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व्यावसायिक परीक्षण रिपोर्ट  
COMMERCIAL TEST REPORT (Initial)

संख्या / No. : T-1088/1613/2017  
माह / Month : May, 2017



**SONALIKA DI-750 III HDM TRACTOR (Brand Name : RX)**



सत्यमेव जयते

भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय  
(कृषि, सहकारिता एवं किसान कल्याण विभाग)

GOVERNMENT OF INDIA

MINISTRY OF AGRICULTURE AND FARMERS WELFARE

(DEPARTMENT OF AGRICULTURE, CO-OPERATION AND FARMERS WELFARE)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

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T- 1088/1613/2017	<b>SONALIKA DI-750 III HDM TRACTOR (Brand Name: RX) Commercial (Initial)</b>
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Type of Test : **COMMERCIAL (Initial)**

Test code/Procedure : IS: 5994-1998 (Reaffirmed in 2009), IS: 9253-2001(Reaffirmed in 2012) and IS: 12207-2014

Period of Test : **March,2016 to February,2017**

Test Report No : **T- 1088/1613/2017**  
Month/Year : **May, 2017**

- i) The results reported in this report are observed values and no corrections have been applied for atmospheric and site conditions.
- ii) The data given in this report pertain to the particular machine submitted by the applicant for tests.
- iii) The results presented in this report do not in any way attribute to the durability of the machine.
- iv) This report should not be reproduced in part or full without prior permission of the Director, Central Farm Machinery Training and Testing Institute, Budni (M.P.).

SELECTED CONVERSIONS		
Sl. No	Units	Conversion Factor
1	<b>Force:</b>	
	1 kgf	9.80665 N 2.20462 lbf
	<b>Power:</b>	
2	1 hp	1.01387metric hp (Ps) 745.7 W
	1 Ps	735.5 W
	1 kW	1.35962 Ps
	<b>Pressure:</b>	
3	1 psi	6.895 kPa
	1 kgf/cm <sup>2</sup>	98.067 kPa = 735.56 mm of Hg
	1 bar	100 kPa = 10 N/cm <sup>2</sup>
	1 mm of Hg	1.3332 m-bar

ABBREVIATIONS	
Apa	As per applicant
TDC	Top Dead Centre
IS	Indian Standard
LHS/RHS	Left Hand Side/ Right Hand Side
Hg.	Mercury
Temp.	Temperature
N.R.	Not recorded
Rpm	Revolutions per minute
O.D/I.D	Outer diameter/ Inner diameter
N.A.	Not available/ Not applicable
PTO	Power take-off
R.H.	Relative Humidity



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The draft test report of "Sonalika International DI – 750 III RX POWER PLUS" tractor was released vide letter no. 2-33/2015-16/Test, dated 08.03.2017. At the time of releasing of final test report, the applicant submitted vide letter no. nil dated 18.05.2017, requested to rename the tractor make and model as "Sonalika DI – 750 III HDM (Brand Name: RX)". The competent authority has accepted the request of applicant for change in make and model name of tractor from "Sonalika International DI – 750 III RX POWER PLUS" to "Sonalika DI 750 III HDM (Brand Name: RX)". Hence, this report is released under the changed name "Sonalika DI 750 III HDM (Brand Name: RX)" as under:

**Manufacturer** : M/s. International Tractors Limited  
Vill. Chak Gujran, P.O. Piplanwala,  
Jalandhar Road, Hoshiarpur – 148022  
(Punjab)

Test requested by (applicant) : The manufacturer

Selected for test by : Applicant

Place of running-in : At manufacturer's works

**Duration of said running-in (h):**

- Engine : 35

- Transmission : Nil

**Method of Selection** : The tractor was submitted directly by  
the applicant for test. Hence method of  
selection is not known.

### 1. SPECIFICATIONS

**1.1 Tractor:**

Make : Sonalika

Model : DI - 750 III HDM

Variants, if any : None

Brand name : RX

Type : Four Wheeled, Rear Wheel Driven,  
General Purpose Agricultural Tractor.

Year of manufacture : 2015

Chassis number : EZUDU505606S3

Country of Origin : INDIA

**1.2 Engine:**

Make : Sonalika

Model : 4100EL

Type : Four stroke, naturally aspirated, liquid  
cooled, direct injection, diesel engine.

Serial number : 4100EL53F497396F16



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- Engine speed (Manufacturer's recommended production setting), (rpm) :**
- Maximum speed at no load, (rpm) : 2150 to 2250
  - Low idle speed, (rpm) : 650 to 750
  - Speed at max. torque, (rpm) : 1175 to 1225
- Rated speed, (rpm):**
- For PTO use : 2000
  - For drawbar use : 2000
- 1.3 Cylinder & Cylinder Head:**
- Numbers : Four
  - Disposition : Vertical, inline
  - Bore/stroke, (mm) : 100/118
  - Capacity as specified by the applicant, (cc) : 3707
  - Compression ratio, (apa) : 18.2 ( ± 0.2 ) : 1
  - Type of cylinder head : Individual
  - Type of cylinder liners : Wet, replaceable
  - Type of combustion chamber : Direct injection, Re-entrant, cavity on piston crown
  - Arrangement of valves : Over head, inline
- Valve clearance (hot/cold):**
- Inlet valve, (mm) : 0.30 - 0.40 / 0.30 - 0.40
  - Exhaust valve, (mm) : 0.30 - 0.40 / 0.30 - 0.40
- 1.4 Fuel System:**
- Type of fuel system : Gravity and force feed
- 1.4.1 Fuel tank:**
- Capacity, ( l ) : 64.5
  - Location : Above clutch housing
  - Provision for draining of sediments/water : Provided
  - Type of fuel tank : Metallic
- 1.4.2 Water separator:**
- Make : DEC
  - Type : Gravity, inverted funnel type
  - Location : In between fuel tank & feed pump (LHS of engine)
  - Capacity, (l) : 0.45
- 1.4.3 Fuel feed pump:**
- Make : Bosch, India
  - Type : Plunger
  - Model/Group combination No. : FP/KSG 22AD106, F002A50D46
  - Provision of sediment bowl : Provided
  - Method of drive : Through camshaft of fuel injection pump.



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- 1.4.4 Fuel filters:**  
Make : Bosch, India  
Model/Group combination No. : F002 H20 109  
Numbers : Two  
Type of elements:  
- Primary : Cloth  
- Secondary : Paper  
Capacity of final stage filter, (l) : 0.45
- 1.4.5 Fuel Injection pump:**  
Make : Bosch, India  
Model/Group combination No. : F 002 A3Z F02,  
PES 4A 50D 320RS 3500  
Type : Inline, plunger  
Serial number : 55356432  
Method of drive : Through timing gears
- 1.4.6 Fuel Injectors:**  
Make : Bosch, India  
Model/Group combination No. : F 002 C70 552  
Nozzle No. : DSLA148P 1549  
Type : Multi hole (five holes)  
Manufacturer's production pressure setting, (MPa) : 25.0 + 0.8  
Injection timing : 12 ± 2 degrees before TDC  
Firing order : 1-3-4-2
- 1.4.7 Governor:**  
Make : Bosch, India  
Model/Group combination No. : RSV 350...1000A 5C1720R  
Type : Mechanical, centrifugal, variable speed.  
Rated engine speed, (rpm) : 2000  
Governed range of engine speed, (rpm) : 650 – 2250
- 1.5 Air Intake System:**
- 1.5.1 Pre-cleaner:** : Not provided
- 1.5.2 Air cleaner:**  
Make : Luman  
Type : Dry type  
Location : In front of radiator under the bonnet  
Range of suction pressure at maximum power, (kPa) : 3.5 to 3.6

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<b>Details of elements:</b>		<b>Secondary element</b>	<b>Primary element</b>
- Size (OD/ID), (mm)	:	73.6/62.6	120.4/88.3
- Length, (mm)	:	300	305
- Type	:	Fabric	Paper
Air flow restriction indicator	:	Provided on the dash board	
Dust unloading valve	:	Provided	
Maintenance schedule	:	Replace elements after every 500 hours of operation	
<b>1.6 Exhaust System:</b>			
Type of silencer	:	Up-draught, (elliptical)	
Position of silencer outlet with respect to SIP, (mm):			
- Vertical	:	900	
- Longitudinal	:	1490	
- Lateral	:	360(on RHS)	
Range of exhaust gas pressure at maximum power, (kPa)	:	10.8 to 10.9	
Provision of spark arresting device	:	None	
Provision against entry of rain water	:	A bend is provided at the top of silencer.	
<b>1.7 EGR:</b>			
Make	:	POSH (apa)	
Model	:	Not Available	
Type	:	Direct	
Location	:	Above the engine	
<b>1.8 Lubricating system:</b>			
Type	:	Force feed-cum-splash	
Oil sump capacity, ( l )	:	9.85	
Total lube oil capacity, ( l )	:	10.30	
Oil change period	:	First change after 50 hours and subsequently after every 250 hours of operation.	
Cooling device, (if any)	:	None	
<b>Filters:</b>			
Make	:	APE	
Type	:	One full flow, spin-on throw away and one wire mesh strainer at suction.	
Number (s)	:	Two	
<b>Pump:</b>			
Type	:	Gear	
Method of drive	:	Through timing gears.	
Pressure release setting, (kPa)	:	441.3 (apa)	
Minimum permissible pressure, (kPa)	:	250 ± 50 (apa)	
<b>1.9 Cooling system:</b>			
Type	:	Forced circulation of water.	



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Details of pump	: Centrifugal, semi-open impeller of 89.9 mm diameter, having twelve vanes and driven through crankshaft pulley by a cogged V-belt common to alternator.
Details of fan	: Suction type, having six numbers of polypropylene blades of 400 mm diameter and mounted on water pump shaft.
Means of temperature control	: Thermostat
Bare radiator capacity, ( l )	: 5.40
Capacity of expansion tank, (l)	: 1.0
Total coolant capacity, ( l )	: 12.0
Radiator cap pressure, ( kPa)	: 88
<b>1.10 Starting System:</b>	
Type	: 12V, DC, Electrical
Aid for cold starting	: None
Any other device provided for easy starting.	: None
<b>1.11 Electrical System:</b>	
<b>1.11.1 Battery:</b>	
Make & Model	: AMARON
Type	: Lead acid
Capacity and rating	: 12 V, 75 Ah at 20 hours discharge rate
Location	: In front of radiator, under the bonnet
<b>1.11.2 Starter:</b>	
Make	: Lucas TVS
Model	: M14
Type	: Pre-engaging, solenoid operated
Capacity and rating	: 12V, 2.7 kW
Serial Number	: 26024094A
<b>1.11.3 Generator:</b>	
Make	: Lucas TVS
Model	: A115
Type	: Alternator
Serial number	: 26021304
Output rating	: 12V, 36 Amp
Method of drive	: Through crankshaft pulley by a cogged V-belt common to water pump pulley.
<b>1.11.4 Voltage regulator:</b>	: In built with alternator





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**1.11.5 Details of lights:**

Description	No. & capacity of bulbs	Height of the centre of beam above ground level.(mm)	Size of beam, (mm)	Distance between centre of the beam and outside edge of tractor at standard rear track setting, (mm)
<b>Front Lights:</b>				
Head lights	2, 12V, 60/55W	1180	160 x 100	770
Parking lights	2, 12V, 5W	1370	60 x 65	240
Turn indicators-cum-hazard light	2, 12V, 21W	1370	70 x 65	170
Reflectors (white)	2	1370	30 x 55	280
<b>Rear lights:</b>				
Parking-cum-brake light	2, 12V, 21/5W	1330	60 x 65	245
Turn indicators-cum-hazard light	2, 12V, 21W	1330	70 x 65	180
Pough light (on RHS mudguard)	1, 12 V, 35W	1520	125 φ	290
Registration plate Light	Part of rear tail light assembly			
Reflectors (Red)	2	1330	30 x 55	290

**1.11.6 Main switch**

: Key turn type having three positions viz. OFF; Circuit ON & START

**1.11.7 Light switch**

: Combinations switch having six positions viz.  
i) OFF  
ii) Parking + dash board light  
iii) Head light (short beam) + (ii)  
iv) Head light (long beam) + (ii)  
v) L/R Turn indicator switch  
iv) Horn push button

**1.11.8 Horn:**

Make  
Type  
Location

: MINDA  
: 2B, 12 V, Electromagnetically vibrator type  
: In front of radiator, under the bonnet

**1.11.9 Fuse box**

: Contains eight numbers of fuses of following capacity.

Capacity	10 A	15 A
Numbers	5	3

**1.11.10 Flasher Unit:**

Make  
Capacity:  
-Turn signal  
- Hazard signal  
Flashes/Min,

: Tenac  
: 12 V, 85 F/m  
: 12V/21W x 2 + 2W x 1  
: 12V/21W x 4 + 2W x 2  
: 85

**1.11.11 Seven pin trailer socket**

: Provided

1.10

**Instrument panel details:**

- i) Engine speed-cum-cumulative digital run hour meter (0-25 x 100)
- ii) Battery volt meter gauge (8-16)
- iii) Water temperature gauge (with colour zones)
- iv) Lubricant oil pressure gauge (with coloured zones)
- v) Fuel level gauge (with coloured zones)
- vi) Battery charging warning indicator
- vii) Main switch (Rotary type)
- viii) Light switch
- ix) Head light (Long beam) indicator lamp
- x) Air filter clogging indicator
- xi) Turn/hazard indicator
- xii) Hazard light switch
- xiii) Mobile charging socket
- xiv) Hand throttle lever
- xv) Steering control wheel
- xvi) Rear view mirror
- xvii) Fuel shut off knob

1.10

**Transmission System:**

1.10.1

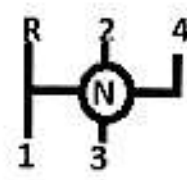
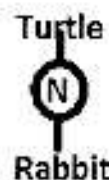
**Clutch:**

- Make : LUK, India
- Type : Dual, Dry friction plates
- Transmission : Dry friction pads
- PTO : Dry friction plate
- No. of friction plate(s) : Two
- Material : Cerametallic (apa)
- Size, [OD/ID (mm)] :**
- Transmission : 272.7/84.5  $\Phi$  mm dia. and 28.5 cm<sup>2</sup> contact area of each pad having five pads.
- PTO : 280.0/166.0  $\Phi$  mm
- Method of operation:**
- Main transmission clutch : By pressing LHS foot pedal halfway.
- PTO clutch : By pressing LHs foot pedal fully.

1.10.2

**Gear box:**

- Make : Sonalika
- Model : Not available
- Type : Mechanical, constant mesh gears
- No. of speeds:**
- Forward : 08
- Reverse : 02
- Gear shifting pattern :



Range selection lever

Main gear shift lever

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- Location of gear shifting levers : (i) Side shift arrangement  
(ii) Main gear shift lever on RHS of operator's seat.  
(iii) Range selector lever on LHS of operator's seat.
- Oil capacity, (l) : 53.0 (common to rear differential, rear final drive, hydraulic & brake systems)
- Oil changing period : First change after **1000** hours of operation and subsequent after every **1800** hours of operation.

**1.13.3 Nominal Speed :**

Movement	Gear No.	No of engine revolutions for one revolution of driving wheel with		Nominal speed at rated engine speed when fitted with <b>14.9 - 28 size tyres of 640 mm radius index,</b> (kmph)	Nominal speed at rated engine speed when fitted with <b>16.9 - 28 size tyres of 670 mm radius index,</b> (kmph)
		With 14.9-28 size tyres	With 16.9-28 size tyres		
Forward	L1	156.94	156.49	3.07	3.23
	L2	120.32	120.48	4.01	4.19
	L3	85.97	85.91	5.61	5.88
	L4	56.57	56.48	8.53	8.94
	H1	44.70	44.64	10.80	11.31
	H2	34.36	34.26	14.05	14.74
	H3	24.42	24.36	19.76	20.72
	H4	16.13	16.14	29.92	31.28
Reverse	LR	115.42	115.27	4.18	4.38
	HR	32.87	32.86	14.68	15.36

**1.13.4 Rear differential unit:**

- Type : Crown wheel and bevel pinion with differential assembly accommodated inside the differential housing.
- Reduction through crown wheel & pinion : 3.167 : 1 (38/12 T)
- Oil capacity of final drive, ( l ) : 53.0 (common to gearbox, rear final drive, hydraulic & brake systems).
- Oil changing period : First change after **1000** hours of operation and subsequent after every **1800** hours of operation.
- Differential lock:**
- Type : Pin type
- Location : On LHS of differential housing
- Method of operation : By depressing pedal, provided on RHS of operator's seat.

**1.13.5 Rear axle & Rear final drive:**

- Make : Sonalika
- Type : Bull & Pinion type, accommodated inside the differential housing.

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- Reduction through final drive : 2.545 : 1 (56/22T)
- Oil capacity of final drive, (l) : 53.0 (common to gearbox, rear differential, hydraulic & brake systems)
- Oil changing period : First change after **1000** hours of operation and subsequent after every **1800** hours of operation.
  
- 1.14 Power lift (Hydraulic System):**
- Make : Sonalika
- Type : Open centre, live, ADDC
- No. and type of cylinder : One, single acting
- Type of linkage lock for transport : Hydraulic, a slow-fast knob provided on hydraulic top cover in its fully closed position acts as a transport lock.
  
- 1.14.1 Hydraulic pump :**
- Make : Rexorth
- Type : Gear
- Location & drive : On RHS of engine and driven through timing gears.
- No. & type of filters : Two, one wire mesh strainer & another full flow spin-on throw away type
- Hydraulic oil capacity, ( l ) : 53.0 (common to gearbox, rear differential, rear final drive, & brake systems)
- Oil change period : First change after **1000** hours of operation and subsequent after every **1800** hours of operation.
- Provision for external tapping : Provided (a plug is provided on distributor)
- Details of control levers : i) Position control lever (black)  
ii) Draft control lever (red)  
iii) Response control knob at distributor.
- Method of draft sensing : Through top link

**1.14.2 Three point linkage:**

S. No.	Observations	As per IS: 4468- (Part-I) 1997 (Category I / II), (mm)	As measured (mm)	Remarks
1	2	3	4	5
<b>I. Upper hitch points:</b>				
a)	Dia of hitch pin hole	19.30 to 19.50/ 25.70 to 25.90	25.89	Conforms to Cat. II
b)	Width of ball	44.0 (max)/51.0 (max)	32.10	Conforms to Cat. I
<b>II. Lower hitch points:</b>				
a)	Dia. of hitch pin hole	22.40 to 22.65/ 28.70 to 29.00	29.0	Conforms to Cat. II
b)	Width of ball	34.8 to 35.0/ 44.8 to 45.0	45.0	Conforms to Cat. II
III.	Lateral distance from lower hitch point to centre line of tractor	359/435	364	<b>Does not conform</b>



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1	2	3	4	5
W	Lateral movement of lower hitch points	100 (min)/125 (min)	150	Conforms to Cat. I & II
X	Distance from end of power take-off to centre of lower hitch point (lower links in horizontal position)	450 to 575/550 to 625	515	Conforms to Cat. I
Y	Transport height	820 (min) /950 (min)	855	Conforms
ZZ	Power range (without torque)	560 (min)/ 650 (min)	600	Conforms to Cat. I
AAA	Leveling adjustment	100 (min)/100 (min)	275	Conforms
BB	Lower hitch point tyre clearance	100 (min)/100 (min)	215	Conforms
CC	Lower hitch point height	200 (max) /200 (max)	200	Conforms

**LINKAGE** Linkage geometry dimensions (Refer Fig.-1(a)):

The following are dimensions observed, corresponding to 640 mm as tyre dynamic radius index

1 No.	Parameter	Notation	Dimension or range, (mm)	Setting used during test, (mm)
1	2	3	4	5
1	Length of lower link	A	765	765
2	Length of lift arm	B	235	235
3	Length of lift rods	C	615 to 660	635
4	Length of top link	D	435 to 660	495
5	Distance of lift rod connection point from pivot point of lower link	E	295, 355, 420	355
6	Distance of lower link pivot point from rear wheel axis:			
	-Horizontally	F	110, behind	110, behind
	-Vertically	G	150, below	150, below
7	Distance of upper link pivot point from rear wheel axis:			
	-Horizontally	H	370, 372 & 375 behind	372, behind
	-Vertically	J	260, 300 & 340 above	300, above
8	Distance of lift arm pivot point from rear wheel axis:			
	-Horizontally	K	05, forward	05, forward
	-Vertically	L	360, above	360, above
9	Height of lower hitch points relative to the rear wheel axis:			
	-In high position	M	90 to 215	160, above
	-In low position	N	-600 to -275	440, below
10	Height of lower link hitch points when locked in transport position	-	160, above	

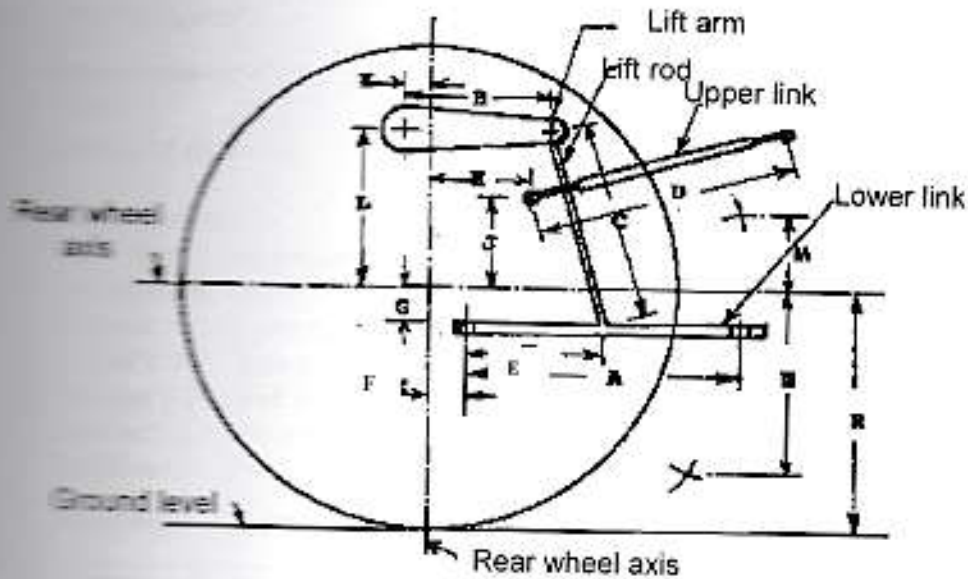


Fig. 1 (a): DIMENSIONAL NOTATIONS FOR TABLE OF LINKAGE GEOMETRY

CONA: Drawbar:  
CONA: Linkage Drawbar [Refer Fig.1(b)]:

Notation	As per IS: 12953-1990 (Cat. I) / (Cat. II), (mm)	As measured, (mm)	Remarks
1	2	3	4
2	683 ± 1.5/825 ± 1.5	683	Conforms to Cat. I
3	75 (min)/75 (min)	75	Conforms
4	30 (min) / 30 (min)	30	Conforms
5	21.79 to 22.0/27.79 to 28.0	27.82	Conforms to Cat. II
6	39.0 (min)/49.0 (min)	66.70	Conforms
7	12.0 (min)/12.0 (min)	12.0	Conforms
8	15.0 (min)/15.0 (min)	22.70	Conforms
9	25 ± 1/25 ± 1	24.60	Conforms
10	80 ± 1.5/80 ± 1.5	80.0	Conforms
No. of holes	7/9	7	Conforms to Cat. I

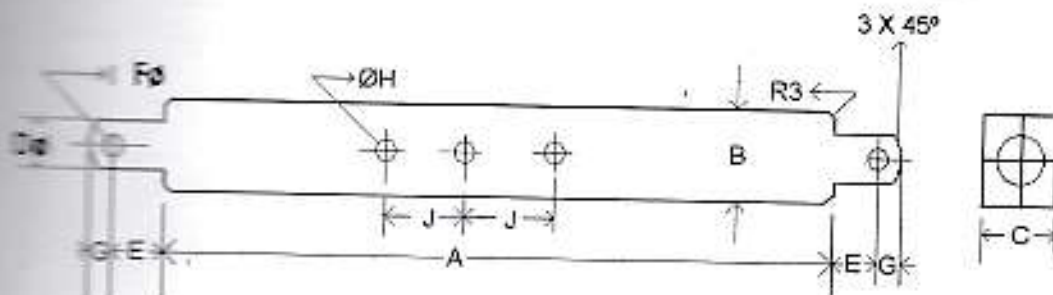


Fig. 1 (b): DIMENSIONAL NOTATIONS FOR LINKAGE DRAWBAR

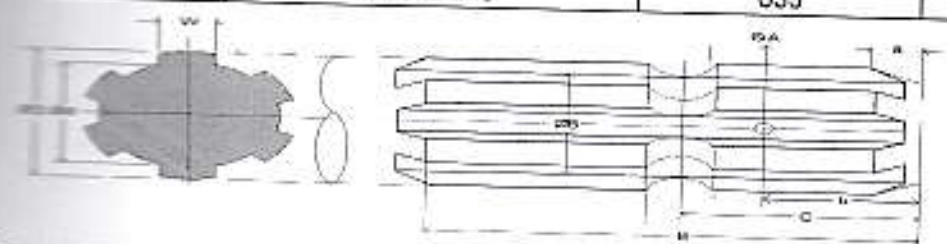
TS-1000191022117

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- 1000191022117 Swinging drawbar : **Not provided**
- 1000191022117 Power take-off shaft:
  - Type : Type-I, independent
  - Method of engaging : By a hand lever located on LHS of operator's seat
  - No. of shaft (s) : One
  - PTO speed corresponding to rated engine speed, (rpm) : 643
  - Distance behind rear axle, (mm) : 360
  - Engine to PTO speed ratio : 3.111 : 1
  - Whether PTO Shaft is capable of transmitting the full power of engine : Yes
  - Other speeds, if any : None

**1000191022117 Specifications of Power Take-Off Shaft: -**

Specification	As per IS:4931-1995 (Type-I)	As observed	Remarks
Maximum speed, (rpm)	540 ± 10	540 rpm corresponding to 1680 engine rpm	Conforms
No. of splines	6	6	Conforms
Direction of rotation	Clockwise	Clockwise	Conforms
Location	The position of the centre of the end of PTO shaft shall be within 50mm to right or left of the centre line of the tractor.	In centre line of tractor	Conforms
<b>Dimensions (mm) [See Fig. 2]:</b>			
D0	34.79±0.06	34.78	Conforms
d0	28.91 ± 0.05	28.87	Conforms
B0	29.4 ± 0.1	29.50	Conforms
A0 (Optional)	8.3 ± 0.1	NA	NA
W	8.69 - 0.09 - 0.16	8.60	Conforms
a	7	7	Conforms
a (Optional)	25 ± 0.5	NA	NA
c	38	38	Conforms
x	30°	30°	Conforms
B	76 (min)	84	Conforms
h	450 to 675	635	conforms



**Fig. 2: DIMENSIONAL NOTATIONS FOR TYPE-I POWER TAKE-OFF SHAFT**



**SONALIKA DI-750 III HDM TRACTOR (Brand Name: RX)  
Commercial (Initial)**

1.18.1	<b>PTO Master Shield</b>	: Not provided
1.18.2	<b>Towing hitch:</b>	
1.18.2.1	<b>Front:</b>	
	Type	: Clevis
	Location	: At front of front axle support
	Height above ground level, (mm)	: 670 (Fixed)
	Dia. of pin hole, (mm)	: 31.0
	Width of clevis, (mm)	: 140
1.18.2.2	<b>Rear:</b>	
	Type	: Clevis
	Location	: At the rear of transmission housing
	Height above ground level, (mm):	
	Maximum	: 810
	Minimum	: 535
	Number of positions	: 10
	Type of adjustment	: By changing hitch position and reversing & changing hitch position on its mounting bracket.
	<b>Distance of hitch point, (mm):</b>	
	- From rear wheel centre	: 510
	- From power take-off shaft end	: 150
	Dia. of pin hole, (mm)	: 42
	Width of clevis, (mm)	: 75
1.18.3	<b>Steering:</b>	
	Make	: Danfoss
	Type	: Open centre, Hydrostatic
	Location	: Above clutch housing
	Diameter of steering control wheel, (mm)	: 375
	Make & type of pump	: Not available & external gear type
	Location & drive	: Mounted on RHS driven through timing gears of engine
	Method of operation	: Manual, through steering control wheel
	Make, type & number of hydraulic ram cylinder	: Not available, double acting, one
	Location of ram cylinder	: On LHS located behind the front axle
	Oil capacity of steering system, (l)	: 2.20
	Oil change period	: First change after 250 hours of operation and subsequent after every 1000 hours of operation.
1.18.4	<b>Brakes:</b>	
1.18.4.1	<b>Service Brake:</b>	
	Make	: Not available
	Type	: Mechanical, oil immersed disc brake



**SONALIKA DI-750 III HDM TRACTOR (Brand Name: RX)  
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<p>Location :</p> <p>No. of discs :</p> <p>Area of liners, (cm<sup>2</sup>) :</p> <p>Material of liners :</p> <p>Method of operation :</p> <p>Oil capacity, (l) :</p> <p>Oil change period :</p>	<p>: On differential half axle shaft, out side the differential housing</p> <p>: Four (on each wheel brake)</p> <p>: 944.63 (on each wheel side)</p> <p>: Non - asbestos (apa)</p> <p>: Individual and combined, pedal operated by right foot</p> <p>: 53.0 (common to gearbox, rear differential, rear final drive &amp; hydraulic system)</p> <p>: First change after <b>1000</b> hours of operation and subsequent after every <b>1800</b> hours of operation.</p>
<p><b>10802</b> Parking Brake:</p> <p>Type :</p> <p>Location &amp; Method operation of operation :</p>	<p>: Pawl &amp; Ratchet arrangement</p> <p>: Service brake acts as parking brake when locked in position by a hand lever provided on LHS of operator's seat.</p>
<p><b>10803</b> Wheel Equipment:</p> <p><b>10804</b> Steered Wheel(s):</p> <p>Make :</p> <p>Numbers :</p> <p>Type of tyre :</p> <p>Size :</p> <p>Ply rating :</p> <p>Maximum permissible loading capacity of each tyre at 370 kPa pressure, (kgf) :</p> <p><b>Recommended inflation pressure, (kPa) :</b></p> <p>- For field work :</p> <p>- For transport :</p> <p>Track width, (mm) :</p> <p>Method of changing track width :</p> <p>Make &amp; size of rim :</p>	<p>: Good Year</p> <p>: 2</p> <p>: Pneumatic, ribbed</p> <p>: 7.50 - 16</p> <p>: 8</p> <p>: 870</p> <p>: 250</p> <p>: 250</p> <p>: 1350 (std.), 1510, 1570 &amp; 1710</p> <p>: By reversing the wheel disc and changing position of lugs on rims.</p> <p>: SSWL, 5.5Fx16</p>
<p><b>10805</b> Drive wheel(s):</p> <p>Make :</p> <p>Numbers :</p> <p>Type of tyre :</p> <p>Size :</p> <p>Ply rating :</p> <p>Maximum permissible loading capacity of each tyre at 230 kPa pressure, (kgf) :</p> <p><b>Recommended inflation pressure, (kPa):</b></p> <p>- For field work :</p> <p>- For transport :</p> <p>Track width, (mm) :</p> <p>Method of changing track width :</p> <p>Make &amp; size of rim :</p>	<p>: Good Year</p> <p>: 2</p> <p>: Pneumatic, traction</p> <p>: 14.9 - 28</p> <p>: 12</p> <p>: 2120</p> <p>: 110</p> <p>: 150</p> <p>: 1420(std.), 1540, 1600, 1700, 1810 &amp; 1940</p> <p>: By reversing the wheel disc and changing position of disc on offset rim lugs.</p> <p>: AMW, W13 x 28</p>



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**SONALIKA DI-750 III HDM TRACTOR (Brand Name: RX)  
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- 1.19.1 Wheel base, (mm) : 2215  
Method of changing wheel base, if any, and range : None
- 1.20 Operator's seat:  
Make : Not available  
Type : Cushioned seat & back rest  
Type of suspension : Two helical springs  
Type of dampening : Hydraulic shock absorber  
Range of adjustment, (mm):  
Vertical : NIL  
Lateral : NIL  
Longitudinal :  $\pm 115$
- 1.21 Provision for safety and comfort of operator:
- 1.21.1 Operator's Seat:  
All parameters meets the minimum requirements of IS: 12343-1998, (Re-affirmed in March, 2009), **except the following:**  
i) Vertical distance from seat index point to the centre of accelerator pedal.  
ii) Longitudinal distance from seat index point to the center of steering control wheel.  
iii) Vertical distance from seat index point to the center of steering control wheel.
- 1.21.2 Conformity with IS: 6283 (Part 1)-2006  
All the controls are identifiable with symbols as per IS: 6283(Part 1) -2006, **except the following:**  
i) Grease lubricant frequency  
ii) Oil lubricant, type & frequency
- 1.21.3 Conformity with IS: 6283 (Part 2)-2007  
All the displays are identifiable with colour codes as per IS: 6283(Part 2) -2007
- 1.21.4 Conformity with IS : 8133-1983 (Re-affirmed in March, 2009) :  
Location and movement of various controls meets the requirement of IS: 8133-1983), **except the following:**  
i) The fuel shut-off knob does not remain in stop position without the application of sustained manual effort.
- 1.21.5 Conformity with IS:12239 (Part-1)-1996 (Re-affirmed in February, 2012) :  
Meets the requirements of IS: 12239 (Part-1) – 1996, **except the following:**  
i) Provision of spark arresting device in the exhaust system.
- 1.21.6 Conformity with IS:12239 (Part-2)-1999 (Re-affirmed in March, 2009):  
Meets the requirements of IS: 12239 (Part-2)-1999, **except the following:**  
i) The working clearance between draft control lever and mudguard is not provided as per the minimum requirement  
ii) Provision of PTO master shield
- 1.21.7 Conformity with IS: 14683 – 1999 (Re-affirmed in March, 2009) :  
Lighting meets the requirements of IS: 14683 – 1999.
- 1.21.8 Rear view mirror:  
Rear view mirror has been provided.



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**SONALIKA DI-750 III HDM TRACTOR (Brand Name: RX)  
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1.21.9 **Slow moving emblem:**  
Slow moving emblem has been provided.

1.22 **Labelling of tractor as per IS: 10273-1987 (Reaffirmed in March, 2009):**  
Location: The labeling plate riveted on LHS fender (rear mudguard) of the tractor provides the following information:

Name of Manufacturer	INTERNATIONAL TRACTORS LTD., HOSHIARPUR, PUNJAB (INDIA)
Make	SONALIKA
Model	DI-750 III HDM
Year of manufacturer	2015
Engine Serial Number	4100EL53F497396F16
Chassis Serial Number	EZUDU505606S3
Maximum PTO Power, kW	32.0
Specific fuel consumption, g/kWh	260

1.23 **Ballast Conditions:**

Particulars	Ballast mass as used, (kg)			
	Front		Rear	
	Water	C.I.weight	Water	C.I.weight
(i) As used during drawbar performance test	NIL	186	200	408
(ii) As used during field test, except rotavator	NIL	62	200	272
(iii) As used during haulage test	NIL	Nil	NIL	Nil
(iv) As use during wet land operation (with puddler & half cage wheel)	NIL	NIL	NIL	NIL

1.23.1 **Standard ballast :**

Particulars	Ballast mass as used, (kg)	
	Front	Rear
C.I.weight	56	Nil
Location	At front axle bracket	

1.24 **Masses:**

Particulars	Mass of the tractor without operator but with all the liquid reservoirs full, (kg)		
	Front	Rear	Total
(i) Standard ballast	920	1440	2360
(ii) With ballast as used during drawbar performance test.	1165	1990	3155
(iii) With ballast as used during dry land operation (other than rotavator operation)	1010	1884	2894
(iv) Without ballast as used during wet land operation with half cage wheel	940	1520	2460
(v) As used during the haulage test with trailer with canopy and drawbar.	920	1440	2360



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SONALIKA DI-750 III HDM TRACTOR (Brand Name: RX)  
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## 1.25 Overall dimensions:

Condition	Length,(mm)	Width,(mm)	Height, (mm)	Ground Clearance, (mm)
Without ballast	3745	1810	2300 (with exhaust pipe)	422 (below the drain plug of differential housing)

## 1.26 Number of external lubricating points:

- Oiling	: Nil
- Grease nipples	: 22
- Grease cups	: 02

## 1.27 Colour of tractor:

Chassis & Engine	: Black
Sheet metal:	
Bonnet & Mudguard	: Blue
Rim	: Silver

## 1.28 Optional features of base model:

- (i) One step up rear tyre size i. e. 16.9 - 28, 12 PR

## 2. FUEL AND LUBRICANTS

2.1 Fuel : The High-speed diesel oil supplied by M/s Indian Oil Corporation Limited having density of  $0.836 \text{ g/cm}^3$  at  $15^\circ\text{C}$  was used.

## 2.2 Lubricants:

S. No.	Particulars	As recommended by the manufacturer	As used during the test
1	Engine oil	SAE 20 W 40	As recommended
2	Transmission, Hydraulic, differential, Brake & rear final drive.	SAE-EP-80	Oil originally filled in the tractor was not changed
3	Steering system	SAE-EP-80	--do--
4	Grease	Multi purpose grease	Servo grease MP

## 3. PTO PERFORMANCE TEST

Date(s) of test : 13.07.2016, 14.07.2016 & 18.07.2016

Tractor run at the Institute prior to start of : 5.39

PTO test (h)

Type of dynamometer bench : ESF 1000 S, Eddy Current

2.3 The results of power take-off performance are tabulated in Table-1 and graphically represented in Fig. 3, 4 and 5.



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**SONALIKA DI-750 III HDM TRACTOR (Brand Name: RX)  
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**Table - 1**

Power (kW)	Speed, (rpm)		Fuel consumption			Specific energy, (kWh/l)
	P.T.O.	Engine	l/h	kg/h	Specific, (kg/ kWh)	
<b>a) Maximum power - 2 hours test:</b>						
33.4	643	2000	10.66	8.91	0.267	3.13
32.0	643	2000	10.23	8.55	0.267	3.13*
<b>b) Power at rated engine speed (2000 rpm):</b>						
33.4	643	2000	10.66	8.91	0.267	3.13
32.0	643	2000	10.23	8.55	0.267	3.13*
<b>c) Power at standard power take-off speed (540 ± 10 rpm):</b>						
21.5	540	1680	9.45	7.90	0.251	3.33
20.2	540	1680	9.23	7.72	0.256	3.27*
<b>d) Varying loads at rated engine speed:</b>						
<b>(i) Torque corresponding to maximum power available at rated engine speed:</b>						
33.4	643	2000	10.66	8.91	0.267	3.13
<b>(ii) 85% of the torque obtained in (i):</b>						
28.4	666	2072	9.65	8.07	0.274	3.05
<b>(iii) 75% of the torque obtained in (ii):</b>						
22.4	674	2097	7.96	6.65	0.297	2.82
<b>(iv) 50% of the torque obtained in (ii):</b>						
15.2	687	2137	6.42	5.37	0.354	2.37
<b>(v) 25% of the torque obtained in (ii):</b>						
7.7	696	2165	4.96	4.15	0.539	1.55
<b>(vi) Unloaded:</b>						
-	-	-	3.82	3.19	-	-
<b>e) Varying loads at standard PTO speed(540 ± 10 rpm):</b>						
<b>(i) Torque corresponding to maximum power available at standard PTO speed</b>						
21.5	540	1680	9.45	7.90	0.251	3.33
<b>(ii) 85% of the torque obtained in (i):</b>						
27.9	565	1727	8.30	6.94	0.252	3.33
<b>(iii) 75% of the torque obtained in (ii):</b>						
27.3	563	1751	6.71	5.61	0.267	3.13
<b>(iv) 50% of the torque obtained in (ii):</b>						
14.2	570	1773	5.23	4.37	0.308	2.72
<b>(v) 25% of the torque obtained in (ii):</b>						
7.3	583	1814	3.94	3.29	0.451	1.85
<b>(vi) Unloaded:</b>						
7.4	584	1848	2.86	2.39	1.71	0.49

\*Under high ambient conditions

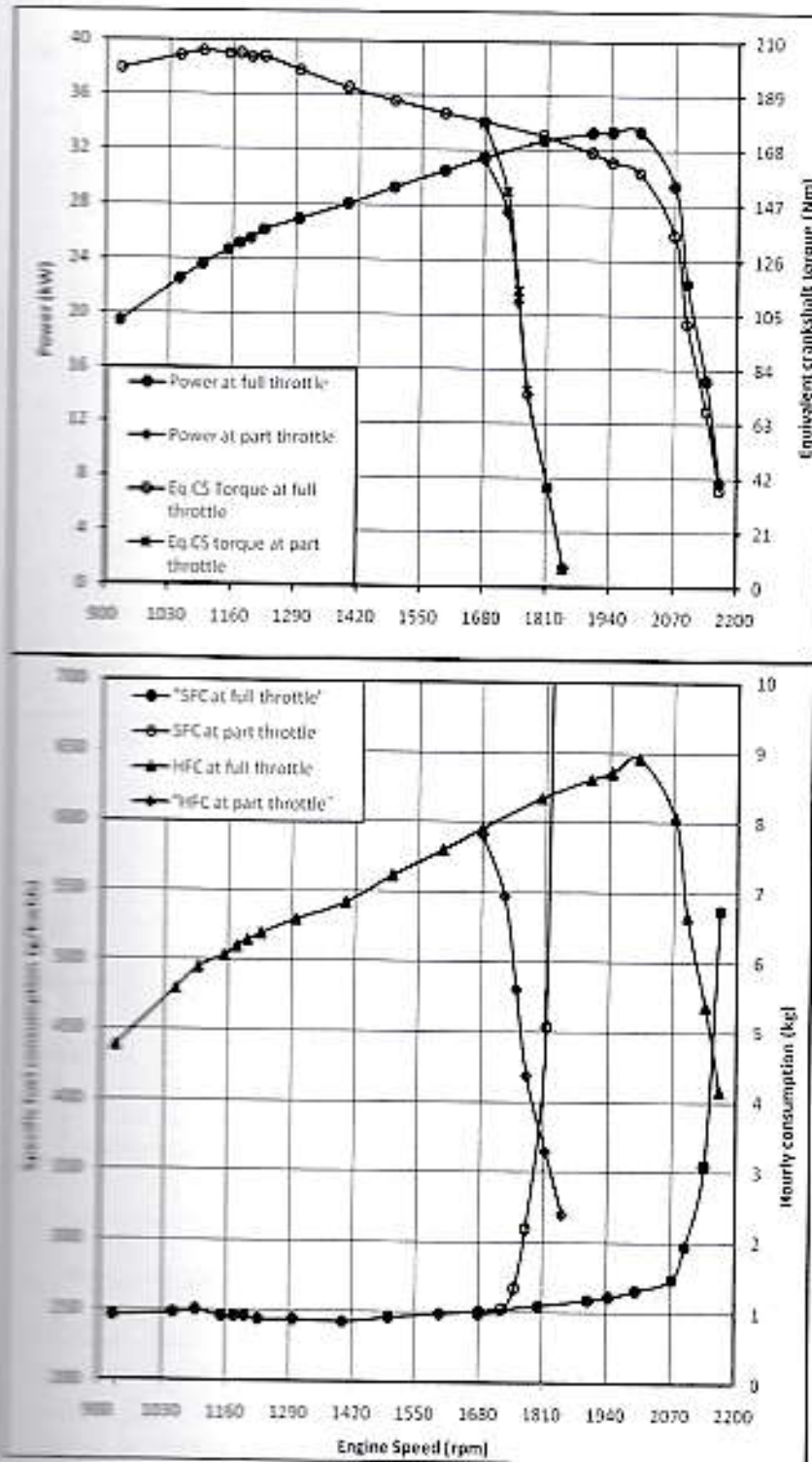


Fig.2: PTO PERFORMANCE CHARACTERISTICS (Natural Ambient)



T-1088/1613/2017

### SONALIKA DI-750 III HDM TRACTOR (Brand Name: RX) Commercial (Initial)

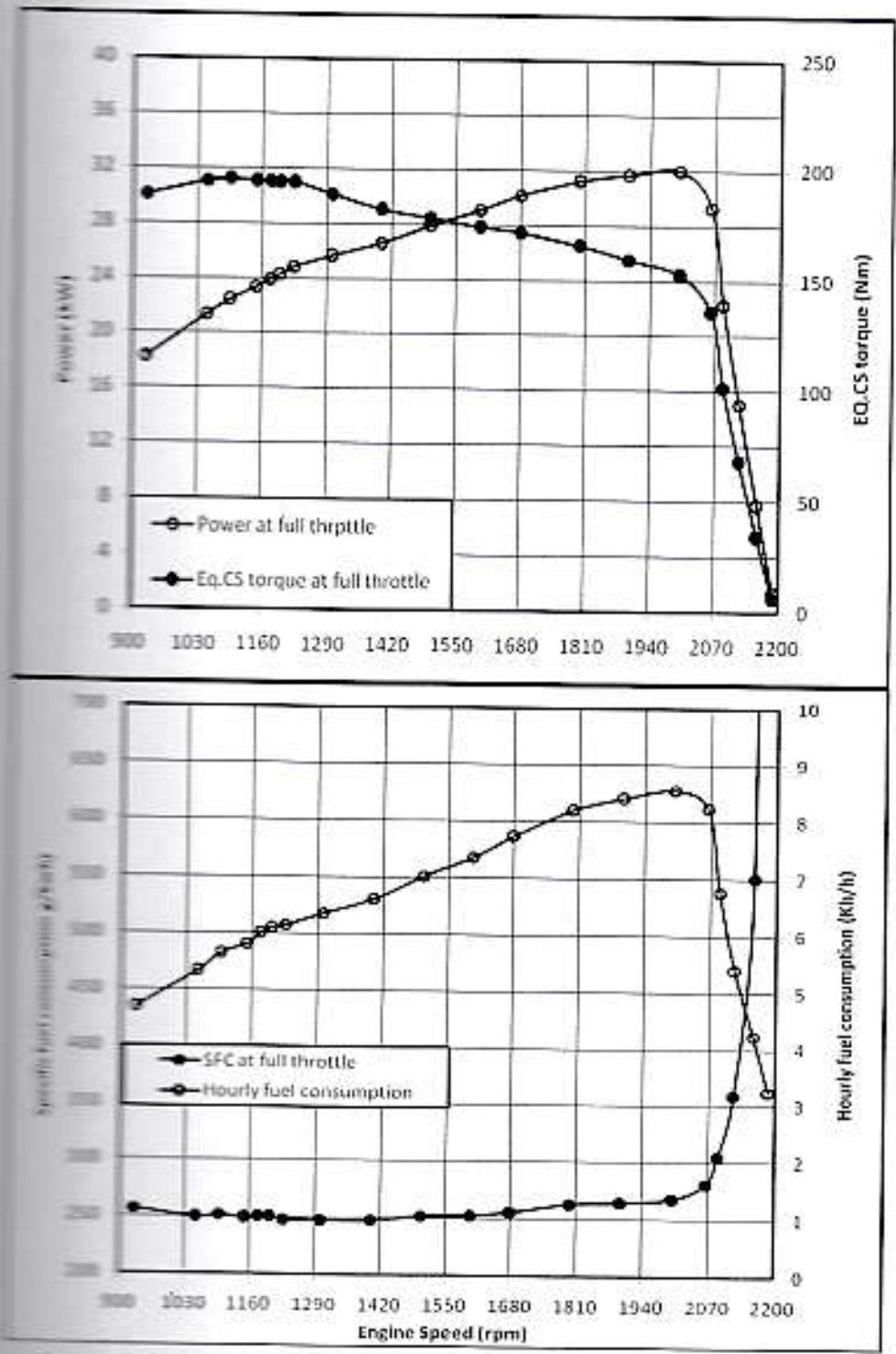


Fig. 4: PTO PERFORMANCE CHARACTERISTICS (High Ambient)



T-1088/1513/2017

SONALIKA DI-750 III HDM TRACTOR (Brand Name: RX)  
Commercial (Initial)

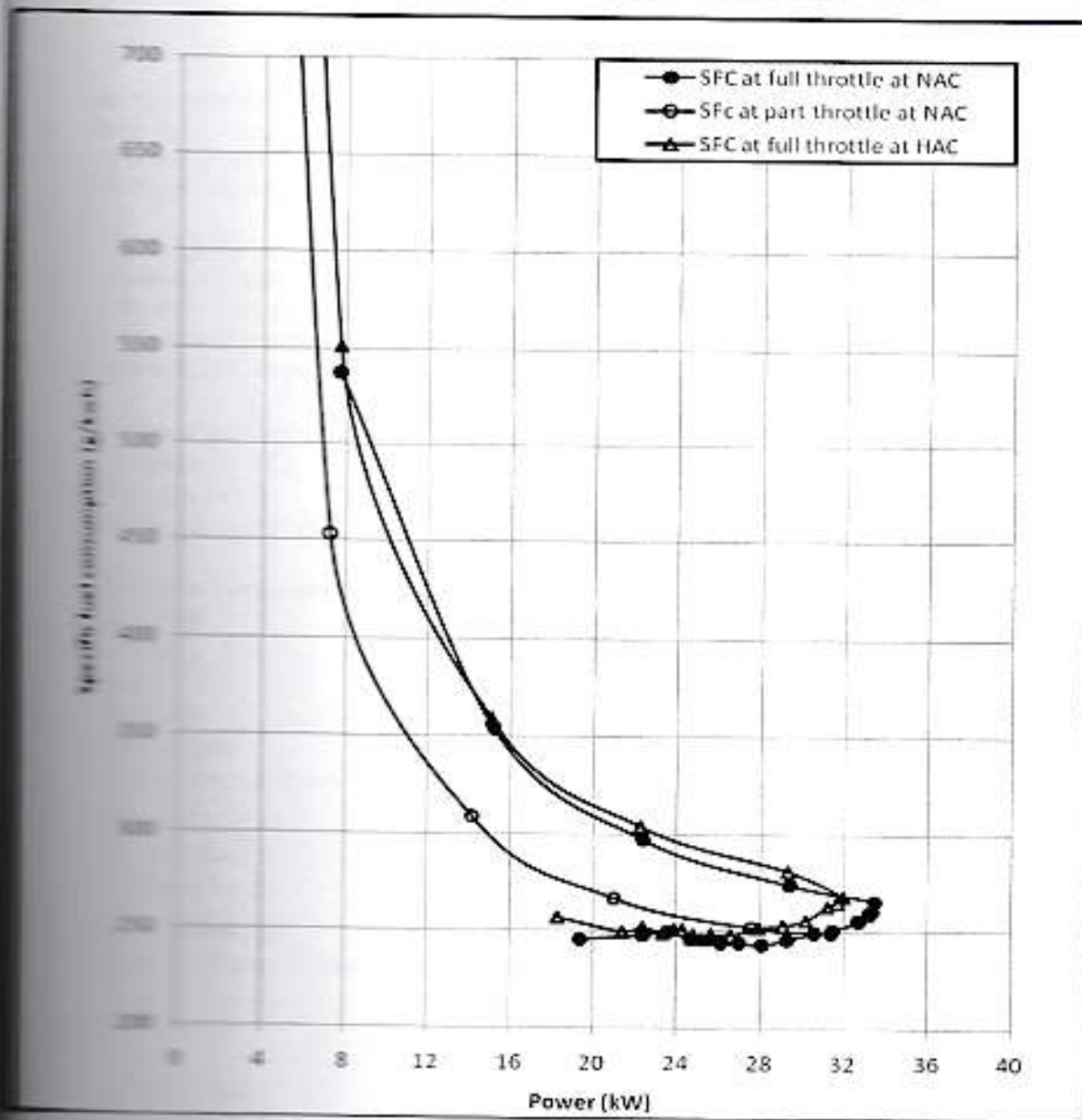


Fig.5: PTO PERFORMANCE CHARACTERISTICS





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SONALIKA DI-750 III HDM TRACTOR (Brand Name: RX)  
Commercial (Initial)

	<u>Natural ambient</u>	<u>High ambient</u>
-No load maximum engine speed, (rpm) :	2189	2187
-Equivalent crankshaft torque at maximum power, (Nm) :	159.62	152.6
-Maximum equivalent crankshaft torque, (Nm) :	205.2	194.9
-Engine speed at maximum equivalent crankshaft torque, (rpm) :	1098	1098
-Back up torque, (%) :	28.6	27.7
-Smoke level, maximum light absorption coefficient, (per meter) :	0.17	--
<b>- Range of atmospheric conditions:</b>		
Temperature, (°C) :	28 to 35	42 to 45
Pressure, (kPa) :	722 to 735	99.1 to 99.6
Relative humidity, (%) :	96.2 to 98.0	28 to 33
<b>- Maximum temperatures, (°C):</b>		
Engine oil :	106	113
Coolant :	93	103
Fuel :	51	61
Air intake :	40	50
Exhaust gas :	545	531
<b>- Pressure at maximum power:</b>		
Intake air, (kPa) :	3.5 to 3.6	3.5
Exhaust gas, (kPa) :	10.8 to 10.9	10.1
<b>- Consumptions:</b>		
Lub oil, (g/kwh) :	--	0.48
Coolant (% of total coolant capacity) :	--	0.42

#### 4. DRAWBAR PERFORMANCE TEST

Details of test :	21.11.2016 to 25.11.2016
Tractor run at the Institute prior to start of drawbar test, (h) :	18.21
Type of track :	Concrete
<b>Height of drawbar, (mm):</b>	
- Without ballast :	590
- With ballast :	550

The results of drawbar performance test consisting of maximum power and pull standard ballast with ballast and ten hours test are tabulated in Table – 2. The results of the tests with ballast, are also represented graphically in Fig.6 & 7



Table - 2

**DRAWBAR PERFORMANCE TEST**

Sl. No.	Travel Speed (km/h)	Draw bar power (kW)	Draw bar pull (kN)	Eng. no. Speed (rpm)	Wheel Slip (%)	Fuel consumption		Specific Energy (kWh/l)	Atmospheric conditions			Temperature (°C)					Max. sustained pull (kN)
						(kg/kWh)	(l/h)		Temp (°C)	Pressure (kPa)	R.H. (%)	Fuel	Trans. oil	Coolant (Water)	Eng. oil		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
<b>i) Maximum power test (Tractor with standard ballasted):</b>																	
L1	2.82	14.6	18.62	2103	14.9	0.420	7.34	1.99	24	99.1	45	33	75	76	92	19.61	
L2	3.63	18.1	17.93	2081	14.8	0.394	8.53	2.12	25	99.0	43	34	75	77	93	18.49	
L3	5.19	25.1	17.38	2051	11.7	0.344	10.33	2.43	27	99.0	34	36	61	78	95	18.04	
L4	8.16	27.1	11.94	1998	6.3	0.326	10.57	2.56	27	99.0	38	36	59	80	96	16.43	
H1	10.55	27.8	9.50	2007	4.7	0.318	10.57	2.63	28	99.0	39	36	50	81	93	12.36	
<b>ii) Maximum power test (Tractor ballasted):</b>																	
L1	2.76	18.1	23.62	2082	15.1	0.400	8.66	2.09	24	99.4	35	33	64	77	94	24.99	
L2	3.58	23.4	23.49	2050	14.8	0.357	9.99	2.34	23	99.4	41	34	61	78	94	24.37	
L3	5.17	27.4	19.10	2004	9.6	0.328	10.75	2.55	23	99.5	46	32	58	79	97	23.84	
L4	8.11	27.2	12.08	1998	6.5	0.330	10.74	2.53	21	99.5	49	30	53	78	93	16.97	
H1	10.41	27.4	9.48	1909	5.2	0.332	10.88	2.52	20	99.6	52	30	36	78	88	13.03	



Contd. Table-2

Sl. No.	Tractor Speed (km/h)	Engine Power (kW)	Drawbar Pull (kN)	Engine Speed (rpm)	Wheel Slip (%)	Fuel Consumption		Specific Energy (kWh/kN)	Atmospheric conditions			Temperature (°C)			Max. sustained pull (kN)	
						(kg/kWh)	(l/h)		Fuel Temp (°C)	Pressure (kPa)	RH (%)	Fuel	Trans. oil	Coolant (Water)		Eng. ine oil
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<b>iii) Five hours test at 75 percent of pull obtained at max. Power (ballasted wheeled tractor):</b>																
L3	5.53	22.10	14.35	2079	7.37	0.345	9.26	2.38	13 to 26	35 to 54	99.4 to 99.7	24 to 45	50 to 81	75 to 78	87 to 95	--
<b>iv) Five hours test at pull corresponding to 15 percent wheel slip (ballasted wheeled tractor):</b>																
L2	3.61	23.6	23.49	2057	14.39	0.357	10.19	2.31	25 to 31	26 to 37	99.1 to 99.4	37 to 45	81 to 84	74 to 79	94 to 97	--

i) The lub. oil and coolant consumption during 10 hours test were observed as Nil and 5.0 ml/h respectively.

ii) Tyre Creeping, (mm):

-LHS : 25  
-RHS : 50

iii) Maximum temperatures during entire drawbar test, (°C):

Engine oil : 97  
Coolant : 87  
Transmission oil : 84  
Fuel : 45

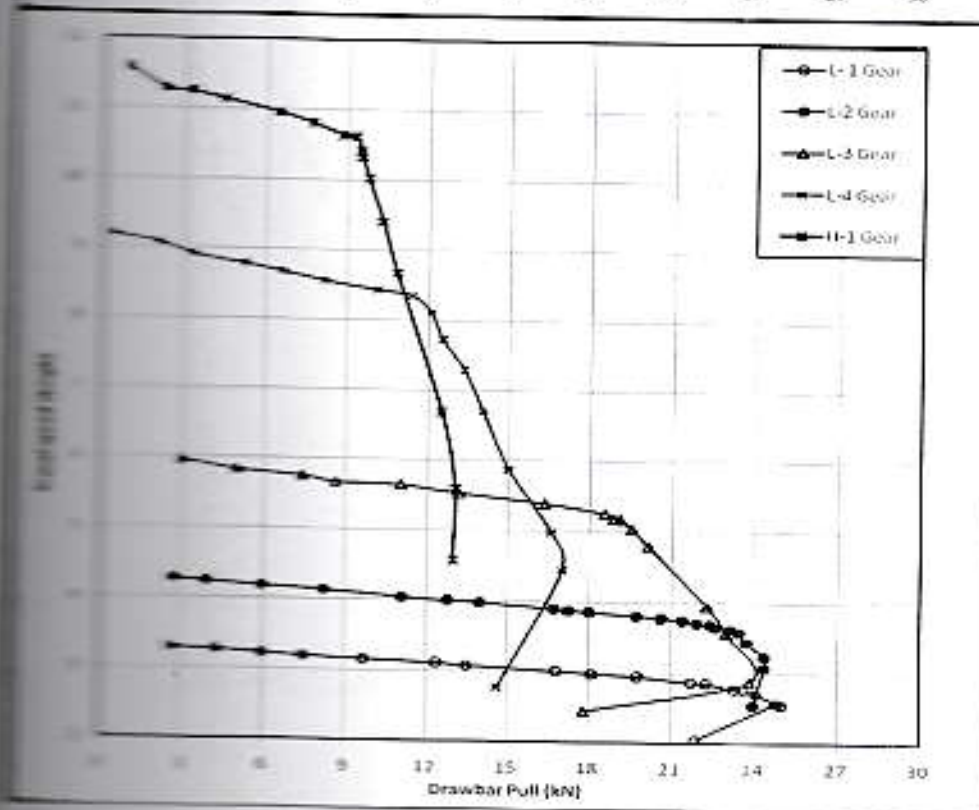
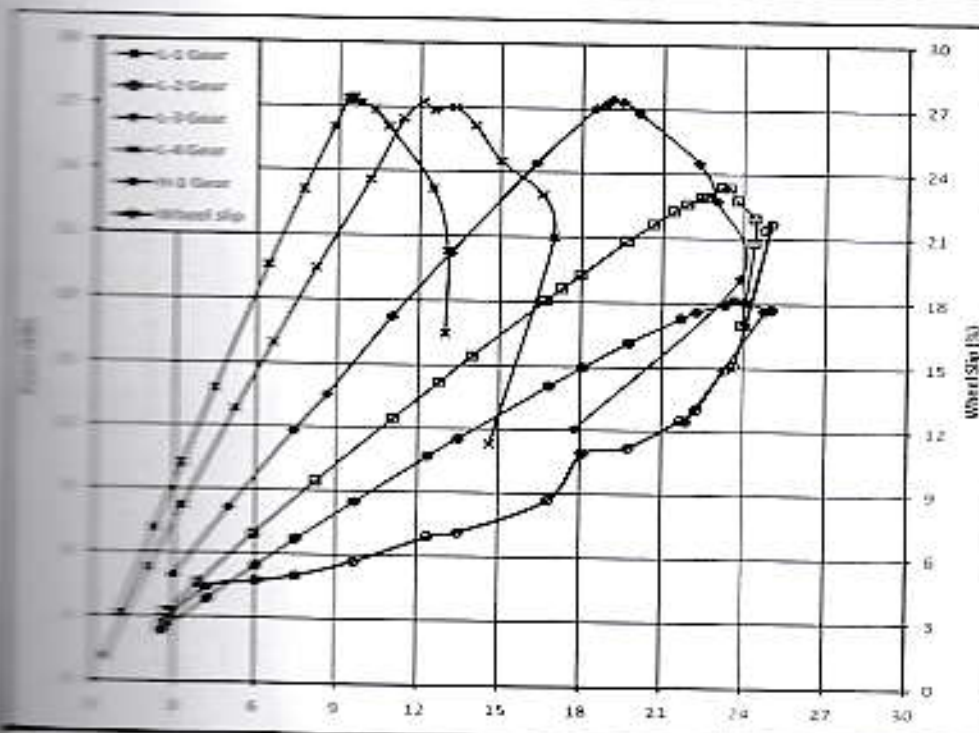


Fig.8: DRAWBAR PERFORMANCE CHARACTERISTICS (Ballasted condition)



SONALIKA DI-750 III HDM TRACTOR (Brand Name: RX)  
Commercial (Initial)

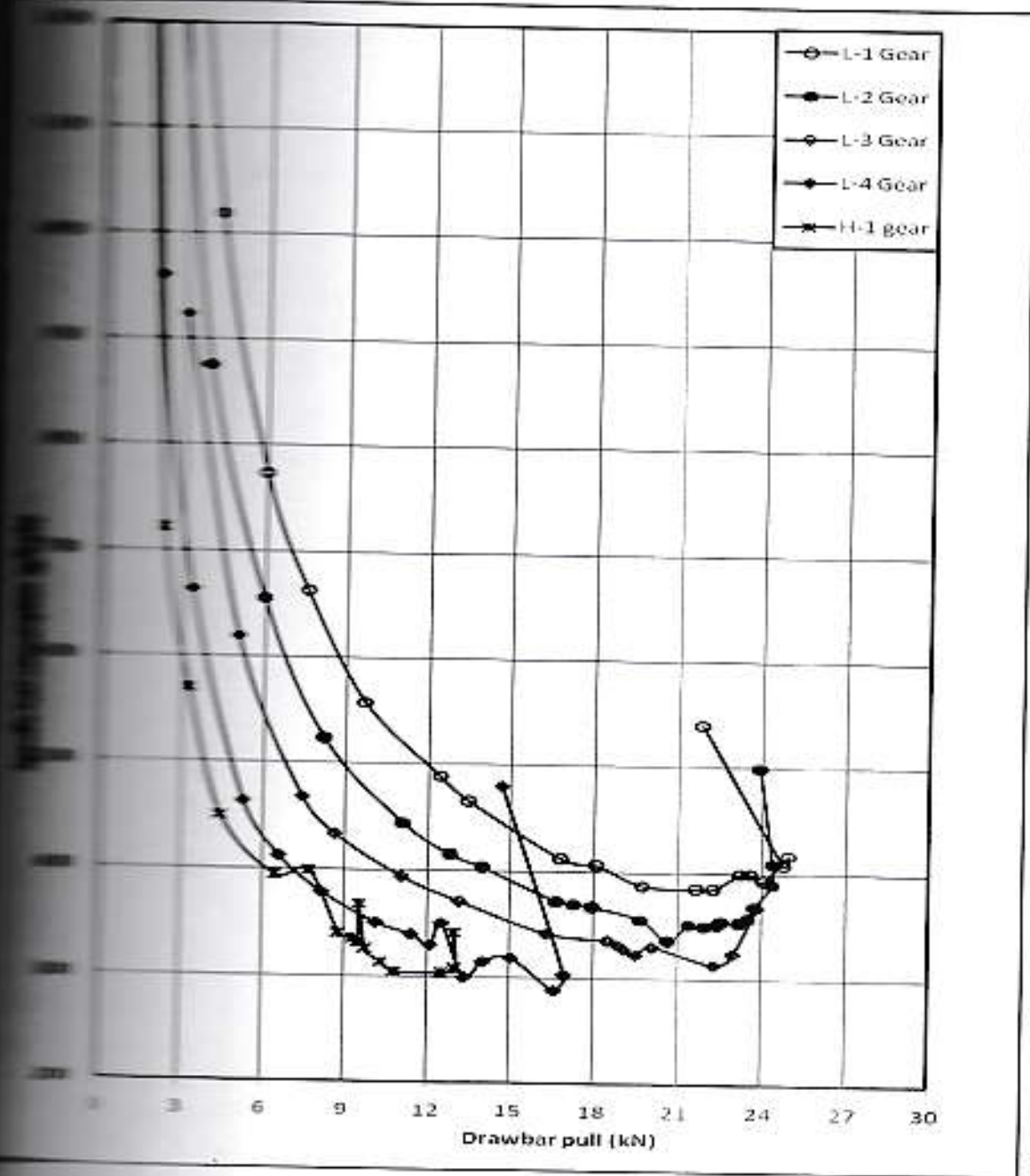


Fig. 7. DRAWBAR PERFORMANCE CHARACTERISTICS (Ballasted condition)



TC-100017/13/2017

**SONALIKA DI-750 III HDM TRACTOR (Brand Name: RX)**  
**Commercial (Initial)**

**5. POWER LIFT AND HYDRAULIC PUMP PERFORMANCE TEST**

Date(s) of test : 07.06.2016, 08.06.2016 & 20.06.2016  
 Tractor run at the Institute prior to start of hydraulic test, (h) : 1.65  
 Pump speed at rated engine speed, (rpm) : 2000

**5.1 Hydraulic power test:**

Pump delivery rate at minimum pressure and rated engine speed, (l/min) : 27.73  
 Maximum hydraulic power, (kW) : 6.7  
 Pump delivery rate at maximum hydraulic power, (l/min) : 27.54  
 Pressure at maximum hydraulic power, (MPa) : 14.5  
 Sustained pressure of the open relief valve, (MPa) : 18.0  
 Tapping point:  
 a) Relief valve test : At external circuit  
 b) Pump performance test : At pump outlet  
 Temperature of hydraulic fluid, (°C) : 60 to 64

**5.2 Lifting capacity test:**

Test	Height of lower hitch point above ground in down position, (mm)	Vertical Movement with lifting forces, (mm)	Maximum corrected force exerted through full range, (kN)	Corresponding pressure, (MPa)	Moment about rear axle, (kN-m)	Maximum tilt angle of mast from vertical, (degrees)
Actual Load	200	595	16.60	16.2	14.53	-
Centre standard frame	200	590	13.03	16.2	19.35	13

**5.3 Maintenance of lift load:**

Force applied at the frame, (kN) : 11.73  
 Temperature of hydraulic fluid at the start of test, (°C) : 60

**Test data:**

Elapsed Time, (minute)	5	10	15	20	25	30
Cumulative drop in height of lift, (mm)	01	03	05	06	07	08



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**SONALIKA DI-750 III HDM TRACTOR (Brand Name: RX)  
Commercial (Initial)**

**6. BRAKE TEST**

601 Service brake:

6021 Cold brake test:

Date of test : 20.06.2016  
 Type of track : Concrete  
 Maximum attainable speed, (kmph):  
 - Unballasted : 32.6  
 - With road ballast : 32.6

		At maximum attainable speed			
Standard: Ballasted tractor	Braking device control force, (N)	509	467	426	385
	Mean deceleration, (m/sec <sup>2</sup> )	2.93	2.76	2.63	2.50
	Stopping distance, (m)	14.17	14.87	15.62	16.40
		At 25 kmph travel speed			
Standard: Ballasted tractor	Braking device control force, (N)	560	506	452	399
	Mean deceleration, (m/sec <sup>2</sup> )	2.93	2.73	2.61	2.50
	Stopping distance, (m)	8.31	8.83	9.24	9.65

6022 Brake fade test:

		At maximum attainable speed			
Standard: Ballasted tractor	Braking device control force, (N)	507	470	433	396
	Mean deceleration, (m/sec <sup>2</sup> )	2.92	2.71	2.60	2.50
	Stopping distance, (m)	14.35	15.11	15.76	16.40
		At 25 kmph travel speed			
Standard: Ballasted tractor	Braking device control force, (N)	571	520	469	418
	Mean deceleration, (m/sec <sup>2</sup> )	2.82	2.75	2.60	2.50
	Stopping distance, (m)	8.47	8.76	9.26	9.65

Max. deviation of tractor from its original : None  
 course, (m)

Abnormal vibration : None

The brakes were heated by : Self braking

603 Parking brake test:

Particulars	Parked on 18 percent slope		Parked on 12 percent slope with trailer of 2.39 tones.	
	Facing up	Facing down	Facing up	Facing down
Braking device control force, (N)	250	330	349	378
Effect of parking brake	----- Effective -----			



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**7. NOISE MEASUREMENT**

**7.1 Noise at bystander's position:**

Date of test : 31.05.2016  
 Type of track : Concrete  
 Background noise level, dB (A) : 54  
**Atmospheric conditions:**  
 Temperature, (°C) : 35  
 Pressure, (kPa) : 97.8  
 Relative humidity, (%) : 31  
 Wind velocity, (m/s) : 2.6

**Test Data:**

Sl. No.	Gear	Travelling speed before acceleration, (kmph)	Noise level, dB (A)
1	L1	2.53	84
2	L2	3.26	84
3	L3	4.56	84
4	L4	6.93	84
5	H1	8.76	83
6	H2	11.34	83
7	H3	16.02	82
8	H4	24.06	82

**7.2 Noise at operator's ear level:**

Date of test : 22.11.2016  
 Type of track : Concrete  
 Background noise level, dB (A) : 54  
**Atmospheric conditions:**  
 Temperature, (°C) : 20  
 Pressure, (kPa) : 99.6  
 Relative humidity, (%) : 62  
 Wind velocity, (m/s) : 1.4

**Test Data:**

Gear	Drawbar pull at which the tractor develops the max. noise level, (kN)	Corresponding travelling speed, (kmph)	Noise level, dB (A)
L1	4.68 to 18.53	3.29 to 2.82	93
L2	4.98 to 1793	4.27 to 3.63	93
L3	5.48 to 17.60	5.95 to 5.07	93
L4	0.93 to 11.94	9.35 to 8.16	93
H1	7.28 to 8.17	11.0 to 10.89	93

\*Gear corresponds to the nominal traveling speed nearest to 7.5 kmph.





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**8. MECHANICAL VIBRATION MEASUREMENT**

Date of test : 20.07.2016  
Type of test surface : Concrete

Sl. No.	Measuring points	Vibration, microns			
		At load corresponding to 85% of max. PTO power		At no load	
		HD	VD	HD	VD
1	2	3	4	5	6
1	Foot rest	Left: 120*	190*	120*	70
	Right	60	180*	40	120*
2	Steering wheel	90	130*	90	40
3	Seat	Back: 30	30	30	20
	Bottom	60	70	50	30
4	Outguard	Left: 80	40	40	60
	Right	60	60	30	20
5	Head light	Left: 60	60	60	60
	Right	70	80	60	60
6	Battery base, centre	80	90	90	70
7	Tail light	Left: 60	70	40	40
	Right	60	50	40	40
8	Plough light	140*	80	70	30
9	Gear shifting lever	30	30	40	20
10	Accelerator lever	Hand: 40	120*	40	90
	Foot	110*	60	110*	70
11	Brake pedal	Left: 150*	160*	140*	70
	Right	110*	160*	80	100
12	Clutch pedal	100	130*	100	130*
13	Wash hydraulic control lever	80	80	70	70
14	PTO engaging lever	30	30	20	30
15	Differential lock	30	30	30	60

\*The amplitude of mechanical vibration is on higher side.

**9. LOCATION OF CENTRE OF GRAVITY**

Condition	Particulars	Coordinates
Under normal standard operating condition but with all the liquid reservoirs full & the operator seated by a 75kg mass on the seat.	Height above ground, (mm)	839.9
	Distance forward from the vertical plane containing the axis of rear wheels, (mm)	848.5
	Distance from the median plane parallel to the longitudinal axis of tractor bisecting the track, (mm)	2.88 (towards RHS)

**10. TURNING ABILITY**

Characteristics	Minimum turning diameter, (m)		Minimum clearance diameter, (m)	
	LHS	RHS	LHS	RHS
Speed applied	6.99	6.77	7.29	7.07
Speed released	7.79	7.63	8.11	7.95

### 11. OPERATOR'S FIELD OF VISION

The operator's field of vision to the front and rear from the operator's seat is represented in Fig. 8. The observations are as under:

- (i) The non-visible space in front is 7000 mm which is 3.16 times of wheel base (i.e. 2215 mm).
- (ii) The non-visible space on LHS and RHS is 2600 mm which is 1.83 times of rear track width (i.e. 1420 mm).
- (iii) No part is creating masking effect

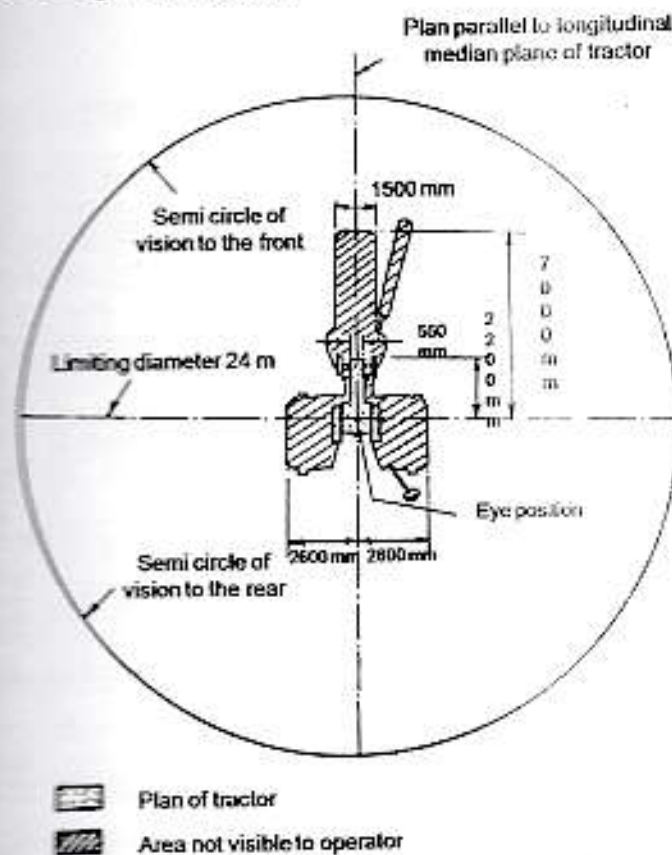


Fig. 8: OPERATOR'S FIELD OF VISION



**12. FIELD TEST**

- 12.1 The field tests comprising of Disc ploughing, Rotavation and Puddling (including water proof test for five hours) were conducted for **11.2, 11.0** and **15.0** hours respectively.
- 12.2 All the field tests were conducted at the full accelerator settings, when the no load speed of the engine varied from **2162 to 2212** rpm.
- 12.3 The brief specifications of the implements used during field tests are given in **Annexure-II**.
- 12.4 The summary of field test observation with Disc plough, Rotavator and Puddling is given in **Table-3**.

**Table - 3**

**SUMMARY OF FIELD PERFORMANCE TEST**

S. No.	Parameter/operation	Disc Ploughing	Rotavation	Puddling
1	Type of soil (refer IS: 7926-1975)	Heavy	Heavy	Heavy
2	Av. soil moisture, (%) / Av. Depth of standing water, (mm)	8 to 9	15 to 19	15 to 16
3	Bulk density of soil, (g/cc)	1.30 to 1.35	2.0 to 2.1	--
4	Cone index, (kg/sq.cm) / puddling index, (%)	6.81 to 7.66	5.10 to 8.17	74 to 76
5	Gear used	L2	L2	L2
6	Av. speed of operation, (kmph)	3.42 to 3.46	3.11 to 3.90	3.28 to 3.31
7	Av. wheel slip, (%) / Av. Travel reduction, (%)	12.5 to 18.4	-5.59 to -4.10	10.7 to 10.8
8	Av. depth of cut, (cm) / Av. depth of puddle, (cm)	18 to 19	7 to 8	31
9	Av. working width, (cm)	91 to 97	175 to 176	--
10	Area covered, (ha/h)	0.253 to 0.313	0.403 to 0.559	--
11	Fuel consumption:			
	- (lit)	5.35 to 5.41	7.30 to 7.40	5.10
	- (lit/ha)	17.07 to 21.36	13.25 to 18.11	--
12	Av. draft of implement, (kN)	6.87 to 7.36	-	--

**Remarks:** The average lub oil and coolant (water) consumptions during the entire field tests were observed as **3.76** and **5.64** ml/h respectively.

**12.5 Wet land cultivation (Puddling):**

- 12.5.1 The tractor was fitted with half cage wheel & puddler for carrying out the puddling operation. The brief specification of half cage wheel used is given in **Annexure -II**.
- 12.5.2 After completion of puddling test and water proof test, the tractor was partially dismantled to check effectiveness of sealing provided against ingress of water and / or mud in various assemblies / components as per requirements of IS : 11082 - 1984 (Technical requirement of Agriculture tractors for wet land cultivation). The observations recorded were as under.



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S. No.	Location	Whether ingress of mud and/or water	Remark
1	King pin assemblies	No	None
2	Stub axles	No	
3	Centre pin assembly	No	
4	Clutch housing	No	
5	Engine sump, transmission, hydraulic, brake & steering gearbox housing oils	No	
6	Starter motor	No	
7	Alternator	No	

**13. HAULAGE TEST**

Type of trailer:	Two wheel (Single axle)	Four wheel (Double axle)
Gross mass of trailer, (tonnes)	5.0	6.5
Height of trailer hitch above ground level, (mm)	560	565
Gears used during the test for negotiating slopes upto 8%	H-4	H-4
Average travel speed, (kmph)	30.20 to 30.64	30.19 to 30.64
<b>Average fuel consumption:</b>		
- (l/h)	6.35 to 6.88	6.74 to 7.02
- (l/km/tonnes)	42.1 to 45.0	34.3 to 35.3
Average distance traveled per litre of fuel consumption, (km)	4.45 to 4.75	4.36 to 4.48
<b>General observations:</b>		
Effectiveness of brakes	Effective	Effective
Manoeuvrability of tractor-trailer combination	Satisfactory	Satisfactory

**14. COMPONENTS / ASSEMBLY INSPECTION**

The engine and other assemblies were dismantled after **86.19** hours of tractor operation at this Institute.

1401 Engine:  
1402 Cylinder bore:

Cylinder No.	Cylinder bore dia. (mm)						Maximum permissible wear limit, (mm)
	Top position		Middle position		Bottom position		
	Thrust side	Non-thrust side	Thrust side	Non-thrust side	Thrust side	Non-thrust side	
1	100.03	100.02	100.02	100.02	100.02	100.02	100.35
2	100.04	100.02	100.04	100.03	100.03	100.03	
3	100.02	100.02	100.02	100.02	100.02	100.02	
4	100.03	100.04	100.03	100.04	100.03	100.04	



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Part: **Piston:**

Piston No.	Piston diameter, (mm)				Max. permissible wear limit,	Piston to cylinder liner clearance at skirt. (mm)	
	Top (above top compression ring)		At skirt			As observed	Discard limit
	Thrust Side	Non-thrust side	Thrust side	Non-thrust side			
1	99.415	99.381	99.921	**	0.35	0.109	0.45
2	99.412	99.354	99.922	**		0.118	
3	99.412	99.373	99.921	**		0.099	
4	99.408	99.351	99.928	**		0.112	

\*\* measured due to piston design feature.

Part: **Ring end gap:**

Ring No.	Ring end gap, (mm)												Max. permissible ring end gap limit, (mm)
	Cylinder No. 1			Cylinder No. 2			Cylinder No. 3			Cylinder No. 4			
	Top	Middle	Bottom	Top	Middle	Bottom	Top	Middle	Bottom	Top	Middle	Bottom	
104	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	2.0
106	0.90	0.90	0.90	1.00	1.00	1.00	0.90	0.90	0.90	0.95	0.95	0.95	2.0
108	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	2.0

Part: **Ring side clearance:**

Rings	Ring side clearance, (mm)				Max. permissible clearance limit, (mm)
	Piston-I	Piston-II	Piston-III	Piston-IV	
Compression ring	-----Taper rings-----				Taper rings
Compression ring	0.052	0.044	0.042	0.051	0.20
Ring	0.053	0.050	0.063	0.047	0.20

Part: **Crank bearings:**

Bearing No.	Diametrical Clearance, (mm)	Crankshaft end float, (mm)	Maximum permissible wear limit, (mm)	
			Diametrical clearance	Crankshaft end float
11	0.079 to 0.097	0.20	0.35	0.70
12	0.057 to 0.074			
13	0.085 to 0.092			
14	0.065 to 0.075			
15	0.048 to 0.109			

Part: **Big end bearings:**

Bearing No.	Clearance, (mm)		Max. Permissible clearance limit, (mm)	
	Diametrical	Axial	Diametrical	Axial
17	0.102 to 0.093	0.30	0.35	1.00
18	0.088 to 0.089	0.40		
19	0.101 to 0.082	0.30		
20	0.103 to 0.069	0.30		





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- 15.1 Visual damage, pitting & chipping of front : none
- 15.2 Transmission gear teeth
- Clearance between centre pin and bush, mm : 0.12 to 0.16 | Against discard limit of 1.00 mm
- 15.3 Steering system:  
Visual condition of the components of : Normal  
complete steering assembly
- 15.4 Starter motor & Alternator:  
Presence of scuff in housing : None  
Condition of bearings and other Components : Normal

**15. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS**

Adjustments/Defects/Breakdowns and Repairs	Categories of Breakdowns	Tractor run hours
None	-	-

**16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS**

Evaluative (mandatory) / Non-evaluative (Non-mandatory) parameters applicable for qualifying Minimum Performance criteria as per Clause-4 (Table-1) of IS: 12207-2014 for acceptance of the tractor for the purpose of subsidies/NABARD financing are summarized as under:

Sl. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2014	Values declared by the applicant (D)/ Requirement (R)	As observed	Whether meets the requirements (Yes/No)
1	2	3	4	5	6	7
<b>16.1 PTO Performance:</b>						
16.1	Maximum power (at 2700 rpm) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: -5 / +10% for PTO power >26 kW. -7.5/+10% for PTO power ≤ 26 kW or -5 / +10% for Engine power >26 kW. -7.5/+10% for Engine power ≤ 26 kW.	32.0(D)	33.4	Yes
16.2	Power at rated engine speed (at 2700 rpm)	Non Evaluative	-do-	32.0(D)	33.4	Yes
16.3	Specific fuel consumption corresponding to maximum power (at 2700 rpm)	Non Evaluative	+ 5%	260 (D)	267	Yes
16.4	Maximum equivalent constant torque (at 2700 rpm)	Non Evaluative	± 8%	210 (D)	205.2	Yes

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1	2	3	4	5	6	7
19	Rated torque, percent	Non Evaluative	10 percent, min.	10 percent, min.(R)	28.5	Yes
20	Maximum operating temperature ( <sup>o</sup> C)					
1	Engine oil	Non Evaluative	The declared value should not exceed the max. value specified by the oil company and the observed value under high ambient condition should not exceed the declaration.	132(D)	113	Yes
2	Coolant (water)	Evaluative	The declared value should not exceed the boiling temperature of coolant under the pressurized or otherwise and the observed value under high ambient condition should not exceed the declaration.	118(D)	103	Yes
21	Specific consumption (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	1% of SFC at max. power under high ambient condition (D) 2.67 (R)	0.48	Yes
22	Glass tint	Evaluative	Maximum light absorption coefficient of 3.25 per metre or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)	3.25 per metre	0.17	Yes

**23. Tractor performance :**

23	Minimum tractor pull with ballast corresponding to 15 percent wheel slip.	Non Evaluative	Minimum 65% of static mass with ballast	20.32 (D)	23.62	Yes
				20.12 (R)		
24	Minimum tractor pull without ballast corresponding to 15 percent wheel slip.	Evaluative	Minimum 65% of static mass of tractor without ballast	15.28 (D)	18.62	Yes
				15.05 (R)		
25	Minimum tractor pull without ballast.	Evaluative	Minimum 80 % of PTO power as referred in SI No. i) a) of PTO performance in case of tractors having total static mass > 1500 kg Minimum 75 % of PTO power as referred in SI No. i) a) of PTO performance in case of light weight tractors having 1500 kg total static mass of tractor Minimum 75 % of the engine power as referred in SI No. i) a) of engine performance in case of tractors which do not have a PTO shaft.	25.6 (D)	27.8	Yes
				26.7 (R)		
26	Maximum transmission temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	130 (D)	79	Yes





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1	2	3	4	5	6	7
<b>Power lift and hydraulic pump performance :</b>						
<b>Maximum lifting capacity throughout the range of lift, (kN):</b>						
1	With jacks	Non Evaluative	[Tolerance of minus 10%]	14±1 (D)	16.60	Yes
2	With the standard frame	Evaluative	The lift capacity should at least be 24 kg/PTO kW, and it should be 21.5 kg/engine kW where the tractor is not provided with a PTO shaft	10±1(D) 7.86 (R)	13.03	Yes
3	Maximum drop in the height of the arm, at application of the force after each 5 minutes interval for a total duration of 30 minute (max)	Non Evaluative	[Tolerance of plus 5 mm]	50 (D) 50 (R)	08	Yes

<b>Brake performance at 25 kmph:</b>						
<b>Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with road surface, (m):</b>						
1	Clutch brake	Evaluative	10	10 (R)	8.31	Yes
2	Foot brake	Evaluative	10	10 (R)	8.47	Yes
3	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s <sup>2</sup>	Evaluative	600	600 (R)	399 to 418	Yes
4	Whether parking brake is effective at a force of 600 N at foot pedal(s) or 400 N at hand lever	Evaluative	Yes / No	Yes (R)	Yes	Yes

<b>Noise measurement :</b>						
1	Maximum ambient noise emitted by the tractor (dB(A))	Evaluative	As per CMVR	68 (R)	84	Yes
2	Maximum noise at operator's ear level (dB(A))	Evaluative	As per CMVR	90 (R)	93	Yes

<b>Amplitude of mechanical vibrations at :</b>						
1	Left foot rest	Non Evaluative	100 microns (max)	100 (R)	190	No
2	Right foot rest				180	No
3	Seat with driver's weight	Non Evaluative	100 microns (max)	100 (R)	70	Yes
4	Steering wheel	Non Evaluative	100 microns (max)	100 (R)	130	No



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1	2	3	4	5	6	7
<b>10.17) Air Cleaner:</b>						
Minimum oil pull (mm/Hg)	Non-Evaluative	0.25 % (maximum)	Dry type air cleaner is provided	NA	NA	
<b>10.18) Package requirements:</b>						
<b>(a) Gross mass of the trailers, (tonnes):</b>						
1 Two-wheel	Non-Evaluative	--	5.0 (D)	5.0	Yes	
2 Four-wheel	Evaluative	--	6.5 (D)	6.5	Yes	
<b>(b) Distance traveled: litre of fuel consumption, (km/l):</b>						
1 Two-wheel	Non-Evaluative	--	4.5 to 6.0 (D)	4.45 to 4.75	Yes	
2 Four-wheel	Evaluative	--	4.5 to 6.0 (D)	4.36 to 4.48	No	
<b>(c) Fuel consumption (L/km/hour):</b>						
1 Two-wheel	Non-Evaluative	--	30 to 40 (D)	42.10 to 44.97	No	
2 Four-wheel	Evaluative	--	30 to 40 (D)	34.33 to 35.26	Yes	
<b>10.19) Wetland cultivation:</b>						
Leading to the following assemblies:	Evaluative	The identified assemblies should essentially meet the requirement of IS- 11082. No water ingress in the identified assembly given in column-2. If tractor does not meet the requirements of wetland cultivation, it may be recommended for dry land operation only.		There should be no ingress of water and/or mud	No ingress of water and/or mud was observed	Yes
1 Clutch assembly	-(-)					
2 Brake assembly	-(-)					
3 Front axle hubs	-(-)					
4 Engine oil	-(-)					
5 Transmission oil	-(-)					
<b>10.20) Safety features:</b>						
Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes (As per IS 12299 part 2)	--	Provided	Yes	
Lighting arrangement	Evaluative	As per CMVR	--	Provided	Yes	
Lighting requirement (Tractors having more than 1100 mm rear track width)	Non-Evaluative	Should meet the requirements of IS 12343 (as amended from time to time)	--	Does not conform	Yes	
Technical requirements for PTO shaft	Non-Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)	--	Conforms	Yes	
Dimension of three point linkage	Non-Evaluative	Should meet the requirements of IS 4468 (part 1) (as amended from time to time)	--	Does not conform	Yes	
Specification of linkage and swinging brackets	Non-Evaluative	Should meet the requirements of IS 12953 and IS 12362 (part 3) (as amended from time to time)	--	Conforms	Yes	
<b>10.21) Labeling of tractors (Provision of labelling plate):</b>						
1 Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	SONALIKA	Yes		
2 Model	Evaluative		DI - 750 III HDM	Yes		
3 Year of manufacture	Evaluative		2015	Yes		
4 Engine number	Evaluative		4100ELS/F497306F16	Yes		
5 Chassis number	Evaluative		EZUDU505606SS	Yes		
6 Declaration of PTO power, (kW)	Evaluative		32.0	Yes		



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1	2	3	4	5	6	
<b>16.1.12</b>	<b>Discard limit for:</b>					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer	100.35	100.02 to 100.04	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.45	0.099 to 0.118	Yes
(c)	<b>Ring end gap (mm):</b>					
	- Top comp. ring	Evaluative	-do-	2.0	0.54	Yes
	- 2 <sup>nd</sup> comp. ring		-do-	2.0	0.90 to 1.00	Yes
	- Oil ring		-do-	2.0	0.60	Yes
(d)	<b>Ring groove clearance (mm):</b>					
	- Top comp. ring	Evaluative	-do-	Tapered	Tapered	Yes
	- 2 <sup>nd</sup> comp. ring		-do-	0.20	0.042 to 0.062	Yes
	- Oil ring		-do-	0.20	0.047 to 0.063	Yes
(e)	<b>Clearance of main bearings (mm):</b>					
	- Diametrical clearance	Evaluative	-do-	0.35	0.037 to 0.109	Yes
	- Crankshaft end float	Evaluative	-do-	0.70	0.20	Yes
(f)	<b>Clearance of big end bearings (mm):</b>					
	- Diametrical clearance	Evaluative	-do-	0.35	0.069 to 0.133	Yes
	- Axial	Evaluative	-do-	1.00	0.30 to 0.40	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.10	0.072 to 0.121	Yes
(h)	Clearance between centre pin and bush, (mm)	Non Evaluative	-do-	1.00	0.118 to 0.161	Yes

16.1.13	<b>Literature (Submission to test agency):</b>					
(a)	Operator manual	Evaluative	Provided/Not Provided	Provided	Provided	Yes
(b)	Parts Catalogue	Evaluative	Provided/Not Provided	Provided	Provided	Yes
(c)	Workshop/ Service manual	Evaluative	Provided/Not Provided	Provided	Provided	Yes

<b>16.1.14 CATEGORY OF BREAKDOWNS / DEFECTS :</b>					
S. No.	Category of breakdowns	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2014	As observed	Whether meets the requirements (Yes/No.)
1.	Critical	Evaluative	No critical breakdown	None	Yes
2.	Major	Evaluative	Not more than two and neither of them should be repetitive in nature	None	Yes
3.	Minor	Evaluative	Not more than five and frequency of each should not be more than two.	None	Yes
4.	Total breakdowns	Evaluative	In no case, the total number of breakdowns should exceed five, that is, (2 major + 3 minor) or 5 minor breakdowns.	None	Yes



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16.2 Optional requirements as per Clause-4 (Table-2) of IS:12207-2014:				
S. No.	Characteristic	Requirements as per IS: 12207-2014	As observed	Whether meets the requirements (Yes/No.)
1.	Fitment of ROPS	With a provision for fitment of ROPS.	Not provided	No
		If ROPS fitted it should meet the requirement of IS: 11821-1992	Not provided	Not applicable
2.	Accessories	Trailer hitch & linkage drawbar may be provided.	Provided	Yes
		front tow hook	Not provided	No

**16.3 Conformity with following IS:**

- i) Guide lines for declaration of power and specific fuel consumption and labelling of agricultural tractors (First revision) [IS10273: 1987 (Reaffirmed 2009)] : **Conforms**
- ii) Agricultural tractors - Rear mounted power take-off - Types 1, 2 and 3 (third revision) [IS:4931-1995 (Reaffirmed 2009)] : **Conforms**
- iii) Agricultural wheeled tractors - Three-point linkage Part 2 Category 1N (Narrow Hitch) (Third Revision) [IS 4468 (Part-2):1993/ ISO 730-2:1979 (Reaffirmed 2009)] : **Does not conform**
- iv) Drawbar for agricultural tractors - Link type [IS 12953:1990 (Reaffirmed 2007)] : **Conforms**
- v) Agricultural tractors - Operator's seat technical requirement [IS 12343 -1998 (First revision) (Reaffirmed 2009)] : **Does not conform**
- vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision): [IS 12239 (PT-1) 1996/ISO 4254-1:1989 (Reaffirmed 2009)] : **Does not conform**
- vii) Tractors and machinery for agriculture and forestry - Technical means for ensuring safety Part 2: Tractors (first revision) (IS 12239 (PT-2) 1999) (Reaffirmed 2009)] : **Does not conform**
- viii) Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) IS: 8133-1983 (Reaffirmed 2009)] : **Does not conform**
- ix) Tractors and machinery for agriculture and forestry, powered lawn and garden equipment - Symbols for operator controls and other displays Part 2 Symbols for agricultural tractors and machinery [IS:6283 (Part-1)- 2006 and IS: 6283 (Part-2)-2007 (Reaffirmed 2009)] : **Does not conform**
- x) Agricultural Tractors and Machinery - Lighting device for travel on public roads (IS: 14683-1999) (Reaffirmed 2009)] : **Conforms**



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**16.4 Salient Observations:**

**16.4.1 Laboratory tests:**

**16.4.1.1 PTO performance:**

- i) The maximum power was observed 33.4 kW against the declaration of 32.0 kW. Which is within the tolerance limit of IS: 12207-2014.
- ii) The specific fuel consumption corresponding to maximum power was measured as 267 g/kWh against the declaration of 260 g/kWh, which is within the tolerance limit of IS: 12207-2014.
- iii) The backup torque was observed as 28.5 %.

**16.4.1.2 Drawbar performance:**

- i) During ten hours drawbar test, the creeping on LHS and RHS tyre over the rim was observed 25 & 50 mm respectively. This should be looked into for necessary corrective action.

**16.4.1.3 Mechanical vibration:**

The amplitude of mechanical vibration on various assemblies marked as (\*) in Chapter-8 of this test report is on higher side, especially on the foot rest & steering wheel. This calls for dampening down of vibrations to improve the operator's comfort and service life of components.

**16.4.1.4 Three point linkage:**

The lateral distance from lower hitch point to center line of tractor does not meet the requirements of IS-4468-(Part I)-1997. This should be looked into for necessary corrective action.

**16.4.1.5 Operator's Seat**

The dimension vertical distance from seat index point to the center of accelerator pedal, longitudinal distance from seat index point & vertical distance from seat index point to the center of steering control wheel does not meet the minimum requirements of IS: 12343-1998 (Re-affirmed in March,2009). This should be looked into for corrective action.

**16.4.1.6 Operator's work place:**

Operator's work place meets the requirements of IS-12239(part-I)--1996.Except the provision of Spark arrester.

**16.4.1.7 Symbols of operator's controls and other displays:**

The symbols for operator's controls such as grease lubricant frequency & oil lubricant, type & frequency has been not provided and does not meet the minimum requirements of IS: 6283(Part I & Part II)-1998.

**16.4.1.8 Location and movement of operator's controls:**

**Location and movement of operator's controls** such as fuel shut-off knob for stop does not remain in stop position without application of sustained manual effort and does not meet the minimum requirements of IS: 8133 -1983. This should be looked into for corrective action.

**16.4.1.9 Constructional requirement with regard to safety:**

The provision of PTO master shield & the working clearance between draft control lever and mudguard has not been provided as per IS: 12239 (Part-II)-1999. This should be looked into for corrective action.



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**16.4.2 Field performance test:**

**16.4.2.1 Wetland cultivation (Puddling operation):**

No ingress of mud and / or water was noticed during puddling operation of the tractor and meet the requirements of IS: 11082-1984 (Technical requirements of agricultural tractors for wetland operation). Therefore, the tractor is found suitable for wetland operation (Puddling).

**16.4.2.3 Haulage performance:**

The distance travelled per liter of fuel consumption with four wheel trailer were observed as 4.36 to 4.48 against the declaration of 4.5 to 6.0 km/l and the fuel consumption with two wheel trailer were observed 42.10 to 44.97 against the declaration of 30 to 40 ml/km/tonne, and does not meet the requirement of IS: 12207-2014 and therefore, should be looked into for necessary corrective action.

**16.5 Maintenance / Service Problems:**

No noticeable maintenance or service problem was observed during the test.

**16.6 Recommendation with regard to safety on tractor:**

The following requirements, inter alia, may be considered for incorporation on the tractor:

- i) Provision for spark arresting device in exhaust system.
- ii) The working clearance between draft control lever and mudguard should be provided as per the requirement of relevant Indian Standard.
- iii) The fuel shut-off knob for stop does not remain in stop position without application of sustains manual effort.
- iv) The dimension width of seat & distance from seat index point to the center of clutch pedals of operator's seat should be within the limit of easy handling of tractor.
- v) Provision of master shield for PTO shaft.
- vi) Provision of the symbols for operator's controls such as grease lubricant frequency & oil lubricant type & frequency.
- vii) The dimension vertical distance from seat index point to the centre of accelerator pedal, longitudinal distance from seat index point & vertical distance from seat index point to the center of steering control wheel should be within the limit of easy handling of tractor.
- viii) Provision of front tow hook.

**16.7 Adequacy of Literature supplied with machine:**

**16.7.1** The following literature was supplied with the tractor for reference during the testing.

- i) Operator's Manual in respect of Sonalika DI-750 III HDM tractors.
- ii) Tractor Parts Catalogue in respect of Sonalika DI-750 III HDM tractors.
- iii) Service Manual in respect of Sonalika DI-750 III HDM tractors.

**16.8.2** The printed literature supplied with the test sample is in English. The literature may be brought out as per IS: 8132 - 1999 (Reaffirmed in March, 2009) for the guidance of users and service personnel in national as well as other regional languages.

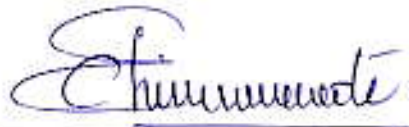
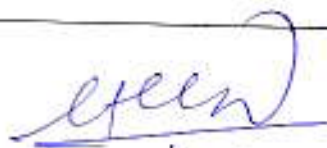
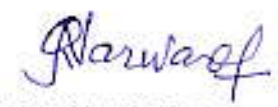


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### 17. CITIZEN CHARTER

Time frame for Testing & Evaluation as per Citizen Charter	Duration of Test	Whether the Test Report is released within the time frame given in Citizen Charter	Remarks
10 Months	12 Months (March, 2016 to February, 2017)	No	Due to non availability of field for testing

### TESTING AUTHORITY:

	
<b>C.V. CHIMOTE</b> TEST ENGINEER	<b>Y.K. RAO</b> SENIOR AGRICULTURAL ENGINEER
 <b>J.J.R. NARWARE</b> DIRECTOR	

This test report is compiled by Shri. Shwetabh Singh Senior Tech. Assistant

### 18. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's Comments
18.1	1.212, 1.21.6 & 16.4.1.4	Observation will be studied & necessary action will be incorporated.
18.2	16.4.1.5, 16.4.1.6, 16.4.1.7, 16.4.1.8 & 16.4.1.9	These are minor non conformance and will not affect the tractor performance, however necessary quality check implemented in quality system



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**ANNEXURE -I**

**BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST**

Sl. No.	Item	Disc Plough	Rotavator	Puddler
1.	Make	Sonalika	Escorta	ACE
2.	Type	Mounted	Mounted	Mounted
3.	No. of bottom / blades/discs	2	42 in 8 flange	12 (6 in each gang)
4.	Type of bottom / blades/discs	Concave disc	Hatchet	Notched
5.	Size of bottom / blade/disc, (mm)	660 mm in diameter	67.3x270x7	500
6.	Spacing of bottom/blade/disc, (mm)	555	255	180
7.	Lower hitch point span, (mm)	760	805	835
8.	Mast height, (mm)	600	490	510
9.	<b>Overall dimensions, (mm):</b>			
	- Length	1940	1200	1020
	- Width	1040	2185	2070
	- Height	1220	1020	1050
10.	Gross mass, (kg)	280	515	305

**ANNEXURE -II**

**BRIEF SPECIFICATION OF HALF CAGE WHEEL**

Sl No.	Items	Specification
1.	Type	Half cage wheel
2.	Outer dia, (mm)	
3.	Width, (mm)	
4.	No. and types of lugs	12, Straight lugs made of M.S. angle section welded to iron frame
5.	Size of angle section	50 x 5
6.	Length of lug, (mm)	
7.	Spacing of lug, (mm)	
8.	Weight of each cage wheels, (kg)	





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**TRACTOR RUN HOURS DURING TEST**

**ANNEXURE- III**

<b>A. LABORATORY AND TRACK TESTS:</b>		<b>HOURS</b>
1.	Running-in	--
2.	PTO performance test	7.22
3.	Power lift and hydraulic pump performance test	2.49
4.	Drawbar performance test	16.51
5.	Turning ability	0.75
6.	Location of centre of gravity	0.10
7.	Operator's field of vision	-
8.	Brake test	1.0
9.	Noise measurement	1.75
10.	Mechanical vibration test	1.0
11.	Nominal speed test	0.5
<b>B. FIELD TEST:</b>		
1.	Disc ploughing	11.21
2.	Rotavation	11.0
3.	Puddling (including 5 hrs water proof test)	15.0
<b>C. HAULAGE TEST:</b>		5.44
D.	Miscellaneous test and other run hours including idle transportation, trials and preparation for test	12.34
	<b>TC:</b>	<b>85.19</b>