

Q k l k; d i j k k f j i k Z
COMMERCIAL TEST REPORT (Initial)

संख्या/No. : T-1548/2076/2021
माह/Month : June, 2021

[ONLINE TESTING]

(; g i j k k f j i k Z 30/06/2024 r d o s k g d @ THIS TEST REPORT IS VALID UPTO : 30/06/2024)



INTERNATIONAL TRACTORS LIMITED, SOLIS 2516 TRACTOR



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, Cooperation & Farmer's Welfare)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

ट्रैक्टर नगर, बुदनी (म.प्र.) 466 445

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

(An ISO 9001: 2015 Certified Institute)

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T-1548/2076/2021	INTERNATIONAL TRACTORS LIMITED, SOLIS 2516 TRACTOR – Commercial (Initial)
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Manufacturer : M/s. International Tractors Limited
Vill. Chak Gujran, P.O. Piplanwala,
Jalandhar Road, Hoshiarpur - 146 022
(Punjab). India

Test requested by : The manufacturer
Selected for test by : Applicant
Place of running-in : At manufacturer's works
Duration of said running-in, (h):
- Engine : 20
- Transmission : 20

Method of Selection : Due to Covid-19 Pandemic, it was not possible to conduct the random selection. Nor was possible for applicant to facilitate the random selection. As a last resort, applicant requested to allow the direct submission of test sample, which was allowed.

1. SPECIFICATIONS

- 1.1 Tractor:**
 Make : INTERNATIONAL TRACTORS LIMITED
 Model : SOLIS 2516
 Brand name : None
 Variants if any : None
 Type : Four wheeled, four wheel driven (4WD),
 General purpose Agricultural Tractor.
 Month & Year of manufacture : 09 & 2020
 Chassis number : DWJSH968444G26D
 Country of origin : India
- 1.2 Engine:**
 Make : M/s. Mitsubishi Heavy Industries – VST
 Diesel Engines Pvt. Ltd.
 Model : Not Available
 Type : Four stroke, naturally aspirated, liquid
 cooled, direct injection, diesel engine
 Serial number : A36024H0
 Country of origin : India
- 1.2.1 Engine speed (rpm), (Manufacturer's recommended production setting),:**
 - Maximum speed at no load : 2945 to 2995
 - Low idle speed : 970 to 1030
 - Speed at maximum torque : 1400 to 2200
- Rated speed, (rpm):**
 - For PTO use : 2700
 - For drawbar use : 2700
- 1.3 Cylinder & Cylinder Head:**
 Number : Three
 Disposition : Vertical, inline
 Bore/stroke, (mm) : 78/92

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16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

16.1 On the basis of tests conducted the performance results have been summarized as evaluative (mandatory) / Non-evaluation (Non-mandatory) parameter applicable for qualifying Minimum Performance criteria as per Clause-4 (Table-1) of **Indian standard: 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/ (D) Requirement (R)	As observed	Whether meets the requirements (Yes/No)
1	2	3	4	5	6	7
16.1.1	PTO Performance :					
a)	Maximum power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of $\pm 5\%$ for PTO power and or Engine power >26 kW $\pm 10\%$ for PTO power and or engine ≤ 26 kW	16.4 (D)	15.0	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	16.4 (D)	15.0	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+10 percent Max.	360 (D)	335	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8 percent	70 (D)	60.3	Yes
e)	Back-up torque, percent	Evaluative	12 percent	12 (D) 12 (R)	13.8	Yes
f)	Maximum operating temperature, ($^{\circ}$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.	130(D)	111	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)	104	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	3.38 (R)	1.465	Yes
h)	Smoke level	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 hatridge value (As per CMVR)	3.25 per metre (R)	0.28	Yes

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1	2	3	4	5	6	7
16.1.2	Drawbar performance :					
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 70 percent of static mass with ballast	Ballasting not recommended by the manufacturer	Not applicable	Not applicable
b)	Max. drawbar pull with standard ballast, as the case may be corresponding to 15 percent wheel slip or 7 percent track slip, (kN)	Evaluative	Minimum 70 percent of static mass of tractor without ballast or with standard ballast, as the case may be	6.70(D) 6.83 (R) Minimum	9.38	Yes
c)	Maximum drawbar power with standard ballast as the 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.	12.3 (D) 11.3 (R) Minimum	13.5	Yes
d)	Max. transmission oil temperature (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	110 (D)	81	Yes
16.1.3	Power lift and hydraulic pump performance :					
a)	Maximum lifting capacity throughout the range of lift, (kN):					
	1) At hitch points	Evaluative	[Tolerance of ± 10%]	6.37(D)	6.86	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.	4.33 (D) 3.53 (R) Minimum	3.70	Yes
b)	Maximum drop in the height of the point of application of the force after each 5 min. interval for a total duration of 30 min/ mm	Non Evaluative	The observed value should not exceed 50 mm.	50 (D)	00	Yes
16.1.4	Brake performance at 18.51 kmph:					
a)	Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with <u>unballasted</u>*, (m):					
	1) Cold brake	Evaluative	10	10 (R)	3.2	Yes
	2) Hot brake	Evaluative	10	10 (R)	3.4	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² . (N)	Evaluative	600	600 (R)	200 to 230	Yes

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1	2	3	4	5	6	7
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
* The manufacturer has not recommended ballasting for road test, therefore the brake test was conducted under unballasted condition only.						
16.1.5	Noise measurement :					
a)	Maximum ambient noise emitted by the tractor at bystanders position, dB(A)	Evaluative	88 dB(A) for >1.5 tonne GVW and 85 dB(A) for <1.5 tonne GVW (as per CMVR)	85 (R)	81	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	93	Yes
16.1.6	Amplitude of mechanical vibrations at :					
	1) Left foot rest	Non Evaluative	100 microns (max)	100 (D)	137	No
	2) Right foot rest				105	No
	3) Seat (with driver seated)				62	Yes
	4) Steering Wheel				273	No
16.1.7	Air cleaner oil pull over :					
	Maximum air cleaner oil pull over (%)	Evaluative	0.25 % (max.)	N.A	Dry type air cleaner is fitted	Not applicable
16.1.8	Haulage requirements :					
a)	Gross mass of the trailers, (tones):					
	- Two wheel	Non Evaluative	--	3.0 (D)	3.0	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	- Two wheel	Non Evaluative	--	3 to 6 (D)	4.92 to 5.17	Yes
c)	Fuel consumption (ml/km/tonne):					
	- Two wheel	Non Evaluative	--	50 to 90 (D)	64.48 to 67.70	Yes
16.1.9	Wetland cultivation :					
	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 and/or mud (R)	No ingress of mud and / or water was observed during water proof test	Yes
	1) Clutch assembly	-do-				
	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
16.1.10	Safety features:					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes (As per IS 12239 part 2)	--	Meet the requirements	Yes
b)	Lighting arrangement	Evaluative	As per CMVR	--	Meet the requirements	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)	--	Not applicable	Not applicable
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)	--	Meet the requirements	Yes
e)	Dimension of three point linkage	Non-Evaluative	Should meet the requirements of IS 4468 (part 1) (as amended from time to time)	--	Does not meet the requirements	No
f)	Specification of linkage drawbars	Evaluative	Should meet the requirements of IS 12953 (as amended from time to time)	--	Meet the requirements	Yes
g)	Specification of Swinging drawbars	Evaluative	Should meet the requirements of IS 12362 (Part 3)		Not Provided	Not applicable
h)	1) Maximum travelling speed at rated engine speed in reverse gears, Kmph	Evaluative	Should not exceed 20 Kmph	-	(9.34 kmph) Meet the requirements	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 applicable	Not applicable

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1	2	3	4	5	6	7	
16.1.11	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 MM YY 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.	International Tractors Limited	Yes	
	2)	Model	Evaluative		Solis 2516	Yes	
	3)	Month & Year of manufacture	Evaluative		09/2020	Yes	
	4)	Engine number	Evaluative		A36024H0	Yes	
	5)	Chassis number	Evaluative		DWJSH968444G26D	Yes	
	6)	Declaration of PTO power, kW (hp)	Evaluative		16.4(22)	Yes	
	7)	Specific fuel consumption ,g/kWh (g/hph)	Evaluative		327.5 (244)	Yes	
16.1.12	Discard limit for:						
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by Manufacturer	78.20	78.006 to 78.041	Yes	
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.30	0.075 to 0.091	Yes	
©	Piston diameter at skirt, mm	Non Evaluative		77.80	77.950 to 77.960	Yes	
(d)	Ring end gap (mm):						
	-	Top comp.ring.	Evaluative	-do-	1.5	0.30 to 0.35	Yes
	-	2 nd comp. ring.		-do-	1.5	0.45 to 0.50	Yes
	-	Oil ring.		-do-	1.5	0.30 to 0.35	Yes
(e)	Ring groove clearance (mm):						
	-	Top comp. ring.	Evaluative	-do-	--	Tappered	--
	-	2 nd comp.ring.	-do-	-do-	0.30	0.070 to 0.073	Yes
	-	Oil ring.	-do-	-do-	0.20	0.032 to 0.037	Yes
(f)	Clearance of main bearings, (mm):						
	-	Diametrical	Evaluative	-do-	0.10	0.075 to 0.093	Yes
	-	Crank shaft end float	Evaluative	-do-	0.50	0.20	Yes
(g)	Clearance of big end bearings, (mm):						
	-	Diametrical	Evaluative	-do-	0.15	0.063 to 0.093	Yes
	-	Axial	Evaluative	-do-	0.50	0.20	Yes
(h)	Clearance between king pin and bush,(mm)	Non Evaluative	-do-	Not applicable	Not applicable	Not applicable	
(i)	Clearance between center pin and bush,(mm)	Non Evaluative	-do-	Not applicable	Not applicable	Not applicable	

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1	2	3	4	5	6	7
16.1.13	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	As per relevant IS- 8132	Provided	Yes
(b)	Parts Catalogue	Evaluative			Provided	Yes
(c)	Workshop/ Service manual	Evaluative			Provided	Yes
16.1.14	Fitment of Roll Over Protective Structure (ROPS): for tractors 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 provided	Not fitted	Not applicable
16.1.15	Standard accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Provided	Yes
16.1.16	Accessories (Optional)	Non Evaluative	Ballast weights if fitted should meet the requirement of CMVR.	Provided	Not fitted	Not applicable
16.2	CATEGORY OF BREAKDOWNS / DEFECTS (As per clause 5.0 of IS:12207-2019):					
S. No.	Category of Breakdown	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	As observed	Whether meets the requirement (Yes/No.)	
1.	Critical breakdown	Evaluative	There is no 'critical breakdown' during the course of testing.	None	Yes	
2.	Major breakdowns	Evaluative	There are not more than 02 major breakdowns and neither of them is of repetitive nature.	Two (Mj & Mj-9)	Yes	
3.	Minor breakdowns	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.	Two (Mj & Mj-9)	Yes	

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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 2014)] | : | Conforms |
| ii) | Agricultural tractors - Rear mounted power take-off - Types 1, 2 and 3 (third revision) [IS:4931-1995 (Reaffirmed 2014)] | : | Conforms |
| iii) | Agricultural wheeled tractors - Three-point linkage: Part 2 Category 1N (Narrow Hitch) [IS 4468 (Part-2):1993/ ISO 730-2:1979 (Reaffirmed 2014)] | : | Does not conform |
| iv) | Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed October, 2017)] | : | Conforms |
| v) | Agricultural tractors - Operator’s seat technical requirement [IS 12343 –1998 (First revision) (Reaffirmed 2014)] | : | Not applicable as the rear track width is less than 1150 mm |
| 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 October, 2017)] | : | 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 2014)] | : | Does not conform |
| viii) | Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) IS: 8133-1983 (Reaffirmed 2014)] | : | 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 2014)] | : | Conforms |
| x) | Agricultural Tractors and Machinery - Lighting device for travel on public roads (IS: 14683-1999) (Reaffirmed 2014)] | : | Does not conform |

16.4 Salient Observations:

16.4.1 Laboratory tests:

16.4.1.1 PTO Performance Test:

- i) During Max. Power search test under natural ambient condition, the maximum PTO power was recorded 14.5 kW against the minimum requirement 14.8 kW and does not meet the evaluative requirement as per IS: 12207-2019. To rectify the problem, the following checking/adjustment were carried.
- a) Fuel line was checked and cleaned.
 - b) Fuel filter were replaced with new one.
 - c) Cleaning of radiator was carried out and coolant was replaced.
 - d) Fuel timing was checked and found correct.
 - e) Air cleaner primary & secondary filter element were cleaned.
 - f) Hydraulic oil filter and strainer were cleaned.
 - g) Fan belt tension was checked & found correct.
 - h) Transmission oil was checked and refilled.

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- i) On inspection, the ‘**Malfunctioning of injector**’ of 3rd cylinder was observed. To rectify the above defect , the manufacturer had requested to replace the injector assembly of 3rd cylinder. Hence injector assembly was replaced with new one having same specification(Part number 10054975AA). As the complete injector assembly was replaced, this defect was considered as major defect (**Mj**) as per IS: 12207-2019.
- ii) The maximum PTO power was recorded as **15.0 kW** against the declaration of **16.4 kW**, which meets the evaluative requirement of IS: 12207-2019.
- ii) The specific fuel consumption corresponding to maximum power was recorded as **335 g/kWh** against the declaration of **360 g/kWh**, which meets the evaluative requirement of IS: 12207-2019.
- iii) The maximum equivalent crankshaft torque was recorded as **60.3 N-m** against the declaration of **70.0 N-m**, which does not meets the non-evaluative requirement of IS: 12207-2019. This should be looked into for necessary corrective action.
- iv) The backup torque is **13.8 %** and meets the evaluative requirement of IS: 12207-2019.

16.4.1.2 Drawbar performance test:

During drawbar performance test under unballasted condition, It was observed that the “High-low” gear shifting lever was not working properly. On inspection the “High-low” gear shifting “**Spring**” (Part number 10053731AA) was found broken. Upon this, the “High-low” gear shifting “**Spring**” was replaced with new one having same specification (Part number 10053731AA).

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. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

16.4.1.4 Three point linkage:

Distance from end of power take-off to to centre of lower hitch point does not meet the requirement and some of the parameters conform to Cat. I and some of them conform to Cat.IV. Keeping in view the spirit of standardization, necessary improvement may be incorporated.

16.4.1.5 Operator’s Seat:

Meets the minimum requirements of IS: 12343-1998 (Re-affirmed in 2014), **except the following:**

- i) Length of seat from Seat Index Point.
- ii) Width of operator’s seat
- iii) Vertical distance from SIP to clutch pedal.
- iv) Vertical distance from SIP to brake pedal.

16.4.1.6 Operator’s work place:

Operator’s work place meets the requirements of IS: 12239 (Part-I) 1996 (Reaffirmed Oct., 2017), **except the following:**

- i) Provision of hand holds for easy mounting & dismounting of the operator’s.
- ii) Provision of vertical retainers at both sides of clutch pedal.
- iii) Provision of spark arresting device in the exhaust system.

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16.4.1.7 Constructional requirement with regard to safety:

Meets the requirements of IS: 12239 (Part-II)-1996 (Re-affirmed in October, 2017), except the following:

- i) PTO master shield has not been provided.
- ii) Working clearance in between position control and draft control lever is less than the requirement.
- iii) Provision for mounting a canopy above driver's seat.
- iv) Minimum Cautionary notice as per clause 11.2 of above referred standard has not been provided.

16.4.1.8 Symbols of operator's controls and other displays:

All controls are identifiable with the symbols as per IS: 6283 (Part 1&2)-1998, except the following:

- i) Oil lubricant, type and frequency
- ii) Grease lubricant, type and frequency
- iii) Speed range (Fast-slow)

16.4.1.9 Location of operator's controls with regard to safety:

Location of operator's controls with regard to safety meets the requirements of IS: 8133-1983 (Reaffirmed 2014), **except the** provision of clear function of each position on hydraulic control lever.

16.4.1.10 Engine model :

The engine model is not embossed or etched or punched on engine. It is essential things for identification of engine model. This should be looked into for necessary corrective action.

16.4.1.11 PTO master shield:

PTO master shield not provided on tractor as per the requirements of IS: 4931-1995(Reaffirmed in 2004). This should be looked into for necessary corrective action.

16.4.1.12 Labelling of tractor:

- i) The specific fuel consumption at maximum power was mentioned as 327.5 g/kWh on the labeling plate. Whereas, same has been declared as 360 g/kWh vide application. This needs to be looked into for necessary corrective action.
- ii) The specific fuel consumption corresponding to maximum power has been specified as **327.5, g/kWh (244 g/hph)**. By calculation, we find $327.5 \times 0.73555 = 241$ g/hph. This need to be looked in to for necessary correction.

16.5 Field performance test:

16.5.1 Wet land cultivation (Puddling operation):

No ingress of water and/or mud was observed during puddling operation of the tractor. Hence, it meets the requirements of IS: 11082-1984 (Technical requirements of agricultural tractors for wetland operations). The tractor is found suitable for wetland cultivation (Puddling operation).

16.6 Component / Assembly Inspection :

During component/assembly inspection, it was seen that, 03 number of teeth of the High-low main shaft gear was found broken. **This breakdown is considered as major breakdown and categorized (Mj-9) as per IS: 12207-2019.**

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16.7 Maintenance / Service Problems:
No noticeable maintenance or service problem was observed during the test.

16.8 Recommendation with regard to safety on tractor:
The following requirements, inter alia, may be considered for incorporation on the tractor:

- i) Provision of spark arrester in the exhaust system.
- ii) The working clearance between the draft control lever and position control lever should be provided as per the requirement of relevant Indian Standard.
- iii) Length and width of operator's seat should be as per relevant standard.
- iv) Vertical retainers at both sides of clutch pedals should be provided as per relevant standard.
- v) PTO shaft master shield should be provided to avoid the accident.
- vi) Grease lubricant, oil lubricant type and frequency chart should be provided on the tractor.
- vii) Vertical distance from SIP to clutch and brake pedals should be provided as per the relevant standard.
- viii) Provision for mounting a canopy above driver's seat.
- ix) Provision of clear function of each position on hydraulic control lever.
- x) Provision of engine model to embossed or etched or punched on engine for identification of engine model.

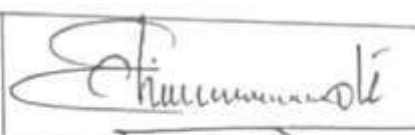
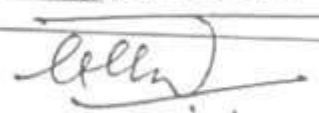
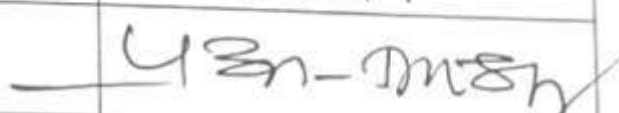
16.9 Adequacy of Literature supplied with machine:

16.9.1 The following literatures were supplied with the test tractor for reference during the test:-

- a) Operator's manual of "INTERNATIONAL TRACTORS LTD., SOLIS 2516" Tractor model.
- b) Service manual of "INTERNATIONAL TRACTORS LTD., SOLIS 2516" Tractor model.
- c) Parts Catalogue of "INTERNATIONAL TRACTORS LTD., SOLIS 2516" Tractor model.

16.9.2 The printed literature supplied with the test sample is in English. However, these literatures should be brought out in other vernacular languages of India for guidance of users

TESTING AUTHORITY:

C.V. CHIMOTE TEST ENGINEER	
Y.K.RAO SENIOR AGRICULTURAL ENGINEER	
P. K. PANDEY DIRECTOR	

Draft test report is compiled by: Shwetabh Singh, Agricultural Engineer.

T-1548/2076/2021	INTERNATIONAL TRACTORS LIMITED, SOLIS 2516 TRACTOR – Commercial (Initial)
	(THIS TEST REPORT IS VALID UPTO : 30/06/2024)

17. APPLICANT COMMENT'S

Para No.	Our Reference	Applicant's comments
17.1	16.4.1.8 (i), (ii) & (iii)	This will be provided during regular production of tractors.
17.2	16.4.1.12 (i)	The declared value of SFC is 360 g/kWh as mentioned in Application No.2. This will be corrected accordingly wherever applicable.

ANNEXURE – I

BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

S. No.	Item	MB Plough	Rotavator	Rotavator (used during puddling)
1.	Make	Mahindra & Mahindra	Howard	Kamco
2.	Type	Mounted	Mounted	Mounted
3.	No. of bottom/blades	Two	30, in 6 flange	20
4.	Type of bottom/blades	General purpose	Hatchet	Hatchet
5.	Size of bottom/blades, (mm)	255	215 x 75 x 5	160 x 50 x 5
6.	Spacing of bottom/flanges, (mm)	170	250	180
7.	Lower hitch point span, (mm)	480	710	435
8.	Mast height, (mm)	375	465	400
9.	Overall dimensions, (mm):			
	- Length	1035	1035	1025
	- Width	700	1790	280
	- Height	840	960	710
10.	Gross mass, (kg)	95	290	105

ANNEXURE – II

BRIEF SPECIFICATION OF CAGE WHEEL

S. No.	Parameters	Specifications
1.	Type	Half cage wheel
2.	Dia, (mm)	770
3.	Width, (mm)	386
4.	No. and types of lugs	09, Straight lugs made of M.S. angle section welded to angle iron frame
5.	Size of angle section, (mm)	40 x 40 x 5
6.	Length of lugs, (mm)	270
7.	Spacing of lugs, (mm)	275
8.	Weight of each cage wheels (kg)	35

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ANNEXURE – III

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	40.0
2.	PTO performance test	12.9
3.	Power lift and hydraulic pump performance test	4.3
4.	Drawbar performance test	15.9
5.	Turning ability	0.3
6.	Location of centre of gravity	--
7.	Operator's field of vision	--
8.	Brake test	1.7
9.	Noise measurement	2.0
10.	Mechanical vibration test	1.0
11.	Theoretical speed test	1.0
B.	FIELD TEST:	
1.	Ploughing	11.4
2.	Rotavation	10.3
3.	Puddling (including five hours water proof test)	15.0
C.	HAULAGE TEST:	9.4
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	16.1
	TOTAL:	103.6