

व्यावसायिक परीक्षण रिपोर्ट (वैरिएंट)  
COMMERCIAL TEST REPORT (Variant)

संख्या / No. : T-1496/2023/2020  
माह / Month : December, 2020

(यह परीक्षण रिपोर्ट 31/12/2023 तक वैध है। / THIS TEST REPORT IS VALID UP TO : 31/12/2023)



**INTERNATIONAL TRACTORS LIMITED,  
DI-55 (Brand Name : Sonalika) TRACTOR**



सत्यमेव जयते

भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय  
कृषि, सहकारिता एवं किसान कल्याण विभाग  
मशीनीकरण एवं प्रौद्योगिकी प्रभाग

GOVERNMENT OF INDIA

MINISTRY OF AGRICULTURE AND FARMERS WELFARE

(Department of Agriculture, Cooperation & Farmers Welfare, Mechanization & Technology Division)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान  
ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

**CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE**  
(An ISO : 9001 - 2015 Certified Institute)

**Tractor Nagar, Budni (M.P.) 466 445**

E-mail [fmti-mp@nic.in](mailto:fmti-mp@nic.in)

Website : <http://www.fmttibudni.gov.in>

Telephone : 07564 - 234729, 234743

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- Specification checking
- Nominal speed test
- PTO performance test under natural ambient condition

## 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 g/cc at 15°C was used.

**2.2 Lubricants:**

	Particulars	As recommended by the manufacturer	As used during the test
1.	Engine oil	SAE 15W40	As recommended
2.	Gearbox, rear differential, rear axle, rear final drive, brake and hydraulic system	ELF 2412	Oil originally filled in the tractor systems were not changed
3.	Steering system	SAE EP 80	
4.	Grease	MP grease	Servo grease MP

## 3. ESSENTIAL TESTS

### 3.1. SPECIFICATIONS

<b>3.1.1 Tractor:</b>		<u><b>Base Model</b></u>	<u><b>Variant Model</b></u>
Make	:	International Tractors Limited	
Model	:	DI - 750 III HDM	DI - 55
Brand name	:	RX	Sonalika
Type	:	Four Wheeled, Rear Wheel Driven, General Purpose Agricultural Tractor.	
Month & Year of manufacture	:	2015	06 / 20
Chassis number	:	EZUDU505606S3	HZADH938530S3
Country of Origin	:	India	
<b>3.1.2 Engine:</b>			
Make	:	International Tractors Limited	
Model	:	4100EL	4105NG
Type	:	Four stroke, naturally aspirated, liquid cooled, direct injection, diesel engine.	
Serial number	:	4100EL53F497396F16	4105NG04F934883F16
<b>Engine speed (Manufacturer's recommended production setting),(rpm) :</b>			
- Maximum speed at no load	:	2150 to 2250	
- Low idle speed	:	650 to 750	750 to 850
- Speed at maximum torque	:	1175 to 1225	1100 to 1300
<b>Rated speed, (rpm):</b>			
- For PTO use	:	2000	
- For drawbar use	:	2000	
<b>3.1.3 Cylinder &amp; Cylinder Head:</b>			
Number	:	Four	
Disposition	:	Vertical, Inline	
Bore/stroke, (mm)	:	100 / 118	105 / 118
Capacity as specified by the applicant, (cc)	:	3707	4087
Compression ratio, (apa)	:	18.2 (± 0.2) : 1	16.4 (± 0.2) : 1
Type of cylinder head	:	Individual	
Type of cylinder liners	:	Wet, replaceable	
Type of combustion chamber	:	Direct injection, Ré-entrant, cavity on piston crown	
Arrangement of valves	:	Over head, inline	
<b>Valve clearance (cold/hot)</b>	:	<u><b>Base Model</b></u>	<u><b>Variant Model</b></u>
- Inlet valve, (mm)	:	0.30-0.40 / 0.30 - 0.40	0.30 / 0.30

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## 7. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

7.1 On the basis of tests conducted the performance results have been summarized as evaluative (mandatory) and non-evaluation (not-mandatory) parameter applicable for qualifying Minimum Performance Criteria as per Clause-4 (Table-1) of IS: 12207-2019 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: 12207-2019	Values declared by the applicant/ requirement		As observed		Whether variant model meets the requirements (Yes/No.)
				Base model	Variant Model	Base model	Variant model	
1	2	3	4	5 a	5 b	6 a	6 b	7
<b>7.1.1</b>	<b>PTO Performance:</b>							
<b>a)</b>	Max. power under 2 h test, (kW ) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: $\pm 5\%$ for PTO power or engine power $>26$ kW, $\pm 10\%$ for PTO power or Engine power $\leq 26$ kW.	32.0 (D)	38.0 (D)	33.4	37.2	Yes
<b>b)</b>	Power at rated engine speed, (kW)	Non Evaluative	-do-	32.0 (D)	38.0 (D)	33.4	37.2	Yes
<b>c)</b>	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	$+ 10\%$ Max.	260 (D)	255 (D)	267	255	Yes
<b>d)</b>	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	$\pm 8\%$	210 (D)	230	205.2	231.8	Yes
<b>e)</b>	Back-up torque, percent	Evaluative	12 percent, min.	10%, min. (R)	12%, min. (R)	28.5	30.6	Yes

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1	2	3	4	5	6	7
7.1.2	<b>Safety features :</b>					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pullies, silencer, hydraulic pipes (As per IS 12239 (Part2))		Meets the requirement	Yes
b)	Lighting arrangement	Evaluative	As per CMVR		Meets the requirement	Yes
c)	Seating requirements (Tractors having more than 1150 mm rear track width)	Non Evaluative	Should meet the requirements of IS: 12343 (As amended from time to time)		<b>Does not meets the requirement</b>	<b>No</b>
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)		Meets the requirement	Yes
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)		<b>Does not meets the requirement</b>	<b>No</b>
f)	Specifications of linkage drawbar	Evaluative	Should meet the requirements of IS: 12953 (As amended from time to time)		Meets the requirement	Yes
g)	Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirement of IS: 12362 (Part 3) (As amended from time to time)		Not fitted	Not applicable
h)	1) Maximum travelling speed at rated engine speed in reverse gears, Kmph	Evaluative	Should not exceed 20 Kmph		13.62 kmph (Meets the requirement)	Yes
	2) Audible warning signal on tractor	Evaluative	As soon as the travelling speed in reverse gear reaches to 20 kmph, an audible warning signal on tractor shall be activated. The safety aspects about the operation of shuttle technology shall be brought in operation and manufacturer/dealer shall ensure the training on this aspect to operator before the delivery of tractor.		Not fitted	Not applicable

1	2	3	4	5	6	7
7.1.3	<b>Labelling of tractors (Provision of labelling plate):</b>					
1)	Make	Evaluative	Should conform to the requirements of CMVR along with maximum PTO Power in kW and year of manufacture in numerical form.  <div style="border: 1px solid black; display: inline-block; padding: 2px;">MM    YY</div>  Digit 01 – 12 in box No.1 for MM will represent the months and next two digits in box No.2 for YY will represent the year of Manufacturing.		International Tractors Limited	Yes
2)	Model	Evaluative			DI - 55	Yes
3)	Month & Year of manufacture	Evaluative			06 / 20	Yes
4)	Engine number	Evaluative			4105NG04F9 34883F16	Yes
5)	Chassis number	Evaluative			HZADH9385 30S3	Yes
6)	Declaration of PTO power, (kW)	Evaluative			38.0	Yes

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1	2	3	4	5	6	7
<b>7.1.4</b>	<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>7.1.5</b>	<b>Fitment of Roll Over Protective Structures (ROPS):</b>					
(a)	For tractor having more than 1150 mm rear track width	Evaluative	ROPS should meet the requirement of IS:1182 or OECD code or equivalent International Standard	Provided	Not fitted	Not Applicable
<b>7.1.6</b>	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Provided	Yes
<b>7.1.7</b>	Accessories (optional)	Non Evaluative	Ballast weight, if fitted, should meet the requirement of CMVR	Provided	Provided	Yes

<b>7.2 CATEGORY OF BREAKDOWNS / DEFECTS :</b>					
Sl. No.	Category of breakdowns	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	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 three 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

**7.2 Salient Observations:**

**7.2.1 Laboratory tests:**

**7.2.1.1 PTO performance:**

- i) The maximum PTO power was recorded as **37.2 kW** against the declaration of **38.0 kW**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power was recorded as **255 g/kWh** against the declaration of **255 g/kWh**, which is within the tolerance limit of IS: 12207-2019.
- iii) The maximum equivalent crankshaft torque was recorded as **231.8 N-m** against the declaration of **230 N-m**, which is within the permissible limit as specified in IS: 12207-2019.
- iv) The backup torque is **30.6 %** and meets the requirement of IS: 12207-2019

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### 7.2.1.3 Operator's seat:

- i) The dimension of vertical distance from seat index point to the centre of clutch pedal does not meet the requirement of IS: 12343-1998 (Re-affirmed in 2014). This is should be looked into for necessary corrective action
- ii) Inclination of seat towards rear direction was recorded as 19° against the maximum requirement of 15°, which does not meet the requirement of IS: 12343-1998 (Re-affirmed in 2014). This is should be looked into for necessary corrective action.

### 7.2.1.4 Three point linkage:

The dimension of lateral distance from lower hitch point to centre line of tractor does not meet the requirement of IS:4468 (part-1):1997 (Reaffirmed in Oct., 2017). This may be looked into for necessary corrective action.

### 7.3 Maintenance / Service Problems:

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

### 7.4 Recommendation with regard to safety on tractor:

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

- i) The dimension of vertical distance from seat index point to the centre of clutch should be provided as per IS: 12343-1998, (Re-affirmed in 2014).
- ii) Inclination of seat towards rear direction should be provided as per IS: 12343-1998, (Re-affirmed in 2014).
- iii) Height of 1<sup>st</sup> foot step should be provided as per IS:12239 (Part-1)-1996 (Re-affirmed in 2014).
- iv) Clearance between draft control lever and mudguard should be provided as per IS: 12239 (Part-1) – 1996 (Re-affirmed in 2014).
- v) The spark arrester should be provided in the exhaust system as per IS: 12239 (Part-1) – 1996 (Re-affirmed in 2014).
- vi) PTO master shield may be provided around the PTO shaft as per IS: 4931-1995 (Reaffirmed in 2014).
- vii) Differential local pedal should be provided as per IS: 12239 (Part-1) – 1996 (Re-affirmed in 2014).

### 7.5 Adequacy of Literature supplied with machine:

#### 7.5.1 The following literatures were submitted with the test tractor for reference during the test:-

- a) Operator's Manual for International Tractors Limited, DI-42 HDM, DI-42 HDM S3, DI-42 HDM 4WD, DI-42 HDM Power Plus, DI-47 HDM, DI-745 III HDM, DI-50, DI-55 tractor models.
- b) Tractor Parts Catalogue Part-I and Part-II for International Tractors Limited, DI-42 HDM, DI-42 HDM S3, DI-42 HDM 4WD, DI-42 HDM Power Plus, DI-47 HDM, DI-745 III HDM, DI-50, DI-55 tractor models.
- c) Service Manual Part-I and Part-II for International Tractors Limited, DI-42 HDM, DI-42 HDM S3, DI-42 HDM 4WD, DI-42 HDM Power Plus, DI-47 HDM, DI-745 III HDM, DI-50, DI-55 tractor models.

#### 7.5.2 These literatures may also be brought out in national & other regional languages for the guidance of user's and service personnel.

The results of the tests carried out on variant model “**International Tractors Limited, DI-55 (Brand Name: Sonalika)**” tractor have been compared with those on base model “**International Tractors Limited, DI-750 III HDM (Brand Name: RX)**” tractor tested vide test report No. **T-1088/1613/2017 (May, 2017)** and found within the limit, as specified in IS: 12207-2019.

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### 8. 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	03 Months (September, 2020 to November, 2020)	Yes	None

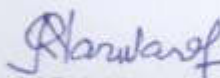
#### TESTING AUTHORITY:



**RAJNEESH PATEL**  
AGRICULTURAL ENGINEER



**C.V. CHIMOTE**  
TEST ENGINEER



**J.J.R. NARWARE**  
DIRECTOR

### 9. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's Comments
9.1	7.4 (iii)	The issue is being reviewed by our R&D Team.
9.2	7.5.2	We are already providing literatures in National as well as Regional languages.

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**ANNEXURE-I**

**TRACTOR RUN HOURS DURING TEST**

<b>A.</b>	<b>LABORATORY AND TRACK TESTS</b>	<b>HOURS</b>
1.	Running –in	40.00
2.	PTO performance test	7.05
3.	Nominal speed test	0.78
<b>B.</b>	Miscellaneous test and other run hours, including idle run transportation, trial and preparation for test.	1.21
<b>Total</b>		<b>49.04</b>