

Managing Performance, Efficiency & Compaction

How do you manage tractor performance, efficiency and compaction?


1

[BALLAST SETUP]

Total Weight of the Machine
(lbs. per PTO hp)

Weight Split
(front and rear ratio)

- Determined by the load and desired speed of the operation being performed
- Impacts performance, efficiency and compaction




2

[TIRE SETUP]

Tire pressure and the weight being carried on the tire impact the flat plate (footprint) that the tire was designed to operate with. When weight changes, the tire psi must be adjusted to obtain the original flat plate.

- Determined by the weight being carried by the tire
- Controlled by adjusting tire psi (more weight = more air)
- Flat plate impacts performance, efficiency and compaction



Do you know if your current tractor setup is the best for the work you are performing?

Acres an hour	4.1	3.7	5	4.2	4.8
Fuel cost an hour	\$58.38	\$57.93	\$59.57	\$61.25	\$63.77
Fuel cost an acre	\$14.24	\$15.66	\$11.91	\$14.58	\$13.29
Time in 500 acres	122	135	100	119	104
Fuel cost in 500 acres	\$7,120	\$7,828	\$5,957	\$7,292	\$6,643

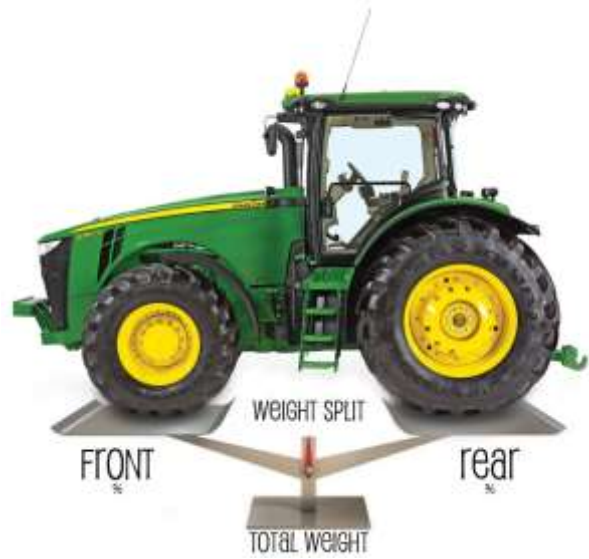
We have all heard for years that proper tractor ballast and tire pressures are critical to a tractor’s field performance and efficiency. We wanted to validate how critical adjustments to ballast and tire pressure can be to a tractor’s performance and efficiency... and the health of your crop in the field.

Recently a team of dedicated Horizon Equipment Optimization Specialists conducted some in-field testing around tractor ballast and tire pressure for a given operation.

A few pounds of ballast here and there or a couple of pounds of tire pressure can quickly determine how successful your tractor setup will perform, your operational cost and the impact on your crop during the growing season.

Effects of too little Ballast :

- Excessive wheel spin or slip
- Loss of power transfer
- Excess tire wear (slippage wear)
- Fuel waste
- Lower productivity



Effects of too much Ballast :

- Soil compaction (loss of potential yield)
- Power loss
- Increased load
- Fuel waste
- Lower productivity
- Excess tire wear or failure

Breaking Down the Ballasting Targets

1. Total Weight (lbs per PTO-h.p.)

- Determined by light, medium or heavy draft load (drawbar pull) and desired field speed
- Faster and lighter loads need less ballast
- Slower and heavier loads need more ballast

	Light	Medium	Heavy
Ground Speed	8.7 km/h (5.4 mph) and faster	7.2-8.7 km/h (4.5 - 5.4 mph)	7.2 km/h (5.4 mph) and slower
Kg/PTO-hp	52	59	66
Lb/PTO-hp	115	130	145

Operations performed at 5.4 mph or faster and have a lower draft (Pull easy):
 Field Cultivator
 Planter
 Easy year on a NH3 Bar
 Light Disk pass

Operations performed at 5 - 5.4 mph and are medium draft:
 Soil Finisher
 Tougher NH3 operations
 Heavy Disk passes

Operations performed below 5 mph and developing a heavy draft:
 Ripper
 Disk Ripper
 Chisel

2. Weight Split : Front/Rear

- Front-to-rear weight split is CRITICAL in managing efficient power transfer, avoiding “power hop” and extending tractor durability
- The draft load determines the targeted weight split
- Note that a standard MFD vs. ILS (Independent Link Suspension) axle changes the required weight split, depending on draft load

	Light	Medium	Heavy	All Implements
% of total tractor weight on front axle				
2WD	-	-	-	25% + to increase stability
MFWD	35% max	35% max	35% max	-
ILS	40-55%	~55%	~55%	-

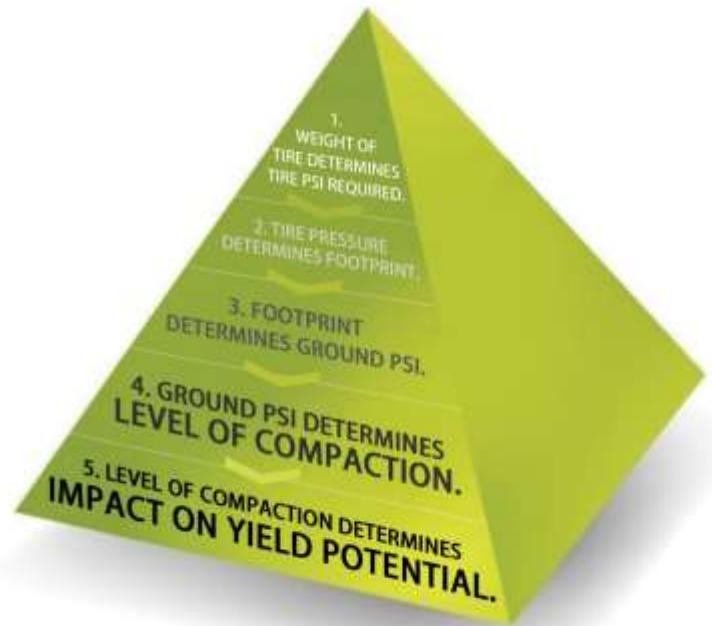
*EXAMPLES SHOWN FOR MFD ROW CROP TRACTORS. ARTICULATED 4WD UNITS DIFFER.

Tire Pressure Effects :

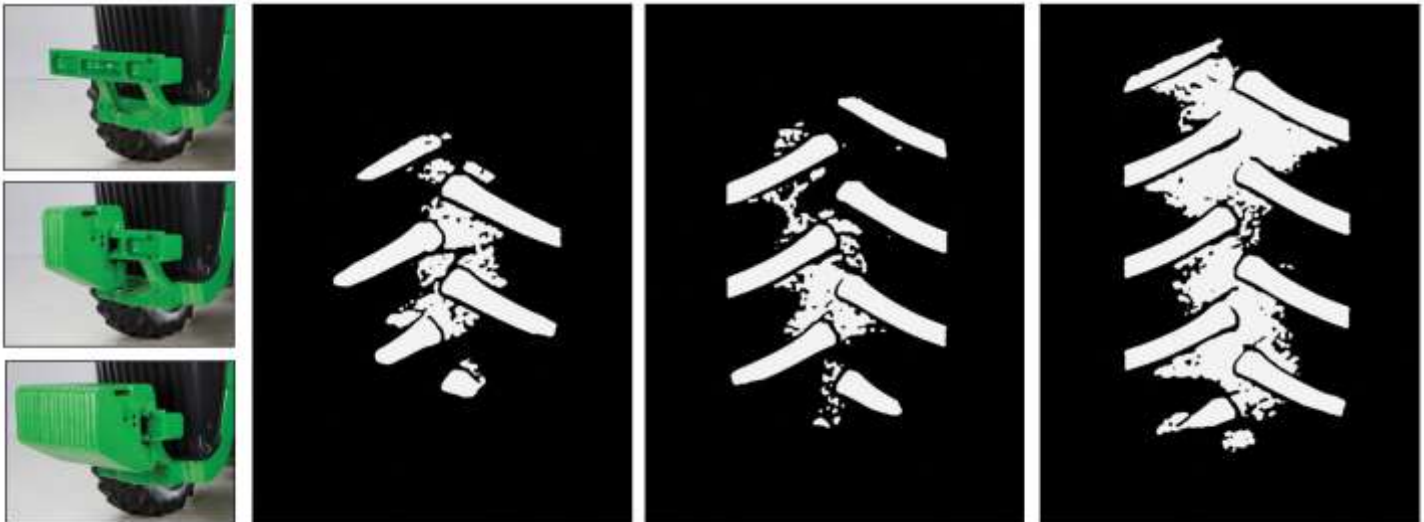
- Excessive wheel spin or slip
- Loss of power transfer
- Excess tire wear (slippage wear)
- Fuel waste
- Lower productivity
- Soil compaction (loss of yield potential)

Effects of too low tire psi :

- Excess tire wear or failure



Adjusting Tire Pressures



BALLAST CALCULATOR

SUMMARY

Tractor Configurations		New Ballast		Tire Pressure (psi / bar)	
Tractor Type	21108	Front Weight Support	1	Front Pressure	16
Transmission	AutoPower 507	Front Subcase Weights	10	Rear Pressure	12
Front Axle	3.5	Rear 345 lbs	3		
Front Tire Size	420-85R14 Duals	Rear 430 lbs	4		
Front Pendants	Yes	Rear 3420 lbs	8		
Rear Axle	113.0"				
Rear Tire Size	495-80R20 Duals				
Engine Horsepower	219				
PTO Horsepower	225				

Standard	Tractor Weight	Ballast	Front	Rear	Tire Pressure	Ballast	Front	Rear
Standard	122	16425	49	17416	81	33841	16	16
Ballast	122	16425	49	17416	81	33841	16	16

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LET US HELP YOU FIND THE VALUE YOU PAID FOR AND CAPTURE THE BENEFITS.

Our Ballasting/Tire tools take the "guess" out of the equation.



Temperature Changes Impact Tire Pressure.

Keep in mind that for every 10 degrees of temperature change, tire pressure will move one degree.

Example : One early April morning, when the ambient air temperature is 40 degrees, you set tires at the optimal 10 psi we have recommended.

In May, when the temperature is 70 degrees, your tires are now carrying 13 psi and you are operating on a footprint that has been reduced by 30%. Less efficiency...More compaction.

Sometimes a “larger” tire is chosen in the interest of reducing compaction. Unfortunately, if the tire is too large for the machine it is mounted on, the weight of the machine may not be sufficient, or the tire pressure may not be dropped low enough to “load” the tire down to its designed flat plate. In these cases, a “smaller” tire can develop more flat plate than a “larger” tire. We look at axle loads and tire pressure/load charts to determine the best fit for your machine. Those numbers can make a big impact. Let us help you!

480/80R50 IN. 159A8 R1W

NOMINAL SECTION WIDTH IN MM
ASPECT RATIO : SIDEWALL HEIGHT (RIM TO BEAD TO TREAD) AS PERCENT OF TREAD WIDTH
R=RADIAL
RIM DIAMETER INCHES
LOAD INDEX #
SPEED RATING : A8=25 MPH / B=30 MPH
TREAD DESIGN/DEPTH "R1" "R1-W"

Same Size... Huge Difference

- 480/80R50 In. 159A8 R1W - In Base Price
- 480/80R50 In. 159B R1W - \$1,020.00 option cost
- If 480/80R50 166A8 R1W - \$3,436.00 option cost

Allow us to explain the differences and how they will impact your operation.

If your tractor power is matched to the demand of the load it is pulling... (not too big, not too small)
 If your tractor is properly ballasted...
 If your tire pressures are properly selected and properly set...
 If you are developing medium to heavy draft loads...

Managing Slip via Tire Pressure and PSI

- Under medium to heavy loads, wheel slip should normally be in a range between 8-10% for optimum power delivery at 5-6 mph field speeds. (Light loads such as high speed or low draft do not apply.)
- At field speeds (5.0 to 6.0 mph) and while developing a medium/heavy draft loads, 8-10% slip is more efficient than 0% (Zero) slip. **HARD TO UNDERSTAND - BUT TRUE**
- Maximum power and efficiency is available in a “Sweet Spot”...right between rolling resistance and wheel slippage



Review of Tractor Ballast/Tire Optimization

There is a lot to discuss here, and much for you to gain.
 An investment of a few minutes, discussing ballast and tires can drastically change your bottom line.
 From chore/utility tractors...to 600 hp track tractors, we can help you.
 Please contact your Horizon Equipment team to bring you more value from your investment.