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## Test 1654: Caterpillar Challenger 75 and 75C Diesel 10-Speed

Nebraska Tractor Test Lab

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# NERASKA OECD TRACTOR TEST 1654—SUMMARY 099

## CATERPILLAR CHALLENGER 75 DIESEL

## ALSO CATERPILLAR CHALLENGER 75C 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
<b>MAXIMUM POWER AND FUEL CONSUMPTION</b>					
<b>* Rated Engine Speed—(PTO speed—1024 rpm)</b>					
281.36 (209.81)	2099	15.61 (59.07)	0.388 (0.236)	18.03 (3.55)	
<b>Maximum Power (2 Hours)</b>					
301.85 (225.09)	1949	16.17 (61.19)	0.374 (0.228)	18.67 (3.68)	
<b>Standard Power Take-off Speed (1000 rpm)</b>					
285.55 (212.94)	2050	15.69 (59.38)	0.384 (0.234)	18.20 (3.59)	

### VARYING POWER AND FUEL CONSUMPTION

281.36 (209.81)	2099	15.61 (59.07)	0.388 (0.236)	18.03 (3.55)	Air temperature  75°F (24°C)
244.31 (182.18)	2145	13.95 (52.80)	0.399 (0.243)	17.52 (3.45)	
187.68 (139.96)	2194	11.50 (43.54)	0.428 (0.261)	16.32 (3.21)	Relative humidity  43%
127.82 (95.31)	2242	9.06 (34.28)	0.495 (0.301)	14.11 (2.78)	
65.25 (48.66)	2294	6.61 (25.02)	0.708 (0.431)	9.87 (1.94)	Barometer  28.87" Hg (97.75 kPa)
0.80 (0.60)	2299	3.99 (15.11)	34.842 (21.194)	0.20 (0.04)	

Maximum Torque 960 lb.-ft (1301 Nm) at 1352 rpm  
Maximum Torque Rise 36.3%

### 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)
<b>Maximum Power—3rd Gear</b>									
251.01 (187.18)	20596 (91.62)	4.57 (7.36)	2096	1.91	0.437 (0.266)	15.98 (3.15)	188 (87)	68 (20)	29.08 (98.48)
<b>75% of Pull at Maximum Power—3rd Gear</b>									
194.93 (145.36)	15408 (68.54)	4.74 (7.64)	2162	1.28	0.461 (0.281)	15.15 (2.98)	187 (86)	80 (27)	29.06 (98.41)
<b>50% of Pull at Maximum Power—3rd Gear</b>									
133.91 (99.86)	10257 (45.63)	4.90 (7.88)	2222	0.81	0.537 (0.326)	13.03 (2.57)	189 (87)	80 (27)	29.06 (98.41)
<b>75% of Pull at Reduced Engine Speed—4th Gear</b>									
194.64 (145.14)	15401 (68.51)	4.74 (7.63)	1889	1.28	0.442 (0.269)	15.81 (3.11)	188 (87)	80 (27)	29.06 (98.41)
<b>50% of Pull at Reduced Engine Speed—4th Gear</b>									
133.65 (99.66)	10272 (45.69)	4.88 (7.85)	1937	1.02	0.499 (0.304)	14.00 (2.76)	187 (86)	80 (27)	29.06 (98.41)

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

**Dates of Test:** October 4-11, 1991

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

**FUEL OIL and TIME:** Fuel No. 2 Diesel Cetane  
No. 53.9 Specific gravity converted to 60°/60°F  
(15°/15°C) 0.8396 Fuel weight 6.990 lbs/gal (0.838  
kg/l) Oil SAE 10W30 API service classification  
CE, CD, SF To motor 7.246 gal (27.428 l) Drained  
from motor 6.770 gal (25.628 l) Transmission and  
final drive lubricant SAE 30W API CD/TO-2 fluid  
Hydraulic lubricant SAE 30W API CD/TO-2 fluid  
Total time engine was operated 19.5 hours.

**ENGINE:** Make Caterpillar Diesel Type six cyl-  
inder vertical with turbocharger and air to air  
intercooler Serial No. \*43Z00251\* Crankshaft  
lengthwise Rated rpm 2100 Bore and stroke (as  
specified) 4.92" × 5.5" (125 mm × 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 aspi-  
rator 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  
oil Fuel filter one paper cartridge and screen Muf-  
fler underhood Exhaust vertical Cooling medium  
temperature control thermostat.

**ENGINE OPERATING PARAMETERS:** Fuel  
rate 99.3-109.8 lb/hr (45.1-50.0 kg/hr) High idle  
2260-2340 rpm Turbo boost nominal 12.8-16.8 psi  
(88-116 kPa) as measured 14.5 psi (100 kPa).

**CHASSIS:** Type track layer-rubber track Serial  
No. \*4CJ00356\* Tread width 84.6" (2150 mm)  
Length of track on ground 107.6" (2733 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 power operated by foot pedal Steering  
differential steering hydrostatically actuated by  
steering wheel Power take-off 1000 rpm at 2050  
engine rpm Unladen tractor mass 34370 lb (15590  
kg).

**REPAIRS AND ADJUSTMENTS:** No repairs  
or adjustments.

## DRAWBAR PERFORMANCE AT 1950 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									
208.00 (155.10)	33931 (150.93)	2.30 (3.70)	2128	14.19	0.512 (0.312)	13.64 (2.69)	186 (85)	58 (14)	29.17 (98.78)
2nd Gear									
256.30 (191.12)	27273 (121.32)	3.52 (5.67)	1946	4.70	0.441 (0.268)	15.86 (3.12)	189 (87)	77 (25)	29.08 (98.48)
3rd Gear									
266.17 (198.49)	23706 (105.45)	4.21 (6.78)	1948	2.79	0.427 (0.260)	16.38 (3.23)	188 (87)	69 (21)	29.08 (98.48)
4th Gear									
267.76 (199.67)	20684 (92.01)	4.85 (7.81)	1947	1.81	0.423 (0.257)	16.52 (3.25)	189 (87)	65 (18)	29.08 (98.48)
5th Gear									
266.02 (198.37)	17797 (79.16)	5.61 (9.02)	1951	1.55	0.426 (0.259)	16.40 (3.23)	189 (87)	58 (14)	29.08 (98.48)
6th Gear									
263.00 (196.12)	15263 (67.89)	6.46 (10.40)	1949	1.12	0.429 (0.261)	16.28 (3.21)	189 (87)	61 (16)	29.08 (98.48)
7th Gear									
262.57 (195.80)	13264 (59.00)	7.42 (11.95)	1955	1.07	0.434 (0.264)	16.09 (3.17)	191 (88)	69 (21)	29.08 (98.48)
8th Gear									
257.97 (192.37)	11379 (50.61)	8.50 (13.68)	1950	0.97	0.437 (0.266)	16.00 (3.15)	191 (88)	73 (23)	29.08 (98.48)

## 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									
210.22 (156.76)	34309 (152.61)	2.30 (3.70)	2125	14.07	0.514 (0.313)	13.59 (2.68)	186 (85)	53 (12)	29.17 (98.78)
2nd Gear									
244.68 (182.45)	23724 (105.53)	3.87 (6.22)	2097	3.00	0.449 (0.273)	15.57 (3.07)	188 (86)	75 (24)	29.08 (98.48)
3rd Gear									
251.01 (187.18)	20596 (91.62)	4.57 (7.36)	2096	1.91	0.437 (0.266)	15.98 (3.15)	188 (87)	68 (20)	29.08 (98.48)
4th Gear									
250.56 (186.84)	17871 (79.49)	5.26 (8.46)	2097	1.39	0.442 (0.269)	15.81 (3.11)	188 (86)	63 (17)	29.08 (98.48)
5th Gear									
246.30 (183.67)	15282 (67.98)	6.04 (9.73)	2099	1.28	0.447 (0.272)	15.64 (3.08)	188 (86)	57 (14)	29.10 (98.54)
6th Gear									
243.43 (181.52)	13105 (58.29)	6.97 (11.21)	2098	1.07	0.455 (0.277)	15.37 (3.03)	188 (87)	60 (16)	29.09 (98.51)
7th Gear									
241.00 (179.71)	11323 (50.37)	7.98 (12.84)	2100	0.91	0.458 (0.279)	15.26 (3.01)	190 (88)	69 (21)	29.08 (98.48)
8th Gear									
236.06 (176.03)	9657 (42.96)	9.17 (14.75)	2100	0.86	0.463 (0.282)	15.09 (2.97)	190 (88)	71 (22)	29.08 (98.48)

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—4th Gear	78.5
75% of pull at maximum power—4th Gear	78.0
50% of pull at maximum power—4th Gear	76.5
50% of pull at reduced engine speed—5th Gear	74.5
Bystander (10th Gear)	93.5

#### TIRES 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
16.5 in (420 mm)
NA
NA
34535 lb (15665 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 for the returned fuel was maintained at 153° F (67° C). The performance figures on this summary were taken from a test conducted under the OECD Code II restricted standard test code procedure.

Report reissued: Supplemental sales permit for Caterpillar Challenger 75C Diesel, January, 1993.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1654**, Summary 099, February 10, 1992.

LOUIS I. LEVITICUS

Engineer-in-Charge

L. L. BASHFORD

R. D. GRISIO

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:

2470 psi (170 bar)

ii) Pump delivery rate at minimum pressure:

27.4 GPM (103.7 l/min)

iii) Pump delivery rate at maximum

hydraulic power:

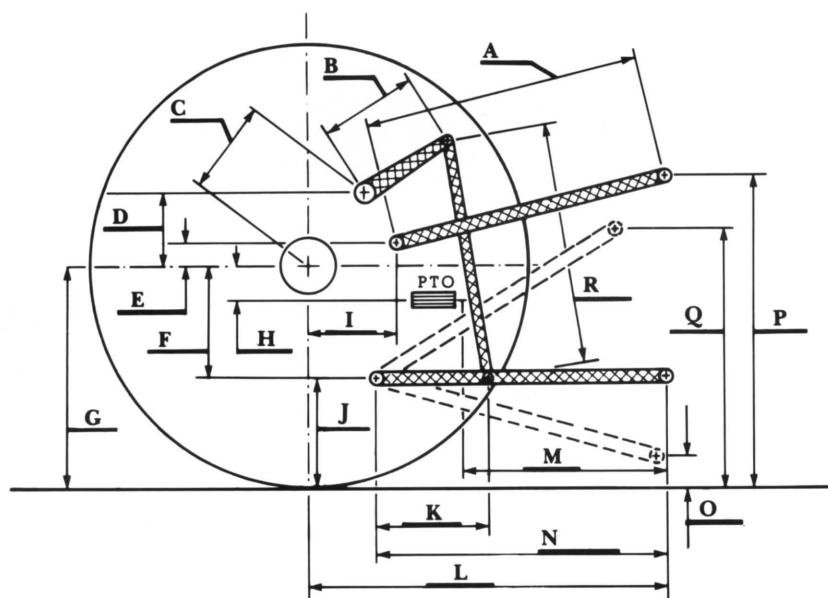
23.9 GPM (90.5 l/min)

Delivery pressure:

2320 psi (160 bar)

Power:

32.4 Hp (24.1 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 75 Diesel

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