



ACE DI 42 XT 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 - 2015 Certified Institute)

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

E-mail fmtl-mp@gov.in

Website : <http://www.fmttibudni.gov.in>

Telephone : 07564 - 234729

Fax : 07564 - 234743



T- 1104/1630/2017

ACE DI 42 XT TRACTOR- Commercial (Variant)

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

Applicant : M/s. Action Construction Equipment
Limited,
25th Mile Stone, Jajru Road, Mathura
Road, Ballabgarh, Faridabad, Haryana -
121 004

Month: August

Test Report No. T- 1104/1630/2017

Year : 2017



GOVERNMENT OF INDIA
CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE
TRACTOR NAGAR, BUDNI (MADHYA PRADESH) 466445, INDIA

E-mail: fnti-mp@gov.in

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

Telephone: 07564-234729

FAX: 07564-234743

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Type of Test : **COMMERCIAL (Variant)**

Test code/Procedure : IS: 5994-1998 (Reaffirmed in March 2009),
and IS: 12207-2014

Period of Test : July, 2017 to August, 2017

Test Report No. : **T- 1104/1630/2017**

Month/Year : **August, 2017**

- i) The results reported in this report are observed values and no corrections have been applied for atmospheric and site conditions.
- ii) The data given in this report pertain to the particular machine submitted by the applicant for test.
- iii) The results presented in this report do not in any way attribute to the durability of the machine.
- iv) This report should not be reproduced in part or full without prior permission of the Director, Central Farm Machinery Training and Testing Institute, Budni (M.P.).
- v) This is a Variant test report and, should be read in conjunction with the Test Report of base model i.e. "ACE DI 350 NG Tractor" bearing No. T- 959/1477/2015, March, 2015.

SELECTED CONVERSIONS & ABBREVIATIONS

| SELECTED CONVERSIONS | | | ABBREVIATIONS | |
|----------------------|-----------------------|----------------------------------|-------------------|------------------------------------|
| Sl. No | Units | Conversion Factor | | |
| 1 | Force: | | apa | As per applicant |
| | 1 kgf | 9.80665 N 2.20462 lbf | TDC | Top Dead Centre |
| 2 | Power: | | IS | Indian Standard |
| | 1 hp | 1 01387metric hp (Ps) 745.7 W | LHS/RHS | Left Hand Side/ Right Hand Side |
| | 1 Ps | 735.5 W | Hg | Mercury |
| | 1 kW | 1.35962 Ps | Temp. | Temperature |
| 3 | Pressure: | | N.R. | Not recorded |
| | 1 psi | 6.895 kPa | rpm | Revolutions per minute |
| | 1 kgf/cm ² | 98.067 kPa = 735.56 mm of Hg | O.D/I.D | Outer diameter/ Inner diameter |
| | 1 bar | 100 kPa = 10 N/cm ² | N.A. | Not available/ Not applicable |
| | 1 mm of Hg | 1.3332 m-bar | PTO | Power take-off |
| | | R.H | Relative Humidity | |

C O N T E N T S

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

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

Selected for test by : Applicant
Place of running-in : At applicant's works

Duration of said running-in (h):
- Engine : 25
- Transmission : 25

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

1. SCOPE OF TEST

The "ACE DI 350 NG" tractor had undergone "Initial Commercial Test" at this Institute and a test report No. T- 959/1477/2015, was released in March, 2015. Now the applicant has submitted an application vide letter No. ICT/42XT/001 dated 30.12.2016 for testing of "ACE DI 42 XT" tractor as a Variant of "ACE DI 350 NG" tractor.

The applicant having enclosed a list of following differences in the technical specifications between "ACE DI 350 NG" and "ACE DI 42 XT" and requested to test the "ACE DI 42 XT" as a variant of "ACE DI 350 NG" tractor

The major features of Base model and Variant model are listed below:

| S. No. | Parameters | Base Model (Test Report No. T-959/1477/2015) | Variant Model |
|--------|--|--|--|
| 1 | 2 | 3 | 4 |
| 1. | Model of tractor | ACE DI 350 NG | ACE DI 42 XT |
| 2. | Exhaust System (Position of silencer outlet w.r.t SIP, mm) | | |
| | -Vertical | 970 | 960 |
| | -Longitudinal | 1465 | 1360 |
| | -Lateral | 485 (on RHS) | 430 (RHS) |
| 3. | Type of clutch | Single, Dry friction plate | Dual, Dry friction plate and pads |
| 4. | Location of gear shifting lever | Centre shift | Side shift |
| 5. | Brake system: | | |
| | Type | Mechanical, dry disc brakes | Mechanical, oil immersed multi disc brakes |
| | No. of disc (s) | Two (on each wheel side) | Four (on each wheel side) |
| | Area of liners (cm ²) | 734.88 (on each wheel side) | 917.9 (on each wheel side) |

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| 1 | 2 | 3 | 4 |
|-----|---|---|---|
| 6 | Type of steering system | Mechanical | Hydrostatic (power steering) |
| 7 | Wheel equipments : | | |
| | Track width of steered wheel, mm | 1285 (std.) & 1495 | 1280 (std.) & 1540 |
| | Track width of drive wheel, mm | 1365 (std.), 1455, 1565, 1595, 1705, 1795 & 1905 | 1355 (std.), 1455, 1565, 1585, 1695, 1805 & 1955 |
| 8. | Wheel base (mm) | 1970 | 2015 |
| 9. | Minimum & maximum height of rear towing hitch, mm | 620 (fixed) | 655 (Fixed) |
| 10. | Minimum & maximum height of rear towing hitch, mm | 425 & 870 | 525 to 860 |
| 11. | Overall dimensions (Length and Width), mm | 3720 and 1710 | 3760 and 1720 |

Subsequent to the examination of the case in light of Clause 8.4 & Sl. No. i), vii) of Table-3 of Indian Standard IS 12207-2014, the following tests were considered to be carried out:

- Specification checking
- Nominal speed test
- Two hour maximum PTO power performance test, under natural ambient condition
- Brake test
- Turning ability test

2. FUEL AND LUBRICANTS

2.1 Fuel : The High-speed diesel oil supplied by M/s Indian Oil Corporation Limited having density of 0.836 g/cc at 15°C was used.

2.2 Lubricants:

| S. No. | Particulars | As recommended by the manufacturer | As used during the test |
|--------|---|------------------------------------|---|
| 1 | Engine oil | SAE 20 W 40 | As recommended |
| 2 | Gearbox, Differential, rear axle housing and hydraulic system oil | HP Super Tran (E) | Oil originally filled in the systems were not changed |
| 3 | Steering system | HLP - 68 | --do-- |
| 4 | Grease | Servo grease MP | MP Grease |

3. ESSENTIAL TESTS

3.1. SPECIFICATIONS

| | <u>Base Model</u> | <u>Variant Model</u> |
|--|-------------------|--|
| 3.1.1 Tractor: | | |
| Make | : | ACE |
| Model | : | DI 350 NG DI 42 XT |
| Brand name, if any | : | None |
| Type | : | Four wheeled, rear-wheel driven, unit construction, general purpose, standard Agricultural Tractor |
| Year of manufacture | : | 2013 2016 |
| Chassis number | : | NAC 350000003 SAF420025452 |
| Country of Origin | : | India India |
| 3.1.2 Engine: | | |
| Make | : | ACE |
| Model | : | A40 |
| Type | : | Four stroke, water cooled, naturally aspirated, direct injection, diesel engine |
| Serial number | : | TMAC 0000003 TSAF0002724 |
| 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 |
| 3.1.3 Cylinder & Cylinder Head: | | |
| Number | : | Three |
| Disposition | : | Vertical, Inline |
| Bore/stroke, (mm) | : | 105/110 |
| Capacity as specified by the applicant, (cc) | : | 2857 |
| Compression ratio, (apa) | : | 18.5 : 1 |
| Type of cylinder head | : | Individual |
| Type of cylinder liners | : | Wet, replaceable |
| Type of combustion chamber | : | Re entrant |
| Arrangement of valves | : | Overhead, inline |
| Valve clearance (cold): | | |
| - Inlet valve, (mm) | : | 0.30 / 0.30 |
| - Exhaust valve, (mm) | : | 0.40 / 0.40 |
| 3.1.4 Fuel System: | | |
| Type of fuel feed system | : | Gravity and force feed |
| 3.1.4.1 Fuel tank: | | |
| Capacity, (l) | : | 59.0 54.0 |
| Location | : | Above clutch housing |
| Provision for draining of sediments/ water | : | Provided |
| Material of fuel tank | : | Metallic |

| | <u>Base Model</u> | <u>Variant Model</u> |
|---|--|-------------------------------------|
| 3.1.4.2 Water separator | | |
| Make | | Hilux |
| Type | | Inverted funnel, gravity separation |
| Location | Mounted on LHS of engine in between fuel tank and fuel feed pump | |
| Capacity (l) | | 0.46 |
| 3.1.4.3 Fuel feed pump: | | |
| Make | | Bosch |
| Type | | Plunger |
| Model/Group combination No. | FP/KS22AD48/2944003 0011 | FP/KSG 22AD105, F002 A50 040 (apa) |
| Provision of sediment bowl | | Provided (Metallic) |
| Method of drive | Through cam shaft of fuel injection pump | |
| 3.1.4.4 Fuel filters: | | |
| Make | | Bosch, India |
| Model/Group combination No. | | 9 450 030 11B |
| Number | | Two |
| Type of elements | | |
| -Primary | | Cloth |
| -Secondary | | Paper |
| Capacity of final stage filter, (l) | 0.45 | 0.48 |
| 3.1.4.5 Fuel Injection pump: | | |
| Make | | Bosch |
| Model/Group combination No. | E 040 266 900 (Production No. F002 AOZ 950, PES3A90D320RS3500) | F002 AOZ 950, PES3A90D320RS3500 |
| Type | Inline, plunger | |
| Serial number | 104001 | 65472252 |
| Method of drive | Through timing gears | |
| 3.1.4.6 Fuel injectors: | | |
| Make | | Bosch, India |
| Model/Group combination No. | | |
| Holder number | F 002 C70 552 | F 002 C70 552 |
| Nozzle number | DSL A 140 PV3 391 672 (Production No. DSL A 140 P 5601) | DSL A 140 P 5601 |
| Type | Multinoles (five holes) | |
| Manufacturer's production pressure setting, (Mpa) | 25 ± 0.8 | |
| Injection timing | 9 ± 1 degree before TDC | |
| Firing order | 1-3-2 | |
| 3.1.4.7 Governor: | | |
| Make | | Bosch, India |
| Model/Group combination No. | E 042 207 500 (Production No. RSV350...900A5C1735R) | RSV350...900A5C1735R |
| Type | Mechanical, centrifugal, variable speed | |
| Rated engine speed, (rpm) | 1800 | |
| Governed range of engine speed, (rpm) | 650 to 2050 | |

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| | Base Model | Variant Model |
|---|---|---|
| 3.1.5 Air intake system: | | |
| 3.1.5.1 Pre-cleaner | | Not provided |
| 3.1.5.2 Air cleaner | | |
| Make | | Donaldson |
| Type | | Dry |
| Location | | In front of radiator, under the bonnet |
| Range of suction pressure at maximum power, (kPa) | 2.1 | 2.2 to 2.3 |
| Details of elements: | | |
| - Size (OD/ID), (mm) | Secondary element : 78.59/64.78 | Primary element : 127.15 / 84.95 |
| - Length, (mm) | 295 | 305 |
| - Type | | Plastic |
| - No. of elements | One | One |
| Air flow restriction indicator | | Provided on dash board |
| Dust unloading valve | | Provided |
| Maintenance schedule | i) Cleaning of primary element if required in arduous condition or after every 300 hours of operation. Replace primary element after every 900 hours of operation or after 3 cleanings of primary filter element. ii) Replace secondary element after every 2700 hours or after 3 replacement of primary filter element. | |
| | | Not specified |
| 3.1.6 Exhaust System: | | |
| Type of silencer | | Updraft, elliptical |
| Position of silencer outlet with respect to SIP, (mm) | | |
| - Vertical | 970 | 960 |
| - Longitudinal | 1465 | 1360 |
| - Lateral | 485 (on RHS) | 430 (RHS) |
| Range of exhaust gas pressure at maximum power, (kPa) | 1.59 to 6.53 | 3.47 to 4.27 |
| Provision of spark arrestor | | None |
| Provision against entry of rain water. | | A bend is provided at the top of silencer |
| 3.1.7 Lubricating system: | | |
| Type | | Forced feed-cum-splash |
| Oil sump capacity, (l) | 6.2 | 5.5 |
| Total lub oil capacity, (l) | 7.2 | 7.1 |
| Oil change period | First change after 50 hours and subsequently after every 250 hours of operation | |
| Cooling device, (if any) | | None |
| Lubrication oil Filters: | | |
| Make | Mico | Not available |
| Type | Spin-on, replaceable type | |
| Number | One | |
| Lubrication oil Pump: | | |
| Make | NA | Viraj automotive |
| Type | | Gear |
| Method of drive | | Through timing gears |
| Pressure release setting, (kPa) | | 450 (apa) |
| Minimum permissible pressure, (kPa) | | 49 (apa) |

| | | <u>Base Model</u> | <u>Variant Model</u> |
|-----------------|---|--|--|
| 3.1.8 | Cooling system: | | |
| | Type | Forced circulation of liquid | |
| | Coolant as recommended | PEE KAY INTERNATIONAL | |
| | Coolant water ratio | 1:10 | |
| | Details of pump | Centrifugal, semi open impeller having 12 vanes of 89.54 mm diameter and driven through crankshaft pulley by a "V" belt common to alternator. | Centrifugal, semi open impeller having 12 vanes of 90 mm (apa) diameter and driven through crankshaft pulley by a "V" belt common to alternator. |
| | Details of fan | Suction type having 07 polypropylene blades of 420 mm diameter, driven through crankshaft pulley by a "V" belt common to alternator and mounted on water pump shaft. | |
| | Means of temperature control | Thermostat | |
| | Bare radiator capacity, (l) | 2.3 | 2.7 |
| | Capacity of expansion flask, (l) | 1.1 | 1.0 |
| | Total coolant capacity, (l) | 7.9 | 7.6 |
| | Radiator cap pressure, (kPa) | 49 (apa) | 90 (apa) |
| 3.1.9 | Starting System: | | |
| | Type | 12V, DC, Electrical | |
| | Aid for cold starting | None | |
| | Any other device provided for easy starting | None | |
| 3.1.10 | Electrical System: | | |
| 3.1.10.1 | Battery: | | |
| | Make & Model | Amaron & TRA 550 D31R | Exide & MF70Z |
| | Number | One | |
| | Type | Lead Acid | |
| | Capacity and rating | 12V, 88 Ah at 20 hours discharge rate | 12V, 75 Ah at 20 hours discharge rate |
| | Location | In front of radiator, under the bonnet | On LHS of clutch housing in separate housing |
| 3.1.10.2 | Starter: | | |
| | Make | Magneton | Penalfa |
| | Model | NA | AS 013-2456 |
| | Type | Pre-engaging, solenoid operated | |
| | Capacity and rating | 12V, 2.5 kW | 12V, 2.5 kW (apa) |
| | Serial Number | 5006 - 1571 | Not available |
| 3.1.10.3 | Generator: | | |
| | Make | Magneton | Penalfa |
| | Model | AS 00 31371 - G | AS 082-876-A |
| | Type | Alternator | |
| | Output rating | 12V, 42 Amps | 12V, 42 Amp |
| | Serial number | 0324201027 | Not available |
| | Method of drive | Through crankshaft pulley by a cogged "V" belt. | |
| 3.1.10.4 | Voltage regulator | Inbuilt with alternator | |

3.1.10.5 Details of lights:

| Description | No. & capacity of bulb | Height of the centre of beam above ground level (mm) | Size, (mm) | Distance between centre of the beam and outside edge of tractor at standard rear track setting, (mm) |
|-----------------------------------|-----------------------------|--|------------|--|
| 1 | 2 | 3 | 4 | 5 |
| Base Model: | | | | |
| Front Lights: | | | | |
| - Head lights | 2, 12V, 60/55W | 1230 | 160 x 100 | 700 |
| - Parking lights | 2, 12V, 5W | 1265 | 65 x 65 | 180 |
| - Turn-cum-hazard Indicator light | 2, 12V, 21W | 1265 | 65 x 70 | 110 |
| - Reflectors (White) | 2 | 1265 | 30 x 55 | 220 |
| Rear lights: | | | | |
| - Tail-cum-brake light | 2, 12V, 21/5W | 1240 | 65 x 65 | 180 |
| - Turn-cum-hazard Indicator light | 2, 12V, 21W | 1240 | 65 x 70 | 110 |
| - Plough light (on RHS mudguard) | 1, 12V, 55 W | 1410 | 125 ϕ | 340 |
| - Reflectors (Red) | 2 | 1330 | 30 x 55 | 220 |
| - Registration plate light (RHS) | Part of rear light assembly | | | |
| Variant Model: | | | | |
| Front Lights: | | | | |
| - Head lights | 2, 12V, 60/55W | 1240 | 160 x 100 | 705 |
| - Parking lights | 2, 12V, 5W | 1280 | 65 x 65 | 155 |
| - Turn-cum-hazard Indicator light | 2, 12V, 21W | 1280 | 65 x 70 | 85 |
| - Reflectors (White) | 2 | 1280 | 30 x 55 | 200 |
| Rear lights: | | | | |
| - Tail-cum-brake light | 2, 12V, 21/5W | 1270 | 65 x 65 | 155 |
| - Turn-cum-hazard Indicator light | 2, 12V, 21W | 1270 | 65 x 70 | 90 |
| - Plough light (on RHS mudguard) | 1, 12V, 55 W | 1420 | 125 ϕ | 320 |
| - Reflectors (Red) | 2 | 1270 | 30 x 55 | 195 |
| - Registration plate light (RHS) | Part of rear light assembly | | | |

3.1.11

Instrument panel details:-

- i) Engine speed- cum- digital cumulative run hour meter (0 - 30 x 100 rpm)
- ii) Coolant (water) temperature gauge (with colour zones)
- iii) Battery voltmeter (with colour zones)
- iv) Lubricant oil pressure gauge (with colour zones)
- v) Fuel level gauge (with colour zones)
- vi) Air cleaner clogging indicator light
- vii) Main switch (key-turn type)
- viii) Light switch (rotary type)
- ix) Head light (long beam) indicator lamp

Base model

- Provided
- Provided
- Provided
- Provided
- Provided
- Provided
- Provided
- Provided
- Provided

Variant model

- Provided
- Provided
- Provided
- Provided
- Provided
- Provided
- Provided
- Provided
- Provided

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| | | | |
|--------|--|---------------------|----------|
| x) | Battery charging indicator lamp | Provided | Provided |
| xi) | Turn indicator-cum-hazard indicator lamp | Provided | Provided |
| xii) | Turn indicator switch | Not provided | Provided |
| xiii) | Hazard light switch | Provided | Provided |
| xiv) | Mobile charger socket | Provided | Provided |
| xv) | Fuel shut-off knob | Provided | Provided |
| xvi) | Steering control wheel | Provided | Provided |
| xvii) | Hand accelerator lever | Provided | Provided |
| xviii) | Horn push button | Provided | Provided |
| xix) | Rear view mirror | Provided | Provided |

3.1.12 Transmission System:

Base model

Variant model

3.1.12.1 Clutch:

| | | |
|------------------------------|---|--|
| Make | : Luk, India | Luk, India (apa) |
| Type: | Dry, single friction plate | Dual, Dry friction plate and Pads |
| No. of friction plate, (s) : | | |
| Transmission | : One | One |
| PTO | : Not provided | One |
| Size, (OD/ID, mm): | | |
| Transmission | : 279.62/165.99 | 279.55 / 166.08 |
| PTO | : Not applicable | 277.08/ 167.14 (have 04 Pads of area 27.01 cm ² of each pad) |
| Method of operation: | | |
| Transmission | : By fully pressing the clutch pedal transmission or PTO will be engaged. | By pressing the foot operated LHS clutch pedal halfway |
| PTO | : Not applicable | By pressing the foot operated LHS clutch pedal fully |

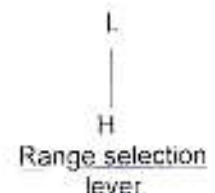
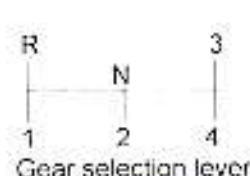
3.1.12.2 Gear box:

| | | |
|-------|---|--|
| Make | : | ACE |
| Model | : | None |
| Type | : | Mechanical, combination of constant and sliding mesh gear with epicyclic gear reduction unit for Hi-low gear selection. |
| | | Mechanical, combination of constant and sliding mesh gear with epicyclic gear reduction unit for Hi-low gear selection (apa) |

No. of speeds:

| | | |
|-----------|---|----|
| - Forward | : | 08 |
| - Reverse | : | 02 |

Gear shifting pattern on Base model and Variant model





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| | <u>Base model</u> | <u>Variant model</u> |
|---|---|---|
| Location of gear shifting levers | : Centre shift | Side shift |
| Main gear shift | : In-front of operator's seat | On RHS of operator's seat |
| Range selection (high-low & medium) | : In-front of operator's seat | On LHS of operator's seat |
| Oil capacity, (l) | : 54.0 (Common with differential, rear final drive & hydraulic system) | 50.5 (Common with differential, rear final drive & brake and hydraulic system) |
| Oil changing period | : First change after 750 hours of operation subsequently changes after every 1000 hours of operation | |
| 3.1.12.3 Rear differential unit: | | |
| Type | : Crown wheel & bevel pinion with differential unit accommodated inside the differential housing. | |
| Reduction through crown wheel & bevel pinion | : 3.23 : 1 (42/13 T) | 3.23 : 1 (42/13T) |
| Oil capacity (l) | : 54.0 (Common with gearbox, rear final drive & hydraulic system) | 50.5 (Common with gearbox, rear final drive & brake hydraulic system) |
| Oil changing period | : First change after 750 hours of operation subsequently changes after every 1000 hours of operation. | |
| Differential lock: | : Not provided | |
| 3.1.12.4 Rear axle & Rear final drive: | | |
| Make | : Not applicable | |
| Type | : Bull and pinion gear reduction unit accommodated inside differential housing on both sides. | |
| Reduction through final drive | : 4.462 : 1 (58/13T) | 4.462:1 (58/13T) (apa) |
| Oil capacity of rear axle & final drive. (l) | : 54.0 (Common with gearbox, differential & hydraulic system) | 50.5 (Common with gear box, differential & brake and hydraulic system) |
| Oil changing period | : First change after 750 hours of operation subsequently changes after every 1000 hours of operation. | |
| 3.1.13 Power lift (Hydraulic system): | | |
| Make | : NA | ACE (apa) |
| Model | : NA | |
| Type | : Open center, live, ADDC | |
| No. and type of cylinder | : One, single acting | |
| Type of linkage lock for transport | : Hydraulic, response control valve in fully closed position act as a transport lock. | |
| 3.1.13.1 Hydraulic pump: | | |
| - Make | : NA | United (apa) |
| - Type | : Gear | |
| - Location & drive | : On RHS of engine & through timing gears | |
| No. & type of filters | : Two, both of fine wire mesh strainer type | Three, two fine wire mesh strainer and one spin-on throw away type filter (apa) |
| Cooling device for hydraulic oil, if any | : None | |

| | <u>Base model</u> | <u>Variant model</u> |
|--------------------------------|---|--|
| Hydraulic oil capacity, (l) | : 54.0 (Common with transmission housing) | 50.5 (Common with transmission & brake system) |
| Oil change period | : First change after 750 hours of operation subsequently changes after every 1000 hours of operation. | |
| Provision for external tapping | : Provided | |
| Details of control levers | : i) Position control lever ii) Draft control lever iii) Response control knob (at distributor) | |
| Method of draft sensing | : Through top link | |

3.1.13.2 Three point linkage:

| S. No. | Observations | As per IS: 4468- (Part-1) -1997, (Cat.I / Cat.II), (mm) | As measured (mm) | | Remarks in case of variant model |
|--------------------------------|---|---|-------------------|----------------------|----------------------------------|
| | | | <u>Base model</u> | <u>Variant model</u> | |
| 1 | 2 | 3 | 4 | 5 | 6 |
| I. Upper hitch points: | | | | | |
| | a) Dia of hitch pin hole | 19.30 to 19.50 / 25.70 to 25.90 | 25.76 | 25.71 | Conforms to Cat.II |
| | b) Width of ball | 44.0 (max.) / 51.0 (max.) | 50.82 | 50.97 | Conforms to Cat.II |
| II. Lower hitch points: | | | | | |
| | a) Dia of hitch pin hole | 22.40 to 22.65 / 28.70 to 29.00 | 29.0 | 28.89 | Conforms to Cat. II |
| | b) Width of ball | 34.8 to 35.0 / 44.8 to 45.0 | 45.0 | 44.95 | Conforms to Cat. II |
| III. | Lateral distance from lower hitch point to centre line of tractor. | 359 / 435 | 359 | 364 | Does not conform |
| IV. | Lateral movement of lower hitch points | 100 (min) / 125 (min) | 140 | 200 | Conforms to Cat.I & II |
| V. | Distance from end of power take-off to centre of lower hitch point (lower links in horizontal position) | 450 to 575 / 550 to 625 | 520 | 490 | Conforms to Cat.I |
| VI. | Transport height | 820 (min)/ 950 (min) | 825 | 855 | Conforms to Cat.I |
| VII. | Power range (without force) | 560(min)/ 650 (min) | 630 | 590 | Conforms to Cat.I |
| VIII. | Leveling adjustment | 100 (min)/ 100 (min) | 250 | 270 | Conforms to Cat.I & II |
| IX. | Lower hitch point clearance | 100 (min)/ 100 (min) | 225 | 190 | Conforms to Cat.I & II |
| X. | Lower hitch point height | 200 (max)/ 200 (max) | 200 | 200 | Conforms to Cat.I & II |

3.1.13.3 Linkage Drawbar [Refer Fig.1] :

| Notation | As per IS: 12953-1990, (Cat.I) / (Cat.II), (mm) | As measured, (mm) | | Remarks in case of variant model |
|-----------------|---|-------------------|---------------|----------------------------------|
| | | Base model | Variant model | |
| A | 883 ± 1.5 / 825 ± 1.5 | 683 | 684 | Conforms to Cat-I |
| B | 75 (min) / 75 (min) | 75 | 75 | Conforms to Cat I & II |
| C | 30 (min) / 30 (min) | 30.1 | 31.46 | Conforms to Cat I & II |
| D \varnothing | 21.79 to 22.0 / 27.79 to 28.00 | 27.89 | 27.95 | Conforms to Cat-II |
| E | 39.0 (min) / 49.0 (min) | 54.6 | 54.33 | Conforms to Cat I & II |
| F \varnothing | 12.0 (min) / 12.0 (min) | 12.0 | 12.07 | Conforms to Cat I & II |
| G | 15.0 (min) / 15.0 (min) | 15.0 | 16.62 | Conforms to Cat I & II |
| H \varnothing | 25 ± 1 / 25 ± 1 | 25.1 | 24.88 | Conforms to Cat I & II |
| J | 80 ± 1.5 / 80 ± 1.5 | 80 | 80.86 | Conforms to Cat I & II |
| No. of holes | 7 / 9 | 07 | 07 | Conforms to Cat-I |



Fig. 1: DIMENSIONAL NOTATIONS FOR LINKAGE TYPE DRAWBAR

| | | Base model | Variant model |
|------------|---|---|------------------------------|
| 3.1.13.3.2 | Swinging drawbar | : | Not provided |
| 3.1.13.3.3 | Provision for coupling of trailer brakes | : Not provided | Provided |
| 3.1.14 | Power take-off shaft: | | |
| | Type | : Type-I, Independent | Not Type-I, Semi Independent |
| | Method of engaging | : By a hand lever provided on LHS of operator's seat. | |
| | No. of shaft,(s) | : One | One |
| | PTO speed corresponding to rated engine speed, (rpm): | : 551 | 551 |
| | Distance behind rear axle, (mm) | : 355 | 370 |
| | Engine to PTO speed ratio | : 3.267 : 1 | 3.267:1 |
| | Whether the PTO shaft is capable of transmitting the full power of engine | : Yes | Yes |
| | Other speeds (rpm) | : Not provided | Not provided |

3.1.14.1 Specifications of Power Take-Off Shaft:

| Specification | As per IS: 4931-1995 (Type I) | As observed | | Remarks in case of variant model |
|--|---|----------------------------------|--|---|
| | | Base model | Variant model | |
| 1 | 2 | 3 | 4 | 5 |
| Nominal speed, (rpm) | 540 ± 10 | 540 | 540 rpm of PTO shaft corresponds to 1/64 rpm of engine | Conforms |
| No. of splines | 6 | 6 | 6 | Conforms |
| Direction of rotation | Clockwise | Clockwise | Clockwise | Conforms |
| Location | The position of the centre of the end of pto shaft shall be within 50mm to right or left of the centre line of the tractor | 08 mm LHS from centre line | 08 mm LHS from centre line | Conforms |
| Dimensions, (mm) [Refer Fig.2]: | | | | |
| D \varnothing | 34.79 ± 0.06 | 34.95 | 34.84 | Conforms |
| d \varnothing | 28.91 ± 0.05 | 28.94 | 28.89 | Conforms |
| B \varnothing | 29.4 ± 0.1 | 29.3 | 29.48 | Conforms |
| A \varnothing (optional) | 8.3 ± 0.1 | 8.3 | 8.23 | Conforms |
| W | 8.69 ± 0.09 -0.16 | 8.65 | 8.67 | Conforms |
| a | 7 | 7 | 7 | Conforms |
| b (optional) | 25 ± 0.5 | 25.5 | 25.43 | Conforms |
| c | 38 | 38 | 38 | Conforms |
| X | 30° | 30° | 30° | Conforms |
| B | 76 (min) | 80 | 88.50 | Conforms |
| h | 450 to 675 | 615 | 615 | Conforms |

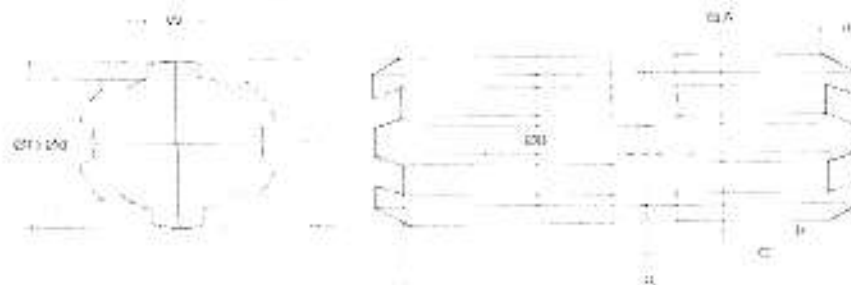


Fig.2 (a): DIMENSIONAL NOTATIONS FOR TYPE-I POWER TAKE-OFF SHAFT

| | | |
|---|----------------------------|---------------------------|
| 3.1.14.2 Power Take-off Master Shield (Type I): | Base model Not provided | Variant model Provided |
|---|----------------------------|---------------------------|

Dimensions of Power take-Off Master Shield, [Refer Fig. 2(b)]:

| Specification | As per IS 4931- 1995 (mm) | As Observed | | Remark |
|---------------|------------------------------|----------------|---------------|----------|
| | | Base model | Variant model | |
| K | 70 (Min.) | | 70 | Conforms |
| M | 125 ± 5 | | 125 | Conforms |
| N | 85 ± 5 | Not applicable | 80 | Conforms |
| P | 285 ± 5 | | 285 | Conforms |
| r | 76 (Max.) | | 0 | Conforms |

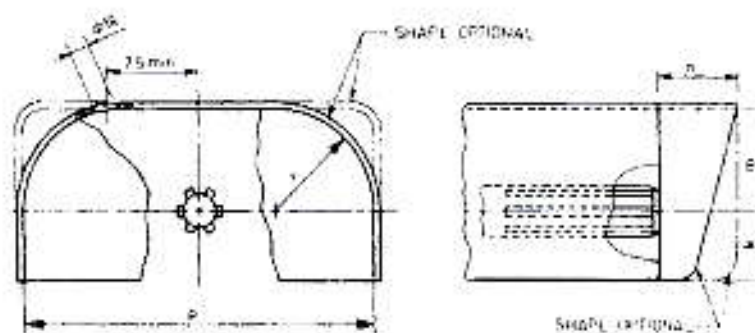


Fig. 2(b): DIMENSIONAL NOTATIONS FOR PTO SHAFT MASTER SHIELD

| 3.1.15 Towing hitch: | | Base model | Variant model |
|----------------------|--|---|--|
| 3.1.15.1 | Front | | |
| | Type | Clevis | Clevis |
| | Location | At front axle support bracket | At front axle support bracket |
| | Height above ground level, (mm) | 620 (fixed) | 655 (Fixed) |
| | Type of adjustment | None | Fixed |
| | Width of clevis, (mm) | 52 | 51.05 |
| | Dia. of pin hole, (mm) | 28 | 27.75 |
| 3.1.15.2 | Rear: | | |
| | Type | Clevis | |
| | Location | At rear of transmission housing | At rear of differential housing |
| | Height above ground level, (mm): | | |
| | - Maximum | 870 | 860 |
| | - Minimum | 425 | 525 |
| | - No. of positions | 8 | 8 |
| | - Type of adjustment | By changing the position and reversing and changing of hitch on mounting bracket. | By changing the position and reversing the hitch on its mounting bracket |
| | Distance of hitch point, (mm): | | |
| | -From rear wheel centre | 450 | 480 |
| | -From power take-off shaft end | 95 | 110 |
| | Dia of pin hole, (mm) | 35 | 34.55 |
| | Width of clevis, (mm) | 83 | 90.70 |
| 3.1.16 | Steering: | | |
| | Make | ZF India | Ognibene |
| | Type | Mechanical (worm and roller) | Hydrostatic (power steering) |
| | Location | Mounted on gearbox housing | Above gearbox housing |
| | Method of operation | Manual, by steering control wheel | |
| | Diameter of steering control wheel, (mm) | 430 | 420 |

| | |
|-------------------|--|
| T- 1104/1630/2017 | ACE DI 42 XT TRACTOR- Commercial (Variant) |
|-------------------|--|

| | | <u>Base model</u> | <u>Variant model</u> |
|-----------------|---|---|--|
| | Make of distributor | : Not applicable | Ognibene |
| | Make & Type of pump | : -do- | United & gear |
| | -Location | : -do- | On front. RHS of engine |
| | -Method of drive | : -do- | Through timing gear coupled with hydraulic pump |
| | Make, Number & Type of hydraulic ram cylinder | : -do- | Ognibene, one & double acting, single connecting |
| | -Location | : -do- | On LHS, rear of front axle |
| | Steering oil capacity. (l) | : 0.42 | 1.97 |
| | Lubricant change period | : First change after 750 hours of operation subsequently changes after every 1000 hours of operation. | |
| 3.1.17 | Brakes: | | |
| 3.1.17.1 | Service Brake: | | |
| | Make | : Vishwas | JMIL |
| | Type | : Mechanical, dry disc brakes | Mechanical, oil immersed multidisc brakes |
| | Location | : On bull-pinion half axle shaft, outside of the differential housing. | On RHS & LHS of bull pinion half axle shaft |
| | No. of disc (s) | : Two (on each wheel side) | Four (on each wheel side) |
| | Area of liners. (cm ²) | : 734.88 (on each wheel side) | 917.9 (on each wheel side) |
| | Material of liners | : Asbestos (apa) | Frictional material – HY-02-05 |
| | Method of operation | : Individual or combined pedal operation by right foot. | |
| 3.1.17.2 | Parking Brake: | | |
| | Type | : Pawl and ratchet arrangement | |
| | Location & Method of operation | : Service brake acts as parking brake when locked in position by a hand lever provided on RHS of operator's seat. | |
| 3.1.18 | Wheel Equipment: | <u>Base model</u> | <u>Variant model</u> |
| 3.1.18.1 | Steered Wheel(s): | | |
| | Make | : Good Year | Apollo premium krishak |
| | Number | : | Two |
| | Type of tyre | : | Pneumatic, ribbed |
| | Size | : | 6.00 -16 |
| | Ply rating | : | 8 |
| | Maximum permissible load on each tyre at inflation pressure recommended for road work, (kgf) at 230 kPa | : | 675 |

| | <u>Base model</u> | <u>Variant model</u> |
|---|---|--|
| Recommended inflation pressure, kPa : | | |
| - for field work : | | 230 |
| - for transport : | | 230 |
| Track width, (mm) : | 1265 (std.) & 1495 | 1300 (std.) & 1540 |
| Method of changing track width : | By reversing the wheel disc | |
| Make & size of rim : | SSWL W 4.50 x 16 | CWPL & 4.5 E x 16 |
| 3.1.18.2 Drive wheel (s): | | |
| Make : | Good Year | Apollo krishak gold |
| Number : | | Two |
| Type of tyre : | Pneumatic, traction | |
| Size : | 13.6 - 28 | |
| Ply rating : | 12 | |
| Maximum permissible load on each tyre at inflation pressure recommended for road work, (kgf) : | 1800 | |
| Recommended inflation pressure, (kPa): | | |
| - For field work : | | 110 |
| - For transport : | | 113 |
| Track width, (mm) : | 1365 (std.), 1455, 1555, 1595, 1705, 1795 & 1905 | 1355 (std.), 1455, 1565, 1585, 1695, 1805 & 1955 |
| Method of changing track width : | By changing & reversing the wheel disc on off-set rim lugs. | |
| Make & size of wheel rim : | CWPL & W12 x 28 | |
| 3.1.18.3 Wheel base, (mm) : | | |
| Method of changing wheel base, if any, and range : | 1970 None | 2015 None |
| 3.1.19 Operator's seat: | | |
| Make : | NA | Not available |
| Type : | Cushioned with backrest | |
| Type of Suspension : | Two Helical coil springs | |
| Type of Damping : | Hydraulic shock absorber | |
| Range of adjustment, (mm): | | |
| Vertical : | Nil | Nil |
| Lateral : | Nil | Nil |
| Longitudinal : | ± 85 | ±65 |
| 3.1.20 Provision for safety and comfort of operator: | | |
| 3.1.20.1 Operator's Seat: | | |
| Meets the minimum requirements of IS: 12343-1998, (Re-affirmed in March, 2009). Operator's seat meets the minimum requirements of IS: 12343-1998 (Re-affirmed in March, 2009) | | |
| 3.1.20.2 Conformity with IS: 6283 (Part 1 & 2)-1998 (Re-affirmed in March, 2009) : | | |
| Controls and displays are identifiable with symbols meets the requirements as per IS: 6283 (Part 1&2) – 1998. | | |



- | | <u>Base model</u> | <u>Variant model</u> |
|-----------------|--|--|
| 3.1.20.3 | Conformity with IS : 8133-1983 (Re-affirmed in March, 2009) : Location and movement of various controls meets the requirement of IS: 8133-1983, except the following: | |
| | i) Provision of safety against accidental start of engine has not been provided. | i) Provision of safety against accidental start of engine has not been provided. |
| 3.1.20.4 | Conformity with IS:12239 (Part-1)-1996 (Re-affirmed in March,2007) : Meets the requirements of IS: 12239 (Part-1) – 1996, except the following: | |
| | i) Provision of spark arresting device in the exhaust system. | i) Spark arrester in the exhaust system is not provided. |
| | ii) Subsequent steps should be provided. | ii) Subsequent steps should be provided. |
| 3.1.20.5 | Conformity with IS:12239 (Part-2)-1999 (Re-affirmed in March,2009) : Meets the requirements of IS:12239 (Part-2)-1999, except the following: | |
| | i) Differential lock is not provided | i) Differential lock is not provided. |
| | ii) PTO shaft master shield is not provided | |
| 3.1.20.6 | Conformity with IS: 14683 – 1999 (Re-affirmed in March, 2009) : Lightings provided on the tractor meets the requirements and conform to IS: 14683-1999. | |
| 3.1.20.7 | Rear view mirror: Rear view mirror has been provided | |
| 1.20.8 | Slow moving emblem: Slow moving emblem has been provided. | |

| | | <u>Base model</u> | | | <u>Variant model</u> | | |
|---------------|--|---|------|-------|---|------|-------|
| 3.1.21 | Mass of tractor, (kg): | Front | Rear | Total | Front | Rear | Total |
| | Without ballast : | 800 | 1175 | 1975 | 765 | 1235 | 2000 |
| 3.1.22 | Over all dimensions: | | | | | | |
| | - Length : | 3720 | | | 3760 | | |
| | - Width : | 1710 | | | 1720 | | |
| | - Height (with exhaust pipe) : | 2310 | | | 2310 | | |
| | Minimum ground clearance, (mm) : | 400 (below differential housing drain plug) | | | 332 (below trailer hitch mounting bolt) | | |
| 3.1.23 | Labelling plate of tractor: | | | | | | |
| | Location of labelling plate: Labeling plate is riveted on LHS of gearbox housing and provides the following information:- | | | | | | |

| | |
|--|--|
| Name of Manufacturer | M/s Action Construction Equipment Ltd. Dhudholla Link Road, Village : Dhudholla, Palwal -121 102 HARYANA (INDIA) |
| Make | ACE |
| Model | DI 42 XT |
| Year of manufacture | 2016 |
| Engine Serial Number | TSAF0002724 |
| Chassis Serial Number | SAF420025452 |
| Maximum PTO Power, kW | 27.0 |
| Specific fuel consumption, gm/kWh | 265 |

3.1.24 Number of external lubricating points:

| | <u>Base model</u> | <u>Variant model</u> |
|--------------------|-------------------|----------------------|
| - Oiling : | | Nil |
| - Grease nipples : | | 19 |
| - Grease cups : | | 02 |

3.1.25 Colour of tractor:

| | |
|----------------------|--------|
| Chassis & engine : | Black |
| Bonnet & Mudguards : | Blue |
| Wheel discs & rims : | Silver |

3.2 NOMINAL SPEED TEST

| Movement | Gear No. | No. of engine revolutions for one revolution of driving wheel | | Nominal speed at rated engine speed when fitted with 13.6-28 size tyres of 610 mm radius index, (kmph) | | Variation in nominal speed (%) |
|----------|----------|---|----------------------|--|----------------------|--------------------------------|
| | | <u>Base model</u> | <u>Variant model</u> | <u>Base model</u> | <u>Variant model</u> | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Forward | L1 | 174.37 | 174.39 | 2.37 | 2.37 | 0.00 |
| | L2 | 128.63 | 128.53 | 3.22 | 3.22 | 0.00 |
| | L3 | 77.48 | 77.50 | 5.34 | 5.34 | 0.00 |
| | L4 | 56.79 | 56.78 | 7.29 | 7.29 | 0.00 |
| | H1 | 44.25 | 44.24 | 9.35 | 9.36 | 0.11 |
| | H2 | 32.63 | 32.68 | 12.69 | 12.68 | -0.08 |
| | H3 | 19.66 | 19.67 | 21.05 | 21.05 | 0.00 |
| | H4 | 14.41 | 14.41 | 28.74 | 28.71 | -0.10 |
| Reverse | LR | 139.58 | 139.39 | 2.97 | 2.97 | 0.00 |
| | HR | 35.40 | 35.43 | 11.69 | 11.68 | -0.09 |

3.3 PTO PERFORMANCE TEST

| S. No. | Particulars | Base Model | Variant Model |
|--------|---|-------------------------------------|---------------|
| 1 | Date(s) of test | 07.06.2014, 18.06.2014 & 19.06.2014 | 25.07.2017 |
| 2 | Tractor run at this Institute prior to start of PTO test, (h) | 7.31 | 1.13 |
| 3 | Dynamometer test bench used | SAJ-AG-250 Eddy Current | |

Maximum power two hours test under natural ambient condition was conducted. The results of Power take-off performance test under natural ambient of base & variant models are tabulated in Table-1.

Table-1

| 1 | Power, (kW) | Speed, (rpm) | | Fuel Consumption | | | Specific energy, (kWh/l) |
|---|----------------|--------------|--------|------------------|--------|----------|--------------------------------|
| | | PTO | Engine | (l/h) | (kg/h) | (kg/kWh) | |
| | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| a) Maximum power – 2 hours test (under natural ambient condition): | | | | | | | |
| Base model | 27.0 | 566 | 1849 | 8.69 | 7.27 | 0.269 | 3.11 |
| Variant model | 26.8 | 551 | 1800 | 8.80 | 7.35 | 0.274 | 3.05 |
| b) Power at rated engine speed (1800 rpm): | | | | | | | |
| Base model | 26.8 | 551 | 1800 | 8.54 | 7.14 | 0.268 | 3.12 |
| Variant model | 26.8 | 551 | 1800 | 8.80 | 7.35 | 0.274 | 3.05 |

| Sl. No. | Parameters | Base Model | | Variant Model |
|------------|--|--------------------|----------------|---|
| | | Natural Ambient | High Ambient | Natural Ambient (Under max. power two hours test) |
| i) | No load maximum speed, (rpm) | 1973 | 1973 | 1986 |
| ii) | Equivalent crankshaft torque at maximum power (Nm) | 139.5 | 130.5 | 142.3 |
| iii) | Maximum equivalent crank shaft torque (Nm) | 160.9 | 149.9 | -- |
| iv) | Engine speed at maximum equivalent crankshaft torque, (rpm) | 1150 | 1150 | -- |
| v) | Backup torque (%) | 15.34 | -- | -- |
| vi) | Smoke level, maximum light absorption coefficient, (per meter) | 0.19 | -- | -- |
| vii) | Range of atmospheric condition : | | | |
| | - Temperature, ($^{\circ}$ C) | 25 to 28 | 42 to 45 | 27 to 28 |
| | - Pressure, (kPa) | 97.39 to 98.08 | 98.29 to 98.84 | 98.0 to 98.2 |
| | - Relative humidity, (%) | 52.1 to 63.8 | 31.7 to 51.2 | 86 to 89 |
| viii) | Maximum Temperature, ($^{\circ}$C): | | | |
| | - Engine oil | 97 | 108 | 91 |
| | - Coolant | 81 | 97 | 74 |
| | - Fuel | 48 | 63 | 44 |
| | - Air intake | 35 | 53 | 32 |
| | - Exhaust gas | 616 | 632 | 576 |
| ix) | Pressure at maximum power: | | | |
| | - Intake air, (kPa) | 2.1 | 1.9 | 2.2 to 2.3 |
| | - Exhaust gas, (kPa) | 4.66 | 6.53 | 3.47 to 4.27 |
| x) | Consumptions: | | | |
| | Lub. Oil (g/kWh) | -- | 0.844 | -- |
| | -Coolant (% of total coolant capacity) | -- | Nil | -- |

4. OTHER APPLICABLE TESTS

4.1 BRAKE TEST

4.1.1 Service brake:

4.1.1.1 Cold brake test:

Date of test(s) : 01.08.2017
 Type of Track : Concrete
 Maximum attainable speed (kmph):
 -Without Ballast : 31.8
 -With Road Ballasted : 31.8

| | | At maximum attainable speed | | | |
|---------------------|---|-----------------------------|-------|-------|-------|
| Unballasted tractor | Braking device control, force (N) | 390 | 329 | 267 | 206 |
| | Mean deceleration, (m/sec ²) | 3.41 | 3.13 | 2.72 | 2.50 |
| | Stopping distance, (m) | 11.54 | 12.46 | 14.34 | 15.61 |
| | | At 25 kmph travel speed | | | |
| Unballasted tractor | Braking device control, force(N) | 358 | 308 | 258 | 207 |
| | Mean deceleration, (m/ sec ²) | 3.30 | 2.91 | 2.70 | 2.50 |
| | Stopping distance, (m) | 7.56 | 8.30 | 8.92 | 9.65 |

4.1.1.2 Brake fade test: Unballasted tractor

| | | At maximum attainable speed | | | |
|---|--|-----------------------------|-------|-------|-------|
| Braking device control force (N) | | 387 | 354 | 322 | 289 |
| Mean deceleration, (m/ sec ²) | | 3.24 | 2.89 | 2.70 | 2.50 |
| Stopping distance, (m) | | 12.15 | 13.48 | 14.43 | 15.61 |
| | | At 25 kmph travel speed | | | |
| Braking device control force,(N) | | 434 | 368 | 302 | 236 |
| Mean deceleration, (m/ sec ²) | | 3.23 | 3.05 | 2.73 | 2.50 |
| Stopping distance, (m) | | 7.68 | 7.91 | 8.83 | 9.65 |

Maximum deviation of tractor from its original course, (m) : None
 Abnormal vibration : None
 The brakes were heated by : Self braking

4.1.2 Parking brake test:

| Particulars | 18 percent slope | | 12 percent slope with trailer of 1.85 tonnes. | |
|-----------------------------------|---------------------|------|---|------|
| | Up | Down | Up | Down |
| Braking device control force, (N) | 274 | 294 | 247 | 264 |
| Efficacy of parking brake | -----Effective----- | | | |

4.2. TURNING ABILITY

| Characteristics | Minimum turning diameter, (m) | | Minimum clearance diameter, (m) | |
|-----------------|-------------------------------|------|---------------------------------|------|
| | LHS | RHS | LHS | RHS |
| Brakes released | 7.26 | 6.98 | 7.94 | 7.74 |
| Brake applied | 6.27 | 6.19 | 7.11 | 7.03 |

5. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

| S. No. | Adjustment/ Defects/ breakdowns and Repairs | Category of breakdown | Tractor run hours |
|----------|---|-----------------------|-------------------|
| --None-- | | | |

6. COMPARISON BETWEEN BASE MODEL AND VARIANT MODEL
(Based on Table 3 & 4 of Indian Standard 12207: 2014)

| Sl No. | Clause No | Features | Observation on base model T-959/1477/2015, March, 2015) | Observation on variant model | Remarks | |
|--------|---------------------------------|--|--|----------------------------------|----------------------|----------------|
| 1 | 2 | 3 | 4 | 5 | 6 | |
| 1. | i) | Clutch: | Single, Dry friction plate | Dual, Dry friction plate and pad | Changed | |
| | | | Various configuration in base & variant models (refer para 3.1.12.1) | | Changed | |
| 2. | ii) | Air cleaner | Same configuration in base & variant models except (refer para 3.1.5.2) | | No change | |
| | | Range of suction pressure at maximum power (kPa) | 2.1 | 2.2 to 2.3 | No change | |
| 3. | iii) | Exhaust system | | | | |
| | | a) | Position of silencer outlet w.r.t SIP, mm | | | |
| | | | -Vertical | 970 | 960 | No change |
| | | | -Longitudinal | 1465 | 1360 | Changed |
| | | | -Lateral | 485 (on RHS) | 430 (RHS) | Changed |
| | b) | Range of exhaust gas pressure at maximum power (kPa) | 1.59 to 6.53 | 3.47 to 4.27 | Changed | |
| 4. | iv) | Gear Box: | | | | |
| | | Type | Mechanical, combination of constant and sliding mesh gear with epicyclic gear reduction unit for Hi-low gear selection | | | No change |
| | | Location of gear shifting lever: | Centre shift | Side shift | | Changed |
| | | Main gear shift lever | At front of operator's seat | On RHS of operator's seat | | Changed |
| | Range selection lever | At front of operator's seat | On LHS of operator's seat | | Changed | |
| 5. | v) | Reduction ratio of transmission: | | | | |
| | Movement | Gear | Base model | Variant model | Variation (%) | Remark |
| | Forward | L1 | 174.37 | 174.39 | 0.01 | No changed |
| | | L2 | 128.63 | 128.53 | -0.08 | -do- |
| | | L3 | 77.48 | 77.50 | 0.03 | -do- |
| | | L4 | 56.79 | 56.78 | -0.02 | -do- |
| | | H1 | 44.25 | 44.24 | -0.02 | -do- |
| | | H2 | 32.63 | 32.68 | 0.15 | -do- |
| | | H3 | 19.66 | 19.67 | 0.05 | -do- |
| | | H4 | 14.41 | 14.41 | 0.00 | -do- |
| | Reverse | LR | 139.58 | 139.39 | -0.14 | -do- |
| | | HR | 35.40 | 35.43 | 0.08 | -do- |
| | Range of speeds, (kmph): | | | | | |
| | - Forward | | | 2.37 to 28.74 | 2.37 to 28.71 | No change |
| | - Reverse | | | 2.97 to 11.69 | 2.97 to 11.68 | No change |
| | Additional no. of speed | | | None | None | No change |



| | |
|-------------------|--|
| T- 1104/1630/2017 | ACE DI 42 XT TRACTOR- Commercial (Variant) |
|-------------------|--|

| 1 | 2 | 3 | 4 | 5 | 6 |
|-----|-------|---|---|--|-----------|
| 6. | vi) | Fitment of accessories: | | | |
| | | - Expansion tank | Provided | Provided | No change |
| | | - Additional hydraulic pump | None | None | No change |
| | | - Air compressor | None | None | No change |
| | | - Radiator | Provided | Provided | No change |
| | | - Bare radiator capacity, (l) | 2.30 | 2.70 | No change |
| | | Total coolant capacity, (l) | 7.90 | 7.60 | No change |
| | | - Oil cooler | Not provided | Not provided | No change |
| 7. | vii) | Brake system: | | | |
| | | Type | Mechanical, dry disc brakes | Mechanical, oil immersed multi disc brakes | Changed |
| | | No. of disc (s) | Two (on each wheel side) | Four (on each wheel side) | Changed |
| | | Area of liners (cm ²) | 734.88 (on each wheel side) | 917.9 (on each wheel side) | Changed |
| 8. | viii) | Type of three point linkage | | | |
| | | | Same configuration in base & variant models (refer para 3.1.13.2 & 3.1.13.3) | | No change |
| | | Type | Cat.I / Cat.II | Cat.I / Cat.II | No change |
| | | Rear/front mounted | Rear mounted | Rear mounted | No change |
| 9. | ix) | PTO shaft (s) | | | |
| | | Location | 08 mm LHS from centre line | 08 mm LHS from centre line of tractor | No change |
| | | Type | Type-I, Not Independent | Type-I, Semi Independent | Changed |
| | | Speed corresponding to rated engine speed (rpm) | 551 - Clockwise rotation | 551 - Clockwise rotation | No change |
| | | Other speed corresponding to rated engine speed (rpm) | None | None | No change |
| | | - Anticlockwise rotation speed (rpm) | Not provided | Not provided | No change |
| 10. | x) | Type of drive: | 2WD | 2WD | No change |
| 11. | xi) | Hydraulic system: | | | |
| | | Location & type of Hydraulic pump drive | Same configuration in base & variant models (refer para 3.1.13). | | No change |
| 12. | xii) | Positioning of Hydraulic Sensing Mechanism: | | | |
| | | Lower link, top link, etc. | Through top link | Through top link | No change |
| 13. | xiii) | Rear Final Reduction: | | | |
| | | Reduction through final drive | 4.462 : 1 (58/13T) | 4.462 : 1 (58/13T) | No change |
| | | Type | Bull and pinion gear reduction unit accommodated inside differential housing on both sides. | | No change |

| 1 | 2 | 3 | 4 | 5 | 6 |
|-----|---|---|---|--|-----------|
| 14. | xiv) | Type of fuel Injection pump: | | | |
| | | Inline/Rotary/Common rail | Inline plunger | Inline plunger | No change |
| 15. | Change related to statutory/ regulatory requirements (As per Table 4): | | | | |
| | a) | Engine operating principle (spark/ compression ignition, two/four stroke) | Compression Ignition, 4 stroke | Compression Ignition, 4 stroke | No change |
| | b) | Number & arrangement of cylinders | Three vertical inline | Three vertical inline | No change |
| | c) | Maximum declared PTO power, (kW) | 27.0 | 27.0 | No change |
| | d) | Bore /stroke (mm) | 105/110 | 105/110 | No change |
| | e) | Engine displacement (cc) | 2857 | 2857 | No change |
| | d) | Rated engine speed (rpm) | 1800 | 1800 | No change |
| | e) | Naturally aspirated/turbo charged | Naturally aspirated | Naturally aspirated | No change |
| 16 | Change related to ergonomics, safety comfort, statutory / regulatory requirements: | | | | |
| | a) | IS: 10273 | Conformed | Conforms | No change |
| | b) | IS: 4931 | Did not conform | Conforms | Changed |
| | c) | IS: 4468 | Conformed | Does not conform | Changed |
| | d) | IS: 12953 | Conformed | Conforms | No change |
| | e) | IS: 12343 | Conformed | Conforms | No change |
| | f) | IS: 12239 (Pt-I) | Did not conform | Does not conform | No change |
| | g) | IS: 12239 (Pt-II) | Did not conform | Does not conform | No change |
| | h) | IS: 8133 | Did not conform | Does not conform | No change |
| | i) | IS: 6283 | Conformed | Conforms | No change |
| | j) | IS: 14683 | Conformed | Conforms | No change |
| 17. | Other changes: | | | | |
| | a) | Type of steering system | Mechanical | Hydrostatic (power steering) | Changed |
| | b) | Front towing hitch | Various configuration in base model (refer para 3.1.15.1) | | Changed |
| | c) | Rear towing hitch | Various configuration in base model (refer para 3.1.15.2) | | Changed |
| | d) | Wheel equipments: | | | |
| | | Track width of steered wheel, mm | 1265 (std.) & 1495 | 1280 (std.) & 1540 | Changed |
| | | Track width of drive wheel, mm | 1365 (std.), 1455, 1555, 1595, 1705, 1795 & 1905 | 1355 (std.), 1455, 1565, 1585, 1695, 1805 & 1955 | Changed |
| | e) | Wheel base (mm) | 1970 | 2015 | Changed |
| | f) | Over all dimensions, mm: | | | |
| | | - Length | 3720 | 3760 | Changed |
| | g) | Minimum ground clearance, (mm) | 400 (below differential housing drain plug) | 332 (below trailer hitch mounting ball) | Changed |

| | |
|-------------------|--|
| T- 1104/1630/2017 | ACE DI 42 XT TRACTOR- Commercial (Variant) |
|-------------------|--|

| 1 | 2 | 3 | 4 | 5 | 6 | |
|---|----|---------------------|---------------------------------------|--|--|---------|
| | h) | Battery: | | | | |
| | | Make & Model | Amaron & TRA 550 D31R | Exide & MF70Z | Changed | |
| | | Capacity and rating | 12V, 88 Ah at 20 hours discharge rate | 12V, 75 Ah at 20 hours discharge rate | Changed | |
| | | | Location | In front of radiator, under the bonnet | On LHS of clutch housing in separate housing | Changed |
| | i) | Generator: | | | | |
| | | Make | Magneton | Penalfa | Changed | |
| | | Model | AS 00 31371 - G | AS 082-8/6-A | Changed | |
| | j) | Sheet metal: | | | | |
| | | - Colour | Blue | Blue | No change | |
| | | -Decals (Sticker) | ACE DI 350 NG | ACE DI - 42 XT | Changed | |

7. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

On the basis of test conducted the performance results have been summarized as evaluative (mandatory) and non – evaluative (not mandatory) parameters applicable for qualifying Minimum Performance Criteria as per clause-4 table-1 of Indian Standard 12207: 2014 for acceptance of tractor for the purpose of subsidies/NABARD financing for the applicable features for this tractor model.

7.1 Evaluative & Non Evaluative Parameters:

| Sl. No. | Characteristic | Category (Evaluative / Non Evaluative) | Requirements as per IS: 12207-2014 | Values declared by the applicant/ requirement | | As observed | | Whether Variant model meets the requirements (Yes/No) |
|---------|---|--|--|---|---------------|-------------|---------------|---|
| | | | | Base model | Variant Model | Base model | Variant model | |
| 1 | 2 | 3 | 4 | 5 a | 5 b | 6 a | 6 b | 7 |
| 7.1.1 | PTO Performance : | | | | | | | |
| a) | - Max. power under 2 h test, (kW) (Natural ambient condition) | Evaluative | Declared value to be achieved with a tolerance of $\pm 5\%$ +10% for PTO power >26 kW / $\pm 5\%$ +10% for PTO power ≤ 26 kW or $\pm 5\%$ +10% for engine power >26 kW / $\pm 5\%$ +10% for engine power ≤ 26 kW | 27 (D) | 27 (D) | 27.0 | 26.8 | Yes |
| b) | Power at rated engine speed, (kW) | Non Evaluative | -do- | 27 (D) | 27 (D) | 26.8 | 26.8 | Yes |
| c) | Specific fuel consumption corresponding to maximum power, (g/kWh) | Non Evaluative | +5% | 265 (D) | 265 (D) | 269 | 274 | Yes |

| | |
|-------------------|--|
| T- 1104/1630/2017 | ACE DI 42 XT TRACTOR– Commercial (Variant) |
|-------------------|--|

| 1 | 2 | 3 | 4 | 5 a | 5 b | 6 a | 6 b | 7 |
|-------|---|------------|--|----------|--------------|------------|------------|-----|
| 7.1.2 | 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) | 10 (R) | 8.48 | 7.56 | Yes |
| | 2) Hot brake | Evaluative | 10 | 10 (R) | 10 (R) | 8.48 | 7.68 | Yes |
| b) | Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N) | Evaluative | 600 | 600 (R) | 600 (R) | 461 to 468 | 207 to 236 | 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 | Yes | 436 | 294 | Yes |
| 7.1.3 | Labelling of tractors (Provision of labeling plate): | | | | | | | |
| | 1) Make | Evaluative | Should conform to the requirements of CMVR along with declared value of PTO HP | -- | ACE | | | Yes |
| | 2) Model | Evaluative | | -- | DI 42 XT | | | Yes |
| | 3) Year of manufacture | Evaluative | | -- | 2016 | | | Yes |
| | 4) Engine number | Evaluative | | -- | TSAF0002724 | | | Yes |
| | 5) Chassis number | Evaluative | | -- | SAF420025452 | | | Yes |
| | 6) Declaration of PTO power, kW | Evaluative | | -- | 27.0 | | | Yes |
| 7.1.4 | Literature (Submission to test agency) | | | | | | | |
| (a) | Operator manual | Evaluative | Provided/ Not Provided | Provided | | Provided | | Yes |
| (b) | Parts Catalogue | Evaluative | Provided/Not Provided | Provided | | Provided | | Yes |
| (c) | Workshop/Service manual | Evaluative | Provided/Not Provided | Provided | | Provided | | Yes |

7.2 Salient Observations:

7.2.1 Laboratory tests:

7.2.1.1 PTO Performance:

- i) The maximum PTO power was observed as **26.8 kW** against the declaration of **27.0 kW**, which meets the requirement of IS: 12207-2014 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power was recorded as **274 g/kWh** against the declaration of **265 g/kWh**, which is within the tolerance limit of IS: 12207-2014.

7.2.1.2 Three point linkage:

Dimension of lateral distance from lower hitch point to centre of tractor does not meet the requirement of IS 4468 (Part-I): 1997. Some of the parameters of three point linkages meet to the Cat. I and some of Cat. II of IS 4468 (Part-I): 1997. Keeping in view the spirit of standardization, necessary improvements may be incorporated.

7.2.1.3 Linkage Drawbar:

Some of the parameters of linkage drawbar meet to the Cat. I and some of Cat. II of IS 12953 : 1990 (Reaffirmed in 2000). Keeping in view the spirit of standardization, necessary improvements may be incorporated.

7.3 Maintenance / Service Problems:

No noticeable maintenance or service problem was observed during the test

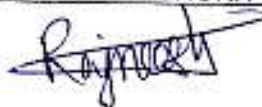
- 7.4 Recommendation with regard to safety on tractor:**
The following requirements, inter alia, may be considered for incorporation on the tractor:
- i) The spark arrester has not been provided in the exhaust system.
 - ii) Differential lock should be provided
 - iii) Provision of safety against accidental start of engine has not been provided.
- 7.5 Adequacy of Literature supplied with machine:**
- 7.5.1** The following literature has been supplied with the tractor
- a) Service Manual of ACE DI 42 XT tractor
 - b) Parts Catalogue of ACE DI 42 XT tractor.
 - c) Operator's manual of ACE DI 42 XT tractor.
- 7.5.2** The supplied literature was found adequate, except the following:
- i) Recommended oil grade on various systems of tractor is not specified in operator's or service manual
 - ii) Servicing schedule of air cleaner, transmission system oil specified on specifications submitted by applicant is not matching with operator's manual
 - iii) Servicing schedule of steering system is not specified in operator's manual.
 - iv) It is therefore, recommended that following literature may be brought out as per IS: 8132-1999 (Reaffirmed in March, 2009) for the guidance of users and service personnel in national as well as regional languages for this model of tractor

The results of the tests carried out on variant model 'ACE DI 42 XT' Tractor have been compared with those on base model 'ACE DI 350 NG' Tractor and found within the limit, as specified in Indian Standard: 12207-2014.

8. CITIZEN CHARTER

| Duration of Test | Time frame for Testing & Evaluation as per Citizen Charter | Whether the Test Report is released within the time frame given in Citizen Charter | Remarks |
|--|--|--|---------|
| 02 Month (July, 2017 to August, 2017) | 10 Months | Yes | None |

TESTING AUTHORITY:


RAJNEESH PATEL
AGRICULTURAL ENGINEER


C.V. CHIMOTE
TEST ENGINEER


Y.K. RAO
SENIOR AGRICULTURAL ENGINEER


J.J.R. NARWARE
DIRECTOR

The report compiled by: Shri **Rajneesh Patel**, Agricultural Engineer

9. APPLICANT'S COMMENTS

| Para No. | Our Reference | Applicant's comments |
|----------|---|---|
| 9.1 | 7.2.1.2 (ii), 7.2.1.3, 7.5.2 & 7.4 (iv) | The standardization of three point linkage, linkage drawbar to add information in operator manual and to provide provision of safety against accidental start of engine. We will take the necessary action during the production. |



ANNEXURE-I

TRACTOR RUN HOURS DURING TEST

| A. LABORATORY AND TRACK TESTS | | HOURS |
|--------------------------------------|--|--------------|
| 1. | Running -in | -- |
| 2. | PTO Performance Test | 2.83 |
| 3. | Theoretical speed test | 0.83 |
| 4. | Brake test | 1.16 |
| 5. | Turning ability test | 0.33 |
| B. | Miscellaneous test and other run hours, including idle run transportation, trial and preparation for test. | Nil |
| Total | | 5.12 |