Comments and secretariat observations for an amendment to EN 13121-3:2020

Date: 2020-02-27 Nonhoff/Lux	Document: **EN 13121-3:2016** GRP tanks and vessels for use above ground – Part 3: Design and workmanship	Project:

MB/ NC[1]	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment[2]	Comments	Proposed change	Observations of the secretariat
DE	1	7.9.2	Last sentence	ed	The lowest value determined from (a) or (b)	The lowest value determined from (l) or (m)	
DE / AT	2	7.9.5.1	last clause formula (4)	te	$F = \gamma_M \cdot \gamma_F \cdot A_1 \cdot A_2 \cdot A_3 \cdot A_4 \cdot \sqrt{A_5}$ Delete $\sqrt{A_5}$ in all formulas	The design equations for stability specified in the standard all describe the elastic buckling failure. Since the elastic stability failure is always short time, the influence value $\sqrt{A_5}$ can be dispensed. If, however, the failure analysis is performed according to theory II. order, A_5 must be taken into account $F = \gamma_M \cdot \gamma_F \cdot A_1 \cdot A_2 \cdot A_3 \cdot A_4$	
DE	3	8.3	2. line Formula (11)	te	$A_{5,F} = [F_{min.}/\gamma_M \cdot A_1 \cdot A_2 \cdot A_3 \cdot A_4]^2$ change to	$F = \gamma_M \cdot \gamma_F \cdot A_1 \cdot A_2 \cdot A_3 \cdot A_4 \geq F_{min}$	
DE	4	9.3.2	Header and first line and first paragraph	ed	9.3.2 Dimensioning by using ($A_5 \cdot \gamma$)-factored loads For the "($A_5 \cdot \gamma$)-factored load dimensioning" (ultimate limit state) …. These "($A_5 \cdot \gamma$)-factored loads ddtermine	9.3.2 Dimensioning by using ($A_5 \cdot \gamma_{F,i}$)-factored loads For the "($A_5 \cdot \gamma_{F,i}$)-factored load dimensioning" (ultimate limit state) …. These "($A_5 \cdot \gamma_i$)-factored loads ddtermine	
DE	5	10.2.1	Formula (34)	te	$p_{d,cr} = PS_{ep} \cdot \sqrt{A_{5,i}} \cdot \gamma_{F,p} + p_{wind} \cdot \gamma_{F,p}$	Change to $p_{d,cr} = PS_{ep} \cdot \gamma_{F,p} + p_{wind} \cdot \gamma_{F,p}$	
De	6	10.2.2	Third formula under [36]	te	$M_{d,cr} = M_{wind} \cdot \gamma_{F,p} + \Sigma (M_{e,I} \sqrt{A_{5,i}} \cdot \gamma_{F,i})$	Change to $M_{d,cr} = M_{wind} \cdot \gamma_{F,p} + \Sigma (M_{e,I} \cdot \gamma_{F,i})$	
De	7	10.2.2	Third formula under [37]	te	$W_{d,cr} = W \cdot \sqrt{A_{5,i}} \cdot \gamma_{F,w} + \Sigma (W_{e,I} \sqrt{A_{5,i}} \cdot \gamma_{F,i})$	Change to $W_{d,cr} = W \cdot \gamma_{F,w} + \Sigma (W_{e,I} \cdot \gamma_{F,i})$	

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DE/IT	8	10.3.5	Formula (50)	te	$E_s \cdot I_s \geq \frac{\gamma_M \cdot A_1 \cdot A_2 \cdot A_3 \cdot A_4 \cdot p_{d,cr} \cdot L_S \cdot D_S^3 \cdot F}{24}$	Change to $E_s \cdot I_s \geq \frac{\gamma_M \cdot A_1 \cdot A_2 \cdot A_3 \cdot A_4 \cdot p_{d,cr} \cdot L_S \cdot D_S^3 \cdot \gamma_{F,i}}{24}$	
DE	9	10.4.3.1	formula (55)	te	$p_{d,cr} = PS_{ep} \cdot \sqrt{A_{5,i}}\, \gamma_{F,p} + p_{wind} \cdot \gamma_{F,p}$	Change to $p_{d,cr} = PS_{ep} \cdot \gamma_{F,p} + p_{wind} \cdot \gamma_{F,p}$	
DE	10	10.4.4.2.3	Formula under (66)	te	$N_{x,1} = \sum(N_{x1,i} \cdot \sqrt{A_{5,i}} \cdot \gamma_{F,i})$ and $N_{x,2} = \sum(N_{x2,i} \cdot \sqrt{A_{5,i}} \cdot \gamma_{F,i})$	Change to $N_{x,1} = \sum(N_{x1,i} \cdot \gamma_{F,i})$ and $N_{x,2} = \sum(N_{x2,i} \cdot \gamma_{F,i})$	
DE	11	10.5.3	Formula (80)	te	$p_{d,cr} = PS_{ep} \cdot \sqrt{A_{5,i}} + \sum(p_i \cdot \sqrt{A_{5,i}} \cdot \gamma_{F,p})$	Change to $p_{d,cr} = PS_{ep} + \sum(p_i \cdot \gamma_{F,p})$	
DE	12	10.6.1	Formula (84)	te	$M_{d,cr} = \Sigma\,(M_{e,I}\, \sqrt{A_{5,i}} \cdot \gamma_{F,i})$	Change to $M_{d,cr} = \Sigma\,(M_{e,I} \cdot \gamma_{F,i})$	
DE	13	10.6.1	Formula (87)	te	$W_{d,cr} = W \cdot \sqrt{A_{5,i}} \cdot \gamma_{F,w} + \Sigma\,(W_{e,I}\, \sqrt{A_{5,i}} \cdot \gamma_{F,i})$	Change to $W_{d,cr} = W \cdot \gamma_{F,w} + \Sigma\,(W_{e,I} \cdot \gamma_{F,i})$	
DE/IT	14	10.6.2.3	Head line	ed	$r \leq 30$ mm	Change to $r < 30$ mm	
CEN Consultant 9	15	10.6.2.5	Figure 14	ed	Incorrect wording: Key 2 barrel taper	Change to: 2 75 mm ≤ taper ≤ 1:6	The corerection made by CCMC not totally correct
DE/IT	16	10.6.4.3.2	Lins under Formula (104)	ed	C_z = 0,9 for bottoms with R = D or C_z = 0,6 for bottoms with R ≤ 0,8 · D	Change to C_z = 0,9 for bottoms with 0,8 ·D < R ≤ D or C_z = 0,6 for bottoms with R ≤ 0,8 · D	
DE/IT	17	10.6.4.3.3	Lins under Formula (107)	ed	C_{Sku} = 1,2 for bottoms with R = D or C_{Sku} = 0,6 for bottoms with R ≤ 0,8 · D	Change to C_{Sku} = 1,2 for bottoms with 0,8 ·D < R ≤ D or C_{Sku} = 0,6 for bottoms with R ≤ 0,8 · D	
DE	18	10.6.4.3.5	Formula	te	$M_{d,cr} = M_{wind} \cdot \gamma_{F,p} + \Sigma\,(M_{e,I}\, \sqrt{A_{5,i}} \cdot \gamma_{F,i})$	Change to $M_{d,cr} = M_{wind} \cdot \gamma_{F,p} + \Sigma\,(M_{e,I} \cdot \gamma_{F,i})$	

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			under (115)				
DE	19	10.6.4.3.5	Formula under (116)	te	$W_{d,cr} = W \cdot \sqrt{A_{5,i}} \cdot \gamma_{F,w} + \Sigma (W_{e,I} \sqrt{A_{5,i}} \cdot \gamma_{F,i})$	Change to $W_{d,cr} = W \cdot \gamma_{F,w} + \Sigma (W_{e,I} \cdot \gamma_{F,i})$	
FI	20	10.6.4.3.6	Formula (123)	ed	τ_k should read $\tau_{lap,k}$	change τ_k to $\tau_{lap,k}$	
DE/IT	21	10.6.4.3.6	Formula (124)	ed	$l_{over} \leq 16 \cdot t_{over}$	better is $t_{over} \geq l_{over} / 16$ because lover in formula (123) shall be $\leq 16 \cdot t_{over}$	
FI	22	10.7.1	Formula (135)	ed	$\tau_{k;lap}$ should read $\tau_{lap,k}$	replace ; with , change $\tau_{k;lap}$ to $\tau_{lap,k}$	
DE/IT	23	10.7.1	Formula (136)	ed	$l_{over} \leq 16 \cdot t_{over}$	better is $t_{over} \geq l_{over} / 16$ because l_{over} in formula (123) shall be $\leq 16 \cdot t_{over}$	
DE	24	10.7.2	2:nd line	ed	... , or 2 layers of 450 g/m^3 CSM, …	... , or 2 layers of 450 g/m^2 CSM, …	
DE/IT	25	10.8.3	Formula (142	te	$t_3 \geq \frac{p_d \cdot d_c}{2 \cdot U_{R,d,c}}$	Its wrong. Change to $\frac{p_d \cdot d_c}{4 \cdot U_{R,d,c}} \leq 1$	
DE/IT	26	19.9.3.3	Formula (147)	te	$m_{W,d,R} = \frac{W_{d,R}}{4 \cdot \pi} \cdot \left(\frac{(1-\nu) \cdot lnD}{2 \cdot r_0} + 1\right)$ $m_{W,d,\varepsilon} = \frac{W_{d,\varepsilon}}{4 \cdot \pi} \cdot \left(\frac{(1-\nu) \cdot lnD}{2 \cdot r_0} + 1\right)$ The second term in the bracket is always less than 1. On the exact equation can be omitted here.	$m_{W,d,R} \leq \frac{W_{d,R}}{4 \cdot \pi} \cdot \left((1+\nu) \cdot ln\left(\frac{D}{2 \cdot r_0}\right) + 1\right)$ $m_{W,d,\varepsilon} \leq \frac{W_{d,\varepsilon}}{4 \cdot \pi} \cdot \left((1+\nu) \cdot ln\left(\frac{D}{2 \cdot r_0}\right) + 1\right)$	
FI	27	10.9.3.5	Formulas (149) and (150)	ed	t in the formulas should read N_{BF}	Replace t in the formulas with N_{BF}	
DE	28	10.10.1	3:rd	te	b) by two or more flexible saddles which embrace the lower region of the vessel for 180°, or by two	b) by two or more flexible saddles which embrace the lower region of the vessel for ≥ 160°, or by two	

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			sentence		or more slings secured to a supporting structure, again supporting the vessel for 180°.	or more slings secured to a supporting structure, again supporting the vessel for 180°.	
DE / AT	29	10.10.1	Key Figure 39; NOTE 2	te	2 flexible saddle Θ ≥ 180°	2 flexible saddle Θ ≥ 160°	
DE	30	10.10.2		ed	H_i is the height of the dished end	h_i is the height of the dished end	
DE	31	10.10.3.1	2. sentence	ed	Loading due to vessel weight – see the	change to Load due to the filling medium – see the Remark:. then is ρ in formula (156) and (157) clear	
FI	32	10.10.3.1	Formula (156)	te	Definition of ρ in the formula unclear. $n_{\varphi b,d,R} = 0{,}15 \cdot \rho \cdot g \cdot L_s^2 \cdot A_5 \cdot \gamma_{F,w}$ $n_{\varphi b,d,\varepsilon} = 0{,}15 \cdot \rho \cdot g \cdot L_s^2$	see table 1 ρ Density of liquid	
FI	33	10.10.3.1	Formula (157)	te	$n_{\varphi m,d,R} = (2 \cdot PS_{op} \cdot \gamma_{F,p} + \rho \cdot g \cdot D(1 - cos\varphi) \cdot \gamma_{F,w}) \cdot \frac{D \cdot A_5}{4}$ or $n_{\varphi m,d,\varepsilon} = (2 \cdot PS_{op} \cdot \gamma_{F,p} + \rho \cdot g \cdot D(1 - cos\varphi)) \cdot \frac{D}{4}$		
DE	34	10.10.3.2.3	Third line under Formula (163)	te	$M_{d,cr} = M_2 \cdot \sqrt{A_{5,i}} \cdot \gamma_{F,w} + \Sigma (M_{e,I} \sqrt{A_{5,i}} \cdot \gamma_{F,i})$	$M_{d,cr} = M_2 \cdot \gamma_{F,w} + \Sigma (M_{e,I} \cdot \gamma_{F,i})$	
FI	35	10.10.3.2.3	Formula (164)	ed	the last term should read $(L_s/D)^3$ instead of $(Ls/D)^3$	correct to $(L_s/D)^3$	
DE	36	10.10.3.2.3	Third line under Formula (170)	te	$M_{d,cr} = M_1 \cdot \sqrt{A_{5,i}} \cdot \gamma_{F,w} + \Sigma (M_{e,I} \sqrt{A_{5,i}} \cdot \gamma_{F,i})$	$M_{d,cr} = M_1 \cdot \gamma_{F,w} + \Sigma (M_{e,I} \cdot \gamma_{F,i})$	

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DE	37	10.10.3.3	Formula (175)	te	$Q_{d,cr} = w \cdot \left(A + \frac{2 \cdot h}{3}\right) \cdot \sqrt{A_5} \cdot \gamma_{F,w}$	$Q_{d,cr} = w \cdot \left(A + \frac{2 \cdot h}{3}\right) \cdot \gamma_{F,w}$	
DE	38	10.10.3.3	Formula (176)	te	$Q_{d,cr} = w \cdot \left(\frac{L}{2} - A\right) \cdot \sqrt{A_5} \cdot \gamma_{F,w}$	$Q_{d,cr} = w \cdot \left(\frac{L}{2} - A\right) \cdot \gamma_{F,w}$	
DE	39	10.10.3.5	1. formula	te	$p_{d,cr} = PS_{ep} \cdot \sqrt{A_{5,i}} \cdot \gamma_{F,p} + p_{wind} \cdot \gamma_{F,p}$	Change to $p_{d,cr} = PS_{ep} \cdot \gamma_{F,p} + p_{wind} \cdot \gamma_{F,p}$	
DE	40	10.10.3.5	Formula (185)	te	or $Q_{d,cr} = 0{,}156 \cdot \rho \cdot g \cdot \pi \cdot D^2 \cdot L_S \cdot \sqrt{A_5} \cdot \gamma_{F,w}$	or $Q_{d,cr} = 0{,}156 \cdot \rho \cdot g \cdot \pi \cdot D^2 \cdot L_S \cdot \gamma_{F,w}$	
FI	41	10.10.4.2.2	Below Table 18	ed	a) For the selected laminate using 9.3.2 to proof the load bearing capacity.	Change to: a) For the selected laminate use 9.3.2 to proof the load bearing capacity.	
FI	42	10.10.4.2.3	End of clause	ed	Standard text "For the selected laminate use 9.3.2 to proof the load bearing capacity." missing.	Add text "For the selected laminate use 9.3.2 to proof the load bearing capacity." below formula (196)	
FI	43	10.10.4.3.3.1	First sentence	te	The design of a vessel on two soft saddlesin this section means that the vessel is supported using a flexible steel saddle-band which envelopes the vessel for 180° and is fixed …..	The design of a vessel on two soft saddlesin this section means that the vessel is supported using a flexible steel saddle-band which envelopes the vessel for ≥ 160° and is fixed …..	
FI	44	10.11.1		te	Large diameter pipes and pipe fittings. This standard covers large diameter piping (DN>600) bonded …., especially for elbows and tees, … For elbows and tees reference is made to EN ISO 14692-3:2002 Annex D. According to EN ISO 14692-3:2002 Annex D reference shall be made to BS 7159 for diameters larger than 0,5 m.	To be discussed. The design formulas mentioned in the ISO 14692-3 are sometimes too far on the unsafe side, as has been clearly proven by tests.	

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DE	45	10.11.1	Third fomula under (224)	te	$M_{d,cr} = M_{contend} \cdot \sqrt{A_{5,i}} \cdot \gamma_{F,w} + \Sigma\,(M_{e,I} \sqrt{A_{5,i}} \cdot \gamma_{F,i})$	$M_{d,cr} = M_{contend} \cdot \gamma_{F,w} + \Sigma\,(M_{e,I} \cdot \gamma_{F,i})$	
FI	46	10.11.2	Formula (227)	ed	τ_k should read $\tau_{lap,k}$	change τ_k to $\tau_{lap,k}$	
DE	47	10.11.2	Formula (216)	ed	$l_{over} \leq 16 \cdot t_{over}$	better is $t_{over} \geq l_{over} / 16$ because l_{over} in formula (123) shall be $\leq 16 \cdot t_{over}$	
FI	48	10.11.3	Formula (231)	ed	τ_k should read $\tau_{lap,k}$	change τ_k to $\tau_{lap,k}$	
DE	49	10.11.3	Formula (232)	ed	$l_{over} \leq 16 \cdot t_{over}$	better is $t_{over} \geq l_{over} / 16$ because lover in formula (123) shall be $\leq 16 \cdot t_{over}$	
DE	50	11.2.1	Key figure 53	te	$h_F = \frac{2 \cdot PCD - DN - D_G}{4}$	$h_F = \frac{2 \cdot PCD - DN - D_G + b_G}{4}$	
DE	51	11.2.2	symbols	ed	Missing b_G A_G effective …by using EN 1591	Add b_G width of gasket A_G effective …by using EN 1591-1:2014	
DE	52	11.2.3	Formula (244)	te	$H_{F,d,R} = p_{d,R} \cdot \frac{\pi}{4}(D_G^2 - DN^2)$ $H_{F,\varepsilon} = p_{d,\varepsilon} \cdot \frac{\pi}{4}(D_G^2 - DN^2)$	$H_{F,d,R} = p_{d,R} \cdot \frac{\pi}{4}\left((D_G - b_G)^2 - DN^2\right)$ $H_{F,\varepsilon} = p_{d,\varepsilon} \cdot \frac{\pi}{4}\left((D_G - b_G)^2 - DN^2\right)$	
FI	53	11.2.4	Formula (245)	te	$H_{g1,d,R} = p_{g1} \cdot A_G \cdot A_5 \cdot \gamma_F \cdot D_G \cdot \pi$ or $H_{g1,d,\varepsilon} = p_{g1} \cdot A_G \cdot D_G \cdot \pi$ should read $H_{g1,d,R} = p_{g1} \cdot A_G \cdot A_5 \cdot \gamma_F$ or $H_{g1,d,\varepsilon} = p_{g1} \cdot A_G$	Correct to: $H_{g1,d,R} = p_{g1} \cdot A_G \cdot A_5 \cdot \gamma_F$ or $H_{g1,d,\varepsilon} = p_{g1} \cdot A_G$	

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					as $A_G = b_g \cdot D_G \cdot \pi$.		
FI	54	11.2.4	Formula (246)	te	$H_{g0,d,R} = p_{g0} \cdot A_G \cdot A_5 \cdot \gamma_F \cdot D_G \cdot \pi$ or $H_{g0,d,\varepsilon} = p_{g0} \cdot A_G \cdot D_G \cdot \pi$ should read $H_{g0,d,R} = p_{g0} \cdot A_G \cdot A_5 \cdot \gamma_F$ or $H_{g0,d,\varepsilon} = p_{g0} \cdot A_G$ as $A_G = b_g \cdot D_G \cdot \pi$.	Correct to: $H_{g0,d,R} = p_{g0} \cdot A_G \cdot A_5 \cdot \gamma_F$ or $H_{g0,d,\varepsilon} = p_{g0} \cdot A_G$	
DE / AT	55	11.2.8	Table 24 to 29, NOTE 3	te	clarification of flange deformation φ = 1,2 degree	change and add to: maximum of φ = 1,5 degree; $\varepsilon_{lim} \leq 0{,}25\%$;with E=13000 N/mm²	
DE	56	11.3.5	formula (261)	te	$\varphi = \frac{M \cdot d_C}{2 \cdot E \cdot I_{xx}} \leq 1{,}5°$; Only the temperature must be used for the verification if it already works during assembly. The influence of A_2 and A_5 should not be considered here	$\hat{\varphi} = \frac{M \cdot d_c}{2 \cdot E \cdot I_{xx}} \cdot (A_3) \leq 0.025\ (\cong 1{,}5°)$	
DE	57	11.3.2	Formula (267)	te	$H_{F,d,R} = p_{d,R} \cdot \frac{\pi}{4}(D_G^2 - DN^2)$	$H_{F,d,R} = p_{d,R} \cdot \frac{\pi}{4}\left((D_G - b_G)^2 - DN^2\right)$	
DE	58	11.3.2	Key figure 55	te	$h_B = \frac{PCD - D_2}{2}$	Change to $h_B = \frac{3 \cdot PCD - D_1 - 2 \cdot D_2}{6}$	
DE	59	11.3.5	Formula (277)	ed	$M_{A0,d} = W_{m,d} \cdot (h_A - h_B)$	$M_{br0,d} = W_{m0,d} \cdot h_B$ for backing ring $M_{A0,d} = H_{R,d,R} \cdot (h_A - h_B) + H_{g0,d,R} \cdot (h_{g1} - h_B)$	

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DE	60	11.3.5	Formula (278)	ed	$M_{A1,d} = W_{m1,d} \cdot (h_A - h_B)$	$M_{br1,d} = W_{m1,d} \cdot h_B$ for backing ring $M_{A1,d} = H_{A,d,R} \cdot (h_A - h_B) + H_{F,d,R} \cdot (h_F - h_B) + H_{g1,d,R} \cdot (h_{g1} - h_B)$	
DE	61	11.3.5	Formula (283)	ed	$Z_{C-C} = \frac{\pi}{6} \cdot N^2 \cdot (D_2 - d^*)$	$Z_{C-C} = \frac{\pi}{6} \cdot N^2 \cdot D_2$	
DE	62	11.3.6	Table 29	ed	OD dimension in at shall be mm in classification 150 and classification 10	mm anstead in	
DE	63	11.4	Formula (290)	ed	$l_{over} \leq 16 \cdot t_{over}$	better is $t_{over} \geq l_{over} / 16$ because l_{over} in formula (123) shall be $\leq 16 \cdot t_{over}$	
DE	64	12.2.2.5	Third formula under (298)	te	$M_{d,cr} = M_{wind} \cdot \gamma_{F,p} + \Sigma (M_{e,I} \sqrt{A_{5,i}} \cdot \gamma_{F,i})$	Change to $M_{d,cr} = M_{wind} \cdot \gamma_{F,p} + \Sigma (M_{e,I} \cdot \gamma_{F,i})$	
DE	65	12.2.2.5	Third formula under (299)	te	$W_{d,cr} = W \cdot \sqrt{A_{5,i}} \cdot \gamma_{F,w} + \Sigma (W_{e,I} \sqrt{A_{5,i}} \cdot \gamma_{F,i})$	Change to $W_{d,cr} = W \cdot \gamma_{F,w} + \Sigma (W_{e,I} \cdot \gamma_{F,i})$	
DE / AT	66	14.3	Formula (306)	te	$V_{E,d} \leq 2 \cdot \frac{H_{AE}}{N_b}$ consideration of friction is missing	change to $V_{E,d} \leq 2 \cdot \frac{H_{AE} - \mu_s \cdot 0{,}9 \cdot W_G (g - 0{,}7 a_g)}{N_b}$ μ_s = coefficient of sliding friction for GRP to concrete:0,15 for PE to concrete: 0,05 for GRP to PE: 0,05 W_G see formula 18	
AT	67	14.3	last clause	ed	All nuts shall be locked by a counter nut. This is normaly not necessary!	Change to: In the case of dynamic loads all nuts shall be	

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MB/ NC[1]	**Line number** (e.g. 17)	**Clause/ Subclause** (e.g. 3.1)	**Paragraph/ Figure/ Table/** (e.g. Table 1)	**Type of comment**[2]	**Comments**	**Proposed change**	**Observations of the secretariat**
						locked by a counter nut.	
DE	68	17.3.4	Key figure 65	ed	1 support legs 2 flatness 1,0 mm for D_{in} ≤ 450 1,5 mm for 450 < D_{in} ≤ 1000 3,0 mm for D_{in} >1000 3 local faults on mating surfaces < 0,8 mm 4 flange drawback D_{in} ± 1,5 mm for DN 25 to DN 80 D_{in} ± 4 mm for DN 100 to DN 350 D_{in} ± 6 mm for DN 400 to DN 1000 α≤ 1° for D_{in} ≤1000; for DN > 1000 according to the requirements Reverse drawback is not allowed	1 support legs 2 flatness 1,0 mm for D_{in} ≤ 450 1,5 mm for 450< D_{in} ≤ 1000 3,0 mm for D_{in} >1000 3 roundness D_{in} ± 1,5 mm for DN 25 to DN 80 D_{in} ± 4 mm for DN 100 to DN 350 D_{in} ± 6 mm for DN 400 to DN 1000 4 flange drawback α≤ 1° for D_{in} ≤1000; for DN > 1000 according to the requirements Reverse drawback is not allowed 5 local faults on mating surfaces < 0,8 mm; tightness must be given	
	69	17.4.3	Last sentence	ed	*For spray-up laminates with fibre lengths of 16 mm to 32 mm, the mechanical properties deviate from Table 3.* It is unclear as what is required in this situation.	*Correct as follows:* *For spray-up laminates with fibre lengths of 16 mm to 32 mm, the mechanical properties* are 20 % lower than the values given in Table 3.	
DE/IT	70	B.3	Formula (B.3)	ed	$E_T = \frac{1}{t}\sum_{i\_=1}^{n} E_i \cdot t_i = \frac{1}{t}\sum X_i$	$E_T = \frac{1}{t}\sum_{i\_=1}^{n} E_i \cdot t_i = \frac{1}{t}\sum X_i\, m_i$	
DE/IT	71	B.3	Formula (B.4)	ed	$E_c = \frac{1}{t^2}\sum_{i\_=1}^{n} E_i \cdot t_i \cdot h_i = \frac{1}{t}\sum X_i \cdot h_i)$	$E_c = \frac{1}{t^2}\sum_{i\_=1}^{n} E_i \cdot t_i \cdot h_i = \frac{1}{t^2}\sum X_i\, m_i \cdot h_i$	

Comments and secretariat observations for an amendment to EN 13121-3:2020

Date: 2020-02-27 Nonhoff/Lux	Document: **EN 13121-3:2016** GRP tanks and vessels for use above ground – Part 3: Design and workmanship	Project:

MB/ NC[1]	**Line number** (e.g. 17)	**Clause/ Subclause** (e.g. 3.1)	**Paragraph/ Figure/ Table/** (e.g. Table 1)	**Type of comment**[2]	**Comments**	**Proposed change**	**Observations of the secretariat**
DE/IT	72	B.3	Formula (B.5)	ed	$E_B = \frac{1}{t^3}\sum_{i\_=1}^{n} 12\cdot E_i\cdot t_i\cdot h_i^2 = \sum_{i=1}^{n} X_i\cdot(12\cdot h_i^2 + t^2)$	$E_B = \frac{1}{t^3}\sum_{i\_=1}^{n} E_i\cdot t_i\cdot(t_i^2 + 12\cdot h_i^2)$ $= \frac{1}{t^3}\sum_{i=1}^{n} X_i\cdot m_i\cdot(t_i^2 + 12\cdot h_i^2)$	
DE	73	B.3	symbols		m_i is missing	Add mi see 8.4.2	
DE	74	B.3	symbols	ed	X_i is the unit …….of laminate N/mm	X_i is the unit …….of laminate N/mm per kg/m² glass	
DE	75	B.4	Formula (B.6)	ed	$B = \sum E_i\cdot t_i\cdot\left(\frac{t_i^2}{12}+h_i^2\right) = \sum X_i\cdot\left(\frac{t_i^2}{12}+h_i^2\right)$	$B = \sum E_i\cdot t_i\cdot\left(\frac{t_i^2}{12}+h_i^2\right) = \sum X_i\cdot m_i\cdot\left(\frac{t_i^2}{12}+h_i^2\right)$	
DE	76	B.5ß	Formula (B.7)	ed	$\varepsilon_\Phi = \frac{q_\Phi}{E_\Phi\cdot t} \pm \frac{6\cdot M_\Phi}{E_\Phi\cdot t^2}$ change to	$\varepsilon_\Phi = \frac{q_\Phi}{E_{\Phi,T}\cdot t} \pm \frac{6\cdot M_\Phi}{E_{\Phi,B}\cdot t^2}$	
DE	77	B.5	Formula (B.8)	ed	$\varepsilon_x = \frac{q_x}{E_x\cdot t} \pm \frac{6\cdot M_x}{E_x\cdot t^2}$ change to	$\varepsilon_x = \frac{q_x}{E_{x,T}\cdot t} \pm \frac{6\cdot M_x}{E_{x,B}\cdot t^2}$	
DE	78	B.5	Formula (B.9)	ed	$\varepsilon_\Phi = \frac{q_\Phi}{E_\Phi\cdot t} \pm \frac{6\cdot M_\Phi}{E_\Phi\cdot t^2}\left(\frac{2\cdot E_{c\Phi}}{E_\Phi}\right)$ change to	$\varepsilon_\Phi = \frac{q_\Phi}{E_{\Phi,T}\cdot t} \pm \frac{6\cdot M_\Phi}{E_{\Phi,B}\cdot t^2}\left(\frac{2\cdot E_{c\Phi}}{E_{\Phi,B}}\right)$	
DE	79	B.5	Formula (B.10)	ed	$\varepsilon_x = \frac{q_x}{E_x\cdot t} \pm \frac{6\cdot M_x}{E_x\cdot t^2}\left(\frac{2\cdot E_{cx}}{E_x}\right)$ change to	$\varepsilon_x = \frac{q_x}{E_{x,T}\cdot t} \pm \frac{6\cdot M_x}{E_{x,B}\cdot t^2}\left(\frac{2\cdot E_{cx}}{E_{x,B}}\right)$	
IT/DE	80	C.3.2	Option A	ed	For clarification	Attention: this test creates additional loads for the floor, the anchoring and the roof.	
CEN Consul tant 18	81	C.4 Hydraulic pressure test	C.4.1	ge	Vessel subject to pressure shall be hydraulically tested to 1,3 times the calculation and carry out at 20°C or ambient temperature. *Vessels subject to pressure shall be hydraulically tested to 1,3 times the calculation pressure and*	Vessel subject to pressure shall be hydraulically tested to 1,3 times the calculation and carry out at 20°C or ambient temperature. Because of the danger of micro-cracking if overloaded the test pressure limited to 1,3 times calculation pressure	TC210: Change not accepted. Danger of micro-cracking if overloaded. CEN Consultant:

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					carried out at 20 °C or ambient temperature. This is different to the requirement in 7.4.Annex I PED however 7 Annex I PED The following provisions apply as a general rule. However, where they are not applied, including in cases where materials are not specifically referred to and no harmonised standards are applied, the manufacturer shall demonstrate that appropriate measures have been taken to achieve an equivalent overall level of safety. The method by which the equivalent level of safety has been met should be detailed.	add the red sentences	I agree with your reason, 'Danger of micro-cracking if overloaded' could this reason be added to the applicable section to explain why a 1,3 test pressure is used
DE/IT	82	C.4.3	text	ed	add in the second paragraph	The duration of the pneumatic pressure test should be ≥ 1 hour	
DE/IT	83	C.4.4	text	ed	add in the paragraph	The duration of the vacuum test should be ≥ 20 minutes	
FI	84	Bibliography		ed	Remove Directive 97/23/EC (PED) as it is replaced by Directive 2014/68/EU	Delete Directive 97/23/EC (PED) from the Bibliography.	

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