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## Test 680: Case Moderl 801-B (Diesel)

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Department of Agricultural Engineering  
Dates of test: October 27, 1958 to November 14, 1958  
Manufacturer: J. I. CASE COMPANY, RACINE,  
WISCONSIN  
Manufacturer's rating: Not Rated

CASE 801-B DIESEL

BELT HORSEPOWER TESTS

Hp	Crank shaft speed rpm	Fuel Consumption			Temp. Deg. F.			Barometer inches of mercury
		Gal per hr	Hp-hr per gal	Lb per hp-hr	Cooling medium	Air wet bulb	Air dry bulb	
TESTS B & C—100% MAXIMUM POWER—TWO HOURS								
54.42	1801	4.023	13.53	0.520	177	52	69	29.027
TEST D—RATED POWER—ONE HOUR								
48.25	1890	3.585	13.45	0.522	173	54	73	29.030
TEST E—VARYING POWER—TWO HOURS (20 minute runs; last line average)								
48.17	1893	3.589	13.42	0.524	172	53	69	.....
1.26	1985	1.366	0.92	7.619	161	52	66	.....
24.95	1949	2.403	10.38	0.677	167	53	69	.....
54.52	1800	4.024	13.55	0.519	177	53	69	.....
12.67	1972	1.865	6.79	1.035	161	52	67	.....
36.88	1923	2.949	12.51	0.562	169	52	68	.....
29.74	1920	2.699	11.02	0.638	168	52	68	29.040

DRAWBAR HORSEPOWER TESTS

Hp	Draw bar pull lbs	Speed miles per hr	Crank shaft speed rpm	Slip of drive wheels %	Fuel Consumption			Temp. Deg. F.			Barometer inches of mercury
					Gal per hr	Hp-hr per gal	Lb per hp-hr	Cooling med	Air wet bulb	Air dry bulb	
TEST H—OBSERVED MAXIMUM HORSEPOWER—2 HOURS—4th Gear											
51.38	4387	4.39	1815	4.90	4.109	12.50	0.562	174	41	50	28.980
*46.98	5154	3.42	1846	6.01	4.134	11.36	0.619	178	45	59	29.000
TEST H—75% OF PULL AT OBSERVED MAXIMUM HORSEPOWER—10 HOURS 4th Gear											
40.54	3251	4.68	1908	3.76	3.343	12.13	0.580	172	44	57	28.821
**39.80	3941	3.79	1888	4.55	3.735	10.66	0.660	175	43	55	29.010
TEST H—50% OF PULL AT OBSERVED MAXIMUM HORSEPOWER—2 HOURS 4th Gear											
28.24	2196	4.82	1944	2.59	2.744	10.29	0.683	169	40	45	28.918
*27.09	2570	3.95	1930	2.95	2.871	9.44	0.745	173	44	56	29.020
TESTS F & G—100% MAXIMUM POWER											
42.07	7888	2.00	1805	13.75	2nd Gear (part throttle)			173	42	53	28.550
49.62	6444	2.89	1804	9.07	3rd Gear			176	42	52	28.550
50.14	4352	4.32	1797	5.51	4th Gear			176	46	58	28.440
49.07	3213	5.73	1801	3.93	5th Gear			176	46	58	28.440
47.59	2153	8.29	1806	2.66	6th Gear			178	48	61	28.410
45.68	1497	11.44	1803	1.65	7th Gear			175	48	61	28.410
36.00	7963	1.70	1892	14.85	2nd Gear (Torq. Conv.)			173	34	40	28.690
43.64	7900	2.07	1838	14.08	3rd Gear (Torq. Conv.)			170	34	40	28.690
46.95	5124	3.44	1842	5.84	4th Gear (Torq. Conv.)			175	48	61	28.740
46.87	4034	4.36	1837	5.10	5th Gear (Torq. Conv.)			173	42	51	28.685
45.83	2815	6.11	1825	3.51	6th Gear (Torq. Conv.)			175	42	51	28.685
43.70	2107	7.78	1800	2.74	7th Gear (Torq. Conv.)			175	43	52	28.665
43.03	1532	10.53	1785	2.09	8th Gear (Torq. Conv.)			176	43	52	28.665
TEST J—OPERATING MAXIMUM POWER											
51.59	4522	4.28	1800	6.77	4th Gear			175	44	57	28.895
46.61	5045	3.46	1920	8.06	4th Gear (Torq. Conv.)			177	44	57	28.895

\* Torque converter drive

\*\* 2 Hours—Torque converter drive

TEST K—PULL-SPEED CHARACTERISTIC—4th Gear

	3251	4352	4650	4900	4950	4850	4750
Pounds Pull							
Horsepower	40.54	50.14	48.4	45.7	39.6	33.6	26.6
Miles Per Hour	4.68	4.32	3.9	3.5	3.0	2.6	2.1
Pounds Pull (Torq. Conv.)	3941	5124	5600	6150	6700	7300	7950
Horsepower (Torq. Conv.)	39.80	46.95	44.8	44.3	41.1	38.9	36.0
Miles Per Hour (Torq. Conv.)	3.79	3.44	3.0	2.7	2.3	2.0	1.7

TIRES, WHEELS AND WEIGHT

	Tests F, G, H & K		Test J	
	Cast iron		Cast iron	
Rear wheels Type	Cast iron		Cast iron	
Liquid ballast	720 lb each		None	
Added cast iron	420 lb each		None	
Rear tires No. and size	Two 15.5-38		Two 15.5-38	
Ply	6		6	
Air pressure	18 lb		14 lb	
Front wheels Type	Cast iron		Cast iron	
Liquid ballast	None		None	
Added cast iron	162 lb each		None	
Front tires No. and size	Two 6.00-16		Two 6.00-16	
Ply	6		6	
Air pressure	44 lb		44 lb	
Height of drawbar	20 inches		20 inches	
Static weight Rear end	7010 lb		4730 lb	
Front end	2353 lb		2030 lb	
Total weight as tested with operator	9538 lb		6935 lb	

FUEL, OIL, WATER and TIME Fuel Diesel Cetane No. 50.8 (rating taken from oil company's typical inspection data) Weight per gallon 7.030 lb Oil SAE 20-20W To motor 1.979 gal Drained from motor 1.913 gal Operating time 12 hours Oil SAE 10W To motor 1.976 gal Drained from motor 1.884 gal Operating time 48½ hours Water used 0.463 gal Total time motor was operated 60½ hours.

CHASSIS Type tricycle Serial No. 8124603 Tread width rear 52" to 88" front 9½" and 15½" Wheel base 92¼" Hydraulic control system direct engine drive Advertised speeds mph Direct drive first 1.60 second 2.29 third 3.13 fourth 4.53 fifth 5.89 sixth 8.40 seventh 11.51 eighth 16.64 Reverse first 2.06 second 7.58 Torque converter drive first 0 to 1.5 second 0 to 2.1 third 0 to 2.9 fourth 0 to 4.1 fifth 0 to 5.4 sixth 0 to 7.7 seventh 0 to 9.0 eighth 0 to 14.0 Reverse first 0 to 1.9 second 0 to 7.0 Belt pulley diam. 10½" face 7¼" rpm 1128 Belt speed 3105 fpm Belt flat Length 72" Width 7" Thickness 0.216" Maximum slip 0.78% Clutch multiple disc main hydraulic power-clutch operated by piston thru foot pedal control valve and single disc direct drive hydraulic clutch, locking turbine to engine thru hand operated control valve Seat upholstered seat with back rest cushioned by rubber in torsion Brakes double disc brakes operated by two foot pedals Equalized by locking pedals together Power take-off direct engine drive with independent clutch Steering aided by hydraulic power steering.

ENGINE Make Case Diesel Type 4 cylinder vertical Serial No. 8124603 Crankshaft mounted lengthwise Head I Lubrication pressure Bore and stroke 4½" x 5" Rated rpm 1800 Compression ratio 15 to 1 Displacement 267 cu. in. Valves port diameter Inlet 1 9/16" Exhaust 1 3/8" Governor variable speed centrifugal Starting system 12 volt (two 6 volt batteries) Air cleaner oil washed wire mesh Muffler was used Oil filter replaceable wood cellulose element Fuel filter one edge wound metal filter removable for cleaning, one filter with replaceable element and one replaceable sealed filter Cooling medium temperature control thermostat.

REPAIRS AND ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data and without allowances, additions or deductions. Tests B and F were made with fuel pump set to develop approximately 56.5 corrected maximum belt horsepower and data from these tests were used in determining the horsepower to be developed in tests D and H, respectively. Tests C, D, E, G, H, J and K were made with the same setting.

This tractor is equipped with a hydraulic torque converter which automatically loads the engine and controls the forward travel speed with changing drawbar load, the converter can also be locked out.

HORSEPOWER SUMMARY

	Drawbar		Belt
	Direct Drive	Torque Converter	
1. Sea level (calculated) maximum horsepower (based on 60° F and 29.92" Hg)	52.65	48.92	56.63
2. Observed maximum horsepower (tests F and B)	50.14	46.95	54.42
3. Seventy-five per cent of calculated maximum drawbar horsepower and eighty-five per cent of calculated maximum belt horsepower (ASAE and SAE ratings)	39.49	.....	48.14

We, the undersigned, certify that this a true and correct report of official Tractor Test No. 680.

L. F. LARSEN  
Engineer-in-Charge

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

## EXPLANATION OF TEST REPORT

**TEST A:** The manufacturer's representative operates the tractor for a minimum of 12 hours using light to heavy drawbar loads in each gear.

This serves as a period for limber up, general observation and adjustments. Adjustments that are permissible include valve tappet clearance, breaker point gap, spark plug gaps, clutch and others of a similar nature. No new parts or accessories can be installed without having mention made of it in the report.

No data are recorded during this preliminary run except the time that the engine is operated.

### BELT HORSEPOWER TESTS

**TEST B:** The manual throttle control lever is set so that the throttle valve is held wide open and the belt load on the dynamometer is adjusted so that the engine is at the rated speed recommended by the manufacturer. Carburetor, ignition timing and manifold adjustments are all set for maximum engine power.

This test is designed to determine maximum belt horsepower of the tractor at rated speed and to measure fuel consumption at the maximum power on the belt.

**TEST C:** For tractors with carburetors the best fuel economy does not always occur when the engine develops maximum power at rated speed. Test C is intended to allow the manufacturer's representative to select a more economical fuel setting even though there is a slight loss of power. *This more practical carburetor setting is used in all later tests except test F.* The throttle valve is wide open and load adjusted to give rated rpm. Tests B and C are the same for diesel tractors which have an altogether different fuel system.

**TEST D:** The manual throttle control lever is set the same as for tests B and C allowing the governor to control engine speed at part throttle. Load is applied until 85% of maximum corrected horsepower found in test B is obtained.

This rating is somewhat less than the maximum belt horsepower in order that the operator may have a certain amount of reserve.

**TEST E:** Varying load serves to show the range of engine speeds when the engine is controlled by the governor during the following varied loads, of 20 minutes each; rated load, no load,  $\frac{1}{2}$  rated load, maximum load at wide open throttle valve,  $\frac{1}{4}$  and  $\frac{3}{4}$  rated load.

The average result of this test shows the average power and fuel consumption. Since the average tractor is subjected to varying loads, these data serve well in predicting fuel consumption and efficiency of a tractor in general use.

### DRAWBAR HORSEPOWER TESTS

In all drawbar tests the pull exerted by the tractor is transmitted by a hydraulic pressure cylinder to a recording instrument in the test car. When rubber tires are used, all tests are made on the concrete test course. The same tires, wheels and weights are used for all tests except J. All crawler type tractors are tested on an earthen test course which is maintained by grading, sprinkling and rolling so that it remains very nearly the same for each test.

**TEST F:** A drawbar test, the results of which are used to determine the rated drawbar horsepower in test H. The carburetor is set to develop maximum power as in test B. The rated gear recommended by manufacturer as plow gear is used in the test. The drawbar load is adjusted to give rated engine speed.

**TEST G:** Maximum drawbar horsepower is determined in each gear when the carburetor is set for fuel economy as in test C. The manual throttle control lever is set so that the throttle valve is held wide open and the load is applied so that the engine runs at rated engine speed.

When operating in low gear it is not uncommon for the tractor to develop less drawbar horsepower than in rated gear because of excessive wheel slippage. When excessive wheel slippage occurs the load is reduced until slippage approaches 15%. When the load is reduced it is necessary to operate the tractor engine at part throttle and control engine speed by governor action.

**TEST H:** Intended to test the ability of the tractor to run continuously for 10 hours at rated drawbar horsepower and to determine the fuel consumption during that time. Rated drawbar horsepower is 75% of 100% maximum drawbar horsepower (Test F), corrected to standard conditions.

When operating at rated horsepower the manual throttle control lever is set the same as in tests F and G allowing the governor to maintain engine speed at part throttle. This rating is less than maximum drawbar horsepower in order that the operator may have a certain amount of reserve.

**TEST J:** The tractor is operated in rated gear with all added weight removed. This test shows the effect of the removal of added weight on the performance of the tractor when compared with test G.

Removal of wheel weights generally increases wheel slippage and decreases drawbar horsepower.

**TEST K:** This is intended to show the pull, horsepower, and travel speed of the tractor at rated horsepower (taken from test H); maximum horsepower (taken from test G); and at least four other conditions obtained by reducing travel speed in 10% increments by overload.

