1-1-1975

Test 1196: Allis-Chalmers 7040 PS Diesel

Nebraska Tractor Test Lab
University of Nebraska-Lincoln, tractortestlab@unl.edu

NEBRASKA TRACTOR TEST 1196 – ALLIS-CHALMERS 7040 PS DIESEL

POWER TAKE-OFF PERFORMANCE

Hp	Crank-shaft speed rpm	Fuel Consumption Gal per hr	Fuel Consumption 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—1021 rpm)								
136.30	2301	8.903	0.451	15.31	188	64	75	28.870
Standard Power Take-off Speed (1000 rpm)—One Hour								
136.15	2253	8.779	0.445	15.51	188	64	75	28.830
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
120.87	2403	8.281	0.473	14.60	185	64	75	.....
0.00	2545	3.011	.....	.....	174	64	73	.....
62.50	2485	5.631	0.622	11.10	179	64	74	.....
135.96	2301	8.867	0.450	15.33	188	64	75	.....
31.63	2516	4.327	0.945	7.31	175	64	74	.....
92.40	2449	6.969	0.521	13.26	181	64	75	.....
Av 73.89	**2450**	**6.181**	**0.578**	**11.95**	**180**	**64**	**74**	**28.790**

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Fuel Consumption Slip of drivers %	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 5th (1-H) Gear											
114.34	9298	4.61	2299	7.57	8.762	0.529	13.05	186	51	61	28.735
75% of Pull at Maximum Power—Ten Hours 5th (1-H) Gear											
95.58	7201	4.98	2421	5.23	7.777	0.562	12.29	180	43	49	28.950
50% of Pull at Maximum Power—Two Hours 5th (1-H) Gear											
66.20	4822	5.15	2464	3.72	6.372	0.665	10.39	181	53	64	28.695
55% of Pull at Reduced Engine Speed—Two Hours 7th (2-H) Gear											
65.54	4788	5.13	1780	3.52	5.123	0.540	12.79	180	52	60	28.730
MAXIMUM POWER WITH BALLAST											
84.82	13547	2.35	2417	12.63	2nd Gear (2-L)			181	37	42	28.800
113.86	10574	4.04	2299	8.72	4th Gear (4-L)			185	46	52	28.770
117.75	9586	4.61	2300	7.76	5th Gear (1-H)			185	47	53	28.770
116.32	6691	6.52	2299	5.16	7th Gear (2-H)			185	48	55	28.770
113.05	6416	6.61	2302	4.60	8th Gear (6-L)			185	44	51	28.810
113.16	4646	9.13	2300	3.56	9th Gear (3-H)			185	49	56	28.770

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST
5th (1-H) Gear

Pounds Pull	9586	10652	11267	11160	11463	11156
Horsepower	117.75	116.43	108.39	93.95	82.44	68.46
Crankshaft Speed rpm	2300	2071	1840	1607	1380	1173
Miles Per Hour	4.61	4.10	3.61	3.16	2.70	2.30
Slip of Drivers %	7.76	8.72	9.73	9.44	10.01	9.58

TRACTOR SOUND LEVEL WITH CAB	db(A)
Maximum Available Power 2 Hours	79.5
75% of Pull at Max. Power 10 Hours	79.0
50% of Pull at Max. Power 2 Hours	79.0
50% of Pull at Reduced Engine Speed 2 Hours	76.5
Bystander in 12th (6-H) gear	89.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi	Two 20.8-38; 10; 22	Two 20.8-38; 10; 22
Ballast	—Liquid	1202 lb each	None
	Cast Iron	1260 lb each	None
Front Tires	—No., size, ply & psi	Two 11.00-16; 8; 36	Two 11.00-16; 8; 36
Ballast	—Liquid	None	None
	Cast Iron	26 lb each	None
Height of drawbar		22 inches	22 inches
Static weight with operator	—rear	13555 lb	8630 lb
	front	3800 lb	3748 lb
	total	17355 lb	12378 lb

Department of Agricultural Engineering

Dates of Test: November 3 to 20, 1975

Manufacturer: ALLIS-CHALMERS CORPORATION, Wilwaukee. Wisconsin 53201

FUEL, OIL AND TIME **Fuel** Diesel No. 2 **Cetane No.** 51.7 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.8293 **Weight per gallon** 6.905 lb **Oil SAE** 30 **API classification** SE-CD **To motor** 4.079 gal **Drained from motor** 3.003 gal **Transmission and final drive lubricant** Allis-Chalmers Power Fluid 821 **Total time engine was operated** 51.5 hours.

ENGINE **Make** Allis-Chalmers **Type** 6 cylinder with turbocharger **Serial No.** 3D-34020 **Crankshaft Mounted** lengthwise **Rated rpm** 2300 **Bore and stroke** 4.25″ x 5.0″ **Compression ratio** 16 to 1 **Displacement** 426 cu. in. **Cranking system** 12 volt **Lubrication** pressure **Air cleaner** two stage dry with pleated paper primary and safety element and centrifugal precleaner **Oil filter** two full flow cartridges **Oil cooler** engine coolant heat exchanger for crankcase oil and radiator for transmission and hydraulic oil **Fuel filter** one cartridge **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS **Type** standard **Serial No.** 3257 S **Tread width** rear 66″ to 99″ front 62″ to 90″ **Wheel base** 106″ **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from centerline of rear wheels 32.7″ Vertical distance above roadway 37.2″ 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 (six 'gears-on-the-go') power shifting **Advertised speeds mph** first 1.8 second 2.5 third 3.5 fourth 4.4 fifth 4.9 sixth 5.4 seventh 6.8 eighth 6.8 ninth 9.4 tenth 11.8 eleventh 14.6 twelfth 18.4 reverse 3.0 and 8.0 **Clutch** multiple wet disc operated by foot pedal **Brakes** wet multiple disc operated hydraulically by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 144.5″ left 144.5″ (on concrete surface without brake) right 169″ left 169″ **Turning space diameter** (on concrete surface with brake applied) right 306″ left 306″ (on concrete surface without brake) right 355″ left 355″ **Power take-off** 1000 rpm at 2253 engine rpm.

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test code or official Nebraska test procedure. Fuel temperature at injection pump return was 158°F. Six gears were chosen between tangential pull limit of the driving tires and 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1196.**

LOUIS I. LEVITICUS
Engineer-in-Charge

G. D. STEINBRUEGGE, Chairman
W. E. SPLINTER
D. E. LANE
Board of Tractor Test Engineers

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

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, ½ of the 85% torque; maximum power, ¼ and ¾ 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.

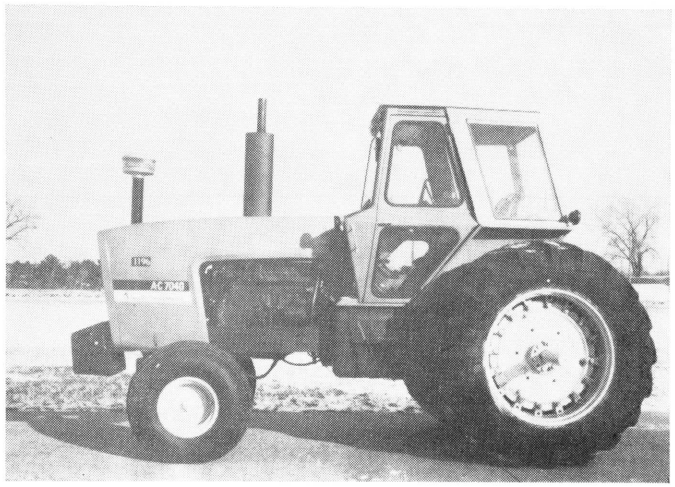
Varying Drawbar Pull and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. 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** 68583.



ALLIS-CHALMERS 7040 PS DIESEL