

Gurteen Agricultural College
Environmental and Sustainable Farming

Level 6 Certificate
In association with
Susliving

Module 8

Evaluation of Energy and Resource Usage, Efficiency
and Conservation on Farms

8.3 Tractor Fuel Consumption Rates

Tractor Fuel Consumption Rates

Unit 8.3

This session aims to provide the learner with the knowledge and skills to:

- Understand what drives tractor fuel consumption.
- Be able to appreciate the impact of horsepower, farm task and driver behaviour on fuel consumption.
- Be aware of tools and methods to measure fuel consumption.

Tractor Power

Similar to Electricity consumption where we had Power (KW) and Time (Hrs) = KWHr

More energy used (Diesel)= more power generated.=
more tasks/ work done

Tractor Power consumption therefore is the amount of work done by the length of time being used Horsepower Hours HP-Hours

Tractor Power continued

- KW – Kilowatt is the standard measurement of power but others are
- HP – Horse Power = 0.75 KW
- CC – Cubic Centimetre = 0.112 KW

Tractor Fuel Efficiency

Tractor Fuel Efficiency is now a major part of a tractor's overall performance and is measured as:

HP-Hours/ gallon

The higher the number the more efficient it is and is independently verified by test labs

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Examples of rated tractor fuel efficiency

¹ JOHN DEERE 9400/9420 24 SPEED 312 HP			
Measured at PTO		Measured at drawbar	
Power at rated engine speed	PTO power at max power	Max pull (unballasted)	Max power (unballasted)
18.15 hp-hr./gal.	19.05 hp-hr./gal.	15.34 hp-hr./gal.	17.01 hp-hr./gal.
² AGCO CHALLENGER MT 845, TRACK 338 HP			
Measured at PTO		Measured at drawbar	
Power at rated engine speed	PTO power at max power	Max pull (unballasted)	Max power (unballasted)
18.14 hp-hr./gal.	19.59 hp-hr./gal.	13.45 hp-hr./gal.	15.72 hp-hr./gal.
³ CASE IH STX 325 / NEW HOLLAND TJ 325 292 HP			

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Figure 3. Wheel Demand HP vs. MPH – Flat, Smooth Surface, No Wind

MPH	Vehicle Description GVW (lb)	Aerodynamic / Air Resistance HP	Rolling Resistance HP	Total Wheel Demand HP
55	Automobile – 4,250	11	5	16
	Van – 80,000	74	96	170
	Flat-bed – 80,000	80	96	176
	Lowboy – 140,000	124	167	291
75	Automobile – 4,250	28	7.9	36
	Van – 80,000	188	148	336
	Flat-bed – 80,000	202	148	350
	Lowboy – 140,000	313	259	572
80	Automobile – 4,250	34	9	43
	Van – 80,000	228	163	391
	Flat-bed – 80,000	245	163	408
	Lowboy – 140,000	379	284	663

Relationship between
Speed and Power

Tractor Fuel consumption

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Affect of speed on HP demand

Figure 4. Wheel Demand HP vs. MPH – 3% Grade, Smooth Surface, No Wind

