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Test 733: McCormick International B-275 (Diesel) Also International 354 (Diesel) 8-Speed

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 733-McCORMICK INTERNATIONAL B-275 DIESEL ALSO INTERNATIONAL 354 DIESEL 8 SPEED

POWER TAKE-OFF PERFORMANCE

Hp	Crank shaft speed rpm	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cool- ing med	Air wet bulb	Air dry bulb	Barometer inches of mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
32.88	1875	2.287	0.488	14.38	199	55	75	29.275
Standard Power Take-off Speed (540 rpm)—One Hour								
32.23	1821	2.227	0.484	14.47	202	54	75	29.245
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
28.46	1907	1.990	0.490	14.30	184	55	76	.....
0.00	1987	0.903	.....	.....	130	52	71	.....
14.55	1949	1.168	0.563	12.46	145	53	72	.....
32.23	1874	2.225	0.484	14.49	192	54	73	.....
7.31	1961	0.976	0.936	7.49	138	53	71	.....
21.49	1919	1.626	0.530	13.22	157	53	72	.....
Av 17.34	1933	1.481	0.599	11.71	157	53	72	29.235

DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank shaft speed rpm	Slip of drivers %	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	
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—4th Gear Low Range											
30.23	2293	4.94	1865	5.14	2.474	0.574	12.22	134	37	39	29.045
75% of Pull at Maximum Power—Ten Hours—4th Gear Low Range											
24.04	1724	5.23	1942	3.71	2.080	0.606	11.56	102	20	22	29.319
50% of Pull at Maximum Power—Two Hours—4th Gear Low Range											
16.71	1192	5.26	1926	2.35	1.591	0.667	10.50	90	30	34	29.110
MAXIMUM POWER WITH BALLAST											
27.42	4641	2.22	1895	10.90	2nd Gear Low Range..		108	35	38	29.080	
29.84	3490	3.21	1872	8.42	3rd Gear Low Range..		144	36	40	29.140	
30.41	2934	3.89	1880	6.85	1st Gear High Range..		154	36	40	29.160	
30.76	2321	4.97	1880	5.48	4th Gear Low Range..		161	36	40	29.160	
30.08	1783	6.33	1873	4.08	2nd Gear High Range..		141	36	40	29.140	
29.49	1199	9.22	1878	2.01	3rd Gear High Range..		124	35	38	29.080	
28.49	768	13.91	1880	0.97	4th Gear High Range..		113	36	39	29.100	
MAXIMUM POWER WITHOUT BALLAST											
30.15	2346	4.82	1874	11.57	4th Gear Low Range..		120	33	37	29.080	
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST— 4th Gear Low Range											
Pounds pull			2300	2400	2450	2500	2400	2300	....	
Horsepower			30.8	28.2	25.5	22.7	18.6	14.7	....	
Miles per hour			5.0	4.4	3.9	3.4	2.9	2.4	....	

Department of Agricultural Engineering
Dates of Test: March 3 to March 23, 1960
Manufacturer: INTERNATIONAL HARVESTER
COMPANY OF GREAT BRITAIN, LONDON,
ENGLAND
Manufacturer's Power Rating: Not Rated

FUEL, OIL and TIME Fuel No. 2 Diesel Fuel Cetane No 50 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8419 Weight per gallon 7.010 lb Oil SAE 5W-20 API service classification MS, DM To motor 1.201 gal Drained from motor 0.854 gal Transmission and final-drive lubricant SAE 80 Type Gear oil Total time engine was operated 47½ hours.

ENGINE Make International Harvester DSL Type 4 cylinder vertical Serial No 15217A Crankshaft mounted lengthwise Rated rpm 1875 Bore and stroke 3⅜" x 4" Compression ratio 19.3 to 1 Displacement 143 cu in Cranking system 12 volt (two 6 volt batteries) Lubrication pressure Air cleaner oil washed wire screen Oil filter replaceable paper element Fuel filter replaceable treated paper element Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No 15219 Tread width rear 48" to 76" front 48" to 76" Wheel base 74½" 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 27.7" Vertical distance above roadway 27" Horizontal distance from center of rear wheel tread 0" to the right / left Hydraulic control system direct engine drive Transmission selective gear fixed-ratio Advertised speeds mph (low range) first 1.6 second 2.5 third 3.5 fourth 5.3 reverse 2.3 (high range) first 4.2 second 6.6 third 9.4 fourth 14.0 reverse 6.3 Clutch dry disc dual plate operated by foot pedal Brakes disc brakes may be operated by hand lever or independently by foot pedals which can be locked together Steering no power assistance Turning radius (on concrete surface with brake applied) right 123" left 123" (on concrete surface without brake) right 132" left 132" Turning space diameter (on concrete surface with brake applied) right 256" left 256" (on concrete surface without brake) right 274" left 274" Belt pulley 1308 rpm at 1875 engine rpm diam 9½" face 6⅝" Belt speed 3260 fpm Power take-off 540 rpm at 1821 engine rpm.

REPAIRS AND ADJUSTMENTS During the 10 hour run engine speed became excessive due to the failure of the governor stop. This was corrected and test continued.

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

This tractor was equipped with a foot operated differential lock. It was not used during the test. First gear low range was not run as pull was limited in second gear low range by stability formula.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 733.

L. F. LARSEN
Engineer-in-Charge

L. W. HURLBUT, Chairman
G. W. STEINBRUEGGE
J. J. SULEK
Board of Tractor
Test Engineers

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	No, Size, Ply & psi	Two 11-28;4;14	Two 11-28;4;12
Ballast	—Liquid	452 lb each	None
	Cast iron	500 lb each	None
Front tires	No, Size, Ply & psi	Two 5.50-16;4;32	Two 5.50-16;4;24
	—Liquid	None	None
	Cast iron	182 lb each	None
Height of drawbar		21½ inches	23 inches
Static weight	—Rear	4134 lb	2231 lb
	Front	1694 lb	1330 lb
Total weight with operator		6003 lb	3736 lb

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 transmissions, 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.



McCormick International B-275 Diesel