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National Automotive Sampling System
Tire Pressure Special Study

July 26, 2001

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Background

- In 2000, Section 12 of the Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act.
  - An upgrade to standard placement of the vehicle placard, and;
  - A new rule requiring an onboard tire pressure measuring sensor.
- In response, NHTSA's NCSA conducted the Tire Pressure Special Study in 2001.

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Objective

- Collect data to support various tire related rulemaking actions:
  - Driver profile and interview data
  - Vehicle profile data
  - Tire profile and observation data

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Special Study

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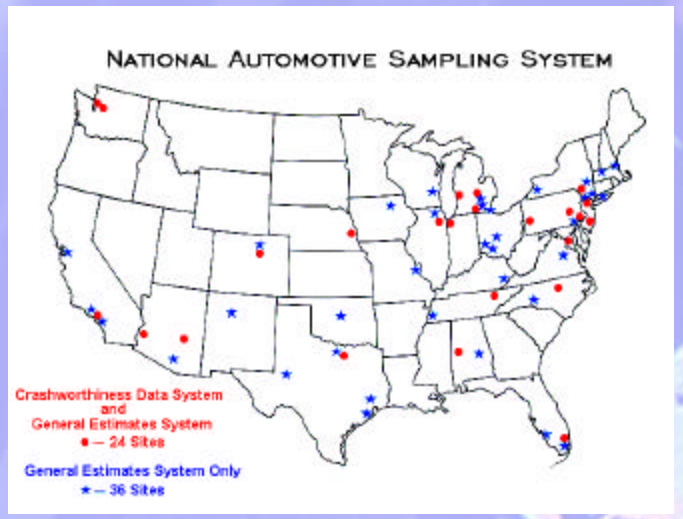
Why NASS?

- Existing infrastructure for conducting special studies quickly and cost-effectively
  - 1st Stage of a Probability Based National Sample
    - 24 Geographic Areas (PSUs)
  - 67 Trained Field Investigators



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Sample Design

- Stage 1 - 24 NASS CDS PSUs
- Stage 2 – Zip Codes
  - –7 Zip Codes within each PSU
- Stage 3 – Refueling Stations
  - –2 Refueling Stations within each zip code
    - Multiple islands
    - Canopies over the islands
    - Stations must be at least 2 miles apart
  - –Vehicles must be there to refuel to participate

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Scope

- Observations taken at 24 NASS PSUs over a 14 day period in February, 2001
- 11,530 Vehicles Inspected
  - 6,442 Passenger Cars,
  - 1,874 SUVs,
  - 1,376 Vans, and
  - 1,838 Pickup Trucks

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Interview Form

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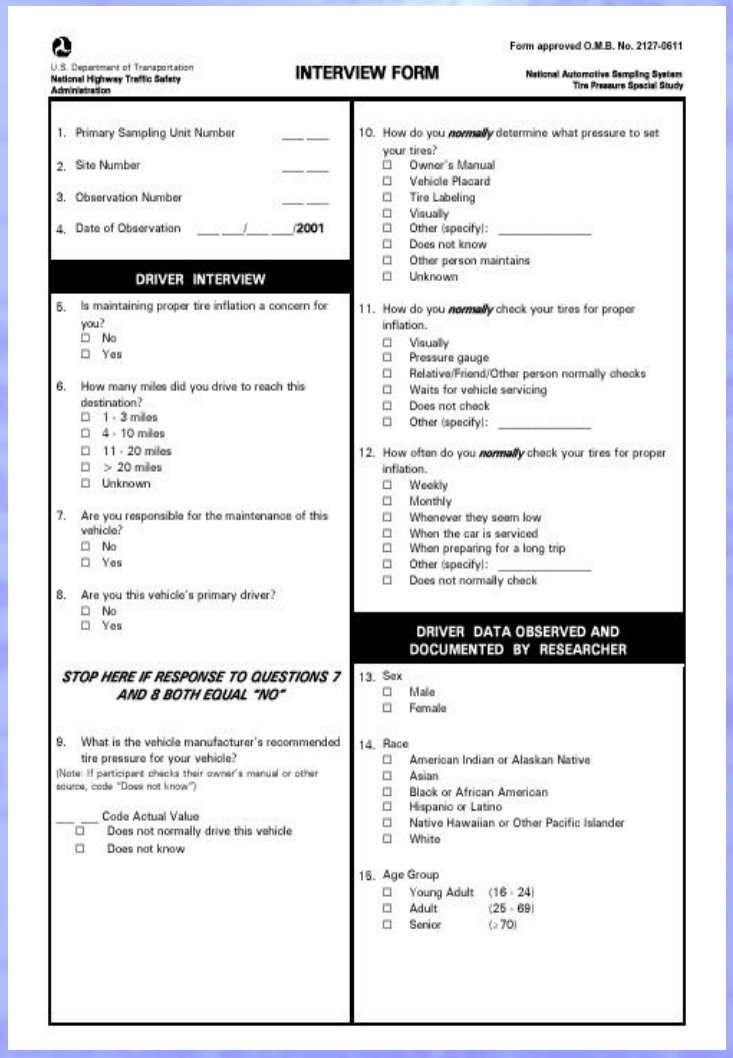
- Driver Knowledge, Attitude, Practice
  - Tire
  - Tire Care
- Driver Profile Information
  - Age
  - Sex
  - Race



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INTERVIEW FORM

Form approved O.M.B. No. 2127-0611
National Automotive Sampling System
Tire Pressure Special Study

1. Primary Sampling Unit Number ___ ___
2. Site Number ___ ___
3. Observation Number ___ ___
4. Date of Observation ___ ___/___ ___/2001

DRIVER INTERVIEW

5. Is maintaining proper tire inflation a concern for you?
   - ☐ No
   - ☐ Yes
6. How many miles did you drive to reach this destination?
   - ☐ 1 - 3 miles
   - ☐ 4 - 10 miles
   - ☐ 11 - 20 miles
   - ☐ > 20 miles
   - ☐ Unknown
7. Are you responsible for the maintenance of this vehicle?
   - ☐ No
   - ☐ Yes
8. Are you this vehicle's primary driver?
   - ☐ No
   - ☐ Yes

STOP HERE IF RESPONSE TO QUESTIONS 7 AND 8 BOTH EQUAL "NO"

9. What is the vehicle manufacturer's recommended tire pressure for your vehicle?
   (Note: If participant checks their owner's manual or other source, code "Does not know")
   - ___ ___ Code Actual Value
   - ☐ Does not normally drive this vehicle
   - ☐ Does not know
10. How do you ***normally*** determine what pressure to set your tires?
    - ☐ Owner's Manual
    - ☐ Vehicle Placard
    - ☐ Tire Labeling
    - ☐ Visually
    - ☐ Other (specify): _____
    - ☐ Does not know
    - ☐ Other person maintains
    - ☐ Unknown
11. How do you ***normally*** check your tires for proper inflation.
    - ☐ Visually
    - ☐ Pressure gauge
    - ☐ Relative/Friend/Other person normally checks
    - ☐ Waits for vehicle servicing
    - ☐ Does not check
    - ☐ Other (specify): _____
12. How often do you ***normally*** check your tires for proper inflation.
    - ☐ Weekly
    - ☐ Monthly
    - ☐ Whenever they seem low
    - ☐ When the car is serviced
    - ☐ When preparing for a long trip
    - ☐ Other (specify): _____
    - ☐ Does not normally check

DRIVER DATA OBSERVED AND DOCUMENTED BY RESEARCHER

13. Sex
    - ☐ Male
    - ☐ Female
14. Race
    - ☐ American Indian or Alaskan Native
    - ☐ Asian
    - ☐ Black or African American
    - ☐ Hispanic or Latino
    - ☐ Native Hawaiian or Other Pacific Islander
    - ☐ White
15. Age Group
    - ☐ Young Adult (16 - 24)
    - ☐ Adult (25 - 69)
    - ☐ Senior (≥ 70)

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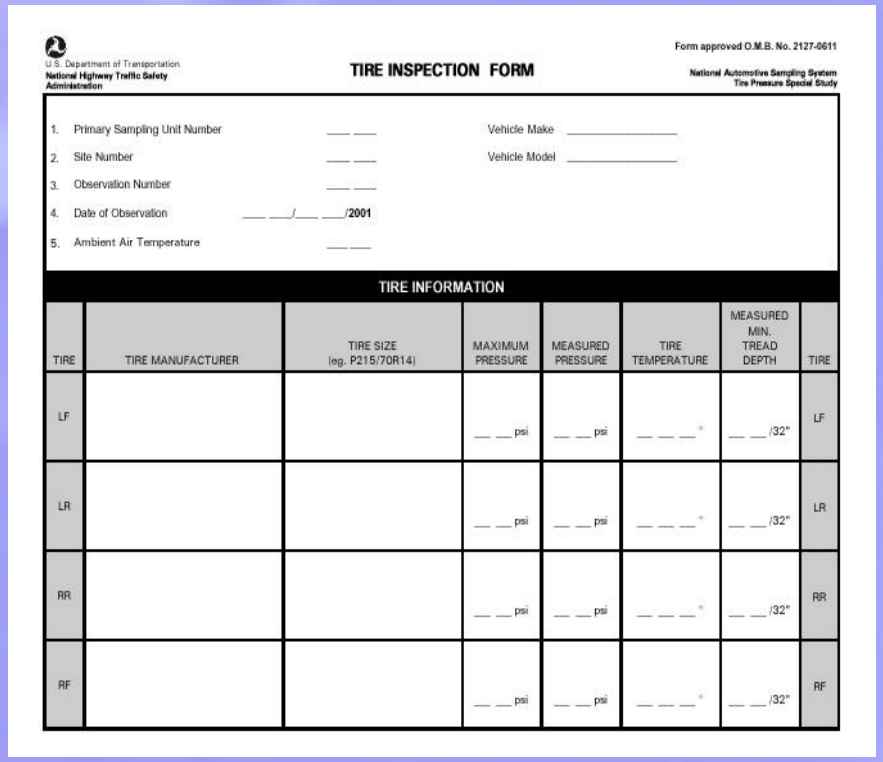
Tire Inspection Form

Tire Data

- Profile
  - **Manufacturer**
  - **Size**
  - **Max Pressure**
- Measurements
  - **Pressure**
  - **Temperature**
  - **Tread Depth**



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Form approved O.M.B. No. 2127-0611

TIRE INSPECTION FORM

National Automotive Sampling System
Tire Pressure Special Study

1. Primary Sampling Unit Number ___ ___ Vehicle Make _____
2. Site Number ___ ___ Vehicle Model _____
3. Observation Number ___ ___
4. Date of Observation ___ ___/___ ___/2001
5. Ambient Air Temperature ___ ___

TIRE INFORMATION

TIRE	TIRE MANUFACTURER	TIRE SIZE (eg. P215/70R14)	MAXIMUM PRESSURE	MEASURED PRESSURE	TIRE TEMPERATURE	MEASURED MIN. TREAD DEPTH	TIRE
LF			___ psi	___ psi	___ °	___/32"	LF
LR			___ psi	___ psi	___ °	___/32"	LR
RR			___ psi	___ psi	___ °	___/32"	RR
RF			___ psi	___ psi	___ °	___/32"	RF

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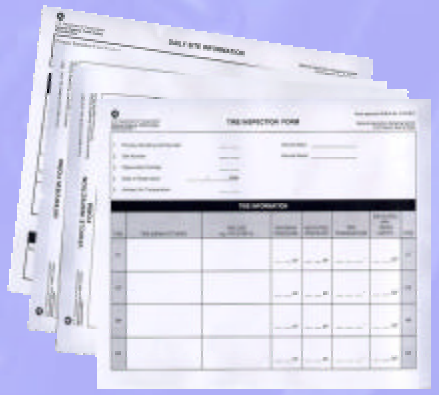
Data Collection Tools

- Tire Pressure Gauge
- Pyrometer
- Tread Depth Indicator
- Data Forms



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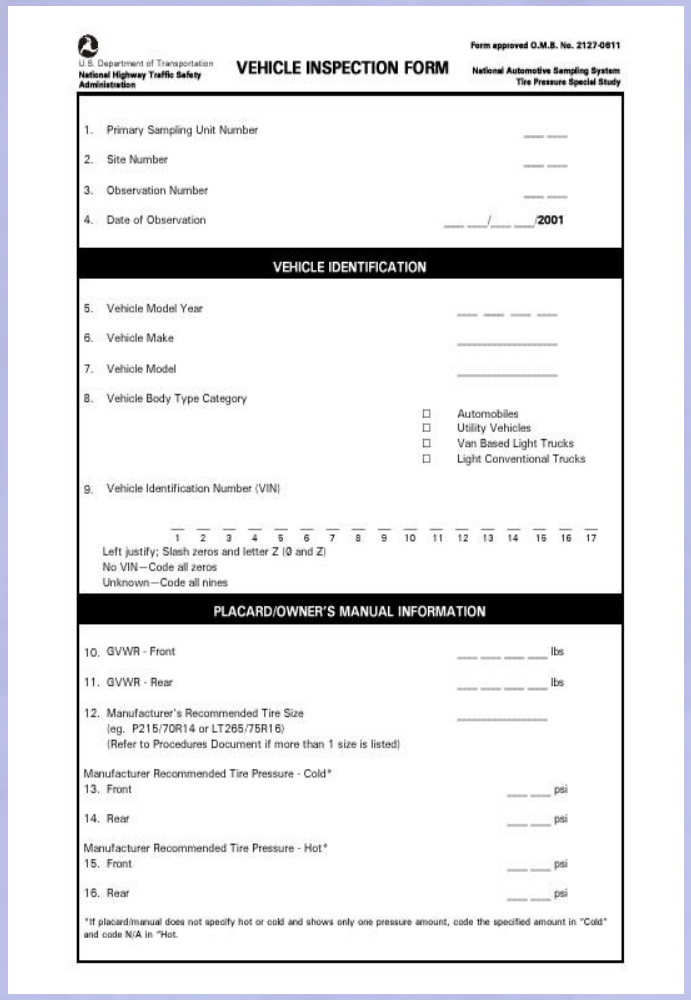
Vehicle Inspection Form



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VEHICLE INSPECTION FORM

Form approved O.M.B. No. 2127-0611
National Automotive Sampling System
Tire Pressure Special Study

1. Primary Sampling Unit Number ___ ___
2. Site Number ___ ___
3. Observation Number ___ ___
4. Date of Observation ___ ___/___ ___/2001

VEHICLE IDENTIFICATION

5. Vehicle Model Year ___ ___ ___ ___
6. Vehicle Make _____
7. Vehicle Model _____
8. Vehicle Body Type Category
   - ☐ Automobiles
   - ☐ Utility Vehicles
   - ☐ Van Based Light Trucks
   - ☐ Light Conventional Trucks
9. Vehicle Identification Number (VIN)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Left justify; Slash zeros and letter Z (Ø and Z)
No VIN—Code all zeros
Unknown—Code all nines

PLACARD/OWNER'S MANUAL INFORMATION

10. GVWR - Front ___ ___ ___ ___ lbs
11. GVWR - Rear ___ ___ ___ ___ lbs
12. Manufacturer's Recommended Tire Size _____
    (eg. P215/70R14 or LT265/75R16)
    (Refer to Procedures Document if more than 1 size is listed)

Manufacturer Recommended Tire Pressure - Cold*
13. Front ___ ___ psi
14. Rear ___ ___ psi

Manufacturer Recommended Tire Pressure - Hot*
15. Front ___ ___ psi
16. Rear ___ ___ psi

*If placard/manual does not specify hot or cold and shows only one pressure amount, code the specified amount in "Cold" and code N/A in "Hot.

- Vehicle Data
  - Profile
    - **Make, Model, Body Type**
  - Vehicle Placard Information
    - **Recommended Tire Size, Pressure & GVWR**

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Preliminary Results

- A Look at the Manufacturer's Recommended Pressures and the Measured Pressures for each vehicle
  - 10,900 Observations had complete data for all four tires, and the front and rear recommended pressures

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Preliminary Results

- Analysis on three different groups (all four tires were of the same type)
  - Passenger Cars with Metric P-Type Tires
    - About 6,000 Vehicles Used in Analysis
  - Trucks, SUVs, and Vans with Metric P-Type Tires
    - About 4,000 Vehicles Used in Analysis
  - Trucks, SUVs, and Vans with either Metric LT-Type or High Flotation Tires
    - About 900 Vehicles Used in Analysis

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Tire Types

- Four Different Tire Types
  - P-Metric and LT-Metric Tires (e.g. P205/75R14)
    - If “P” or “LT” position was blank, we assumed P-Metric
  - High Flotation Tires (e.g. 31X10.50R15LT/C)
  - Numeric Tires (e.g. 8.75R16.5LT/D)
  - Other Tire Types

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Table 1

Percentage of Drivers Concerned with Proper Tire Inflation by Type of Vehicle and Response

(Estimates and Sampling Errors in Percentages)

Vehicle Type	Response	
	Concerned	Not Concerned
Cars w/ P Tires	84 (2.6)	16 (2.6)
Light Trucks w/ P Tires	87 (2.5)	13 (2.5)
Light Trucks w/ Other Tires	88 (3.8)	12 (3.8)
Overall	**85 (2.3)**	**15 (2.3)**

Preliminary Results

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Table 2

Percentage of Drivers Who Check Their Tire Pressure by Type of Vehicle and Response.

(Estimates and Sampling Errors in Percentages)

Vehicle Type	Response						
	Weekly	**Monthly**	**When They Seem Low**	**When Serviced**	**Before a Long Trip**	**Other**	**Does Not Check at All**
Cars w/ P Tires	9 (0.7)	21 (1.4)	26 (3.7)	30 (2.8)	1 (0.2)	6 (0.8)	7 (0.9)
Light Trucks w/ P Tires	9 (0.7)	25 (1.2)	24 (3.4)	28 (4.0)	2 (0.6)	8 (1.0)	4 (0.9)
Light Trucks w/ Other Tires	8 (2.5)	40 (5.9)	16 (5.1)	26 (3.0)	2 (1.1)	7 (1.9)	2 (0.9)
Overall	**9 (0.7)**	**24 (1.0)**	**25 (3.4)**	**28 (3.0)**	**2 (0.4)**	**7 (0.8)**	**5 (0.8)**

Preliminary Results

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Table 3

Percentage of Drivers Using the Following Methods to Check Tire Pressure by Type of Vehicle and Response

(Estimates and Sampling Errors in Percentages)

Vehicle Type	Response					
	Pressure Gauge	**Visually**	**When Serviced**	**Other Person Responsible for Car**	**Other Method**	**Does Not Check at All**
Cars w/ P Tires	42 (3.0)	16 (2.0)	27 (2.7)	10 (1.0)	1 (0.2)	4 (0.6)
Light Trucks w/ P Tires	51 (2.0)	13 (2.4)	24 (3.0)	8 (0.7)	1 (0.2)	2 (0.3)
Light Trucks w/ Other Tires	68 (7.4)	6 (1.2)	18 (6.9)	7 (2.9)	0 (0.0)	1 (0.2)
Overall	**48 (2.3)**	**15 (2.1)**	**25 (2.8)**	**9 (0.7)**	**1 (0.1)**	**3 (0.4)**

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Table 4

Percentage of Drivers Using the Following References to Determine Proper Tire Inflation Levels for Their Vehicle by Type of Vehicle and Response *(Estimates and Sampling Errors in Percentages)*

Vehicle Type	Response							
	Owner's Manual	**Vehicle Placard**	**Tire Labeling**	**Visually**	**Other Person**	**Other Method**	**Does Not Know**	**Unknown**
Cars w/ P Tires	18 (2.3)	8 (1.1)	22 (2.0)	11 (1.2)	24 (3.4)	10 (2.2)	7 (1.2)	1 (0.5)
Light Trucks w/ P Tires	15 (1.9)	7 (0.7)	31 (4.5)	8 (1.1)	23 (3.6)	10 (1.2)	4 (0.9)	2 (0.5)
Light Trucks w/ Other Tires	22 (8.9)	11 (4.1)	44 (6.1)	7 (2.2)	4 (1.4)	10 (2.4)	2 (0.9)	0 (0.1)
Overall	**17 (2.5)**	**8 (0.9)**	**27 (3.7)**	**10 (1.1)**	**22 (3.3)**	**10 (1.8)**	**6 (0.9)**	**1 (0.2)**

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Table 5

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Percent of Drivers Using the Following References To Determine Proper Tire Inflation Levels for their Vehicle by Gender and Response.

(Estimates and Sampling Errors in Percentages)

Gender	Response							
	Manual	**Placard**	**Tire Label**	**Visually**	**Other Person**	**Other Method**	**Does Not Know**	**Unknown**
Male	18 (3.1)	10 (1.1)	36 (4.7)	11 (1.5)	10 (2.4)	11 (2.0)	4 (0.8)	1 (0.2)
Female	15 (2.2)	5 (0.9)	13 (2.3)	8 (1.2)	40 (4.6)	8 (2.2)	9 (1.5)	2 (0.5)

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Table 6

Percentage of Vehicles that Have at Least One Tire Under inflated by 6 psi or More.

Vehicle Category	Percent
Passenger Cars with P-Metric Tires	40
Trucks, SUVs, and Vans with P-Metric Tires	45

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Chart 1

Passenger Cars with P-Metric Tires: Distribution of Measured Pressure at Each Tire.

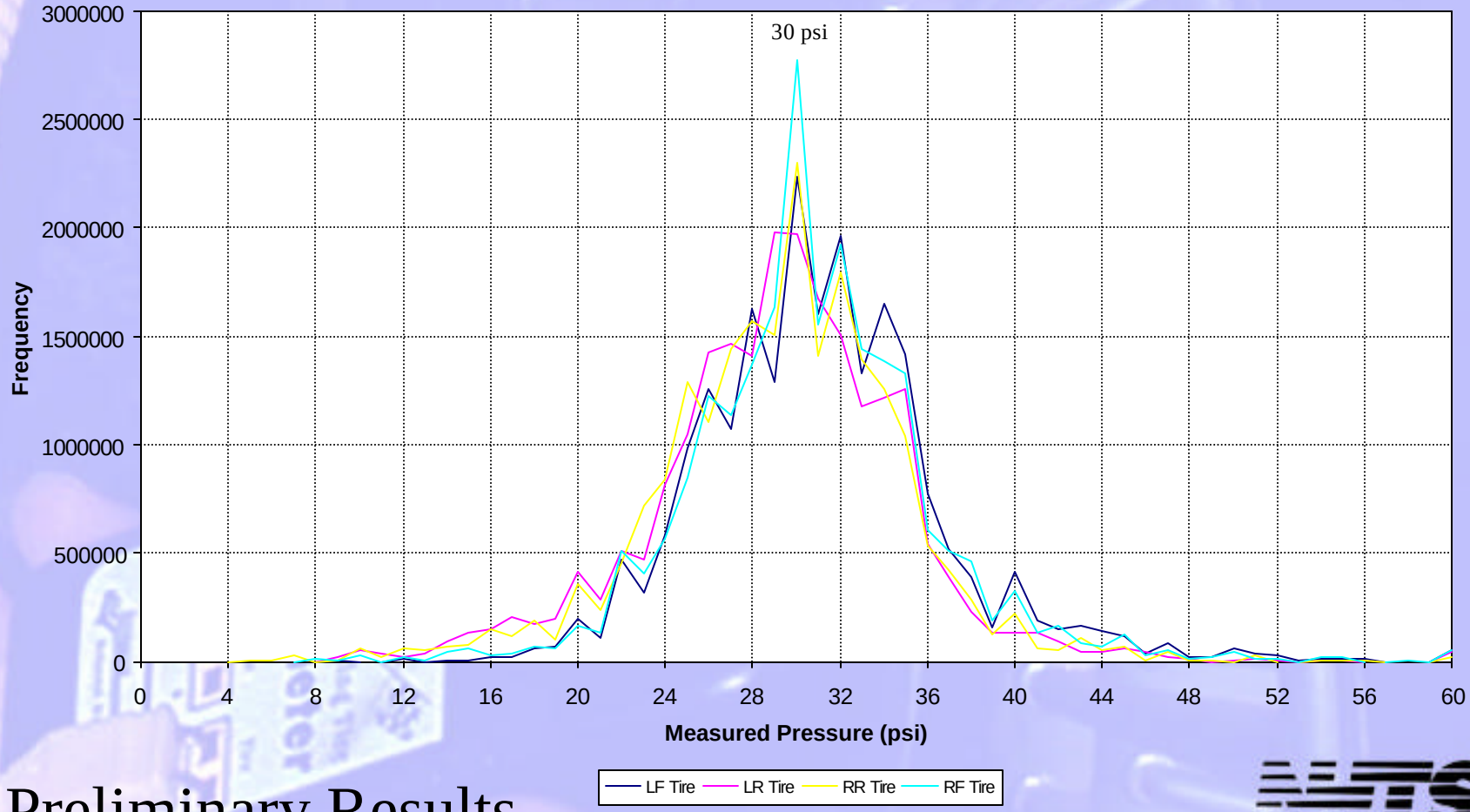

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Chart 2

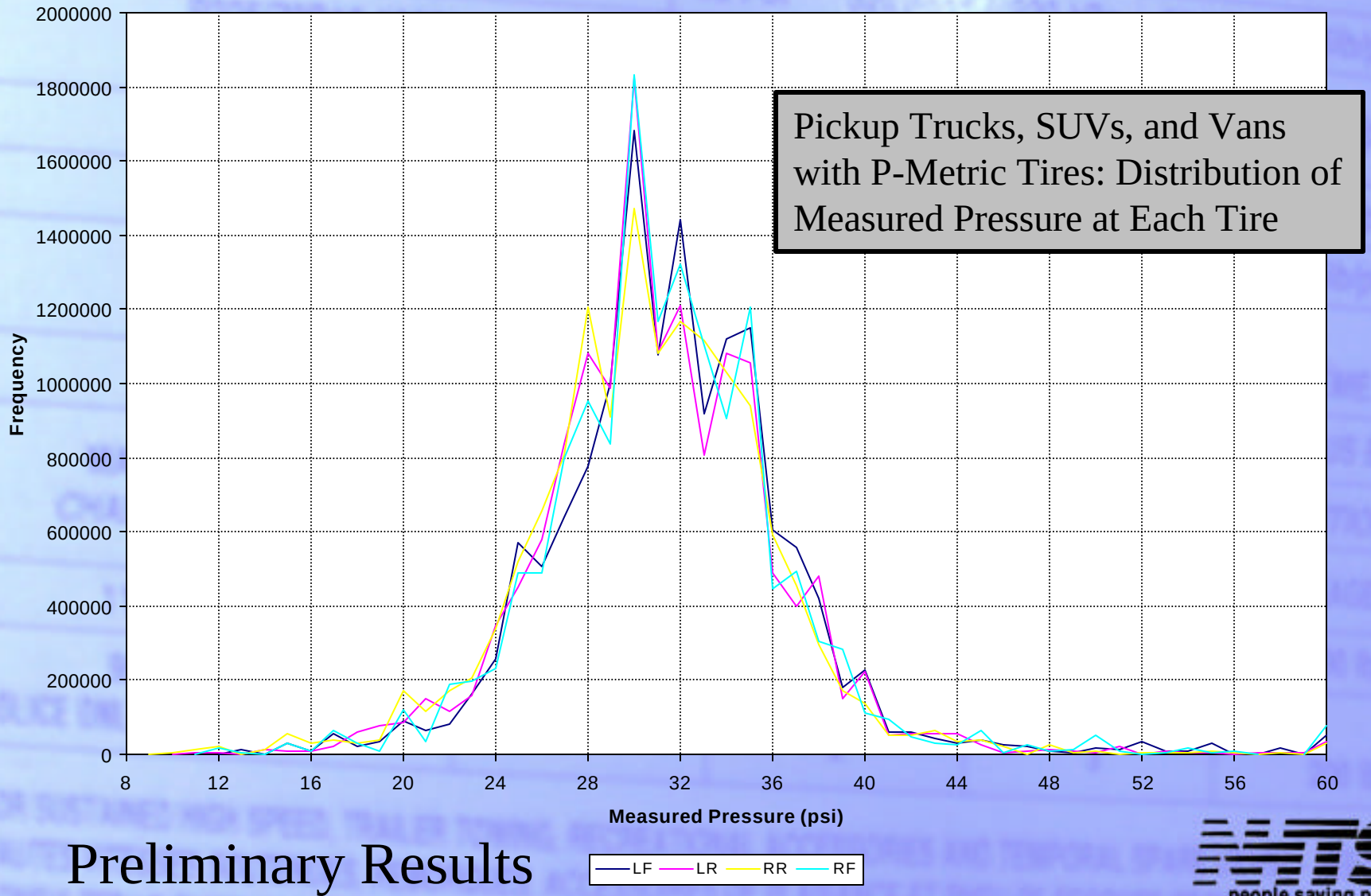

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Chart 3

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Pickup Trucks, SUVs, and Vans with LT-Metric and High Flotation Tires: Cumulative Percent of Measured Pressure at Each Tire

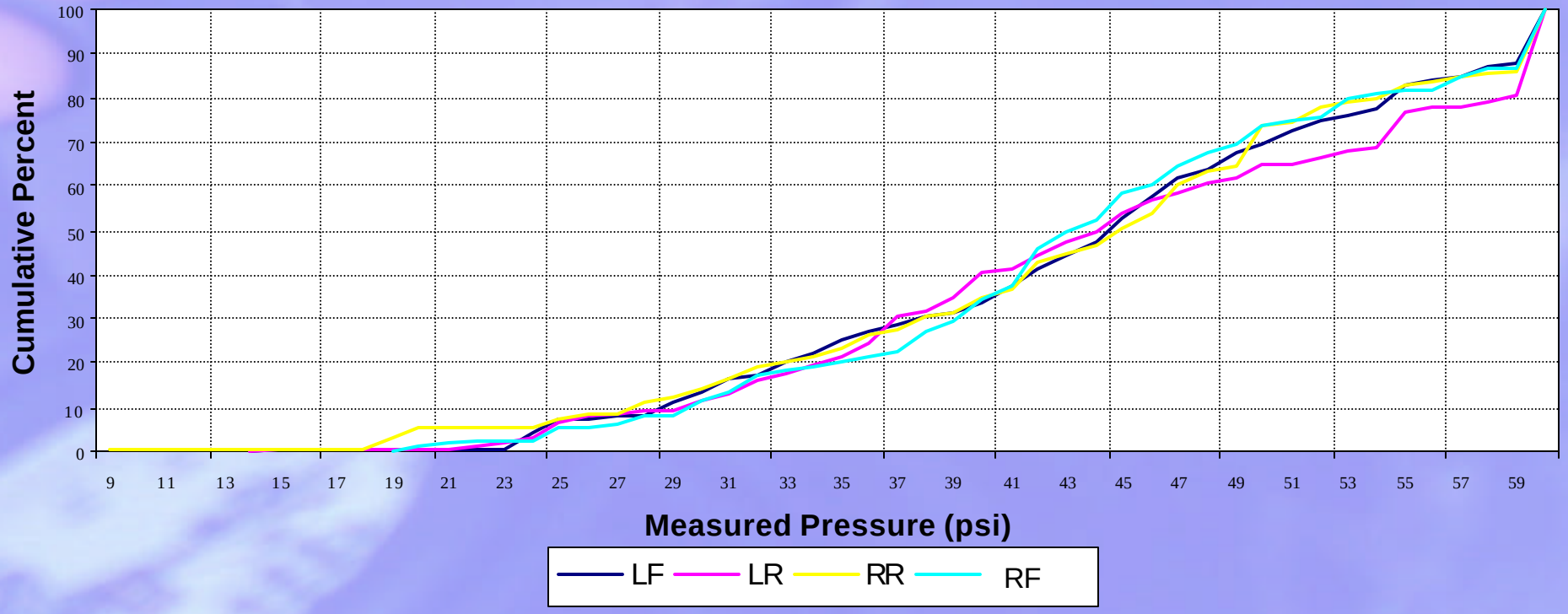

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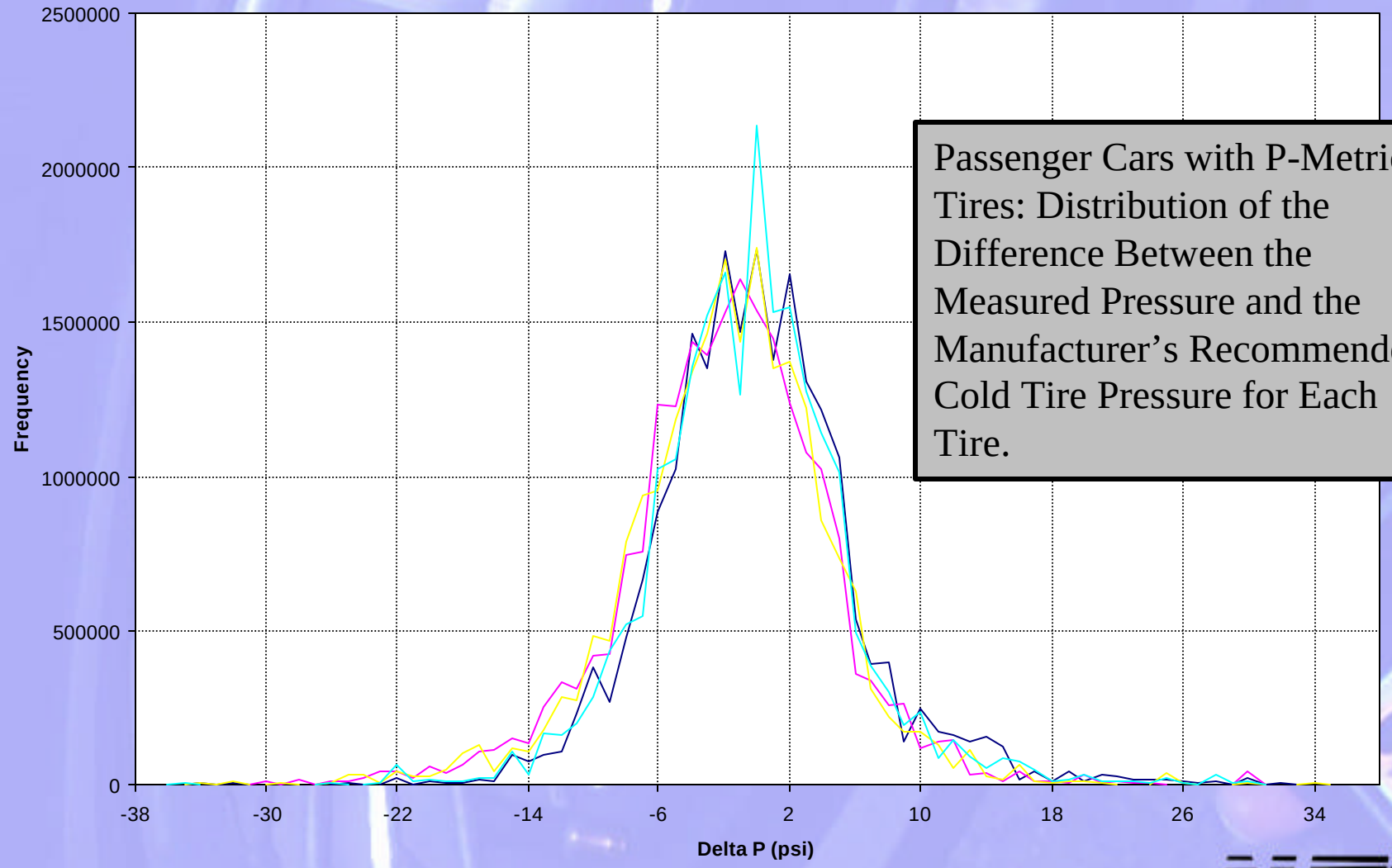
Chart 4



Passenger Cars with P-Metric Tires: Distribution of the Difference Between the Measured Pressure and the Manufacturer's Recommended Cold Tire Pressure for Each Tire.

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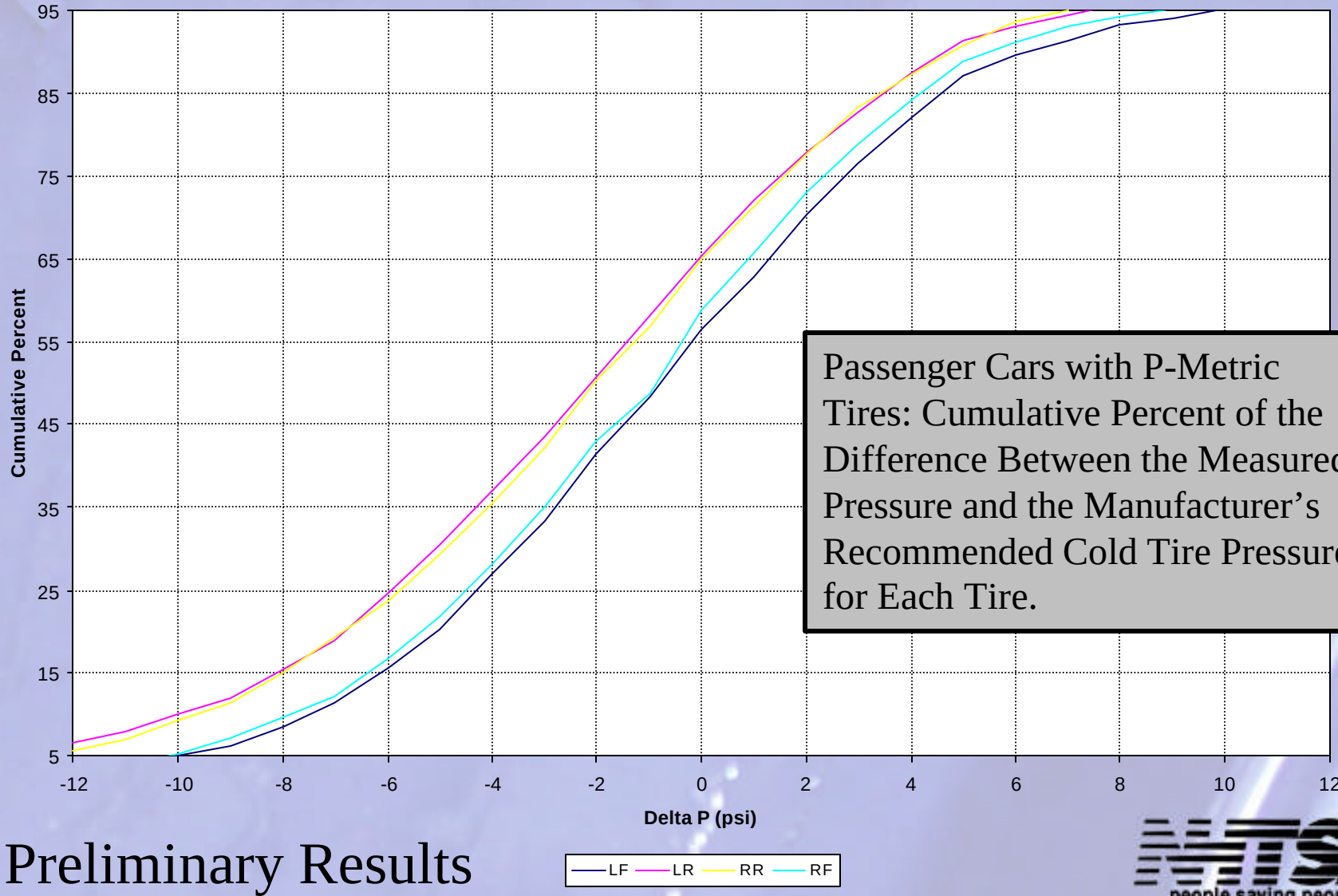
Chart 5



Passenger Cars with P-Metric Tires: Cumulative Percent of the Difference Between the Measured Pressure and the Manufacturer's Recommended Cold Tire Pressure for Each Tire.

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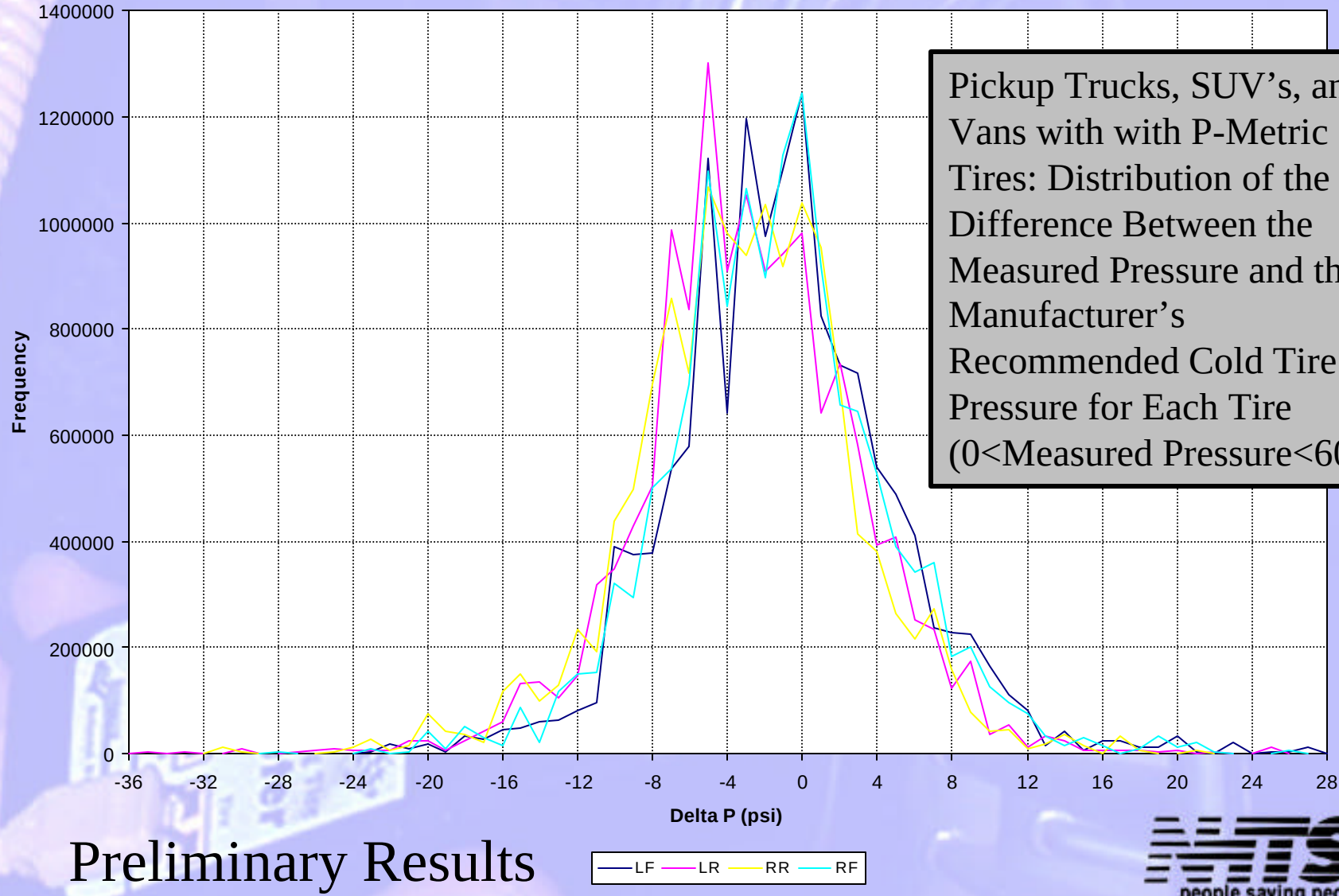
Chart 6



Pickup Trucks, SUV's, and Vans with with P-Metric Tires: Distribution of the Difference Between the Measured Pressure and the Manufacturer's Recommended Cold Tire Pressure for Each Tire (0<Measured Pressure<60).

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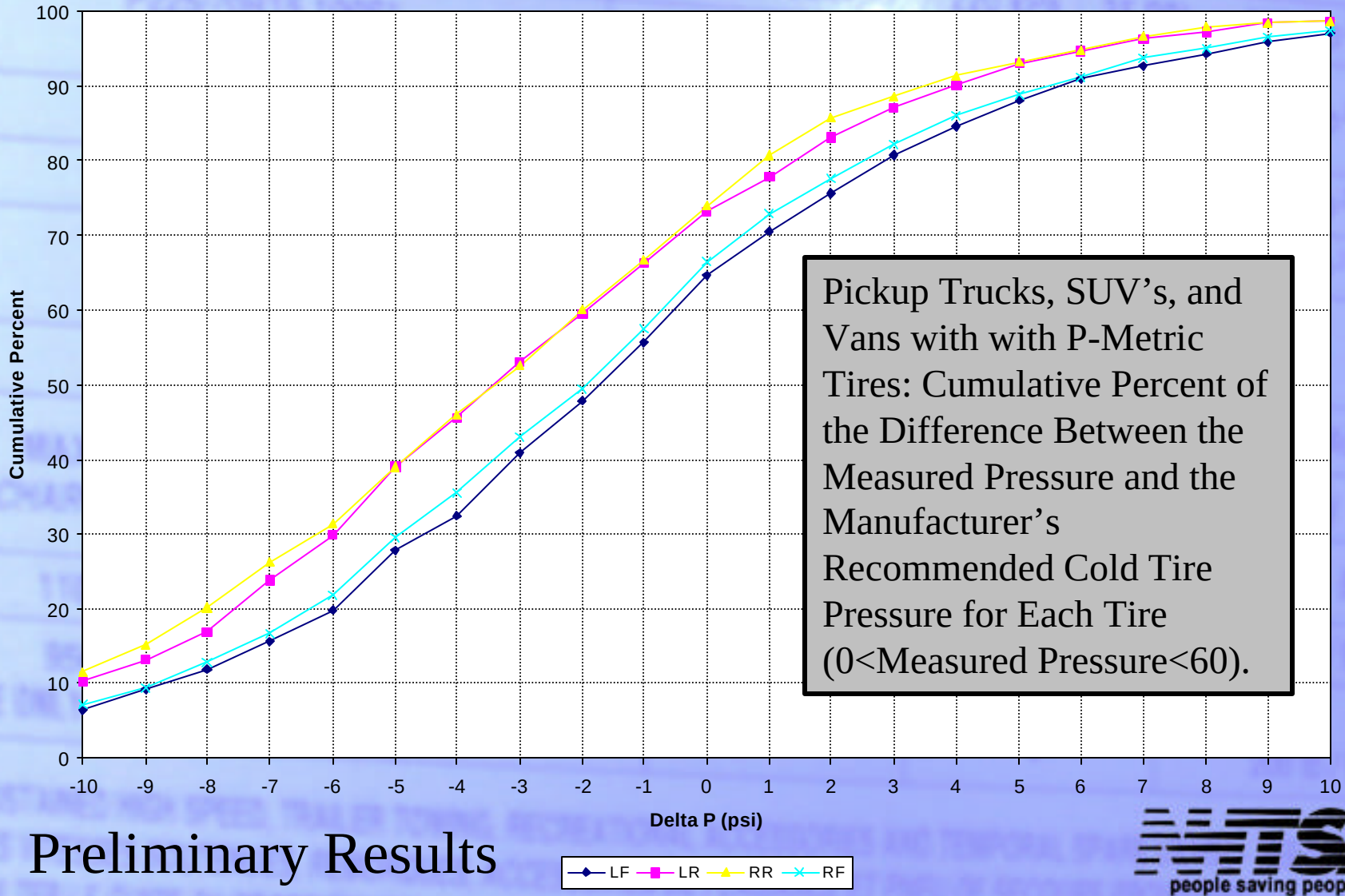
Chart 7



Pickup Trucks, SUV's, and Vans with with P-Metric Tires: Cumulative Percent of the Difference Between the Measured Pressure and the Manufacturer's Recommended Cold Tire Pressure for Each Tire (0<Measured Pressure<60).

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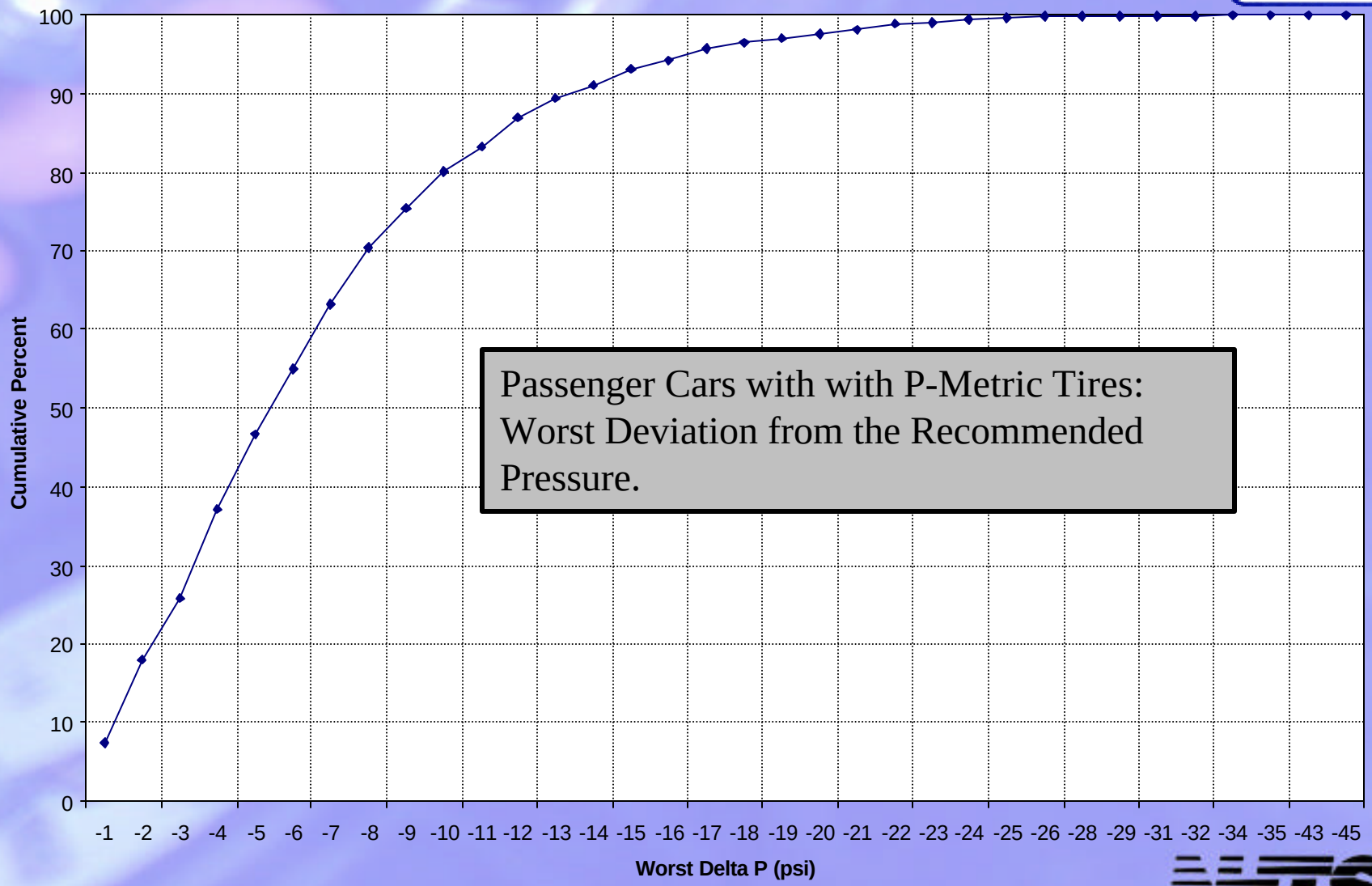
Chart 8



Passenger Cars with with P-Metric Tires: Worst Deviation from the Recommended Pressure.

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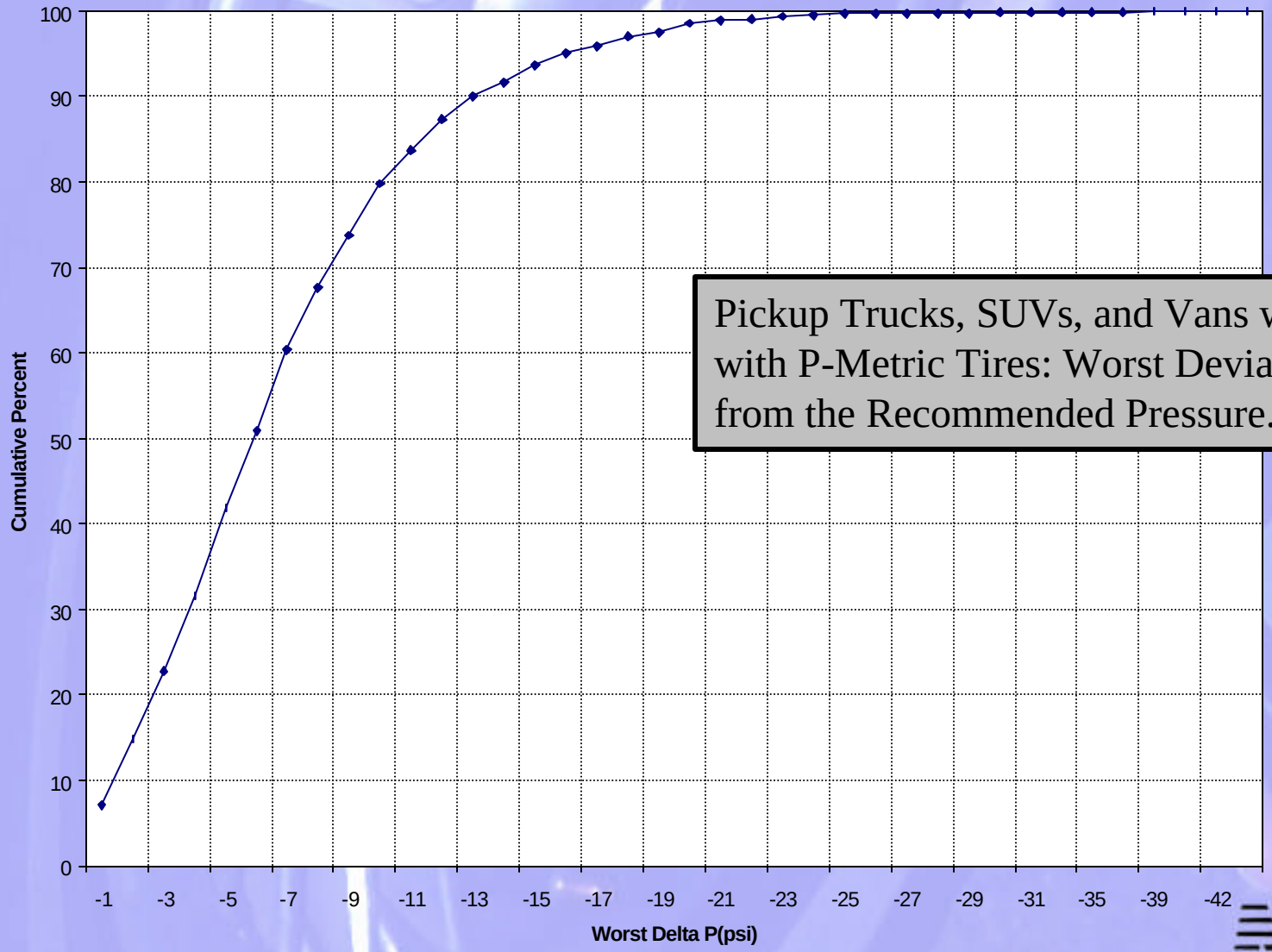
Chart 9



Pickup Trucks, SUVs, and Vans with with P-Metric Tires: Worst Deviation from the Recommended Pressure.

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More Information

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