Evaluation of type approval possibilities for “AT” Tyres
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What are “AT” tyres?
On what vehicles are AT Tyres installed?

Recreational use (EU category L7eB) mostly in terrain, where necessary also on paved road.

\[ V_{\text{max}}: 90\text{km/h (Quad) or } <15\text{ kW (SbS)} \]
# L6 and L7 category

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>On Road Quad</td>
<td>On Road Quad</td>
<td>All Terrain Quad</td>
<td>Side-by-Side Buggy</td>
<td>Quadri-Mobile: Utility</td>
<td>Quadri-Mobile: Passenger</td>
</tr>
</tbody>
</table>

Only these use AT Tyres
On what vehicles are AT Tyres installed?

Utility use in Agriculture/Forestry (EU category T), almost always in terrain, some paved road use (similar to tractor use). $V_{\text{max}}$: some $>80$ km/h

Sales in EU: 60000/year
Typical markings on AT tyres

Marking of both sides shown.

Note the “Not for Highway Use” = NHS. This marking is important for USA as ATV and SbS are not “highway” vehicles (not covered by NHTSA). US “Highway” is to be understood as “public road”
AT tyres in the market

<table>
<thead>
<tr>
<th>Tyre Size</th>
<th>Load Index</th>
<th>Speed Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>25x8-12</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>25x10.00-12 J</td>
<td>38</td>
<td>J</td>
</tr>
<tr>
<td>25x9.50-12</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>22x8.00-10 J</td>
<td>24</td>
<td>J</td>
</tr>
<tr>
<td>24x8.00-11 J</td>
<td>29</td>
<td>J</td>
</tr>
<tr>
<td>24x8.00-12 J</td>
<td>28</td>
<td>J</td>
</tr>
<tr>
<td>25x8.00-12 J</td>
<td>31</td>
<td>J</td>
</tr>
<tr>
<td>24x9.00-11 J</td>
<td>33</td>
<td>J</td>
</tr>
<tr>
<td>24x10.00-11 J</td>
<td>36</td>
<td>J</td>
</tr>
<tr>
<td>25x10.00-12 J</td>
<td>38</td>
<td>J</td>
</tr>
<tr>
<td>22x11.00-9 J</td>
<td>36</td>
<td>J</td>
</tr>
</tbody>
</table>

The ATV tyre is an ideal choice for farmers looking to upgrade their stock ATV tyres. The has proven very popular with hill farmers who need the extra traction to pull up muddy hills, especially if towing.

Ideal for Local Authority and agricultural machines where road use between sites is often necessary. The features aggressive style lugs for superior traction. Speed index rating J [62 mph/100 kph].

E-marked street legal.
AT tyres in the market

- Perfect tire for utility quad rider looking for more performance.
- Aggressive tread pattern, based off the legendary, combined with radial construction breaks the barrier between sport and utility tires.
- Lightweight design reduces steering effort for quick handling.
- Radial construction offers incredible traction and bump absorption.

<table>
<thead>
<tr>
<th>Tire Size</th>
<th>Part Number</th>
<th>Ply Rating (PR)</th>
<th>Overall Diameter (inch)</th>
<th>Section Width (inch)</th>
<th>Rim Size (inch)</th>
<th>Tire Press. (PSI)</th>
<th>Load (lbs)</th>
<th>Tread Depth (inch)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT22x11.00-9</td>
<td>TM16642500</td>
<td>6</td>
<td>25.0</td>
<td>7.6</td>
<td>12x6.0</td>
<td>7</td>
<td>290</td>
<td>16/32</td>
<td>15.7</td>
</tr>
<tr>
<td>AT20x11.00-9</td>
<td>TM16679500</td>
<td>6</td>
<td>26.0</td>
<td>8.9</td>
<td>12x7.0</td>
<td>7</td>
<td>410</td>
<td>16/32</td>
<td>17.4</td>
</tr>
<tr>
<td>AT20x11.00-10</td>
<td>TM16771000</td>
<td>6</td>
<td>26.2</td>
<td>8.7</td>
<td>14x7.0</td>
<td>7</td>
<td>410</td>
<td>18/32</td>
<td>19.2</td>
</tr>
<tr>
<td>AT22x11.00-10</td>
<td>TM16681000</td>
<td>6</td>
<td>25.0</td>
<td>12.5</td>
<td>12x8.0</td>
<td>7</td>
<td>365</td>
<td>18/32</td>
<td>18.3</td>
</tr>
<tr>
<td>AT26x9R12</td>
<td>TM16631600</td>
<td>6</td>
<td>26.0</td>
<td>10.6</td>
<td>12x8.0</td>
<td>7</td>
<td>480</td>
<td>18/32</td>
<td>20.3</td>
</tr>
<tr>
<td>AT26x9R14</td>
<td>TM16665100</td>
<td>6</td>
<td>26.2</td>
<td>10.6</td>
<td>14x8.0</td>
<td>7</td>
<td>460</td>
<td>20/32</td>
<td>23.3</td>
</tr>
</tbody>
</table>
How have AT Tyres been approved?

- AT tyres have been covered in Regulation 106 since the beginning and are still covered there. They are included in “Agricultural High Flotation Tyres”. Most recent tyre sizes are not in the list.

- As Regulation 106 is limited in speed to 65 km/h, approvals for AT tyres installed on vehicles that go faster than 65 km/h (approved as L6, L7, M or N) have been given according to Regulations 30, 54 and 75.

- As the EU recognises type approval of vehicles with AT tyres in both L and T frameworks with speeds up to 90 km/h, a vacuum exists for AT tyres above 65 km/h.
What are the options?

• All tyre Regulations (R30, R54, R75, R106) allow for safe use of tyres in general on road.

• Tests of tyres in the Regulations focus on either speed with lower load (R30, R75) or on load with lower speed (R54, R106). This reflects the application of the vehicles: fast, paved surface use versus slower, loaded use or terrain use

• Tyres mounted on ATV and SbS are “AT” tyres that are already covered in Regulation 106 and their main purpose is terrain use
Limitations in Regulations 75 and 106

**Regulation 75**
This Regulation applies to new pneumatic tyres for vehicles of category L1, L2, L3, L4 and L5. However, it does not apply to tyre types designed exclusively for the "off-road" use, which are marked "NHS" (Not for Highway Service)...

AT Tyres are **not** included

Tyres for trailers are **not** included

**Regulation 106**
This Regulation covers new pneumatic tyres designed primarily, but not only, for agricultural and forestry vehicles (power-driven vehicles in category T), agricultural machines (power-driven and trailed) and agricultural trailers, and identified by speed category symbols corresponding to speeds of 65 km/h (speed symbol "D") and below.

AT Tyres are **included**

Tyres for trailers are **included**
Different approaches for tests

Regulation 30 and 75

• Load/speed test:
  65% of max load rating, (test drum 1,7m Ø) starting @ 40 km/h less than speed category up to max speed rating-10 km/h, in steps of 10 km/h with each step taking 10 minutes. Total 1 hour.

• Dynamic growth for R 75 only

Regulation 54 and 106

• Load/speed test for R106: up to 101% of max load rating for 7+16+24 hours (test drum 1,7m Ø)
  20 km/h = 62,5 rpm for D

• Same approach used for load/speed test in R54
  32 km/h = 100 rpm for F
  40 km/h = 125 rpm for G
  48 km/h = 150 rpm for J

• Burst test for R106 only
What parts from R54 can apply to AT tyres in R106?

• **Scope:**
  This Regulation covers new pneumatic tyres designed primarily, but not only, for vehicles in categories M2, M3, N and O3 and O4. However, it does not apply to tyre types identified by speed category symbols corresponding to speeds below 80 km/h.

• **Load/speed test:**

<table>
<thead>
<tr>
<th>Load index</th>
<th>Tyre speed category</th>
<th>Test-drum speed Radial-ply min⁻¹</th>
<th>Load placed on the wheel as a percentage of the load corresponding to the load index</th>
</tr>
</thead>
<tbody>
<tr>
<td>121 or less</td>
<td>F</td>
<td>100</td>
<td>7 h. 66 %, 16 h. 84 %, 24 h. 101 %</td>
</tr>
<tr>
<td></td>
<td>G</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td></td>
<td>J</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td></td>
<td>K</td>
<td>175</td>
<td></td>
</tr>
</tbody>
</table>

• **R 54 and R106 tests for load/speed are identical and R 106 can be extended with data from table in R54**

• **Note:** speed category E is not covered in 106 and also not in R54
What changes are necessary to cover AT tyres up to 90 km/h?

**In Regulation 75**

- Extend the scope to L6 + L7: AT tyres are installed on only a small part of vehicles in L6 + L7. What about other vehicles in L6+L7?
- Delete exemption “NHS”: Nobody checked if such tyres can comply. repercussions for USA market?
- Create new category for “AT” with dimensions and tyre size designations that do not fit the R75 approach
- Need to introduce new tests, taken from R 106 that do not fit the R75 approach

**In Regulation 106**

- Extend the scope [for AT Tyres] to 90 km/h
- Extend the load/speed test [for AT tyres] to 90 [or 100] km/h (copy from R54)
Conclusion

- Extending the scope of R106 to include AT tyres with Speed Index up to G [or J] is a simple copy/paste exercise, using the load speed requirements from R54.

- Extending the scope of R75 with new vehicle types and introducing new types of tests requires more time to study the consequences.