Understanding Global Tire Regulations

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<td>Goals</td>
<td>U.S. will refer to the standard: US FMVSS 109 (U.S. for remainder of presentation)</td>
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<tr>
<td>Goals</td>
<td>Presentation does not provide details of the various procedures</td>
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- **Procedure**
  - Dimensional Tests
  - Endurance Tests
  - Tire Strength Tests
  - High Speed Tests
  - Bead Unseating Tests
  - Additional Tests
  - Conclusions
Dimensions – Section Width Grouping

U.S., Australia, Gulf, Malaysia, Japan, ECE, Peru, Russia

Take the average of 4 points, 180 kPa, 23 ±2 °C
Peru, China

6 points measured

U.S. Australia, Gulf, Malaysia, Japan, ECE, Peru, Russia

Take the average of 6

Australia, U.S., Malaysia, Gulf

170 kPa, 23 ±2 °C

6 points measured

U.S. Australia, Gulf, Malaysia, Japan, ECE, Peru, Russia

Take the average of 6

Australia, U.S., Malaysia

180 kPa

29 - 38 °C

Australia, Malaysia

23 ±2 °C

S = S₁ + k(A - A₁)

Tolerance = ± 3.5% for non M+S
Tolerance = ± 4.5% for M+S

Japan, ECE, Russia

Measure 6 points and use an Equation to get Section Width, 23 ±2 °C

U.S.

23 ±2 °C

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Dimensions – Overall Width Grouping

4 points measured, average, 180 kPa, 23 ±2 °C

Indonesia, China

6 points measured

U.S., Australia, Gulf, Malaysia, Japan, ECE, Peru, Russia, Brazil, India, Mexico

Takes the maximum

Brazil, ECE, Russia, Gulf, India, Japan

170 kPa, 23 ±2 °C

Brazil, ECE, Russia, India, Japan

180 kPa, 23 ±2 °C

Australia, Malaysia, Mexico

180 kPa, 23 ±2 °C

US

180 kPa, 29-38 °C

Tolerance = ± 3.5% for non M+S (+8mm for tires with protective rib)

Tolerance = ± 4.5% for M+S
Dimensions – Diameter Grouping

- U.S., Australia, Gulf, Malaysia, Japan, ECE, Peru, Russia, Brazil, India, Mexico, China, Indonesia
  - Divide the circumference by 3.1416
  - Tolerance = ± 1%

- U.S., Australia, Malaysia, Japan, ECE, Peru, Russia, Brazil, India, Mexico, China, Indonesia
  - 170 kPa, 23 ±2 °C

- U.S., Japan, ECE, Russia, China, Indonesia
  - 23 ±2 °C

- Australia, Malaysia, Japan, ECE, Peru, Russia, Brazil, India, Mexico, China, Indonesia
  - 180 kPa
  - 29-36 °C
Tire Endurance Test Procedure Grouping

- China, U.S., Australia, Mexico, India, Indonesia, Japan, Malaysia, Peru
  - Speed 80 km/h at 100%, 110% and 115% load, 170 kPa
  - Gulf
  - Speed 120 km/h or 110 km/h for winter tires, 180 kPa
- China, Australia, India, Indonesia, Japan, Mexico, Peru, Malaysia, US FMVSS 109
- China, Australia, India, Indonesia, Japan, Mexico, Peru, Malaysia, US FMVSS 109
- Speed 81 km/h
  - If do not pass

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Tire Strength Procedure Grouping

- **Gulf**
  - Inflation Pressure: 170 kPa
  - Number of Measurements: 5

- **Indonesia**
  - Number of Measurements: 4 (may be able to increase the number)

- **U.S., China, Australia, India, Indonesia, Japan, Malaysia, Mexico, Peru**
  - Inflation Pressure: 180 kPa
  - Number of Measurements: 5
  - Test must result with at least 1 casing failure
  - Testing does not require casing failure
High Speed Procedure Grouping

China, U.S 109, U.S. 139, ECE, Australia, Brazil, Gulf, India, Indonesia, Japan, Malaysia, Mexico

ECE Similar Regulations

China, ECE, Australia, Brazil, India, Indonesia, Japan

Without extra step @ SSY

ECE, Australia, Brazil, India

With extra step @ SSY

China, Indonesia, Japan

US FMVSS Similar Regulations

Speed Steps of 140, 150 and 160 km/h at 85% load

Gulf, Malaysia, Mexico, U.S. 109

Speed Steps of 120, 130 and 140 km/h

Gulf, Malaysia, Mexico, U.S. 109

Extra Steps for Higher Speed Rated Tires

Speed Steps of 120, 130 and 140 km/h, 88% load, 220 kPa

Malaysia, Mexico, U.S. 109

No Extra Steps for Higher Speed Rated Tires

Speed Steps of 120, 130 and 140 km/h, 100% load, 210 kPa

Gulf

Speed Steps of 120, 130 and 140 km/h

Malaysia, U.S. 109

Extra Steps for Higher Speed Rated Tires

Mexico
### Bead Unseating Procedure Grouping

**4 Points Measured**
- India, Indonesia, Japan

**5 Points Measured**
- China (4 pt. min.), U.S., Australia, Gulf, Malaysia

- **Block A**
  - Indonesia, Japan

- **Block B**
  - India, Japan

- **Block C**
  - China, Mexico (10 mm longer), Australia

- 180 kPa

- China, U.S., Australia, Mexico

- 170 kPa, Block C

- Gulf

- U.S., Australia