Deutsches Institut für Bautechnik

The German national technical approval for use of stainless steels in structural applications

Fourth International Structural Stainless Steel Experts Seminar
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Zulassungsbescheid

Zulassungsgegenstand:	Nichtrostender Stahl
Antragsteller:	Informationsstelle Edelstahl Rostfrei Technisches Büro Bauwesen 4 Düsseldorf 11, Postfach 266
Geltungsbereich:	Nordrhein-Westfalen*)
Geltungsdauer:	bis 31. Januar 1977

Nach § 24 Abs. 5 der Bauordnung für das Land Nordrhein-Westfalen (BauO NW) in der Fassung der Bekanntmachung vom 27. Januar 1970 (GV.NW. S. 96) in Verbindung mit der Verordnung zur Übertragung von Zuständigkeiten auf das Institut für Bautechnik in Berlin vom 6. April 1970 (GV.NW. S. 272) werden aufgrund der vorgelegten Unterlagen und Prüfungsnachweise unter den nachstehenden Bestimmungen die nichtrostenden Stähle für die Verwendung als Baustähle allgemein bauaufsichtlich zugelassen.

Der Zulassungsbescheid umfaßt 18 Seiten und als Anlage 6 Tafeln. Die Anlage ist Bestandteil des Zulassungsbescheids.

*) Diese Zulassung gilt zugleich in Baden-Württemberg, Bayern, Berlin, Bremen, Hamburg, Niedersachsen und Schleswig-Holstein; nach Anerkennung auch in den anderen Ländern.

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DIBt

Allgemeine bauaufsichtliche Zulassung

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ANSTALT DES ÖFFENTLICHEN RECHTS

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Antragsteller:
Informationsstelle Edelstahl Rostfrei
Sohnstraße 65, 40237 Düsseldorf

Zulassungsgegenstand:
Erzeugnisse, Verbindungsmittel und Bauteile aus nichtrostenden Stählen

Der oben genannte Zulassungsgegenstand wird hiermit allgemein bauaufsichtlich zugelassen.
Diese allgemeine bauaufsichtliche Zulassung umfasst 28 Seiten und 33 Anlagen.
Der Gegenstand ist erstmals am 31. Mai 1974 allgemein bauaufsichtlich zugelassen worden.

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Table 1: Classification of steel grades regarding strength classes and corrosion resistance classes

Table 1

Steel designation[1]			Micro-structure[2]	Strength classes[3] and product forms[4]					Corrosion
No.	Name	Number		S 235	S 275	S 355	S 460	S 690	Resistance Class[5] [6]
1	X2CrNi12	1.4003	F	B, Ba, H, P	D, H, S, W	D, S	D, S	---	I / low
2	X6Cr17	1.4016	F	D, S, W	---	---	---	---	
3	X5CrNi18-10	1.4301	A	B, Ba, D, H, P, S, W	B, Ba, D, H, P, S	B, Ba, D, H, S	Ba, D, H, S	S	
4	X2CrNi18-9	1.4307	A	B, Ba, D, H, P, S, W	B, Ba, D, H, P, S	Ba, D, H, S	Ba, D, S	S	
5	X3CrNiCu18-9-4	1.4567	A	D, S, W	D, S	D, S	D, S	---	II / moderate
6	X6CrNiTi18-10	1.4541	A	B, Ba, D, H, P, S, W	B, Ba, D, H, P, S	Ba, D, H, S	Ba, D, H, S	---	
7	X2CrNiN18-7	1.4318	A	---	---	B, Ba, D, H, P, S	B, Ba, H	---	
8	X5CrNiMo17-12-2	1.4401	A	B, Ba, D, H, P, S, W	B, Ba, D, H, P, S	Ba, D, H, S	Ba, D, S	S	
9	X2CrNiMo17-12-2	1.4404	A	B, Ba, D, H, P, S, W	B, Ba, D, H, P, S	Ba, D, H, S	Ba, D, H, S	D, S	
10	X3CrNiCuMo17-11-3-2	1.4578	A	D, S, W	D, S	D, S	D, S	---	III / medium
11	X6CrNiMoTi17-12-2	1.4571	A	B, Ba, D, H, P, S, W	B, Ba, D, H, P, S	Ba, D, H, S	Ba, D, H, S	D, S	
12	X2CrNiMoN17-13-5	1.4439	A	---	B, Ba, D, H, S, W	---	---	---	
13	X2CrNiN23-4	1.4362	FA	---	---	---	B, Ba, D, S, W	D, S	
14	X2CrNiMoN22-5-3	1.4462	FA	---	---	---	B, Ba, D, P, S, W	D, S	
15	X1NiCrMoCu25-20-5	1.4539	A	B, Ba, D, H, P, S, W	B, Ba, D, P, S	D, P, S	D, S	D, S	
16	X2CrNiMnMoNbN25-18-5-4	1.4565	A	---		---	B, Ba, D, S	---	IV / high
17	X1NiCrMoCuN25-20-7	1.4529	A	---	B, D, S, W	B, D, H, P, S	D,P, S	D, S	
18	X1CrNiMoCuN20-18-7	1.4547	A	---	B, Ba	B, Ba	---	---	

[1] according to DIN EN 10088-1:2005-09

[2] A = Austenite; F = Ferrite; FA = Ferrite – Austenite (Duplex)

[3] The strength classes higher than the lowest are achieved by cold-working.

[4] B = Plate; Ba = Strip and plates made of strips; D = Wire, drawn; H = Hollow sections; P = Sections; S = Rods; W = Wire, rolled

[5] applies to metallic bright surfaces only. When bimetallic corrosion is possible the less noble metal may be jeopardised.

[6] required corrosion resistance class see Annex 1.1, Table 1a

Exposure	Exposure class		Criteria und Examples	Corrosion Resistance Class			
				I	II	III	IV
humidity, yearly average value U of humidity	SF0	dry	U < 60 %	X			
	SF1	seldom moist	60 % ≤ U < 80 %	X			
	SF2	often moist	80 % ≤ U < 95 %	X			
	SF3	permanent moist	95 % < U		X		
chloride content of surrounding area, distance M from the sea, distance S from busy roads with road salt application	SC0	low	rural, urban, M > 10 km, S > 0.1 km	X			
	SC1	medium	industrial area, 10 km ≥ M > 1 km, 0.1 km ≥ S > 0.01 km		X		
	SC2	high	M ≤ 1 km S ≤ 0.01 km			X[1)]	
	SC3	very high	indoor swimming pool, road tunnel				X[2)]
exposure to redox affecting chemicals (e.g. SO_2, HOCl, Cl_2, H_2O_2)	SR0	low	rural, urban	X			
	SR1	medium	industrial area			X[1)]	
	SR2	high	indoor swimming pool, road tunnel				X[2)]
pH-value on the surface	SH0	alkaline (e.g. with contact to concrete)	9 < pH	X			
	SH1	neutral	5 < pH ≤ 9	X			
	SH2	low acidic (e.g. with contact to wood)	3 < pH ≤ 5		X		
	SH3	acidic (exposure to acids)	pH ≤ 3			X	
location of structural parts	SL0	indoors	indoors, heated and not heated	X			
	SL1	outdoors, exposed to rain	exposed structures		X[3)]		
	SL2	outdoors, accessible but protected from weather	roofed structures		X[3)]		
	SL3	outdoors, non-accessible[4)], ambient air has access	accumulation of pollutants on surface by air pollution, cleaning not possible			X	

Only the exposure leading to the highest Corrosion Resistance Class (CRC) has to be taken into account. No higher requirements result from the coincidence of exposure conditions.

1) If **accessible** structures are cleaned regularly or exposed to rain corrosion will be much lower and the CRC may be reduced by one class. Otherwise the CRC has to be increased by one class if corrosion relevant substances can deposit and remain on the surfaces of structural parts.

2) If **accessible** structures are cleaned regularly corrosion will be much lower and the CRC may be reduced by one class.

3) If the life cycle is limited to 20 years and pitting corrosion up to 100 µm is tolerated CRC I may be chosen (no visual demands).

4) Structures are classified as **non-accessible** if an inspection of their condition is extremely difficult and a necessary rehabilitation is very expensive.

Informationsstelle Edelstahl Rostfrei Sohnstr. 65 40237 Düsseldorf Germany	**Table 1a:** Choice of steel grade under atmospheric exposure	**Annex 1.1a** to *allgemeinen bauaufsichtlichen Zulassung* **Z-30.3-6** of 2 May 2011

3.3.7.10.5 Effective width for the procedure elastic-elastic

Corresponding to the conditions of the elements 711 to 713, the effective width b' is to be determined with the changes mentioned below.

The limit case $\sigma = f_{y,d}$ mentioned in note 2 regarding element 712 is to be assumed. Consequently, $\bar{\lambda}_P$ is written instead of $\bar{\lambda}_{P\sigma}$.

$$b' = 0.74 \cdot \left\{ \frac{1}{\bar{\lambda}_P} - \frac{0.22}{\bar{\lambda}_P^{\,2}} \right\} \cdot b \qquad \text{for} \qquad \bar{\lambda}_P > 0.673 \cdot \sqrt{\frac{E_{sek,y}}{E}}$$

Effective width with bearing on one side:

$$b' = b \qquad \text{for} \qquad \lambda_p \le 0.7 \cdot \sqrt{\frac{E_{sek,y}}{E}}$$

$$b' = \left\{ \frac{0.68}{\bar{\lambda}_P} - \frac{0.11}{\bar{\lambda}_P^{\,2}} \right\} \cdot b \qquad \text{for} \qquad 0.7 \cdot \sqrt{\frac{E_{sek,y}}{E}} < \bar{\lambda} < 0.6875$$

$$b' = \frac{0.52}{\bar{\lambda}_P} \cdot b \qquad \text{for} \qquad \bar{\lambda}_p \ge 0.6875$$

with $E_{sek,y}$ = secant modulus according to 3.3.2.3.2(1),

E = modulus of elasticity according to Annex 8.1 and 8.2, Table 11, column 6.

Deviating from the factors defined in DIN 18800-2:2008-11, element 712, these are:

$$\bar{\lambda}_p = \sqrt{\frac{f_{y,k}}{k \cdot \sigma_e}}$$

$$\sigma_e = 153\,600 \cdot \left(\frac{t}{b} \right)^2 \text{N/mm}^2$$

In Table 27, line 1, the effective widths are to be determined as follows:

Thank you for your Attention