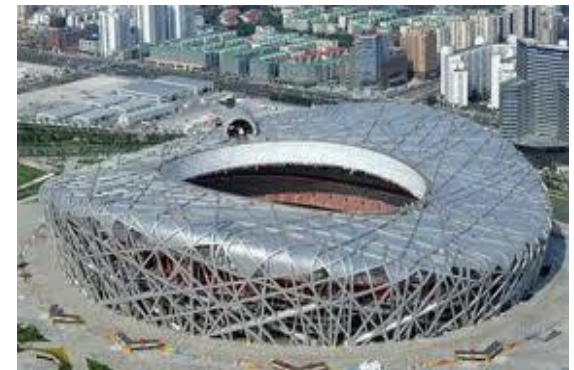


## UVOD U STANDARD EN 1090-1: Opšti uslovi proizvodnje čeličnih i aluminijumskih konstrukcija

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## EN 1090

### Execution of steel structures and aluminium structures

- Part 1: Requirements for conformity assessment for structural components (CE)

 replaces „Übereinstimmungsnachweis“ Ü

- Part 2: Technical requirements for the execution of steel structures

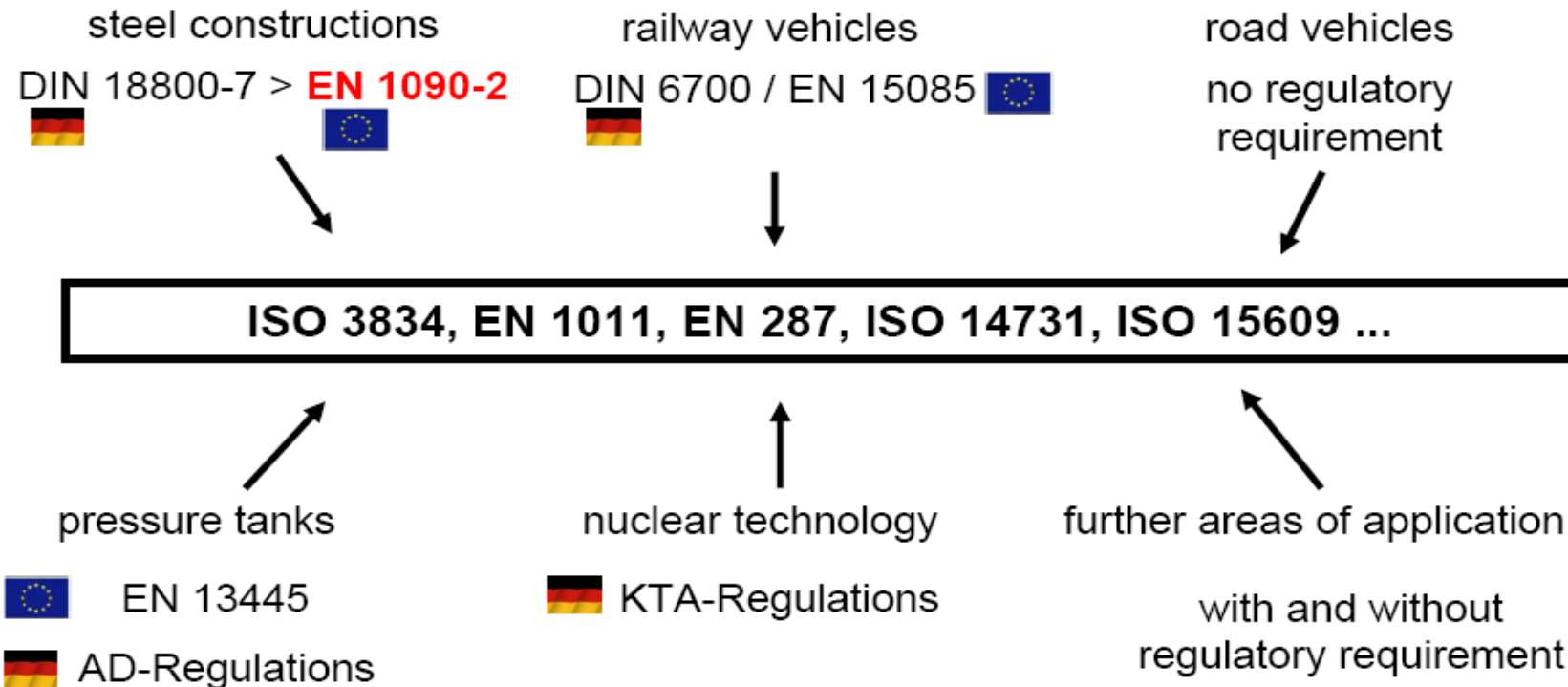
 replaces DIN 18800 part 7

- Part 3: Technical requirements for the execution of aluminium structures

 replaces DINV 4113 part 3



## Normative Regulations





DIN 18800 part 7



weldment classes

A – E

depend on

- material
- thickness of product
- welding process
- component
- loading



EN 1090 part 2



execution classes EXC

1 – 4

depend on

- consequence class CC
- service categorie SC
- production categorie PC

- **DIN 18800 ostaje da vazi samo na teritoriji Nemačke do 01. jula 2014. Priznavaće se oba standarda.**
- **EN 1090 vazi na teritoriji Evropske Unije počev od 01. jula 2012**

## EN 1090-2

### Terms and definitions

**execution**

all activities performed for the physical completion of the works, i.e. procurement, fabrication, welding, mechanical fastening, transportation, erection, surface treatment and the inspection and documentation thereof

**execution class**

classified set of requirements specified for the execution of the works as a whole, of an individual component or of a detail of a component

**service category**

category that characterises a component in terms of the circumstances of its use

**production category**

category that characterises a component in terms of the methods used for its execution

**Consequence classes**

EN 1990:2002 gives in its Annex B guidelines for the choice of consequence class for the purpose of reliability differentiation. Consequence classes for structural components are divided in three levels denoted CC<sub>i</sub> (i = 1, 2 or 3).

## POSLEDIČNA KLASA CC

### Consequence Classes CC

EN 1990 Annex B

Schadens- folgeklassen	Merkmale	Beispiele im Hochbau oder bei sonstigen Ingenieurbauwerken
CC 3	Hohe Folgen für Menschenleben <u>oder</u> sehr große wirtschaftliche, soziale oder umweltbeeinträchtigende Folgen	Tribünen, öffentliche Gebäude mit hohen Versagensfolgen (z. B. eine Konzerthalle)
CC 2	Mittlere Folgen für Menschenleben, beeinträchtigende wirtschaftliche, soziale oder umweltbeeinträchtigende Folgen	Wohn- und Bürogebäude, öffentliche Gebäude mit mittleren Versagensfolgen (z. B. ein Bürogebäude)
CC 1	Niedrige Folgen für Menschenleben <u>und</u> kleine oder vernachlässigbare wirtschaftliche, soziale oder umweltbeeinträchtigende Folgen	Landwirtschaftliche Gebäude ohne regelmäßigen Personenverkehr (z. B. Scheunen, Gewächshäuser)

# Proizvodnja čeličnih i aluminijumskih konstrukcija



Industrie Service

Versagens- folgeklasse	Beispiel für Zusammenhang von Gebäudetyp und -Nutzung
1	Einfamilienhäuser mit bis zu 4 Stockwerken. Landwirtschaftliche Gebäude, die zu anderen Gebäuden oder Flächen mit häufiger Nutzung durch Personen mindestens das 1,5-fache der Gebäudehöhe beträgt. <div style="background-color: yellow; border: 2px solid black; padding: 5px; text-align: center; margin: 10px 0;"> <b>CC1 = low</b> </div>
2a Untere Risiko- Gruppe	5-stöckige Gebäude mit einheitlicher Nutzung. Hotels mit bis 4 Stockwerken. Wohn- und Apartmentgebäude mit bis 4 Stockwerken. Bürogebäude mit bis 4 Stockwerken. Industriebauten mit bis 3 Stockwerken. Einzelhandelsgeschäfte mit bis 3 Stockwerken und bis 1 000 m <sup>2</sup> Geschoßfläche in jedem Geschoß. Einstöckige Schulgebäude Alle Gebäude mit bis zu 2 000 m <sup>2</sup> in jedem Geschoß. <div style="background-color: yellow; border: 2px solid black; padding: 5px; text-align: center; margin: 10px 0;"> <b>CC2 = standard</b> </div>
2b Obere Risiko- Gruppe	Hotels, Wohn- und Apartmentgebäude mit mehr als 4 und bis 15 Stockwerken. Schulgebäude mit mehr als einem und bis 15 Stockwerken. Einzelhandelsgeschäfte mit mehr als 3 und bis 15 Stockwerken. Krankenhäuser mit bis 3 Stockwerken. Bürogebäude mit mehr als 4 und bis zu 15 Stockwerken. Alle Gebäude mit Publikumsverkehr mit Geschoßflächen von mehr als 2 000 m <sup>2</sup> und mehr als 2 Stockwerken. Parkhäuser mit mehr als 2 Stockwerken. <div style="background-color: yellow; border: 2px solid black; padding: 5px; text-align: center; margin: 10px 0;"> <b>extraordinary big buildings</b> </div>
3	Alle über 100 m hohen Gebäude. Alle Stadien. Gebrücken. <div style="background-color: yellow; border: 2px solid black; padding: 5px; text-align: center; margin: 10px 0;"> <b>CC3 = soccer arenas (railway bridges)</b> </div>

EN 1991-1-7



## Consequence Classes CC

Further examples für CC3

- Hospitals
- Kindergartens, schools
- Buildings with a capacity >1000 persons



## Service Categorie SC

Categories	Criteria
SC1	<ul style="list-style-type: none"><li>Structures and components designed for quasi static actions only (Example: Buildings)</li><li>Structures and components with their connections designed for seismic actions in regions with low seismic activity and in DCL*</li><li>Structures and components designed for fatigue actions from cranes (class S<sub>0</sub>)**</li></ul>
SC2	<ul style="list-style-type: none"><li>Structures and components designed for fatigue actions according to EN 1993. (Examples: Road and railway bridges, cranes (class S<sub>1</sub> to S<sub>9</sub>)**, structures susceptible to vibrations induced by wind, crowd or rotating machinery)</li><li>Structures and components with their connections designed for seismic actions in regions with medium or high seismic activity and in DCM* and DCH*</li></ul>

\* DCL, DCM, DCH: ductility classes according to EN 1998-1  
\*\* For classification of fatigue actions from cranes, see EN 1991-3 and EN 13001-1

SC1 = static

SC2 = fatigue

## Production Categorie PC

Categories	Criteria
PC1	<ul style="list-style-type: none"><li>• Non welded components manufactured from any steel grade products</li><li>• Welded components manufactured from steel grade products below S355</li></ul>
PC2	<ul style="list-style-type: none"><li>• Welded components manufactured from steel grade products from S355 and above</li><li>• Components essential for structural integrity that are assembled by welding on construction site</li><li>• Components with hot forming manufacturing or receiving thermic treatment during manufacturing</li><li>• Components of CHS lattice girders requiring end profile cuts</li></ul>

PC1

S235 / S275

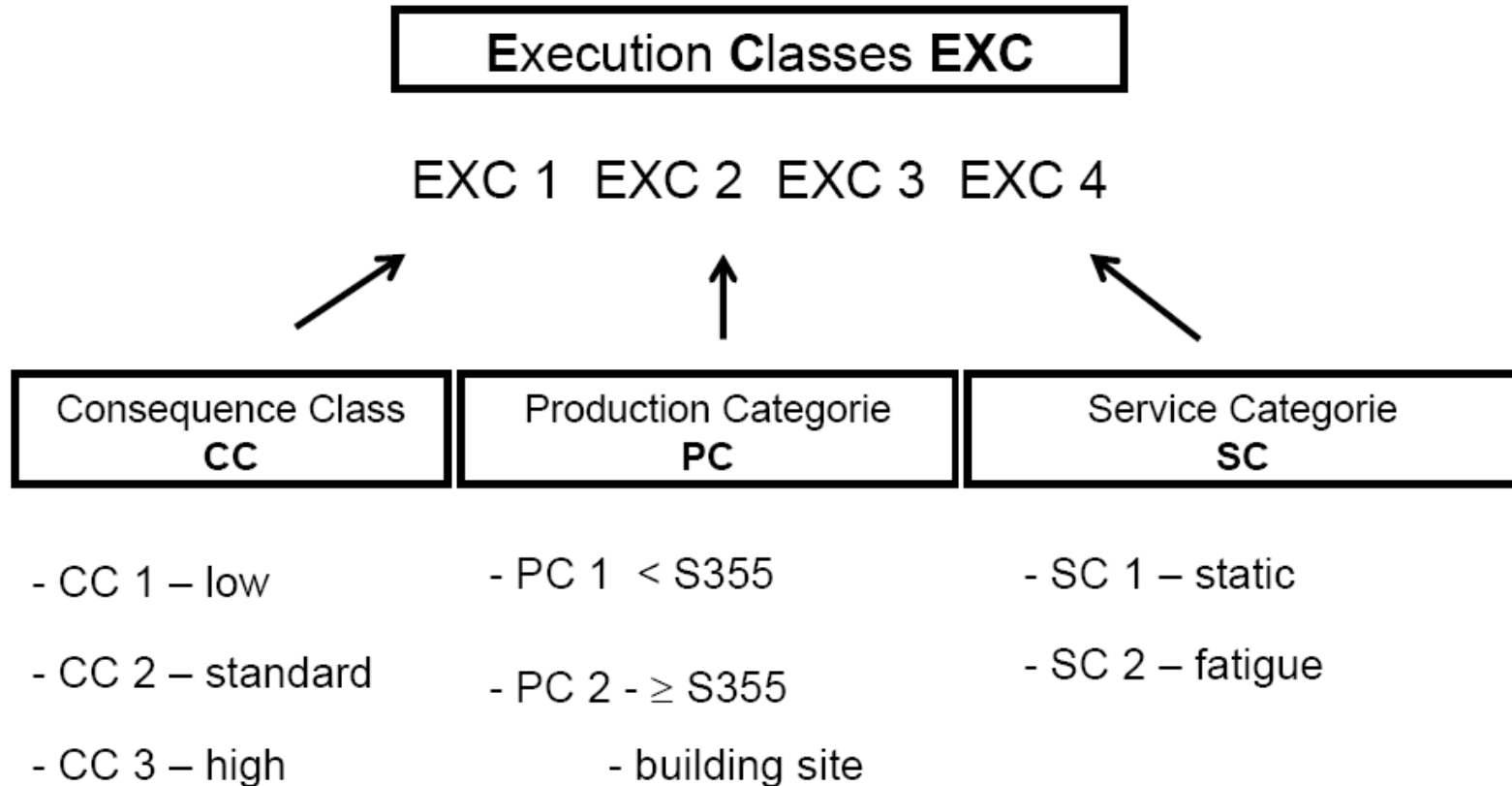
PC2

≥ S355 or building site

## Execution Classes EXC

Consequence classes		CC1		CC2		CC3	
Service categories		SC1	SC2	SC1	SC2	SC1	SC2
Production categories	PC1	EXC1	EXC2	EXC2	EXC3	EXC3 <sup>a</sup>	EXC3 <sup>a</sup>
	PC2	EXC2	EXC2	EXC2	EXC3	EXC3 <sup>a</sup>	EXC4

<sup>a</sup> EXC4 should be applied to special structures or structures with extreme consequences of a structural failure as required by national provisions.



## Execution Classes EXC

Execution Classes (workshop welded components)

Consequence Class (workshop)		CC1 low		CC2 standard		CC3 high	
		SC1 static	SC2 fatigue	SC1 static	SC2 fatigue	SC1 static	SC2 fatigue
Production Categorie	PC1 S235, S275	<b>EXC1</b>	<b>EXC2</b>	<b>EXC2</b>	<b>EXC3</b>	<b>EXC3</b>	<b>EXC3</b>
	PC2 ≥ S355	<b>EXC2</b>	<b>EXC2</b>	<b>EXC2</b>	<b>EXC3</b>	<b>EXC3</b>	<b>EXC4</b>

<sup>a</sup> EXC4 should be applied to special structures or structures with extreme consequences of a structural failure as required by national provisions

## welding supervisor

B = IWS    S = IWT    C = IWE

EXC	Steels (steel group)	Reference standards	Thickness (mm)		
			$t \leq 25^a$	$25 < t \leq 50^b$	$t > 50$
EXC2	S235 to S355 (1.1, 1.2, 1.4)	EN 10025-2, EN 10025-3, EN 10025-4 EN 10025-5, EN 10149-2, EN 10149-3 EN 10210-1, EN 10219-1	B	S	C <sup>c</sup>
	S420 to S700 (1.3, 2, 3)	EN 10025-3, EN 10025-4, EN 10025-6 EN 10149-2, EN 10149-3 EN 10210-1, EN 10219-1	S	C <sup>d</sup>	C
EXC3	S235 to S355 (1.1, 1.2, 1.4)	EN 10025-2, EN 10025-3, EN 10025-4 EN 10025-5, EN 10149-2, EN 10149-3 EN 10210-1, EN 10219-1	S	C	C
	S420 to S700 (1.3, 2, 3)	EN 10025-3, EN 10025-4, EN 10025-6 EN 10149-2, EN 10149-3 EN 10210-1, EN 10219-1	C	C	C
EXC4	All	All	C	C	C

<sup>a</sup> Column base plates and endplates  $\leq 50$  mm.  
<sup>b</sup> Column base plates and endplates  $\leq 75$  mm.  
<sup>c</sup> For steels up to and including S275, level S is sufficient.  
<sup>d</sup> For steels N, NL, M and ML, level S is sufficient.

## Execution Classes EXC

Execution Classes (workshop welded components)

Consequence Class (workshop)		CC1 low		CC2 standard		CC3 high	
		SC1 static	SC2 fatigue	SC1 static	SC2 fatigue	SC1 static	SC2 fatigue
Production Categorie	PC1 S235, S275	<b>EXC1</b>	<b>EXC2</b>	<b>EXC2</b>	<b>EXC3</b>	<b>EXC3</b>	<b>EXC3</b>
	PC2 ≥ S355	<b>EXC2</b>	<b>EXC2</b>	<b>EXC2</b>	<b>EXC3</b>	<b>EXC3</b>	<b>EXC4</b>

<sup>a</sup> EXC4 should be applied to special structures or structures with extreme consequences of a structural failure as required by national provisions

## Execution Class and welding supervisor (workshop welded components)

Consequence Class		CC1 low		CC2 standard		CC3 high	
Service Categorie		SC1 static	SC2 fatigue	SC1 static	SC2 fatigue	SC1 static	SC2 fatigue
PC1 <u>&lt;S355</u>	$t \leq 25$ (50 <sup>1</sup> )	<b>EXC1</b> ---	<b>EXC2</b> IWS	<b>EXC2</b> IWS	<b>EXC3</b> IWT	<b>EXC3</b> IWT T	<b>EXC3</b> IWT
	$25 < t \leq 50$ (75 <sup>1</sup> )	<b>EXC1</b> ---	<b>EXC2</b> IWT	<b>EXC2</b> IWT	<b>EXC3</b> IWE	<b>EXC3</b> IWE	<b>EXC3</b> IWE
	$t > 50$	<b>EXC1</b> ---	<b>EXC2</b> IWT	<b>EXC2</b> IWT	<b>EXC3</b> IWE	<b>EXC3</b> IWE	<b>EXC3</b> IWE

<sup>a</sup> EXC4 should be applied to special structures or structures with extreme consequences of a structural failure as required by national provisions

<sup>1</sup>) column base plates and endplates

<sup>2</sup>) IWT adequate if grade N, NL, M, ML

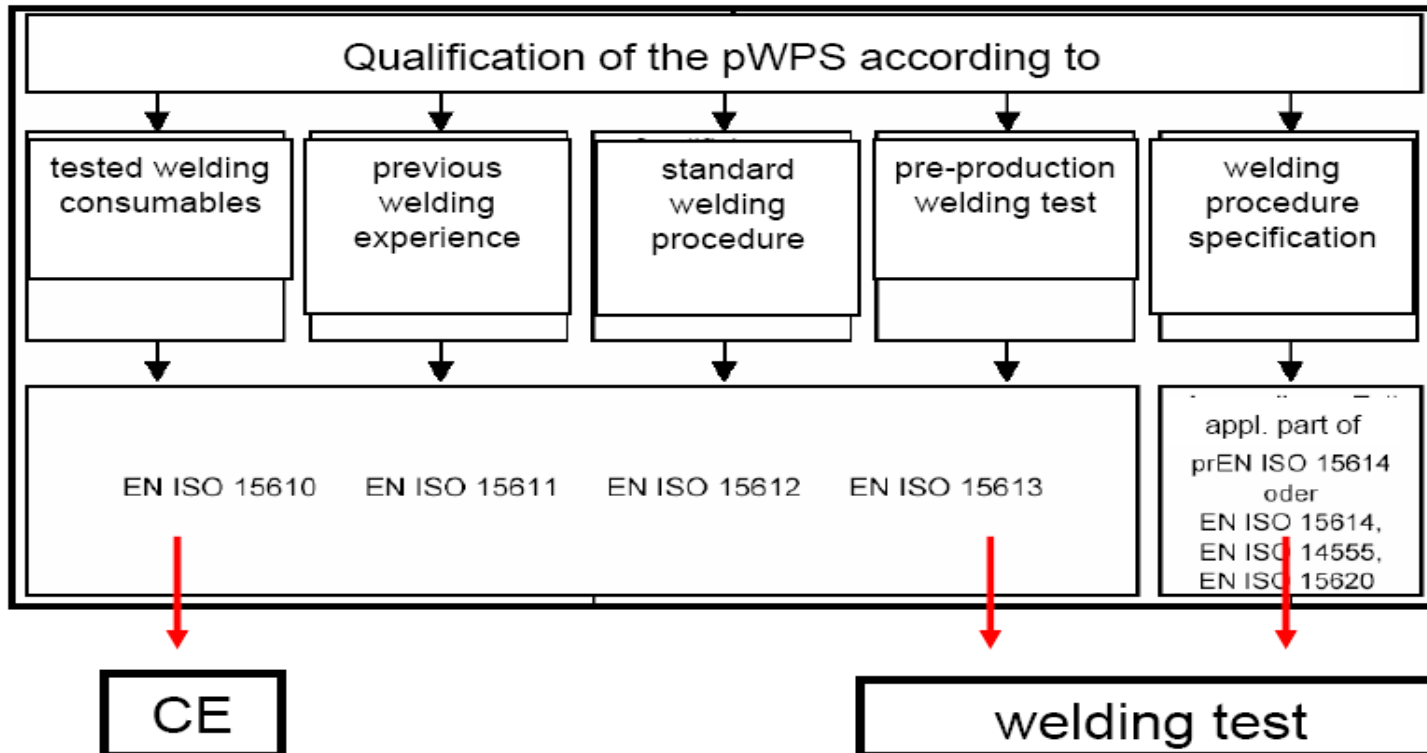


## Execution Class and welding supervisor (workshop welded components)

Consequence Class		CC1 low		CC2 standard		CC3 high	
		SC1 static	SC2 fatigue	SC1 static	SC2 fatigue	SC1 static	SC2 fatigue
PC2 > S355	$t \leq 25$ (50 <sup>1</sup> )	<b>EXC2</b> <b>IWT</b>	<b>EXC2</b> <b>IWT</b>	<b>EXC2</b> <b>IWT</b>	<b>EXC3</b> <b>IWE</b>	<b>EXC3</b> <b>IWE</b>	<b>EXC4</b> <b>IWE</b>
	$25 < t \leq 50$ (75 <sup>1</sup> )	<b>EXC2</b> <b>IWE<sup>2</sup></b>	<b>EXC2</b> <b>IWE<sup>2</sup></b>	<b>EXC2</b> <b>IWE<sup>2</sup></b>	<b>EXC3</b> <b>IWE</b>	<b>EXC3</b> <b>IWE</b>	<b>EXC4</b> <b>IWE</b>
	$t > 50$	<b>EXC2</b> <b>IWE</b>	<b>EXC2</b> <b>IWE</b>	<b>EXC2</b> <b>IWE</b>	<b>EXC3</b> <b>IWE</b>	<b>EXC3</b> <b>IWE</b>	<b>EXC4</b> <b>IWE</b>

<sup>a</sup> EXC4 should be applied to special structures or structures with extreme consequences of a structural failure as required by national provisions

welding according to  
qualified welding procedure specifications WPS



welding according to  
qualified welding procedure specifications WPS

Table 12 — Methods of qualification of welding procedures for the processes 111, 114, 12, 13 and 14

Method of qualification		EXC 2	EXC 3	EXC 4
Welding procedure	EN ISO 15614-1	X	X	X
Pre-production	EN ISO 15613	X	X	X
Standard welding procedure	EN ISO 15612	X <sup>a</sup>	-	-
Previous welding experience	EN ISO 15611	X <sup>b</sup>		
Tested welding consumables	EN ISO 15610			
X	Permitted			
-	Not permitted			

<sup>a</sup> Only for materials ≤ S 355 and only for manual or partly mechanized welding.  
<sup>b</sup> Only for materials ≤ S 275 and only for manual or partly mechanized welding.

## Qualification of the WPS acc to ISO 15610

### EN 1090 part 2

#### Limits of application

MAG, MIG, WIG, E

S235 - S275 (1.1) (~~+S555~~)

Stainless steels (8.1)

Thickness 3 - 40 mm

fillet welds  $a \geq 3$  mm

tube diameters  $> 25$  mm

Qualification of the WPS acc to ISO 15610

## EN 1090 part 2

Limits of application

MAG, MIG, WIG, E

**only EXC2 !**

S235 - S275 (1.1) (~~S355~~)

Stainless steels (8.1)

**- changings for fatigue actions**

THICKNESS 5 - 40 mm

**- changings in CC3 (high)**

fillet welds  $a \geq 3$  mm

**- if welding supervisor IWS → similar to DIN 18800-7**

## EN 1090

### Execution of steel structures and aluminium structures

-Part 1: Requirements for conformity assessment for structural components (CE)

 replaces „Übereinstimmungsnachweis“ Ü

- Part 2: Technical requirements for the execution of steel structures

 replaces DIN 18800 part 7

- Part 3: Technical requirements for the execution of aluminium structures

 replaces DINV 4113 part 3



The Construction Products Directive (CPD) shall guarantee the **free trade** with and the **unlimited use** of construction products in the single european market



CE - conformity assessment



EN 1090-1 Annex ZA

# Proizvodnja čeličnih i aluminijumskih konstrukcija



Industrie Service


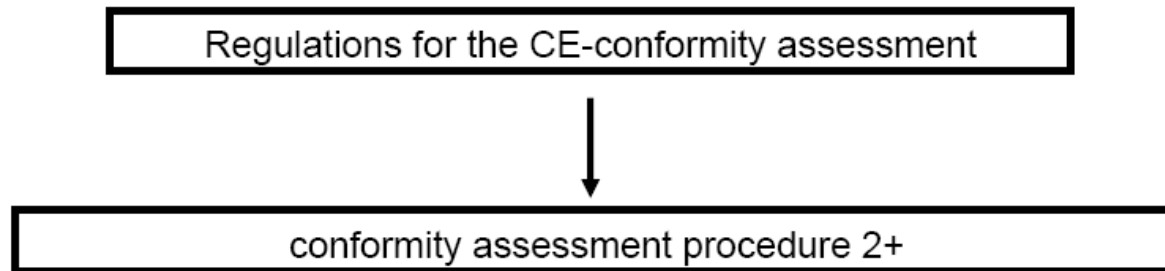
  01234	CE conformity marking, consisting of the "CE"-symbol given in Directive 93/68/EEC.  Identification number of the notified body
AnyCo Ltd, PO Box 21, B-1050  08  01234-CPD-00234	Name or identifying mark and registered address of the producer  Last two digits of the year in which the marking was affixed  Certificate number
EN 1090-1  Welded steel beam – M 346  Tolerances on geometrical data: EN 1090-2.  Weldability: Steel S235J0 according to EN 10025-2.  Fracture toughness: 27 J at 0°C.  Reaction to fire: Material classified: Class A1.  Release of cadmium: NPD.  Emission of radioactivity: NPD.  Durability: Surface preparation according to EN 1090-2, preparation grade P3. Surface painted according to EN ISO 12944-5, S.1.09.  <u>Structural characteristics:</u> <u>Design:</u> NPD. <u>Manufacturing:</u> According to component specification CS-034/2006, and EN 1090-2, execution class EXC2.	No. of European standard  Description of product  and  information on regulated characteristics

Figure ZA.1 – Example of CE marking information of product properties by material properties and geometrical data

1/29/2013





**Table ZA.2 System of attestation of conformity for steel and aluminium structural components**

Product	Intended use	Level(s) or class(s)	Attestation of conformity system
Steel and aluminium structural components	For structural use in all types of construction works		2+

System 2+: See CPD Annex III.2 (ii). First possibility, including certification of the factory production control by an approved body on the basis of initial inspection of factory and of factory production control as well as of continuous surveillance, assessment and approval of factory production control.

**Table ZA.3 Assignment of tasks for evaluation of conformity of structural steel and aluminium components**

Tasks		Content of the task	Evaluation of conformity Clauses to apply
Tasks under the responsibility of the manufacturer	Initial type testing	Relevant parameters related to the performance characteristics of Table ZA.1	6.2
	Factory Production Control (FPC)	Relevant parameters related to the performance characteristics of Table ZA.1	6.3
	Sampling, testing and inspection at the factory	Relevant characteristics of Table ZA.1	Table 2
Tasks for the certification body	Certification of FPC by a certified body on the basis of:	Initial inspection of factory and of FPC	6.3 and Annex B
		Continuous surveillance, assessment and approval of FPC	6.3 and Annex B

## Welding Certificate

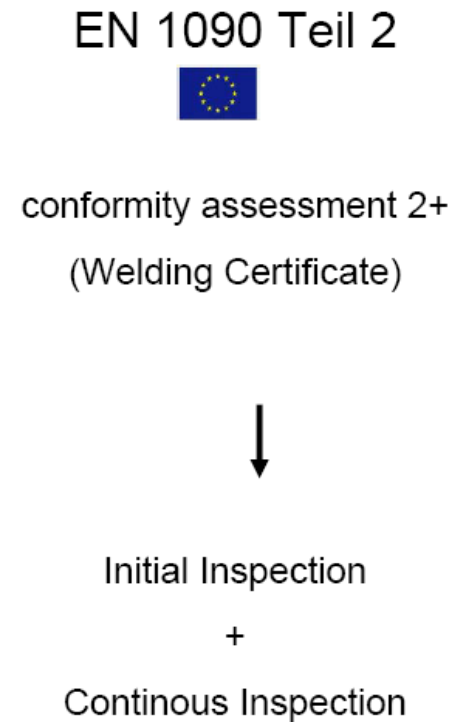
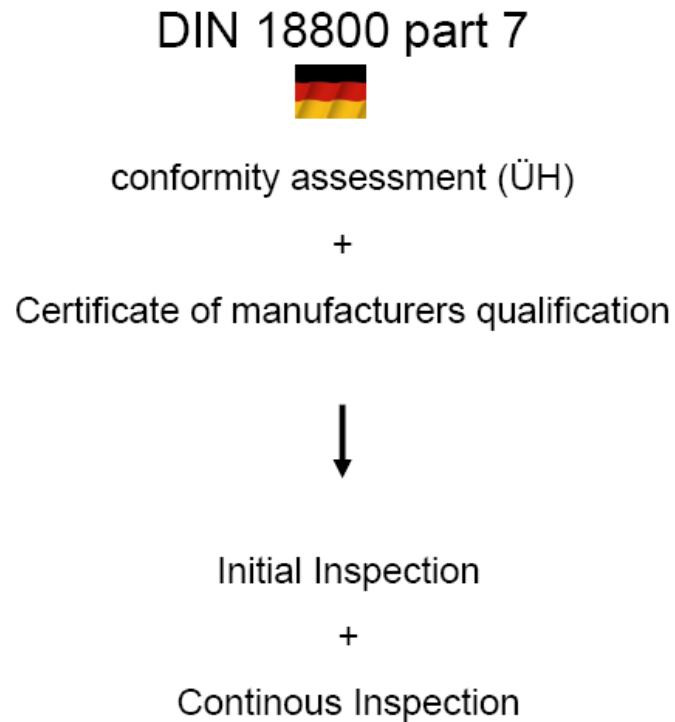
The welding certificate should include the following information:

- scope and the applicable standards;
- execution class(es);
- welding process(es);
- parent material(s);
- responsible welding coordinator, see EN ISO 14731;
- remarks if any.

**Table B.3 — Routine surveillance intervals**

Execution class	Intervals between inspections of manufacturer's FPC after the ITT (years)
EXC1 and EXC2	1-2-3-3
EXC3 and EXC4	1-1-2-3-3

## Quality control system



**Ex: Factory Building**

→ CC 2

- span 25 m
- max t = 16 mm
- end plates 40 mm
- S235
- shop welding
- Static loading

→ PC 1

→ SC 1

Consequence classes		CC1		<u>CC2</u>		CC3	
Service categories		SC1	SC2	<u>SC1</u>	SC2	SC1	SC2
Production categories	<u>PC1</u>	EXC1	EXC2	<u>EXC2</u>	EXC3	EXC3 <sup>a</sup>	EXC3 <sup>a</sup>
	PC2	EXC2	EXC2	EXC2	EXC3	EXC3 <sup>a</sup>	EXC4

<sup>a</sup> EXC4 should be applied to special structures or structures with extreme consequences of a structural failure as required by national provisions.

# Proizvodnja čeličnih i aluminijumskih konstrukcija



Industrie Service

**Ex: Factory Building**

CC2, SC1, PC1, EXC2

- max t = 16 mm
- end plates 40 mm
- S235

Execution Class and welding supervisor (workshop welded components)

Consequence Class		CC1 low		<u>CC2</u> standard		CC3 high	
Service Categorie		SC1 static	SC2 fatigue	<u>SC1</u> static	SC2 fatigue	SC1 static	SC2 fatigue
<u>PC1</u> <u>&lt;S355</u>	<u>t ≤ 25 (50<sup>1</sup>)</u>	EXC1 ---	EXC2 IWS	<b>EXC2</b> <b>IWS</b>	EXC3 IWT	EXC3 IWT T	EXC3 IWT
	25 < t ≤ 50 (75 <sup>1</sup> )	EXC1 ---	EXC2 IWT	EXC2 IWT	EXC3 IWE	EXC3 IWE	EXC3 IWE
	t > 50	EXC1 ---	EXC2 IWT	EXC2 IWT	EXC3 IWE	EXC3 IWE	EXC3 IWE

**Ex: Factory Building**

- max t = 16 mm
- end plates 40 mm
- S235

CC2, SC1, PC1, EXC2

## Qualification of the WPS

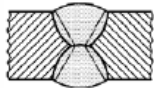
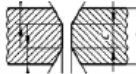
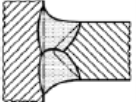
Table 12 — Methods of qualification of welding procedures for the processes 111, 114, 12, 13 and 14

Method of qualification		EXC 2	EXC 3	EXC 4
Welding procedure test	EN ISO 15614-1	X	X	X
Pre-production welding test	EN ISO 15613	X	X	X
Standard welding procedure	EN ISO 15612	X <sup>a</sup>	-	-
Previous welding experience	EN ISO 15611	X <sup>b</sup>	-	-
Tested welding consumables	EN ISO 15610			
X	Permitted			
-	Not permitted			
<sup>a</sup> Only for materials ≤ S 355 and only for manual or partly mechanized welding.				
<sup>b</sup> Only for materials ≤ S 275 and only for manual or partly mechanized welding.				

**CE**

## supplementary non destructive testings

Table 24 — Extent of supplementary NDT

Type of weld	Shop and site welds		
	EXC2	EXC3	EXC4
<p>Transverse butt welds and partial penetration welds in butt joints subjected to tensile stress:</p> <p><math>U \geq 0,5</math></p>  <p><math>U &lt; 0,5</math></p> 	10 %	20 %	100 %
	0 %	10 %	50 %
<p>Transverse butt welds and partial penetration welds:</p> <p>in cruciform joints</p>  <p>in T joints</p>	10 %	20 %	100 %
	5 %	10 %	50 %
<p>Transverse fillet welds in tension or shear:</p> <p>With <math>a &gt; 12</math> mm or <math>t &gt; 20</math> mm</p> <p>With <math>a \leq 12</math> mm and <math>t \leq 20</math> mm</p>	5 %	10 %	20 %
	0 %	5 %	10 %
Longitudinal welds and welds to stiffeners	0 %	5 %	10 %
<p>NOTE 1 Longitudinal welds are those made parallel to the component axis. All the others are considered as transverse welds.</p> <p>NOTE 2 <math>U</math> = Utilization grade for welds for quasi-static actions. <math>U = E_d/R_d</math>, where <math>E_d</math> is the largest action effect of the weld and <math>R_d</math> is the resistance of the weld in the ultimate limit state.</p> <p>NOTE 3 Terms <math>a</math> and <math>t</math> refer respectively to the throat thickness and the thickest material being joined.</p>			



Ex: soccer arena

→ CC 3

- max t = 50 mm

- end plates 60 mm

- S355

→ PC 2

- site weldings

- Static loading

→ SC 1



Consequence classes		CC1		CC2		<u>CC3</u>	
Service categories		SC1	SC2	SC1	SC2	<u>SC1</u>	SC2
Production categories	<b>PC1</b>	EXC1	EXC2	EXG2	EXC3	EXC3 <sup>a</sup>	EXC3 <sup>a</sup>
	<u><b>PC2</b></u>	<b>EXC2</b>	<b>EXC2</b>	<b>EXC2</b>	<b>EXC3</b>	<b>EXC3<sup>a</sup></b>	<b>EXC4</b>

<sup>a</sup> EXC4 should be applied to special structures or structures with extreme consequences of a structural failure as required by national provisions.

**Ex: soccer arena**

- max t = 50 mm
- Stirnplatten 60 mm
- S355

CC3, SC1, PC2, EXC3

Consequence Class		CC1 low		CC2 standard		CC3 <u>high</u>	
		SC1 static	SC2 fatigue	SC1 static	SC2 fatigue	SC1 <u>static</u>	SC2 fatigue
PC2 <u>S355</u>	$t \leq 25 (50^1)$	EXC2 IWS	EXC2 IWS	EXC2 IWS	EXC3 IWT	EXC3 IWT	EXC4 IWE
	<u><math>25 &lt; t \leq 50 (75^1)</math></u>	EXC2 IWT	EXC2 IWT	EXC2 IWT	EXC3 IWE	<b>EXC3 IWE</b>	EXC4 IWE
	$t > 50$	EXC2 IWE	EXC2 IWE	EXC2 IWE	EXC3 IWE	EXC3 IWE	EXC4 IWE

Ex: soccer arena

CC3, SC1, PC2, EXC3

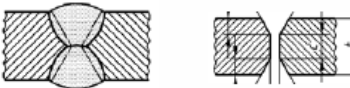
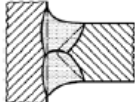
## Qualification of the WPS

Table 12 — Methods of qualification of welding procedures for the processes 111, 114, 12, 13 and 14

Method of qualification		EXC 2	EXC 3	EXC 4
Welding procedure test	EN ISO 15614-1	X	X	X
Pre-production welding test	EN ISO 15613	X	X	X
Standard welding procedure	EN ISO 15612	X <sup>a</sup>	-	-
Previous welding experience	EN ISO 15611	X <sup>b</sup>	-	-
Tested welding consumables	EN ISO 15610		-	-
X	Permitted			
-	Not permitted			
<sup>a</sup>	Only for materials ≤ S 355 and only for manual or partly mechanized welding.			
<sup>b</sup>	Only for materials ≤ S 275 and only for manual or partly mechanized welding.			

## supplementary non destroying testings

Table 24 — Extent of supplementary NDT

Type of weld	Shop and site welds		
	EXC2	EXC3	EXC4
<p>Transverse butt welds and partial penetration welds in butt joints subjected to tensile stress.</p> <p><math>U \geq 0,5</math></p>  <p><math>U &lt; 0,5</math></p>	10 %	20 %	100 %
<p>Transverse butt welds and partial penetration welds:</p> <p>in cruciform joints</p>  <p>in T joints</p>	10 %	20 %	100 %
<p>Transverse fillet welds in tension or shear:</p> <p>With <math>a &gt; 12</math> mm or <math>t &gt; 20</math> mm</p> <p>With <math>a \leq 12</math> mm and <math>t \leq 20</math> mm</p>	5 %	10 %	20 %
<p>Longitudinal welds and welds to stiffeners</p>	0 %	5 %	10 %
<p>NOTE 1 Longitudinal welds are those made parallel to the component axis. All the others are considered as transverse welds.</p> <p>NOTE 2 <math>U</math> = Utilization grade for welds for quasi-static actions. <math>U = E_d/R_d</math>, where <math>E_d</math> is the largest action effect of the weld and <math>R_d</math> is the resistance of the weld in the ultimate limit state.</p> <p>NOTE 3 Terms <math>a</math> and <math>t</math> refer respectively to the throat thickness and the thickest material being joined.</p>			

## Ex: Bridges

railway bridge



EXC 4

road bridge



CC 2 / 3

SC 2    PC 1 / 2

EXC 3 / 4

pedestrian bridge



CC 2 / 3

SC 1 / 2    PC 1 / 2

EXC 2 / 3 / 4

Consequence classes		CC1		CC2		CC3	
Service categories		SC1	SC2	SC1	SC2	SC1	SC2
Production categories	PC1	EXC1	EXC2	EXC2	EXC3	EXC3 <sup>a</sup>	EXC3 <sup>a</sup>
	PC2	EXC2	EXC2	EXC2	EXC3	EXC3 <sup>a</sup>	EXC4

<sup>a</sup> EXC4 should be applied to special structures or structures with extreme consequences of a structural failure as required by national provisions.



## Summary

- EN 1090-2 replaces national regulations (DIN 18800 part 7)
- EN 1090-2 classifies Execution Classes EXC 1 – 4
- EN 1090-2 defines welding supervisors IWS / IWT / IWE with application limits
- EN 1090-2 defines supplementary non destructive testings
- EN 1090-2 defines test piece weldings
- EN 1090-1 defines regulations for the CE – conformity assessment
- EN 1090-1 requires a welding certificate



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