1-1-1991

Test 1646: Ford 8630 Powershift Diesel 18-Speed

Nebraska Tractor Test Lab
University of Nebraska-Lincoln, tractortestlab@unl.edu

NEBRASKA OECD TRACTOR TEST 1646—SUMMARY 084
FORD 8630 POWERSHIFT DIESEL
18 SPEED

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—1147 rpm)					
121.77 *(90.80)*	2199	7.74 *(29.30)*	0.444 *(0.270)*	15.73 *(3.10)*	
Standard PTO Speed (PTO—1000 RPM)					
117.10 *(87.32)*	1916	7.00 *(26.49)*	0.418 *(0.254)*	16.73 *(3.30)*	Air temperature
VARYING POWER AND FUEL CONSUMPTION					
121.77 *(90.80)*	2199	7.74 *(29.30)*	0.444 *(0.270)*	15.73 *(3.10)*	74°F *(23°C)*
111.68 *(83.28)*	2375	7.64 *(28.91)*	0.478 *(0.291)*	14.62 *(2.88)*	Relative humidity
84.69 *(63.16)*	2402	6.48 *(24.52)*	0.535 *(0.325)*	13.07 *(2.58)*	69%
57.10 *(42.58)*	2425	5.23 *(19.81)*	0.641 *(0.390)*	10.91 *(2.15)*	Barometer
28.56 *(21.29)*	2437	3.90 *(14.78)*	0.956 *(0.582)*	7.31 *(1.44)*	28.73" Hg *(97.29 kPa)*
0.49 *(0.36)*	2455	2.70 *(10.23)*	38.744 *(23.567)*	0.18 *(0.04)*	

Maximum Torque 348 lb.-ft *(471 Nm)* at 1501 rpm
Maximum Torque Rise 19.5%

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)*	Fuel Consumption Hp.hr/gal *(kW.h/l)*	Temp.°F *(°C)* cool-ing med	Temp.°F *(°C)* Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Power—10th Gear									
104.00 *(77.55)*	7903 *(35.15)*	4.93 *(7.94)*	2198	3.21	0.516 *(0.314)*	13.55 *(2.67)*	190 *(88)*	73 *(23)*	28.75 *(97.36)*
75% of Pull at Maximum Power—10th Gear									
85.80 *(63.98)*	5928 *(26.37)*	5.43 *(8.74)*	2395	2.31	0.587 *(0.357)*	11.91 *(2.35)*	186 *(86)*	76 *(24)*	28.74 *(97.32)*
50% of Pull at Maximum Power—10th Gear									
58.47 *(43.60)*	3957 *(17.60)*	5.54 *(8.92)*	2427	1.57	0.710 *(0.432)*	9.85 *(1.94)*	185 *(85)*	76 *(24)*	28.74 *(97.32)*
75% of Pull at Reduced Engine Speed—11th Gear									
85.71 *(63.92)*	5927 *(26.36)*	5.42 *(8.73)*	2024	2.31	0.516 *(0.314)*	13.56 *(2.67)*	186 *(85)*	76 *(24)*	28.74 *(97.32)*
50% of Pull at Reduced Engine Speed—11th Gear									
58.39 *(43.54)*	3955 *(17.59)*	5.54 *(8.91)*	2051	1.57	0.594 *(0.362)*	11.77 *(2.32)*	185 *(85)*	76 *(24)*	28.74 *(97.32)*

Location of Test: Tractor Testing Laboratory, University of Nebraska, Lincoln, Nebraska 68583-0832, U.S.A.

Dates of Test: May 14-21, 1991

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)*** 0.8399 **Fuel weight** 6.993 lbs/gal *(0.838 kg/l)* **Oil SAE** 15W-40 **API service classification** SG/CE **To motor** 4.018 gal *(15.210 l)* **Drained from motor** 3.755 gal *(14.213 l)* **Transmission and final drive lubricant** Ford M2C 134D fluid **Hydraulic lubricant** Ford M2C 134D fluid **Front axle lubricant** Ford M2C 134D fluid **Total time engine was operated** 19.5 hours.

ENGINE: Make Ford Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *U293287* **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** (as specified) 4.4" × 4.4" *(111.8 mm × 111.8 mm)* **Compression ratio** 15.6 to 1 **Displacement** 401 cu in *(6572 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, radiator for hydraulic and transmission oil **Fuel filter** one paper element and sediment bowl **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

ENGINE OPERATING PARAMETERS: Fuel rate 52.2-57.6 lb/hr *(23.7-26.1 kg/hr)* **High idle** 2425-2475 rpm **Turbo boost** nominal 15-19 psi *(103-131 kPa)* as measured 15.4 psi *(106 kPa)*

CHASSIS: Type front wheel assist **Serial No.** *A928884* **Tread width** rear 64.0" *(1625 mm)* to 120.0" *(3048 mm)* front 59.8" *(1520 mm)* to 84.0" *(2134 mm)* **Wheel base** 105.0" *(2667 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Nominal travel speeds mph *(km/h)*** first 1.20 *(1.94)* second 1.43 *(2.30)* third 1.67 *(2.69)* fourth 1.91 *(3.08)* fifth 2.26 *(3.64)* sixth 2.65 *(4.26)* seventh 3.11 *(5.01)* eighth 3.68 *(5.92)* ninth 4.31 *(6.93)* tenth 5.01 *(8.07)* eleventh 5.92 *(9.53)* twelfth 6.93 *(11.16)* thirteenth 7.94 *(12.78)* fourteenth 9.38 *(15.10)* fifteenth 10.98 *(17.67)* sixteenth 12.92 *(20.80)* seventeenth 15.28 *(24.59)* eighteenth 17.88 *(28.77)* reverse 1.93 *(3.11)*, 2.28 *(3.67)*, 2.67 *(4.30)*, 3.06 *(4.92)*, 3.62 *(5.82)*, 4.23 *(6.81)*, 4.98 *(8.02)*, 5.88 *(9.47)*, 6.89 *(11.09)* **Clutch** multiple wet disc electro-hydraulically operated by foot pedal **Brakes** wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 1873 engine rpm and 1000 rpm at 1919

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)*
				5th Gear					
78.37	13794	2.13	2403	14.83	0.659	10.61	184	70	28.73
(58.44)	*(61.36)*	*(3.43)*			*(0.401)*	*(2.09)*	*(84)*	*(21)*	*(97.29)*
				6th Gear					
91.12	12866	2.66	2378	8.68	0.599	11.68	186	72	28.74
(67.95)	*(57.23)*	*(4.27)*			*(0.364)*	*(2.30)*	*(86)*	*(22)*	*(97.32)*
				7th Gear					
98.77	12149	3.05	2275	6.92	0.552	12.66	187	72	28.75
(73.65)	*(54.04)*	*(4.91)*			*(0.336)*	*(2.49)*	*(86)*	*(22)*	*(97.36)*
				8th Gear					
100.34	10571	3.56	2200	5.02	0.536	13.05	189	72	28.75
(74.82)	*(47.02)*	*(5.73)*			*(0.326)*	*(2.57)*	*(87)*	*(22)*	*(97.36)*
				9th Gear					
100.59	8948	4.22	2201	3.85	0.531	13.17	191	72	28.75
(75.01)	*(39.80)*	*(6.78)*			*(0.323)*	*(2.59)*	*(88)*	*(22)*	*(97.36)*
				10th Gear					
104.00	7903	4.93	2198	3.21	0.516	13.55	190	73	28.75
(77.55)	*(35.15)*	*(7.94)*			*(0.314)*	*(2.67)*	*(88)*	*(23)*	*(97.36)*
				11th Gear					
102.93	6562	5.88	2201	2.48	0.519	13.47	190	74	28.74
(76.75)	*(29.19)*	*(9.47)*			*(0.316)*	*(2.65)*	*(88)*	*(23)*	*(97.32)*
				12th Gear					
101.27	5497	6.91	2199	2.15	0.526	13.30	189	75	28.74
(75.52)	*(24.45)*	*(11.12)*			*(0.320)*	*(2.62)*	*(87)*	*(24)*	*(97.32)*
				13th Gear					
99.51	4704	7.93	2198	1.82	0.539	12.98	190	75	28.74
(74.21)	*(20.92)*	*(12.77)*			*(0.328)*	*(2.56)*	*(88)*	*(24)*	*(97.32)*
				14th Gear					
97.15	3868	9.42	2202	1.48	0.543	12.89	190	76	28.74
(72.45)	*(17.21)*	*(15.16)*			*(0.330)*	*(2.54)*	*(88)*	*(24)*	*(97.32)*

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 Gear					
84.23	17444	1.81	2383	14.29	0.636	11.00	186	67	28.76
(62.81)	*(77.59)*	*(2.91)*			*(0.387)*	*(2.17)*	*(86)*	*(19)*	*(97.39)*
				5th Gear					
96.73	15900	2.28	2353	7.23	0.573	12.21	186	70	28.74
(72.13)	*(70.72)*	*(3.67)*			*(0.348)*	*(2.40)*	*(85)*	*(21)*	*(97.32)*
				6th Gear					
100.27	14831	2.54	2199	6.18	0.535	13.06	186	71	28.74
(74.77)	*(65.97)*	*(4.08)*			*(0.326)*	*(2.57)*	*(85)*	*(22)*	*(97.32)*
				7th Gear					
102.38	12705	3.02	2200	5.03	0.525	13.32	190	73	28.75
(76.34)	*(56.51)*	*(4.86)*			*(0.319)*	*(2.62)*	*(88)*	*(23)*	*(97.36)*
				8th Gear					
101.21	10480	3.62	2201	3.69	0.533	13.13	190	74	28.75
(75.48)	*(46.62)*	*(5.83)*			*(0.324)*	*(2.59)*	*(88)*	*(23)*	*(97.36)*
				9th Gear					
101.76	8953	4.26	2201	3.04	0.526	13.29	192	76	28.75
(75.88)	*(39.82)*	*(6.86)*			*(0.320)*	*(2.62)*	*(89)*	*(24)*	*(97.36)*
				10th Gear					
104.43	7865	4.98	2197	2.63	0.516	13.55	191	77	28.75
(77.87)	*(34.98)*	*(8.01)*			*(0.314)*	*(2.67)*	*(88)*	*(25)*	*(97.36)*
				11th Gear					
103.67	6572	5.92	2198	2.22	0.515	13.57	191	77	28.75
(77.30)	*(29.23)*	*(9.52)*			*(0.313)*	*(2.67)*	*(88)*	*(25)*	*(97.36)*
				12th Gear					
101.21	5454	6.96	2202	1.98	0.534	13.10	191	78	28.75
(75.47)	*(24.26)*	*(11.20)*			*(0.325)*	*(2.58)*	*(88)*	*(26)*	*(97.36)*
				13th Gear					
98.96	4646	7.99	2201	1.64	0.537	13.02	191	79	28.76
(73.79)	*(20.66)*	*(12.86)*			*(0.327)*	*(2.57)*	*(88)*	*(26)*	*(97.39)*
				14th Gear					
96.45	3824	9.46	2201	1.31	0.554	12.62	191	79	28.76
(71.92)	*(17.01)*	*(15.22)*			*(0.337)*	*(2.49)*	*(88)*	*(26)*	*(97.39)*

engine rpm **Unladen tractor mass** 13990 lb *(6346 kg)*.

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

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 return was maintained at 198° F *(92° C)*. This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. 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. **1646,** Summary 084, August 20, 1991.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
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)*	Fuel Consumption Hp.hr/gal *(kW.h/l)*	Temp.°F *(°C)* cool-ing med	Temp.°F *(°C)* Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Power—10th Gear									
104.14 *(77.66)*	7887 *(35.08)*	4.95 *(7.97)*	2203	3.08	0.517 *(0.315)*	13.52 *(2.66)*	191 *(88)*	77 *(25)*	28.75 *(97.36)*
75% of Pull at Maximum Power—10th Gear									
85.62 *(63.85)*	5913 *(26.30)*	5.43 *(8.74)*	2395	2.43	0.593 *(0.361)*	11.79 *(2.32)*	189 *(87)*	80 *(27)*	28.74 *(97.32)*
50% of Pull at Maximum Power—10th Gear									
58.28 *(43.46)*	3944 *(17.54)*	5.54 *(8.92)*	2426	1.69	0.720 *(0.438)*	9.71 *(1.91)*	185 *(85)*	80 *(27)*	28.74 *(97.32)*
75% of Pull at Reduced Engine Speed—11th Gear									
85.76 *(63.95)*	5913 *(26.30)*	5.44 *(8.75)*	2029	2.26	0.521 *(0.317)*	13.43 *(2.65)*	187 *(86)*	80 *(27)*	28.74 *(97.32)*
50% of Pull at Reduced Engine Speed—11th Gear									
58.20 *(43.40)*	3938 *(17.51)*	5.54 *(8.92)*	2053	1.52	0.601 *(0.366)*	11.63 *(2.29)*	185 *(85)*	80 *(27)*	28.74 *(97.32)*

DRAWBAR PERFORMANCE
MAXIMUM POWER IN SELECTED GEARS

6th Gear									
90.41 *(67.42)*	13824 *(61.49)*	2.45 *(3.95)*	2320	13.78	0.612 *(0.372)*	11.43 *(2.25)*	186 *(86)*	71 *(22)*	28.74 *(97.32)*
7th Gear									
98.88 *(74.48)*	12789 *(56.89)*	2.93 *(4.71)*	2198	7.62	0.537 *(0.327)*	13.02 *(2.56)*	188 *(87)*	74 *(23)*	28.74 *(97.32)*
8th Gear									
100.54 *(74.97)*	10562 *(46.98)*	3.57 *(5.74)*	2200	4.75	0.536 *(0.326)*	13.04 *(2.57)*	191 *(88)*	75 *(24)*	28.75 *(97.36)*
9th Gear									
101.39 *(75.61)*	9006 *(40.06)*	4.22 *(6.79)*	2201	3.72	0.528 *(0.321)*	13.25 *(2.61)*	191 *(88)*	76 *(24)*	28.75 *(97.36)*
10th Gear									
104.14 *(77.66)*	7887 *(35.08)*	4.95 *(7.97)*	2203	3.08	0.517 *(0.315)*	13.52 *(2.66)*	191 *(88)*	77 *(25)*	28.75 *(97.36)*
11th Gear									
102.87 *(76.71)*	6553 *(29.15)*	5.89 *(9.47)*	2202	2.67	0.523 *(0.318)*	13.38 *(2.64)*	190 *(88)*	77 *(25)*	28.75 *(97.36)*
12th Gear									
100.79 *(75.16)*	5462 *(24.30)*	6.92 *(11.14)*	2203	2.10	0.529 *(0.322)*	13.21 *(2.60)*	192 *(89)*	78 *(26)*	28.75 *(97.36)*
13th Gear									
99.70 *(74.34)*	4705 *(20.93)*	7.95 *(12.79)*	2202	1.85	0.539 *(0.328)*	12.98 *(2.56)*	191 *(88)*	79 *(26)*	28.76 *(97.39)*
14th Gear									
97.50 *(72.71)*	3884 *(17.28)*	9.41 *(15.15)*	2202	1.60	0.551 *(0.335)*	12.70 *(2.50)*	192 *(89)*	79 *(26)*	28.76 *(97.39)*

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive Disengaged dB(A)	Front Wheel Drive Engaged dB(A)
Maximum Sound Level	79.0	82.0
Bystander	—	—

TIRES AND WEIGHT	With Ballast	Without Ballast
Rear Tires—No., size, ply & psi *(kPa)*	Four 18.4R38; *; 14 *(95)*	Two 18.4R38; *; 14 *(95)*
Ballast—Duals (total)	1710 lb *(776 kg)*	None
—Cast Iron (total)	None	None
Front Tires—No., size, ply & psi *(kPa)*	Two 14.9-28; 8; 16 *(110)*	Two 14.9-28; 8; 14 *(95)*
Ballast—Liquid (total)	None	None
—Cast Iron (total)	1093 lb *(496 kg)*	None
Height of Drawbar	19.5 in *(495 mm)*	18.0 in *(455 mm)*
Static Weight with Operator—Rear	11154 lb *(5059 kg)*	9444 lb *(4284 kg)*
—Front	5805 lb *(2633 kg)*	4712 lb *(2137 kg)*
—Total	16959 lb *(7692 kg)*	14156 lb *(6421 kg)*

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi. *(bar)*	2620 *(181)*
Location	remote lift circuit
Hydraulic oil temperature °F*(°C)*	138 *(59)*
Location	hydraulic sump
Category	II
Quick attach	none

Hitch point distance to ground level in. *(mm)*	8.1 *(206)*	15.0 *(381)*	22.0 *(559)*	29.0 *(737)*	36.0 *(914)*
Lift force on frame lb.	8010	8168	8288	8077	8000
" " " " " " *(kN)*	*(35.6)*	*(36.3)*	*(36.9)*	*(35.9)*	*(35.6)*

with lift assist cylinders

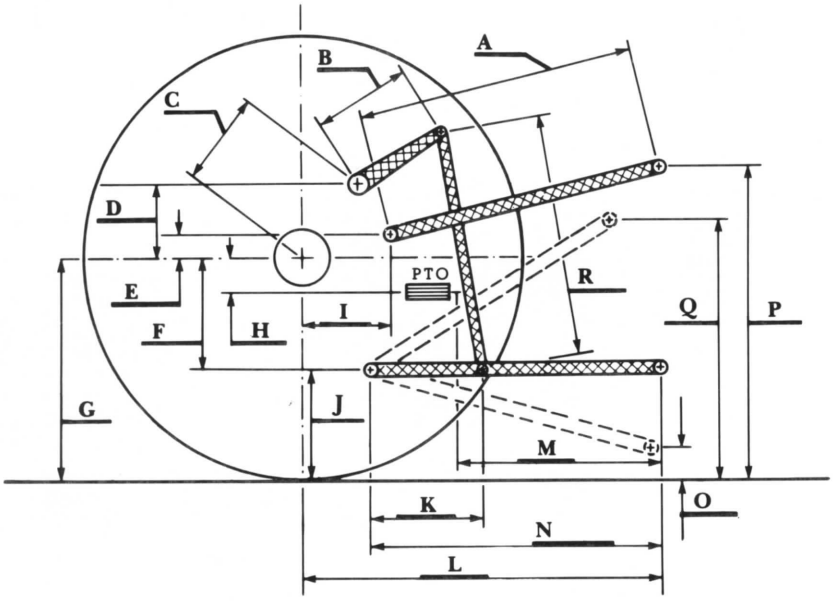
Hitch point distance to ground level in. *(mm)*	8.3 *(211)*	15.0 *(381)*	22.0 *(559)*	29.0 *(737)*	36.0 *(914)*
Lift force on frame lb.	13158	12414	11961	11097	10286
" " " " " " *(kN)*	*(58.5)*	*(55.2)*	*(53.2)*	*(49.4)*	*(45.8)*

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: II
Quick Attach: none

Maximum Force Exerted Through Whole Range:	6305 lbs	*(28.0 kN)*	*8988 lb *(40.0 kN)*
i) Opening pressure of relief valve:	NA		
Sustained pressure at compensator cutoff:	2570 psi	*(177 bar)*	
ii) Pump delivery rate at minimum pressure and rated engine speed:	28.3 GPM	*(107.1 l/min)*	
iii) Pump delivery rate at maximum hydraulic power:	24.9 GPM	*(94.3 l/min)*	
Delivery pressure:	2150 psi	*(148 bar)*	
Power:	31.2 HP	*(23.3 kW)*	*with lift assist cylinders

Ford 8630 Powershift Diesel



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	*mm*
A	29.8	*756*
B	15.0	*381*
C	16.2	*412*
D	15.5	*394*
E	5.0	*127*
F	10.5	*267*
G	32.3	*820*
H	2.4	*62*
I	17.4	*442*
J	21.8	*553*
K	22.6	*573*
L	45.3	*1150*
M	23.6	*599*
N	36.2	*921*
O	7.7	*196*
P	45.8	*1164*
Q	32.2	*818*
R	34.9	*886*

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