

# NEBRASKA OECD TRACTOR TEST 1997–SUMMARY 778

## VERSATILE 305 DIESEL

### 16 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—1104 rpm)</b>					
255.79 (190.74)	2101	16.20 (61.32)	0.447 (0.272)	15.79 (3.11)	
<b>Maximum Power (1 hour)</b>					
314.39 (234.44)	1949	17.86 (67.60)	0.401 (0.244)	17.61 (3.47)	
<b>Standard Power Take-off Speed (1000 rpm)</b>					
313.79 (233.99)	1904	17.68 (66.92)	0.398 (0.242)	17.75 (3.50)	

#### VARYING POWER AND FUEL CONSUMPTION

255.79 (190.74)	2101	16.20 (61.32)	0.447 (0.272)	15.79 (3.11)	Air temperature
221.29 (165.02)	2138	15.38 (58.22)	0.490 (0.298)	14.39 (2.83)	74°F (23°C)
168.59 (125.71)	2172	13.10 (49.60)	0.549 (0.334)	12.87 (2.53)	Relative humidity
113.30 (84.49)	2192	10.71 (40.53)	0.667 (0.406)	10.58 (2.08)	64%
57.65 (42.99)	2226	7.20 (27.25)	0.881 (0.536)	8.01 (1.58)	Barometer
5.18 (3.86)	2248	4.67 (17.67)	6.364 (3.871)	1.11 (0.22)	28.36" Hg (96.04 kPa)

Maximum torque - 944 lb.-ft. (1280 Nm) at 1450 rpm

Maximum torque rise - 47.6%

Torque rise at 1699 engine rpm - 43%

Power increase at 1949 engine rpm - 22.9%

#### DRAWBAR PERFORMANCE

##### UNBALLASTED - FRONT DRIVE ENGAGED 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	Barom. inch Hg (kPa)
<b>Maximum Power—7th Gear</b>								
210.50 (156.97)	15385 (68.43)	5.13 (8.26)	2100	6.4	0.548 (0.333)	12.89 (2.54)	185 (85)	65 (19)
<b>75% of Pull at Maximum Power—7th Gear</b>								
165.20 (123.19)	11591 (51.56)	5.35 (8.60)	2145	4.4	0.624 (0.379)	11.32 (2.23)	184 (84)	69 (21)
<b>50% of Pull at Maximum Power—7th Gear</b>								
113.90 (84.93)	7725 (34.36)	5.53 (8.89)	2179	2.8	0.745 (0.453)	9.48 (1.87)	182 (83)	72 (22)
<b>75% of Pull at Reduced Engine Speed—9th Gear</b>								
165.32 (123.28)	11543 (51.34)	5.38 (8.65)	1499	4.3	0.521 (0.317)	13.56 (2.67)	187 (86)	69 (21)
<b>50% of Pull at Reduced Engine Speed—9th Gear</b>								
114.05 (85.05)	7771 (34.56)	5.50 (8.85)	1512	2.8	0.554 (0.337)	12.73 (2.51)	182 (83)	71 (22)

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

**Dates of tests:** June 21 - 24, 2011

**Manufacturer:** Versatile, Canada

**FUEL, OIL and TIME:** Fuel No. 2 Diesel Specific gravity converted to 60°/60°F (15°/15°C) 0.8476 Fuel weight 7.057 lbs/gal (0.846 kg/l) Oil SAE 15W40 API service classification CI-4 Transmission and hydraulic lubricant New Holland Multi-Tran fluid Front axle lubricant SAE 85W-140 API GL-5 Total time engine was operated: 20.0 hours

**ENGINE: Make** Cummins Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** \*73082277\* **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** 4.488" x 5.315" (114.0 mm x 135.0 mm) **Compression ratio** 17.5 to 1 **Displacement** 505 cu in (8268 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 hydraulic and transmission oil **Fuel filter** two paper elements **Fuel cooler** radiator for pump return fuel **Muffler** vertical **Cooling medium** temperature control thermostat and variable speed fan

**ENGINE OPERATING PARAMETERS: Fuel rate:** 112.0-118.0 lb/h (51.4 - 56.6 kg/h) **High idle:** 2240-2260 rpm **Turbo boost:** nominal 22.5 - 25.4 psi (155 - 175 kPa) as measured 24.0 psi (165 kPa)

**CHASSIS: Type** front wheel assist **SerialNo.** \*505327\*305\* **Tread width** rear 60.0" (1524 mm) to 132.0" (3355 mm) front 60.0" (1524 mm) to 88.0" (2235 mm) **Wheelbase** 125.4" (3185 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 1.79 (2.89) second 2.16 (3.47) third 2.58 (4.15) fourth 3.09 (4.98) fifth 3.72 (5.98) sixth 4.44 (7.15) seventh 5.36 (8.62) eighth 6.41 (10.32) ninth 7.69 (12.38) tenth 9.20 (14.80) eleventh 11.02 (17.75) twelfth 13.23 (21.29) thirteenth 15.82 (25.47) fourteenth 19.10 (30.73) fifteenth 22.91 (36.87) sixteenth 27.42 (44.13) reverse 2.23 (3.59), 2.67 (4.30), 3.20 (5.15), 3.83 (6.17), 4.60 (7.40), 5.50 (8.85), 6.64 (10.69), 7.97 (12.82), 9.53 (15.34) **Clutch** multiple wet disc electrohydraulically operated by foot pedal **Brakes** wet disc hydraulically operated by two foot pedals that can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 1880 engine rpm or 1000 rpm at 1904 engine rpm **Unladen tractor mass** 22160 lb (10052 kg)

**DRAWBAR PERFORMANCE @ 2100 ENGINE RPM**  
**UNBALLASTED - FRONT DRIVE ENGAGED**  
**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)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)	
5th Gear									
173.55 (129.41)	19358 (86.11)	3.36 (5.41)	2139	13.1	0.658 (0.400)	10.73 (2.11)	183 (84)	65 (18)	28.59 (96.82)
6th Gear									
201.04 (149.92)	18587 (82.68)	4.06 (6.53)	2099	10.6	0.577 (0.351)	12.23 (2.41)	187 (86)	65 (18)	28.58 (96.78)
7th Gear									
210.50 (156.97)	15385 (68.43)	5.13 (8.26)	2100	6.4	0.548 (0.333)	12.89 (2.54)	185 (85)	65 (19)	28.59 (96.82)
8th Gear									
210.42 (156.91)	12631 (56.19)	6.25 (10.06)	2098	4.9	0.549 (0.334)	12.85 (2.53)	186 (85)	66 (19)	28.60 (96.85)
9th Gear									
206.50 (153.98)	10257 (45.62)	7.55 (12.15)	2098	3.8	0.562 (0.342)	12.55 (2.47)	185 (85)	67 (19)	28.60 (96.85)
10th Gear									
209.13 (155.95)	8607 (38.29)	9.11 (14.66)	2099	3.2	0.553 (0.336)	12.77 (2.52)	186 (85)	67 (20)	28.60 (96.85)

**REPAIRS AND ADJUSTMENTS:** A shim was added to the 3 point lift pressure control valve before the lift test.

**REMARKS:** All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. An oil leak was noted from the left rear axle seal. Tests continued without repair. For the maximum power tests the fuel temperature at the fuel pump inlet was maintained at 147°F (64°C). The performance results on this summary were taken from OECD tests conducted under the Code 2 Test Procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1997**, Nebraska Summary 778, July 6, 2011.

Roger M. Hoy  
 Director

M.F. Kocher  
 D.R. Keshwani  
 P.J. Jasa  
 Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 6th gear	78.0	78.0
Bystander in 16th gear		83.0

TIRES, BALLAST AND WEIGHT	With Ballast	Without Ballast
	<b>Rear Tires</b> -No., size, ply & psi (kPa)	Four 520/85R46;***;10(70)
<b>Ballast</b> - Duals (total)	2090 lb (948 kg)	None
- Cast Iron (total)	1760 lb (798 kg)	None
<b>Front Tires</b> -No., size, ply & psi (kPa)	Four 380/80R38;***;16(110)	Two 380/80R38;***;20(140)
<b>Ballast</b> - Duals (total)	1260 lb (571 kg)	None
- Cast Iron (total)	3445 lb (1563 kg)	None
<b>Height of Drawbar</b>	24.5 in (620 mm)	24.5 in (620 mm)
<b>Static Weight with operator</b> - Rear	17930 lb (8133 kg)	14615 lb (6629 kg)
- Front	12960 lb (5878 kg)	7720 lb (3502 kg)
- Total	30890 lb(14011 kg)	22335 lb(10131 kg)

**DRAWBAR PERFORMANCE @ 1950 ENGINE RPM**  
**UNBALLASTED - FRONT DRIVE ENGAGED**  
**MAXIMUM POWER IN SELECTED GEARS**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel lb/hp.hr (kg/kW.h)	Consumption Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
5th Gear									
173.93 (129.70)	19348 (86.06)	3.37 (5.42)	2139	12.8	0.655 (0.398)	10.78 (2.12)	184 (84)	65 (18)	28.58 (96.78)
6th Gear									
201.14 (149.99)	18500 (82.29)	4.08 (6.57)	2101	10.1	0.576 (0.350)	12.26 (2.41)	186 (85)	65 (18)	28.59 (96.82)
7th Gear									
232.48 (173.36)	18086 (80.45)	4.82 (7.76)	2040	9.4	0.517 (0.314)	13.65 (2.69)	187 (86)	65 (19)	28.60 (96.85)
8th Gear									
254.90 (190.08)	16996 (75.60)	5.63 (9.05)	1950	7.9	0.496 (0.301)	14.24 (2.81)	192 (89)	66 (19)	28.60 (96.85)
9th Gear									
257.74 (192.19)	14018 (62.35)	6.90 (11.10)	1950	5.6	0.491 (0.299)	14.36 (2.83)	192 (89)	67 (19)	28.60 (96.85)
10th Gear									
261.03 (194.65)	11728 (52.17)	8.35 (13.44)	1950	4.5	0.484 (0.294)	14.58 (2.87)	192 (89)	68 (20)	28.60 (96.85)

**DRAWBAR PERFORMANCE @ 1950 ENGINE RPM**  
**BALLASTED - FRONT DRIVE ENGAGED**  
**MAXIMUM POWER IN SELECTED GEARS**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel lb/hp.hr (kg/kW.h)	Consumption Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
4th Gear									
203.08 (151.44)	27996 (124.53)	2.72 (4.38)	2083	13.2	0.578 (0.351)	12.21 (2.41)	190 (88)	74 (24)	28.73 (97.29)
5th Gear									
234.68 (175.00)	26647 (118.53)	3.31 (5.32)	2029	9.9	0.523 (0.318)	13.49 (2.66)	192 (89)	75 (24)	28.71 (97.22)
6th Gear									
253.97 (189.38)	24443 (108.73)	3.90 (6.28)	1949	7.4	0.500 (0.304)	14.12 (2.78)	194 (90)	76 (24)	28.70 (97.19)
7th Gear									
264.68 (197.37)	20587 (91.57)	4.83 (7.77)	1950	5.1	0.479 (0.291)	14.74 (2.90)	194 (90)	76 (25)	28.70 (97.19)
8th Gear									
263.64 (196.59)	16889 (75.12)	5.86 (9.42)	1951	4.1	0.482 (0.293)	14.63 (2.88)	193 (89)	77 (25)	28.71 (97.22)
9th Gear									
259.23 (193.31)	13786 (61.32)	7.05 (11.35)	1950	3.3	0.489 (0.297)	14.44 (2.84)	194 (90)	78 (26)	28.69 (97.16)
10th Gear									
259.53 (193.53)	11451 (50.94)	8.50 (13.67)	1950	2.6	0.491 (0.298)	14.39 (2.83)	194 (90)	77 (25)	28.69 (97.16)

## HYDRAULIC PERFORMANCE

CATEGORY: III

Quick Attach: Yes

OECD Static test

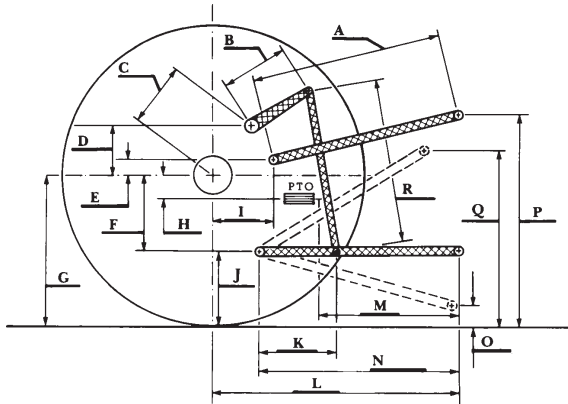
Maximum force exerted through whole range: 15791 lb (70.2 kN)

	<u>Hydraflow system</u>	<u>Hydraflow plus system</u>
i) Sustained pressure at compensator cutoff:	2873 psi (198 bar)	2881 psi (199 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	36.7 GPM (138.7 l/min)	58.1 GPM (220.0 l/min)
iii) Pump delivery rate at maximum hydraulic power:	33.4 GPM (126.3 l/min)	57.9 GPM (219.2 l/min)
Delivery pressure:	2119 psi (146 bar)	2409 psi (166 bar)
Power:	41.2 HP (30.8 kW)	81.4 Hp (60.7 kW)

### HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	29.2	743
B	15.0	380
C	19.2	487
D	20.7	395
E	15.6	206
F	12.8	324
G	37.4	950
H	3.0	75
I	23.3	591
J	24.6	626
K	19.8	503
L	52.6	1336
*L'	57.7	1466
M	29.4	746
N	36.5	926
O	9.0	230
P	48.9	1241
Q	40.6	1030
R	35.3	897

\*L' to Quick Attach ends



**VERSATILE 305 DIESEL**