

व्यावसायिक परीक्षण रिपोर्ट

COMMERCIAL TEST REPORT (Initial)

संख्या / No. : T-984/1508/2015

माह / Month : September, 2015

Library Reference Copy  
Not For Sale

LIBRARY REFERENCE COPY



**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, CO-OPERATION AND FARMERS WELFARE)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

**CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE**

(An ISO : 9001 - 2008 Certified Institute)

**Tractor Nagar, Budni (M.P.) 466 445**

E-mail [fmti-mp@nic.in](mailto:fmti-mp@nic.in)

Website : <http://cfmmtti.dacnet.nic.in>

Telephone : 07564 - 234729

Fax : 07564 - 234743



T-984/1508/2015

ACE DI 305 NG TRACTOR - Commercial (Initial)

Manufacturer : M/s. Action Construction Equipment Limited,  
Plant-II, Dudhola Link Road, Dudhola  
Palwal, Haryana – 121 102 -

Test requested by (applicant) : M/s. Action Construction Equipment  
Limited,  
25<sup>th</sup> Mile Stone, Jajru Road, Mathura Road,  
Ballabgarh, Faridabad – 121 004 (Haryana)

Place of running-in : Not specified

Duration of said running-in, (h) :

- Engine : 25

- Transmission : 25

Method of Selection : The tractor was submitted directly by the  
applicant for test. Hence, method of selection  
is not known.

## 1. SPECIFICATIONS

### 1.1 Tractor:

Make : ACE

Model : DI 305 NG

Variants, if any : None

**The declared variant model not arrived from this given base model.**

Type : Four wheeled, rear-wheel driven, General  
Purpose Agricultural Tractor

Year of manufacture : 2014

Chassis number : MAD 300000005

Country of origin : India

### 1.2 Engine:

Make : M/s. Action Construction Equipment Limited

Model : A25

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

Serial number : TMAD 0000005

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

- 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





## 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:

Sl. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2014	Values 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 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 / +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	17.5 (D)	16.5	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	17.5 (D)	16.5	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	265 (D)	271	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	116 (D)	122.4	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	25.00 (d)	39.6	Yes
<b>f) Maximum operating temperature, (°C)</b>						
	1) Engine oil	Non Evaluative	The declared value should not exceed the max. value specified by the oil company and the observed value under high ambient condition should not exceed the declaration.	135 (D)	85	Yes
	2) Coolant (water)	Evaluative	The observed value under high ambient condition should not exceed the declaration	118 (D)	80	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.73	1.185	Yes



**14.2 Clutch:**

- Any marked wear on clutch friction plates : None
- Condition of clutch release bearing : Normal
- Condition of release levers & springs : Normal
- Condition of pilot bearing : Normal
- Presence of oil in clutch housing : None
- Any marks on fly wheel/ pressure plate : None

**Overall thickness of clutch plate, (mm):**

**Discard limit**

- transmission : 11.18 to 11.49 Up to over rivet head.

**Height of lining over rivet head, (mm):**

- transmission : 2.99 to 3.10 Up to over rivet head.

**14.3 Transmission gears:**

Any visual damage, pitting & chipping of any transmission gear teeth. : None

Backlash between crown wheel and pinion, (mm) : 0.57

Backlash is adjusted by shim.

**14.4 Brakes:**

Description	Initial specified overall thickness of brake disc, (mm)	Measured thickness of brake disc after test, (mm)	Measured height of lining over rivet head, (mm)	Discard limit, (mm)
Left	8.0	13.05 to 13.144	2.21 to 2.52	Against discard limit upto rivet head.
Right	8.0	12.707 to 13.069	2.06 to 2.42	

**14.5 Front axle:**

Observation

Any marked wear of king pins : None

Any marked wear of king pin bushes : None

Clearance between king pin and bushes, (mm) : 0.090 to 0.166

Against the discard limit of 1.0 mm

Condition of bearings for stub axles : Normal

Condition of thrust bearings : Normal

Condition of seals for stub axles and king pins : Normal

Clearance between centre pin and bushes, (mm) : 0.123 to 0.261

Against the discard limit of 0.5 mm

**14.6 Steering system:**

Visual condition of the components of complete steering assembly : Normal

**14.7 Starter motor & Alternator:**

Presence of soil/oil in housing : None

Condition of bearings and other components : Normal

**15. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS**

Sl. No.	Adjustments / Defects / Breakdowns and Repairs	Tractor run hours
1.	The internal leakage in hydraulic system was observed	14.75





## 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:

Sl. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2014	Values 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 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 / +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	17.5 (D)	16.5	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	17.5 (D)	16.5	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	265 (D)	271	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	116 (D)	122.4	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	25.00 (d)	39.6	Yes
<b>f) Maximum operating temperature, (°C)</b>						
1)	Engine oil	Non Evaluative	The declared value should not exceed the max. value specified by the oil company and the observed value under high ambient condition should not exceed the declaration.	135 (D)	85	Yes
2)	Coolant (water)	Evaluative	The observed value under high ambient condition should not exceed the declaration	118 (D)	80	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.73	1.185	Yes



<b>T-984/1508/2015</b>	<b>ACE DI 305 NG TRACTOR - Commercial (Initial)</b>
------------------------	---

1	2	3	4	5	6	7	
<b>h)</b>	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	Yes	
<b>16.1.2 Drawbar performance :</b>							
<b>a)</b>	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	15.00 (D)	18.91	Yes	
				15.50 (R)			
<b>b)</b>	Max. drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast	11.5 (D)	15.55	Yes	
				11.67 (R)			
<b>c)</b>	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 (D)	17.0	Yes	
				13.2 (R)			
<b>d)</b>	Maximum transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	135	78	Yes	
<b>16.1.3 Power lift and hydraulic pump performance :</b>							
<b>a)</b>	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Non Evaluative	[Tolerance of minus 10%]	9.80 (D)	11.69	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	7.50 (D)	10.13	Yes
				3.88 Minimum, (R)			
<b>b)</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	Observed value should not exceed 50 mm	50 (R)	335	No	





1	2	3	4	5	6	7
<b>16.1.4</b>	<b>Brake performance at 25 kmph:</b>					
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)	9.02	Yes
	2) Hot brake	Evaluative	10	10 (R)	9.08	Yes
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)	415 to 444	Yes
c)	Whether parking brake is effective at a force of 600 N at foot pedal(s) or 400 N at hand lever	Evaluative	Yes / No	Yes (R)	Yes	Yes
<b>16.1.5</b>	<b>Noise measurement :</b>					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88 (R)	84	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	98 (R)	89	Yes
<b>16.1.6</b>	<b>Amplitude of mechanical vibrations at :</b>					
	1) Left foot rest	Non Evaluative	100 microns (max)	100 (R)	90	Yes
	2) Right foot rest				100	Yes
	3) Seat (with driver seated)				160	No
	4) Steering Wheel				70	Yes
<b>16.1.7</b>	<b>Haulage requirements :</b>					
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non Evaluative	--	4.0 (D)	4.0	Yes
	2) Four wheel	Evaluative	--	4.0 (D)	4.0	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	1) Two wheel	Non Evaluative	--	4.00 to 7.00 (D)	7.01 to 7.52	No
	2) Four wheel	Evaluative	--	4.00 to 7.00 (D)	6.36 to 7.52	No
c)	Fuel consumption (ml/km/tonne):					
	1) Two wheel	Non Evaluative	--	30 to 50 (D)	27.21 to 27.57	No
	2) Four wheel	Evaluative	--	35 to 55 (D)	33.24 to 39.29	No



T-984/1508/2015

ACE DI 305 NG TRACTOR - Commercial (Initial)

1	2	3	4	5	6	7
<b>16.1.8</b>	<b>Wetland cultivation :</b>					
	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	No ingress of water was observed during water proof test	Yes
1)	Clutch assembly	-do-				
2)	Brake housings	-do-				
3)	Front axle hubs	-do-				
<b>16.1.9</b>	<b>Safety features :</b>					
<b>a)</b>	Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes (As per IS 12239 (part 2) -1999	--	Meets the requirement	Yes
<b>b)</b>	Lighting arrangement (Tractor having more than 1150 mm rear track width)	Evaluative	As per CMVR	--	--do--	Yes
<b>c)</b>	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)	--	Does not meet the requirement	No
<b>d)</b>	Technical requirements for PTO shaft	Non-Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)	--	Does not meet the requirement	No
<b>e)</b>	Dimension of three point linkage	Non-Evaluative	Should meet the requirements of IS 4468 (part 1) (as amended from time to time)	--	Meets the requirement	Yes
<b>f)</b>	Specification of linkage and swinging drawbars	Non-Evaluative	Should meet the requirements of IS 12953 and IS 12362 (part 3) (as amended from time to time)	--	Meets the requirement	Yes



T-984/1508/2015

ACE DI 305 NG TRACTOR - Commercial (Initial)

1	2	3	4	5	6	7
<b>16.1.10 Labelling of tractors (Provision of labelling plate):</b>						
	1) Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--	ACE	Yes
	2) Model	Evaluative		--	DI 305 NG	Yes
	3) Year of manufacture	Evaluative		--	2014	Yes
	4) Engine number	Evaluative		--	MAD300000005	Yes
	5) Chassis number	Evaluative		--	TMAD00000005	Yes
	6) Declaration of PTO power, (kW)	Evaluative		--	17.5	Yes
<b>16.1.11 Discard limit for:</b>						
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer	105.30	105.02 to 105.06	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.45	0.132 to 0.188	Yes
<b>(c) Ring end gap (mm):</b>						
	- Top comp. ring.	Evaluative	-do-	2.0	0.35 to 0.45	Yes
	- 2 <sup>nd</sup> comp. ring.		-do-	2.0	0.75 to 0.90	Yes
	- Oil ring.		-do-	2.0	0.45 to 0.55	Yes
<b>(d) Ring groove clearance (mm):</b>						
	- Top comp. ring.	Evaluative	-do-	0.20	Taper rings	--
	- 2 <sup>nd</sup> comp. ring.		-do-	0.20	0.072 to 0.077	Yes
	- Oil ring.		-do-	0.20	0.031 to 0.039	Yes
<b>(e) Clearance of main bearings (mm):</b>						
	- Diametrical clearance	Evaluative	To be specified by the manufacturer	0.40	0.092 to 0.184	Yes
	- Crankshaft end float	Evaluative		0.60	0.15	Yes
<b>(f) Clearance of big end bearings, (mm):</b>						
	- Diametrical	Evaluative	-do-	0.60	0.071 to 0.151	Yes
	- Axial	Evaluative	-do-	1.00	0.30	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	1.00	0.090 to 0.166	Yes
(h)	Clearance between centre pin and bush, (mm)	Non Evaluative	-do-	1.00	0.123 to 0.261	Yes
<b>16.1.12 Literature (Submission to test agency)</b>						
(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



T-984/1508/2015

ACE DI 305 NG TRACTOR - Commercial (Initial)

16.1.13 CATEGORY OF BREAKDOWNS / DEFECTS :					
S. 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 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 five 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

16.2 Optional requirements as per Clause-4 (Table-2) of IS:12207-2014:				
S. No.	Characteristic	Requirements as per IS: 12207-2008	As observed	Whether meets the requirements (Yes/No.)
1.	Maximum oil pull over, (%)	0.25% (max.)	Not applicable	Yes
2.	Fitment of ROPS	With a provision for fitment of ROPS.	Not provided	Not applicable
		If ROPS fitted it should meet the requirement of IS: 11821-1992	ROPS not fitted	Not applicable
3.	Accessories	Trailer hitch, front tow hook, linkage drawbar may be provided.	Provided	Yes

**16.3 Conformity with following IS:**

- 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 February, 2012)] : **Does not conform**
- iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in February, 2012)] : **Conforms**
- v) Agricultural tractors - Operator's seat technical requirement [IS 12343 -1998 (First revision) (Reaffirmed in March, 2009)] : **Does not conform**





T-984/1503/2015

**ACE DI 305 NG TRACTOR - Commercial (Initial)**

- vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision) : [IS 12239 (Part-1)-1996 (Reaffirmed in February, 2012) / 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 (Part-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 – Symbols for Agricultural Tractors and Machinery [IS: 6283 (Part-2) – 2007(Reaffirmed in March, 2009) / ISO 3767-2:1991]] : **Conforms**
- ix) Guidelines for location and operation of operator controls on agricultural tractors and machinery (first revision) (IS: 8133 – 1983) (Reaffirmed in March, 2009) / ISO 3789: 1982] : **Does not conform**
- x) Agricultural Tractor & Machinery Lighting device for travel on public roads [IS: 14683-1999 (Reaffirmed in March, 2009)] : **Conforms**

**16.4 Salient Observations:**

**16.4.1 Laboratory tests:**

- i) The backup torque is 39.6 %
- ii) The specific fuel consumption corresponding to maximum power was measured as 271 g/kWh against the declaration of 265 g/kWh, which within the tolerance limit of IS:12207-2014.

**16.4.1.2 Drawbar performance test:**

During 10 hour drawbar test, the creeping of LHS & RHS rear tyre over the rims was observed as 40 mm & 60 mm respectively, which was considered on higher side. This may be looked into for necessary corrective action.

**16.4.1.3 Hydraulic performance test:**

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.

**16.4.1.4 Mechanical Vibration:**

The amplitude of mechanical vibration on various assemblies marked as (\*) in Chapter-9 of this test report are on higher side specially at the seat, steering control wheel, left and right foot rest. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

**16.4.2 Field performance test:**

**16.4.2.1 Wet land cultivation (Puddling operation):**

No ingress of mud/or water was noticed during puddling operation of the tractor. Hence, It meets the requirements of IS: 11082-1984 (Technical requirements of agricultural tractors for wetland operation). The tractor is suitable for wetland operation (Puddling).

**16.5 Maintenance / Service Problems:**

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



T-984/1508/2015

ACE DI 305 NG TRACTOR - Commercial (Initial)

- 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 exhaust system.
  - Provision of safety against accidental start of engine.
  - Provision of differential lock.
  - Provision of PTO shaft master shield.
- 16.7 Adequacy of Literature supplied with machine:**
- 16.7.1** The published literatures not provided by the applicant during the course of test. However after the release of draft test report, following printed literatures were supplied by the applicant.
- Operators Manual**
  - Parts Catalogue**
  - Workshop Manual**
- 16.7.2** The given literature supplied was found adequate.

#### 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	10 Months (November, 2014 to August, 2015)	Yes	None

#### TESTING AUTHORITY:

**C. K. TIJARE**  
AGRICULTURAL ENGINEER

**P. C. MESHARAM**  
SENIOR AGRICULTURAL ENGINEER

**C.R.LOHI**  
DIRECTOR

#### 18. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
18.1	16.4.1.2, 16.4.1.3 & 16.4.1.4	We will take the necessary action soon to rectify these points