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Test 1186: S.A.M.E. Buffalo 4WD Diesel

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1186—SAME BUFFALO 4WD DIESEL

POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Air wet bulb	Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1000 rpm)								
104.94	2200	6.892	0.454	15.23	Air-cooled	65	75	29.013
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
91.92	2267	5.925	0.445	15.51	Air-cooled	66	75	.....
0.00	2433	2.053	.....	.....	Air-cooled	66	75	.....
47.81	2359	3.911	0.565	12.22	Air-cooled	65	75	.....
105.97	2200	6.985	0.456	15.17	Air-cooled	66	76	.....
24.36	2403	2.939	0.834	8.29	Air-cooled	66	75	.....
70.48	2317	4.840	0.475	14.56	Air-cooled	65	75	.....
Av 56.76	2330	4.442	0.541	12.78	Air-cooled	66	75	29.053

DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Slip of drivers %	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
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours 8th (2 N) Gear											
83.70	5816	5.40	2197	6.00	6.710	0.554	12.47	Air-cl.	64	73	29.065
75% of Pull at Maximum Power—Ten Hours 8th (2 N) Gear											
69.34	4552	5.71	2290	4.38	5.574	0.556	12.44	Air-cl.	68	79	29.038
50% of Pull at Maximum Power—Two Hours 8th (2 N) Gear											
48.64	3073	5.94	2341	3.01	4.522	0.643	10.76	Air-cl.	68	79	29.015
50% of Pull at Reduced Engine Speed—Two Hours 9th (3 N) Gear											
48.73	3066	5.96	1907	2.89	3.943	0.559	12.36	Air-cl.	73	79	28.885

MAXIMUM POWER WITH BALLAST

78.27	10941	2.68	2244	14.72	5th Gear (2 L)	Air-cooled	75	86	28.810
86.12	9515	3.39	2203	10.57	6th Gear (3 L)	Air-cooled	59	65	29.040
88.24	7810	4.24	2202	8.20	7th Gear (1 N)	Air-cooled	59	65	29.040
87.24	6066	5.39	2199	6.15	8th Gear (2 N)	Air-cooled	59	65	29.040
85.71	4766	6.74	2199	4.78	9th Gear (3 N)	Air-cooled	61	69	29.050
82.39	3271	9.45	2198	3.29	10th Gear (1 V)	Air-cooled	61	69	29.050

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—8th (2 N) GEAR

Pounds Pull	6066	6500	6846	7028	7002	6833
Horsepower	87.24	83.88	78.04	70.24	59.94	48.81
Crankshaft Speed rpm	2199	1982	1758	1546	1324	1104
Miles Per Hour	5.39	4.84	4.28	3.75	3.21	2.68
Slip of Drivers %	6.15	6.52	6.96	7.26	7.26	7.11

TRACTOR SOUND LEVEL (without cab)

	db(A)
Maximum Available Power 2 Hours	99.5
75% of Pull at Max. Power 10 Hours	97.5
50% of Pull at Max. Power 2 Hours	97.5
50% of Pull at Reduced Engine Speed 2 Hours	95.0
Bystander (in 12th gear—3V)	88.0

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires		
—No., size, ply & psi	Two 18.4-38; 8; 16	Two 18.4-38; 8; 16
Ballast	909 lb each	None
Cast Iron	None	None
Front Tires		
—No., size, ply & psi	Two 13.6-28; 6; 20	Two 13.6-28; 6; 20
Ballast	475 lb each	None
Cast Iron	940 lb total	None
(front end)		
Height of drawbar	23 inches	23 inches
Static weight with operator—rear	7995 lb	6177 lb
front	5800 lb	3910 lb
total	13795 lb	10087 lb

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska—Lincoln
H. W. Ottoson, Director

Department of Agricultural Engineering

Dates of Test: August 26 to September 11, 1975

Manufacturer: S.A.M.E. S.p.A. Treviglio, Italy

FUEL, OIL AND TIME Fuel No 2 Diesel Cetane No 51.7 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.830 Weight per gallon 6.911 lb Oil SAE 30 API service classification SB/SE-CA/CC To motor 4.425 gal. Drained from motor 3.814 gal Transmission and final drive lubricant SAE 80 Total time engine was operated 41.5 hours.

ENGINE Make S.A.M.E. S.p.A. Type 6 cylinder vertical air-cooled Serial No 1303 Crankshaft Mounted lengthwise Rated rpm 2200 Bore and stroke 4.13" x 4.72" Compression ratio 17 to 1 Cranking system 12 v Lubrication pressure Displacement 380 cu in Air cleaner dry paper element with centrifugal pre-cleaner and dust evacuator Oil filter one cartridge Oil cooler radiator for crankcase oil Fuel filter two cartridges Muffler vertical Cooling medium temperature control air-cooled.

CHASSIS Type four-wheel drive Serial No. DT 1303 Tread width rear 67" to 94" front 67" to 90.5" Wheel base 104" 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 39" Vertical distance above roadway 33" 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 shift Advertised speeds mph first 1.1 second 1.3 third 1.6 fourth 2.2 fifth 2.8 sixth 3.5 seventh 4.2 eighth 5.2 ninth 6.4 tenth 8.9 eleventh 11.1 twelfth 13.7 reverse 1.5; 3.1; 5.8; 12.3 Clutch single plate dry disc operated by foot pedal Brakes wet discs operated by hand lever and two pedals which can be locked together Steering power assist Turning radius (on concrete surface with brake applied) right 203" left 197" (on concrete surface without brake) right 236" left 226" Turning space diameter (on concrete surface with brake applied) right 423" left 407" (on concrete surface without brake) right 486" left 467" Power take-off 1000 rpm at 2200 engine rpm.

REPAIRS OR ADJUSTMENTS: No repairs or adjustments.

REMARKS: Six gears were chosen between 15% slip and 15 MPH. Fuel temperature at injection pump return was 157°F. All test results were determined from observed data obtained in accordance with SAE and ASAE test code or official Nebraska test procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1186.

LOUIS I. LEVITICUS
Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman

W. E. SPLINTER

D. E. LANE

Board of Tractor Test Engineers

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories may be disconnected only when the means for disconnecting can be reached from the operator station. 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. Prior to the maximum power run the tire tread-bar height must be at least 65% of new tread height.

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 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 use.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effects 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 4 different runs 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; (3) 50% of the pull at maximum power; and (4) maintaining the same load and travel speed as in (3) by shifting to a higher gear and reducing the engine rpm.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 6 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 manufacturer's representative has the option of selecting one gear or speed over eight miles per hour. The maximum safe speed for the Nebraska Test Course has been set at 15 mph. The slip limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Varying Drawbar Pull 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.

SOUND MEASUREMENT

Sound is recorded during each of the Varying Power and Fuel Consumption runs as the tractor travels on a straight section of the test course. The dB(A) sound level is obtained with the microphone located near the right ear of the operator. Bystander sound readings are taken with the microphone placed 25 feet from the line of travel of the tractor.

An increase of 10 dB(A) will approximately double the loudness to the human ear.

For additional information about the Nebraska Tractor Tests write to the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska 68503.



SAME BUFFALO 4WD DIESEL