
Jekleni izkovki za tlačne posode - 2. del: Feritna in martenzitna jekla s specificiranimi lastnostmi pri povišanih temperaturah - Dopnilo A1

Steel forgings for pressure purposes - Part 2: Ferritic and martensitic steels with specified elevated temperatures properties

Schmiedestücke aus Stahl für Druckbehälter - Teil 2: Ferritische und martensitische Stähle mit festgelegten Eigenschaften bei erhöhten Temperaturen

Pièces forgées en acier pour appareils à pression - Partie 2 : Aciers ferritiques et martensitiques avec propriétés spécifiées à température élevée

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Ta slovenski standard je istoveten z: EN 10222-2:2017/prA1

ICS:

77.140.30	Jekla za uporabo pod tlakom	Steels for pressure purposes
77.140.85	Železni in jekleni kovani izdelki	Iron and steel forgings

SIST EN 10222-2:2017/oprA1:2019 **en,fr,de**

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English Version

Steel forgings for pressure purposes - Part 2: Ferritic and martensitic steels with specified elevated temperatures properties

Pièces forgées en acier pour appareils à pression -
Partie 2 : Aciers ferritiques et martensitiques avec
propriétés spécifiées à température élevée

Schmiedestücke aus Stahl für Druckbehälter - Teil 2:
Ferritische und martensitische Stähle mit festgelegten
Eigenschaften bei erhöhten Temperaturen

This draft amendment is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 459/SC 11.

This draft amendment A1, if approved, will modify the European Standard EN 10222-2:2017. If this draft becomes an amendment, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration.

This draft amendment was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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European foreword

This document (EN 10222-2:2017/prA1:2019) has been prepared by Technical Committee CEN/TC 459/SC 11 “Steels castings and forgings”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 10222-2:2017.

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EN 10222-2:2017/prA1:2019 (E)

1 Modification to Table 2

Replace Table 2 with the following: “

Table 2 — Chemical composition

Steel designation		Chemical composition (cast analysis) % ^a													
Name	Number	C	Si max.	Mn	P max.	S max.	Cr	Cu	Mo	Nb	Ni	Ti max.	V	Others	Carbon equivalent value max. %
P235GH ^c	1.0345	≤ 0,16	0,35	0,40 to 1,20	0,030	0,025	≤ 0,30	≤ 0,30	≤ 0,08	≤ 0,01	≤ 0,30	0,03	≤ 0,02	Cr+Cu+Mo+Ni ≤ 0,70	-
P245GH ^c	1.0352	0,08 to 0,20	0,40	0,50 to 1,30	0,025	0,015	≤ 0,30	≤ 0,30	≤ 0,08	≤ 0,01	≤ 0,30	0,03	≤ 0,02	Cr+Cu+Mo+Ni ≤ 0,70	0,41
P250GH ^{c d}	1.0460	0,18 to 0,23	0,40	0,30 to 0,90	0,025	0,015	≤ 0,30	≤ 0,30	≤ 0,08	≤ 0,01	≤ 0,30	0,03	≤ 0,02	Cr+Cu+Mo+Ni ≤ 0,70	0,43
P265GH ^c	1.0425	≤ 0,20	0,40	0,50 to 1,40	0,030	0,025	≤ 0,30	≤ 0,30	≤ 0,08	≤ 0,01	≤ 0,30	0,03	≤ 0,02	Cr+Cu+Mo+Ni ≤ 0,70	-
P280GH ^c	1.0426	0,08 to 0,20	0,40	0,90 to 1,50	0,025	0,015	≤ 0,30	≤ 0,30	≤ 0,08	≤ 0,01	≤ 0,30	0,03	≤ 0,02	Cr+Cu+Mo+Ni ≤ 0,70	0,45
P295GH ^c	1.0481	0,08 to 0,20	0,40	0,90 to 1,50	0,030	0,025	≤ 0,30	≤ 0,30	≤ 0,08	≤ 0,01	≤ 0,30	0,03	≤ 0,02	Cr+Cu+Mo+Ni ≤ 0,70	-
P305GH ^c	1.0436	0,15 to 0,20	0,40	0,90 to 1,60	0,025	0,015	≤ 0,30	≤ 0,30	≤ 0,08	≤ 0,01	≤ 0,30	0,03	≤ 0,02	Cr+Cu+Mo+Ni ≤ 0,70	0,47
16Mo3 ^e	1.5415	0,12 to 0,20	0,35	0,40 to 0,90	0,025	0,010	≤ 0,30	≤ 0,30	0,25 to 0,35	-	≤ 0,30	-	-	-	-

Steel designation		Chemical composition (cast analysis) % ^a													
Name	Number	C	Si max.	Mn	P max.	S max.	Cr	Cu	Mo	Nb	Ni	Ti max.	V	Others	Carbon equivalent value max. %
13CrMo4-5 ^e	1.7335	0,08 to 0,18	0,35	0,40 to 1,00	0,025	0,010	0,70 ^b to 1,15	≤ 0,30	0,40 to 0,60	-	≤ 0,30	-	-	-	-
15MnMoV4-5 ^e	1.5402	≤ 0,18	0,40	0,90 to 1,40	0,025	0,010	-	-	0,40 to 0,60	-	-	-	0,04 to 0,08	-	-
18MnMoNi5-5 ^e	1.6308	≤ 0,20	0,40	1,15 to 1,55	0,025	0,010	-	-	0,45 to 0,55	-	0,50 to 0,80	-	≤ 0,03	-	-
14MoV6-3 ^e	1.7715	0,10 to 0,18	0,40	0,40 to 0,70	0,025	0,010	0,30 to 0,60	≤ 0,30	0,50 to 0,70	-	-	-	0,22 to 0,28	Sn ≤ 0,025, Al ≤ 0,020	-
15MnCrMoNiV5-3 ^e	1.6920	≤ 0,17	0,40	1,00 to 1,50	0,025	0,010	0,50 to 1,00	-	0,20 to 0,35	-	0,30 to 0,70	-	0,05 to 0,10	-	-
11CrMo9-10 ^e	1.7383	0,08 to 0,15	0,50	0,40 to 0,80	0,020	0,010	2,00 to 2,50	≤ 0,25	0,90 to 1,10	-	-	-	-	-	-
X16CrMo5-1	1.7366	≤ 0,18	0,40	0,30 to 0,80	0,025	0,010	4,00 to 6,00	-	0,45 to 0,65	-	-	-	-	-	-
X10CrMoVNb9-1	1.4903	0,08 to 0,12	0,50	0,30 to 0,60	0,020	0,005	8,0 to 9,5	≤ 0,30	0,85 to 1,05	0,06 to 0,10	≤ 0,30	-	0,18 to 0,25	N 0,030 to 0,070, Al ≤ 0,040	-
X20CrMoV11-1	1.4922	0,17 to 0,23	0,40	0,30 to 1,00	0,020	0,005	10,00 to 12,50	-	0,80 to 1,20	-	0,30 to 0,80	-	0,20 to 0,35	-	-

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Steel designation		Chemical composition (cast analysis) % ^a													
Name	Number	C	Si max.	Mn	P max.	S max.	Cr	Cu	Mo	Nb	Ni	Ti max.	V	Others	Carbon equivalent value max. %
<p>^a Elements not listed in this table shall not be intentionally added to the steel without the approval of the purchase except for finishing the cast. All appropriate measures shall be taken to prevent the addition from scrap or other materials used in steelmaking of these elements which may have adversely affect the mechanical properties and usability.</p> <p>^b If resistance to pressurized hydrogen is of importance, a min. content of Cr of 0,80 % may be agreed at the time of enquiry and order.</p> <p>^c A ratio Al/N \geq 2 shall apply.</p> <p>^d For teq > 100 mm, the lower limit for Mn shall be increased to Mn \geq 0,40 % (see EN 10222-1:2017, Table A.1).</p> <p>^e For these steel grades a higher content of sulfur up to 0,015 % may be agreed at time of enquiry or order.</p>															

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2 Modification to Table 4

Replace Table 4 with the following: “

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Table 4 — Mechanical properties at room temperature

Steel designation		Thickness of the ruling section t_R^a mm	Mechanical properties at room temperature				Impact energy e_c KV ₂ J min.	
Name	Number		Yield strength R_{eH}^b MPa min.	Tensile strength R_m MPa	Elongation after fracture $A\%^c$ min.		l	tr/t
					l	tr/t		
P235GH	1.0345	$t_R \leq 35$	235	360 to 480	29	27	40	27 ^d
		$35 < t_R \leq 60$	225		28	26		
		$60 < t_R \leq 160$	210		27	25		
P245GH	1.0352	$t_R \leq 35$	245	410 to 530	25	23	40	27 ^d
		$35 < t_R \leq 160$	220					
P250GH	1.0460	$t_R \leq 60$	250	410 to 540	25	20	44	31 ^d
		$60 < t_R \leq 105$	240					
		$105 < t_R \leq 225$	230					
		$225 < t_R \leq 375$ $375 < t_R \leq 750$	210 200					
P265GH	1.0425	$t_R \leq 60$	245	410 to 530	29	27	40	27 ^d
		$60 < t_R \leq 100$	215		26	24		
P280GH	1.0426	$t_R \leq 35$ $35 < t_R \leq 160$	280 255	460 to 580	23	21	48	27 ^d
P295GH	1.0481	$t_R \leq 60$	285	460 to 580	24	22	40	27 ^d
		$60 < t_R \leq 100$	260		23	21		
P305GH	1.0436	$t_R \leq 35$	305	490 to 610	22	20	48	27 ^d
		$35 < t_R \leq 160$	280					
		$t_R \leq 70$	285	510 to 630				
16Mo3	1.5415	$t_R \leq 35$	295	440 to 570	23	21	50	31 ^d
		$35 < t_R \leq 70$	285					
		$70 < t_R \leq 100$	275					
		$100 < t_R \leq 250$	265					
		$250 < t_R \leq 500$	250					
13CrMo4-5	1.7335	$t_R \leq 35$	295	440 to 590	20	18	44	27 ^d
		$35 < t_R \leq 70$	285					
		$70 < t_R \leq 100$	275					
		$100 < t_R \leq 250$	265					
		$250 < t_R \leq 500$	240					
15MnMoV4-5	1.5402	$t_R \leq 35$	345	510 to 650	23	21	40	40
		$35 < t_R \leq 70$			22	20		