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Low Rolling Resistance Tires Winter Performance



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The Fine Print

- Gross performance differences (if any) of tires
 - NOT an exercise in ranking tires
- Tire selection independent of manufacturer support
 - Sourced through consumer channels



Methodology

- Lab Based Testing
- Vehicle Based Testing

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Laboratory Based Testing



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Purpose for Lab Tests

- Quantify performance differences
- Help correlate vehicle test results



Limitations

- Single tire sample per test
- Snow traction test is an outdoor test
 - Weather dependent
 - Relative
- Trends & gross differences only
 - No ranking



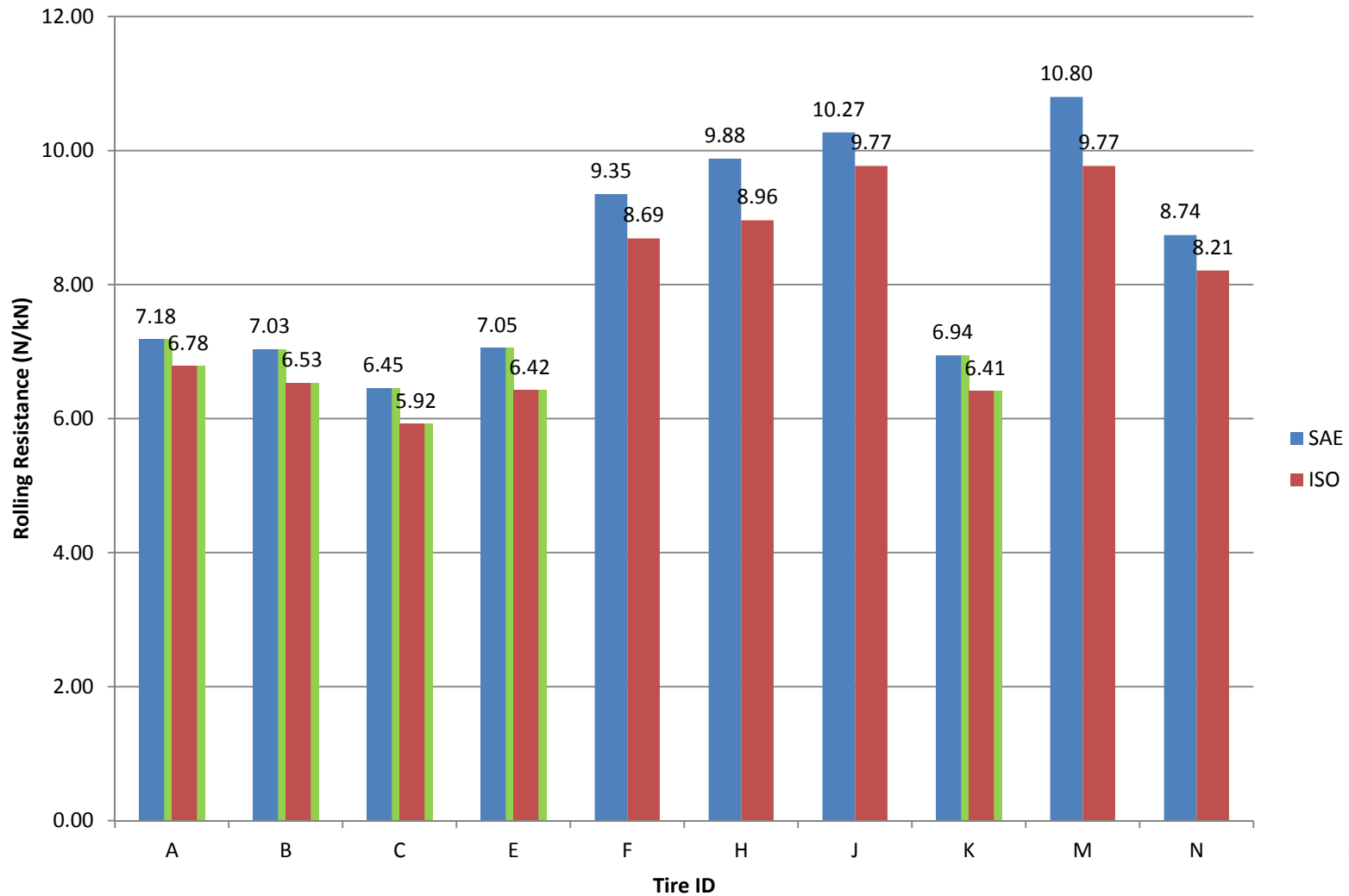
Tests to be Performed

- Rolling Resistance Measurement
 - Smithers Ravenna, OH facility
- Durability Testing
 - Smithers Ravenna, OH facility
- Snow Traction
 - Smithers Racoco, MI facility



Rolling Resistance Results

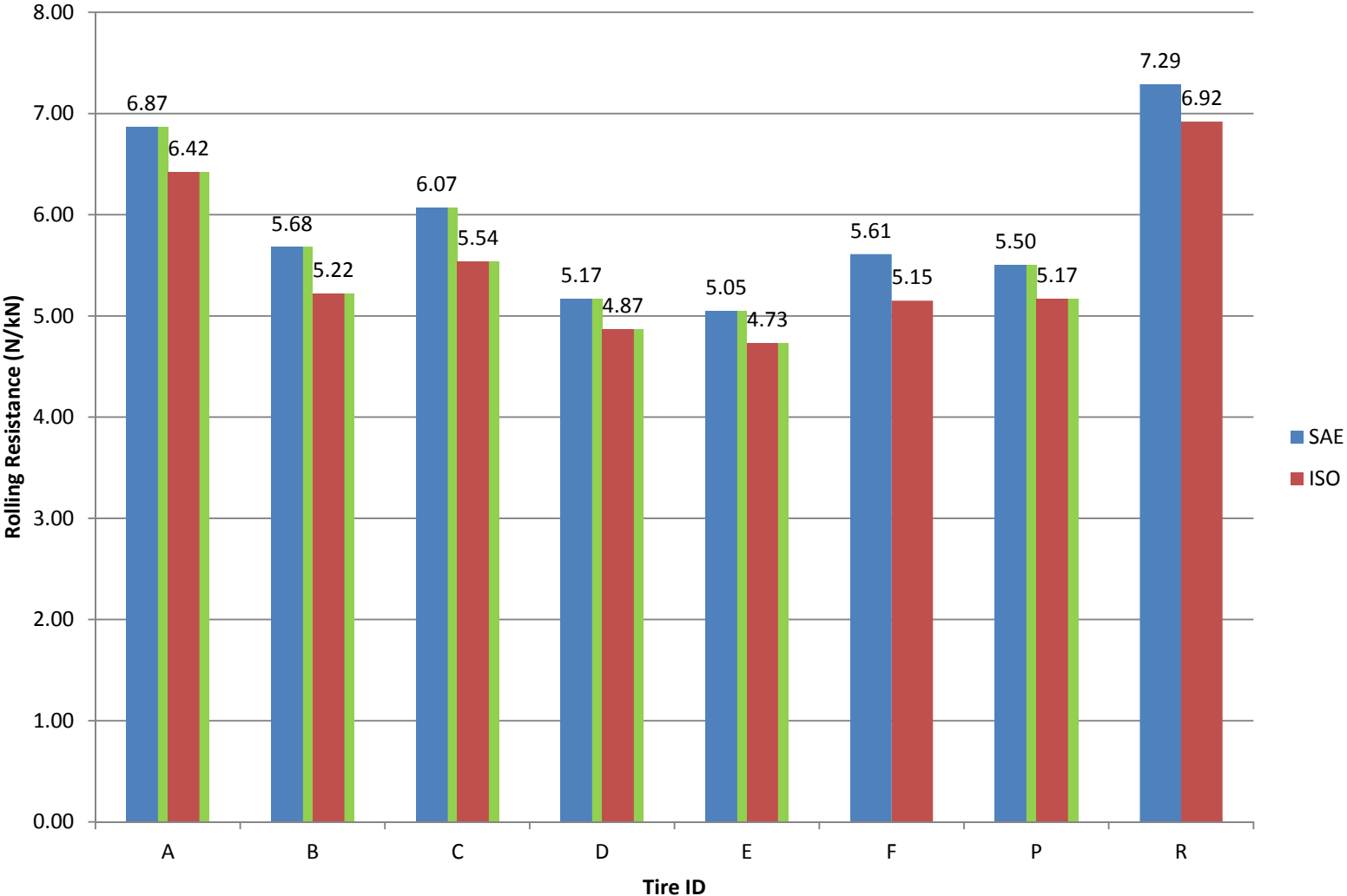
Drive Tire Rolling Resistance





Rolling Resistance Results

Trailer Tire Rolling Resistance





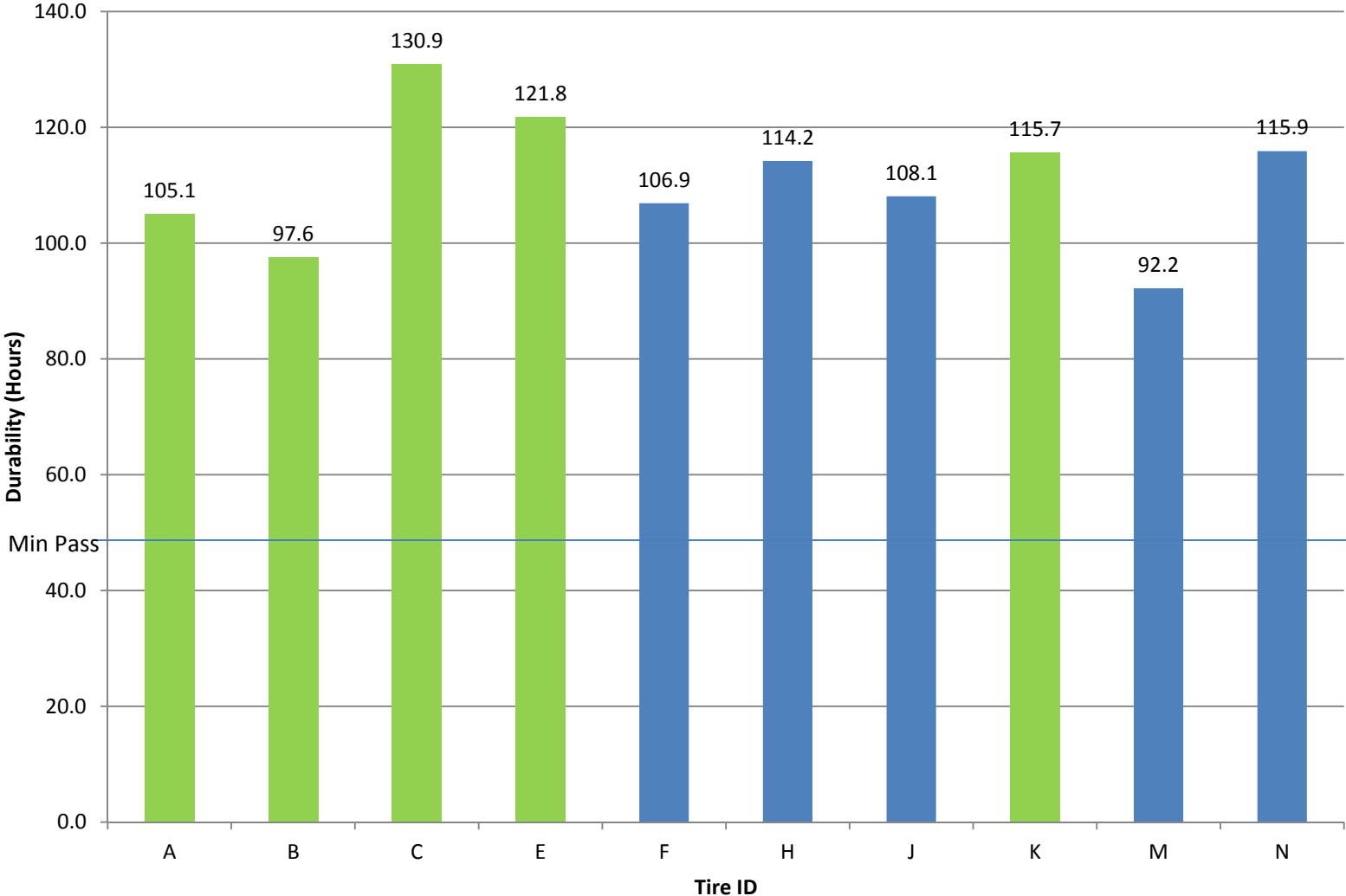
Durability Testing

- Allows qualitative comparison, does NOT model or predict life
- Base test only establishes an absolute minimum level for road worthiness



Durability Testing Results

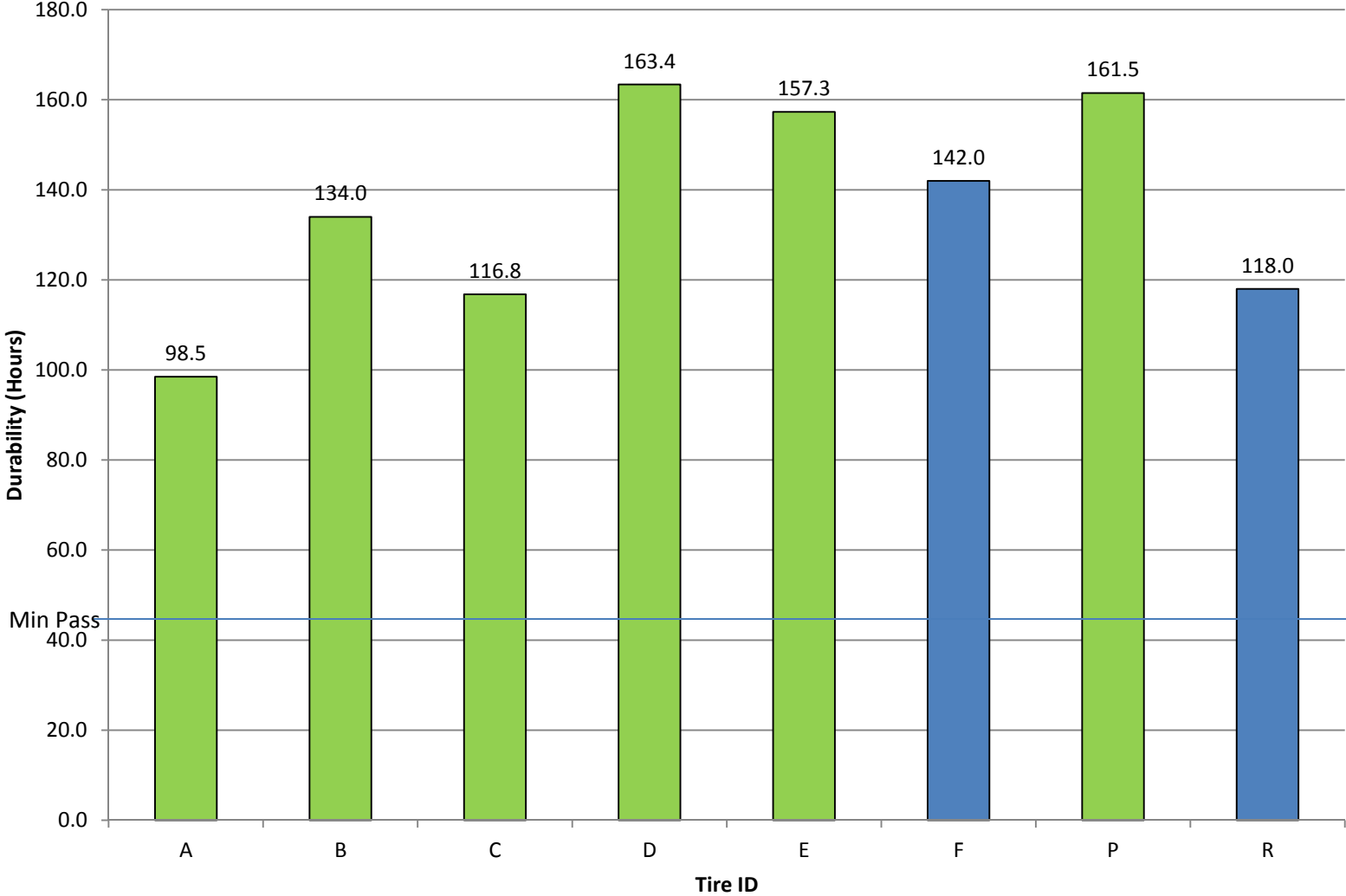
Durability: Drive Tires





Durability Testing Results

Durability: Trailer Tires





Durability Testing Notes

- At its core, the durability test is only an acceptance test.
- Durability test does NOT model or predict actual service life.



Snow Traction Testing

- Based on ASTM F1805, modified for heavy truck tires
- Results are normalized against a “control” tire
- Forward (driving) traction only.
 - No lateral component (such as cornering)
 - No braking

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Snow Traction Apparatus

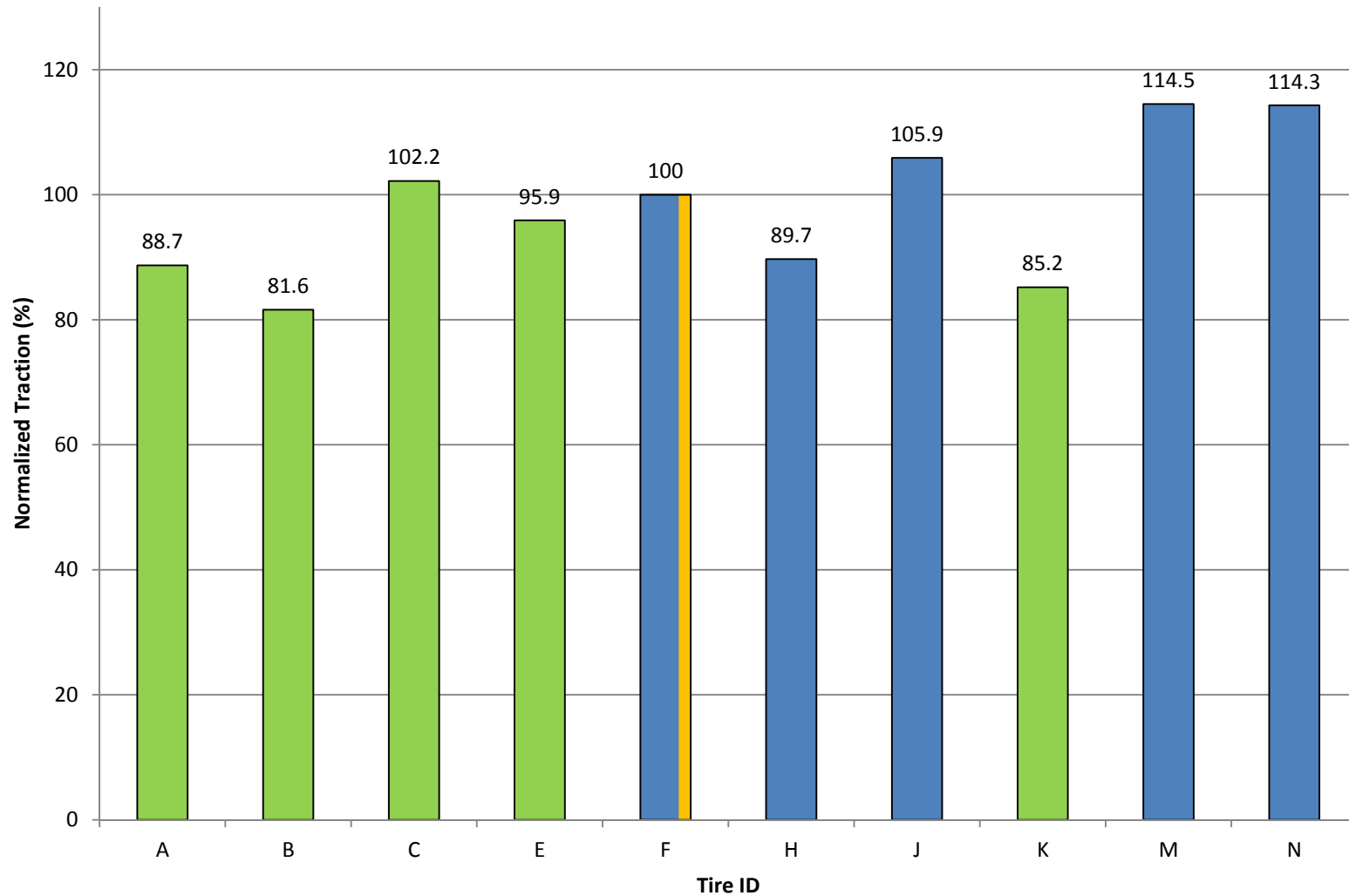


Image credit: Smithers Rapra



Snow Traction Results

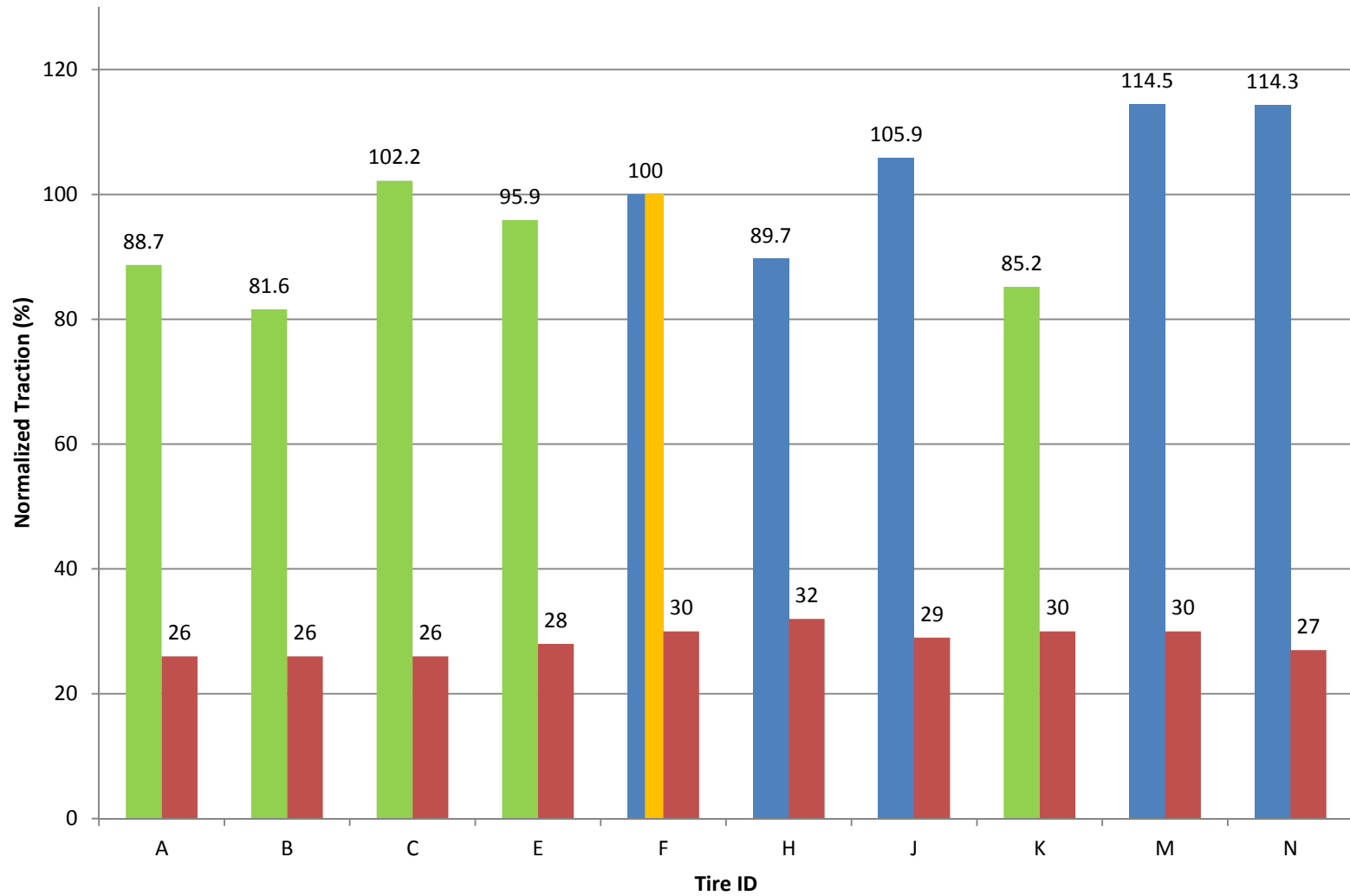
Traction: Drive Tires





Snow Traction Results

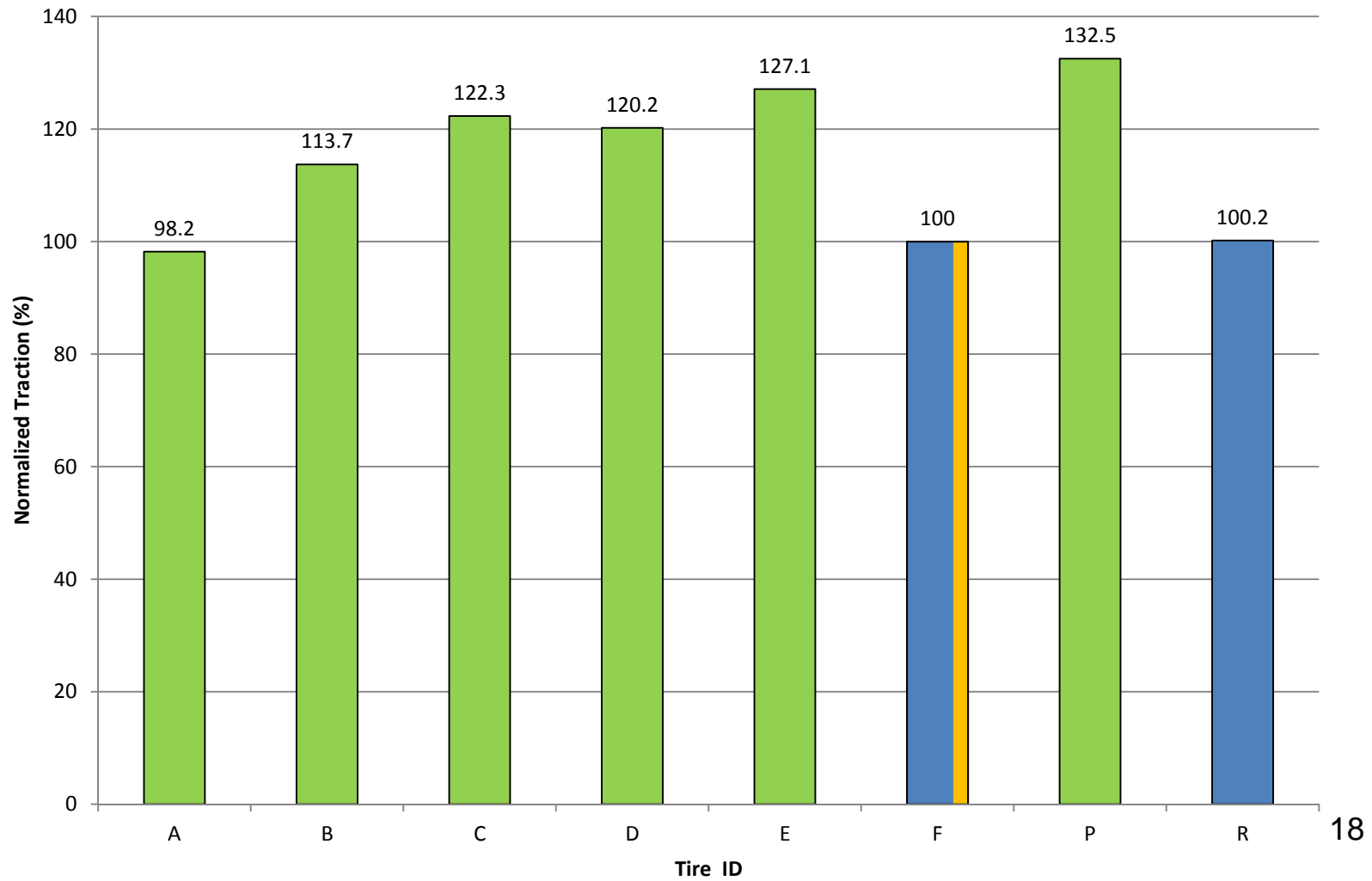
Traction: Drive Tires





Snow Traction Results

Traction: Trailer Tires





Lab Results Summary

- Rolling Resistance
 - SmartWay verified have much lower RR
- Durability
 - Comparable to non-SmartWay
- Snow Traction
 - Comparable to non-SmartWay

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Vehicle Based Testing



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Purpose for Vehicle Based Testing

- Does SmartWay verification mean significantly reduced winter performance?
- Lab vs. Actual
- Vehicle interaction effects?



Vehicle Setup

- Extensive instrumentation
 - Vehicle computer
 - GPS
 - IMU
- Other additional data



Tests to be Performed

- Stopping Distance Measurement
- Turning Test
 - On/off ramp analogue



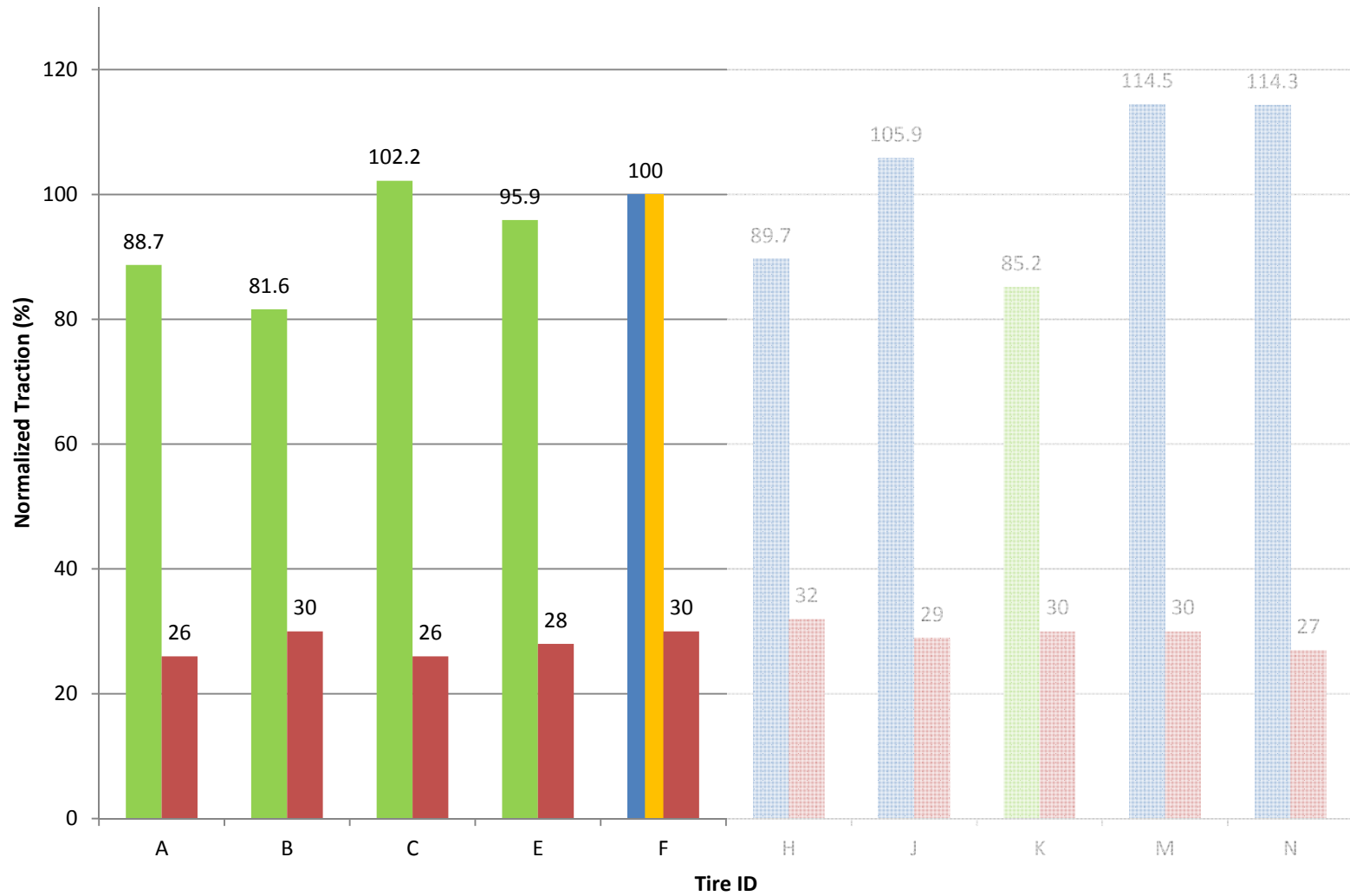
Limitations

- Single configuration sample per test
- Weather dependent
- Trends & gross deficiencies only
 - No ranking



Snow Traction Results

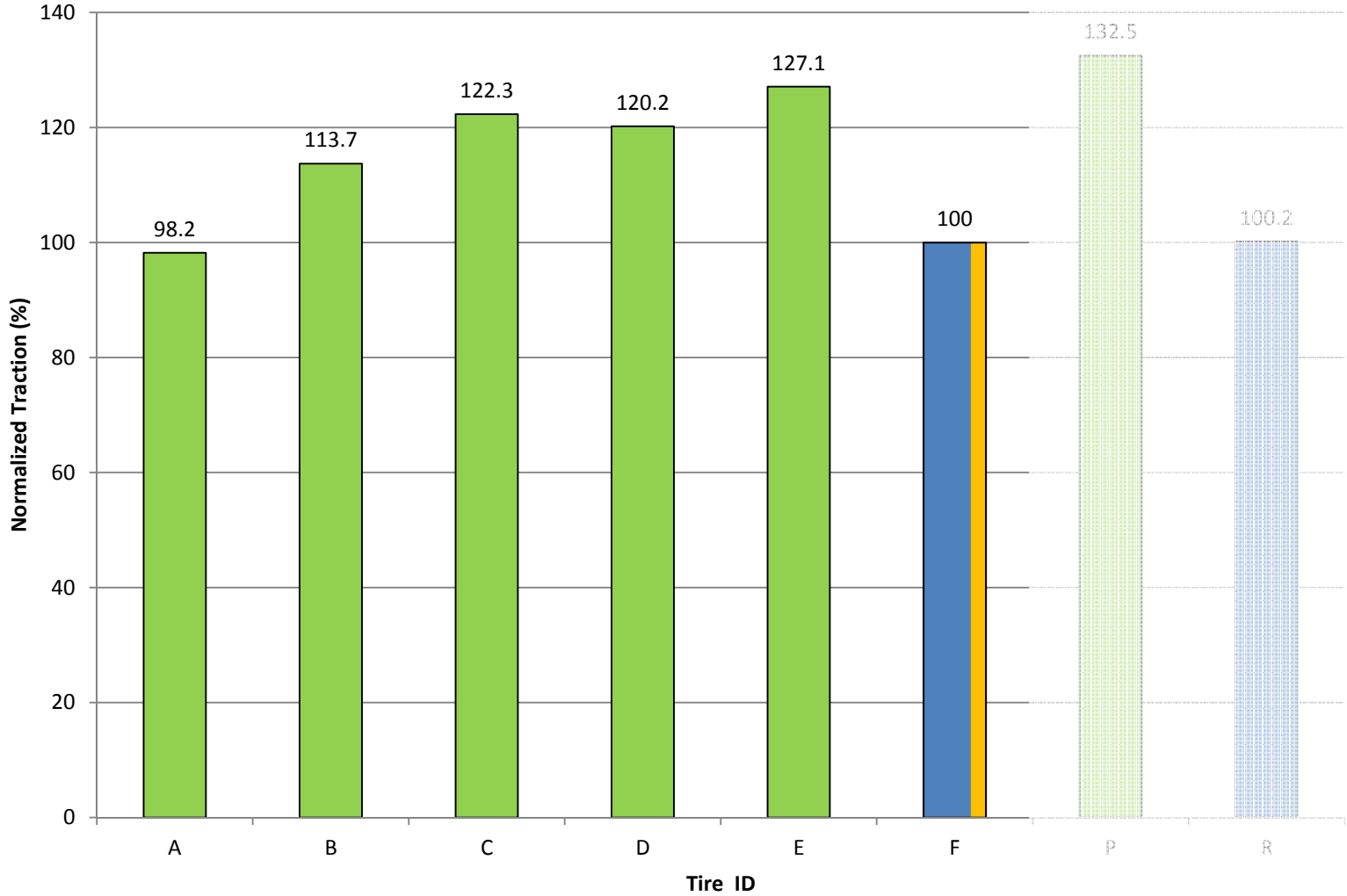
Traction: Drive Tires





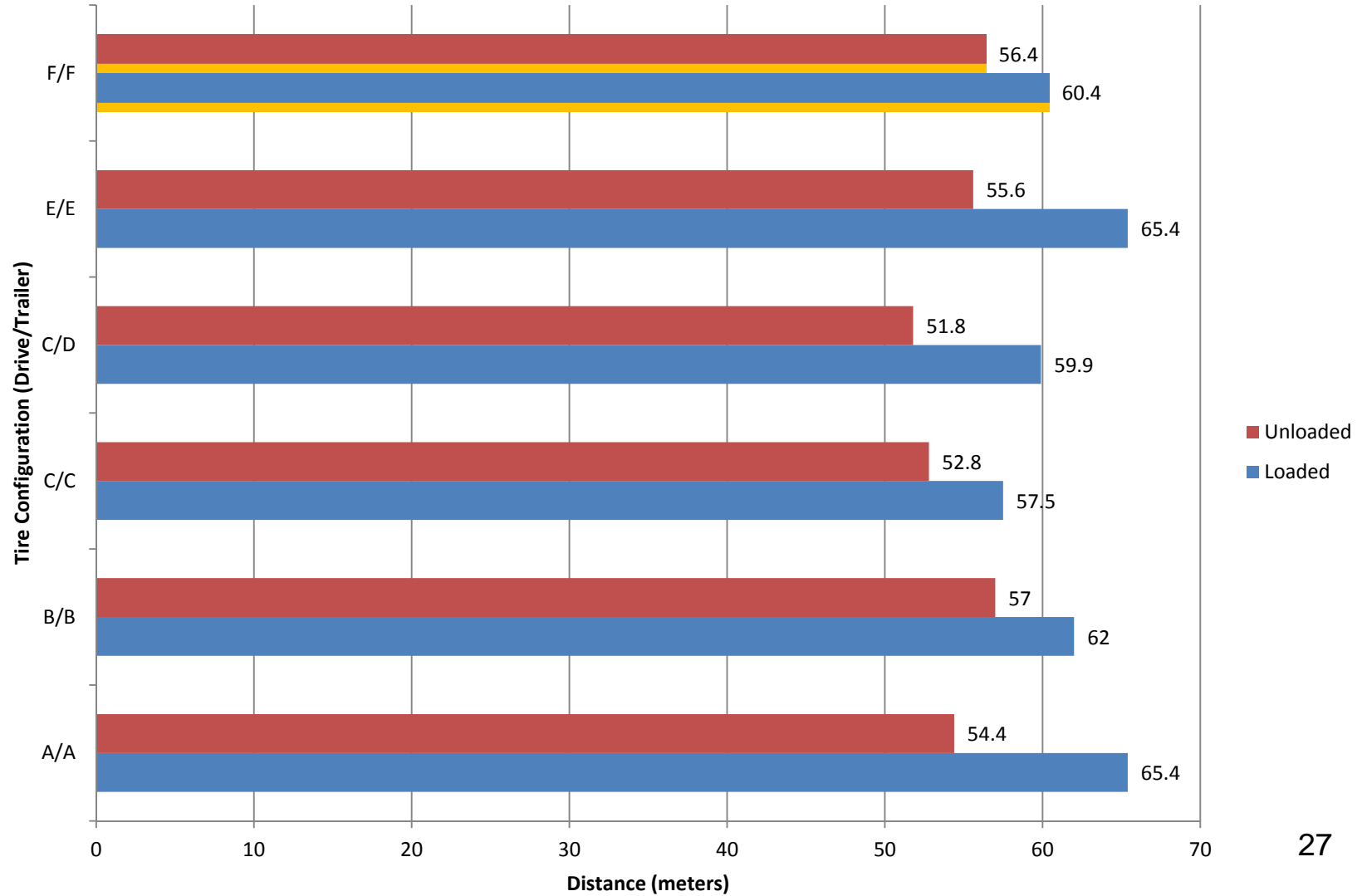
Snow Traction Results

Traction: Trailer Tires



Stopping Distance Results

65 km/h Stopping Distance





Turning Test

- Simulation of on/off ramp
- Road holding ability
- 180 degree turn, 23 m radius

Turning Test Results

- Pass/Fail only

	Turning Test Entry Speed			
	20 km/h	25 km/h	30 km/h	35 km/h
A/A	Pass	Pass	Pass	FAIL
B/B	Pass	Pass	FAIL	not attempted
C/C	Pass	Pass	Pass	FAIL
C/D	Pass	Pass	Pass	FAIL
E/E	Pass	Pass	Pass	FAIL
F/F	Pass	Pass	Pass	FAIL



Vehicle Testing Results Summary

- Stopping Distance
 - Comparable to non-SmartWay
 - No adverse system interaction
- Turning/Road Holding
 - Comparable to non-SmartWay
 - No adverse system interaction

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Questions?



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