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Test 1653: Caterpillar Challenger 65B and 65C Diesel 10-Speed

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

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NEBRASKA OECD TRACTOR TEST 1653—SUMMARY 098

CATERPILLAR CHALLENGER 65B DIESEL

ALSO CATERPILLAR CHALLENGER 65C DIESEL

10 SPEED

POWER TAKE-OFF PERFORMANCE

| Power HP (kW) | Crank shaft speed rpm | Fuel Consumption | | | Mean Atmospheric Conditions |
|--|--------------------------------|---|-----------------------|-----------------------|--------------------------------|
| | | Gal/hr (l/h) | lb/hp.hr (kg/kW.h) | Hp.hr/gal (kW.h/l) | |
| MAXIMUM POWER AND FUEL CONSUMPTION | | | | | |
| * | | Rated Engine Speed—(PTO speed—1024 rpm) | | | |
| 245.20 (182.85) | 2100 | 15.16 (57.39) | 0.432 (0.263) | 16.17 (3.19) | |
| Maximum Power (Two Hours) | | | | | |
| 257.20 (191.79) | 1953 | 15.34 (58.07) | 0.417 (0.254) | 16.77 (3.30) | |
| Standard Power Take-off Speed (1000 rpm) | | | | | |
| 250.16 (186.55) | 2050 | 15.32 (57.99) | 0.428 (0.260) | 16.33 (3.22) | Air temperature |

VARYING POWER AND FUEL CONSUMPTION

| | | | | | |
|--------------------|------|------------------|--------------------|-----------------|-----------------------|
| 245.20 (182.85) | 2100 | 15.16 (57.39) | 0.432 (0.263) | 16.17 (3.19) | 77°F (25°C) |
| 215.24 (160.50) | 2166 | 13.86 (52.47) | 0.450 (0.274) | 15.53 (3.06) | |
| 164.34 (122.55) | 2208 | 11.33 (42.99) | 0.482 (0.293) | 14.50 (2.86) | 35% |
| 111.22 (82.94) | 2249 | 8.74 (33.46) | 0.558 (0.339) | 12.52 (2.47) | Barometer |
| 56.36 (42.03) | 2279 | 6.52 (24.68) | 0.809 (0.492) | 8.64 (1.70) | 29.07" Hg (98.44 kPa) |
| 0.54 (0.40) | 2305 | 4.33 (16.39) | 56.618 (34.441) | 0.12 (0.02) | |

Maximum Torque 822 lb. ft (1115 Nm) @ 1300 RPM

Maximum Torque Rise 34.1%

DRAWBAR PERFORMANCE

FUEL CONSUMPTION CHARACTERISTICS

| Power Hp (kW) | Drawbar pull (kN) | Speed mph (km/h) | Crank- shaft speed rpm | Slip % | Fuel Consumption | | Temp.°F (°C) | | Barom. inch Hg (kPa) |
|---|-------------------------|------------------------|---------------------------------|-----------|-----------------------|-----------------------|---------------------|--------------------|-------------------------------|
| | | | | | lb/hp.hr (kg/kW.h) | Hp.hr/gal (kW.h/l) | cool- ing med | Air dry bulb | |
| Maximum Power—4th Gear | | | | | | | | | |
| 220.32 (164.29) | 15775 (70.17) | 5.24 (8.43) | 2101 | 1.24 | 0.497 (0.302) | 14.06 (2.77) | 177 (80) | 64 (18) | 28.98 (98.14) |
| 75% of Pull at Maximum Power—4th Gear | | | | | | | | | |
| 172.46 (128.61) | 11817 (52.56) | 5.47 (8.81) | 2189 | 0.93 | 0.545 (0.331) | 12.84 (2.53) | 177 (80) | 76 (24) | 28.85 (97.70) |
| 50% of Pull at Maximum Power—4th Gear | | | | | | | | | |
| 117.48 (87.61) | 7876 (35.03) | 5.59 (9.00) | 2231 | 0.66 | 0.636 (0.387) | 10.99 (2.16) | 175 (79) | 76 (24) | 28.85 (97.70) |
| 75% of Pull at Reduced Engine Speed—5th Gear | | | | | | | | | |
| 171.70 (128.03) | 11821 (52.58) | 5.45 (8.77) | 1897 | 0.93 | 0.499 (0.304) | 14.00 (2.76) | 176 (80) | 76 (24) | 28.85 (97.70) |
| 50% of Pull at Reduced Engine Speed—5th Gear | | | | | | | | | |
| 117.61 (87.70) | 7888 (35.09) | 5.59 (9.00) | 1942 | 0.66 | 0.560 (0.340) | 12.49 (2.46) | 175 (79) | 76 (24) | 28.85 (97.70) |

Location of Test: Tractor Testing Laboratory,
University of Nebraska, Lincoln Nebraska 68583-
0832 U.S.A.

Dates of Test: October 2-11, 1991

Manufacturer: Caterpillar Inc., 100 N.E. Adams
St., Peoria, Illinois 61629

FUEL OIL AND TIME: Fuel No. 2 Diesel Ce-
tane No. 53.9 Specific gravity converted to 60°/
60°F (15°/15°C) 0.8395 Fuel weight 6.990 lbs/gal
(0.838 kg/l) Oil SAE 10W30 API service classi-
fication CE, CD, SF To motor 5.964 gal (22.575 l)
Drained from motor 5.836 gal (22.091 l) Trans-
mission and final drive lubricant SAE 30W API
CD/TO-2 fluid Hydraulic lubricant Caterpillar
CXP fluid Total time engine was operated 21.5
hours.

ENGINE: Make Caterpillar Diesel Type six cyl-
inder vertical with turbocharger and intercooler
Serial No. *08Z63806* Crankshaft lengthwise
Rated engine speed 2100 Bore and stroke (as spec-
ified) 4.75" × 6.00" (120.6 mm × 152.4 mm)
Compression ratio 15.0 to 1 Displacement 638 cu
in (10450 ml) Starting system 12 volt Lubrication
pressure Air cleaner two paper elements and as-
pirator Oil filter one full flow cartridge Oil cooler
engine coolant heat exchanger for crankcase oil,
engine coolant heat exchanger for transmission
oil, radiator for steering oil, radiator for hydraulic
oil Fuel filter one paper cartridge and screen Muf-
fler underhood Exhaust vertical Cooling medium
temperature control thermostat.

ENGINE OPERATING PARAMETERS: fuel
rate 96.9-107.0 lb/hr (44.0-48.6 kg/hr) high idle
2220-2340 rpm Turbo boost nominal 14.5-19.7 psi
(100-136 kPa) as measured 18.4 psi (127 kPa)

CHASSIS: Type track layer—rubber track Se-
rial No. *7YC02016* Tread width 84.6" (2150 mm)
Length of track on ground 107.0" (2718 mm) Hy-
draulic control system direct engine drive Trans-
mission selective gear fixed ratio with full range
operator controlled powershift Nominal travel
speeds mph (km/h) first 2.6 (4.2) second 4.0 (6.4)
third 4.7 (7.5) fourth 5.3 (8.6) fifth 6.1 (9.9) sixth
7.0 (11.3) seventh 8.1 (13.0) eighth 9.3 (14.9) ninth
12.0 (19.3) tenth 18.1 (29.3) reverse 1.9 (3.1), 4.5
(7.2) Clutch multiple wet disc hydraulically power
actuated by foot pedal Brakes caliper disc hy-
draulically operated by foot pedal Steering dif-
ferential steering hydrostatically actuated by
steering wheel Power take-off 1000 rpm at 2049
engine rpm Unladen tractor mass 34030 lb (15436
kg).

REPAIRS AND ADJUSTMENTS: No repairs
or adjustments.

DRAWBAR PERFORMANCE AT 1900 RPM **MAXIMUM POWER IN SELECTED GEARS**

| Power Hp (kW) | Drawbar pull (kN) | Speed mph (km/h) | Crank- shaft speed rpm | Slip % | Fuel Consumption lb/hp.hr (kg/kW.h) | Hp.hr/gal (kW.h/l) | Temp.°F (°C) cool- ing med | Air dry bulb | Barom. inch Hg (kPa) |
|----------------------|-------------------------|------------------------|---------------------------------|-----------|---|-----------------------|-------------------------------------|--------------------|-------------------------------|
| 1st Gear | | | | | | | | | |
| 190.66 (142.17) | 32714 (145.52) | 2.19 (3.52) | 2062 | 14.34 | 0.565 (0.344) | 12.36 (2.44) | 176 (80) | 70 (21) | 28.78 (97.46) |
| 2nd Gear | | | | | | | | | |
| 222.37 (165.82) | 24413 (108.59) | 3.42 (5.50) | 1891 | 3.36 | 0.489 (0.297) | 14.29 (2.82) | 178 (81) | 72 (22) | 28.90 (97.87) |
| 3rd Gear | | | | | | | | | |
| 228.72 (170.55) * | 20938 (93.14) | 4.10 (6.59) | 1897 | 2.08 | 0.474 (0.288) | 14.75 (2.91) | 177 (80) | 65 (18) | 28.97 (98.10) |
| 4th Gear | | | | | | | | | |
| 229.19 (170.91) | 18193 (80.93) | 4.72 (7.60) | 1900 | 1.56 | 0.471 (0.287) | 14.83 (2.92) | 177 (80) | 63 (17) | 28.99 (98.17) |
| 5th Gear | | | | | | | | | |
| 228.20 (170.17) | 15737 (70.00) | 5.44 (8.75) | 1900 | 1.24 | 0.468 (0.285) | 14.93 (2.94) | 176 (80) | 58 (14) | 29.00 (98.21) |
| 6th Gear | | | | | | | | | |
| 224.36 (167.30) | 13467 (59.90) | 6.25 (10.05) | 1897 | 1.09 | 0.481 (0.292) | 14.54 (2.86) | 179 (82) | 67 (19) | 28.96 (98.07) |
| 7th Gear | | | | | | | | | |
| 223.43 (166.61) | 11672 (51.92) | 7.18 (11.55) | 1901 | 0.98 | 0.485 (0.295) | 14.41 (2.84) | 179 (82) | 69 (21) | 28.94 (98.00) |
| 8th Gear | | | | | | | | | |
| 219.76 (163.88) | 10019 (44.56) | 8.23 (13.24) | 1895 | 0.82 | 0.494 (0.301) | 14.15 (2.79) | 179 (81) | 71 (22) | 28.92 (97.93) |

DRAWBAR PERFORMANCE AT 2100 RPM **MAXIMUM POWER IN SELECTED GEARS**

| Power Hp (kW) | Drawbar pull (kN) | Speed mph (km/h) | Crank- shaft speed rpm | Slip % | Fuel Consumption lb/hp.hr (kg/kW.h) | Hp.hr/gal (kW.h/l) | Temp.°F (°C) cool- ing med | Air dry bulb | Barom. inch Hg (kPa) |
|---------------------|-------------------------|------------------------|---------------------------------|-----------|---|-----------------------|-------------------------------------|--------------------|-------------------------------|
| 1st Gear | | | | | | | | | |
| 199.44 (148.72) | 31875 (141.78) | 2.35 (3.78) | 2099 | 9.43 | 0.538 (0.327) | 12.99 (2.56) | 177 (81) | 70 (21) | 28.78 (97.46) |
| 2nd Gear | | | | | | | | | |
| 215.85 (160.96) | 21106 (93.88) | 3.84 (6.17) | 2098 | 2.24 | 0.508 (0.309) | 13.75 (2.71) | 178 (81) | 72 (22) | 28.88 (97.80) |
| 3rd Gear | | | | | | | | | |
| 219.41 (163.61) | 18046 (80.27) | 4.56 (7.34) | 2100 | 1.51 | 0.497 (0.302) | 14.06 (2.77) | 177 (81) | 66 (19) | 28.97 (98.10) |
| 4th Gear | | | | | | | | | |
| 220.32 (164.29) | 15775 (70.17) | 5.24 (8.43) | 2101 | 1.24 | 0.497 (0.302) | 14.06 (2.77) | 177 (80) | 64 (18) | 28.98 (98.14) |
| 5th Gear | | | | | | | | | |
| 217.56 (162.23) | 13551 (60.28) | 6.02 (9.69) | 2099 | 1.09 | 0.495 (0.301) | 14.11 (2.78) | 176 (80) | 59 (15) | 29.00 (98.21) |
| 6th Gear | | | | | | | | | |
| 212.82 (158.70) | 11530 (51.29) | 6.92 (11.14) | 2099 | 0.93 | 0.512 (0.311) | 13.66 (2.69) | 178 (81) | 68 (20) | 28.95 (98.04) |
| 7th Gear | | | | | | | | | |
| 209.88 (156.51) | 9914 (44.10) | 7.94 (12.78) | 2100 | 0.82 | 0.521 (0.317) | 13.41 (2.64) | 178 (81) | 70 (21) | 28.93 (97.97) |
| 8th Gear | | | | | | | | | |
| 206.70 (154.13) | 8498 (37.80) | 9.12 (14.68) | 2100 | 0.71 | 0.531 (0.323) | 13.16 (2.59) | 179 (81) | 71 (22) | 28.91 (97.90) |

TRACTOR SOUND LEVEL WITH CAB

dB(A)

| | |
|--|------|
| Maximum Available Power—4th Gear | 73.5 |
| 75% of pull at maximum power—4th Gear | 74.0 |
| 50% of pull at maximum power—4th Gear | 73.5 |
| 50% of pull at reduced engine speed—5th Gear | 72.0 |
| Bystander (10th Gear) | 92.0 |

TIRES AND WEIGHT

Tested Without Ballast

Rear Tires —No., size, ply & psi (kPa)
Front Tires —No., size, ply & psi (kPa)
Height of Drawbar
Static Weight with operator — Rear
— Front
— Total

16.5 in (420 mm)

34195 lb (15510 kg)

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 163° F (73° C). The performance figures on this summary were taken from a test conducted under the OECD Code II restricted standards test code procedure.

Report reissued: Supplemental sales permit for Caterpillar Challenger 65C Diesel, January, 1993.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1653**, Summary 098, November 4, 1991.

LOUIS I. LEVITICUS

Engineer-in-Charge

L. L. BASHFORD

R. D. GRISSO

K. VON BARGEN

Board of Tractor Test Engineers

THREE POINT HITCH PERFORMANCE (SAE Static Test)

| | | | | | |
|---|---------------------|---------------|---------------|--------------|--------------|
| Observed Maximum Pressure psi. (bar) | 2500 (172) | | | | |
| Location | remote outlet | | | | |
| Hydraulic oil temperature °F(°C) | 142 (61) | | | | |
| Location | hydraulic reservoir | | | | |
| Category | III | | | | |
| Quick attach | no | | | | |
| Hitch point distance to ground level in. (mm) | 8.6 (218) | 15.8 (401) | 24.4 (620) | 33.6 (853) | 43.9 (1115) |
| Lift force on frame lb. (kN) | 30640 (136.3) | 28060 (124.8) | 23600 (105.0) | 19350 (86.1) | 13680 (60.9) |

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

Quick Attach: none

Maximum Force Exerted Through Whole Range:

11367 lbs (50.6 kN)

i) Opening pressure of relief valve:

NA

Sustained pressure at compensator cutoff:

2490 psi (172 bar)

ii) Pump delivery rate at minimum pressure:

27.1 GPM (102.6 l/min)

iii) Pump delivery rate at maximum

hydraulic power:

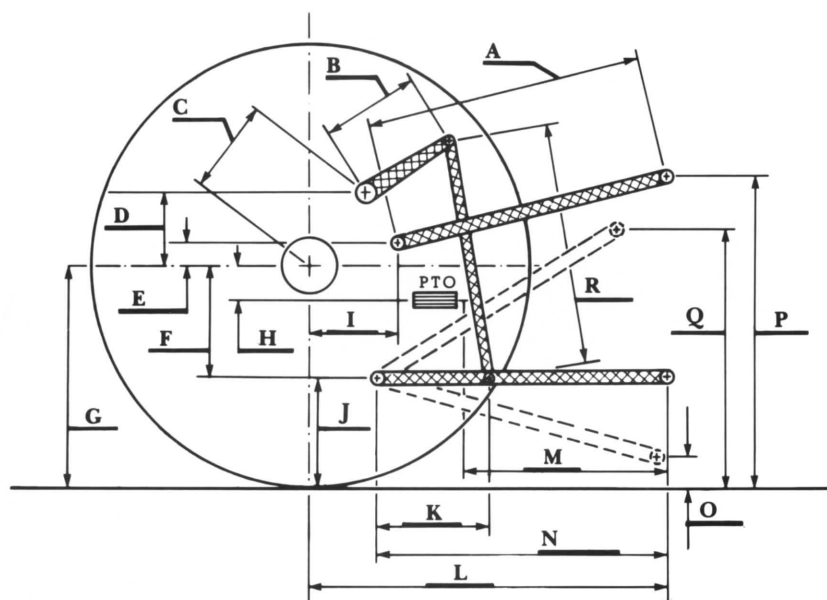
23.6 GPM (89.3 l/min)

Delivery pressure:

2280 psi (157 bar)

Power:

31.4 HP (23.4 kW)



Hitch Dimensions as Tested — No Load

| | inch | mm |
|----|------|------|
| A | 26.7 | 678 |
| B | 21.5 | 545 |
| C | 18.6 | 472 |
| D | 16.3 | 415 |
| E | 16.6 | 422 |
| F | 3.9 | 98 |
| G | 23.9 | 606 |
| *H | -5.1 | -130 |
| I | 14.6 | 370 |
| J | 20.0 | 508 |
| K | 21.1 | 535 |
| L | 40.6 | 1030 |
| M | 25.5 | 648 |
| N | 30.1 | 765 |
| O | 9.0 | 229 |
| P | 47.0 | 1194 |
| Q | 37.7 | 958 |
| R | 26.1 | 663 |

*PTO is above rear axle.



Caterpillar Challenger 65B Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Darrell Nelson, Dean and Director