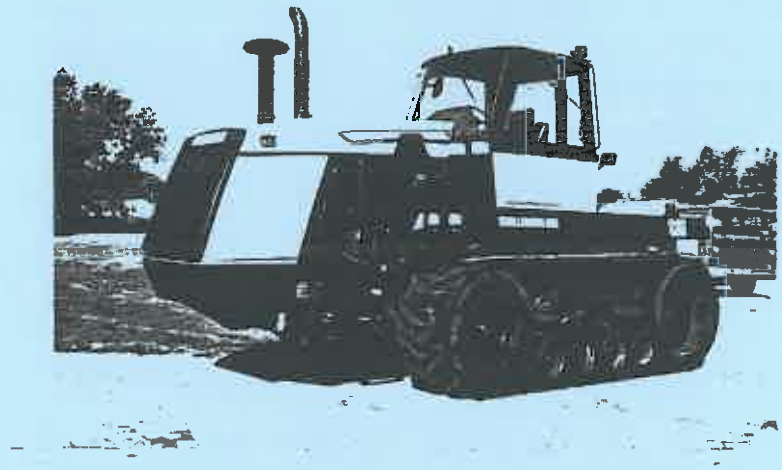
OECD APPROVAL # 1360
(Restricted code)
Date of approval: March 24 1991

NEBRASKA TRACTOR TESTING LABORATORY
DEPARTMENT OF AGRICULTURAL ENGINEERING
INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
UNIVERSITY OF NEBRASKA - EAST CAMPUS
LINCOLN, NEBRASKA 68583-0832, USA

# REPORT ON TEST IN ACCORDANCE WITH OECD STANDARD CODE FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTOR PERFORMANCE

## CATERPILLAR CHALLENGER 65B, RUBBER TRACKED TRACTOR.



MANUFACTURED BY: Caterpillar Inc.
100 N.E. Adams Street
Peoria, Illinois 61629, USA

NEBRASKA TEST NO. 1653

Test date: October 1991

This test report provides the results of the tests conducted in accordance with the OECD Restricted Test Code for the Official Testing of Agricultural Tractor Performance - C(87)53 Final - Annex II.

This report has been approved by the OECD Coordinating Centre in Paris (CEMAGREF) on March 24, 1992

Caterpillar Challenger 65B, rubber-tracked tractor OECD # 1360

No reproduction of this report or any part of it can be made without prior approval by the Tractor testing laboratory.

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The model CATERPILLAR CHALLENGER 65 has been tested and approved under the test number 1268 Restricted code on the 19th July 1990. The tractor model CATERPILLAR 65B tested here differs by a higher a higher fuel flow rate for the fuel injection pump and gives higher power level justifying a new O.E.C.D. test.

## SPECIFICATIONS OF TRACTOR

| | | |
|---|---|---|
| Manufacturers name/address | : | Caterpillar Inc.<br>100 N.E. Adams Street<br>Peoria, Illinois 61629 USA |
| Location of tractor assembly | : | same |
| Submitted for test by | : | The manufacturer. |
| Selected for test by | : | The manufacturer in agreement with the test station. |
| Place of running in | : | Caterpillar proving grounds<br>Peoria Illinois |
| Duration of running in | : | 70 hours |
| Location of test | : | Tractor Testing laboratory<br>University of Nebraska<br>Lincoln, Nebraska, USA |

### SPECIFICATIONS OF TRACTOR.

| | |
|---|---|
| Make/Model/Type | Caterpillar Challenger 65,<br>Unit construction, Track laying |
| Number of driving members | Two rubber tracks. |
| Serial number | *7YC02016* |
| 1st Serial number | This model is the 1st of the 7YC series |

### ENGINE.

| | |
|---|---|
| Make | Caterpillar |
| Model | 3306 DITA |
| Type | Diesel, direct injection, turbocharged and aftercooled. |
| Serial Number | *08Z63806* |
| **Cylinders** | |
| Number/Disposition | 6, in-line, vertical |
| Bore/Stroke | 120.6 mm x 152.4 mm<br>(4.75 in x 6.00 in) |
| Cubic capacity | 10450 ml (638 cu in) |
| Compression Ratio | 15.0 to 1 |
| Arrangement of valves | Overhead |
| Cylinder liners | Wet, replaceable |
| **Turbocharging** | |
| Make/Model/Type | Schwitzer,S4DS011-1.42VIF,<br>Exhaust gas driven. |
| Pressure | 100-136 kPa (14.5-19.7 psi)<br>at rated engine speed and load |
| **Fuel System** | |
| Fuel Feed system | Engine driven transfer pump |
| Make/Model/Type of filters | Primary - washable screen;<br>Secondary - paper element, 1P2299 |
| Fuel tank capacity | 832 liters (220 US gallons) |

| | |
|---|---|
| Make/Model/Type of Injection Pump | Caterpillar NSFS - 10 mm |
| Pump Serial number | none |
| Production setting of pump | 159 +/- 5 cu.mm/stroke at 2100 rpm, using 1.6 mm I.D.x 788 mm length line. |
| Flow Rate (at 2100 engine rpm and full load) | 44.0 - 48.6 Kg/h (96.9 - 107.0 lb/h) (fuel density 0.838 kg/l) |
| Make/Model/Type of injectors | Caterpillar part # 8N7003 |
| Injection pressure | 90 MPa (13000 psi) |
| Timing | 14 degrees BTDC |

**Governor**

| | |
|---|---|
| Make/Model/Type | Caterpillar mechanical. |
| Governed engine speed range | From 880 to 2280 rev/min |
| Rated engine speed | 2100 rev/min |
| high-idle speed range | 2280 +/- 60 rev/min |

**Air Cleaner.**

| | |
|---|---|
| Pre-cleaner | |
| Make/Model/Type | Caterpillar 8N6883 |
| Air intake location | Right front, above hood. |
| Main Cleaner | |
| Make/Model/Type | Caterpillar,7W5316, dry paper dual element |
| Maintenance indicator | Restriction gage on engine. |

**Lubrication system.**

| | |
|---|---|
| Type of feed pump | Gear pump |
| Type of filters | Spin - on, Caterpillar 1W3300 |
| Number | One |
| Oil cooler | Heat exchanger with engine coolant |

**Cooling System.**

| | |
|---|---|
| Type of coolant | Liquid |
| Type of pump | Centrifugal, belt driven |
| Fan specification | Schwitzer, direct drive |
| Number of fan blades | 8 |
| Fan diameter | 914 mm (36 in) |
| Coolant capacity | 42 liter (44 qt) |
| Type of temperature control | Thermostat |
| Superpressure system | 48 kPa (7 psi) |

**Starting system.**

| | |
|---|---|
| Make/Model/Type of starter | Delco 42MT, electro-mechanical engagement |
| Power Rating | 5.6 kW (7.5 hp) |
| Cold starting aid | Ether spray in intake manifold. |
| Safety device | Transmission neutral switch. |

| | |
|---|---|
| **Electrical System.** | |
| Voltage & grounding. | 12 Volt DC;negative ground |
| Generator | |
| Make/Model/Type | Delco Remy/27SI type 200/9X9096 |
| Power rating | 115 Ampere at 2200 engine rev/min |
| Batteries | |
| Number & connection | 2-12 V batteries in parallel |
| Rating | 100 Ampere-hours per battery at 20 hour rating. |
| **Exhaust system.** | |
| Make/Model/Type | Donaldson/M120507/expansion chamber |
| Location | Underhood muffler; vertical exhaust pipe, right front side. |

## TRANSMISSION

| | |
|---|---|
| **Clutch. (travel alone)** | |
| Make/Model/Type | Caterpillar, wet disc,integral with transmission, oil cooled |
| Number of plates | 6 |
| Diameter of plates | 190 mm (7.5 in) |
| Method of operation | Hydraulic, foot pedal. |
| **Gear Box.** | |
| Make/Model/Type | Caterpillar, direct drive, full powershift,mechanical |
| Arrangement | Four rotating countershaft clutches and four stationary planetary clutches |
| Number of gears | 10 forward and 2 reverse, controlled by a single hand lever |
| Oil cooler | heat exchanger with engine coolant |
| Available options | none |
| **Rear axle and final drives.** | |
| Make/Model/Type | Caterpillar/outboard single reduction pinion and bull gear |
| Differential lock | Not applicable |

Gear ratios and travel speeds.

| Gear Number | Number of Engine revolutions for one revolution of the driving wheelsof | Nominal travel speed at rated engine speed 2100 rev/min [km/h] | [mph] |
|---|---|---|---|
| 1 fwd | 99.535 | 4.2 | 2.6 |
| 2 fwd | 65.923 | 6.4 | 4.0 |
| 3 fwd | 55.880 | 7.5 | 4.7 |
| 4 fwd | 48.798 | 8.6 | 5.3 |
| 5 fwd | 42.491 | 9.9 | 6.1 |
| 6 fwd | 37.009 | 11.3 | 7.0 |
| 7 fwd | 32.320 | 13.0 | 8.1 |
| 8 fwd | 28.143 | 14.9 | 9.3 |
| 9 fwd | 21.773 | 19.3 | 12.0 |
| 10 fwd | 14.421 | 29.3 | 18.1 |
| 1 rev | 135.731 | 3.1 | 1.9 |
| 2 rev | 57.942 | 7.2 | 4.5 |

Calculated with a rear axle radius of 600 mm (23.6 in).

**POWER - TAKE - OFF.**

Main Power-Take-Off.

| | |
|---|---|
| Type | Independent |
| Method of engagement | Multiplate wet clutch hydraulically actuated by hand lever, independent of main drive clutch |
| Number of shafts | One |

Power take-off proportional to engine speed.

1000 rev/min

| | |
|---|---|
| Location | Rear of tractor in vertical center plane. |
| Diameter of shaft | 45 mm (1.75 in.) |
| Number of splines | 20; conforms to ISO 500/1979. |
| Height above ground | 736 mm (29.0 in.) |
| Distance from median plane of tractor | 0 mm |
| Distance behind rear axle | 382 mm (15.1 in.) |
| PTO Speed at rated engine spd | 1025 rev/min |
| Engine speed at std PTO spd | 2050 |
| Ratio of Engine rpm to PTO rpm | 2.05 to 1 |
| Direction of Rotation (viewed facing driving end) | Clockwise. |

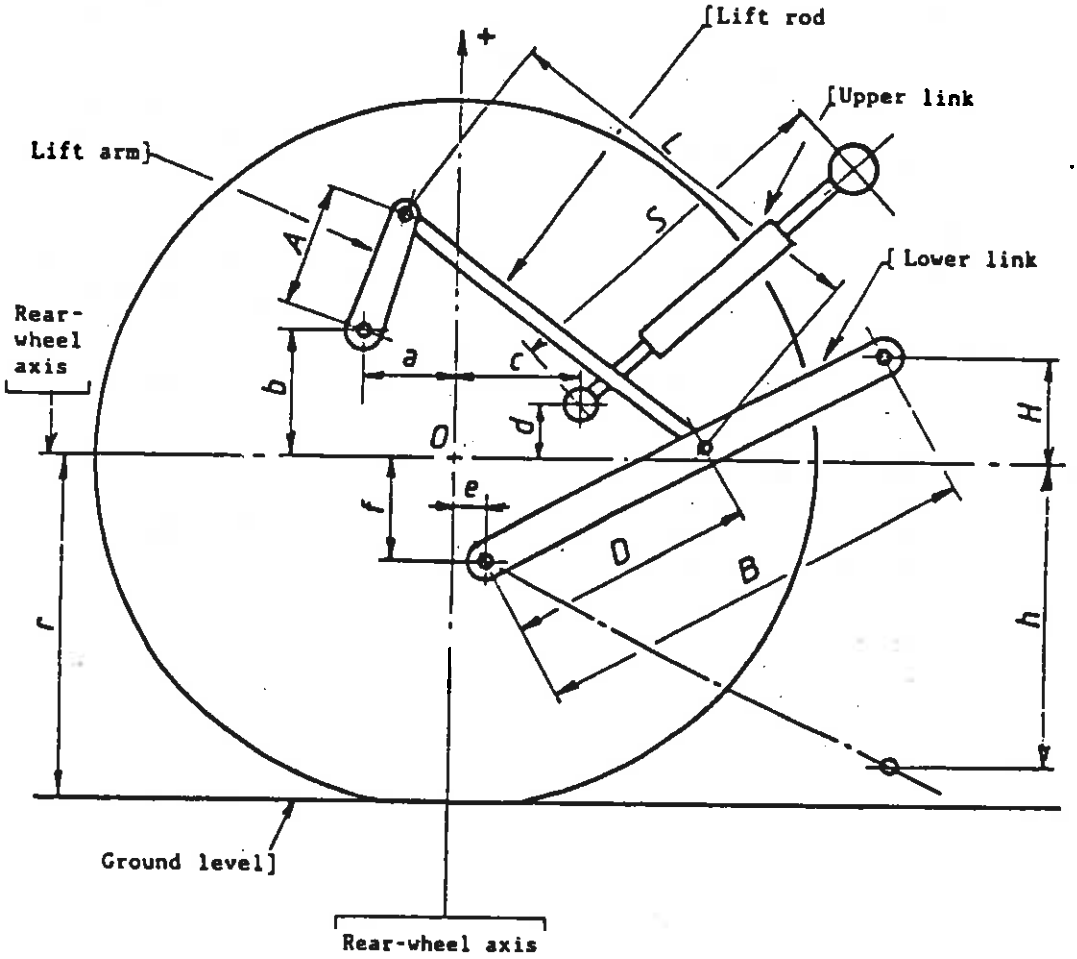
## POWER LIFT.

| | |
|---|---|
| Make/Model/Type | Caterpillar |
| Type of hydraulic system | Closed center; load sensing |
| Type/Number of cylinders | Two external,both single acting |
| Type of linkage lock for transport | Electrohydraulic position control |
| Compensator setting | 17.6 +/- 0.35 MPa (2550 +/- 50 psi) |
| Opening pressure of cylinder safety valve | 20.7 +/- 0.5 MPa (3000 +/- 72 psi) |
| Lift pump type | Cessna load sensing piston pump |
| Transmission pump to engine | Gear drive from transmission. |
| Type/Number of filters | 1 spin-on cartridge |
| Location of oil reservoir | Behind cab |
| Type/Number/Location of tapping points. | 4 pairs of ISO standard couplings at rear of tractor |
| Max. oil volume available for external cylinders. | 40 l (10.6 gal) |

## THREE POINT LINKAGE

Category 3 in conformity with ISO 730/1-1977
Category adapter - none

## THREE-POINT LINKAGE.



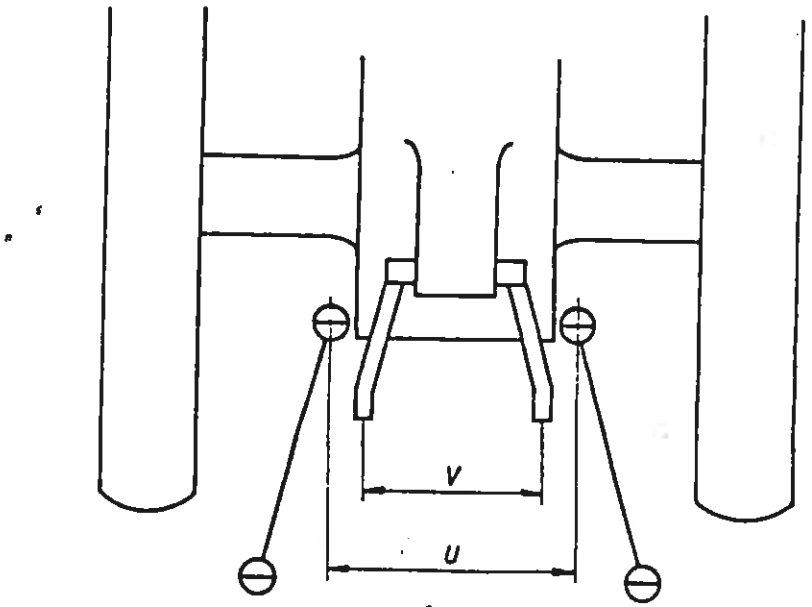



Table 1. - *Linkage geometry dimensions.

| | | Dimension or range | | Settings used on test | |
|---|---|---|---|---|---|
| | | [mm] | [in] | [mm] | [in] |
| Category | | III | | | |
| Length of lift arms | (A) | 545 | 21.5 | same | |
| Length of lower links | (B) | 765 | 30.1 | same | |
| Distance of lift arm pivot from rear wheel axis: horizontal | (a) | 225 | 8.9 | same | |
| Distance of lift arm pivot from rear wheel axis: vertical | (b) | 415 | 16.3 | same | |
| Horizontal distance between the 2 lower link points | (u) | 860 | 33.9 | same | |
| Horizontal distance between the 2 lift arm end points | (v) | 1040 | 40.9 | same | |
| Length of upper link | (s) | 640 to 740 | 25.2 to 29.1 | 678 | 26.7 |
| Distance of upper link pivot from rear axle centerline: horizontal | (c) | 370 | 14.6 | same | |
| Distance of upper link pivot from rear axle centerline: vertical | (d) | 422 | 16.6 | same | |
| Distance of lower link pivot from rear wheel axis: horizontal | (e) | 265 | 10.4 | same | |
| Distance of lower link pivot from rear wheel axis: vertical | (f) | 98 | 3.9 | same | |
| Distance of lower link pivot points to lift rod pivot points on lower links. | (D) | 535 | 21.1 | same | |
| Length of lift rods | (L) | 560 to 665 | 22.0 to 26.2 | 663 | 26.1 |
| Height of lower hitch points relative to rear axle: In low position | (h) | 230 to 375 | 9.1 to 14.8 | 371 | 14.6 |
| Height of lower hitch points relative to rear axle: In high position | (H) | 470 to 350 | 18.5 to 13.8 | 358 | 14.1 |
| Height above ground of lower hitch points when locked in transport position. | | 950 to 1070 | 37.4 to 42.1 | 962 | 37.9 |

*Calculated with a rear axle radius of 600 mm (23.6 in)

## SWINGING DRAWBAR.

| | | |
|---|---|---|
| Type | | Oscillating |
| Height above ground | | 424 mm (16.7 in) |
| Adjustments | | None |
| Distance of hitch point from rear axle: | horizontal | 840 mm (33.1 in) |
| | vertical | 174 mm (6.9 in) |
| Distance of hitch point from PTO shaft end: | Vertical | 299 mm (11.8 in) |
| | Horizontal | 509 mm (20.0 in) |
| Lateral adjustment; | Right side | 134 mm (5.3 in) |
| | Left side | 134 mm (5.3 in) |
| Distance of pivot point from rear axle; | horizontal | 730 mm (28.7 in) |
| Diameter of drawbar pin hole | | 40 mm (1.6 in) |
| Maximum vertical static permissible load: | | 18 kN (4050 lb) |

## STEERING.

| | |
|---|---|
| Make/Model/Type | Caterpillar/differential steer |
| Method of operation | Linde piston pump and motor, pilot activated valves, controlled by steering wheel. |
| Working pressure | 42.0 MPa (6090 psi) |
| Oil cooler | Radiator ahead of main radiator |

## BRAKES

Service brake.

| | |
|---|---|
| Make/Model/Type | Caterpillar, caliper, dry disc |
| Method of operation | Manual/Hydraulic; foot pedal control. |
| Trailer braking take-off | None |

Parking brake.

| | |
|---|---|
| Type | Caliper, dry disc. |
| Method of operation | Manual/mechanical, hand lever. |

## CAB STRUCTURE

| | |
|---|---|
| Make/Model/Type | Caterpillar/3W5036/Cab |
| Manufacturers name/address | Caterpillar Inc.<br>100 N.E. Adams street<br>Peoria, Ill. 61629, USA |
| Protective device | Cab, not tiltable. |
| OECD approval number | None. |

## DRIVER'S SEAT.

| | |
|---|---|
| Make/Model/Type | Grammer/DS85H/90AR |
| Type of suspension | Adjustable spring suspension with swivel and fore/aft isolators |
| Type of damping | Hydraulic |
| Range of adjustment | |
| Longitudinal | 150 mm (5.9 in.) |
| Vertical | 15 mm (0.6 in.) |

## LIGHTING.

| | Height above ground of center | | Size | Distance from outside edge to median plane of tractor | |
|---|---|---|---|---|---|
| | [mm] | [in] | [mm] | [mm] | [in] |
| Headlights | 1478 | 58.2 | 95 x 155 | 1328 | 52.3 |
| Rear lights | 2178 | 85.7 | 100 x 165 | 790 | 31.1 |
| Rear reflectors | 1478 | 58.2 | 110 x 110 | 884 | 34.8 |
| Stop lights | 1478 | 58.2 | 110 x 110 | 1328 | 52.3 |

## TEST CONDITIONS.

Overall dimensions.

| | |
|---|---|
| Length | 5718 mm (225.1 in) |
| Width - Minimum | 2862 mm (112.7 in) |
| Height - Top of Cab | 3284 mm (129.3 in) |
| - Top of exhaust | 3492 mm (137.5 in) |
| Ground clearance | 422 mm (16.6 in) |
| Clearance-limiting part | Drawbar anchor point |

Tractor Mass (with Cab)

| | | Without driver | | With driver | |
|---|---|---|---|---|---|
| | | [kg] | [lb] | [kg] | [lb] |
| Unballasted | Total | 15435 | 34030 | 15510 | 34195 |

## TRACK SPECIFICATIONS.

| | |
|---|---|
| Track materials | rubber covered steel cables |
| Track width and base | 626 mm (24.6 in),2718 mm(107 in) |
| Dynamic radius(rolling radius) | 524 mm (20.6 in) |
| Track support system | 5 bogey wheels with pneumatic suspension |
| Treadbars | |
| Number per metre | 4.2 |
| Track weight | 477 kg (1050 lb) |
| length | 8529 mm (336 in) |

## Oils and Lubrication.

Capacity and change interval:

| | Capacity liter | Capacity quart | Oil change hours | Filter change hours |
|---|---|---|---|---|
| Engine (w/o filter) | 25 | 26 | 250 | 250 |
| Transmission | 55 | 58 | 1000 | 500 |
| Differential/final drive | 193 | 204 | 1000 | -- |
| Hydraulic system | 61 | 64 | 1000 | 1000 |
| Steering system | 35 | 37 | 1000 | 1000 |

Oil and Lubricant specifications:

| | Recommended | Used during test |
|---|---|---|
| Engine oil | | |
| Type | Caterpillar CXP | |
| Viscosity | SAE 15W40 | SAE 10W30 |
| Classification | API-CD | |
| Transmission | | |
| Type | Caterpillar CXP | same |
| Viscosity | SAE 30W | |
| Classification | CD/TO-2 | |
| Hydraulic fluid | | |
| Type | Caterpillar CXP | same |
| Viscosity | SAE 10W | |
| Classification | HYDO | |
| Grease | MPGM NLGI No.2 | |
| Number of lubrication points | 24 | |

## Fuel.

| | |
|---|---|
| Type/grade | Grade 2-D, in conformity with the national standard |
| Density (Pto test) | 0.838 g/cubic-cm (6.990 lb/gallon) at 15'C (59'F) |
| (Drawbar test) | Same as Pto test. |
| Cetane number | 53.9 |
| Viscosity | 2.40 cSt at 38'C (100'F) |

## COMPULSORY TESTS RESULTS.

### (1) MAIN POWER TAKE-OFF PERFORMANCE (1000 rev/min).

Date of tests : 10 October 1991
Location of tests : Tractor Testing Labratory
University of Nebraska, Lincoln, Nebraska.
Type of Dynamometer: Eaton Dynamatic 2025 D.G.

| Power kW (hp) | Speeds engine rev/min | Speeds PTO rev/min | Fuel Consumption hourly l/h (gal/h) | Fuel Consumption hourly kg/h (lb/h) | Fuel Consumption specific kg/kW.h (lb/hp.h) | Specific energy kW.h/l (hp.h/gal) |
|---|---|---|---|---|---|---|
| 1.1 Maximum power - 2 hour test. | | | | | | |
| 191.82 (257.23) | 1953 | 952 | 58.08 (15.34) | 48.65 (107.25) | 0.254 (0.417) | 3.30 (16.77) |
| 1.2 Power at rated engine speed.- 1 hour | | | | | | |
| 182.85 (245.20) | 2100 | 1024 | 57.40 (15.16) | 48.08 (106.00) | 0.263 (0.432) | 3.19 (16.17) |
| 1.3 Maximum power at standard PTO speed.(1000 rev/min) | | | | | | |
| 186.55 (250.16) | 2050 | 1000 | 57.98 (15.32) | 48.57 (107.07) | 0.260 (0.428) | 3.22 (16.33) |

1.4 Part Loads - Governor hand lever set for maximum power at rated engine speed.

| Power kW (hp) | Speeds engine rev/min | PTO rev/min | Fuel Consumption hourly 1/h (gal/h) | hourly kg/h (lb/h) | specific kg/kW.h (lb/hp.h) | Specific energy kW.h/l (hp.h/gal) |
|---|---|---|---|---|---|---|
| (i) Torque obtained at maximum power at rated engine speed. | | | | | | |
| 182.85 (245.20) | 2100 | 1024 | 57.40 (15.16) | 48.08 (106.00) | 0.263 (0.432) | 3.19 (16.17) |
| (ii) 85% of the torque obtained in (i). | | | | | | |
| 160.50 (215.24) | 2166 | 1057 | 52.48 (13.86) | 43.95 (96.90) | 0.274 (0.450) | 3.06 (15.53) |
| (iii) 75% of the torque defined in (ii). | | | | | | |
| 122.54 (164.34) | 2208 | 1077 | 42.89 (11.33) | 35.92 (79.20) | 0.293 (0.482) | 2.86 (14.50) |
| (iv) 50% of the torque defined in (ii). | | | | | | |
| 82.94 (111.22) | 2249 | 1097 | 33.63 (8.88) | 28.17 (62.10) | 0.340 (0.558) | 2.47 (12.52) |
| (v) 25% of the torque defined in (ii). | | | | | | |
| 42.03 (56.36) | 2279 | 1112 | 24.69 (6.52) | 20.68 (45.60) | 0.492 (0.809) | 1.70 (8.64) |
| (vi) Unloaded. | | | | | | |
| 0.40 (0.54) | 2305 | 1124 | 16.41 (4.33) | 13.74 (30.30) | 34.439 (56.618) | 0.02 (0.12) |

1.5 Part Loads - Governor hand lever set for maximum power at standard PTO speed.

| Power kW (hp) | Speeds engine rev/min | Speeds PTO rev/min | Fuel Consumption hourly l/h (gal/h) | Fuel Consumption hourly kg/h (lb/h) | Fuel Consumption specific kg/kW.h (lb/hp.h) | Specific energy kW.h/l (hp.h/gal) |
|---|---|---|---|---|---|---|
| (i) Torque obtained at standard PTO speed | | | | | | |
| 186.55 (250.16) | 2050 | 1000 | 57.98 (15.32) | 48.57 (107.07) | 0.260 (0.428) | 3.22 (16.33) |
| (ii) 85% of the torque obtained in (i). | | | | | | |
| 159.81 (214.30) | 2065 | 1007 | 50.04 (13.22) | 41.91 (92.40) | 0.262 (0.431) | 3.19 (16.21) |
| (iii) 75% of the torque defined in (ii). | | | | | | |
| 122.14 (163.80) | 2106 | 1027 | 40.94 (10.82) | 34.29 (75.60) | 0.281 (0.462) | 2.98 (15.14) |
| (iv) 50% of the torque defined in (ii). | | | | | | |
| 83.55 (112.05) | 2159 | 1053 | 32.49 (8.58) | 27.22 (60.00) | 0.326 (0.535) | 2.57 (13.05) |
| (v) 25% of the torque defined in (ii). | | | | | | |
| 43.07 (57.75) | 2231 | 1088 | 24.04 (6.35) | 20.14 (44.40) | 0.468 (0.769) | 1.79 (9.09) |
| (vi) Unloaded. | | | | | | |
| 0.58 (0.78) | 2247 | 1096 | 14.95 (3.95) | 12.52 (27.60) | 21.454 (35.270) | 0.04 (0.20) |

No load maximum engine speed 2305 rev/min

Equivalent engine torque:

| | |
|---|---|
| at rated engine speed | 832 Nm(2100 rev/min) |
| at maximum power | 938 Nm(1953 rev/min) |
| at maximum torque | 1115 Nm(1300 rev/min) |

Mean atmospheric conditions:

| | |
|---|---|
| Temperature-dry bulb | 26'C (78'F) |
| Relative humidity | 29 % |
| Barometer | 98.45 kPa(29.07 in.Hg) |

| | | |
|---|---|---|
| Maximum temperatures: | | |
| | Thermostat housing | 89'C (192'F) |
| | Engine oil pan | 94'C (202'F) |
| | Fuel at injection pump | 63'C (146'F) |
| | Engine air intake | 46'C (115'F) |
| | Trans./Hydr.oil | 47'C (116'F) |
| Turbocharger boost pressure | | |
| | at rated engine speed | 119 kPa (17.3 psi) |
| | at maximum power | 127 kPa (18.4 psi) |

## 2. POWER LIFT AND HYDRAULIC PUMP PERFORMANCE TEST.

Date of test: 8 October 1991
Location:TTL/UNL, Lincoln, Nebr.

### 2.1 HYDRAULIC POWER TEST - Hydraulic pump performance.

i. Sustained pressure with relief valve open. 17.17 MPa (2490 psi)

ii. Pump delivery rate at minimum pressure & rated engine speed. 102.6 l/min (27.1 gpm)

iii.

| | Flow rate l/min (gal/min) | Pressure Mpa (psi) | Power kW (hp) |
|---|---|---|---|
| At 90% of relief valve setting | 90.8 (24.0) | 15.4 (2240) | 23.4 (31.4) |
| At maximum hydraulic power | 89.3 (23.6) | 15.7 (2280) | 23.4 (31.4) |

| | |
|---|---|
| Tapping points | Two hydraulic outlets combined |
| Hydraulic fluid temperature: | |
| at flow meter | 66'C (151'F) |

## 2.2 POWER LIFT TEST.

This test was conducted at the Caterpillar facility under supervision by staff of the Tractor Testing Labratory
Date of test: 27 August 1991

| | | Hitch points | Frame |
|---|---|---|---|
| Lower hitch points above ground - down position: | [mm/in] | 229/9.0 | 178/7.0 |
| Vertical movement: without load: | [mm/in] | 729/28.7 | 945/37.2 |
| Vertical movement: with load: | [mm/in] | 706/27.8 | 902/35.5 |
| Maximum corrected force through full range: | [kN/lb] | 81.5/18315 | 50.6/11367 |
| Corresponding pressure: | [kPa/psi] | 15513/2250 | |
| Moment about rear axle: | [kN.m/lb.ft] | 83.8/61813 | 82.8/61098 |
| Maximum mast tilt angle: | [deg] | -- | 13.7 |

Lifting height relative to horizontal position of lower links.

| | | | | | | |
|---|---|---|---|---|---|---|
| | [mm] | -330 | -279 | -201 | -99 | 0 | 99 |
| | [in] | -13.0 | -11.0 | -7.9 | -3.9 | 0 | 3.9 |
| Corrected lift forces | | | | | | | |
| Hitch point | [kN] | -- | 129.0 | 120.5 | 112.4 | 106.4 | 101.4 |
| | [lb] | -- | 28988 | 27090 | 25263 | 23913 | 22788 |
| at frame | [kN] | 106.4 | -- | 100.7 | 93.7 | 86.9 | 79.6 |
| | [lb] | 23922 | -- | 22644 | 21069 | 19539 | 17892 |

Lifting height relative to horizontal position of lower links.

| | | | | | | |
|---|---|---|---|---|---|---|
| | [mm] | 201 | 300 | 401 | 427 | 572 |
| | [in] | 7.9 | 11.8 | 15.8 | 16.8 | 22.5 |
| Corrected lift forces | | | | | | |
| Hitch point | [kN] | 95.8 | 91.0 | 83.3 | 81.5 | -- |
| | [lb] | 21528 | 20488 | 18729 | 18315 | -- |
| at frame | [kN] | -- | 72.5 | 64.2 | -- | 50.6 |
| | [lb] | -- | 16290 | 14436 | -- | 11367 |

# Drawbar Power at Part Loads

| Date of tests: | 07–Oct–91 | | Test # | Fuel density: 1653 | 0.838 kg/l | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type of track: | | Concrete | | Engine | | | | | | | | | Relative | Barometric |
| Gear | Power kW | Pull kN | Speed km/h | Speed rev/min | Slip | SFC kg/kW.h | SFE kW.h/l | Fuel | Temperature, deg C Coolant | Oil | Dry | Wet | humidity | Pressure kPa |
| II. Part Loads (unballasted, trac drive at 2100 rev/min) | | | | Drawbar height: | 419 mm | | | | | | | | | |
| II.1 in selected gear at maximum power | | | | | | | | | | | | | | |
| 4 | 170.91 | 80.93 | 7.60 | 1900 | 1.56% | 0.287 | 2.92 | 62 | 80 | 91 | 17 | 11 | 47% | 98.17 |
| II.1.1 75% of pull at maximum power at rated speed | | | | | | | | | | | | | | |
| 4 | 128.61 | 52.56 | 8.81 | 2189 | 0.93% | 0.331 | 2.53 | 60 | 80 | 91 | 24 | 16 | 43% | 97.70 |
| II.1.2 50% of pull at maximum power at rated speed | | | | | | | | | | | | | | |
| 4 | 87.61 | 35.03 | 9.00 | 2231 | 0.66% | 0.387 | 2.16 | 60 | 79 | 91 | 24 | 16 | 43% | 97.70 |
| II.1.3 next higher gear at reduced engine speed, same pull and travel speed as II.1.1 | | | | | | | | | | | | | | |
| 5 | 128.03 | 52.58 | 8.77 | 1897 | 0.93% | 0.304 | 2.76 | 58 | 80 | 91 | 24 | 16 | 43% | 97.70 |
| II.1.4 next higher gear at reduced engine speed, same pull and travel speed as II.1.2 | | | | | | | | | | | | | | |
| 5 | 87.70 | 35.09 | 9.00 | 1942 | 0.66% | 0.340 | 2.46 | 58 | 79 | 89 | 24 | 16 | 43% | 97.70 |
| II.2 in selected gear nearest to 7.5 km/h | | | | | | | | | | | | | | |
| 3 | 170.55 | 93.14 | 6.59 | 1897 | 2.08% | 0.288 | 2.91 | 59 | 80 | 90 | 18 | 12 | 47% | 98.10 |
| II.2.1 75% of pull at maximum power at rated speed | | | | | | | | | | | | | | |
| 3 | 128.08 | 60.04 | 7.68 | 2188 | 1.14% | 0.331 | 2.53 | 60 | 81 | 92 | 23 | 15 | 42% | 97.93 |
| II.2.2 50% of pull at maximum power at rated speed | | | | | | | | | | | | | | |
| 3 | 87.50 | 40.03 | 7.87 | 2234 | 0.77% | 0.385 | 2.17 | 59 | 80 | 90 | 23 | 15 | 42% | 97.93 |
| II.2.3 next higher gear at reduced engine speed, same pull and travel speed as II.2.1 | | | | | | | | | | | | | | |
| 4 | 128.15 | 60.06 | 7.68 | 1911 | 1.09% | 0.301 | 2.79 | 57 | 80 | 90 | 23 | 15 | 42% | 97.93 |
| II.2.4 next higher gear at reduced engine speed, same pull and travel speed as II.2.2 | | | | | | | | | | | | | | |
| 4 | 87.55 | 40.03 | 7.87 | 1953 | 0.71% | 0.341 | 2.45 | 59 | 79 | 89 | 23 | 15 | 42% | 97.93 |

| Date of tests: | 07–Oct–91 | | Test # | Fuel density: 1653 | 6.990 lb/gal | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type of track: | | Concrete | | Engine | | | | | | | | | Relative | Barometric |
| Gear | Power hp | Pull lb | Speed mph | Speed rpm | Slip | SFC lb/hp.h | SFE hp.h/gal | Fuel | Temperature, deg F Coolant | Oil | Dry | Wet | humidity | Pressure |
| II. Part Loads (unballasted, trac drive at 2100 rev/min) | | | | Drawbar height: | 16.5 in | | | | | | | | | |
| II.1 in selected gear at maximum power | | | | | | | | | | | | | | |
| 4 | 229.19 | 18193 | 4.72 | 1900 | 1.56% | 0.471 | 14.83 | 144 | 177 | 196 | 63 | 52 | 47% | 28.99 |
| II.1.1 75% of pull at maximum power at rated speed | | | | | | | | | | | | | | |
| 4 | 172.46 | 11817 | 5.47 | 2189 | 0.93% | 0.545 | 12.84 | 139 | 177 | 196 | 76 | 60 | 43% | 28.85 |
| II.1.2 50% of pull at maximum power at rated speed | | | | | | | | | | | | | | |
| 4 | 117.48 | 7876 | 5.59 | 2231 | 0.66% | 0.636 | 10.99 | 140 | 175 | 195 | 76 | 60 | 43% | 28.85 |
| II.1.3 next higher gear at reduced engine speed, same pull and travel speed as II.1.1 | | | | | | | | | | | | | | |
| 5 | 171.70 | 11821 | 5.45 | 1897 | 0.93% | 0.499 | 14.00 | 137 | 176 | 196 | 76 | 60 | 43% | 28.85 |
| II.1.4 next higher gear at reduced engine speed, same pull and travel speed as II.1.2 | | | | | | | | | | | | | | |
| 5 | 117.61 | 7888 | 5.59 | 1942 | 0.66% | 0.560 | 12.49 | 136 | 175 | 193 | 76 | 60 | 43% | 28.85 |
| II.2 in selected gear nearest to 4.6 mph | | | | | | | | | | | | | | |
| 3 | 228.72 | 20936 | 4.10 | 1897 | 2.08% | 0.474 | 14.75 | 139 | 177 | 194 | 65 | 53 | 49% | 28.97 |
| II.2.1 75% of pull at maximum power at rated speed | | | | | | | | | | | | | | |
| 3 | 171.76 | 13498 | 4.77 | 2188 | 1.14% | 0.544 | 12.84 | 140 | 177 | 197 | 74 | 59 | 42% | 28.92 |
| II.2.2 50% of pull at maximum power at rated speed | | | | | | | | | | | | | | |
| 3 | 117.34 | 9000 | 4.89 | 2234 | 0.77% | 0.634 | 11.03 | 139 | 176 | 194 | 74 | 59 | 42% | 28.92 |
| II.2.3 next higher gear at reduced engine speed, same pull and travel speed as II.2.1 | | | | | | | | | | | | | | |
| 4 | 171.85 | 13503 | 4.77 | 1911 | 1.09% | 0.494 | 14.14 | 135 | 176 | 194 | 74 | 59 | 42% | 28.92 |
| II.2.4 next higher gear at reduced engine speed, same pull and travel speed as II.2.2 | | | | | | | | | | | | | | |
| 4 | 117.40 | 9000 | 4.89 | 1953 | 0.71% | 0.561 | 12.46 | 138 | 175 | 193 | 74 | 59 | 42% | 28.92 |

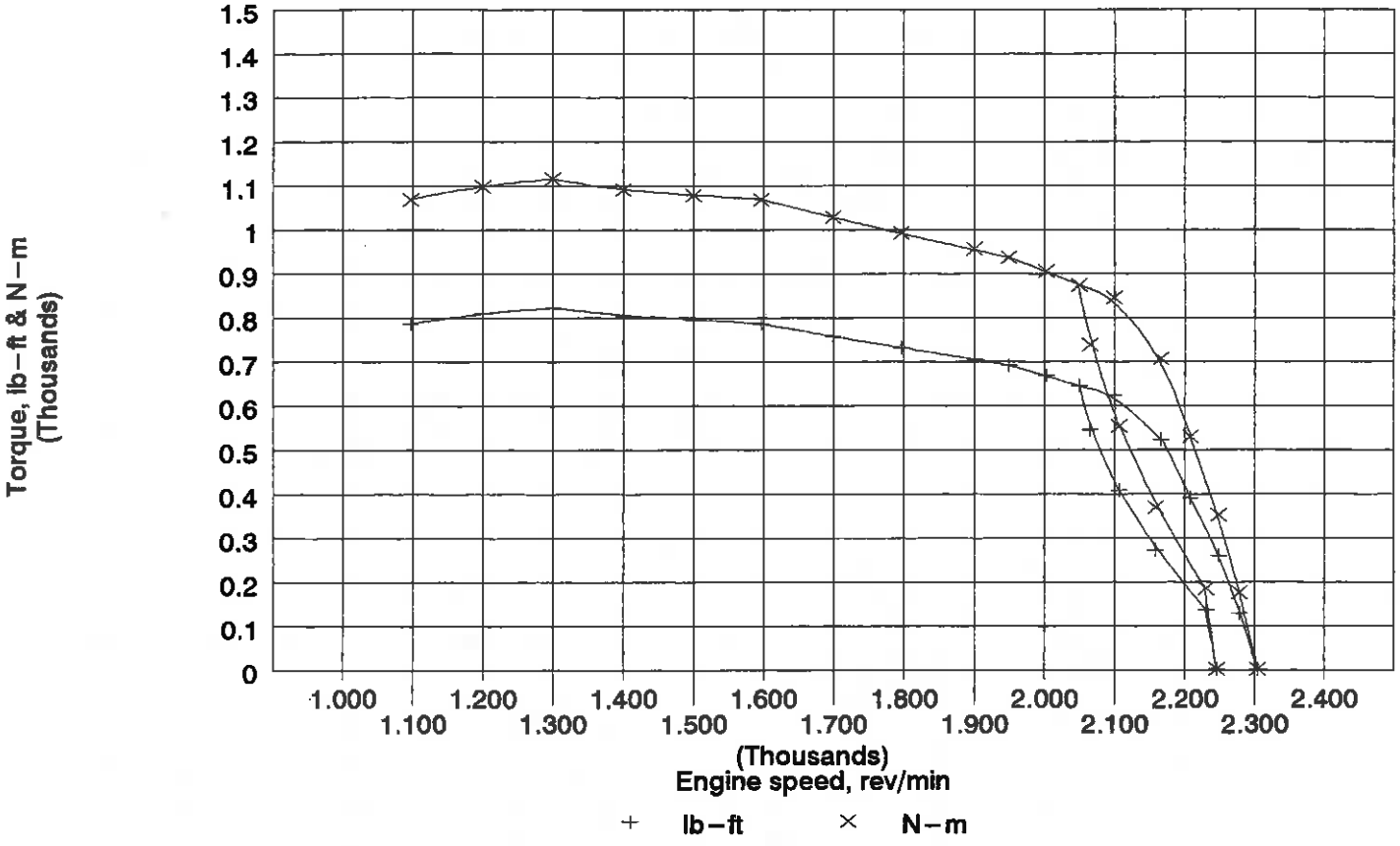
## Drawbar Power at Maximum Engine Power

| Date of tests: | | 07–Oct–91 | | Fuel density: | | 0.838 kg/l | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 08–Oct–91 | Test # | 1653 | | | | | | | | | | |
| Type of track: | | Concrete | | Engine | | | | | | | | | Relative | Barometric |
| Gear | Power kW | Pull kN | Speed km/h | Speed rev/min | Slip | SFC kg/kW.h | SFE kW.h/l | Temperature, deg C Fuel | Coolant | Oil | Dry | Wet | humidity | Pressure kPa |
| Ia. Maximum Power (unballasted, trac drive at 1900 rev/min) | | | | | | | | | | | | | | |
| | | | | Drawbar height: | 419 mm | | | | | | | | | |
| 1 | 142.17 | 145.52 | 3.52 | 2062 | 14.34% | 0.344 | 2.44 | 61 | 80 | 91 | 21 | 14 | 46% | 97.46 |
| 2 | 165.82 | 108.59 | 5.50 | 1891 | 3.36% | 0.297 | 2.82 | 59 | 81 | 92 | 22 | 14 | 40% | 97.87 |
| 3 | 170.55 | 93.14 | 6.59 | 1897 | 2.08% | 0.288 | 2.91 | 59 | 80 | 90 | 18 | 12 | 49% | 98.10 |
| 4 | 170.91 | 80.93 | 7.60 | 1900 | 1.56% | 0.287 | 2.92 | 62 | 80 | 91 | 17 | 11 | 47% | 98.17 |
| 5 | 170.17 | 70.00 | 8.75 | 1900 | 1.24% | 0.285 | 2.94 | 59 | 80 | 91 | 14 | 10 | 62% | 98.21 |
| 6 | 167.30 | 59.90 | 10.05 | 1897 | 1.09% | 0.292 | 2.86 | 62 | 82 | 90 | 19 | 12 | 43% | 98.07 |
| 7 | 166.61 | 51.92 | 11.55 | 1901 | 0.98% | 0.295 | 2.84 | 60 | 82 | 91 | 21 | 13 | 39% | 98.00 |
| 8 | 163.86 | 44.56 | 13.24 | 1895 | 0.82% | 0.301 | 2.79 | 59 | 81 | 90 | 22 | 13 | 34% | 97.93 |

| Date of tests: | | 07–Oct–91 | | Fuel density: | | 6.990 lb/gal | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 08–Oct–91 | Test # | 1653 | | | | | | | | | | |
| Type of track: | | Concrete | | Engine | | | | | | | | | Relative | Barometric |
| Gear | Power hp | Pull lb | Speed mph | Speed rpm | Slip | SFC lb/hp.h | SFE hp.h/gal | Temperature, deg F Fuel | Coolant | Oil | Dry | Wet | humidity | Pressure in Hg |
| Ia. Maximum Power (unballasted, trac drive at 1900 rev/min) | | | | | | | | | | | | | | |
| | | | | Drawbar height: | 16.5 in | | | | | | | | | |
| 1 | 190.66 | 32714 | 2.19 | 2062 | 14.34% | 0.565 | 12.36 | 142 | 176 | 196 | 70 | 58 | 46% | 28.78 |
| 2 | 222.37 | 24413 | 3.42 | 1891 | 3.36% | 0.489 | 14.29 | 138 | 178 | 197 | 72 | 58 | 40% | 28.90 |
| 3 | 228.72 | 20936 | 4.10 | 1897 | 2.08% | 0.474 | 14.75 | 139 | 177 | 194 | 65 | 53 | 49% | 28.97 |
| 4 | 229.19 | 18193 | 4.72 | 1900 | 1.56% | 0.471 | 14.83 | 144 | 177 | 196 | 63 | 52 | 47% | 28.99 |
| 5 | 228.20 | 15737 | 5.44 | 1900 | 1.24% | 0.468 | 14.93 | 139 | 176 | 196 | 58 | 50 | 62% | 29.00 |
| 6 | 224.36 | 13467 | 6.25 | 1897 | 1.09% | 0.481 | 14.54 | 143 | 179 | 194 | 67 | 54 | 43% | 28.96 |
| 7 | 223.43 | 11672 | 7.18 | 1901 | 0.98% | 0.485 | 14.41 | 140 | 179 | 196 | 69 | 55 | 39% | 28.94 |
| 8 | 219.76 | 10019 | 8.23 | 1895 | 0.82% | 0.494 | 14.15 | 139 | 179 | 194 | 71 | 56 | 34% | 28.92 |

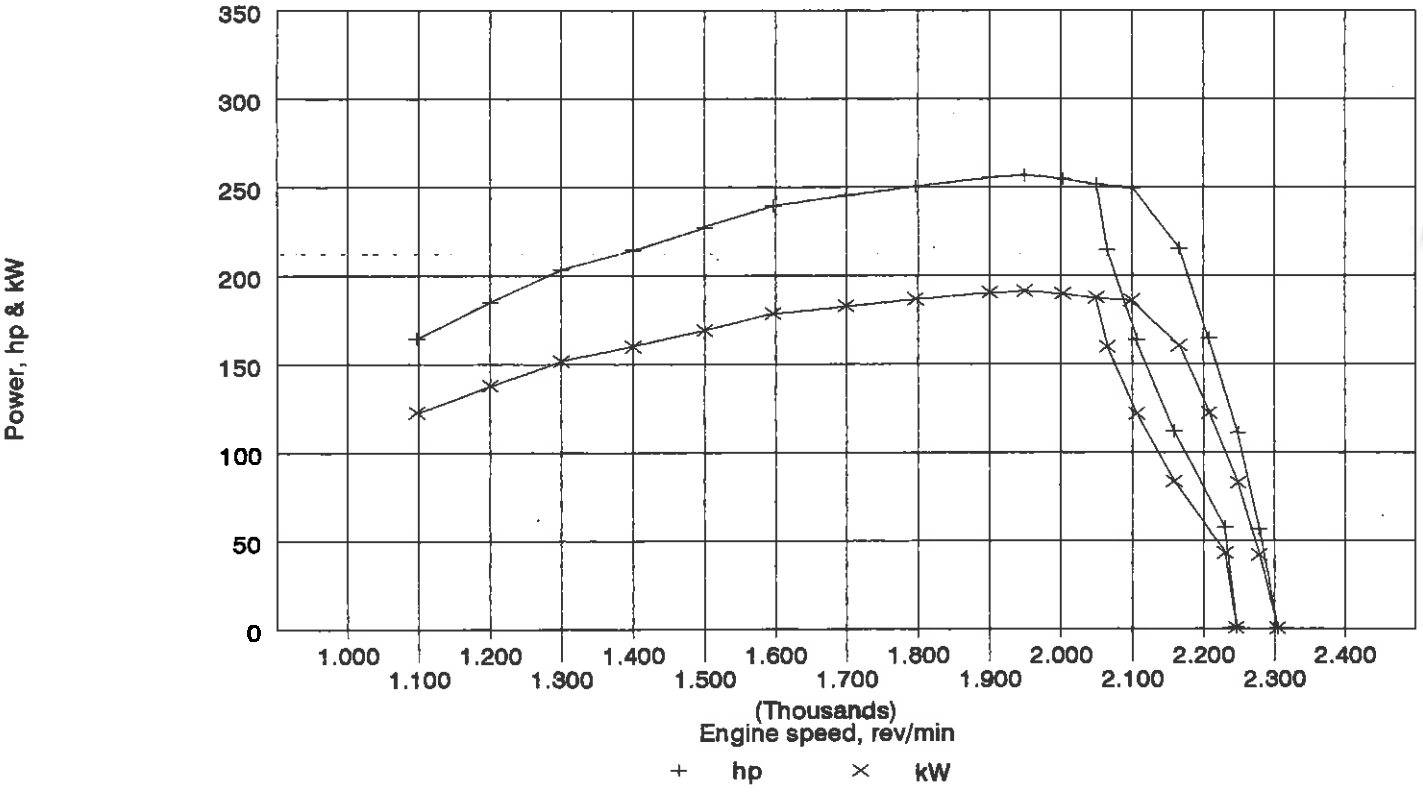
## Equivalent Crankshaft Torque

Caterpillar Challenger 65B



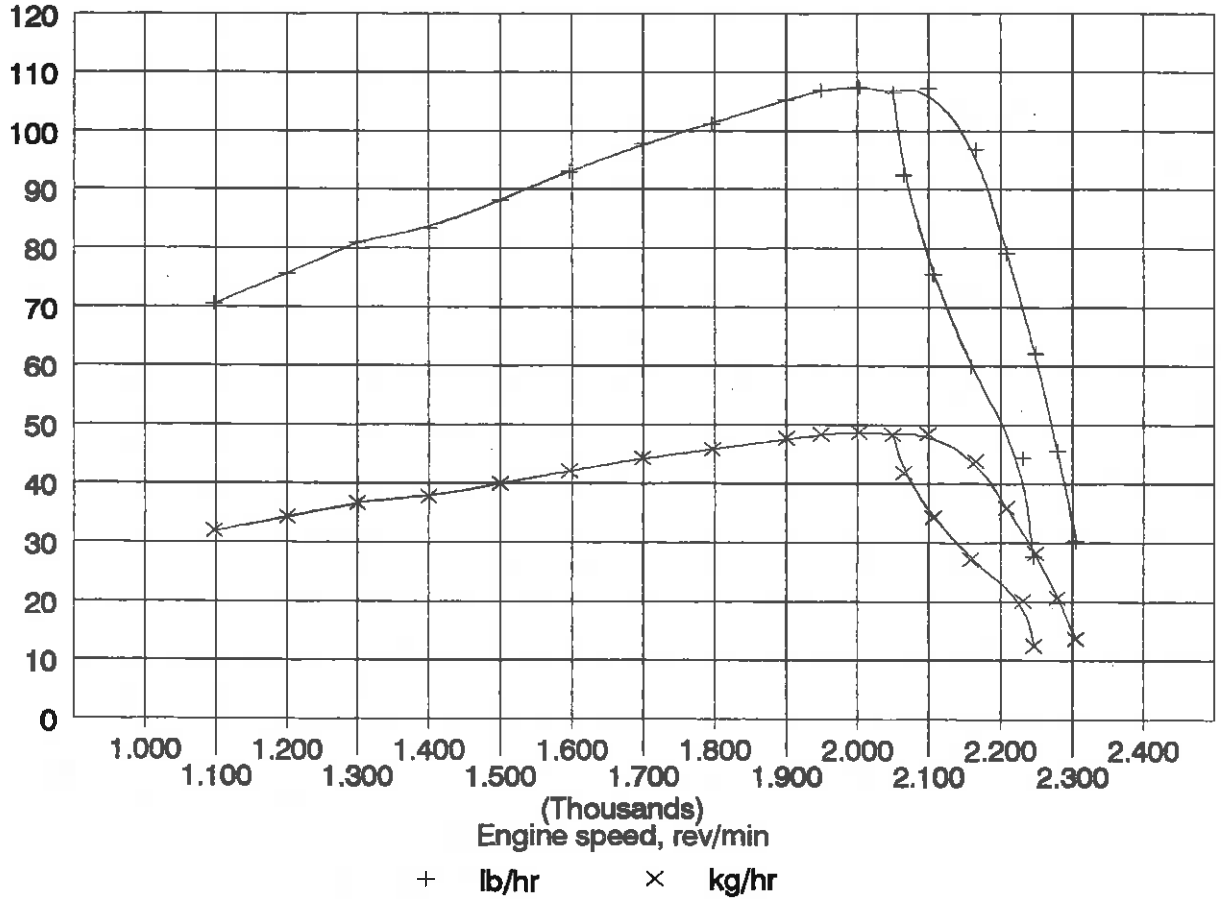

## PTO Power

Caterpillar Challenger 65B



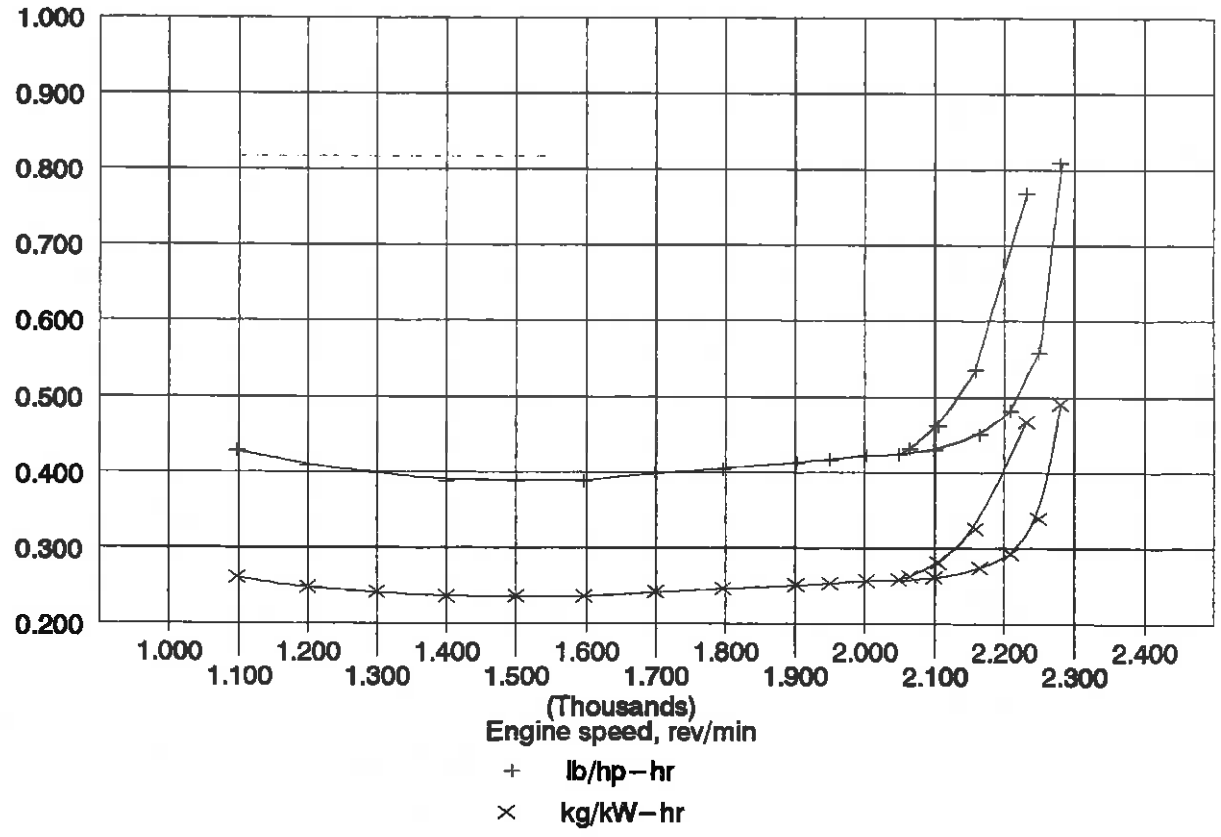
## PTO Fuel Consumption

### Caterpillar Challenger 65B



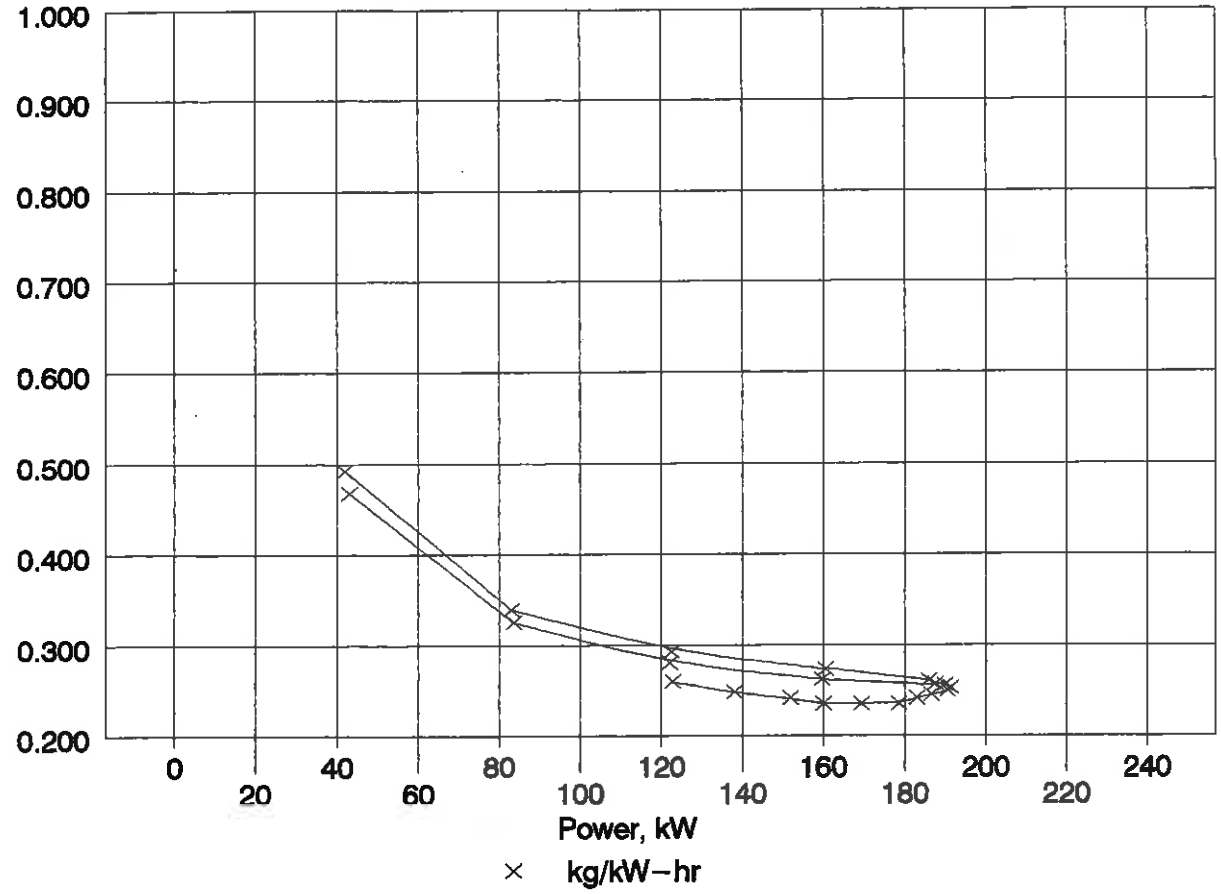

## Specific Fuel Consumption

### Caterpillar Challenger 65B



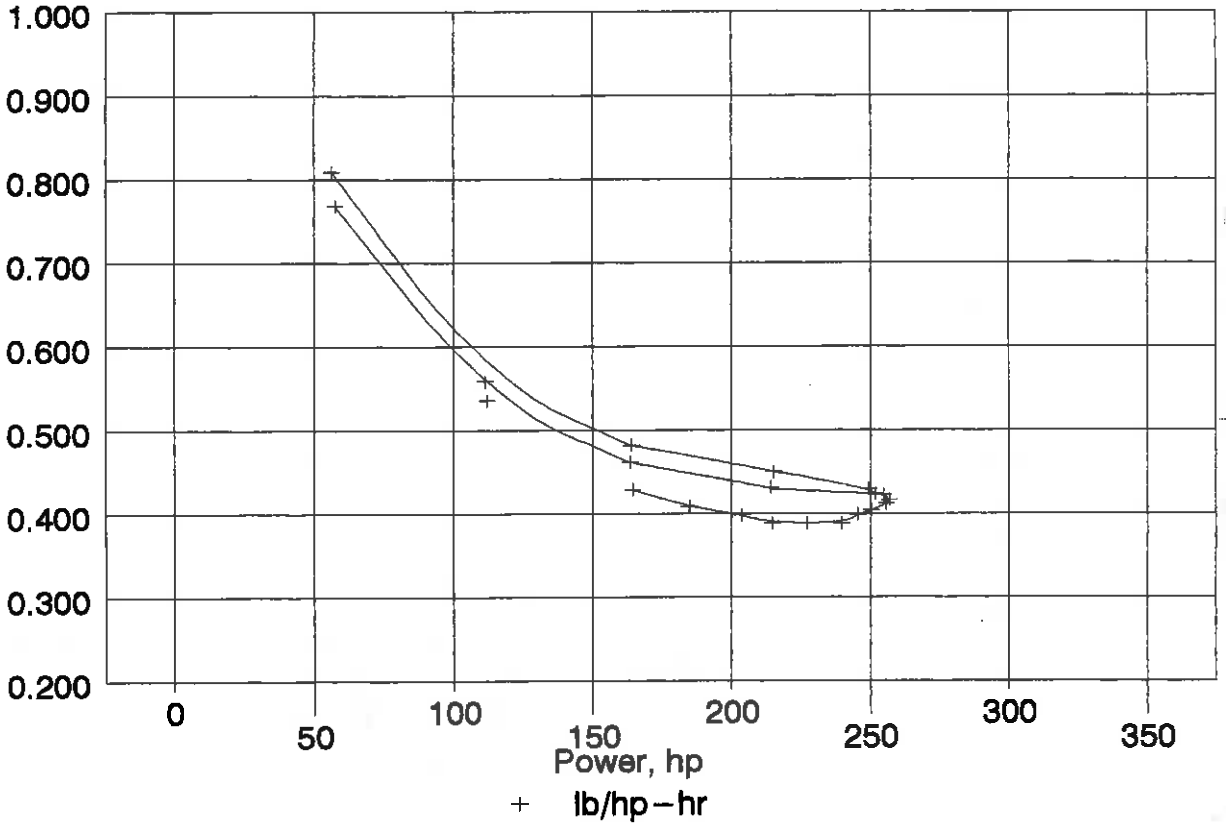
SFC vs PTO Power

Caterpillar Challenger 65B




SFC vs PTO Power

Caterpillar Challenger 65B



## Drawbar Power at Rated Engine Speed

Date of tests: 07–Oct–91 08–Oct–91 Test # 1653 Fuel density: 0.838 kg/l

Type of track: Concrete

| Gear | Power kW | Pull kN | Speed km/h | Engine Speed rev/min | Slip | SFC kg/kW.h | SFE kW.h/l | Temperature, deg C Fuel | Coolant | Oil | Dry | Wet | Relative humidity | Barometric Pressure kPa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I. Maximum Power (unballasted, trac drive at 2100 rev/min) Drawbar height: 419 mm | | | | | | | | | | | | | | |
| 1 | 148.72 | 141.78 | 3.78 | 2099 | 9.43% | 0.327 | 2.56 | 60 | 81 | 91 | 21 | 14 | 46% | 97.46 |
| 2 | 160.96 | 93.88 | 6.17 | 2098 | 2.24% | 0.309 | 2.71 | 61 | 81 | 92 | 22 | 14 | 40% | 97.80 |
| 3 | 163.61 | 80.27 | 7.34 | 2100 | 1.51% | 0.302 | 2.77 | 61 | 81 | 92 | 19 | 12 | 43% | 98.10 |
| 4 | 164.29 | 70.17 | 8.43 | 2101 | 1.24% | 0.302 | 2.77 | 61 | 80 | 91 | 18 | 12 | 49% | 98.14 |
| 5 | 162.23 | 60.28 | 9.69 | 2099 | 1.09% | 0.301 | 2.78 | 61 | 80 | 91 | 15 | 10 | 53% | 98.21 |
| 6 | 156.70 | 51.29 | 11.14 | 2099 | 0.93% | 0.311 | 2.69 | 61 | 81 | 92 | 20 | 12 | 37% | 98.04 |
| 7 | 156.51 | 44.10 | 12.78 | 2100 | 0.82% | 0.317 | 2.64 | 61 | 81 | 92 | 21 | 13 | 39% | 97.97 |
| 8 | 154.13 | 37.80 | 14.68 | 2100 | 0.71% | 0.323 | 2.59 | 60 | 81 | 92 | 22 | 14 | 40% | 97.90 |

Date of tests: 07–Oct–91 08–Oct–91 Test # 1653 Fuel density: 6.990 lb/gal

Type of track: Concrete

| Gear | Power hp | Pull lb | Speed mph | Engine Speed rpm | Slip | SFC lb/hp.h | SFE hp.h/gal | Temperature, deg F Fuel | Coolant | Oil | Dry | Wet | Relative humidity | Barometric Pressure in Hg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I. Maximum Power (unballasted, trac drive at 2100 rev/min) Drawbar height: 16.5 in | | | | | | | | | | | | | | |
| 1 | 199.44 | 31875 | 2.35 | 2099 | 9.43% | 0.538 | 12.99 | 140 | 177 | 197 | 70 | 58 | 46% | 28.78 |
| 2 | 215.85 | 21106 | 3.84 | 2098 | 2.24% | 0.508 | 13.75 | 141 | 178 | 197 | 72 | 58 | 40% | 28.88 |
| 3 | 219.41 | 18046 | 4.56 | 2100 | 1.51% | 0.497 | 14.06 | 141 | 177 | 198 | 66 | 54 | 43% | 28.97 |
| 4 | 220.32 | 15775 | 5.24 | 2101 | 1.24% | 0.497 | 14.06 | 142 | 177 | 197 | 64 | 53 | 49% | 28.98 |
| 5 | 217.56 | 13551 | 6.02 | 2099 | 1.09% | 0.495 | 14.11 | 141 | 176 | 196 | 59 | 50 | 53% | 29.00 |
| 6 | 212.82 | 11530 | 6.92 | 2099 | 0.93% | 0.512 | 13.66 | 141 | 178 | 198 | 68 | 54 | 37% | 28.95 |
| 7 | 209.88 | 9914 | 7.94 | 2100 | 0.82% | 0.521 | 13.41 | 141 | 178 | 198 | 70 | 56 | 39% | 28.93 |
| 8 | 206.70 | 8498 | 9.12 | 2100 | 0.71% | 0.531 | 13.16 | 139 | 179 | 198 | 71 | 57 | 40% | 28.91 |

Repairs: None
Remarks: None