



**ACE DI 350 NG TRACTOR**



**भारत सरकार**

**GOVERNMENT OF INDIA**

कृषि मंत्रालय (कृषि एवं सहकारिता विभाग, मशीनीकरण एवं प्रौद्योगिकी 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

Phone : 07564-234729 Fax : 07564-234743 E-mail : fmti-mp@nic.in Website: <http://cfmtti.dacnet.nic.in>



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,  
Jajru Road, 25<sup>th</sup> Mile Stone, Mathura Road,  
Ballabgarh, Faridabad – 121 004 (Haryana),

Place of running-in : At Applicant's works

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 350 NG

Variants, if any:

S. No.	Variant model	Variant features
1.	ACE DI 350 NG I	With dry type air cleaner & differential lock.
2.	ACE DI 350 NG II	With dry type air cleaner, power steering & wet brake.
3.	ACE DI 350 NG III	With wet type air cleaner.

Type : Four wheeled, rear-wheel driven, unit  
construction, Standard Agricultural Tractor

Year of manufacture : 2013

Chassis number : NAC 350000003

Country of origin : India

### 1.2 Engine:

Make : ACE

Model : A40

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

Serial number : TMAC 0000003

#### 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



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

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

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

16.1 Evaluative (mandatory) / Non-evaluative (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	27 (D)	27.0	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	27 (D)	26.8	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	265 (D)	269	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	175 (D)	160.9	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	13	15.34	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)	108	Yes
2)	Coolant (water)	Evaluative	The observed value under high ambient condition should not exceed the declaration	110 (D)	97	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	Not to exceed 2.75 g/kWh	0.844	Yes



1	2	3	4	5	6	7
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	Yes
<b>16.1.2 Drawbar performance :</b>						
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	17.00 (D) 17.50 (R)	21.78	Yes
b)	Max. drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast	12.30 (D) 12.59 (R)	15.38	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.	24.6 (D) 21.62 (R)	22.3	Yes
d)	Maximum transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	135	83	Yes
<b>16.1.3 Power lift and hydraulic pump performance :</b>						
a)	Maximum lifting capacity throughout the range of lift, (kN):		[Tolerance of minus 10%]	9.80 (D)	10.59	Yes
	1) At hitch points	Non 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)	10.58	Yes
	2) With the standard frame	Evaluative		6.36 Minimum, (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 Minutes, (mm)	Non Evaluative	Observed value should not exceed 50 mm	50 (R)	20	Yes



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)	9.65	Yes
	2) Hot brake	Evaluative	10	10 (R)	9.65	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)	461 to 468	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)	85	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	98 (R)	92	Yes

<b>16.1.6</b>	<b>Amplitude of mechanical vibrations at :</b>					
	1) Left foot rest	Non Evaluative	100 microns (max)	100 (R)	100	Yes
	2) Right foot rest				90	Yes
	3) Seat (with driver seated)				70	Yes
	4) Steering Wheel				100	Yes

<b>16.1.7</b>	<b>Haulage requirements :</b>					
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non Evaluative	--	5.0 (D)	5.0	Yes
	2) Four wheel		--	6.0 (D)	6.0	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	1) Two wheel	Non Evaluative	--	4.00 to 6.00 (D)	5.66 to 5.82	Yes
	2) Four wheel		--	3.50 to 5.50 (D)	5.58 to 5.66	No
c)	Fuel consumption (ml/km/tonne):					
	1) Two wheel	Non Evaluative	--	35.0 to 55.0 (D)	34.33 to 35.29	No
	2) Four wheel		--	30.0 to 50.0 (D)	29.42 to 29.82	No

1	2	3	4	5	6	7	
16.1.8	<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-					

16.1.9	<b>Safety features :</b>					
a)	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)	Lighting arrangement (Tractor having more than 1150 mm rear track width)	Evaluative	As per CMVR	--	--do--	Yes
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)	--	--do--	Yes
d)	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
e)	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
f)	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)	--	--do--	Yes



1	2	3	4	5	6	7	
16.1.10	<b>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 350 NG	Yes	
	3) Year of manufacture	Evaluative		--	2013	Yes	
	4) Engine number	Evaluative		--	TMAC 0000003	Yes	
	5) Chassis number	Evaluative		--	NAE 350000003	Yes	
	6) Declaration of PTO power, (kW)	Evaluative		--	27	Yes	
16.1.11	<b>Discard limit for:</b>						
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer	105.30	105.00 to 105.04	Yes	
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.45	0.111 to 0.156	Yes	
(c)	<b>Ring end gap (mm):</b>						
	- Top comp. ring.	Evaluative	-do-	2.0	0.45 to 0.50	Yes	
	- 2 <sup>nd</sup> comp. ring.		-do-	2.0	0.65 to 0.90	Yes	
	- Oil ring.		-do-	2.0	0.55 to 0.60	Yes	
(d)	<b>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 0.076	Yes	
	- Oil ring.		-do-	0.20	0.046 to 0.048	Yes	
(e)	<b>Clearance of main bearings (mm):</b>						
	- Diametrical clearance	Evaluative	To be specified by the manufacturer	0.40	0.033 to 0.096	Yes	
	- Crankshaft end float	Evaluative		0.60	0.15	Yes	
(f)	<b>Clearance of big end bearings, (mm):</b>						
	- Diametrical	Evaluative	-do-	0.60	0.075 to 0.115	Yes	
	- Axial	Evaluative	-do-	1.00	0.20 to 0.30	Yes	
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	1.00	0.544 to 0.639	Yes	
(h)	Clearance between centre pin and bush, (mm)	Non Evaluative	-do-	1.00	0.103 to 0.127	Yes	
16.1.12	<b>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	



16.1.12 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.)
			4	5
1	2	3		
1.	Maximum oil pull over, (%)	0.25% (max.)	Not applicable	Yes
2.	Fitment of ROPS	With a provision for fitment of ROPS. If ROPS fitted it should meet the requirement of IS: 11821-1992	Not provided ROPS not fitted	Not applicable Not applicable
3.	Accessories	Trailer hitch, front tow hook, linkage drawbar may be provided.	Provided	Yes

### 16.3 Conformity with following IS:

- |      |  |   |                  |
|------|--|---|------------------|
| 1    | 2  | 3 | 4                |
| 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)] | : | Conforms         |



1	2	3	4
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)]	: Conforms	
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:

##### 16.4.1.1 PTO Performance:

- The maximum backup torque was observed as 15.34 %.
- The maximum power was observed as 27.0 kW against the declaration of 27.0 kW, which meet the requirement of IS: 12207-2014 with regard to tolerance.
- The specific fuel consumption corresponding to maximum power was measured as 265 g/kWh against the declaration of 269 g/kWh, which is within the tolerance limit of IS: 12207-2014.
- The power drop of 6.3 % was recorded in high ambient condition as compared to natural ambient condition. It is considered on higher side and calls for necessary corrective action.

##### 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 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.

**16.4.1.4 Linkage drawbar:**

Some of the parameters of the drawbar linkage conform to Cat.-I and some of them conform to Cat.-II. Keeping in view of the spirit of standardization, the necessary improvements may be incorporated.

**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.

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

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

- i) Provision for spark arresting device in exhaust system.
- ii) Provision of safety against accidental start of engine.
- iii) Provision of differential lock.
- iv) Provision of PTO shaft master shield.

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

The following literature was supplied with the tractor for reference during the test.

- i) Operator's manual
- ii) Spare parts catalogue
- iii) Service 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 (April, 2014 to February, 2015)	Yes	None

**TESTING AUTHORITY:**

**R. M. TIWARI**  
SENIOR AGRICULTURAL ENGINEER

**C.R. LOHI**  
DIRECTOR

Test Report compiled by: Er. Rajneesh Patel, Senior Technical Assistant.