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Report from the Expert Group on laboratory alignment for the measurement of tyre rolling resistance installed under Regulation (EU) 2020/740 and listed on the Commission registry of Expert Groups to the European Commission - 2025

Inter-laboratory Alignment Procedure for Rolling Resistance Measurement in accordance with Annex V to Regulation (EU) 2020/740 of the European Parliament and of the Council of 25 May 2020 on the labelling of tyres with respect to fuel efficiency and other parameters, amending Regulation (EU) 2017/1369 and repealing Regulation (EC) No 1222/2009.

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1. Executive Summary

Tyres, mainly because of their rolling resistance, account for 20 % to 30 % of the fuel consumption of vehicles. A reduction of the rolling resistance of tyres may therefore contribute significantly to the energy efficiency of road transport and thus to the reduction of emissions. Fuel-efficient tyres are cost-effective since fuel savings more than compensate for the increased purchase price of tyres stemming from higher production costs.

The Regulation (EU) 2019/2144 of the European Parliament and of the Council of 27 November 2019 on type-approval requirements for motor vehicles and their trailers, and systems, components and separate technical units intended for such vehicles, as regards their general safety and the protection of vehicle occupants and vulnerable road users sets out minimum requirements for the rolling resistance of tyres.

Technological developments make it possible to significantly decrease energy losses due to tyre rolling resistance beyond those minimum requirements. To reduce the environmental impact of road transport, it is therefore appropriate to lay down provisions to encourage end-users to purchase more fuel-efficient tyres by providing harmonised information on that parameter.

The Regulation[1] (EU) 2020/740 of the European Parliament and of the Council establishes a framework for the provision of harmonised information on tyre parameters through labelling, allowing end-users to make an informed choice when purchasing tyres. The information to be provided under Articles 4, 5, 6 and 7 of the Regulation (EU) 2020/740 on the fuel efficiency class, the external rolling noise class, and the wet grip class of tyres shall be obtained by applying the harmonised testing methods referred to in Annex I of the Regulation (EU) 2020/740. The fuel efficiency class must be determined on the basis of the rolling resistance coefficient (RRC) according to the specified 'A' to 'E' scale and measured in accordance with Annex 6 to UNECE Regulation No 117 and its subsequent amendments and aligned in accordance with the laboratory alignment procedure set out in Annex V of Regulation (EU) 2020/740.

As described in the Annex V to the Regulation (EU) 2020/740, the laboratory alignment procedure for the measurement of rolling resistance (RR) should be based upon the generation of assigned RRC values. For the definition of these "**assigned values"**, the establishment of reference laboratories is essential.

A Network of Laboratories (including an Expert Group) was created under Regulation (EC) No 1222/2009[2], composed of volunteer test laboratories (Technical Services, Tyre Manufacturers) to perform inter-laboratory comparison tests on different samples of tyres, in order to establish reference data for rolling resistance measurements. The alignment method for laboratories has to measure tyre rolling resistance at the worldwide level.

The 'Expert Group on laboratory alignment for the measurement of tyre rolling resistance' was set up on 3/9/2010. Main activities of the group were dedicated to the creation of an alignment method for laboratories having to measure tyre rolling resistance in accordance with the Regulation (EC) No 1222/2009. The group met several times in 2010/2011 for the alignment of reference laboratories for the measurement of tyre rolling resistance under the Regulation, and in 2013/2014 for the first assessment of the stability and validity of the assigned values of the initial alignment according to Annex V, point 3 of the Regulation. An Intermediate check was initiated by the expert group and performed in 2015 to further improve the alignment process. This check showed that the system of Reference Laboratories was stable with the 10 participating labs, illustrating that the evolution of some machines could be compensated (or eliminated) by the other labs. The main difference for the assigned values was due to the tyre evolution, not the labs evolutions. In 2016/2017, the re-assessment of the assigned values of the reference laboratories alignment was performed. In 2018 a new intermediate check procedure was performed. the global results showed a complete stability since there was no significant change on C1/C2 and C3 machines. Thus, it was decided that the group could continue using their then current equations. In 2019, the re-assessment of the assigned values of the reference laboratories alignment was performed. In 2020 a new intermediate check procedure was performed. the global results showed a complete stability since there was no significant change on C1/C2 and C3 machines. Thus, it was decided that the group could continue using their then current equations. In 2021, the re-assessment of the assigned values of the reference laboratories alignment was performed. In 2022, a new intermediate check procedure was performed. the global results showed a complete stability since there was no significant change on C1/C2 and C3 machines. Thus, it was decided that the group could continue using their current equations. Due to the periodic review of the stability of the Network of Reference Laboratories according to the Regulation in 2023, a new round of alignment among the Reference Laboratories was done. The final report included the new alignment equations for C3

[1] Official Journal of the European Union, L177 of 5.6.2020: REGULATION (EU) 2020/740 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 May 2020 on the labelling of tyres with respect to fuel efficiency and other parameters, amending Regulation (EU) 2017/1369 and repealing Regulation (EC) No 1222/2009.

[2] Official Journal of the European Union, L342/46-58, 22.12.2009: REGULATION (EC) No 1222/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters.

machines. For C1/C2 machines, the Network of Reference Laboratories confirmed the stability and accepted the validity of the assigned values of 2021 and it was decided that the group could continue using their then current equations for their C1/C2 machines.

The alignment of the assigned values of the reference laboratories has been done as per Annex V of Regulation (EU) 2020/740.

Due to the periodic review of the stability of the Network of Reference Laboratories according to the Regulation, a new round of alignment among the Reference Laboratories was done in 2025. This final report includes the new alignment equations for C1/C2 and C3 machines that will be applicable as of **March 2nd, 2026** and will apply to the labelling of the tyres in the scope of Regulation (EU) 2020/740.

A document giving the application rules on how to handle the process of changing alignment equations, both for Reference and Candidate Laboratories is included in Annex F.

2. Introduction

The Regulation (EU) 2020/740 was setting a labelling classification based upon absolute rolling resistance coefficient (RRC) values. Under Annex I to the Regulation, the rolling resistance (RR) shall be measured according to the Annex 6 of UN-ECE Regulation No 117 and its subsequent amendments.

According to the experience gained by the European tyre industry from previous Round-Robin tests for tyre rolling resistance, and to the previous rounds of the inter-laboratory alignment procedure for tyre rolling resistance measurement under Regulation (EC) No 1222/2009 performed in 2011 and 2014, the deviations in test results observed could reach up to more than 1 N/kN between laboratories.

Due to this observed dispersion between measurement machines, a machine alignment procedure is necessary to get comparative Rolling Resistance Coefficient (RRC) values and give an appropriate competitive playground for the declaration of RRC labelling values according to the Regulation (EU) 2020/740.

2.1. Members of the Expert Group

Conveners (revolving):

TÜV SÜD (Germany),
UTAC (France),
IDIADA (Spain).

Tyre manufacturers:

Apollo,
Bridgestone,
Continental,
Goodyear,
Michelin,
Pirelli,
Prometeon,
ETRTO (European Tyre and Rim Technical Organisation).

Independent Test Laboratories:

IDIADA (Spain),
RDW (Netherlands),
TÜV SÜD Product Service (Germany),
UTAC (France).

Observers:

NOKIAN (Tyre manufacturer),
Tyres Europe (European Association of tyre manufacturers),
JASIC (Japan Automobile Standards Internationalization Center),
KEA (Korean Energy Agency).

2.2. Approach for laboratory alignment

The procedure is based upon the generation of assigned RRC values as described in Annex V to Regulation (EU) 2020/740.

The Expert Group proposed a two-steps process for laboratory alignment:

In the first step, a Network of Laboratories for the definition of assigned values was created. According to Annex IVa of Regulation 1222/2009, the last assigned values of each alignment tyre were determined by the Network of Reference Laboratories in 2023. After two years the network has to assess the stability and validity of the assigned values.

One member, Apollo, has changed their C1/C2 machine since the previous alignment campaign. One new member, Prometeon, has introduced a new C3 machine, replacing the former C3 machine of the member Pirelli, that had been removed previously.

This Network of Reference Laboratories is operating the RR test machines and equipment as listed in Annex A.

The preparation of the laboratory alignment procedure consisted in the following actions:

- Assess number of alignment tyres for each category C1/C2 and C3,
- Fix details of alignment tyres (class, dimension, load index, standard or reinforced),
- Set up logistics, shipment between laboratories,
- Recommend tyre storage conditions,
- Establish the test procedure and test conditions for inter-laboratory comparison.

Based on the assigned values the Laboratories in the Network are correlated and aligned versus this “virtual reference laboratory”.

In the second step, once the Laboratories Network has been established and the alignment vs. the assigned values has been completed, any Candidate Laboratory can be aligned with any of the Network Laboratories.

2.3.Procedure for Inter-laboratory alignment

The Network of Laboratories was created Sept 3, 2010, by the Committee on the Labelling of Tyres under Regulation (EC) No 1222/2009 and has been reactivated in 2013, 2016, 2018, 2020, 2022 and 2025 in order to assess the stability and validity of the assigned values.

2.3.1.Choice of laboratories

According to the rules described in the “Guideline working document on reference laboratories as defined in Commission Regulation (EU) 1235/2011 of 29 November 2011 amending Regulation (EC) No 1222/2009 of the European Parliament and of the Council with regard to the wet grip grading of tyres, the measurement of rolling resistance and the verification procedure”, one new member (RDW) fulfilled the conditions to be added to the previous group of participants in 2015 to the Network of Laboratories. A second new member (Prometeon) fulfilled the conditions to be added to the previous group of participants with their C3 machine in 2025.

The 12 Laboratories participating to the Inter laboratory alignment process are identified as follow:

Laboratory Name	Laboratory ID
TÜV SÜD	Lab0
UTAC	LAB1
IDIADA	LAB2
Michelin	LAB3
JASIC	LAB4
Goodyear	LAB5
Continental	LAB6
Bridgestone	LAB7
Pirelli	LAB8
RDW	LAB9
Apollo	LAB10
Prometeon	LAB 11

Description and information of the machines to be used for the inter-laboratory alignment are given in Annex A.

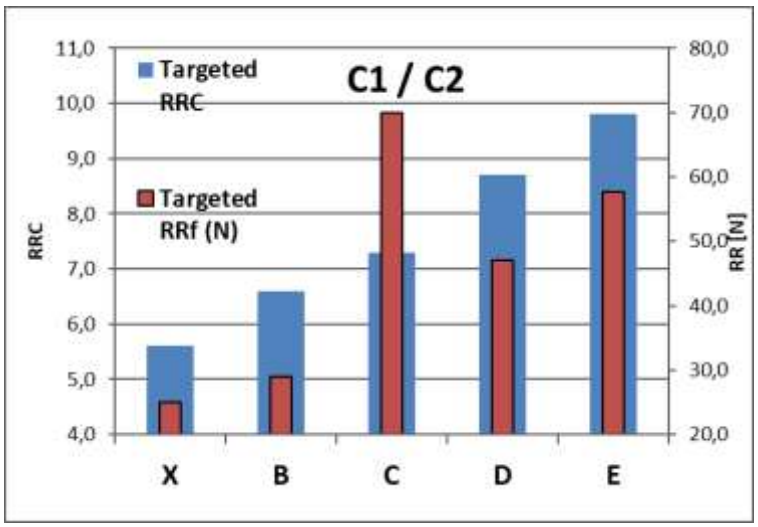
2.3.2. Choice of alignment tyres

Six sets of alignment tyres for C1/C2 category (A to E and X) and five sets of alignment tyres for C3 category (F to K) were selected by the Expert Group; selection of tyres was accomplished in such way to cover the Load Index and Rolling Resistance, coefficient and force, ranges in conformity with the requirements of Regulation (EU) 2020/740.

Final selection of alignment tyres, aligned RRC and RR force (RRf) and test conditions, C1/C2 tyres:

											Expected aligned values		
C1/C2	Manufacturer	Brand / Size / Design	Tyre class	LI	SS	Speed [km/h]	Test Load [N]	Infl. press. [kPa]	Rim [“]	Warm-up [min]	Targeted RRC	delta RRC	Targeted RRf (N)
A	Continental	215/70 R15C VANCONTACT ECO	C2	109	S	80	8 588	450	6,50	50	4,8		41,2
X	Bridgestone	195/55R16 XL TURANZA ECO	C1	91	V	80	4 824	250	6,00	30	5,6	0,8	25,0
B	Pirelli	205/45 R17 XL CINTURATO P7	C1	88	W	80	4 395	250	7,00	30	6,6	1,0	29,0
C	Continental	205/75 R16C CONTIVANCONTACT 100	C2	113	R	80	9 588	525	5,50	50	7,3	0,7	70,0
D	Apollo	225/45 R18 XL ULTRAC PRO	C1	95	(Y)	80	5 415	250	8,00	30	8,7	1,4	47,1
E	Apollo	255/40 R17 XL CLASSIC SPRINT	C1	98	Y	80	5 886	250	9,00	30	9,8	1,1	57,7
		Range									5,0		45,0

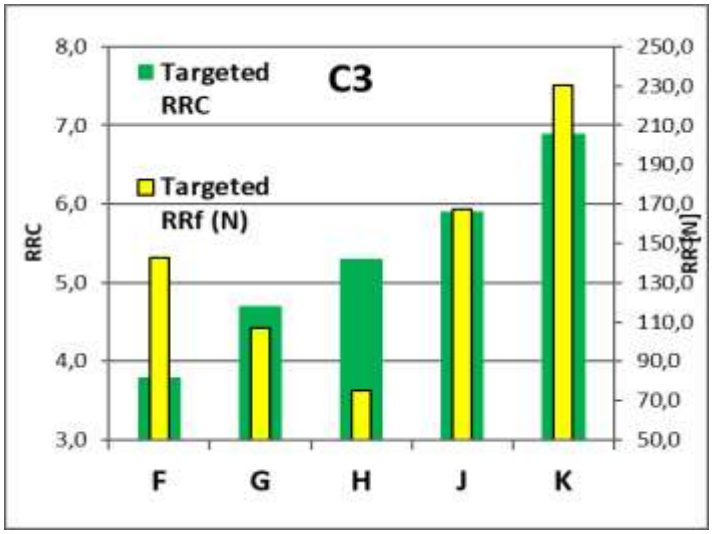
The measuring rim width 8 inch for tyre D was selected instead of 7.5 inch due to the necessary availability to all Reference Laboratories.



Final selection of alignment tyres, aligned RRC and RR force (RRf) and test conditions, C3 tyres:

											Expected aligned values		
C3	Manufacturer	Brand / Size / Design		LI	SS	Speed [km/h]	Test Load [N]	Infl. press. [kPa]	Rim [*]	Warm-up [min]	Targeted RRC	delta RRC	Targeted RRf (N)
F	Goodyear	385/55R22.5 160K FUELMAX S PERFORMANCE	C3	160	K	80	37 523	900	11,75	180	3,8		142,6
G	Michelin	245/70R17.5 X LINE ENERGY	C3	143	J	60	22 722	860	7,50	150	4,7	0,9	106,8
H	Continental	215/75R17.5 HYBRID LS3	C3	126	M	80	14 175	900	6,00	150	5,3	0,6	75,1
J	Michelin	295/80R22.5 X COACH Z	C3	154	M	80	31 270	850	9,00	180	5,9	0,6	167,0
K	Continental	13R22.5 HDC1	C3	156	G	60	33 354	875	9,00	180	6,9	1,0	230,1
		Range									3,1		155,0

The measuring rim width 11.75 inch for tyre F was selected instead of 12.25 inch due to the necessary availability to all Reference Laboratories (same as already decided for the previous campaign).



The alignment tyres were provided by industry.

2.3.3. Pre-tests on each batch of tyres

As stipulated by the Expert Group, the industry provided the alignment tyres with minimum production variation. But as tyres are never strictly identical, a process of initial measurement of each tyre (4 times) was established in order to assess the tyre category set´s individual variance; each of the laboratories providing initial measurements did tests with one whole batch of alignment tyres (same category, brand and design).

C1/C2	Manufacturer	Brand / Size / Design	Pretested by
A	Continental	215/70 R15C VANCONTACT ECO	IDIADA
X	Bridgestone	195/55R16 XL TURANZA ECO	Bridgestone
B	Pirelli	205/45 R17 XL CINTURATO P7	Pirelli
C	Continental	205/75 R16C CONTIVANCONTACT 100	Bridgestone
D	Apollo	225/45 R18 XL ULTRAC PRO	RDW
E	Apollo	255/40 R17 XL CLASSIC SPRINT	TÜV SÜD

Due to damages in several tyres of batch C, detected after the pre tests, a second batch of tyres with specification C was prepared and pre tested by Continental.

C3	Manufacturer	Brand / Size / Design	Pretested by
F	Goodyear	385/55R22.5 160K FUELMAX S PERFORMANCE	IDIADA
G	Michelin	245/70R17.5 X LINE ENERGY	Michelin
H	Continental	215/75R17.5 HYBRID LS3	RDW
J	Michelin	295/80R22.5 X COACH Z	UTAC
K	Continental	13R22.5 HDC1	TÜV SÜD

2.3.4. Alignment tests for C1/C2 and C3 tyres

Each sample of each set of 13 C1/C2 tyres (incl. spares), ID A, X, B, C, D and E was tested 4 times on one of the 11 machines dedicated to this class of tyres.

Each sample of each set of 13 C3 tyres (incl. spares), ID F, G, H, J and K was tested 4 times on one of the 11 machines dedicated to this class of tyres.

3. Results

The analysis of the results of the pre-tests shows that all the Rolling Resistance Machines used comply with the requirement on Sigma m of Regulation (EU) 2020/740.

All the results have been collected and recorded on the template report shown in Annex B.

The data formats to be used for the computations and results are included in Annex V of Regulation (EU) 2020/740:

- The measured RRC values corrected from drum diameter and temperature shall be rounded to 2 digits after the comma.
- Then the computations will be made with all digits: There will be no further rounding except on the final alignment equations.
- All standard deviation values will be displayed with 3 digits after comma.
- All RRC values will be displayed with 2 digits after comma.
- All alignment coefficients (A1l, B1l, A2c and B2c) will be rounded and displayed with 4 digits after comma.

Deliverables of the Network of Reference Laboratories Expert Group:

➢ For pre-tests:

- Raw data and aligned data
- Qualification of the data
- Precision and uncertainty values
- Correction factor for each batch
- Conclusions

➢ For alignment tests:

- Raw data and aligned data
- Qualification of the data
- Precision and uncertainty values
- Assigned values
- Qualification of the assigned value
- Alignment equations for reference laboratories
- Precision and uncertainty of predicted values.

3.1.Pre-tests results

Each tyre of one batch has been tested on one machine four times and the average and the standard deviation of the three last measurements has been calculated.

The pre-tests batches include at least one additional tyre for each batch and the group decide to choose the alignment tyres to be use in each batch by considering the following criteria appropriate and effective:

Excludes any tyre that has got a standard deviation above the limit (5.0 %) for the three last measurements (Raw values), then in case all the tyres respect the standard deviation condition (Raw values), then remove any tyre who do not make the tyre batch distributed evenly.

The analysis, based on the three last measurements (out of four) for each tyre, results in exclusion of the following samples from the batches:

C1/C2

Batch A Tyres N° 11 and N° 12
Batch X Tyres N° 4 and N° 8
Batch B Tyres N° 4, N°7, N°8 and N° 11
Batch C Tyres N°0, N° 6 and N° 10
Batch D Tyres N° 8 and N° 12
Batch E Tyres N° 1 and N° 12

C3

Batch F Tyres N° 11
Batch G Tyres N° 3 and N° 6
Batch H Tyres N° 2
Batch J Tyres N° 3
Batch K Tyres N° 7 and N° 11

Each remaining tyre from the batches has been re-identified as A0, A1… till A11 to K0, K1… till K11.

Then, the repeatability of the pre-tests data was analysed, these data include the variation of the RR measurement process as well as the evolution of the tyres during the pre-tests. The goal of the pre-tests was to analyse the variation within a batch of tyres and to use the results to apply a correction factor. The data and the analysis of these data are given in Annex C to this report.

Another outcome from these pre-tests was the maximum variation of the measured RR coefficient for a set of 11 carefully selected tyres in each batch of classes C1/C2 and C3:

- For C1/C2 = -2.49%, +3.90%
- For C3 = -2.54%, +0.04%

Even if we could consider that these results are not bad for manufactured products, a correction factor will be used to normalize the values for future computerization of regression function for each machine.

3.2.Alignment tests results

Each tyre has been tested on one machine four times and the correction factor of the tested tyre was applied to each measurement then the average of three corrected last measurements has been calculated. The data and the analysis of these data are given in Annex D to this report.

Based on the experience gained during the previous inter-laboratory rounds in 2011, 2015, 2017, 2019, 2021 and 2023, all individual data have been used for the calculation of the linear regression function for each laboratory.

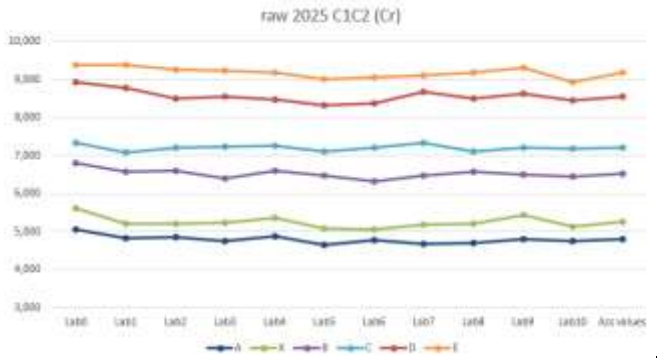
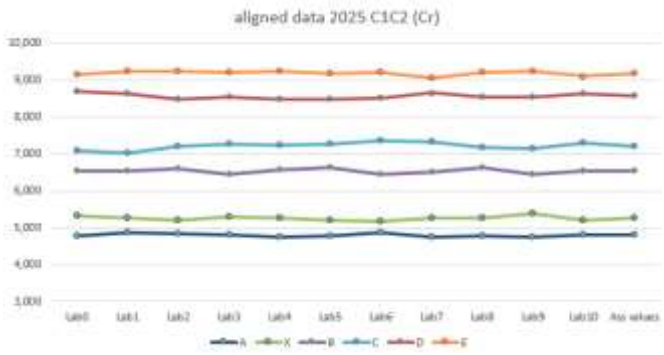
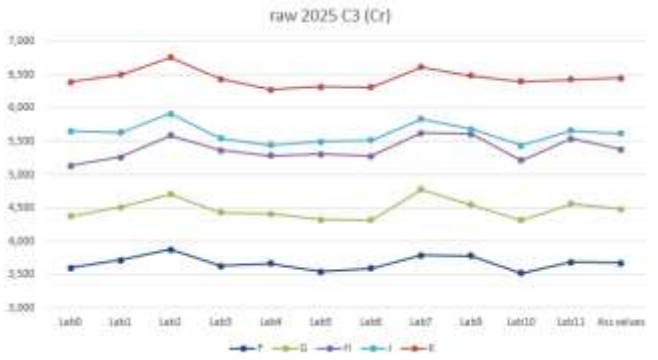
4. Conclusion

Pre-tests are still needed to monitor the dispersion of each batch of tyres and to improve the accuracy of alignment equation for each machine. Independent from the variation from one laboratory to another (if they are compliant with the requirement of Annex V of Regulation (EU) 2020/740), the system is robust.

The experience gained confirms that a first test in the same conditions is necessary before starting the series of measurements.

The statistical analysis confirms that the correlation is very high.

The accuracy of measured values is improved by this alignment procedure:

Maximum deviation from assigned values before alignment for C1/C2 = -3.73% / +6.85% 	Maximum deviation from assigned values after alignment for C1/C2 = -2.49% / +2.51% 
Maximum deviation from assigned values before alignment for C3 = -4.59% / +6.71% 	Maximum deviation from assigned values after alignment for C3 = -3.00% / +2.44% 

Other documents are annexed to this report:

- Annex E: the test protocol template for candidate / reference laboratory alignment in the current version.
- Annex F: Proposal of guidance on how to handle the process of changing alignment equations, both for Reference and Candidate laboratories.

Annex A – Equipment information

	TUV SUD N°0		UTAC N°1		IDIADA N°2		Michelin N°3		JASIC N°4		Goodyear N°5	
ADDRESS	TÜV SÜD Product Service GmbH Daimlerstrasse 15 85748 Garching/Munich, Germany		Groupe UTAC Autodrome de Linas-Montlhéry 91319 Montlhéry Cedex France		IDIADA Automotive Technology, S.A. Workshop homologation Division Pol Ind L'Albornar, AP2 ext 12 E-43710 SANTA OLIVA		CERL Michelin - Magasin F43 Compte J-B MATHIEU Zone Industrielle de Ladoux 63118 Cébazat France		Bridgestone Corporation Technology Centre 3-1-1, Ogawahigashi-cho, Kodaira-shi, Tokyo 187-8531 Japan		Goodyear Innovation Center Luxembourg Avenue Gordon Smith L-7750 Colmar-Berg Luxembourg	
Contact person	Andreas HENDL Alexander KNOERZER Lars NETSCH		Nicolas LUNEAU		Oscar COMAJUAN Ricard ANADON		Jean-Baptiste MATHIEU		Tai YAMAGUCHI		Florian NICOLAS	
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Tyre type	C1 / C2	C3	C1 / C2	C3	C1 / C2	C3	C1 / C2	C3	C1 / C2	C3	C1 / C2	C3
Location	Garching - Germany		Linas-Montlhéry - France		Santa-Oliva - Spain		Ladoux - France		Tokyo - Japan		Colmar-Berg - Luxembourg	
Machine identification #	H8	H4	BAN0226-VL	BAN0226-PL	10223	10259	19/V V6	RRPL A1	RG	RE	M/C # 204	M/C # 289.8
Machine operational	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Machine complies to performance criteria Network Laboratories	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Measurement method	Power	Power	Torque	Torque	Torque	Torque	Deceleration	Deceleration	Force	Force	Torque	Torque
Drum diameter [m]	2.0	1.7	2.0	2.0	1.7	1.7	1.7	2.7	2	3	2	2
Drum surface	Smooth steel	Smooth steel	Smooth steel	Smooth steel	Smooth steel	Smooth steel	Smooth steel	Smooth steel	Smooth steel	Smooth steel	Smooth steel	Smooth steel
Max. test load [kg]	1835	10194	2000	6000	1500	7000	2039	8155	1500	8000	1250	6118

	Continental N°6		Bridgestone N°7		Pirelli N°8		RDW N°9		Apollo N°10		Prometeon N°11	
ADDRESS	Continental Reifen Deutschland GmbH Jaedekamp 30 30419 Hannover		Bridgestone Europe Italian Branch Via del Fosso del Salceto, 13/15 – 00128 Rome, Italy		Pirelli Tyre SpA Sperimentazione Indoor via Chiese; 51 20126 Milano ITALY		RDW Testcentrum Talingweg 76 8218 NX Lelystad The Netherlands		Apollo Tyres (Hungary) Kft. H-3212 Gyöngyöshalász, Apollo út 106. Hungary		Prometeon Tyre Group Innovation center Via Finale 1 20092 -Cinisello Balsamo (MI) Italy	
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Tyre type	C1 / C2	C3	C1 / C2	C3	C1 / C2	C3	C1 / C2	C3	C1 / C2	C3	C1 / C2	C3
Location	Hannover - Germany		Rome - Italy		Milan - Italy	-	Lelystad - The Netherlands		Gyöngyöshalász - Hungary		-	Cinisello Balsamo -Italy
Machine Identification #	M1320	M1190	T34001	HU-2	MIQ 2094	-	OPS 26 - P1	OPS 26 - P2	TS-16-10-007	TS-16-10-008	-	7003921
Machine operational	yes	yes	yes	yes	yes	-	yes	yes	yes	yes, but deactivated after alignment	-	yes
Machine complies to performance criteria Network Laboratories	yes	yes	yes	yes	yes	-	yes	yes	yes	yes	-	yes
Measurement method	Torque	Torque	Torque	Torque	Torque	-	Torque	Torque	Torque	Torque	-	Torque
Drum diameter [m]	2	2	2	1.7	2	-	2	2	2	2	-	2
Drum surface	Smooth steel	Smooth steel	Smooth steel	Smooth steel	Smooth steel	-	Smooth steel	Smooth steel	Smooth steel	Smooth steel	-	Smooth steel
Max. test load [kg]	1834	8154	1223	6054	2000	-	2000	5000	1450	6000	-	6000

Annex B – Data report template (for pre-test and test protocols)

TYRE ROLLING RESISTANCE TEST PROTOCOL

Test Lab

General Data

Test Lab/Location:		Report No.	
Test-Rig:		Test Date:	
Drum Ø [m]:		Drum Surface:	
Test Conditions:	ECE-R 117	Test Method:	

Test-Rim

Diameter x Width[´´]:		Material:	Steel

Tyre

Tyre-ID:		Tyre Class (C1, C2, C3):	1
DOT-Nr.:		Brand-/Trade Name:	
Tyre Manufacturer:		Reinforced yes/no:	
Size:		Speed Index:	
Nominal Diameter (m):		Load Index:	

Set Test-Data

Setting	Warm-up [min]:	Speed [km/h]:	Load [daN]:	Camb. [°]:	p_{cold} [kPa]:	T_{amb} [°C]:
1						
2						
3						
4						

Measurements

Rec.	Speed [km/h]:	Load [daN]:	T_{amb} [°C]:	
1				Remark: Average ambient temperature during whole process
2				
3				
4				

Results (non corrected results)

Rec.	Skim Test Load (N)	F_r [N]:	Temp_corr ?	F_{PL} [N]:	Automatic Calc. c_r[N/kN]:
1					
2					
3					
4					

Corrected Results (Temperature 25°C, Drum diameter 2.0m)

Rec.	Correction Formula	Automatic Calc. F_r [N]:	F_{PL} [N]:	Automatic Calc. c_r[N/kN]:
1	0,008			
2				
3				
4				

Aligned Results acc. EU 2020/740, Annex V (Temperature 25°C, Drum diameter 2.0m)

1	Slope		Intercept		
2					
3					
4					

Reference Lab Test Protocol Version 1.7. September, 2025

Comments:

If Fr (N) in fields H31 to H34 and RRC in fields T31 to T34 are already temperature corrected, enter Temp_corr = 1 (otherwise 0)

Temperature correction coefficient is 0.008 for Class C1 tyres, 0.010 for Class C2 and C3 tyres with a load index equal or lower than 121, 0.006 for Class C3 tyres with a load index greater than 121

Annex C - Pre-tests results

1. Pre-tests results & Correction Factors for C1/C2 tyres

Tyre	Test_2	Test_3	Test_4	Avg	Correction_factor		
A00	4.91	4.92	4.92	4.92	**0.995**	**Min**	98.7%
A01	4.89	4.85	4.83	4.86	**1.008**	**Max**	101.0%
A02	4.95	4.93	4.92	4.93	**0.992**	**Range**	2.2%
A03	4.89	4.87	4.84	4.87	**1.006**		
A04	4.87	4.84	4.83	4.85	**1.010**		
A05	4.94	4.86	4.90	4.90	**0.999**		
A06	4.88	4.85	4.86	4.86	**1.006**		
A07	4.89	4.90	4.83	4.87	**1.004**		
A08	4.89	4.89	4.86	4.88	**1.003**		
A09	4.92	4.91	4.90	4.91	**0.997**		
A10	4.90	4.86	4.82	4.86	**1.007**		
ASpare1	4.95	4.94	4.97	4.95	**0.988**		
ASpare2	4.97	4.97	4.93	4.96	**0.987**		
			Avg_total	4.89			

Tyre	Test_2	Test_3	Test_4	Avg	Correction_factor		
X00	5.00	5.00	5.04	5.01	**0.998**	**Min**	96.9%
X01	4.91	4.93	4.92	4.92	**1.017**	**Max**	102.1%
X02	5.11	5.06	5.04	5.07	**0.987**	**Range**	5.2%
X03	5.09	5.03	5.05	5.06	**0.990**		
X04	5.04	5.06	5.03	5.04	**0.992**		
X05	5.05	5.03	4.99	5.02	**0.996**		
X06	5.01	5.05	5.00	5.02	**0.997**		
X07	4.93	4.95	4.96	4.95	**1.012**		
X08	4.98	4.98	4.98	4.98	**1.005**		
X09	4.95	4.93	4.95	4.94	**1.012**		
X10	4.97	4.99	4.96	4.97	**1.006**		
XSpare1	4.90	4.88	4.93	4.90	**1.021**		
XSpare2	5.20	5.13	5.17	5.17	**0.969**		
			Avg_total	5			

Tyre	Test_2	Test_3	Test_4	Avg	Correction_factor		
B00	6.50	6.48	6.48	6.49	**0.994**	**Min**	98.6%
B01	6.42	6.50	6.38	6.43	**1.002**	**Max**	101.6%
B02	6.53	6.51	6.50	6.51	**0.990**	**Range**	3.0%
B03	6.54	6.54	6.54	6.54	**0.986**		
B04	6.50	6.50	6.47	6.49	**0.993**		
B05	6.46	6.49	6.42	6.46	**0.999**		
B06	6.46	6.44	6.46	6.45	**0.999**		
B07	6.45	6.46	6.42	6.44	**1.001**		
B08	6.41	6.43	6.40	6.41	**1.005**		
B09	6.49	6.47	6.45	6.47	**0.996**		
B10	6.37	6.38	6.50	6.42	**1.005**		
BSpare1	6.39	6.33	6.33	6.35	**1.015**		
BSpare2	6.38	6.35	6.31	6.35	**1.016**		
			Avg_total	6.45			

Tyre	Test_2	Test_3	Test_4	Avg	Correction_factor		
C00	7.30	7.26	7.24	7.27	**1.003**	**Min**	98.6%
C01	7.33	7.28	7.24	7.28	**1.000**	**Max**	101.2%
C02	7.30	7.29	7.25	7.28	**1.001**	**Range**	2.6%
C03	7.34	7.30	7.29	7.31	**0.997**		
C04	7.29	7.26	7.22	7.26	**1.004**		
C05	7.35	7.31	7.29	7.32	**0.996**		
C06	7.27	7.26	7.23	7.25	**1.005**		
C07	7.36	7.34	7.32	7.34	**0.993**		
C08	7.32	7.25	7.24	7.27	**1.002**		
C09	7.34	7.31	7.26	7.30	**0.998**		
C10	7.29	7.26	7.20	7.25	**1.005**		
CSpare1	7.21	7.22	7.17	7.20	**1.012**		
CSpare2	7.43	7.40	7.35	7.39	**0.986**		
			Avg_total	7.29			

Tyre	Test_2	Test_3	Test_4	Avg	Correction_factor		
D00	8.83	8.84	8.86	8.84	**0.998**	**Min**	99.2%
D01	8.92	8.92	8.80	8.88	**0.993**	**Max**	100.9%
D02	8.86	8.94	8.85	8.88	**0.993**	**Range**	1.7%
D03	8.84	8.81	8.80	8.82	**1.001**		
D04	8.77	8.83	8.79	8.80	**1.003**		
D05	8.84	8.79	8.77	8.80	**1.002**		
D06	8.79	8.81	8.74	8.78	**1.005**		
D07	8.91	8.81	8.79	8.84	**0.998**		
D08	8.85	8.80	8.71	8.79	**1.004**		
D09	8.92	8.76	8.70	8.79	**1.003**		
D10	8.98	8.92	8.79	8.90	**0.992**		
DSpare1	8.76	8.72	8.75	8.74	**1.009**		
			Avg_total	8.82			

Tyre	Test_2	Test_3	Test_4	Avg	Correction_factor		
E00	9.56	9.51	9.47	9.51	**0.994**	**Min**	98.5%
E01	9.52	9.46	9.46	9.48	**0.997**	**Max**	101.0%
E02	9.37	9.37	9.35	9.36	**1.010**	**Range**	2.5%
E03	9.51	9.46	9.46	9.48	**0.998**		
E04	9.52	9.52	9.51	9.52	**0.994**		
E05	9.49	9.42	9.44	9.45	**1.001**		
E06	9.42	9.39	9.39	9.40	**1.006**		
E07	9.56	9.52	9.47	9.52	**0.994**		
E08	9.49	9.42	9.42	9.44	**1.001**		
E09	9.46	9.42	9.39	9.42	**1.003**		
E10	9.41	9.35	9.34	9.37	**1.009**		
ESpare1	9.42	9.37	9.32	9.37	**1.009**		
ESpare2	9.64	9.63	9.54	9.60	**0.985**		
			Avg_total	9.46			

2. Pre-tests results & Correction Factors for C3 tyres

Tyre	Test_2	Test_3	Test_4	Avg	Correction_factor		
F00	3.85	3.77	3.79	3.80	**1.014**	**Min**	96.6%
F01	3.82	3.82	3.84	3.83	**1.008**	**Max**	101.4%
F02	3.96	3.94	3.93	3.94	**0.978**	**Range**	4.8%
F03	3.87	3.82	3.87	3.85	**1.001**		
F04	3.84	3.83	3.84	3.84	**1.006**		
F05	3.87	3.76	3.79	3.81	**1.013**		
F06	3.82	3.80	3.79	3.80	**1.014**		
F07	3.84	3.89	3.83	3.85	**1.001**		
F09	3.87	3.82	3.80	3.83	**1.007**		
F10	3.85	3.82	3.82	3.83	**1.007**		
F11	3.97	3.86	3.92	3.92	**0.985**		
FSpare1	3.98	3.99	4.01	3.99	**0.966**		
			Avg_total	3.86			

Tyre	Test_2	Test_3	Test_4	Avg	Correction_factor		
G00	4.46	4.44	4.43	4.44	**1.000**	**Min**	98.7%
G01	4.44	4.42	4.40	4.42	**1.006**	**Max**	100.9%
G02	4.42	4.42	4.41	4.42	**1.006**	**Range**	2.2%
G03	4.49	4.47	4.47	4.48	**0.993**		
G04	4.44	4.45	4.42	4.44	**1.002**		
G05	4.47	4.46	4.44	4.46	**0.997**		
G06	4.50	4.47	4.45	4.47	**0.994**		
G07	4.44	4.43	4.43	4.43	**1.003**		
G09	4.44	4.41	4.40	4.42	**1.006**		
G10	4.48	4.46	4.44	4.46	**0.997**		
G11	4.42	4.41	4.39	4.41	**1.009**		
GSpare1	4.51	4.50	4.50	4.50	**0.987**		
			Avg_total	4.45			

Tyre	Test_2	Test_3	Test_4	Avg	Correction_factor		
H00	5.70	5.71	5.70	5.70	**0.988**	**Min**	98.4%
H01	5.74	5.69	5.71	5.71	**0.987**	**Max**	100.9%
H02	5.65	5.65	5.61	5.64	**1.000**	**Range**	2.5%
H03	5.64	5.70	5.59	5.64	**0.999**		
H04	5.64	5.64	5.57	5.62	**1.004**		
H05	5.63	5.58	5.56	5.59	**1.008**		
H06	5.70	5.61	5.55	5.62	**1.003**		
H07	5.63	5.60	5.54	5.59	**1.008**		
H09	5.64	5.57	5.57	5.59	**1.008**		
H10	5.59	5.58	5.59	5.59	**1.009**		
H11	5.62	5.62	5.63	5.62	**1.002**		
HSpare1	5.76	5.73	5.70	5.73	**0.984**		
			Avg_total	5.64			

Tyre	Test_2	Test_3	Test_4	Avg	Correction_factor		
J00	5.71	5.68	5.63	5.67	**1.005**	**Min**	99.2%
J01	5.76	5.72	5.68	5.72	**0.997**	**Max**	100.7%
J02	5.75	5.72	5.70	5.72	**0.996**	**Range**	1.5%
J03	5.70	5.66	5.63	5.66	**1.007**		
J04	5.73	5.70	5.66	5.70	**1.001**		
J05	5.73	5.69	5.66	5.69	**1.002**		
J06	5.74	5.70	5.68	5.71	**0.999**		
J07	5.71	5.68	5.65	5.68	**1.004**		
J09	5.74	5.70	5.69	5.71	**0.999**		
J10	5.75	5.73	5.71	5.73	**0.995**		
J11	5.74	5.68	5.65	5.69	**1.002**		
JSpare1	5.79	5.75	5.71	5.75	**0.992**		
			Avg_total	5.7			

Tyre	Test_2	Test_3	Test_4	Avg	Correction_factor		
K00	6.46	6.42	6.42	6.43	**1.009**	**Min**	99.1%
K01	6.49	6.47	6.46	6.47	**1.003**	**Max**	100.9%
K02	6.57	6.50	6.51	6.53	**0.995**	**Range**	1.9%
K03	6.52	6.46	6.41	6.46	**1.005**		
K04	6.61	6.54	6.52	6.56	**0.991**		
K05	6.57	6.55	6.54	6.55	**0.991**		
K06	6.51	6.52	6.44	6.49	**1.001**		
K07	6.59	6.55	6.49	6.54	**0.993**		
K09	6.49	6.48	6.46	6.48	**1.003**		
K10	6.57	6.53	6.51	6.54	**0.994**		
K11	6.50	6.43	6.41	6.45	**1.007**		
KSpare1	6.48	6.40	6.42	6.43	**1.009**		
			Avg_total	6.49			

Annex D - Alignment tests results - Cr (N/kN)

1. Raw data

1.1. C1/C2 tyres

											Corrected individ vBlues 2-4			
		Mesures	1	2	3	4	moy 2-4	sig 2-4	Corr Factor	Corrected Bvg	2	3	4	sigma
TÜV	Lab0	A0	5,05	5,10	5,08	5,08	5,087	0,012	0,995	5,063	5,08	5,06	5,06	0,011
UTAC	Lab1	A1	4,80	4,79	4,77	4,79	4,783	0,012	1,008	4,820	4,83	4,81	4,83	0,012
Idiada	Lab2	A2	4,84	4,87	4,93	4,85	4,883	0,042	0,992	4,844	4,83	4,89	4,81	0,041
Mi	Lab3	A3	4,73	4,70	4,70	4,74	4,713	0,023	1,006	4,739	4,73	4,73	4,77	0,023
JASIC	Lab4	A4	4,81	4,84	4,82	4,81	4,823	0,015	1,010	4,870	4,89	4,87	4,86	0,015
GY	Lab5	A5	4,66	4,65	4,65	4,67	4,657	0,012	0,999	4,651	4,64	4,64	4,66	0,012
Conti	Lab6	A6	4,77	4,75	4,75	4,72	4,740	0,017	1,006	4,769	4,78	4,78	4,75	0,017
BS	Lab7	A7	4,67	4,68	4,66	4,62	4,653	0,031	1,004	4,673	4,70	4,68	4,64	0,031
Pi	Lab8	A8	4,73	4,74	4,67	4,68	4,697	0,038	1,003	4,710	4,75	4,68	4,69	0,038
RDW	Lab9	A9	4,78	4,85	4,82	4,79	4,820	0,030	0,997	4,804	4,83	4,80	4,77	0,030
AP	Lab10	A10	4,77	4,75	4,73	4,69	4,723	0,031	1,007	4,756	4,78	4,76	4,72	0,031
										4,791				

											Corrected individ vBlues 2-4			
		Mesures	1	2	3	4	moy 2-4	sig 2-4	Corr Factor	Corrected Bvg	2	3	4	sigma
TÜV	Lab0	X0	5,60	5,62	5,60	5,64	5,620	0,020	0,998	5,610	5,61	5,59	5,63	0,020
UTAC	Lab1	X1	5,25	5,14	5,13	5,11	5,127	0,015	1,017	5,215	5,23	5,22	5,20	0,016
Idiada	Lab2	X2	5,27	5,30	5,31	5,24	5,283	0,038	0,987	5,215	5,23	5,24	5,17	0,037
Mi	Lab3	X3	5,37	5,26	5,34	5,24	5,280	0,053	0,990	5,226	5,21	5,29	5,19	0,052
JASIC	Lab4	X4	5,40	5,42	5,40	5,40	5,407	0,012	0,992	5,365	5,38	5,36	5,36	0,011
GY	Lab5	X5	5,11	5,10	5,10	5,13	5,110	0,017	0,996	5,091	5,08	5,08	5,11	0,017
Conti	Lab6	X6	5,08	5,05	5,07	5,09	5,070	0,020	0,997	5,054	5,03	5,05	5,07	0,020
BS	Lab7	X7	5,21	5,13	5,12	5,14	5,130	0,010	1,012	5,190	5,19	5,18	5,20	0,010
Pi	Lab8	X8	5,20	5,18	5,18	5,20	5,187	0,012	1,005	5,212	5,21	5,21	5,23	0,012
RDW	Lab9	X9	5,34	5,39	5,40	5,33	5,373	0,038	1,012	5,440	5,46	5,47	5,40	0,038
AP	Lab10	X10	5,11	5,11	5,09	5,11	5,103	0,012	1,006	5,135	5,14	5,12	5,14	0,012
										5,250				

											Corrected individ values 2-4			
		Mesures	1	2	3	4	moy 2-4	sig 2-4	Corr Factor	Corrected avg	2	3	4	sigma
TÜV	Lab0	B0	6,85	6,83	6,81	6,87	6,837	0,031	0,994	6,795	6,79	6,77	6,83	0,030
UTAC	Lab1	B1	6,55	6,55	6,57	6,54	6,553	0,015	1,002	6,567	6,56	6,58	6,55	0,015
Idiada	Lab2	B2	6,67	6,70	6,68	6,62	6,667	0,042	0,990	6,599	6,63	6,61	6,55	0,041
Mi	Lab3	B3	6,58	6,48	6,52	6,47	6,490	0,026	0,986	6,398	6,39	6,43	6,38	0,026
JASIC	Lab4	B4	6,70	6,65	6,65	6,67	6,657	0,012	0,993	6,613	6,61	6,61	6,63	0,011
GY	Lab5	B5	6,45	6,49	6,49	6,51	6,497	0,012	0,999	6,487	6,48	6,48	6,50	0,012
Conti	Lab6	B6	6,31	6,33	6,32	6,33	6,327	0,006	0,999	6,321	6,32	6,31	6,32	0,006
BS	Lab7	B7	6,61	6,48	6,50	6,46	6,480	0,020	1,001	6,484	6,48	6,50	6,46	0,020
Pi	Lab8	B8	6,59	6,56	6,53	6,52	6,537	0,021	1,005	6,571	6,59	6,56	6,55	0,021
RDW	Lab9	B9	6,51	6,53	6,56	6,50	6,530	0,030	0,996	6,507	6,51	6,54	6,48	0,030
AP	Lab10	B10	6,48	6,45	6,44	6,39	6,427	0,032	1,005	6,457	6,48	6,47	6,42	0,032
										6,527				

											Corrected individ values 2-4			
		Mesures	1	2	3	4	moy 2-4	sig 2-4	Corr Factor	Corrected avg	2	3	4	sigma
TÜV	Lab0	C0	7,34	7,33	7,33	7,32	7,327	0,006	1,003	7,347	7,35	7,35	7,34	0,006
UTAC	Lab1	C1	7,17	7,12	7,07	7,08	7,090	0,026	1,000	7,093	7,12	7,07	7,08	0,026
Idiada	Lab2	C2	7,31	7,19	7,20	7,25	7,213	0,032	1,001	7,220	7,20	7,21	7,26	0,032
Mi	Lab3	C3	7,28	7,26	7,25	7,25	7,253	0,006	0,997	7,230	7,24	7,23	7,23	0,006
JASIC	Lab4	C4	7,29	7,25	7,22	7,22	7,230	0,017	1,004	7,260	7,28	7,25	7,25	0,017
GY	Lab5	C5	7,18	7,15	7,13	7,15	7,143	0,012	0,996	7,114	7,12	7,10	7,12	0,011
Conti	Lab6	C6	7,21	7,17	7,19	7,19	7,183	0,012	1,005	7,216	7,20	7,22	7,22	0,012
BS	Lab7	C7	7,43	7,40	7,37	7,38	7,383	0,015	0,993	7,329	7,35	7,32	7,33	0,015
Pi	Lab8	C8	7,15	7,12	7,11	7,08	7,103	0,021	1,002	7,119	7,14	7,13	7,10	0,021
RDW	Lab9	C9	7,27	7,24	7,24	7,22	7,233	0,012	0,998	7,217	7,22	7,22	7,20	0,012
AP	Lab10	C10	7,18	7,16	7,14	7,13	7,143	0,015	1,005	7,179	7,20	7,18	7,17	0,015
										7.211				

											Corrected individ values 2-4			
		Mesures	1	2	3	4	moy 2-4	sig 2-4	Corr Factor	Corrected avg	2	3	4	sigma
TÜV	Lab0	D0	8,96	8,98	8,96	8,92	8,953	0,031	0,998	8,931	8,96	8,94	8,90	0,030
UTAC	Lab1	D1	8,93	8,83	8,87	8,80	8,833	0,035	0,993	8,775	8,77	8,81	8,74	0,035
Idiada	Lab2	D2	8,58	8,58	8,51	8,61	8,567	0,051	0,993	8,507	8,52	8,45	8,55	0,051
Mi	Lab3	D3	8,61	8,58	8,52	8,52	8,540	0,035	1,001	8,545	8,58	8,52	8,52	0,035
JASIC	Lab4	D4	8,55	8,48	8,43	8,44	8,450	0,026	1,003	8,474	8,50	8,45	8,46	0,027
GY	Lab5	D5	8,35	8,31	8,32	8,28	8,303	0,021	1,002	8,324	8,33	8,34	8,30	0,021
Conti	Lab6	D6	8,45	8,36	8,34	8,32	8,340	0,020	1,005	8,379	8,40	8,38	8,36	0,020
BS	Lab7	D7	8,84	8,74	8,72	8,65	8,703	0,047	0,998	8,688	8,72	8,70	8,64	0,047
Pi	Lab8	D8	8,55	8,49	8,48	8,42	8,463	0,038	1,004	8,497	8,52	8,51	8,45	0,038
RDW	Lab9	D9	8,48	8,57	8,64	8,56	8,590	0,044	1,003	8,617	8,60	8,67	8,59	0,044
AP	Lab10	D10	8,60	8,56	8,55	8,50	8,537	0,032	0,992	8,464	8,49	8,48	8,43	0,032
										8,564				

											Corrected individ values 2-4			
		Mesures	1	2	3	4	moy 2-4	sig 2-4	Corr Factor	Corrected avg	2	3	4	sigma
TÜV	Lab0	E0	9,57	9,45	9,45	9,43	9,443	0,012	0,994	9,386	9,39	9,39	9,37	0,011
UTAC	Lab1	E1	9,54	9,42	9,45	9,40	9,423	0,025	0,997	9,399	9,40	9,43	9,38	0,025
Idiada	Lab2	E2	9,21	9,17	9,17	9,18	9,173	0,006	1,010	9,264	9,26	9,26	9,27	0,006
Mi	Lab3	E3	9,35	9,27	9,27	9,22	9,253	0,029	0,998	9,233	9,25	9,25	9,20	0,029
JASIC	Lab4	E4	9,33	9,25	9,26	9,21	9,240	0,026	0,994	9,181	9,19	9,20	9,15	0,026
GY	Lab5	E5	9,00	9,00	9,03	8,99	9,007	0,021	1,001	9,012	9,01	9,04	9,00	0,021
Conti	Lab6	E6	9,15	9,04	9,02	8,99	9,017	0,025	1,006	9,070	9,09	9,07	9,04	0,025
BS	Lab7	E7	9,20	9,19	9,20	9,14	9,177	0,032	0,994	9,118	9,13	9,14	9,08	0,032
Pi	Lab8	E8	9,24	9,19	9,18	9,16	9,177	0,015	1,001	9,189	9,20	9,19	9,17	0,015
RDW	Lab9	E9	9,39	9,28	9,32	9,26	9,287	0,031	1,003	9,319	9,31	9,35	9,29	0,031
AP	Lab10	E10	8,94	8,92	8,80	8,84	8,853	0,061	1,009	8,937	9,00	8,88	8,92	0,062
										9,192				

1.2. C3 tyres

											Corrected individ values 2-4			
		Mesures	1	2	3	4	moy 2-4	sig 2-4	Corr Factor	Corrected avg	2	3	4	sigma
TÜV	Lab0	F0	3,62	3,58	3,54	3,52	3,547	0,031	1,014	3,598	3,63	3,59	3,57	0,031
UTAC	Lab1	F1	3,68	3,69	3,67	3,69	3,683	0,012	1,008	3,714	3,72	3,70	3,72	0,012
Idiada	Lab2	F2	3,97	3,96	3,95	3,97	3,960	0,010	0,978	3,874	3,87	3,86	3,88	0,010
Mi	Lab3	F3	3,65	3,64	3,62	3,62	3,627	0,012	1,001	3,631	3,64	3,62	3,62	0,012
JASIC	Lab4	F4	3,66	3,64	3,64	3,65	3,643	0,006	1,006	3,664	3,66	3,66	3,67	0,006
GY	Lab5	F5	3,52	3,50	3,49	3,48	3,490	0,010	1,013	3,537	3,55	3,54	3,53	0,010
Conti²	Lab6	F6	3,56	3,55	3,54	3,53	3,540	0,010	1,014	3,591	3,60	3,59	3,58	0,010
BS	Lab7	F7	3,82	3,79	3,79	3,77	3,783	0,012	1,001	3,788	3,79	3,79	3,77	0,012
RDW	Lab9	F9	3,75	3,77	3,74	3,74	3,750	0,017	1,007	3,777	3,80	3,77	3,77	0,017
AP	Lab10	F10	3,49	3,50	3,51	3,47	3,493	0,021	1,007	3,519	3,53	3,54	3,50	0,021
Prom	Lab11	F11	3,76	3,74	3,74	3,74	3,740	0,000	0,985	3,684	3,68	3,68	3,68	0,000
										3,671				

											Corrected individ values 2-4			
		Mesures	1	2	3	4	moy 2-4	sig 2-4	Corr Factor	Corrected avg	2	3	4	sigma
TÜV	Lab0	G0	4,43	4,38	4,36	4,37	4,370	0,010	1,000	4,372	4,38	4,36	4,37	0,010
UTAC	Lab1	G1	4,53	4,50	4,49	4,46	4,483	0,021	1,006	4,509	4,53	4,52	4,49	0,021
Idiada	Lab2	G2	4,60	4,69	4,71	4,64	4,680	0,036	1,006	4,710	4,72	4,74	4,67	0,036
Mi	Lab3	G3	4,48	4,47	4,47	4,44	4,460	0,017	0,993	4,429	4,44	4,44	4,41	0,017
JASIC	Lab4	G4	4,43	4,41	4,39	4,41	4,403	0,012	1,002	4,412	4,42	4,40	4,42	0,012
GY	Lab5	G5	4,37	4,35	4,34	4,32	4,337	0,015	0,997	4,326	4,34	4,33	4,31	0,015
Conti²	Lab6	G6	4,38	4,35	4,34	4,33	4,340	0,010	0,994	4,313	4,32	4,31	4,30	0,010
BS	Lab7	G7	4,80	4,82	4,74	4,74	4,767	0,046	1,003	4,780	4,83	4,75	4,75	0,046
RDW	Lab9	G9	4,56	4,51	4,50	4,54	4,517	0,021	1,006	4,546	4,54	4,53	4,57	0,021
AP	Lab10	G10	4,34	4,33	4,32	4,33	4,327	0,006	0,997	4,312	4,32	4,31	4,32	0,006
Prom	Lab11	G11	4,55	4,55	4,52	4,50	4,523	0,025	1,009	4,563	4,59	4,56	4,54	0,025
										4,479				

											Corrected individ values 2-4			
		Mesures	1	2	3	4	moy 2-4	sig 2-4	Corr Factor	Corrected avg	2	3	4	sigma
TÜV	Lab0	H0	5,18	5,16	5,20	5,23	5,197	0,035	0,988	5,136	5,10	5,14	5,17	0,035
UTAC	Lab1	H1	5,37	5,37	5,34	5,30	5,337	0,035	0,987	5,266	5,30	5,27	5,23	0,035
Idiada	Lab2	H2	5,58	5,60	5,55	5,61	5,587	0,032	1,000	5,587	5,60	5,55	5,61	0,032
Mi	Lab3	H3	5,40	5,38	5,38	5,35	5,370	0,017	0,999	5,364	5,37	5,37	5,34	0,017
JASIC	Lab4	H4	5,29	5,27	5,27	5,26	5,267	0,006	1,004	5,286	5,29	5,29	5,28	0,006
GY	Lab5	H5	5,31	5,28	5,26	5,25	5,263	0,015	1,008	5,308	5,32	5,30	5,29	0,015
Conti²	Lab6	H6	5,29	5,28	5,26	5,24	5,260	0,020	1,003	5,276	5,30	5,28	5,26	0,020
BS	Lab7	H7	5,60	5,58	5,60	5,56	5,580	0,020	1,008	5,627	5,63	5,65	5,61	0,020
RDW	Lab9	H9	5,58	5,55	5,57	5,59	5,570	0,020	1,008	5,614	5,59	5,61	5,63	0,020
AP	Lab10	H10	5,18	5,17	5,19	5,15	5,170	0,020	1,009	5,217	5,22	5,24	5,20	0,020
Prom	Lab11	H11	5,56	5,55	5,52	5,50	5,523	0,025	1,002	5,537	5,56	5,53	5,51	0,025
										5,383				

											Corrected individ values 2-4			
		Mesures	1	2	3	4	moy 2-4	sig 2-4	Corr Factor	Corrected avg	2	3	4	sigma
TÜV	Lab0	J0	5,65	5,67	5,60	5,60	5,623	0,040	1,005	5,653	5,70	5,63	5,63	0,041
UTAC	Lab1	J1	5,70	5,66	5,65	5,64	5,650	0,010	0,997	5,633	5,64	5,63	5,62	0,010
Idiada	Lab2	J2	5,95	5,96	5,94	5,92	5,940	0,020	0,996	5,919	5,94	5,92	5,90	0,020
Mi	Lab3	J3	5,55	5,52	5,51	5,49	5,507	0,015	1,007	5,545	5,56	5,55	5,53	0,015
JASIC	Lab4	J4	5,49	5,44	5,44	5,43	5,437	0,006	1,001	5,443	5,45	5,45	5,44	0,006
GY	Lab5	J5	5,54	5,51	5,48	5,47	5,487	0,021	1,002	5,496	5,52	5,49	5,48	0,021
Conti²	Lab6	J6	5,57	5,54	5,52	5,50	5,520	0,020	0,999	5,517	5,54	5,52	5,50	0,020
BS	Lab7	J7	5,84	5,83	5,83	5,78	5,813	0,029	1,004	5,837	5,85	5,85	5,80	0,029
RDW	Lab9	J9	5,73	5,70	5,70	5,67	5,690	0,017	0,999	5,683	5,69	5,69	5,66	0,017
AP	Lab10	J10	5,47	5,47	5,46	5,46	5,463	0,006	0,995	5,438	5,44	5,43	5,43	0,006
Prom	Lab11	J11	5,70	5,66	5,65	5,65	5,653	0,006	1,002	5,666	5,67	5,66	5,66	0,006
										5,621				

											Corrected individ values 2-4			
		Mesures	1	2	3	4	moy 2-4	sig 2-4	Corr Factor	Corrected avg	2	3	4	sigma
TÜV	Lab0	K0	6,33	6,31	6,34	6,36	6,337	0,025	1,009	6,397	6,37	6,40	6,42	0,025
UTAC	Lab1	K1	6,52	6,47	6,50	6,47	6,480	0,017	1,003	6,501	6,49	6,52	6,49	0,017
Idiada	Lab2	K2	6,78	6,80	6,81	6,79	6,800	0,010	0,995	6,766	6,77	6,78	6,76	0,010
Mi	Lab3	K3	6,44	6,42	6,40	6,40	6,407	0,012	1,005	6,438	6,45	6,43	6,43	0,012
JASIC	Lab4	K4	6,40	6,35	6,34	6,33	6,340	0,010	0,991	6,280	6,29	6,28	6,27	0,010
GY	Lab5	K5	6,44	6,40	6,38	6,36	6,380	0,020	0,991	6,323	6,34	6,32	6,30	0,020
Conti²	Lab6	K6	6,35	6,33	6,31	6,29	6,310	0,020	1,001	6,314	6,33	6,31	6,29	0,020
BS	Lab7	K7	6,72	6,65	6,69	6,66	6,667	0,021	0,993	6,617	6,60	6,64	6,61	0,021
RDW	Lab9	K9	6,49	6,45	6,48	6,48	6,470	0,017	1,003	6,488	6,47	6,50	6,50	0,017
AP	Lab10	K10	6,46	6,48	6,42	6,43	6,443	0,032	0,994	6,402	6,44	6,38	6,39	0,032
Prom	Lab11	K11	6,40	6,38	6,35	6,41	6,380	0,030	1,007	6,427	6,43	6,40	6,46	0,030
										6,450				

2. Qualification of reference machines

2.1. Sigma m for C1/C2 machines (based on corrected raw data)

Laboratory	Sigma A	Sigma X	Sigma B	Sigma C	Sigma D	Sigma E	**Sigma m**
Lab0	0.011	0,020	0,030	0,006	0,030	0,011	**0.021**
Lab1	0.012	0,016	0,015	0,026	0,035	0,025	**0.023**
Lab2	0.041	0,037	0,041	0,032	0,051	0,006	**0.038**
Lab3	0.023	0,052	0,026	0,006	0,035	0,029	**0.032**
Lab4	0.015	0,011	0,011	0,017	0,027	0,026	**0.019**
Lab5	0.012	0,017	0,012	0,011	0,021	0,021	**0.016**
Lab6	0.017	0,020	0,006	0,012	0,020	0,025	**0.018**
Lab7	0.031	0,010	0,020	0,015	0,047	0,032	**0.029**
Lab8	0.038	0,012	0,021	0,021	0,038	0,015	**0.026**
Lab9	0.030	0,038	0,030	0,012	0,044	0,031	**0.032**
Lab10	0.031	0,012	0,032	0,015	0,032	0,062	**0.035**

2.2. Sigma m for C3 machines (based on corrected raw data)

Laboratory	Sigma F	Sigma G	Sigma H	Sigma J	Sigma K	**Sigma m**
Lab0	0,031	0,010	0,035	0,041	0,025	**0.030**
Lab1	0,012	0,021	0,035	0,010	0,017	**0.021**
Lab2	0,010	0,036	0,032	0,020	0,010	**0.024**
Lab3	0,012	0,017	0,017	0,015	0,012	**0.015**
Lab4	0,006	0,012	0,006	0,006	0,010	**0.008**

Lab5	0,010	0,015	0,015	0,021	0,020	**0.017**
Lab6	0,010	0,010	0,020	0,020	0,020	**0.017**
Lab7	0,012	0,046	0,020	0,029	0,021	**0.028**
Lab9	0,017	0,021	0,020	0,017	0,017	**0.019**
Lab10	0,021	0,006	0,020	0,006	0,032	**0.020**
Lab11	0,000	0,025	0,025	0,006	0,030	**0.021**

3. Statistical analysis of the Interlaboratories results – Cr (N/kN)

1. Results of interlaboratories tests on Coefficient of rolling resistance (Cr) – Tyre A

1.1. Average, standard deviation, coefficient of variation in percentage, expanded uncertainty in repeatability conditions

Laboratory	N	Average	Standard_deviation	Coefficient_of_variation_perc	Repeatability_exp_uncertainty
00	3	5.063	0.011	0.227	0.023
01	3	4.820	0.012	0.241	0.023
02	3	4.844	0.041	0.853	0.083
03	3	4.739	0.023	0.490	0.046
04	3	4.870	0.015	0.317	0.031
05	3	4.651	0.012	0.248	0.023
06	3	4.769	0.017	0.365	0.035
07	3	4.673	0.031	0.657	0.061
08	3	4.710	0.038	0.806	0.076
09	3	4.804	0.030	0.622	0.060
10	3	4.756	0.031	0.647	0.062

1.2. Confidence interval of the average per laboratory at the level 95%

Confidence_interval_av_low	Confidence_interval_av_up	T	Confidence_interval_T_low
5.050	5.076	4.303	5.034
4.807	4.833	4.303	4.791
4.797	4.891	4.303	4.741
4.713	4.766	4.303	4.682
4.853	4.887	4.303	4.832
4.638	4.664	4.303	4.622
4.750	4.789	4.303	4.726
4.638	4.707	4.303	4.596
4.667	4.753	4.303	4.615
4.770	4.838	4.303	4.730
4.721	4.791	4.303	4.680

Confidence_interval_T_up	Semi_amplitude_T
5.091	0.029
4.849	0.029
4.947	0.103
4.797	0.058
4.908	0.038
4.679	0.029
4.813	0.043
4.749	0.076
4.804	0.094
4.878	0.074
4.832	0.076

1.3. Between and within contribution for the factor laboratory

Laboratory	CEi	CDi
00	57.55	1.78
01	0.65	1.83
02	2.20	23.02
03	2.05	7.28
04	4.89	3.21
05	15.28	1.79
06	0.35	4.10
07	10.84	12.70
08	5.10	19.45
09	0.13	12.07
10	0.94	12.77

1.4. Global average, results of precision values and measurement uncertainties

Variable	Cr
Global_average	4.791
Repeatability_standard_deviat	0.026
Limit_of_repeatability	0.073
Repeatability_exp_uncertainty	0.052
Reproducibility_stand_deviat	0.115
Limit_of_reproducibility	0.323
Reproducibility_exp_uncertaint	0.231

1.5. Results of measurement uncertainties in percentage

Variable	Cr
Repe_exp_uncert_percent	1.08
Repro_exp_uncert_percent	4.82

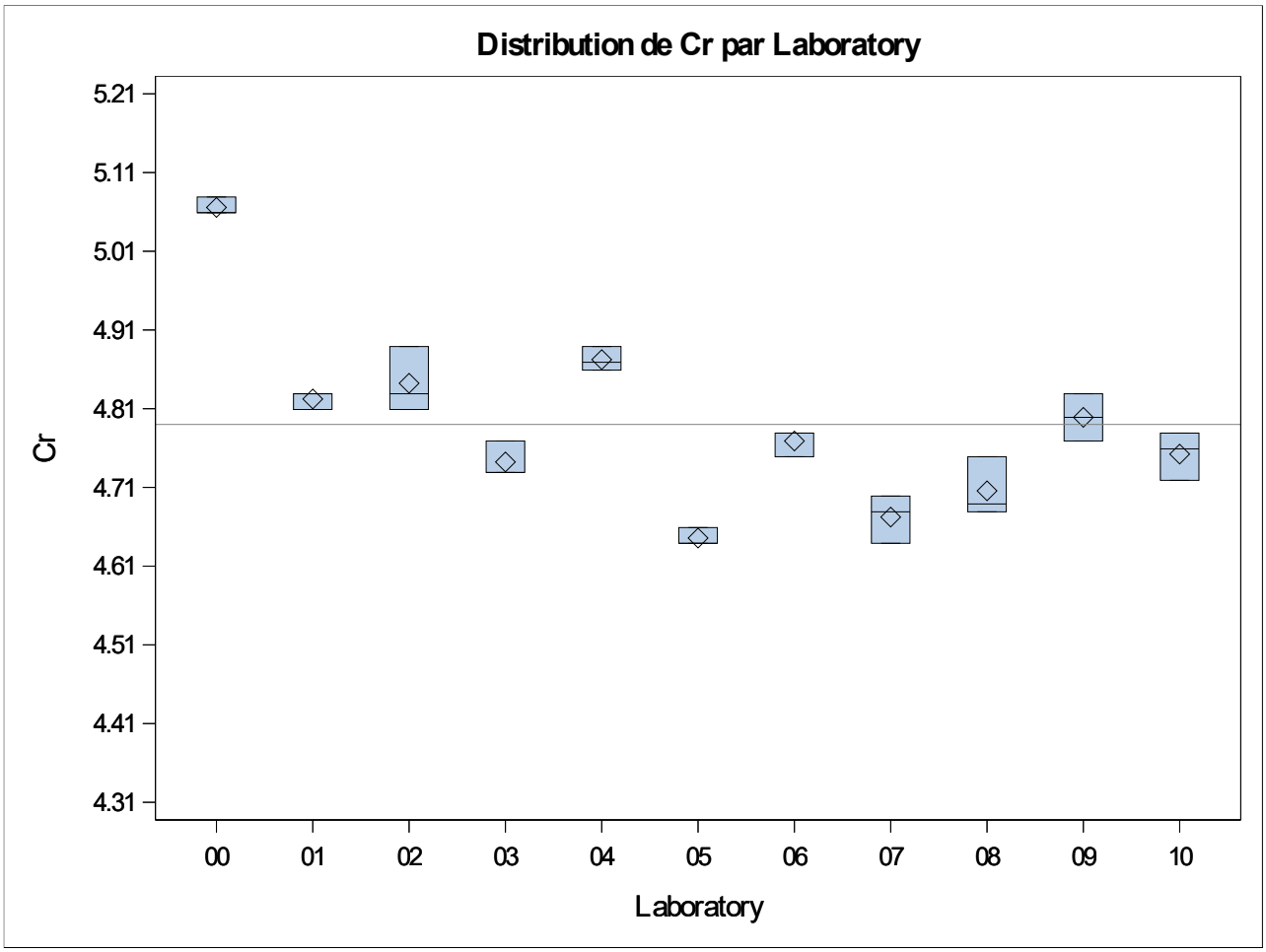
1.6. Part of variation in per cent of the laboratories on the total variation

Variable	Cr
Variation_part_labo	94.94

1.7. *Trueness study - Estimation and significativity of the bias*

Laboratory	Number of non-missing values, Cr	Bias	Inc_bias	IC_inf_bias	IC_sup_bias	Bias_significant
00	3	0.272	0.108	0.060	0.484	YES
01	3	0.029	0.108	-0.183	0.241	NO
02	3	0.053	0.108	-0.159	0.265	NO
03	3	-0.051	0.108	-0.263	0.161	NO
04	3	0.079	0.108	-0.133	0.291	NO
05	3	-0.140	0.108	-0.352	0.072	NO
06	3	-0.021	0.108	-0.233	0.191	NO
07	3	-0.118	0.108	-0.330	0.094	NO
08	3	-0.081	0.108	-0.293	0.131	NO
09	3	0.013	0.108	-0.199	0.225	NO
10	3	-0.035	0.108	-0.247	0.177	NO

1.8. Box-plot graphics



2. Results of interlaboratories tests on Coefficient of rolling resistance (Cr) – Tyre X

2.1. Average, standard deviation, coefficient of variation in percentage, expanded uncertainty in repeatability conditions

Laboratory	N	Average	Standard_deviation	Coefficient_of_variation_perc	Repeatability_exp_uncertainty
00	3	5.610	0.020	0.356	0.040
01	3	5.215	0.016	0.298	0.031
02	3	5.215	0.037	0.717	0.075
03	3	5.226	0.052	1.002	0.105
04	3	5.365	0.011	0.214	0.023
05	3	5.091	0.017	0.339	0.035
06	3	5.054	0.020	0.394	0.040
07	3	5.190	0.010	0.195	0.020
08	3	5.212	0.012	0.223	0.023
09	3	5.440	0.038	0.705	0.077
10	3	5.135	0.012	0.226	0.023

2.2. Confidence interval of the average per laboratory at the level 95%

Confidence_interval_av_low	Confidence_interval_av_up	T	Confidence_interval_T_low
5.588	5.633	4.303	5.561
5.197	5.232	4.303	5.176
5.173	5.257	4.303	5.122
5.166	5.285	4.303	5.096
5.352	5.378	4.303	5.337
5.071	5.110	4.303	5.048
5.032	5.077	4.303	5.005
5.179	5.202	4.303	5.165
5.199	5.225	4.303	5.183
5.397	5.483	4.303	5.345
5.122	5.149	4.303	5.107

Confidence_interval_T_up	Semi_amplitude_T
5.660	0.050
5.253	0.039
5.308	0.093
5.356	0.130
5.394	0.028
5.134	0.043
5.104	0.050
5.215	0.025
5.241	0.029
5.535	0.095
5.164	0.029

2.3. Between and within contribution for the factor laboratory

Laboratory	CEi	CDi
00	49.08	5.35
01	0.48	3.24
02	0.47	18.75
03	0.23	36.83
04	4.99	1.76
05	9.63	4.00
06	14.55	5.34
07	1.38	1.37
08	0.55	1.81
09	13.62	19.73
10	5.01	1.81

2.4. Global average, results of precision values and measurement uncertainties

Variable	Cr
Global_average	5.250
Repeatability_standard_deviat	0.026
Limit_of_repeatability	0.073
Repeatability_exp_uncertainty	0.052
Reproducibility_stand_deviat	0.164
Limit_of_reproducibility	0.459
Reproducibility_exp_uncertaint	0.328

2.5. Results of measurement uncertainties in percentage

Variable	Cr
Repe_exp_uncert_percent	0.99
Repro_exp_uncert_percent	6.24

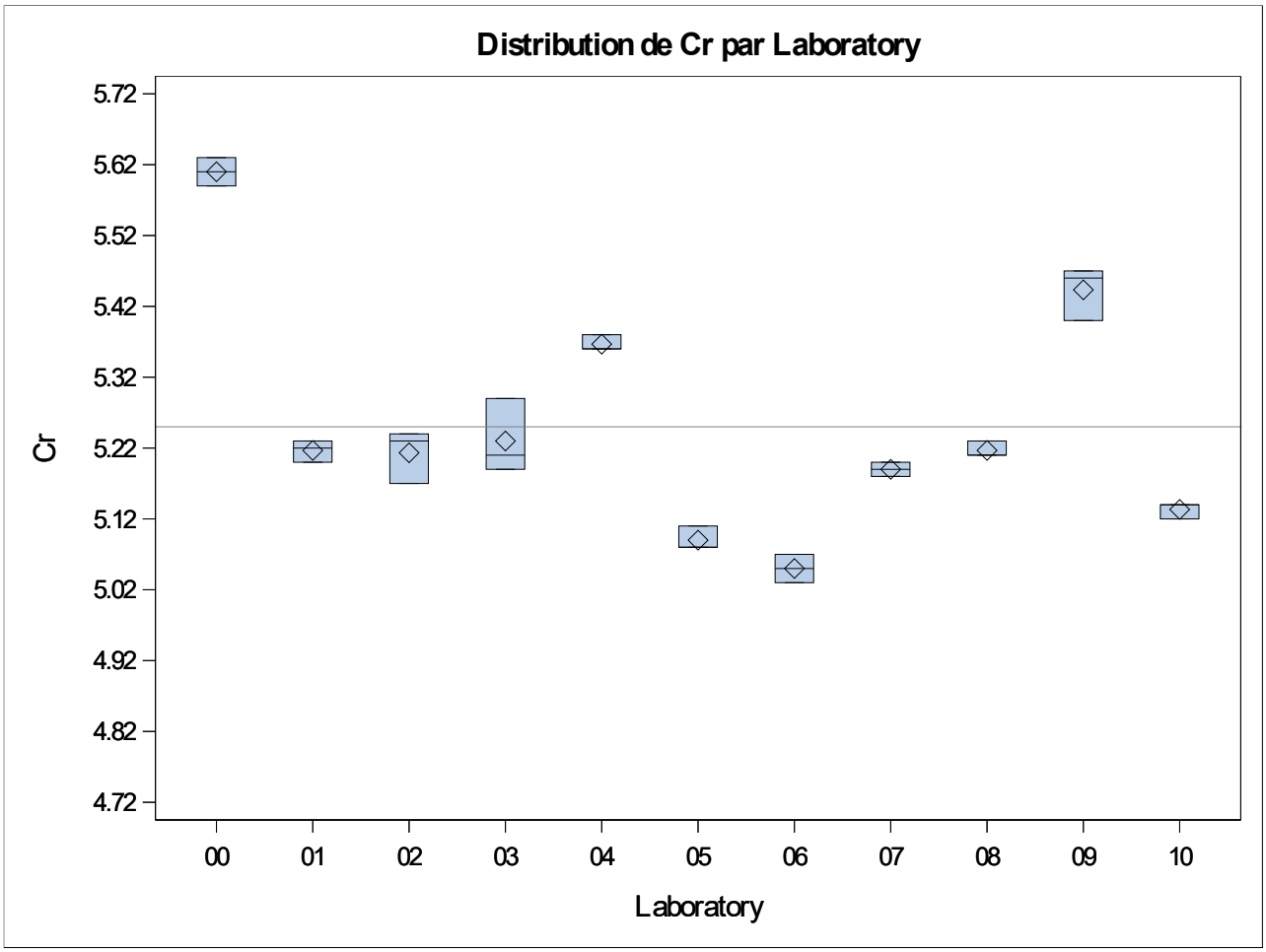
2.6. Part of variation in percent of the laboratories on the total variation

Variable	Cr
Variation_part_labo	97.48

2.7. Trueness study - Estimation and significativity of the bias

Laboratory	Number of non-missing values, Cr	Bias	Inc_bias	IC_inf_bias	IC_sup_bias	Bias_significant
00	3	0.360	0.155	0.056	0.663	YES
01	3	-0.036	0.155	-0.339	0.268	NO
02	3	-0.035	0.155	-0.339	0.268	NO
03	3	-0.025	0.155	-0.328	0.279	NO
04	3	0.115	0.155	-0.189	0.418	NO
05	3	-0.159	0.155	-0.463	0.144	NO
06	3	-0.196	0.155	-0.499	0.108	NO
07	3	-0.060	0.155	-0.364	0.243	NO
08	3	-0.038	0.155	-0.342	0.265	NO
09	3	0.190	0.155	-0.114	0.493	NO
10	3	-0.115	0.155	-0.418	0.189	NO

2.8. Box-plot graphics



3. Results of interlaboratories tests on Coefficient of rolling resistance (Cr) – Tyre B

3.1. Average, standard deviation, coefficient of variation in percentage, expanded uncertainty in repeatability conditions

Laboratory	N	Average	Standard_deviation	Coefficient_of_variation_perc	Repeatability_exp_uncertainty
00	3	6.795	0.030	0.447	0.061
01	3	6.567	0.015	0.233	0.031
02	3	6.599	0.041	0.624	0.082
03	3	6.398	0.026	0.408	0.052
04	3	6.613	0.011	0.173	0.023
05	3	6.487	0.012	0.178	0.023
06	3	6.321	0.006	0.091	0.012
07	3	6.484	0.020	0.309	0.040
08	3	6.571	0.021	0.318	0.042
09	3	6.507	0.030	0.459	0.060
10	3	6.457	0.032	0.500	0.065

3.2. Confidence interval of the average per laboratory at the level 95%

Confidence_interval_av_low	Confidence_interval_av_up	T	Confidence_interval_T_low
6.761	6.829	4.303	6.720
6.550	6.585	4.303	6.529
6.552	6.646	4.303	6.497
6.368	6.427	4.303	6.333
6.600	6.626	4.303	6.584
6.474	6.500	4.303	6.458
6.314	6.327	4.303	6.306
6.461	6.507	4.303	6.434
6.547	6.595	4.303	6.519
6.473	6.541	4.303	6.433
6.421	6.494	4.303	6.377

Confidence_interval_T_up	Semi_amplitude_T
6.870	0.075
6.605	0.038
6.701	0.102
6.463	0.065
6.641	0.028
6.516	0.029
6.335	0.014
6.534	0.050
6.623	0.052

Confidence_interval_T_up	Semi_amplitude_T
6.581	0.074
6.537	0.080

3.3. Between and within contribution for the factor laboratory

Laboratory	CEi	CDi
00	46.01	13.95
01	1.04	3.55
02	3.30	25.70
03	10.72	10.29
04	4.69	1.99
05	1.03	2.01
06	27.36	0.50
07	1.20	6.06
08	1.24	6.63
09	0.26	13.52
10	3.14	15.79

3.4. Global average, results of precision values and measurement uncertainties

Variable	Cr
Global_average	6.527
Repeatability_standard_deviat	0.025
Limit_of_repeatability	0.069
Repeatability_exp_uncertainty	0.049
Reproducibility_stand_deviat	0.126
Limit_of_reproducibility	0.354
Reproducibility_exp_uncertaint	0.253

3.5. Results of measurement uncertainties in percentage

Variable	Cr
Repe_exp_uncert_percent	0.75
Repro_exp_uncert_percent	3.88

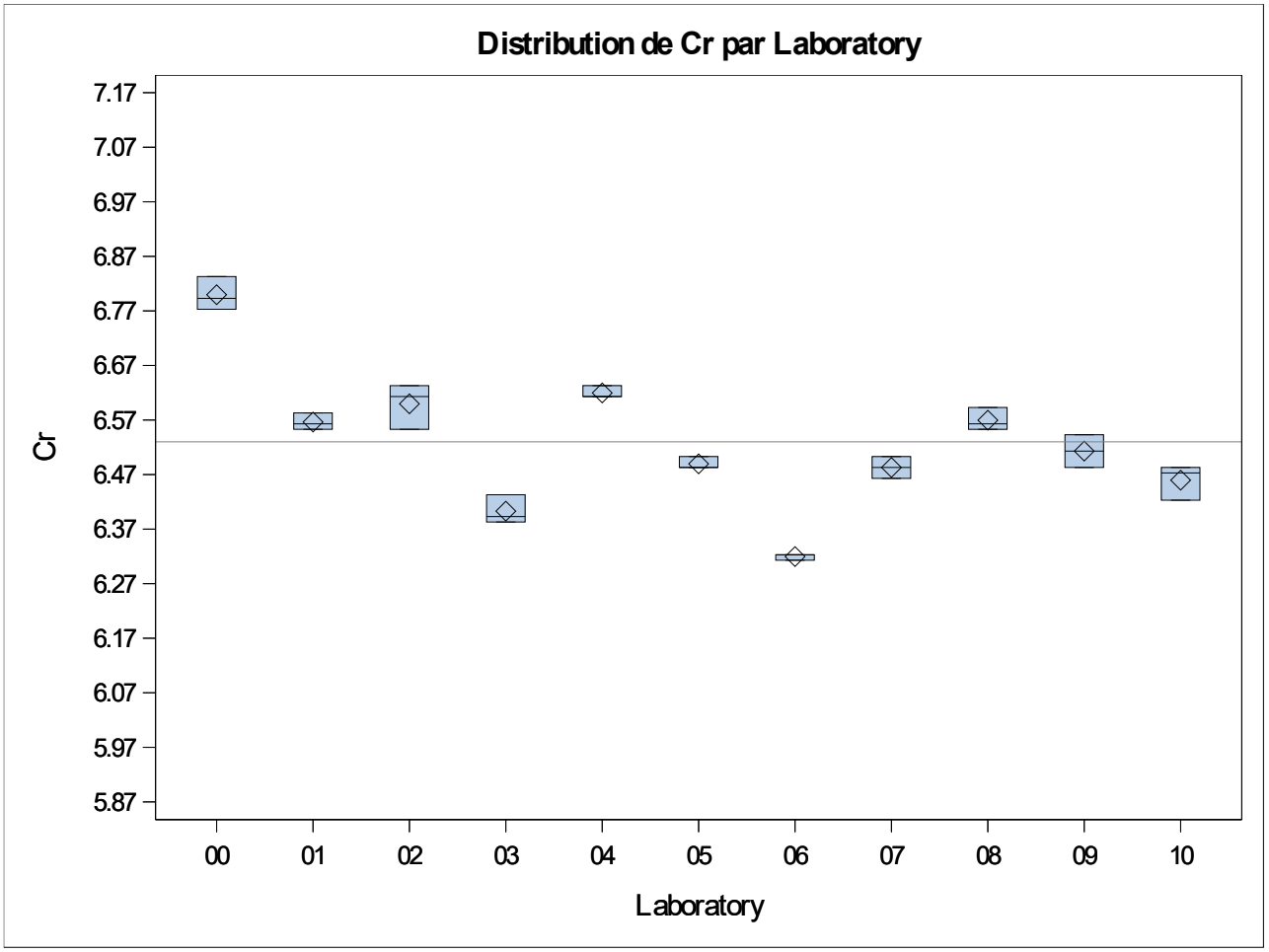
3.6. Part of variation in percent of the laboratories on the total variation

Variable	Cr
Variation_part_labo	96.24

3.7. Trueness study - Estimation and significativity of the bias

Laboratory	Number of non-missing values, Cr	Bias	Inc_bias	IC_inf_bias	IC_sup_bias	Bias_significant
00	3	0.268	0.119	0.034	0.501	YES
01	3	0.040	0.119	-0.193	0.274	NO
02	3	0.072	0.119	-0.162	0.305	NO
03	3	-0.129	0.119	-0.363	0.104	NO
04	3	0.086	0.119	-0.148	0.319	NO
05	3	-0.040	0.119	-0.273	0.193	NO
06	3	-0.207	0.119	-0.440	0.027	NO
07	3	-0.043	0.119	-0.277	0.190	NO
08	3	0.044	0.119	-0.189	0.277	NO
09	3	-0.020	0.119	-0.254	0.213	NO
10	3	-0.070	0.119	-0.303	0.163	NO

3.8. Box-plot graphics



4. Results of interlaboratories tests on Coefficient of rolling resistance (Cr) – Tyre B

4.1. Average, standard deviation, coefficient of variation in percentage, expanded uncertainty in repeatability conditions

Laboratory	N	Average	Standard_deviation	Coefficient_of_variation_perc	Repeatability_exp_uncertainty
00	3	7.347	0.006	0.079	0.012
01	3	7.093	0.026	0.373	0.053
02	3	7.220	0.032	0.446	0.064
03	3	7.230	0.006	0.080	0.012
04	3	7.260	0.017	0.240	0.035
05	3	7.114	0.011	0.162	0.023
06	3	7.216	0.012	0.161	0.023
07	3	7.329	0.015	0.207	0.030
08	3	7.119	0.021	0.293	0.042
09	3	7.217	0.012	0.160	0.023
10	3	7.179	0.015	0.214	0.031

4.2. Confidence interval of the average per laboratory at the level 95%

Confidence_interval_av_low	Confidence_interval_av_up	T	Confidence_interval_T_low
7.340	7.353	4.303	7.332
7.063	7.123	4.303	7.027
7.183	7.256	4.303	7.140
7.223	7.236	4.303	7.216
7.240	7.279	4.303	7.216
7.101	7.127	4.303	7.085
7.203	7.229	4.303	7.187
7.312	7.347	4.303	7.292
7.096	7.143	4.303	7.068
7.204	7.230	4.303	7.188
7.162	7.197	4.303	7.141

Confidence_interval_T_up	Semi_amplitude_T
7.361	0.014
7.159	0.066
7.300	0.080
7.244	0.014
7.303	0.043
7.142	0.029
7.245	0.029
7.367	0.038
7.171	0.052

Confidence_interval_T_up	Semi_amplitude_T
7.245	0.029
7.217	0.038

4.3. Between and within contribution for the factor laboratory

Laboratory	CEi	CDi
00	26.93	0.98
01	20.54	20.57
02	0.11	30.40
03	0.52	0.97
04	3.45	8.88
05	13.95	3.88
06	0.04	3.95
07	20.54	6.75
08	12.40	12.78
09	0.04	3.90
10	1.50	6.92

4.4. Global average, results of precision values and measurement uncertainties

Variable	Cr
Global_average	7.211
Repeatability_standard_deviat	0.018
Limit_of_repeatability	0.049
Repeatability_exp_uncertainty	0.035
Reproducibility_stand_deviat	0.084
Limit_of_reproducibility	0.234
Reproducibility_exp_uncertaint	0.167

4.5. Results of measurement uncertainties in percentage

Variable	Cr
Repe_exp_uncert_percent	0.49
Repro_exp_uncert_percent	2.32

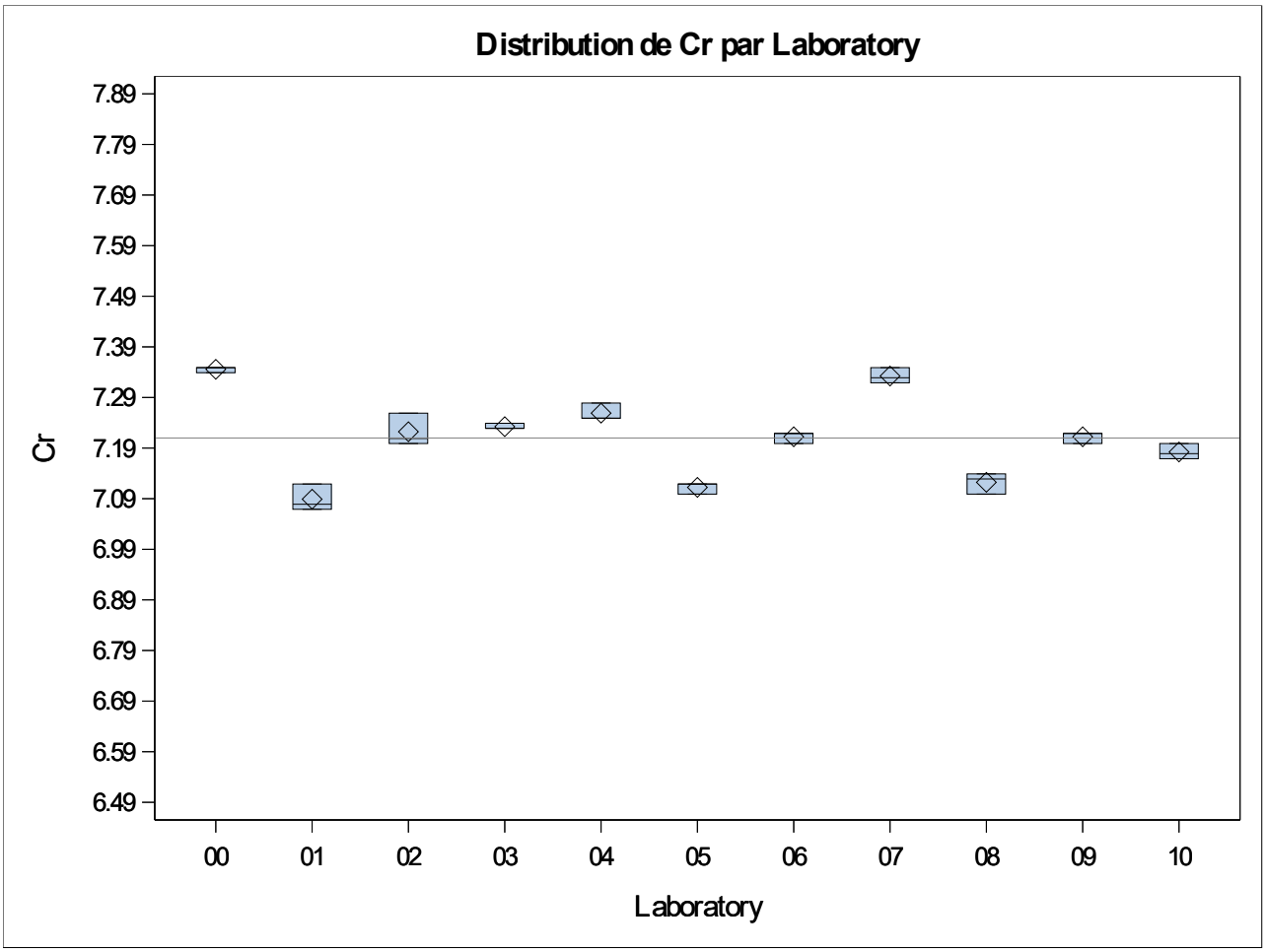
4.6. Part of variation in percent of the laboratories on the total variation

Variable	Cr
Variation_part_labo	95.58

4.7. Trueness study - Estimation and significativity of the bias

Laboratory	Number of non-missing values, Cr	Bias	Inc_bias	IC_inf_bias	IC_sup_bias	Bias_significant
00	3	0.135	0.079	-0.019	0.290	NO
01	3	-0.118	0.079	-0.272	0.036	NO
02	3	0.008	0.079	-0.146	0.163	NO
03	3	0.019	0.079	-0.135	0.173	NO
04	3	0.048	0.079	-0.106	0.203	NO
05	3	-0.097	0.079	-0.252	0.057	NO
06	3	0.005	0.079	-0.149	0.159	NO
07	3	0.118	0.079	-0.036	0.272	NO
08	3	-0.092	0.079	-0.246	0.062	NO
09	3	0.005	0.079	-0.149	0.160	NO
10	3	-0.032	0.079	-0.186	0.122	NO

4.8. Box-plot graphics



5. Results of interlaboratories tests on Coefficient of rolling resistance (Cr) – Tyre D

5.1. Average, standard deviation, coefficient of variation in percentage, expanded uncertainty in repeatability conditions

Laboratory	N	Average	Standard_deviation	Coefficient_of_variation_perc	Repeatability_exp_uncertainty
00	3	8.931	0.030	0.341	0.061
01	3	8.775	0.035	0.398	0.070
02	3	8.507	0.051	0.599	0.102
03	3	8.545	0.035	0.406	0.069
04	3	8.474	0.027	0.313	0.053
05	3	8.324	0.021	0.251	0.042
06	3	8.379	0.020	0.240	0.040
07	3	8.688	0.047	0.543	0.094
08	3	8.497	0.038	0.447	0.076
09	3	8.617	0.044	0.507	0.087
10	3	8.464	0.032	0.377	0.064

5.2. Confidence interval of the average per laboratory at the level 95%

Confidence_interval_av_low	Confidence_interval_av_up	T	Confidence_interval_T_low
8.897	8.966	4.303	8.855
8.736	8.815	4.303	8.688
8.449	8.565	4.303	8.380
8.505	8.584	4.303	8.458
8.444	8.504	4.303	8.408
8.300	8.347	4.303	8.272
8.357	8.402	4.303	8.329
8.635	8.742	4.303	8.571
8.454	8.540	4.303	8.402
8.568	8.667	4.303	8.509
8.428	8.501	4.303	8.385

Confidence_interval_T_up	Semi_amplitude_T
9.007	0.076
8.862	0.087
8.634	0.127
8.631	0.086
8.540	0.066
8.375	0.052
8.429	0.050
8.805	0.117
8.591	0.094

Confidence_interval_T_up	Semi_amplitude_T
8.726	0.109
8.544	0.079

5.3. Between and within contribution for the factor laboratory

Laboratory	CEi	CDi
00	42.74	6.59
01	14.14	8.64
02	1.02	18.44
03	0.12	8.53
04	2.56	5.00
05	18.28	3.09
06	10.77	2.87
07	4.91	15.80
08	1.42	10.26
09	0.91	13.58
10	3.12	7.21

5.4. Global average, results of precision values and measurement uncertainties

Variable	Cr
Global_average	8.564
Repeatability_standard_deviat	0.036
Limit_of_repeatability	0.100
Repeatability_exp_uncertainty	0.072
Reproducibility_stand_deviat	0.180
Limit_of_reproducibility	0.504
Reproducibility_exp_uncertaint	0.360

5.5. Results of measurement uncertainties in percentage

Variable	Cr
Repe_exp_uncert_percent	0.84
Repro_exp_uncert_percent	4.21

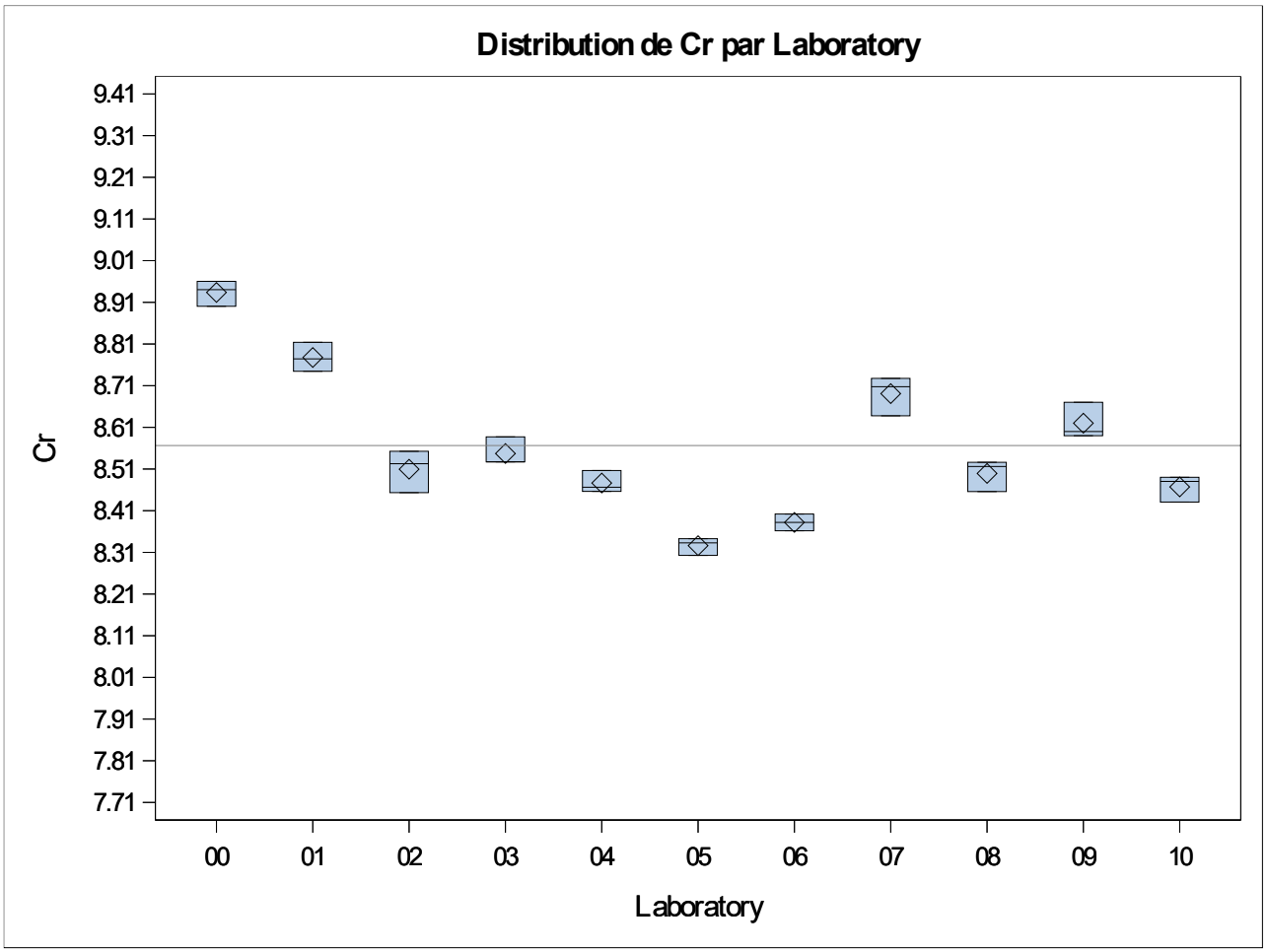
5.6. Part of variation in percent of the laboratories on the total variation

Variable	Cr
Variation_part_labo	96.05

5.7. Trueness study - Estimation and significativity of the bias

Laboratory	Number of non-missing values, Cr	Bias	Inc_bias	IC_inf_bias	IC_sup_bias	Bias_significant
00	3	0.367	0.169	0.035	0.699	YES
01	3	0.211	0.169	-0.121	0.543	NO
02	3	-0.057	0.169	-0.389	0.275	NO
03	3	-0.019	0.169	-0.351	0.313	NO
04	3	-0.090	0.169	-0.422	0.242	NO
05	3	-0.240	0.169	-0.572	0.092	NO
06	3	-0.184	0.169	-0.517	0.148	NO
07	3	0.125	0.169	-0.208	0.457	NO
08	3	-0.067	0.169	-0.399	0.265	NO
09	3	0.054	0.169	-0.278	0.386	NO
10	3	-0.099	0.169	-0.431	0.233	NO

5.8. Box-plot graphics



6. Results of interlaboratories tests on Coefficient of rolling resistance (Cr) – Tyre E

6.1. Average, standard deviation, coefficient of variation in percentage, expanded uncertainty in repeatability conditions

Laboratory	N	Average	Standard_deviation	Coefficient_of_variation_perc	Repeatability_exp_uncertainty
00	3	9.386	0.011	0.122	0.023
01	3	9.399	0.025	0.267	0.050
02	3	9.264	0.006	0.063	0.012
03	3	9.233	0.029	0.312	0.058
04	3	9.181	0.026	0.286	0.053
05	3	9.012	0.021	0.231	0.042
06	3	9.070	0.025	0.279	0.051
07	3	9.118	0.032	0.350	0.064
08	3	9.189	0.015	0.166	0.031
09	3	9.319	0.031	0.329	0.061
10	3	8.937	0.062	0.690	0.123

6.2. Confidence interval of the average per laboratory at the level 95%

Confidence_interval_av_low	Confidence_interval_av_up	T	Confidence_interval_T_low
9.373	9.399	4.303	9.358
9.371	9.428	4.303	9.337
9.257	9.270	4.303	9.249
9.200	9.265	4.303	9.161
9.151	9.210	4.303	9.115
8.988	9.036	4.303	8.960
9.041	9.099	4.303	9.007
9.082	9.154	4.303	9.038
9.171	9.206	4.303	9.151
9.284	9.353	4.303	9.242
8.868	9.007	4.303	8.784

Confidence_interval_T_up	Semi_amplitude_T
9.415	0.029
9.461	0.062
9.278	0.014
9.304	0.072
9.246	0.065
9.064	0.052
9.133	0.063
9.197	0.079
9.227	0.038

Confidence_interval_T_up	Semi_amplitude_T
9.395	0.076
9.091	0.153

6.3. Between and within contribution for the factor laboratory

Laboratory	CEi	CDi
00	17.12	1.40
01	19.49	6.71
02	2.36	0.36
03	0.77	8.84
04	0.05	7.36
05	14.57	4.62
06	6.68	6.83
07	2.46	10.86
08	0.00	2.49
09	7.29	10.01
10	29.21	40.52

6.4. Global average, results of precision values and measurement uncertainties

Variable	Cr
Global_average	9.192
Repeatability_standard_deviat	0.029
Limit_of_repeatability	0.082
Repeatability_exp_uncertainty	0.058
Reproducibility_stand_deviat	0.151
Limit_of_reproducibility	0.422
Reproducibility_exp_uncertaint	0.301

6.5. Results of measurement uncertainties in percentage

Variable	Cr
Repe_exp_uncert_percent	0.64
Repro_exp_uncert_percent	3.28

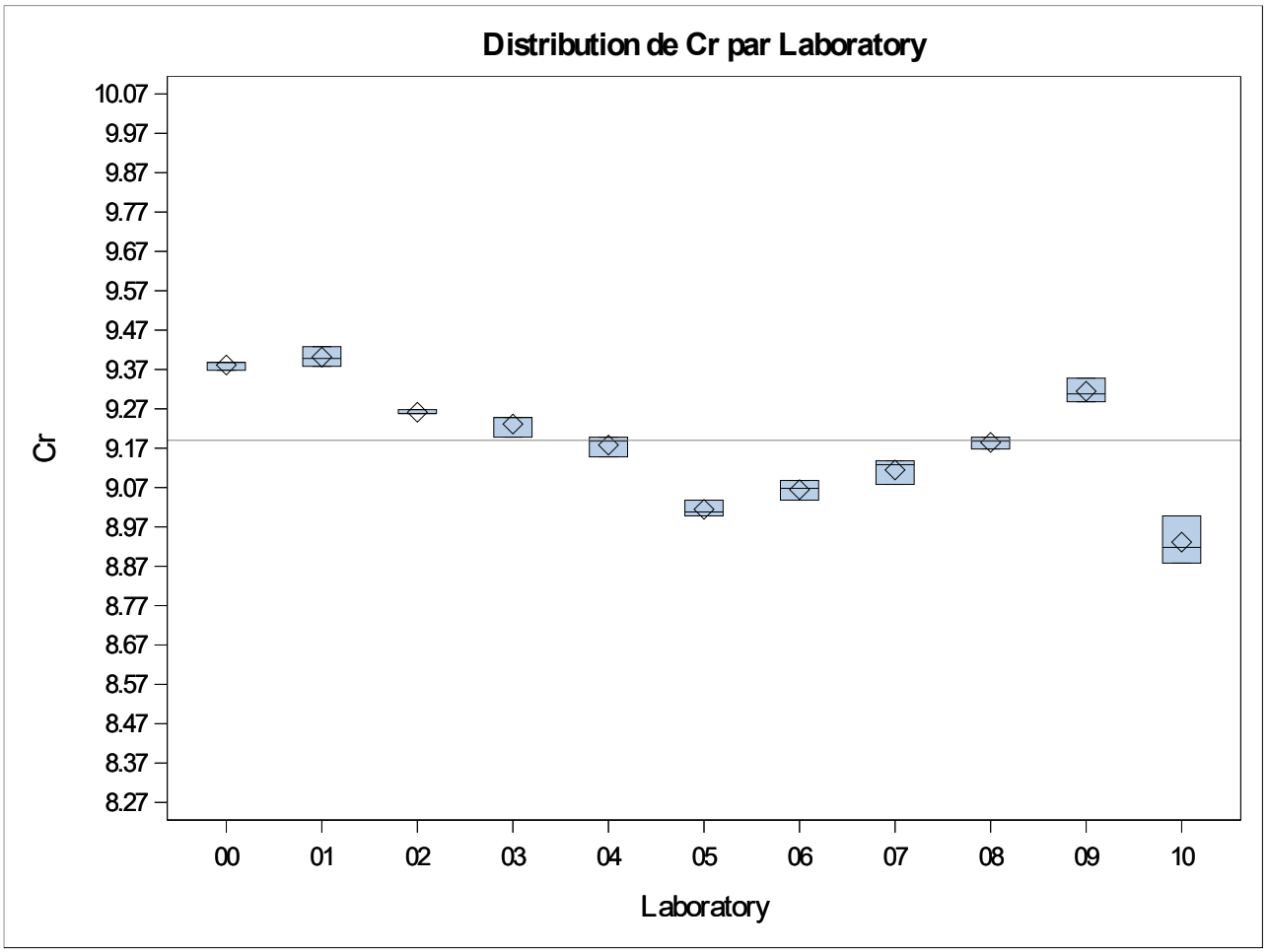
6.6. Part of variation in percent of the laboratories on the total variation

Variable	Cr
Variation_part_labo	96.24

6.7. ***Trueness study - Estimation and significativity of the bias***

Laboratory	Number of non-missing values, Cr	Bias	Inc_bias	IC_inf_bias	IC_sup_bias	Bias_significant
00	3	0.195	0.142	-0.083	0.472	NO
01	3	0.208	0.142	-0.070	0.485	NO
02	3	0.072	0.142	-0.206	0.350	NO
03	3	0.041	0.142	-0.237	0.319	NO
04	3	-0.011	0.142	-0.289	0.267	NO
05	3	-0.179	0.142	-0.457	0.098	NO
06	3	-0.122	0.142	-0.399	0.156	NO
07	3	-0.074	0.142	-0.352	0.204	NO
08	3	-0.003	0.142	-0.281	0.275	NO
09	3	0.127	0.142	-0.151	0.405	NO
10	3	-0.254	0.142	-0.532	0.024	NO

6.8. Box-plot graphics



7. Results of interlaboratories tests on Coefficient of rolling resistance (Cr) – Tyre F

7.1. Average, standard deviation, coefficient of variation in percentage, expanded uncertainty in repeatability conditions

Laboratory	N	Average	Standard_deviation	Coefficient_of_variation_perc	Repeatability_exp_uncertainty
00	3	3.598	0.031	0.861	0.062
01	3	3.714	0.012	0.313	0.023
02	3	3.874	0.010	0.253	0.020
03	3	3.631	0.012	0.318	0.023
04	3	3.664	0.006	0.158	0.012
05	3	3.537	0.010	0.287	0.020
06	3	3.591	0.010	0.282	0.020
07	3	3.788	0.012	0.305	0.023
09	3	3.777	0.017	0.462	0.035
10	3	3.519	0.021	0.596	0.042
11	3	3.684	0.000	0.000	0.000

7.2. Confidence interval of the average per laboratory at the level 95%

Confidence_interval_av_low	Confidence_interval_av_up	T	Confidence_interval_T_low
3.563	3.633	4.303	3.521
3.700	3.727	4.303	3.685
3.863	3.885	4.303	3.850
3.618	3.644	4.303	3.602
3.657	3.670	4.303	3.649
3.526	3.549	4.303	3.512
3.579	3.602	4.303	3.566
3.775	3.801	4.303	3.759
3.758	3.797	4.303	3.734
3.495	3.543	4.303	3.467
3.684	3.684	4.303	3.684

Confidence_interval_T_up	Semi_amplitude_T
3.675	0.077
3.742	0.029
3.899	0.024
3.660	0.029
3.678	0.014
3.562	0.025
3.616	0.025
3.817	0.029
3.821	0.043

Confidence_interval_T_up	Semi_amplitude_T
3.571	0.052
3.684	0.000

7.3. Between and within contribution for the factor laboratory

Laboratory	CEi	CDi
00	4.33	39.32
01	1.50	5.55
02	33.79	3.92
03	1.27	5.47
04	0.04	1.38
05	14.51	4.21
06	5.17	4.21
07	11.21	5.47
09	9.29	12.46
10	18.73	18.00
11	0.15	0.00

7.4. Global average, results of precision values and measurement uncertainties

Variable	Cr
Global_average	3.671
Repeatability_standard_deviat	0.015
Limit_of_repeatability	0.042
Repeatability_exp_uncertainty	0.030
Reproducibility_stand_deviat	0.111
Limit_of_reproducibility	0.312
Reproducibility_exp_uncertaint	0.223

7.5. *Results of measurement uncertainties in percentage*

Variable	Cr
Repe_exp_uncert_percent	0.81
Repro_exp_uncert_percent	6.08

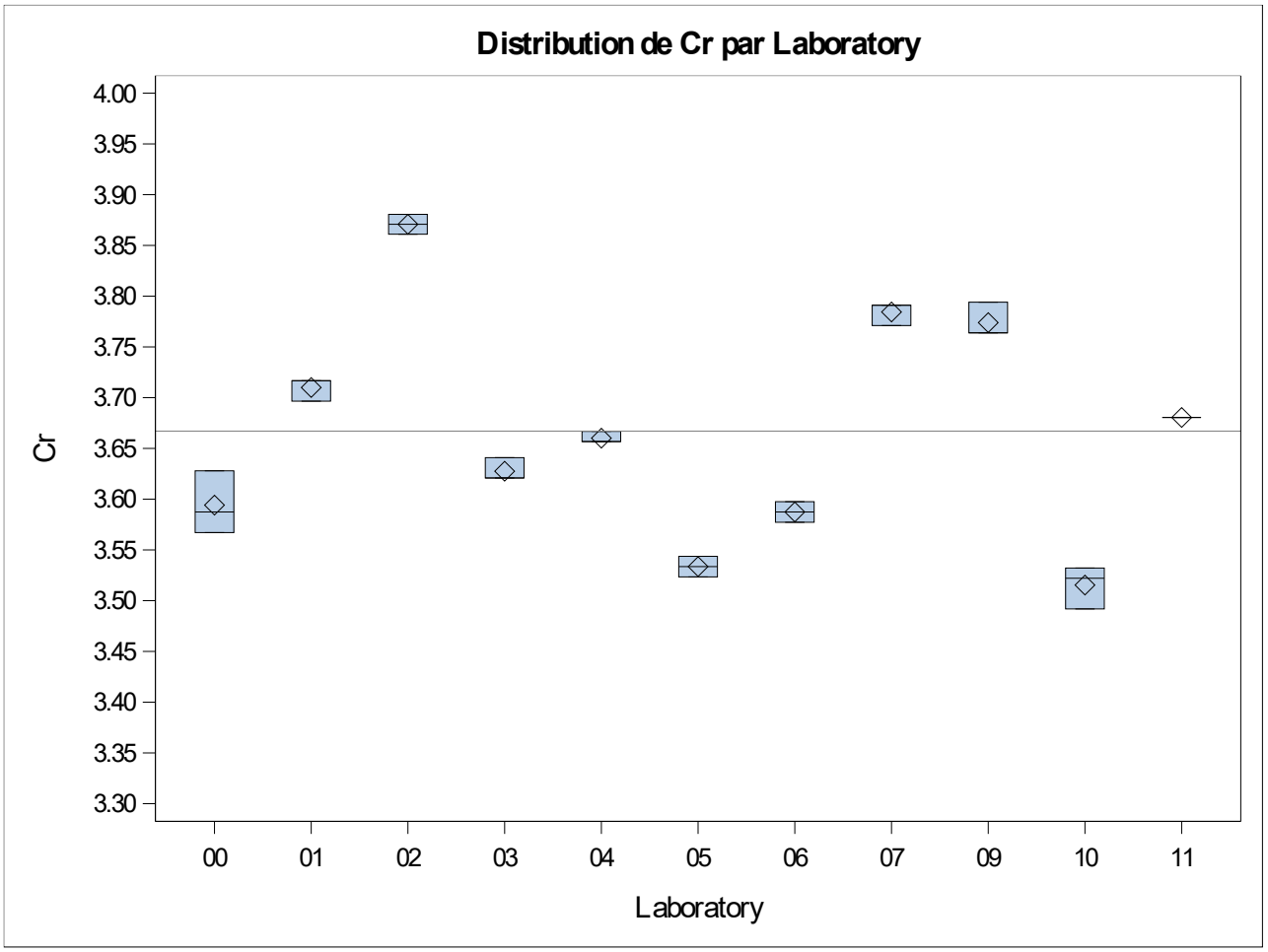
7.6. *Part of variation in percent of the laboratories on the total variation*

Variable	Cr
Variation_part_labo	98.21

7.7. Trueness study - Estimation and significativity of the bias

Laboratory	Number of non-missing values, Cr	Bias	Inc_bias	IC_inf_bias	IC_sup_bias	Bias_significant
00	3	-0.073	0.106	-0.280	0.134	NO
01	3	0.043	0.106	-0.164	0.250	NO
02	3	0.204	0.106	-0.003	0.411	NO
03	3	-0.040	0.106	-0.247	0.168	NO
04	3	-0.007	0.106	-0.214	0.200	NO
05	3	-0.134	0.106	-0.341	0.074	NO
06	3	-0.080	0.106	-0.287	0.127	NO
07	3	0.117	0.106	-0.090	0.324	NO
09	3	0.107	0.106	-0.100	0.314	NO
10	3	-0.152	0.106	-0.359	0.055	NO
11	3	0.013	0.106	-0.194	0.221	NO

7.8. Box-plot graphics



8. Results of interlaboratories tests on Coefficient of rolling resistance (Cr) – Tyre G

8.1. Average, standard deviation, coefficient of variation in percentage, expanded uncertainty in repeatability conditions

Laboratory	N	Average	Standard_deviation	Coefficient_of_variation_perc	Repeatability_exp_uncertainty
00	3	4.372	0.010	0.229	0.020
01	3	4.509	0.021	0.464	0.042
02	3	4.710	0.036	0.770	0.073
03	3	4.429	0.017	0.388	0.034
04	3	4.412	0.012	0.262	0.023
05	3	4.326	0.015	0.352	0.030
06	3	4.313	0.010	0.230	0.020
07	3	4.780	0.046	0.969	0.093
09	3	4.546	0.021	0.461	0.042
10	3	4.312	0.006	0.133	0.012
11	3	4.563	0.025	0.556	0.051

8.2. ***Confidence interval of the average per laboratory at the level 95%***

Confidence_interval_av_low	Confidence_interval_av_up	T	Confidence_interval_T_low
4.361	4.383	4.303	4.347
4.485	4.533	4.303	4.457
4.669	4.751	4.303	4.620
4.409	4.448	4.303	4.386
4.399	4.425	4.303	4.383
4.308	4.343	4.303	4.288
4.302	4.324	4.303	4.288
4.727	4.832	4.303	4.664
4.522	4.570	4.303	4.494
4.306	4.319	4.303	4.298
4.534	4.592	4.303	4.500

Confidence_interval_T_up	Semi_amplitude_T
4.397	0.025
4.561	0.052
4.800	0.090
4.471	0.043
4.441	0.029
4.363	0.038
4.337	0.025
4.895	0.115
4.598	0.052

Confidence_interval_T_up	Semi_amplitude_T
4.327	0.014
4.626	0.063

8.3. Between and within contribution for the factor laboratory

Laboratory	CEi	CDi
00	4.54	1.70
01	0.35	7.46
02	21.06	22.41
03	1.00	5.03
04	1.79	2.28
05	9.30	3.95
06	10.92	1.68
07	35.56	36.49
09	1.76	7.47
10	10.97	0.56
11	2.77	10.97

8.4. Global average, results of precision values and measurement uncertainties

Variable	Cr
Global_average	4.479
Repeatability_standard_deviat	0.023
Limit_of_repeatability	0.065
Repeatability_exp_uncertainty	0.046
Reproducibility_stand_deviat	0.160
Limit_of_reproducibility	0.449
Reproducibility_exp_uncertaint	0.321

8.5. *Results of measurement uncertainties in percentage*

Variable	Cr
Repe_exp_uncert_percent	1.03
Repro_exp_uncert_percent	7.16

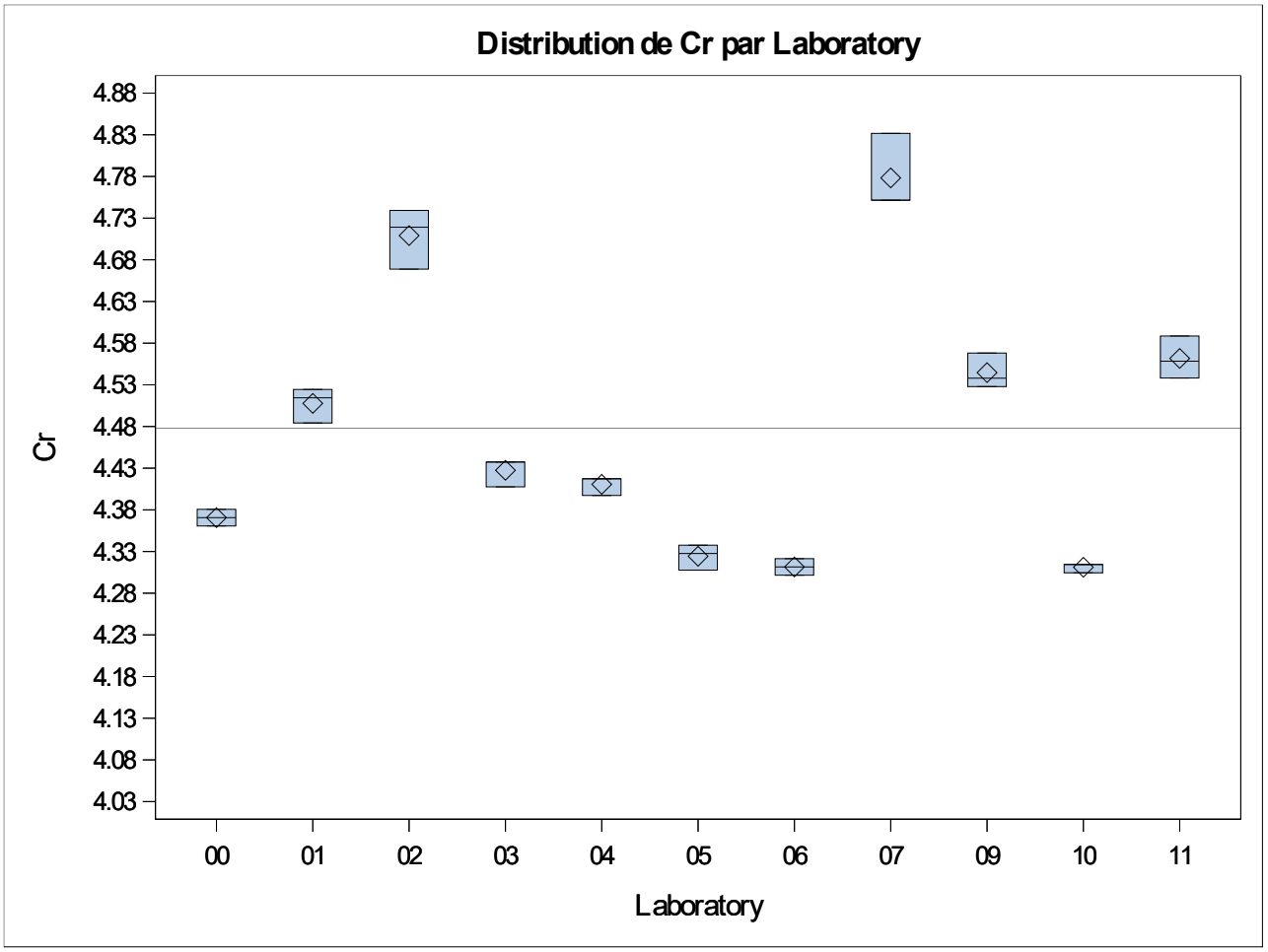
8.6. Part of variation in percent of the laboratories on the total variation

Variable	Cr
Variation_part_labo	97.92

8.7. Trueness study - Estimation and significativity of the bias

Laboratory	Number of non-missing values, Cr	Bias	Inc_bias	IC_inf_bias	IC_sup_bias	Bias_significant
00	3	-0.107	0.152	-0.405	0.190	NO
01	3	0.030	0.152	-0.268	0.327	NO
02	3	0.231	0.152	-0.067	0.529	NO
03	3	-0.050	0.152	-0.348	0.247	NO
04	3	-0.067	0.152	-0.365	0.230	NO
05	3	-0.154	0.152	-0.451	0.144	NO
06	3	-0.166	0.152	-0.464	0.131	NO
07	3	0.300	0.152	0.003	0.598	YES
09	3	0.067	0.152	-0.231	0.364	NO
10	3	-0.167	0.152	-0.464	0.131	NO
11	3	0.084	0.152	-0.214	0.381	NO

8.8. *Box-plot graphics*



9. Results of interlaboratories tests on Coefficient of rolling resistance (Cr) – Tyre H

9.1. Average, standard deviation, coefficient of variation in percentage, expanded uncertainty in repeatability conditions

Laboratory	N	Average	Standard_deviation	Coefficient_of_variation_perc	Repeatability_exp_uncertainty
00	3	5.136	0.035	0.676	0.069
01	3	5.266	0.035	0.658	0.069
02	3	5.587	0.032	0.575	0.064
03	3	5.364	0.017	0.323	0.035
04	3	5.286	0.006	0.110	0.012
05	3	5.308	0.015	0.290	0.031
06	3	5.276	0.020	0.380	0.040
07	3	5.627	0.020	0.358	0.040
09	3	5.614	0.020	0.359	0.040
10	3	5.217	0.020	0.387	0.040
11	3	5.537	0.025	0.456	0.050

9.2. Confidence interval of the average per laboratory at the level 95%

Confidence_interval_av_low	Confidence_interval_av_up	T	Confidence_interval_T_low
5.097	5.176	4.303	5.050
5.226	5.305	4.303	5.179
5.551	5.624	4.303	5.507
5.345	5.384	4.303	5.321
5.279	5.292	4.303	5.272
5.290	5.325	4.303	5.270
5.253	5.299	4.303	5.226
5.604	5.650	4.303	5.577
5.591	5.637	4.303	5.564
5.194	5.240	4.303	5.167
5.508	5.566	4.303	5.474

Confidence_interval_T_up	Semi_amplitude_T
5.223	0.086
5.352	0.086
5.667	0.080
5.407	0.043
5.300	0.014
5.346	0.038
5.326	0.050
5.677	0.050
5.664	0.050

Confidence_interval_T_up	Semi_amplitude_T
5.267	0.050
5.600	0.063

9.3. ***Between and within contribution for the factor laboratory***

Laboratory	CEi	CDi
00	19.85	19.22
01	4.52	19.15
02	13.51	16.49
03	0.12	4.78
04	3.09	0.54
05	1.86	3.79
06	3.75	6.42
07	19.33	6.49
09	17.25	6.48
10	9.04	6.50
11	7.67	10.15

9.4. ***Global average, results of precision values and measurement uncertainties***

Variable	Cr
Global_average	5.383
Repeatability_standard_deviat	0.024
Limit_of_repeatability	0.067
Repeatability_exp_uncertainty	0.048
Reproducibility_stand_deviat	0.176
Limit_of_reproducibility	0.494
Reproducibility_exp_uncertaint	0.353

9.5. ***Results of measurement uncertainties in percentage***

Variable	Cr
Repe_exp_uncert_percent	0.89
Repro_exp_uncert_percent	6.55

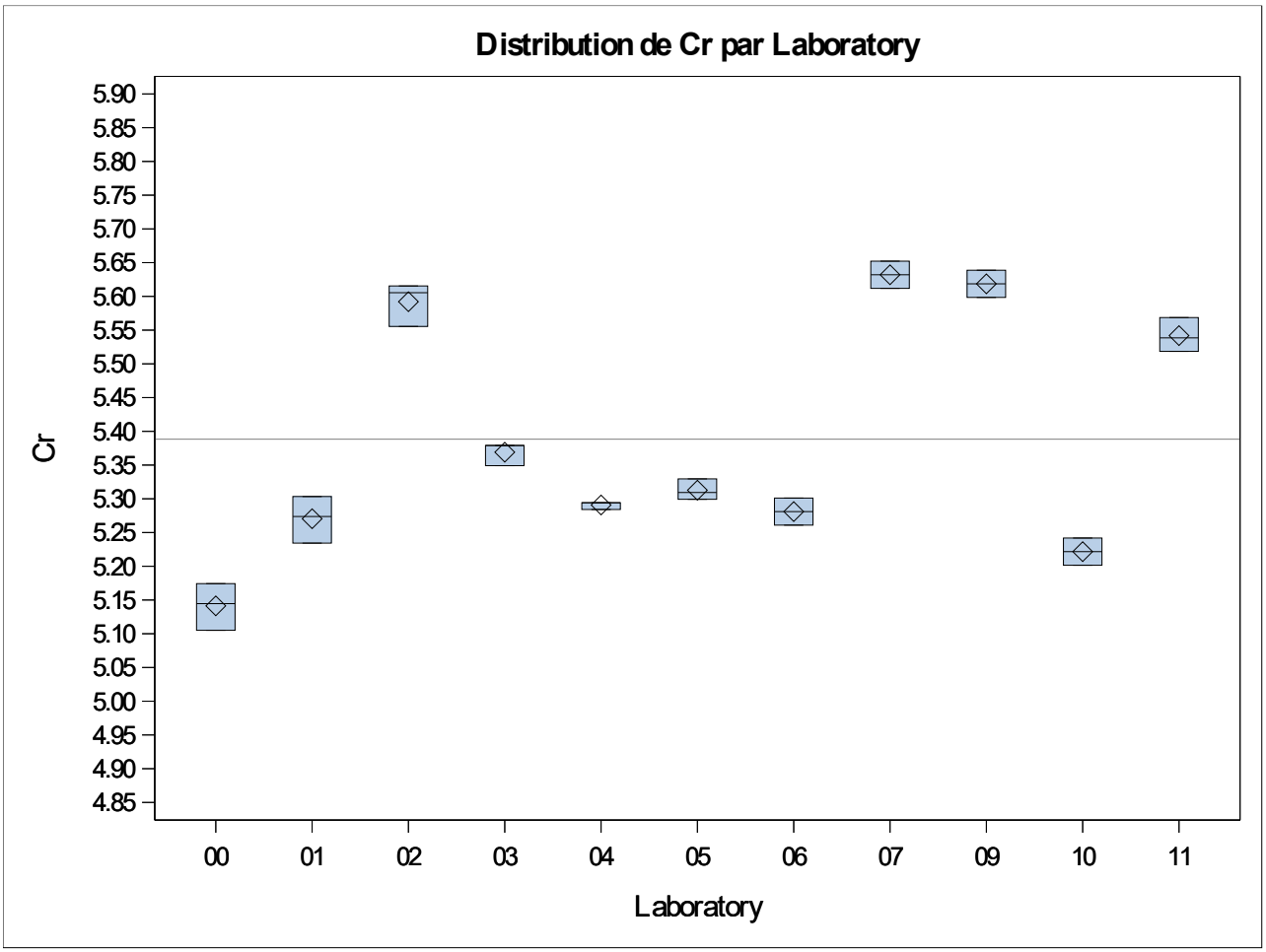
9.6. Part of variation in percent of the laboratories on the total variation

Variable	Cr
Variation_part_labo	98.17

9.7. Trueness study - Estimation and significativity of the bias

Laboratory	Number of non-missing values, Cr	Bias	Inc_bias	IC_inf_bias	IC_sup_bias	Bias_significant
00	3	-0.247	0.167	-0.575	0.081	NO
01	3	-0.118	0.167	-0.445	0.210	NO
02	3	0.204	0.167	-0.124	0.531	NO
03	3	-0.019	0.167	-0.347	0.308	NO
04	3	-0.098	0.167	-0.425	0.230	NO
05	3	-0.076	0.167	-0.403	0.252	NO
06	3	-0.107	0.167	-0.435	0.220	NO
07	3	0.244	0.167	-0.084	0.571	NO
09	3	0.230	0.167	-0.097	0.558	NO
10	3	-0.167	0.167	-0.494	0.161	NO
11	3	0.154	0.167	-0.174	0.481	NO

9.8. Box-plot graphics



10. Results of interlaboratories tests on Coefficient of rolling resistance (Cr) – Tyre J

10.1. Average, standard deviation, coefficient of variation in percentage, expanded uncertainty in repeatability conditions

Laboratory	N	Average	Standard_deviation	Coefficient_of_variation_perc	Repeatability_exp_uncertainty
00	3	5.653	0.041	0.719	0.081
01	3	5.633	0.010	0.177	0.020
02	3	5.919	0.020	0.337	0.040
03	3	5.545	0.015	0.277	0.031
04	3	5.443	0.006	0.106	0.012
05	3	5.496	0.021	0.379	0.042
06	3	5.517	0.020	0.362	0.040
07	3	5.837	0.029	0.497	0.058
09	3	5.683	0.017	0.304	0.035
10	3	5.438	0.006	0.106	0.011
11	3	5.666	0.006	0.102	0.012

10.2. Confidence interval of the average per laboratory at the level 95%

Confidence_interval_av_low	Confidence_interval_av_up	T	Confidence_interval_T_low
5.607	5.699	4.303	5.552
5.622	5.645	4.303	5.608
5.896	5.942	4.303	5.869
5.528	5.563	4.303	5.507
5.436	5.449	4.303	5.428
5.472	5.520	4.303	5.444
5.494	5.539	4.303	5.467
5.804	5.870	4.303	5.765
5.664	5.703	4.303	5.640
5.431	5.444	4.303	5.423
5.660	5.673	4.303	5.652

Confidence_interval_T_up	Semi_amplitude_T
5.754	0.101
5.658	0.025
5.968	0.050
5.584	0.038
5.457	0.014
5.548	0.052
5.566	0.050
5.909	0.072
5.726	0.043

Confidence_interval_T_up	Semi_amplitude_T
5.452	0.014
5.681	0.014

10.3. Between and within contribution for the factor laboratory

Laboratory	CEi	CDi
00	0.42	37.03
01	0.06	2.23
02	37.00	8.91
03	2.38	5.31
04	13.21	0.75
05	6.49	9.76
06	4.54	8.96
07	19.44	18.85
09	1.61	6.71
10	13.98	0.74
11	0.86	0.75

10.4. Global average, results of precision values and measurement uncertainties

Variable	Cr
Global_average	5.621
Repeatability_standard_deviat	0.020
Limit_of_repeatability	0.056
Repeatability_exp_uncertainty	0.040
Reproducibility_stand_deviat	0.156
Limit_of_reproducibility	0.436
Reproducibility_exp_uncertaint	0.312

10.5. Results of measurement uncertainties in percentage

Variable	Cr
Repe_exp_uncert_percent	0.72
Repro_exp_uncert_percent	5.54

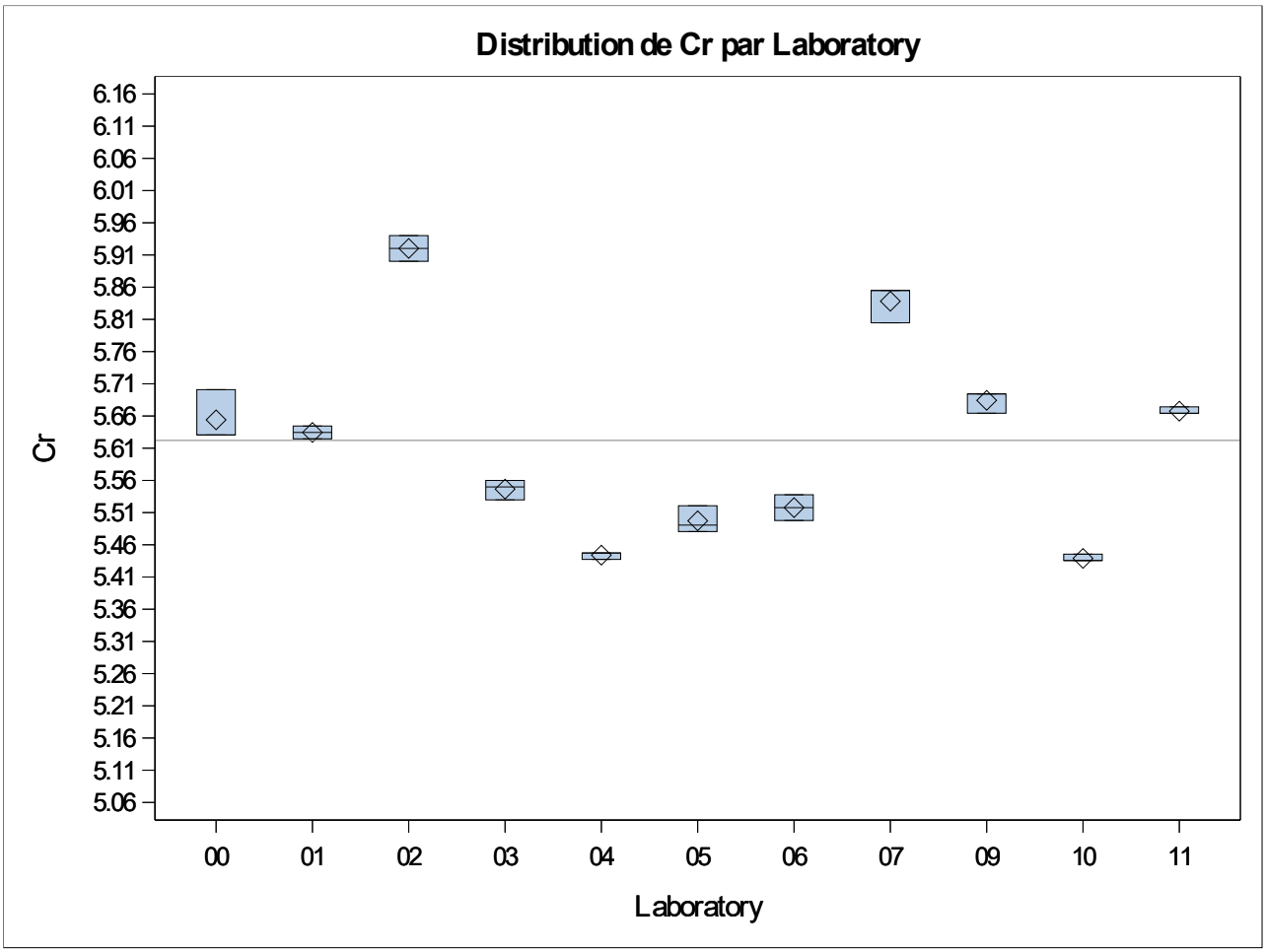
10.6. Part of variation in percent of the laboratories on the total variation

Variable	Cr
Variation_part_labo	98.33

10.7. Trueness study - Estimation and significativity of the bias

Laboratory	Number of non-missing values, Cr	Bias	Inc_bias	IC_inf_bias	IC_sup_bias	Bias_significant
00	3	0.032	0.148	-0.258	0.322	NO
01	3	0.012	0.148	-0.277	0.302	NO
02	3	0.298	0.148	0.008	0.588	YES
03	3	-0.076	0.148	-0.365	0.214	NO
04	3	-0.178	0.148	-0.468	0.111	NO
05	3	-0.125	0.148	-0.414	0.165	NO
06	3	-0.104	0.148	-0.394	0.185	NO
07	3	0.216	0.148	-0.074	0.506	NO
09	3	0.062	0.148	-0.227	0.352	NO
10	3	-0.183	0.148	-0.473	0.106	NO
11	3	0.045	0.148	-0.244	0.335	NO

10.8. Box-plot graphics



11. Results of interlaboratories tests on Coefficient of rolling resistance (Cr) – Tyre K

11.1. Average, standard deviation, coefficient of variation in percentage, expanded uncertainty in repeatability conditions

Laboratory	N	Average	Standard_deviation	Coefficient_of_variation_perc	Repeatability_exp_uncertainty
00	3	6.397	0.025	0.397	0.051
01	3	6.501	0.017	0.267	0.035
02	3	6.766	0.010	0.147	0.020
03	3	6.438	0.012	0.180	0.023
04	3	6.280	0.010	0.158	0.020
05	3	6.323	0.020	0.313	0.040
06	3	6.314	0.020	0.317	0.040
07	3	6.617	0.021	0.312	0.041
09	3	6.488	0.017	0.268	0.035
10	3	6.402	0.032	0.499	0.064
11	3	6.427	0.030	0.470	0.060

11.2. Confidence interval of the average per laboratory at the level 95%

Confidence_interval_av_low	Confidence_interval_av_up	T	Confidence_interval_T_low
6.368	6.426	4.303	6.334
6.481	6.521	4.303	6.458
6.755	6.778	4.303	6.742
6.424	6.451	4.303	6.409
6.269	6.291	4.303	6.255
6.300	6.345	4.303	6.273
6.292	6.337	4.303	6.265
6.593	6.640	4.303	6.566
6.468	6.507	4.303	6.445
6.366	6.438	4.303	6.322
6.393	6.461	4.303	6.352

Confidence_interval_T_up	Semi_amplitude_T
6.460	0.063
6.544	0.043
6.791	0.025
6.466	0.029
6.304	0.025
6.372	0.049
6.364	0.050
6.668	0.051
6.531	0.043

Confidence_interval_T_up	Semi_amplitude_T
6.481	0.079
6.502	0.075

11.3. Between and within contribution for the factor laboratory

Laboratory	CEi	CDi
00	1.41	13.63
01	1.29	6.38
02	49.64	2.09
03	0.08	2.84
04	14.41	2.07
05	8.08	8.30
06	9.17	8.46
07	13.79	9.02
09	0.70	6.37
10	1.17	21.54
11	0.26	19.29

11.4. Global average, results of precision values and measurement uncertainties

Variable	Cr
Global_average	6.450
Repeatability_standard_deviat	0.021
Limit_of_repeatability	0.058
Repeatability_exp_uncertainty	0.041
Reproducibility_stand_deviat	0.143
Limit_of_reproducibility	0.400
Reproducibility_exp_uncertaint	0.286

11.5. Results of measurement uncertainties in percentage

Variable	Cr
Repe_exp_uncert_percent	0.64
Repro_exp_uncert_percent	4.43

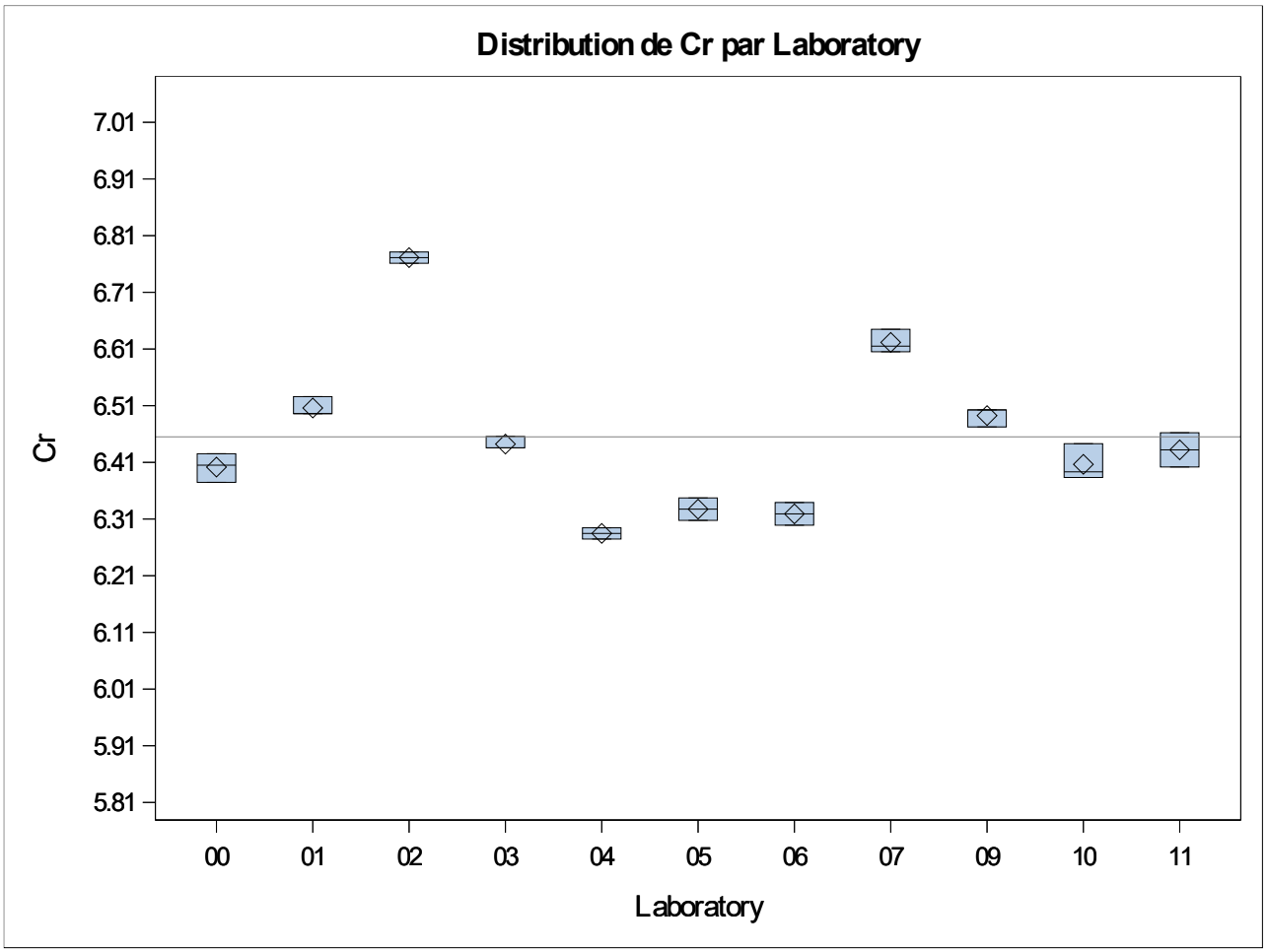
11.6. Part of variation in percent of the laboratories on the total variation

Variable	Cr
Variation_part_labo	97.89

11.7. Trueness study - Estimation and significativity of the bias

Laboratory	Number of non-missing values, Cr	Bias	Inc_bias	IC_inf_bias	IC_sup_bias	Bias_significant
00	3	-0.053	0.135	-0.319	0.212	NO
01	3	0.051	0.135	-0.214	0.316	NO
02	3	0.316	0.135	0.051	0.581	YES
03	3	-0.013	0.135	-0.278	0.253	NO
04	3	-0.170	0.135	-0.436	0.095	NO
05	3	-0.128	0.135	-0.393	0.138	NO
06	3	-0.136	0.135	-0.401	0.129	NO
07	3	0.167	0.135	-0.099	0.432	NO
09	3	0.038	0.135	-0.228	0.303	NO
10	3	-0.049	0.135	-0.314	0.217	NO
11	3	-0.023	0.135	-0.288	0.242	NO

11.8. Box-plot graphics



Calculation of assigned values

1. Estimation of the variance of assigned values on corrected values for C1/C2 tyres

Batch	Assigned value	Repeatabiliy standard deviation	Reproducibility standard deviation	Variance Assigned values	Standard deviation Assigned values	Number of laboratories	Number of repetitions	Inf	Sup	Laboratory Variance
X	5.250	0.026	0.164	0.002	0.049	11	3	5.152	5.348	0.026
A	4.791	0.026	0.115	0.001	0.034	11	3	4.722	4.859	0.013
B	6.527	0.025	0.126	0.001	0.038	11	3	6.452	6.602	0.015
C	7.211	0.018	0.084	0.001	0.025	11	3	7.161	7.261	0.007
D	8.564	0.036	0.180	0.003	0.054	11	3	8.457	8.671	0.031
E	9.192	0.029	0.151	0.002	0.045	11	3	9.102	9.281	0.022

2. Estimation of the variance of assigned values on corrected values for C3 tyres

Batch	Assigned value	Repeatability standard deviation	Reproducibility standard deviation	Variance Assigned values	Standard deviation Assigned values	Number of laboratories	Number of repetitions	Inf	Sup	Laboratory Variance
F	3.671	0.015	0.111	0.001	0.033	11	3	3.604	3.737	0.012
G	4.479	0.023	0.160	0.002	0.048	11	3	4.383	4.575	0.025
H	5.383	0.024	0.176	0.003	0.053	11	3	5.278	5.489	0.031
J	5.621	0.020	0.156	0.002	0.047	11	3	5.527	5.714	0.024
K	6.450	0.021	0.143	0.002	0.043	11	3	6.365	6.536	0.020

Regression functions

1. Regression functions for C1/C2 machines – Cr (N/kN)

Lab.	Intercept $B1_l$	Standard error Intercept	Slope $A1_l$	Standard error Slope	s (Residual standard deviation)	R^2
Lab0	-0,3431	0,0963	1,0107	0,0131	0,0880	0,9972
Lab1	0,2941	0,0933	0,9499	0,0130	0,0929	0,9968
Lab2	-0,0139	0,0661	0,9993	0,0093	0,0631	0,9985
Lab3	0,1531	0,0570	0,9818	0,0081	0,0558	0,9989
Lab4	-0,2915	0,0497	1,0364	0,0070	0,0457	0,9992
Lab5	0,0414	0,0659	1,0150	0,0095	0,0634	0,9985
Lab6	0,0858	0,0935	1,0051	0,0134	0,0904	0,9970
Lab7	0,2193	0,0901	0,9696	0,0127	0,0888	0,9971
Lab8	0,0802	0,0561	0,9941	0,0079	0,0543	0,9989
Lab9	-0,0264	0,0871	0,9950	0,0121	0,0829	0,9975
Lab10	-0,0943	0,0748	1,0286	0,0107	0,0707	0,9982

2. Regression functions for C3 machines – Cr (N/kN)

Lab.	Intercept $B1_l$	Standard error Intercept	Slope $A1_l$	Standard error Slope	s (Residual standard deviation)	R^2
Lab0	0,1947	0,1342	0,9791	0,0262	0,0989	0,9901
Lab1	-0,0236	0,0975	1,0039	0,0187	0,0691	0,9952
Lab2	-0,0428	0,0519	0,9613	0,0095	0,0367	0,9986
Lab3	0,0757	0,0367	0,9929	0,0071	0,0265	0,9993
Lab4	-0,2269	0,0405	1,0660	0,0079	0,0277	0,9992
Lab5	0,1706	0,0403	0,9905	0,0079	0,0297	0,9991
Lab6	0,0819	0,0475	1,0074	0,0093	0,0344	0,9988
Lab7	-0,1484	0,1025	0,9887	0,0189	0,0710	0,9949
Lab9	-0,1374	0,1082	1,0070	0,0204	0,0750	0,9943
Lab10	0,2867	0,0605	0,9712	0,0119	0,0456	0,9979
Lab11	-0,0783	0,0964	1,0046	0,0183	0,0676	0,9954

Annex E - Template for candidate / reference laboratory alignment

1. General information of Applicant (Candidate laboratory)

Company: _____
Address: _____
City: _____ P.O. Box: _____
Contact person: _____ Position: _____
Telephone: _____ Fax: _____ E-mail: _____

a) Tyre manufacturer ☐ b) Independent laboratory ☐

Is your company integrated in a Group? ☐ Yes ☐ No
If yes, indicate which one: _____

Candidate machine identification
Trade Mark: _____ Serial number: _____
Test Lab location: _____ Year of make: _____
Date of last calibration: _____
The laboratory is certified/accredited/compliant to ISO 17025 ☐
The facility is certified / compliant to ISO /TS 16949 ☐
The laboratory complies with the specifications of ISO 28580 Annex A on test equipment tolerances ☐
Drum Ø [mm]: _____
Drum Surface: _____
Drum material: _____

Where to send the test tyres after testing:
Address: _____
City: _____ P.O.Box:_____
Contact person:_____

Test tyres provided:
Tyre type: ☐ C1/C2 ☐ C3
Method: ☐ Force ☐ Torque ☐ Power ☐ Deceleration

Test results of the n+1 measurements (corrected for drum diameter and room temperature)

Tyre : Make - Size – Designation	$RRC_{1,c}$ (kg/t)	$RRC_{2,c}$ (kg/t)	$RRC_{3,c}$ (kg/t)	$RRC_{4,c}$ (kg/t)	……	$RRC_{n+1,c}$ (kg/t)

Candidate machine measurement repeatability: σ_m (kg/t): _____
All the information included by the company in this form will be confidential.

2. General information of the Reference laboratory

Company: _____
Address: _____
City: _____ P.O. Box: _____
Contact person: _____ Position: _____
Telephone: _____ Fax: _____ E-mail: _____

a) Tyre manufacturer ☐ b) Independent laboratory ☐

Reference machine identification
Trade Mark: _____ Serial number: _____
Test Lab location: _____ Year of make: _____
Date of last calibration: _____
The laboratory is certified/accredited/compliant to ISO 17025 ☐
The facility is certified / compliant to ISO /TS 16949 ☐
The laboratory complies with the specifications of ISO 28580 Annex A on test equipment tolerances ☐
Drum Ø [mm]: _____
Drum Surface: _____
Drum material: _____

Test characteristics:
Method: ☐ Force ☐ Torque ☐ Power ☐ Deceleration

Test results, average of measurement 2 – 4, corrected for drum diameter and temperature:

Tyre : Make - Size – Designation	$RRC_{2,l}$(kg/t)	$RRC_{3,l}$(kg/t)	$RRC_{4,l}$(kg/t)	RRC avg. (kg/t)

3. Alignment equation

Regression formula[3]: **RRC = aligned value (kg/t)**
$RRC_{m,c}$ = candidate's measurement (kg/t)

$RRC = a * RRC_{m,c} + b$

a = _____ **b = _____**

$a = A1_l * A2_c$
$b = A1_l * B2_c + B1_l$
Coefficient of determination[4]: R^2 = _____
Date: _____
Stamp and Signature: _____

[3] **$A1_l$, $B1_l$, $A2_c$ and $B2_c$ are the coefficients defined in annex V of Regulation (EU) 2020/740**
RRC is the assigned value of the rolling resistance coefficient aligned to EU Reference.
$RRC_{m,l}$ is the individual measured value of the rolling resistance coefficient by the reference laboratory (l) (including temperature and drum diameter corrections)
$RRC_{m,c}$ is the individual measured value of the rolling resistance coefficient by the candidate laboratory (c) (including temperature and drum diameter corrections)
[4] **Coefficient of determination R^2 is defined as the sum of squares due to the regression divided by the total sum of squares. Usually, R^2 is interpreted as representing the percentage of variation of the dependent variable explained by variation of the independent variables.**

Annex F - Proposal of guidance on how to handle the process of changing alignment equations, both for Reference and Candidate Laboratories

1. The applicable alignment equation is determined based on the measurement date:
   A Rolling Resistance test result generated ***before*** the date of entry into force of the new EGLA alignment equations March 2, 2026, will be aligned with the old equation and a test result generated ***after*** the date of entry into force March 2, 2026, will be aligned with the new equation.

2. If a Candidate Laboratory or another machine was aligned before this date, its current alignment equation is still valid for 2 years following its alignment report issue date.

3. If a validation check on a Label grade is done by a Testing Service or another Test Laboratory after this date, it can be done according to the following multi-steps approach:

(a) For a validation test result generated from March 2, 2026:
➔ Apply the alignment equation applicable from March 2, 2026.

After this first step (a), if the results confirm the level of the Label grade, the tyre is declared compliant.
If the results do not confirm the level of the Label grade, the second step (b) shall be applied.

(b) If the Label grade was originally based on an alignment report generated after March 2, 2026, the tyre is declared non-compliant and the procedure defined in Annex V of Regulation (EU) 2020/740 shall be applied

If the Label grade was originally based on an alignment report generated before March 2, 2026, the alignment equation applicable before March 2, 2026 will be applied to these validation results.

After this second step (b), if these new results confirm the level of the Label grade, the tyre is declared compliant.
If these new results do not confirm the level of the Label grade, the tyre is declared non-compliant and the procedure defined in Annex V of Regulation (EU) 2020/740 shall be applied.

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