

DIN EN 13674-1:2011-04 (E)

Railway applications - Track - Rail - Part 1: Vignole railway rails 46 kg/m and above

Contents	Page
Foreword	4
Introduction	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
4 Information to be supplied by the purchaser	8
5 Steel grades	9
6 Profile drawings/properties/mass	9
7 Manufacture	10
7.1 Product integrity	10
7.2 Blooms	10
7.3 Rails	10
7.4 Identification	10
7.4.1 Branding	10
7.4.2 Hot stamping	11
7.4.3 Cold stamping	11
7.4.4 Other identification	11
8 Qualifying tests	12
8.1 Procedure	12
8.2 Fracture toughness (K _{Ic})	12
8.2.1 Test pieces and test methods	12
8.2.2 Qualifying criteria	12
8.3 Fatigue crack growth rate	13
8.3.1 Test method	13
8.3.2 Test pieces	13
8.3.3 Number of tests and test conditions	13
8.3.4 Qualifying criteria	13
8.4 Fatigue test	13
8.4.1 Test method	13
8.4.2 Test pieces	14
8.4.3 Number of tests and test conditions	14
8.4.4 Qualifying criteria	14
8.5 Residual stress in rail foot	14
8.5.1 Test method	14
8.5.2 Test pieces	14
8.5.3 Measurements	14
8.5.4 Qualifying criteria	14
8.6 Variation of centre line running surface hardness of heat treated rails	14
8.7 Tensile strength and elongation	15
8.8 Segregation	15
8.9 Other qualifying requirements	16
9 Acceptance tests	16

9.1	Laboratory tests	16
9.1.1	General	16
9.1.2	Sampling and preparation of samples and test pieces	16
9.1.3	Chemical composition	16
9.1.4	Microstructure	20
9.1.5	Decarburisation	21
9.1.6	Oxide cleanliness	21
9.1.7	Sulfur prints	21
9.1.8	Hardness	21
9.1.9	Tensile tests	22
9.1.10	Retest procedures	22
9.2	Dimension tolerances	23
9.2.1	Profile	23
9.2.2	Straightness, surface flatness and twist	23
9.2.3	Cutting and drilling	27
9.3	Gauges	27
9.4	Inspection for internal quality and surface quality	27
9.4.1	Internal quality	27
9.4.2	Surface quality	29
9.4.3	Checking of automated testing equipment	30
Annex A (normative) Rail profiles		41
Annex B (normative) Standard test method for the determination of the plane strain fracture toughness (Klc) of rails		67
B.1	Test methods	67
B.2	Test pieces	67
B.3	Number of tests	67
B.4	Test conditions)	67
B.5	Analysis of test data	68
B.6	Reporting of results	68
Annex C (normative) Method for the determination of rail foot surface longitudinal residual stresses .73 C.1 Procedure		73
C.2	Strain gauges and their location	73
Annex D (normative) Limiting sulfur prints		76
Annex E (normative) Profile and drilling gauges		90
Annex F (informative) Significant technical changes between this European standard and the previous edition		103
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC		105
Bibliography		108
