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9-12-1984

## Test 1537: Ford TW-35 FWD Diesel and Ford 8830 Diesel 16-Speeds

Nebraska Tractor Test Lab

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# NEBRASKA TRACTOR TEST 1537—FORD TW-35 FWD DIESEL ALSO FORD 8830 DIESEL 16 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—1147 rpm)									
171.12 (127.60)	2200	10.166 (38.479)	0.414 (0.252)	16.83 (3.316)	198 (92.4)	64 (17.7)	75 (24.1)	29.13 (98.38)	
Standard Power Take-off Speed (1000 rpm)—One Hour									
162.55 (121.21)	1919	9.249 (35.007)	0.397 (0.241)	17.58 (3.463)	192 (88.7)	65 (18.2)	76 (24.4)	29.13 (98.35)	
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
154.07 (114.89)	2330	9.521 (36.041)	0.431 (0.262)	16.18 (3.188)	197 (91.7)	66 (18.9)	77 (24.7)	..... .....	
0.00 (0.00)	2455	2.481 (9.393)	..... .....	..... .....	175 (79.4)	66 (18.9)	77 (25.0)	..... .....	
79.10 (58.98)	2392	5.883 (22.269)	0.519 (0.316)	13.44 (2.649)	182 (83.3)	67 (19.2)	77 (25.0)	..... .....	
170.93 (127.46)	2201	10.171 (38.499)	0.415 (0.252)	16.81 (3.311)	200 (93.3)	67 (19.2)	78 (25.6)	..... .....	
40.06 (29.87)	2423	4.133 (15.644)	0.720 (0.438)	9.69 (1.909)	182 (83.3)	67 (19.4)	78 (25.3)	..... .....	
116.96 (87.22)	2358	7.629 (28.878)	0.455 (0.277)	15.33 (3.020)	187 (86.1)	67 (19.4)	77 (25.0)	..... .....	
Av Av	93.52 (69.74)	2360	6.636 (25.121)	0.495 (0.301)	14.09 (2.776)	187 (86.2)	67 (19.2)	77 (25.1)	29.09 (98.23)

## DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

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 8th (5L) Gear											
145.69 (108.64)	10041 (44.66)	5.44 (8.76)	2199	4.96	10.106 (38.256)	0.484 (0.294)	14.42 (2.840)	201 (93.6)	60 (15.3)	70 (20.8)	28.85 (97.42)
75% of Pull at Maximum Power—Ten Hours 8th (5L) Gear											
119.30 (88.96)	7625 (33.92)	5.87 (9.44)	2337	3.59	8.698 (32.927)	0.509 (0.309)	13.71 (2.702)	198 (92.4)	63 (17.2)	75 (24.1)	28.65 (96.76)
50% of Pull at Maximum Power—Two Hours 8th (5L) Gear											
81.06 (60.45)	5048 (22.45)	6.02 (9.69)	2368	2.33	6.730 (25.477)	0.579 (0.352)	12.04 (2.373)	190 (87.8)	66 (18.9)	83 (28.1)	28.99 (97.88)
50% of Pull at Reduced Engine Speed—Two Hours 11th (6L) Gear											
81.05 (60.44)	5048 (22.45)	6.02 (9.69)	1531	2.24	5.605 (21.217)	0.482 (0.293)	14.46 (2.849)	192 (88.9)	69 (20.3)	91 (32.5)	28.95 (97.76)
MAXIMUM POWER IN SELECTED GEARS											
131.17 (97.81)	18823 (83.73)	2.61 (4.21)	2294	14.78	3rd (2L) Gear			196 (91.1)	57 (13.9)	64 (17.8)	28.81 (97.29)
138.87 (103.55)	15400 (68.50)	3.38 (5.44)	2199	8.55	4th (3L) Gear			199 (92.5)	59 (15.0)	65 (18.3)	29.00 (97.93)
138.38 (103.19)	14968 (66.58)	3.47 (5.58)	2199	8.25	5th (2H) Gear			199 (92.5)	60 (15.6)	66 (18.9)	29.00 (97.93)
141.60 (105.59)	11885 (52.86)	4.47 (7.19)	2198	6.00	6th (3H) Gear			200 (93.1)	60 (15.6)	67 (19.4)	29.00 (97.93)
144.30 (107.60)	11638 (51.77)	4.65 (7.48)	2200	5.92	7th (4L) Gear			199 (92.5)	61 (16.1)	69 (20.6)	29.00 (97.93)
147.55 (110.02)	10166 (45.22)	5.44 (8.76)	2199	5.04	8th (5L) Gear			201 (93.9)	60 (15.6)	70 (21.1)	28.85 (97.42)
142.14 (105.99)	8759 (38.96)	6.09 (9.79)	2200	4.22	9th (4H) Gear			199 (92.5)	62 (16.7)	70 (21.1)	29.00 (97.93)
144.01 (107.39)	7609 (33.84)	7.10 (11.42)	2199	3.64	10th (5H) Gear			198 (91.9)	62 (16.7)	72 (22.2)	29.00 (97.93)
143.70 (107.15)	6278 (27.93)	8.58 (13.81)	2199	2.88	11th (6L) Gear			200 (93.1)	62 (16.7)	74 (23.3)	29.00 (97.93)

Department of Agricultural Engineering

Dates of Test: September 12 - 24, 1984

Manufacturer: FORD MOTOR COMPANY,  
2500 Maple Road, Troy, Michigan 48084

**FUEL, OIL AND TIME:** Fuel No. 2 Diesel  
Cetane No. 46.8 (rating taken from oil company's  
inspection data) **Specific gravity converted to 60/  
60°F (15/15°C)** 0.8378 **Fuel weight** 6.976 lbs/gal  
(0.836 kg/l) **Oil SAE 30 API service classifica-  
tion** SE, SF, CC, CD **To motor** 4.063 gal  
(15.379 l) **Drained from motor** 3.700 gal  
(14.007 l) **Transmission and final drive lubri-  
cant** Ford 134 fluid **Total time engine was oper-  
ated** 38.0 hours.

**ENGINE:** Make Ford Diesel **Type** six cylinder  
vertical with turbocharger and air to air intercool-  
er **Serial No.** \*M766277\* **Crankshaft** lengthwise  
**Rated rpm** 2200 **Bore and stroke** 4.4" × 4.4" (112  
mm × 112 mm) **Compression ratio** 15.6 to 1 **Dis-  
placement** 401 cu in (6572 ml) **Starting system** 12  
volt **Lubrication pressure** **Air cleaner** two paper  
elements with aspirator **Oil filter** two full flow  
cartridges **Oil cooler** engine coolant heat exchan-  
ger for crankcase oil, radiator for hydraulic and  
transmission oil **Fuel filter** one paper element  
and sediment bowl **Muffler** vertical **Cooling  
medium temperature control** two thermostats  
and variable speed fan.

**CHASSIS:** **Type** front wheel assist with duals  
**Serial No.** \*C724968\* **Tread width** rear 64"  
(1626 mm) to 120" (3048 mm) front 70" (1778 mm)  
to 84" (2134 mm) **Wheel base** 111" (2819 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 35.8" (910  
mm) Vertical distance above roadway 43.6" (1107  
mm) Horizontal distance from center of rear wheel  
tread 0.2" (5 mm) to the left **Hydraulic control  
system** direct engine drive **Transmission** selec-  
tive gear fixed ratio with partial (2) range operator  
controlled powershift **Advertised speeds mph  
(km/h)** first 1.8 (2.9) second 2.4 (3.8) third 2.8 (4.5)  
fourth 3.5 (5.7) fifth 3.6 (5.8) sixth 4.6 (7.4)  
seventh 4.7 (7.6) eighth 5.5 (8.8) ninth 6.1 (9.8)  
tenth 7.1 (11.4) eleventh 8.5 (13.7) twelfth 10.7  
(17.2) thirteenth 10.9 (17.5) fourteenth 13.7 (22.1)  
fifteenth 14.3 (22.9) sixteenth 18.3 (29.5) reverse  
2.0 (3.2), 2.5 (4.1), 5.9 (9.5), 7.6 (12.3) **Clutch**  
single dry disc operated by foot pedal **Brakes**  
power assisted, double wet disc hydraulically oper-  
ated by two foot pedals which can be locked  
together **Steering** hydrostatic **Turning radius**  
(on concrete surface with brake applied) right  
198" (5.03 m) left 198" (5.03 m) (on concrete sur-  
face without brake) right 227" (5.77 m) left 227"  
(5.77 m) **Turning space diameter** (on concrete  
surface with brake applied) right 414" (10.51 m)  
left 414" (10.51 m) (on concrete surface without  
brake) right 472" (12.00 m) left 472" (12.00 m)  
**Power take-off** 1000 rpm at 1919 engine rpm  
**Unladen tractor mass** 15100 lb (6849 kg).

### LUGGING ABILITY IN 8th (5L) GEAR

Crankshaft Speed rpm	2199	1984	1754	1538	1315	1092
Pull—lbs (kN)	10166 (45.22)	10870 (48.35)	11555 (51.40)	11607 (51.63)	10608 (47.19)	9131 (40.62)
Increase in Pull %	0	7	14	14	4	-10
Power—Hp (kW)	147.55 (110.02)	141.54 (105.55)	132.51 (98.81)	116.59 (86.94)	91.76 (68.42)	66.14 (49.32)
Speed—Mph (km/h)	5.44 (8.76)	4.88 (7.86)	4.30 (6.92)	3.77 (6.06)	3.24 (5.22)	2.72 (4.37)
Slip %	5.04	5.52	5.84	6.00	5.36	4.38

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
Maximum Available Power—Two Hours	82.0	81.5
75% of Pull at Maximum Power—Ten Hours	81.5	
50% of Pull at Maximum Power—Two Hours	81.5	
50% of Pull at Reduced Engine Speed—Two Hours	79.0	
Bystander in 16th (8H) gear		88.5

### DRAWBAR PERFORMANCE (Front Wheel Drive Disengaged)

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		
<b>Maximum Available Power—Two Hours 8th (5L) Gear</b>												
140.64 (104.88)	10079 (44.83)	5.23 (8.42)	2200	8.23	10.128 (38.337)	0.502 (0.306)	13.89 (2.736)	206 (96.4)	63 (17.2)	78 (25.3)		28.85 (97.42)
<b>MAXIMUM POWER IN SELECTED GEARS</b>												
125.15 (93.33)	13887 (61.77)	3.38 (5.44)	2314	14.81				195 (90.3)	58 (14.4)	65 (18.3)		28.83 (97.35)
143.24 (106.81)	10189 (45.32)	5.27 (8.48)	2199	7.62				203 (94.7)	63 (17.2)	75 (23.9)		29.00 (97.93)

### TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
<b>Rear Tires</b>		
—No., size, ply & psi (kPa)	Four 20.8-38; 10; 16 (110)	Four 20.8-38; 10; 16 (110)
Ballast	375 lb (170 kg)	None
—Liquid (each inner)	None	None
—Cast Iron (each)	None	None
<b>Front Tires</b>		
—No., size, ply & psi (kPa)	Two 16.9-28; 6; 18 (125)	Two 16.9-28; 6; 18 (125)
Ballast	440 lb (200 kg)	None
—Liquid (each)	750 lb (340 kg)	None
—Cast Iron (each)		
<b>Height of Drawbar</b>	24.5 in (620 mm)	24.5 in (620 mm)
<b>Static Weight with Operator—Rear</b>	12400 lb (5625 kg)	11650 lb (5285 kg)
—Front	7870 lb (3570 kg)	5490 lb (2490 kg)
—Total	20270 lb (9195 kg)	17140 lb (7775 kg)

### THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	2550	17580
Location	remote	
Hydraulic oil temperature °F (°C)	104	40
Location	sump	
	<b>Maximum Lift Capacity</b>	<b>Lift Capacity for Transport</b>
<b>QUICK ATTACH CATEGORY</b>	no II	*not measured
<b>LOAD lbs (kg)</b>	7158	3247
<b>TIME sec</b>	2.04	
<b>HITCH POINT MOVEMENT in (mm)</b>		
Lowest position	9.1	232
Top of timed range	33.1	841
Highest position	36.6	930
<b>LOAD CG MOVEMENT in (mm)</b>		
Lowest position	9.3	235
Top of timed range	32.8	832
Highest position	36.6	930

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

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

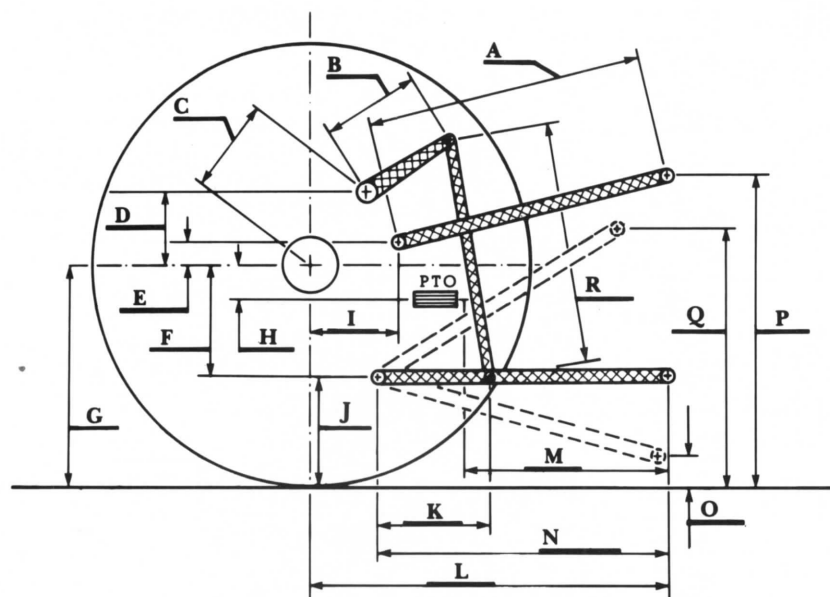
**REMARKS:** All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 183°F (84.0°C). 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 No. 1537, November 26, 1984.

**NOTE:** Report reissued, supplemental sales permit for Ford 8830 Diesel 16 speed, July, 1990.

LOUIS I. LEVITICUS  
Engineer-in-Charge

K. VON BARGEN  
R.D. GRISSE  
G.J. HOFFMAN  
Board of Tractor Test Engineers



Hitch Dimensions as Tested — No Load

	inch	mm
A	28.9	734
B	15.0	381
C	16.2	412
D	15.5	394
E	8.0	203
F	10.5	267
G	33.9	861
H	2.4	62
I	17.0	432
J	23.4	594
K	18.9	481
L	45.3	1150
M	23.6	600
N	36.3	921
O	8.0	203
P	42.4	1077
Q	37.0	940
R	33.1	841



Ford TW-35 Diesel

The Agricultural Experiment Station  
 Institute of Agriculture and Natural Resources  
 University of Nebraska—Lincoln  
 Irvin T. Omtvedt, Dean and Director