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Test 1706: Caterpillar Challenger 65D Diesel 10-Speed

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NEBRASKA OECD TRACTOR TEST 1706—SUMMARY 201

CATERPILLAR CHALLENGER 65D DIESEL

10 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1024 rpm)					
256.15 (191.01)	2100	15.49 (58.65)	0.425 (0.258)	16.53 (3.26)	
Maximum Power (2 hours)					
268.39 (200.14)	2050	16.10 (60.93)	0.421 (0.256)	16.67 (3.28)	
Standard Power Take-off Speed (1000 rpm)					
268.39 (200.14)	2050	16.10 (60.93)	0.421 (0.256)	16.67 (3.28)	
VARYING POWER AND FUEL CONSUMPTION					
256.15 (191.01)	2100	15.49 (58.65)	0.425 (0.258)	16.53 (3.26)	Air temperature
223.84 (166.92)	2157	13.80 (52.23)	0.433 (0.263)	16.22 (3.20)	76°F (24°C)
171.07 (127.56)	2207	11.23 (42.53)	0.461 (0.288)	15.23 (3.00)	Relative humidity
116.55 (86.11)	2252	8.93 (33.80)	0.538 (0.327)	13.05 (2.57)	26%
59.60 (44.45)	2292	6.41 (24.26)	0.755 (0.459)	9.30 (1.83)	Barometer
1.08 (0.81)	2320	4.06 (15.36)	26.470 (16.101)	0.27 (0.05)	28.57"Hg (96.70 kPa)

Maximum Torque 894 lb.-ft. (1212 Nm) at 1300 rpm
 Maximum Torque Rise 39.6%
 Torque rise at 1699 rpm 27%

DRAWBAR PERFORMANCE

FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (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)
Maximum Power—3rd Gear									
235.26 (175.43)	19258 (85.66)	4.58 (7.37)	2092	1.55	0.475 (0.289)	14.79 (2.91)	180 (82)	48 (9)	28.60 (96.85)
75% of Pull at Maximum Power—3rd Gear									
181.87 (135.62)	14245 (63.36)	4.79 (7.70)	2177	1.02	0.516 (0.314)	13.62 (2.68)	177 (81)	49 (9)	28.66 (97.05)
50% of Pull at Maximum Power—3rd Gear									
124.82 (93.08)	9516 (42.33)	4.92 (7.92)	2230	0.75	0.595 (0.362)	11.80 (2.32)	174 (79)	49 (9)	28.66 (97.05)
75% of Pull at Reduced Engine Speed—5th Gear									
181.44 (135.30)	14261 (63.44)	4.77 (7.68)	1655	1.07	0.461 (0.280)	15.24 (3.00)	177 (81)	49 (9)	28.66 (97.05)
50% of Pull at Reduced Engine Speed—5th Gear									
124.77 (93.04)	95.05 (42.28)	4.92 (7.92)	1701	0.75	0.506 (0.308)	13.87 (2.73)	173 (78)	49 (9)	28.66 (97.05)

Location of Test: Tractor Testing Laboratory,
 University of Nebraska, Lincoln, Nebraska 68583-0832

Dates of Test: April 1-4, 1996

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

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No. 50.6 Specific gravity converted to 60°/60° F (15°/15°C) 0.8435 Fuel weight 7.023 lbs/gal (0.842 kg/l) Oil SAE 10W30 API service classification CF-4, CE To motor 5.991 gal (22.678 l) Drained from motor 5.487 gal (20.770 l) Transmission and final drive lubricant SAE 30W API CD/TO-2 fluid Hydraulic lubricant Caterpillar CXP fluid Total time engine was operated 17.0 hours.**

ENGINE: Make Caterpillar Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** *08Z88981* **Crankshaft** lengthwise **Rated rpm** 2100 **Bore and stroke** (as specified) 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 aspirator **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, engine coolant heat exchanger for transmission oil, radiator for hydraulic oil, radiator for steering and PTO oil **Fuel filter** one element and one cartridge **Muffler** vertical **Cooling medium temperature control** thermostat.

ENGINE OPERATING PARAMETERS: **Fuel rate:** 106.9-117.9 lb/h (48.5-53.5 kg/h) **High idle:** 2260-2380 rpm **Turbo boost** nominal 22.8 psi (157 kPa) as measured 20.2 psi (139 kPa)

CHASSIS: **Type** tracklayer-rubber tracked **Serial No.** *2ZJ02010* **Tread width** 90.1" (2285 mm) **Length of track on ground** 107.1" (2721 mm) **Hydraulic control system** direct engine drive **Transmission** 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 actuated by foot pedal **Brakes** caliper disc hydraulically operated by foot pedal **Steering** differential steering hydrostatically actuated by steering wheel **Power take-off** 1000 rpm at 2050 engine rpm **Unladen tractor mass** 35235 lb (15982 kg)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments

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

Power Hp (kW)	Drawbar pull lbs (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									
217.71 (162.34)	33636 (149.62)	2.43 (3.91)	2098	8.16	0.509 (0.310)	13.79 (2.72)	178 (81)	47 (8)	28.60 (96.85)
2nd Gear									
231.52 (172.64)	22247 (98.96)	3.90 (6.28)	2096	2.07	0.483 (0.293)	14.56 (2.87)	178 (81)	47 (8)	28.60 (96.85)
3rd Gear									
235.26 (175.43)	19258 (85.66)	4.58 (7.37)	2092	1.55	0.475 (0.289)	14.79 (2.91)	180 (82)	48 (9)	28.60 (96.85)
4th Gear									
233.59 (174.18)	16681 (74.20)	5.25 (8.45)	2094	1.34	0.480 (0.292)	14.65 (2.89)	180 (82)	50 (10)	28.64 (96.99)
5th Gear									
228.49 (170.38)	14201 (63.17)	6.03 (9.71)	2092	1.18	0.489 (0.298)	14.35 (2.83)	181 (83)	51 (11)	28.64 (96.99)
6th Gear									
223.55 (166.70)	12029 (53.51)	6.97 (11.22)	2096	0.97	0.505 (0.307)	13.90 (2.74)	180 (82)	51 (11)	28.64 (96.99)
7th Gear									
219.49 (163.67)	10338 (45.99)	7.96 (12.81)	2093	0.86	0.511 (0.311)	13.73 (2.71)	181 (83)	51 (11)	28.64 (96.99)
8th Gear									
212.86 (158.73)	8719 (38.78)	9.16 (14.79)	2096	0.81	0.520 (0.316)	13.50 (2.66)	185 (83)	51 (11)	28.64 (96.99)

**DRAWBAR PERFORMANCE AT 2050 RPM
MAXIMUM POWER IN SELECTED GEARS**

Power Hp (kW)	Drawbar pull lbs (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									
213.58 (159.27)	35502 (157.92)	2.26 (3.63)	2064	13.21	0.537 (0.327)	13.09 (2.58)	178 (81)	47 (8)	28.60 (96.85)
2nd Gear									
239.96 (178.94)	23603 (104.99)	3.81 (6.14)	2054	2.28	0.477 (0.290)	14.71 (2.90)	180 (82)	47 (8)	28.60 (96.85)
3rd Gear									
241.42 (180.03)	20197 (89.84)	4.48 (7.21)	2055	1.86	0.474 (0.289)	14.80 (2.92)	180 (82)	49 (9)	28.62 (96.92)
4th Gear									
240.14 (179.07)	17492 (77.81)	5.15 (8.29)	2055	1.34	0.477 (0.290)	14.74 (2.90)	181 (83)	50 (10)	28.64 (96.99)
5th Gear									
237.33 (176.97)	15073 (67.05)	5.90 (9.50)	2049	1.18	0.483 (0.294)	14.53 (2.86)	182 (83)	51 (11)	28.64 (96.99)
6th Gear									
233.00 (173.75)	12881 (57.30)	6.78 (10.92)	2042	1.02	0.495 (0.301)	14.19 (2.80)	182 (83)	51 (11)	28.64 (96.99)
7th Gear									
228.92 (170.71)	11035 (49.08)	7.78 (12.52)	2045	0.97	0.502 (0.306)	13.98 (2.75)	182 (83)	51 (11)	28.64 (96.99)
8th Gear									
224.18 (167.17)	9383 (41.74)	8.96 (14.42)	2052	0.81	0.509 (0.310)	13.81 (2.72)	182 (83)	51 (11)	28.64 (96.99)

TRACTOR SOUND LEVEL WITH CAB

dB(A)

At 75% load in 6th gear	75.5
Bystander	NA

TIRES, BALLAST AND WEIGHT

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

Tested Without Ballast

NA
 NA
 18.0 in (455 mm)
 NA
 NA
 35400 lb (16057 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 of the injection pump return was maintained at 182° F (83°C). This tractor did not meet manufacturers claim of 27 GPM (103.5 l/min) hydraulic flow. Fans were used to cool the PTO reduction box gearbox during the PTO test sequence. The performance figures on this summary were taken from a test conducted under the OECD Code II restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1706**, Summary 201 April 17, 1996.

LOUIS I. LEVITICUS
 Engineer-in-Charge

L.L. BASHFORD
 R.D. GRISSO
 M.L. KOCHER

Board of Tractor Test Engineers

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

Quick Attach: None

Maximum Force Exerted Through Whole Range: 13086 lbs (58.2 kN)

i) Opening pressure of relief valve: NA

Sustained pressure of the open relief valve: 2790 psi (192 bar)

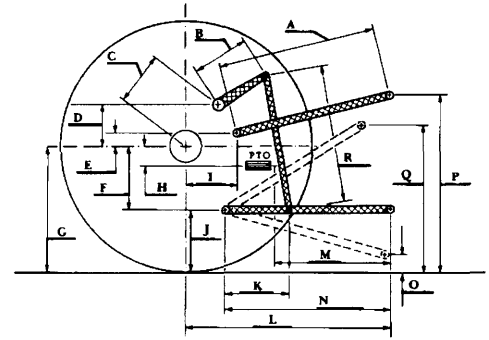
ii) Pump delivery rate at minimum pressure: 25.7 GPM (97.3 l/min)

iii) Pump delivery rate at maximum

hydraulic power: 21.3 GPM (80.6 l/min)

Delivery pressure: 2640 psi (182 bar)

Power: 32.8 HP (24.5 kW)



THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar) 2720 (187)

Location lift cylinder

Hydraulic oil Temperature °F (°C) 146 (63)

Location hydraulic reservoir

Category III

Quick Attach no

Hitch point distance

to ground level in. (mm) 10.2 (259) 16.0 (406) 24.0 (610) 32.0 (813) 40.0 (1016)

Lift force on frame lb. 30015 28818 24471 20376 15084

" " " " (kN) (133.5) (128.2) (108.9) (90.6) (67.1)

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	38.7	984
R	26.1	663

*PTO is above rear axle



CATERPILLAR CHALLENGER 65D DIESEL

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