SURFACE VEHICLE RECOMMENDED PRACTICE

J2522	SEP2014
Issued 2003-06 Stabilized 2014-09 Superseding J2522 JAN2013	

Dynamometer Global Brake Effectiveness

RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE Brake Dynamometer Standards Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/J2522_201409

FOREWORD

The globalization trend in the automotive industry necessitates the proper definition of applicable test procedures for assessment and comparison of different friction materials. These comparison tests should prove useful as a common ground for the development, selection, and quality assurance of friction linings.

The AK Working Group, which represents European manufacturers of friction linings and passenger car brakes, has developed an “AK Master” Standard in recent years. The SAE Brake Dynamometer Test Code Standards Committee considers this standard useful in supporting the technological efforts intended to improve motor vehicle braking systems overall performance and safety. Therefore this committee is making the AK Master standard available to the industry as an SAE Recommended Practice.

This document should be used in conjunction with other applicable standards or test procedures (SAE, Federal Codes or other specific testing programs) to fully assess a friction material’s adequacy for a certain application or vehicle platform.

This revision harmonizes cooling air speed with other SAE inertia dynamometer test procedures and also reflects standard testing practices from several laboratories which conduct the test on a regular basis.

1. SCOPE

1.1 This SAE Recommended Practice defines an Inertia Dynamometer Test procedure that assesses the effectiveness behavior of a friction material with regard to pressure, temperature and speed for motor vehicles fitted with hydraulic brake actuation.

1.2 The main purpose of SAE J2522 is to compare friction materials under the most equal conditions possible. To account for the cooling behavior of different test stands, the fade sections are temperature-controlled.

2. REFERENCES

There are no referenced publications specified herein.

3. DEFINITIONS

To facilitate the application of this document, the following terms and definitions should apply.

3.1 FRICTION VALUE FOR A BRAKE APPLY

Arithmetic average of all individual friction values for a brake apply

3.2 NOMINAL FRICTION VALUE

Average friction value for all brake applies without fading series and without temperature series

3.3 MINIMUM FRICTION VALUE

Lowest arithmetical average of the individual friction values for the fade sections and temperature series

3.4 FRICTION VALUE

The ratio of output torque to input torque for a disc brake at any specific point in time according to Equation 1.

$$\mu = \frac{100 \cdot Md_{Brake}}{2 \cdot (p - p_{Threshold}) \cdot A_p \cdot r_{eff} \cdot \eta} \quad \text{(Eq. 1)}$$

3.5 C* VALUE

The ratio of output torque to input torque for a drum brake at any specific point in time according to Equation 2.

$$C^* = \frac{100 \cdot Md_{Brake}}{(p - p_{Threshold}) \cdot A_p \cdot r_{eff} \cdot \eta} \quad \text{(Eq. 2)}$$

4. SYMBOLS AND ABBREVIATIONS

The following symbols and abbreviations are used in order to perform the calculations needed during the test

4.1 μ

Friction value.[unitless]

4.2 Md_{Brake}

Measured torque. [N m]

4.3 p

Applied pressure. [kPa]

4.4 $p_{Threshold}$

Threshold pressure to be taken as 50 kPa for disc brake, the threshold pressure for drum brakes is determined in dependency of the brake. [kPa]

4.5 A_p

Piston area. [mm^2]

4.6 r_{eff}

Effective radius. [mm]

4.7 η

Efficiency 100%

4.8 μ0P6

Average value of the friction values of the 1st to 6th application in 6.3.

4.9 μv120

Average value of the friction values of the applications at 2 000, 3 000 and 4 000 kPa in 6.4.3.

4.10 μvmax

Average value of the friction values of the applications at 2 000, 3 000 and 4 000 kPa in 6.4.5.

4.11 μ0P6

Average value of the friction values of the 1st to 6th application in 6.5.

4.12 μT40

Friction value of the 1st application in 6.6.

4.13 μMW2

Friction value of the 2nd application in 6.7.

4.14 μ0P18

Average value of the friction values of the 1st to 18th application in 6.8.

4.15 μF1

Minimum friction value of the 1st to 15th application in 6.9.

4.16 μ0P18

Average value of the friction values of the 1st to 18 application in 6.10.

4.17 μT500/ μT300

Minimum friction value of the friction values of the temperature series in 6.12.1 and 6.12.2.

4.18 μ0P18

Average value of the friction values of the 1st to 18th application in 6.13.

4.19 μF2

Minimum friction value of the 1st to 15th application in 6.14.

4.20 μ0P18

Average value of the friction values of the 1st to 18th application in 6.15.

5. TEST CONDITIONS

5.1 Inertia for the Front Axle

According to half of 75% of the gross vehicle weight if not otherwise specified.

5.2 Inertia for the Rear Axle

According to half of 25% of the gross vehicle weight if not otherwise specified.

5.3 Pressure Rise Rate

25 000 kPa/s ± 5 000 kPa/s.

5.4 Sampling Rate

Minimum 50 ms for pressure and torque.

5.5 Temperature Measurement

Position thermocouple at the friction path center radius 0.5 mm ± 0.1 mm deep in the disc outer face or drum contact face. Additional thermocouple(s) can be set in the friction material for temperature recording purposes.

5.6 Cooling Air Conditions

For 6.9, 6.12.1, 6.12.2, and 6.14, use 10 km/h (alternatively air inlet 0%, air outlet 100%); For 6.2, use 50 km/h; and for all other sections, use 30 km/h at the brake.

5.7 Fade Sections

The fade sections are controlled by torque and temperature. The braking torque is determined by the vehicle weight, the braking force distribution, the rolling radius, and the specified deceleration. (See Table 1.)

TABLE 1 - INITIAL TEMPERATURES FOR FADE STOPS

Stop	Initial temperature for disc brake °C	Initial temperature for drum brake °C
1	100	100
2	215	151
3	283	181
4	330	202
5	367	219
6	398	232
7	423	244
8	446	254
9	465	262
10	483	270
11	498	277
12	513	284
13	526	289
14	539	295
15	550	300

The starting temperatures are calculated by Equation 3.

$$T_{AN} = [(T_{A15} - T_{A1})/\ln(15)] \times \ln(N) + T_{A1} \quad \text{(Eq. 3)}$$

If initial temperatures cannot be reached in 6.12.1 and 6.12.2, then perform 80 km/h drags at a braking torque corresponding to 1.96 m/s^2 maximum deceleration for 20 s drag time. However, only the temperatures described in the program are to be collected for test report purposes. If initial temperatures are not reached in 6.9 and 6.14, the temperature levels can be the final temperature of the previous stop. Warmup stops should not be performed for these sections.

5.8 Brake disc material should be made of gray cast iron.

5.9 All specified values are recommended and can be adjusted according to the brake being tested.

6. TEST PROCEDURE

6.1 Green μ Characteristic

30 snubs 80 to 30 km/h at 3 000 kPa. See Table 2.

TABLE 2 - GREEN μ CHARACTERISTIC SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of snubs per cycle	30	30	30
Brake speed (km/h)	80	80	80
Release speed (km/h)	30	30	30
Pressure (kPa)	3 000	3 000	3 000
Initial brake temperature (°C)	≤100	≤100	≤80
Final brake temperature (°C)	Open	Open	Open
Number of cycles	1	1	1

6.2 Burnish

192 snubs 80 to 30 km/h at varying pressures. (Optional 2 cycle “64 snubs”.) See Table 3.

TABLE 3 - BURNISH SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of snubs per cycle	32	32	32
Brake speed (km/h)	80	80	80
Release speed (km/h)	30	30	30
Initial brake temperature (°C)	≤100	≤100	≤80
Final brake temperature (°C)	Open	Open	Open
Pressure snub 1 (kPa)	1 500	1 500	1 500
Pressure snub 2 (kPa)	3 000	3 000	3 000
Pressure snub 3 (kPa)	1 500	1 500	1 500
Pressure snub 4 (kPa)	1 800	1 800	1 800
Pressure snub 5 (kPa)	2 200	2 200	2 200
Pressure snub 6 (kPa)	3 800	3 800	3 800
Pressure snub 7 (kPa)	1 500	1 500	1 500
Pressure snub 8 (kPa)	2 600	2 600	2 600
Pressure snub 9 (kPa)	1 800	1 800	1 800
Pressure snub 10 (kPa)	3 400	3 400	3 400
Pressure snub 11 (kPa)	1 500	1 500	1 500
Pressure snub 12 (kPa)	2 600	2 600	2 600
Pressure snub 13 (kPa)	1 500	1 500	1 500
Pressure snub 14 (kPa)	2 200	2 200	2 200
Pressure snub 15 (kPa)	3 000	3 000	3 000
Pressure snub 16 (kPa)	4 600	4 600	4 600
Pressure snub 17 (kPa)	2 600	2 600	2 600
Pressure snub 18 (kPa)	5 100	5 100	5 100
Pressure snub 19 (kPa)	2 200	2 200	2 200

TABLE 3 - BURNISH SECTION (CONTINUED)

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Pressure snub 20 (kPa)	1 800	1 800	1 800
Pressure snub 21 (kPa)	4 200	4 200	4 200
Pressure snub 22 (kPa)	1 500	1 500	1 500
Pressure snub 23 (kPa)	1 800	1 800	1 800
Pressure snub 24 (kPa)	4 600	4 600	4 600
Pressure snub 25 (kPa)	2 600	2 600	2 600
Pressure snub 26 (kPa)	1 500	1 500	1 500
Pressure snub 27 (kPa)	3 400	3 400	3 400
Pressure snub 28 (kPa)	2 200	2 200	2 200
Pressure snub 29 (kPa)	1 800	1 800	1 800
Pressure snub 30 (kPa)	3 000	3 000	3 000
Pressure snub 31 (kPa)	1 800	1 800	1 800
Pressure snub 32 (kPa)	3 800	3 800	3 800
Number of cycles	6	6	6

6.3 Characteristic Value 1

6 snubs 80 to 30 km/h at 3 000 kPa. See Table 4.

TABLE 4 - CHARACTERISTIC VALUE 1 SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of stops per cycle	6	6	6
Brake speed (km/h)	80	80	80
Release speed (km/h)	30	30	30
Pressure (kPa)	3 000	3 000	3 000
Initial brake temperature (°C)	≤100	≤100	≤80
Final brake temperature (°C)	Open	Open	Open
Number of cycles	1	1	1

6.4 Speed/Pressure Sensitivity Sections

Pressure sensitivity at various brake and release speeds.

6.4.1 Speed/Pressure Sensitivity 40 km/h

8 stops 40 to 5 km/h at increasing pressures. See Table 5.

TABLE 5 - SPEED/PRESSURE SENSITIVITY 40 KM/H SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of stops per cycle	8	8	7
Brake speed (km/h)	40	40	40
Release speed (km/h)	≤5	≤5	≤5
Initial brake temperature (°C)	≤100	≤100	≤80
Final brake temperature (°C)	Open	Open	Open
Pressure stop 1 (kPa)	1 000	1 000	2 000
Pressure stop 2 (kPa)	2 000	2 000	3 000
Pressure stop 3 (kPa)	3 000	3 000	4 000
Pressure stop 4 (kPa)	4 000	4 000	5 000
Pressure stop 5 (kPa)	5 000	5 000	6 000
Pressure stop 6 (kPa)	6 000	6 000	7 000
Pressure stop 7 (kPa)	7 000	7 000	8 000
Pressure stop 8 (kPa)	8 000	8 000	—
Number of cycles	1	1	1

6.4.2 Speed/Pressure Sensitivity 80 km/h

8 snubs 80 to 40 km/h at increasing pressures. See Table 6.

TABLE 6 - SPEED/PRESSURE SENSITIVITY 80 KM/H SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of snubs per cycle	8	8	7
Brake speed (km/h)	80	80	80
Release speed (km/h)	40	40	40
Initial brake temperature (°C)	≤100	≤100	≤80
Final brake temperature (°C)	Open	Open	Open
Pressure snub 1 (kPa)	1 000	1 000	2 000
Pressure snub 2 (kPa)	2 000	2 000	3 000
Pressure snub 3 (kPa)	3 000	3 000	4 000
Pressure snub 4 (kPa)	4 000	4 000	5 000
Pressure snub 5 (kPa)	5 000	5 000	6 000
Pressure snub 6 (kPa)	6 000	6 000	7 000
Pressure snub 7 (kPa)	7 000	7 000	8 000
Pressure snub 8 (kPa)	8 000	8 000	—
Number of cycles	1	1	1

6.4.3 Speed/Pressure Sensitivity 120 km/h

8 snubs 120 to 80 km/h at increasing pressures. See Table 7.

TABLE 7 - SPEED/PRESSURE SENSITIVITY 120 KM/H SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of snubs per cycle	8	8	7
Brake speed (km/h)	120	120	120
Release speed (km/h)	80	80	80
Initial brake temperature (°C)	≤100	≤100	≤80
Final brake temperature (°C)	Open	Open	Open
Pressure snub 1 (kPa)	1 000	1 000	2 000
Pressure snub 2 (kPa)	2 000	2 000	3 000
Pressure snub 3 (kPa)	3 000	3 000	4 000
Pressure snub 4 (kPa)	4 000	4 000	5 000
Pressure snub 5 (kPa)	5 000	5 000	6 000
Pressure snub 6 (kPa)	6 000	6 000	7 000
Pressure snub 7 (kPa)	7 000	7 000	8 000
Pressure snub 8 (kPa)	8 000	8 000	—
Number of cycles	1	1	1

6.4.4 Speed/Pressure Sensitivity 160 km/h

8 snubs 160 to 130 km/h at increasing pressures. See Table 8.

TABLE 8 - SPEED/PRESSURE SENSITIVITY 160 KM/H SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of snubs per cycle	8	8	7
Brake speed (km/h)	160	160	160
Release speed (km/h)	130	130	130
Initial brake temperature (°C)	≤100	≤100	≤ 80
Final brake temperature (°C)	Open	Open	Open
Pressure snub 1 (kPa)	1 000	1 000	2 000
Pressure snub 2 (kPa)	2 000	2 000	3 000
Pressure snub 3 (kPa)	3 000	3 000	4 000
Pressure snub 4 (kPa)	4 000	4 000	5 000
Pressure snub 5 (kPa)	5 000	5 000	6 000
Pressure snub 6 (kPa)	6 000	6 000	7 000
Pressure snub 7 (kPa)	7 000	7 000	8 000
Pressure snub 8 (kPa)	8 000	8 000	—
Number of cycles	1	1	1

6.4.5 Speed/Pressure Sensitivity 200 km/h

8 snubs 200 to 170 km/h at increasing pressures. If vehicle maximum speed below 200 km/h use brake speed equal to vehicle top speed and release speed of 30 km/h below vehicle top speed. See Table 9.

TABLE 9 - SPEED/PRESSURE SENSITIVITY 200 KM/H SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of snubs per cycle	8	8	7
Brake speed (km/h)	200	200	200
Release speed (km/h)	170	170	170
Initial brake temperature (°C)	≤100	≤100	≤80
Final brake temperature (°C)	Open	Open	Open
Pressure snub 1 (kPa)	1 000	1 000	2 000
Pressure snub 2 (kPa)	2 000	2 000	3 000
Pressure snub 3 (kPa)	3 000	3 000	4 000
Pressure snub 4 (kPa)	4 000	4 000	5 000
Pressure snub 5 (kPa)	5 000	5 000	6 000
Pressure snub 6 (kPa)	6 000	6 000	7 000
Pressure snub 7 (kPa)	7 000	7 000	8 000
Pressure snub 8 (kPa)	8 000	8 000	—
Number of cycles	1	1	1

6.5 Characteristic Value 2

6 snubs 80 to 30 km/h at 3 000 kPa. See Table 10.

TABLE 10 - CHARACTERISTIC VALUE 2 SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of stops per cycle	6	6	6
Brake speed (km/h)	80	80	80
Release speed (km/h)	30	30	30
Pressure (kPa)	3 000	3 000	3 000
Initial brake temperature (°C)	≤100	≤100	≤80
Final brake temperature (°C)	Open	Open	Open
Number of cycles	1	1	1

6.6 Cold Application

1 stop 40 to 5 km/h at 3 000 kPa. See Table 11.

TABLE 11 - COLD APPLICATION SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of stops per cycle	1	1	1
Brake speed (km/h)	40	40	40
Release speed (km/h)	≤5	≤5	≤5
Pressure (kPa)	3 000	3 000	3 000
Initial brake temperature (°C)	≤40	≤40	≤40
Final brake temperature (°C)	Open	Open	Open
Number of cycles	1	1	1

6.7 Motorway Applications

1 stop and 1 snub at 0.6 g. See Table 12.

TABLE 12 - MOTORWAY APPLICATIONS SECTIONS

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of stops per cycle	2	2	2
Brake speed for stop 1 (km/h)	100	100	100
Brake speed for snub 2 (km/h)	90% of Vmax	90% of Vmax	90% of Vmax
Release speed for stop 1 (km/h)	≤5	≤5	≤5
Release speed for snub 2 (km/h)	50% of Vmax	50% of Vmax	50% of Vmax
Deceleration level (m/s²)	5.89	5.89	5.89
Initial brake temperature (°C)	≤50	≤50	≤50
Final brake temperature (°C)	Open	Open	Open
Number of cycles	1	1	1

6.8 Characteristic Value 3

18 snubs 80 to 30 km/h at 3 000 kPa. See Table 13.

TABLE 13 - CHARACTERISTIC VALUE 3 SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of stops per cycle	18	18	18
Brake speed (km/h)	80	80	80
Release speed (km/h)	30	30	30
Pressure (kPa)	3 000	3 000	3 000
Initial brake temperature (°C)	≤100	≤100	≤80
Final brake temperature (°C)	Open	Open	Open
Number of cycles	1	1	1

6.9 Fade 1

15 stops 100 to 5 km/h at 3.92 m/s^2 and increasing initial temperatures. See Table 14.

TABLE 14 - FADE 1 SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of stops per cycle	15	15	15
Brake speed (km/h)	100	100	100
Release speed (km/h)	≤5	≤5	≤5
Deceleration level (m/s^2)	3.92	3.92	3.92
Maximum pressure (kPa)	16 000	16 000	10 000
Initial temperature 1 (°C)	≤100	≤100	≤100
Initial temperature 2 (°C)	≤215	≤215	≤151
Initial temperature 3 (°C)	≤283	≤283	≤181
Initial temperature 4 (°C)	≤330	≤330	≤202
Initial temperature 5 (°C)	≤367	≤367	≤219
Initial temperature 6 (°C)	≤398	≤398	≤232
Initial temperature 7 (°C)	≤423	≤423	≤244
Initial temperature 8 (°C)	≤446	≤446	≤254
Initial temperature 9 (°C)	≤465	≤465	≤262
Initial temperature 10 (°C)	≤483	≤483	≤270
Initial temperature 11 (°C)	≤498	≤498	≤277
Initial temperature 12 (°C)	≤513	≤513	≤284
Initial temperature 13 (°C)	≤526	≤526	≤289
Initial temperature 14 (°C)	≤539	≤539	≤295
Initial temperature 15 (°C)	≤550	≤550	≤300
Final brake temperature (°C)	Open	Open	Open
Number of cycles	1	1	1

6.10 Recovery 1

18 snubs 80 to 30 km/h at 3 000 kPa. See Table 15.

TABLE 15 - RECOVERY 1 SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of stops per cycle	18	18	18
Brake speed (km/h)	80	80	80
Release speed (km/h)	30	30	30
Pressure (kPa)	3 000	3 000	3 000
Initial brake temperature (°C)	≤100	≤100	≤80
Final brake temperature (°C)	Open	Open	Open
Number of cycles	1	1	1

6.11 Temperature/Pressure Sensitivity 100 °C/80 °C

8 snubs 80 to 30 km/h at increasing pressure. See Table 16.

TABLE 16 - TEMPERATURE/PRESSURE SENSITIVITY 100 °C/80 °C SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of snubs per cycle	8	8	7
Brake speed (km/h)	80	80	80
Release speed (km/h)	30	30	30
Initial brake temperature (°C)	≤100	≤100	≤80
Final brake temperature (°C)	Open	Open	Open
Pressure snub 1 (kPa)	1 000	1 000	2 000
Pressure snub 2 (kPa)	2 000	2 000	3 000
Pressure snub 3 (kPa)	3 000	3 000	4 000
Pressure snub 4 (kPa)	4 000	4 000	5 000
Pressure snub 5 (kPa)	5 000	5 000	6 000
Pressure snub 6 (kPa)	6 000	6 000	7 000
Pressure snub 7 (kPa)	7 000	7 000	8 000
Pressure snub 8 (kPa)	8 000	8 000	—
Number of cycles	1	1	1

6.12 Temperature/Pressure Sensitivity 500 °C/300 °C sections

Temperature sensitivity at constant pressure and pressure sensitivity at high temperature.

6.12.1 Increasing Temperature 500 °C/300 °C

9 snubs 80 to 30 km/h at increasing temperature. See Table 17.

TABLE 17 - INCREASING TEMPERATURE 500 °C/300 °C SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of snubs per cycle	9	9	5
Brake speed (km/h)	80	80	80
Release speed (km/h)	30	30	30
Pressure (kPa)	3 000	3 000	3 000
Initial temperature 1 (°C)	≤100	≤100	≤100
Initial temperature 2 (°C)	≤150	≤150	≤150
Initial temperature 3 (°C)	≤200	≤200	≤200
Initial temperature 4 (°C)	≤250	≤250	≤250
Initial temperature 5 (°C)	≤300	≤300	≤300
Initial temperature 6 (°C)	≤350	≤350	—
Initial temperature 7 (°C)	≤400	≤400	—
Initial temperature 8 (°C)	≤450	≤450	—
Initial temperature 9 (°C)	≤500	≤500	—
Final brake temperature (°C)	Open	Open	Open
Number of cycles	1	1	1

6.12.2 Pressure Line 500 °C/300 °C

8 snubs 80 to 30 km/h at increasing pressure. See Table 18.

TABLE 18 - PRESSURE LINE 500 °C/300 °C SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of snubs per cycle	8	8	7
Brake speed (km/h)	80	80	80
Release speed (km/h)	30	30	30
Initial brake temperature (°C)	≤500	≤500	≤300
Final brake temperature (°C)	Open	Open	Open
Pressure snub 1 (kPa)	1 000	1 000	2 000
Pressure snub 2 (kPa)	2 000	2 000	3 000
Pressure snub 3 (kPa)	3 000	3 000	4 000
Pressure snub 4 (kPa)	4 000	4 000	5 000
Pressure snub 5 (kPa)	5 000	5 000	6 000
Pressure snub 6 (kPa)	6 000	6 000	7 000
Pressure snub 7 (kPa)	7 000	7 000	8 000
Pressure snub 8 (kPa)	8 000	8 000	-
Number of cycles	1	1	1

6.13 Recovery 2

18 snubs 80 to 30 km/h at 3 000 kPa. See Table 19.

TABLE 19 - RECOVERY 2 SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of stops per cycle	18	18	18
Brake speed (km/h)	80	80	80
Release speed (km/h)	30	30	30
Pressure (kPa)	3 000	3 000	3 000
Initial brake temperature (°C)	≤100	≤100	≤80
Final brake temperature (°C)	Open	Open	Open
Number of cycles	1	1	1

6.14 Fade 2

15 stops 100 to 5 km/h at 3.92 m/s^2 and increasing initial temperatures. See Table 20.

TABLE 20 - FADE 2 SECTION

Parameter	Front axle	Rear axle Disc brake	Rear axle Drum brake
Number of stops per cycle	15	15	15
Brake speed (km/h)	100	100	100
Release speed (km/h)	≤5	≤5	≤5
Deceleration level (m/s^2)	3.92	3.92	3.92
Maximum pressure (kPa)	16 000	16 000	10 000
Initial temperature 1 (°C)	≤100	≤100	≤100
Initial temperature 2 (°C)	≤215	≤215	≤151
Initial temperature 3 (°C)	≤283	≤283	≤181
Initial temperature 4 (°C)	≤330	≤330	≤202
Initial temperature 5 (°C)	≤367	≤367	≤219
Initial temperature 6 (°C)	≤398	≤398	≤232
Initial temperature 7 (°C)	≤423	≤423	≤244
Initial temperature 8 (°C)	≤446	≤446	≤254
Initial temperature 9 (°C)	≤465	≤465	≤262
Initial temperature 10 (°C)	≤483	≤483	≤270
Initial temperature 11 (°C)	≤498	≤498	≤277
Initial temperature 12 (°C)	≤513	≤513	≤284
Initial temperature 13 (°C)	≤526	≤526	≤289
Initial temperature 14 (°C)	≤539	≤539	≤295
Initial temperature 15 (°C)	≤550	≤550	≤300
Final brake temperature (°C)	Open	Open	Open
Number of cycles	1	1	1