

DIN EN 1090-4:2020-06 (E)

Execution of steel structures and aluminium structures - Part 4: Technical requirements for cold-formed structural steel elements and cold-formed structures for roof, ceiling, floor and wall applications

Contents		Page
European foreword		7
1	Scope	8
2	Normative references	10
3	Terms, definitions, symbols and abbreviations	13
3.1	Terms and definitions	13
3.2	Symbols and abbreviations	14
4	Specifications and documentation	16
4.1	Execution Specification	16
4.1.1	General	16
4.1.2	Execution classes	16
4.1.3	Layout drawings	16
4.1.4	Geometrical tolerances	17
4.2	Installer's Documentation	18
4.2.1	General	18
4.2.2	Quality documentation	18
4.2.3	Safety of the erection works	18
4.3	Detailed traceability documentation	18
4.4	Execution documentation	18
5	Constituent products	18
5.1	General	18
5.2	Identification, inspection documents and traceability	19
5.3	Materials	19
5.4	Thickness tolerances	21
5.5	Minimum nominal sheet thicknesses	21
5.5.1	Profiled sheets	21
5.5.2	Structural members	22
5.6	Geometrical tolerances	22
5.7	Mechanical fasteners	22
5.7.1	General	22
5.7.2	Type of fasteners and materials	23
5.8	Accessories	24
5.9	Surface protection	24
5.10	External fire performance for roofing elements	24
5.11	Reaction to fire	24
5.12	Resistance to fire	24
5.13	Release of dangerous substances	24
5.14	Lightning protection	24
6	Manufacturing	24
6.1	General	24
6.2	Identification	25
6.3	Cold forming	25
6.4	Cutting	25
6.4.1	General	25

6.4.2	Shearing and nibbling	25
6.4.3	Thermal cutting	25
6.5	Punching	25
6.5.1	General	25
6.5.2	Execution	26
7	Welding	27
7.1	Welding of customized cold rolled hollow sections	27
7.1.1	General	27
7.1.2	Qualification of welding procedures and welding personnel	27
7.1.3	Geometrical tolerances	28
7.1.4	Inspection and testing of welded custom cold rolled sections	28
7.2	Spot welding	28
7.3	Welding at the construction site	29
8	Mechanical fastening	29
8.1	General	29
8.2	Use of self-tapping and self-drilling screws	29
8.3	Use of blind rivets	30
8.4	Use of cartridge fired pins	30
8.5	Attachment of cold formed structural members and sheeting to the supporting member .	31
8.5.1	Types of connections and attachments	31
8.5.2	Attachment of profiled sheets to the supporting member transverse to the direction of span	31
8.5.3	Attachment of profiled sheets to the supporting member parallel to the direction of sheeting's span	33
8.5.4	Supporting member made of metal	33
8.5.5	Supporting member made of timber or other wood-based materials	33
8.5.6	Supporting member made of concrete or masonry	33
8.6	Connecting profiled sheets	33
8.7	Edge distances and spacing of fasteners for sheeting	34
8.7.1	General	34
8.7.2	Edge spacings of webs of trapezoidal sheeting and liner tray profiles	34
9	Erection	34
9.1	General	34
9.2	Site conditions	35
9.3	Training/instruction of installation personnel	35
9.4	Inspection of preceding works	35
9.5	Layout drawing	35
9.6	Tools required	36
9.7	Safety on site	36
9.8	Inspection of packaging and contents	36
9.9	Storage	36
9.10	Damaged structural members and sheeting and connecting devices	37
9.11	Unloading, lifting gear/slings/straps	37
9.12	Laying	37
9.13	Direction of lay	38
9.14	Maintaining the cover width during installation	38
9.15	Condition after installation (swarf from drilling, fouling of surface, protective film wrap) .	38
9.16	Inspection after installation	38
9.17	Diaphragms	38
9.18	Protection against lightning	39
10	Surface protection	39
10.1	Corrosion protection	39
10.2	Cleaning and maintenance	40
10.2.1	Organic coated products	40
10.2.2	Metallic coated products	40
10.2.3	Stainless steel	40
11	Geometrical tolerances	40

11.1	General	40
11.2	Tolerance types	41
11.3	Essential tolerances	41
11.3.1	General	41
11.3.2	Manufacturing tolerances	41
11.3.3	Erection tolerances	41
11.4	Functional tolerances	42
12	Inspection, testing and correction	42
12.1	General	42
12.2	Structural members, profiled sheets and fasteners	42
12.2.1	General	42
12.2.2	Non-conforming products	42
12.3	Manufacturing: geometrical dimensions of manufactured structural members and sheeting	42
12.3.1	General	42
12.3.2	Profiled sheets	42
12.3.3	Members	43
12.4	Inspection of the installed structure	44
12.5	Inspection of fastening	44
12.5.1	Self-tapping and self-drilling screws	44
12.5.2	Blind rivets	44
12.5.3	Cartridge fired pins	44
12.5.4	Bolted Connections	44
Annex A(normative)Basic requirements for profiled sheeting		45
A.1	General	45
A.2	Supporting members	45
A.2.1	Materials	45
A.2.2	Shear forces/fixed points	45
A.3	Edges of laying area	45
A.3.1	Longitudinal decking edge trims	45
A.3.2	Weakening of the cross section	46
A.3.3	Reinforcements and double layers	46
A.3.4	Avoidance of ice damming	47
A.4	Building physics requirements	48
A.4.1	General	48
A.4.2	Water permeability	48
A.4.3	Thermal insulation	48
A.4.4	Avoidance of condensation / moisture protection	48
A.4.4.1	General	48
A.4.4.2	Measures against convection	49
A.4.5	Airborne sound insulation (Rw)	49
A.4.6	Sound absorption (w)	49
A.4.7	Protection against lightning	49
A.5	Roof drainage	50
Annex B(normative)Additional design requirements for profiled sheeting		52
B.1	General	52
B.2	Serviceability	52
B.3	Widths of supports	52
B.4	Supports made of concrete or masonry	53
B.5	Eccentric attachments	54
B.6	Stiffening of liner trays	55
B.7	Walkability	56
B.7.1	Walkability during installation	56
B.7.2	Walkability and access after installation	56
B.7.3	Test "Walkability"	56
B.8	Moment-resisting connection	58
B.9	Rotational restraint	60

B.10	Cantilevers	60
B.11	Openings in laying area	62
	Annex C(informative)Documentation	65
	Annex D(normative)Geometrical tolerances	66
D.1	General	66
D.2	Essential and functional manufacturing tolerances -- Cold-formed profiled sheets	66
D.3	Essential and functional manufacturing tolerances --cold formed members including custom cold rolled hollow sections	70
D.3.1	Press braked or folded members	70
D.3.2	Roll formed members	72
	Annex E(normative)Corrosion protection by metallic coating with or without organic coatings	73
E.1	Corrosion protection	73
E.2	Suitability of corrosion protection	76
E.2.1	Selection	76
E.2.2	Examination of suitability (initial inspection)	82
E.2.2.1	General	82
E.2.2.2	Coating mass / coating thickness	82
E.2.2.3	Condensed-water test	83
E.2.2.4	Salt spray test	83
E.2.2.5	Adhesive strength of coil coating after cupping	83
E.2.2.6	Testing of workability and formability, crack testing after bending	83
E.2.3	Monitoring	84
E.2.3.1	General	84
E.2.3.2	Type testing	84
E.2.3.3	Factory production control (FPC)	84
E.2.4	Galvanic corrosion	85
	Annex F(normative)Additional information	88
F.1	List of required additional information	88
F.2	List of additional information if not otherwise specified	88
	Bibliography	90