OECD APPROVAL # 1331
(Restricted code)
Date of approval: 16 September 1991

NEBRASKA TRACTOR TESTING LABORATORY
DEPARTMENT OF AGRICULTURAL ENGINEERING
INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
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LINCOLN, NEBRASKA 68583-0832, USA

REPORT ON TEST IN ACCORDANCE WITH OECD STANDARD CODE FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTOR PERFORMANCE

FORD 8830 POWERSHIFT (4WD)
WITH MECHANICAL FRONT WHEEL DRIVE





MANUFACTURED BY: Ford New Holland Inc
500 Diller Avenue
New Holland, PA. USA

NEBRASKA TEST NO. 1648

Test date: May 1991

This test report provides the results of the tests conducted in accordance with the OECD Standard Test Code for the Official Testing of Agricultural Tractor Performance - C(87)53 Final - Annex II, Restricted Code.

This report has been approved by the OECD Coordinating Centre in Paris (CEMAGREF) on 16 September 1991

Ford 8830 Powershift with MFWD OECD # 1331

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SPECIFICATIONS OF TRACTOR.

Manufacturers name/address	: Ford New Holland Inc. 500 Diller Avenue New Holland, PA 17557
Submitted for test by	: The manufacturer
Selected for test by	: The manufacturer in agreement with the test station.
Place of running in	: Ford New Holland New Holland PA
Duration of running in	: 286 hours
Location of Test	: Tractor Testing Laboratory Lincoln, Nebraska,USA.

TRACTOR SPECIFICATIONS.

Make	Ford
Model	8830 Powershift
Type	Unit construction, mechanical front wheel drive (4WD)
Number of driving wheels	4
Serial Number	*A928997*
1st Serial number	*A925541*

ENGINE.

Make	Ford New Holland
Model	401
Type	Diesel,direct injection,turbocharged with air to air intercooler
Serial Number	*M294149*
Cylinders	
Number/Disposition	6, in-line, vertical
Bore/stroke	111.8 mm x 111.8 mm (4.4 in x 4.4 in)
Capacity	6572 ml (401 cu in)
Compression Ratio	15.6 - 1
Arrangement of valves	Overhead
Cylinder liners	parent bore
Super charging	
Make/Model/Type	Garrett/408665/exhaust gas driven Garrett/493011-20/tip turbine for air to air intercooler
Pressure	103-131 kPa (15-19 psi) at rated speed and load
Fuel System	
Feed system	Mechanical lift pump
Make/Type/Model of filters	Sediment bowl and paper element filter
Fuel Tank capacity	379 liters (100 US gallons)

Make/Model/Type Injection Pump	Lucas/CAVP5638/2A/In line
Pump Serial number	KH01336B3 DSA 299
Production setting of pump Flow Rate (Rated Eng.Spd & Full Load)	34.2 +/- 1.7 kg/hr 75.4 +/- 3.8 lb/hr
Make/Model/Type Injectors	Lucas/CAV/multi-hole
Injection pressure	22.2 - 22.6 MPa (3225 -3275 psi)
Timing	25 degrees before TDC
Governor	
Make/Model/Type	Lucas/CAV/mechanical
Governed engine speed range	From 700 to 2475 rev/min
Rated engine speed	2200 rev/min
High-idle speed range	2450 +/-25 rev/min
Air Cleaner.	
Pre-cleaner	
Make/Model/Type	United/Screened cap
Air intake location	Above hood
Primary Cleaner	
Make/Model/Type	Donaldson/aspirated/dual element/pleated paper
Maintenance indicator	Air restriction warning light
Lubrication system.	
Type of feed pump	Crankshaft driven gear pump
Type of filters	Full flow spin on
Number	two
Oil cooler	Heat exchanger with engine coolant
Cooling system.	
Type of coolant	Liquid
Type of pump	Centrifugal
Fan specification	Belt driven, Thermal viscous
Number of fan blades	6
Fan diameter	584 mm (23.0 in)
Coolant system capacity	23 l (24 qt)
Type of temperature control	2 thermostats and variable speed fan
Superpressure system	69 kPa (10 psi)
Starting system.	
Make/Model/Type	Magneti Marelli/M127/electro-mechanical engagement
Power Rating	2.7 kW (3.6 hp)
Cold starting aid	Ether spray in intake manifold and block heaters
Safety device	Transmission neutral and PTO off switches

Electrical system.	
Voltage and grounding.	12 Volt DC;negative ground
Generator	
Make/Model/Type	Bosch/K1-14V 20/belt driven
Power rating	95 Amp at 2200 engine rev/min.
Batteries	
Number & connection	1-12 V battery
Rating	128 Amp-hour at 20 hour rating 750 cold crank amps
Exhaust system.	
Make/Model/Type	Nelson Burgess/expansion chamber
Location	vertical above hood

TRANSMISSION.

Clutch. (travel)	
Make/Model/Type	Funk Mfg/8100 series/full powershift/oil cooled
Number of plates	14
Plate diameter	148.6 mm (5.85 in)
Method of operation	Electro-Hydraulically actuated by foot pedal
Gear Box.	
Make/Model/Type	Funk Mfg/full powershift
Arrangement	Counter shaft design providing 18 forward and 9 reverse ratios. Ratios are selected by engaging various combinations of 3 groups of 3 (9) multi-disc electro-hydraulic clutches. One clutch from each group is engaged to provide a ratio. 9 forward ratios in front section and 2 forward, 1 reverse ratio in rear section.
Number of gears	18 forward and 9 reverse controlled by single hand lever
Oil cooler	Heat exchanger with air
Available options	creeper
Rear axle and final drives.	
Make/Model/Type	Ford New Holland/crown wheel and pinion, differential and inboard planetary reduction
Differential Lock	
Type	Hydraulic engaged wet discs
Method of engagement	Electrical switch on console
Method of disengagement	Electrical switch on console or actuation of either brake pedal

Front Axle and final drives.

Make/Model/Type	ZF, APL 365 spiral bevel with outboard planetary reduction
Differential lock	
Type	limited slip
Method of engagement	automatic
Method of disengagement	automatic

Gear ratios and travel speeds.
(Tire dynamic radius of 855 mm (33.7 in) ISO 4251/1-1984)

Gear Number	Number of engine revolutions for one revolution of the driving wheels	Nominal travel speed at rated engine speed of 2200 rev/min [km/h]	[mph]
1 fwd	350.0	2.03	1.26
2 fwd	296.2	2.39	1.49
3 fwd	253.1	2.80	1.74
4 fwd	221.0	3.21	1.99
5 fwd	187.0	3.79	2.36
6 fwd	159.8	4.44	2.76
7 fwd	135.7	5.22	3.25
8 fwd	114.9	6.17	3.84
9 fwd	98.2	7.22	4.49
10 fwd	84.3	8.41	5.23
11 fwd	71.3	9.94	6.18
12fwd	61.0	11.63	7.23
13 fwd	53.2	13.32	8.28
14 fwd	45.0	15.75	9.79
15 fwd	38.5	18.43	11.45
16 fwd	32.7	21.69	13.48
17 fwd	27.7	25.64	15.93
18 fwd	23.6	30.00	18.64
4 rev	218.8	3.24	2.01
5 rev	185.1	3.83	2.38
6 rev	158.2	4.48	2.79
7 rev	138.1	5.13	3.19
8 rev	116.9	6.07	3.77
9 rev	99.9	7.10	4.41
10 rev	84.4	8.36	5.19
11 rev	71.8	9.88	6.14
12 rev	61.3	11.56	7.18

Number of front wheel revolutions
for one rear wheel revolution. 1.39

CREEPER GEAR RATIOS
(Not of tested tractor)

Gear ratios and travel speeds.
(Tire dynamic radius of 855 mm (33.7 in) ISO 4251/1-1984)

Gear Number	Number of engine revolutions for one revolution of the driving wheels	Nominal travel speed at rated engine speed of 2200 rev/min [km/h]	[mph]
1 fwd creep	3713.2	0.19	0.12
2 fwd creep	3142.4	0.23	0.14
3 fwd creep	2685.1	0.26	0.16
4 fwd creep	2344.6	0.30	0.19
5 fwd creep	1983.9	0.36	0.22
6 fwd creep	1695.3	0.42	0.26
7 fwd creep	1439.6	0.49	0.31
8 fwd creep	1219.0	0.58	0.36
9 fwd creep	1041.8	0.68	0.42
10 fwd creep	894.3	0.79	0.49
11 fwd creep	756.4	0.94	0.58
12 fwd creep	647.1	1.10	0.68
13 fwd creep	564.4	1.26	0.78
14 fwd creep	477.4	1.48	0.92
15 fwd creep	408.4	1.74	1.08
16 fwd creep	346.9	2.04	1.27
17 fwd creep	293.9	2.42	1.50
18 fwd creep	250.4	2.83	1.76
4 rev creep	2321.2	0.31	0.19
5 rev creep	1963.7	0.36	0.22
6 rev creep	1678.3	0.42	0.26
7 rev creep	1465.1	0.48	0.30
8 rev creep	1240.2	0.57	0.36
9 rev creep	1059.8	0.67	0.42
10 rev creep	895.4	0.79	0.49
11 rev creep	761.7	0.93	0.58
12 rev creep	650.3	1.09	0.68

Number of front wheel revolutions
for one rear wheel revolution. 1.39

POWER - TAKE - OFF.

Main Power-Take-Off.	
Type	Independent
Method of engagement	Hydraulically actuated multi-plate wet clutch operated by hand lever, independent of main drive clutch.
Number of shafts	Two
Method of changing speeds	not applicable
Standard PTO. 1000 rev/min.	
Location	Rear of tractor, vertical center plane.
Diameter of shaft	35 mm (1.375 in) or 44.5 mm (1.75 in)
Number of splines	21 or 20; conforms to ISO 500/1979
Height above ground	793 mm (31.3 in)
Distance from median plane of tractor	0 mm
Distance behind rear axle	551 mm (21.7 in)
PTO Speed at rated engine spd	1147 rev/min
Engine speed at Std. PTO spd	1918 rev/min
Engine speed/PTO speed ratio	1.918
Direction of rotation when viewed from shaft end	Clockwise.

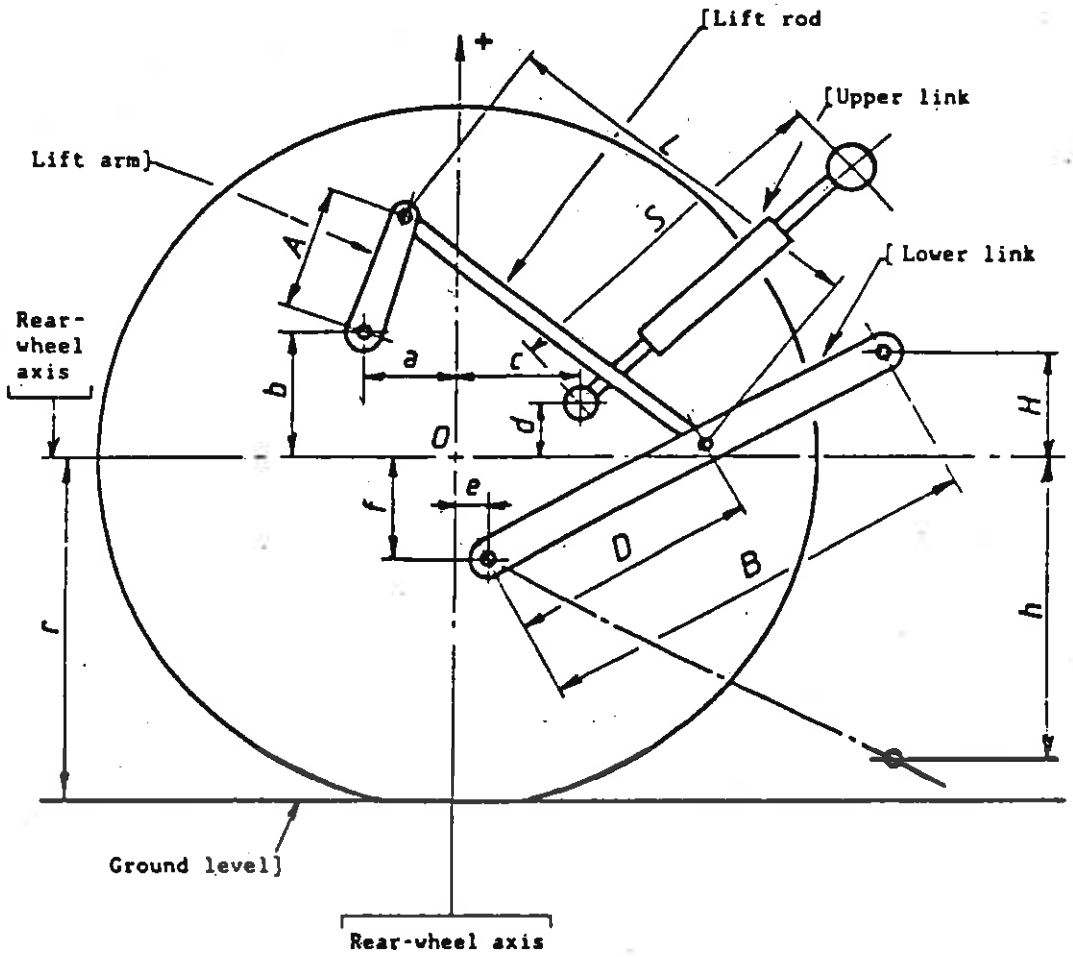
POWER LIFT.

Make	Ford New Holland
Type of hydraulic system	Open Center
Number/Type of cylinders	One internal with two optional external, all single acting
Type of linkage lock for transport	None
Relief valve setting	17.23 MPa (2500 psi)
Opening pressure of cylinder safety valve	19.3 MPa (2800 psi)
Lift pump type	Gear
Power transmission to pump	PTO drive
Type/Number of filters	Full flow/two
Location of oil reservoir	Transmission and rear axle housing
Number/Type/Location of tapping points.	2 pairs of ISO standard couplings at rear of tractor (2 additional pairs are optionally available)
Max. oil volume available for external cylinders	32 l (34 qt)

THREE POINT LINKAGE.

- Category 2 or 3 in conformity with ISO 730/1-1977
- Category adaptor - None

THREE POINT LINKAGE



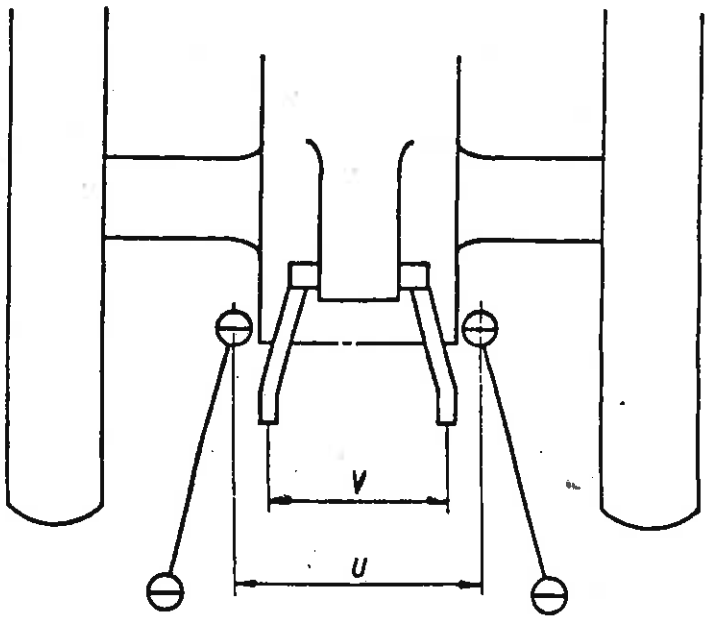


Table 1.1 -*Linkage geometry dimensions.

		Dimension or range [mm]	Dimension or range [in]	Settings used on test [mm]	Settings used on test [in]
Lift category		III			
Rear Tire - Radius Index	(r)	855	33.7		
Front Tire - Radius Index	(r')	670	26.4		
Length of lift arms	(A)	381	15.0	same	
Length of lower links	(B)	906	35.7	same	
Distance of lift arm pivot from: horizontal	(a)	121	4.8	same	
rear wheel axis: vertical	(b)	394	15.5	same	
Horizontal distance between the 2 lower link points	(u)	558	22.0	same	
Horizontal distance between the 2 lift arm end points	(v)	635	25.0	same	
Length of upper link	(S)	597	23.5		
	to	800	31.5	737	29.0
Distance of upper link pivot from: horizontal	(c)	442	17.4	same	
rear wheel axis: vertical	(d)	127	5.0		
	or	203	8.0	203	8.0
Distance of lower link pivot from: horizontal	(e)	229	9.0	same	
rear wheel axis: vertical	(f)	267	10.5	same	
Distance of lower link pivot points to lift rod pivot pts on lower links.	(D)	473	18.6		
	or	564	22.2	564	22.2
Length of lift rods	(L)	740	29.1		
	to	1000	39.4	886	34.9
Height of lower hitch points relative to rear wheel axis In low position	(h)	355	14.0		
	to	775	30.5	625	24.6
In high position	(H)	-140	-5.5		
	to	216	8.5	-3	-0.1
Height above ground of lower hitch points when locked in transport position.		714	28.1		
	to	1070	42.1	851	33.5

*Assuming (r) with a tire dynamic index of 855 mm (33.7 in)
ISO 4251/1-1984

SWINGING DRAWBAR.

Type	Oscillating
Height above ground	500 mm (19.7 in)
Adjustments	None
Distance of hitch point from rear wheel axis,horizontal	959 mm (37.8 in)
Distance of hitch point from PTO shaft end	
Vertical	250 mm (9.9 in)
Horizontal	406 mm (16.0 in)
Lateral adjustment; Right hand	274 mm (10.8 in)
Left hand	274 mm (10.8 in)
Distance of pivot point from rear wheel axis; horizontal	51 mm (2.0 in) forward.
Diameter of drawbar pin hole	34 mm (1.3 in)
Maximum vertical static permissible load	17.4 kN (3900 lb)

STEERING.

Make/Model/Type	TRW Ross Gear/HGA/Hydrostatic
Method of operation	Steering wheel
Pump	Gear pump,engine mounted
Ram(s)	One double acting cylinder integral with front wheel assist
Working pressure	13.4 to 14.1 MPa (1950 - 2050 psi)

BRAKES.

Service brake.	
Make/Model/Type	Lucas Girling/Servoboosted hydraulic
Method of operation	Hydraulically boosted for two master cylinders;operated by two pedals which can be locked together.
Parking brake.	
Type	Wet disc in front wheel drive transfer case
Method of operation	Cable operated by hand lever
Trailer Brake	
Type	None

WHEELS.

Number.	
Front	Two; Driving and steering
Rear	Two or four; Driving
Wheel base	2814 mm (110.8 in)

Track width adjustment

	Minimum [mm]	Minimum [in]	Maximum [mm]	Maximum [in]	Adjustment method
Front	1520	59.8	1625	84.0	Reversing wheels and offset lug rims
Rear	1626	64.0	3048	120.0	Adjustable clamping wedges on bar axle with manual adjust rims

PROTECTIVE STRUCTURE.

Make/Model/Type	Ford New Holland/ integral with cab
Manufacturer's name/address	Ford New Holland New Holland, Penn.
Protective device	Cab, not tiltable.
OECD approval number	CSD 0174/13,14-a(C)

DRIVER'S SEAT.

Make/Model/Type	Grammar/LS-95/suspended
Type of suspension	Air suspension, electrically controlled
Range of adjustment	
Longitudinal	150 mm (5.9 in)
Vertical	60 mm (2.4 in)

LIGHTING.

	Height above ground of center [mm]	Height above ground of center [in]	Size [mm]	Distance from out - side edge to median plane of tractor. [mm]	Distance from out - side edge to median plane of tractor. [in]
Headlights	1306	51.4	134 dia.	292	11.5
Rearlights	2797	110.1	133 x 84	635	25.0
Rear reflectors	1793	70.6	44 x 50	856	33.7
Side Lights	2771	109.1	133 x 84	266/445	10.5/17.5

TEST CONDITIONS.

Overall dimensions.

Length		4913 mm (193.4 in)
Width	Minimum	2655 mm (104.5 in)
	Maximum(duals)	3550 mm (139.8 in)
Height -	Top of cab	2930 mm (115.4 in)
-	Top of exhaust	3106 mm (122.3 in)
Ground clearance. (unballasted)		447 mm (17.6 in)
Clearance-limiting part		drawbar support

Tractor Mass (with cab,full fuel tank).

		without driver [kg]	without driver [lb]	with driver [kg]	with driver [lb]
Unballasted	Front	2635	5810	2645	5830
	Rear	4423	9750	4488	9895
	Total	7058	15560	7133	15725
Ballasted	Front	3292	7258	3302	7280
	Rear	5841	12878	5906	13020
	Total	9133	20136	9208	20300

Ballast.

	Number of weights	Mass (total) [kg]	Mass (total) [lb]	Water [kg]	Water [lb]
Front	none	none	none	none	
Rear	4	160	352	none	
	2	420	926		
Duals (rear)	2	862	1900		
Additional front frame + weights test equipment	1	161	355		
	10	454	1000		
		18	42		

Tire Specifications.

	Front Wheels	Rear Wheels
Make	Goodyear	Goodyear
Dimensions	16.9-28	20.8R38
Ply rating	8 ply	2 star (10 ply)
Type	Bias	Radial
Max.load (tire manufacturer)	2175 kg/tire (4800 lb/tire)	3905 kg/tire (8610 lb/tire)
Max.load(tractor manufacturer)	2175 kg/tire) (4795 lb/tire)	3475 kg/tire (7660 lb/tire)
Inflation pressure (tire mfr)	160 kPa(24 psi)	160 kPa(24 psi)
Dynamic Radius Index	670 mm(26.4 in)	855 mm (33.7 in)
Chosen track width - singles	1980 mm(78.0 in)	1715 mm (67.5 in)
- duals		3020 mm(118.9 in)

Oils and Lubrication.

Capacity and change interval:

	Capacity liter	Capacity quart	Oil change hours	Filter change hours
Engine (w/o filter)	17	18	200	200
Gear Box (includes rear axle and rear final drive)	96	102	1200	300
Front axle housing	9	9.5	1200	---
Final drive, front	1.8	1.9	1200	---
Hydraulic system	common with gear box			

Oil and Lubricant specifications:

	Recommended	Used during test
Engine oil		
Type	Ford M2C121-C	same
Viscosity	SAE 15W-40	
Classification	API SG/CE Mil-L-2104D	
Transmission		
Type	Ford M2C134-D	same
Viscosity	15W30	
Classification	Rear axle oil	
Hydraulic fluid	same as transmission oil	same
Steering oil	same as transmission oil	same
Front axle and hubs		
Type	Ford M2C134-D	same
Viscosity	15W30	
Classification	Rear axle oil	
Grease	Ford M1C137-B	
Number of lubrication points	21	

Fuel

Type/grade	Grade 2-D, in conformity with the national standard
Density (Pto test)	0.838 g/cubic-cm (6.993 lb/gallon) at 15'C (59'F)
(Drawbar test)	same as Pto test.
Cetane number	53.9
Viscosity	2.31 cSt at 38'C (100'F)

Remarks: 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.

COMPULSORY TESTS.

(1) MAIN POWER TAKE-OFF PERFORMANCE (1000 rev/min).

Date of tests : 20 May 1991
Location of tests : Nebraska Tractor Testing Laboratory
University of Nebraska, Lincoln, Nebraska.
Type of Dynamometer: Eaton Dynamatic 2025 D.G.

Power kW (hp)	Speeds engine rev/min	Speeds PTO rev/min	Fuel Consumption hourly l/h (gal/h)	Fuel Consumption hourly kg/h (lb/h)	Fuel Consumption specific kg/kW.h (lb/hp.h)	Specific energy kW.h/l (hp.h/gal)
1.1 Maximum Power- 2 hour test.						
127.54 (171.04)	2198	1147	39.99 (10.56)	33.51 (73.87)	0.263 (0.432)	3.19 (16.19)
1.2 Power at rated engine speed. (1 hour)						
127.54 (171.04)	2198	1147	39.99 (10.56)	33.51 (73.87)	0.263 (0.432)	3.19 (16.19)
1.3 Maximum power at standard PTO speed. (1000 rev/min)						
124.14 (166.48)	1918	1000	36.95 (9.76)	30.96 (68.26)	0.249 (0.410)	3.36 (17.06)

1.4 Part Loads - governor hand lever set for maximum power at rated engine speed

Power kW (hp)	Speeds engine rev/min	Speeds PTO rev/min	Fuel Consumption hourly 1/h (gal/h)	Fuel Consumption hourly kg/h (lb/h)	Fuel Consumption specific kg/kW.h (lb/hp.h)	Specific energy kW.h/l (hp.h/gal)
i. Torque corresponding to maximum power at rated engine speed.						
127.54 (171.04)	2198	1147	39.99 (10.56)	33.51 (73.87)	0.263 (0.432)	3.19 (16.19)
ii. 85% of the torque obtained in (i)						
118.48 (158.89)	2399	1252	39.46 (10.42)	33.07 (72.90)	0.279 (0.459)	3.00 (15.24)
iii. 75% of the torque defined in (ii)						
88.39 (118.53)	2425	1266	32.32 (8.54)	27.08 (59.70)	0.306 (0.504)	2.74 (13.88)
iv. 50% of the torque defined in (ii)						
59.22 (79.42)	2435	1270	26.31 (6.95)	22.04 (48.60)	0.372 (0.612)	2.25 (11.43)
v. 25% of the torque defined in (ii)						
30.10 (40.36)	2443	1274	20.95 (5.53)	17.55 (38.70)	0.583 (0.959)	1.44 (7.29)
vi. unloaded						
0.37 (0.49)	2469	1288	13.48 (3.56)	11.29 (24.90)	30.880 (50.767)	0.03 (0.14)

1.5 Part Loads - governor hand lever set for maximum power at standard pto speed

Power kW (hp)	Speeds engine rev/min	Speeds PTO rev/min	Fuel Consumption hourly l/h (gal/h)	Fuel Consumption hourly kg/h (lb/h)	Fuel Consumption specific kg/kW.h (lb/hp.h)	Specific energy kW.h/l (hp.h/gal)
i. Torque corresponding standard PTO rpm						
124.14 (166.48)	1918	1000	36.95 (9.76)	30.96 (68.26)	0.249 (0.410)	3.36 (17.06)
ii. 85% of the torque obtained in (i)						
112.74 (151.19)	2049	1069	34.43 (9.09)	28.85 (63.60)	0.256 (0.421)	3.27 (16.62)
iii. 75% of the torque defined in (ii)						
86.93 (116.58)	2088	1089	28.42 (7.51)	23.81 (52.50)	0.274 (0.450)	3.06 (15.53)
iv. 50% of the torque defined in (ii)						
59.03 (79.17)	2131	1111	22.90 (6.05)	19.19 (42.30)	0.325 (0.534)	2.58 (13.09)
v. 25% of the torque defined in (ii)						
30.49 (40.89)	2153	1123	18.03 (4.76)	15.10 (33.30)	0.495 (0.814)	1.69 (8.59)
vi. Unloaded						
0.33 (0.44)	2212	1154	8.93 (2.36)	7.48 (16.50)	22.839 (37.547)	0.04 (0.19)

No-load maximum engine speed	2469 rev/min
Equivalent engine torque:	
at rated engine speed	554 Nm (2198 rev/min)
at maximum power	554 Nm (2198 rev/min)
at maximum torque	655 Nm (1600 rev/min)
Mean atmospheric conditions:	
Temperature-dry bulb	22'C (72'F)
Relative humidity	68 %
Barometer	98.50 kPa (29.09 in Hg)

Maximum Temperatures :		
	Thermostat housing	91'C (195'F)
	Engine oil	102'C (216'F)
	Fuel at injection pump	72'C (162'F)
	Engine air intake	29'C (85'F)
	Trans./Hydr. Oil	64'C (148'F)
Turbocharger boost pressure		
	at rated engine speed	124 kPa (18.0 psi)
	at maximum power	124 kPa (18.0 psi)

2. HYDRAULIC POWER AND LIFTING FORCE.

Date of test: 21 May 1991
Location: TTL/UNL, Lincoln, Nebr.

2.1 HYDRAULIC POWER TEST - HYDRAULIC PUMP PERFORMANCE

Sustained pressure with pump stalled	18.20 MPa (2640 psi)
Pump delivery rate at minimum pressure and rated engine speed	109.8 l/m (29.0 gpm)

	Flow Rate l/min (gal/min)	Pressure MPa (psi)	Power kW (hp)
At 90% of relief valve setting	76.5 (20.2)	15.86 (2370)	20.8 (27.9)
At maximum hydraulic power.	95.0 (25.1)	14.82 (2150)	23.5 (31.5)

Tapping point(s)	Two hydraulic outlets combined
Hydraulic fluid temperature at flow meter	65'C (149'F)

2.2 POWER LIFT TEST.

		Hitch Points	Frame
Lower hitch points above ground - down position.	[mm/in]	229/9.0	127/5.0
Vertical movement without load	[mm/in]	622/24.5	791/31.1
Vertical movement with load	[mm/in]	602/23.7	755/29.7
Maximum corrected force through full range	[kN/lbf]	35.1/7902	30.2/6791
Corresponding pressure	[kPa/psi]	16258/2358	
Moment about rear axle	[kN.m/ft.lb]	39.9/29435	52.7/38876
Maximum mast tilt angle	[degrees]	--	7.7

Lifting height relative to the horizontal position of lower links

[mm]	-427	-356	-300	-201	-99
[in]	-16.8	-14.0	-11.8	-7.9	-3.9

Corrected lift forces.

hitch points [kN]	--	35.1	35.7	37.7	39.2
hitch points [lb]	--	7902	8033	8469	8820
at frame [kN]	30.2	30.5	--	31.5	32.1
at frame [lb]	6791	6863	--	7079	7210

Lifting height relative to the horizontal position of lower links

[mm]	0	99	201	246	328
[in]	0	3.9	7.9	8.7	12.9

Corrected lift forces.

hitch points [kN]	40.8	41.8	42.9	44.0	--
hitch points [lb]	9162	9392	9639	9895	--
at frame [kN]	32.4	32.0	--	31.5	31.1
at frame [lb]	7283	7201	--	7079	6997

THREE POINT LIFT PERFORMANCE
(With lift assist cylinders)
(for settings used see p.8)

		Hitch Points	Frame
Lower hitch points above ground - down position.	[mm/in]	229/9.0	127/5.0
Vertical movement without load	[mm/in]	622/24.5	791/31.1
Vertical movement with load	[mm/in]	602/23.7	760/29.9
Maximum corrected force through full range	[kN/lbf]	54.6/12276	41.4/9306
Corresponding pressure	[kPa/psi]	16258/2358	
Moment about rear axle	[kN.m/ft.lb]	62.0/45728	72.2/53277
Maximum mast tilt angle	[degrees]	--	7.7

Lifting height relative to the horizontal position of lower links

[mm]		-432	-356	-300	-201	-99
[in]		-17.0	-14.0	-11.8	-7.9	-3.9
Corrected lift forces.						
hitch points	[kN]	--	54.6	54.6	55.8	57.1
	[lb]	--	12276	12281	12546	12848
at frame	[kN]	48.5	46.7	--	46.1	45.8
	[lb]	10899	10494	--	10368	10296

Lifting height relative to the horizontal position of lower links

[mm]		0	99	201	246	328
[in]		0	3.9	7.9	9.7	12.9
Corrected lift forces.						
hitch points	[kN]	58.2	58.4	58.4	59.1	--
	[lb]	13095	13127	13136	13282	--
at frame	[kN]	45.3	44.1	--	42.4	41.4
	[lb]	10175	9909	--	9540	9306

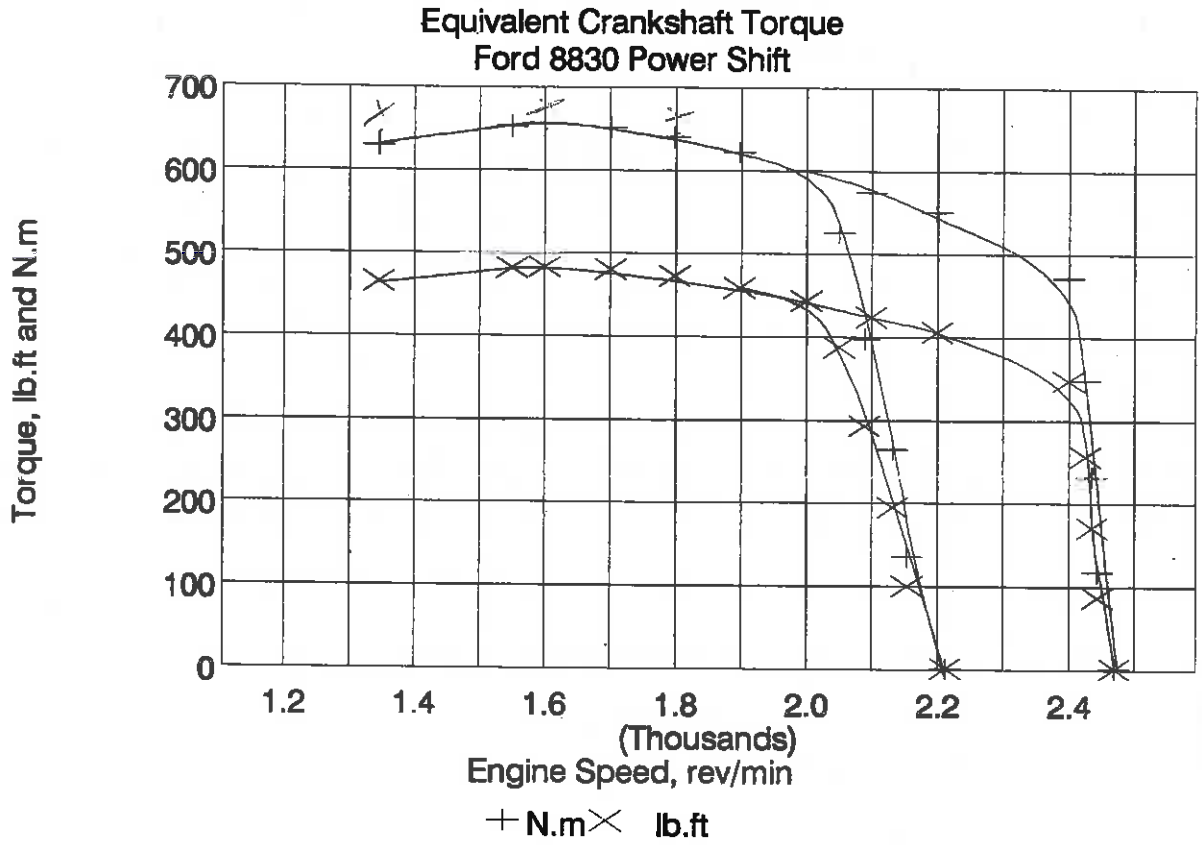
DRAWBAR PERFORMANCE AND FUEL ECONOMY (UNBALLASTED TRACTOR)

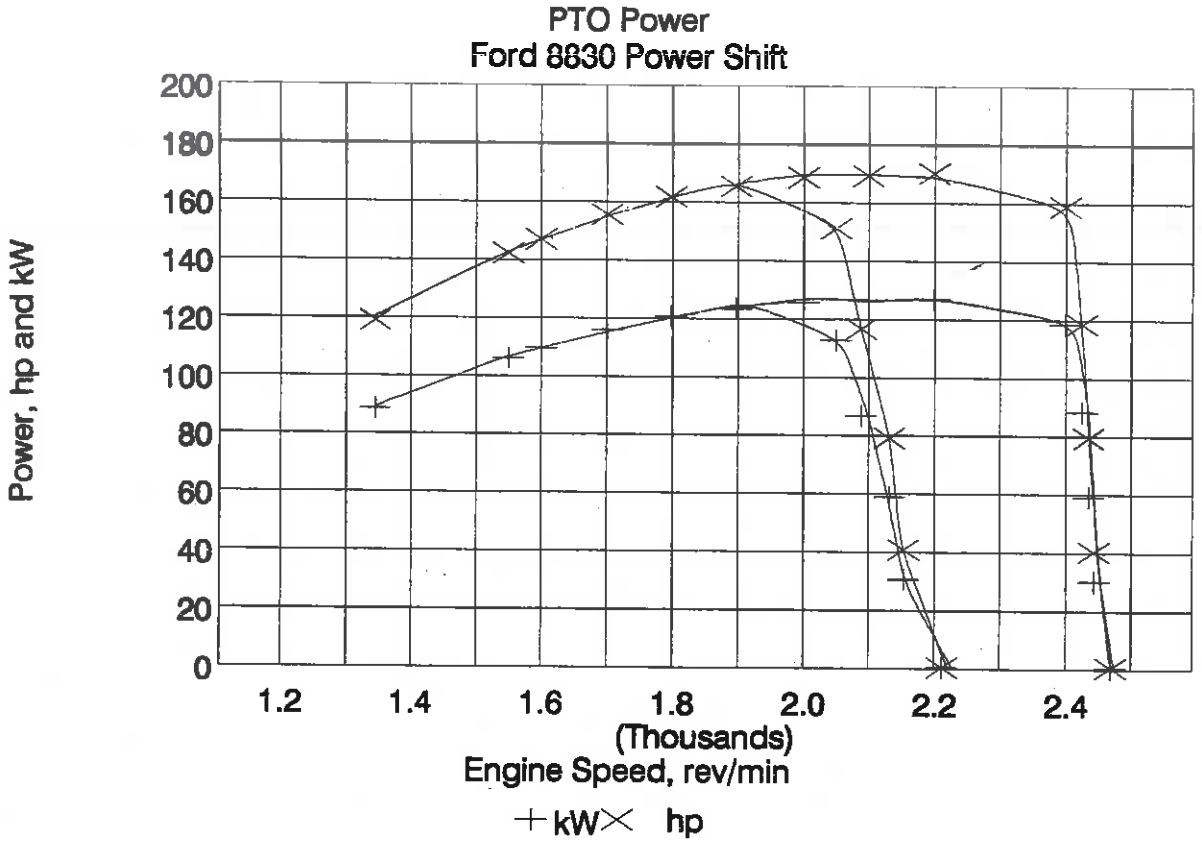
Date of tests: 20-May-91 Fuel density: 0.838 kg/l
20-May-91 Test # 1648
Type of track: Concrete Engine

Gear	Power kW	Pull kN	Speed km/h	Speed rev/min	Slip	SFC kg/kW.h	SFE kW.h/l	Temperature, deg C Fuel	Coolant	Oil	Dry	Wet	Relative humidity	Barometric Pressure kPa
I. Maximum Power (unballasted, fwa			2200 rev/min)			Tire pressure:		97 kPa, rear			110 kPa, front			
			Drawbar height:		483 mm									
6	80.47	68.20	4.25	2419	14.66%	0.381	2.20	69	85	98	18	17	91%	98.48
7	94.94	68.64	4.98	2391	13.93%	0.367	2.28	70	85	97	18	17	91%	98.48
8	103.50	60.94	6.11	2291	6.73%	0.331	2.53	69	87	95	18	17	91%	98.48
9	104.50	53.58	7.02	2202	4.82%	0.320	2.62	69	86	97	19	18	91%	98.44
10	106.68	46.63	8.25	2201	3.92%	0.313	2.68	69	87	97	19	18	91%	98.44
11	107.80	39.50	9.82	2200	2.91%	0.311	2.70	69	88	95	19	17	91%	98.48
12	106.01	32.95	11.58	2202	2.57%	0.315	2.66	69	87	99	19	17	91%	98.48
13	104.60	28.26	13.33	2203	2.14%	0.319	2.63	69	87	94	19	17	91%	98.48
II. Part Loads (unballasted, fwa			2200 rev/min)			Tire pressure:		97 kPa, rear			110 kPa, front			
			Drawbar height:		483 mm									
II.1 in selected gear at maximum power														
11	107.80	39.50	9.82	2200	2.91%	0.311	2.70	69	88	95	19	17	91%	98.48
II.1.1 75% of pull at maximum power at rated speed														
11	89.29	29.64	10.84	2406	2.23%	0.340	2.47	70	87	101	22	16	54%	98.34
II.1.2 50% of pull at maximum power at rated speed														
11	60.80	19.77	11.07	2439	1.54%	0.401	2.09	68	85	102	22	16	54%	98.34
II.1.3 next higher gear at reduced engine speed, same pull and travel speed as II.1.1														
12	89.14	29.62	10.84	2055	2.23%	0.308	2.72	68	86	94	22	16	54%	98.34
II.1.4 next higher gear at reduced engine speed, same pull and travel speed as II.1.2														
12	60.85	19.76	11.08	2066	1.45%	0.347	2.41	65	84	95	22	16	54%	98.34
II.2 in selected gear nearest to 7.5 km/h														
9	104.50	53.58	7.02	2202	4.82%	0.320	2.62	69	86	97	19	18	91%	98.44
II.2.1 75% of pull at maximum power at rated speed														
9	87.62	40.20	7.85	2421	3.00%	0.348	2.41	70	86	102	22	16	54%	98.34
II.2.2 50% of pull at maximum power at rated speed														
9	59.78	26.80	8.03	2450	2.06%	0.404	2.08	70	84	102	22	16	54%	98.34
II.2.3 next higher gear at reduced engine speed, same pull and travel speed as II.2.1														
10	87.67	40.19	7.85	2060	3.06%	0.304	2.76	68	86	94	22	16	54%	98.34
II.2.4 next higher gear at reduced engine speed, same pull and travel speed as II.2.2														
10	59.80	26.79	8.04	2104	1.97%	0.340	2.46	67	84	95	22	16	54%	98.34

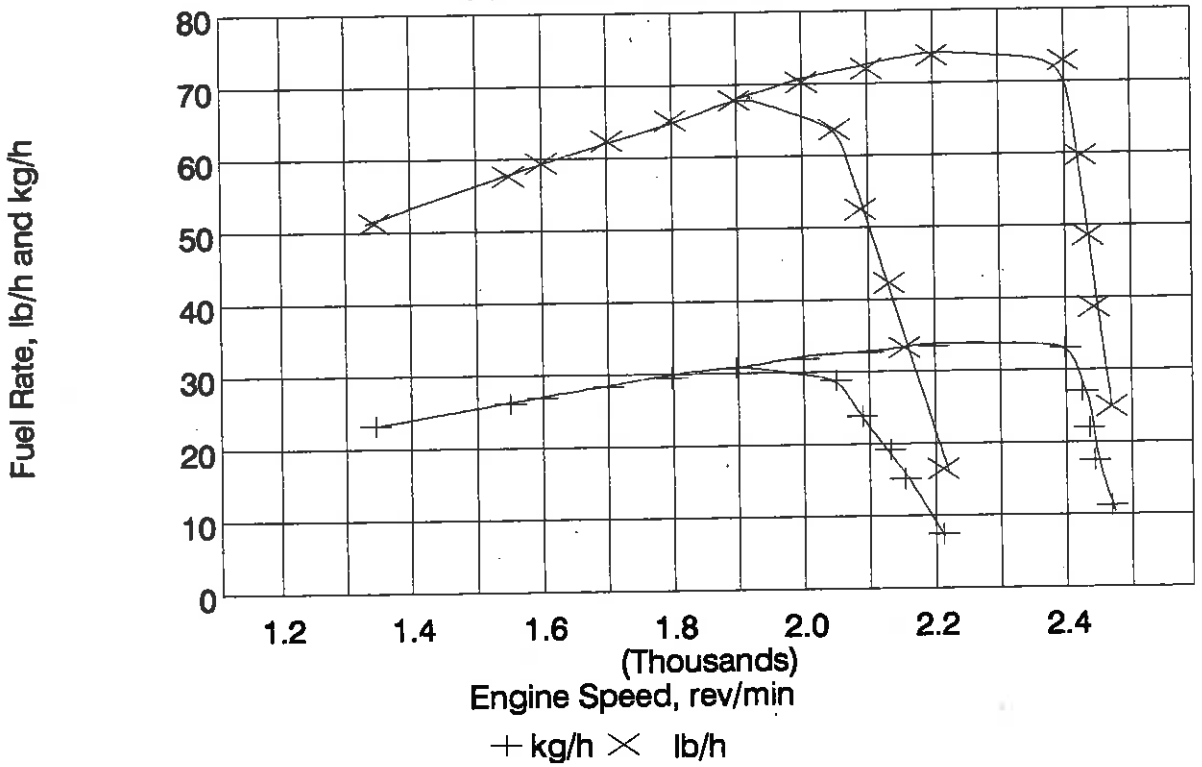
Date of tests: 20-May-91 Fuel density: 6.993 lb/gal
20-May-91 Test # 1648
Type of track: Concrete Engine

Gear	Power hp	Pull lb	Speed mph	Speed rpm	Slip	SFC lb/hp.h	SFE hp.h/gal	Temperature, deg F Fuel	Coolant	Oil	Dry	Wet	Relative humidity	Barometric Pressure in Hg
I. Maximum Power (unballasted, fwa			2200 rev/min)			Tire pressure:		14 psi, rear			16 psi, front			
			Drawbar height:		19 in									
6	107.91	15333	2.64	2419	14.66%	0.626	11.17	157	185	209	64	62	91%	29.08
7	127.31	15431	3.09	2391	13.93%	0.603	11.60	158	186	207	64	62	91%	29.08
8	138.80	13700	3.80	2291	6.73%	0.545	12.83	157	186	204	65	63	91%	29.08
9	140.14	12046	4.36	2202	4.82%	0.526	13.29	156	187	207	67	64	91%	29.07
10	143.33	10483	5.13	2201	3.92%	0.514	13.61	156	188	207	67	64	91%	29.07
11	144.56	8880	6.10	2200	2.91%	0.511	13.70	156	190	204	66	63	91%	29.08
12	142.16	7406	7.20	2202	2.57%	0.519	13.49	157	189	211	66	63	91%	29.08
13	140.27	6352	8.26	2203	2.14%	0.524	13.35	157	189	202	66	63	91%	29.08
II. Part Loads (unballasted, fwa			2200 rev/min)			Tire pressure:		14 psi, rear			16 psi, front			
			Drawbar height:		19 in									
II.1 in selected gear at maximum power														
11	144.56	8880	6.10	2200	2.91%	0.511	13.70	156	190	204	66	63	91%	29.08
II.1.1 75% of pull at maximum power at rated speed														
11	119.73	6664	6.74	2406	2.23%	0.559	12.52	159	189	215	71	60	54%	29.04
II.1.2 50% of pull at maximum power at rated speed														
11	81.53	4445	6.88	2439	1.54%	0.659	10.61	155	185	215	71	60	54%	29.04
II.1.3 next higher gear at reduced engine speed, same pull and travel speed as II.1.1														
12	119.54	6658	6.73	2055	2.23%	0.506	13.83	154	187	201	71	60	54%	29.04
II.1.4 next higher gear at reduced engine speed, same pull and travel speed as II.1.2														
12	81.60	4443	6.89	2066	1.45%	0.570	12.26	150	184	203	71	60	54%	29.04
II.2 in selected gear nearest to 4.6 mph														
9	140.14	12046	4.36	2202	4.82%	0.526	13.29	156	187	207	67	64	91%	29.07
II.2.1 75% of pull at maximum power at rated speed														
9	117.50	9037	4.88	2421	3.00%	0.572	12.23	159	187	215	71	60	54%	29.04
II.2.2 50% of pull at maximum power at rated speed														
9	80.17	6025	4.99	2450	2.06%	0.664	10.53	157	184	215	71	60	54%	29.04
II.2.3 next higher gear at reduced engine speed, same pull and travel speed as II.2.1														
10	117.57	9035	4.88	2060	3.06%	0.500	13.99	155	187	201	71	60	54%	29.04
II.2.4 next higher gear at reduced engine speed, same pull and travel speed as II.2.2														
10	80.19	6022	4.99	2104	1.97%	0.559	12.51	153	183	203	71	60	54%	29.04

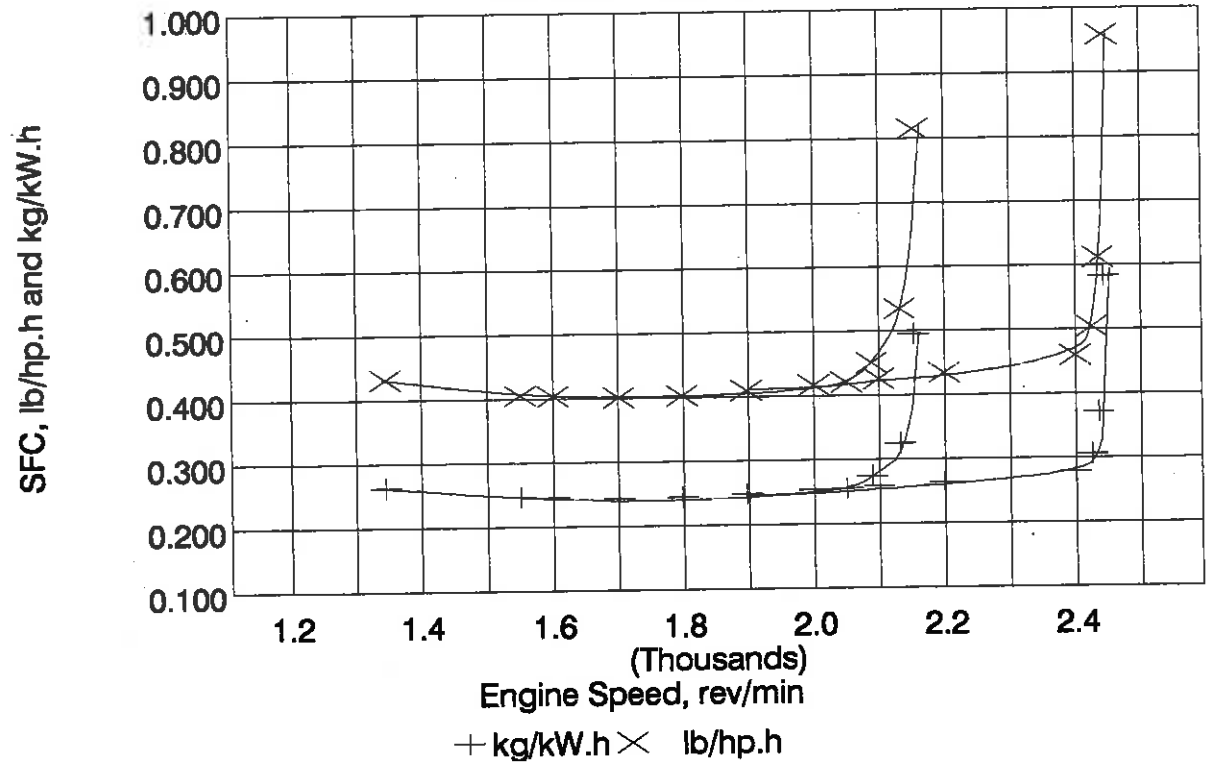

Equivalent Crankshaft Torque
Ford 8830 Power Shift
Torque, lb.ft and N.m
700
600
500
400
300
200
100
0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
(Thousands)
Engine Speed, rev/min
+ N.m × lb.ft

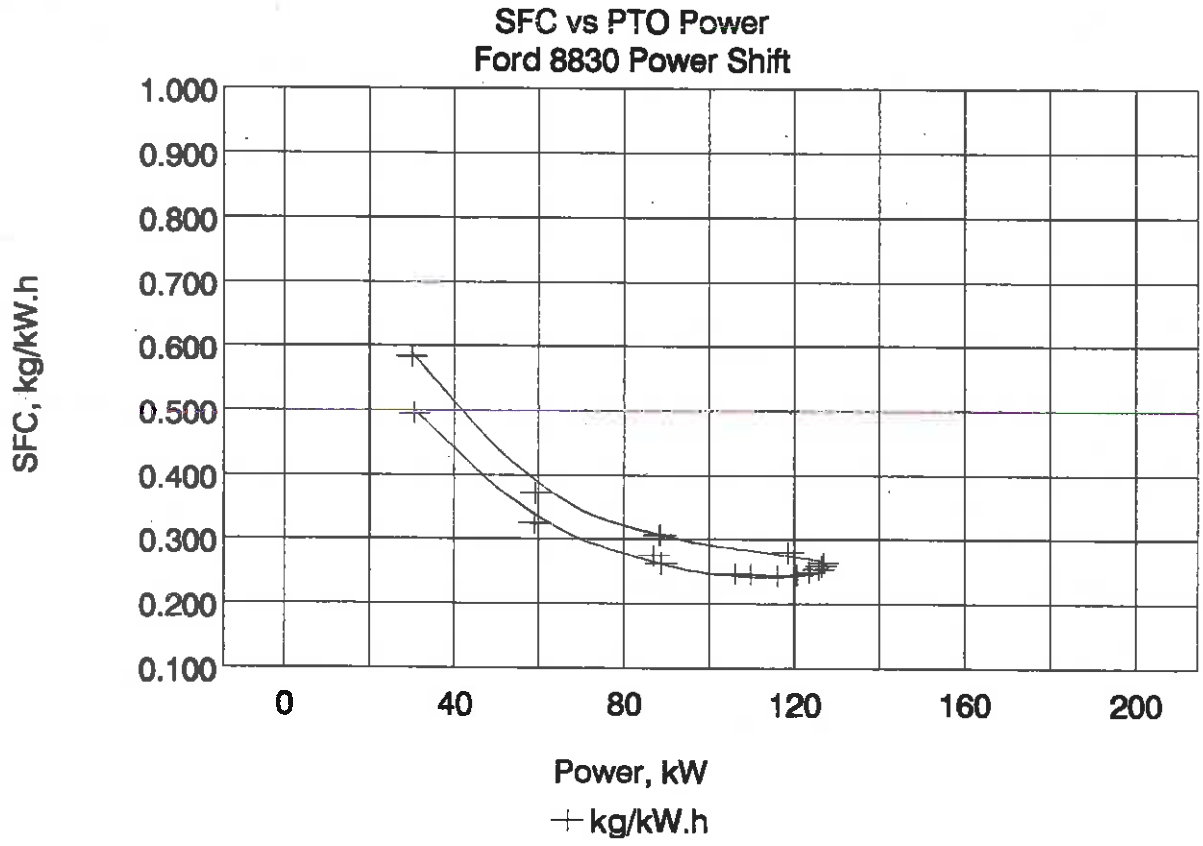

PTO Power
Ford 8830 Power Shift
Power, hp and kW
200
180
160
140
120
100
80
60
40
20
0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
(Thousands)
Engine Speed, rev/min
+ kW × hp

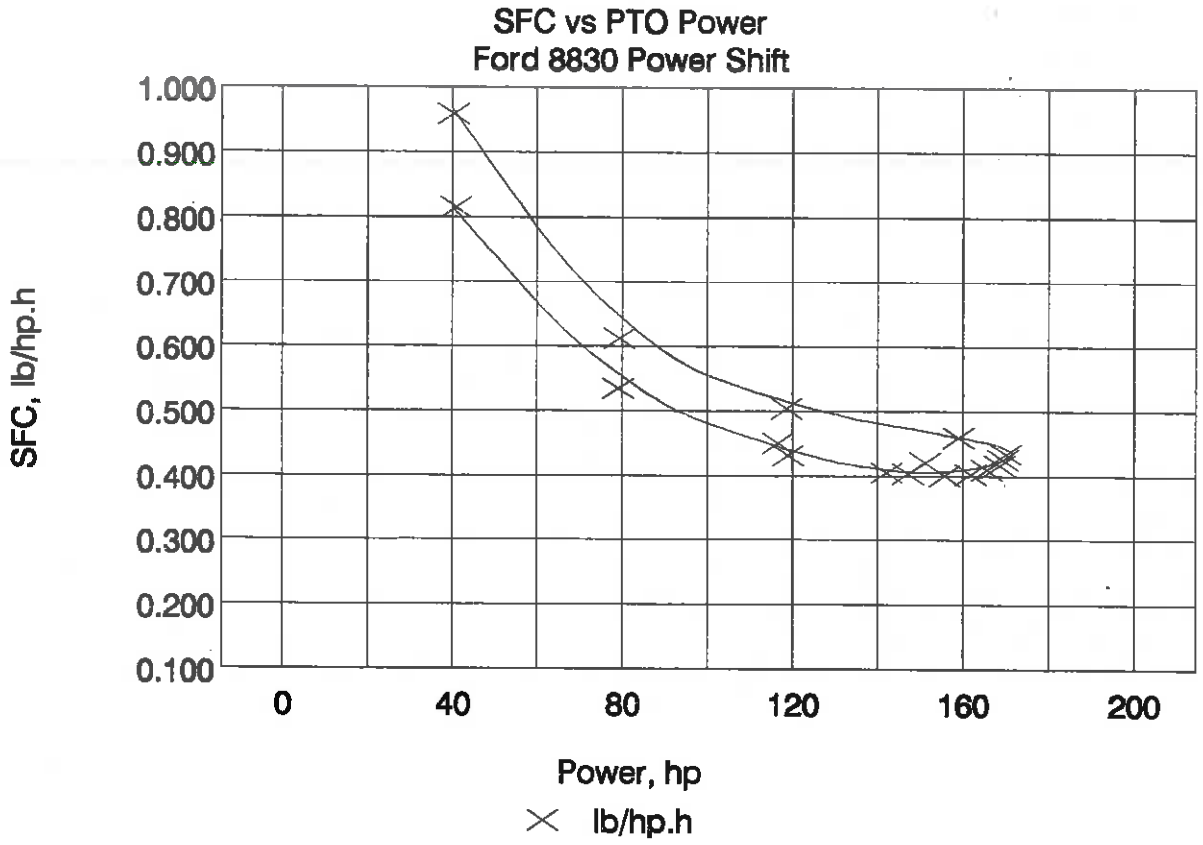
PTO Fuel Consumption
Ford 8830 Power Shift



PTO Specific Fuel Consumption
Ford 8830 Power Shift




SFC vs PTO Power
Ford 8830 Power Shift
SFC, kg/kW.h
1.000
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0
40
80
120
160
200
Power, kW
kg/kW.h


SFC vs PTO Power
Ford 8830 Power Shift
SFC, lb/hp.h
1.000
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0
40
80
120
160
200
Power, hp
lb/hp.h

DRAWBAR POWER AND FUEL CONSUMPTION (BALLASTED TRACTOR) Optional test 2 WD

Date of tests: 21-May-91, 22-May-91 | Test # 1648 | Fuel density: 0.838 kg/l

Type of track: Concrete

Gear	Power kW	Pull kN	Speed km/h	Engine Speed rev/min	Slip	SFC kg/kW.h	SFE kW.h/l	Temperature, deg C: Fuel	Coolant	Oil	Dry	Wet	Relative humidity	Barometric Pressure kPa
Ia. Maximum Power (ballasted, 2wd 2200 rev/min)								Tire pressure: 97 kPa, rear (inner) 110 kPa, front						
				Drawbar height: 521 mm				97 kPa, rear (outer)						
7	95.56	72.53	4.74	2256	13.01%	0.353	2.37	70	88	103	23	22	92%	97.77
8	102.79	62.23	5.95	2201	5.34%	0.324	2.59	70	88	104	24	22	84%	97.80
9	104.04	53.10	7.05	2202	4.13%	0.320	2.62	69	91	101	23	22	92%	97.73
10	106.94	46.62	8.26	2202	3.55%	0.313	2.68	68	91	101	26	22	71%	97.83
11	105.52	38.59	9.84	2204	2.71%	0.316	2.65	68	89	102	27	22	71%	97.87
12	103.67	32.30	11.55	2198	2.11%	0.322	2.60	68	89	102	28	23	65%	97.83
13	102.70	27.80	13.30	2200	1.77%	0.324	2.59	68	89	105	29	23	60%	97.83
II. Part Loads (ballasted, 2wd 2200 rev/min)								Tire pressure: 97 kPa, rear (inner) 110 kPa, front						
				Drawbar height: 521 mm				97 kPa, rear (outer)						
II.1 in selected gear at maximum power														
10	106.94	46.62	8.26	2202	3.55%	0.313	2.68	68	91	101	26	22	71%	97.83
II.1.1 75% of pull at maximum power at rated speed														
10	88.93	35.00	9.15	2410	2.54%	0.344	2.43	69	88	102	28	26	85%	97.83
II.1.2 50% of pull at maximum power at rated speed														
10	60.51	23.32	9.34	2440	1.60%	0.400	2.10	69	85	103	28	26	85%	97.83
II.1.3 next higher gear at reduced engine speed, same pull and travel speed as II.1.1														
11	88.81	35.00	9.14	2038	2.45%	0.309	2.71	66	86	96	28	26	85%	97.83
II.1.4 next higher gear at reduced engine speed, same pull and travel speed as II.1.2														
11	60.47	23.33	9.33	2063	1.60%	0.344	2.43	66	85	97	28	26	85%	97.83

University of Nebraska Tractor Test Laboratory

Date of tests: 21-May-91, 22-May-91 | Test # 1648 | Fuel density: 6.993 lb/gal

Type of track: Concrete

Gear	Power hp	Pull lb	Speed mph	Engine Speed rpm	Slip	SFC lb/hp.h	SFE hp.h/gal	Temperature, deg F: Fuel	Coolant	Oil	Dry	Wet	Relative humidity	Barometric Pressure
Ia. Maximum Power (ballasted, 2wd 2200 rev/min)								Tire pressure: 14 psi, rear (inner) 16 psi, front						
				Drawbar height: 20.5 in				14 psi, rear (outer)						
7	128.14	16306	2.95	2256	13.01%	0.580	12.05	157	190	217	74	71	92%	28.87
8	137.85	13989	3.70	2201	5.34%	0.532	13.14	159	191	219	75	71	84%	28.88
9	139.52	11937	4.38	2202	4.13%	0.526	13.30	156	195	215	74	71	92%	28.86
10	143.41	10482	5.13	2202	3.55%	0.514	13.61	154	196	214	78	71	71%	28.89
11	141.51	8677	6.12	2204	2.71%	0.520	13.44	155	193	215	80	72	71%	28.90
12	139.02	7261	7.18	2198	2.11%	0.529	13.22	155	193	216	82	73	65%	28.89
13	137.72	6251	8.26	2200	1.77%	0.532	13.14	155	193	222	84	74	60%	28.89
II. Part Loads (ballasted, 2wd 2200 rev/min)								Tire pressure: 14 psi, rear (inner) 16 psi, front						
				Drawbar height: 20.5 in				14 psi, rear (outer)						
II.1 in selected gear at maximum power														
10	143.41	10482	5.13	2202	3.55%	0.514	13.61	154	196	214	78	71	71%	28.89
II.1.1 75% of pull at maximum power at rated speed														
10	119.25	7868	5.68	2410	2.54%	0.566	12.35	156	190	216	82	78	85%	28.89
II.1.2 50% of pull at maximum power at rated speed														
10	81.14	5243	5.80	2440	1.60%	0.657	10.64	156	185	218	82	78	85%	28.89
II.1.3 next higher gear at reduced engine speed, same pull and travel speed as II.1.1														
11	119.10	7868	5.68	2038	2.45%	0.508	13.76	151	187	205	82	78	85%	28.89
II.1.4 next higher gear at reduced engine speed, same pull and travel speed as II.1.2														
11	81.10	5245	5.80	2063	1.60%	0.566	12.35	150	185	206	82	78	85%	28.89

DRAWBAR POWER AND FUEL CONSUMPTION (BALLASTED TRACTOR) Optional test 4 WD

Date of tests: 21-May-91 / 22-May-91 Test # 1648 Fuel density: 0.838 kg/l

Type of track: Concrete

Gear	Power kW	Pull kN	Speed km/h	Engine Speed rev/min	Slip	SFC kg/kW.h	SFE kW.h/l	Temperature, deg C: Fuel	Coolant	Oil	Dry	Wet	Relative humidity	Barometric Pressure kPa
I. Maximum Power (ballasted, fwa			2200 rev/min)			Tire pressure:		97 kPa, rear (inner)			110 kPa, front			
			Drawbar height:		521 mm			97 kPa, rear (outer)						
4	77.88	91.24	3.07	2414	14.49%	0.389	2.15	69	86	102	22	21	92%	97.73
5	94.92	93.60	3.65	2368	12.40%	0.366	2.29	70	86	99	22	21	92%	97.73
6	101.94	82.17	4.47	2317	6.36%	0.338	2.48	69	87	102	23	22	92%	97.77
7	104.31	74.08	5.07	2208	5.33%	0.320	2.62	69	88	104	24	22	84%	97.80
8	104.51	62.19	6.05	2198	3.94%	0.319	2.63	69	88	103	24	22	84%	97.80
9	104.52	52.63	7.15	2204	3.27%	0.319	2.63	70	89	104	24	22	84%	97.80
10	107.39	46.21	8.37	2204	2.68%	0.312	2.69	67	91	103	24	22	84%	97.77
11	106.16	38.44	9.94	2204	2.34%	0.316	2.65	67	89	101	26	22	71%	97.87
12	103.82	31.97	11.69	2204	1.56%	0.322	2.60	68	89	98	27	23	71%	97.87
13	102.14	27.41	13.41	2202	1.39%	0.328	2.55	68	89	103	28	23	65%	97.83

University of Nebraska Tractor Test Laboratory

Date of tests: 21-May-91 / 22-May-91 Test # 1648 Fuel density: 6.993 lb/gal

Type of track: Concrete

Gear	Power hp	Pull lb	Speed mph	Engine Speed rpm	Slip	SFC lb/hp.h	SFE hp.h/gal	Temperature, deg F: Fuel	Coolant	Oil	Dry	Wet	Relative humidity	Barometric Pressure in Hg
I. Maximum Power (ballasted, fwa			2200 rev/min)			Tire pressure:		14 psi, rear (inner)			16 psi, front			
			Drawbar height:		20.5 in			14 psi, rear (outer)						
4	104.44	20512	1.91	2414	14.49%	0.640	10.93	156	186	216	72	70	92%	28.86
5	127.29	21043	2.27	2368	12.40%	0.602	11.61	159	186	211	72	70	92%	28.86
6	136.71	18472	2.78	2317	6.36%	0.555	12.59	156	188	215	73	71	92%	28.87
7	139.88	16654	3.15	2208	5.33%	0.527	13.28	157	191	219	75	71	84%	28.88
8	140.15	13980	3.76	2198	3.94%	0.524	13.34	157	191	217	75	71	84%	28.88
9	140.17	11831	4.44	2204	3.27%	0.524	13.35	158	192	220	75	71	84%	28.88
10	144.01	10388	5.20	2204	2.68%	0.513	13.64	153	196	217	76	71	84%	28.87
11	142.37	8641	6.18	2204	2.34%	0.520	13.44	153	192	213	79	72	71%	28.90
12	139.22	7187	7.26	2204	1.56%	0.529	13.22	154	192	208	81	73	71%	28.90
13	136.97	6163	8.33	2202	1.39%	0.540	12.96	155	193	218	83	74	65%	28.89

Repairs: None
Remarks: None