

(यह परीक्षण रिपोर्ट 30/06/2025 तक वैध है। / THIS TEST REPORT IS VALID UP TO : 30/06/2025)



## ESCORTS LIMITED, POWERTRAC 439 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, CO-OPERATION & 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)

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-1446/1973/2020

ESCORTS LIMITED, POWERTRAC 439 TRACTOR (2<sup>nd</sup> Batch)

THIS TEST REPORT IS VALID UPTO: 30/06/2025

Manufacturer

: M/s. Escorts Limited,  
Plot No. 2 & 3, Sector - 13  
FARIDABAD - 121 007  
HARYANA

test requested by (applicant)

: M/s. Escorts R&D Center,  
15/5, Mathura Road, Faridabad -  
121003, Haryana

Selected for test by  
Place of running-in  
Duration of said running-in, (h):

: Testing Authority  
: At applicant's works

- Engine  
- Transmission  
Method of Selection

: 20  
: 30  
: The test sample was selected randomly out of Five tractors from the production line by the representative of testing authority.

Tractors made available for random selection

Sr. No.	Chassis serial number:
i)	T053454652FH
ii)	T053454857FH
iii)	T053454866FH
iv)	T053454869FH
v)	T053454852FH

### 1. SPECIFICATIONS

1.1

Tractor:  
Make  
Model  
Brand name  
Variant, if any

: Escorts Limited  
: Powertrac 439  
: Powertrac

S. No.	Variant models	Variant Feature
1.	ESCORTS LIMITED, POWERTRAC 439 DS PLUS ALT 4000 TRACTOR <small>* Tested vide test report No. T-1384/1891/2020 released in January, 2020.</small>	On the basis of change in maximum PTO power declaration 25.0 kW (in base model) to 27.8 kW (in variant model)
2.	ESCORTS LIMITED, 439 E1 (Brand name - POWERTRAC) <small>* Tested vide test report No. T-1084/1892/2017 released in April, 2017.</small>	On the basis of change in nominal speed
3.	ESCORTS LIMITED, 437 (Brand name - POWERTRAC) <small>* Tested vide test report No. T-1320/1847/2020 released in March, 2020.</small>	On the basis of positioning of hydraulic sensing mechanism from lower link (in base model) to Top link (in variant model)

Type

: Four wheeled, rear-wheel driven, unit construction, General Purpose, Standard Agricultural Tractor.

Month & year of manufacture

: 09 & 19

Chassis number

: T053454857FH

Country of origin

: India

1.2

Engine:

Make

: Escorts Limited

Model

: E3.215 D-3A

Type

: Four stroke, naturally aspirated, water, cooled, direct injection, diesel engine.

Serial number

: E3512496

Country of origin

: India



**16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS**

**16.1** On the basis of test conducted the performance results have been summarized as evaluative (mandatory) / Non-evaluative (Non-mandatory) parameters applicable for qualifying Minimum Performance criteria as per Clause-4 (Table-1) of IS: 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	Value declared by the applicant (D) Requirement (R)	As observed	Whether meets the requirements (Yes/No)
1	2	3	4	5	6	7
<b>16.1.1</b>	<b>PTO Performance :</b>					
a)	Maximum power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: +5% for PTO power and or engine power >26 kW, -10% for PTO power and or engine < 26 kW.	25.0 (D)	24.9	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	25.0 (D)	24.5	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% max.	238 (D)	245	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	137 (D)	130.0	Yes
e)	Back-up torque, percent	Evaluative	12 percent	12 (R)	22.3	Yes
f)	<b>Maximum operating temperature, (°C)</b>					
	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.	125 (D)	98	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.	110 (D)	104	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under high ambient conditions.	2.46 Maximum (R)	0.50	Yes
h)	Smoke level, m <sup>2</sup>	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent AQSCII No. 5.2 or 1/3 Hainridge value (As per CMVR)	3.25 Maximum (R)	0.18	Yes



R (2<sup>nd</sup> Batch)  
6/2025

T-1446/1973/2020

ESCORTS LIMITED, POWERTRAC 439 TRACTOR (2<sup>nd</sup> Batch)

THIS TEST REPORT IS VALID UPTO: 30/06/2025

**CONDITIONS**

summarized as per applicable for ) of IS: 12207- BARD financing

As observed	Whether meets the requirements (Yes/No)
6	7
24.9	Yes
24.5	Yes
245	Yes
30.0	Yes
22.3	Yes
99	Yes
104	Yes
150	Yes
118	Yes

1	2	3	4	5	6	7
<b>16.1.2 Drawbar performance :</b>						
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 70% of static mass of tractor with ballast.	19.0 (D) 18.9 (R)	20.9	Yes
b)	Maximum drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without ballast or with standard ballast, as the case may be.	12.5 (D) 12.8 (R)	15.3	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. ii) 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.	21.3 (D) 19.9 (R)	21.0	Yes
d)	Maximum transmission oil temperature (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	125 (D)	81	Yes
<b>16.1.3 Power lift and hydraulic pump performance :</b>						
<b>a) Maximum lifting capacity throughout the range of lift, (kN):</b>						
	1) At hitch points	Evaluative	Tolerance of ± 10%	13.49 (D) 7.85 (D)	14.75	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.	5.86 (R)	11.59	Yes
b)	Maximum drop in the height of the point of application of the force after each 5 minutes interval for a total duration of 30 minutes, (mm)	Non Evaluative	The observed value should not exceed 50 mm	50 (D) Maximum	50	Yes
<b>16.1.4 Brake performance at 25 kmph:</b>						
<b>a) Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with road ballast, (m):</b>						
	1) Cold brake	Evaluative	10	10 (R)	7.61	Yes
	2) Hot brake	Evaluative	10	10 (R)	7.71	Yes



T-1446/1973/2020

ESCORTS LIMITED, POWERTRAC 439 TRACTOR (2<sup>nd</sup> Batch)

THIS TEST REPORT IS VALID UPTO: 30/06/2025

1	2	3	4	5	6	7	
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s <sup>2</sup> (N)	Evaluative	600	600 (R) Maximum	337 to 368	Yes	
c)	Whether parking brake is effective at a force of 600 N at foot pedal (s) or 400 N at hand lever, N	Evaluative	Yes / No	Yes	Yes	Yes	
16.1.5	<b>Noise measurement :</b>						
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88 (R)	81	Yes	
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	95	Yes	
16.1.6	<b>Amplitude of mechanical vibrations at:</b>						
1)	Left foot rest	Non Evaluative	100 microns (max)	100(R)	67	Yes	
2)	Right foot rest				108	No	
3)	Seat (with driver seated)				46	Yes	
4)	Steering wheel				81	Yes	
16.1.7	<b>Air cleaner:</b>						
	Air cleaner oil puff over, (%)	Evaluative	0.25 % (maximum)	0.25 % (maximum)	0.20	Yes	
16.1.7	<b>Haulage requirements :</b>						
a)	<b>Gross mass of the trailers, (tonnes):</b>						
	Two wheel	Non Evaluative	To be specified by the manufacturer		5.0 (D)	5.0	Yes
	Four wheel	Non Evaluative			6.0 (D)	6.0	Yes
b)	<b>Distance travelled / liter of fuel consumption, (km/l):</b>						
	Two wheel	Non Evaluative	To be specified by the manufacturer		5.0 to 6.0 (D)	6.75 to 6.89	No
	Four wheel	Non Evaluative			5.0 to 6.0 (D)	6.38 to 6.46	No
c)	<b>Fuel consumption (ml/km/tonne):</b>						
	Two wheel	Non Evaluative	To be specified by the manufacturer		30.0 to 35.0 (D)	29.01 to 29.64	Yes
	Four wheel	Non Evaluative			30.0 to 35.0 (D)	25.79 to 26.19	No



1	2	3	4	5	6	7
<b>16.1.8 Wetland cultivation :</b>						
<b>Sealing for the following assemblies:</b>						
	1) Clutch assembly	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 water and/or mud was observed during ICT test vide test report no. T-541/1030, June, 2006	Yes
	2) Brake housings	Evaluative				Yes
	3) Front axle hubs	Evaluative				Yes
	4) Engine Oil	Evaluative				Yes
	5) Transmission Oil	Evaluative				Yes
<b>16.1.9 Safety features :</b>						
	a) Guards against moving and hot parts	Evaluative	As per CMVR	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)	Meet the requirements		Yes
	d) Technical requirements for PTO shaft	Non Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)	Meet the requirements		Yes
	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 meet the requirements		No
	f) Specifications of linkage drawbar	Non Evaluative	Should meet the requirements of IS 12953	Meet the requirements		Yes
	g) Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirements of IS 12362 (Part 3) (As amended from time to time)	Not provided		Not applicable
	h) 1) Maximum traveling speed at rated engine speed in reverse gear, kmph	Evaluative	Should not exceed 20 kmph	10.11 kmph Meet the requirements		Yes

337 to 368	Yes
Yes	Yes
81	Yes
95	Yes
67	Yes
109	No
48	Yes
81	Yes
0.20	Yes
5.0	Yes
6.0	Yes
3.75 to 3.89	No
3.38 to 3.46	No
3.01 to 3.04	Yes
3.79 to 3.19	No



1446/1973/2020

ESCORTS LIMITED, POWERTRAC 439 TRACTOR (2<sup>nd</sup> Batch)

THIS TEST REPORT IS VALID UPTO: 30/06/2025

1	2	3	4	5	6	7	
	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 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	NA	
<b>16.1.10</b>	<b>Labelling of tractor</b>						
	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.	Escorts Limited	Yes	
	2)	Model	Evaluative		POWERTRAC 439	Yes	
	3)	Month & Year of mfg.	Evaluative		09/19	Yes	
	4)	Engine number	Evaluative		E3512496	Yes	
	5)	Chassis number	Evaluative		T053454857FH	Yes	
	6)	Declaration of PTO power, (kW)	Evaluative		25	Yes	
<b>16.1.11</b>	<b>Discard limits for (mm):</b>						
a)	Cylinder bore diameter, (mm)		Evaluative	To be specified by Manufacturer	91.3(D)	91.01 to 91.04	Yes
b)	Clearance between piston & cylinder liner at skirt, (mm)		Non Evaluative		0.45	0.12 to 0.13	Yes
c)	Piston diameter, (mm)				When the ring groove diameter exceeds the discard limit	90.91	--
d)	<b>Ring end gap (mm):</b>						
	1)	Top comp. ring	Evaluative	To be specified by Manufacturer	2.00	0.40 to 0.50	Yes
	2)	2 <sup>nd</sup> comp. ring.			2.00	0.90 to 0.95	Yes
	3)	Oil ring.			2.00	0.40 to 0.45	Yes
e)	<b>Ring groove clearance (mm):</b>						
	1)	Top comp. ring	Evaluative	To be specified by Manufacturer	0.20	0.12 to 0.13	Yes
	2)	2 <sup>nd</sup> comp. ring.			0.20	0.06	Yes
	3)	Oil ring.			0.15	0.04	Yes
f)	<b>Clearance of main bearings (mm):</b>						
	1)	Diametrical clearance	Evaluative	To be specified by Manufacturer	0.40 (D)	0.08 to 0.12	Yes
	2)	Crankshaft end float			0.67 (D)	0.33	Yes



TOR (2<sup>nd</sup> Batch)  
10/06/2025

T-1446/1973/2020

ESCORTS LIMITED, POWERTRAC 439 TRACTOR (2<sup>nd</sup> Batch)

THIS TEST REPORT IS VALID UPTO: 30/06/2025

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imited	Yes
AC 439	Yes
9	Yes
196	Yes
57FH	Yes
	Yes
1 to 91.04	Yes
2 to 0.13	Yes
30.91	-
to 0.50	Yes
to 0.95	Yes
to 0.45	Yes
to 0.13	Yes
0.06	Yes
0.04	Yes
to 0.12	Yes
0.33	Yes

1	2	3	4	5	6	7
g)	<b>Clearance of big end bearings, (mm):</b>					
	1) Diametrical	Evaluative	To be specified by Manufacturer	0.40	0.05 to 0.09	Yes
2) Axial	0.60			0.30 to 35	Yes	
h)	Clearance between king pin and bush, (mm)	Non Evaluative	To be specified by Manufacturer	0.40	0.03 to 0.17	Yes
i)	Clearance between center pin and bush, (mm)	Non Evaluative	To be specified by Manufacturer	0.40	0.16 to 0.20	Yes
16.1.12	<b>Literature (Submission to test agency):</b>					
(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)	Service manual	Evaluative			Provided	Yes
16.1.13	Fitment of roll Over protective structures,(ROPS); for tractor having more than 1150 mm rear track width	Evaluative	ROPS should meet the requirement of IS 11821 or DECO code or equivalent International standard	-	Not fitted	Not applicable
16.1.14	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with the tractor.	-	Provided	Yes
16.1.15	(Optional) Accessories	Non Evaluative	Ballast weights, if fitted, should meet the requirement of CMVR	--	Provided	Yes
16.2	<b>CATEGORY OF BREAKDOWNS / DEFECTS (As per clause 5.0 of IS:12207-2019):</b>					
S. No.	Category of Breakdown	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	As observed	Whether meets the requirement (Yes/No)	
a)	Critical breakdown	Evaluative	There is no 'critical breakdown' during the course of testing	None	Yes	
b)	Major breakdowns	Evaluative	There are not more than 03 major breakdowns and neither of them is of repetitive nature	None	Yes	
c)	Minor breakdowns	Evaluative	There are not more than 03 minor defects during the test and the frequency of each is not be more than two	None	Yes	
d)	Total breakdowns	Evaluative	In no case, the total number of breakdowns should exceed four that is, (01 major + 03 minor) or 04 minor breakdowns	None	Yes	





1-1446/1973/2020

ESCORTS LIMITED, POWERTRAC 439 TRACTOR (2<sup>nd</sup> Batch

THIS TEST REPORT IS VALID UPTO: 30/06/2025

**16.3 Salient Observations:****16.3.1 Laboratory tests:****16.3.1.1 PTO Performance:**

- i) The maximum PTO power was recorded as 24.9 kW against the declaration of 25.0 kW, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power was recorded as 245 g/kWh, against the declaration of 238 g/kWh, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iii) The maximum equivalent crankshaft torque was measured as 130.0 Nm against the declaration of 137 Nm, which meets the requirement of IS: 12207-2019 with regard to tolerance.
- iv) The backup torque was observed 22.3 % against the minimum requirement of 12%, which meets the requirement of IS: 12207-2019 with regard to tolerance.
- v) The maximum power was located at 2300 rpm of engine, which is 4.5% higher than rated engine speed i.e. 2200 rpm, which indicates that the fuel injection pump setting is not proper. This should be looked into for necessary corrective action.

**16.3.1.2 Drawbar Performance:**

- i) During ten hours drawbar performance test, creeping of LHS & RHS rear tyre over the rims was recorded as Nil & 60 mm respectively. This should be looked into for necessary corrective action.

**16.3.1.3 Hydraulic performance:**

- i) The moment about rear axle with standard frame was calculated as 16.40 kN-m and the moment about front axle was calculated as 14.82 kN-m. The moment about rear axle is on higher side as compared to the moment about front axle. It is, therefore, recommended that the lifting capacity of the hydraulic system may be reduced or suitable standard ballast may be provided to avoid the front lifting of the tractor.

**16.3.1.4 Mechanical Vibration:**

The amplitude of mechanical vibration at various points on various assemblies marked as (\*) in chapter - 9 of this test report are on higher side. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

**16.3.1.5 Three point linkage:**

- i) The lateral distance of lower hitch point to center line of tractor & distance of end of PTO to center line of lower hitch point does not meet the requirement of IS: 4468 (Part-1)-1997 (Re-affirmed in October, 2017). This should be looked into for necessary corrective action.
- ii) Some of the parameters conform to Cat. I and some of them conform to Cat. II. Keeping in view the spirit of standardization, necessary improvement may be incorporated.

**16.3.1.6 Symbols of operator's controls and other displays:**

Some of the controls / display such as oil lubricant type & its frequency are not identifiable with the symbols as per IS: 6283 (Part 1&2)-1998 (Reaffirmed 2014). This needs to be looked into for necessary corrective action.



**16.3.1.7 Operator's work place:**

Operator's work place meets the requirements of IS: 12239 (Part-1) 1996(Reaffirmed Oct., 2017), **except the following:**

- i) Provision of spark arresting device in the exhaust system.
- ii) Provision of vertical retainers at both sides of clutch pedal.

**16.3.1.8 Constructional requirement with regard to safety:**

Meets the requirements of IS: 12239 (Part-1)-1996 (Re-affirmed in October, 2017), **except the following:**

- i) PTO master shield has not been provided.
- ii) Minimum Cautionary notice as per clause 11.2 of above referred standard has not been provided.
- iii) Working clearance in between position control and draft control lever is less than the requirement.

**16.3.1.9 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 following:**

- i) Fuel shut-off knob does not remain in stop position.
- ii) Safety against accidentally start of engine has not been provided.

**16.4 Maintenance / Service Problems:**

No noticeable maintenance or service problem was observed during the test.

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

The following requirements, inter alia, may be considered for incorporation on the tractor as per relevant Indian Standards:

- i) Provision of spark arresting device in exhaust system.
- ii) PTO shaft master shield should be provided to avoid the accident.
- iii) The fuel shut-off lever does not remain in "STOP" position.
- iv) The working clearance between the draft control lever & position control lever should be provided as per the requirement of relevant Indian Standard.
- v) Provision of differential lock in the tractor.
- vi) Provision of vertical retainers at both side of clutch & brake pedal.

**16.6 Adequacy of Literature supplied with machine:**

**16.6.1** The supplied literature was found adequate

- a) Operator's Manual for Powertrac 439, 434DS PLUS ALT 3500, 439 DS PLUS 4000 & 437 tractor models.
- b) Spare Parts Catalogue for Powertrac 439 tractor model.
- c) Repair manual for Powertrac 439, 434 DS PLUS ALT 3500, 439 DS PLUS 4000 & 437 tractor models.

**16.6.2** However, these literatures should be brought out in other vernacular languages of India for guidance of users



T-1446/1973/2020

ESCORTS LIMITED, POWERTRAC 439 TRACTOR (2<sup>nd</sup> Batch)

THIS TEST REPORT IS VALID UPTO: 30/06/2025

**17. CITIZEN CHARTER**

Time frame for Testing & Evaluation as per Citizen Charter	Duration of Test	Whether the Test Report is released within the time frame given in Citizen Charter	Remarks
10 Months	07 Months (November, 2019 to May, 2020)	Yes	None

**TESTING AUTHORITY:**

**SHWETABH SINGH**  
AGRICULTURAL ENGINEER

**C.V. CHIMOTE**  
TEST ENGINEER

**J.J.R. NARWARE**  
DIRECTOR

This test report is compiled by Sh. Shivkumar Sharma, Senior Technical Assistant.

**18. APPLICANT'S COMMENTS**

Para No.	Our Reference	Applicant's comments
18.1	16.3.1.1(v), 16.3.1.2, 16.3.1.3 & 16.3.1.8	These being studied & corrective action would be taken in near future.
18.2	16.3.1.5, 16.3.1.7, 16.3.1.8, 16.3.1.9 & 16.5	Your valuable comments & suggestion for improvements are well taken. Under our policy of continuous product improvement these aspect are further being looked into & will try to eliminate these deviation soon wherever necessary.

**ANNEXURE-I**

**TRACTOR RUN HOURS DURING TEST**

A.	LABORATORY AND TRACK TESTS	HOURS
1.	Running-in	-
2.	PTO performance test	12.47
3.	Drawbar performance test	15.20
4.	Power lift and hydraulic pump performance test	1.00
5.	Brake test	1.50
6.	Noise measurement	1.25
7.	Air cleaner oil pull over test	3.50
8.	Mechanical vibration test	0.75
9.	Turning ability test	0.50
10.	Steering effort test	0.17
11.	Nominal speed test	0.49
B.	HAULAGE TEST	4.85
C.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	4.64
<b>TOTAL:</b>		<b>46.38</b>