European Committee for Standardization
Comité Européen de Normalisation
Europaïsches Komitee für Normung

EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD):* **(2014)-0x-0x** **Date: 201X-xx-xx**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13445-	2014			--

Subject: General issue (no specific chapter) about Ps, wall thickness and safety class of the vessel

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

From :
Company: CEA .....
Name: ROMUALD DUPERRIER .....
Postal address: CEA Saclay, 91191 Gif sur Yvette cedex
e-mail: romuald.duperrier@cea.fr.....
phone: +33 1 69 08 66 85 .....

☒ Manufacturer ☐ User ☐ Other (please specify):

Question/comment:

Considering that Ps is a manufacturer choice, the standard provides rules for calculating the minimum vessel wall thickness taking into account material type, geometry, allowance for corrosion and manufacturing tolerance. Considering that manufacturer will optimize the cost of the vessel, multiplying the thickness by a huge factor seems unusual. Also, I am puzzled by the following situation: for 2 designed vessels having the same Ps.V but two very different thicknesses both exceeding the minimum thickness and having the same burst discs opening at Ps, both vessels would be classified the same way. However, I believe that the two vessels do not carry the same level of hazard as the thicker one would burst at a much higher pressure than the other one in case of failure of the burst disc (wrong location, other object blocking the burst disc, inherent failure). Should the standard either require a maximum thickness relative to the minimum thickness derived from Ps or indicate that the Ps must be recalculated once the final thickness is selected?

Proposed answer(s): *

The standard indicates that the Ps shall be recalculated once the wall thickness is selected removing the manufacturing tolerance and corrosion anticipation.

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

The proposed answer is not correct. According to the PED Ps has to be established by the manufacturer, considering the process requirements and the less favourable conditions that might occur during the service of the vessel. Once Ps has been established, the manufacturer is free to select the thicknesses of the materials used in fabrication, provided such thicknesses are within the limits imposed by the calculation rules for all reasonably foreseeable loading conditions (pressure plus all other simultaneously acting loads). In the PED there is no obligation to calculate the maximum pressure compatible with the thicknesses actually used in fabrication.

To be sent to EN 13445 Maintenance Help Desk secretariat:	EN 13445 MHD secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13445@unm.fr

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

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EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD):* **(2014)-03-41** **Date: 201X-xx-xx**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13445-3	2014	149	10.6	--

Subject: Openings in flat heads

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

From :
Company: Lloyd's Register EMEA.....
Name: Andrea Filippo Magrì.....
Postal address: Via Cadorna 69, 20090 Vimodrone (MI) Italy .....
e-mail: andrea.magri@lr.org.....
phone: + 39 334 6628013 .....

☐ Manufacturer ☐ User ☒ Other (please specify): Notified Body

Question/comment: Figures 10.6-3 and 10.6-4 seem to not include weld area in calculation of area A used to define equivalent diameter of opening. Would it be correct to include the weld area in the reinforcement ? (With a modification of Figures).

Proposed answer(s): *Yes.

Answer from the MHD *(to be filled by MHD):*
The proposed answer is right. The inclusion of the weld area in the calculation of the equivalent diameter should be permitted. Most designers will use either inhouse or proprietary computer software for performing calculations so it is important that the software developers are aware of the amendment. These modifications will be incorporated in amendment prA21 (vessels on legs).

To be sent to EN 13445 Maintenance Help Desk secretariat:

EN 13445 MHD secretariat c/o UNM
Standardization Office on behalf of AFNOR
F 92038 Paris La Défense Cedex – France
e-mail: en13445@unm.fr

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

European Committee for Standardization
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Europaïsches Komitee für Normung

EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD):* **(2014)-03-42** **Date: 2019-08-30**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13445-3 :2014(E)	1	31,32,33	7.5.3.2 7.5.3.3	--

Subject:

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

From :
Company: NaftagasTechnical Services
Name: Janos Nemet
Postal address: 23 000 Zrenjanin Serbia
e-mail: janos.nemet@nis.eu
phone: + 381 64 888 2825

☐ Manufacturer ☐ User ☐ Other (please specify): designer

Question/comment:

I have a question regarding the equations 7.5-2, 7.5-3, 7.5-7 and 7.5-8 :

In case of welded multisectional torispherical heads, with seams running across the head, thus affecting the knuckle region : why weld joint coefficient (Z) does not figure in these equations.

Proposed answer(s): incorporate the influence of joint coefficient in the equations 7.5-2, 7.5-3, 7.5-7 and 7.5-8

Answer from the MHD *(to be filled by MHD):*
The proposed answer is not correct. In torispherical ends the thickness of the knuckle is limited by these equations for buckling and bending, due to the presence of compressive stress the joint efficiency shall not be considered.

To be sent to EN 13445 Maintenance Help Desk secretariat:

EN 13445 MHD secretariat c/o UNM
Standardization Office on behalf of AFNOR
F 92038 Paris La Défense Cedex – France
e-mail: en13445@unm.fr

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

European Committee for Standardization
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EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD)*: **(2014)-03-43** **Date: 2019-09-26**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13445-3	2014	154	11.3	NF E86-200-3

Subject:

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

From :

Company: Edvance .....

Name: Julien Halleguen.....

Postal address: 10 rue Raymond David, Batiment Viva, 92240 Malakoff .....

e-mail:Julien.halleguen@edvance.fr .....

phone: +33178151465 .....

☐ Manufacturer ☒ User ☐ Other (please specify):

Question/comment:

The definition of A as “the outside diameter of the flange or, where slotted holes extend to outside of flange, the diameter to bottom of slots” seems to indicate that slotted holes are allowed for flanges, and so that configurations of flanges where nuts and washers may stick out of the outside diameter A because of a large slot could be allowed.

But figures 11.5.1 p.161 in §11.5 all show flange configurations where there is a ligament between outside diameter A and the bolt hole.

What is the minimum allowable thickness of the ligament between A and the bolt hole?

Is there an allowable tolerance on the size of a slot on the outside diameter of a flange?

This part of a flange assembly (minimal ligament thickness) is not verified by applying §11 Taylor-Forge method.

If not indicated in EN 13445-3, is there another European Norm that may indicate such a tolerance or allowable ligament thickness, in the case of a flange assembly for a pressure vessel?

Proposed answer(s): *

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

No. In AD Merkblatt B8 there is a front view of a flange with slotted holes, but without specific limitations on the ligament. However if the proportions of such figure are respected, we do not think that additional verifications are required. In case of doubts, a DBA is always possible.

To be sent to EN 13445 Maintenance Help Desk secretariat:	EN 13445 MHD secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13445@unm.fr

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

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EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD):* **(2014)-03-44** **Date: 2019-10-17**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13445-	2014	158	11.4.3.2 11.4.3.3	--

Subject:

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

From :
Company: Fortum Power and Heat Oy .....
Name: Eero-Matti Halme .....
Postal address: POB 100, FI-00048 FORTUM, Finland
e-mail: eero-matti.halme@fortum.com .....
phone: +358401948550 .....

☐ Manufacturer ☒ User ☐ Other (please specify):

Question/comment:

The formulas in the chapters 11.4.3.2 and 11.4.3.3 are not taking the utilization factor of the bolts into account. If the utilization of the bolts is low, the effective length of the thread is over sized unnecessarily.

Proposed answer(s): *

The formulas for the required height of the nut and effective length of the threaded hole should contain utilization factor of the bolts in accordance with chapter 11.5.2 as an multiplier in order to take the stress state of the bolts into account. However, the minimum effective length of the thread should be limited so that several threads are still carrying the load in order to ensure proper strength of the joint.

Answer from the MHD *(to be filled by MHD):*
Although the objection is reasonable, we consider that all parts screwed to standard bolts shall be designed considering that they shall be able to resist the same load as the bolt itself (for the nuts this principle is stated at the beginning of subclause 11.4.3.2: “The nuts shall have specified proof load values not less than the minimum proof load values of the screws on which they are mounted).
Of course different criteria may be used in the case of non-standard components or in case of Design by Analysis.

To be sent to EN 13445 Maintenance Help Desk secretariat:

EN 13445 MHD secretariat c/o UNM
Standardization Office on behalf of AFNOR
F 92038 Paris La Défense Cedex – France
e-mail: en13445@unm.fr

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

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EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD):* **(2014)-03-46** **Date: 2019-03-09**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13445-3	2019		6	--

Subject:

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

From :
Company: LORENZO SAMA' .....
Name: .....
Postal address: VIA SQUARANTO 26 37141 VERONA ITALY .....
e-mail: ing.lorenzo.sama@gmail.com .....
phone: +393493202666 .....

☐ Manufacturer ☐ User X Other (please specify): DESIGNER

Question/comment:

Considering allowable stress if manufacturer use ASTM/ASME materials, for example SA-240 tp 304. Specifications are given for Rp0.2% room temperature. Only ASME II-D table Y-1 gives indications above 30°C.
As per subclause 6 of EN13445-3 it is not possible to use Rp1.0 because data are not available so it must be necessary to use Rp0.2 (in lieu of Rp1.0) in formulas of subclause (see table 6-1).

Proposed answer(s): *

Yes, Rp0.2 in lieu of Rp1.0 must be used if ASME materials are used with EN13445-3. No possibility to change these values (See notes of footnotes of table Y-1, ASME II-D) unless special agreements with steel manufacturer are made and reported in material certificate.

Since there are no formal data available in the Code it is not permitted to extrapolate data to give Rp1.0 prediction.

This is an extension of footnote b) of EN13445-3 table 6-1

See also “Comparison of ASME Specifications and European Standards” publication 16/12/2005

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

The proposed answer is incorrect. If ASTM/ASME materials are used then a Particular Material Appraisal is required – see EN 13445-2 sub-clause 4.3.3 and PED Annex I, clause 4.2(b) – and the properties of the material needed in order to evaluate the design stress shall be specified in the PMA. Clause 4.3 of Annex I of the PED requires that documentation prepared by the material manufacturer affirming compliance with a specification shall be obtained for all materials. In this case the specification would be taken as being the PMA. It is up to the vessel manufacturer to specify in the PMA the properties that are required in order to evaluate the design stresses in accordance with EN 13445-3 clause 6.

To be sent to EN 13445 Maintenance Help Desk secretariat:

EN 13445 MHD secretariat c/o UNM
Standardization Office on behalf of AFNOR
F 92038 Paris La Défense Cedex – France
e-mail: en13445@unm.fr

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EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD):* **(2014)-03-47** **Date: 2019-05-11**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13445-3/A3	2018	21	15.6.5	--

Subject:

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

From :
Company: BMT Medical Technology, s.r.o.....
Name: Ondrej Grym.....
Postal address: Cejl 157/50 602 00 Brno Czech republic
.....
e-mail: ondrej.grym@bmt.cz .....
phone: +420 545 537 336 .....

☐ Manufacturer ☒ User ☐ Other (please specify):

Question/comment:

How way is an equation (15.6.5-3) derived?

Proposed answer(s): *

Answer from the MHD *(to be filled by MHD):*
In amendment EN 13445-3_A3_2017 (clause 15) there has been made correction to formula (15.6.5-3), which takes into account the stiffness reduction of thin walled reinforcement member in the corner of vessel. The correction is based on the publication of Zhao-jing Zeng, Jia-ju Gao and Qi-shou Gu in International Journal of Pressure Vessels & Piping 30 (1987) pages 193-204.

To be sent to EN 13445 Maintenance Help Desk secretariat:

EN 13445 MHD secretariat c/o UNM
Standardization Office on behalf of AFNOR
F 92038 Paris La Défense Cedex – France
e-mail: en13445@unm.fr

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

European Committee for Standardization
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EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD):* **(2014)-03-48** **Date: 2020-05-23**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13445-3	2019		6	--

Subject:

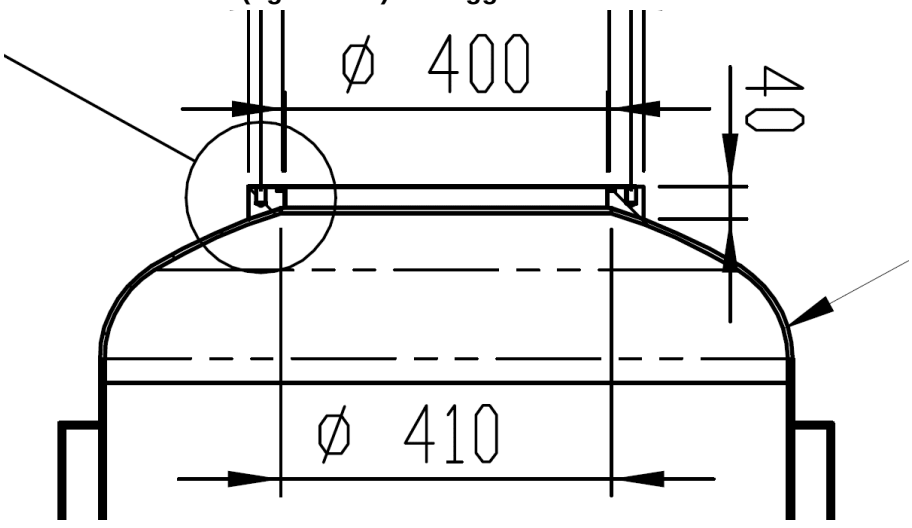
Type of request: X Technical clarification ☐ Editorial correction ☐ Technical comment ☐ Translation correction

From :
Company: ING. LORENZO SAMA'.....
Name: LORENZO SAMA'.....
Postal address: VIA SQUARANTO 26 37141 VERONA ITALY .....
e-mail: ing.lorenzo.sama@gmail.com .....
phone: +393493202666 .....

☐ Manufacturer ☐ User X Other (please specify): DESIGNER

Question/comment:

Considering a machined flange directly welded to an end (tipically elliptical or torospherical) to form an opening, in an "insert pad" configuration (see picture below); could this feature be calculated in 2 step:
a) as a reinforcement ring
b) as a flange
holding as minimum the thicker of the 2 cases above
or it is mandatory to follow annex G (fig G.3-7 b) as suggested in NOTE of clause 9.5.2.4.3?



Proposed answer(s): *

Opening compensation calculations as per clause 9 doesn't consider tightness issues. Annex G is not mandatory, even if normative, but using method proposed the Designer should also be aware of additional external moment/forces could arise from flanged connection and take into account in calculations.

In any case this feature shall not be reduced as a simply reinforcing ring without consideration about tightness issues.

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Answer from the MHD *(to be filled by MHD):* The proposed answer is correct.	
To be sent to EN 13445 Maintenance Help Desk secretariat:	EN 13445 MHD secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13445@unm.fr

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

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EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD):* **(2014)-03-49**			**Date: 2020-06-15**	
Please fulfil the following				
Part: EN 13445-3	Issue: 2016	Page 137	Subclause 10.4.4	National Standard Reference English

Subject: Ambiguous MAWP for EN 13445-3 clause 10.4.4

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

From :
Company: Red-Bag BV – member via NEN (Netherlands)
Name:Rutger Botermans
Postal address: Klinknagelstraat 3, 3089JP Rotterdam NL
e-mail: rutger.botermans@red-bag.com
phone: +31 6 5110 2024

☐ Manufacturer ☐ User ☒ Other (please specify): Engineering – Consultancy - Software

Question/comment: The **i**teration from 0 MPa to find the MAWP leads to a different result than iteration from for example 50 MPa to find the MAWP, in the example the MAWP is 4.29 MPa versus 7.91 MPa.

This happens due to the note for C_2 on page 137. For the iteration from 0 MPa upwards, C_2 is valid and the second part of formula 10.4-10 is valid. For the iteration from 50 MPa downwards C_2 becomes negative and the second term of 10.4-10 is not required, and the factor C_1 is smaller than C_2

Attached is the example flat plate, with dimensions, material and design conditions.

Proposed answer(s): *

Change note to: When the values of e_s/D_i and P/f_{min} result in a value of the coefficient C_2 less than 0.3, the internal pressure P is too high.

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

```
there is no MAWP in this standard
```
When C2 is negative the calculation shows that the thickness is not acceptable.

To be sent to EN 13445 Maintenance Help Desk secretariat:	EN 13445 MHD secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13445@unm.fr

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

Red-Bag
Engineers Consultants Software

Klinknagelstraat 2
3089 JP Rotterdam
The Netherlands

To: EN 13445 Maintenance Agency

From: Rutger Botermans – Red-Bag

Subject: Ambiguous MAWP for EN 13445-3 clause 10.4.4

Date: 2020-06-15

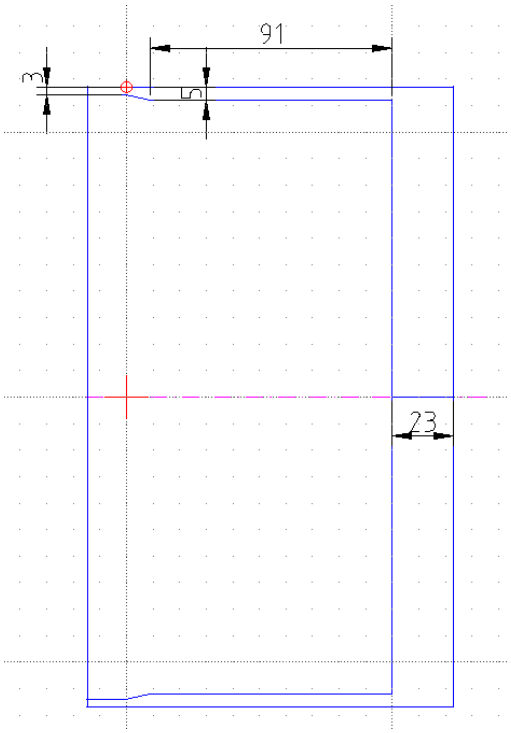

Figure: flat end welded directly to the shell

Design data:

- Dimensions as above with 0.5 mm corrosion
- Material SA-105 flat end, SA-106 gr. B cylinder/pipe
- Design condition: pressure 1.36 MPa, temperature 250 Celsius

Iteration results:

Pressures:	1.36 MPa	4.29 MPa [1])	7.91 MPa [1])	50 MPa
C1	0.365	0.399	0.408	0.436
C2	0.361	0.554	-0.573	-0.126
e_a analysis thickn.	22.5 mm	22.5 mm	22.5 mm	22.5 mm
e (10.4-10)	8.25 mm	22.48 mm	22.1 mm [2])	59.29 mm [2])

[1]) possible MAWP results

[2]) excluding second term in formula 10.4-10

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Europaïsches Komitee für Normung

EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD):* **(2014)-03-50** **Date: 2020-07-20**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13445-3	2019	158	11.4.3.3	--

Subject:

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

From :

Company:BOEMA SpA.....

Name:Davide ALCIATI .....

Postal address:Corso Romano Scagliola, 197 12052 Neive (CN) ITALY .....

e-mail:alciatidavide@boema.com .....

phone: +39 0173 678711 .....

■ Manufacturer ■ User ☐ Other (please specify):

Question/comment:

I have a question concerning the paragraph **11.4.3.3** of the standard EN 13443-3:2019.

Why the engagement length of screws in threaded holes of a component shall not be less than the ratio between Rp0.2 screw and the component. If I need to use a powerful bolt, following this rule, I have to use a long threaded holes, a lot of times this rule it is determinant for flange design. Whit the same geometry and the same design parameter to use a ASTM B7 instead a ASTM B8 Cl.1 bolt there will be a threaded holes 3,82 times deeper.

Proposed answer(s): *

Threaded holes at least: 1,5/2 *dn.

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

no, leave it as it is.

To be sent to EN 13445 Maintenance Help Desk secretariat:

EN 13445 MHD secretariat c/o UNM
Standardization Office on behalf of AFNOR
F 92038 Paris La Défense Cedex – France
e-mail: en13445@unm.fr

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

European Committee for Standardization
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EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD):* **(2014)-03-51**			**Date: 2020-28-09**	
Please fulfil the following				
Part: EN 13445-3	Issue: 2018	Page 101	Subclause **9.5.2.3.1**	National Standard Reference --

Subject: Reinforcing pads used to reinforce nozzles in predominantly static loaded pressure vessels.

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

From :
Company: Consultant Pressure Equipment ...
Name: Walther Stikvoort .....
Postal address: 9402 SH 37 Assen NL .....
e-mail:stikvoort@ziggo.nl .....
phone: +31 592347088 .....

☐ Manufacturer ☐ User ☐ Other (please specify): Consultant Mechanical Integrity

Question/comment:

Re: EN 13445-3 ; Clause 9.5.2.3.1 Reinforcing pads

This clause state that for the calculation of Af_p equation (9.5-20) shall be used.
Equation (9.5-20) reads: $e_p = min\ (e_{a,p}\ ;\ e_{c,s})$. This means that the reinforcing pad thickness up to no greater value than the shell thickness may be used in the calculation of Af_p.
Suggest to limit the pad thickness to 1.5 instead of 1.0 x shell thickness when calculating Af_p.
This is in line with practices successfully used in other recognised codes and standards.

Proposed answer(s): *

Reinforcing pads have a nominal thickness no greater than 1.5 times the nominal thickness of the main body.

Answer from the MHD *(to be filled by MHD):*
The proposed answer is correct

To be sent to EN 13445 Maintenance Help Desk secretariat:	EN 13445 MHD secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13445@unm.fr

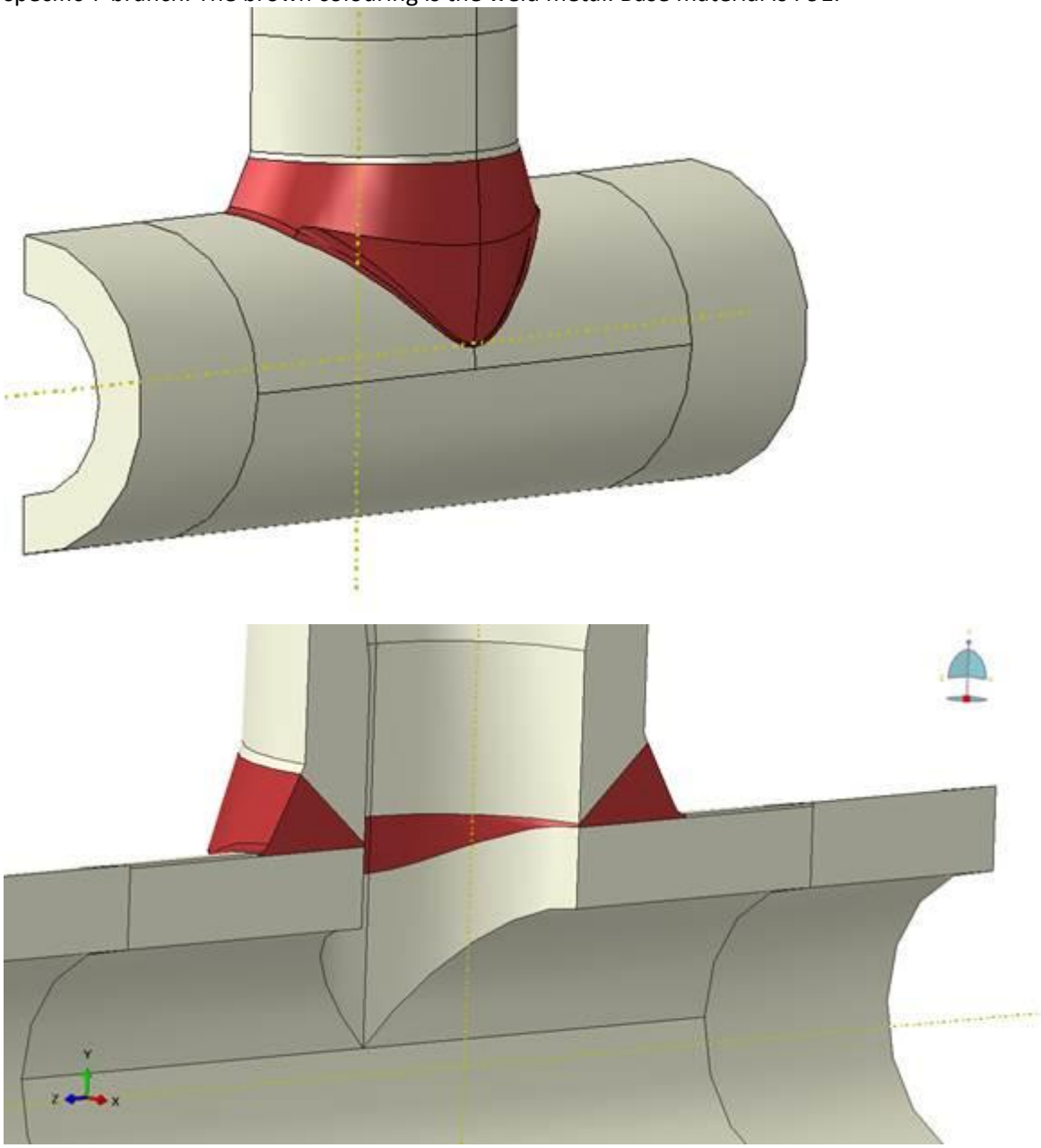
***** *Please note that question with proposed answers will be dealt with as priority.*

(2014)-03-52 & 53

Hello,

I have 2 questions regarding the interpretation of the fatigue analysis within EN13445-3 paragraph 18 and I hope that I'm addressing this question the correct person/email address.

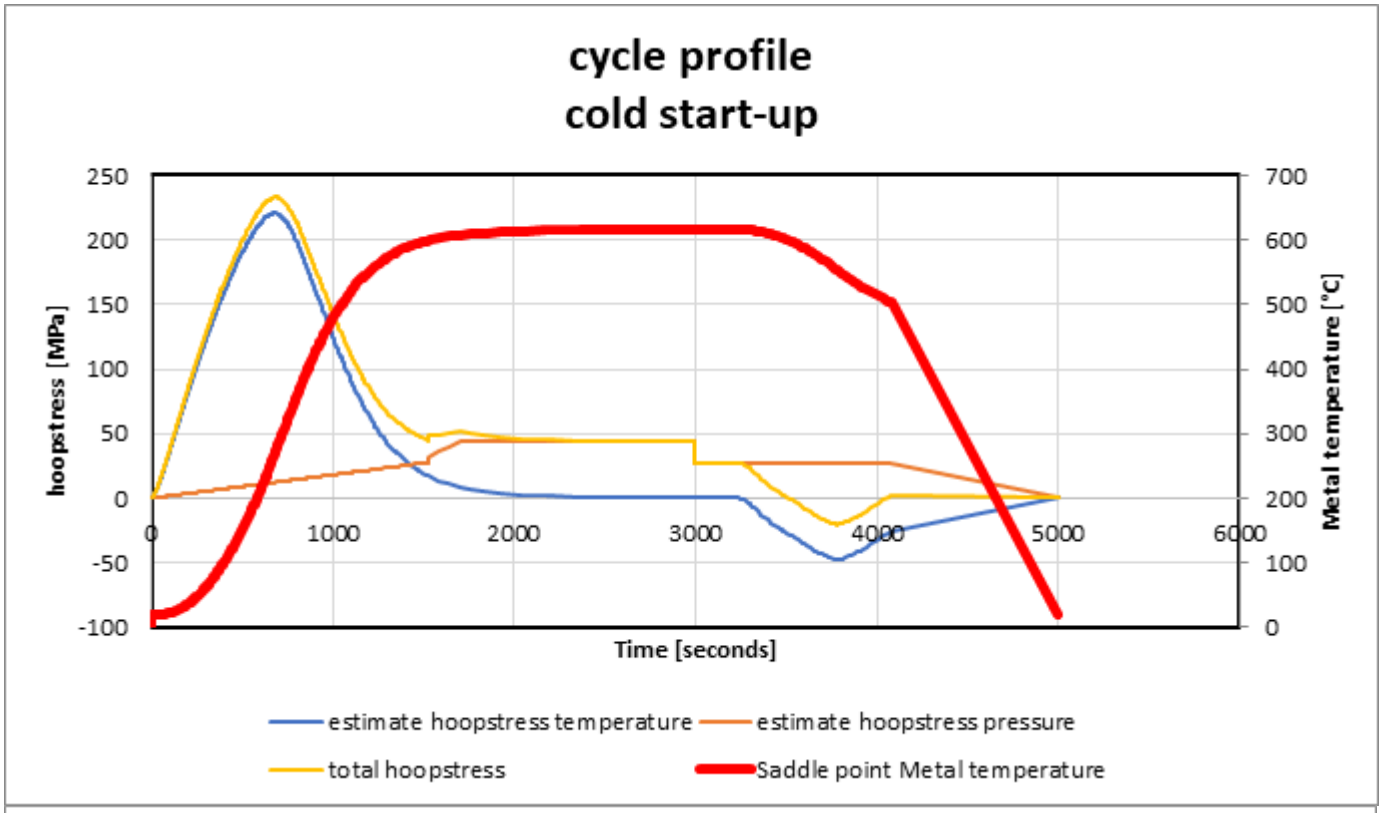
The component under consideration is a 1:1 T-branch with an outer diameter of 273.11 mm (DN250) and a wall thickness of 50 mm (both header and branch). Just for visualisation I have added a picture of a FE-model of this specific T-branch. The brown colouring is the weld metal. Base material is P91.

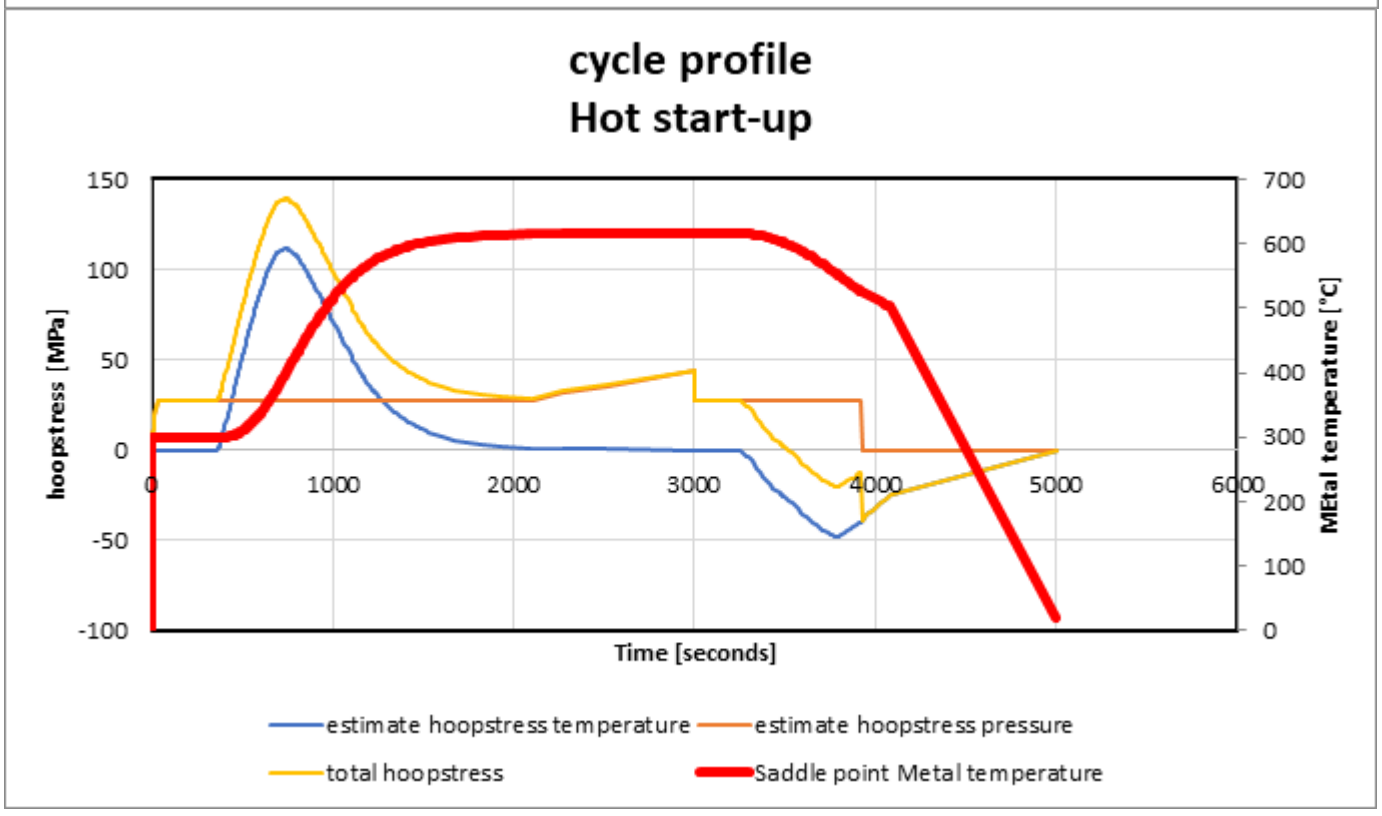


Question 1

This question is regarding the temperature correction value in a fatigue assessment according to EN13445-3 section 18.

The component endures both a cold start and a hot start. The cold start endures a higher stress range, but the start temperature is low (20°C). For a hot start, the stress range is smaller, but the start temperature is higher.
Based on the assumption that Tmin is that start temperature of the process in equation "T*=0.25Tmin+0.75Tmax", this start temperature will have a large influence on the fatigue behaviour.





Based on these 2 cases a discussion can be held regarding the usage of Tmin and Tmax.

For the cold start-up, we assume a start and end temperature of 20°C/615°C and for the hot start-up, a temperature of 300°C/615°C. This results in the table below

method 1	cold start-up	hot start-up
Tmin	20	300
Tmax	615	615
T*	466.25	536.25
hoop stress range	253	178
fT*	0.63	0.52
effective stress range	399.07	343.49

The difference is about 15% between the hot and the cold start-up.

An alternative approach could be to determine the temperature at the peak stress and bottom stress at the highest and lowest stress level. This results in the table below; a difference of 30% between the hot and the cold start-up:

method 2	cold start-up	hot start-up
Tmin	264	400
Tmax	554	554
T*	481.5	515.5
hoop stress range	253	178
fT*	0.61	0.55
effective stress range	414.75	321.26

A second alternative approach could be to assume that fatigue damage occurs in tensile stress conditions and not in compressive. If this approach is realistic, we only have to consider the first 1000 seconds of the start-up. In that case, the following could be assumed resulting in a difference of 15% between hot and cold start-up. however, with much lower stress ranges:

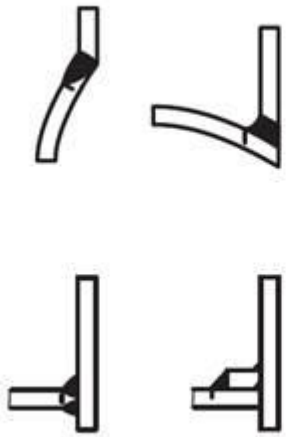
method 3	cold start-up	hot start-up
Tmin	20	300
Tmax	264	400
T*	203	375
hoop stress range	253	178
fT*	0.94	0.76
effective stress range	269.80	233.35

My question to you or the EN-pressure vessel committee is the following: How must we interpret the “Tmax” and “Tmin” in equation 18.10-14 of EN13445-3?

Answer: If there is no stress cause by temperature make a calculation for the number of cycle of cold start and a calculation for a number of cycle of hot start and make a calculation for cumulative damage factor.

Question 2

This second question is regarding the use of FAT classes for welds.
Based on table 18-4 the weld between a branch and header/vessel should be classified within picture 3.2. Weld toe is not dressed but we have a full penetration weld. FAT Class 71 could be used

3.2	Weld toe in shell		Full penetration welds: - as welded - weld toes dressed (see 18.10.2.2)	 71 80	 63 63
			Partial penetration welds: - weld throat ≥ 0,8 x thinner thickness of connecting walls, as welded - weld throat < 0,8 x thinner thickness of connecting walls - weld toes dressed (see 18.10.2.2)	 63 32 71	 63 32 63

However, this weld class picture is for a nozzle/header detail, where the nozzle diameter is smaller than the header diameter. In the saddle point of this T-branch the weld looks more like this:

1.5	Full penetration butt welds made from one side without backing		If full penetration can be assured*. If inside cannot be visually inspected and full penetration cannot be assured*.	63 40	40 40

Resulting in a FAT class 63.

Our question: which FAT class is the appropriate one?

Answer: 3.2 is the appropriate one

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EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD)*: **(2014)-04-04**			**Date: 201X-xx-xx**	
Please fulfil the following				
Part: EN 13445-4	Issue: 2014	Page 27	Subclause 8.2 f)	National Standard Reference --
Subject:				
Type of request:	☒ Technical clarification		☐ Editorial correction	
	☐ Technical comment		☐ Translation correction	

From : Company: C&P S.r.l. Name: U. Schiavo-Lena Postal address: Via Guidoni 7 - 20851 Lissone (MB).....	e-mail:Umberto.schiavolena@cpinspection.com ... phone: +39 3406348572 .....

☐ Manufacturer	☐ User	☒ Other (please specify): NoBo (2399)

Question/comment:

A vessel is composed by two hemispherical ends (plates P460 QL2 EN 10028-6) and a cylindrical seamless shell (forging P420QH EN10222-4). The two circumferential welds connecting the ends to the shell are welded with an automatic process and same WPS. The plates of the ends belong to two different heats. How many test plates are required?

Proposed answer(s): *

Answer from the MHD *(to be filled by MHD):*
According to 8.2 f) 3) two test plates will be necessary (two different heats).

To be sent to EN 13445 Maintenance Help Desk secretariat:	EN 13445 MHD secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13445@unm.fr

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

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EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD)*: **(2014)-04-06**			**Date: 2019-12-23**	
Please fulfil the following				
Part: EN 13445-4	Issue: 3	Page 20	Subclause 7.3 a)	National Standard Reference SS-EN 13445-4:2014
Subject:				
Type of request:	☒ Technical clarification		☐ Editorial correction	
	☐ Technical comment		☐ Translation correction	

From :
Company: Kiwa Inspecta AB .....
Name: Karin Velander .....
Postal address: P.O.Box 7178, 170 07 Solna, Sweden

e-mail: karin.velander@kiwa.com .....
phone: +46104793509 .....

☐ Manufacturer	☐ User	☒ Other (please specify): Notified Body

Question/comment:

EN 13445-4 clause 7.3 a) state that:

For test plates on butt joints equal to or over 20 mm thickness a longitudinal weld tensile test having a minimum diameter equal to or over 6 mm shall be performed in accordance with EN ISO 5178:2011 and $R_{e/T}$, R_m and A_5 shall satisfy the specified minimum requirements of the base material or for weld consumables requirements in EN 13445-2:2014, 4.3.5 or other relevant values specifically taken into account in the design (e.g. austenitic filler metal in combination with 9 % Nickel steel).

Question:

Is the thickness “equal to or over 20 mm” the thickness of the test piece according to EN ISO 15614-1 or is it the thickness of the welded joints in vessels?

Proposed answer(s): *
For longitudinal and circumferential welded joints in vessels of thicknesses equal to or greater than 20 mm, the welding procedure qualification test shall include a longitudinal weld tensile test on weld metal.

(Note, if a welding procedure qualification test has been performed at 18 mm then it qualifies thicknesses between 9 to 36 mm according to EN ISO 15614-1 but without longitudinal weld tensile test, then an additional test must be performed to meet the requirements according to EN 13445-4 clause 7.3 a).

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

“equal to or over 20 mm” refers to the thickness of welded joints in the vessels.

To be sent to EN 13445 Maintenance Help Desk secretariat:	EN 13445 MHD secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13445@unm.fr

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

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EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD)*: **(2014)-05-18**			**Date: 201x-xx-xx**	
Please fulfil the following				
Part: EN 13445-5	Issue: 2014	Page 19	Subclause	National Standard Reference CODAP 2015 – GA5.4.2
Subject:				
Type of request:	☐ Technical clarification		☐ Editorial correction	
	☒ Technical comment		☐ Translation correction	

From :
Company: Réservoirs X. Pauchard .....
Name: F. BENGLER.....
Postal address: 1 Bd X. Pauchard – 71400 Autun - F
e-mail: f.bengler@xpauchard.fayat.com.....
phone: +33 385865333 .....

☒ Manufacturer	☐ User	☐ Other (please specify):

Question/comment: Do the thickness limits given in Table 6.6.1-1 (EN13445-5) apply to all components of pressure equipment (eg a flange plate)?

Proposed answer(s): The requirement on the nominal thickness values of the main pressure parts is not applicable to the pipe flanges but remains applicable to the body flanges.

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

The thickness limits are for all components (see Table 6.6.2-1 and Figure 6.6.3-3).

To be sent to EN 13445 Maintenance Help Desk secretariat:	EN 13445 MHD secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13445@unm.fr

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

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EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD):* **(2014)-05-19**			**Date: 2019-02-25**	
Please fulfil the following				
Part: EN 13445-5	Issue: 2014	Page 21	Subclause 5	National Standard Reference
Subject: covered weld				
Type of request:	☒ Technical clarification		☐ Editorial correction	
	☐ Technical comment		☐ Translation correction	
From : Company: INSTITUT DE SOUDURE INDUSTRIE Name: BOUDOT Postal address:13 rue du Vercors 69960 CORBAS			e-mail: f.boudot@isgroupe.com phone: +33688434072	
☐ Manufacturer	☒ User	☐ Other (please specify):		

Question/comment:

6.6.2.5 a/ the welds covered by the double envelopes and the welds on which the half coil Welding are welded (with superimposition of the welded zone) are not subject to any control if these welds are not cross-only butt joints?

Proposed answer(s): *non-destructive testing shall be performed at all intersections of longitudinal and circumferential butt joints. There are no end on welds covered

Answer from the MHD *(to be filled by MHD):*
The proposed answer is correct.

To be sent to EN 13445 Maintenance Help Desk secretariat:	EN 13445 MHD secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13445@unm.fr

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

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EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD)*: **(2014)-05-20** **Date: 2019-04-08**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13445-5	2014	19	6.6.1	--

Subject: Testing group 4 maximum thickness clarification

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

From :

Company: SIEMENS HEALTHCARE.....

Name: XIU Haitao.....

Postal address:

Siemens Shenzhen Magnetic Resonance Ltd.
SHS DI MR R&D SZN FG
Gao Xin Zhong Er Dao
518057 SHENZHEN, China.....

e-mail: hai.xiu@siemens-healthineers.com.....

phone: +86 755 23185246 .....

☒ Manufacturer ☐ User ☐ Other (please specify):

Question/comment:

Hi MHD,

I am a R&D designer of SIEMENS healthcare China branch.

We are designing a pressure vessel according to EN13445. This pressure vessel has 4mm thickness shell and 18mm thickness flat ends, the material of this pressure vessel is in group8.1.

We want to use the weld joint E9 in EN13445-3 table A-3, but we found this joint is only applicable for welding test group 4.In EN13445-5 Table6.6.1-1, the maximum thickness permitted for material group 8.1 in testing group 4 is 16mm.

For Chinese Code reason, this flat end thickness has to be bigger than 18mm.

We do not understand the 16mm maximum thickness for testing group 4. Could you please help to clarify the reason of this 16mm maximum thickness?

Is it possible for us to use weld joint E9 after doing some analysis?

Thanks very much.

Proposed answer(s): *

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

If the weld is in the cylinder, the limit of the thickness is fulfilled.

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EN 13445 "Unfired pressure vessels"
Form for question

Reserved to MHD			
Registration number	Date of submission	Target date for answer	Date of acceptance
Part number: EN13445-5	Page number: 56 to 60	Subclause number: C.5.3 to C.5.7	Reference of the national standard used .....

Question:

In C.5.3 is indicated that design requirements of EN 13445-3:2014 are applicables for opening and closing devices but some consideration about calculations have been done:

- For fully machined and aligned elements giving uniformity of load distribution 100% of allowable permissible unit area may be used
- For those not fully machined the allowable permissible unit area shall not exceed 75%
- For opening and closing devices with more than 3 locking elements, the theoretical, i.e. calculated stress load acting on each locking element, shall be increased by at least 20%

Why these consideration are not incorporated in EN 13445-3:2014 or at least reported?
Which components of annex C are covered by calculation in EN 13445-3:2014? In our opinion screw clamps, hinged bolts can be included, yoke-type closures and quick opening and closing devices can't be included.

answer: it is already written in the scope of EN 13445-3

Proposed answer(s): *

In part 11 of EN 13445-3:2014 include a sentence:

"Special consideration must be done for screw clamps and hinged bolts connection according to C.5.3 of EN13445.5:2014, yoke-type closures and quick opening and closing devices are out of scope of this standard and require special analysis (finite element analysis)"

Question from:

Company: CITAL S.r.l. e-mail: pastorino.amedeo@cital.it
Name: Amedeo Piero Pastorino phone: .....
Postal address:..... fax: .....
..... date: .....

Manufacturer ■ User ☐ Other ☐ (please specify) .....

* please note that questions with proposed answer(s) will be dealt with as prioritary

To be sent to EN 13445 MHD secretariat

e-mail : EN13445@unm.fr
fax : 33 1 47 17 67 99
address : EN 13445 MHD secretariat
c/o UNM
F – 92038 PARIS LA DEFENSE CEDEX

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EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)

Question form

Request reference number *(to be filled by MHD):* **(2014)-05-22**				**Date: 2019-06-21**
Please fulfil the following				
Part: EN 13445-5	Issue: 2014	Page 35	Subclause 10.2.3.3.1	National Standard Reference --
Subject:				
Type of request:	☐ Technical clarification	☐ Editorial correction		
	☒ Technical comment	☐ Translation correction		
From : Company : EDF Name: Yoann GRAND BROCHIER Postal address: 2 rue Ampère 93200 Saint-Denis, FRANCE		e-mail: Yoann.grand-brochier@edf.fr phone: +33 1 43 69 80 36		
☐ Manufacturer	☒ User	☐ Other (please specify):		

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Europaïsches Komitee für Normung

Question/comment:

There is a risk of confusion between :
- design pressure as defined in subsection 10.2.3.3.1 of EN 13445-5 (*«Pd and Td are the coincident design pressure and design temperature values for the maximum pressure load case »* (for normal operating load cases), hence Pd ≤ PS)
- design pressure as defined in subsection 5.3.5 of EN 13445-3 (*« The absolute value of the design pressure Pd for normal operating load cases shall not be smaller than the absolute value of PS. »*, hence Pd ≥ PS).

Proposed answer(s): *
We suggest to clarify as follows in §10.2.3.3.1 a) of EN 13445-5:

a) The test pressure shall be determined by the greater of :

$$Pt = 1.25\,P\,\frac{f_a}{f_T} \qquad \cancel{P_t = 1.25 \cdot P_d \frac{f_a}{f_{T_d}}} \qquad \text{(10.2.3.3.1-1)}$$

or

$$P_t = 1{,}43 \cdot P_s \qquad \text{(10.2.3.3.1-2)}$$

where
[…]

« ~~P_d~~ P and ~~Td~~ T are the normal operating load case coincident ~~design~~ pressure and ~~design~~ temperature values that yield maximum pressure load case;

[…]

~~f_{Td}~~ f_T is the nominal design stress for normal operating load cases of the material of the part under consideration at temperature ~~T_d~~ T;

Since the ratio $\cancel{\frac{f_a}{f_{T_d}}}$ $\frac{f_a}{f_T}$ depends on the material of the part under consideration, the value $\cancel{\frac{f_a}{f_{T_d}}}$ $\frac{f_a}{f_T}$ to be used for calculation of P_t shall not be less than the smallest ratio obtained considering the different materials of the main pressure bearing parts (e.g. shells, ends, tubesheets of heat exchangers, tube bundles, main flanges but ignoring bolting associated to main flanges). Main pressure bearing parts do not include pressure rated standard flanges and bolting designed without calculation according to the rules of 11.4.2 of EN 13445-3:2014

NOTE 1 The rules of 11.4.2 of EN 13445-3:2014 deal with the use of standard flanges without calculation.

P_t , P_S , f_a and ~~f_{Td}~~ f_T shall have consistent units

The maximum pressure load case is that set of coincident ~~design~~ pressure and ~~design~~ temperature in normal operating load cases which gives the highest P/f_T ratio and hence the highest test pressure. »

[…]

Answer from the MHD *(to be filled by MHD):*
the proposed answer is not correct. Clauses 5.3.4 and 5.3.5 of part 3 have to be change in consistency with EN 764-1.

To be sent to EN 13445 Maintenance Help Desk secretariat:	EN 13445 MHD secretariat c/o UNM Standardization Office on behalf of AFNOR F 92038 Paris La Défense Cedex – France e-mail: en13445@unm.fr

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EN 13445 "Unfired pressure vessels" Maintenance Help Desk (MHD)
Question form

Request reference number *(to be filled by MHD):* **(2014)-05-23** **Date: 201X-xx-xx**

Please fulfil the following

Part:	Issue:	Page	Subclause	National Standard Reference
EN 13445-5	5 (2018-7)	21	6.6.2.5 a) 1)	--

Subject:

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

From :
Company: Zeton BV.....
Name: Hubert Velten.....
Postal address: Marssteden 206, 7547 TD, Enschede.

e-mail: hubert.velten@zeton.nl .....
phone: +31 (0)53 428 4100.....

☐ Manufacturer ☐ User ☒ Other (please specify): Engineering, design & fabrication of pilot plant

Question/comment: EN 13445-5 para 6.6.2.5 a) 1) mentions that when less than 100% testing is required, NDE shall be performed on intersecting long and circ butt joints.

1. It is unclear which type of NDE is required.
2. Say we have a vessel, where the shell is made out of welded tube acc. EN 10217-7, TC2. The long seam then has already received 100% NDE. Is NDE then still required on the intersections?

Proposed answer(s): *

1. The type of NDE shall be volumetric.
2. No

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

1- As a minimum, the extent and type of testing as determined in Table 6.6.2-1 shall be fulfilled.
2- Yes

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