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10-6-1958

## Test 674: International 460 Utility

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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Department of Agricultural Engineering  
Dates of test: October 6, 1958 to October 18, 1958  
Manufacturer: INTERNATIONAL HARVESTER COMPANY, CHICAGO, ILLINOIS  
Manufacturer's rating: Not Rated

NEBRASKA TRACTOR TEST NO. 674

INTERNATIONAL 460 UTILITY

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	
TEST B—100% MAXIMUM POWER—TWO HOURS								
49.79	1800	4.264	11.68	0.527	168	53	70	29.128
TEST C—OPERATING MAXIMUM POWER—ONE HOUR								
46.69	1800	3.820	12.22	0.503	160	54	69	29.135
TEST D—RATED POWER—ONE HOUR								
43.89	1927	3.855	11.39	0.540	160	54	70	29.140
TEST E—VARYING POWER—TWO HOURS (20 minute runs; last line average)								
44.04	1923	3.859	11.41	0.539	160	54	70	.....
1.32	2083	1.590	0.83	7.409	146	54	70	.....
22.99	1997	2.741	8.39	0.733	153	54	70	.....
46.50	1801	3.829	12.14	0.506	163	54	70	.....
11.88	2066	2.205	5.39	1.141	150	54	70	.....
33.74	1959	3.293	10.25	0.600	160	54	70	.....
26.74	1971	2.920	9.16	0.671	155	54	70	29.170

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	Cool- ing med	Air wet bulb	Air dry bulb	
TEST H—RATED POWER—TEN HOURS—3rd Gear											
35.28	2261	5.85	1937	2.64	3.834	9.20	0.668	163	64	74	29.045
TEST F—100% MAXIMUM POWER											
45.91	3197	5.39	1797	3.33	3rd Gear	.....	.....	169	68	78	29.015
TEST G—OPERATING MAXIMUM POWER											
28.66	6442	1.67	1800	14.05	1st Gear	(prt thrtl)	.....	154	57	60	29.100
44.06	4271	3.87	1800	6.63	2nd Gear	.....	.....	161	57	60	29.100
44.08	3109	5.32	1798	4.71	3rd Gear	.....	.....	164	62	67	29.085
43.39	2118	7.68	1800	2.85	4th Gear	.....	.....	167	65	72	29.085
43.02	927	17.40	1791	0.00	5th Gear	.....	.....	172	68	78	29.015
19.38	6485	1.12	1798	14.39	1st Gear	TA (prt thrtl)	.....	151	57	60	29.100
41.01	6257	2.46	1801	12.08	2nd Gear	Torq. Amp.	.....	159	57	60	29.100
42.92	4615	3.49	1799	7.30	3rd Gear	Torq. Amp.	.....	160	57	60	29.100
43.23	3194	5.08	1799	4.83	4th Gear	Torq. Amp.	.....	160	62	67	29.085
41.76	1352	11.58	1800	1.73	5th Gear	Torq. Amp.	.....	166	65	72	29.085
TEST J—OPERATING MAXIMUM POWER											
43.52	3219	5.07	1794	11.57	3rd Gear	.....	.....	161	60	69	29.000
TEST K—SPEED-PULL CHARACTERISTIC											
Pounds Pull	2261	3109	3150	3200	3300	3300	3300	3300	3300	3250	
Horsepower	35.28	44.08	40.3	36.7	32.6	28.2	22.5				
Miles Per Hour	5.85	5.32	4.8	4.3	3.7	3.2	2.6				

TIRES, WHEELS AND WEIGHT

Tests F, G, H & K			Test J	
Rear wheels				
Type	Pressed Steel		Pressed Steel	
Liquid ballast	603 lb each		None	
Added cast iron	882 lb each		None	
Rear tires				
No. and size	Two 14.9-28		Two 14.9-28	
Ply	6		6	
Air pressure	16 lb		14 lb	
Front wheels				
Type	Pressed Steel		Pressed Steel	
Liquid ballast	None		None	
Added cast iron	255 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	21 inches		22 inches	
Static weight				
Rear end	5980 lb		3010 lb	
Front end	2340 lb		1830 lb	
Total weight as tested with operator	8495 lb		5015 lb	

HORSEPOWER SUMMARY

	Drawbar	Belt
1. Sea level (calculated) maximum horsepower (based on 60° F and 29.92" Hg)	48.15	51.64
2. Observed maximum horsepower (tests F and B)	45.91	49.79
3. Seventy-five per cent of calculated maximum drawbar horsepower and eighty-five per cent of calculated maximum belt horsepower (ASAE and SAE ratings)	36.11	43.89

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 674.

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.

