

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F.
Larsen

January 1991

Test 1553: Caterpillar Challenger 65B and 65C Diesel 10-Speed

Tractor Museum

University of Nebraska-Lincoln, TractorMuseumArchives@unl.edu

Follow this and additional works at: <http://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Applied Mechanics Commons](#)

Museum, Tractor, "Test 1553: Caterpillar Challenger 65B and 65C Diesel 10-Speed" (1991). *Nebraska Tractor Tests*. 1963.
<http://digitalcommons.unl.edu/tractormuseumlit/1963>

This Article is brought to you for free and open access by the Tractor Test and Power Museum, The Lester F. Larsen at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Tractor Tests by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

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)	
VARYING POWER AND FUEL CONSUMPTION					
245.20 (182.85)	2100	15.16 (57.39)	0.432 (0.263)	16.17 (3.19)	Air temperature 77°F (25°C)
215.24 (160.50)	2166	13.86 (52.47)	0.450 (0.274)	15.53 (3.06)	Relative humidity 35%
164.34 (122.55)	2208	11.33 (42.99)	0.482 (0.293)	14.50 (2.86)	Barometer 29.07" Hg (98.44 kPa)
111.22 (82.94)	2249	8.74 (33.46)	0.558 (0.339)	12.52 (2.47)	
56.36 (42.03)	2279	6.52 (24.68)	0.809 (0.492)	8.64 (1.70)	
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)	NA
Front Tires —No., size, ply & psi (kPa)	NA
Height of Drawbar	16.5 in (420 mm)
Static Weight with operator — Rear	
— Front	
— Total	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.	30640	28060	23600	19350	13680
" " " " " " (kN)	(136.3)	(124.8)	(105.0)	(86.1)	(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:

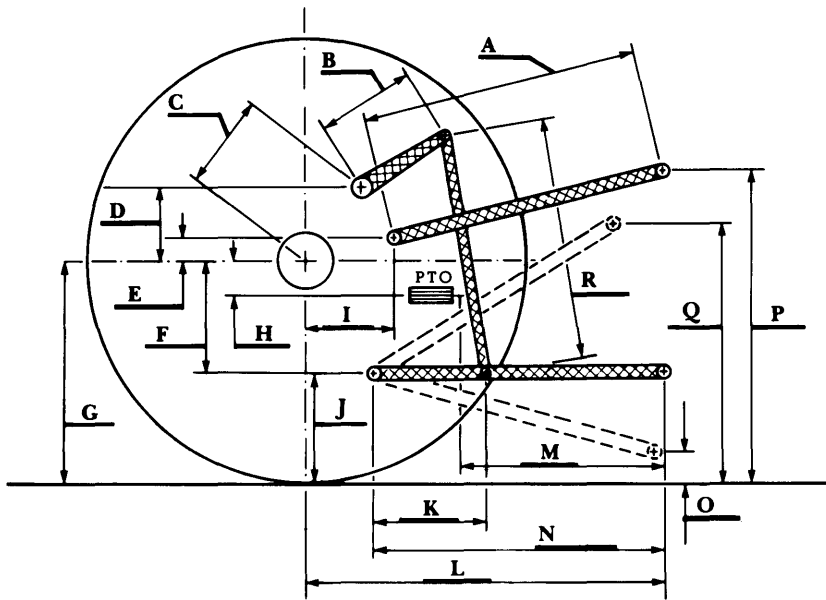
23.6 GPM(89.3 l/min)

Delivery pressure:

2280 psi (157 bar)

Power:

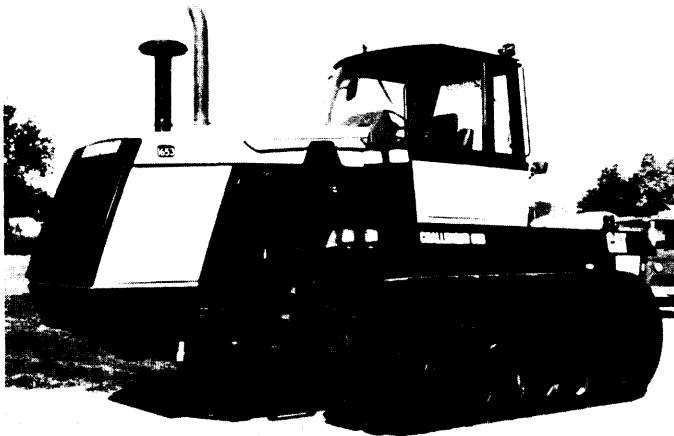
31.4 HP (23.4 kW)



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