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Test 1656: Ford 5640 (16x4) Diesel 16-Speed

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 1656—SUMMARY 105

FORD 5640 16 x 4 DIESEL

16 SPEED

Location of Test: Tractor Testing Laboratory,
University of Nebraska, Lincoln, Nebraska 68583-0832

Dates of Test: April 22-May 12, 1992

Manufacturer: FORD NEW HOLLAND, 500
Diller Avenue, New Holland, PA 17557

FUEL, OIL and TIME: Fuel No. 2 Diesel Cetane No. 53.9 Specific gravity converted to 60°/60°F (15°/15°C) 0.8381 Fuel weight 6.978 lbs/gal (0.836 kg/l) Oil SAE 15W-40 API service classification SG/CE To motor 2.358 gal (8.924 l) Drained from motor 2.044 gal (7.737 l) Transmission and final drive lubricant Ford M2C 134D fluid Front axle lubricant Ford M2C 134D fluid Total time engine was operated 34.0 hours.

ENGINE: Make Ford Diesel Type four cylinder vertical Serial No. *EA334873* Crankshaft lengthwise Rated rpm 2200 Bore and stroke (as specified) 4.4" × 4.4" (111.8 mm × 111.8 mm) Compression ratio 17.5 to 1 Displacement 268 cu in (4400 ml) Starting system 12 volt Lubrication pressure Air cleaner two paper elements and aspirator Oil filter one full flow cartridge Oil cooler heat exchanger in lower radiator for crankcase oil, radiator transmission and hydraulic fluid Fuel filter one paper element and sediment bowl Muffler vertical Cooling medium temperature control one thermostat.

ENGINE OPERATING PARAMETERS: Fuel rate 28.0-30.0 lb/hr (12.7-13.6 kg/hr) High idle 2295-2375 rpm

CHASSIS: Type front wheel assist Serial No. *BD05905* Tread width rear 56.8" (1442 mm) to 90.0" (2286 mm) front 55.6" (1412 mm) to 83.4" (2119 mm) Wheel base 93.0" (2362 mm) Hydraulic control system direct engine drive Transmission selective gear fixed ratio with partial (2) range operator controlled powershift Nominal travel speeds mph (km/h) first 1.42 (2.29) second 1.78 (2.85) third 1.82 (2.94) fourth 2.29 (3.67) fifth 3.11 (5.01) sixth 4.00 (6.44) seventh 4.24 (6.82) eighth 5.09 (8.18) ninth 5.45 (8.77) tenth 6.34 (10.21) eleventh 6.52 (10.51) twelfth 8.16 (13.12) thirteenth 11.13 (17.91) fourteenth 14.31 (23.03) fifteenth 15.15 (24.37) sixteenth 19.47 (31.34) reverse 2.05 (3.29), 2.63 (4.23), 7.30 (11.75), 9.39 (15.11) Clutch single dry disc operated by foot pedal Brakes wet multiple disc operated by two foot pedals which can be locked together Steering hydrostatic Power take-off 540 rpm at 1902 engine rpm Unladen tractor mass 8070 lb (3660 kg).

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—624 rpm)					
66.26 (49.41)	2199	4.14 (15.68)	0.436 (0.265)	16.00 (3.15)	
Standard PTO Speed (PTO—540 rpm)					
63.17 (47.10)	1904	3.79 (14.34)	0.419 (0.255)	16.67 (3.28)	

Air temperature

76°F (24°C)

Relative humidity

31%

Barometer

28.99" Hg (98.18 kPa)

VARYING POWER AND FUEL CONSUMPTION

66.26 (49.41)	2199	4.14 (15.68)	0.436 (0.265)	16.00 (3.15)
57.45 (42.84)	2243	3.70 (14.00)	0.449 (0.273)	15.54 (3.06)
43.53 (32.46)	2265	3.10 (11.72)	0.496 (0.302)	14.06 (2.77)
29.21 (21.78)	2282	2.45 (9.28)	0.585 (0.356)	11.92 (2.35)
14.71 (10.97)	2296	1.89 (7.16)	0.897 (0.546)	7.77 (1.53)
0.40 (0.30)	2310	1.33 (5.05)	23.293 (14.168)	0.30 (0.06)

Maximum Torque 187 lb.-ft (254 Nm) at 1297 rpm

Maximum Torque Rise 18.4%

DRAWBAR PERFORMANCE

FUEL CONSUMPTION CHARACTERISTICS

(Front Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—8th (5L) Gear									
59.99 (44.73)	4482 (19.93)	5.02 (8.08)	2198	3.22	0.489 (0.298)	14.27 (2.81)	183 (84)	64 (18)	29.12 (98.61)
75% of Pull at Maximum Power—8th (5L) Gear									
46.55 (34.71)	3361 (14.95)	5.19 (8.36)	2256	2.45	0.533 (0.324)	13.10 (2.58)	183 (84)	73 (23)	29.08 (98.48)
50% of Pull at Maximum Power—8th (5L) Gear									
31.62 (23.58)	2244 (9.98)	5.28 (8.50)	2279	1.75	0.619 (0.377)	11.27 (2.22)	182 (83)	73 (23)	29.08 (98.48)
75% of Pull at Reduced Engine Speed—10th (6L) Gear									
46.71 (34.83)	3363 (14.96)	5.21 (8.38)	1814	2.53	0.480 (0.292)	14.54 (2.87)	183 (84)	73 (23)	29.08 (98.48)
50% of Pull at Reduced Engine Speed—10th (6L) Gear									
31.56 (23.54)	2343 (9.98)	5.28 (8.49)	1824	1.75	0.532 (0.323)	13.13 (2.59)	182 (83)	73 (23)	29.08 (98.48)

DRAWBAR PERFORMANCE MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
4th (2H) Gear									
46.34 (34.56)	8611 (38.30)	2.02 (3.25)	2238	14.91	0.593 (0.361)	11.76 (2.32)	182 (83)	52 (11)	29.13 (98.65)
5th (3L) Gear									
57.83 (43.12)	7224 (32.13)	3.00 (4.83)	2202	5.81	0.511 (0.311)	13.65 (2.69)	183 (84)	58 (14)	29.13 (98.65)
6th (3H) Gear									
57.07 (42.56)	5445 (24.22)	3.93 (6.33)	2199	3.90	0.515 (0.313)	13.54 (2.67)	184 (84)	60 (16)	29.12 (98.61)
7th (4L) Gear									
59.72 (44.54)	5383 (23.94)	4.16 (6.70)	2200	3.97	0.500 (0.304)	13.97 (2.75)	184 (84)	62 (17)	29.12 (98.61)
8th (5L) Gear									
59.99 (44.73)	4482 (19.93)	5.02 (8.08)	2198	3.22	0.489 (0.298)	14.27 (2.81)	183 (84)	64 (18)	29.12 (98.61)
9th (4H) Gear									
57.18 (42.64)	3953 (17.58)	5.42 (8.73)	2205	2.83	0.513 (0.312)	13.61 (2.68)	184 (84)	65 (18)	29.11 (98.58)
10th (6L) Gear									
58.46 (43.60)	3464 (15.41)	6.33 (10.19)	2204	2.53	0.503 (0.306)	13.87 (2.73)	184 (84)	65 (18)	29.11 (98.58)
11th (5H) Gear									
57.67 (43.00)	3311 (14.73)	6.53 (10.51)	2205	2.37	0.507 (0.308)	13.78 (2.71)	184 (84)	66 (19)	29.11 (98.58)
12th (6H) Gear									
55.85 (41.65)	2562 (11.39)	8.18 (13.16)	2201	1.91	0.523 (0.318)	13.36 (2.63)	183 (84)	67 (19)	29.11 (98.58)

DRAWBAR PERFORMANCE MAXIMUM POWER IN SELECTED GEARS (Ballasted Tractor)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3rd (1H) Gear									
43.21 (32.22)	9927 (44.16)	1.63 (2.63)	2249	14.15	0.598 (0.364)	11.67 (2.30)	183 (84)	61 (16)	28.88 (97.80)
4th (2H) Gear									
53.74 (40.08)	9568 (42.56)	2.11 (3.39)	2205	9.44	0.541 (0.329)	12.91 (2.54)	183 (84)	63 (17)	28.87 (97.77)
5th (3L) Gear									
57.47 (42.86)	7095 (31.56)	3.04 (4.89)	2205	4.33	0.510 (0.310)	13.67 (2.69)	185 (85)	66 (19)	28.85 (97.70)
6th (3H) Gear									
56.52 (42.15)	5361 (23.84)	3.95 (6.36)	2201	2.98	0.517 (0.315)	13.49 (2.66)	182 (83)	61 (16)	28.72 (97.26)
7th (4L) Gear									
58.70 (43.77)	5252 (23.36)	4.19 (6.75)	2204	2.98	0.497 (0.302)	14.06 (2.77)	182 (83)	63 (17)	28.72 (97.26)
8th (5L) Gear									
59.00 (44.00)	4387 (19.51)	5.04 (8.12)	2201	2.45	0.496 (0.301)	14.08 (2.77)	182 (83)	65 (18)	28.73 (97.29)
9th (4H) Gear									
56.25 (41.94)	3955 (17.59)	5.33 (8.58)	2168	2.37	0.519 (0.316)	13.44 (2.65)	183 (84)	65 (18)	28.73 (97.29)
10th (6L) Gear									
57.82 (43.11)	3416 (15.19)	6.35 (10.22)	2211	2.06	0.507 (0.309)	13.76 (2.71)	183 (84)	67 (19)	28.74 (97.32)
11th (5H) Gear									
56.35 (42.02)	3239 (14.41)	6.53 (10.50)	2206	2.06	0.520 (0.316)	13.41 (2.64)	184 (84)	69 (21)	28.75 (97.36)
12th (6H) Gear									
54.74 (40.82)	2516 (11.19)	8.16 (13.13)	2200	1.60	0.534 (0.325)	13.06 (2.57)	184 (84)	71 (22)	28.75 (97.36)

REPAIRS AND ADJUSTMENTS: The tube in the left rear tire was replaced after the maximum pull tests due to the tire slipping on the rim. The fuel pump was replaced during the preliminary PTO testing.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump was maintained at 137° F (58° C). The performance figures on this summary were taken from a test conducted under the OECD Code II restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1656**, Summary 105, June 8, 1992.

LOUIS I. LEVITICUS
Engineer-in-Charge

L. L. BASHFORD

R. D. GRISIO

K. VON BARGEN

Board of Tractor Test Engineers

DRAWBAR PERFORMANCE **FUEL CONSUMPTION CHARACTERISTICS** **(Front Drive Disengaged)**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—8th (5L) Gear									
59.37 (44.28)	4459 (19.83)	4.99 (8.04)	2203	2.78	0.494 (0.300)	14.13 (2.78)	183 (84)	65 (18)	28.73 (97.29)
75% of Pull at Maximum Power—8th (5L) Gear									
45.94 (34.26)	3342 (14.86)	5.16 (8.30)	2257	2.01	0.532 (0.323)	13.13 (2.59)	183 (84)	73 (23)	28.80 (97.53)
50% of Pull at Maximum Power—8th (5L) Gear									
31.21 (23.27)	* 2232 (9.93)	5.24 (8.44)	2281	1.40	0.625 (0.380)	11.16 (2.20)	182 (83)	73 (23)	28.80 (97.53)
75% of Pull at Reduced Engine Speed—10th (6L) Gear									
46.03 (34.33)	3345 (14.88)	5.16 (8.31)	1810	2.01	0.482 (0.293)	14.46 (2.85)	184 (84)	73 (23)	28.80 (97.53)
50% of Pull at Reduced Engine Speed—10th (6L) Gear									
31.16 (23.24)	2230 (9.92)	5.24 (8.43)	1825	1.32	0.530 (0.322)	13.17 (2.59)	182 (83)	73 (23)	28.80 (97.53)

DRAWBAR PERFORMANCE **MAXIMUM POWER IN SELECTED GEARS**

4th (2H) Gear									
44.17 (32.94)	8257 (36.73)	2.01 (3.23)	2241	14.51	0.595 (0.362)	11.73 (2.31)	183 (84)	64 (18)	28.86 (97.73)
5th (3L) Gear									
56.64 (42.24)	7168 (31.88)	2.96 (4.77)	2202	5.86	0.514 (0.312)	13.59 (2.68)	184 (84)	70 (21)	28.84 (97.66)
6th (3H) Gear									
56.56 (42.18)	5423 (24.12)	3.91 (6.29)	2198	3.16	0.517 (0.315)	13.50 (2.66)	182 (83)	62 (17)	28.72 (97.26)
7th (4L) Gear									
58.76 (43.82)	5312 (23.63)	4.15 (6.68)	2204	3.23	0.498 (0.303)	14.00 (2.76)	182 (83)	64 (18)	28.72 (97.26)
8th (5L) Gear									
59.37 (44.28)	4459 (19.83)	4.99 (8.04)	2203	2.78	0.494 (0.300)	14.13 (2.78)	183 (84)	65 (18)	28.73 (97.29)
9th (4H) Gear									
56.66 (42.25)	3950 (17.57)	5.38 (8.66)	2202	2.32	0.517 (0.314)	13.50 (2.66)	184 (84)	66 (19)	28.74 (97.32)
10th (6L) Gear									
58.78 (43.83)	3512 (15.62)	6.28 (10.10)	2205	2.17	0.498 (0.303)	14.02 (2.76)	184 (84)	68 (20)	28.74 (97.32)
11th (5H) Gear									
57.37 (42.78)	3226 (14.79)	6.47 (10.41)	2203	2.01	0.511 (0.311)	13.65 (2.69)	184 (84)	70 (21)	28.75 (97.36)
12th (6H) Gear									
55.72 (41.55)	2594 (11.54)	8.06 (12.97)	2190	1.63	0.524 (0.319)	13.31 (2.62)	185 (85)	71 (22)	28.76 (97.39)

TRACTOR SOUND LEVEL WITHOUT CAB

dB(A)

At 75% of load in 8th (5L) gear — front drive engaged	97.0
Bystander	NA

TIRES AND WEIGHT

Rear Tires—No., size, ply & psi (kPa)
Ballast—Liquid (total)
 —Cast Iron (total)
Front Tires—No., size, ply & psi (kPa)
Ballast—Liquid (total)
 —Cast Iron (total)
Height of Drawbar
Static Weight with Operator—Rear
 —Front
 —Total

With Ballast

Two 18.4R34; *, 12 (85)
 932 lb (423 kg)
 600 lb (272 kg)
 Two 14.9-24; 6; 14 (95)
 None
 None
 17.0 in (430 mm)
 6528 lb (2961 kg)
 3240 lb (1470 kg)
 9768 lb (4431 kg)

Without Ballast

Two 18.4R34; *, 12 (85)
 None
 None
 Two 14.9-24; 6; 14 (95)
 None
 None
 17.5 in (445 mm)
 4996 lb (2266 kg)
 3240 lb (1470 kg)
 8236 lb (3736 kg)

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi. (bar)	2675 (184)				
Location	remote outlet				
Hydraulic oil temperature °F(°C)	164 (73)				
Location	rear axle sump				
Category	II				
Quick attach	none				
Hitch point distance to ground level in. (mm)	8.0 (203)	15.0 (381)	22.1 (561)	29.0 (737)	36.0 (914)
Lift force on frame lb.	5788	5582	6454	6091	5129
" " " " " (kN)	(25.7)	(24.8)	(28.7)	(27.1)	(22.8)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: II

Quick Attach: none

Maximum Force Exerted

Through Whole Range: 3879 lbs (17.3 kN)

i) Opening pressure of relief valve: NA

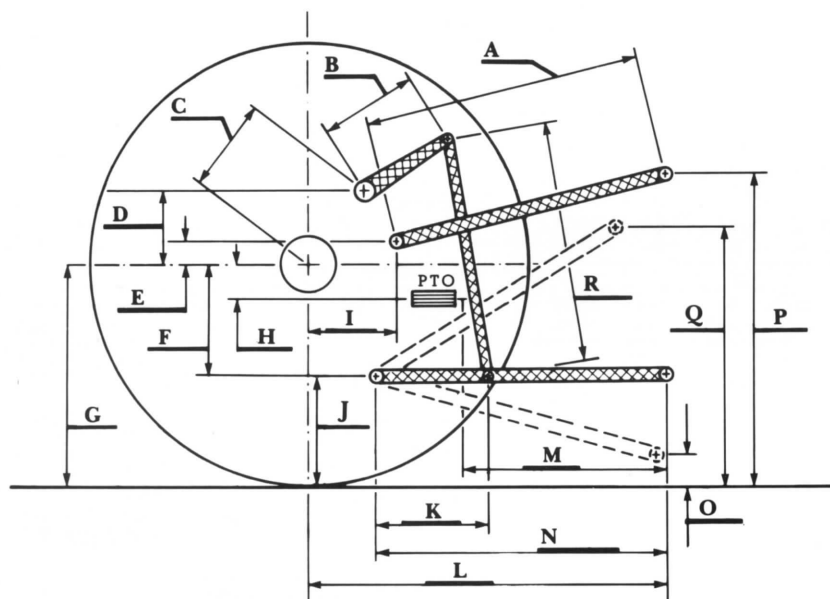
Sustained pressure with relief valve open: 2560 psi (176 bar)

ii) Pump delivery rate at minimum pressure and rated engine speed: 18.3 GPM (69.3 l/min)

iii) Pump delivery rate at maximum hydraulic power: 14.7 GPM (55.6 l/min)

Delivery pressure: 2400 psi (165 bar)

Power: 20.6 HP (15.3 kW)



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	28.1	714
B	10.0	254
C	14.0	356
D	13.4	341
E	8.1	205
F	9.0	229
G	30.3	770
H	1.3	33
I	12.8	325
J	21.3	541
K	20.5	520
L	40.0	1017
M	22.0	559
N	36.0	915
O	8.0	203
P	45.3	1151
Q	32.3	820
R	33.8	857



Ford 5640 16 x 4 Diesel

Agricultural Research Division
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University of Nebraska-Lincoln
Darrell Nelson, Dean and Director