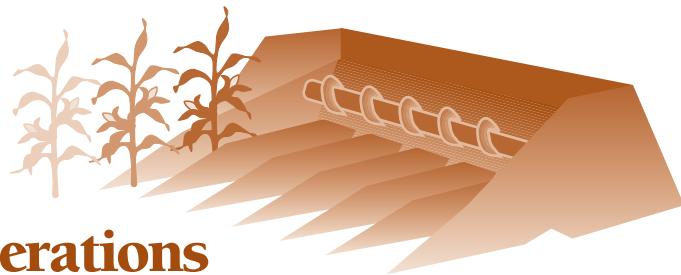


## Machinery Management

# Fuel Required for Field Operations



The table below contains estimates of the average quantity of diesel fuel required for farm field operations. The estimates include only the fuel required for actual field work and do not account for machine preparation or travel to and from the field. Because fuel consumption values for any particular operation vary among tractors, soil type, etc., actual fuel requirements may be as much as 35 percent higher or lower than the values listed in the table. Engine efficiencies increase over time. Older tractors manufactured before 1990 or in poor repair may use 10 percent or more additional fuel. Older gasoline powered equipment uses about 50 percent more gallons of gasoline than the table values indicate.

Fuel requirements for tillage machines were calculated for a central Iowa loam soil. For heavier soils, the values in the table should be increased slightly. Values were calculated for a 7-inch plowing depth and 3- to 6-inch operating depth for other tillage machines. Field speeds were assumed to be 4 to 6 mph for tillage operations, 5 mph for planting and spraying, 4 to 5 mph for forage harvesting machines, and 4 mph for corn and soybean harvesting.

The values for row-crop operations were calculated for 30-inch rows. They should be adjusted for other row widths. All values were calculated assuming efficient materials handling in the field, proper tractor ballasting to

keep wheel slippage below 15 percent, properly tuned and adjusted tractor engines, and partial load tractor operation efficiency by shifting up a gear and throttling the engine back.

### Approximate Diesel Fuel Required for Field Operations

Field Operation	Diesel Gallons Per Acre	Field Operation	Diesel Gallons Per Acre
<b>Fertilization</b>		<b>Harvesting</b>	
Spreading dry fertilizer, bulk cart	0.15	Mower	0.30
Anhydrous ammonia (30-inch spacing)	0.55	Mower-conditioner, PTO	0.55
<b>Tillage</b>		Self-propelled windrower	0.45
Shredding cornstalks	0.45	Rake	0.25
Moldboard plow	1.70	Baler	0.40
Subsoiler/ripper	1.70	Forage harvester	
Disk-chisel plow	1.30	Green forage	0.85
Chisel plow	1.10	Haylage	1.15
Offset disk	0.85	Corn silage	3.25
Tandem disk, plowed field	0.65	High-moisture ground ear corn	1.70
Tandem disk, tilled field	0.55	Forage blower	
Tandem disk, cornstalks	0.45	Green forage	0.30
Field cultivate, plowed field	0.70	Haylage	0.25
Field cultivate, tilled field	0.65	Corn silage	1.25
Seedbed conditioner	0.90	High-moisture ground ear corn	0.40
<b>Planting (30-inch rows)</b>		Combine, soybeans	1.00
Planter, seed only, tilled seedbed	0.40	Combine, corn	1.45
Plant with fertilizer and pesticide attachments, tilled seedbed	0.55	Hauling, field plus ½ mile on gravel road	
Till-planter	0.55	Green forage	0.30
No-till planter	0.45	Haylage	0.20
Grain drill	0.30	Corn silage	1.25
Broadcast seeder	0.15	Corn grain	0.20
Air drill	0.70	Soybeans	0.08
<b>Weed Control (30-inch rows)</b>		Hauling, add following values to those above for each additional mile on gravel road	
Sprayer, trailer type	0.10	Green forage	0.15
Rotary hoe	0.20	Haylage	0.20
Row-crop cultivator	0.40	Corn silage	0.80
		Corn grain	0.15
		Soybeans	0.05

Other publications that will help you make good machinery management decisions are:

- PM 696 *Estimating Field Capacity of Farm Machines*
- PM 710 *Estimating Farm Machinery Costs*
- PM 786 *Combine Ownership or Custom Hire*
- PM 787 *Acquiring Farm Machinery Services: Ownership, Custom Hire, Rental, Leasing*
- PM 952 *Farm Machinery Selection*
- PM 1373 *Joint Machinery Ownership*
- PM 1450 *Transferring Ownership of Farm Machinery*
- PM 1860 *Replacement Strategies for Farm Machinery*
- PM 1874 *Fieldwork Days in Iowa*

File: Engineering 3-1 and Economics 1-8

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