



SWARAJ 855 XMGXDCRPS540D - TRACTOR



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)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

(An ISO : 9001-2008 Certified Institute)

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3. ESSENTIAL TESTS

3.1. SPECIFICATIONS

	<u>Base Model</u>	<u>Variant Model</u>
3.1.1 Tractor:		
Make	: Swaraj	Swaraj
Model	: 855 XM	Swaraj 855 XMGXDCRPS 540D
Brand name	: Swaraj	Swaraj
Type	: Four wheeled, rear wheel driven, general purpose Agricultural Tractor.	
Year of manufacture	: 2011	2014
Chassis Serial number	: WWCE 63622142687	WXCB63930985847
Country of Origin	: India	India
3.1.2 Engine:		
Make	: Swaraj	M/s. Kirloskar oil Engines Ltd.
Model	: RB 33 XM +	RV3XM+ 3A
Type	: Four stroke, water cooled, direct injection, diesel engine.	
Serial number	: 47.1402/SPD 02217	47.3046/STB02804S
Engine speed (Manufacturer's recommended production setting)(rpm):		
- Maximum speed at no load	: 1900 to 2000	1900 to 2000
- Low idle speed	: 580 to 700	580 to 700
- Speed at maximum torque	: 1000 to 1400	1000 to 1400
Rated speed, (rpm):		
- For PTO use	: 1800	1800
- For drawbar use	: 1800	1800
3.1.3 Cylinder & Cylinder Head:-		
Number	: Three	Three
Disposition	: Vertical, inline	Vertical, inline
Bore/stroke, (mm)	: 110/122	110/122
Capacity as specified by the applicant, (cc)	: 3480	3480 (apa)
Compression ratio, (apa)	: 19.2 ± 0.5 : 1	19.2 ± 0.5 : 1
Type of cylinder head	: Individual	Individual
Type of cylinder liners	: Wet, replaceable	Wet, replaceable
Type of combustion chamber	: Direct injection, open chambre piston crown	
Arrangement of valves	: Over head, Inline	Over head, Inline
Valve clearance (cold/hot):		
- Inlet valve, (mm)	: 0.25 - 0.30	0.25 - 0.30
- Exhaust valve, (mm)	: 0.30 - 0.35	0.30 - 0.35
3.1.4 Fuel System:		
Type of fuel feed system	: Gravity and forced feed	



10. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

- 10.1** 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: 2008 for acceptance of tractor for the purpose of subsidies/NABARD financing for the applicable features for this tractor model.

Sl. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2008	Values declared by the applicant/ requirement		As observed		Whether Variant model meets the requirements (Yes/N o.)
				Base model	Variant Model	Base model	Variant model	
1	2	3	4	5 a	5 b	6 a	6 b	7
10.1.1	PTO Performance :							
a)	- Max. Power under 2 hrs. test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: a)-5/+10% for PTO power >26 kW. b)-7.5/+10% for PTO power ≤ 26 kw	33.8 (D)	32.0 (D)	33	31.3	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	33.8 (D)	32.0 (D)	33	31.3	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+5%	258 (D)	262 (D)	255	264	Yes
d)	Maximum equivalent crankshaft torque(Nm)	Non Evaluative	± 8%	210 (D)	210 (D)	207	203	Yes
e)	Back-up torque, percent	Non Evaluative	10%, min.	7%, min.	7%, min.	18.4	22.1	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.	130(D)	130(D)	93	94	Yes

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1	2	3	4	5 a	5 b	6 a	6 b	7
	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.	115 (D)	115 (D)	85	79	Yes
g)	Engine oil consumption g/kwh	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.55 (R)	2.64 (R)	0.39	NR	--
h)	Smoke level	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 meter	3.25 Per meter	0.39 Per meter	0.20 Per meter	Yes
10.1.2	Brake performance at 25 kmph:							
	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	10(R)	10(R)	8.37	7.40	Yes
	2 Hot Brake	Evaluative	10	10(R)	10(R)	8.55	7.36	Yes
	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600(R)	600(R)	382 to 392	178 to 229	Yes
	Whether parking brake is effective at a force of 600 N at foot pedal(s) or 400 N at hand lever	Evaluative	Yes	Yes	Yes	Yes	Yes	Yes
10.1.3	Safety feature:							
a)	Guards against moving and hot parts	Evaluative	Belt drives, pullies, silencer, hydraulic pipes (As per IS 12239 (Part 2))	-	-	Conforms	Conforms	Yes
Remark: The hydraulic pipe lines are not fully guarded. The year of manufacturer of the test sample is before the date of implementation of relevant IS. Therefore for prospective effects of implementation of code this conforms to IS								
b)	Lighting arrangements	Evaluative	As per CMVR	-	-	Conforms	Conforms	Yes
c)	Seating requirements	Non-Evaluative	Should meet requirements of IS 12343 (as amended from time to time)	-	-	Conforms	Conforms	Yes
d)	Technical requirements of PTO shaft	Non-Evaluative	Should meet the requirements of IS: 4931 (as amended from time to time)	-	-	Conforms	Does not conform	No



e)	Dimensions of three point linkages	Non-Evaluative	Should meet the requirements of IS: 4468 (Part 1) (as amended from time to time)	-	-	Does not conform	Does not conform	No
f)	Specification of linkage and swinging drawbar	Non-Evaluative	Should meet the requirements of IS: 12362 (Part 3)(as amended from time to time)	-	-	Does not conform	Does not conform	No

10.1.4 Labelling of tractors (Provision of labelling plate):							
10.1.4	1)	Make	Evaluative	Should conform to the requirements of CMVR	SWARAJ	SWARAJ	Yes
	2)	Model	Evaluative		855 XM	855 XM GXDCRPS 540 D	Yes
	3)	Year of manufacture	Evaluative		WW	WX (i.e Feb,2014)	Yes
	4)	Engine serial number	Evaluative		47.1402/SPD 02217	47.3046/ST B 0 2804 S	Yes
	5)	Chassis serial number	Evaluative		WWCE 63622142687	WXCB639309858 47	Yes
	6)	Declaration of PTO power, kW	Evaluative		33.8 (46.0)	32.0 (HP unit not provided)	Yes

10.1.5 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

10.2 Salient Observations:

10.2.1 Laboratory tests:

10.2.1.1 PTO Performance:

- i) The maximum PTO power in case of base and variant models were observed as 33.0 & 31.3 kW against the declaration of 33.8 & 32.0 kW respectively, which is within the specified limit.
- ii) The specific fuel consumption in case of base and variant models corresponding to maximum power were observed as 255 & 264 g/kWh against the declaration of 258 & 262 g/kWh respectively, which is within the specified limit.

10.2.1.2 Three point linkage:

- i) Lateral distance from lower hitch point to centre line of tractor does not meet the requirements of IS 4468: 1997. It should be looked into for compliance.

10.2.1.3 Meets the requirements of IS: 12239 (Part-1) – 1996, except the following:

- i) Provision of spark arrester has not been provided.
- ii) Height of 1st step from ground level and width of foot steps



- 10.2.1.4** Meets the requirements of IS: 12239 (Part-2) - 1996, except the following:
- i) Working clearance between draft & position control lever
 - ii) The guard to minimize the possibility of in-advertent contact for hydraulic pipe lines, alternator and silencer against to minimize the possibility of in-advertent human contact
 - iii) The minimum cautionary notice as per clause 11.2 of IS:12239(Part-2)-1999
- 10.2.1.5** Location and movement of various controls meets the requirement of IS : 8133-1981, except the following:
- i) Differential Lock not provided.
- 10.2.1.6** Controls and displays are identifiable with symbols as per IS : 6283 (Part 1&2) - 1998, except the following:
- i) Hand brake
- 10.2.1.7** Labelling of tractor: -
Labelling plate of tractor meets the requirements.
- 10.3** **Maintenance / Service Problems:**
No noticeable maintenance or service problem was observed during the test.
- 10.4** **Recommendation with regard to safety on tractor:**
The following requirements, inter alia, may be considered for incorporation on the tractor:
- i) Safety provisions against accidental start of engine.
 - ii) Provision of hand brake with identifiable symbol.
 - iii) Provision of Differential lock.
 - iv) The working clearance around draft control lever may be provide as per requirement of IS:12239(part-2)-1999
- 10.5** **Adequacy of Literature supplied with machine:**
The following literature was supplied after completion of all test.
- i) Operator's manual
 - ii) Parts catalogue
 - iii) Service manual
- The above literatures are found adequate.
- 10.5.1** The literatures should also be brought out in national as well as other regional languages for the guidance of users and service personnel.
- The result of the test carried out on variant model "SWARAJ 855 XMGXDCRPS 540 D TRACTOR" have been compared with those on base model "SWARAJ 855 XM TRACTOR" & found within the limit, as specified in Indian Standard:12207-2014



11. Citizen Charter

Duration of test	Test duration under citizen charter	Whether the report release with in time frame given citizen charter	Remark, if any
August 2014 to January, 2014 (5 Month)	10 Month	Yes	None

TESTING AUTHORITY:

P. C. MESHAM
AGRICULTURAL ENGINEER

H. L. YADAV
SENIOR AGRICULTURAL ENGINEER

C. R. LOHI
DIRECTOR

12. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
12.1	10.2.0.2 (i) 10.2.0.3 (i), (ii)	These requirements are being revisited for necessary corrective action at our end
12.2	10.2.1.4(i), (ii) (iii)	Study and trials are under progress for necessary corrective action
12.3	10.2.1.5 (i) 10.2.1.6 (ii)	These requirements are being revised for necessary corrective action at our end.
12.4	10.6	Literatures are already printed in all regional language for end user.
10.5	10.1.3(a)	Tractor manufactured before implementation of IS: 12207-2014, on after relaxation in procedure considered it as conformed instead of does not conform.