

DIN EN 15328:2024-06 (E)

Railway applications - Braking - Brake pads (includes Amendment :2024)

Contents	Page
European foreword.....	5
Introduction	7
1 Scope.....	8
2 Normative references.....	8
3 Terms and definitions	9
4 Symbols and abbreviations	10
5 Characteristics and test method of the brake pads	11
5.1 Classification of brake pads.....	11
5.2 Coefficient of friction	11
5.3 Environmental impact, health and safety	11
5.4 Usage requirements	11
5.5 Frictional requirements for brake pads	11
5.5.1 General.....	11
5.5.2 Priority levels of brake applications.....	12
5.5.3 Criteria for the nominal line	12
5.5.4 Criteria for the mean coefficient of friction.....	12
5.5.5 Criteria for continuous brake applications	13
5.5.6 Criteria for bedding brake applications	13
5.6 Requirements and optional test programs for brake pads for coaches.....	14
5.6.1 General.....	14
5.6.2 Tolerance ranges.....	14
5.6.3 Criteria for continuous brake applications	14
5.6.4 Criteria for bedding brake applications	14
5.6.5 Coefficient of friction under high thermal load.....	14
5.6.6 Coefficient of friction under wet conditions.....	14
5.7 Geometrical features of the brake pads.....	15
5.7.1 Brake pad shape	15
5.7.2 Brake pad wear	15
5.7.3 Brake pad fixing.....	15
5.8 Mechanical, physical and chemical characteristics	15
5.9 Thermal and mechanical requirements	17
5.10 In-service assessment.....	17
5.11 Marking of brake pads.....	17
5.12 Dynamometer tests	17
5.13 Conditions for classification tests	18
5.13.1 Classification scheme for locomotives, MUs, high-speed trains, freight wagon and coaches.....	18
5.13.2 Optional classification scheme for coaches	20
5.13.3 Validity of assessment.....	20
5.13.4 Scope of classification.....	20
5.14 Interchangeability of brake pads	20
Annex A (normative) Generic conditions for the execution of test programs	21
A.1 General.....	21
A.2 Response time	21

A.3	Weighing	21
A.4	Interruption of test sequence	21
A.5	Temperatures	21
A.6	Brake applications under wet conditions	21
A.7	Conditioning of brake discs	22
A.7.1	General	22
A.7.2	Conditioning program	23
A.7.3	Roughness measurement	23
A.8	Bedding-in of brake pads	23
A.9	Methods of temperature measurements	24
A.10	Mean friction radius	24
A.11	Rotation and ventilation conditions	24
Annex B (normative) Test programs for classes A1 to G1		25
B.1	Test program: brake pads of class A1	25
B.2	Test program: brake pads of classes B1 and C1	27
B.3	Test Program: brake pads of classes B2 and C2	32
B.4	Test program: brake pads of class C0	37
B.5	Test program: brake pads of class C3	39
B.6	Test program: brake pads of class D1	42
B.7	Test program: brake pads of class D2	45
B.8	Test program: brake pads of class E1	49
B.9	Test program: brake pads of class F1	51
B.10	Test program: brake pads of classes F2 and G1	55
B.11	Test program: brake pads of class F3	57
B.12	Assessment of static friction coefficient	60
Annex C (normative) Test programs for coaches		61
C.1	Test program S1.1 ($v_{max} = 200$ km/h – organic brake pads)	61
C.2	Test program S2.1 (wet test)	64
C.3	Instantaneous coefficient of friction for test program S1.1, S2.1, T1 and T2	64
C.4	Mean coefficient of friction for test programs S1.1, S2.1, T1 and T2	65
C.5	Test program T1 ($v_{max} = 200$ km/h – sintered brake pads)	66
C.6	Test program T2 wet test (sintered brake pads)	69
Annex D (normative) Documentation of brake tests		70
Annex E (normative) Generic test programs for locomotives, MUs and high speed trains		72
E.1	Use of the generic test programs	72
E.2	Locomotives and MUs	72

E.2.1	Test parameters.....	72
E.2.2	Brake steps	75
E.2.3	Masses	76
E.2.4	Continuous brake applications	76
E.3	High speed trains	76
E.3.1	Test parameters.....	76
E.3.2	Brake steps	78
E.3.3	Masses	79
E.3.4	Brake forces for high-speed brake applications.....	79
E.3.5	Power for continuous brake applications.....	80
Annex F (normative)	Brake pads shapes and envelopes	81
F.1	General.....	81
F.2	Preferred space envelope for SBP 200 cm ²	81
F.3	Preferred space envelope for SBP 175 cm ²	82
F.4	Space envelope for SBP 200 cm ²	83
F.5	Maximum Space envelope for SBP 175 cm ²	83
Annex G (normative)	Drawings for dove tails.....	84
Annex H (informative)	In-service test	86
H.1	Test requirements	86
H.2	Mechanical requirements	86
H.3	Thermal requirements.....	87
Annex I (informative)	Example of the declaration of conformity.....	88
Bibliography.....		89