

DIN EN 14730-1:2006-10 (E)

Railway applications - Track - Aluminothermic welding of rails - Part 1: Approval of welding processes

Contents		Page
Foreword		4
Introduction		5
1	Scope	6
2	Normative references	6
3	Terms and definitions	6
4	Information to be supplied by the railway authority	7
5	Approval procedure	8
5.1	General	8
5.2	Process identification	8
5.3	General requirements	8
5.4	Initial compliance testing	8
5.5	Extension of initial compliance testing	10
5.6	Documents to be submitted with the request for approval	11
5.6.1	The process manual	11
5.6.2	Drawing with the required measurements	11
5.6.3	Chemical analysis ranges and tolerances	12
5.7	Preparation and allocation of test welds	12
6	Re-approval following process changes	13
7	Laboratory tests	16
7.1	Visual surface examination	16
7.1.1	As cast weld surface	16
7.1.2	Ground weld surface	16
7.1.3	Visible heat affected zone	17
7.2	Running surface hardness test	17
7.3	Slow bend test	18
7.4	Internal examination	18
7.4.1	Weld soundness	18
7.4.2	Fusion zone - shape and dimension	21
7.4.3	Microscopic examination	22
7.4.4	Heat softened zone width	22
7.5	Fatigue test	22
7.6	Chemical analysis	23
Annex A (informative) Steps in approval		25
Annex B (informative) Suggested sequence of laboratory tests		26
Annex C (normative) Ultrasonic testing procedure for aluminothermic welds in rail		27
C.1	A test of the head zone of the weld (non-planar defects)	27
C.2	A test of the head zone of the weld (planar defects)	27
C.3	A test of the head and web zone of the weld (planar defects)	27
C.4	A test of the middle zone of the foot of the weld	27

C.5	A test of the ankle zone of the foot of the weld	27
C.6	A test of the toe zone of the foot of the weld	28
Annex D (normative) Procedure for FRY etching		29
Annex E (normative) Procedure for measurement of surface hardness		30
Annex F (normative) Procedure for slow bend test		31
Annex G (normative) Procedure for recording test weld fracture face defects		32
Annex H (normative) Ultrasonic inspection procedure on aluminothermic welds to be sectioned		34
H.1	Principle	34
H.2	Apparatus	34
H.3	Preparation of samples	34
H.4	Calibration	34
H.5	Testing	35
H.6	Reporting	35
Annex I (normative) Procedure for microscopic examination of the visible heat affected zone and fusion zone of welds		36
Annex J (normative) Procedure for measurement of the heat softened zone width		37
J.1	Measurement of hardness	37
J.2	Evaluation of hardness data	38
J.2.1	General	38
J.2.2	Mean hardness of parent rail	38
J.2.3	Measurement hardness line	38
J.2.4	Heat softened zone width measurement	39
J.2.5	Parent rail hardness variation	39
Annex K (normative) Fatigue test methods for aluminothermic welds		40
K.1	Scope	40
K.2	Test equipment	40
K.3	Calibration procedure	41
K.3.1	General	41
K.3.2	Test piece	41
K.3.3	Test piece preparation	41
K.3.4	Instrumentation	42
K.3.5	Procedure	42
K.4	Fatigue test method	45
K.4.1	General	45
K.4.2	Staircase testing method	45
K.4.3	Example of the data analysis of a fatigue strength determination by the staircase method	47
K.4.4	Past-the-post testing method	48
Annex L (informative) A-deviations		49