



**INTERNATIONAL TRACTORS LIMITED,
SONALIKA INTERNATIONAL DI-740 SUPER CM SERIES 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, CO-OPERATION & 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 fnti-mp@nic.in Website : <http://www.fmttibudni.gov.in> Telephone : 07564 - 234729, 234743



Subsequent to the examination of case in the light of clause 3.2.5 (b) and clause 6.1 of IS:12207 - 2019, the following tests were considered to be carried out:

- Specifications checking in brief
- Nominal speed test
- Two hour maximum PTO power test under normal ambient condition
- Brake test

Manufacturer	:	M/s. International Tractors Limited, Vill.- Chak Gujran, P.O.- Piplanwala, Jalandhar Road, Distt.- Hoshiarpur-146 022 (Punjab) India
Test requested by (Applicant)	:	The manufacturer
Test requested by (applicant)	:	The manufacturer
Selected for test by	:	The manufacturer
Place of running-in	:	At manufacturer's work place
Duration of said running-in, (h):		
- Engine	:	35
- Transmission	:	Nil
Method of Selection	:	The test sample was submitted directly for test by the applicant. Hence method of selection is not known.

2. ESSENTIAL TESTS

2.1. SPECIFICATIONS

The following are the brief specifications of the tractor. However, for detail specifications of the tractor, the test report No. T-896/1411/2013 was released in **December, 2013** should be referred.

2.1.1 Tractor:

Make	:	International Tractors Limited
Model	:	Sonalika International DI-740 Super CM Series
Brand name	:	Sonalika
Type	:	Four wheeled, rear wheel driven, Unit construction, General purpose, Agricultural tractor
Month & Year of manufacture	:	06 2011
Chassis Serial number	:	HSASH105412S3
Country of Origin	:	India

2.1.2 Engine:

Make	:	Simpsons & Co. Ltd.
Model	:	T III A S325.2 - F2.2
Type	:	Four stroke, liquid cooled, naturally aspirated, direct injection, diesel engine
Serial number	:	K58251

Engine speed (Manufacturer's recommended production setting)(rpm) :

- Maximum speed at no load	:	2100 to 2200
- Low idle speed	:	650 to 750
- Speed at maximum torque	:	1200 to 1400

Rated speed, (rpm):

- For PTO use	:	2000
- For drawbar use	:	2000

2.1.3 Cylinder & Cylinder Head:

Number	:	Three
Disposition	:	Vertical, inline
Bore / stroke, (mm)	:	91.4 / 127
Capacity as specified by the applicant, (cc)	:	2500



5. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

- 5.1 The performance results have been reproduced from commercial 1st Batch Test report No. T-896/1411/2013 (December, 2013), on the basis of test conducted the performance results have been summarized as evaluative (mandatory) and non – evaluative (not mandatory) parameters applicable for qualifying Minimum Performance Criteria as per clause-4 Table-1 of Indian Standard 12207: 2019 for acceptance of 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 (D)/ Requirement (R)	As observed	Whether meets the requirements (Yes/No)
1	2	3	4	5	6	7
5.1.1	PTO Performance:					
a)	Maximum power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: + 5 % for PTO power and or Engine power >26 kW. ±10% for PTO power and or engine < 26 kW	27.2 (D)	28.1	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	27.2 (D)	28.1	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10%	287 (D)	264	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	148(D)	157.6	Yes
e)	Back-up torque, percent %	Evaluative	12 percent, min.	12 % (D) 12 % (R)	17.6	Yes
f)	Maximum operating temperature, (°C) (*)					
	1) Engine oil	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)	125	Yes
	2) Coolant	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.	115 (D)	93	Yes
g)	Engine oil consumption, (g/kWh) (*)	Evaluative	Not exceeding 1% of SFC at max. power under high ambient conditions	2.47 (Maximum) (R)	0.84	Yes
h)	Smoke level, m ⁻¹ (*)	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value.	3.25 (Maximum) (R)	0.16	Yes



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1	2	3	4	5	6	7
5.1.2 Drawbar performance : (*)						
a)	Max. drawbar pull with ballast corresponding to 15 percent wheel slip or 7 percent track slip, (kN)	Non Evaluative	Minimum 70% of static mass with ballast	17.64(D)	21.50	Yes
				17.65 (R) Minimum		
b)	Max. drawbar pull without ballast corresponding to 15 percent wheel slip or 7 percent track slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without ballast or with standard ballast, as the case may be	13.45 (D)	16.53	Yes
				13.53 (R) Minimum		
c)	Maximum drawbar power without ballast, as in case may be, (kW)	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.	21.2 (D) 22.7 (R) Minimum	26.4	Yes
d)	Maximum transmission oil temperature (°C)	Evaluative	To be declared by the manufacturer.	130 (D)	80	Yes
5.1.3 Power lift and hydraulic pump performance: (*)						
a)	Maximum lifting capacity throughout the range of lift, (kN):					
	1) At hitch points	Evaluative	Tolerance of ± 10%	10.82 (D)	11.16	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	9.81 (D) 6.62 Minimum (R)	11.19	Yes
b)	Maximum drop in the height of the point of application of the force after each 5 minutes interval for a total duration of 30 Minutes, (mm)	Non Evaluative	The observed value should not exceed 50 mm	50(D)	08	Yes
				50 (R) Maximum		



1	2	3	4	5	6	7
5.1.4	Brake performance at 25 kmph:					
a)	Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with road ballast, (m):					
	1) Cold brake	Evaluative	10 m	10 (R)	8.43	Yes
	2) Hot brake	Evaluative	10 m	10 (R)	8.51	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600 N	600 (R) Maximum	396 to 469	Yes
c)	Whether parking brake is effective at a force of 600 N at foot pedal (s) or 400 N at hand lever, N	Evaluative	Yes / No	Yes	360	Yes
5.1.5	Noise measurement:					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	88 dB (A) for >1.5 tonne GVW and 85 dB (A) for <1.5 tonne GVW (As per CMVR)		86	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	96 (as per CMVR)		95	Yes
5.1.6	Amplitude of mechanical vibrations at:					
	1) Left foot rest				130	No
	2) Right foot rest				130	No
	3) Seat (with driver seated)	Non Evaluative	100 microns (max)		60	Yes
	4) Steering wheel				150	No
5.1.7	Air cleaner oil pull over test :					
	Maximum air cleaner pull over, (%)	Evaluative	0.25% (Max)		0.21	Yes
5.1.8	Haulage requirements:					
a)	Gross mass of the trailers, (tonnes):					
	Two wheel	Non Evaluative	To be specified by manufacturer		4.0 (D)	4.0
	Four wheel	Evaluative			5.0 (D)	5.0
b)	Distance travelled / liter of fuel consumption, (km/l):					
	Two wheel	Non Evaluative	-do-		5 to 6 (D)	5.61 to 5.86
	Four wheel				5 to 6	5.01 to 5.34
c)	Fuel consumption: (ml/km/tonne):					
	Two wheel	Non Evaluative	-do-		30 to 40	42.7 to 44.6
	Four wheel	Evaluative			30 to 40	37.5 to 39.9
5.1.9	Wetland cultivation (Puddling Operation):					
	Sealing for 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.			
	1) Clutch assembly	-do-			There should be no ingress of water and / or mud (R)	No ingress of water and/or mud was observed during ICT Report No.T-003/1106 / 2007 (November, 2007)
	2) Brake housings	-do-				
	3) Front axle hubs	-do-				
	4) Engine oil	-do-				
	5) Transmission oil	-do-				



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1	2	3	4	5	6	7	
5.1.10	Safety features :						
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulic pipes (As per IS: 12239 (Part-2))		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)		Does not meet the requirement	No	
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)		Does not meet the requirement	No	
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 requirements of IS 12362 (Part 3) (As amended from time to time)		Not provided	Not applicable	
h)	1) Evaluative	Evaluative	Should not exceed 20 kmph		12.40 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 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 Provided	Not applicable	
5.1.11	Labelling of tractors (Provision of labelling plate):						
1)	Make	Evaluative	Should conform to the requirements of CMVR along-with maximum PTO power in kW and year of manufacture in numerical form <table border="1" style="margin: 0 auto; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">MM</td> <td style="width: 20px; text-align: center;">YY</td> </tr> </table> Digit 01-12 in box No.1 for MM will represent the months & next two digits in box No.2 for YY will represent the year of manufacturing.	MM	YY	International Tractors Limited	Yes
MM	YY						
2)	Model	Evaluative		Sonalika International DI-740 Super CM Series	Yes		
3)	Month & Year of manufacture	Evaluative		06 / 20	Yes		
4)	Engine number	Evaluative		K58251	Yes		
5)	Chassis number	Evaluative		HSASH105412S3	Yes		
6)	Declaration of PTO power, (kW)	Evaluative	27.2	Yes			
5.1.12	Discard limit for, (mm) : (*)						
a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer and supported by the printed literature	91.68	91.49 to 91.50	Yes	
b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.45	0.144 to 0.158	Yes	
c)	Piston diameter at skirt, (mm)	Non Evaluative		-do-	Not Specified	91.055 to 91.060	-



1	2	3	4	5	6	7
(d)	Ring end gap (mm): - Top comp. ring. - 2 nd comp. ring. - Oil ring.	Evaluative	To be specified by the manufacturer and supported by the printed literature	1.50 1.50 1.50	0.45 to 0.50 0.50 to 0.55 0.50	Yes Yes Yes
(e)	Ring groove clearance (mm): - Top comp. ring. - 2 nd comp. ring. - Oil ring.	Evaluative	-do-	0.25 0.25 0.25	0.057 to 0.065 0.054 to 0.058 0.028 to 0.038	Yes Yes Yes
(f)	Clearance of main bearings (mm): - Diametrical clearance - Crankshaft end float	Evaluative Evaluative	-do-	0.25 0.50	0.114 to 0.141 0.25	Yes Yes
(g)	Clearance of big or small end bearings, (mm): - Diametrical - Axial	Evaluative Evaluative		0.25 0.75	0.083 to 0.126 0.35	Yes Yes
(h)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	1.0	0.13 to 0.16	Yes
(i)	Clearance between centre pin and bush, (mm)	Non Evaluative		1.0	0.24	Yes
5.1.13	Literature (Submission to test agency)					
(a)	Operator manual	Evaluative	The printed literature in booklet form should be provided as per IS 8132 & should submit along with the test sample	Provided	Provided	Yes
(b)	Parts Catalogue	Evaluative		Provided	Provided	Yes
(c)	Workshop / Service manual	Evaluative		Provided	Provided	Yes
5.1.14	Fittment of Roll Over Protective Structures (ROPS) for tractor having more than 1150 mm rear track width	Evaluative	ROPS should meet the requirement of IS 11821 or OECD code or equivalent International standard	Not fitted		Not applicable
5.1.15	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage, drawbar should be provided with the tractor.	Provided		Yes
5.1.16	Accessories (options)	Non Evaluative	Balast weights, if fitted, should meet the requirement of CMVR	Provided		Yes
5.2	CATEGORY OF BREAKDOWNS / DEFECTS (As per Clause 5.0 of IS:12207-2019) :					
S. 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 one and neither of them should be rectifiable 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 four, that is, (1 major + 3 minor) or 4 minor breakdowns.	None	Yes	



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Remark (*):- Data has been taken from Commercial 1st Batch test report of "International Tractors Limited, Sonalika International DI-740 Super CM Series" tractor model tested vide report No. T-896/1411/2013 (December, 2013).

5.3 Salient Observations:

5.3.1 PTO performance test:

- i) The maximum PTO power was recorded as **28.1 kW** against the declaration of **27.2 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 **287 g/kWh** against the declaration of **264 g/kWh**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iii) The maximum equivalent crankshaft torque was recorded as **157.6 N-m** against the declaration of **148.0 N-m**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iv) The backup torque is **17.6 %**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.

5.3.2 This tractor model meets the evaluative requirements of IS: 12207-2019.

6. 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 (July, 2020 to September 2020)	Yes	None

TESTING AUTHORITY:

RAJNEESH PATEL
AGRICULTURAL ENGINEER

C.V. CHIMOTE
TEST ENGINEER

J.J.R. NARWARE
DIRECTOR

7. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
	--Nil--	

**ANNEXURE - I****TRACTOR RUN HOURS DURING TEST**

A.	LABORATORY AND TRACK TESTS	HOURS
1.	Running-in	35.00
2.	Nominal speed test	0.95
3.	PTO performance test	4.22
4.	Brake test	2.25
B.	Miscellaneous test and other run hours, including idle run transportation, trial and preparation for test.	0.75
Total		43.17