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January 1998

Test 1748: Caterpillar Challenger 65E Diesel 10-Speed

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 1748—SUMMARY 264

CATERPILLAR CHALLENGER 65E 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—1022 rpm)					
276.87 (206.46)	2100	15.24 (57.68)	0.389 (0.236)	18.17 (3.58)	
Standard Power Take-off Speed (1000 rpm)					
285.92 (213.21)	2054	15.53 (58.79)	0.384 (0.233)	18.41 (3.63)	
Maximum Power (2 hours)					
308.98 (230.40)	1900	16.37 (61.97)	0.374 (0.228)	18.87 (3.72)	

VARYING POWER AND FUEL CONSUMPTION

276.87 (206.46)	2100	15.24 (57.68)	0.389 (0.236)	18.17 (3.58)	Air temperature
242.82 (181.07)	2165	13.80 (52.26)	0.402 (0.244)	17.59 (3.47)	
189.20 (141.09)	2248	11.72 (44.38)	0.438 (0.266)	16.14 (3.18)	Relative humidity
129.13 (96.29)	2302	9.26 (35.05)	0.506 (0.308)	13.95 (2.75)	
64.56 (48.15)	2302	6.41 (24.28)	0.702 (0.427)	10.07 (1.98)	Barometer
1.07 (0.80)	2302	3.82 (14.47)	25.300 (15.389)	0.28 (0.05)	

Maximum Torque 949 lb.-ft. (1287 Nm) at 1200 rpm

Maximum Torque Rise 37.2%

Torque rise at 1700 rpm 29%

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									
248.00 (184.94)	20425 (90.85)	4.55 (7.33)	2100	1.77	0.433 (0.264)	16.30 (3.21)	189 (87)	66 (19)	28.72 (97.26)
75% of Pull at Maximum Power—3rd Gear									
196.11 (146.24)	15358 (68.32)	4.79 (7.71)	2194	1.19	0.468 (0.285)	15.09 (2.97)	189 (87)	65 (18)	28.85 (97.70)
50% of Pull at Maximum Power—3rd Gear									
136.86 (102.06)	10214 (45.43)	5.02 (8.09)	2294	0.76	0.553 (0.336)	12.78 (2.52)	188 (87)	69 (21)	28.82 (97.60)
75% of Pull at Reduced Engine Speed—5th Gear									
196.35 (146.42)	15315 (68.12)	4.81 (7.74)	1680	1.24	0.416 (0.253)	16.97 (3.34)	190 (88)	66 (19)	28.83 (97.63)
50% of Pull at Reduced Engine Speed—5th Gear									
136.61 (101.87)	10224 (45.48)	5.01 (8.06)	1744	0.81	0.467 (0.284)	15.13 (2.98)	189 (87)	71 (22)	28.82 (97.60)

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

Dates of Test: May 5-June 2, 1998

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) 0.8483 Fuel weight 7.063 lbs/gal (0.846 kg/l) Oil SAE 15W40 API service classification CG-4, Transmission and final drive lubricant SAE 30W API CD/TO-2 fluid Hydraulic lubricant Caterpillar CXP fluid Total time engine was operated 20.0 hours.

ENGINE: Make Caterpillar Diesel Type six cylinder vertical with turbocharger and air to air intercooler Serial No. *7ZR00556* Crankshaft lengthwise Rated engine speed 2100 Bore and stroke (as specified) 4.92" x 5.51" (125 mm x 140 mm) Compression ratio 16 to 1 Displacement 629 cu in (10308 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, radiator for transmission oil, radiator for hydraulic oil and steering oil Fuel filter one cartridge and water separator Fuel cooler radiator for return fuel Muffler vertical Cooling medium temperature control thermostat.

ENGINE OPERATING PARAMETERS: Fuel rate: 101.0-111.6 lb/h (45.8-50.6 kg/h) High idle: 2260-2340 rpm Turbo boost nominal 14.1-18.7 psi (97-129 kPa) as measured 16.1 psi (111 kPa)

CHASSIS: Type tracklayer-rubber tracked Serial No. *6GS00201* 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 2.62 (4.22) second 3.96 (6.37) third 4.63 (7.45) fourth 5.30 (8.53) fifth 6.07 (9.77) sixth 6.99 (11.25) seventh 7.99 (12.86) eighth 9.16 (14.74) ninth 11.81 (19.01) tenth 17.81 (28.66) reverse 1.92 (3.09), 4.45 (7.15) 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 34195 lb (15510 kg)

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									
202.24 (150.81)	33284 (148.05)	2.28 (3.67)	2135	14.65	0.506 (0.308)	13.97 (2.75)	189 (87)	60 (16)	28.69 (97.16)
2nd Gear									
245.57 (183.12)	23827 (105.99)	3.86 (6.22)	2098	2.44	0.438 (0.266)	16.13 (3.18)	190 (88)	61 (16)	28.69 (97.16)
3rd Gear									
248.00 (184.94)	20425 (90.85)	4.55 (7.33)	2100	1.77	0.433 (0.264)	16.30 (3.21)	189 (87)	66 (19)	28.72 (97.26)
4th Gear									
248.22 (185.10)	17849 (79.39)	5.22 (8.39)	2096	1.45	0.435 (0.265)	16.24 (3.20)	190 (88)	67 (19)	28.72 (97.26)
5th Gear									
245.77 (183.27)	15352 (68.29)	6.00 (9.66)	2098	1.24	0.437 (0.266)	16.15 (3.18)	190 (88)	69 (21)	28.72 (97.26)
6th Gear									
244.86 (182.59)	13265 (59.01)	6.92 (11.14)	2097	0.98	0.439 (0.267)	16.09 (3.17)	189 (87)	59 (15)	28.84 (97.66)
7th Gear									
244.00 (181.95)	11567 (51.45)	7.91 (12.73)	2093	0.81	0.442 (0.269)	15.99 (3.15)	189 (87)	60 (16)	28.83 (97.63)
8th Gear									
239.58 (178.65)	9853 (43.83)	9.12 (14.68)	2101	0.76	0.450 (0.274)	15.69 (3.09)	189 (87)	62 (17)	28.84 (97.66)

DRAWBAR PERFORMANCE AT 1900 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									
201.77 (150.46)	33096 (147.22)	2.29 (3.68)	2136	14.36	0.507 (0.308)	13.93 (2.74)	189 (87)	60 (16)	28.69 (97.16)
2nd Gear									
266.39 (198.65)	29291 (130.29)	3.41 (5.49)	1904	5.05	0.431 (0.262)	16.40 (3.23)	190 (88)	62 (17)	28.69 (97.16)
3rd Gear									
272.74 (203.39)	25169 (111.96)	4.06 (6.54)	1902	3.11	0.422 (0.256)	16.75 (3.30)	190 (88)	67 (19)	28.72 (97.26)
4th Gear									
274.42 (204.63)	21910 (97.46)	4.70 (7.56)	1902	2.18	0.418 (0.255)	16.88 (3.33)	190 (88)	68 (20)	28.72 (97.26)
5th Gear									
277.70 (207.08)	19175 (85.29)	5.43 (8.74)	1905	1.61	0.412 (0.251)	17.14 (3.38)	191 (88)	64 (18)	28.85 (97.70)
6th Gear									
276.93 (206.51)	16562 (73.67)	6.27 (10.09)	1905	1.19	0.414 (0.252)	17.08 (3.36)	190 (88)	59 (15)	28.83 (97.63)
7th Gear									
276.74 (206.36)	14488 (64.44)	7.16 (11.53)	1899	1.03	0.414 (0.252)	17.06 (3.36)	190 (88)	61 (16)	28.84 (97.66)
8th Gear									
272.96 (203.55)	12442 (55.34)	8.23 (13.24)	1899	0.92	0.422 (0.257)	16.75 (3.30)	190 (88)	63 (17)	28.84 (97.66)

TRACTOR SOUND LEVEL WITH CAB

dB(A)

At 75% load in 6th gear	75.3
Bystander	

TRACKS, BALLAST AND WEIGHT

Track Width
Ballast—Cast iron—Front

Tested Without Ballast

30.0 in (760 mm)
None

Height of Drawbar
Static Weight with Operator

18.5 in (470 mm)
34360 lb (15585 kg)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments

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 temperature of the returned fuel was maintained at 147° F (64°C). Water was used to cool the PTO reduction box during the PTO test sequence. The performance figures on this summary were taken from a test conducted under the OECD Code II test procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1748**, Summary 264 June 23, 1998.

LEONARD L. BASHFORD
Director

M. F. KOCHER
R. D. GRISSO
G.J. HOFFMAN
Board of Tractor Test Engineers

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

Quick Attach: None

Maximum Force Exerted Through Whole Range:

11851 lbs (52.7 kN)

i) Opening pressure of relief valve:

NA

Sustained pressure with pump stalled:

2950 psi (203 bar)

ii) Pump delivery rate at minimum pressure and rated engine speed:

41.0 GPM (155.2 l/min)

iii) Pump delivery rate at maximum

hydraulic power:

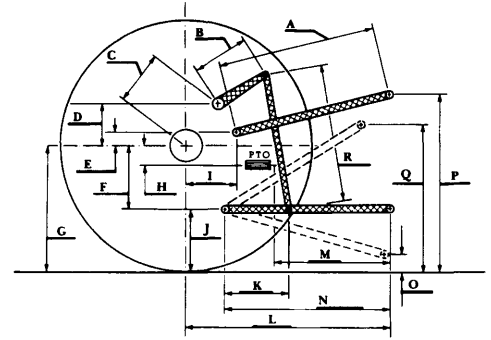
38.2 GPM (144.6 l/min)

Delivery pressure:

2660 psi (183 bar)

Power:

59.3 HP (44.2 kW)



THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar)

2880 (198)

Location

lift cylinder

Hydraulic oil Temperature °F (°C)

153 (67)

Location

pump inlet

Category

III

Quick Attach

none

Hitch point distance

to ground level in. (mm)

11.1 (282)

16.0 (406)

24.0 (610)

32.0 (813)

40.3 (1024)

Lift force on frame lb.

28587

25231

22017

18300

14583

" " " " (kN)

(127.2)

(112.2)

(97.9)

(81.4)

(64.9)

HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	26.5	673
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	9.3	236
P	47.0	1194
Q	37.5	952
R	25.6	651

*PTO is above rear axle



CATERPILLAR CHALLENGER 65E DIESEL

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University of Nebraska-Lincoln
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