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Test 1657: Ford 6640 (16x4) Diesel 16-Speed

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

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NEBRASKA OECD TRACTOR TEST 1657—SUMMARY 106

FORD 6640 16 x 4 DIESEL

16 SPEED

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

Dates of Test: April 24-May 11, 1992

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

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—1072 rpm) | | | | | |
| 76.75 (57.23) | 2199 | 4.70 (17.79) | 0.427 (0.260) | 16.33 (3.22) | |
| Maximum Power (2 Hours) | | | | | |
| 77.13 (57.51) | 2150 | 4.66 (17.63) | 0.421 (0.256) | 16.56 (3.26) | |
| Standard PTO Speed (PTO—1000 rpm) | | | | | |
| 75.63 (56.39) | 2050 | 4.48 (16.95) | 0.413 (0.251) | 16.89 (3.33) | |

VARYING POWER AND FUEL CONSUMPTION

| | | | | | |
|------------------|------|-----------------|-------------------|-----------------|-----------------------|
| 76.75 (57.23) | 2199 | 4.70 (17.79) | 0.427 (0.260) | 16.33 (3.22) | Air temperature |
| | | | | | 75°F (24°C) |
| 66.06 (49.26) | 2229 | 4.21 (15.95) | 0.445 (0.271) | 15.68 (3.09) | Relative humidity |
| | | | | | 26% |
| 49.95 (37.25) | 2248 | 3.53 (13.34) | 0.492 (0.300) | 14.17 (2.79) | Barometer |
| | | | | | 29.19" Hg (98.86 kPa) |
| 33.56 (25.02) | 2267 | 2.75 (10.42) | 0.572 (0.348) | 12.20 (2.40) | |
| 16.84 (12.56) | 2284 | 2.06 (7.81) | 0.855 (0.520) | 8.16 (1.61) | |
| 0.64 (0.48) | 2304 | 1.46 (5.53) | 15.898 (9.670) | 0.44 (0.09) | |

Maximum Torque 220 lb.-ft (299 Nm) at 1101 rpm
Maximum Torque Rise 20.2%

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 | | | | | | | | | |
| 67.18 (50.10) | 5033 (22.39) | 5.01 (8.06) | 2200 | 3.49 | 0.484 (0.295) | 14.41 (2.84) | 184 (84) | 70 (21) | 28.88 (97.80) |
| 75% of Pull at Maximum Power—8th (5L) Gear | | | | | | | | | |
| 51.61 (38.49) | 3774 (16.79) | 5.13 (8.25) | 2235 | 2.65 | 0.529 (0.322) | 13.18 (2.60) | 180 (82) | 76 (24) | 28.85 (97.70) |
| 50% of Pull at Maximum Power—8th (5L) Gear | | | | | | | | | |
| 35.03 (26.12) | 2516 (11.19) | 5.22 (8.41) | 2256 | 1.80 | 0.639 (0.389) | 10.92 (2.15) | 177 (81) | 76 (24) | 28.85 (97.70) |
| 75% of Pull at Reduced Engine Speed—10th (6L) Gear | | | | | | | | | |
| 51.54 (38.43) | 3772 (16.78) | 5.12 (8.25) | 1789 | 2.65 | 0.471 (0.286) | 14.82 (2.92) | 181 (83) | 76 (24) | 28.85 (97.70) |
| 50% of Pull at Reduced Engine Speed—10th (6L) Gear | | | | | | | | | |
| 35.01 (26.11) | 2514 (11.18) | 5.22 (8.41) | 1808 | 1.80 | 0.533 (0.324) | 13.10 (2.58) | 178 (81) | 76 (24) | 28.85 (97.70) |

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 2.538 gal (9.609 l) Drained from motor 1.870 gal (7.080 l) Transmission and final drive lubricant Ford M2C 134D fluid Front axle lubricant Ford M2C 134D fluid Total time engine was operated 29.0 hours.

ENGINE: Make Ford Diesel Type four cylinder vertical Serial No. *NA334823* Crankshaft lengthwise Rated rpm 2200 Bore and stroke (as specified) 4.4" × 5.0" (111.8 mm × 127.0 mm) Compression ratio 17.5 to 1 Displacement 304 cu in (5000 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 for hydraulic and transmission oil Fuel filter one paper element and sediment bowl and sediment bowl Muffler vertical Cooling medium temperature control one thermostat.

ENGINE OPERATING PARAMETERS: Fuel rate 31.3-34.8 lb/hr (14.2-15.8 kg/hr) High idle 2295-2375 rpm

CHASSIS: Type front wheel assist Serial No. *BD05394* 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 1890 engine rpm and 1000 rpm at 2049 engine rpm Unladen tractor mass 8135 lb (3690 kg).

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

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 | | | | | | | | | |
| 46.63 (34.78) | 8611 (38.30) | 2.03 (3.27) | 2238 | 14.29 | 0.607 (0.369) | 11.49 (2.26) | 177 (81) | 63 (17) | 28.85 (97.70) |
| 5th (3L) Gear | | | | | | | | | |
| 61.81 (46.09) | 8155 (36.28) | 2.84 (4.57) | 2186 | 10.03 | 0.528 (0.321) | 13.22 (2.60) | 180 (82) | 72 (22) | 28.85 (97.70) |
| 6th (3H) Gear | | | | | | | | | |
| 63.91 (47.66) | 6286 (27.96) | 3.81 (6.14) | 2154 | 4.75 | 0.507 (0.308) | 13.77 (2.71) | 185 (85) | 70 (21) | 28.89 (97.83) |
| 7th (4L) Gear | | | | | | | | | |
| 66.36 (49.48) | 6148 (27.35) | 4.05 (6.51) | 2157 | 4.61 | 0.485 (0.295) | 14.39 (2.83) | 183 (84) | 70 (21) | 28.90 (97.87) |
| 8th (5L) Gear | | | | | | | | | |
| 67.45 (50.30) | 5153 (22.92) | 4.91 (7.90) | 2161 | 3.64 | 0.480 (0.292) | 14.54 (2.86) | 185 (85) | 70 (21) | 28.91 (97.90) |
| 9th (4H) Gear | | | | | | | | | |
| 65.04 (48.50) | 4608 (20.50) | 5.29 (8.52) | 2163 | 3.26 | 0.500 (0.304) | 13.96 (2.75) | 185 (85) | 70 (21) | 28.87 (97.77) |
| 10th (6L) Gear | | | | | | | | | |
| 67.24 (50.14) | 4089 (18.19) | 6.17 (9.92) | 2156 | 2.80 | 0.481 (0.293) | 14.50 (2.86) | 185 (85) | 70 (21) | 28.85 (97.70) |
| 11th (5H) Gear | | | | | | | | | |
| 65.59 (48.91) | 3876 (17.24) | 6.35 (10.21) | 2153 | 2.73 | 0.493 (0.300) | 14.15 (2.79) | 185 (85) | 71 (22) | 28.83 (97.63) |
| 12th (6H) Gear | | | | | | | | | |
| 64.55 (48.14) | 3026 (13.46) | 8.00 (12.87) | 2160 | 2.11 | 0.501 (0.305) | 13.92 (2.74) | 184 (84) | 71 (22) | 28.81 (97.56) |

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) |
|---------------------|--------------------------------|------------------------|---------------------------------|-----------|---|-----------------------|-------------------------------------|--------------------|-------------------------------|
| 4th (2H) Gear | | | | | | | | | |
| 55.65 (41.50) | 10512 (46.76) | 1.99 (3.19) | 2213 | 14.77 | 0.575 (0.350) | 12.13 (2.39) | 180 (82) | 62 (17) | 28.74 (97.32) |
| 5th (3L) Gear | | | | | | | | | |
| 65.20 (48.62) | 8173 (36.35) | 2.99 (4.81) | 2188 | 4.83 | 0.499 (0.303) | 14.00 (2.76) | 181 (83) | 68 (20) | 28.73 (97.29) |
| 6th (3H) Gear | | | | | | | | | |
| 64.61 (48.18) | 6259 (27.84) | 3.87 (6.23) | 2168 | 3.35 | 0.500 (0.304) | 13.94 (2.75) | 184 (84) | 70 (21) | 28.72 (97.26) |
| 7th (4L) Gear | | | | | | | | | |
| 66.25 (49.41) | 6067 (26.99) | 4.10 (6.59) | 2162 | 3.12 | 0.487 (0.296) | 14.34 (2.82) | 184 (84) | 73 (23) | 28.72 (97.26) |
| 8th (5L) Gear | | | | | | | | | |
| 67.31 (50.19) | 5090 (22.64) | 4.96 (7.98) | 2171 | 2.51 | 0.483 (0.294) | 14.45 (2.85) | 183 (84) | 68 (20) | 28.54 (96.65) |
| 9th (4H) Gear | | | | | | | | | |
| 64.77 (48.30) | 4565 (20.30) | 5.32 (8.56) | 2170 | 2.44 | 0.500 (0.304) | 13.95 (2.75) | 186 (86) | 75 (24) | 28.71 (97.22) |
| 10th (6L) Gear | | | | | | | | | |
| 66.38 (49.50) | 4000 (17.79) | 6.22 (10.02) | 2175 | 2.13 | 0.489 (0.297) | 14.28 (2.81) | 183 (84) | 68 (20) | 28.55 (96.68) |
| 11th (5H) Gear | | | | | | | | | |
| 64.75 (48.28) | 3749 (16.68) | 6.48 (10.42) | 2191 | 1.90 | 0.505 (0.307) | 13.82 (2.72) | 182 (83) | 70 (21) | 28.56 (96.72) |
| 12th (6H) Gear | | | | | | | | | |
| 62.68 (46.74) | 2926 (13.02) | 8.03 (12.93) | 2169 | 1.51 | 0.518 (0.315) | 13.46 (2.65) | 184 (84) | 70 (21) | 28.57 (96.75) |

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 135° F (57° 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. **1657**, Summary 106, June 8, 1992.

LOUIS I. LEVITICUS

Engineer-in-Charge

L. L. BASHFORD

R. D. GRISSO

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 | | | | | | | | | |
| 67.93 (50.66) | 5110 (22.73) | 4.99 (8.02) | 2201 | 2.68 | 0.481 (0.293) | 14.50 (2.86) | 183 (84) | 68 (20) | 28.54 (96.65) |
| 75% of Pull at Maximum Power—8th (5L) Gear | | | | | | | | | |
| 51.06 (38.08) | 3753 (16.69) | 5.10 (8.21) | 2239 | 2.07 | 0.529 (0.322) | 13.20 (2.60) | 183 (84) | 85 (29) | 28.68 (97.12) |
| 50% of Pull at Maximum Power—8th (5L) Gear | | | | | | | | | |
| 34.94 (26.05) | 2502 (11.13) | 5.24 (8.43) | 2284 | 1.45 | 0.629 (0.383) | 11.09 (2.18) | 180 (82) | 85 (29) | 28.68 (97.12) |
| 75% of Pull at Reduced Engine Speed—10th (6L) Gear | | | | | | | | | |
| 51.06 (38.07) | 3753 (16.69) | 5.10 (8.21) | 1794 | 2.07 | 0.464 (0.282) | 15.05 (2.96) | 186 (85) | 85 (29) | 28.68 (97.12) |
| 50% of Pull at Reduced Engine Speed—10th (6L) Gear | | | | | | | | | |
| 34.97 (26.08) | 2508 (11.16) | 5.23 (8.42) | 1824 | 1.29 | 0.520 (0.316) | 13.41 (2.64) | 180 (82) | 85 (29) | 28.68 (97.12) |

DRAWBAR PERFORMANCE MAXIMUM POWER IN SELECTED GEARS

| | | | | | | | | | |
|-----------------------|-----------------|-----------------|------|-------|------------------|-----------------|-------------|------------|------------------|
| 4th (2H) Gear | | | | | | | | | |
| 48.10 (35.87) | 9022 (40.13) | 2.00 (3.22) | 2232 | 14.29 | 0.596 (0.362) | 11.71 (2.31) | 179 (81) | 66 (19) | 28.74 (97.32) |
| 5th (3L) Gear | | | | | | | | | |
| 63.93 (47.67) | 8315 (36.99) | 2.88 (4.64) | 2178 | 7.23 | 0.505 (0.307) | 13.81 (2.72) | 182 (83) | 69 (21) | 28.73 (97.29) |
| 6th (3H) Gear | | | | | | | | | |
| 64.62 (48.19) | 6329 (28.15) | 3.83 (6.16) | 2168 | 3.73 | 0.502 (0.305) | 13.90 (2.74) | 184 (84) | 72 (22) | 28.72 (97.26) |
| 7th (4L) Gear | | | | | | | | | |
| 66.29 (49.43) | 6151 (27.36) | 4.04 (6.50) | 2162 | 3.73 | 0.486 (0.295) | 14.36 (2.83) | 185 (85) | 74 (23) | 28.72 (97.26) |
| 8th (5L) Gear | | | | | | | | | |
| 67.93 (50.66) | 5110 (22.73) | 4.99 (8.02) | 2201 | 2.68 | 0.481 (0.293) | 14.50 (2.86) | 183 (84) | 68 (20) | 28.54 (97.65) |
| 9th (4H) Gear | | | | | | | | | |
| 65.78 (49.05) | 4657 (20.71) | 5.30 (8.53) | 2175 | 2.45 | 0.491 (0.299) | 14.21 (2.80) | 186 (85) | 71 (22) | 28.58 (96.78) |
| 10th (6L) Gear | | | | | | | | | |
| 67.15 (50.08) | 4042 (17.98) | 6.23 (10.03) | 2192 | 2.14 | 0.484 (0.294) | 14.42 (2.84) | 183 (84) | 70 (21) | 28.55 (96.68) |
| 11th (5H) Gear | | | | | | | | | |
| 66.17 (49.34) | 3860 (17.17) | 6.43 (10.35) | 2192 | 1.99 | 0.491 (0.299) | 14.20 (2.80) | 184 (84) | 70 (21) | 28.56 (96.72) |
| 12th (6H) Gear | | | | | | | | | |
| 64.37 (48.00) | 3033 (13.49) | 7.96 (12.81) | 2167 | 1.61 | 0.503 (0.306) | 13.86 (2.73) | 184 (84) | 71 (22) | 28.57 (96.73) |

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)

1468 lb (666 kg)

600 lb (272 kg)

Two 14.9-24; 6; 14 (95)

None

None

17.0 in (430 mm)

7138 lb (3238 kg)

3230 lb (1465 kg)

10368 lb (4703 kg)

Without Ballast

Two 18.4R34; *, 12 (85)

None

None

Two 14.9-24; 6; 14 (95)

None

None

17.5 in (445 mm)

5026 lb (2280 kg)

3274 lb (1485 kg)

8300 lb (3765 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. (kN) | 5788 (25.7) | 5582 (24.8) | 6454 (28.7) | 6091 (27.1) | 5129 (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

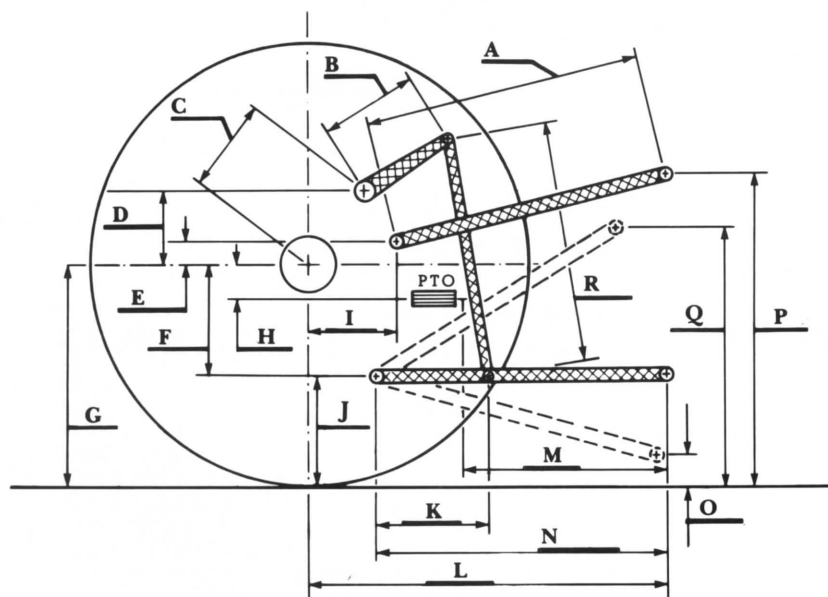
Sustained pressure with relief valve open: 2670 psi (184 bar)

ii) Pump delivery rate at minimum pressure and rated engine speed: 18.4 GPM (69.7 l/min)

iii) Pump delivery rate at maximum hydraulic power: 14.9 GPM (56.4 l/min)

Delivery pressure: 2450 psi (169 bar)

Power: 21.3 HP (15.9 kW)



| | 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 |

HITCH DIMENSIONS AS TESTED—NO LOAD



Ford 6640 16 x 4 Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Darrell Nelson, Dean and Director