व्यावसायिक परीक्षण रिपोर्ट COMMERCIAL TEST REPORT (Initial)

संख्या / No. : T-961/1479/2015 माह / Month : March, 2015



PREET 6549 TRACTOR



भारत सरकार

GOVERNMENT OF INDIA

कृषि मंत्रालय (कृषि एवं सहकारिता विभाग, मशीनीकरण एवं प्रोद्योगिकी 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)

ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५ TRACTOR NAGAR, BUDNI (M.P.) 466445

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PREET 6549 TRACTOR - Commercial (Initial)



Manufacturer

Test requested by Duration of running-in, (h): - Engine - Transmission

Method of Selection:

: M/s. Preet Tractors Pvt. Ltd. Post Box No. 28. Patiala Road, Nabha-147 201 (Punjab)

- : The manufacturer
- 32 :

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: The test sample was selected by the applicant hence method of selection is not known.

SPECIFICATIONS

1.

1.1	Tractor:		
	Make		PREET
	Model		
	Variants : -		Not Declared
	Brand name		N.A.
	Туре		
		•	Four wheeled, rear-wheel drive, standard, agricultural tractor.
	Year of manufacture		2014
	Chassis number		
	Country of origin	:	India
1.2	Engine:		
	Make	:	PREET
	Model	:	6549
	Туре		
			Four stroke, water cooled, direct injection naturally aspirated diesel engine.
	Engine Serial number		P 465 00007
1.2.1	Engine speed (Manufacturer's		
	recommended production set	tina) (r	om):
	 Maximum speed at no load 		2350 to 2450
	 Low idle speed 	2	600 to 700
	 Speed at max. torque 		1200 to 1400
	Rated speed, (rpm):		1000 10 1400
	- For PTO use		2200
	- For drawbar use	1	2200
1.3	Cylinder & Cylinder Head:		
	Number		Four
	Disposition		
	Bore/stroke, (mm)		Vertical, inline
	Capacity as specified by the		105/ 118
	applicant, (cc)	:	4088 (apa)
	Compression ratio		18.5 : 1
	Type of cylinder head		Individual
	Type of cylinder liners		
	Type of combustion chamber		Wet, replaceable
	Arrangement of valves	:	Re-entrant cavity on piston crown
			Overhead, Inline
	Valve clearance (mm) - Inlet valve		Cold) (Hot):
	- Exhaust valve		0.30 0.30
		: (0.40 0.40

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16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

16.1 Evaluative (mandatory) / Non-evaluation (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:

		rized as ur					-
S. No.	Charad	cteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2008	Values declared by the applicant/ requirement	As observed	Whether meets the require- ments (Yes/No.)
1		2	3	4	5	6	7
16.1.1	PTO Pe	rformance	:				
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 or-5 / +10% for Engine power >26 kW. $-7.5/+10\%$ for Engine power ≤ 26 kW	42.0	41.1	Yes
b)	Power a engine s	it rated speed, (kW)	Non Evaluative	-do-	42.0	40.2	Yes
c)	(g/kWh)	ption nding to m power,	Non Evaluative	± 5%	280	276	Yes
d)	Maximum equivalent crankshaft torque, (Nm)		Non Evaluative	± 8%	250	229.53	No
e)	Back-up torque, percent		Non Evaluative	10 percent, min.	20 (D)	22.74	Yes
f)	Maximu	im operatin	g temperature	(⁰ C)			I
.,		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.	120	126	No
	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.	110	109	Yes
g)	Engine oil consumption, (g/kWh)		Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.76 (R) 2 (D)	0.61	Yes
h)	Smoke I	evel	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 meter (R)	0.32 (per meter)	Yes

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1		2	3	4	5	6	7
16.1.2	Drawba	ar performanc	-	4	5	U	1
a)	Max. o with corresp	drawbar pull ballast oo-nding to rcent wheel	Non Evaluative	Minimum 65% of static mass with ballast	21.04 (R) 25.0 (D)	27.0	Yes
b)	Max. drawbar pull with un- ballasted correspo-nding to 15 percent wheel slip, (kN)		Evaluative	Minimum 65% of static mass of tractor without ballast/ with standard ballast	14.79 (R) 17.0 (D)	18.0	Yes
c)	Maximum drawbar power without ballast, (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.	32.9 (R) 34.0(D)	33.0	Yes
d)	Maximum transmission oil temperature (°C)		Non Evaluative	The declared value should not exceed the maximum value specified by oil company	90 (D)	89	Yes
16.1.3	Power	lift and hyd	raulic pump	performance:			
a)	Maximu	im lifting capa	city throughou	t the range of lift, (kN):			
	1)	At hitch points	Non Evaluative	[Tolerance of minus 10%]	17.5 (D)	14.3	Yes
	2)	With the standard frame	Evaluative	The lift capacity should at least be 24 kg/PTO kW. and it should be 21.5	9.67 (R)	14.2	Yes
				kg/engine kW where the tractor is not provided with a PTO shaft	13.0 (D)		
b)	height o applicatio after ea interval duration (mm)	n drop in the f the point of on of the force ch 5 minutes for a total of 30 minute,	Non Evaluative	The observed value should not exceed 50 mm	50 (D)	65	No
16.1.4	Brake	performance	at 25 kmph:	-			
a)	Maximu (m):	im stopping di		ce, equal to or less that	an 600 N on b	rake pedal wit	h ballast,
	1)	Cold brake	Evaluative	10	10	6.37	Yes
b)	2) Maximi	Hot brake	Evaluative	10	10	6.47	Yes
U)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)		600	600	142 to 163	Yes	
C)	Whether brake is force of	effective at a 600 N at foot or 400 N at	Evaluative	Yes / No	Yes	Yes	Yes

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1		2	3	4	5	6	7
16.1.5	Noi	se measurement	-	•	Ū	.	<u> </u>
a)	nois	kimum ambient se emitted by tractor dB(A)	Evaluative	As per CMVR	88	84	Yes
b)	Max ope dB(kimum noise at rator's ear level A)	Evaluative	As per CMVR	98	94	Yes
16.1.6		plitude of mecha	nical vibrations	at:	r		
	1)	Right foot rest				210	No
	0)	left foot rest	Non	100 microns		170	No
	2)	Seat (with driver seated)	Evaluative	(max.)	100 micron	70	Yes
	3)	Steering control wheel		(1100.0)	(max)	220	No
16.1.7	Нац	lage requirement	ts :				
a)		ss mass of the trai					
,	1)	Two wheel	Non		5.0	5.0	Yes
	2)	Four wheel	Evaluative		8.0	8.0	Yes
b)		ance travelled / lit		nption, (km/l):			
	1)	Two wheel	Non		7.0	5.22	No
	2)	Four wheel	Evaluative		7.0	4.10	No
c)	гие 1)	Two wheel	km/tonne).		35.0	30.87 to	Yes
	''	1 WO WIICCI	Non		33.0	33.09	103
	2)	Four wheel	Evaluative		35.0	30.64 to	Yes
	,					31.57	
16.1.8		tland cultivation :		1			T
		lling for the	Evaluative	The identified assemblies should	The		
		wing assemblies: Clutch assembly	-do-	essentially meet the	manufa- cturer has	Manufacture	
	1)	Ciulon assembly	-00-	requirement of IS: 11082. No water	recommen	has not	
	2)	Brake housings	-do-	ingress in the identified assembly	ded that the tractor	recommende d the tractor for puddling	Not applicable
	3)	Front axle hubs	-do-	given in column-2. If tractor does not meet the	is not suitable	operation. Hence the	
	4)	Engine Oil	-do-	requirements of wetland cultivation, it may be	for wetland	puddling test was not	
	5)	Transmission Oil	-do-	recommended for dry land operation only.	cultivation	conducted	
16.1.9	Saf	ety features :	•		•	•	
a)	mo\ part		Evaluative	Belt drives, pulley, silencer, hydraulic pipes (As per IS 12239 (part 2)	Conforms	Conforms*	Yes
				and hot parts a			
				the date of impler nentation of Indiar			
		99 (Reaffirmed ir			-		-
b)	Ligh	nting Ingement	Evaluative	As per CMVR		Conforms	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)		Conforms	Yes
d)	Tec requ	hnical uirements for O shaft	Non Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)		Does not Meet the requirements	No
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1		2	3	4	5		6	7
e)		ensions of thre t linkage		Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)	-		Meet the requirements	Yes
f)	Spec linka		of Non Evaluative	Should meet the requirements of			Meet the requirements	Yes
	Swin	ging drawbar		IS 12953 and IS 12362 (Part 3) (As amended from time to time)			Not Provided	Not applicable
16.1.10				f labelling plate):				
	1)	Make	Evaluative				PREET	Yes
	2)	Model	Evaluative	Should			6549	Yes
	3)	Year of manufactur		conform to the			2014	Yes
	4)	Engine number	Evaluative	requirements of CMVR			5 00007	Yes
	5)	Chas-sis number	Evaluative	along-with declared value of PTO HP		BC	< 6500003	Yes
	6)	Declaration of PTO power, (kW	/)				42.0	Yes
16.1.11		ard limit for:		.	105		405.054	
(a)	diam	nder bore neter, (mm)	Evaluative	To be declared by the manufacturer	105.4		105.05 to 105.07	Yes
(b)	betw & cy	rance veen piston vlinder liner kirt, (mm)	Non Evaluative	-do-	0.78	3	0.154 to 0.174	Yes
(C)	Ring	g end gap (m	m):					
	-	Top comp. ring.		-do-	2.0		0.40 to 0.45	Yes
	-	2 nd comp. ring.	Evaluative	-do-	2.0		0.80 to 0.85	Yes
())	-	Oil ring.		-do-	2.0		0.55 to 0.65	Yes
(d)	Ring	j groove clea	rance (mm):					
	-	Top comp. ring.		-do-	0.35		Tapered	
	-	2 nd comp. ring.	Evaluative	-do-	0.35		0.067 to 0.075	Yes
	-	Oil ring.		-do-	0.35)	0.034 to 0.041	Yes
(e)	Clea	Diametrical	n bearings (mm)	:	0.90		0.086 to 0.135	Yes
	-	clearance	Evaluative	-do-				
/f\	-	Crankshaft end float	Evaluative	-do-	1.00		0.15	Yes
(f)	Clea	Diametri-	end bearings, (n	To be declared by	0.90		.094 to 0.124	Yes
	-	cal	Evaluative	the manufacturer				
(a)	- Claa	Axial rance	Evaluative	-do-	1.00		.20 to 0.25 .083 to 0.106	Yes
(g)	betw	een king and bush,	Non Evaluative	-do-	0.40		.003 (0 0. 100	Yes
(h)	Clea betw	rance reen center and bush,	Non Evaluative	-do-	0.40		0.197 to 0.287	Yes

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16.1.12	Literature (Su	bmission to tes	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
16.1.13	CATEGORY OF BREAKDOWNS / DEFECTS :					
SI. No.	Category of breakdowns	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2014		As observed	Whether meets the requirements (Yes/No.)
1.	Critical	Evaluative	No critical brea	akdown	None	Yes
2.	Major	Evaluative	Not more than two and neither of them should be repetitive in nature		one	Yes
3.	Minor	Evaluative	Not more than five and frequency of each should not be more than two.		One (Mn9)	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		One	Yes

16.2	Optional requirement	ts as per Clause-4 (Table-2) of I	S:12207-2014:	
S. No.	Characteristic	Requirements as per IS: 12207-2014	AS observed	Remarks
1	2	3	4	5
1	Air cleaner oil pull over, max. oil pull over (%)	0.25% (max.)	Dry type	
2.	Seating requirements	Should meet the requirements of IS: 12343-1998	Conforms	Yes
3.	Fitment of ROPS	With a provision for fitment of ROPS. If ROPS fitted it should meet the requirement of IS: 11821-1992	Not provided	
4.	Technical requirements for PTO shaft & its Master shield	Should meet the requirements of IS: 4931 -1995	Does not conform	Νο
5.	Dimensions of three point linkage	Should meet the requirements of IS: 4468 (Part-I)-1997	Does not conform	No
6.	Specifications of linkage drawbar.	Should meet the requirements of IS: 12953-1990	Conforms	Yes
7.	Specifications of swinging drawbar	Should meet the requirements of IS:12362 Part 3-1994.	Not provided	
8.	Accessories	Trailer hitch, front tow hook, linkage drawbar may be provided.	Provided	Yes

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16.3 Conformity with following Indian Standard:

	Comorning with following maran otandard.		
i)	Guidelines for declaration of power and specific fuel consumption and labeling 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)]	:	Does not conform
iii)	Agricultural wheeled tractors - Rear mounted three-point linkage: Part 1 Categories 1, 2, 3 & 4 (fourth revision) [IS 4468 (Part-I):1997 (Reaffirmed in March, 2007)/ISO 730-1:1994]	:	Does not conform
iv)	Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in March, 2007)].	:	Conforms
v)	Agricultural tractors – Operator's seat technical requirement [IS 12343 –1998 (First revision) (Reaffirmed in March, 2009)].	:	Conforms
vi)	Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision) : [IS 12239 (PT-1)-1996 (Reaffirmed in March, 2009)/ISO 4254-1:1989].	:	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 in March, 2009)].	:	Does not conform
viii)	Tractors and machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays [IS: 6283 (Part-1 & Part-2) –2006 & 2007(Reaffirmed in March, 2009)/ ISO 3767-2:1991)].	:	Does not conform
ix)	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
X)	Agricultural Tractor & Machinery Lighting device for travel on public roads (IS: 14683-1999) (Reaffirmed in March, 2009)]	:	Conforms
	Salient Observations:		

16.4 Salient Observations

16.4.1 Laboratory tests:

16.4.1.1 PTO Performance:

- i) The backup torque is 22.74 %.
- ii) Maximum equivalent crankshaft torque, was observed as 229.53 Nm against the declared value of 250 Nm, which is in lower side and not under the tolerance limit. This should be looked into for necessary correction.
- iii) The specific fuel consumption corresponding to maximum power was observed as 276 g/kWh against the specified value of 280 g/kWh which is within the specified limit

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- iv) Maximum oil temperature during 2 hrs max power test in higher ambient condition approached to 126 °C against the declaration of 120 °C, which is on higher side .This should be looked into for necessary correction.
- v) Maximum coolant temperature during full load varying speed test in higher ambient condition approached to 109 °C against the declaration of 110 °C, this should be looked into for safety point of view of the engine.

16.4.1.2 Drawbar Performance :

- i) During 10 hrs test Maximum transmission oil temperature approaches to 89 °C which is very close to its discard limit .It should be looked into for necessary corrective action.
- During ten hours drawbar test, creeping of LHS & RHS rear tyre over the rims was observed as 41 mm & 40 mm respectively. This should be looked into for necessary corrective action.

16.4.1.3 Hydraulic Performance:

i) Total drop in height of lift during lift load maintenance test was recorded as 65 mm against the declaration of 50 mm. This should be looked into.

16.4.1.4 Mechanical Vibration:

The amplitude of mechanical vibration marked as (*) in chapter-9 of this report is on higher side especially at LHS & RHS foot rest & steering control wheel, brake & clutch pedals. This calls for reduction in amplitude of vibration in view of improving service life of the component(s) and the operator's comfort.

16.4.1.5 Three point Linkage :

- i) The lateral distance from lower hitch point to the centre line of tractor does not meet the requirement of As per IS: 4468-(Part-1) -1997. This should be looked into for corrective action.
- Some of the parameters conform to Category-I and some of them conform to Category-II. Keeping in the view of the spirit of standardization necessary improvement may be incorporated.

16.4.1.6 Linkage drawbar:

All dimension of linkage drawbar meets the requirement of As per IS: 12953-1995

16.4.1.7 PTO Master shield:

PTO master shield not provided on tractor as per the requirements of IS: 4931-1995. This should be looked into.

16.4.1.8 Location and movement of operator's controls:

Location and movement of operator's controls such as Safety against accidental start of the engine, fuel shut-off knob does not meet the requirement of **IS:8133-1983 (Re-affirmed in March, 2009):.** This should be looked into for corrective action.

16.4.2 Field performance:

16.4.2.1 Wet land cultivation (Puddling Operation):

The manufacturer has recommended that the tractor is not suitable for wetland cultivation (puddling operation) and therefore, the wetland cultivation (puddling operation) was not conducted. It is recommended that in all the literature this fact that the tractor is not suitable for wetland (puddling) operation should be mentioned clearly & boldly in all the relevant literature of the tractor & also a cautionary notice regarding non-suitability of tractor for puddling operation may be displayed on the bonnet of the tractor.

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16.5	Maintenance / Service Problems:				
	Noticeable maintenance or service problems, observed during the test., have been tabled in chapter no.14. Therefore, it should be looked into for necessary quality improvement.				
16.6	Recommendation with regard to safety on tractor				
	The following requirements, inter alia, may be considered for incorporation on the tractor:				
	 Provision for spark arresting device in the exhaust system. 				
	ii) Safety against the accidental start of the engine.				
	iii) The fuel shut-off lever does not remain in "STOP" position.				
	iv) Hydraulic pipe lines should be fully protected.				
	 v) The working clearance between the draft control lever & mud guard may be provided as per IS:12239 (Part-2)-1999 vi) Provision of differential lock. 				
16.7	Adequacy of Literature supplied with machine: The following literature was supplied with the tractor for reference during the test. a) Operator's -cum- service Book (For Preet 6549, Preet 3549 Challenger, Pree				
	 4549 T-III A, & Preet 955 tractors) b) Spare parts catalogue (For Preet 6549, 3549 Challenger, 4549 T –III A, 955 tractors) 				
	 c) Service Manual (For Preet 6549, Preet 3549 Challenger, Preet 4549 Challenger, & Preet 955 Challenger tractors) 				
16.7.1	The operator's manual may be revised as per IS: 8132-1999 (Reaffirmed i Oct.2004) with inclusion of inter alia, the following;				
	i) Fuel saving tips				
 Gross mass of trailer & safe hitch height, while using trailer. 					
	 iii) Recommendation regarding matching implements. iv) Corrections with regard to recommended lubricants. 				
	 iv) Corrections with regard to recommended lubricants. 				
	17. CITIZEN CHARTER				
Evaluation	e for Testing & Duration of Test Whether the Test Report is released within the time frame given in Citizen				

TESTING AUTHORITY:

Charter

No

trees

H.L.YADAV SENIOR AGRICULTURAL ENGINEER

10 Months

C. R. LOHI DIRECTOR

Test Report compiled by: Sh. Nitesh Kumar Verma, Senior Technical Assistant.

11 Months

(March 2014 to

January 2015)

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Due to break down /defects occurred

performance tests

during PTO &

Drawbar

CENTRA

T-96

Pa

18. Applicant's Comments

Para No.	Our Reference	Applicant's comments			
18.1	1.13.2 (iii),	Care to be taken during production of tractors			
18.2	16.1.1 (f),	We have discussed with oil supplier, there is no any issue if engine oil approaches at 130 °C.			
18.3	16.2 (Sr.No. 5)	Care to be taken during production of tractors We will look into for corrective action.			

<u>APPENDIX - I</u>

BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST
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S. No.	ltem	Rotavator	Disc Plough
1.	Make	PREET	PREET
2.	Туре	Mounted	Mounted
3.	No. of blades/bottoms, (mm)	48, in 8 flanges	Three
4.	Type of blades/ bottoms, (mm)	L shape	Concave
5.	Size of blades/ bottoms, (mm)	240 X 80 X 7	645
6.	Spacing of blades / bottoms, (mm)	240	575
7.	Lower hitch point span, (mm)	780	760
8.	Mast height, (mm)	575	600
9.	Overall dimensions, (mm):		
	- Length	2275	2400
	- Width	1130	1040
	- Height	1032	1220
10.	Gross mass, (kg)	460	390

<u> APPENDIX - II</u>

TRACTOR RUN HOURS DURING TEST

Α.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	
2.	PTO performance test	12.0
3.	Power lift and hydraulic pump performance test	3.67
4.	Drawbar performance test	16.73
5.	Turning ability	0.2
6.	Location of centre of gravity	0.2
7.	Operator's field of vision	Nil
8.	Brake test	1.82
9.	Noise measurement	1.91
10.	Mechanical vibration test	1.0
11.	Nominal speed test	0.67
В.	FIELD TEST:	
1.	Rotavation	15.3
2.	Disc Ploughing	20.3
C.	HAULAGE TEST:	5.25
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	14.97
	TOTAL:	94.02

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