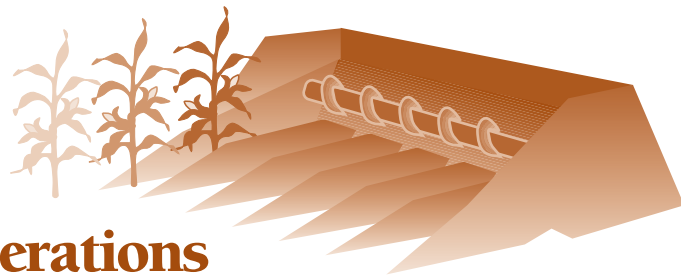


Machinery Management

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

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

Prepared by Mark Hanna, extension agricultural engineer. Originally prepared by George Ayres, former extension agricultural engineer.

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