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Test 1242: Ford 7700 Diesel 16-Speed

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

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NEBRASKA TRACTOR TEST 1242 — FORD 7700 DIESEL, 16-SPEED

Department of Agricultural Engineering

Dates of Test: May 9 to 18, 1977

Manufacturer: FORD MOTOR COMPANY,
Tractor Operations, 2500 East Maple Rd., Troy,
Michigan 48084

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—1020 rpm)								
84.38 (62.92)	2100	5.657 (21.415)	0.464 (0.282)	14.92 (2.938)	191 (88.1)	58 (14.4)	75 (23.8)	29.080 (98.199)
Standard Power Take-off Speed (1000 rpm)—One Hour								
84.29 (62.85)	2059	5.529 (20.929)	0.454 (0.276)	15.24 (3.003)	190 (87.9)	59 (14.8)	75 (24.0)	29.110 (98.300)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
77.05 (57.46)	2260	5.543 (20.983)	0.498 (0.303)	13.90 (2.738)	182 (83.3)	58 (14.7)	74 (23.1)	..... .....
0.00 (0.00)	2366	1.868 (7.071)	..... .....	..... .....	169 (76.1)	58 (14.7)	74 (23.1)	..... .....
39.54 (29.48)	2312	3.654 (13.830)	0.640 (0.389)	10.82 (2.132)	172 (77.8)	59 (15.0)	75 (23.9)	..... .....
84.76 (63.20)	2100	5.686 (21.525)	0.464 (0.282)	14.91 (2.936)	188 (86.4)	60 (15.6)	77 (25.0)	..... .....
19.88 (14.83)	2323	2.713 (10.270)	0.945 (0.575)	7.33 (1.444)	170 (76.7)	60 (15.6)	77 (25.0)	..... .....
58.54 (43.65)	2280	4.546 (17.210)	0.538 (0.327)	12.88 (2.536)	176 (80.0)	60 (15.8)	80 (26.4)	..... .....
Av 46.63 Av (34.77)	2274	4.002 (15.148)	0.594 (0.361)	11.65 (2.295)	176 (80.0)	59 (15.2)	76 (24.4)	29.120 (98.334)

DRAWBAR PERFORMANCE

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)			Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 9th (4DD) Gear												
67.62 (50.42)	5435 (24.18)	4.67 (7.51)	2102	10.53	5.670 (21.465)	0.580 (0.353)	11.92 (2.349)	195 (90.6)	65 (18.3)	80 (26.7)	28.950 (97.760)	
75% of Pull at Maximum Power—Ten Hours 9th (4DD) Gear												
57.94 (43.21)	4154 (18.48)	5.23 (8.42)	2280	7.49	5.168 (19.564)	0.617 (0.376)	11.21 (2.208)	184 (84.6)	71 (21.5)	81 (27.1)	28.772 (97.159)	
50% of Pull at Maximum Power—Two Hours 9th (4DD) Gear												
40.33 (30.07)	2778 (12.36)	5.44 (8.76)	2307	4.97	4.153 (15.722)	0.713 (0.434)	9.71 (1.913)	175 (79.4)	66 (18.6)	81 (27.2)	28.900 (97.591)	
50% of Pull at Reduced Engine Speed—Two Hours 12th (6DD) Gear												
40.22 (30.00)	2767 (12.31)	5.45 (8.77)	1550	5.07	3.088 (11.689)	0.531 (0.323)	13.03 (2.566)	169 (76.1)	63 (17.2)	68 (20.0)	28.745 (97.068)	
MAXIMUM POWER IN SELECTED GEARS												
68.40 (51.01)	7688 (34.20)	3.34 (5.37)	2170	14.83	6th (3DD) Gear			175 (79.4)	60 (15.6)	64 (17.8)	28.730 (97.017)	
69.67 (51.95)	6101 (27.14)	4.28 (6.89)	2101	11.85	8th (5PD) Gear			188 (86.4)	64 (17.8)	74 (23.3)	28.970 (97.827)	
68.75 (51.27)	5528 (24.59)	4.66 (7.50)	2100	10.53	9th (4DD) Gear			187 (85.8)	63 (17.2)	72 (22.2)	28.970 (97.827)	
70.62 (52.66)	4800 (21.35)	5.52 (8.88)	2099	8.85	10th (6PD) Gear			187 (86.1)	65 (18.3)	76 (24.4)	28.960 (97.794)	
71.57 (53.37)	3688 (16.40)	7.28 (11.71)	2101	6.69	12th (6DD) Gear			191 (88.1)	65 (18.3)	77 (25.0)	28.960 (97.794)	
70.04 (52.23)	2607 (11.59)	10.08 (16.22)	2098	4.79	13th (7PD) Gear			189 (87.2)	65 (18.3)	78 (25.6)	28.960 (97.794)	
LUGGING ABILITY IN RATED GEAR 9th (4DD)												
Crankshaft Speed rpm				2100	1890	1681	1474	1259	1052			
Pull—lbs (kN)				5528 (24.59)	5976 (26.58)	6371 (28.34)	6427 (28.59)	6074 (27.02)	5349 (23.79)			
Increase in Pull %				0	8	15	16	10	−3			
Power—Hp (kW)				68.75 (51.27)	66.06 (49.26)	61.84 (46.12)	54.57 (40.69)	44.53 (33.21)	33.38 (24.89)			
Speed—Mph (km/h)				4.66 (7.50)	4.15 (6.67)	3.64 (5.86)	3.18 (5.12)	2.75 (4.42)	2.34 (3.77)			
Slip %				10.53	11.54	12.76	12.88	11.91	10.28			

FUEL, OIL AND TIME: Fuel No. 2 Diesel
Cetane No. 51.8 (rating taken from oil company's
typical inspection data) **Specific gravity converted
to 60°/60° (15°/15°)** 0.8313 **Fuel weight** 6.922 lbs/
gal (0.831 kg/l) **Oil SAE 30 API service classifi-
cation** SB/SE-CA/CD **To motor** 1.853 gal
(7.014 l) **Drained from motor** 1.527 gal (5.780 l)
Transmission and final drive lubricant Ford
M2C53A **Total time engine was operated** 41.0
hours

ENGINE: Make Ford Diesel **Type** 4 cylinder
vertical with turbocharger **Serial No.** F136277
Crankshaft lengthwise **Rated rpm** 2100 **Bore
and stroke** 4.4" × 4.2" (111.8 mm × 106.7 mm)
Compression ratio 15.6 to 1 **Displacement** 255 cu
in (4186 ml) **Cranking system** 12 volt **Lubrica-
tion** pressure **Air cleaner** primary and safety
paper elements and centrifugal precleaner **Oil
filter** full flow screw-on paper cartridge **Oil
cooler** engine coolant heat exchanger for crank-
case oil, radiator for transmission and hydraulic
oil **Fuel filter** nylon gauze in bottom of tank and
paper element **Muffler** vertical **Cooling medium
temperature control** thermostat

CHASSIS: **Type** standard **Serial No.** C525430
Tread width rear 56" (1422 mm) to 80" (2032 mm)
front 56" (1422 mm) to 88" (2235 mm) **Wheel base**
101.6" (2581 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 31.1" (790 mm) Vertical distance above
roadway 39.1" (993 mm) Horizontal distance from
center of rear wheel tread 0.1" (3 mm) to the right
Hydraulic control system direct engine drive
Transmission selective gear fixed ratio with par-
tial (2 range) operator controlled power shift **Ad-
vertised speeds mph (km/h)** first 1.4 (2.2) second
1.7 (2.7) third 1.7 (2.8) fourth 2.2 (3.5) fifth 2.9
(4.7) sixth 3.8 (6.1) seventh 4.0 (6.5) eighth 4.8
(7.8) ninth 5.2 (8.4) tenth 6.0 (9.7) eleventh 6.2
(10.0) twelfth 7.8 (12.5) thirteenth 10.6 (17.0)
fourteenth 13.6 (21.8) fifteenth 14.5 (23.4) six-
teenth 18.6 (30.0) reverse 1.9 (3.1), 2.5 (4.0), 7.0
(11.2) and 9.0 (14.4) **Clutch** single dry plate oper-
ated by foot pedal **Brakes** multiple wet disc oper-
ated by two foot pedals which can be locked to-
gether **Steering** hydrostatic **Turning radius** (on
concrete surface with brake applied) right 147"
(3.73 m) left 146" (3.71 m) (on concrete surface
without brake) right 168.5" (4.28 m) left 166.5"
(4.23 m) **Turning space diameter** (on concrete
surface with brake applied) right 305" (7.75 m) left
303" (7.70 m) (on concrete surface without brake)
right 348" (8.84 m) left 344" (8.74 m) **Belt pulley**
1073 rpm at 2050 engine rpm diameter 11" (280
mm) face 6.5" (165 mm) **Belt speed** 3089 fpm (15.7
m/s) **Power take-off** 540 rpm at 1900 engine rpm
& 1000 rpm at 2059 engine rpm.

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—Two Hours	83.5
75% of Pull at Maximum Power—Ten Hours	84.0
50% of Pull at Maximum Power—Two Hours	83.5
50% of Pull at Reduced Engine Speed—Two Hours	83.5
Bystander in 15th (8PD) gear	86.5

TIRES, BALLAST AND WEIGHT

		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 18.4-34; 6; 16 (110)	Two 18.4-34; 6; 16 (110)
Ballast	—Liquid (each)	1045 lb (474 kg)	None
	—Cast Iron (each)	50 lb (23 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 7.50-18; 6; 40 (280)	Two 7.50-18; 6; 40 (280)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	105 lb (48 kg)	None
Height of drawbar		26.5 in (670 mm)	26.5 in (670 mm)
Static weight with operator —rear		8130 lb (3688 kg)	5940 lb (2694 kg)
front		2670 lb (1211 kg)	2460 lb (1116 kg)
total		10800 lb (4899 kg)	8400 lb (3810 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 code or official Nebraska test procedure. Temperature at injection pump return was 163°F (72.8°C). Six gears were chosen between 15% slip and 15 mph (24.1 km/h).

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1242**.

LOUIS I. LEVITICUS

Engineer-in Charge

G. W. STEINBRUEGGE, Chairman

W. E. SPLINTER

K. VON BARGEN

Board of Tractor Test Engineers



Ford 7700 Diesel, 16-Speed