PAMI

OECD No. 1128

Date of Approval: January 29, 1988

## REPORT OF TEST IN ACCORDANCE WITH OECD STANDARD CODE

# CASE INTERNATIONAL 9170
and
# STEIGER PANTHER 1000
## 4WD Articulated Tractors



**Manufactured by:** J. I. CASE COMPANY
700 State Street
Racine, Wisconsin 53404 USA

**Date of test:** April and July of 1987


Prairie Agricultural Machinery Institute

Test Station: P.O. Box 1060
Portage la Prairie, Manitoba
CANADA R1N 3C5
Telephone: (204) 239-5445

Head Office: P.O. Box 1900
Humboldt, Saskatchewan
CANADA SOK 2A0
Telephone: (306) 682-2555
Telex: 074-2468

TABLE OF CONTENTS


Page No.

SPECIFICATION OF TRACTOR . . . . . 1

CONDITIONS DURING TEST . . . . . 11

FUEL AND LUBRICANTS USED IN TESTS . . . . . 11

COMPUSLORY TESTS

1 Main power take-off performance . . . . . 12

2 Power lift and hydraulic pump performance . . . 16

3 Drawbar performance . . . . . 18

4 Turning space and turning circle . . . . . 20

5 Location of center of gravity . . . . . 20

6 Braking . . . . . 20

7 Measurement of external noise level . . . . . 22

OPTIONAL TESTS

8 Noise measurement at the driver's ear . . . . . 22

REPAIRS AND ADJUSTMENTS DURING TESTS . . . . . 23

REMARKS . . . . . 23


* **********
* The Case International 9170 is identical to the Steiger Panther*
* 1000 (Cummins powered) except with regard to color and model *
* designation. *
**********

| | |
|---|---|
| Manufacturer's name and address: | J.I. Case Company<br>3101 1st Avenue North<br>Fargo, North Dakota<br>58102 USA |
| Submitted for test by: | The manufacturer |
| Selected for test by: | The manufacturer with agreement of the test station |
| Place of running-in: | J.I. Case; Fargo, North Dakota |
| Duration of running-in: | 80 hours |

## SPECIFICATION OF TRACTOR

### Tractor

| | |
|---|---|
| Make: | Case International |
| Model: | 9170 |
| Type: | 4 wheel drive, articulated |
| Serial No.: | 17900706 |
| First Serial No.: | Case IH 9170 ; 17000669<br>Steiger Panther 1000; 17900255 |

### Engine:

| | |
|---|---|
| Make: | Cummins |
| Model: | NTA-855-A |
| Type: | Diesel, turbo charged, after cooled |
| Serial No.: | 11385464 |
| Cylinders: | |
| Number and disposition: | 6, in-line, vertical |
| Bore: | 140 mm (5.5 in) |
| Stroke: | 152 mm (6.0 in) |
| Capacity: | 14013 $cm^3$ (855 $in^3$) |
| Compression ratio: | 14.5:1 |
| Arrangement of valves: | Overhead |
| Liners: | Wet, replaceable |

Engine (cont'd):

Fuel System:

| | |
|---|---|
| Feed system: | Engine Driven Transfer Pump |
| Make, type and model of filters: | Two, Case IH, spin-on, 28-035 |
| Tank capacity: | 948 L (250 gal) |
| Make, type and model of injection pump: | Cummins Type G, Model PT Non AFC, Variable speed governor, gear pump supplies pressure for PT system |
| Injection pump Serial No.: | 0929919 |
| Manufacturer's production setting of injection pump: | 53.5-56.2 kg/h (118 - 124 lb/h) at 2100 rev/min engine speed and full load, 25°C (77°F) temperature, using fuel of 0.85 specific gravity at 15.6°C (60°F) |
| Make/type/model of injectors: | Cummins PTD, DFF, P/N 3047987 |
| Injection pressure: | 103.4 MPa (1020.6 atm) |
| Rail Pressure: | 706-868.7 kPa (114-126 lb/in$^2$) |
| Injection pump delivery starts: | 19° before T.D.C. |

Governor:

| | |
|---|---|
| Make and type: | Centrifugal flyweight, integral to fuel pump |
| Governed range of engine speed: | 850 rev/min to 2350 rev/min |
| Rated engine speed: | 2100 rev/min |

Air Cleaner:

| | |
|---|---|
| Make and type: | Donaldson, dry with safety element |
| Model: | EGB14-0160 |
| Position: | Mounted on front left fender |
| Maintenance indicator: | Sight glass at engine compartment, Donaldson RBX00-2252 |

Pre-Cleaner:

| | |
|---|---|
| Make and type: | Donaldson, aspirating |
| Position: | Integral with air cleaner |

Turbo-charger:

| | |
|---|---|
| Make and type: | Cummins, T46B, exhaust gas driven |
| Intake manifold pressure: | 132 ± 13.5 kPa (19.2 ± 2 lb/in$^2$) at rated speed |

Lubrication system:

| | |
|---|---|
| Type of feed and pump: | Full pressure positive displacement |
| Type of filter: | Full Flow and bypass, spin on |
| Total oil capacity including filters: | 39.8 L (84.0 pt) |
| Recommended oil: | SAE 15W40, temperatures greater than -10°C (14°F)* API Classification CC/CD viscosity 10 cSt at 100°C (210°F) |
| MIL standard: | L-2104C |
| Oil and filter change period: | 250 hours |

Cooling System:

| | |
|---|---|
| Coolant: | Liquid |
| Type of pump: | Centrifugal |
| Fan diameter | 813 mm (32 in) |
| Number of fan blades: | 8 |
| Type of temperature control: | Thermostat |
| Coolant capacity: | 62.5 L (132 pt) |
| System pressure: | 48.3 kPa (7 lb/in$^2$) |

Starting System:

| | |
|---|---|
| Make, type and model: | Delco 42 MT 400, Electric motor |
| Starter motor power rating: | 7.46 kW (10 hp) |
| Safety features: | Electrical lock-out on gear shift and PTO controls |
| Cold starting aids: | In-block coolant heater and optional ether spray in intake manifold. |

* 10W30 can be used for ambient temperature -25° to 35° C (-13° to 95°F)

Exhaust sytem:

| | |
|---|---|
| Make and construction: | Donaldson |
| Dimensions of expansion chamber: | 229 mm dia x 1372 mm long (9 in dia x 54 in long) |
| Position: | Mounted vertically on right, front fender with outlet directed to right front |

Electrical system:

| | |
|---|---|
| Voltage: | 12 |
| Earth polarity: | Negative |
| Make and type of generator: | Delco Remy 30SI Alternator |
| Output: | 90 A at 2100 engine rev/min |
| Make and type of battery: | GNB low maintenance (3 per tractor) |
| Rating: | 90 Ah at 20 hours/battery<br>625 cold crank amp/battery<br>160 min. reserve capacity/battery<br>(per SAE J537) |

Transmission:

Clutch:

| | |
|---|---|
| Make and type: | FTK, multi-plate, oil cooled |
| Diameter of plates: | Main 228.6 mm (9 in)<br>PTO 177.8 mm (7 in) |
| Method of Operation: | Hydraulic Pressure, foot pedal |

Gearbox:

| | |
|---|---|
| Make and type: | FTK, Full Power Shift |
| Number of speeds: | 12 forward and 2 reverse |
| Arrangement: | Counter shaft |

Rear and Front Axle and Final Drives:

| | |
|---|---|
| Make and type: | Raba 598, out-board planetary, |
| Type of different lock and method of engagement: | Optional Eaton no-spin, self engaging (front only) |
| Driven From: | Transmission |

Transmission oils

| | Gearbox | Front & rear axles/final drives |
|---|---|---|
| Recommended oil: | Case IH Hytran Plus | SAE 80W-90 |
| Capacity: | 34 L (71.8 pt) | 21.4 L (45 pt) |
| Viscosity at 100°C (210°F) | 6.2 cSt | 15.2 cSt |
| MIL standard | NA | L-2105C |
| Oil change period | 1000 hours | 500 hours |
| Filter change period | 500 hours | -- |

| Gear | Number of engine revolutions for one revolution of driving wheel | Nominal travelling speed for 2100 rev/min rated engine speed* | |
|---|---|---|---|
| | | km/h | (mile/h) |
| Forward | | | |
| 1 | 195.67 | 3.2 | 2.0 |
| 2 | 163.11 | 4.0 | 2.5 |
| 3 | 132.54 | 4.8 | 3.0 |
| 4 | 108.21 | 5.9 | 3.7 |
| 5 | 90.20 | 7.1 | 4.4 |
| 6 | 73.29 | 8.9 | 5.5 |
| 7 | 61.55 | 10.5 | 6.5 |
| 8 | 51.30 | 12.5 | 7.8 |
| 9 | 41.68 | 15.4 | 9.6 |
| 10 | 34.03 | 18.8 | 11.7 |
| 11 | 28.35 | 22.7 | 14.1 |
| 12 | 23.05 | 27.8 | 17.3 |
| Reverse | | | |
| 1 | 149.63 | 4.3 | 2.7 |
| 2 | 82.74 | 7.7 | 4.8 |

* Calculated with a tire radius of 818 mm (32.2 in)

## Power take-off

| | |
|---|---|
| Number of shafts/speeds and Position: | One, at rear of tractor in vertical centre plane |
| Height above ground: | 744 mm (29.3 in) |
| Distance behind rear axle: | 635 mm (25.0 in) |
| Diameter: | 44.4 mm (1.75 in) |
| Number of splines: | 20 (ISO 500) |
| Method of engagement: | Hydraulic clutch operated by hand lever, independent of main clutch |
| Speed at rated engine speed: | 1000.5 rev/min |
| Engine speed at standard pto speed of 1000 rev/min: | 2099 rev/min |
| Engine/PTO speed ratio | 2.09797:1 |

Direction of rotation (viewed facing driving end): Clockwise

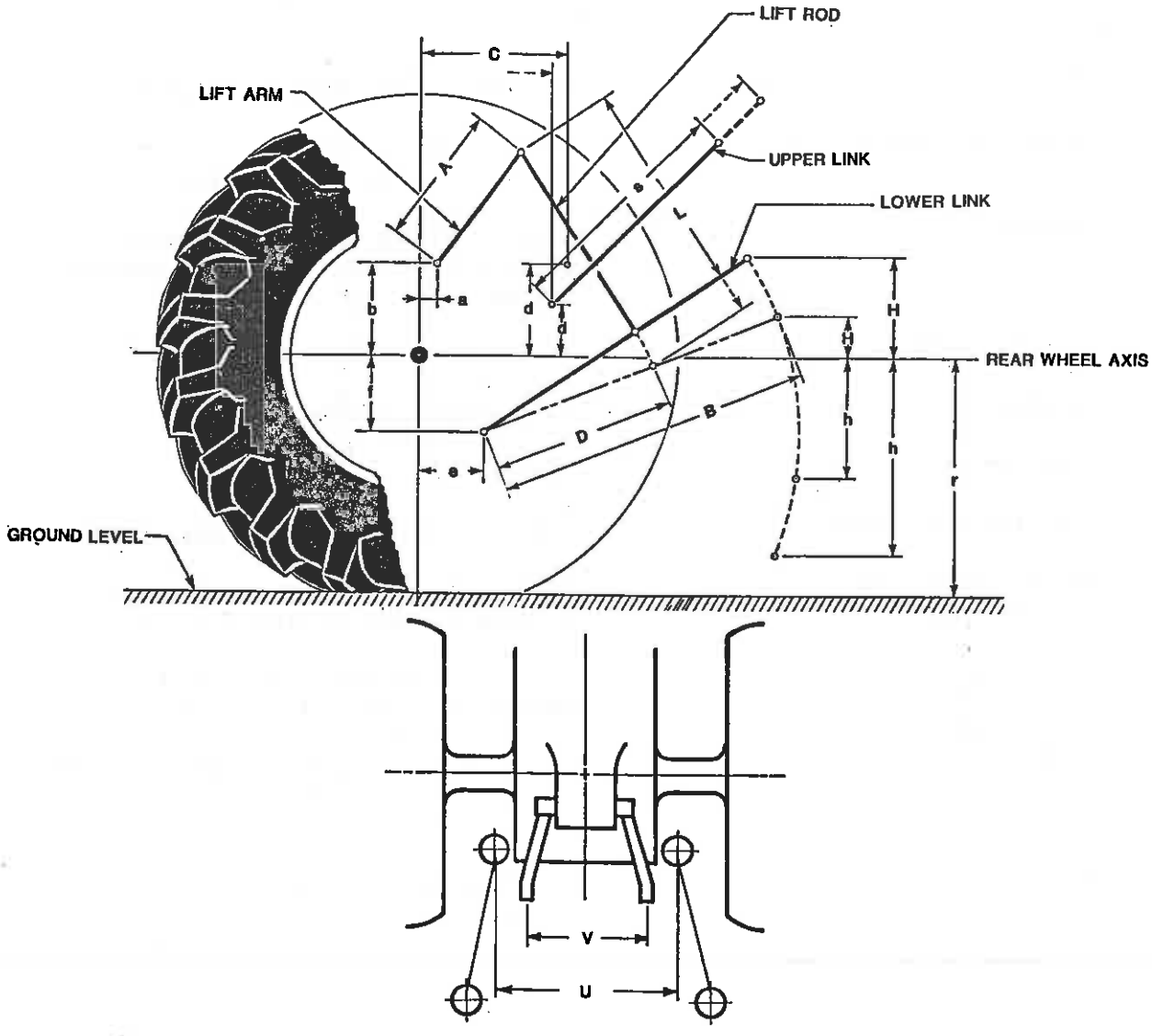
## Power lift

| | |
|---|---|
| Type of hydraulic system: | Closed centre, load sensing |
| Make and type of pump: | Cessna, axial piston, pressure & flow compensated |
| Filters: | Dual cannister with replaceable elements, cleanable suction screen inside reservoir |
| Nominal working pressure: | 17.237 MPa (2500 lb/in$^2$) |
| Number and type of cylinders: | Two, single acting |
| Pump drive: | Direct drive on transmission |
| Oil supplied from: | Hydraulic reservoir via charge pump |
| Type, number and position of external tappings: | ISO standard lever type couplers 4 pairs at rear of tractor |
| Reservoir oil capacity: | 98.4 L (26 US gal), 34 L (9 US gal) available to external cylinders |
| Linkage category: | SAE IV-N; ISO 4L except for horizontal distance PTO to hitch points of horizontal links 664 mm (26.1 in) |
| Controls: | Position control, electrical/ hydraulic, adjustable lower rate |
| Cylinder safety valve opening pressure: | 20.7 MPa (3000 psi) |

## Drawbar

| | |
|---|---|
| Type: | Swinging |
| Vertical height above ground to centre of clevis: | Max. 544 mm (21.4 in)<br>Min. 384 mm (15.1 in) |
| Changed by: | Inverting drawbar |
| Distance behind rear axle centre: | 1143 mm (45.0 in) |
| Horizontal distance behind PTO: | 509 mm (20 in) |
| Vertical distance below PTO: | 203 and 356 mm (8.0 and 14.0 in) |
| Lateral movement: | 165 mm (6.5 in) |
| Pivot position relative to rear axle: | 1778 mm (70 in) forward |
| Drawbar pin hole diameter: | 46.0 mm (1.81 in) |

## Implement linkage:



Dimensions of rear implement linkage (projected lengths in mm (in), underlined dimensions are valid for power lift measurements (page 17).

| | | | | |
|---|---|---|---|---|
| Rear tires<br>Front tires | radius index (r)<br>radius index (r') | | 818<br>818 | (32.2)<br>(32.2) |
| Length of lift arms | | (A) | 533 | (21.0) |
| Length of lower links | | (B) | 997 | (39.3) |
| Distance of lift arm pivot points from rear wheel centre | horizontal<br>vertical | (a)<br>(b) | 371<br>601 | (14.6)<br>(23.7) |
| Horizontal distance between lower link pivot points | | (u) | 825 | (32.5) |
| Horizontal distance between lift arm end points | | (v) | 1057 | (41.6) |
| Length of upper link | | (s) | 756 (29.8) to 946 (37.2), <u>774</u> <u>(30.5)</u> | |
| Distance of upper link pivot point from rearwheel centre | horizontal<br>vertical | (c)<br>(d) | 535<br>280 | (21.0)<br>(11.0) |
| Distance of lower link pivot point from rearwheel centre | horizontal<br>vertical | (e)<br>(f) | 302<br>345 | (11.9)<br>(13.6) |
| Distance of lower link pivot points from lift rod pivot points on lower links | | (D) | 652 | (25.7) |
| Length of lift rods | | (L) | 829 (32.6) to 1032 (40.6)<br><u>913</u> <u>(35.9)</u> | |

Height of lower link hitch points relative to rearwheel center line (situated 818 mm (32.2 in) above ground), these data are valid for unloaded power lift:

| | | * Lift Test* | | |
|---|---|---|---|---|
| <u>Length of lift rods</u> | <u>(L)</u> | <u>913 (35.9)</u> | <u>829 (32.6)</u> | <u>1032(40.6)</u> |
| <u>Lowest position</u> | <u>(h)</u> | <u>599 (23.6)</u> | <u>458 (18.0)</u> | <u>775 (30.5)</u> |
| <u>Highest (transport) position</u> | <u>(H)</u> | <u>181 (7.1)</u> | <u>315 (12.4)</u> | <u>13 (0.5)</u> |

Type of transport lock: Hydraulic

## Steering

| | |
|---|---|
| Make and type: | Eaton hydrostatic steering control unit, operated by hand wheel |
| Make and type of pump: | Cessna axial piston pressure and flow compensated |
| Oil supplied from: | Hydraulic reservoir |
| Working pressure: | 15.9 MPa (2300 lb/in$^2$), maximum |
| Recommended oil: | CASE IH Hytran Plus viscosity 6.2 cSt min at 100°C (210°F) |
| MIL standard: | NA |
| Oil change period: | 1000 hours |
| Filter change period: | 500 hours |

## Brakes

| | |
|---|---|
| Make and type: | (2) Kelsey Hayes, caliper, dry disc |
| Position: | On front axle drive shaft at differential |
| Method of operation: | Manual/hydraulic, operated with foot pedal |
| Type of parking brake: | Caliper/dry disc, mechanically operated with hand lever |
| Trailer braking take-off: | None |

## Wheels

| | |
|---|---|
| Make and size: | Goodyear, Dyna Torque, 23.1 x 34 |
| Type: | Bias-ply, 8 ply rating |
| Rated maximum load at rated pressure of each tire: | 2622 kg (5780 lb) at 96.5 kPa (14 lb/in$^2$) |
| Track width: | inner, 2032 mm (80 in)<br>outer, 3480 mm (137 in)<br>non-adjustable |

## Wheelbase

3594 mm (141.5 in)

## Seat

| | |
|---|---|
| Make and type: | Grammer air ride with swivel |
| Suspension: | Air ride, lateral isolator, weight adjustment |
| Damping: | Hydraulic |
| Range of adjustment: | Longitudinal 150 mm (5.9 in)<br>Vertical 60 mm (2.36 in) |

## Safety Cab

| | |
|---|---|
| Make/model: | Case IH, 4CSF-2 |
| CSS No.: | 076/3, Case IH 9170<br>076/4, Steiger Panther 1000 |
| Description: | 4 post ROPS with Charpy V-notch certified material |

## Lighting

Unrestricted beam angle of headlight in plan view 100°

| | Height above ground of centre mm (in) | Size mm (in) | Distance from outside edge of tractor at 3480 mm (137 in) outer wheel track, to centre mm (in) |
|---|---|---|---|
| Headlights | 1768 (69.61) | 102x152 (4.00x6.00) | 1704 (67.1) |
| Stop and tail lights | 1854 (73.00) | 57x165 (2.2x6.50) | 980 (38.6) |
| Reflectors: front | 1302 (51.25) | 48x111 (1.88x4.38) | 1460 (57.5) |
| rear | 1829 (72.00) | 48x111 (1.88x4.38) | 815 (32.1) |

## Number of grease points

Whole tractor: 35 (includes 17 for PTO and three point hitch)

## Overall dimensions

| | Length, m (in) | Width max m (in) | Width min m (in) | Maximum height, to top of exhaust m (in) |
|---|---|---|---|---|
| Single wheels | 7.16 (282) | 2.62 (103) | 2.62 (103) | 3.80 (149.6) |
| Dual wheels | 7.16 (282) | 4.07 (160) | 4.07 (160) | 3.80 (149.6) |

Minimum ground clearance 353 mm (13.9 in) to underside of linkage restraints

## CONDITIONS DURING TEST

### Masses

Tractor (without driver but with dual wheels and tanks full)

| | Front, kg (lb) | Rear, kg (lb) | Total kg (lb) |
|---|---|---|---|
| Unballasted | 8140 (17950) | 7265 (16020) | 15405 (33970) |
| Ballasted | 9745 (21490) | 7265 (16020) | 17010 (37510) |

### Track setting during tests

| | Inner | Outer |
|---|---|---|
| Front: | 2032 mm (80.0 in) | 3480 mm (137.0 in) |
| Rear: | 2032 mm (80.0 in) | 3480 mm (137.0 in) |

## FUEL AND LUBRICANTS USED IN TESTS

**Fuel**

Diesel oil to SAE J313, Grade 2-D, specific gravity for pto tests 0.859 at 15°C (59°F), for drawbar tests 0.854 at 15°C (59°F), viscosity 2.0 - 4.27 cSt at 38°C (100°F)
Cetane No. 40 min.

**Oil**

Engine: Texaco URSA SP, SAE 15W-40, viscosity: 10 cSt at 100°C (210°F) API class CD

Transmission: Case IH Transmission Oil 02-7408T1
Viscosity 7 cSt at 100°C (210°F)
MIL and API not available

Hydraulic power lift and steering: Texaco Rando HD46 SAE 10W
Viscosity 6.6 cSt at 100°C (210°F)
MIL and API not available

## COMPULSORY TESTS

1. MAIN POWER TAKE-OFF PERFORMANCE

Date and location of tests: 02nd APRIL 1987, Fargo, North Dakota,USA

Type of dynamometer: Eaton, Eddy Current

| Power | Speed, rev/min | | Fuel Consumption | | | |
|---|---|---|---|---|---|---|
| kW (hp) | Engine | PTO | l/h (USgal/h) | kg/h (lb/h) | kg/kWh (lb/hph) | KWh/l (hph/USgal) |
| MAXIMUM POWER 2 hour test | | | | | | |
| 246.3 (330.2) | 1800 | 858 | 64.1 (16.9) | 55.1 (121.5) | 0.224 (0.368) | 3.84 (19.49) |
| PART LOADS | | | | | | |
| (1) Manufacturer's rated engine speed | | | | | | |
| 229.9 (308.1) | 2099 | 1001 | 64.0 (16.9) | 55.0 (121.2) | 0.239 (0.393) | 3.59 (18.23) |
| (2) 85% of the torque obtained at rated speed | | | | | | |
| 201.3 (269.9) | 2163 | 1031 | 58.8 (15.5) | 50.5 (111.4) | 0.251 (0.413) | 3.42 (17.37) |
| (3) 75% of the torque defined in (2) | | | | | | |
| 153.0 (205.0) | 2190 | 1044 | 49.8 (13.2) | 42.8 (94.4) | 0.280 (0.460) | 3.07 (15.57) |
| (4) 50% of the torque defined in (2) | | | | | | |
| 103.2 (138.3) | 2217 | 1057 | 36.2 (9.6) | 31.1 (68.6) | 0.301 (0.496) | 2.85 (14.48) |
| (5) 25% of the torque defined in (2) | | | | | | |
| 52.3 (70.1) | 2247 | 1071 | 26.5 (7.0) | 22.8 (50.2) | 0.435 (0.716) | 1.98 (10.03) |
| (6) Unloaded | | | | | | |
| 5.2 (6.9) | 2292 | 1093 | 17.1 (4.5) | 14.7 (32.4) | 2.839 (4.669) | 0.30 (1.54) |

| Power | Speed, rev/min | | Fuel Consumption | | | |
|---|---|---|---|---|---|---|
| kW (hp) | Engine | PTO | 1/h (USgal/h) | kg/h (lb/h) | kg/kWh (lb/hph) | KWh/l (hph/Usgal) |
| Part loads, the governor lever in the position corresponding to the standard pto speed at full load (1000 rev/min). | | | | | | |
| (1) Maximum Power, rated engine speed | | | | | | |
| 229.9 (308.1) | 2099 | 1001 | 64.0 (16.9) | 55.0 (121.2) | 0.239 (0.393) | 3.59 (18.23) |
| (2) 85% of the torque obtained at rated speed | | | | | | |
| 201.3 (269.9) | 2163 | 1031 | 58.8 (15.5) | 50.5 (111.4) | 0.251 (0.413) | 3.42 (17.37) |
| (3) 75% of the torque defined in (2) | | | | | | |
| 153.0 (205.0) | 2190 | 1044 | 49.8 (13.2) | 42.8 (94.4) | 0.280 (0.460) | 3.07 (15.57) |
| (4) 50% of the torque defined in (2) | | | | | | |
| 103.2 (138.3) | 2217 | 1057 | 36.2 (9.6) | 31.1 (68.6) | 0.301 (0.496) | 2.85 (14.48) |
| (5) 25% of the torque defined in (2) | | | | | | |
| 52.3 (70.1) | 2247 | 1071 | 26.5 (7.0) | 22.8 (50.2) | 0.435 (0.716) | 1.98 (10.03) |
| (6) Unloaded | | | | | | |
| 5.2 (6.9) | 2292 | 1093 | 17.1 (4.5) | 14.7 (32.4) | 2.839 (4.669) | 0.30 (1.54) |

Standard specific fuel consumption, kg/kWh (lb/hph)

0.251 (0.413) / 0.301 (0.496) / 0.251 (0.413) / 0.301 (0.496)

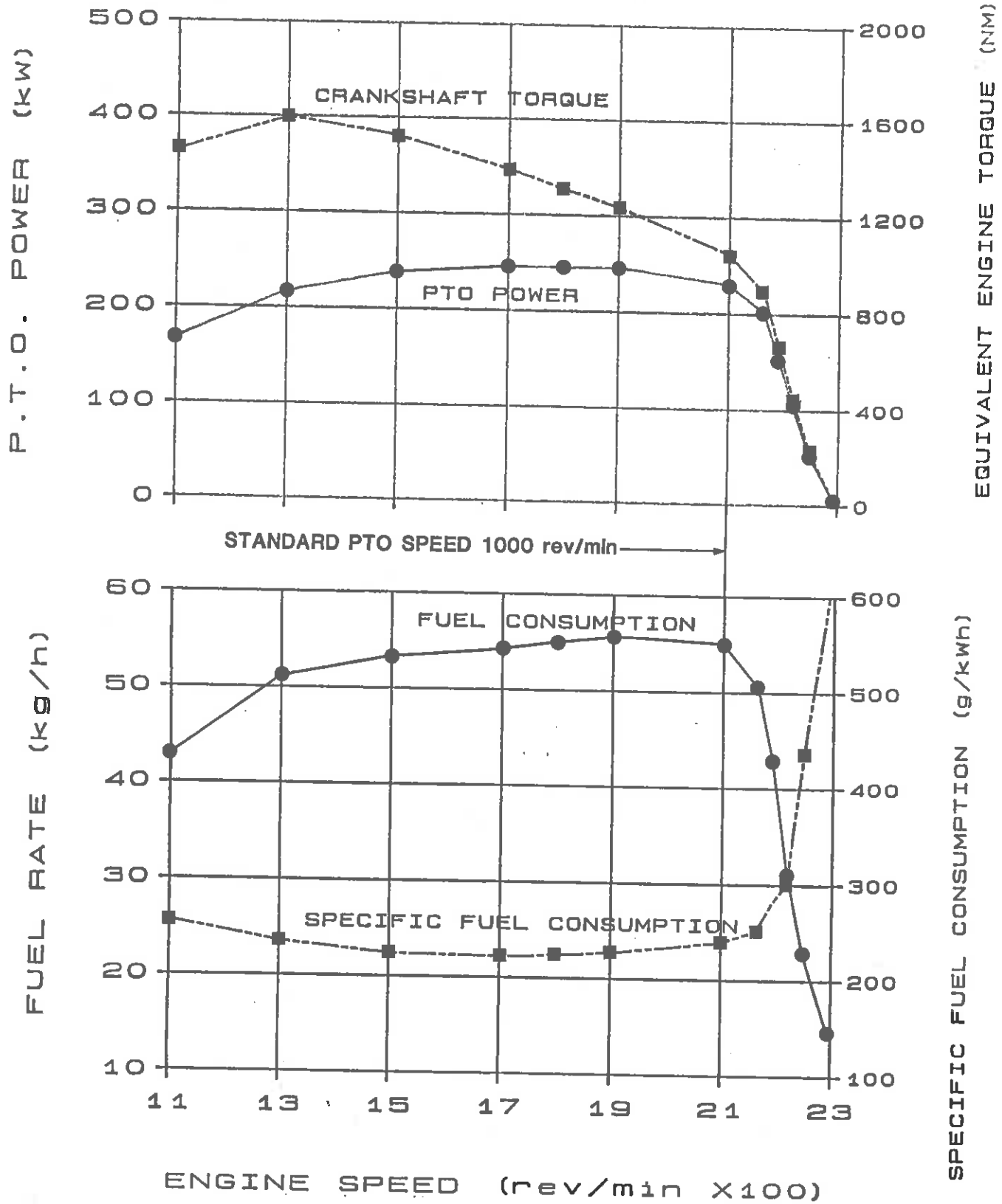
No load, maximum engine speed — 2292 rev/min

Equivalent crankshaft torque at maximum power — 1305.0 Nm (962.5 lb ft)
at rated engine speed — 1044.2 Nm (770.2 lb ft)

Maximum equivalent crankshaft torque — 1595.1 Nm (1176.5 lb ft) at 1300 rev/min engine speed

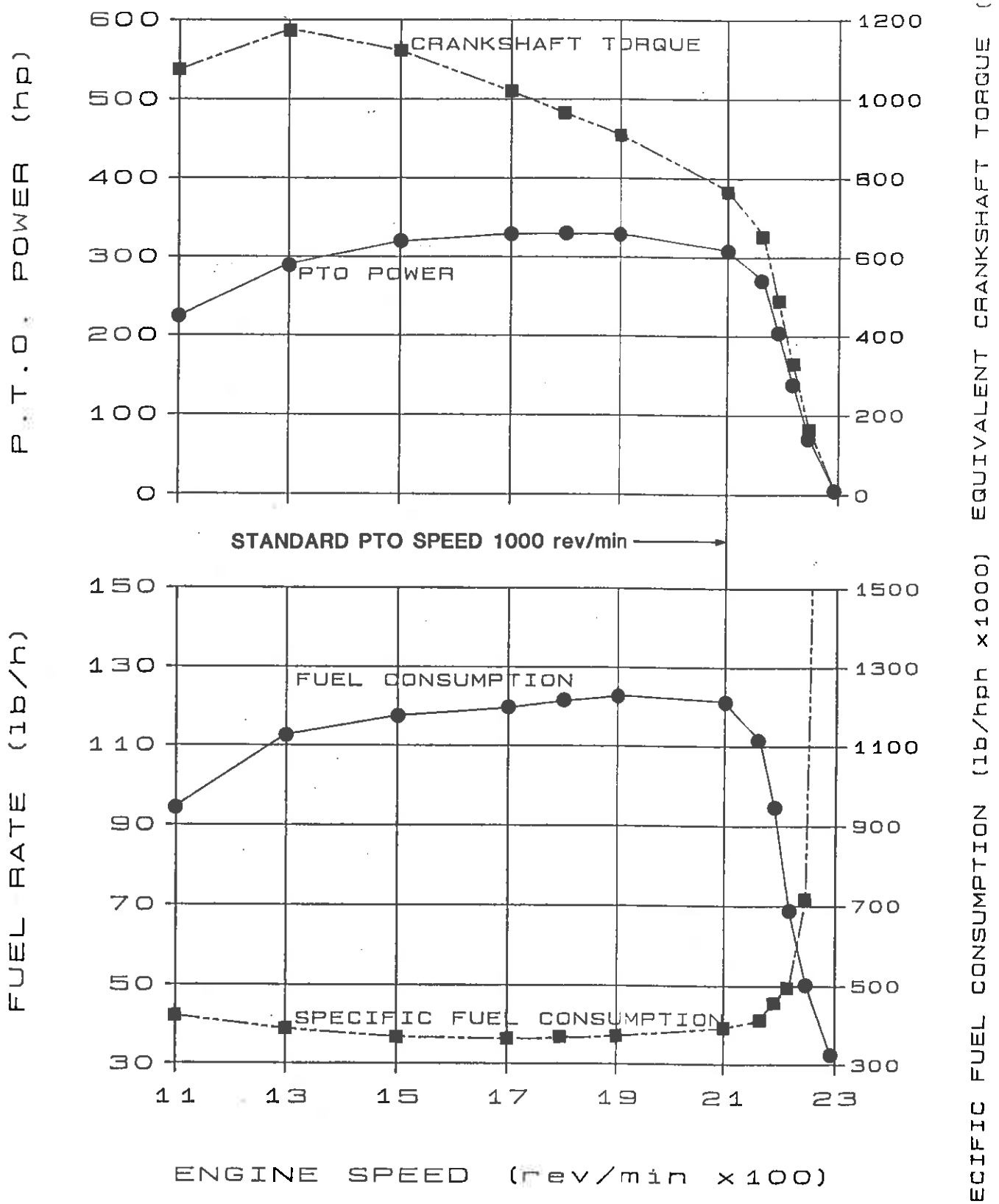
Mean atmospheric conditions
temperature — 26°C (79°F)
pressure — 1026 m bar (30.30 in Hg)
relative humidity — 21%

Maximum temperature
coolant — 86°C (187°F)
engine oil — 120°C (248°F)
fuel — 43°C (109°F)
air intake — 30°C ( 86°F)



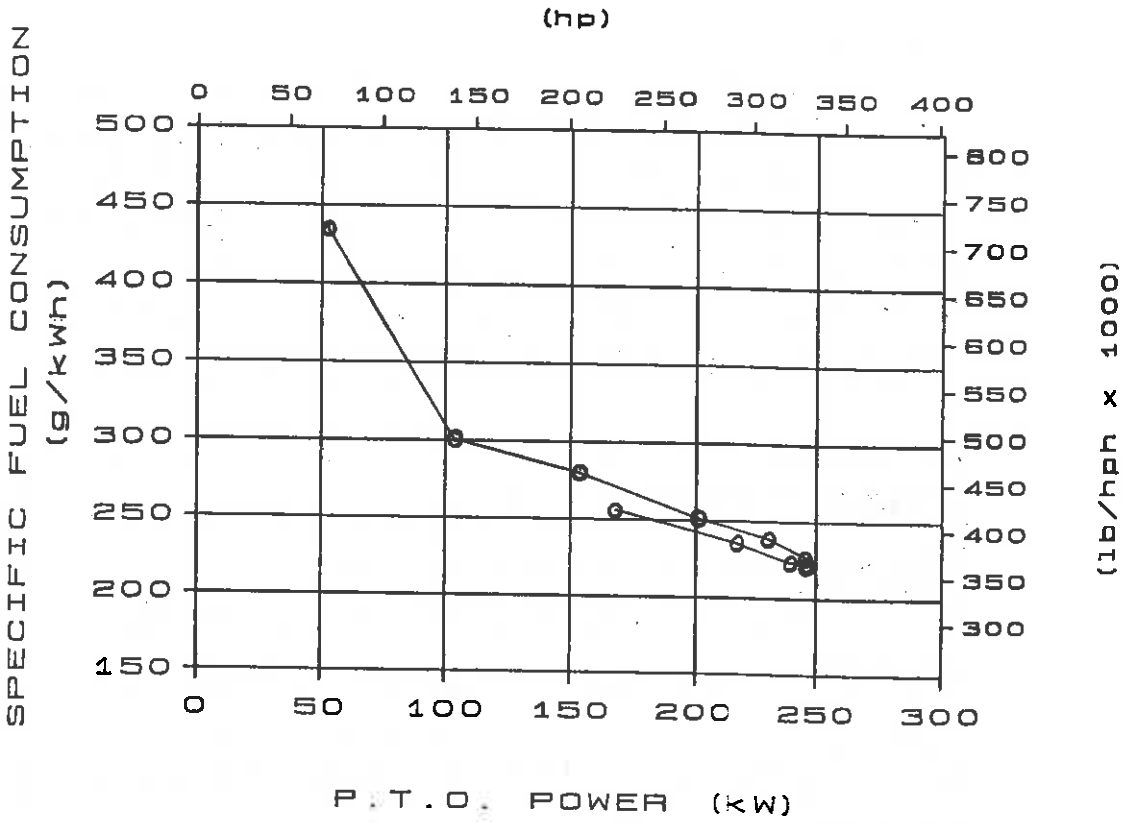

POWER TAKE-OFF TEST

(Metric units)




POWER TAKE-OFF TEST
(English units)

POWER TAKE-OFF PERFORMANCE 9170




2. POWER LIFT AND HYDRAULIC PUMP PERFORMANCE

Date and location of tests: July 1987; Fargo, North Dakota,USA

Hydraulic pump performance

i) Maximum pressure at rated flow: 14.5 MPa (2110 lb/in$^2$)
Sustained pressure at compensator cutoff: 17.4 MPa (2531 lb/in$^2$)

ii) Pump delivery rate at minimum pressure and rated engine speed: 117.3 l/min (31.0 gal/min)

iii)

| Pump delivery rate | at maximum power | at 90% of compensator cut off pressure |
|---|---|---|
| | 103.7 L/min (27.4 gal/min US) | 78.7 L/min (20.8 gal/min US) |
| Delivery Pressure: | 14.6 MPa (2120 lb/in$^2$) | 15.7 MPa (2278 lb/in$^2$) |
| Power: | 25.3 kW (33.9 hp) | 20.6 kW (27.6 hp) |

POWER LIFT

**Power Lift, Metric Units**

| | Height of lower hitch point above ground in down position mm | Vertical Movement mm | Maximum force exerted through full range kN | Corresponding pressure of hydraulic fluid MPa | Moment about rear axle kNm | Max. tilt angle of mast over range of lift degrees |
|---|---|---|---|---|---|---|
| At hitch points | 219 | 780 | 98.2 | 14.6 | 122.2 | - |
| On the frame | 189 | 888 | 71.1 | | 132.3 | 10.2* |

**Temperature of hydraulic fluid at start of test 65°C**
***Tilt angle of mast from vertical position to uppermost position 7.4°**

| Lifting heights relative to horizontal lower links | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | -291 | -250 | -200 | -100 | 0 | 100 | 200 | 300 | 400 | 500 | 550 |
| **Lifting forces corresponding to 90% of maximum pressure; 15.7 MPa** | | | | | | | | | | | |
| - at hitch points | | | | | | | | | | | |
| kN | | 122.5 | 120.9 | 117.7 | 114.5 | 111.4 | 109.0 | 107.5 | 106.2 | 105.2 | |
| - at test frame | | | | | | | | | | | |
| kN | 118.3 | | 112.5 | 106.5 | 101.1 | 97.0 | 93.3 | 88.7 | 83.8 | 79.0 | 76.2 |
| **Lifting forces corresponding to pressure at maximum hydraulic power; 14.6 MPa** | | | | | | | | | | | |
| - at hitch points | | | | | | | | | | | |
| kN | | 114.3 | 112.8 | 109.8 | 107.0 | 104.0 | 101.8 | 100.4 | 99.1 | 98.2 | |
| - at test frame | | | | | | | | | | | |
| kN | 110.4 | | 105.0 | 99.4 | 94.4 | 90.6 | 87.0 | 82.8 | 78.3 | 73.7 | 71.1 |

**Power Lift, English Units**

| | Height of lower hitch point above ground in down position in | Vertical Movement in | Maximum force exerted through full range lb | Corresponding pressure of hydraulic fluid $lb/in^2$ | Moment about rear axle lbft | Max. tilt angle of mast over range of lift degrees |
|---|---|---|---|---|---|---|
| At hitch points | 8.7 | 30.7 | 22080 | 2120 | 90130 | -- |
| On the frame | 7.5 | 35.0 | 15990 | | 97580 | 10.2* |

**Temperature of hydraulic fluid at start of test 65°C (149°F)**
***Tilt angle of mast from vertical position to uppermost position 7.4°**

| Lifting heights relative to horizontal lower links | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| in | -11.5 | - 9.8 | -7.9 | -3.9 | 0 | 3.9 | 7.9 | 11.8 | 15.7 | 19.7 | 21.7 |
| **Lifting forces corresponding to 90% of maximum pressure; 2278 $lb/in^2$** | | | | | | | | | | | |
| - at hitch points | | | | | | | | | | | |
| lb | | 27530 | 27180 | 26460 | 25750 | 25050 | 24520 | 24180 | 23890 | 23660 | |
| - at test frame | | | | | | | | | | | |
| lb | 26590 | | 25290 | 23950 | 22730 | 21820 | 20970 | 19950 | 18850 | 17760 | 17130 |
| **Lifting forces corresponding to pressure at maximum hydraulic power; 2120 $lb/in^2$** | | | | | | | | | | | |
| - at hitch points | | | | | | | | | | | |
| lb | | 25690 | 25370 | 24700 | 24040 | 23380 | 22890 | 22570 | 22290 | 22080 | |
| - at test frame | | | | | | | | | | | |
| lb | 24820 | | 23610 | 22360 | 21220 | 20370 | 19570 | 18620 | 17600 | 16580 | 15990 |

DRAWBAR PERFORMANCE, Metric Units

Date of Tests: July 1987
Type of Track: Concrete

| Gear | Speed km/h | Power kW | Drawbar Pull kN | Engine Speed rev/min | Wheel Slip % | Specific Fuel Consumption kg/kWh | Specific Fuel Consumption kWh/L | Temparature, °C Fuel | Coolant | Oil | Atmospheric Conditions Temperature °C | Relative Humidity % | Pressure mbar |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (i) MAXIMUM POWER (unballasted, dual wheels) Tire inflation pressure: Inner 96 kPa, Outer 82 kPa Height of drawbar above ground: 349 mm | | | | | | | | | | | | | |
| 1 | 3.07 | 115.57 | 135.78 | 2196 | 15.02 | 0.390 | 2.18 | 42 | 82 | 107 | 30 | 55 | 1017 |
| 2 | 3.64 | 147.39 | 145.91 | 2171 | 14.99 | 0.348 | 2.44 | 45 | 84 | 114 | 30 | 54 | 1017 |
| 3 | 4.36 | 175.20 | 144.71 | 2112 | 14.89 | 0.314 | 2.70 | 45 | 85 | 118 | 30 | 53 | 1017 |
| 4 | 4.80 | 189.72 | 142.28 | 1898 | 14.85 | 0.293 | 2.89 | 46 | 89 | 122 | 30 | 53 | 1017 |
| 5 | 5.96 | 201.21 | 121.51 | 1851 | 9.61 | 0.275 | 3.09 | 44 | 89 | 123 | 32 | 51 | 1017 |
| 6 | 7.78 | 205.61 | 95.12 | 1898 | 6.53 | 0.272 | 3.12 | 44 | 88 | 123 | 32 | 51 | 1017 |
| 7 | 9.34 | 207.18 | 79.86 | 1886 | 5.20 | 0.266 | 3.19 | 44 | 88 | 123 | 31 | 50 | 1017 |
| 8 | 10.78 | 208.83 | 69.75 | 1801 | 4.46 | 0.265 | 3.20 | 44 | 89 | 123 | 32 | 49 | 1017 |
| 9 | 13.42 | 207.57 | 55.67 | 1802 | 3.44 | 0.263 | 3.23 | 44 | 88 | 123 | 31 | 48 | 1017 |
| (ii) MAXIMUM POWER ( ballasted, dual wheels) Tire inflation pressure: Inner 110 kPa, Outer 96 kPa Height of drawbar above ground: 355 mm | | | | | | | | | | | | | |
| 1 | 3.06 | 126.20 | 148.24 | 2204 | 14.93 | 0.358 | 2.38 | 37 | 82 | 114 | 25 | 71 | 1011 |
| 2 | 3.63 | 157.98 | 156.57 | 2178 | 14.93 | 0.342 | 2.49 | 38 | 83 | 116 | 27 | 71 | 1011 |
| 3 | 4.27 | 181.16 | 152.90 | 2077 | 14.89 | 0.304 | 2.80 | 39 | 84 | 118 | 25 | 71 | 1011 |
| 4 | 4.57 | 192.76 | 151.86 | 1801 | 14.17 | 0.290 | 2.94 | 39 | 86 | 120 | 28 | 71 | 1011 |
| 5 | 6.18 | 204.79 | 119.25 | 1900 | 8.21 | 0.273 | 3.12 | 39 | 86 | 120 | 27 | 71 | 1011 |
| 6 | 7.82 | 208.72 | 96.10 | 1901 | 5.75 | 0.267 | 3.19 | 40 | 86 | 120 | 26 | 71 | 1011 |
| 7 | 8.91 | 210.42 | 84.97 | 1801 | 4.76 | 0.263 | 3.24 | 42 | 86 | 120 | 26 | 71 | 1011 |
| 8 | 10.81 | 209.99 | 69.93 | 1802 | 3.75 | 0.256 | 3.33 | 45 | 86 | 120 | 26 | 71 | 1011 |
| | | | | | | | | | | | | | |
| (iii) FIVE HOUR TEST AT 75% OF PULL AT MAXIMUM POWER | | | | | | | | | | | | | |
| 7 | 10.78 | 191.24 | 63.85 | 2140 | 3.03 | 0.286 | 2.98 | 44 | 85 | 120 | 28 | 59 | 1012 |
| (iv) FIVE HOUR TEST AT PULL CORRESPONDENING TO 15% WHEELSLIP IN TEST (ii) | | | | | | | | | | | | | |
| 2 | 3.84 | - | 156.65 | 2180 | - | - | - | 44 | 85 | 118 | 32 | 65 | 1012 |

Total oil consumption during ten hours duration of tests (iii) and (iv) 7 g/h.

Test (iv) was carried out with additional ballast and the results for power, slip and fuel consumption have no practical significance.

**DRAWBAR** PERFORMANCE, English Units

Date of Tests: July 1987
Type of Track: Concrete

| Gear | Speed mile/h | Power hp | Drawbar Pull lb | Engine Speed rev/min | Wheel Slip % | Specific Fuel Consumption lb/hph | Specific Fuel Consumption hph/USgal | Temparature °F Fuel | Temparature °F Coolant | Temparature °F Oil | Atmospheric Conditions Temperature °F | Atmospheric Conditions Relative Humidity % | Atmospheric Conditions Pressure in Hg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (i) MAXIMUM POWER (unballasted, dual wheels) Tire inflation pressure: Inner 14 psi, Outer 12 psi Height of drawbar above ground: 13.7 in | | | | | | | | | | | | | |
| 1 | 1.90 | 154.92 | 30530 | 2196 | 15.02 | 0.642 | 11.07 | 108 | 180 | 225 | 86 | 55 | 30.05 |
| 2 | 2.26 | 197.58 | 32800 | 2171 | 14.99 | 0.572 | 12.38 | 113 | 183 | 237 | 86 | 54 | 30.05 |
| 3 | 2.71 | 234.85 | 32530 | 2112 | 14.89 | 0.517 | 13.70 | 113 | 185 | 244 | 86 | 53 | 30.05 |
| 4 | 2.98 | 254.32 | 31990 | 1898 | 14.85 | 0.482 | 14.67 | 115 | 192 | 252 | 86 | 53 | 30.05 |
| 5 | 3.70 | 269.72 | 27320 | 1851 | 9.61 | 0.452 | 15.66 | 111 | 192 | 253 | 88 | 52 | 30.05 |
| 6 | 4.84 | 275.62 | 21380 | 1898 | 6.53 | 0.447 | 15.84 | 111 | 190 | 253 | 90 | 51 | 30.05 |
| 7 | 5.80 | 277.72 | 17950 | 1886 | 5.20 | 0.437 | 16.18 | 111 | 190 | 253 | 88 | 50 | 30.05 |
| 8 | 6.70 | 279.93 | 15680 | 1801 | 4.46 | 0.436 | 16.21 | 111 | 192 | 253 | 90 | 49 | 30.05 |
| 9 | 8.34 | 278.25 | 12520 | 1802 | 3.44 | 0.432 | 16.38 | 111 | 190 | 253 | 80 | 48 | 30.05 |
| (ii) MAXIMUM POWER (ballasted, dual wheels) Tire inflation pressure: Inner 16 psi, Outer 14 psi Height of drawbar above ground: 14.0 in | | | | | | | | | | | | | |
| 1 | 1.90 | 169.17 | 33330 | 2204 | 14.93 | 0.588 | 12.10 | 99 | 180 | 237 | 77 | 71 | 29.87 |
| 2 | 2.26 | 211.77 | 35200 | 2178 | 14.93 | 0.563 | 12.64 | 100 | 181 | 241 | 81 | 71 | 29.87 |
| 3 | 2.65 | 242.84 | 34380 | 2077 | 14.89 | 0.500 | 14.22 | 102 | 183 | 244 | 77 | 71 | 29.87 |
| 4 | 2.84 | 258.39 | 34140 | 1801 | 14.17 | 0.477 | 14.90 | 102 | 187 | 248 | 82 | 71 | 29.87 |
| 5 | 3.84 | 274.51 | 26810 | 1900 | 8.21 | 0.449 | 15.82 | 102 | 187 | 248 | 81 | 71 | 29.87 |
| 6 | 4.86 | 279.79 | 21600 | 1901 | 5.75 | 0.440 | 16.17 | 104 | 187 | 248 | 79 | 71 | 29.87 |
| 7 | 5.54 | 282.07 | 19100 | 1801 | 4.76 | 0.432 | 16.46 | 108 | 187 | 248 | 79 | 71 | 29.87 |
| 8 | 6.72 | 281.48 | 15720 | 1802 | 3.75 | 0.420 | 16.92 | 113 | 187 | 248 | 79 | 71 | 29.87 |
| | | | | | | | | | | | | | |
| (iii) FIVE HOUR TEST AT 75% OF PULL AT MAXIMUM POWER | | | | | | | | | | | | | |
| 7 | 6.70 | 256.35 | 14350 | 2140 | 3.03 | 0.470 | 15.11 | 111 | 185 | 248 | 82 | 59 | 29.90 |
| (iv) FIVE HOUR TEST AT PULL CORRESPONDING TO 15% WHEELSLIP IN TEST (ii) | | | | | | | | | | | | | |
| 2 | 2.39 | - | 35220 | 2180 | - | - | - | 111 | 185 | 244 | 90 | 65 | 29.88 |

Total oil consumption during ten hours duration of tests (iii) and (iv) 0.015 lb/h.

Test (iv) was carried out with additional ballast and the results for power, slip and fuel consumption have no practical significance.

## 4. TURNING SPACE AND TURNING CIRCLE

Details of wheel equipment: As in specification, without ballast

| | | Inner | Outer |
|---|---|---|---|
| Track of wheels: | Front | 2032 mm (80.0 in) | 3480 mm (137.0) |
| | Rear | 2032 mm (80.0 in) | 3480 mm (137.0) |

| | Dual Wheels | |
|---|---|---|
| | Left-hand | Right-hand |
| Radius of turning space, m (in) | 7.35 (289) | 7.37 (290) |
| Radius of turning circle, m (in) | 7.03 (277) | 7.01 (276) |

## 5. LOCATION OF CENTRE OF GRAVITY, single wheels

| | |
|---|---|
| Height above ground, mm (in) | 1366 mm (53.8 in) |
| Distance forward from the vertical plane containing the axis of the rear wheels, mm (in) | 1900 mm (74.8 in) |
| Distance from the median plane of the tractor, mm (in) | 0 |

## 6. BRAKING

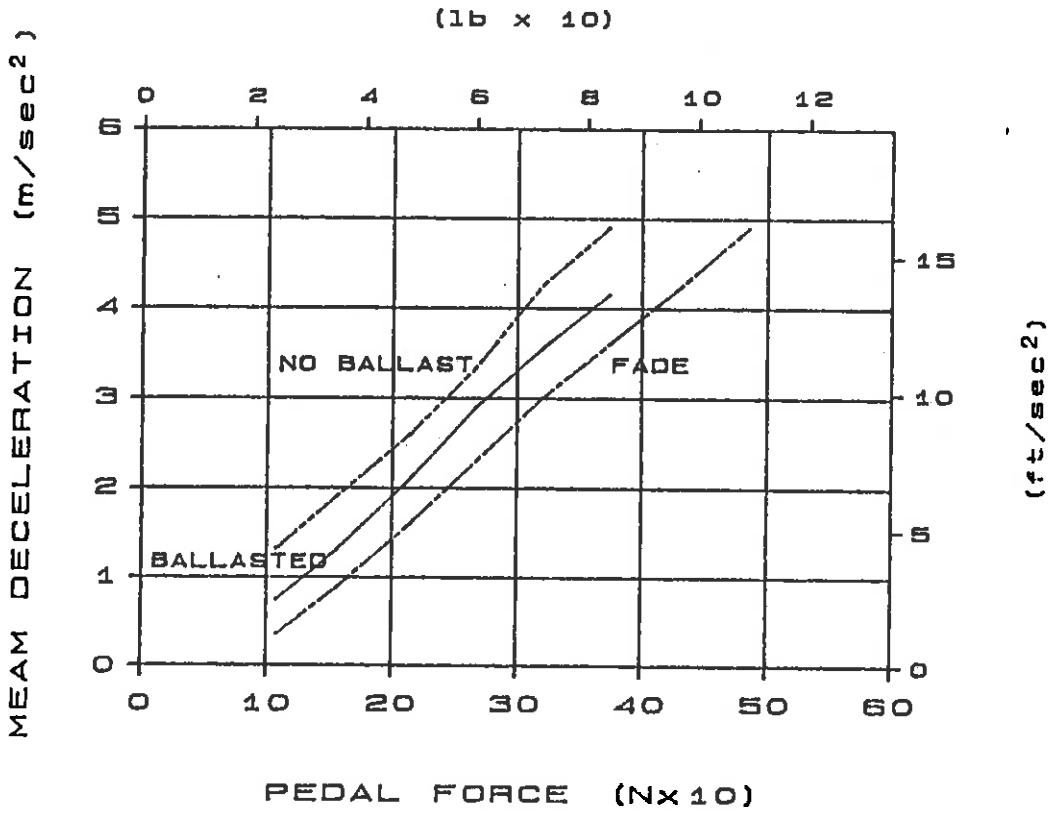
Date of tests: 18th and 27th of JULY 1987

Type of track: Concrete

Masses during brake tests

| | Front | | Rear | | Total | |
|---|---|---|---|---|---|---|
| | kg | (lb) | kg | (lb) | kg | (lb) |
| Ballasted | 10820 | (23860) | 7330 | (16160) | 18150 | (40020) |
| Unballasted | 8140 | (17950) | 7265 | (16020) | 15405 | (33970) |

A) Service brakes




Travelling speed before application of brakes, 30.8 km/h (19.2 mile/h)

Brakes-heating: Actuating of brakes for 1 km (0.62 mi) at 80% of maximum speed with pedal force corresponding to 1 $m/s^2$ (3.3 $ft/s^2$)

Comments on deviation and vibration: None

B) Parking brake

| | Ballasted tractor on slope of 18% | | Unballasted tractor on 12% slope with trailer of 11600 kg (25500 lb) | |
|---|---|---|---|---|
| | Up | Down | Up | Down |
| Pull on handbrake N (lb) | 67 (15) | 71 (16) | 67 (15) | 71 (16) |

## 7. MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of tests: 11th JUNE 1987
Type of sound level meter: Bruel and Kjaer 2218
Type of track: Concrete

Results of tests:

Gear: 12
Travelling speed before acceleration: 23.1 km/h (14.4 mile/h)
Sound level: 95 dBA

## OPTIONAL TESTS

## 8. NOISE MEASUREMENT AT THE DRIVER'S EAR

Date of tests: JULY 1987
Type of sound level meter: Bruel and Kjaer 2218
Type of track: Concrete
Cab fitted: Yes

Results of tests:

| Gear | Drawbar pull at which the tractor develops maximum sound level, kN | (lb) | Measured travelling speed, km/h | (mile/h) | Sound level, dBA |
|---|---|---|---|---|---|
| 5* | 67.39 | (15150) | 7.48 | (4.65) | 77.5 |
| 5* | 8.30 | (1870) | 8.04 | (5.00) | 77.5 |
| 3 | 122.20 | (27470) | 4.69 | (2.92) | 79.0 |
| 4 | 91.29 | (20520) | 6.07 | (3.77) | 79.0 |
| 6 | 70.53 | (15860) | 9.07 | (5.64) | 78.0 |
| 7 | 54.11 | (12160) | 10.98 | (6.82) | 78.5 |
| 8 | 33.97 | (7640) | 13.47 | (8.37) | 78.5 |
| 9 | 34.98 | (7860) | 16.39 | (10,19) | 79.0 |
| 12 | No Load | | 30.8 | (19.20) | 78.0 |

*The 5th gear corresponds to the nominal travelling speed nearest to 7.5 km/h (4.7 mile/h).

Details of materials used for sound proofing the protective structures

Interior padding:

| | |
|---|---|
| . Roof | vinyl covered polyester safety foam, 50 mm (2.0 in) above operator 13 mm (0.50 in) ahead of operator; plastic outer cab top lined with urethane foam, 25 mm (1.0 in) |
| . Door | glass, as below |
| . Floor | polyethylene foam, 10.4 mm (0.40 in) ribbed, rubber floor mat , 7.4 mm (0.30) |
| . Front panel | glass, as below |
| . Rear and lower right panel | vinyl covered polyester urethane safety foam with accoustical barrier, 25 mm (1.0 in) |
| . Instrument panel and steering column | ABS plastic shroud 4 mm (0.16 in) thick polyethylene foam with acoustical barrier 12 mm (0.5 in) |
| Draught proofing: | rubber moulding |
| Glass: | tinted, tempered, safety glass, 5.6 mm (0.22 in) |
| Windscreen wipers: | United Technologies Electro Systems Model 1927328 MO 12WC |
| Direction indicators: | lever on steering column operating blinking lights |
| Heaters and air conditioner: | located on front console, constant flow cab pressurization, aspirated cab air intake filtration system. |

REPAIRS AND ADJUSTMENTS DURING TESTS: None

REMARKS: None

**********

Test carried out by: R.R. Hochstein, P. Eng., Senior Development Engineer
: K.A. Carmichael, C.E.T.

Signed: Head of Test Station

for the Director

Date: 19 November 1987