

ICS 29.280
CCS S 35



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 25117-2020

Replacing GB/T 25117.1-2010, GB/T 25117.2-2010, GB/T 25117.3-2010

**Railway applications - Rolling stock - Combined test method for
traction systems**

Issued on: September 29, 2020

Implemented on: April 1, 2021

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

1 Scope	1
2 Normative references	3
3 Terms and definitions	3
4 Traction system characteristics	5
5 Test general requirements	7
6 Test general conditions	7
6.1 Test composition	7
6.2 Cooling during the test	10
6.3 Mechanical output measurement	10
6.4 Measurement error and measurement accuracy	13
6.5 Environmental conditions	14
7 Torque characteristic test	14
7.1 Overview	14
7.2 Traction motor thermal torque characteristic test	14
7.3 Cold torque characteristic test of traction motor	15
7.4 Starting torque at zero speed	16
8 Efficiency and energy consumption test	16
8.1 Overview	16
8.2 Efficiency characteristics	16
8.3 Energy consumption test under the line operation curve	17
9 Temperature rise test	18
9.1 Overview	18
9.2 Continuous load temperature rise test	18
9.3 Temperature rise test under the line operating curve	19
9.4 Parallel asynchronous traction motor wheel diameter difference test	19
10 System function test	21
10.1 Reverse start test	21
10.2 Traction-brake conversion test	22
10.3 Micro braking test	23
11 Network pressure variation range test	23
11.1 Test purpose	23
11.2 Test conditions	23

11.3 Test procedure	24
11.4 Acceptance criteria	24
12 System protection test	25
12.1 Overview	25
12.2 Voltage rapid change test	25
12.3 Traction power supply voltage interruption test	26
12.4 Traction power supply contact failure test	26
12.5 Sudden failure test of regenerative braking	27
12.6 Stopping test of traction inverter	28
12.7 Temperature calculation function test	28
12.8 Overcurrent and overvoltage protection test	29
12.9 Control battery power interruption test	29
13 Fault management test	29
13.1 Overview	29
13.2 Sensor function failure test	30
13.3 Command and feedback signal loss	30
13.4 Cooling system failure test	30
13.5 Grounding and short-circuit faults	30
14 Combined test of energy storage traction system	30
Appendix A (Normative Appendix) Combined Test Items	31
Appendix B (Normative Appendix) Special test items and test conditions for DC traction motors	32
Appendix C (informative appendix) User and manufacturer agreement clause	34
Reference	35

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard replaces GB/T 25117.1-2010 "Rail Transit Locomotive and Rolling Stock Combination Test Part 1. Inverter-powered AC

Combined test of flow motor and its control system", GB/T 25117.2-2010 "Rail Transit Locomotive and Rolling Stock Combined Test Part 2

Points. Combination test of chopper-powered DC traction motor and its control system" and GB/T 25117.3-2010 "Rail Transit Locomotive

Vehicle combination test Part 3. Combined test of AC motor and its control system powered

by indirect converter". This standard and

Compared with GB/T 25117.1-2010, GB/T 25117.2-2010 and GB/T 25117.3-2010, the main technical changes are as follows.

---Modified the scope of application, and added the technical requirements for the combined test of the traction system composed of permanent magnet traction motors on the original basis (see

Chapter 1, GB/T 25117.1-2010, GB/T 25117.2-2010 and GB/T 25117.3-2010 Chapter 1);

---Modified "Terms and Definitions" (see Chapter 3, GB/T 25117.1-2010, GB/T 25117.2-2010 and GB/T 25117.3-

Chapter 3 of.2010);

---Deleted environmental conditions (see GB/T 25117.1-2010, GB/T 25117.2-2010 and GB/T 25117.3-2010

Chapter 4);

---Modified "Traction System Characteristics" and renamed the chapter title (see Chapter 4, GB/T 25117.1-2010, GB/T 25117.2-

2010 and Chapter 5 of GB/T 25117.3-2010);

--- Added "Test General Requirements" (see Chapter 5);

--- Deleted "test classification" (see GB/T 25117.1-2010, GB/T 25117.2-2010 and GB/T 25117.3-2010

Chapter 6);

---Modified "Test General Conditions" (see Chapter 6, GB/T 25117.1-2010, GB/T 25117.2-2010 and GB/T 25117.3-

7.2 of.2010);

--- Deleted Chapter 7 "Tests" of the.2010 edition, and scattered the contents of each test item to the standard Chapters 7~14

(See Chapter 7 of GB/T 25117.1-2010, GB/T 25117.2-2010 and GB/T 25117.3-2010);

---Modified "torque characteristic test", changed "full torque speed scan test" to "speed scan test", and used it as "traction motor thermal

As a sub-item of "state torque characteristic test", the item "starting torque test at zero speed" is added (see Chapter 7,

7.5.1 of GB/T 25117.1-2010, GB/T 25117.2-2010 and GB/T 25117.3-2010);

---Modified the acceptance criteria in "Hot Torque Characteristic Test of Traction Motor" and "Cold Torque Characteristic Test of Traction Motor" to take all traction

The sum of the motor torque is judged and the maximum working speed requirement in the test (see 7.2, 7.3, GB/T 25117.1-2010,

7.5.1.2 and 7.5.1.3 of GB/T 25117.3-2010);

---Modified the test requirements of "Traction Motor Cold Torque Characteristic Test", which only requires single point execution at the lowest speed point (see 7.3.3,

GB/T 25117.1-2010, GB/T 25117.3-2010 7.5.1.3);

---Added the energy consumption test items under the line operation curve in the "efficiency and energy consumption test" (see Chapter 8);

---Added the temperature rise test items under the line operation curve (see Chapter 9);

---Added the reverse start test item, traction-brake conversion test item and micro brake test in the "system function test" (see section

Chapter 10);

---Modified the "net voltage variation range test" (see Chapter 11, GB/T 25117.1-2010, GB/T 25117.3-2010, 7.6.1.2);

---Modified the "system protection test", split the short-term power supply interruption test in the 2010 edition into a traction power supply voltage interruption test

And traction power supply contact failure test, adding the regenerative braking sudden failure test and the traction converter stop test

Test, temperature calculation function test, over-current and over-voltage protection test, control battery power interruption test 5 test items (see

Chapter 12, GB/T 25117.1-2010, GB/T 25117.3-2010 7.6.1.3);

---Added the sensor function failure test, command and feedback signal loss, cooling system failure test,

4 test items for grounding and short-circuit faults (see Chapter 13);

---Added the combined test of energy storage traction system (see Chapter 14);

---Added special test items and test conditions for DC traction motors (see Appendix B);

---Modified the terms of the agreement between the user and the manufacturer (see Appendix C, Appendix A of GB/T 25117.1-2010, GB/T 25117.2-