TECHNICAL SPECIFICATION

FOR SCAVENGE BLOWER FOR MACHINE ROOM ALONG WITH MOTOR FOR 3-PHASE ELECTRIC LOCOMOTIVES

Specification No: CLW/ES/3/0022/I

Enclosure :

(a) Drawing No: (i) CLW/ES/3/SK-1/0022/I
(ii) CLW/ES/3/SK-3/0022/I

(b) i) RDSO Specification No.: E-10/3/09 (MOTOR) with Amendment No-1 to 6 (For Motor)
ii) CLW Specification No.: CLW/ES/3/0455(For Blower)

ISSUE DATE: 16.05.2001

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ISSUED BY:

DY. CHIEF ELECTRICAL ENGINEER/D-**III**
CHITTARANJAN LOCOMOTIVE WORKS
P.O : CHITTARANJAN – 713331
DIST. BARDHMAN (WEST), WEST BENGAL (INDIA)

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ALTERATION RECORD SHEET

Amendment Number	Date of Amendment	Page number	Alteration	Reason	Initial
01	26.02.97	4,5,6	A	Ambient Temp., Technical Data for Blower, Air delivery, Motor Speed, Insulation Temp. Rise, Cooling, Capacitor Ambient Temp. added	S/d-
02	22.03.01	6,7,8 & 9	B	Fixing centre of inlet flange and details of fixing holes added in sheet no.8. Position of motor terminal box changed L.H.S viewed from NDE of Motor at par with imported Motor. Duct arrangement modified. Drawing added at page no.9. Page 6 & 7 added. Full run weld added on blower duct at page 8. 22 µF start and 22 µF run for motor in steinmetz connection added at page 6.	S/d-
03	11.05.2001		C	The Specification has been revised completely and details of test procedure has been deleted & reference has been made to CLW/ES/3/0454 & CLW/ES/3/0455 which give the details of testing procedure as per RDSO Instruction.	S/d-
04	11.12.2002	8	D	Note: 6) Added at sheet no. 8	S/d-
05	14.02.2003	7,8	E	(i) Note: 7) & 8) added at sheet no. 8 as per RDSO Letter No. EL/3.2.176/2 dated 03.02.2003. (ii)Note : 2) added at Sheet No. 7	S/d-
06	27.04.10	8 & 9	F	1.Hopper portion of duct arrangement has been deleted at sheet no.8,SK-1. 2.Sheet no.9 has been deleted as per RDSO letter no.EL/11.5.5/5 dated 17.11.09.	S/d-
07	11.07.18	8	G	Motor mounting base plate should be cut from upper portion of the indicated hole so that the hole should be visible from outside and fitment to the base plate with bolt easily.	S/d-
08	03.03.2022	1,5,6,11	H	1. At Sheet no. 1, SK-4 deleted. 2. At sheet no .5 & 6, running and starting capacitor deleted. 3. At sheet no.11, diagram of connection(SK-4) deleted.	S/d-
09		7	I	Warranty Clause included	S/D

NOTE: "Specifications have been digitized and all alterations have been incorporated"

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INDEX

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SPECIFICATION FOR SCAVENGE BLOWER FOR MACHINE ROOM ALONG WITH MOTOR

1. SCOPE :-

Two Scavenge blowers are used in the ventilation system of the Indian Railways locomotive. This SCAVENGE BLOWER is used to remove contaminated air from machine room.

2. Climatic and environmental condition:

- Maximum atmospheric temperatures : 70°C (Under Sun)
  : 50°C (In shade)
- Humidity : 100% saturation during rainy season.
- Reference Site condition:

i. Ambient Temp. : Max.65°C and min. -10°C

ii. The contactor will indicate the expected temperature rise in the machine room under reference site condition.

iii. Humidity : 60%.

iv. Altitude : 160 meters above mean sea level.

v. Rainfall : Very heavy in certain areas. The locomotive will be designed to permit it's running at 10 kilometer per hour in flood water level of 102 millimeter above rail level.

- Atmosphere during hot weather : Extremely dusty and desert terrain in certain areas.
- Coastal areas : Locomotive and equipment will be designed to work in coastal areas in humid and salt laden atmosphere.
- Vibration. : The equipment , subsystem and their mounting arrangement will be designed to withstand vibrations and shocks encountered in service as specified in corresponding IEC publications unless otherwise prescribed.

3. Standard:

IEC standard publication 34-1 Rotating electric machines. Part: <Rating and Performance>

IEC Standard Publication 34-5 Part 5, Classification of degrees of protection provided by enclosures for rotating electric machines (IP-Code)

IEC 34-6/1991/Part 6: Methods of cooling (IC-Code)

IEC 34-8/1972/Part 8: Terminal markings and direction of rotation of rotating machines.

IEC 38/1983: IEC Standard Voltages.

IEC 72-1/1991: Dimensions and output series for rotating electric machines.

IEC 85/ Second edition 1984/Thermal evaluation and classification of electric insulation: $ 2: Thermal classes Part 1: Frame numbers 56 to 400 and flange numbers 55 to 1080.

IEC 349-2/1993-3/First edition / pages 39 formula, Group 1 <Insulation test voltage>

IS: 325/1991/specification for three-phase induction motors, Rating and Performance.

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IS: 1231/1991/Dimension of three-phase foot mounted Induction Motors.

IS: 2223/1983/Dimension of three-phase flange mounted induction motors.
IS: 4029/1991/Guide for testing three-phase Induction Motors.
IS: 13730 (Pt.8)/I993/specification for polyesterimide enamelled round copper winding wires with temperature class 180.
IS: 13730 (Pt.13)/ specification for dual coated enameled round copper wires with temperature class 200.
IS: 11184/1994/Enamelled and varnish bonded glass fibre covered round copper wires.

4. TECHNICAL DATA OF SCAVENGE BLOWER FOR MACHINE ROOM INCLUDING MOTOR:-

4.1 MOTOR : -

a) Manufacture, Dimensions (drawing): Refer Specification CLW/ES/3/SK-3/0022 , Alt.-C
b) Degree of Protection : IP55
c) Rating : Continuous (SI)
d) Insulation class : H with VPI
e) Cooling according to : IEC 411 & IEC 34-1
f) Temperature rise of winding : 80°C Max.
g) Frame size : 90L TEFC
h) Temperature rise bearing : 30° C Max.

Electrical data of Motor :- **Nominal**

Voltage	:	415 +10% -24%	-- V
Current I	:	2.9	-- A
Power P2	:	0.75	-- KW
Speed	:	2910	-- RPM
Frequency	:	50	-- Hz
Power Factor cos φ	:	0.95	
Insulation	:	H class V.P.I	

At 415V 50Hz Supply:-

Starting current (Is)	:	15	-- A
Is/In	:	520	--%
Starting torque (Ts)	:	1.5	--NM
Ts/Tn	:	60	--%
Normal Torque Tn	:	2.46	-- NM
Terminal Box	:	1xPG16 Cable gland	
Ambient temperature	:	65°C	
Bearing size	:	~~6205 (OPEN TYPE)~~ Firm may use sealed bearing or higher size bearing however firm needs to get their drawing approved, vendors may also suggest any change in BOM to get better quality.	
Weight of Motor	:	23.5 Kg appx.	
Gross Wt.	:	37.0 Kg appx.	

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The motor is 0.75 KW, 3 Phase, Squirrel cage type, 2 poles foot mounted.

4.2 BLOWER

a) Size	:	249 mm
b) Weight of Fan	:	13.5 Kg appx.
c) Air delivery at 20°C	:	0.1 M^3/sec
d) Total pressure head at 20 °C	:	550pa (Pascal), 56.18 mm wg.
e) Speed	:	2910 r.p.m
f) Type	:	Centrifugal type .
g) Dimensions	:	Refer Specification CLW/ES/3/Sk-1/0022, Alt. H
h) Power consumption	:	0.67 KW

Motor is directly coupled with blower unit.

5. TYPE TEST AND ROUTINE TESTS:

Tests are classified as type test and routine tests.

5.1 TESTS ON MOTOR: For Type test and Routine Test: Refer to RDSO Specification No. E-10/3/09 (Motor) with amendment no-1 to 6 or latest.

A) Type test - (To be conducted on Prototype Motors)

- Resistance Measurement
- Direction of rotation
- No Load Test
- Locket Rotor Test
- Pull Up and Pull Out Torque test
- Load Test
- Temperature Rise Test
- Over Speed test
- High Voltage Test
- Surge test
- Vibration test
- Starting test
- Measurement of “Noise Level”
- Visual and Dimensional Check

B) Routine Tests:-

- Resistance Measurement
- Direction of Rotation
- No Load Test
- Locked Rotor Test
- Temperature Rise Test
- High Voltage Test
- Vibration Test
- Surge Test

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- Visual and Dimensional Check

5.2TESTS ON BLOWER:- (Refer Specification No. CLW/ES/3/0455)

A) Type Tests: -

- Air delivery test
- Starting time test
- Starting duty test
- Endurance test
- Vibration level test
- Weighment
- Checking of bearing by shock pulse meter
- Checking of dimensions workmanship, clearance of impeller fixing and locking arrangement. Intensity of sound in decibel.
- Starting Current, Running Current at i) 373V 33 Hz. (ii) 415V, 50 Hz. – to be recorded.

B) Routine Tests:

- Checking of obligatory dimensions and clearance of impeller fixing and locking arrangement.
- Starting time test
- Vibration level test
- Condition of bearing by shock pulse meter.

For Details of type test and routine test of Blower please refer specification no. CLW/ES/3/0455
Vibration level in microns when blower is discharging its rated delivery al rated pressure & voltage

- Motor - 10 microns max.
- Blower - 15 microns max.

6. Scope of supply:-

Motor	:	01 No
Blower Housing	:	01 No
Inlet cone with flange	:	01 No
Impeller	:	01 No
Gasket	:	01 No

Name plate, Arrow for direction of rotation and direction of air flow made of Aluminum riveted on blower housing Qty ---- 01 set

A removable stool made of steel to be provided on motor blower unit to avoid damage of duct assembly during transit/storage Qty ---- 01 no

7. **Warranty**: The supplier must give a clear warranty for a period of 42 month from the date of supply or 36 Month from the date of commissioning in locomotives whichever is earlier.

8. **NAME PLATE: -**

i) Manufacturer's name, type & serial number
ii) Air delivery
iii) Rated speed & rated current
iv) Make of the motor

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v) Power consumption in KW
vi) Impeller diameter
vii) Weight
viii) Manufacturing date & year
ix) Arrow for direction of rotation and direction of airflow to be provided

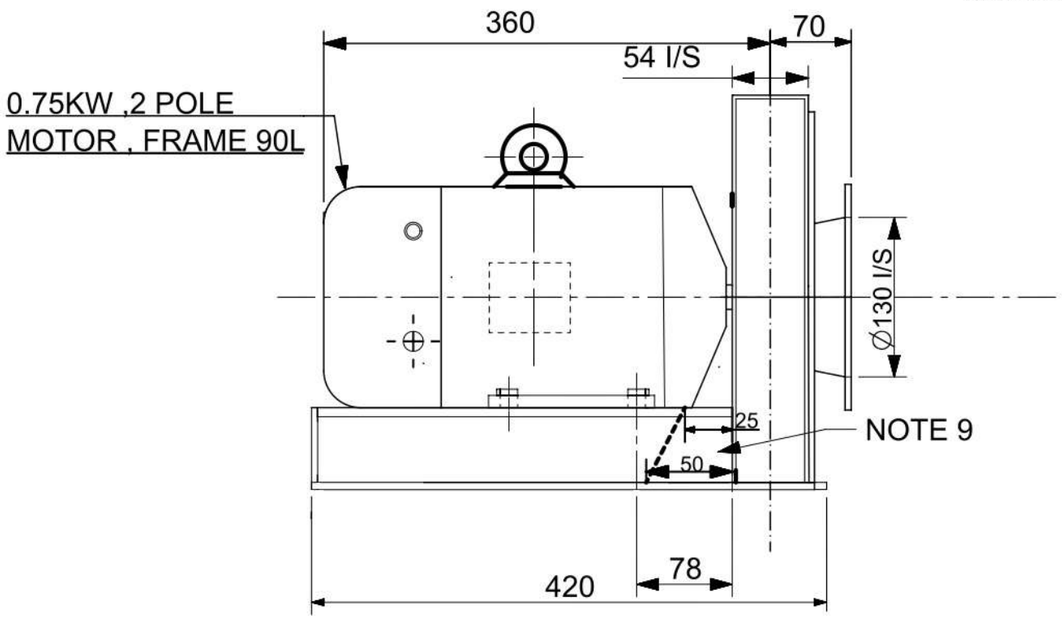
Note to the Firm:

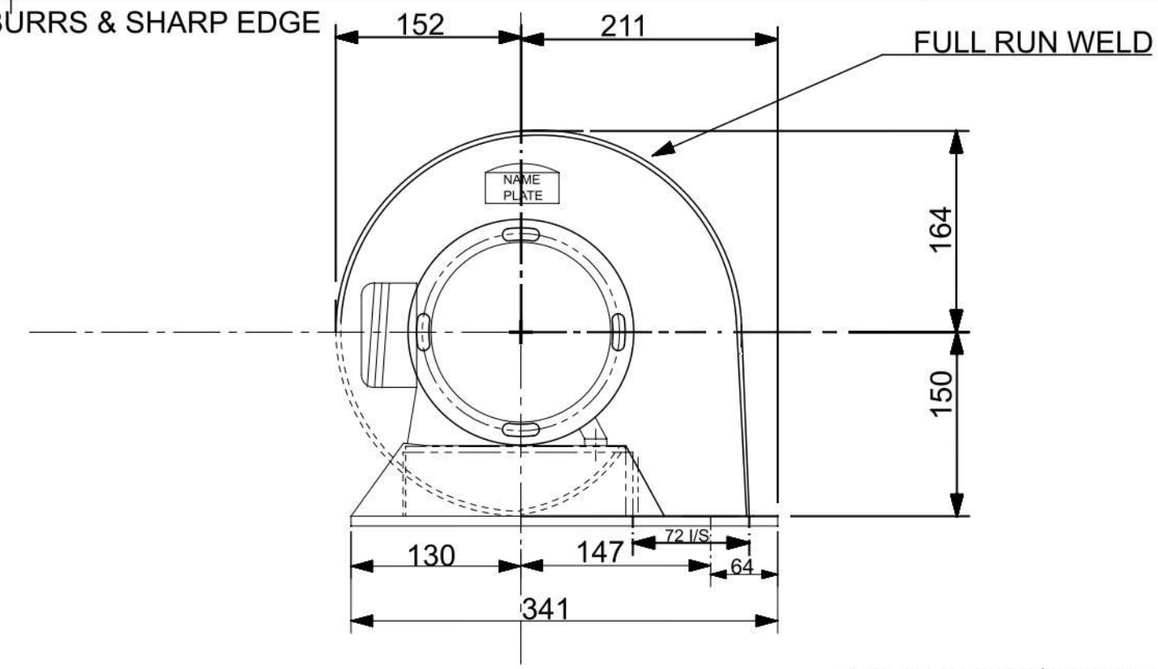
1. All hardware and fasteners are to be used from UVAM Approved/Developmental source only.
2. All non-metallic parts of Machine Room Blower including motor should be fire retardant and self-extinguishing properties as per IS:11731 (Part-I and Part-II) or any other equivalent DIN, IEC standard.

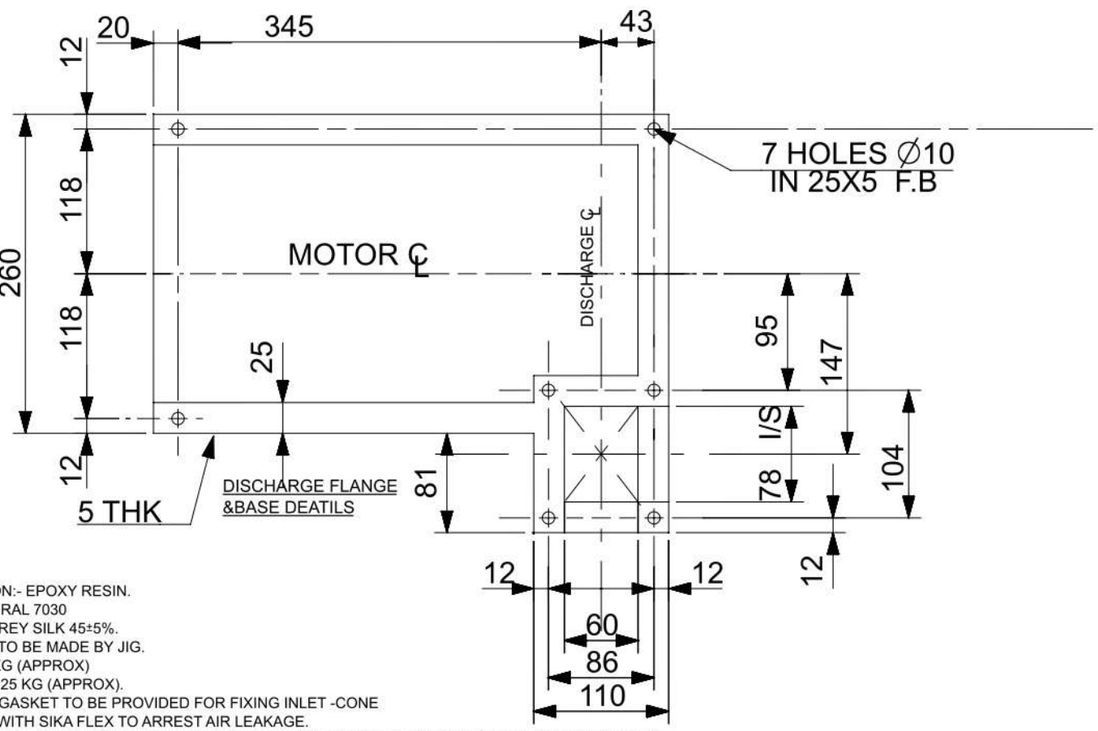
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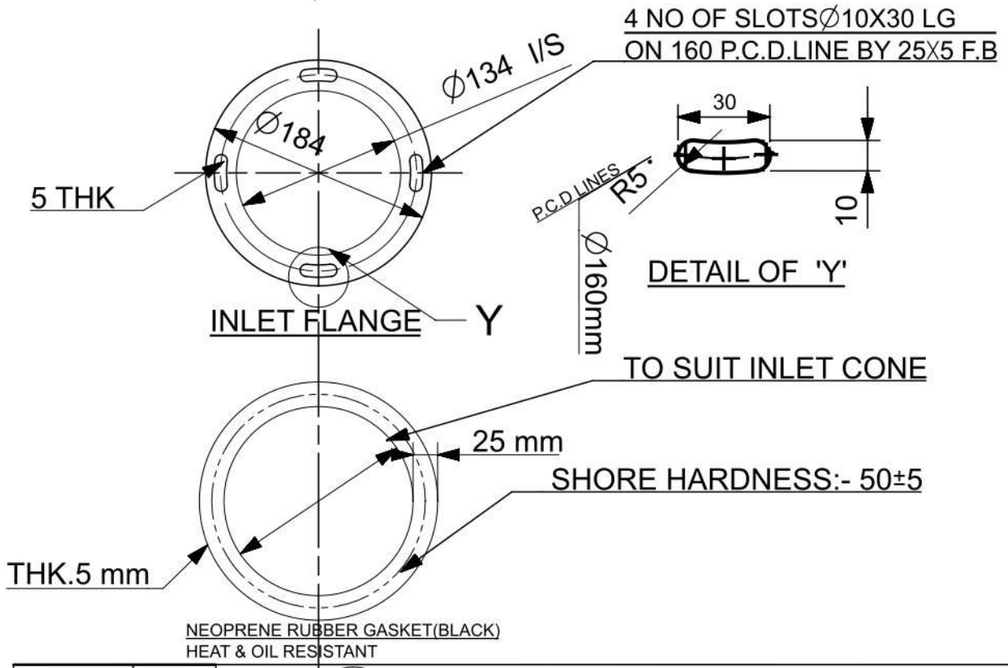
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REMOVE ALL BURRS & SHARP EDGE









NOTE:-

1. SURFACE PROTECTION:- EPOXY RESIN.
2. PAINTING:- TOP COAT RAL 7030
   STONE GREY SILK 45±5%.
3. ALL DRILLING HOLES TO BE MADE BY JIG.
4. GROSS WEIGHT= 36 KG (APPROX)
   WEIGHT OF MOTOR=25 KG (APPROX).
5. NEOPRENE RUBBER GASKET TO BE PROVIDED FOR FIXING INLET -CONE ON BLOWER CASING WITH SIKA FLEX TO ARREST AIR LEAKAGE.
6. DIRECTION OF ROTATION ,DIRECTION OF AIR FLOW AND NAME PLATE TO BE RIVETTED ON BLOWER HOUSING. ARROW FOR DIRECTION OF ROTATION & DIRECTION OF AIR FLOW TO BE PAINTED RED.
7. IMPELLER HUB SHOULD HAVE PUNCH MARK INDICATING MAKE & YEAR OF MANUFACTURE.
8. IMPELLER SHOULD HAVE SERIAL NO . OF CASING AND MAKE PAINTED ON THE BACK PLATE OF IMPELLER.
9. THIS PORTION SHOULD BE CUT WITH 25mm AND 50mm(MAX).

धातु–वेल्डन चिन्ह भा. मा. : 813 / अ. मा. सं. :2553 WELDING SYMBOLS TO IS:813 / ISO:2553	अनिर्दिष्ट सद्य – सीमा भा. मा. : 2102 / अ. मा. सं. : 2768 UNSPECIFIED TOLEARANCE TO IS : 2102 / ISO : 2768												TOL. CLS.	
	पदांक GRADE NO.	सं1 N1	सं2 N2	सं3 N3	सं4 N4	सं5 N5	सं6 N6	सं7 N7	सं8 N8	सं9 N9	सं10 N10	सं11 N11	सं12 N12	
सतह – रुक्षता का मान भा. मा. 3073 / अ. मा. सं. 1302 SURFACE ROUGHNESS VALUE TO IS:3073 / ISO:1302	Rz	0.16-0.3	0.5-0.7	0.9-1.1	1.5-2.0	2.5-3.8	5.0-6.3	9.0-12	16-25	30-40	50-63	75-100	160-250	
	Ra μm	0.025	0.05	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50	
	चिन्ह SYMBOL													

परिवर्तन संख्या ALT. NO.	प्राधिकार AUTHY	वर्णन DESCRIPTION	दिनांकित आद्यक्षर DATED INITIAL

अभिकल्पित DGN	
जाँचा व.अ.अ. CHD SSE	
समीक्षित स.वि.अ. / व.वि.अ. REVIEWED AEE / SEE	
अनुमोदित उ.मु.वि.अ. APPROVED DYCEE	
दिनांक DATE	
रैखिक अनुपात SCALE	N.T.S
संदर्भ / REF.	ALT-

चित्तरंजन रेलइंजन कारखाना
CHITTARANJAN LOCOMOTIVE WORKS, INDIA

पदार्थ MATL	प्रति भार कि. ग्रा. WT. EACH IN KG
विशिष्टि SPECN	

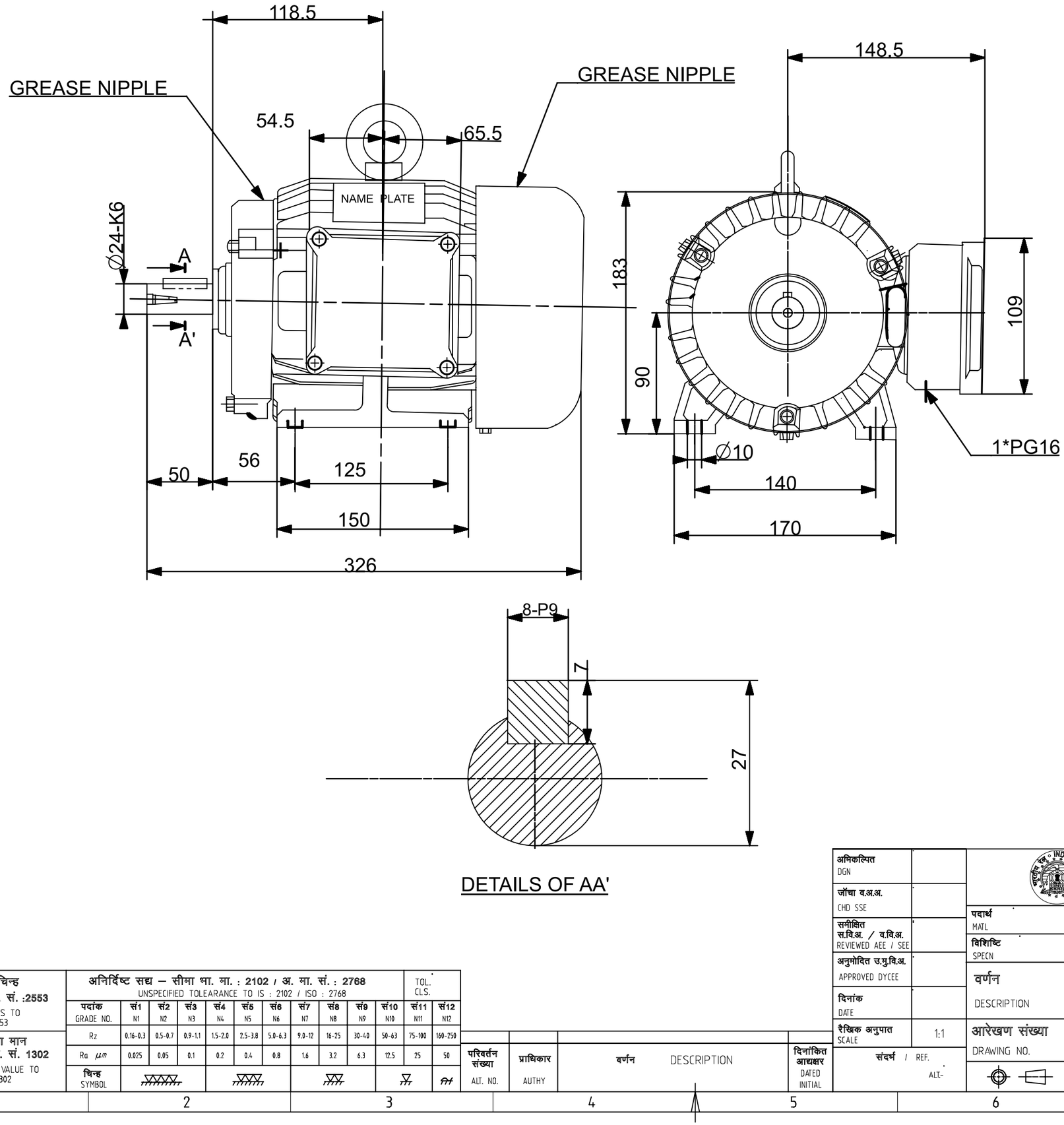
वर्णन DESCRIPTION: SPECIFICATION FOR SCAVENGE BLOWER FOR MACHINE ROOM

आरेखण संख्या DRAWING NO.: CLW/ES/3/SK-1/0022/ I

परिवर्तन संख्या ALTERATION NO. | पर्ण SHEET 1 OF 1 | A3

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DETAILS OF AA'

धातु–वेल्डन चिन्ह भा. मा. : 813 / अ. मा. सं. :2553 WELDING SYMBOLS TO IS:813 / ISO:2553	अनिर्दिष्ट सद्य – सीमा भा. मा. : 2102 / अ. मा. सं. : 2768 UNSPECIFIED TOLEARANCE TO IS : 2102 / ISO : 2768											TOL. CLS.	
	पदांक GRADE NO.	सं1 N1	सं2 N2	सं3 N3	सं4 N4	सं5 N5	सं6 N6	सं7 N7	सं8 N8	सं9 N9	सं10 N10	सं11 N11	सं12 N12
सतह – रुक्षता का मान भा. मा. 3073 / अ. मा. सं. 1302 SURFACE ROUGHNESS VALUE TO IS:3073 / ISO:1302	Rz	0.16-0.3	0.5-0.7	0.9-1.1	1.5-2.0	2.5-3.8	5.0-6.3	9.0-12	16-25	30-40	50-63	75-100	160-250
	Ra μm	0.025	0.05	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50
	चिन्ह SYMBOL												

परिवर्तन संख्या ALT. NO.	प्राधिकार AUTHY	वर्णन DESCRIPTION	दिनांकित आद्यक्षर DATED INITIAL

अभिकल्पित DGN	
जाँचा व.अ.अ. CHD SSE	
समीक्षित स.वि.अ. / व.वि.अ. REVIEWED AEE / SEE	
अनुमोदित उ.मु.वि.अ. APPROVED DYCEE	
दिनांक DATE	
रैखिक अनुपात SCALE	1:1
संदर्भ / REF.	ALT.-

चित्तरंजन रेलइंजन कारखाना
CHITTARANJAN LOCOMOTIVE WORKS, INDIA

पदार्थ MATL	प्रति भार कि. ग्रा. WT. EACH IN KG
विशिष्टि SPECN	
वर्णन DESCRIPTION	MOTOR TYPE 90L FOR SCAVENGER BLOWER(MACHINE ROOM)
आरेखण संख्या DRAWING NO.	CLW/ES/3/SK-3/0022/
परिवर्तन संख्या ALTERATION NO.	पर्ण SHEET 1 OF 1 — A3

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