



उत्पाद मानक

TG60718

PRODUCT STANDARD
TURBOGENERATOR ENGINEERING

मुखपृष्ठ

PREFACE SHEET

केवल आंतरिक प्रयोग हेतु
प्रदायक को देने से पूर्व इस मुखपृष्ठ को निकाल दें ।

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समतुल्य मानक/सूची आदि
COMPARABLE STANDARDS / CATALOGUES ETC. }

सुझाए/सम्भावित प्रदायक एवं श्रेणी
SUGGESTED / PROBABLE SUPPLIERS AND GRADES.
1-SIEMENS LIMITED
2-BOLL & KIRCH FILTERBAU GMBH }

कोई अन्य जानकारी
ANY OTHER INFORMATIONS

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इस प्रलेख में दी गई सूचना भारत हेतु इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए ।

हस्ताक्षर एवं दिनांक
SIGN & DATE

सामग्री सूची संख्या
INVENTORY NO.

P-6427
13/01/12

रवीकृति

APPROVED : M.K.GOEL

13/01/12

Gr. No

8.10

REV

00

निर्माण
PREPARED : EME

जारी
ISSUED : TSX

दिनांक :
DATE : 31.08.12



PRODUCT STANDARD
ELECTRICAL MACHINES ENGINEERING

TG60718

पृष्ठ 6 का 1

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BASED ON OWN EXPERIENCE

SPECIFICATION FOR DUPLEX HYDROGEN DRIER

1.0

SCOPE:

This specification covers the requirements of Duplex Hydrogen Drier used for drying of hydrogen gas in H₂ cooled turbogenerators.

2.0

TECHNICAL PARAMETERS:

- | | | | |
|-------------|---|---|---------------------------------------|
| 2.1 | Medium | : | Hydrogen gas |
| 2.2 | Flow rate | : | 50m ³ /Hr |
| 2.3 | Inlet temperature | : | 60 ⁰ C |
| 2.4 | Dew point | : | (-) 40 ⁰ C at 1 bar (abs.) |
| 2.5 | Saturation time | : | 8 Hours (minimum) |
| 2.6 | Regeneration time | : | 4 Hours (approx.) |
| 2.7 | Design pressure | : | 10 Bar |
| 2.8 | Connection flanges | : | NB 50, NP 16 |
| 2.9 | <u>Adsorber</u> | | |
| | a. Tank volume | ~ | 46 liter |
| | b. Tank Diameter | ~ | 273 mm |
| | c. Molicular Sieve/ Active Alumina | ~ | 40 L (32 kg) |
| | d. Tank to be fully insulated and lined with galvanized plate steel . | | |
| 2.10 | Heater rating | : | 2.5KW, 3Ph, 415 V, 50 Hz. |
| 2.11 | Power supply | : | 415 V, 3 Phases, 4 wire |
| 2.12 | Blower capacity | | |
| | a. Discharge | : | 50 m ³ /hr |
| | b. Motor rating | : | 0.9KW, 3 Phases, 415 V, 50 Hz. |
| 2.13 | <u>THREE WAY VALVE COMBINATION</u> | | |
| | a. Nominal Connection Dia | : | NB50 |
| | b. Nominal Pressure | : | PN16 |
| | c. Valve Material | : | 1.4408 (SS 316) |
| | d. Seat/Socket | : | PTFE with 25% Carbon |
| | e. Electric Drive | : | With Profibus DP Controller |

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SUPERSEDES INVENTORY NO.

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हस्ताक्षर एवं दिनांक	TSX	B. CHAUDHARY	<i>B. Ch</i>	अनुवादक TRANSLATED BY	नाम NAME	दिनांक एवं हस्ताक्षर SIGN. & DATE
	PSC Member	AK Malhotra	<i>AKM</i>	निर्माणकर्ता WORKED BY	ANUBHAV	<i>Anubhav</i> 31/8/12
हस्ताक्षर एवं दिनांक	QAX	S.K. CHAUHAN	<i>S.K. Chauhan</i>	जांचकर्ता CHECKED BY	R.L.VYAS	<i>R.L. Vyas</i> 31.8.12
	सहमत विभाग AGREED DEPT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY	A.K. MALHOTRA	<i>AKM</i> 8/9/12
सामग्री सूची संख्या	REV. NO. 00			स्वीकृति : APPROVED :	<i>M.K. Goel</i> M.K.GOEL (AGM/EME)	Gr. No. 8.10
	DATED 31.08.2012			निर्माण PREPARED	जारी ISSUED	दिनांक : DATE 31.08.12
				EME, HEEP, HWR	TSX, HEEP, HWR	

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अनुवाद करना उसे किसी भी तरह प्रमाण, जो कि कानूनी के विरुद्ध न हो, कानूनीकरण हो न किया जाए।हस्ताक्षर एवं दिनांक
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- 2.14. Material of vessels, heater body and piping etc. : Carbon steel
- 2.15. Operation mode : Continuous and automatic
- 2.16. Hydraulic test pressure (For pressure vessels) : 15 bar for 10 minutes
- 2.17. Leakage test medium : Air
- 2.18. Leakage test pressure : 6 bar for 4 Hrs.
- 2.19. Approximate space : 1270x1040x2125(LxBxH)
- 2.20. Painting : Shade No. RAL 9002 GRAY

Material Code : W90414906373

3.0 TECHNICAL DETAILS

- 3.1 All Components of the duplex gas drier like Motor/Blower/Heater/Servo drive/Junction boxes etc shall be explosion proof as per IS:2147-III.
- 3.2 The Duplex Hydrogen Drier shall mainly consist of the item as shown In fig- 1.

4.0 WORKING PRINCIPLE

A gas flow set up by the differential pressure of the generator fan, circulates hydrogen through the gas drier chamber which is filled up with adsorbent material. As the gas flows through the desiccant bed, the water molecules are absorbed and dry gas comes out through the three way valve as shown in the Fig. 1. After a period of 8 hours the dessicant bed is taken as saturated and the other adsorber is then taken into hydrogen drying position.

The adsorbent material is reactivated by heated air which is supplied by the heater and a fan. The hot air is supplied at app. 130-140 °C. When the discharge air reaches about 85°C, the heater is stopped. The fan continues to run. It is ensured that the heater will be activated only after the replacement of the hydrogen gas in the gas drier and valves with air with the help of PT. The blower, however, is to run continuously till the bed is cooled to 65°C when the controller will switch off the blower.

Reactivation of the gas drier is stopped by changing over the three way valves from the reactivation to hydrogen drying position. For protection of the gas drier heater against excessive temperature on the heater surface, provision is made for automatic switching off during the reactivation procedure with the help of a temp. switch.

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अनुरोध रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।

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5.0

QUALITY ASSURANCE INSPECTION AND TESTING

- 5.1** The bidder shall submit the quality plan on BHEL format. Purchaser shall indicate customer hold up points (CHP) wherein BHEL Inspector shall witness the tests at supplier's works.
- 5.2** The proposed shop tests and procedures for the tests shall be submitted to BHEL for approval along with QP.
- 5.3** The minimum tests and checks to be carried out as envisaged by BHEL are given below:
- 5.3.1 Testing of materials:-** The material of vessels, heaterbody and piping should be CS and material of 3-way valve should be SS316, shall be tested as per relevant specifications.
- 5.3.2** Check of dimensions of all components.
- 5.3.3** All pressure relating butt weld joints shall be checked by 10% radiography test as per ASME Sev V. Acceptance norms shall be as per ASME Sec VIII.
- 5.3.4** All fillet weld joints shall be checked for surface crack examination by DPT/ MPI on 100% basis as per ASME Sec. V. Acceptance norms shall be as per ASME Sec. VIII.
- 5.3.5 WELDING** – All welding shall be carried out as per procedure drawn and qualified in according with requirement of ASME section IX or any other equipment standard acceptable to BHEL.
- 5.3.6** The complete gas drier including gas drier chamber, heater jacket, 3-way valve and associated piping shall tested at 6 kg/cm² for 4 hours with air and no leakage shall be permitted.
- 5.3.7** Hydraulic test of complete Drier assy. shall be done at 15 kg/cm² for 30 min. No leakage allowed.
- 5.3.8** Calibration and accuracy of all instruments as per applicable standards.
- 5.3.9** Performance/functional testing of complete equipment along with blower, heater and control cabinet shall be carried out.

6.0

PACKING AND DESPATCH

- 6.1** All opening shall be blankd during transport.
- 6.2** all the instruments likely to get damaged during transit shall be packed in a seprate small packing box and this box shall be kept in the main packing box.

7.0

DOCUMENTS TO BE SUPPLIED ALONGWITH OFFER

- 7.1** P & I diagram of gas drier with BOM.
- 7.2** GA drawing of gas drier.
- 7.3** Detailed tower drawing.

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- 7.4 Detailed heater drawing.
- 7.5 Control schematic.
- 7.6 Power supply diagram.
- 7.7 GA drawing of control cabinet.
- 7.8 Quality Plan on BHEL formate along with performance test procedure.

8.0 DOCUMENTS TO BE SUPPLIED AFTER PLACEMENT OF ORDER

- 8.1 The following drawings shall be submitted in four copies each for BHEL approval.
 - 8.1.1 P & I diagram of gas drier with BOM.
 - 8.1.2 GA drawing of gas drier.
 - 8.1.3 Detailed tower drawing.
 - 8.1.4 Detailed heater drawing.
 - 8.1.5 Control schematic.
 - 8.1.6 Power supply diagram.
 - 8.1.7 GA drawing of control cabinet.
- 8.2 2 copies of O & M manual giving complete description, operation, dismantling, trouble shooting and maintenance details, shall be furnished for approval of BHEL.
- 8.3 5 copies of O & M manual shall be supplied alongwith drier as final submission. All the drawings listed at 8.2 shall form part of final O & M manual.

9.0 TEST CERTIFICATES ALONG WITH DESPATCH DOCUMENTS- (3 COPIES EACH)

- 9.1 Pneumatic test certificates of complete gas drier.
- 9.2 Certificates of compliance for the bought out items as well as raw materials.
- 9.3 NDT Reports of weldings.
- 9.4 Hydraulic test certificates.
- 9.5 Calibration/accuracy test certificates of instruments.
- 9.6 Performance test reports.

10.0 IDENTIFICATION

A name plate of stainless steel material, with following information engraved on it, shall be affixed to the equipment at appropriate location:-

- Item description
- Manufacturer's name
- Equipment type
- Sl. No.
- Main technical parameters
- BHEL Specification No.

REV. 00

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