

### MACHINERY COST ESTIMATES: TRACTORS

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This publication shows estimated costs for different sized tractors. These estimates are useful for determining machinery costs on farms, rental rates for machinery, and custom rates for machinery

**Table 1. List Prices and Estimated Costs Per Hour for Tractors of Different Sizes.**

Tractor <sup>1</sup>	List Price <sup>2</sup>	----- Costs -----			
		<b>Total<sup>3</sup></b>	= Overhead <sup>4</sup>	+ Fuel <sup>5</sup>	+ Labor <sup>6</sup>
	\$/tractor	----- \$ per hour -----			
65 PTO Hp Tractor	43,000	<b>33.55</b>	14.00	4.70	14.85
95 PTO Hp Tractor	62,000	<b>41.55</b>	20.20	6.50	14.85
105 PTO Hp Tractor	66,500	<b>44.15</b>	21.70	7.60	14.85
115 PTO Hp Tractor	72,500	<b>46.85</b>	23.70	8.30	14.85
140 PTO Hp Tractor	93,000	<b>55.25</b>	30.30	10.10	14.85
155 PTO Hp Tractor	99,500	<b>58.55</b>	32.50	11.20	14.85
170 PTO Hp Tractor	127,000	<b>68.15</b>	41.40	11.90	14.85
190 PTO Hp Tractor	135,000	<b>72.55</b>	44.00	13.70	14.85
215 PTO Hp Tractor, FWA	149,000	<b>78.95</b>	48.60	15.50	14.85
235 PTO Hp Tractor, FWA	162,000	<b>84.65</b>	52.80	17.00	14.85
255 PTO Hp Tractor, FWA	174,500	<b>90.15</b>	56.90	18.40	14.85
280 PTO Hp Tractor, 4WD	144,000	<b>82.05</b>	47.00	20.20	14.85
325 PTO Hp Tractor, 4WD	164,000	<b>91.85</b>	53.50	23.50	14.85
375 PTO Hp Tractor, 4WD	190,000	<b>103.95</b>	62.00	27.10	14.85
425 PTO Hp Tractor, 4WD	206,500	<b>112.95</b>	67.40	30.70	14.85
450 PTO Hp Tractor, 4WD	230,500	<b>122.55</b>	75.20	32.50	14.85
500 PTO Hp Tractor, 4WD	244,000	<b>130.55</b>	79.60	36.10	14.85

<sup>1</sup> "FWA" indicates a front wheel assist tractor. "4WD" indicates a four wheel drive tractor.

<sup>2</sup> List prices for 2005. Purchase price is assumed to be 85% of the list price.

<sup>3</sup> Sum of overhead, fuel, and labor costs.

<sup>4</sup> Includes depreciation, interest, insurance, housing, and repair costs. These per hour charges are appropriate for calculating rental costs when the person renting the tractor provides fuel and labor.

<sup>5</sup> Fuel costs are based on a price of \$1.50 per gallon for diesel fuel. Fuel costs vary depending on fuel use. Use varies with load on the tractor.

<sup>6</sup> Labor costs are based on a \$13.50 per hour labor charge. Labor time is assumed to be ten percent higher than tractor hours.

operations. Estimates include charges for depreciation, interest, insurance, housing, repairs, fuel and labor. Not included are allowances for profit. Charging custom rates at estimated costs should cover costs, but will not generate profits. Adding 5 to 15 percent to estimated costs may be appropriate when determining custom rates. Table 1 shows list prices and per hour costs for different sized tractors.

### Methods of Calculating Costs

Formulas developed by the American Society of Agricultural Engineers (ASAE) are used to calculate costs. All costs are based on buying a new tractor, owning the tractor for 10 years, and using the tractor 300 hours per year. Table 2 lists other variables used to calculate costs. A more detailed description of how each cost is calculated is given below.

**Depreciation:** Depreciation covers the decline in the tractor's value over its life. Depreciation is calculated as: (purchase price – salvage value) / years of ownership. The purchase price equals the list price of the tractor (Table 1) times 85 percent. The salvage value gives the price of the tractor when sold. Given a 10 year life, ASAE Standards give a salvage value of 36 percent of the list price for tractors.

**Table 2. Factors Used in Calculating Costs.**

Purchase price	85%	of list price
Interest rate	7%	of remaining value
Insurance and housing	1%	of remaining value
Diesel fuel	\$1.50	per gallon
Lubrication cost	10%	of fuel costs
Tractor hours	300	per year
Years of life	10	years
Labor charge	\$13.50	per hour
Labor time	1.10	times tractor hours

**Interest:** Interest covers the cost of having funds invested in the machine. Interest is calculated for each year the machine is owned by multiplying the remaining value of the machine at the beginning of each year by a 7 percent interest rate. The remaining value is calculated using ASAE standards. The 7 percent interest rate represents a charge for equity and debt capital invested in the machine. The yearly interest charges are totaled and then divided by the total hours of use.

**Insurance and Housing:** Insurance and housing costs are calculated in a manner similar to interest costs using a one percent charge on the tractor's remaining value.

**Repairs:** Repairs cover repair parts, installation charges, and general maintenance. These costs are calculated using ASAE formulas. For 300 hours of use per year and 10 years of life, per hour repair charges equal 0.05546 times the list price of the machine.

**Fuel and Lubrication:** Fuel charges are based on diesel fuel priced at \$1.50 per gallon. Lubrication costs are figured at 10 percent of fuel cost.

**Labor:** Labor charges are based on a \$13.50 per hour labor charge. Labor time is assumed to be 10 percent more than the operating time of the tractor.

### Composition of Costs

For the 155 HP tractor, overhead costs of \$32.50 per hour include charges for depreciation (\$16.20 per hour), interest (\$12.40), insurance and housing (\$1.80), and repairs (2.10). Annually, depreciation and interest costs total \$8,580 ((\$16.20 per hour depreciation + \$12.40 per hour interest) x 300 hours). These \$8,580 of costs are incurred by owning the tractor and do not change with annual use. On a per hour basis, depreciation and interest costs increase as hours of use decrease. At 150 hours of use, for example, depreciation and interest costs equal \$57.20 per hour (\$8,580 / 150 hours). At a 450 hour use level, depreciation and interest costs equal \$19.06. Hence, per hour overhead costs vary with annual hours of use.

Overhead costs are double those shown in Table 1 when use is 150 hours rather than 300 hours.  
Overhead costs are 0.66 times those shown in Table 1 when use is 450 hours rather than 300 hours.  
Higher overhead costs with low annual use points out the importance of properly matching machinery to the farm operation. Overhead costs are lower when machinery is fully utilized.

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