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Test 1386: Hesston Fiat 780DT and 780 Diesel 8-Speed

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1386 — HESSTON 780 DT FIAT DIESEL ALSO HESSTON 780 FIAT DIESEL 8 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—606 rpm)									
70.57 (52.62)	2500	4.357 (16.493)	0.432 (0.263)	16.20 (3.190)	182 (83.2)	61 (16.0)	75 (23.8)	28.823 (97.332)	
Standard Power take-off Speed (540 rpm)—One Hour									
66.67 (49.72)	2226	3.989 (15.100)	0.419 (0.255)	16.71 (3.293)	182 (83.1)	62 (16.4)	75 (23.9)	28.825 (97.338)	
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
61.85 (46.12)	2576	3.745 (14.176)	0.424 (0.258)	16.52 (3.253)	173 (78.3)	62 (16.7)	75 (23.9)	..... .....
0.00 (0.00)	2632	1.088 (4.119)	..... .....	..... .....	153 (67.2)	63 (17.2)	75 (23.9)	..... .....
31.19 (23.26)	2598	2.314 (8.759)	0.520 (0.316)	13.48 (2.656)	162 (71.9)	63 (17.2)	75 (23.9)	..... .....
70.83 (52.82)	2501	4.392 (16.626)	0.434 (0.264)	16.13 (3.177)	183 (83.9)	63 (17.2)	76 (24.2)	..... .....
15.68 (11.69)	2614	1.645 (6.227)	0.735 (0.447)	9.53 (1.877)	155 (68.3)	63 (17.2)	75 (23.9)	..... .....
46.32 (34.54)	2572	2.991 (11.322)	0.452 (0.275)	15.49 (3.051)	168 (75.6)	63 (17.2)	75 (23.9)	..... .....
Av Av	37.65 (28.08)	2582	2.696 (10.205)	0.501 (0.305)	13.96 (2.752)	166 (74.2)	63 (17.1)	75 (23.9)	28.800 (97.258)

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		
Maximum Available Power—Two Hours 5th (H1) Gear												
59.79 (44.58)	4373 (19.45)	5.13 (8.25)	2501	7.85	4.357 (16.491)	0.510 (0.310)	13.72 (2.703)	187 (85.8)	53 (11.7)	70 (20.8)	28.845 (97.410)	
75% of Pull at Maximum Power—Ten Hours 5th (H1) Gear												
48.72 (36.33)	3383 (15.05)	5.40 (8.69)	2569	5.68	3.514 (13.301)	0.505 (0.307)	13.86 (2.731)	180 (82.3)	64 (17.8)	81 (27.2)	28.604 (96.590)	
50% of Pull at Maximum Power—Two Hours 5th (H1) Gear												
33.50 (24.98)	2256 (10.04)	5.57 (8.96)	2608	4.15	2.732 (10.341)	0.571 (0.347)	12.26 (2.416)	166 (74.4)	67 (19.2)	74 (23.1)	28.695 (96.900)	
50% of Pull at Reduced Engine Speed—Two Hours 6th (H2) Gear												
33.69 (25.12)	2268 (10.09)	5.57 (8.97)	1808	3.98	2.285 (8.651)	0.475 (0.289)	14.74 (2.904)	170 (76.4)	71 (21.4)	81 (27.2)	28.685 (96.860)	
MAXIMUM POWER IN SELECTED GEARS												
53.36 (39.79)	6965 (30.98)	2.87 (4.62)	2543	14.99	3rd (L3) Gear			158 (69.7)	64 (17.8)	68 (20.0)	28.700 (96.920)	
59.07 (44.05)	5806 (25.83)	3.82 (6.14)	2500	11.39	4th (L4) Gear			181 (82.5)	51 (10.6)	63 (17.2)	28.880 (97.520)	
61.59 (45.93)	4507 (20.05)	5.13 (8.26)	2500	7.91	5th (H1) Gear			175 (79.4)	48 (8.9)	59 (15.0)	28.900 (97.590)	
62.06 (46.28)	3058 (13.60)	7.61 (12.25)	2499	5.24	6th (H2) Gear			184 (84.2)	51 (10.6)	65 (18.3)	28.870 (97.490)	

LUGGING ABILITY IN 5th (H1) GEAR

Crankshaft Speed rpm	2500	2253	2000	1746	1494	1246	1004
Pull—lbs (kN)	4507 (20.05)	4771 (21.22)	4947 (22.00)	5107 (22.72)	5159 (22.95)	5222 (23.23)	5218 (23.21)
Increase in Pull %	0	6	10	13	14	16	16
Power—Hp (kW)	61.59 (45.93)	58.38 (43.54)	53.44 (39.85)	47.98 (35.78)	41.39 (30.86)	34.88 (26.01)	27.97 (20.86)
Speed—Mph (km/h)	5.13 (8.26)	4.59 (7.39)	4.05 (6.52)	3.52 (5.67)	3.01 (4.84)	2.50 (4.03)	2.01 (3.24)
Slip %	7.91	8.60	8.98	9.47	9.59	9.83	9.96

Department of Agricultural Engineering

Dates of Test: April 21-29, 1981

Manufacturer: FIAT TRATTORI S.p.A., Via
Pico della Mirandola, 72-41100, Modena, Italy

FUEL, OIL AND TIME: Fuel No. 2 Diesel
Cetane No. 46.3 (rating taken from oil company's
inspection data) Specific gravity converted to 60°/
60° (15°/15°) 0.8408 Fuel weight 7.001 lbs/gal
(0.839 kg/l) Oil SAE 15W-40 API service classi-
fication SB/SE-CA/CD To motor 2.684 gal
(10.160 l) Drained from motor 2.287 gal
(8.657 l) Transmission lubricant SAE 15W-40
Final drive lubricant API 303 Total time engine
was operated 40.0 hours

ENGINE Make Fiat Diesel **Type** four cylinder
vertical **Serial No.** 8045.04*377-799018 **Crank-
shaft** lengthwise **Rated rpm** 2500 **Bore and
stroke** 4.055" × 4.33" (103 mm × 110 mm) **Com-
pression ratio** 17 to 1 **Displacement** 224 cu in
(3666 ml) **Starting system** 12 volt **Lubrication
pressure** **Air cleaner** two paper elements **Oil fil-
ter** one full flow paper cartridge **Fuel filter** two
paper elements **Muffler** vertical **Cooling
medium temperature control** one thermostat.

CHASSIS: Type front wheel assist **Serial No.**
780DT/8*682310* **Tread width** rear 55.1" (1400
mm) to 82.7" (2100 mm) front 64.2" (1630 mm) to
77.0" (1955 mm) **Wheel base** 89.8" (2280 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 33.8" (859
mm) Vertical distance above roadway 31.3" (795
mm) Horizontal distance from center of rear wheel
tread 0" (0 mm) to the right/left **Hydraulic control
system** direct engine drive **Transmission** selec-
tive gear fixed ratio **Advertised speeds mph (km/
h)** first 1.5 (2.4) second 2.2 (3.6) third 3.3 (5.3)
fourth 4.2 (6.8) fifth 5.5 (8.9) sixth 7.9 (12.8)
seventh 11.8 (19.1) eighth 15.3 (24.7) reverse 2.0
(3.2), 7.1 (11.5) **Clutch** dry double disc operated
by foot pedal **Brakes** single wet disc hydraulically
operated by two foot pedals which can be locked
together and hand lever **Steering** hydrostatic
Turning radius (on concrete surface with brake
applied) right 191" (4.85 m) left 189" (4.80 m) (on
concrete surface without brake) right 214" (5.44
m) left 213" (5.41 m) **Turning space diameter** (on
concrete surface with brake applied) right 393"
(9.98 m) left 389" (9.88 m) (on concrete surface
without brake) right 438" (11.13 m) left 436"
(11.07 m) **Power take-off** 540 rpm at 2226 engine
rpm.

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 was
139°F (59.5°C). Four gears were chosen between

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	97.0	97.5
75% of Pull at Maximum Power—Ten Hours		96.0
50% of Pull at Maximum Power—Two Hours		94.0
50% of Pull at Reduced Engine Speed—Two Hours		91.0
Bystander in 8th (H4) gear		89.5

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 5th (H1) Gear											
59.97 (44.72)	4275 (19.02)	5.26 (8.47)	2499	6.00	4.357 (16.491)	0.509 (0.309)	13.77 (2.712)	190 (87.8)	56 (13.1)	74 (23.1)	28.805 (97.270)

MAXIMUM POWER IN SELECTED GEARS

43.15 (32.18)	8210 (36.52)	1.97 (3.17)	2583	14.87	2nd (L2) Gear			151 (65.8)	62 (16.7)	67 (19.4)	28.690 (96.880)
61.95 (46.20)	4420 (19.66)	5.26 (8.46)	2500	6.16	5th (H1) Gear			179 (81.7)	50 (10.0)	62 (16.7)	28.890 (97.560)

TIRES, BALLAST AND WEIGHT

		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 18.4-30; 6; 16 (110)	Two 18.4-30; 6; 16 (110)
Ballast	—Liquid (each)	950 lb (431 kg)	None
	—Cast Iron (each)	710 lb (322 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 12.4-24; 6; 22 (150)	Two 12.4-24; 6; 22 (150)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	300 lb (136 kg)	None
Height of drawbar		19.5 in (495 mm)	19.5 in (495 mm)
Static Weight with Operator —Rear		7175 lb (3255 kg)	3855 lb (1749 kg)
Front		2925 lb (1327 kg)	2325 lb (1054 kg)
Total		10100 lb (4581 kg)	6180 lb (2803 kg)

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1386.

LOUIS I. LEVITICUS
Engineer-in Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD

Board of Tractor Test Engineers



Hesston 780 DT Fiat Diesel