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Test 1356: Versatile 835 Diesel 12-Speed

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1356 — VERSATILE 835 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—1009 rpm)								
198.23 (147.82)	2100	13.103 (49.601)	0.467 (0.284)	15.13 (2.980)	182 (83.5)	65 (18.1)	75 (23.8)	28.923 (97.670)
*	VARYING POWER AND FUEL CONSUMPTION—Two Hours							
174.33 (130.00)	2172	12.379 (46.859)	0.501 (0.305)	14.08 (2.774)	181 (82.8)	64 (17.8)	75 (23.9)	..... .....
0.00 (0.00)	2280	5.038 (19.072)	..... .....	..... .....	177 (80.6)	63 (17.2)	75 (23.9)	..... .....
89.25 (66.56)	2225	8.534 (32.306)	0.675 (0.411)	10.46 (2.060)	178 (81.4)	63 (17.2)	75 (23.9)	..... .....
197.64 (147.38)	2100	13.093 (49.561)	0.468 (0.285)	15.10 (2.974)	182 (83.6)	63 (17.2)	75 (23.9)	..... .....
44.98 (33.54)	2248	6.512 (24.652)	1.022 (0.622)	6.91 (1.361)	178 (80.8)	63 (17.2)	75 (23.9)	..... .....
132.31 (98.67)	2200	10.641 (40.282)	0.568 (0.345)	12.43 (2.449)	179 (81.7)	63 (17.2)	75 (23.9)	..... .....
Av 106.42 Av (79.36)	2204	9.366 (35.455)	0.622 (0.378)	11.36 (2.238)	179 (81.8)	63 (17.3)	75 (23.9)	28.993 (97.906)

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 (2-3) Gear											
171.41 (127.82)	10488 (46.65)	6.13 (9.86)	2100	3.32	13.027 (49.314)	0.537 (0.326)	13.16 (2.592)	182 (83.3)	62 (16.7)	72 (21.9)	29.035 (98.047)
75% of Pull at Maximum Power—Ten Hours 7th (2-3) Gear											
138.81 (103.51)	8048 (35.80)	6.47 (10.41)	2193	2.27	11.696 (44.276)	0.595 (0.362)	11.87 (2.338)	183 (83.6)	77 (25.0)	86 (29.9)	28.852 (97.429)
50% of Pull at Maximum Power—Two Hours 7th (2-3) Gear											
95.15 (70.95)	5397 (24.01)	6.61 (10.64)	2223	1.51	9.806 (37.120)	0.728 (0.443)	9.70 (1.911)	181 (82.3)	74 (23.3)	88 (30.8)	28.785 (97.203)
50% of Pull at Reduced Engine Speed—Two Hours 11th (3-3) Gear											
95.13 (70.94)	5373 (23.90)	6.64 (10.69)	1146	1.43	6.531 (24.724)	0.485 (0.295)	14.57 (2.869)	183 (83.9)	75 (23.9)	90 (31.9)	28.775 (97.169)
MAXIMUM POWER IN SELECTED GEARS											
157.96 (117.79)	26380 (117.34)	2.25 (3.61)	2102	14.16			1st (1-1) Gear	179 (81.7)	63 (17.2)	66 (18.9)	28.930 (97.692)
161.98 (120.79)	22702 (100.98)	2.68 (4.31)	2100	11.86			2nd (1-2) Gear	183 (83.9)	75 (23.9)	83 (28.3)	28.850 (97.422)
167.84 (125.16)	19786 (88.01)	3.18 (5.12)	2099	8.88			3rd (1-3) Gear	185 (84.7)	72 (22.2)	82 (27.8)	28.770 (97.152)
171.87 (128.16)	17012 (75.67)	3.79 (6.10)	2099	6.63			4th (1-4) Gear	185 (84.7)	71 (21.7)	80 (26.7)	28.770 (97.152)
175.28 (130.71)	14617 (65.02)	4.50 (7.24)	2100	5.17			5th (2-1) Gear	184 (84.4)	70 (21.1)	79 (26.1)	28.770 (97.152)
175.86 (131.14)	12513 (55.66)	5.27 (8.48)	2099	4.20			6th (2-2) Gear	184 (84.2)	71 (21.7)	80 (26.7)	28.760 (97.118)
179.07 (133.53)	10949 (48.70)	6.13 (9.87)	2100	3.13			7th (2-3) Gear	185 (85.0)	77 (25.0)	85 (29.4)	28.860 (97.456)
176.52 (131.63)	9261 (41.19)	7.15 (11.50)	2099	2.89			8th (2-4) Gear	186 (85.3)	72 (22.2)	83 (28.3)	28.770 (97.152)
174.23 (129.92)	7250 (32.25)	9.01 (14.50)	2098	2.19			9th (3-1) Gear	187 (85.8)	73 (22.8)	84 (28.9)	28.770 (97.152)

Department of Agricultural Engineering

Dates of Test: June 13-July 3, 1980

Manufacturer: VERSATILE MANUFACTURING CO., 1260 Clarence Avenue, Winnipeg, Manitoba Canada R3T 1T3

FUEL, OIL AND TIME: Fuel No. 2 Diesel Cetane No. 47.9 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° (15°/15°)** 0.8482 **Fuel weight** 7.062 lbs/gal (0.846 kg/l) **Oil SAE 30 API service classification** SB/SE-CA/CD **To motor** 7.913 gal (29.952 l) **Drained from motor** 6.208 gal (23.497 l) **Transmission and hydraulic lubricant** Esso Hydraul 56 or equivalent **Final drive lubricant** SAE 90 **Total time engine was operated** 70.5 hours

ENGINE Make Cummins Dsl **Type** six cylinder vertical with turbocharger **Serial No.** 10911188 **Crankshaft lengthwise** **Rated rpm** 2100 **Constant power range** 1750 to 2100 rpm **Bore and stroke** 5.5" × 6.0" (139.7 mm × 152.4 mm) **Compression ratio** 14.1 to 1 **Displacement** 855 cu in (14013 ml) **Starting system** 12 volt **Lubrication pressure** **Air cleaner** two paper elements with 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 cartridges **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type four wheel drive with duals **Serial No.** 835 80 034670 **Tread width** rear 72" (1829 mm) to 118" (2997 mm) front 72" (1829 mm) to 118" (2997 mm) **Wheel base** 130" (3302 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 84.0" (2134 mm) Vertical distance above roadway 42.0" (1067 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 **Advertised speeds mph (km/h)** first 2.6 (4.2) second 3.0 (4.9) third 3.5 (5.6) fourth 4.1 (6.6) fifth 4.7 (7.6) sixth 5.5 (8.9) seventh 6.3 (10.2) eighth 7.3 (11.8) ninth 9.2 (14.8) tenth 10.7 (17.2) eleventh 12.3 (19.8) twelfth 14.3 (23.0) reverse 3.4 (5.4), 3.9 (6.3), 4.5 (7.3), 5.2 (8.4) **Clutch** dual dry disc operated by foot pedal **Brakes** dual caliper disc hydraulically operated by foot pedal or mechanically by hand lever **Steering** hydrostatic and articulated **Turning radius** (on concrete surface without brake) right 239" (6.07 m) left 239" (6.07 m) **Turning space diameter** (on concrete surface without brake) right 490" (12.45 m) left 490" (12.45 m) **Power take-off** 1009 rpm at 2100 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

LUGGING ABILITY IN 7th (2-3) GEAR

Crankshaft Speed rpm	2100	1888	1682	1466	1257	1045
Pull—lbs (kN)	10949 (48.70)	13232 (58.86)	15237 (67.78)	16590 (73.80)	16531 (73.53)	15642 (69.58)
Increase in Pull %	0	21	39	52	51	43
Power—Hp (kW)	179.07 (133.53)	192.30 (143.40)	195.44 (145.74)	184.26 (137.40)	157.36 (117.34)	124.29 (92.68)
Speed—Mph (km/h)	6.13 (9.87)	5.45 (8.77)	4.81 (7.74)	4.17 (6.70)	3.57 (5.74)	2.98 (4.80)
Slip %	3.13	4.50	5.25	5.83	5.98	5.54

	2100 RPM dB(A)	1900 RPM dB(A)	1750 RPM dB(A)
TRACTOR SOUND LEVEL WITH CAB			
Maximum Available Power—Two Hours	81.5	80.5	81.0
75% of Pull at Maximum Power—Ten Hours	83.0	—	—
50% of Pull at Maximum Power—Two Hours	83.0	—	—
50% of Pull at Reduced Engine Speed—Two Hours	78.0	—	—
Bystander in 12th (3-4) gear	89.0	—	—

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 (2-3) Gear											
186.11 (138.78)	12714 (56.55)	5.49 (8.83)	1898	4.27	13.063 (49.448)	0.496 (0.302)	14.25 (2.807)	186 (85.5)	64 (17.5)	75 (23.6)	29.015 (97.979)

MAXIMUM POWER IN SELECTED GEAR

191.15 (142.54)	13083 (58.20)	5.48 (8.82)	1899	4.50	7th (2-3) Gear			184 (84.2)	69 (20.6)	76 (24.4)	28.750 (97.084)
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DRAWBAR PERFORMANCE AT 1750 RPM

Maximum Available Power—Two Hours 7th (2-3) Gear											
191.23 (142.60)	14299 (63.60)	5.02 (8.07)	1749	5.13	12.939 (48.979)	0.478 (0.291)	14.78 (2.911)	185 (85.0)	71 (21.4)	78 (25.6)	28.915 (97.642)

MAXIMUM POWER IN SELECTED GEARS

174.69 (130.27)	25638 (114.04)	2.56 (4.11)	1807	14.95	3rd (1-3) Gear			181 (82.5)	63 (17.2)	66 (18.9)	28.930 (97.692)
187.20 (139.59)	22957 (102.12)	3.06 (4.92)	1749	9.56	4th (1-4) Gear			181 (82.8)	63 (17.2)	66 (18.9)	28.930 (97.692)
189.84 (141.56)	19619 (87.27)	3.63 (5.84)	1750	8.05	5th (2-1) Gear			189 (86.9)	70 (21.1)	79 (26.1)	28.770 (97.152)
194.32 (144.90)	16958 (75.43)	4.30 (6.92)	1749	6.42	6th (2-2) Gear			188 (86.4)	71 (21.7)	80 (26.7)	28.760 (97.118)
195.90 (146.08)	14669 (65.25)	5.01 (8.06)	1749	5.17	7th (2-3) Gear			186 (85.3)	70 (21.1)	78 (25.6)	28.750 (97.084)
198.10 (147.72)	12647 (56.26)	5.87 (9.45)	1750	4.35	8th (2-4) Gear			188 (86.4)	72 (22.2)	83 (28.3)	28.770 (97.152)
198.32 (147.89)	10013 (44.54)	7.43 (11.95)	1746	3.13	9th (3-1) Gear			189 (86.9)	73 (22.8)	84 (28.9)	28.770 (97.152)
197.02 (146.91)	8499 (37.80)	8.69 (13.99)	1749	2.58	10th (3-2) Gear			188 (86.4)	73 (22.8)	85 (29.4)	28.770 (97.152)

TIRES, BALLAST AND WEIGHT

Rear Tires		—No., size, ply & psi (kPa)	With Ballast	Without Ballast
Ballast		—Liquid (each inner) —Cast Iron (each)	Four 18.4-38; 8; inner 16 (110) outer 14 (95) 655 lb (297 kg) None	Four 18.4-38; 8; inner 16 (110) outer 14 (95) None None
Front Tires		—No., size, ply & psi (kPa)	With Ballast	Without Ballast
Ballast		—Liquid (each inner) —Cast Iron (each)	Four 18.4-38; 8; inner 16 (110) outer 14 (95) 1205 lb (547 kg) None	Four 18.4-38; 8; inner 16 (110) outer 14 (95) None None
Height of Drawbar			17.5 in (445 mm)	17.5 in (445 mm)
Static Weight with Operator—Rear			10930 lb (4958 kg)	9620 lb (4364 kg)
Front			17070 lb (7743 kg)	14660 lb (6649 kg)
Total			28000 lb (12701 kg)	24280 lb (11013 kg)

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test code or official Nebraska test procedure. Temperature at injection pump return was 147°F (63.8°C). Nine gears were chosen between 15% slip and 10 mph (16.1 km/h).

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1356.

LOUIS I. LEVITICUS

Engineer-in Charge

G. W. STEINBRUEGGE, Chairman

W. E. SPLINTER

K. VON BARGEN

Board of Tractor Test Engineers



Versatile 835 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska—Lincoln
Roy G. Arnold, Director