|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **طرح نگهداشت و افزایش تولید 27 مخزن** | | | | | | |
| **DATA SHEETS FOR MV INDUCTION MOTORS**  **نگهداشت و افزایش تولید میدان نفتی بینک** | | | | | | |
|  |  |  |  |  |  |  |
| D03 | Apr. 2023 | AFC | H.Shakiba | M.Fakharian | A.M.Mohseni |  |
| D02 | May. 2022 | IFA | H.Shakiba | M.Fakharian | M.Mehrshad |  |
| D01 | Feb. 2022 | IFA | H.Shakiba | M.Fakharian | M.Mehrshad |  |
| D00 | Sep. 2021 | IFC | H.Shakiba | M.Fakharian | M.Mehrshad |  |
| **Rev.** | **Date** | **Purpose of Issue/Status** | **Prepared by:** | **Checked by:** | **Approved by:** | **Client Approval** |
| **Class:1** | | **Client Doc. Number: F0Z-709026** | | | | |
| **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**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PAGE** | **D00** | **D01** | **D02** | **D03** | **D04** |  | **PAGE** | **D00** | **D01** | **D02** | **D03** | **D04** |
| **1** | X | X | X | X |  | **51** |  |  |  |  |  |
| **2** | X | X | X | X |  | **52** |  |  |  |  |  |
| **3** | X | X | X |  |  | **53** |  |  |  |  |  |
| **4** | X | X |  |  |  | **54** |  |  |  |  |  |
| **5** | X | X |  |  |  | **55** |  |  |  |  |  |
| **6** | X | X | X |  |  | **56** |  |  |  |  |  |
| **7** |  | X | X |  |  | **57** |  |  |  |  |  |
| **8** |  |  |  |  |  | **58** |  |  |  |  |  |
| **9** |  |  |  |  |  | **59** |  |  |  |  |  |
| **10** |  |  |  |  |  | **60** |  |  |  |  |  |
| **11** |  |  |  |  |  | **61** |  |  |  |  |  |
| **12** |  |  |  |  |  | **62** |  |  |  |  |  |
| **13** |  |  |  |  |  | **63** |  |  |  |  |  |
| **14** |  |  |  |  |  | **64** |  |  |  |  |  |
| **15** |  |  |  |  |  | **65** |  |  |  |  |  |
| **16** |  |  |  |  |  | **66** |  |  |  |  |  |
| **17** |  |  |  |  |  | **67** |  |  |  |  |  |
| **18** |  |  |  |  |  | **68** |  |  |  |  |  |
| **19** |  |  |  |  |  | **69** |  |  |  |  |  |
| **20** |  |  |  |  |  | **70** |  |  |  |  |  |
| **21** |  |  |  |  |  | **71** |  |  |  |  |  |
| **22** |  |  |  |  |  | **72** |  |  |  |  |  |
| **23** |  |  |  |  |  | **73** |  |  |  |  |  |
| **24** |  |  |  |  |  | **74** |  |  |  |  |  |
| **25** |  |  |  |  |  | **75** |  |  |  |  |  |
| **26** |  |  |  |  |  | **76** |  |  |  |  |  |
| **27** |  |  |  |  |  | **77** |  |  |  |  |  |
| **28** |  |  |  |  |  | **78** |  |  |  |  |  |
| **29** |  |  |  |  |  | **79** |  |  |  |  |  |
| **30** |  |  |  |  |  | **80** |  |  |  |  |  |
| **31** |  |  |  |  |  | **81** |  |  |  |  |  |
| **32** |  |  |  |  |  | **82** |  |  |  |  |  |
| **33** |  |  |  |  |  | **83** |  |  |  |  |  |
| **34** |  |  |  |  |  | **84** |  |  |  |  |  |
| **35** |  |  |  |  |  | **85** |  |  |  |  |  |
| **36** |  |  |  |  |  | **86** |  |  |  |  |  |
| **37** |  |  |  |  |  | **87** |  |  |  |  |  |
| **38** |  |  |  |  |  | **88** |  |  |  |  |  |
| **39** |  |  |  |  |  | **89** |  |  |  |  |  |
| **40** |  |  |  |  |  | **90** |  |  |  |  |  |
| **41** |  |  |  |  |  | **91** |  |  |  |  |  |
| **42** |  |  |  |  |  | **92** |  |  |  |  |  |
| **43** |  |  |  |  |  | **93** |  |  |  |  |  |
| **44** |  |  |  |  |  | **94** |  |  |  |  |  |
| **45** |  |  |  |  |  | **95** |  |  |  |  |  |
| **46** |  |  |  |  |  | **96** |  |  |  |  |  |
| **47** |  |  |  |  |  | **97** |  |  |  |  |  |
| **48** |  |  |  |  |  | **98** |  |  |  |  |  |
| **49** |  |  |  |  |  | **99** |  |  |  |  |  |
| **50** |  |  |  |  |  | **100** |  |  |  |  |  |

| **Data Sheets for MV Induction Motors** | | | | |
| --- | --- | --- | --- | --- |
| **Item** | | **Category** | **Required Specification** | **Vendor Data** |
|  | | Driven Machine | Electrical Motor |  |
|  | | Driven Machine Tag No. | - |  |
|  | | Manufacturer | By Vendor |  |
|  | | Manufacturer's Number / Type | By Vendor |  |
|  | | Manufacturing Standard | IEC 60034 & IPS-M-EL-132(2) |  |
|  | | Location | [X] Outdoor (Under Shelter)  [ ] Indoor |  |
|  | | Area Classification | Acc. to requisition data |  |
|  | | Ambient Temperature | 5 to +55°C |  |
|  | | Relative Humidity | 100 % |  |
|  | | Dust | [X] Yes  [ ] No |  |
|  | | Corrosion | [X] Yes  [ ] No |  |
|  | | Elevation | 12.5m Above Sea Level |  |
|  | | Quantity | Acc. To Load List  (BK-GCS-PEDCO-120-EL-LI-0001) |  |
|  | | Tag Number | Acc. To Load List  (BK-GCS-PEDCO-120-EL-LI-0001) |  |
|  | Motor Type | | Asynchronous, Squirrel Cage |  |
|  | Mounting | | [ ] Horizontal [ ] Vertical |  |
|  | Rotor Construction | | Brazed Copper Bars  Aluminum Die Cast |  |
|  | | Stator Case Material | Cast Iron |  |
|  | | Frame Material | Steel Sheet or Cast Iron |  |
|  | | Cooling Method | According to IPS-M-EL-131(2) |  |
|  | | Ingress Protection Degree for Motor | IP 54 |  |
|  | | Ingress Protection Degree for Terminal Box | IP 55 |  |
|  | | Explosion Protection of Motor | N/A for Safe Area  Zone 2, IIB, T3 |  |
|  | | Explosion Protection of Terminal Box | N/A for Safe Area  Zone 2, IIB, T3 |  |
|  | | Ex. Certificate Authority/Certificate No. | By Vendor |  |
|  | | Driven Machine Shaft Power Requirement (Pmp) | As Per Related Mechanical Data sheet (to be Specified by Vendor) |  |
|  | | API Design Margin (Km) | 1.10 |  |
|  | | Motor output shaft power requirement @ site condition (=Pmp/Km) | As Per Related Mechanical Data sheet (to be Specified by Vendor) |  |
|  | | De-rating factor due to Ambient Temperature (Kt) | 0.85 (MFR Shall Advise The Value) |  |
|  | | De-rating factor due to Altitude (Ka) | 1 (MFR Shall Advise The Value) |  |
|  | | Motor Power  (Defined for IEC condition i.e. 40°C) | As Per Related Mechanical Data sheet (to be Specified by Vendor) |  |
|  | | Standard Rated Motor Output  =Km X Pmp/ (Ka Kt) | By Vendor |  |
|  | | Frame Size | By Vendor |  |
|  | | Rated Voltage | 11KV ±10% or 3.3KV±10% |  |
|  | | Rated Frequency | 50 Hz ±5% |  |
|  | | Voltage During Motor Start | 80% Un |  |
|  | | Synchronous Speed | By Vendor |  |
|  | | Full Load Speed [RPM] | By Vendor |  |
|  | | Number of Poles | By Vendor |  |
|  | | Starting Method | Direct on Line |  |
|  | | Direction of Rotation (Viewed from coupling end) | Shall be Proposed by MFR Based on Driven Load Rotation of Direction | [ ] CW  [ ] CCW  [ ] Unidirectional  [ ] Bidirectional |
|  | | Stator Winding Connection | Star |  |
|  | | Location of Terminal Box  (Viewed from DE) | [ ] Right [ ] Left |  |
|  | | Insulation Class | Class F |  |
|  | | Class of Temperature Rise | Class B |  |
|  | | Max. Permissible Starting Time [s] | By Vendor |  |
|  | | Accelerating Time  DOL starting, at 100% Un [s] | By Vendor |  |
|  | | Accelerating Time  DOL starting, at 80% Un [s] | By Vendor |  |
|  | | Starting Torque at 100% Un [N.m] | By Vendor |  |
|  | | Starting Torque at 80% Un [N.m] | By Vendor |  |
|  | | Maximum Torque [N.m] | By Vendor |  |
|  | | Rated Torque [N.m] | By Vendor |  |
|  | | Rated Current [A] | By Vendor |  |
|  | | No Load Current [A] | By Vendor |  |
|  | | Locked Rotor Current [A] | <7In |  |
|  | | Torque-Speed Class | Shall be Selected Based on Driven Load Torque Requirement | [ ] A [ ] B  [ ] C [ ] D |
|  | | Permit to Start Times | 3C2H |  |
|  | | Reacceleration | Capable for connection to 100% main voltage with 30%, 180° out of phase residual voltage. |  |
|  | | Heating time Constant [minute] | By Vendor |  |
|  | | Cooling Time Constant [minute] | By Vendor |  |
|  | | Duty Cycle | S1 |  |
|  | | Rotor Moment of Inertia [kgm²] | By Vendor |  |
|  | | Driven Machine Moment of Inertia [kgm²] | By Vendor |  |
|  | | Max. Allowable Load Moment of Inertia [kgm²] | By Vendor |  |
|  | | Power Factor at ½ Rated Load | By Vendor |  |
|  | | Power Factor at ¾ Rated load | By Vendor |  |
|  | | Power factor at Rated Load | By Vendor |  |
|  | | Efficiency at ½ Rated Load | By Vendor |  |
|  | | Efficiency at ¾ Rated Load | By Vendor |  |
|  | | Efficiency at Rated Load | By Vendor |  |
|  | | Bearing (DE) | | |
| Type (Detail Description by Vendor) | [ ] Antifriction (Ball Bearing)  [ ] Antifriction (Roller Bearing)  [X] Sleeve (Spherical Self Aligned) |  |
| Manufacturer | By Vendor |  |
| Minimum Life Without Load | Minimum 100,000 Hours |  |
| Minimum Life With Load | By Vendor |  |
| Lubrication | Oil (oil specification shall be specified by manufacturer) |  |
| Lubrication system  (To be advised by manufacturer considering ambient temperature) | [ ] Grease (anti friction bearings)  [X] Air cooled oil reservoir with Lubricating ring  [ ] Forced Oil Lubrication with air cooled radiator |  |
| Oil Capacity [Liter] | By Vendor |  |
| Permissible Trust Force [N] | By Vendor |  |
| Max. Normal Operating Temperature | By Vendor |  |
|  | | Bearing (NDE) | | |
| Type (Detail Description by Vendor) | [ ] Anti friction (Ball Bearing)  [ ] Antifriction (Roller Bearing)  [X] Sleeve (Spherical self aligned) |  |
| Manufacturer | By Vendor |  |
| Minimum Life Without Load | Minimum 100,000 Hours |  |
| Minimum Life With Load | By Vendor |  |
| Lubrication | Oil (Specification must be specified by manufacturer) |  |
| Oil Capacity [Liter] | By Vendor |  |
| Permissible Trust Force [N] | Shall meet coupled machine trust |  |
| Max. Normal Operating Temperature | By Vendor |  |
|  | | DE Bearing Temperature Sensor / Meter | [ ] Not Required  [ ] PTC  [X] RTD  [X] Thermometer (Dial)  [ ] Temperature Switch |  |
|  | | NDE Bearing Temperature Sensor | [ ] Not Required  [ ] PTC  [X] RTD  [X] Thermometer (Dial)  [ ] Temperature Switch |  |
|  | | Winding Temperature Sensor | [ ] Not Required  [ ] PTC  [X] RTD (9 RTD’s 3 per phase) |  |
|  | | Space Heater | Required |  |
| Space Heater Voltage [V] | 230VAC, 50Hz, 1Ph |  |
| Space Heater Power [W] | By Vendor |  |
|  | | Terminal Boxes | [X] MV main Terminal Box  [X] Space heater / RTD’s / Switches Terminal Box |  |
|  | | Main Power Cable Specification & Size & Orientation | According to  BK-GCS-PEDCO-120-EL-CN-0003 |  |
|  | | Method of Cable Entry | [X] Cable Gland  [ ] Sealing Gasket |  |
|  | | Short Circuit Capability of Terminal Box | 25 kA for 0.2 S |  |
|  | | Power terminal box connection method | Motor & Supply wires with cable shoe to be fixes on suitable post insulators |  |
|  | | Sound Level at 1 distance (m) From Motor | Max. 85 dB(A) |  |
|  | | Finish Color | Manufacturer Standard |  |
|  | | Test & Inspection  Routine tests including:   1. Insulation resistance test on windings, heaters, temperature detectors and bearing insulations 2. Measurement of winding resistance (cold) 3. Measurement of winding resistance (hot) 4. Bearing temperature rise 5. No load current 6. Current unbalance at full load 7. Locked rotor current (at full or reduced voltage) 8. Locked rotor torque (at full or reduced voltage) 9. Torque speed curve 10. No load losses 11. Direction of rotation 12. Slip and nominal speed and full load 13. Vibration severity 14. Noise test 15. bearings inspection   Type test:   1. Heat run test | For P<=500kW  Witness on test of all motors[X]  Report of test of all motors[X]  For P>500kW  Witness on test of all motors[X]  Report of test of all motors[X]  For P<=1000kW  Report of test of one identical motor[X]  For P>1000kW  Witness on test of One project motor[X]  Report of test of above mentioned test[X] |  |

DE: Drive End

NDE: Non Drive End

CW: Clockwise

CCW: Counter Clockwise

Note 1: IPS design margin is defined in accordance with standard output power rating of motor:

|  |  |  |
| --- | --- | --- |
|  | Standard Output Power Rating | Design margin |
| 1 | Up to 22kW | 1.25 |
| 2 | from 22kW to 55kW | 1.15 |
| 3 | Above 55kW | 1.10 |

Note 2: **Conventional** Differential protection **(not self-balancing)** is required for motors with rated power 1000kW and above. CTs shall be provided by vendor and installed in the motor terminal box. And special care shall be considered on CT window size and motor cables overall diameter to be coordinate with each other.