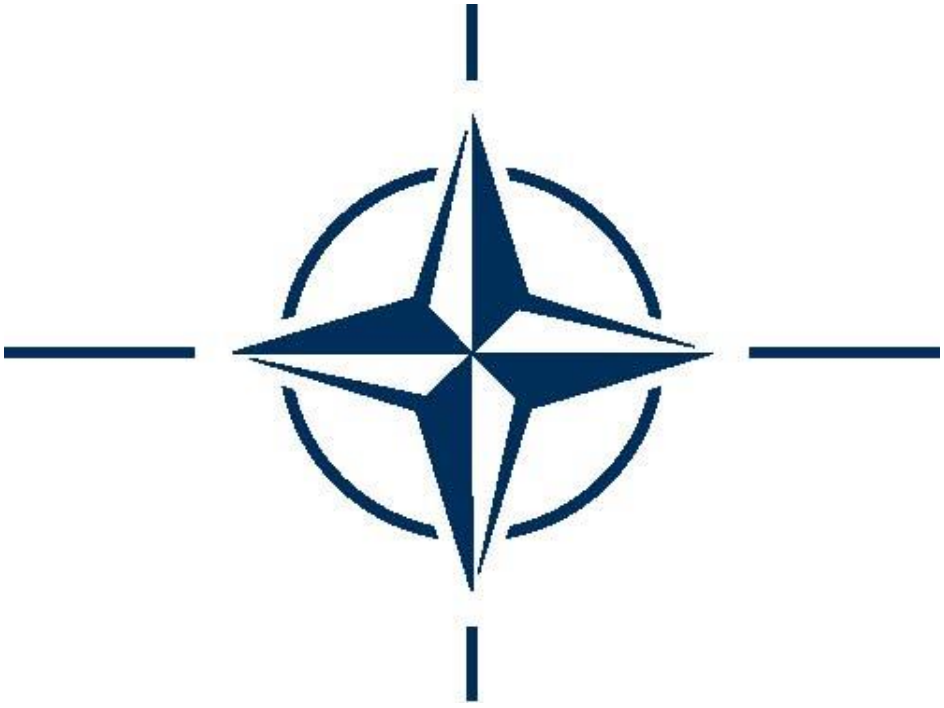
NATO STANDARD

AEP-4825

PROCEDURE FOR THE ASSESSMENT OF RUN-FLAT WHEELS FOR LAND VEHICLES

Edition A, Version 1

MAY 2021



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NATO LETTER OF PROMULGATION

18 May 2021

1. The enclosed Allied Engineering Publication AEP-4825, Edition A, Version 1, Procedure for the Assessment of Run-flat Wheels for Land Vehicles, which has been approved by the nations in the NATIONAL ARMY ARMAMENTS GROUP (NAAG), is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 4825.

2. AEP-4825, Edition A, Version 1, is effective upon receipt.

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4. This publication shall be handled in accordance with C-M(2002)60.

Zoltán GULYÁS
Brigadier General, HUNAF
Director, NATO Standardization Office

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RECORD OF RESERVATIONS

CHAPTER	RECORD OF RESERVATION BY NATIONS
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.	

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RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]
ITA	Italy will retain the right to execute different road tests (more intense or lighter) compared with the one indicated in the STANAG accordingly to the class of vehicle given that the current vehicles used by Italian Armed Forces, even recently produced, are qualified against FINABEL AGREEMENT NO. 20.A.5 which considers a lighter test. More in details, Italy retains the application of the procedure test foreseen at para “3.2 Driving Test” and propose to add an alternative profile (3km at 90km/h, 10km at 50km/h, 37 km at 25km/h for a total of 50 km). Moreover, Italy defines as optional the penetration of all run-flat wheels on one side of vehicles with more than two axles (para 2.2 “Vehicle”).
USA	Paragraph 3.2 specifies criteria for a driving test which includes traveling “3 km at maximum speed with a limit of 90 km/h.” Traveling 3 km at maximum speed would create an unsafe condition for certain large tactical vehicles. Recommend changing the test criteria to align with FINABEL Agreement no. A.20.A, which states “3 km at maximum escape speed to a maximum of 90 km/hr” or “3 km at a vehicle-designated maximum escape speed to a maximum of 90 km/hr.”
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.	

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CHAPTER 1 INTRODUCTION

1.1. AIM

The agreement on run-flat wheel testing procedure shall ensure that NATO communities will exploit and exchange national test results. Participating nations will ensure that suppliers of military vehicles will deliver run-flat wheels meeting the performance specifications in accordance with this test procedure.

This test procedure describes the assessment for analyzing run-flat performance. The assessment starts with preparation of the run-flat wheels and the vehicle, followed by a driving test.

1.2. DEFINITIONS

The term “Wheel” means the tire mounted on the rim.

The term “Run-flat Wheel” means the wheel with run-flat capability, e.g. thicker sidewalls or run-flat system.

The Term “Run-flat System” means a single or multi-piece system carrying the wheel load after the tire was deflated.

The term “Penetration” means all causes of damage that the vehicle tires are likely to be subjected to in a mission.

The term “CTIS” (Central Tire Inflation System) means the system installed in the vehicle that permits changes in tire pressure while the vehicle is stationary or moving without a member of the crew having to leave the vehicle.

1.3. MILITARY REQUIREMENTS FOR A RUN-FLAT WHEEL

A run-flat wheel must permit, despite penetrations or damages of the tire, the mobility of the vehicle for a predetermined period without the need to change the wheel.

The run-flat wheel must have the qualities as close as possible of a regular wheel and must meet the tire specification (e.g. load- / speed index) recommended for the vehicle to which it is mounted.

While the STANAG 4825 standard does not specify tire dimensions, it is required that the tires meet the same specification as the regular tires on the specified vehicle.

1.4. ASSESSMENT

To assess a run-flat wheel, the test must be carried out in accordance with the general conditions of this agreement. The assessment is only valid for the whole combination (rim, run-flat system, tire). If one of these parts is changed, the assessment will not be valid anymore.

The achieved performance of the run-flat wheel is related to the wheel-load of the tested vehicle configuration.

CHAPTER 2 TEST PREPARATION

2.1. RUN-FLAT WHEEL

The test tires should have at least 50% tread life remaining and should not be older than 60 months. Note: New tires are recommended.

It is also recommended to measure the difference in weight between the standard wheel assembly and the run-flat wheel.

The tires must be flattened for the driving test. The method of penetration is to shoot at the tires in order to simulate a combat flat. This method ensures that the run-flat system shows its functionality.

Ammunition 7.62 x 54R B32 API (v_{proof}: 834 to 874 m/s) or 7.62 x 51 AP WC core (v_{proof}: 910 to 950 m/s) shall be used for this purpose. Alternatively, the 7.62 mm ammunition concerning the protection level from STANAG 4569 AEP-55 Vol. 1 of the vehicle can be used.

Five rounds shall be fired into the side wall and two into the tire tread with crossing trajectories, in accordance with figure 1. It is recommended to hit the connection of the multi-piece run-flat system. Aiming marks should be attached to the tire. The impact can take place from the inside or from the outside of the tire.

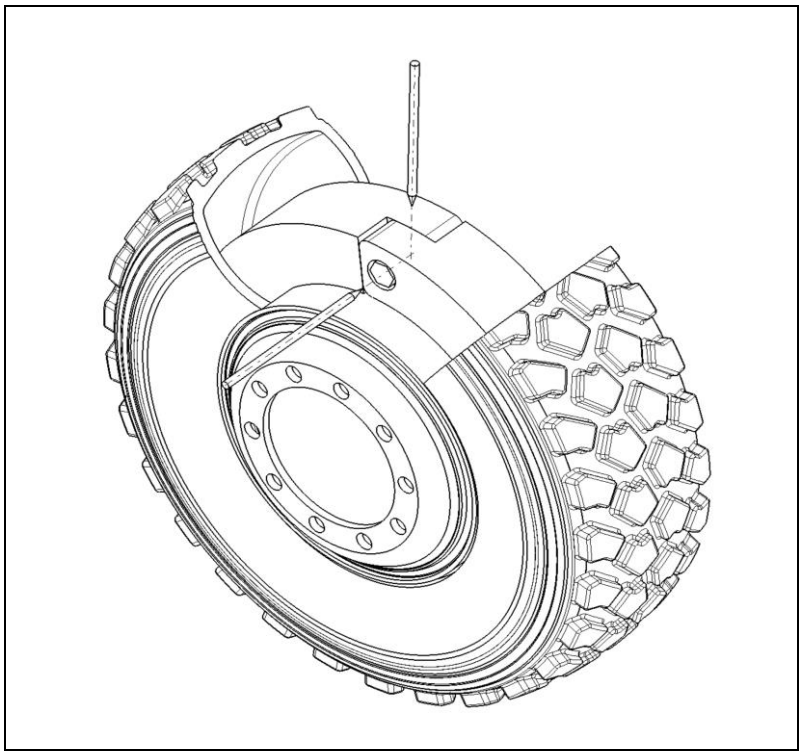

Figure 1: Puncturing of the wheel

2.2. VEHICLE

The vehicle has to be loaded to the maximum gross vehicle weight (combat weight). It is recommend measuring all axle and wheel loads.

For a two-axle vehicle the run-flat wheel with the highest load should be penetrated. If dual tires are mounted, both on one side have to be penetrated. In case of a vehicle with more than two axles, all the run-flat wheels on one side of the vehicle should be penetrated. All penetrated run-flat wheels must have the same configuration (e.g. tire, run-flat system, rim).

Tires which have not been flattened should have the normal tire inflation pressure. If the vehicle is fitted with a CTIS the test will be carried out without using the CTIS.

As far as possible, the vehicle operator should not engage the transfer lock or differentials. In case of vehicles fitted with servo suspension, the test will be carried out using the most adverse configuration.

Proof marks have to be placed on the penetrated run-flat wheels to establish the degree of rotation between tire and rim during the driving test.

CHAPTER 3 DRIVING TEST

3.1. ENVIRONMENTAL CONDITIONS

Ambient weather conditions play an important role during tests. Therefore, the ambient air temperature should not be below 10°C and not above 38°C. The surface of the road must be dry, no precipitation or standing water. The average wind speed should not exceed 3 m/s.

3.2. DRIVING TEST

The test route will be a circuit corresponding to a road made of concrete or asphalt with curves (right and left) with a radius between 25 and 100 meters (e.g. 8-shape).

The vehicle must travel the circuit over a distance of 100 km under the following conditions:

- 3 km at maximum speed with a of limit of 90 km/h.
  In the curve it is allowed to reduce to safe speed, not below 50 km/h, without danger of tip over the vehicle. After the curve the speed has to be increased again to the test speed.

- 22 km @ 50 km/h

- 75 km @ 25 km/h

Short interruptions for taking pictures and making measurements after the maximum speed part, at suitable driven distances over the remaining course, are allowed. The cooling down time of the wheels has to be limited to a minimum.

It is recommended to measure the velocity with e.g. GPS.

3.3 Acceptance

A test is considered successful if the test vehicle completes the full distance of 100 km without the occurrence of any of the incidents listed under 3.4.

3.4 Conditions for premature test termination

The run-flat test must be terminated if any of the following incidents occur:

a) The run-flat tire comes off the rim.
b) Separation of tread from wheel carcass which indicates imminent damage.
c) Any of the wheel rims contacting the ground (tire and run-flat system are partly destroyed).
d) Inability of the vehicle to maintain continuous mobility.
e) Inability of the vehicle to be operated safely (effect on steering, stability or braking).
f) Reduction in speed below test target.
g) One of the wheels starts to burn.

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