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5-31-1985

## Test 1567: Versatile 836 Powershift Diesel 12-Speed

Nebraska Tractor Test Lab

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# NEBRASKA TRACTOR TEST 1567— VERSATILE 836 POWERSHIFT DIESEL 12 SPEED

## POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption			Temperature °F (°C)			Barometer inch Hg (kPa)
		gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cooling medium	Air wet bulb	Air dry bulb	
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed — Two hours (PTO Speed—997 rpm)								
181.04 (135.00)	2100	10.873 (41.158)	0.419 (0.255)	16.65 (3.281)	182 (83.5)	63 (17.0)	75 (24.0)	28.91 (97.62)
Reduced Engine Speed — One hour (PTO Speed—851 rpm)								
185.62 (138.42)	1793	10.295 (38.972)	0.387 (0.235)	18.03 (3.552)	184 (84.4)	63 (17.3)	75 (23.8)	28.92 (97.64)
VARYING POWER AND FUEL CONSUMPTION — Two Hours								
160.02 (119.33)	2183	10.228 (38.717)	0.446 (0.271)	15.65 (3.082)	180 (82.2)	64 (17.8)	76 (24.2)	..... .....
0.00 (0.00)	2322	3.676 (13.915)	..... .....	..... .....	177 (80.6)	62 (16.7)	72 (22.2)	..... .....
82.61 (61.61)	2260	7.399 (28.008)	0.625 (0.380)	11.17 (2.200)	179 (81.7)	64 (17.5)	75 (23.6)	..... .....
181.20 (135.12)	2100	11.212 (42.443)	0.432 (0.263)	16.16 (3.184)	183 (83.6)	64 (17.8)	75 (23.9)	..... .....
41.85 (31.21)	2288	5.245 (19.855)	0.875 (0.532)	7.98 (1.572)	177 (80.6)	63 (17.2)	74 (23.1)	..... .....
122.46 (91.32)	2227	9.076 (34.355)	0.517 (0.315)	13.49 (2.658)	180 (81.9)	64 (17.8)	75 (23.6)	..... .....
Av 98.02 Av (73.10)	2230	7.806 (29.549)	0.556 (0.338)	12.56 (2.474)	179 (81.8)	63 (17.5)	74 (23.4)	28.91 (97.64)

## DRAWBAR PERFORMANCE AT 2100 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption			Temp. °F (°C)			Barom. inch Hg (kPa)
					gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cool- ing med	Air wet bulb	Air dry bulb	
Maximum Available Power — Two Hours 7th Gear											
158.31 (118.05)	10765 (47.89)	5.51 (8.87)	2101	2.71	10.698 (40.496)	0.472 (0.287)	14.80 (2.915)	183 (83.9)	60 (15.3)	71 (21.4)	28.73 (97.02)
75% of Pull at Maximum Power — Ten Hours 7th Gear											
127.01 (94.71)	8204 (36.49)	5.81 (9.34)	2191	1.82	9.524 (36.053)	0.523 (0.318)	13.34 (2.627)	183 (83.9)	70 (21.2)	77 (25.2)	28.44 (96.02)
50% of Pull at Maximum Power — Two Hours 7th Gear											
86.91 (64.81)	5470 (24.33)	5.96 (9.59)	2230	1.08	7.731 (29.267)	0.621 (0.378)	11.24 (2.215)	182 (83.3)	74 (23.3)	86 (29.7)	28.61 (96.59)
50% of Pull at Reduced Engine Speed — Two Hours 10th Gear											
86.90 (64.80)	5472 (24.34)	5.96 (9.58)	1224	1.12	5.567 (21.075)	0.447 (0.272)	15.61 (3.075)	184 (84.2)	63 (17.2)	79 (26.1)	28.77 (97.15)
MAXIMUM POWER IN SELECTED GEARS											
134.54 (100.32)	24723 (109.97)	2.04 (3.28)	2131	14.72	2nd Gear			180 (82.2)	54 (12.2)	64 (17.8)	28.70 (96.92)
148.06 (110.41)	20850 (92.75)	2.66 (4.29)	2099	7.47	3rd Gear			181 (82.8)	56 (13.3)	67 (19.4)	28.73 (97.02)
157.19 (117.21)	17823 (79.28)	3.31 (5.32)	2099	5.74	4th Gear			184 (84.4)	72 (22.2)	83 (28.3)	28.62 (96.65)
160.81 (119.91)	14653 (65.18)	4.12 (6.62)	2099	4.02	5th Gear			184 (84.4)	71 (21.7)	81 (27.2)	28.63 (96.68)
156.34 (116.58)	11515 (51.22)	5.09 (8.19)	2099	3.02	6th Gear			184 (84.4)	71 (21.7)	81 (27.2)	28.62 (96.65)
160.71 (119.84)	10939 (48.66)	5.51 (8.87)	2099	2.86	7th Gear			184 (84.2)	69 (20.6)	79 (26.1)	28.62 (96.65)
161.45 (120.39)	8940 (39.77)	6.77 (10.90)	2097	2.16	8th Gear			183 (83.9)	70 (21.1)	81 (27.2)	28.62 (96.65)
153.26 (114.29)	6893 (30.66)	8.34 (13.42)	2099	1.52	9th Gear			184 (84.2)	71 (21.7)	81 (27.2)	28.62 (96.65)

Department of Agricultural Engineering

Dates of Test: May 7 to 31, 1985

**Manufacturer:** VERSATILE FARM EQUIPMENT COMPANY, 1260 Clarence Avenue, Winnipeg, Manitoba, Canada R3T 1T3

**FUEL, OIL AND TIME:** Fuel No. 2 Diesel Cetane No. 48.3 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F (15/15°C)** 0.8381 **Fuel weight** 6.978 lbs/gal (0.836 kg/l) **Oil** SAE 15W-40 **API service classification** SE, SF, CC, CD **To motor** 6.528 gal (24.711 l) **Drained from motor** 5.748 gal (21.758 l) **Transmission lubricant** Mobil Delvac 1330 **Final drive lubricant** SAE 85W140 **Total time engine was operated** 45.0 hours.

**ENGINE:** Make Cummins Diesel **Type** six cylinder vertical with turbocharger **Serial No.** 34514251 **Crankshaft** lengthwise **Rated rpm** 1750 to 2100 **Bore and stroke** 4.921" × 5.354" (125 mm × 136 mm) **Compression ratio** 16.0 to 1 **Displacement** 611 cu in (10010 ml) **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** one full flow cartridge and one bypass cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge **Muffler** vertical **Cooling medium** temperature control one thermostat.

**CHASSIS:** **Type** four wheel drive with duals **Serial No.** 836 85 217104 **Tread width** rear 62" (1575 mm) to 120.1" (3050 mm) front 62" (1575 mm) to 120.1" (3050 mm) **Wheel base** 129.9" (3300 mm) **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 74.0" (1880 mm) Vertical distance above roadway 41" (1041 mm) Horizontal distance from center of rear wheel tread 0" (0 mm) to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advised speeds mph (km/h)** first 1.9 (3.1) second 2.4 (3.8) third 2.9 (4.6) fourth 3.5 (5.6) fifth 4.3 (6.9) sixth 5.2 (8.4) seventh 5.7 (9.1) eighth 6.9 (11.2) ninth 8.4 (13.6) tenth 10.3 (16.6) eleventh 12.6 (20.2) twelfth 15.4 (24.8) reverse 2.3 (3.7), 2.8 (4.5), 3.4 (5.5) **Clutch** multiple wet disc hydraulically power actuated and operated by foot pedal **Brakes** caliper disc hydraulically actuated by foot pedal **Steering** hydrostatic and articulated **Turning radius** (on concrete surface without brake) right 236" (5.99 m) left 236" (5.99 m) **Turning space diameter** (on concrete surface without brake) right 490" (12.45 m) left 490" (12.45 m) **Power take-off** 997 rpm at 2100 engine rpm **Unladen tractor mass** 24280 lb (11013 kg).

### LUGGING ABILITY IN 7th GEAR

Crankshaft Speed rpm	2099	1885	1683	1473	1255	1046
Pull—lbs (kN)	10939 (48.66)	12599 (56.04)	13798 (61.38)	15068 (67.03)	15997 (71.16)	15027 (66.84)
Increase in Pull %	0	15	26	38	46	37
Power—Hp (kW)	160.71 (119.84)	165.31 (123.27)	160.89 (119.97)	152.92 (114.04)	137.73 (102.71)	108.11 (80.62)
Speed—Mph (km/h)	5.51 (8.87)	4.92 (7.92)	4.37 (7.04)	3.81 (6.12)	3.23 (5.20)	2.70 (4.34)
Slip %	2.86	3.41	3.87	4.32	4.63	4.48

TRACTOR SOUND LEVEL WITH CAB	1750 RPM dB(A)	1900 RPM dB(A)	2100 RPM dB(A)
Maximum Available Power—Two Hours	79.5	77.5	79.5
75% of Pull at Maximum Power—Ten Hours			79.5
50% of Pull at Maximum Power—Two Hours			79.0
50% of Pull at Reduced Engine Speed—Two Hours			71.5
Bystander in 12th gear			91.5

### DRAWBAR PERFORMANCE AT 1900 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool- ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power — Two Hours 7th Gear											
164.91 (122.98)	12454 (55.40)	4.97 (7.99)	1900	3.18	10.497 (39.737)	0.444 (0.270)	15.71 (3.095)	183 (83.9)	62 (16.4)	73 (22.8)	28.78 (97.19)

### MAXIMUM POWER IN SELECTED GEAR

167.47 (124.88)	12641 (56.23)	4.97 (8.00)	1901	3.18	7th Gear	183 (83.9)	62 (16.7)	74 (23.3)	28.78 (97.19)
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### DRAWBAR PERFORMANCE AT 1750 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool- ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power — Two Hours 7th Gear											
162.11 (120.88)	13345 (59.36)	4.56 (7.33)	1749	3.68	10.003 (37.865)	0.431 (0.262)	16.21 (3.192)	183 (83.9)	62 (16.7)	76 (24.2)	28.78 (97.17)

### MAXIMUM POWER IN SELECTED GEAR

165.05 (123.08)	13577 (60.39)	4.56 (7.34)	1750	3.56	7th Gear	183 (83.9)	62 (16.7)	76 (24.4)	28.77 (97.15)
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### TIRES, BALLAST AND WEIGHT

<b>Rear Tires</b>	—No., size, ply & psi (kPa)
<b>Ballast</b>	—Liquid (each inner) —Cast Iron (each)
<b>Front Tires</b>	—No., size, ply & psi (kPa)
<b>Ballast</b>	—Liquid (each inner) —Cast Iron (each)
<b>Height of Drawbar</b>	
<b>Static Weight with Operator—Rear</b>	
—Front	
—Total	

#### With Ballast

Four 18.4-38; 8; inner 14 (95) outer 12 (85)
262 lb (119 kg)
None
Four 18.4-38; 8; inner 14 (95) outer 12 (85)
505 lb (229 kg)
None
18 in (455 mm)
11055 lb (5014 kg)
14940 lb (6777 kg)
25995 lb (11791 kg)

#### Without Ballast

Four 18.4-38; 8; inner 14 (95) outer 12 (85)
None
None
Four 18.4-38; 8; inner 14 (95) outer 12 (85)
None
None
18 in (455 mm)
10530 lb (4776 kg)
13930 lb (6319 kg)
24460 lb (11095 kg)

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

**REMARKS:** All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump inlet was maintained at 120°F (48.8°C). Eight gears were chosen between 15% slip and 10 mph (16.1 km/h). Following the PTO test, one of the alternator belt guard bracket supports was found broken.

We, the undersigned, certify that this is as true and correct report of official Tractor Test No. **1567**, June 21, 1985.

LOUIS I. LEVITICUS

Engineer-in-Charge

K. VON BARGEN

L. L. BASHFORD

T. L. THOMPSON

Board of Tractor Test Engineers

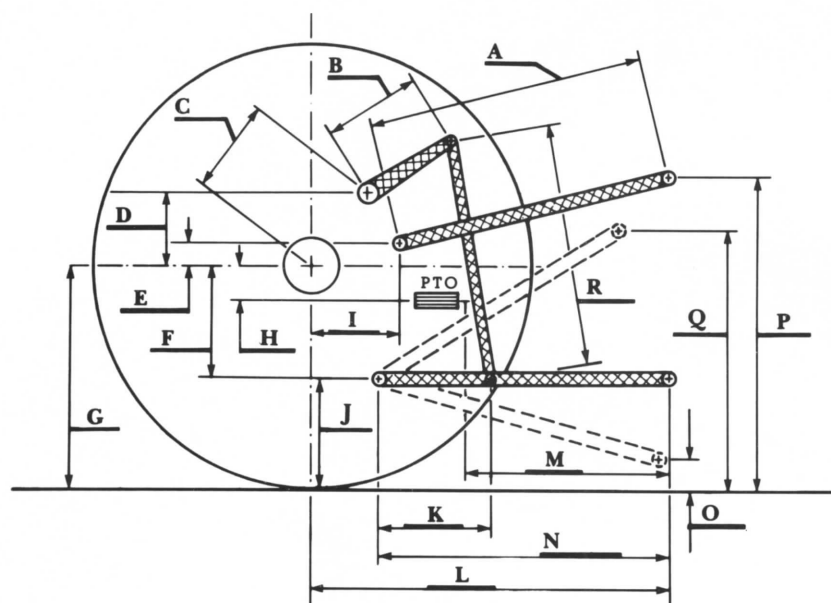
### THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	** 2575 (17750)	
Location	remote outlet	
Hydraulic oil temperature °F (°C)	121 (49)	
Location	pump inlet	
	Maximum Lift Capacity	Lift Capacity for Transport
QUICK ATTACH	yes	
CATEGORY	IV	*not measured
LOAD lbs (kg)	*** 12744 (5781)	
TIME sec	3.82	
HITCH POINT MOVEMENT in (mm)		
Lowest position	14.0 (356)	
*Top of timed range	44.0 (1118)	
Highest position	44.6 (1133)	
LOAD CG MOVEMENT in (mm)		
Lowest position	13.7 (348)	
Top of timed range	50.3 (1278)	
Highest position	51.7 (1313)	

\*Implement load capacity for transport purposes not specified by manufacturer.

\*\*The observed maximum pressure was outside the range specified by the manufacturer, 2400-2500 psi (16550-17240 kPa).

\*\*\*The manufacturer's claimed capacity was 21700 lbs (9840 kg).



Hitch Dimensions as Tested — No Load

	inch	mm
A	28.0	711
B	18.6	472
C	20.3	516
D	19.0	483
E	12.6	319
F	10.4	263
G	31.2	791
H	1.7	44
I	25.7	652
J	20.8	527
K	25.0	635
L	53.4	1356
L'	59.9	1521
M	27.9	708
N	43.0	1092
O	8.0	203
P	47.8	1213
Q	42.1	1070
R	32.5	826

L' to end of quick attach



Versatile 836 Powershift Diesel