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## Test 1005: Allis-Chalmers 180 Gasoline

Nebraska Tractor Test Lab

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# NEBRASKA TRACTOR TEST 1005 – ALLIS CHALMERS 180 GASOLINE

## POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	Fuel Consumption		Temperature Degrees F				Barometer inches of Mercury	
		Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling medium	Air wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours									
65.16	2000	5.910	0.549	11.03	193	60	75	28.763	
Standard Power Take-off Speed (540 rpm)—One Hour									
64.62	1964	5.788	0.542	11.16	194	60	75	28.775	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
57.58	2081	5.368	0.564	10.73	193	61	76	.....	
0.00	2252	2.265	.....	.....	184	60	75	.....	
30.25	2185	3.876	0.776	7.80	190	60	75	.. .....	
64.69	2000	5.834	0.546	11.09	196	61	75	.....	
15.40	2227	3.093	1.216	4.98	186	60	75	.....	
44.47	2142	4.679	0.637	9.50	192	60	74	.....	
Av	35.40	2148	4.186	0.716	8.46	190	60	75	28.775

## DRAWBAR PERFORMANCE

Hp	Drawbar pull lbs	Speed miles per hr	Crankshaft speed rpm	Slip of drivers %	Fuel Consumption		Temp Degrees F				Barometer inches of Mercury
					Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling med	Air wet bulb	Air bulb dry	

## VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST

<b>Maximum Available Power—Two Hours—4th Gear</b>											
56.05	5032	4.18	1997	7.40	5.801	0.626	9.66	195	51	64	28.985
<b>75% of Pull at Maximum Power—Ten Hours—4th Gear</b>											
46.01	3813	4.53	2116	5.31	5.166	0.680	8.91	194	51	64	29.077
<b>50% of Pull at Maximum Power—Two Hours—4th Gear</b>											
31.86	2532	4.72	2172	3.80	4.399	0.836	7.24	191	51	65	28.990

## MAXIMUM POWER WITH BALLAST

51.34	7829	2.46	2060	14.90	2nd Gear	.....	197	45	53	29.040
55.04	6378	3.24	2001	10.08	3rd Gear	.....	193	45	53	29.040
56.84	5115	4.17	2000	7.77	4th Gear	.....	192	45	55	29.040
56.09	4257	4.94	1999	6.28	5th Gear	.....	193	47	58	29.040
57.50	3423	6.30	2000	4.88	6th Gear	.....	192	48	59	29.030
54.17	1836	11.06	2002	3.10	7th Gear	.....	187	48	60	29.030
53.50	1432	14.01	2002	2.22	8th Gear	.....	191	48	60	29.030

## MAXIMUM PULL WITHOUT BALLAST

52.59	4939	3.99	2039	14.66	4th Gear	.....	197	56	70	29.050
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## VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—4th Gear

Pounds pull	5115	5357	5546	5540	5565	5669	5559
Horsepower	56.84	52.99	49.02	42.62	36.53	30.90	24.49
Crankshaft speed rpm	2000	1789	1606	1397	1193	992	802
Miles per hour	4.17	3.71	3.31	2.89	2.46	2.04	1.65
Slip of drivers, %	7.77	8.19	8.55	8.55	8.55	8.79	8.67

## TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 18.4-28; 6; 16	Two 18.4-28. 6; 16
Ballast	—Liquid	900 lb each	None
	—Cast iron	1000 lb each	None
Front tires	—No, size, ply & psi	Two 7.50-16; 6; 24	Two 7.50-16; 6; 24
Ballast	—Liquid	None	None
	—Cast iron	25 lb each	None
Height of drawbar		19 inches	20½ inches
Static weight with operator—Rear		8100 lb	4300 lb
	Front	2170 lb	2120 lb
	Total	10270 lb	6420 lb

Department of Agricultural Engineering

Date of Test: April 8 to April 14, 1969

Manufacturer: ALLIS-CHALMERS MANUFACTURING COMPANY, MILWAUKEE, WISCONSIN

**FUEL, OIL and TIME** Fuel regular gasoline Octane No Motor 85.2 Research 92.6 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7270 Weight per gallon 6.052 lb Oil SAE 10W 30 API service classification MS, DG, DM To motor 2.41 gal Drained from motor 2.367 gal Transmission and final drive lubricant Allis-Chalmers Special lube oil Total time engine was operated 39½ hours.

**ENGINE** Make Allis-Chalmers gasoline Type 6 cylinder vertical Serial No 2G-09715 Crankshaft mounted lengthwise Rated rpm 2000 Bore and stroke 3.75" x 4.00" Compression ratio 8.15 to 1 Displacement 265 cu in Carburetor size 1" Ignition system battery Cranking system 12 volt electric Lubrication pressure Air cleaner dry type with replaceable pleated paper element Oil filter full flow replaceable pleated paper cartridge Fuel filter sediment bowl and screen Muffler was used Cooling medium temperature control thermostat.

**CHASSIS** Type standard Serial No 180-7058 Tread width rear 58" to 82" front 53" to 73" Wheel base 99.158" 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 36.7" Vertical distance above roadway 29.0" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system constant running Transmission selective gear fixed ratio plus operator controlled partial range power shifting Advertised speeds mph first 2.3 second 2.9 third 3.7 fourth 4.6 fifth 5.4 sixth 6.7 seventh 11.6 eighth 14.5 reverse 3.3 and 4.2 Clutch single plate dry disc operated by foot pedal Brakes Contracting band and disc operated by two foot pedals that can be locked together Steering hydrostatic power Turning radius (on concrete surface with brake applied) right 123" left 123" (on concrete surface without brake) right 139" left 139" Turning space diameter (on concrete surface with brake applied) right 261" left 261" (on concrete surface without brake) right 292" left 292" Belt pulley 1678 rpm at 2000 engine rpm diam 9.00" face 6.56" Belt speed 3952 fpm Power take-off 540 rpm at 1963 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 gear was not run as it was necessary to limit the pull in second gear to avoid excessive wheel slippage.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1005.

L. F. LARSEN

Engineer-In-Charge

G. W. STEINBRUEGGE, Chairman

W. E. SPLINTER

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.



ALLIS-CHALMERS 180 GASOLINE