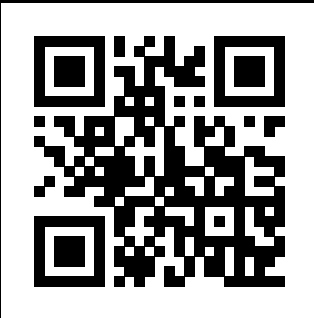




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Standards & Directives

Crane Components
Design, Manufacturing and
Inspection



Mechanical Design Standards

Description	EN-ISO	DIN	FEM
Cranes – Bridge and gantry cranes	EN 15011		
Cranes – General design	EN 13001-1		
Crane Safety – General Design – Part 2: Loads	EN 13001-2		
Rules for the Design of Hoisting Appliances			FEM 1,001
Measures for Achieving Safe Working Conditions			FEM 9.755
Power Driven Series – Safety			FEM 9,751
Hand and Power Driven Hoists for Industrial Use			FEM 9,756
Cranes – Test and Inspection Procedures	TS 10116 TS ISO 9927-1		
Steel Wire Ropes	EN 12385-4+A1 TS EN 13001-3-2		
Cranes – Access	EN 13586		
Cranes- Safe Use	ISO 12480-1		
Terminations for Steel Wire Ropes	EN 13411 (1-2-3-4-5-6-7-8)		
Hook		DIN 15401 DIN 15402	
Hook Traverses		DIN 15412	
Cranes – Wire Ropes	ISO 4309		
Cranes – Safety – Design – Requirements for Equipment	EN 13135+A1		
Cranes – Information for Use and Testing	TS EN 12644-1+A1		
	EN 12644-2 +A1		
Cranes – Steel Structures – Verification		DIN 15018-1,2	
Lifting Appliances – Groove Profiles for Wire Ropes		DIN 15061-1	
Wheel Groups		DIN 15049 DIN 15090 DIN 1025 DIN 15074 DIN 15078 DIN 15079	
Wheel Shafts		DIN 15091	
Classification of Mechanisms	ISO 4301		FEM 9.511
Rules for Design – Local Girder Stresses			FEM 9.341
Dimensions and Design of Ropes			FEM 9.661
Lifting Force Limiters for Control			FEM 9.761
Cranes – Competency Requirements for Crane Operators	ISO 23814		
Cranes – Monitoring of Crane Design and Operation	ISO 12482		
Cranes – Classification	TS ISO 4301-5		
Technical Characteristics and Acceptance Documents	ISO 7363		
Tolerances for Wheels and Travel and Traversing Tracks	ISO 12488-1		
Design of Steel Structures	TS EN 1993-6		
Limit States and Proof of Structural Competence	TS EN 13001-3-1+A2		
Cranes – Stiffness – Bridge and Gantry Cranes	TS ISO 22986		
Cranes – Training of Operators	TS ISO 9926-1		

Electrical Design Standards

Equipment	EN-ISO	FEM
Limiting and Indicating Devices	TS EN 12077-2	
Rotating Electrical Machines	TS EN 60034-1+Cor	
Safety of Machinery – Safety-Related Parts of Control Systems	TS EN ISO 13849-1	
Safety of Machinery – Electrical Equipment of Machines	TS EN 60204-32	
Cranes – Control Devices and Control Stations	TS EN 13557	
Low Voltage Adjustable Frequency Drives		FEM 9.752
Emergency Stop Function	TS EN ISO 13850	
Degrees of Protection Provided by Enclosures (IP Code)	TS EN IEC 60034-5	
Graphical Symbols for Control Devices		FEM 9,941
Selection of Lifting and Travel Motors		FEM 9.683

Electromagnetic compatibility (EMC)

Part	EN-ISO
Electrostatic Discharge Immunity Test	TS EN 61000-4-2
Electrical Fast Transient/Burst Immunity Test	TS EN 61000-4-4
Surge Immunity Test	TS EN 61000-4-5
Immunity to Conducted Disturbances Induced by Radio-Frequency Fields	TS EN IEC 61000-4-6
Radio-Frequency Disturbance Characteristics – Limits and Methods of Measurement	EN 55011
Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests	TS EN IEC 61000-4-11
Limits for Harmonic Current Emissions (Equipment Input Current ≤ 16 A per Phase)	TS EN IEC 61000-3-2
Limitation of Voltage Changes, Voltage Fluctuations and Flicker in Public Low-Voltage Supply Systems (Equipment ≤ 16 A per Phase, Not Subject to Conditional Connection)	TS EN 61000-3-3

Safety of machinery Risk assessment

Risk assessment	EN-ISO
Safety of Machinery – General Principles for Design – Risk Assessment and Risk Reduction	TS EN ISO 12100
Acoustics – Recommended Practice for the Design of Low-Noise Machinery and Equipment	TS EN ISO 11688-1,2

LVD Test

LVD Test	EN-ISO
Electrical Equipment of Machines	TS EN 60204-1

Paint

Paint	EN-ISO
Preparation of Steel Substrates Before Application of Paints and Related Products	TS EN ISO 8501 TS EN ISO 8503
Paints and Varnishes	TS EN ISO 12944

Crane System Directives

Machinery Directive 2006/42/EC
Construction Products Regulation (EU) No 305/2011
Low Voltage Directive 2014/35/EU
Electromagnetic Compatibility Directive 2014/30/EU
Noise Emission in the Environment by Equipment for Use Outdoors Directive 2000/14/EC
Regulation No. 6331 on Health and Safety Requirements for the Use of Work Equipment

Metal Materials

Material	EN-ISO
Spheroidal Graphite Cast Irons	TS EN 1563
Steel Castings – Steel Castings for General Engineering Uses	TS EN 10293
Cold-Formed Welded Structural Hollow Sections of Non-Alloy and Fine Grain Steels	TS EN 10219-1
Heat-Treatable Steels, Alloy Steels and Free-Cutting Steels – Part 1: Non-Alloy Steels for Quenching and Tempering	TS EN ISO 683-1
Part 2: Alloy Steels for Quenching and Tempering	TS EN ISO 683-2
Part 3: Case-Hardening Steels	TS EN ISO 683-3
Hot-Rolled Products of Structural Steels	TS EN 10025-1, 2

Quality Requirements for welding

Requirement	EN-ISO
Execution of Steel Structures and Aluminium Structures	EN 1090-1+A1,2+A1
Welding Coordination	TS EN ISO 14731
Qualification Testing of Welders	TS EN ISO 9606-1
WPS (Welding Procedure Specification)	EN ISO 15609-1
Specification and Qualification of Welding Procedures for Metallic Materials	TS EN ISO 15613, TS EN ISO 15614-1
Welding Personnel	TS EN ISO 14732
Non-Destructive Testing	TS EN ISO 9712
Welding and Allied Processes – Types of Joint Preparation	TS EN ISO 9692-1,2
Welding – Guidance for the Measurement of Preheating Temperature, Interpass Temperature and Preheat Maintenance Temperature During Welding	TS EN ISO 13916

Inspection & Testing after welding

Inspection Method	EN-ISO
Non-Destructive Testing of Welds (NDT)	TS EN ISO 17635
Visual Testing of Fusion-Welded Joints	EN ISO 17637 TS EN ISO 5817
Radiographic Testing	TS EN ISO 17636-1,2 TS EN ISO 10675-1,2
Ultrasonic Testing	TS EN ISO 17640 TS EN ISO 10863 TS EN ISO 13588 TS EN ISO 11666 TS EN ISO 15626 TS EN ISO 22825 TS EN ISO 23279
Magnetic Particle Testing	TS EN ISO 17638 TS EN ISO 23278
Macroscopic and Microscopic Examination of Welds	EN ISO 17639
Classification of Thermal Cuts	TS EN ISO 9013
Guidelines for a Metallic Materials Grouping System	TSE CEN ISO/TR 15608

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