व्यावसायिक परीक्षण रिपोर्ट (वैरिएंट) संख्या / No. : T-1526/2053/2021

COMMERCIAL TEST REPORT (Variant) माह / Month : April, 2021

(यह परीक्षण रिपोर्ट 30/04/2024 तक वैध है। / THIS TEST REPORT IS VALID UP TO : 30/04/2024)

SWARAJ 735 FE e R 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 Website : http://www.fmttibudni.gov.in

Telephone : 07564 - 234729, 234743

Manufacturer : M/s. Mahindra & Mahindra Ltd.,
Farm Equipment Sector, Swaraj Division
Phase-IV, Industrial Area, S.A.S. Nagar,
Mohali, Punjab- 160 055

Month: April	Test Report No. T- 1526/2053/2021	Year: 2021

GOVERNMENT OF INDIA
CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE
TRACTOR NAGAR, BUDNI (MADHYA PRADESH) 466445, INDIA

Web site: http://www.fmttibudni.gov.in

E-mail: fmti-mp@nic.in

Telephone : 07564-234729, 234743

Type of Test	:	**COMMERCIAL (Variant)**
Test code/Procedure	:	IS: 5994 -1998 (Reaffirmed in 2014) and IS: 12207-2019
Period of Test	:	**December, 2020 to February, 2021**
Test Report No	:	**T- 1526/2053/2021**
Month/Year	:	**April, 2021**

i) The results reported in this report are observed values and no corrections have been applied for atmospheric and site conditions.

ii) The data given in this report pertain to the particular machine submitted by the applicant for test.

iii) The results presented in this report do not in any way attribute to the durability of the machine.

iv) This report should not be reproduced in part or full without prior permission of the Director, Central Farm Machinery Training and Testing Institute, Budni (M.P.)

v) This is a Variant test report and, should be read in conjunction with the Batch Test Report of i.e. **"Swaraj 735 FE Tractor"** bearing report **No. T-1211/1738/2019** released in **January, 2019 & Commercial Administrative Extension test report No. T-1346/1873/2020, released** in **March, 2020.**

Sl. No	Units	Conversion Factor
1.	**Force:**	
	1 kgf	9.80665 N
		2.20462 lbf
2.	**Power:**	
	1 Mechanical power	1.01387metric horse power
		745.7 W
	1 Metric horse power	735.5 W
	1 kW	1.35962 Metric horse power
3.	**Pressure:**	
	1 psi	6.895 kPa
	1 kgf/cm^2	98.067 kPa = 735.56 mm of Hg
	1 bar	100 kPa = 10 N/cm^2
	1 mm of Hg	1.3332 m-bar

ABBREVIATIONS	
Apa	As per applicant
TDC	Top Dead Centre
IS	Indian Standard
LHS/RHS	Left Hand Side/ Right Hand Side
Hg	Mercury
Temp.	Temperature
N.R.	Not recorded
Rpm	Revolutions per minute
O.D/I.D	Outer diameter/ Inner diameter
N.A.	Not available/ Not applicable
PTO	Power take-off
R.H.	Relative Humidity

CONTENTS

Manufacturer	:	**M/s. Mahindra & Mahindra Ltd., Farm Equipment Sector, Swaraj Division Phase-IV, Industrial Area, S.A.S. Nagar, Mohali, Punjab- 160 055**
Test requested by (applicant)	:	The manufacturer
Selected for test by	:	Applicant
Place of running-in and test carried out	:	At manufacturer's works
Duration of said running-in (h):		
- Engine	:	28
- Transmission	:	32
Method of Selection	:	The tractor was submitted directly by the applicant for test. Hence method of selection is not known.

1. SCOPE OF TEST

The **"Swaraj 735 FE"** tractor had undergone **"Commercial Batch Test"** at this Institute and bearing a test report **No.T-1211/1738/2019** released in **January, 2019 & Commercial Administrative Extension** test report **No.T-1346/1873/2020,**released in **March, 2020.** Now the applicant has submitted an application vide letter No. 20/2007011 dated 01.07.2020 for testing of "**Swaraj 735 FE e R**" tractor as a Variant of **"Swaraj 735 FE**" tractor.

The variant model derived on the basis of "change in nominal speed" as per Table -2, clause 8.2 of Sl. No. (v) Of IS: 12207-2019.

The applicant having enclosed a list of following differences in the technical specifications between **"Swaraj 735 FE**" and "**Swaraj 735 FE e R**" tractor and requested to test the "**Swaraj 735 FE e R**" tractor as a variant of **"Swaraj 735 FE**" tractor.

The major features of Base model and Variant model are listed below:

S.No.	Parameters	Base Model (T-1211/1738/2019, (January, 2019) & Commercial Administrative Extension test report No. T-1346/1873/2020,released in (March, 2020))	Variant Model
1	2	3	4
1.	**Tractor:**		
	Make	Swaraj	Swaraj
	Model	735 FE	735 FE e R
2.	**Range of Nominal speeds(kmph):**		
	- Forward	2.21 to 28.67	2.44 to 28.70 (variation of 0.10 to 15.52)
	- Reverse	2.63 to 10.35	3.05 to 11.99 (variation of 15.85 to 15.97

Subsequent to the examination of the case in light of table-2 & 3 of Indian Standard IS 12207-2019, the following tests were considered to be carried out :

- Specification checking
- Nominal speed test
- Two hour maximum PTO power 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:

S. No.	Particulars	As recommended by the manufacturer	As used during the test
1.	Air Cleaner oil	SAE 30	As recommended
2.	Engine oil	SAE 20W40	As recommended
3.	Transmission, Hydraulic and brake systems oil	ELF 2371	Oil originally filled in the tractor was not changed
4.	Grease	Servo grease MP	Servo grease MP

3. ESSENTIAL TEST

3.1. SPECIFICATIONS

3.1.1 Tractor:

		Base Model	Variant Model
Make	:	Swaraj	Swaraj
Model	:	735 FE	735 FE e R
Brand name, if any	:	Swaraj	
Type	:	Four wheeled, Rear-wheels driven, Unit construction, General purpose, Agricultural Tractor.	
Month & Year of manufacture	:	01/20	09 & 2020
Chassis number	:	MBNAJ28AELTA32673	MBNAK28AGLTL56508
Country of Origin	:	India	

3.1.2 Engine:

Make	:	M/s Swaraj Engine Ltd.
Model	:	RV3XM +3A
Type	:	Four stroke, naturally aspirated, liquid cooled, direct injection, diesel engine.
Serial number	:	CJ.1354/LA000342 | CJ.1354/LL009745

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

- Maximum speed at no load,	:	1900 to 2000
- Low idle speed	:	580 to 700
- Speed at maximum torque	:	1000 to 1400

Rated speed, (rpm):

- For PTO use	:	1800
- For drawbar use	:	1800

3.1.3 Cylinder & Cylinder Head:

Number	:	Three
Disposition	:	Vertical, inline
Bore/stroke, (mm)	:	100/116
Capacity as specified by the applicant, (cc)	:	2734

			Base Model	Variant Model
	Compression ratio	:	20.4±0.5 : 1	
	Type of cylinder head	:	Individual	
	Type of cylinder liners	:	Wet, replaceable	
	Type of combustion chamber	:	Re-entrant, cavity on piston crown	
	Arrangement of valves	:	Over head, inline	
	Valve clearance (cold):			
	- Inlet valve, (mm)	:	0.25 to 0.30	
	- Exhaust valve, (mm)	:	0.30 to 0.35	
3. 1.4	**Fuel System:**			
	Type of fuel feed system	:	Gravity and force feed	
3. 1.4.1	**Fuel tank:**			
	Capacity, (l)	:	45.3	44.5
	Location	:	Above clutch housing	
	Provision for draining of sediments/water	:	Not Provided	
	Material of fuel tank	:	Metallic	
3. 1.4.2	**Water separator:**			
	Make	:	SAL	Swaraj
	Type	:	Transparent, inverted funnel type, gravity separation	
	Location	:	On LHS of engine, between fuel tank and primary feed pump	
	Capacity, (l)	:	0.5	
3. 1.4.3	**Fuel feed pump:**			
	Make	:	Bosch, India	
	Type	:	Plunger	
	Model/Group combination No.	:	F002A50040, FP/KSG22AD105	
	Provision of sediment bowl	:	Provided	
	Method of drive	:	Through camshaft of fuel injection pump.	
3. 1.4.4	**Fuel filters:**			
	Make	:	Bosch, India	
	Model/Group combination No	:	F002H20105	
	Number(s)	:	Two	
	Types of elements:			
	- Primary	:	Cloth	
	-Secondary	:	Paper	
	Capacity of final stage filter, (l)	:	0.35	0.50
3.1.4.5	**Fuel Injection pump:**			
	Make	:	Bosch, India	
	Model/Group Combination No.	:	F002 A0Z 834, PES3A85D320RS3500	
	Type	:	Inline, plungers	
	Serial number	:	96011630	07663301
	Method of drive	:	Through timing gears	
3.1.4.6	**Fuel injector(s):**			
	Make	:	Bosch, India	
	Model/Group combination No.	:		
	Nozzle holder no.	:	F002 C70 552	
	-Nozzle No.	:	DSLA 156P 5521	

			Base Model	Variant Model
	Type	:	Multi hole (05 holes)	
	Manufacturer's production pressure setting, (MPa)	:	25.0 ± 0.8	
	Injection timing	:	11 ± 1° before TDC	
	Firing order	:	1-2-3	
3.1.4.7	**Governor:**			
	Make	:	Bosch, India	
	Model/Group Combination No.	:	RSV325...900A1C1601R	
	Type	:	Mechanical, centrifugal, variable speed.	
	Rated engine speed, (rpm)	:	1800	
	Governed range of engine speed, (rpm)	:	580 to 2000	
3.1.5	**Air Intake System:**			
3.1.5.1	**Pre-cleaner:**			
	Make	:	Swaraj	
	Type	:	Centrifugal with transparent dust collector	
	Location	:	On the top of main air cleaner inlet tube, outside the bonnet.	
3.1.5.2	**Air cleaner:**			
	Make	:	Swaraj	
	Type	:	Oil bath	
	Location	:	On LHS of engine, outside the bonnet	
	Range of suction pressure at maximum power, (kPa)	:	2.2	1.9 to 2.0
3.1.6	**Exhaust System:**			
	Type of silencer	:	Up-draught (cylindrical)	
	Position of silencer outlet with respect to SIP, (mm):			
	- Upward	:	905	900
	- Longitudinal	:	1460	1500
	- Lateral	:	480 on RHS	430 (on RHS)
	Range of exhaust gas pressure at maximum power, (kPa)	:	2.8 to 3.1	8.8 to 9.7
	Provision of spark arresting device	:	**None**	
	Provision against entry of rain water	:	A bend is provided at the top of silencer.	
3.1.7	**Lubricating system:**			
	Type	:	Force feed cum splash	
	Oil sump capacity, (l)	:	7.6	6.0
	Total lub oil capacity, (l)	:	8.2	7.2
	Oil change period	:	First change after 50 hours and subsequently after every 250 hours of operation.	
	Cooling device, (if any)	:	**None**	
	Filters:			
	Make	:	SEL (apa)	
	Type	:	Full flow, spin-on, throw away, paper element	
	Number	:	One	

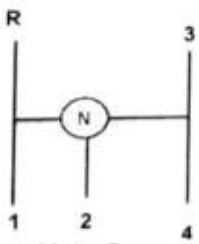
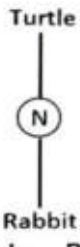
			Base Model	Variant Model
	Pump:			
	Type	:	Gear	
	Method of drive	:	Through crankshaft gears	
	Minimum permissible pressure, (kPa)	:	49	
	Pressure release setting, (kPa)	:	550±50	
3.1.8	**Cooling system:**			
	Type	:	Forced circulation of coolant & water	
	Coolant as recommended	:	RWT Green	
	Coolant and water ratio		92.5:7.5	
	Details of Pump	:	Centrifugal, semi-open impeller of 72 mm diameter having 10 numbers of vanes, and driven through crankshaft pulley by a cogged 'V'-belt common to alternator.	
	Details of fan	:	Suction type having eight numbers of metallic blades of 356 mm diameter and mounted on water pump shaft.	
	Means of temperature control	:	Thermostat	
	Bare radiator capacity, (l)	:	2.7	2.7
	Expansion flask capacity, (l)	:	1.1	1.0
	Total coolant capacity, (l)	:	8.2	7.4
	Radiator cap pressure, (kPa)	:	88	88
3.1.9	**Starting System:**			
	Type	:	12V, DC, Electrical	
	Aid for cold starting	:	None	
	Any other device provided for easy starting	:	None	
3.1.10	**Electrical System:**			
3.1.10.1	**Battery:**			
	Make and model	:	Exide & 95D31LMF	
	Type	:	Lead acid	
	Capacity and rating	:	12V, 80 Ah at 20 hrs discharge rate	
	Location	:	On RHS of clutch housing in separate metallic box.	
3.1.10.2	**Starter:**			
	Make	:	Autolek	
	Model	:	STM RVH-1104	
	Type	:	Pre-engaging, solenoid operated	
	Power rating, (kW)	:	12V, 2.0 kW	
3.1.10.3	**Generator:**			
	Make	:	Autolek	
	Model	:	Q4JAG	
	Type	:	Alternator	
	Output rating	:	12V, 36 A	
	Method of drive	:	Driven through crank shaft pulley by a cogged 'V'-belt common to water pump.	
	Voltage regulator	:	In-built in alternator	

3.1.10.5 Details of lights :

Description	No. & capacity of bulbs	Height of the centre of beam above ground level, (mm)		Size of beam, (mm)		Distance between centre of the beam and outside edge of tractor at standard rear track setting, (mm)	
		Base model	**Variant model**	**Base model**	**Variant model**	**Base model**	**Variant model**
1	2	3	4	5	6	7	8
Front Lights:							
- Head lights	2, 12V,60/55W	1210	1210	135x100	135x100	748	748
- Parking lights	2, 12V, 5W	1270	1270	70 x 75	70 x 75	195	195
- Turn Indicators-cum-Hazard lights	2, 12V, 21W	1270	1270	70 x 75	70 x 75	90	90
- Reflectors (white)	2	1270	1270	35 x 55	35 x 55	145	145
Rear lights:							
- Parking-cum-brake light	2, 12V, 21/5W	1275	1275	70 x 75	70 x 75	240	240
- Turn Indicators-cum- hazard light	2, 12V, 21W	1275	1275	65 x 75	65 x 75	125	125
Plough light	1, 12 V, 35W	1465	1465	135 Ø	135 Ø	160	160
Reflectors (Red)	2	1275	1275	35 x 55	35 x 55	190	190
Registration plate Light	Part of the rear tail light assembly.						

3.1.11 Instrument panel details:

		Base Model	Variant model
i)	Engine speed-cum-digital cumulative run-hour meter (4 to 24 x 100 rpm)	Provided	Provided
ii)	Water temperature gauge (with colour zones)	Provided	Provided
iii)	Fuel level gauge (with colour zones)	Provided	Provided
iv)	Engine oil pressure gauge (with colour zones)	Provided	Provided
v)	Starting switch (key-turn type)	Provided	Provided
vi)	Light switch (Rotary type)	Provided	Provided
vii)	Turn cum hazard indicator	Provided	Provided
viii)	Turn indicator switch	Provided	Provided
ix)	Hazard light switch	Provided	Provided
x)	Head lamp (long beam) 'ON' indicator light	Provided	Provided
xi)	Ampere meter (with colour zones)	Provided	Provided
xii)	Fuel shut-off knob	Provided	Provided
xiii)	Horn push button	Provided	Provided
xiv)	Hand accelerator lever	Provided	Provided
xv)	Steering control wheel	Provided	Provided
xvi)	Rear view mirror	Provided	Provided
xvii	High low lever neutral indicator	Provided	Provided
xviii)	Tell-tale for trailer light	Provided	Provided

			Base Model	Variant Model
3.1.12	**Transmission System:**			
3.1.12.1	**Clutch:**			
	Make	:	Valeo	
	Type	:	Mechanical, single, dry friction plate	
	No. of friction plate(s)	:	One	
	Size, (OD/ID),(mm):			
	- Transmission		280 /170 ¢	
	Material of clutch lining	:	F510 MCC (apa)	
	Method of operation	:	By pressing the clutch pedal provided on LHS of the operator's seat.	
3.1.12.2	**Gear box:**			
	Make	:	Swaraj	
	Model	:	Not available	
	Type	:	Mechanical, sliding mesh spur gear with planetary high-low range selection unit.	
	No. of speeds:			
	- Forward	:	08	
	- Reverse	:	02	
	Location of gear shifting levers	:	Main gear shifting lever and range selector lever is located in front of operator's seat respectively.	
	Gear shifting pattern in case of base and variant models	:	 Main Gear Selection Lever	 High-Low Range Selection Lever
	Oil capacity, (l)	:	52.0 (Common with differential , final drive rear axle & hydraulic system)	40.7
	Oil changing period		After every 1600 hours of operation.	
3.1.12.3	**Range of nominal Speed, (Kmph) :**			
	- Forward	:	2.21 to 28.67	2.44 to 28.70
	- Reverse	:	2.63 to 10.35	3.05 to 11.99
3.1.12.4	**Differential:**			
	Type	:	Crown wheel and bevel pinion with differential assembly accommodated inside the differential housing.	
	Reduction through crown wheel and pinion	:	3.231 : 1 (42/13T)	
	Differential lock	:	**Not Provided**	
3.1.12.5	**Rear axle and Final Drive :**			
	Type	:	Bull and pinion gear reduction unit accommodated inside the differential housing.	
	Reduction through final drive	:	4.462 : 1 (58/13T)	
	Oil capacity of final drive, (l)	:	52.0 (Common with gear box, differential and hydraulic systems)	40.7
	Oil changing period	:	After every 1600 hours of operation.	

			Base Model	Variant Model
3.1.13	**Power lift (Hydraulic System):**			
	Make	:	Swaraj	
	Type	:	Open centre, live, ADDC	
	No. and type of cylinder	:	One, single acting	
	Type of linkage lock for transport	:	Hydrostatic, isolating valve in its fully closed position acts as transport lock	
	Hydraulic pump:			
	-Make	:	Dynamatics	
	-Type	:	Gear	
	-Location & drive	:	On RHS of engine, through timing gears.	
	Hydraulic oil capacity, (l)	:	52.0	40.7
			(Common with gear box, differential, rear axle and final drive systems)	
	Oil change period	:	After every 1600 hours of operation.	
	Provision for external tapping	:	Provided	
	Details of control levers	:	i) Position control lever (black) ii) Draft control lever (red) iii) Isolating valve knob on distributor.	
	Method of draft sensing	:	Through top link	

3.1.13.1 **Three-point linkage**:

S. No.	Observations	As per IS: 4468-(Part-1) -1997 (Reaffirmed in Oct., 2017) **(Cat.I / Cat.II)**,(mm)	As measured (mm)		**Remarks in case of variant model**
			Base model	**Variant model**	
1	2	3	4 (a)	4 (b)	5
I	**Upper hitch points:**				
	a) Dia of hitch pin hole	19.30 to 19.50/ 25.70 to 25.90	26.0	25.8	Conforms to Cat. I & II
	b) Width of ball	44.0 (max.) / 51.0 (max.)	51.0	50.9	Conforms to Cat. I
II	**Lower hitch points:**				
	a) Dia of hitch pin hole	22.40 to 22.65 / 28.70 to 29.00	29.0	29.0	Conforms to Cat. II
	b) Width of ball	34.8 to 35.0 / 44.8 to 45.0	45.0	45.0	--do--
III	Lateral distance from lower hitch point to centre line of tractor.	359 (min.)/435 (min.)	364	364	**Does not Conform**
IV	Lateral movement of lower hitch points	100 (min.)/125 (min.)	120	100	Conforms to Cat. I
V	Distance from end of power take-off to centre of lower hitch point (lower links in horizontal position	450 to 575/ 550 to 625	520	515	--do--
VI	Transport height	820 (min.)/950 (min.)	960	905	--do--
VII	Power range(without force)	560(min)/650 (min)	590	625	--do--

1	2	3	4 (a)	4 (b)	5
VIII	Leveling adjustment	100 (min)/100 (min)	480	435	Conforms to Cat. I & II
IX	Lower hitch point clearance	100 (min)/100 (min)	180	210	--do--
X	Lower hitch point height	200 (max)/200 (max)	200	170	--do--

3.1.13.2 Drawbar:

3.1.13.2.1 Linkage Drawbar {Refer Fig.1}:

Notation	As per IS: 12953-1990, (Cat.I) / (Cat.II), (mm)	As measured, (mm)		Remarks in case of variant model
		Base Model	Variant Model	
1	2	3 (a)	3 (b)	4
A	683 ± 1.5 / 825 ± 1.5	682	683	Conforms to Cat. I
B	75 (min) / 75 (min)	75.0	75.9	Conforms to Cat. I & Cat. II
C	30 (min) / 30 (min)	35.0	30.0	--do--
DØ	21.79 to 22.0 / 27.79 to 28.00	28.0	27.9	Conforms to Cat. II
E	39.0 (min) / 49.0 (min)	56.4	53.4	Conforms to Cat. I & Cat. II
FØ	12.0 (min) / 12.0 (min)	12.7	12.0	--do--
G	15.0 (min) /15.0 (min)	16.0	16.6	--do--
HØ	25 ± 1 / 25 ± 1	24.9	25.5	--do--
J	80 ± 1.5 / 80 ± 1.5	80.0	80.4	--do--
No. of holes	7 / 9	07	07	Conforms to Cat. I

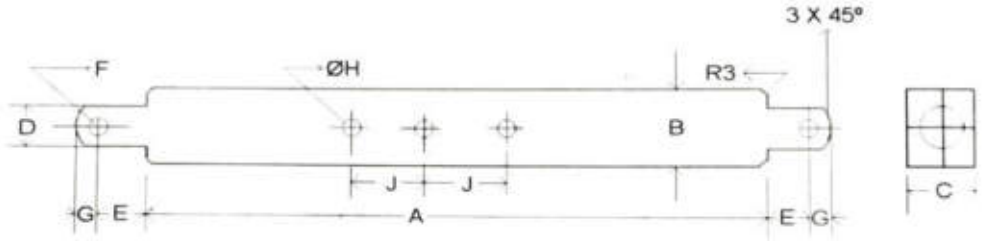


Fig. 1: DIMENSIONAL NOTATIONS FOR LINKAGE TYPE DRAWBAR

			Base Model	Variant Model
3.1.13.2.2	**Swinging drawbar**	:	**Not provided**	
3.1.13.2.3	**Provision to attach trailer brake valve assembly**	:	**Not provided**	
3.1.14	**Power take-off shaft:**			
	Type	:	Type-I, Not independent	
	Method of engaging	:	By a hand lever provided on LHS of operator's seat.	
	No. of shaft(s)	:	One	
	PTO speed corresponding to rated engine speed, (rpm)	:	588	
	Distance behind rear axle, (mm)	:	355	360
	Engine to PTO speed ratio	:	3.0625: 1	
	Whether the PTO shaft is capable of transmitting the full power of engine	:	Yes	

3.1.14.1 Specification of power take-off shaft:

Specification	As per IS: 4931-1995 (Type-I)	As observed		Remarks in case of variant model
		Base Model	**Variant Model**	
1	**2**	**3 (a)**	**3 (b)**	**4**
Nominal speed, (rpm)	540 ± 10	540 rpm of PTO corresponding to 1654 rpm of engine	540 rpm of PTO corresponding to 1654 rpm of engine	Conforms
No. of splines	6	6	6	--do--
Direction of rotation	Clockwise	Clockwise	Clockwise	--do--
Location	The position of the centre of the end of PTO shaft shall be within 50 mm to right or left of the centre line of the tractor	08 mm towards left side from Centre median plane	08 mm towards left side from Centre median plane	--do--
Dimensions, (mm) [See Fig. 2]:				
DØ	34.79 ± 0.06	34.76	34.79	Conforms
dØ	28.91± 0.05	28.87	28.93	--do--
BØ	29.4 ± 0.1	29.37	29.44	--do--
AØ (Optional)	8.3± 0.1	8.34	8.30	--do--
W	8.69 - 0.09 - 0.16	8.56	8.56	--do--
a	7	7	7	--do--
b (optional)	25 ± 0.5	25.34	25.0	--do--
c	38	38	38	--do--
X	30°	30°	30°	--do--
B	76 (min)	81	81	--do--
h	450 to 675	600	600	--do--

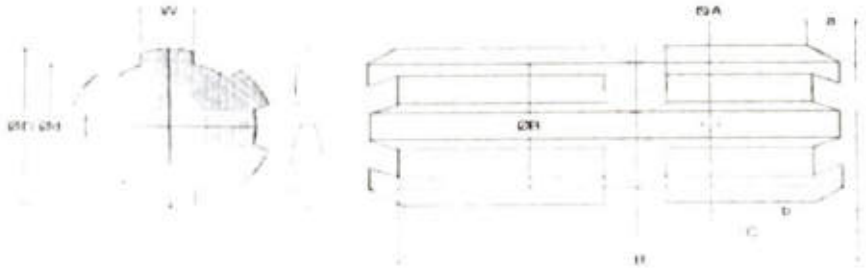


Fig. 2: DIMENSIONAL NOTATIONS FOR TYPE-I POWER TAKE-OFF SHAFT

		Base Model	**Variant Model**
3.1.14.2	**PTO Master Shield** :	**Provided**	
3.1.15	**Towing hitch:**		
3.1.15.1	**Front:**		
	Type :	Clevis	
	Location :	At front on front engine support bracket	
	Height above ground level, (mm) :	635 (fixed)	575 (fixed)
	Number of positions :	01	
	Type of adjustment :	None	
	Dia of pin hole, (mm) :	26.0	33.3
	Width of clevis, (mm) :	63.5	62.9

			Base Model	Variant Model
3.1.15.2	**Rear:**	:	Clevis	
	Type	:	At the rear of transmission housing	
	Location	:		
	Height above ground level, (mm):			
	-Maximum	:	775	855
	-Minimum	:	515	505
	Number of positions	:	06	
	Type of adjustment	:	By changing and reversing the position of hitch on its mounting bracket	
	Distance of hitch point, (mm):			
	- From rear axle centre	:	455	
	- From power take-off shaft end	:	90	
	Dia of pin hole, (mm)	:	34.6	34.5
	Width of clevis, (mm)	:	92.0	80.0
3.1.16	**Steering:**		Rane	
	Make	:	Mechanical, worm & roller with single drop arm	
	Type	:	Above clutch housing	
	Location	:	Manually, through steering control wheel	
	Method of operation	:	420	
	Diameter of steering control wheel, (mm)	:		
	Capacity, (l)	:	0.6	0.5
	Oil change period	:	After every 1600 hours of operation.	
3.1.17	**Brakes:**			
3.1.17.1	**Service Brake:**			
	Make	:	M&M Ltd., Swaraj Division (apa)	
	Type	:	Mechanical, dry disc brake	
	Location	:	On differential half axle shaft outside the differential housing.	
	No. of friction disc(s)	:	Two (on each wheel side)	
	Area of liners, (cm^2)	:	735.2 (on each wheel side)	
	Material of liners	:	Asbestos molded (apa)	
	Method of operation	:	Independent or combined pedal operation by right foot.	
3.1.17.2	**Parking Brake:**			
	Type	:	Paul & Ratchet arrangement	
	Location & method of operation	:	Service brake acts as parking brake when locke in position by a hand lever provided on RHS the foot rest.	
3.1.18	**Wheel Equipment:**			
3.1.18.1	**Steered Wheel(s):**			
	Make	:	Good Year	Apollo Krishak
	Number(s)	:	Two	
	Type of tyre(s)	:	Pneumatic, ribbed	
	Size	:	6.00 - 16	
	Ply rating	:	8	
	Maximum permissible loading capacity of each tyre at 200 kPa pressure, (kgf)	:	410	

			Base Model	Variant Model
	Recommended inflation pressure, (kPa):			
	- for field work	:	200	
	- for transport	:	200	
	Standard track width, (mm)	:	1320 (Std.), & 1520	1315 (Std.) & 1515
	Method of changing track width	:	By reversing the wheel discs.	
	Make & size of wheel rim	:	SSWL, 4.5E x 16	
3.1.18.2	**Drive wheel(s):**			
	Make	:	MRF, Shakti Life	Apollo Krishak
	Number(s)	:	Two	
	Type of tyre(s)	:	Pneumatic, traction	
	Size	:	13.6-28	
	Ply rating	:	12	
	Maximum permissible loading capacity of each tyre at inflation pressure recommended for road work, (kgf)	:	1120	
	Recommended inflation pressure, (kPa):			
	- For field work	:	90	
	- For transport	:	103	
	Track width, (mm)	:	1385, 1405 (Std.), 1495, 1615, 1715, 1735 & 1835	1285, 1395 (Std.), 1415, 1515, 1615, 1725, 1745 & 1845
	Method of changing track width	:	By reversing wheel disc and changing the position of disc on offset rim lugs	
	Make & size of wheel rim	:	SSWL, W12 x 28	
3.1.18.3	**Wheel base, (mm)**	:	2070	
	Method of changing wheel base, if any, and range.	:	**None**	
3.1.19	**Operator's seat:**			
	Make	:	M & M Swaraj Division (apa)	
	Type	:	Cushioned seat with back rest	
	Type of suspension	:	Two helical coil springs	
	Type of dampening	:	Hydraulic shock absorber	
	Range of adjustment, (mm):			
	- Vertical	:	± 15	NIL
	- Lateral	:	NIL	
	- Longitudinal	:	± 65	± 60

3.1.20 Provision for safety and comfort of operator:

3.1.20.1 Conformity with IS: 12343 – 1998 (Reaffirmed in 2014) :

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

Base model	Variant model
i) Vertical adjustment upward & downward from the mid position.	i) Vertical adjustment upward & downward from the mid position.

3.1.20.2 Conformity with IS: 6283 (Part 1 & 2)-1998 (Re-affirmed in March 2014):

All the controls are identifiable with symbols as per IS: 6283 (Part-1 & 2)-1998**(Re-affirmed in March 2014), except the following:**

Base model	Variant model
i) Symbol of starting switch.	--

3.1.20.3 Conformity with IS: 8133-1983 (Reaffirmed in 2014):
Location and movement of various controls meets the requirement of IS: 8133, 1983), **except the following:**

Base model	Variant model
--	i) Fuel shut-off knob does not remain in "stop" position.
--	ii) Differential lock has not been provided.

3.1.20.4 Conformity with IS: 12239 (Part -1)- 1996 (Reaffirmed in October,2017):
Meets the requirements of IS: 12239 (Part-1)-1996 (Reaffirmed in **October,2017**) **except the following:**

Base model	Variant model
i) Width of foot step is less than 200 mm.	i) Width of foot step is less than 20 mm.
ii) Provision of spark arresting device in the exhaust system.	ii) Provision of spark arresting device the exhaust system.

3.1.20.5 Conformity with IS:12239 (Part-2)-1999 (Re-affirmed in 2014) :
Meets the requirements of IS:12239 (Part-2)-1999, **except the following:**

Base model	Variant model
i) The working clearance between position control lever and draft control lever is less than 70 mm.	i) The working clearance betwee position control lever and draft contr lever is less than 70 mm.

3.1.20.6 Conformity with IS: 14683-1999 (Reaffirmed in March 2014):
Lighting meets the requirement of IS: 14683-1999 (Reaffirmed in March 2014):

3.1.20.7 Rear view mirror:
Rear view mirror has been provided

3.1.20.7 Slow moving emblem:
Slow moving emblem has been provided.

3.1.21 Labelling of tractor as per IS: 10273-1987 (Reaffirmed in 2014):
Locations of labelling plate: The labelling plate is riveted on LHS of the gearbo housing and provides the following information:

Name of Manufacturer	**SWARAJ DIVISION TRACTORS MAHINDRA & MAHINDRA LTD.**
Make	SWARAJ
Model	735 FE e R
Month & Year of manufacture	09 & 20
Engine Serial Number	CJ.1354/LL009745
Chassis Serial Number	MBNAK28AGLTL56508
Maximum P.T.O Power, kW	24.1
Specific fuel consumption, g/kWh	258

3.1.22 **Mass of tractor, (kg):**

	Base model			Variant model		
	Front	Rear	Total	Front	Rear	Total
- Without ballast	670	1190	1860	670	1180	1850

3.1.22.1 **Standard ballast, if any** : None

3.1.23 **Over all dimensions, (mm):**

- Length	:	3475	3410
- Width	:	1770	1765
- Height (with exhaust pipe)	:	2220	2200
Minimum ground clearance	:	410 (below differential housing)	400 (below differential housing)

3.1.24 **Number of external lubricating points:**

- Oiling	:	Nil
- Grease cups	:	02
- Grease nipples	:	19

3.1.25 **Colour of tractor:**

Chassis & engine	:	Smoke grey
Bonnet & Mudguard	:	Blue
Wheel discs & rims	:	Cream yellow

3.2 NOMINAL SPEED TEST

Movement	Gear No.	No of engine revolutions for one revolution of driving wheel		Nominal speed at rated engine speed when fitted with **13.6 – 28** size tires of **610 mm** radius index, (kmph)		Variation in nominal speed in case of variant model (%)
		Base model	**Variant model**	**Base model**	**Variant model**	
1	2	3	4	5	6	7
Forward	L1	187.40	169.49	2.21	2.44	+10.4
	L2	137.56	128.81	2.99	3.21	+7.4
	L3	83.30	72.44	4.97	5.70	+14.7
	L4	56.75	56.75	7.29	7.29	0.0
	H1	47.53	43.01	8.70	9.63	+10.7
	H2	35.15	32.67	11.81	12.68	+7.4
	H3	21.16	18.32	19.59	22.63	+15.5
	H4	14.42	14.42	28.67	28.70	+0.1
Reverse	LR	157.56	135.60	2.63	3.05	+16.0
	HR	40.01	34.47	10.35	11.99	+15.9

3.3 PTO PERFORMANCE TEST

S. No.	Particulars	**Base Model**	**Variant Model**
1.	Date(s) of test	30.01.2018 & 31.01.2018	01.02.2021
2.	Tractor run prior to start of PTO test, (h)	0.8	1.0
3.	Dynamometer test bench used	SAJ-AG 250 Eddy Current	SAJ-AG 250 Eddy Current

Maximum power two hours test under natural ambient condition was conducted. The results of Power take-off performance test under natural ambient of base & variant models are tabulated in **Table-1.**

Table -

Tractor	Power, (kW)	Speed, (rpm)		Fuel Consumption			Specific energy, (kWh/l)
		PTO	Engine	(l/h)	(kg/h)	(kg/kWh)	
1	2	3	4	5	6	7	8
a) Maximum power - 2 hours test (under natural ambient condition):							
Base model	24.0	588	1800	6.79	5.68	0.237	3.54
Variant model	24.4	571	1749	7.11	5.95	0.244	3.43
b) Power at rated engine speed :							
Base model	24.0	588	1800	6.79	5.68	0.237	3.54
Variant model	24.0	588	1801	7.08	5.92	0.247	3.39
c) Power at standard power take-off speed (540 ± 10):							
Base model	23.3	540	1653	6.52	5.45	0.233	3.59
Variant model	24.1	540	1654	6.97	5.83	0.242	3.46

Sl. No.	Parameters	Base Model		Variant Model
		Natural Ambient	High Ambient	Natural Ambient
i)	-No load maximum engine speed, (rpm)	1969	1963	1930
ii)	-Equivalent crankshaft torque at maximum power, (Nm)	127.5	122.1	133.3
iii)	-Equivalent crankshaft torque at rated power, (Nm)	127.5	122.1	127.4
iv)	-Maximum equivalent crankshaft torque, (Nm)	163.3	152.6	163.8
v)	-Engine speed at maximum equivalent crankshaft torque, (rpm)	949	949	1002
vi)	- Back up torque, (%)	28.1	25.0	28.6
vii)	**-Smoke level**, maximum light absorption coefficient (per meter)	0.29	--	--
vii)	**- Range of atmospheric conditions:**			
	Temperature, (°C)	27 to 32	41 to 44	27 to 29
	Pressure, (kPa)	99.2 to 99.5	99.7 to 100.7	99.6 to 99.9
	Relative humidity, (%)	43 to 61	22 to 27	38 to 40
viii)	**- Maximum temperatures, (°C):**			
	Engine oil	93	108	99
	Coolant	81	98	88
	Fuel	44	60	48
	Air intake	32	48	32
	Exhaust gas	438	458	538
ix)	**- Pressure at maximum power:**			
	Intake air, (kPa)	2.2	2.2 to 2.3	1.9 to 2.0
	Exhaust gas, (kPa)	2.8 to 3.1	3.1 to 3.7	8.8 to 9.7
x)	**- Consumptions:**			
	Lub oil, (g/kwh)	--	0.52	--
	Coolant (% of total coolant capacity)	--	0.61	--

5. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

S. No.	Adjustments/Defects/Breakdowns and Repairs	Tractor run hours
	--- None ---	

6. COMPARISON BETWEEN BASE MODEL AND VARIANT MODEL (Based on Table 2 & 3 of Indian Standard 12207: 2019)

Sl. No.	Clause No	Features	Observation on base model (T-1211/1738/2019, (January) & Commercial Administrative Extension test report No.T-1346/1873/2020,released in (March, 2020))	Observation on variant model	Remarks
1	2	3	4	5	6
1.	i)	**Clutch:**			
		Single/dual/dry/ wet/ independent clutch/increase in size of clutch	Single, dry friction disc	Single, dry friction disc	No change
2.	ii)	**Air cleaner:**			
		- **Type**	Oil bath		No change
		- **location**	On LHS of engine, outside the bonnet		
		Range of suction pressure at maximum power, (kPa)	2.2	1.9 to 2.0	**Changed**
3.	iii)	**Exhaust system**	Up-draught (cylindrical)	Up-draught (cylindrical)	No change
	a)	**Position of silencer outlet w.r.t SIP, mm:**			
		-Downward	905	900	**Changed**
		-Longitudinal	1460	1500	**Changed**
		-Lateral	480 on RHS	430 (on RHS)	**Changed**
	b)	Range of exhaust gas pressure at maximum power (kPa)	2.8 to 3.1	8.8 to 9.7	**Changed**
4.	iv)	**Gear Box:**			
		- Type	Mechanical, sliding mesh spur gear with planetary high-low range selection unit.		No change
5.	v)	**Reduction ratio of transmission:**			

Movement	Gear	Base model	Variant model	Variation (%)	Remarks
Forward	L1	187.40	169.49	+10.41	**Changed**
	L2	137.56	128.81	+7.36	**--do--**
	L3	83.30	72.44	+14.69	**--do--**
	L4	56.75	56.75	0.00	**--do--**
	H1	47.53	43.01	+10.69	**--do--**
	H2	35.15	32.67	+7.37	**--do--**
	H3	21.16	18.32	+15.52	**--do--**
	H4	14.42	14.42	+0.10	**--do--**
Reverse	RL	157.56	135.60	+15.97	**--do--**
	RH	40.01	34.47	+15.85	**--do--**

Range of speeds (kmph):			
- Forward	2.21 to 28.67	2.44 to 28.70	**Changed**
- Reverse	2.63 to 10.35	3.05 to 11.99	**Changed**
- Additional no. of speed	None	None	No Change

1	2	3	4	5	6
6.	vi)	**Fitment of accessories:**			
		- Expansion tank	Provided	Provided	No change
		- Air compressor	None	None	No change
		- Oil coolers	None	None	No change
		- Radiator	Provided	Provided	No change
		- Bare radiator capacity, (l)	2.7	2.7	No change
		- Total coolant capacity,(l)	8.2	7.4	Changed
7.	vii)	**Brake system:**			
		Type	Mechanical, dry disc brake		No change
		No of friction disc(s)	Two (on each wheel side)		No change
		Area of liners, (cm^2)	735.2 (on each wheel side)		No change
8.	viii)	**Type of three-point linkage:**			
		Type	Cat.I/Cat.II	Cat.I/Cat.II	No change
		Rear/front mounted	Rear mounted	Rear mounted	No change
9.	ix)	**PTO shafts:**			
		Location	Centrally located	Centrally located	No change
		Type	Type-I, Not Independent	Type-I, Not Independent	No change
		Speed corresponding to rated engine speed, (rpm)	588, Clockwise rotation	588, Clockwise rotation	No change
		Anticlockwise rotation speed (rpm)	Provided	Provided	No change
10.	x)	**Type of drive:**	2 WD	2 WD	No change
11.	xi)	**Hydraulic System:**			
		Location & type of Hydraulic pump drive	Same configuration in Base & Variant models refer para 3.1.13		No change
12.	xii)	**Positioning of Hydraulic Sensing Mechanism:**			
		Lower link, top link, etc.	Through top link	Through top link	No change
13.	xiii)	**Rear Final Reduction:**	4.462 : 1 (58/13T)	4.462 : 1 (58/13T)	No change
14.	xiv)	**Type of fuel Injection pump:**			
		Inline/Rotary/Common rail	Inline	Inline	No change
15.	xv)	**Changes related to engine parameters (as per Table-3):**			
	a)	Engine operating principle (spark/ compression ignition, two/four stroke)	Compression Ignition, 4 strokes	Compression Ignition, 4 strokes	No change
	b)	Number & arrangement of cylinders	Three, vertical inline	Three, vertical inline	No change
	c)	Maximum declared PTO power, (kW)	24.1	24.1	No change
	d)	Engine displacement, (cc)	2734	2734	No change
	e)	Rated engine speed,(rpm)	1800	1800	No change
	f)	Naturally aspirated/turbo charged	Naturally aspirated	Naturally aspirated	No change

1	2	3	4	5	6
16.	xvi)	**Change related to ergonomics, safety comfort, and statutory / regulatory requirements:**			
	a)	IS: 10273	Conformed	Conforms	No change
	b)	IS: 4931	Conformed	Conforms	No change
	c)	IS: 4468	**Did not conform**	**Does not conform**	No change
	d)	IS: 12953	Conformed	Conforms	No change
	e)	IS:12343	**Did not conform**	Conforms	**Changed**
	f)	IS:12239 (Pt-I)	**Did not conform**	**Does not conform**	No change
	g)	IS:12239 (Pt-II)	**Did not conform**	**Does not conform**	No change
	h)	IS:8133	**Did not conform**	**Does not conform**	No change
	i)	IS: 6283	**Did not conform**	**Does not conform**	No change
	j)	IS:14683	Conformed	Conforms	No change
17.	xvii)	**Other changes:**			
	a)	**Wheel equipments:**			
		Track width of steered wheel, mm	1320 (Std.), & 1520	1315 (Std.) & 1515	**Changed**
		Track width of drive wheel, mm	1385, 1405 9Std.), 1495, 1615, 1715, 1735 & 1835	1285, 1395 (Std.), 1415, 1515, 1615, 1725, 1745 & 1845	**Changed**
		Wheel base, (mm)	2070	2070	**Changed**
	b)	Overall length, width & height (mm)	3475/1770/2220	34101765/2200	**Changed**
	c)	Unballast mass of tractor,(kg), Front/Rear/Total	670/1190/1860	675/1180/1850	**Changed**

7. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

7.1 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: 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 require-ments (Yes/No)
				Base model	**Variant Model**	**Base model**	**Variant model**	
1	2	3	4	5a	5b	6a	6b	7
7.1.1	**PTO Performance:**							
a)	Maximum power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: ±5 percent for PTO power and engine power>26kW. ±10 percent for PTO power and or engine ≤ 26 kW.	24.1 (D)	24.1 (D)	24.0	24.4	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	24.1 (D)	24.1 (D)	24.0	24.0	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+10 %	258 (D)	258 (D)	237	244	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	150 (D)	150 (D)	163.3	163.8	Yes
e)	Back-up torque, (%)	Evaluative	12 %, min.	12 %, min(R)	12 %, min(R)	28.1	28.6	Yes

1	2	3	4	5 a	5 b	6 a	6 b
7.1.2	**Safety features :**						
a)	Guards against moving and hot parts	Evaluative	Belt drives, pullies, silencer, hydraulic pipes (As per IS 12239 (Part2)		--	Meets the requirement	
b)	Lighting arrangement	Evaluative	As per CMVR		--	Meets the requirement	
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)		--	Meets the requirement	
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)		--	Meets the requirement	
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 meets the requirement**	
f)	Specifications of linkage drawbar	Evaluative	Should meet the requirements of IS: 12953 (As amended from time to time)		--	Meets the requirement	
g)	Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirement of IS: 12362 (Part 3) (As amended from time to time)		--	**Not Provided**	
h)	1) Maximum travelling speed at rated engine speed in reverse gears, Kmph	Evaluative	Should not exceed 20 Kmph		--	11.99 kmph (Meets the requirement)	
	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**	

7.1.3	**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 and next two digits in box No.2 for YY will represent the year of Manufacturing.	--	SWARAJ	Yes
	2)	Model	Evaluative		--	735 FE e R	Yes
	3)	Month & Year of manufacture	Evaluative		--	09 & 20	Yes
	4)	Engine number	Evaluative		--	CJ.1354/LL 009745	Yes
	5)	Chassis number	Evaluative		--	MBNAK28AGLT L56508	Yes
	6)	Declaration of PTO power, (kW)	Evaluative		--	24.1	Yes
7.1.4	**Literature (Submission to test agency):**						
(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
7.1.5	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	Provided	**Not fitted**	**Not applicable**
7.1.6	Standard accessories		Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Provided	Yes
7.1.7	Accessories (Optional)		Non Evaluative	Ballast weights if fitted should meet the requirement of CMVR.	Provided	Provided	Yes
7.2	**CATEGORY OF BREAKDOWNS / DEFECTS :(As per clause 5.0 of IS-12207-2019):**						
Sl. No.	**Category of breakdowns**		**Category (Evaluative / Non Evaluative)**	**Requirements as per IS: 12207-2019**		**As observed**	**Whether meets the requirement (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

7.3 **Salient Observations:**

7.3.1 **Laboratory tests:**

7.3.1.1 **PTO performance:**

i) The maximum PTO power was recorded as **24.4 kW** against the declaration o **24.1 kW**, which meets the evaluative requirement of IS: 12207-2019.

ii) The specific fuel consumption corresponding to maximum power was recorde as **244 g/kWh** against the declaration of **258 g/kWh**, which meets the evaluative requirement of IS: 12207-2019.

iii) The maximum equivalent crankshaft torque was recorded as **163.8 N-m** against the declaration of **150 N-m**, which meets the non-evaluativ requirement of IS: 12207-2019.

iv) The backup torque was observed 28.6% & meets the evaluative requirement o IS: 12207-2019.

7.3.1.2 **Three point linkage :**

i) The lateral distance from lower hitch point to centre line of tractor and lowe hitch point height does not meet the requirement of IS: 4468 (part-1):199 (Reaffirmed in Oct., 2017). This may be looked into for necessary correctiv action.

ii) Some of the parameters conform to Cat I and some of them conform to Cat. Keeping in view the spirit of standardization, necessary improvements may b incorporated.

7.3.1.3 **Operator's work place:**

Operator's work place meets the requirements of IS: 12239 (Part-1 & Part-2) 199 **except the following**:

i) Provision of spark arresting device in the exhaust system.

ii) The working clearance between position control lever and draft control lever less than 70 mm.

7.3.1.4 **Location of operator's controls with regard to safety:**

Location of operator's controls with regard to safety meets the requirements of 8133-1983(Reaffirmed 2014), **except the following**:

i) Provision of differential lock in the tractor.

ii) Fuel shut-off knob does not remain in stop position.

7.4 **Maintenance / Service problems:**

No noticeable maintenance and service problems was observed during the test.

7.5 **Recommendation with regard to safety on tractor:**

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

i) Provision for spark arresting device in exhaust system.

ii) The working clearance between position control lever and draft control le should be as per the minimum requirements of relevant Indian Standard easy operating the lever.

iii) Provision of PTO shaft master shield on tractor to avoid the accident.

iv) Differential lock may be provided

7.6 **Adequacy of Literature:**

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

a) Operator's manual of SWARAJ 735 FEe R tractor.
b) Parts catalogue of SWARAJ 735 FEe R tractor.
c) Service Manual of SWARAJ 735 FEe R tractor.

The results of the tests carried out on variant model **"Swaraj 735 FEe R"** Tractor have been compared with those on base model **"Swaraj 735 FE"** Tractor tested vide test report **No. T- 1211/1738/2019 (January)** and found within the limit, as specified in Indian Standard: 12207-2019.

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	3 Month (December, 2020 to February, 2021)	Yes	None

TESTING AUTHORITY:

SHWETABH SINGH
AGRICULTURAL ENGINEER

C.V. CHIMOTE
TEST ENGINEER

28.4.24

MAHESH CHANDRA
DIRECTOR (I/C)

9. APPLICANT COMMENT'S

Para No.	Our Reference	Applicant's comments
9.1	3.1.20.1, 3.1.20.3, 3.1.20.4, 3.1.20.5 & 7.3.1.3	These requirements are being revisited for necessary corrective action at our end.
9.2	7.3.1.2, 7.3.1.4 & 7.5	Study and trials are under progress for necessary corrective action.

ANNEXURE -I

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	PTO performance test	4.4
4.	Nominal speed test	0.8
B	Miscellaneous test and other run hours including idle run, transportation, preparation for test and trial runs.	0.5
	TOTAL:	5.6