

Evaluation of type approval possibilities for “AT” Tyres



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What are “AT” tyres?



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On what vehicles are AT Tyres installed?

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

V_{\max} : 90km/h (Quad) or <15 kW (SbS)



L6 and L7 category

L7e-A1	L7e-A2	L7e-B1	L7e-B2	L7e-CU	L7e-CP
					

On Road
Quad

On Road
Quad

All Terrain
Quad

Side-by-Side
Buggy

Quadri-
Mobile:
Utility

Quadri-
Mobile:
Passenger

Only these use AT Tyres

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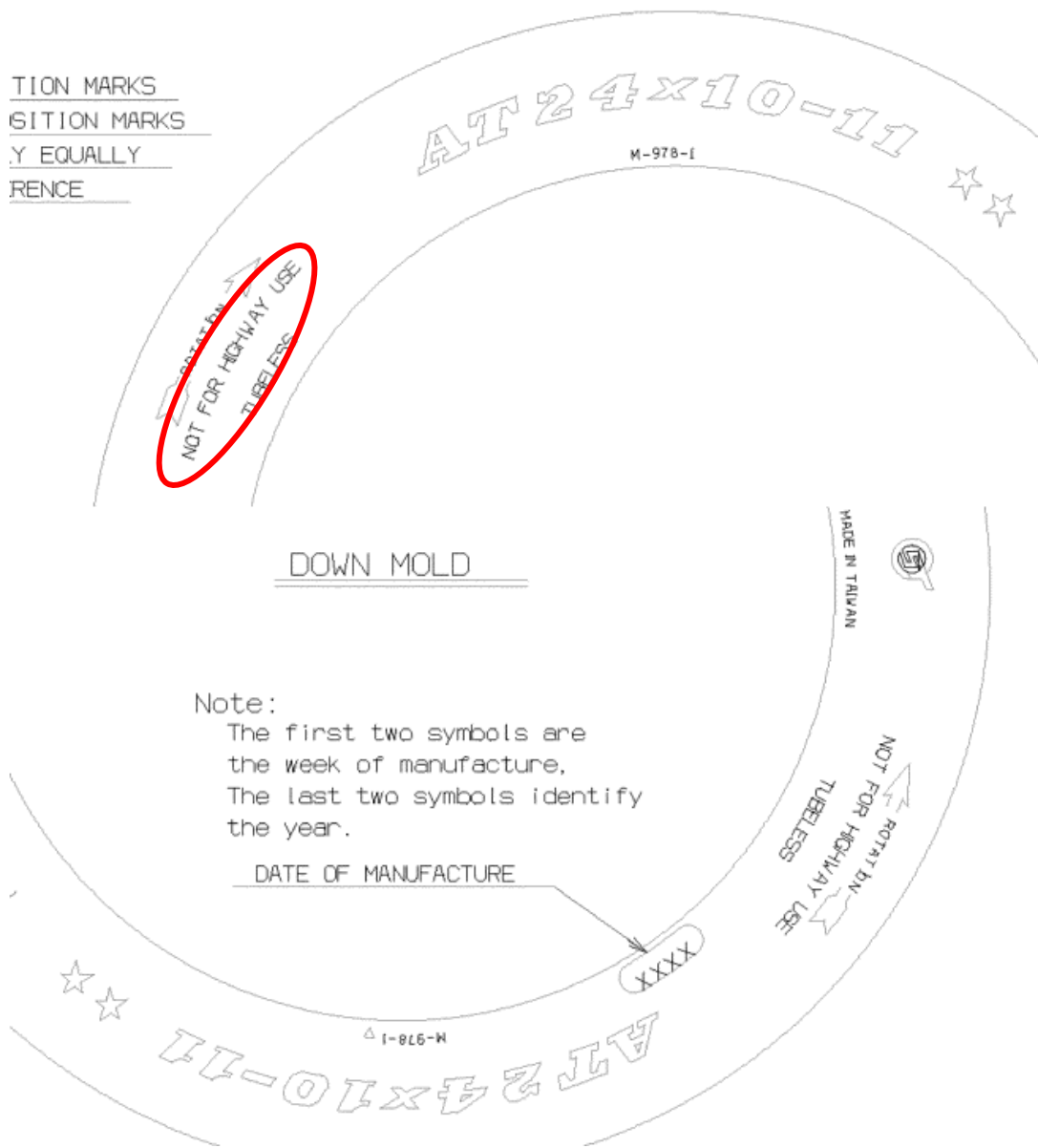
On what vehicles are AT Tyres installed?

Utility use in Agriculture/Forestry (EU category T), almost always in terrain, some paved road use (similar to tractor use). V_{\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”

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AT tyres in the market



Tyre Size	Load Index	Speed Rating
25x8-12		N
25x10.00-12 J	38	J

Tyre Size	Load Index	Speed Rating
25x9.50-12		N
		N

E-marked street legal.

Tyre Size	Load Index	Speed Rating
22x8.00-10 J	24	J
24x8.00-11 J	29	J
24x8.00-12 J	28	J
25x8.00-12 J	31	J
24x9.00-11 J	33	J
24x10.00-11 J	36	J
25x10.00-12 J	38	J
22x11.00-9 J	36	J



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.

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AT tyres in the market

Tyre Size	Speed Rating
AT22x11.00-9	J
AT20x11.00-9	J
AT20x11.00-10	J
AT22x11.00-10	J

- 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.



Tire Size	Part Number	Ply Rating (PR)	Overall Diameter (inch)	Section Width (inch)	Rim Size (inch)	Tire Press. (PSI)	Load (lbs)	Tread Depth (inch)	Weight (lbs)
M925 Front									
AT25x8R12	TM16642500	6	25.0	7.6	12x6.0	7	290	16/32	15.7
AT26x9R12	TM16679500	6	26.0	8.9	12x7.0	7	410	16/32	17.4
AT26x9R14	TM16771000	6	26.2	8.7	14x7.0	7	410	18/32	19.2
M926 Rear									
AT25x10R12	TM16631600	6	25.0	9.3	12x7.5	7	365	18/32	18.3
AT26x11R12	TM16665100	6	26.0	10.6	12x8.0	7	480	18/32	20.3
AT26x11R14	TM16181000	6	26.2	10.6	14x8.0	7	460	20/32	23.3

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**.

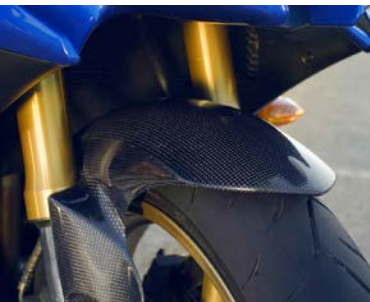
AT Tyres are included

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:

Load index	Tyre speed category	Test-drum speed		Load placed on the wheel as a percentage of the load corresponding to the load index		
		Radial-ply min^{-1}	Radial-ply km/h	7 h.	16 h.	24 h.
121 or less	F	100	32	66 %	84 %	101 %
	G	125	40			
	J	150	48			
	K	175	56			

- **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

Nominal overall diameter code		Nominal section width code	Tyre construction code	Nominal rim diameter code
23	x	10	-	10

- 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**.