



Vehicle  
Certification  
Agency

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# UN Regulation No. 90 Bedding / burnishing procedure



## Background

- ▶ Market surveillance activities by UK and others have identified compliance issues with replacement brake linings.
- ▶ These linings have undergone a bedding procedure that meets the specifications of UN R90, but are subsequently unable to meet all the performance requirements.
- ▶ Investigation has found that in some cases if the same linings are tested following a different bedding procedure (also within the specification of UN R90), the performance requirements are fulfilled.
- ▶ The bedding procedure described in UN R90 has a lot of flexibility, leading to inconsistent results.
- ▶ The UK would like to bring this issue to the attention of GRVA and gather views on how it might be resolved.



## Bedding (burnishing) procedure (M1, M2, N1\*)

▶ **Annex 3, 1.1.1.**

- ▶ [...] Brake linings submitted for test shall be fitted to the relevant brakes and, **until a fixed burnishing procedure is established, shall be burnished to the manufacturer's instructions in agreement with the technical service.**

▶ **1.1.2.2. Procedure**

- ▶ Perform a **minimum 50 km** driving distance and **at least 100 brake applications** at varying decelerations (**at least between 1 m/s<sup>2</sup> and 5 m/s<sup>2</sup>**) with initial speeds between 50 km/h and 120 km/h. **A temperature range between 250 °C and 500 °C** for pad assemblies or between 150 °C and 250 °C for drum brake lining assemblies (measured at the rubbing surface of the disc or drum) **must be achieved at least 3 times** during the bedding procedure. Temperatures must not exceed 500 °C for pad assemblies and 250 °C for drum brake lining assemblies.

▶ **1.1.2.3. Performance check**

- ▶ By braking only one axle at a time perform 5 brake applications from 70 km/h to 0 km/h (front axle) and 45 km/h to 0 km/h (rear axle) at a line pressure of 4 MPa and with an initial temperature of 100 °C for each stop. **The 5 consecutive non-monotonic results must remain within the tolerance of 0.6 m/s<sup>2</sup> (front axle) or 0.4 m/s<sup>2</sup> (rear axle) of their mean fully developed deceleration.**

\* For other categories, no detailed specifications are given

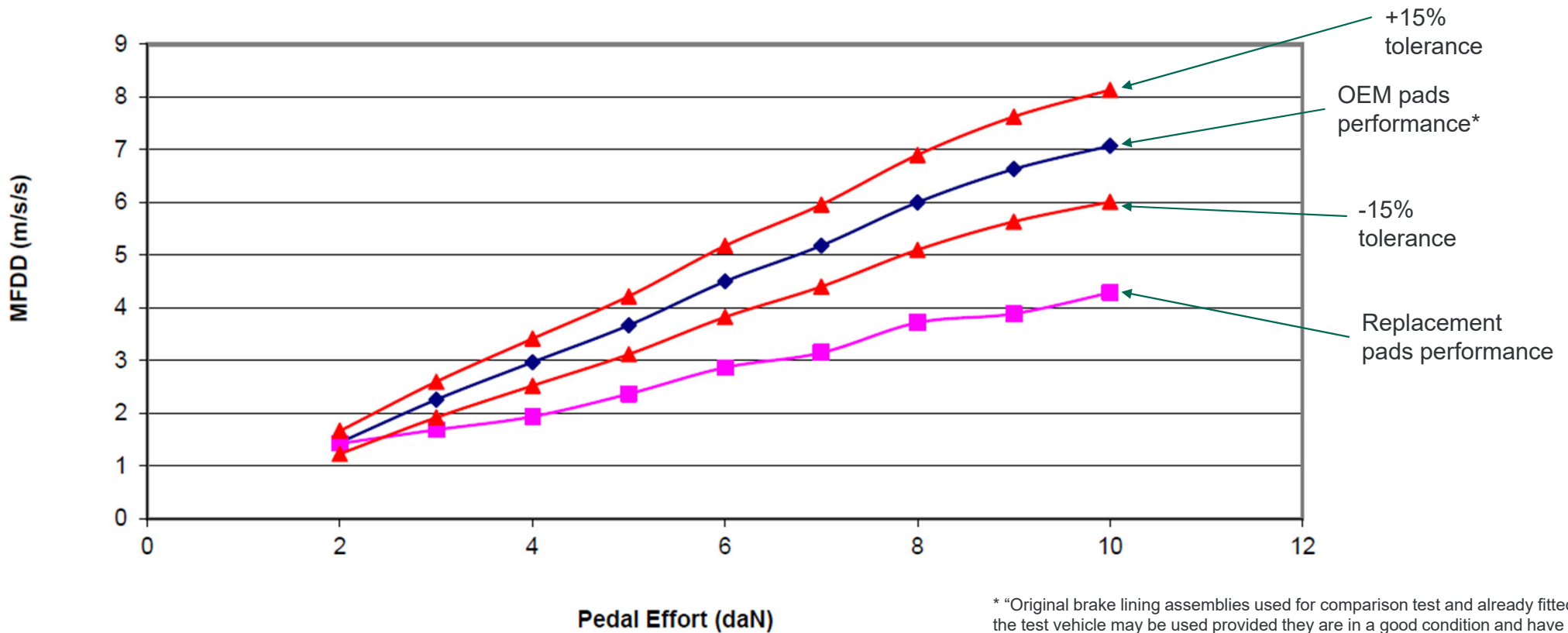


## Problem

- ▶ The procedure in Annex 3 paragraph 1.1.2.2 appears to define the least 'intensive' bedding activity which can be deemed sufficient.
- ▶ It has been found that if a more intensive procedure is used (for example keeping the pad temperature in the range 250-500 °C for most of the bedding process, rather than just three times) the linings can show much better performance in the subsequent approval tests.
- ▶ Annex 3 paragraph 1.1.2.3 provides a check that the bedding is 'complete', however evidence shows that this check can be fulfilled even though the linings are not sufficiently bedded to achieve full performance in all tests.
- ▶ **The significant flexibility within the bedding procedure requirements leads to problems for market surveillance, because the relevant authority / technical service does not know the bedding procedure which was used for the type approval tests. This could also be an issue for parts installed in the field.**



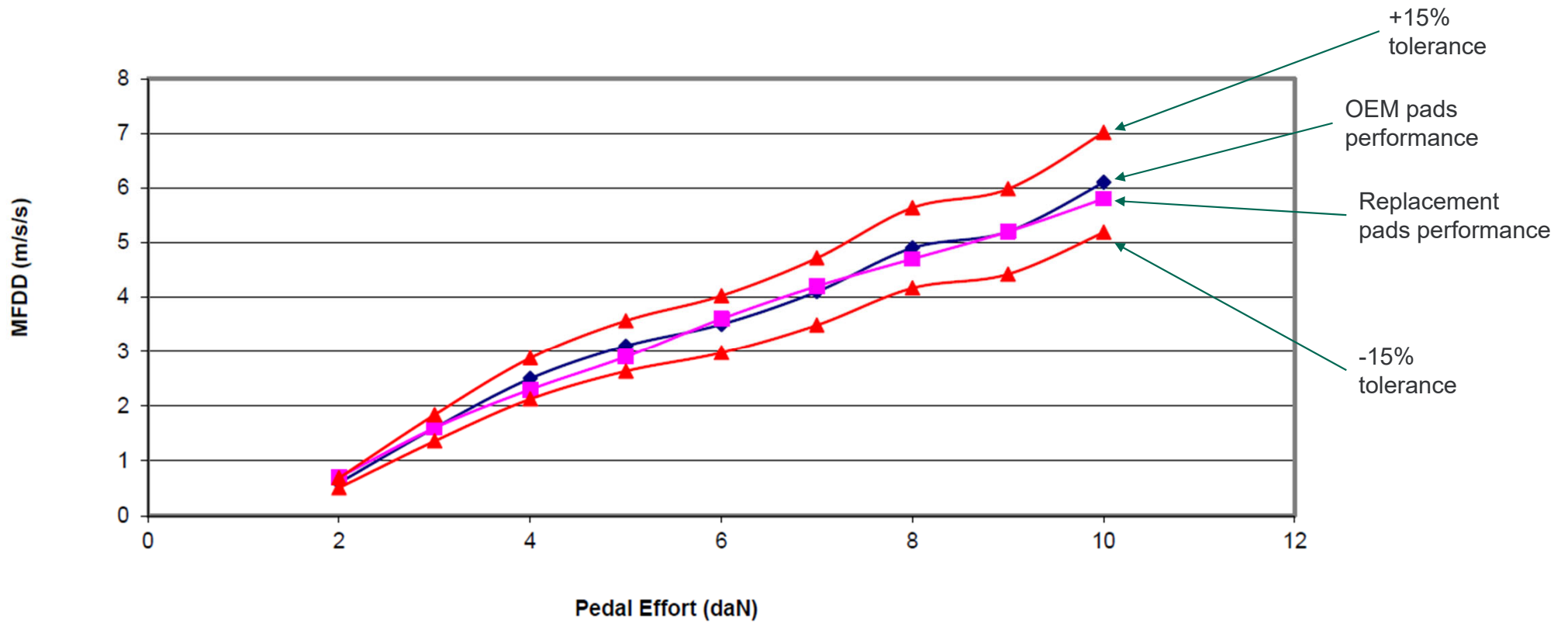
## Cold performance results following R90 specified bedding



\* "Original brake lining assemblies used for comparison test and already fitted to the test vehicle may be used provided they are in a good condition and have not been worn out by more than 20 per cent of the initial thickness."



## Cold performance following manufacturer's bedding procedure





## Questions

- ▶ Have other Contracting Parties or Approval Authorities encountered this issue?
- ▶ Have any solutions or recommendations already been considered?
- ▶ In the absence of other suggestions, we recommend GRVA consider:
  - ▶ Defining a more tightly-specified bedding procedure which does not allow such a wide range of flexibility.  
and/or
  - ▶ Requiring the actual bedding procedure used to be specified on the communication form, and also within the mandatory fitting instructions described in paragraph 6.1.4. The procedure used for the approval tests would thus be available to both market surveillance authorities and installers.
- ▶ Do delegations prefer either of these solutions, or have any alternative suggestion?