



SONALIKA INTERNATIONAL WORLDTRAC 65 RX TRACTOR



सत्यमेव जयते

भारत सरकार

GOVERNMENT OF INDIA

कृषि मंत्रालय (कृषि एवं सहकारिता विभाग, मशीनीकरण एवं प्रौद्योगिकी प्रभाग)

Ministry of Agriculture (Deptt. of Agri. & Co-op, Mechanization & Technology Division)

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

(An ISO : 9001 - 2008 Certified Institute)

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Manufacturer : M/s. International Tractors Ltd.
Village - Chak Gujran,
P.O. Piplanwala, Jalandhar Road,
Distt. Hoshiarpur - 146022 (Punjab)

Test requested by (applicant) : The manufacturer

Selected for test by : The 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 International
- Model : Worldtrac 65 RX
- Variants, if any : Worldtrac 65 RX 4WD
- *The variant models have not been tested at this Institute yet.**
- Type : 4 wheeled, rear wheel driven, general purpose agricultural tractor
- Year of manufacture : 2013
- Chassis number: : JYDDV363364MS
- Country of Origin : India
- 1.2 **Engine:**
- Make : International Tractors Limited
- Model : 4105 FL
- Type : 4 Stroke, water cooled, direct injection, diesel engine
- Serial number : 4105FL33F352696F14
- Engine speed (Manufacturer's recommended production setting), (rpm):**
- Maximum speed at no load, : 2350 to 2450
- Low idle speed : 700 to 800
- Speed at maximum torque : 1100 to 1300
- Rated speed, (rpm):**
- For PTO use : 2200
- For drawbar use : 2200
- 1.3 **Cylinder & Cylinder Head:**
- Number : 04
- Disposition : Vertical, Inline
- Bore/stroke, (mm) : 105/118 (apa)
- Capacity as specified by the applicant, (cc) : 4087
- Compression ratio : 18.5:1(±0.2) (apa)
- Type of cylinder head : Individual
- Type of cylinder liners : Wet, replaceable
- Type of combustion chamber : Re-entrant
- Arrangement of valves : Over Head Valves, Inline
- Valve clearance:**
- | | | |
|-----------------------|--------------|-----------|
| | : Cold (apa) | Hot (apa) |
| - Inlet valve, (mm) | 0.3 – 0.4 | 0.3 – 0.4 |
| - Exhaust valve, (mm) | 0.3 – 0.4 | 0.3 – 0.4 |



16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

16.1 Evaluative (mandatory)/Non-evaluative (Non-mandatory) parameter 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 declare d by the applica nt (D)/ Require ment (R)	As observ ed	Whether meets the requirem ents (Yes/No.)
1	2	3	4	5	6	7
16.1.1	PTO Performance :					
a)	- Max. power under 2 h test, (kW) (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.	38(D)	40.8	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	38(D)	40.3	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	275(D)	263	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	246(D)	234.07	Yes
e)	Back-up torque, percent	Non Evaluative	10, percent, min.	10 % (R)	33.67	Yes
f)	Maximum Operating Temperature (°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)	120	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.	118(D)	98	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	1% of SFC 2.66(R)	0.56	Yes

**16.1.2 Drawbar performance:**

a)	Max. drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	23.0(D) 22.51 (R)	28.34	Yes
b)	Max. drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast or with standard ballast, as the case may be	17.90 (D) 16.58 (R)	21.63	Yes
c)	Maximum drawbar power without ballast, (kW).	Evaluative	Min. 80% of PTO power as referred in SL No. i) a) of PTO performance in case of tractors having total static mass > 1500 kg Minimum 75% of PTO power as referred in SL No. i) a) of PTO performance in case of light weight tractors having 1500 kg total static mass of tractor. Minimum 75% of engine power as referred in SL No. i) a) of engine performance in case of tractors which do not have a PTO shaft.	30.4 (D) 32.6(R)	33.7	Yes
d)	Max. transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	130(D)	106	Yes

16.1.3 Power lift and hydraulic pump performance :

a)	Maximum lifting capacity throughout the range of lift, (kN):			20(D)	16.48	No	
	1)	At hitch points	Non Evaluative	[Tolerance of minus 10%]			
	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	14.0(D) 9.65 (R)	12.42	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 minute, (mm)		Non Evaluative	[Tolerance of plus 5 mm]	50(D)	10	Yes

16.1.4 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):			10	10(D)	7.54	Yes
	1)	Cold brake	Evaluative	10	10(D)	7.66	Yes
	2)	Hot brake	Evaluative	10			
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)		Evaluative	600	600 (R)	319 to 378	Yes



c)	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
16.1.5	Noise measurement :					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88(R)	87	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	98(R)	96	Yes
16.1.6	Amplitude of mechanical vibrations at :					
1)	Left foot rest	Non Evaluative	100 microns (max)	100 (R) microns	40	Yes
	Right foot rest				70	Yes
2)	Seat (with driver seated)				70	Yes
3)	Steering wheel				100	Yes
16.1.7	Haulage requirements :					
a)	Gross mass of the trailers, (tones):					
1)	Two wheel	Non Evaluative	--	05(D)	05	Yes
2)	Four wheel		--	06(D)	06	Yes
b)	Distance travelled per liter of fuel consumption, (km):					
1)	Two wheel	Non Evaluative	--	5.0 to 6.0 (D)	4.136	No
2)	Four wheel		--	5.0 to 6.0 (D)	4.136	No
c)	Fuel consumption (ml/km/tonne):					
1)	Two wheel	Non Evaluative	--	38 to 45 (D)	48.36	No
2)	Four wheel		--	38 to 45 (D)	40.3	Yes
16.1.8	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.	There should be no ingress of water & mud.(R)	No ingress of mud & / or water was observed	Yes
1)	Clutch	do				
2)	Brake Housing	do				
3)	Front Axle Hubs	do				
4)	Engine oil	do				
5)	Transmission oil	do				
16.1.9	Safety Features:					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pully, silencer, hydraulic pipes (As per IS 12239 (part 2) 1999 As per CMVR	-	Provided	Yes
b)	Lighting arrangement (Tractor having more than 1150 mm rear track width)	Evaluative		--	Provided	Yes
c)	Seating requirement (Tractors having more than 1150 mm rear track width)	Non-Evaluative	Should meet the requirements of IS 12343 - 1998 as amended from time to time)	--	Does not meet the requirement	No
d)	Technical requirements for PTO shaft	Non-Evaluative	Should meet the requirements of IS 4931- 1995 (as amended from time to time)	--	Meets the requirement	Yes



e)	Dimension of three point linkage	Non-Evaluative	Should meet the requirements of IS 4468- 1997 (part 1) (as amended from time to time)	--	Meets the requirement	Yes
f)	Specification of linkage and swinging drawbars	Non-Evaluative	Should meet the requirements of IS 12953 and IS 12362 (part 3) (as amended from time to time)	--	Does not meet the requirement	No

16.1.10 Labelling of tractors (Provision of labeling plate):							
	1)	Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	-	Sonalika international	Yes
	2)	Model	Evaluative		-	Worldtrac 65 RX	Yes
	3)	Year of manufacture	Evaluative		-	2013	Yes
	4)	Engine serial number	Evaluative		-	4105FL33F352696F14	Yes
	5)	Chassis serial number	Evaluative		-	JYDDV363364MS	Yes
	6)	Declaration of PTO power, kW(hp)	Evaluative			38(50.95)	Yes

16.1.11 Discard limit for:						
(a)	Cylinder bore diameter, (mm)	Evaluative	To be declared by the manufacturer	105.319	105.04 to 105.08	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative	-do-	0.45	0.164 to 0.184	Yes
(c)	Ring end gap (mm):		-do-	-		
	1 st comp. ring.	Evaluative	-do-	2.0	0.65 to 0.70	Yes
	2 nd comp. ring.		-do-	2.0	0.95 to 1.0	Yes
	Oil ring		-do-	2.0	0.65 to 0.70	Yes
Ring groove clearance (mm):						
(d)					Tapered	-
	1 st comp. ring.	Evaluative	-do-	0.150	0.061 to 0.088	Yes
	2 nd comp. ring.		-do-	0.130	0.032 to 0.057	Yes
	Oil ring.					
(e) Clearance of main bearings (mm):						
	Diametrical clearance	Evaluative	-do-	0.20	0.104 to 0.123	Yes
	Crankshaft end float	Evaluative	-do-	0.60	0.20	Yes
(f) Clearance of big end bearings, (mm):						
	Diametrical	Evaluative	-do-	0.35	0.073 to 0.135	Yes
	Axial	Evaluative	-do-	1.0	0.25 to 0.30	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	NA	0.20 to 0.33	-
(h)	Clearance between center pin and bush, (mm)	Non Evaluative	-do-	NA	0.665 to 0.750	Yes

16.1.12 Literature (Submission to test agency)						
(a)	Operator manual	Evaluative	Provided/Not Provided	As per relevant IS Code (IS 8132)	Provided	Yes
(b)	Parts Catalogue	Evaluative	Provided/Not Provided	As per relevant IS Code (IS 8132)	Provided	Yes
(c)	Workshop/Service manual	Evaluative	Provided/Not Provided	As per relevant IS Code (IS 8132)	Provided	Yes



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16.1.13 CATEGORY OF BREAKDOWNS / DEFECTS :					
Sr.No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2014	As observed	Whether meets the requirements (Yes/No.)
1.	Critical	Evaluative	No critical breakdown	-	Yes
2.	Major	Evaluative	Not more than two and neither of them should be repetitive in nature	-	Yes
3.	Minor	Evaluative	Not more than five and frequency of each should not be more than two.	-	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	-	Yes

16.2 Optional requirements as per Clause-4 (Table-2) of IS:12207-2014:					
Sr.No.	Characteristic	Requirements as per IS: 12207-2014	As observed	Whether meets the requirements (Yes/No.)	
		3	4	5	
1	2				
1	Air cleaner oil pull over, max. oil pull over (%)	0.25% (max.)	Dry type air cleaner provided	Yes	
2.	Seating requirements	Should meet the requirements of IS: 12343-1998	Does not meet the requirement	No	
3.	Fitment of ROPS	With a provision for fitment of ROPS. If ROPS fitted it should meet the requirement of IS: 11821-1992	ROPS not fitted	Not applicable	
4.	Technical requirements for PTO shaft	Should meet the requirements of IS: 4931 -1995	Meet the requirement	Yes	
5.	Dimensions of three point linkage	Should meet the requirements of IS: 4468 (Part-I)-1997	Meets the Requirement	Yes	
6.	Specifications of linkage drawbar	Should meet the requirements of IS: 12953-1990.	Does not meet the requirement	No	
7.	Specifications of swinging drawbar	Should meet the requirements of IS: 12362 Part 3-1994.	Not Provided	NA	
98.	Accessories	Trailer hitch, front tow hook, linkage drawbar may be provided.	Provided	Yes	

- 16.3 Conformity with following IS: :
- I. Guide lines for declaration of power and specific fuel consumption and labelling of agricultural tractors (First revision) [IS 10273:1987 (Reaffirmed in March, 2009)] : Conforms
 - II. Agricultural tractors – Rear mounted power take-off - Types 1, 2 and 3(third revision)[IS: 4931-1995 (Reaffirmed in March, 2009)] : Conforms
 - III. Agricultural wheeled tractors - Rear mounted three-point linkage: Part 1 Categories 1, 2, 3 & 4 (fourth revision) [IS 4468(Part-I):1997/ISO 730-1:1994 (Reaffirmed in March, 2009)] : Conforms
 - IV. Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in March, 2007)] : Does not conform
 - V. 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 in March, 2007)] : Does not conform



- VI. Tractors and machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays [IS: 6283 (Part-1)-2006 (Reaffirmed in March, 2009) and IS: 6283 (Part 2)-2007 (Reaffirmed in March, 2009)] : **Conforms**
- VII. Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) [(IS 12239 (PT-2) 1999) (Reaffirmed in March, 2009)] : **Conforms**
- VIII. Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) [(IS: 8133 – 1983) (Reaffirmed in March, 2009)] : **Does not conform**
- IX. Agricultural Tractor & Machinery Lighting device for travel on public roads [(IS: 14683-1999) (Reaffirmed in March, 2009)] : **Conforms**

16.4 Salient Observations:

16.4.1 Laboratory tests:

16.4.1.1 PTO Performance:

- i) The backup torque is 33.67 %.
- ii) The maximum power was observed as 40.80 kW against the declaration of 38.0 kW, which meet the requirement of IS: 12207-2014 with regard to tolerance.
- iii) The specific fuel consumption corresponding to maximum power was measured as 263 g/kWh against the declaration of 275 g/kWh, which meet the requirement of IS:12207-2014 with regard to tolerance.

16.4.1.2 Hydraulic performance:
The lifting capacity at standard frame was recorded as 12.42 kN and the moment about rear axle was computed as 16.89 kN-m. & 21.30 kN-m for front axle. The moment about rear axle is on lower as compared to the moment about front axle that's why there is no need for front ballasting.

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 at the right mudguard, plough light, foot accelerating lever, gear shifting lever & pto engaging lever. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

16.4.1.4 Three Point Linkage:
All the parameters are meeting the requirement.

16.4.1.5 Linkage Drawbar:
Some of the parameters conform to Cat I & Cat. II and some does not conforms. Keeping in view the spirit of standardization, necessary improvements may be incorporated.

16.4.1.6 Operator's seat:
Inclination of seat towards the rear direction does not meet the requirement. Necessary improvements may be incorporated.

16.4.1.7 Symbols of operator's controls and other displays:
All the controls shall be identifiable with symbol in accordance with IS:6283-1998.

16.4.1.8 Location and operation of operator's control:
Meets the requirements of IS:12239 (Part-2)-1999

16.4.2 Field performance:
16.4.2.1 Wetland cultivation (Puddling operation):
No ingress of mud/or water was noticed during puddling operation of the tractor. Hence, It meets the requirements of IS: 11082-1984 (Technical requirements of agricultural tractors for wetland operation). The tractor is suitable for wetland operation (Puddling).

16.5 Maintenance / Service problems:
Maintenance / Service problems observed during the test. So as per request of applicant all the defected parts observed during the inspection & allowed to replace by new one.



1.	The EGR pipes brazing was done at welding joint.
2.	The flow of oil found very low. The filter was replaced with new one.
3.	The complete control valve assembly cleaned through pressurized air.
4.	The hydraulic oil was filtered and the strainer was also cleaned.

16.6 Recommendation with regard to safety on tractor:
The following requirements, inter alia, may be considered for incorporation on the tractor as per relevant Indian Standards:

- i) Provision for spark arresting device in exhaust system.
- ii) Provision of trailer hook locking devices
- iii) "STOP" Does not remain in its position.

16.7 Adequacy of Literature supplied with machine:

16.7.1 The following literature has been supplied with the tractor

- i) Operator's Manual for Sonalika Worldtrac 65 RX Tractor.
- ii) Part's catalogue for Sonalika Worldtrac 65 RX tractor – Engine, Chassis and Sheet metal, transmission and hydraulic.
- iii) Service Manual Sonalika Worldtrac 65 RX tractor.

16.7.2 The given literature supplied was found adequate.

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	October, 2013 to November, 2014	No	Delay in Hydraulic & drawbar test due to maintenance problem.

TESTING AUTHORITY:

H.L. YADAV
SENIOR AGRICULTURAL ENGINEER

C.R. LOHI
DIRECTOR

Report is compiled by Er. Shwetabh Singh Senior Technical Assistant

18. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
18.1	1.13.2 (iii), 1.13.4.1, 16.1.9 (c & f), 16.2 (6), 16.3 (iv), 16.4.1.6 & 16.5	We will look into for corrective action
18.2	16.1.7 (b & c), 16.3 (vii) & 16.4.1.3	These are minor non conformance & will not affect the tractor performance; however we will look for corrective actions
18.3	1.20.1, 1.20.3, 1.20.4, 16.2 (2 & 3), 16.3 (v), 16.4.1.7 & 16.6	We will look into for implementation of these safety features.