



# JRC update on brake-related topics

T. GRIGORATOS and B. GIECHASKIEL

*PMP Virtual Meeting  
22 Nov 2023*

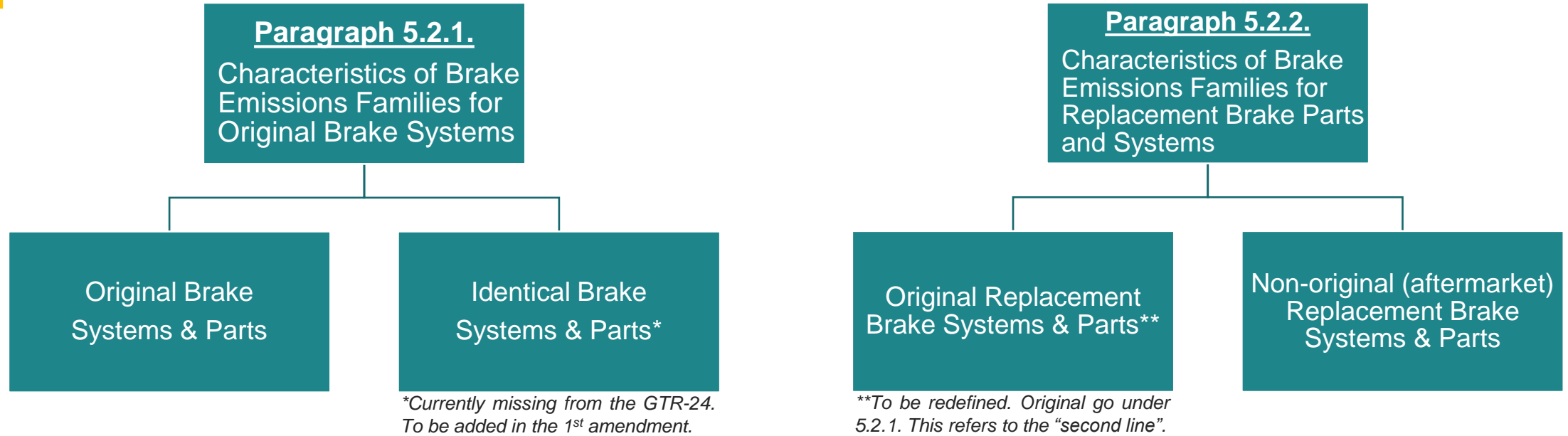
# BRAKE DUST FILTERS

1. Definition of filter systems – JRC agrees in adding clear definitions for passive and active brake filtering devices to the GTR.
2. Handling of filter systems in general (active/passive):
  - i. How to install filter systems at the dynamometer bench – The installation of brake filters shall respect the GTR specifications regarding design, dimensions, temperatures, flowrates, etc.
  - ii. Handling of the filtered volume flow (e.g. release point) – Exact release point shall be defined in the next amendment.
  - iii. Filter conditions (new, unused filters?) – The tested filtering devices shall be new when initiating a brake emissions test.
  - iv. When to apply the filter systems (already during bedding?) – The sequence defined in the GTR (cooling - bedding - emissions sections) shall be followed when testing brake filters.
3. Evaluation of simplified proposal to test active filters at dyno level (GTR-24: [“pump starts 1 second before each WLTP brake event”])
  - i. Evaluation of efficiency bias compared to actual performance of filters in the field. – Data already exist. It is expected better performance in the field based on speed, brake information, and longer sampling duration.
  - ii. Clarification of the impact on cooling air flow control stability – The GTR defined specifications about flow stability shall apply.
  - iii. Impact on tolerances of the temperature requirements – The GTR defined specifications about temperature shall apply.
  - iv. How to incorporate/access a “dynamometer mode” of the filtering systems to allow testing for OEMS and third parties (different behaviour at dynamometer compared to vehicle implementation). – Any solution that does not require additional information from the manufacturers to run the test neither for passive nor for active braking systems is welcome.
  - v. How to deal with active filter systems that are running permanently (including systems that switch between high-flow and low-flow mode. – These filters will be underestimated compared to real life and will be addressed in the next amendment.
  - vi. Definition of “switching off” the filter - Immediately stop the flow or stop the additional blower, allowing the rotating fan to still transport air? – To be clarified.

Text in black represents OICA questions on the topic

Text in red represents JRC's position on the questions

# DEFINITIONS FOR FAMILIES/AFTERMARKET




## EXAMPLE OF DEFINITIONS AS IN UNR No. 90: BRAKE PARTS/DISCS/PADS

- ✓ "**Original brake part/disc/pad**" in the case of motor vehicles means a brake part/disc/pad covered by the vehicle braking system type approval according to Regulation No. 13, Regulation No.13-H, or Regulation No. 78;
- ✓ "**Non-original replacement brake part/disc/pad**" means a brake part/disc/pad of a type approved under Regulation No. 90 as a suitable service replacement for an original brake disc;
- ✓ "**Original replacement brake part/disc/pad**" means an original brake part/disc/pad intended for servicing the vehicle and carrying an identification code affixed in such a way as to be indelible and clearly legible;
- ✓ "**Identical brake part/disc/pad**" is a replacement brake part/disc/pad which is chemically and physically identical in every respect with the exception of the vehicle manufacturer mark, which is absent, to the original brake disc.

# DEFAULT FRICTION BRAKING SHARE COEFFICIENTS

- ✓ Table 5.3 was derived applying a “deterioration factor” of 20% when shifting from the WLTP exhaust to the WLTP-Brake cycle. ***OICA data during the development of Annex C showed that this factor is much higher;***
- ✓ JRC recalculated the c factors in Table 5.3 using a correction ( $1/0.87=1.15$ ) ***for aligning the c definition in the two cycles as proposed by OICA*** (24<sup>th</sup> TF4 Meeting – Slide 5&10 – Definition of denominator).

Brake type	Vehicle Type	Friction Braking Share Coefficient (c)
Full-friction braking	ICE and other vehicle types not covered in this Table	1.0
	NOVC-HEV Cat.1	0.63
Non-friction braking	NOVC-HEV Cat.2	0.45
	OVC-HEV	0.30
	PEV	0.15



Brake type	Vehicle Type	Friction Braking Share Coefficient (c)
Full-friction braking	ICE and other vehicle types not covered in this Table	1.0
	NOVC-HEV Cat.0	0.90
Non-friction braking	NOVC-HEV Cat.1	0.72
	NOVC-HEV Cat.2	0.52
	OVC-HEV	0.34
	PEV	0.17

- ✓ JRC proposes to update the c factors in Table 5.3 in the current 1<sup>st</sup> amendment of the GTR No. 24 to avoid future changes that might have a negative impact on decisions.

# ANNEX C – PARAGRAPH 6.2

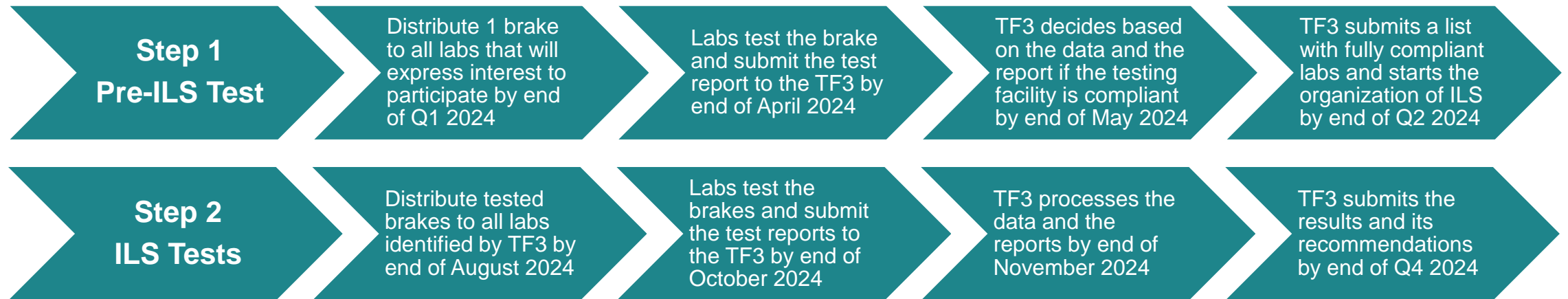
## 6.2. Offset of the Friction Braking Share Coefficient (“Declaration”)

The vehicle-specific friction braking share coefficient calculated according to [paragraph 6.1.] of this Annex may be increased by the manufacturer to cover the statistical and procedural uncertainties.

- ✓ OICA proposes the possibility to increase the measured value also for the other cycle and methods and report this value. This is common practice for other GTRs and homologation;
- ✓ **JRC agrees with OICA’s request. However, it is necessary to define a maximum allowed increase in the declared c value.**
- ✓ Reason: Since this increase in the declaration is meant to cover statistical and procedural uncertainties it cannot be unlimited.
- ✓ Proposal: JRC proposes the following sentence *“The vehicle-specific friction braking share coefficient calculated according to this Annex may be increased by the manufacturer by up to 50 per cent of the measured value or 0.05 absolute whichever is greater”*.

# INTERLABORATORY STUDY No.3 (ILS-3)

- ✓ During the last PMP Meeting (28.09.2023), JRC asked the stakeholders to informally declare their availability for the upcoming ILS-3. Less than 3 labs declared full compliance to the GTR No. 24;
- ✓ It seems that most of the labs will not be ready for carrying out such an activity soon. For this reason, JRC proposes to follow a two-steps approach:



- ✓ The deadlines defined (if agreed) shall be respected by all participants. No exceptions shall be made as these will result in delays that will affect the 2<sup>nd</sup> amendment of the GTR No. 24.

# TF5 ON HEAVY-DUTY VEHICLES

- ✓ TF5 is established as a technical group to accelerate the work on brake emissions from HDVs. It is a sub-group within the PMP IWG and shall provide a status report to the PMP IWG regularly;
- ✓ The TF5 shall aim in extending the brake emissions measurement procedure applied to LDVs (cycle, setup, regen, etc.) to all types of HDVs;
- ✓ TF5 is proposed to start its activities with the kick-off meeting in December 2023 (Thu 14.12.2023 ?). The proposal is to provide a solid report on the method by June 2024;
- ✓ TF5 is proposed to be co-moderated by a JRC representative (T.G.) and a representative from OICA (?);
- ✓ TF5 is proposed to consist of 1 person per entity. “Subscriptions” will be sent to the co-chairs accompanied by a justification on the contribution the participant expects to bring into the group;
- ✓ Meetings are proposed to be scheduled bi-weekly. This shall be confirmed in the first meeting;
- ✓ TF needs expertise from (among others): OEM’s, dyno manufacturers, instrument manufacturers, policy makers, relevant research projects, etc.

# Thank you



© European Union 2023

Unless otherwise noted the reuse of this presentation is authorised under the [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/) license. For any use or reproduction of elements that are not owned by the EU, permission may need to be sought directly from the respective right holders.

