CEN/TC 267/WG 8/MHD « *Maintenance of EN 13480 series* »
Answers to MHD Questions of 2021
Series EN 13480-1-2-3-4-5-6 and -8:2017

MHD Question N°	Subjects	MHD answers doc. N°	Subsequent actions	MHD answers to questioners
2-001-2021	2	N 114	Technical comment	2021-12-02
3-001-2021	9.5	N 114	Technical clarification	2021-12-02
3-002-2021	2	N 114	Technical clarification	2021-12-02
3-003-2021	8	N 114	Technical clarification	2021-12-02
3-004-2021	8.3.8	N 114	Technical clarification	2021-12-02
3-005-2021	13.11.4.2	N 114	Technical clarification	2021-12-02
3-006-2021	12.3.2/12.3.3	N 114	Technical comment	2021-12-02
3-007-2021	Annex J	N 114	Technical clarification	2021-12-02
3-008-2021	A2:2020	N 114	Technical clarification	2021-12-02
3-009-2021	12.3.3	N 114	Technical clarification	2021-12-02
3-010-2021	11.8	N 114	Technical clarification	2021-12-02
4-001-2021	9	N 114	Technical comment	2021-12-02
5-001-2021	8.1.2	N 114	Technical clarification	2021-12-02
5-002-2021	9.3	N 114	Technical clarification	2021-12-02

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EN 13480 "Industrial piping and pipelines" Maintenance Group Question form

Request reference number *(to be filled by MHD)*: **2-001-2021**			**Date**: **2021-10-01**	
Please fulfil the following				
Part: EN 13480-2	Issue: 2017	Page 8	Subclause 2.0	National Standard Reference --
Subject: Normative references				
Type of request:	☐ Technical clarification		☐ Editorial correction	
	☒ Technical comment		☐ Translation correction	

From :
Company: Control Seal B.V.....
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☒ Manufacturer	☐ User	☐ Other (please specify):

Question/comment: **I am missing EN 12516 Part 2 is design code for industrial valves, with materials included (paragraph 6). The EN 12516 Part 2 is simplified calculation method of the EN 13445 Part 3. In special cases, EN 12516 Part 2 reference to EN 13445 Part 3.**

Proposed answer(s): Add the standard:

EN 12516 Part 2 – Industrial Valves – Shell Design Strength – Part 2: Calculation method for steel valve shells

Answer from the MHD *(to be filled by MHD):*

This question is outside of the scope of EN 13480 Maintenance Help Desk.
See new clause 7 "Accessories" in Amendment A1:2019 to EN 13480-1:2017.

To be sent to EN 13480 Maintenance Group secretariat:	EN 13480 Maintenance Group secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13480@unm.fr

***** *Please note that question with proposed answers will be dealt with as priority.*

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EN 13480 "Industrial piping and pipelines" Maintenance Group Question form

Request reference number *(to be filled by MHD)*: **3-001-2021**			**Date**: **2021-02-12**	
Please fulfil the following				
Part: EN 13480-3	Issue: 2017	Page	Subclause 9.5	National Standard Reference --
Subject:				
Type of request:	☒ Technical clarification		☐ Editorial correction	
	☐ Technical comment		☐ Translation correction	

From :
Company:Babcock & Wilcox .....
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e-mail: mbratbo@babcock.com.....
phone: +45 43265751 .....

☐ Manufacturer	☒ User	☐ Other (please specify):

Question/comment:

The pressure retaining capacity of some of the end caps in EN10253-2, cannot be determined according to the formulas in EN13480-3, because the corner radius is too small in relation to the wall thickness.

Is verification by the use of finite element calculation according to EN13445-3 Annex C a viable solution?

Proposed answer(s): *

Yes it is a viable solution.

Answer from the MHD *(to be filled by MHD):*

Agreed, this viable solution is acceptable.
(see Subclause 4.6, 1st paragraph, 2nd sentence of EN 13480-3:2017)

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EN 13480 "Industrial piping and pipelines" Maintenance Group
Question form

Request reference number *(to be filled by MHD)*: **3-002-2021**	**Date: 2021-02-23**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13480-3	2017		2	--

Subject: Forged fittings for socket welding & threaded ends connections

Type of request: ☒ Technical clarification ☐ Editorial correction ☐ Technical comment ☐ Translation correction

From:
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Name: Matteo Di Donato
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☐ Manufacturer ☒ User ☐ Other (please specify):

Question/comment:

According to the MHD questions of 2014 – page 7/40 – registration n° 2-003-2014 – in the reply to question number 3 it was clarified that the standard EN 13480-3 is applicable not only to fully welded piping systems but also to any kind of connections provided that the ESRs of the PED are fulfilled (the use of socket-welding was also confirmed in the MHD question n° 3-005-2016).

Based on the above, when designing piping systems / piping classes according to EN 13480-3 – the connections (usually up to 1 ½ “) can be of socket-welding type, threaded type, butt-welded type and the selection shall be based upon services, pressure classes etc…, to be verified by the engineering.

In case of selection of socket-welding or threaded connections type, please clarify the following questions:

a) Is there any specific harmonized/EN standard (let’s say equivalent to ASME code B16.11) to be used for forged fittings both socket-welding and threaded ends?

b) If the reply to above point “a” is “NO”, may the standard ASME B16.11 be adopted as a valid alternative for specifying forged components for socket-welding and threaded ends components, when designing piping classes/ system to EN 13480?

c) If the reply to above point “b” is “no”, how to proceed?

Proposed answer(s): *

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Answer from the MHD *(to be filled by MHD):* CEN/TC 267/WG 3 answer to MHD: a) no b) no c) Calculation needs to be carried out in accordance with EN 13480-3:2017, based on the geometry and the materials of the components and any missing data related to sizes shall be defined and specified by the designer.

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Question form

Request reference number *(to be filled by MHD)*: **3-003-2021**	**Date: 2021-02-23**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13480-3	2017	74	8	--

Subject: integrally reinforced forged branch outlet fittings in piping classes designed according to EN 13480-3

Type of request: ☒ Technical clarification ☐ Editorial correction ☐ Technical comment ☐ Translation correction

From:
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☐ Manufacturer ☒ User ☐ Other (please specify):

Question/comment:

According to the standard EN 13480-3:2017 § 8 (but in general in the whole standard) no specific reference is made to the integrally reinforced forged branch outlet fittings of buttwelding, socket welding, and threaded types (sockolet, weldoled, threadolet), except for the mention in table H.3 EN 13480-3 and the mention of socket welding in Table 8.2-1 and Table 9.3.3-1 of EN 13480-5.

When designing piping classes according to ASME code B31.3, the above items are largely used as branch connections to run pipes and are specified according to std MSS SP-97, but it is unclear if they are permitted when designing to EN 13480-3 and above all, if a dedicated EN standard exists for these components.

Considering the above, please clarify the following questions:

a) Can the integrally reinforced forged branch outlet fittings of buttwelding, socket welding, and threaded types (sockolet, weldoled, threadolet) be used/specified when designing piping material classes according to std EN 13480-3?

b) If the reply to the above question “a” is “YES”, which is the reference harmonized / EN standard to be used for those components?

c) If the above question “a” is “YES”, but no EN standard exists for sockolet, weldoled, threadolet, may the STD MSS SP-97 be adopted as a reference std for dimensions? (In this case material might still be required to comply with EN standards, unless PMA (clause 4.3, and EN 764-4 and-5 and requirements of EN 13445-2 / EN 13480-2 clause 4.1 and 4.2) is provided

d) If the reply to above question “a” is “NO”, for the branch in pipes what type of branch connections are admitted in place of integrally reinforced forged branch outlet fittings of buttwelding, socket welding, and threaded types, only those referenced in para 8.3.3 EN 13480-3?

Proposed answer(s): *

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Answer from the MHD *(to be filled by MHD):* CEN/TC 267/WG 3 answer to MHD: a) Yes b) No existing European harmonized standards for these components c) Calculation needs to be carried out based on the geometry and the materials of the components. The dimensions may be taken from any standard(s) or specification(s) as long as they are sufficient for the calculations d) -

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***** *Please note that question with proposed answers will be dealt with as priority.*

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EN 13480 "Industrial piping and pipelines" Maintenance Group Question form

Request reference number *(to be filled by MHD)*: **3-004-2021** **Date: 2021-02-23**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13480-3	2017	-	8.3.8	--

Subject: Fittings dimensions EN 10253-X

Type of request: ☒ Technical clarification ☐ Editorial correction ☐ Technical comment ☐ Translation correction

From:
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☐ Manufacturer ☒ User ☐ Other (please specify):

Question/comment:

With reference to the Reducing Tees (and other types of fittings) specified according to harmonized European standard EN 10253-2; EN 10253-4 etc.., there are some intermediate dimensions which are not included in the standards but that may be used for the branch tables in piping connections when preparing piping classes calculated to EN 13480-3.

Example: Table 14 EN 10253-2 - Reducing Tees - size 20”(508) x14” (355,6); 24”(610)x18”(457); 24”(610)x14”(355,6), but not limit to are not provided by the standard – and related dimensions are missing if compared to analogous std ASME B16.9.

Considering the above, please clarify the following question:

a) When designing piping classes/systems calculated to EN 13480-3 and specifying/requiring the butt-welding fittings according to EN 10253-X, is it admitted requiring/specifying a fitting as per EN 10253-X even if the dimensions are not included in the relevant standard tables? (example: reducing tees - EN 10253-2 – Type B - 610X12,5- 457 X 10 - P265GH)

Proposed answer(s): *

Yes, it is admitted specifying and ordering a fitting (reducing tees, etc.…) whose dimensions are not included in the standard EN 10253-X, provided that the “non-standard” required dimensions are agreed by purchaser and manufacturer at the time of PO and provided that all other design requirements set forth in the standard EN 10253-X are complied with by the Manufactuer.

Answer from the MHD *(to be filled by MHD):*

Yes, the proposed answer is correct including the requirements of EN 13480:2017.

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EN 13480 "Industrial piping and pipelines" Maintenance Group Question form

Request reference number *(to be filled by MHD)*: **3-005-2021** **Date: 2021-03-01**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13480-3	2017	173	13.11.4.2	I.S EN 13480-3

Subject:

Type of request: ☒ Technical clarification ☐ Editorial correction ☐ Technical comment ☐ Translation correction

From :
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☐ Manufacturer ☒ User ☐ Other (please specify):

Question/comment: CL. 13.11.4.2 gives the maximum permissible stress for supports. CL. 5.2.2-2 gives the design stress for Austenitic pipes with A> 35%. Cl. 5.2.2-2 calculates a higher permissible stress based on stain hardening. Can CL. 5.2.2-2 be used for pipe support constructed out of stainless steel with A> 35%?

Proposed answer(s): *

Answer from the MHD *(to be filled by MHD):*

Yes, this issue is solved in EN 13480-3:2017/prA5, which has been submitted to CEN Enquiry in Europe from 2021-08-19 to 2021-11-11.
(see also MHD answer to question MHD 3-014-2019, which can be downloaded from the MHD website):
https://www.unm.fr/en/homepage/activities/maintenance-agencies/en-13480

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EN 13480 "Industrial piping and pipelines" Maintenance Group
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Request reference number *(to be filled by MHD)*: **3-006-2021** **Date**: **2021-04-16**

Please fulfil the following

Part:	Pages	Subclauses	National Standard Reference
EN 13480 - 3 / A2	10 – 11	12.3.2 – 12.3.3	English

Subject : Alternative equations

Question/comment :

The new resp. changed equations in chapter 12.3.2 and 12.3.3 are not conservative for negative axial forces ($Q_{xS} < 0$ resp. $Q_{xA} + Q_{xB} < 0$). Detailed information why this is needed is provided on the next pages.

Proposed answer(s)/correction(s) * :

Replace: " $Q_{xA} = \max\left(|Q_{xS}|, \left|\frac{p_c\,\pi\,d_i^2}{4} + Q_{xS}\right|\right)$ "

By: " $Q_{xA} = \left|\frac{p_c\,\pi\,d_i^2}{4}\right| + |Q_{xS}|$ "

Replace: " $Q_x = \max\left(|Q_{xA}| + |Q_{xB}|, \left|\frac{p_c\,\pi\,d_i^2}{4} + Q_{xA}\right| + |Q_{xB}|\right)$ "

By: " $Q_x = \left|\frac{p_c\,\pi\,d_i^2}{4}\right| + |Q_{xA}| + |Q_{xB}|$ "

Replace: " $Q_x = \max\left(|Q_{xA}|, |Q_{xA} + Q_{xB}|, \left|\frac{p_c\,\pi\,d_i^2}{4} + Q_{xA}\right|, \left|\frac{p_c\,\pi\,d_i^2}{4} + Q_{xA} + Q_{xB}\right|\right)$ "

By: " $Q_x = \left|\frac{p_c\,\pi\,d_i^2}{4}\right| + \max\left(|Q_{xA}|, |Q_{xA} + Q_{xB}|\right)$ "

From :
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.....
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fax :.....
date : 16. Apr. 2021.....

☐ Manufacturer ☒ User ☐ Other please specify :

Answer from the MHD *(to be filled by MHD):*

The stress verification for longitudinal stresses in EN 13480-3:2017 is not only a verification of Tresca equivalent stresses.

Nevertheless, this question is transmitted for further consideration by the European working group CEN/TC 267/WG 3.

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To be sent to EN 13480 Maintenance Group secretariat :	
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The equations in chapter 12 of EN 13480-3 need corrections for $Q_{xS} < 0$ and for $Q_{xA} + Q_{xB} < 0$

The stress equations (12.3.2-1) and (12.3.3-1) in EN 13480-3 were changed from edition 2017 to 2020. These equations now also include (non-pressure induced and external) additional axial forces. However, these equations seem to be non-conservative if the additional axial force gets a negative value.

This document shall provide a discussion of this issue and provide information how to fix these equations to be conservative also for negative additional axial forces.

Summary

In the 2020 edition of EN 13480-3, equation (12.3.2-1) became:

$$\sigma_1 = \frac{i_{QA}\, Q_{xA}}{A_c} + \frac{0{,}75\, i\, M_A}{Z_c} \le f_f$$

and equation (12.3.2-2) was added:

$$\sigma_1 = \sqrt{\left[\frac{i_{QA}\, Q_{xA}}{A_c} + \frac{\sqrt{\left(0{,}75\, i_i\, M_{iA}\right)^2 + \left(0{,}75\, i_o\, M_{oA}\right)^2}}{Z_c}\right]^2 + \left(\frac{i_t\, M_{tA}}{Z_c}\right)^2} \le f_f$$

wherein

$$Q_{xA} = \max\left(\left|Q_{xS}\right|, \left|\frac{p_c\, \pi\, d_i^{\,2}}{4} + Q_{xS}\right|\right)$$

This equation for Q_{xA} should be changed to

$$Q_{xA} = \left|\frac{p_c\, \pi\, d_i^{\,2}}{4}\right| + \left|Q_{xS}\right|$$

In the 2020 edition of EN 13480-3, equation (12.3.3-1) became:

$$\sigma_2 = \frac{i_{QA}\, Q_x}{A_c} + \frac{0{,}75\, i\, M_A}{Z_c} + \frac{0{,}75\, i\, M_B}{Z_c} \le k\, f_f$$

and equation (12.3.3-4) was added:

$$\sigma_2 = \sqrt{\left(\frac{i_{QA}\, Q_x}{A_c} + \frac{\sqrt{\left[0{,}75\, i_i \left(M_{iA} + M_{iB}\right)\right]^2 + \left[0{,}75\, i_o \left(M_{oA} + M_{oB}\right)\right]^2}}{Z_c}\right)^2 + \left(\frac{i_t\, M_{tA} + i_t\, M_{tB}}{Z_c}\right)^2} \le k \cdot f_f$$

wherein

$$Q_x = \max\left(|Q_{xA}| + |Q_{xB}|, \left|\frac{p_c\ \pi\ d_i^{\,2}}{4} + Q_{xA}\right| + |Q_{xB}|\right)$$ equation (12.3.3-2) resp.

$$Q_x = \max\left(|Q_{xA}|, |Q_{xA} + Q_{xB}|, \left|\frac{p_c\ \pi\ d_i^{\,2}}{4} + Q_{xA}\right|, \left|\frac{p_c\ \pi\ d_i^{\,2}}{4} + Q_{xA} + Q_{xB}\right|\right)$$ equation (12.3.3-3)

These equations for Q_x should be changed to

$$Q_x = \left|\frac{p_c\ \pi\ d_i^{\,2}}{4}\right| + |Q_{xA}| + |Q_{xB}|$$ for equation (12.3.3-2) and

$$Q_x = \left|\frac{p_c\ \pi\ d_i^{\,2}}{4}\right| + \max\left(|Q_{xA}|, |Q_{xA} + Q_{xB}|\right)$$ for equation (12.3.3-3)

Stress theory

The stresses are verified based on the shear stress (Tresca's) theorem:

$$\sigma_{v,T} = 2 \cdot \tau_{\max} = \max\left(\left|\sigma_I - \sigma_{II}\right|; \left|\sigma_{II} - \sigma_{III}\right|; \left|\sigma_{III} - \sigma_I\right|\right) \le f$$

For simplicity, here the moment M is assumed to be bending only. So the axial, radial and circumferential stresses are the principal stresses.

➔ $\sigma_I = \sigma_x \quad ; \quad \sigma_{II} = \sigma_r \quad ; \quad \sigma_{III} = \sigma_\varphi$

Axial, radial and circumferential stresses

The axial stress in a pipe (at radius = r in the pipe's wall) is:

$$\sigma_x(r) = \frac{p_c \cdot r_i^2}{r_o^2 - r_i^2} + \frac{Q_{xS}}{A_c} \pm \frac{M}{Z_c} \cdot \frac{r}{r_o}$$

The radial stress in a pipe (at radius = r in the pipe's wall) is:

$$\sigma_r(r) = \frac{p_c \cdot r_i^2}{r_o^2 - r_i^2} \cdot \left(1 - \frac{r_o^2}{r^2}\right)$$

The circumferential stress in a pipe (at radius = r in the pipe's wall) is:

$$\sigma_\varphi(r) = \frac{p_c \cdot r_i^2}{r_o^2 - r_i^2} \cdot \left(1 + \frac{r_o^2}{r^2}\right)$$

Dimensioning calculation (parts independent of moments)

The radial stress σ_r and the circumferential stress σ_φ are independent of the moment M (and the additional axial force Q_{xS}). So the equation $|\sigma_{II} - \sigma_{III}|$, where only these occur (and where the highest stress due to internal pressure only is expected), is usually verified using membrane (= averaged over the pipe wall) stresses, which gives a basis to the dimensioning equations (6.1-1), (6.1-2), (6.1-3) and (6.1-4) in EN 13480-3:

$$|\sigma_{II} - \sigma_{III}| = \left| \underbrace{\frac{\int_{r_i}^{r_o} \sigma_r(r)\,dr}{r_o - r_i}}_{\sigma_{r,m}} - \underbrace{\frac{\int_{r_i}^{r_o} \sigma_\varphi(r)\,dr}{r_o - r_i}}_{\sigma_{\varphi,m}} \right| = \left| -\frac{p_c \cdot r_i}{r_o + r_i} - \frac{p_c \cdot r_i}{r_o - r_i} \right|$$

$$\underline{\underline{|\sigma_{II} - \sigma_{III}| = \left| \frac{2 \cdot p_c \cdot r_o \cdot r_i}{r_o^2 - r_i^2} \right| = |p_c| \cdot \left(\frac{d_m}{2 \cdot e_c} - \frac{e_c}{2 \cdot d_m} \right) \le f}}$$

Pipe stress calculation (equations depending of moments)

The axial stress σ_x depends of the moment M (and the additional axial force Q_{xS}). Therefore, the equations $|\sigma_I - \sigma_{II}|$ and $|\sigma_{III} - \sigma_I|$, where σ_x appears are evaluated at the outside of the pipe ($r = r_o$) because there the bending moment M has the greatest influence. These equations give the basis to the pipe stress equations (12.3.2-1) and (12.3.3-1) in EN 13480-3:

$$|\sigma_I - \sigma_{II}| = \left| \underbrace{\left(\frac{p_c \cdot r_i^2}{r_o^2 - r_i^2} + \frac{Q_{xS}}{A_c} \pm \frac{M}{Z_c} \right)}_{\sigma_x(r=r_o)} - \underbrace{(0)}_{\sigma_r(r=r_o)} \right| = \left| \frac{p_c \cdot r_i^2}{r_o^2 - r_i^2} + \frac{Q_{xS}}{A_c} \pm \frac{M}{Z_c} \right|$$

$$\underline{\underline{|\sigma_I - \sigma_{II}| = \left| \frac{p_c \cdot r_i^2}{r_o^2 - r_i^2} + \frac{Q_{xS}}{A_c} \right| + \left| \frac{M}{Z_c} \right| = \left| \frac{p_c \cdot d_i^2}{d_o^2 - d_i^2} + \frac{Q_{xS}}{A_c} \right| + \left| \frac{M}{Z_c} \right| \le f_f}}$$

$$|\sigma_{III} - \sigma_I| = \left| \underbrace{\left(\frac{2 \cdot p_c \cdot r_i^2}{r_o^2 - r_i^2} \right)}_{\sigma_\varphi(r=r_o)} - \underbrace{\left(\frac{p_c \cdot r_i^2}{r_o^2 - r_i^2} + \frac{Q_{xS}}{A_c} \pm \frac{M}{Z_c} \right)}_{\sigma_x(r=r_o)} \right| = \left| \frac{p_c \cdot r_i^2}{r_o^2 - r_i^2} - \frac{Q_{xS}}{A_c} \mp \frac{M}{Z_c} \right|$$

$$\underline{\underline{|\sigma_{III} - \sigma_I| = \left| \frac{p_c \cdot r_i^2}{r_o^2 - r_i^2} - \frac{Q_{xS}}{A_c} \right| + \left| \frac{M}{Z_c} \right| = \left| \frac{p_c \cdot d_i^2}{d_o^2 - d_i^2} - \frac{Q_{xS}}{A_c} \right| + \left| \frac{M}{Z_c} \right| \le f_f}}$$

Here it can be seen that the equations $|\sigma_I - \sigma_{II}|$ and $|\sigma_{III} - \sigma_I|$ are equal if $Q_{xS} = 0$.

Up to the 2017 edition of the EN 13480-3 the term Q_{xS}/A_c was seen as negligible in comparison to the other terms and therefore it was sufficient to only verify $|\sigma_I - \sigma_{II}| \leq f_f$ in the pipe stress calculations (equations (12.3.2-1) and (12.3.3-1) in EN 13480-3).

But, if the term Q_{xS}/A_c is introduced into the pipe stress equations (12.3.2-1) and (12.3.3-1) in EN 13480-3, then it has to be considered that $|\sigma_I - \sigma_{II}|$ only returns a higher value than $|\sigma_{III} - \sigma_I|$ if Q_{xS} and p_c have equal sings ($Q_{xS} > 0$ and $p_c > 0$ resp. $Q_{xS} < 0$ and $p_c < 0$) while $|\sigma_{III} - \sigma_I|$ returns a higher value than $|\sigma_I - \sigma_{II}|$ if Q_{xS} and p_c have non-equal signs ($Q_{xS} < 0$ and $p_c > 0$ resp. $Q_{xS} > 0$ and $p_c < 0$).

Does this mean that now two equations have to be verified for the pipe stress calculation? Effectively not: Because $|\sigma_I - \sigma_{II}|$ and $|\sigma_{III} - \sigma_I|$ only differ in the sing of the term Q_{xS}/A_c, they can be summarized. So this new (summarized) equation is the one to be fulfilled in the pipe stress calculation:

$$\max\left(\left|\sigma_I - \sigma_{II}\right|;\left|\sigma_{III} - \sigma_I\right|\right) = \left|\frac{p_c \cdot d_i^{\,2}}{d_o^{\,2} - d_i^{\,2}}\right| + \left|\frac{Q_{xS}}{A_c}\right| + \left|\frac{M}{Z_c}\right| = \frac{\left|p_c \cdot \pi \cdot d_i^{\,2}/4\right| + \left|Q_{xS}\right|}{A_c} + \left|\frac{M}{Z_c}\right| \leq f_f$$

The problem with the equations in chapter 12 in EN 13480-3 edition 2020

The equations in chapter 12 of EN 13480-3 ignore the term $|\sigma_{III} - \sigma_I|$ and even imply that by (external) compression force the total stress would become lower for a pipe having inner pressure. But in fact the opposite happens, because then $|\sigma_{III} - \sigma_I|$ would return a higher value. Especially in cases where $Q_{xS} \approx -1/2 \cdot p_c \cdot \pi d_i^{\,2}/4$ the equations (12.3.2-1) (resp. (12.3.2-2)) and (12.3.3-1) (resp. (12.3.3-4)) in EN 13480-3 may indicate a significantly lower stress level than the equivalent stress really is. Such situations are likely in piping between axial expansion joints and the next fix-point support.

So to stay conservative, the equations in chapter 12 in EN 13480-3 should be fixed this way:

Equation (12.3.2-1):

$$Q_{xA} = \max\left(\left|Q_{xS}\right|, \left|\frac{p_c\ \pi\ d_i^{\,2}}{4} + Q_{xS}\right|\right) \quad \rightarrow \quad Q_{xA} = \left|\frac{p_c\ \pi\ d_i^{\,2}}{4}\right| + \left|Q_{xS}\right|$$

Equation (12.3.3-2):

$$Q_x = \max\left(\left|Q_{xA}\right| + \left|Q_{xB}\right|, \left|\frac{p_c\ \pi\ d_i^{\,2}}{4} + Q_{xA}\right| + \left|Q_{xB}\right|\right) \quad \rightarrow \quad Q_x = \left|\frac{p_c\ \pi\ d_i^{\,2}}{4}\right| + \left|Q_{xA}\right| + \left|Q_{xB}\right|$$

Equation (12.3.3-3):

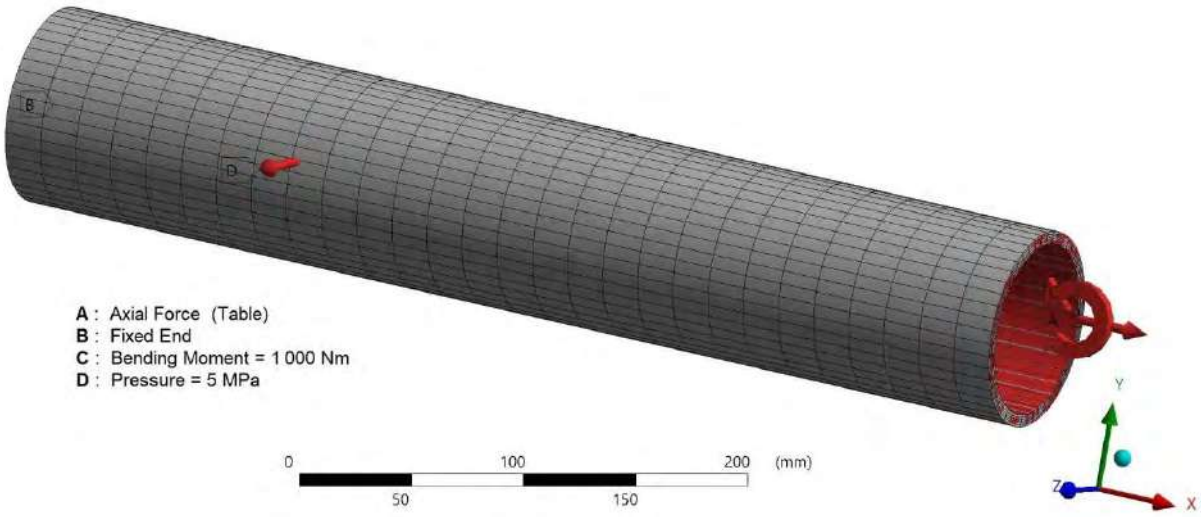
$$Q_x = \max\left(|Q_{xA}|, |Q_{xA} + Q_{xB}|, \left|\frac{p_c\ \pi\ d_i^{\,2}}{4} + Q_{xA}\right|, \left|\frac{p_c\ \pi\ d_i^{\,2}}{4} + Q_{xA} + Q_{xB}\right|\right)$$

➔ $$Q_x = \left|\frac{p_c\ \pi\ d_i^{\,2}}{4}\right| + \max\left(|Q_{xA}|, |Q_{xA} + Q_{xB}|\right)$$

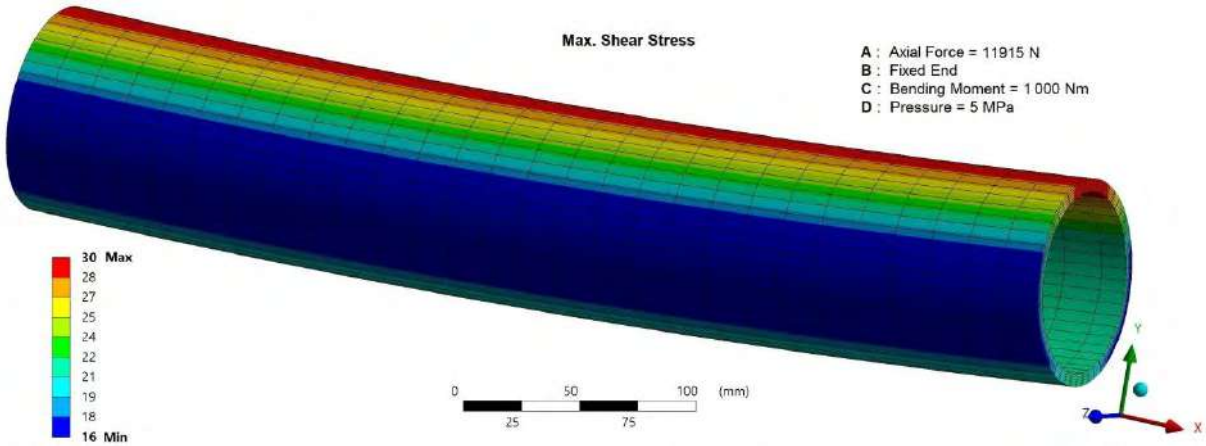
Verification using an ANSYS finite element model

To crosscheck if the statements written above are valid (and not a ghost hunt is done) a simple ANSYS finite element model is created.

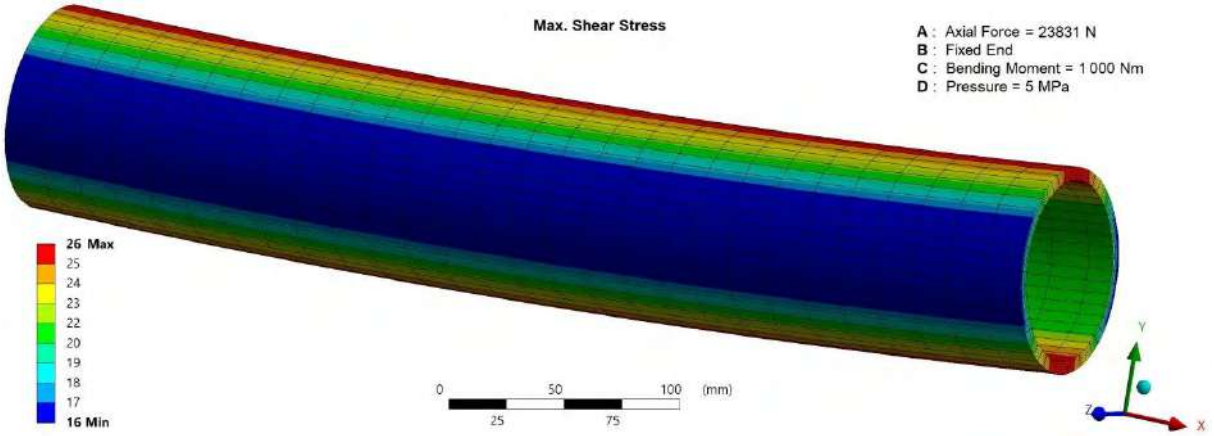
This contains a pipe with d_o = 88.9 mm and e_c = 5.5 mm and is fine meshed (five HEX20 elements over the wall thickness). On this pipe an inner overpressure of 5 MPa is applied. One end of the pipe is held fixed and on the other end a static bending moment of 1 000 Nm (= 1 000 000 Nmm) and a variable axial force $Q_{x\Sigma}$ representing $p_c \cdot \pi d_i^2/4 + Q_{xS}$ is applied.



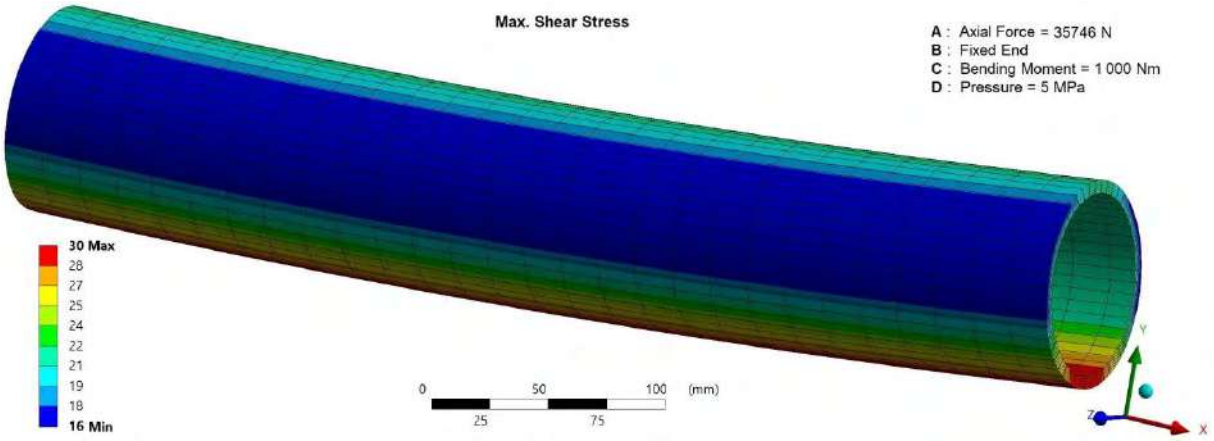
The results show that for $Q_{x\Sigma} < p_c \cdot \pi d_i^2/4 = 23831$ N the upper part of the pipe (compression side) gets the higher shear stress:



The results show that for $Q_{x\Sigma} = p_c \cdot \pi \cdot d_i^2/4 = 23831$ N the upper and lower parts of the pipe get the same shear stress and also the maximum shear stress gets the lowest overall value:



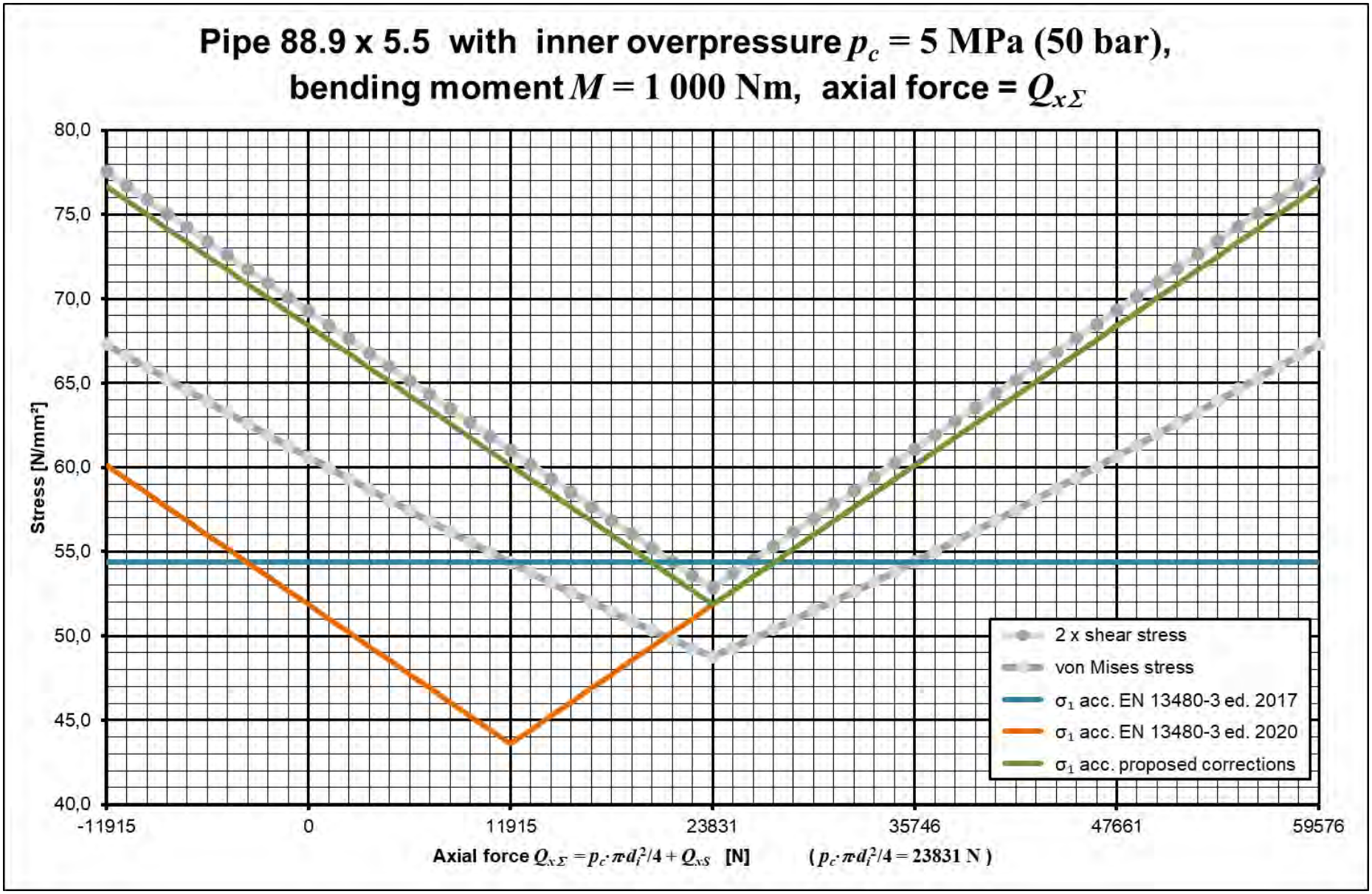
The results show that for $Q_{x\Sigma} > p_c \cdot \pi \cdot d_i^2/4 = 23831$ N the lower part of the pipe (tension side) gets the higher shear stress:



The following diagram provides a comparison of the shear stress results and the von Mises stress calculated with ANSYS and the values given by equation (12.3.2-1) of EN 13480-3 editions 2017 and 2020 as well as for the proposed corrected equation.

This also shows that if $Q_{x\Sigma} > p_c \cdot \pi \cdot d_i^2/4$ the equation (12.3.2-1) (equation (12.3.3-1) analogue) in EN 13480-3 edition 2020 provides good results. However, if $Q_{x\Sigma} < p_c \cdot \pi \cdot d_i^2/4$ this equation gives to low stresses while the equation with the proposed corrections still gives good results.

Therefore, the previously written statements regarding the necessity to correct the equations in chapter 12 in EN 13480-3 seem to be valid.


Pipe 88.9 x 5.5 with inner overpressure p_c = 5 MPa (50 bar),
bending moment M = 1 000 Nm, axial force = $Q_{x\Sigma}$
Stress [N/mm²]
80,0
75,0
70,0
65,0
60,0
55,0
50,0
45,0
40,0
-11915
0
11915
23831
35746
47661
59576
Axial force $Q_{x\Sigma} = p_c \cdot \pi d_i^2/4 + Q_{xS}$ [N]
($p_c \cdot \pi d_i^2/4 = 23831$ N)
2 x shear stress
von Mises stress
σ_1 acc. EN 13480-3 ed. 2017
σ_1 acc. EN 13480-3 ed. 2020
σ_1 acc. proposed corrections

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EN 13480 "Industrial piping and pipelines" Maintenance Group
Question form

Request reference number *(to be filled by MHD)*: **3-007-2021**			**Date**: **21.07.2021**	
Please fulfil the following				
Part: EN 13480-3	Issue: EN 13480-3:2017 and 2017 FprA4 April 2021	Page	Subclause Annex J of EN 13480-3:2017 and Table N.2 of 2017 FprA4 April 2021	National Standard Reference --
Subject: Documentation of supports				
Type of request:	☒ Technical clarification	☐ Editorial correction		
	☐ Technical comment	☐ Translation correction		
From : Company: Hilti AG Name:Giovanni Riello ..... Postal address: Feldkircherstrasse 100 , 9494 Schaan, Liechtenstein.....		e-mail: Giovanni.riello@hilti.com ..... phone: +423-234 2347		
☒ Manufacturer	☐ User	☐ Other (please specify):		

Question/comment:

1. If Annex J (Type testing) is applied to design supports, can EN1090-2:2018 according to Table N.2 be applied to classify pipe supports as S1/S2/S3?

Answer from the MHD *(to be filled by MHD):*

No, see explanation below:
Annex A4 contains: "13.11.11 Alternative rules for design and manufacture of pipe supports"
and the last sentence of this is: "NOTE Annex J is not applicable for supports designed with the alternative route according to Eurocode." If you are dealing with table N.2 "Documentation of pipe supports fabricated according to EN 1090-2:2018" you are dealing with the Eurocode.

To be sent to EN 13480 Maintenance Group secretariat:	EN 13480 Maintenance Group secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13480@unm.fr

***** *Please note that question with proposed answers will be dealt with as priority.*

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EN 13480 "Industrial piping and pipelines" Maintenance Group
Question form

Request reference number *(to be filled by MHD)*: **3-008-2021**	**Date: 11/08/2021**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13480-3	EN 13480-3:2017 / A2:2020 (E)	9 to 40		--

Subject:

Type of request: ☒ Technical clarification ☐ Editorial correction ☐ Technical comment ☐ Translation correction

From :
Company:Fluor UK Ltd .....
Name:Duncan Finch .....
Postal address:140 Pinehurst Road, Farnborough, UK
e-mail:duncan.finch@fluor.com .....
phone: +44(0)7818067194 .....

☐ Manufacturer ☒ User ☐ Other (please specify):

Question/comment:

I am currently working on a project for a client in the EU. I have some questions that I would appreciate clarifications:

Question 1) The FEED stage of the project was signed **before** February 2021. We are assuming that EN 13480-3:2017 / A2:2020 (E) is not applicable as it became law from that date and that we should use the earlier 2017 amended version that was active as law at the time of contract signature.

Question 2) We expect to sign the full engineering project (EPC) early next year to run on from the FEED. Will we need to pick the current code at that date or continue to use the one that was active at the time of the FEED?.

Question 3) There are 30 pages of revisions to EN 13480-3:2017 / A2:2020 (E).

On page 8 of the code I see the following statement:

> This document includes the text of the amendment itself. The amended/corrected pages of EN 13480-3:2017 will be published as Issue 4 of the European Standard.

a) Does this mean that these changes will by updated into the main text in the 2022 update of the code?.
b) Are these amendments listed from P9 to P36 are applicable now i.e. only advisory at this time, or only applicable in the Issue 4 i.e. in the 2022 update?.

Proposed answer(s): *

Question 1 – Project signed before the date of this update does not require by law to follow the 2020 amendment

Question 2 – If the project was started before February 2020 and then rolls on into detail engineering it is not required to use the updated amendment version of the code.

Question 3a- Yes, these changes will be incorporated in the 2022 update of the code

Question 3b- Advisory only ahead of the 2022 update of the code.

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Answer from the MHD *(to be filled by MHD):* Amendments to EN Standards apply at the date they are published by CEN. (for a transition period, if any, please refer to the European Foreword of the corresponding Standard)	
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Request reference number *(to be filled by MHD)*: **3-009-2021** **Date: 2021-09-08**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13480-3	2017	153	12.3.3	--

Subject: Wind loads

Type of request: ☒ Technical clarification ☐ Editorial correction ☐ Technical comment ☐ Translation correction

From :
Company: ..... Atkins
Name: ..... Richard Starr
Postal address:3rd Floor, Acero Sheffield, Digital Campus, Concourse Way, Sheffield, S1 2BJ

e-mail: ..... Richard.starr@atkinsglobal.com
phone: + ... 01142 044 429

☐ Manufacturer ☒ User ☐ Other (please specify):

Question/comment:

I am trying to understand the application of the allowable stress factor k in relation to wind loads, and how that can be applied in coordination with harmonised wind standards i.e. EN 1991-1-4.

EN 1991-1-4 provides a methodology for calculation of a characteristic wind force with an annual probability of exceedance of 0.02, equivalent to a mean return period of 50 years.

EN 13480-3 categorises wind loads according to whether it is acting for less than 10% or 1% in any 24hr operating period. The precise meaning of this is not clear. Can this be related to the annual probability of exceedance used by EN 1991-1-4?

Presumably design life of the installation needs to be considered when making this comparison? Typically piping installations have a design life of less than 50 years, therefore, for a mean return period of 50 years, statistically the assessed wind load is unlikely to be exceeded within the piping installations design life.

Proposed answer(s): *

A piping installation with a design life of ≤ 50 years, assessed against an EN 1991-1-4 characteristic wind force with an annual probability of exceedance of 0.02, requires k = 1.15 in accordance with clause 12.3.3 of EN 13480-3.

Alternatively:

A piping installation with a design life of ≤ 50 years, assessed against an EN 1991-1-4 characteristic wind force with an annual probability of exceedance of 0.02, requires k = 1.2 in accordance with clause 12.3.3 of EN 13480-3.

Answer from the MHD *(to be filled by MHD):*

These approaches are different between EN 13480 and Eurocode : on one hand the factor k proposed by EN 13480 are based on a deterministic approach, as the Eurocode is based on the probabilistic approach of wind hazards. For instance, the factor k was appropriate with French code (CODETI) : in the past, normal wind and exceptional wind were specified. Now, with Eurocode, this point has disappeared.

Please refer to EN 13480-3:2017, subclause 12.3.3 (page 153), sentence specifying as follows, which should be added when considering exceptional wind:

k = 1,3 for exceptional loads with very low probability e.g. very heavy snow/wind (i.e. = 1,75 x normal);

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To be sent to EN 13480 Maintenance Group secretariat:	EN 13480 Maintenance Group secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13480@unm.fr

***** *Please note that question with proposed answers will be dealt with as priority.*

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Request reference number *(to be filled by MHD)*: **3-010-2021**	**Date**: **2021-09-20**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13480-	2017	141		--

Subject: Clarification for §11.8

Type of request: ☒ Technical clarification ☐ Editorial correction ☐ Technical comment ☐ Translation correction

From :
Company: **Bilfinger Peters Engineering SARL**
Name:Hinh Quentin
Postal address:14, rue Avaulée, 92240 Malakoff, France
e-mail:quentin.hinh@bilfinger.com
phone: +.....

☐ Manufacturer ☒ User ☐ Other (please specify):

Question/comment:

I would like some clarifications for §11.8. When local stress are determined with alternative method like WRC what equations must be verified?

Proposed answer(s): From §11.8, allowable stress must be limited to the one indicated in §12.2. Does that mean that equations from §11.6 must be verified with allowable from §12.3:?

If so then:

- fh becomes ff
- Sigma MT becomes membranes stress determined with alternative methods.
- Sigma NT becomes bending stress determined with alternative methods.

Answer from the MHD *(to be filled by MHD):*

Suclause 11.8 of EN 13480-3 (2017- Issue 1) allows other methods to be used to verify stresses in piping generated by integral attachments. If a method other than that of Clause 11 of the standard is implemented, it is the responsibility of the designer to classify these stresses (primary, secondary, peak) and to limit them by taking as criteria those defined in subclause 11.2 according to the nature of the stresses and the loads (for example the stresses due to sustained loads $P_m + P_b + P_L$ shall be limited to $1{,}5\,f_h$).
When the conditions of application of Clause 11 are not met, the responsibility of the designer is to use a proven method with at least the same margins as those provided by EN 13480.

To be sent to EN 13480 Maintenance Group secretariat:	EN 13480 Maintenance Group secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13480@unm.fr

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EN 13480 "Industrial piping and pipelines" Maintenance Group
Question form

Request reference number *(to be filled by MHD)*: **4-001-2021**			**Date**: **9/9/2021**	
Please fulfil the following				
Part: EN 13480-4	Issue: 2016	Page 28	Subclause	National Standard Reference EVS_EN_13480_4_2016
Subject:				
Type of request:	☐ Technical clarification		☐ Editorial correction	
	☒ Technical comment		☐ Translation correction	

From :
Company: TERNA .....
Name: CHARITON KEPIDIS .....
Postal address: LASSANI 6.....

e-mail:c.kepidis@gmail.gr .....
phone: +30 6974648413 .....

☐ Manufacturer	☒ User	☐ Other (please specify):

Question/comment:

My question is about welding on boundary limits (CAP or Blind flange/blind plate) on a certain Hydrotest system.

For example, I have a WPS procedure with parent materials 13CrMo4-5 with PWHT.

Can I exclude the PWHT before Hydrostatic Test. The reason of the question is to avoid PWHT twice or triple time the same area.

Proposed answer(s): *

For my opinion due to tempered weld you can avoid the PWHT for some materials.

Answer from the MHD *(to be filled by MHD)*:

This weld made for the proof test must withstand the pressure. If PWHT is required for this weld, it must be applied. This PWHT and any others should be taken into account from the design stage.

Subject for further discussion and study to be carried out by CEN/TC 267/WG 4.

To be sent to EN 13480 Maintenance Group secretariat:	EN 13480 Maintenance Group secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13480@unm.fr

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EN 13480 "Industrial piping and pipelines" Maintenance Group Question form

Request reference number *(to be filled by MHD)*: **5-001-2021**			**Date**: **08/09/2021**	
Please fulfil the following				
Part: EN 13480-5	Issue: 2017	Page 15	Subclause 8.1.2	National Standard Reference --
Subject:				
Type of request:	☒ Technical clarification		☐ Editorial correction	
	☐ Technical comment		☐ Translation correction	
From : Company: GL STEEL SP Z O.O. Name: P.Ulatowska Postal address:09-400, Kostrogaj 8, Płock, Poland			e-mail:p.szymanska@glsteel.pl phone: +48 730058673	
☒ Manufacturer	☐ User	☐ Other (please specify):		

Question/comment:

In regards to examination of weld quality by sample inspection. One of the options for the sample inspection is representative of a batch of welds – quantity of welds, welded by one welder, or welding operator , in accordance with specific WPS.

Please, confirm if the batch of welds shall be limited to one piping line or can involve eg. Piping class / piping system in regards to NDT performance.

Proposed answer(s): *

Batch of welds is not limited to piping line – only as specified in 8.1.2 – welds welded by one welder or welding operator with specific WPS.

Answer from the MHD *(to be filled by MHD):*

Agree with the proposed answer as long as the corresponding requirements of paragraph 8.1.2 are met. See also subclause 8.1.3 e) of EN 13480-5:2017.

To be sent to EN 13480 Maintenance Group secretariat:	EN 13480 Maintenance Group secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13480@unm.fr

***** *Please note that question with proposed answers will be dealt with as priority.*

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EN 13480 "Industrial piping and pipelines" Maintenance Group
Question form

Request reference number *(to be filled by MHD)*: **5-002-2021**	**Date: 2021-10-18**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13480-5	2017	20	9.3	--

Subject: Presusre test

Type of request: X Technical clarification ☐ Editorial correction ☐ Technical comment ☐ Translation correction

From :
Company:TGE ENGINEERING
Name:Jakub Stojanowski
Postal address: .....
e-mail:Jakub.stojanowski@tge-gas.com
phone: +.....

X Manufacturer ☐ User ☐ Other (please specify):

Question/comment:

I would like to receive interpretation of point 9

1) We have to insert a piece of pipe(1m long) in pipeline that is under construction. Two golden joints (closure welds) will be done each at both ends of that 1m insert. The pipeline itself was pressure tested before 1,43xPS (in this case it was 185,9barg).
2) 1m Pipe insert certificate 3.1 is in attachment.
3) Prior installation of that 1m piece of pipe client requested to pressure test it based on point 9.3.1. and .9.3.4

TDT hereby informs that it cannot agree to the use of a 1 m long DN450 pipe insert for the modernization of one of the pipelines, which will not be subjected to a hydraulic test at the construction site. There are no legal grounds for granting consent for this type of operation, as the EN 13480 standard in point 9.3.4 only indicates that in cases "where the hydrostatic or pneumatic pressure testing of individual welds (connecting welds) would be harmful or impossible, it should be replaced with an appropriate non-destructive test ...", while there is no reference to the elements installed in the pipeline, which should include the insert 1 m long pipe. Moreover, the provisions of the standard 9.3.1. The general indicates that:

"All pipelines constructed in accordance with this European Standard shall be subjected to a verification test to demonstrate the integrity of the finished product. ……

The verification test should be a hydrostatic pressure test, except when the hydrostatic pressure test is harmful or impractical. …. "

Bearing in mind the above, in this type of cases, the pipe inserts are subjected to a separate pressure test "on the side", and then they are welded into the modernized / manufactured pipeline.

Summarizing the above, TDT informs that there are no grounds for not subjecting such important elements of the modernized pipeline to a hydraulic test.

Proposed answer(s): *

In my opinion the 1m seamless pipe insert that we want to install which does not have any joints, therefore it is not subject to a pressure test (in this case, a hydraulic test 185,9barg) according to EN13480-5 point 9.3. The pipe was made by the manufacturer in accordance with the EN 10216-5 standards TC2 test has been conducted. Hydrostatic test 7MPa/5s

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Answer from the MHD *(to be filled by MHD):*

Clause 9.3.4. covers cases where a hydrostatic or pneumatic pressure test of individual welds (connection welds) would be detrimental or impracticable for the piping.
Further exemptions are not covered by the standard.
Special cases, deviations from the specified requirements may be agreed, provided objective evidence is available to demonstrate that equivalent safety shall be attained. See subclause 5.4 of EN 13480-1:2017.

To be sent to EN 13480 Maintenance Group secretariat:	EN 13480 Maintenance Group secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13480@unm.fr

***** *Please note that question with proposed answers will be dealt with as priority.*