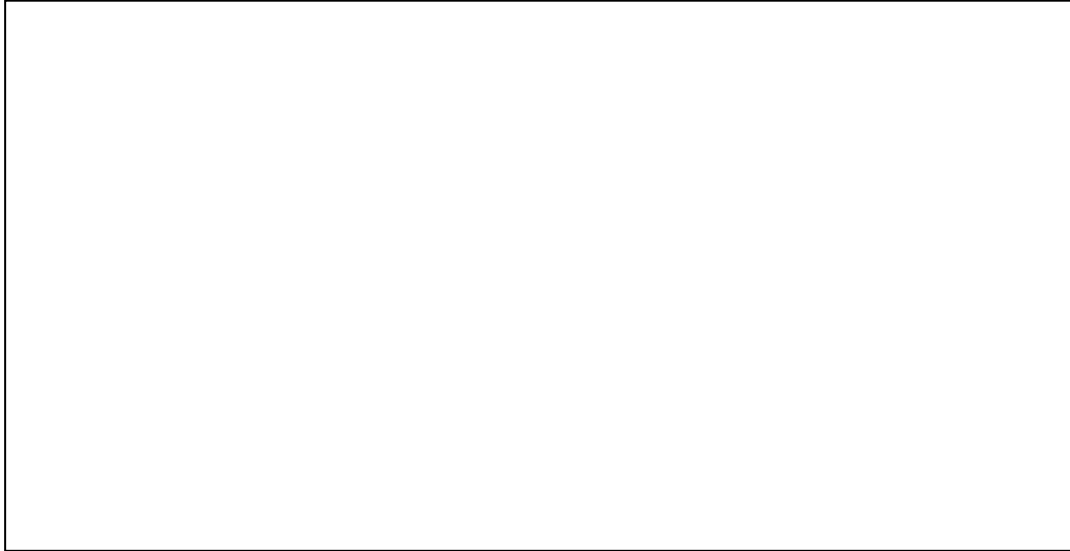


व्यावसायिक परीक्षण रिपोर्ट (प्रथम बैच परीक्षण) संख्या/No. : T- 1544/2072/2021
COMMERCIAL TEST REPORT (1st Batch Test) माह/Month : June, 2021

(सह परीक्षण रिपोर्ट 30/06/2026 तक वैध है। / THIS TEST REPORT IS VALID
UPTO:30/06/2026)



ACE, DI 305 NG TRACTOR



सत्यमेव जयते

भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय
(कृषि, सहकारिता एवं किसान कल्याण विभाग)

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE AND FARMERS WELFARE
(Department Of Agriculture, Cooperation & Farmers Welfare)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
ट्रैक्टर नगर, बुदनी (म.प्र.) 466 445
CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE
TRACTOR NAGAR, BUDNI (M.P.) 466445
(An ISO 9001: 2015 Certified Institute)

E-mail: fmti-mp@nic.in
Telephone: 07564-234729

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

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The “ACE, DI 305 NG” tractor had undergone “Initial Commercial Test” at this Institute and a test report No. T- 984/1508/2015 has been released in September, 2015. Now the applicant has submitted application vide letter No. 305 NG/00 dated 28.12.2018 & revised application No. 305 NG/00 dated 19.11.2019 for Batch testing of “ACE, DI 305 NG” tractor.

Accordingly, all necessary tests as per Table-1 of clause 6.0 of IS: 5994 - 1998 (Reaffirmed in 2019) were carried out and test report released as under.

Manufacturer	: M/s. Action Construction Equipment Ltd., Plant-II, Dudhola Link Road, Dudhola, Distt. Palwal, Haryana - 121 102
Test requested by (Applicant)	: M/s. Action Construction Equipment Ltd., 25 th Mile Stone, Jajru Road, Mathura Road, Ballabgarh, Faridabad, Haryana – 121 004
Selected for test by	: The applicant
Place of running-in	: At manufacturer's works
Duration of said running-in, (h):	
- Engine	: 25
- Transmission	: 25
Method of Selection	: Due to Covid-19 pandemic, it was not possible to conduct the random selection. Nor was it possible for applicant to facilitate the random selection. As a last resort, applicant requested to allow the direct submission of test sample which was allowed.

1. SPECIFICATIONS

1.1 Tractor:	
Make	: ACE
Model	: DI 305 NG
Brand name	: None
Type	: Four wheeled, rear wheel driven, Unit construction, General purpose, Agricultural Tractor
Month & Year of manufacture	: 08 20
Chassis number	: TBK300038785
Country of origin	: India
1.2 Engine:	
Make	: ACE
Model	: A25
Type	: Four stroke, liquid cooled, naturally aspirated, direct injection, diesel engine
Serial number	: TSBK0011094
Country of origin	: India
1.2.1 Engine speed (rpm), (Manufacturer's recommended production settings):	
- Maximum speed at no load	: 1950 to 2050
- Low idle speed	: 650 to 750
- Speed at maximum torque	: 1100 to 1300
Rated speed, (rpm):	
- For PTO use	: 1800
- For drawbar use	: 1800

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- | | |
|--|---|
| <p>i) The maximum lifting capacity throughout the range of lift at hitch points and with standard frame was recorded as 11.69 kN & 10.13 kN respectively against the declaration of 10.80 kN & 7.50 kN respectively & which meets the requirement of IS: 12207-2014.</p> <p>ii) The total cumulative drop was observed as 335 mm during load maintenance test in half hour period, which is considered to be higher side. It is assumed that there was internal leakage in the system and therefore it could not sustain the distinct load.</p> | <p>i) The maximum lifting capacity throughout the range of lift at hitch points and with standard frame was recorded as 10.58 kN & 8.59 kN respectively against the declaration of 10.80 kN & 7.50 kN respectively & which meets the requirement of IS: 12207-2019.</p> <p>ii) The total cumulative drop was observed as 25 mm during load maintenance test in half hour period.</p> |
|--|---|

13.5 Adequacy of literature:

Following literature was supplied with the test sample for reference during the test.

- | | |
|----------------------|----------------------|
| i) Operators Manual | a) Operator's manual |
| ii) Parts Catalogue | b) Parts catalogue |
| iii) Workshop Manual | c) Workshop Manual |

14. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

- 14..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	Values declared by the applicant/ (D) Requirement (R)	As observed	Whether meets the requirements (Yes/No)
1	2	3	4	5	6	7
14.1.1	PTO Performance :					
a)	Maximum power under 2 hours test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: $\pm 5\%$ for PTO power and or engine power > 26 kW. $\pm 10\%$ for PTO power and or engine ≤ 26 kW.	17.5 (D)	16.8	Yes
b)	Power at rated engine speed, (Kw)	Non-Evaluative	-do-	17.5 (D)	16.8	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% max.	265 (D)	286	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non-Evaluative	$\pm 8\%$	116 (D)	117.6	Yes
e)	Back-up torque, percent	Evaluative	12 percent, min	12 (R) 25 (D)	31.8	Yes
f)	Maximum operating temperature ($^{\circ}$ C)					

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	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.	135 (D)	90	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)	76	Yes
g)		Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.89 (R)	0.87	Yes
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 metre (R)	0.19 per meter	Yes

1	2	3	4	5	6	7
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14.1.2 Drawbar performance:

a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non-Evaluative	Minimum 70% of static mass with ballast	15.00 (D) 16.65 (R)	18.62	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	12.6 (D) 12.46 (R)	14.45	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.	14.0 (D) 13.4 (R) Min.	15.5	Yes
d)	Maximum transmission oil temperature (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	135 (D)	64	Yes

14.1.3 Power lift and hydraulic pump performance:

a)	Maximum lifting capacity throughout the range of lift, (kN):						
1)	At hitch points	Evaluative	Tolerance of ± 10%	10.80 (D)	10.58	Yes	
2)	With the standard	Evaluative	The lift capacity should at least be 24 kg/PTO kW. and it	7.50 (D)	8.59	Yes	

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	frame		should be 21.5 kg/engine kW where the tractor is not provided with a PTO shaft	3.96 (R)		
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 minute, (mm)	Non-Evaluative	The observed value should not exceed 50 mm.	50 (D) Max	25	Yes
14.1.4	Brake performance at 25 kmph:					
a)	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)	7.73	Yes
	2) Hot brake	Evaluative	10	10 (R)	7.89	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600 (R) Maximum	395 to 420	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	450 to 475	Yes
1	2	3	4	5	6	7
14.1.5	Noise measurement:					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88 (R)	82	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	93	Yes
c)	Amplitude of mechanical vibrations at:					
	1) Left foot rest	Non-Evaluative	100 microns (max)	100 (R)	92	Yes
	2) Right foot rest				93	Yes
	3) Seat (with driver seated)				135	No
	4) Steering wheel				433	No
14.1.6	Air cleaner:					
	Maximum air cleaner oil pull over, (%)	Evaluative	0.25 % (maximum)	Not applicable	Dry type air cleaner fitted	Not applicable
14.1.7	Haulage requirements:					
a)	Gross mass of the trailers, (tonne):					
	1) Two wheel	Non-Evaluative	--	4.0 (D)	4.0	Yes
	2) Four wheel		--	4.0 (D)	4.0	Yes
b)	Distance travelled / liter of fuel consumption, (km/l):					
	1) Two wheel	Non-Evaluative	--	4.0 to 7.0 (D)	6.67 to 6.89	Yes
	2) Four wheel		--	4.0 to 7.0 (D)	6.46 to 6.89	Yes
c)	Fuel consumption (ml/km/tonne):					
	1) Two wheel	Non-Evaluative	--	30.0 to 50.0(D)	36.27 to 37.48	Yes
	2) Four wheel		--	35.0 to 55.0 (D)	36.27 to 38.69	Yes

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14.1.8	Wetland cultivation:					
	Sealing for the following assemblies:		Evaluative	The identified assemblies should essentially meet the requirement of IS: 11082. No water ingress in the identified assembly given in column-2.If tractor does not meet the requirements of wetland cultivation, it may be recommended for dry land operation only.	There should be no ingress of water and/or mud (R)	No ingress of water and/or mud were not observed during ICT test vide test report No. T-984/1508/ 2015 (September, 2015). So, as per clause 7.2 of IS:12207-2019, test was not conducted.
	1)	Clutch assembly	-do-			
	2)	Brake housings	-do-			
	3)	Front axle hubs	-do-			
	4)	Engine Oil	-do-			
5)	Transmissi on Oil	-do-				
14.1.9	Safety features:					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes (As per IS 12239 (part 2)	Meets the requirement	Yes	
b)	Lighting arrangement (Tractor having more than 1150 mm rear track width)	Evaluative	As per CMVR	Meets the requirement	Yes	
1	2	3	4	5	6	7
c)	Seating requirement (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	Yes	
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)	Meets the requirement	Yes	
e)	Dimension of three point linkage	Non-Evaluative	Should meet the requirements of IS 4468 (part 1) (as amended from time to time)	Does not meet the requirement	No	
f)	Specifications of linkage drawbar	Evaluative	Should meet the requirements of IS 12953	Meets the requirement	Yes	
(g)	Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirements of IS 12362 (Part 3) (As amended from time to time)	Not fitted	Not applicable	
(h)	1)	Maximum traveling speed at rated engine speed in reverse gear, kmph	Evaluative	Should not exceed 20 kmph	11.31 kmph Meets the requirement	Yes
	2)	Audible warning signal on tractor	Evaluative	As soon as the travelling speed in reverse gear reaches to 20 kmph, an audible warning signal on tractor be activated, The safety aspects about the operation of shuttle technology shall be brought	Not applicable	Not applicable

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				in operation and manufacturer /dealer shall ensure the training on this aspect to operator before the delivery of tractor.		
14.1.10	Labelling of tractors (Provision of labelling plate):					
	1) Make	Evaluative	Should conform to the requirements of CMVR along-with maximum PTO power in kW and year of manufacture in numerical Form MM YY Digit 01-12 in box No..1 for MM will represent the months & next two digits in box No.2 for YY will represent the year of manufacturing.	ACE		Yes
	2) Model	Evaluative		DI 305 NG		Yes
	3) Month & Year of manufacture	Evaluative		08	20	Yes
	4) Engine number	Evaluative		TSBK0011094		Yes
	5) Chassis number	Evaluative		TBK300038785		Yes
	6) Declaration of PTO power, (kW)	Evaluative		17.5		Yes
	7) Specific fuel consumption, (g/kWh)	Evaluative		265		Yes
1	2	3	4	5	6	7
14.1.11	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by Manufacturer	105.30	105.036 to 105.070	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non-Evaluative		0.45 (D)	0.130 to 0.145	Yes
(c)	Piston diameter, (mm)	Non-Evaluative		104.200 (D)	104.491 to 104.930	Yes
(d)	Ring end gap (mm):					
	- Top comp. ring.	Evaluative	-do-	2.0 (D)	0.40 to 0.53	Yes
	- 2 nd comp. ring.		-do-	2.0 (D)	0.70 to 0.84	Yes
	- Oil ring.		-do-	2.0 (D)	0.40 to 0.45	Yes
(e)	Ring groove clearance (mm):					
	- Top comp. ring.	Evaluative	-do-	0.20 (D)	Tapered rings	Yes
	- 2 nd comp. ring.		-do-	0.20 (D)	0.075 to 0.078	Yes
	- Oil ring.		-do-	0.20 (D)	0.029 to 0.030	Yes
(f)	Clearance of main bearings (mm):					
	Diametrical clearance	Evaluative	-do-	0.40 (D)	0.095 to 0.123	Yes
	Crankshaft end float	Evaluative	-do-	0.60 (D)	0.15	Yes
(g)	Clearance of big end bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.60 (D)	0.102 to 0.152	Yes
	- Axial	Evaluative	-do-	1.00 (D)	0.30	Yes
(h)	Clearance between king pin and bush, (mm)	Non-Evaluative	-do-	1.00 (D)	0.080 to 0.150	Yes
(i)	Clearance between centre pin and bush, (mm)	Non-Evaluative	-do-	1.00 (D)	0.073 to 0.199	Yes
14.1.12	Literature (Submission to test agency)					
(a)	Operator manual	Evaluative	The printed literature in booklet form	Provided	Provided	Yes
(b)	Parts Catalogue	Evaluative		Provided	Provided	Yes

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(c)	Workshop/ Service manual	Evaluative	should be provided as per IS 8132 & should submit along with the test sample	Provided	Provided	Yes
14.1.13	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 OECD code or equivalent International standard	--	Not fitted	Not applicable
14.1.14	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with the tractor.	--	Provided	Yes
14.1.15	Accessories (optional)	Non-Evaluative	Ballast weights, if fitted, should meet the requirement of CMVR	--	Provided	Yes

14.2	CATEGORY OF BREAKDOWNS / DEFECTS:				
Sl. No.	Category of breakdowns	Category (Evaluative / Non-Evaluative)	Requirements as per IS: 12207-2019	As observed	Whether meets the requirements (Yes/No.)
1.	Critical	Evaluative	There is no 'critical breakdown' during the course of testing	None	Yes
2.	Major	Evaluative	There are not more than 1 major breakdowns	None	Yes
3.	Minor	Evaluative	There are not more than 3 minor defects during the test and the frequency of each is not be more than two	None	Yes
4.	Total breakdowns	Evaluative	In no case, the total number of breakdowns should exceed four that is, (1 major + 3 minor) or 4 minor breakdowns	None	Yes

14.3 Salient Observations:

14.3.1 Laboratory tests:

14.3.1.1 PTO Performance Test:

- i) The maximum PTO power in case of previous & present sample were observed as **16.5 & 16.8 kW** respectively against the declaration of **17.5 kW** & which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power in case of previous & present sample were recorded as **271 & 286 g/kWh** respectively against the declaration of **265 g/kWh** & which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iii) The maximum equivalent crankshaft torque was recorded as **117.6 Nm** against the declaration of **116.0 Nm**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.

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- iv) The backup torque is **31.8 %** and meets the evaluative requirement of IS: 12207-2019.

14.3.1.2 Drawbar performance test:

- i) Maximum drawbar pull in case of previous & present sample with unballast condition corresponding to 15 percent wheel slip were recorded as **15.55 kN & 14.45 kN** respectively against the minimum requirement of **11.67 kN & 12.46 kN** respectively, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- ii) Maximum drawbar power with unballast condition in case of previous & present sample were recorded as **17.0 kW & 15.5 kW** respectively against the minimum requirement of **13.2 kW & 13.4 kW** respectively, which meets the minimum requirement of IS: 12207-2019 with regard to tolerance limit.

14.3.1.3 Hydraulic performance test:

- i) Maximum lifting capacity throughout the range of lift at hitch point and standard frame was recorded as **10.58 kN & 8.59 kN** respectively against the declaration of **10.80 kN & 7.50 kN** respectively, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.

14.3.1.4 Mechanical vibration:

The amplitude of mechanical vibration on various assemblies marked as (*) in **Chapter – 8** of this test report is on higher side. This calls for dampening down of vibrations especially on steering control wheel and seat (with driver seated) to improve the operational comfort and service life of components.

14.3.1.5 Specifications of three-point linkage:

The lateral distance from lower hitch point to centre line of tractor does not meet the requirement of IS: 4468 (Part-1) -1979 (Reaffirmed 2014). This should be looked into for necessary corrective action.

14.4 Maintenance / Service Problems:

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

14.5 Recommendation with regard to safety on tractor:

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

- i) Vertical retainness at both side of clutch pedal should be provided as per IS: 12239 (Part-1)-2018.
- ii) Provision for spark arrester in exhaust system should be provided as per IS-12239 (Part-I) 2018.
- iii) PTO shaft master shield should be provided as per IS: 12239 (Part-2)-1996.
- iv) Safety switch should be provided to avoid accidental start of the tractor as per IS: 8133 -1983.
- v) The fuel shut-off knob should be remained in stop position as per IS: 8133 -1983.
- (vi) There should be provision of differential lock as per IS: 12239 (Part-2) – 1999.
- (vii) The working clearance between the position control lever and draft control lever should be provided as per IS: 12239 (Part-2) – 1999.

14.6 Adequacy of Literature supplied with machine:

- 14.6.1** Literature was supplied with the tractor for reference during the test.

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- a) Operator's manual (for ACE DI 305 NG, DI 854, DI 350 NG, DI 450 NG, DI 550 NG & DI 6565 tractor models)
- b) Parts catalogue of (for ACE DI 305 NG, DI 854, DI 350 NG, DI 450 NG, DI 550 NG DI 6565, DI 350 4WD, DI 450 4WD, DI 550 4WD & DI 6565 4WD tractor models)
- c) Service Manual of (for ACE DI 305 NG, DI 854, DI 350 NG, DI 450 NG, DI 550 NG DI 6565, DI 350 4WD, DI 450 4WD, DI 550 4WD & DI 6565 4WD tractor models)

14.6.2 The supplied literature was found adequate

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

TESTING AUTHORITY:

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

Draft test report compiled by: **C.S. Raghuwanshi**, Agricultural Engineer.

15. APPLICANT'S COMMENTS

Para no.	Our reference	Applicant comments
15.1	14.3.1.4 & 14.3.1.5	Your valuable comments & suggestions in points for improvements are well taken & these aspects are future being looked into & will try to eliminate these deviations soon wherever necessary.

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ANNEXURE - I

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS	HOURS
1.	Running-in (Engine & Transmission)	50.0
2.	PTO performance test	10.9
3.	Power lift and hydraulic pump performance test	1.5
4.	Drawbar performance test	17.6
5.	Brake test	1.0
6.	Noise measurement	1.4
7.	Mechanical vibration test	1.0
8.	Nominal speed test	1.1
B.	HAULAGE TEST	5.7
C.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	5.9
TOTAL:		96.1