ISO 15222:2011- Overview

Presented by Georges DIMITRI (ISO TC31/SC4-WG9 Chairman) for ISO/TC31 – Tyres, Rims and Valves

Geneva, 12 September 2011
ISO 15222 : Truck and bus tyres
Method for measuring relative wet grip performance - Loaded new tyres

PROGRESSION

- New Project Approved mid-2007
- Committee Draft Approved Quarter 3/2009
- DIS Ballot Approved Unanimously September 2010
- Publication: Expected End of August 2011
ISO 15222 : Truck and bus tyres -- Method for measuring relative wet grip performance -- Loaded new tyres

- **SCOPE**
  - Specifies the method for measuring relative wet grip braking performance index to a “reference tyre” under loaded conditions for new tyres.
  - Applies to all truck and bus tyres (C2 & C3 tyre categories) on a defined wet-paved surface and conditions.
  - Method designed to reduce variability – Use of a reference tyre is necessary to limit variability of testing method procedures.
ISO 15222  METHOD WET GRIP Truck & Buses

Principle of the Test Method

- Relative performance test procedure
  - A candidate tyre is compared to a reference tyre using either a:
    - standard vehicle
    - or an analytical vehicle (trailer)

- Reference Tyre sizes
  - 3 specified ASTM reference tyre sizes:
    - 315/70R22.5  \(\rightarrow\) LARGE C3 tyre category
    - 245/70R19.5  \(\rightarrow\) NARROW C3 tyre category
    - 225/75 R16 C  \(\rightarrow\) ALL C2 tyre category
### Reference tyres ➔ 3 ASTM produced by Michelin

#### SRTT for C3 tyres ➔ 2 Families

<table>
<thead>
<tr>
<th>C3 NARROW FAMILY</th>
<th>C3 WIDE FAMILY</th>
</tr>
</thead>
<tbody>
<tr>
<td>$S_{\text{Nominal}} &lt; 285 \text{ mm}$</td>
<td>$S_{\text{Nominal}} \geq 285 \text{ mm}$</td>
</tr>
<tr>
<td>ASTM F 2871 SRTT</td>
<td>ASTM F 2870 SRTT</td>
</tr>
<tr>
<td>245/70R19.5</td>
<td>315/70R22.5</td>
</tr>
</tbody>
</table>

#### SRTT for C2 tyres ➔ (Rim Codes ≤ 17)

| ASTM F 2872 SRTT 225/75 R 16 C |

$S_{\text{Nominal}} = \text{Tyre Nominal Section width}$
ISO 15222 TECHNICAL SPECIFICATIONS

• The test is performed under loaded conditions on wet asphalt.

• Two options can be used Similar to ISO23671(C1 category tyres) :
  • Truck Vehicle test
    The Average Deceleration (AD) is measured
    Wet Grip Index “G” = AD(Candidate tyre) / AD(Reference tyre)
  • Trailer (or analytical vehicle) test
    The Peak Braking Force Coefficient is measured
    Wet Grip Index “G” = pbfc(Candidate tyre) / pbfc(Reference tyre)

• Boundary conditions windows (in terms of Track surface, Wet temperature, Load…) were introduced to let the test be feasible and repeatable.
ISO 15222 METHOD WET GRIP Truck & Buses

- APPROVED TESTING OPTIONS

a) Using a standard truck

b) Using a Trailer or Analytical Vehicle

UMTRI

Analytical Vehicule
ISO 15222 TECHNICAL SPECIFICATIONS

Braking distance → Av. Deceleration

\[ AD = \frac{S_f^2 - S_i^2}{2d} \]

Where \( d \) (m) is the distance covered between the initial speed \( S_i \) (m/s) and the final speed \( S_f \) (m/s).

\[ \mu(t) = \frac{f_h(t)}{f_v(t)} \]

\( \mu(t) \) = dynamic tyre braking force coefficient in real time, 
\( f_h(t) \) = dynamic braking force in real time, N 
\( f_v(t) \) = dynamic vertical load in real time, N
## TYRE CONFIGURATIONS

### 3 CONFIGURATIONS

- **C1**: standard configuration to be used every time it is possible.
- **C2 & C3**: permitted when C1 is not possible (wide single, ...). A correction factor is used to take into account the load transfer and the braking force share between the 2 axles.

<table>
<thead>
<tr>
<th></th>
<th>Reference case</th>
<th>Candidate case</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C1</strong></td>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>C2</strong></td>
<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>C3</strong></td>
<td><img src="image5" alt="Diagram" /></td>
<td><img src="image6" alt="Diagram" /></td>
</tr>
</tbody>
</table>

- **Reference tyre**  
- **Candidate tyre**
**ISO 15222 TECHNICAL SPECIFICATIONS**

**USE OF A CONTROL TYRE**  (same as for C1 category tyres in R117)

For the 3 reference tyres, allows the use of one control tyre to deal with the fitment of different tyre sizes

Principle \((Test/Reference) = (Test/Control) \times (Control/Reference)\)

<table>
<thead>
<tr>
<th>Référence Tyre</th>
<th>Control Tyre</th>
<th>Test Tyre</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct</strong></td>
<td><img src="image1.png" alt="Image" /> <img src="image2.png" alt="Image" /> <img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>Indirect</strong></td>
<td><img src="image5.png" alt="Image" /> <img src="image6.png" alt="Image" /> <img src="image7.png" alt="Image" /></td>
<td><img src="image8.png" alt="Image" /></td>
</tr>
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ADR – 2011-08
### What is the same between ISO 15222 vs. ISO 23671

(Wet test procedure in R117 for C1 tyres)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Trailer Method</th>
<th>Vehicle Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BPN</strong></td>
<td>50±10</td>
<td>(after temperature correction &amp; measured 5 times every 10 m)</td>
</tr>
<tr>
<td><strong>Wet Temp.</strong></td>
<td>5°C - 35°C for all tyres</td>
<td>Temperature variation during the test shall not exceed 10 °C.</td>
</tr>
<tr>
<td><strong>Load</strong></td>
<td>75+/− 5% of LI</td>
<td>Others: 60-100% of LI (60 ±90% for C1)</td>
</tr>
<tr>
<td><strong>Brake force</strong></td>
<td>Peak should be achieved 0.2 ±1 sec</td>
<td>ABS</td>
</tr>
<tr>
<td><strong>INDEX</strong></td>
<td>Obtained from at least 6 pbfc (peak braking force coefficient)</td>
<td>Obtained from AD (Average Deceleration) from at least 6 repetitions (3 for SRTT are enough)</td>
</tr>
</tbody>
</table>
What is different than the current ISO 23671*
(Wet test procedure in R117 for C1 tyres)

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<th>Parameter</th>
<th>Trailer Method</th>
<th>Vehicle Method</th>
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<tbody>
<tr>
<td>Water depth</td>
<td>0.5-2.0mm (\Leftrightarrow (0.5-1.5 \text{ mm for C1}))</td>
<td>0.5-2.0mm (\Leftrightarrow (0.5-1.5 \text{ mm for C1}))</td>
</tr>
<tr>
<td>Speed</td>
<td>50km/h +/- 2km/h (65km/h for C1)</td>
<td>60-20km/h, ABS-brake with clutch-off (\text{for C1 80-20km/h, ABS-brake with clutch-off})</td>
</tr>
<tr>
<td>Inflation</td>
<td>Constant deflection: Vertical load at 75+/-.5% of LI (\text{C1: 180kPa for normal &amp; 220kPa for reinforced})</td>
<td>Constant deflection: Vertical load range 75 (\Leftrightarrow 100%\text{LI}) Constant pressure for vertical load range 60-75% LI (220\text{ kPa for C1})</td>
</tr>
<tr>
<td>Pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment</td>
<td>Trailer / Analytical vehicle (\text{for C1 lower load capability needed})</td>
<td>Standard full truck 4x2 model commercial vehicle, with 2 axles and equipped with ABS (\text{C1: M1 vehicle, with min speed of 90km/h &amp; ABS})</td>
</tr>
</tbody>
</table>

* ISO 23 671 Passenger cars : Method for measuring relative wet grip performance — Loaded tyres
ISO 15222:2011- Overview

THANK YOU

Presented for ISO/TC31 – Tyres, Rims and Valves by Georges DIMITRI - ISO TC31/SC4-WG9 Chairman

Geneva, 12 September 2011