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Test 971: International Farmall 1256 Turbo (Diesel)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 971 – INTERNATIONAL FARMALL 1256 TURBO DIESEL

POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	Fuel Consumption		Temperature Degrees F					
		Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling medium	Air wet bulb	Air dry bulb	Barometer inches of Mercury	
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours									
116.12	2400	7.466	0.448	15.55	182	58	75	28.858	
Standard Power Take-off Speed (1000 rpm)—One Hour									
113.33	2071	6.795	0.418	16.68	183	57	74	28.900	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
103.27	2509	7.128	0.481	14.49	181	59	75	.....
0.00	2649	2.613	.....	.....	170	56	74	.....
53.32	2591	4.976	0.650	10.72	173	58	73	.....
117.23	2400	7.588	0.451	15.45	181	58	74	.....
26.80	2620	3.796	0.987	7.06	171	57	74	.....
78.61	2552	6.017	0.534	13.06	178	60	75	.....
Av	63.21	2553	5.353	0.590	11.81	175	58	74	28.945

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Slip of drivers %	Fuel Consumption			Temp Degrees F				Barom- eter inches of Mercury
					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—8th Gear (1st Hi-TA)												
102.03	8353	4.58	2393	8.40	7.623	0.521	13.38	156	43	53	28.915	
75% of Pull at Maximum Power—Ten Hours—8th Gear (1st Hi-TA)												
86.19	6466	5.00	2537	5.70	7.022	0.568	12.27	153	40	47	28.844	
50% of Pull at Maximum Power—Two Hours—8th Gear (1st Hi-TA)												
61.63	4464	5.18	2589	4.39	5.789	0.655	10.65	159	40	48	28.940	
MAXIMUM POWER WITH BALLAST												
87.89	11104	2.97	2544	14.65	5th Gear (3rd Lo-TA)			160	51	53	28.610	
101.02	9975	3.80	2401	10.65	6th Gear (3rd Lo-DD)			160	51	53	28.610	
102.03	9431	4.06	2402	8.26	7th Gear (4th Lo-TA)			165	50	64	28.810	
104.66	8424	4.66	2401	7.20	8th Gear (1st Hi-TA)			164	51	69	28.760	
104.56	7357	5.33	2401	6.11	9th Gear (4th Lo-DD)			169	50	64	28.810	
105.82	6502	6.10	2403	5.22	10th Gear (1st Hi-DD)			165	50	64	28.810	
105.20	6270	6.29	2398	5.59	11th Gear (2nd Hi-TA)			163	56	70	29.000	
104.18	4765	8.20	2401	4.16	12th Gear (2nd Hi-DD)			165	56	70	29.000	
103.87	3469	11.23	2403	2.85	13th Gear (3rd Hi-TA)			165	59	75	29.000	
100.84	2609	14.49	2401	2.29	14th Gear (3rd Hi-DD)			167	59	76	29.000	
MAXIMUM PULL WITHOUT BALLAST												
89.30	8537	3.92	2494	14.95	7th Gear (4th Lo-TA)			162	59	70	28.900	

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—8th Gear (1st Hi-TA)

Pounds pull	8424	9317	9933	10234	10381	10516	9846
Horsepower	104.66	101.64	95.33	84.82	73.61	61.47	46.69
Crankshaft speed rpm	2401	2157	1914	1670	1433	1185	948
Miles per hour	4.66	4.09	3.60	3.11	2.66	2.19	1.78
Slip of drivers %	7.20	9.23	10.05	10.98	11.24	11.63	10.32

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 18.4-38; 8; 18	Two 18.4-38; 8; 16
	—Liquid	1460 lb each	None
	Cast iron	140 lb each	None
Front tire	—No, size, ply & psi	Two 7.50-16; 8; 44	Two 7.50-16; 8; 44
	—Liquid	None	None
	Cast iron	103 lb each	None
Height of drawbar		22 inches	22½ inches
Static weight with operator—Rear		10625 lb	7425 lb
	Front	3185 lb	2980 lb
	Total	13810 lb	10405 lb

Department of Agricultural Engineering

Dates of Test: April 15 to April 30, 1968

Manufacturer: INTERNATIONAL HARVESTER COMPANY, CHICAGO, ILLINOIS

FUEL, OIL and TIME Fuel No 2 Diesel Cetane No 52.4 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8371 Weight per gallon 6.970 lb Oil SAE 30 API service classification MS, DC, DM, DS To Motor 3.073 gal Drained from motor 2.428 gal Transmission and final-drive lubricant IH Hy-Tran Fluid Total time engine was operated 49½ hours.

ENGINE Make International Diesel Type 6 cylinder vertical with turbo-charger Serial No 2U007506 Crankshaft mounted lengthwise Rated rpm 2400 Bore and stroke 4.321" x 4.625" Compression ratio 16 to 1 Displacement 406.9 cu in Cranking system 12 volt electric (two 6-volt batteries) Lubrication pressure Air cleaner two stage dry type with automatic dust unloader using replaceable pleated paper element Oil filter full flow screw-on replaceable cartridge Oil cooler engine coolant heat exchanger for engine oil—radiator for transmission and hydraulic oil Fuel filter one primary and one final fuel filter using replaceable screw-on cartridges Muffler was not used Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No 9405S-Y Tread width rear 56" to 94" front 50" to 74" Wheel base 104.8" 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 30.7" Vertical distance above roadway 38.2" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system direct engine drive Transmission selective gear fixed ratio with partial range operator controlled power shifting Advertised speeds mph first 1½ second 1¾ third 2 fourth 2½ fifth 3¼ sixth 4½ seventh 4¾ eighth 5 ninth 5½ tenth 6¼ eleventh 6½ twelfth 8½ thirteenth 11½ fourteenth 14½ fifteenth 15½ sixteenth 19½ reverse first 2½ second 3 third 3¼ fourth 4¼ fifth 5½ sixth 7¼ seventh 7½ eighth 9½ Clutch single plate dry disc operated by foot pedal Brakes dry disc hydraulically power actuated by two foot pedals Steering hydraulic with power assist Turning radius (on concrete surface with brake applied) right 131" left 131" (on concrete surface without brake) right 160" left 160" Turning space diameter (on concrete surface with brake applied) right 286" left 286" (on concrete surface without brake) right 344" left 344" Power take-off 539 or 1014 at 2100 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, third and fourth gears were not run as it was necessary to limit the pull in fifth gear to avoid excessive wheel slippage. Fifteenth and sixteenth gears were not run as they exceeded 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 971.

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. W. Ottoson, 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, $\frac{1}{2}$ of 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 transmission, 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 Pull without Ballast. All added ballast is removed from the tractor. The drawbar pull is determined at slip limits of 15% for pneumatic tires or 7% for steel tracks or lugs. The tractor is operated at the fastest possible travel speed.

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.



INTERNATIONAL FARMALL 1256 TURBO DIESEL