor |  |
| **7. Air Intake** | | | |
| 7.1 | Combustion Air Flow at: (m3/h)  Standby Power  Prime Power  Continuous Power | By Vendor |  |
| 7.2 | Max. Air Intake Restriction of Engine : hPa  With New Filter  With Used Filter | By Vendor |  |
| 7.3 | Alternator Cooling Air (m3/h) | By Vendor |  |
| **8. Exhaust System** | | | |
| 8.1 | Max. Allowable Back Pressure  for Exhaust Line (pa) | By Vendor |  |
| 8.2 | Exhaust Flow (at Standby Power) (m3/h) | By Vendor |  |
| 8.3 | Exhaust Gas Temp. After Turbine  (at Standby Power) (ºC) | By Vendor |  |
| 8.4 | Silencer Type | Residential |  |
| 8.5 | Spark Arrester | Required |  |
| **9. Engine Auxiliaries** | | | |
| 9.1 | Alternator Manufacturer | By Vendor |  |
| 9.2 | Alternator Voltage (v) | By Vendor |  |
| 9.3 | Alternator Current (A) | By Vendor |  |
| 9.4 | Starter Manufacturer | By Vendor |  |
| 9.5 | Starter Motor Voltage (v) | By Vendor |  |
| 9.6 | Starter Motor Power (kw) | By Vendor |  |
| **10. Generator Specifications** | | | |
| 10.1 | Quantity / Duty | 1 X 100% / Continuous |  |
| 10.2 | Manufacturer / Type | By Vendor | D02 |
| 10.3 | Continuous Rating (MCR) at Standard Condition for Class F Temperature Rise (kva) | > 515kVA to meet continuous operation  > 572kVA to meet starting conditions |  |
| 10.4 | De-Rating Factor for Ambient Temperature Kt | 0.9  (MFR shall advise his value) |  |
| 10.5 | De-Rating Factor for Altitude Ka | 1.0 |  |
| 10.6 | Total Generator De-Rating Factor Kd=Ka\*Kt | 0.9  (MFR Shall Advise His Value) |  |
| 10.7 | Continuous Rating (MCR) at Site Conditions for Class F Temp. Rise (kva) | 394 |  |
| 10.8 | Permissible Overload  (Class H Temp. Rise & Standby Duty) (kva) | 10% of Rated Current for a Period of One Hour (in Each 12 Hours Function) |  |
| 10.9 | Starting Capability  (12% Voltage Dip at gen. Terminal) | Starting of the biggest motor while having the other loads in operation PF=0.80 |  |
| 10.10 | Unbalance Loading Capacity (%) | 15% |  |
| 10.11 | Power Factor | 0.80 |  |
| 10.12 | Terminal Voltage (v) | 400 |  |
| 10.13 | Stator Winding Connection | Series Star |  |
| 10.14 | Frequency (Hz) | 50 |  |
| 10.15 | Grounding | Solidly Grounded |  |
| 10.16 | Neutral Point | Brought out |  |
| 10.17 | Insulation Class | F |  |
| 10.18 | Temp. Rise for Continuous Duty | B |  |
| 10.19 | Ingress Protection of Terminal Box | IP55W |  |
| 10.20 | Ingress Protection for Generator | IP23 |  |
| 10.21 | Short Circuit Ratio  at Rated Volts & Current | By Vendor |  |
| 10.22 | Synchronous Reactance Xd  (Base 600kVA, 400V, Saturated) (pu) | By Vendor |  |
| 10.23 | Direct Axis Transient Reactance X’d1(pu) | By Vendor |  |
| 10.24 | Direct Axis sub-Trans. Reactance X”d (pu) | By Vendor |  |
| 10.25 | Quadrature Axis Reactance Xq (pu) | By Vendor |  |
| 10.26 | Quadrature Axis Sub-Trans. Reactance X”q (pu) | By Vendor |  |
| 10.27 | Zero Sequence Reactance X0 (pu) | By Vendor |  |
| 10.28 | Negative Sequence Reactance X2 (pu) | By Vendor |  |
| 10.29 | Leakage Reactance XL (pu) | By Vendor |  |
| 10.30 | Time Constants (sec)  Td’  Td”  Ta | By Vendor |  |
| 10.31 | Generator Efficiency at:  1/2 Full Load (%)  3/4 Full Load (%)  4/4 Full Load (%) | By Vendor |  |
| 10.32 | Number of Bearings | 1 (2 is preferred) |  |
| 10.33 | Type of Bearings / Lubrication | Anti-friction / Grease |  |
| 10.34 | Generator Space Heater  - Voltage (v)  - Power (w) | Required  230  By Vendor |  |
| 10.35 | Exciter Type | Self-Excited (PMG is preferred)  Brushless, 3 phase sensing |  |
| 10.36 | Exciter Voltage | By Vendor |  |
| 10.37 | Exciter Manufacturer | By Vendor |  |
| 10.38 | AVR Model | By Vendor |  |
| 10.39 | Voltage Regulation | ±5% |  |
| 10.40 | Exciter Current at: (A)  Continuous Operation  Short time Overload | By Vendor |  |
| **11. Control Panel** | | | |
| 11.1 | Manufacturer | By Vendor |  |
| 11.2 | Standard | IEC, IPS-M-EL-143(3) |  |
| 11.3 | Type | Fixed |  |
| 11.4 | Construction | Self-Standing |  |
| 11.5 | Sheet Steel Thickness | 2mm Wall / 2.5 mm Frame |  |
| 11.6 | Access | Front Via Hinged Door |  |
| 11.7 | Location | Outdoor (Under Shelter) |  |
| 11.8 | Ingress Protection | IP54 |  |
| 11.9 | Busbar System | 3Ph+N+PE |  |
| 11.10 | Rated Busbar Current (A) | 800 |  |
| 11.11 | Busbar Material | Copper (Insulated With Heat Shrink) |  |
| 11.12 | Protection Functions  (Embedded in ACB Protection Unit) | * Overload 49 * Phase over current 50/51   Earth fault 50N/51N |  |
| 11.13 | Protection Functions  (Other Than ACB Protection Unit) | According to “BK-GCS-PEDCO-120-EL-SL-0002” |  |
| 11.14 | Controller Manufacturer / Model no. | By Vendor |  |
| 11.15 | Indicators on Panel | * Gen. Voltages (Analogue) * Gen. Currents * Gen. Frequency (Analogue) * Battery charging ammeter * Power factor meter * Jacket water temperature * Lubricating oil temp. * Lubricating oil press. * Hours run meter * Watt meter * Watt-hour meter * VAR-hour meter * VAR meter |  |
| 11.16 | Transducers (4~20mA Output) | * Generator Voltage * Frequency |  |
| 11.17 | Generator Neutral CT  Manufacturer  Rating & Class | Required for 51G protection  Required for 64R protection  By Vendor  51G: 800/5A, Cl. 5P10 |  |
| 11.18 | Earth Fault Protections  Manufacturer  Type  Setting Range | Required  BY Vendor  Solid state  By Vendor |  |
| 11.19 | Panel Accessories | Anti Condensation Heater  Panel Lighting  Removable Gland Plate |  |
| 11.20 | Finish Color | RAL 7032 |  |
| 11.21 | Cable entry | Bottom via Cable Gland |  |
| 11.22 | Cable Specification & Size  From Generator to Local Panel:  From Local Panel to LV switchgear: | CU/XLPE/AWA/PVC  By Vendor  3x(1x240mm²) Phase 1  3x(1x240mm²) Phase 2  3x(1x240mm²) Phase 3  2x(1x240mm²) Neutral |  |
| **12. Switching Device** | | | |
| 12.1 | Type of Switching Device | ACB |  |
| 12.2 | Manufacturer | By Vendor |  |
| 12.3 | Type Designation | By Vendor |  |
| 12.4 | Operating Mechanism | Motor Operated, Spring Charged,  Stored Energy, Trip Free Mechanism |  |
| 12.5 | Number of Poles | 4 |  |
| 12.6 | Rated Current (A) | 800 |  |
| 12.7 | Rated Voltage (V) | 690 |  |
| 12.8 | Standard | IEC |  |
| 12.9 | Rated Breaking Current | Not Less Than 35kA |  |
| 12.10 | Charging Motor Operating Voltage (V) | 24 (Fed from diesel batteries) |  |
| 12.11 | Trip Unit | Electronic type |  |
| 12.12 | Trip Unit Functions | 49, 50, 51, 50N, 51N |  |
| 12.13 | Trip Unit Model | By Vendor |  |
| **13.Generator Accessories** | | | |
| 13.1 | RTD (Pt100) | Yes (9 RTD’s for S > 500kVA) |  |
| 13.2 | Lifting Bolts | Yes |  |
| 13.3 | Earthing Bolt | Yes |  |
| 13.4 | Drain Plug | Yes |  |
| **14.General** | | | |
| 14.1 | Noise Level | Not More than 81dB @ No Load |  |
| 14.2 | Weight of Diesel Engine  Without Oil and Water (Kg) | By Vendor |  |
| 14.3 | Weight of Generator (Kg) | By Vendor |  |
| 14.3 | Weight of Diesel Generator Skid (Kg) | By Vendor |  |
| 14.4 | Overall Dimension of Diesel Generator Skid (W x D x H) (mm) | By Vendor |  |
| 14.5 | Dimension of Control Panel  (W x D x H) (mm) | By Vendor |  |

Note 1: Cable size shall be according to “BK-GCS-PEDCO-120-EL-LI-0002”.

Note 2: All required accessories shall be considered by vendor.