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Ex Parte Meeting

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Docket NHTSA-2000-8572 – 17

On March 14, 2001, NHTSA representatives met with representatives of Ford concerning the impending rulemaking on tire pressure monitoring systems required by the recently-enacted Transportation Recall Enhancement Accountability and Documentation (TREAD) Act.

NHTSA was represented by Dion Casey, Joe Scott, August Burgett, Jim Simons, Larry Blincoe, Ray Owings, Steve Kratzke, Art Carter, John Finnevan, George Soodoo, Bill Walsh, Bob Shelton, Nancy Bell, Jonathan Walker, Keith Brewer, and Claude Harris. Ford was represented by Fred Porter, Tim Davis, Tim Kramer, Sarah Kirkish, Jim Vondale, and Bill King.

Ford representatives gave a presentation on tire pressure pressure monitoring systems being considered by Ford for use on their vehicles and Ford's recommendations for the impending rulemaking on those systems. The Ford agenda and presentation are attached.

Tire Pressure Monitoring Systems
NHTSA Agenda

March 14, 2001
Conference Room 8442 - DOT

Introductions (5 minutes) — **All**

Opening Remarks (5 minutes) — **Jim Vondale**

Tire Data (30 minutes) — **Tim Davis**
- Tire Failure Root Cause Update
- Priority on Robust Tire Standards
- Recommended Tire Test Procedures

TPMS Implementation Plans (10 minutes) — **Tim Kramer**
- TPMS Design Flexibility Assumed
- Phase-in Timing Required

TPMS Technological Capabilities (30 Minutes) — **Fred Porter**
- TPMS Variability
- Current ABS System Performance Specifications
- Ramifications of RMA Position
- Recommended TPMS Performance Requirements And Test Methods

Recommendations (10 minutes) — **Sarah Kirkish**
- Robust Tire Standards
- Permit TPMS Design Flexibility
- TPMS performance Specifications And Test Methods

Discussion (30 Minutes) — **All**

Next Steps

NHTSA Attendees:
Steve Kratzke, Rulemaking
George Soodoo, Rulemaking Accident Avoidance
Joe Scott, Rulemaking Accident Avoidance
Ray Owings, R&D
Art Carter, R&D Accident Avoidance
12 people invited, Possibly up to 20 attendees total

Ford Attendees:
Jim Vondale, ASO
Tim Davis, Tire Quality
Bill King, Washington Affairs
Sarah Kirkish, ASO
Tim Kramer, PB&SO
Fred Porter, RVT Chassis Electronics

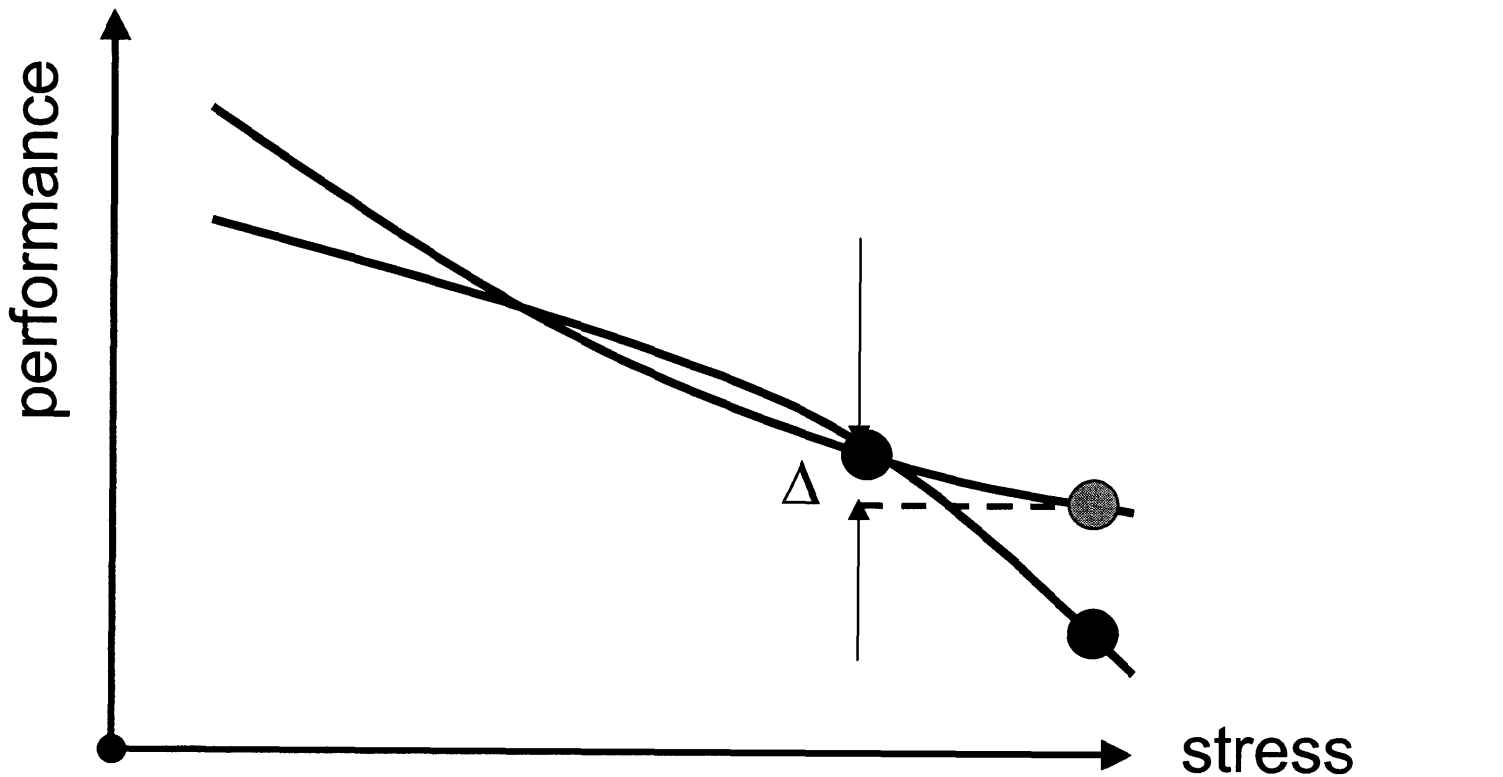
List of Handouts to leave with NHTSA and for Docket:

Agenda
Recommended Tire Test Procedures - Tim Davis
Chart of TPMS Ramifications using RMA Position - Fred Porter
Recommended TPMS Performance Specifications - Fred Porter
Recommended TPMS Test Procedures - Fred Porter

Ford Presentation to NHTSA on Tire Pressure Monitoring Systems

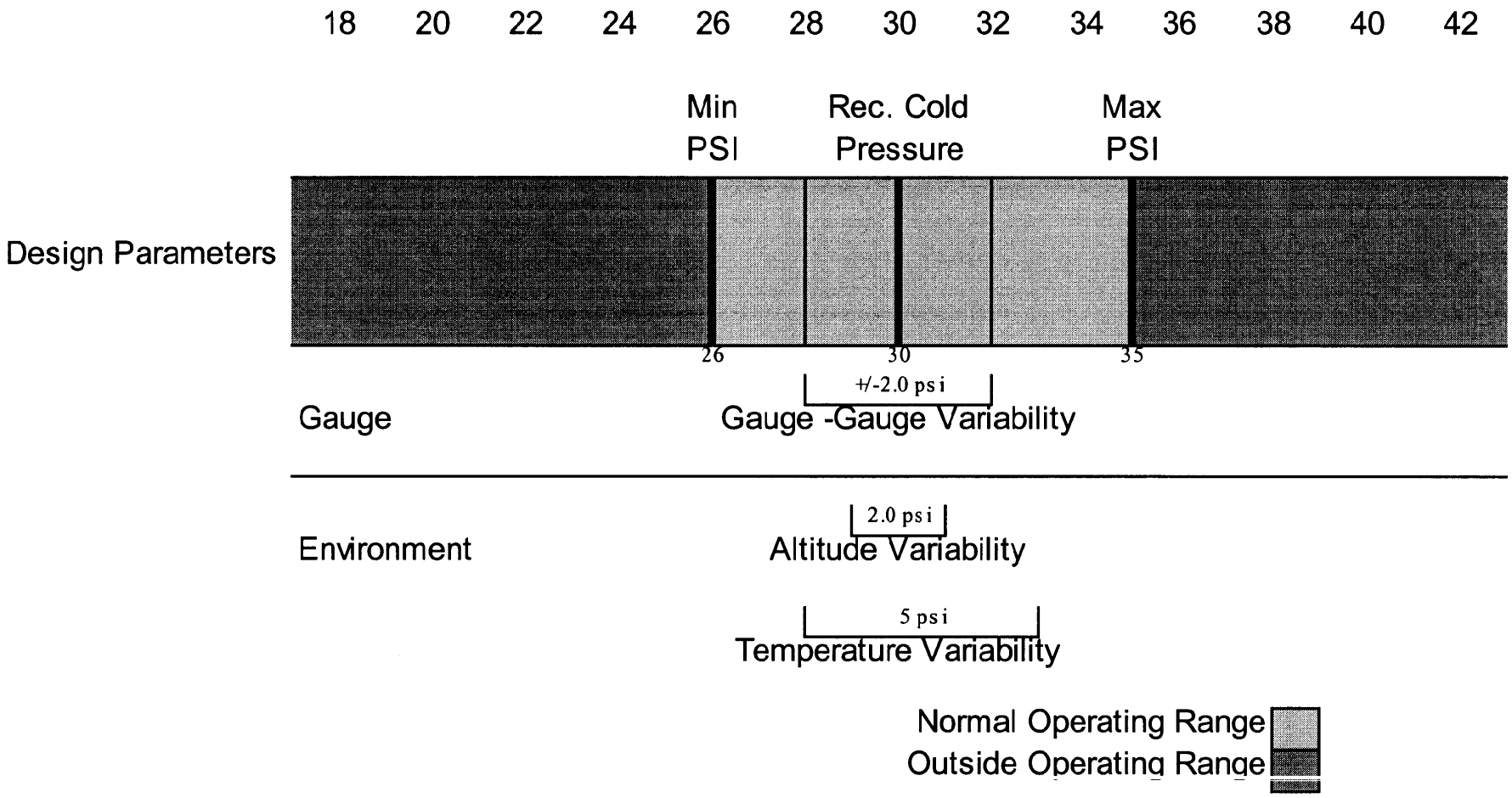
March 14, 2001

Proposal for new tire standards (schematic)



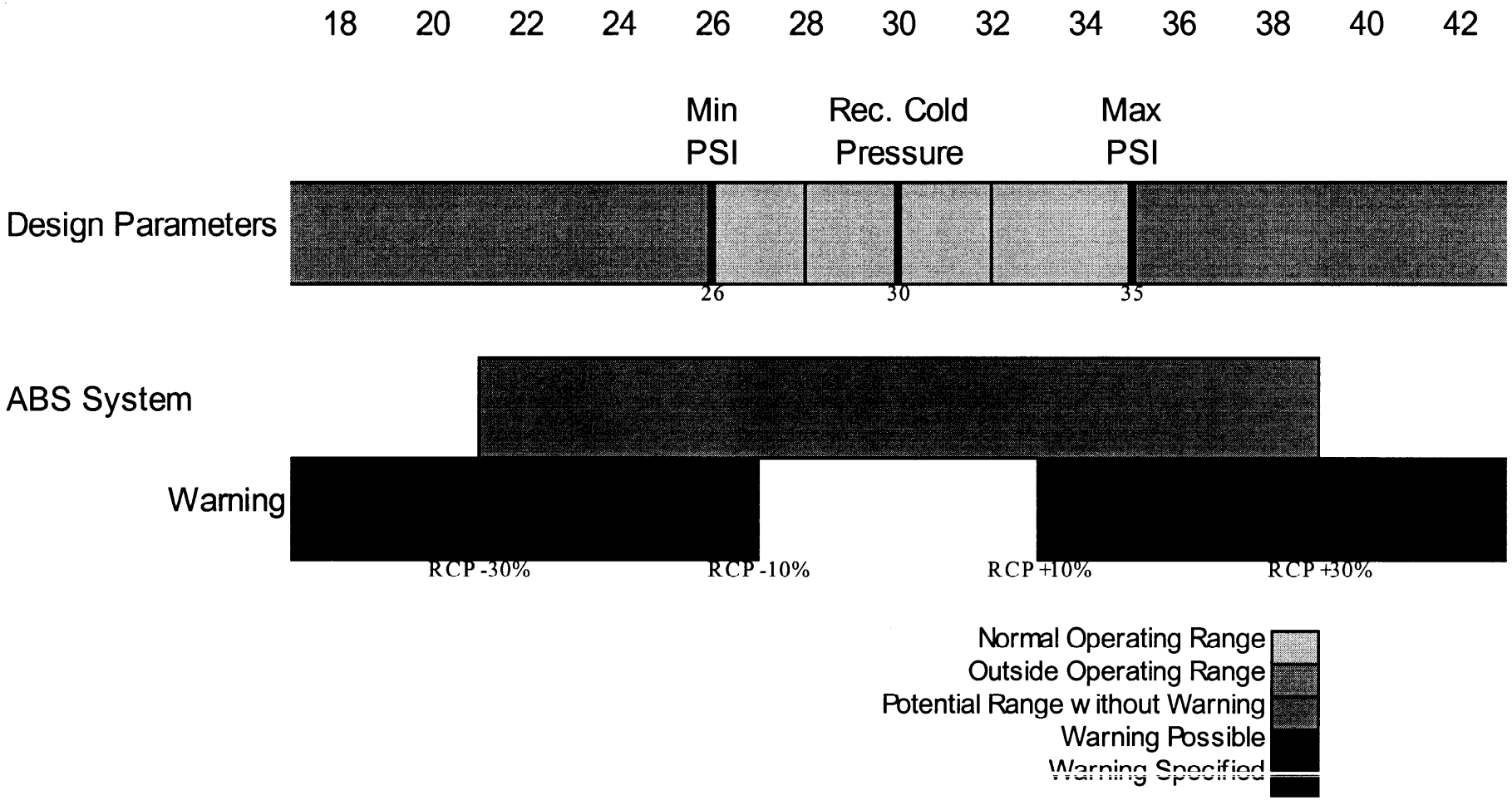
Tire Pressure Scenario

Variability of Pressure Set Point



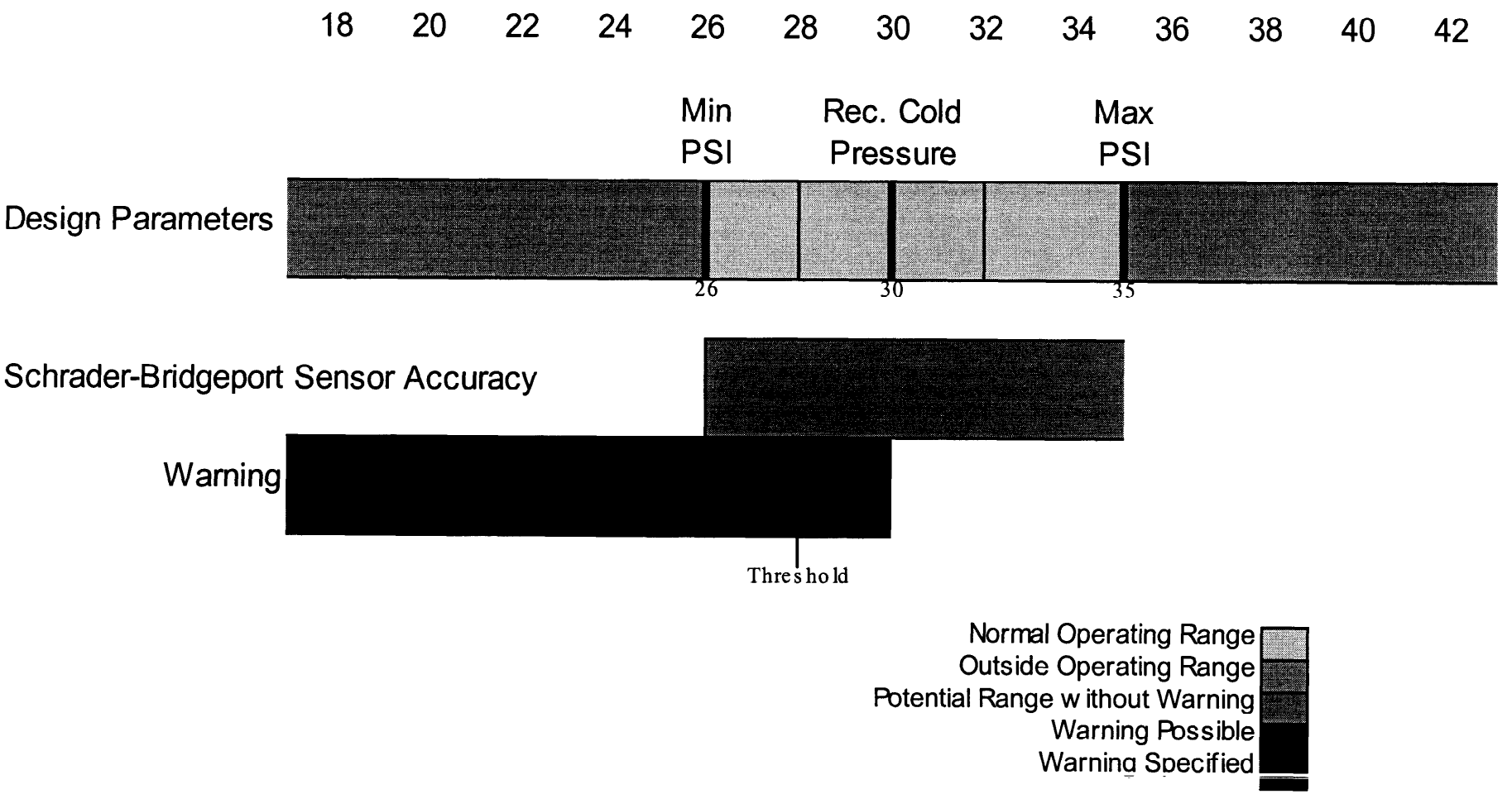
ABS Tire Warning

Single Tire Deflation



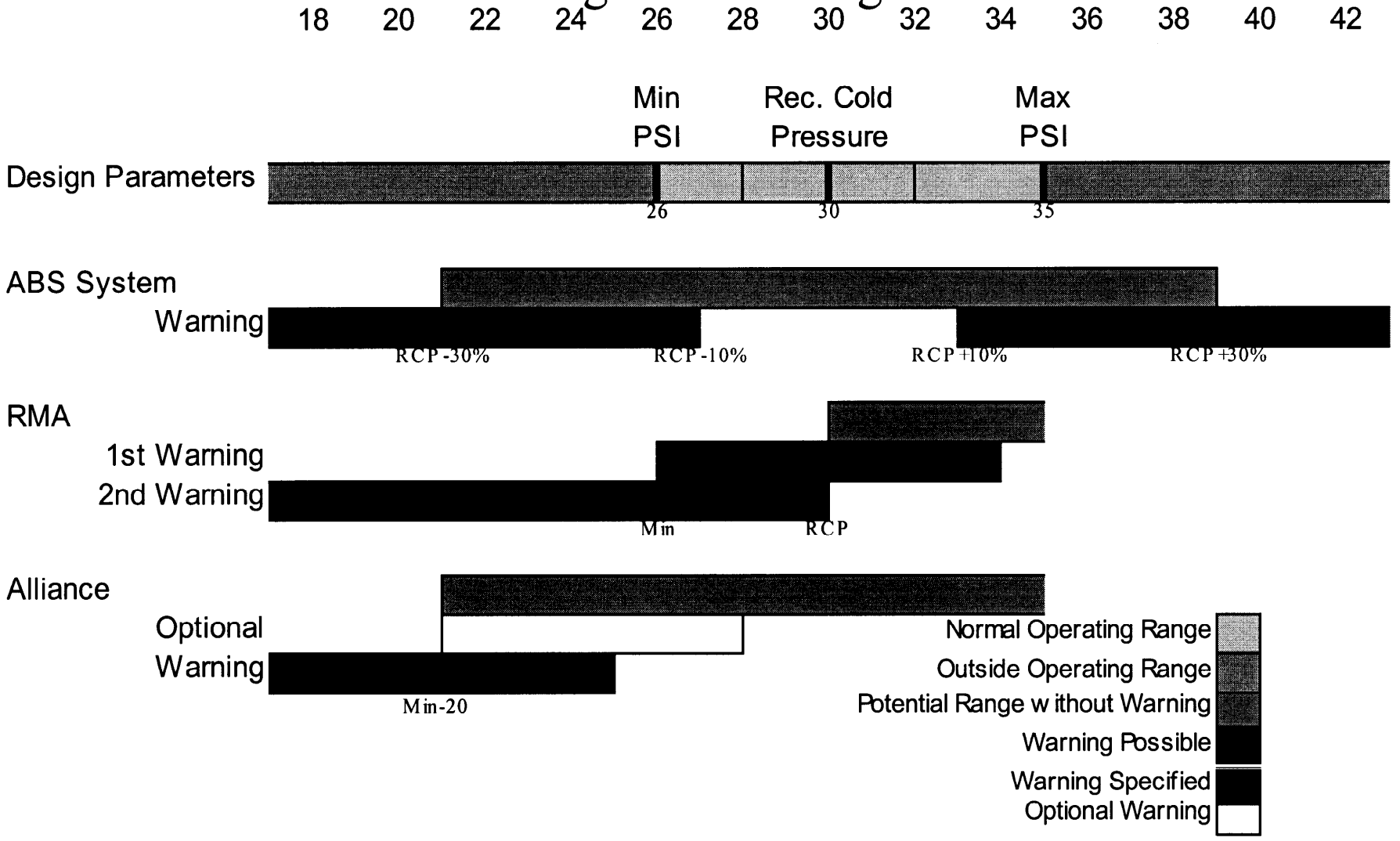
Tire Pressure Sensor

Single Tire Change



Scenario Warning Comparison

Single Tire Change



Tire Monitoring System

Recommended Design Specification

1. Warning Sensitivity

   Must give indication when any one tire has lost 30% or more from it's reset pressure and the vehicle has traveled a cumulative distance less than the greater of 5 miles or 5 minutes under the following conditions:

   |Lateral Acceleration| <= 0.05g

   |Longitudinal Acceleration| <= 0.05g

   Smooth Road

   32 Kph < Vehicle Speed < 129 Kph

Tire Monitoring System

Recommended Design Specification

2. Reset Function

   User must be notified when the reset is initiated by a flashing tire warning lamp (3 times @ 1 Hz) or message center display ("Tire Warn Reset").

   Must resume full sensitivity for all speed ranges after traveling a cumulative distance less than the greater of 20 miles or 20 minutes under nominal driving conditions.

   Must be able to perform reset when all tires are within 10% of recommended cold pressure for the vehicle.

Tire Monitoring System

Recommended Design Specification

3. False Warnings

   Shall not issue false warnings on all driving surfaces when tire pressures are close to nominal defined by:

   $$\max(0.9*RCP, Treset-5psi) <= Ti <= \min(1.1*RCP, Treset+5psi)$$

   where:

   Ti = Tire Pressure

   RCP = Recommended Cold Pressure

   Treset = Tire Pressure when system reset initiated

   psi = pounds per square inch

   max(a,b) = maximum value of 'a' and 'b'

   min(a,b) = minimum value of 'a' and 'b'

Tire Monitoring System

False Warning Test Procedure 1

	Procedure Description	Data	Acceptance Criteria
1	Adjust all tire pressure to RCP + 10%.	Tire pressures and temperatures.	
2	Initiate a reset and drive the required distance or time to complete reset.		
3	Drive a minimum of 20 cumulative miles under nominal driving conditions.	Record tire warning system performance data.	No warnings issued.
4	Decrease tire pressure in one tire to the maximum of RCP - 10% or reset pressure - 5psi.	Record tire pressures for all tires.	
5	Drive a minimum of 20 cumulative miles under nominal driving conditions.	Record tire warning system performance data.	No warnings issued.

Tire Monitoring System

False Warning Test Procedure 2

	Procedure Description	Data	Acceptance Criteria
1	Adjust all tire pressure to RCP - 10%.	Tire pressures and temperatures.	
2	Initiate a reset and drive the required distance or time to complete reset.		
3	Drive a minimum of 20 cumulative miles under nominal driving conditions.	Record tire warning system performance data.	No warnings issued.
4	Increase tire pressure in one tire to the minimum of RCP + 10% or reset pressure + 5psi.	Record tire pressures for all tires.	
5	Drive a minimum of 20 cumulative miles under nominal driving conditions.	Record tire warning system performance data.	No warnings issued.

Tire Monitoring System

False Warning Test Procedure 3

	Procedure Description	Data	Acceptance Criteria
1	Adjust all tire pressure to RCP.	Tire pressures and temperatures.	
2	Initiate a reset and drive the required distance or time to complete reset.		
3	Drive a minimum of 20 cumulative miles under nominal driving conditions.	Record tire warning system performance data.	No warnings issued.
4	Increase tire pressure in one tire to the minimum of RCP + 10% or reset pressure + 5psi.	Record tire pressures for all tires.	
5	Drive a minimum of 20 cumulative miles under nominal driving conditions.	Record tire warning system performance data.	No warnings issued.
6	Decrease tire pressure in one tire to the maximum of RCP - 10% or reset pressure - 5psi.	Record tire pressures for all tires.	
7	Drive a minimum of 20 cumulative miles under nominal driving conditions.	Record tire warning system performance data.	No warnings issued.

Tire Monitoring System

Warning Sensitivity Test Procedure 1

	Procedure Description	Data	Acceptance Criteria
1	Adjust all tire pressure to RCP + 10%.	Tire pressures and temperatures.	
2	Initiate a reset and drive the required distance or time to complete reset.		
3	Drive a minimum of 5 cumulative miles or 5 minutes under nominal driving conditions.	Record tire warning system performance data.	No warnings issued.
4	Decrease tire pressure in one tire to the maximum of RCP - 10% or RCP + 10% - 5 psi.	Record tire pressures for all tires.	
5	Drive a minimum of 5 cumulative miles or 5 minutes under nominal driving conditions.	Record tire warning system performance data.	No warnings issued.
6	Decrease the pressure in one tire to RCP - 20%.	Record tire pressures for all tires.	
7	Drive a minimum of 5 cumulative miles or 5 minutes under nominal driving conditions.	Record tire warning system performance data.	Warning issued within 5 miles or 5 minutes. (8 & 9 not required if issued in less than 3 miles or 3 minutes.
8	Decrease the pressure in one tire to RCP - 40%.	Record tire pressures for all tires.	
9	Drive a minimum of 3 cumulative miles or 3 minutes under nominal driving conditions.	Record tire warning system performance data.	Warning issued within 3 miles or 3 minutes.

Tire Monitoring System

Warning Sensitivity Test Procedure 2

	Procedure Description	Data	Acceptance Criteria
1	Adjust all tire pressure to RCP - 10%.	Tire pressures and temperatures.	
2	Initiate a reset and drive the required distance or time to complete reset.		
3	Drive a minimum of 5 cumulative miles or 5 minutes under nominal driving conditions.	Record tire warning system performance data.	No warnings issued.
4	Decrease tire pressure in one tire to the maximum of RCP - 40%.	Record tire pressures for all tires.	
5	Drive a minimum of 5 cumulative miles or 5 minutes under nominal driving conditions.	Record tire warning system performance data.	Warning issued within 5 miles or 5 minutes. (6 & 7 not required if issued in less than 3 miles or 3 minutes.
6	Decrease the pressure in one tire to RCP - 60%.	Record tire pressures for all tires.	
7	Drive a minimum of 3 cumulative miles or 3 minutes under nominal driving conditions.	Record tire warning system performance data.	Warning issued within 3 miles or 3 minutes.