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EC762 Revised 1954 Which Fuel for Farm Power?

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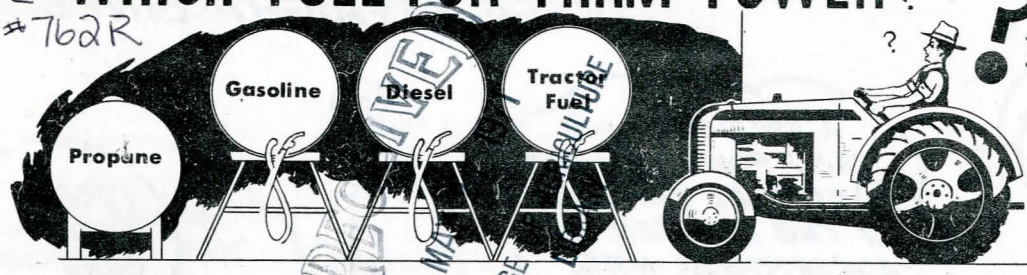
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WHICH FUEL FOR FARM POWER???

E. C. 762-54
Revised, 1954



by
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Asst. Extension Engineer
and
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University of Nebraska

THE NOMOGRAPH on the inside of this folder will tell you what different fuels will cost over a year's time. It can be used for wheel tractors, tracklayers, or power units. You have to know the rated horsepower and the fuel consumption in horsepower hours per gallon. Obtain these from the Nebraska Tractor Test Summary Sheet.

BUYING A NEW TRACTOR? Follow the instructions on the nomograph, working the problem for your present tractor and fuel first. The figure on line 3 represents your annual power requirements in horsepower hours. Big or small, a tractor will have to do that much work to do your job. Starting from this figure on line 3, work the problem for different fuels. Use the specific fuel consumption as shown under Test H, column 72, of the Nebraska Tractor Test Summary Sheet.

SPECIFIC FUEL CONSUMPTION varies with different tractors. For example, the average for all diesel wheel tractors on the 1953 Tractor Test Summary Sheet, under the 10-hour rated load drawbar test, was 13.4 horsepower hours per gallon. Best was 15.19--poorest 12.09. The figures noted for gasoline, tractor fuel, propane, and diesel on line 4 of the nomograph are averages from the 10-hour drawbar test for all wheel tractors of 15 or more drawbar horsepower. (Currently manufactured and tested as of December 1, 1953)

FOR BELT WORK, use the rated belt horsepower. The following averages in horsepower hours per gallon were taken from Test D: gasoline, 11.3 tractor fuel, 11.0; diesel, 15.2; and propane, 8.9. FOR LIGHT AND VARYING LOADS use the horsepower shown in column 34 under test E; or use 60% of rated belt horse power. Average fuel consumption figures are: gasoline, 9.1; tractor fuel, 8.9; diesel, 12.9; and propane, 7.4.

MANY POWER UNITS have corresponding tractor models. If you are interested in a power unit not listed on the Nebraska Tractor Test Summary Sheet, you may be able to find the same engine as tested in a tractor. If no fuel consumption figures are available, use the averages as noted above under belt work. Use rated belt horsepower (85% of maximum horsepower). In no case use a greater horsepower than that recommended by the manufacturer for your load conditions.

FOR TRACKLAYING TRACTORS refer to test H on the Nebraska Tractor Test Summary Sheet. Averages in drawbar horsepower hours per gallon are as follows: gasoline, 8.7; tractor fuel, 9.7; and diesel fuel, 11.6. Although no figures are available for propane, 7.0 would be a reasonable estimate.

If your tractor or power unit is too large for the scale on the nomograph, use one half the rated horsepower and multiply the final result by two.

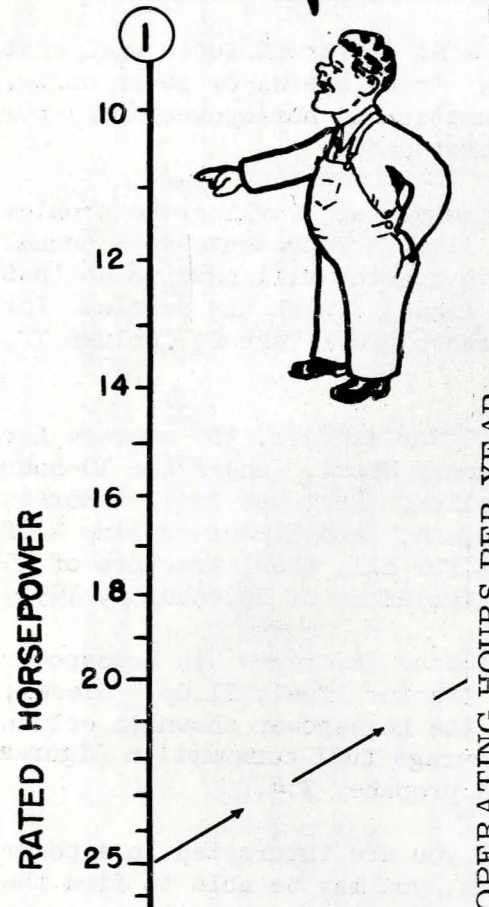
Other factors influencing tractor choice often outweigh fuel costs. On the back of this folder, you will find some of them listed. The high first cost, for example, may rule out diesel for your use. Cold-weather starting may be a deciding factor. Consider all aspects carefully before making a choice. Then follow good maintenance practices for long and satisfactory service.

EXTENSION SERVICE
UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE
AND U. S. DEPARTMENT OF AGRICULTURE
COOPERATING
W. V. LAMBERT, DIRECTOR

Which Fuel For

THREE STRAIGHT LINES M

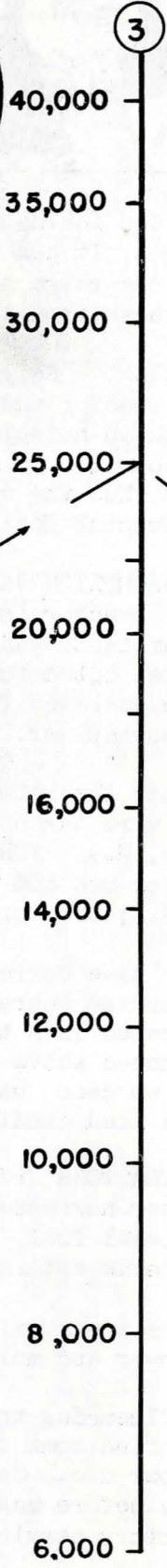
LOCATE THE RATED DRAWBAR HORSEPOWER OF YOUR TRACTOR ON THIS LINE.



HOW MANY HOURS DID YOUR TRACTOR WORK LAST YEAR? MARK THIS LINE.



A STRAIGHT LINE THRU POINTS ① AND ② CROSSES THIS LINE AT THE NUMBER OF HORSEPOWER HRS. REQUIRED FOR YOUR JOB.



LOCATE THE FUEL AND CONSIDER SHOWN. RE COLUMN 7 TRAC SHO COM 7



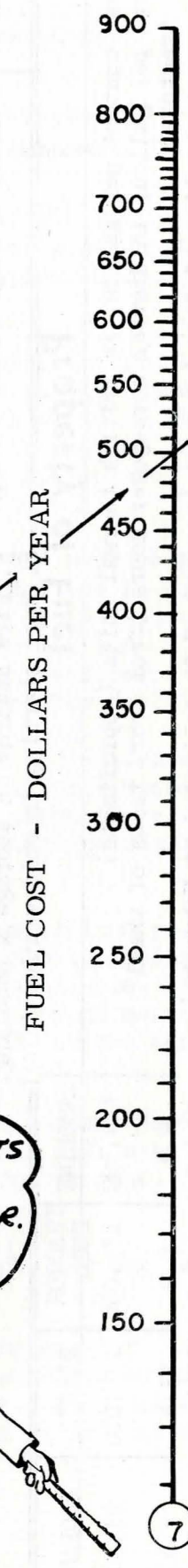
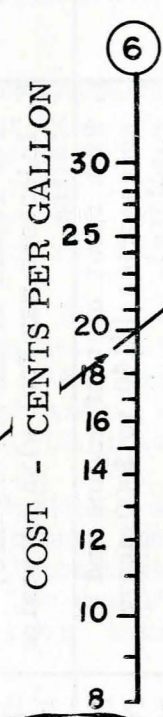
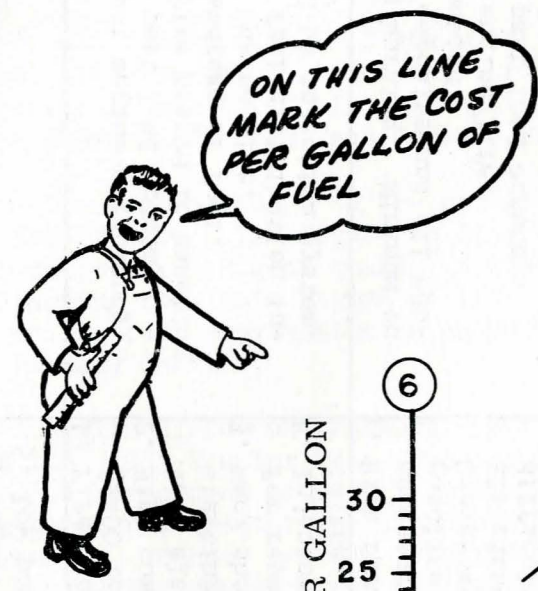
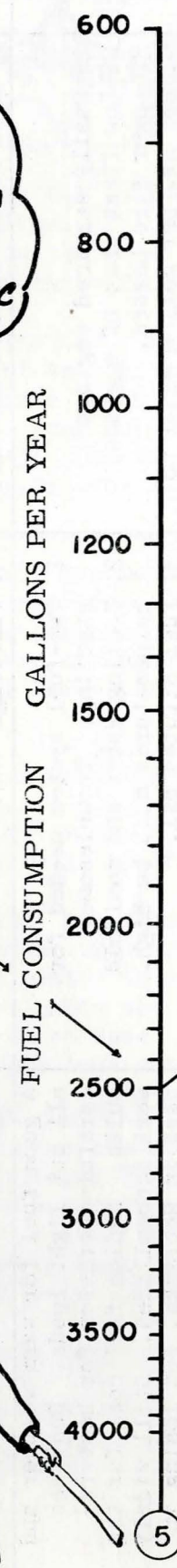
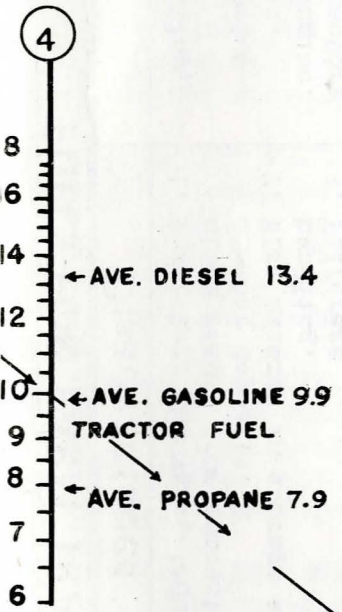
FUEL CONSUMPTION HORSEPOWER HOURS PER GALLON

The horsepower hours per gallon shown for different fuels on line 4 are average from tests on current tractors tested prior to 1954. These are for wheel tractors on the ten hour drawbar test. For power units and tracklayers, see information on the front of this folder.

What's Your Needs?

IT WILL HELP YOU DECIDE

THE POINT FOR THE TRACTOR BEING TESTED. AVERAGES ARE GIVEN FOR THE NEBRASKA STATE TEST SUMMARY FOR FUEL CONSUMPTION OF SPECIFIC TRACTORS.





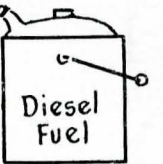

A STRAIGHT LINE THRU POINTS 3 AND 5 GIVES FUEL CONSUMPTION ON THIS LINE.



A STRAIGHT LINE THRU POINTS ON LINES 5 AND 6 GIVES COST IN DOLLARS PER YEAR. START WITH LINE 3 AND REPEAT FOR OTHER FUELS AND TRACTORS.



FUELS FOR FARM TRACTORS

	Advantages	Disadvantages	In General
	<ol style="list-style-type: none"> 1. Convenient. Easy starting, simple operation. 2. Widely used. Stable prices. 3. Easily serviced engines. 4. Lowest first cost of engine. 5. Good resale of used tractors. 	<ol style="list-style-type: none"> 1. Power loss and valve trouble often result from combustion chamber deposits. 2. Fire hazards in storage and handling. 3. Pilferage 	A good fuel for small tractors and diversified jobs. Highest fuel cost for the work accomplished. Used in 80% of all tractors in the U.S.A. Used in 50% of Nebraska's farm tractors.
	<ol style="list-style-type: none"> 1. Easily serviced engines. 2. Low first cost of engines. 3. Lower fire hazard. 4. Hp. hr. per gallon equal to gasoline. 	<ol style="list-style-type: none"> 1. Two-fuel system needed for starting. Troublesome. 2. Cooling water and manifold temperatures must be high. 3. Fuel dilutes oil. 4. Engine deposits. 5. Low power for size of engine. 	A good fuel for warm weather and all but light loads. Requires careful operation for best results. Medium fuel cost for the work accomplished. Still widely used in Nebraska, but losing in popularity. Fuel may vary widely in volatility, octane rating, and heat content per gallon.
	<ol style="list-style-type: none"> 1. Highest engine efficiency. 2. Best part load economy. 3. Low fire hazard in handling and storage of fuel. 4. Long engine life. 5. Good fuel distribution insured by injection system. 	<ol style="list-style-type: none"> 1. First cost of engine is high (\$400 to \$800 above gasoline). 2. High compression makes a 12-volt electrical system or special starting equipment necessary. 3. Many shops are not well equipped for repair of diesel engines. 4. Injectors may foul with excessive idling. 	A good fuel for tractors operating 800 hours and more per year. Lowest fuel cost for work done. This fuel is gaining in popularity, and will be available in smaller tractors. Extra care should be taken to insure cleanliness of fuel.
	<ol style="list-style-type: none"> 1. Clean burning. Minimum engine deposits and oil contamination. 2. Long engine life. 3. Good part load economy. 4. Good fuel distribution--fuel vaporizes before entering the manifold. 5. Smooth engine performance aided by high octane rating. 	<ol style="list-style-type: none"> 1. High first cost of engine and accessories (\$150 to \$400 above gasoline). 2. Converted engines often low in efficiency. Carburetors are difficult to adjust. 3. Least work per gallon of fuel. 4. Bulky tanks interfere with visibility. Special (and high-priced) storage tanks are needed. 5. Fire hazards in storage & handling. 6. Hard starting in cold weather. 	Propane has become a popular engine fuel in some areas. At Nebraska prices, it is comparable to tractor fuel in terms of work per fuel dollar. Tractors should be used at least 400 to 500 hours per year to show any real saving over gasoline. Price of the fuel may vary greatly from one area to another, and may vary from season to season.

Property of Fuel

Heat content per gallon, in British thermal units (approximate)
 Work per gallon, in drawbar horsepower hours (from Nebr. tests of wheel tractors)
 Compression ratios of farm tractors (average of those tested at Nebraska)
 Approximate range of octane rating (anti-knock quality)

GASOLINE	TRACTOR FUEL	DIESEL	PROPANE
124,500	135,000	138,000	91,500
9.9	9.9	13.4	7.9
6.3:1	4.8:1	15:1	7.0:1
72-80	30-40	---	100