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10-16-1985

## Test 1581: Hesston 180-90 Turbo Powershift Fiat Diesel 16-Speed

Nebraska Tractor Test Lab

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# NEBRASKA TRACTOR TEST 1581

## HESSTON 180-90 TURBO POWERSHIFT FIAT DIESEL

### 16 SPEED

Department of Agricultural Engineering

Dates of Test: October 2 to 16, 1985

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

#### 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 — 1061 rpm)								
162.15 (120.91)	2200	10.060 (38.081)	0.435 (0.265)	16.12 (3.175)	178 (81.3)	66 (18.8)	74 (23.6)	28.84 (97.40)
Standard Power Take-off Speed (1000 rpm) — One Hour								
161.07 (120.11)	2075	9.603 (36.353)	0.418 (0.254)	16.77 (3.304)	179 (81.8)	70 (20.8)	75 (24.1)	28.86 (97.46)

#### VARYING POWER AND FUEL CONSUMPTION — Two Hours

141.17 (105.27)	2253	8.917 (33.756)	0.443 (0.269)	15.83 (3.119)	177 (80.3)	71 (21.4)	76 (24.4)	.....	
0.00 (0.00)	2409	3.214 (12.164)	.....	.....	173 (78.3)	69 (20.6)	74 (23.1)	.....	
73.55 (54.85)	2349	5.944 (22.499)	0.567 (0.345)	12.38 (2.438)	175 (79.4)	70 (21.1)	75 (23.9)	.....	
164.73 (122.84)	2201	10.043 (38.016)	0.427 (0.260)	16.40 (3.231)	179 (81.4)	71 (21.7)	75 (23.9)	.....	
37.26 (27.78)	2382	4.626 (17.510)	0.870 (0.529)	8.06 (1.587)	173 (78.3)	68 (19.7)	72 (22.2)	.....	
108.39 (80.82)	2307	7.420 (28.087)	0.480 (0.292)	14.61 (2.878)	176 (80.0)	69 (20.3)	73 (22.5)	.....	
<b>Av 87.52 Av (65.26)</b>	<b>2317</b>	<b>6.694 (25.339)</b>	<b>0.536 (0.326)</b>	<b>13.07 (2.576)</b>	<b>175 (79.6)</b>	<b>69 (20.8)</b>	<b>74 (23.3)</b>	<b>28.90 (97.60)</b>	

#### 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 (III-2) Gear											
138.56 (103.33)	9608 (42.74)	5.41 (8.70)	2200	2.56	9.877 (37.390)	0.500 (0.304)	14.03 (2.763)	181 (82.8)	54 (11.9)	68 (20.0)	28.95 (97.76)
75% of Pull at Maximum Power — Ten Hours 8th (III-2) Gear											
111.65 (83.25)	7425 (33.03)	5.64 (9.07)	2281	1.99	8.395 (31.780)	0.527 (0.321)	13.30 (2.620)	180 (82.0)	49 (9.2)	54 (12.3)	28.97 (97.81)
50% of Pull at Maximum Power — Two Hours 8th (III-2) Gear											
76.64 (57.15)	4950 (22.02)	5.81 (9.34)	2335	1.42	6.932 (26.240)	0.634 (0.386)	11.06 (2.178)	179 (81.7)	47 (8.1)	49 (9.2)	28.93 (97.69)
50% of Pull at Reduced Engine Speed — Two Hours 12th (III-4) Gear											
76.58 (57.10)	4950 (22.02)	5.80 (9.34)	1585	1.33	5.491 (20.787)	0.503 (0.306)	13.95 (2.747)	178 (80.8)	49 (9.2)	50 (9.7)	28.85 (97.41)

**FUEL, OIL AND TIME:** Fuel No. 2 Diesel Cetane No. 46.9 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F (15/15°C)** 0.8420 **Fuel weight** 7.011 lbs/gal (0.840 kg/l) **Oil** SAE 15W40 **API service classification** SF-CD **To motor** 4.038 gal (15.285 l) **Drained from motor** 3.492 gal (13.219 l) **Transmission lubricant** Type A automatic transmission fluid **Hydraulic and front axle lubricant** Hesston M&PS 705106016 fluid **Total time engine was operated** 42.5 hours.

**ENGINE:** Make Fiat/IVECO Diesel Type six cylinder vertical with turbocharger **Serial No.** 8365.25 504\*757733\* **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 4.528" × 5.118" (115 mm × 130 mm) **Compression ratio** 15.5 to 1 **Displacement** 494 cu in (8102 ml) **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and centrifugal precleaner **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, engine coolant heat exchanger for transmission oil **Fuel filter** one paper cartridge, one paper element and sediment bowl **Muffler** vertical **Cooling medium temperature control** one thermostat.

**CHASSIS:** Type front wheel assist with duals **Serial No.** 180-90PSDT/1\*263870\* **Tread width** rear 64" (1625 mm) to 123" (3125 mm) front 64" (1625 mm) to 92" (2337 mm) **Wheel base** 113.8" (2890 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 37.2" (946 mm) Vertical distance above roadway 42.5" (1080 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 partial (4) range operator controlled powershift **Advertised speeds mph (km/h)** first 2.0 (3.3) second 2.5 (4.0) third 3.0 (4.9) fourth 3.8 (6.1) fifth 4.2 (6.7) sixth 4.6 (7.4) seventh 5.1 (8.2) eighth 5.6 (9.1) ninth 6.1 (9.9) tenth 6.8 (11.0) eleventh 7.6 (12.3) twelfth 8.4 (13.6) thirteenth 10.4 (16.8) fourteenth 12.7 (20.5) fifteenth 15.4 (24.8) sixteenth 19.1 (30.7) reverse 1.6 (2.6), 2.0 (3.2), 2.4 (3.9), 3.0 (4.8), 3.3 (5.4), 3.7 (5.9), 4.0 (6.5), 4.5 (7.3), 4.9 (7.9), 5.5 (8.8), 6.1 (9.8), 6.8 (10.9), 8.1 (13.1), 10.2 (16.4), 12.3 (19.8), 15.3 (24.6) **Clutch** dual dry disc hydraulically power actuated and operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hy-

# MAXIMUM POWER IN SELECTED GEARS

119.02 (88.76)	19734 (87.78)	2.26 (3.64)	2251	10.46	2nd (I-2) Gear	179 (81.7)	43 (6.1)	45 (7.2)	29.07 (98.17)
137.01 (102.17)	18387 (81.79)	2.79 (4.50)	2201	6.72	3rd (I-3) Gear	180 (82.2)	45 (7.2)	48 (8.9)	29.08 (98.20)
140.68 (104.91)	15147 (67.38)	3.48 (5.61)	2198	4.18	4th (I-4) Gear	180 (81.9)	41 (5.0)	45 (7.2)	28.93 (97.69)
142.47 (106.24)	13441 (59.79)	3.97 (6.40)	2201	3.59	5th (II-1) Gear	180 (82.2)	43 (6.1)	48 (8.9)	28.93 (97.69)
143.02 (106.65)	12118 (53.90)	4.43 (7.12)	2200	3.25	6th (III-1) Gear	180 (82.2)	44 (6.7)	50 (10.0)	28.93 (97.69)
142.85 (106.52)	11022 (49.03)	4.86 (7.82)	2200	2.82	7th (II-2) Gear	180 (82.2)	44 (6.7)	51 (10.6)	28.93 (97.69)
141.70 (105.67)	9834 (43.74)	5.40 (8.70)	2201	2.65	8th (III-2) Gear	180 (82.2)	46 (7.8)	50 (10.0)	29.08 (98.20)
139.09 (103.72)	8806 (39.17)	5.92 (9.53)	2200	2.39	9th (II-3) Gear	181 (82.5)	48 (8.9)	58 (14.4)	28.92 (97.66)
138.17 (103.04)	7865 (34.99)	6.59 (10.60)	2200	1.95	10th (III-3) Gear	180 (82.2)	47 (8.3)	56 (13.3)	28.92 (97.66)
137.15 (102.27)	7118 (31.66)	7.23 (11.63)	2201	1.77	11th (II-4) Gear	180 (82.2)	46 (7.8)	55 (12.8)	28.93 (97.69)
135.24 (100.85)	6316 (28.09)	8.03 (12.92)	2200	1.69	12th (III-4) Gear	180 (82.2)	45 (7.2)	53 (11.7)	28.93 (97.69)

# LUGGING ABILITY IN 8th (III-2) GEAR

Crankshaft Speed rpm	2201	1983	1752	1538	1313	1091
Pull—lbs (kN)	9834 (43.74)	10559 (46.97)	10964 (48.77)	11436 (50.87)	11742 (52.23)	10741 (47.78)
Increase in Pull %	0	7	11	16	19	9
Power—Hp (kW)	141.70 (105.67)	136.95 (102.12)	125.50 (93.59)	114.69 (85.52)	100.40 (74.87)	76.57 (57.10)
Speed—Mph (km/h)	5.40 (8.70)	4.86 (7.83)	4.29 (6.91)	3.76 (6.05)	3.21 (5.16)	2.67 (4.30)
Slip %	2.65	2.74	2.91	3.08	3.08	2.74

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Disengaged dB(A)	Engaged dB(A)
Maximum Available Power—Two Hours	80.5	81.0
75% of Pull at Maximum Power—Ten Hours		81.5
50% of Pull at Maximum Power—Two Hours		81.0
50% of Pull at Reduced Engine Speed—Two Hours		79.0
Bystander in 16th (IV-4) gear	89.0	

# DRAWBAR PERFORMANCE (Front Wheel Drive Disengaged)

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)	Cool- ing med	Temp. °F (°C) Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power — Two Hours 8th (III-2) Gear											
137.63 (102.63)	9687 (43.09)	5.33 (8.57)	2200	3.54	9.863 (37.336)	0.502 (0.306)	13.95 (2.749)	181 (82.5)	55 (12.8)	73 (22.8)	28.94 (97.71)

# MAXIMUM POWER IN SELECTED GEARS

124.60 (92.92)	14920 (66.37)	3.13 (5.04)	2221	14.34	4th (I-4) Gear	179 (81.7)	41 (5.0)	42 (5.6)	29.06 (98.13)
141.63 (105.61)	9958 (44.29)	5.33 (8.58)	2200	3.50	8th (III-2) Gear	180 (82.2)	48 (8.9)	52 (11.1)	29.09 (98.23)

# TIRES, BALLAST AND WEIGHT

Rear Tires	Ballast	—No., size, ply & psi (kPa)	With Ballast	Without Ballast
			Four 20.8R38; 8; 16 (110)	Four 20.8R38; 8; 16 (110)
Front Tires	Ballast	—No., size, ply & psi (kPa)	None	None
			43 lb (20 kg)	None
			Two 16.9R28; 10; 16 (110)	Two 16.9R28; 10; 16 (110)
Height of Drawbar	Static Weight with Operator—Rear	—Liqud (each)	637 lb (289 kg)	None
			150 lb (68 kg)	None
			18.5 in (470 mm)	18.5 in (470 mm)
Static Weight with Operator—Front	—Total	—Cast Iron (each)	12210 lb (5539 kg)	12040 lb (5461 kg)
			7360 lb (3338 kg)	5785 lb (2624 kg)
			19570 lb (8877 kg)	17825 lb (8085 kg)

drostatic **Turning radius** (on concrete surface with brake applied) right 196" (4.98 m) left 202" (5.13 m)(on concrete surface without brake) right 265" (6.72 m) left 270" (6.86 m) **Turning space diameter** (on concrete surface with brake applied) right 412" (10.46 m) left 424" (10.77 m)(on concrete surface without brake) right 550" (13.97 m) left 560" (14.22 m) **Power take-off** 1000 rpm at 2075 engine rpm **Unladen tractor mass** 15915 lb (7219 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 return was maintained at 143°F (61.4°C). Eleven gears were chosen between 15% slip and 10 mph (16.1 km/h). The pull in 2nd (I-2) gear was limited to avoid tractor bouncing.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1581, December 3, 1985.

LOUIS I. LEVITICUS

Engineer-in-Charge

K. VON BARGEN

W. E. SPLINTER

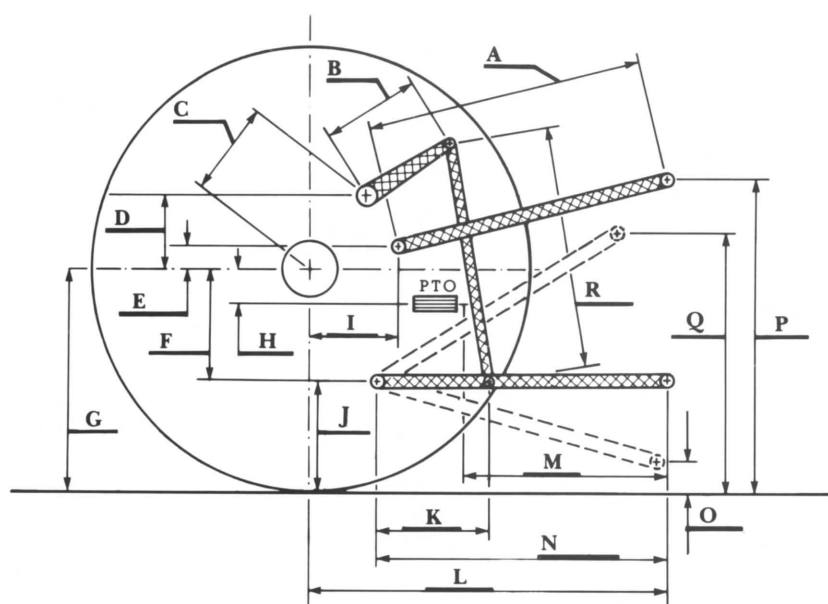
L. L. BASHFORD

Board of Tractor Test Engineers

## THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	2500 (17240)	
Location	remote outlet	
Hydraulic oil temperature °F (°C)	188 (87)	
Location	hydraulic filter	
	<b>Maximum Lift Capacity</b>	<b>Lift Capacity for Transport</b>
QUICK ATTACH	no	
CATEGORY	II	*not measured
LOAD lbs (kg)	12092 (5485)	
TIME sec	3.48	
HITCH POINT MOVEMENT in (mm)		
Lowest position	13.5 (343)	
Top of timed range	37.5 (953)	
Highest position	38.2 (970)	
LOAD CG MOVEMENT in (mm)		
Lowest position	14.6 (371)	
Top of timed range	38.0 (965)	
Highest position	38.7 (983)	

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



Hitch Dimensions as Tested — No Load

	inch	mm
A	31.0	787
B	10.8	275
C	16.9	430
D	16.1	409
E	9.0	229
F	11.0	280
G	33.8	858
H	2.5	64
I	16.7	425
J	22.8	578
K	21.5	546
L	48.5	1232
M	26.2	665
N	40.0	1016
O	8.0	203
P	41.8	1060
Q	36.9	937
R	35.4	899



Hesston 180-90 Powershift Diesel

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