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Test 896: Massey-Ferguson MF 165 (Diesel) (Also MF 165 8-Speed Diesel)

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

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NEBRASKA TRACTOR TEST 896 - MASSEY-FERGUSON MF 165 DIESEL (ALSO MF 165 8-SPEED DIESEL)

POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	Fuel Consumption		Hp-hr per gal	Temperature Degrees F			Barometer inches of Mercury	
		Gal per hr	Lb per hp-hr		Cooling medium	Air wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours									
52.42	1999	3.117	0.411	16.82	172	61	74	29.000	
Standard Power Take-off Speed (540 rpm)—One Hour									
47.40	1705	2.772	0.405	17.10	176	59	73	29.020	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
45.56	2045	2.692	0.409	16.92	167	59	73	.....
0.00	2145	0.867	.....	.....	163	60	74	.....
23.48	2106	1.682	0.496	13.96	164	60	73	.....
52.24	2000	3.160	0.419	16.53	174	61	75	.....
11.84	2125	1.257	0.735	9.42	162	60	75	.....
34.72	2077	2.163	0.431	16.05	168	61	75	.....
Av	27.97	2083	1.970	0.487	14.20	166	60	74	29.020

DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Fuel Consumption			Temp Degrees F			Barom- eter inches of Mercury	
				Slip of drivers %	Gal per hr	Lb per hp-hr	Hp-hr per gal	Cool- ing med	Air wet bulb		Air dry bulb
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—7th Gear (1st Hi-Lo MP)											
44.93	3428	4.91	2000	6.62	3.004	0.463	14.96	178	60	73	29.000
75% of Pull at Maximum Power—Ten Hours—7th Gear (1st Hi-Lo MP)											
37.02	2706	5.13	2049	4.90	2.512	0.470	14.74	169	66	76	28.851
50% of Pull at Maximum Power—Two Hours—7th Gear (1st Hi-Lo MP)											
25.88	1826	5.32	2084	3.11	1.947	0.520	13.29	168	69	84	28.755
MAXIMUM POWER WITH BALLAST											
34.45	5718	2.26	2054	14.92	4th Gear (2nd Lo-Hi MP)		170	56	65	29.090	
44.56	5237	3.19	2001	11.79	5th Gear (3rd Lo-Lo MP)		170	56	65	29.090	
45.28	3886	4.37	2000	7.69	6th Gear (3rd Lo-Hi MP)		175	56	65	29.080	
46.94	3596	4.90	1999	7.13	7th Gear (1st Hi-Lo MP)		175	56	65	29.080	
46.35	2663	6.53	1997	4.71	8th Gear (1st Hi-Hi MP)		178	57	70	29.080	
46.69	2316	7.56	2004	4.29	9th Gear (2nd Hi-Lo MP)		178	57	70	29.080	
45.21	1698	9.99	2000	3.26	10th Gear (2nd Hi-Hi MP)		178	57	70	29.080	
43.66	1157	14.15	2000	2.02	11th Gear (3rd Hi-Lo MP)		176	58	70	29.040	
MAXIMUM POWER WITHOUT BALLAST											
46.19	3600	4.81	2000	9.52	7th Gear (1st Hi-Lo MP)		180	63	66	28.940	

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—7th Gear (1st Hi-Lo MP)

Pounds pull	3596	3770	3821	4015	4069	3977
Horsepower	46.94	43.97	39.76	36.34	31.39	25.66
Crankshaft speed, rpm	1999	1795	1606	1402	1197	1003
Miles per hour	4.90	4.37	3.90	3.39	2.89	2.42
Slip of drivers, %	7.13	7.52	7.75	8.08	8.19	8.19

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 14.9-28; 6; 14	Two 14.9-28; 6; 14
Ballast	—Liquid	491 lb each	None
	Cast iron	679 lb each	None
Front tires	—No, size, ply & psi	Two 6.00-16; 4; 32	Two 6.00-16; 4; 28
Ballast	—Liquid	None	None
	Cast iron	100 lb each	None
Height of drawbar		20½ inches	22 inches
Static weight	—Rear	5520 lb	3180 lb
	Front	1930 lb	1730 lb
Total weight with operator		7625 lb	5085 lb

Department of Agricultural Engineering

Dates of Test: MAY 13 TO MAY 22, 1965

Manufacturer: MASSEY-FERGUSON INC.,
DETROIT, MICHIGAN

FUEL, OIL and TIME Fuel No 2 Diesel Cetane No 57.0 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8312 Weight per gallon 6.920 lb Oil SAE 20-20W API service classification MS, DS To motor 2.045 gal Drained from motor 1.818 gal Transmission and final-drive lubricant Massey-Ferguson Oil M-1101 Total time engine was operated 40½ hours.

ENGINE Make Perkins diesel Type 4 cylinder vertical Serial No 29 A 5487 Crankshaft mounted lengthwise Rated rpm 2000 Bore and stroke 3.6" x 5" Compression ratio 17.5 to 1 Displacement 203.5 cu in Cranking system 12 volt electric Lubrication pressure Air cleaner dry type with replaceable pleated paper element Oil filter full flow replaceable paper element Fuel filter primary and secondary filters with replaceable paper elements and sediment bowl with screen Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No SDW 643000010 Tread width rear 56" to 90" front 48½" to 80½" Wheel base 82" 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 30" Vertical distance above roadway 30.3" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system Constant running except when PTO foot clutch is disengaged Transmission selective gear fixed ratio with partial range operator controlled power shifting Advertised speeds mph first 1.28 second 1.68 third 1.93 fourth 2.53 fifth 3.54 sixth 4.64 seventh 5.15 eighth 6.75 ninth 7.72 tenth 10.11 eleventh 14.17 twelfth 18.54 reverse 1.76, 2.29, 7.01, and 9.18 Clutch single plate dry disc in combination with PTO clutch operated by single foot pedal Brakes double disc operated by two foot pedals which can be locked Steering mechanical with power assist Turning radius (on concrete surface with brake applied) right 126" left 126" (on concrete surface without brake) right 140" left 144" Turning space diameter (on concrete surface with brake applied) right 264" left 264" (on concrete surface without brake) right 290" left 300" Belt pulley 1176 rpm at 1975 engine rpm diam 10¼" face 6½" Belt speed 3117 fpm Power take-off 540 rpm at 1700 engine rpm.

REPAIRS and ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

First, second, and third gears were not run as it was necessary to limit the pull in fourth gear to avoid excessive wheel slippage. Twelfth gear was not run as it exceeded 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 896.

L. F. LARSEN

Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman

J. J. SULEK

D. E. LANE

Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station
E. F. Frolik, Dean; H. H. Kramer, Director, Lincoln, Nebraska

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, $\frac{1}{2}$ the 85% torque; maximum power, $\frac{1}{4}$ and $\frac{3}{4}$ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine, governor, automatic trans-

mission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Power Without Ballast. All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the Nebraska Tractor Tests write to the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.



Massey-Ferguson MF 165 Diesel