



ISO/TC 44/SC 10 N 1215
REPLACES: ISO/TC 44/SC 10 N 1211

[ISO/TC 44/SC 10](#)

Unification of requirements in the field of metal welding

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Secretariat: DIN

Rev. Result of voting and comments on ISO/DIS 15614-1

Date of document

2014-03-24

Expected action

Info

Ballot Information			
Reference	ISO/DIS 15614-1 (Ed 2)	Committee	ISO/TC 44/SC 10
Edition number	2		
English title	Specification and qualification of welding procedures for metallic materials -- Welding procedure test -- Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys		
French title	Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques -- Épreuve de qualification d'un mode opératoire de soudage -- Partie 1: Soudage à l'arc et aux gaz des aciers et soudage à l'arc des nickels et alliages de nickel		
Start date	2013-09-05	End date	2014-02-05
Opened by ISO/CS on	2013-09-05 00:15:10	Closed by ISO/CS on	2014-02-07 00:06:10
Status	Closed		
Voting stage	Enquiry	Version number	1
Note			
Vienna agreement	ISO lead - Harmonized	CEN ballot type	CEN Enquiry Ballot
CEN reference	prEN ISO 15614-1 rev	CEN committee	CEN/TC 121

Result of voting
P-Members voting: 18 in favour out of 21 = 86 % (requirement $\geq$ 66.66%) <i>(P-Members having abstained are not counted in this vote.)</i> Member bodies voting: 3 negative votes out of 24 = 12 % (requirement $\leq$ 25%) <i>Approved</i>

Votes by members					
Country	Member	Status	Approval	Disapproval	Abstention
Australia	SA	O-Member			X
Austria	ASI	P-Member	X		
Belgium	NBN	P-Member		X *	
Canada	SCC	P-Member	X		
China	SAC	P-Member	X		
Denmark	DS	P-Member		X *	
Egypt	EOS	O-Member	X		
Finland	SFS	P-Member	X *		
France	AFNOR	P-Member		X *	
Gabon	ANTT		X		
Germany	DIN	Secretariat	X *		
Hungary	MSZT	P-Member	X		
India	BIS	P-Member	X *		
Italy	UNI	P-Member	X *		
Japan	JISC	P-Member			
Korea, Republic of	KATS	P-Member	X		
Malaysia	DSM				X
Netherlands	NEN	P-Member	X *		
Norway	SN	P-Member	X *		
Poland	PKN	O-Member	X		
Portugal	IPQ	P-Member	X		
Russian Federation	GOST R	P-Member	X		
Singapore	SPRING SG	P-Member	X		
South Africa	SABS	P-Member			X
Sweden	SIS	P-Member	X *		
Switzerland	SNV	P-Member			X *
Ukraine	DTR	P-Member	X		
United Kingdom	BSI	P-Member	X *		
United States	ANSI	P-Member	X *		
P-Member TOTALS Total of P-Members voting: 21			18	3	2
TOTALS			21	3	4
(*) A comment file was submitted with this vote					

Comments from Voters			
Belgium	NBN	P-Member	ISO_DIS 15614-1 (Ed 2)_NBN.doc
Denmark	DS	P-Member	ISO_DIS 15614-1 (Ed 2)_DS.doc
Finland	SFS	P-Member	ISO_DIS 15614-1 (Ed 2)_SFS.doc
France	AFNOR	P-Member	ISO_DIS 15614-1 (Ed 2)_AFNOR.doc
Germany	DIN	Secretariat	ISO_DIS 15614-1 (Ed 2)_DIN.doc
India	BIS	P-Member	ISO_DIS 15614-1 (Ed 2)_BIS.doc
Italy	UNI	P-Member	ISO_DIS 15614-1 (Ed 2)_UNI.doc
Netherlands	NEN	P-Member	ISO_DIS 15614-1 (Ed 2)_NEN.doc
Norway	SN	P-Member	ISO_DIS 15614-1 (Ed 2)_SN.doc
Sweden	SIS	P-Member	ISO_DIS 15614-1 (Ed 2)_SIS.doc
Switzerland	SNV	P-Member	ISO_DIS 15614-1 (Ed 2)_SNV.doc
United Kingdom	BSI	P-Member	ISO_DIS 15614-1 (Ed 2)_BSI.doc
United States	ANSI	P-Member	ISO_DIS 15614-1 (Ed 2)_ANSI.doc

Voting Results:

Ballot Information:

Ballot reference:	prEN ISO 15614-1 rev
Ballot type:	ENQ (Enquiry)
English title:	Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO/DIS 15614-1:2013)
French title:	Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques - Épreuve de qualification d'un mode opératoire de soudage - Partie 1: Soudage à l'arc et aux gaz des aciers et soudage à l'arc des nickels et alliages de nickel (ISO/DIS 15614-1:2013)
German title:	Anforderung und Qualifizierung von Schweißverfahren für metallische Werkstoffe - Schweißverfahrensprüfung - Teil 1: Lichtbogen- und Gasschweißen von Stählen und Lichtbogenschweißen von Nickel und Nickellegierungen (ISO/DIS 15614-1:2013)
Work Item Number:	00121531
Procedure Iteration:	1
Vienna Agreement Status:	VA/ISO
ISO Ballot Type:	Draft International Standard
ISO Reference:	ISO/DIS 15614-1 (Ed 2)
ISO Committee:	ISO/TC 44/SC 10
Opening date:	2013-09-05
Initial closing date:	2014-02-05
Closing date:	2014-02-05
Note:	

Member responses:	
Votes cast (29)	Austria (ASI) Belgium (NBN) Bulgaria (BDS) Croatia (HZN) Cyprus (CYS) Czech Republic (UNMZ) Denmark (DS) Estonia (EVS) Finland (SFS) France (AFNOR) Germany (DIN) Iceland (IST) Ireland (NSAI) Italy (UNI) Latvia (LVS) Lithuania (LST) Malta (MCCAA) Netherlands (NEN) Norway (SN) Poland (PKN) Portugal (IPQ) Romania (ASRO) Slovakia (SUTN) Slovenia (SIST) Spain (AENOR) Sweden (SIS) The Former Yugoslav Republic of Macedonia (ISRM) Turkey (TSE) United Kingdom (BSI)
Comments submitted (1)	CEN/Consultant Pressure Equipment 1
Votes not cast (4)	Greece (ELOT) Hungary (MSZT) Luxembourg (ILNAS) Switzerland (SNV)

Questions:	
Q.1	"Possible acceptance as a European Standard"
Q.2	"Comments of editorial nature"
Q.3	"Comments of technical nature"
Q.4	"National legislative/administrative deviation"
Q.5	"National technical/economic deviation"

Vote matrix:						
Member:	Date:	Q1:	Q2:	Q3:	Q4:	Q5:
Austria (ASI)	2014-02-03 12:21:57	Yes	No	No	No	No
Belgium (NBN)	2014-01-27 14:46:41	No	Yes	Yes	No Answer	No Answer
Bulgaria (BDS)	2014-01-28 14:37:23	Yes	No	Yes	No	No
Croatia (HZN)	2013-10-18 14:32:26	Yes	No	No	No Answer	No Answer
Cyprus (CYS)	2014-01-24 09:54:40	Abstains	No	No	No Answer	No Answer
Czech Republic (UNMZ)	2014-01-29 10:36:41	Yes	No	No	No	No
Denmark (DS)	2014-01-29 11:32:52	No	Yes	Yes	No	No
Estonia (EVS)	2014-01-06 07:36:39	Abstains	No	No	No Answer	No Answer
Finland (SFS)	2013-12-18 15:12:58	Yes	Yes	Yes	No	No
France (AFNOR)	2014-02-05 10:39:46	No	Yes	Yes	No	No
Germany (DIN)	2014-01-31 14:34:58	Yes	Yes	Yes	No	No
Greece (ELOT)	Not Voted	-	-	-	-	-
Hungary (MSZT)	Not Voted	-	-	-	-	-
Iceland (IST)	2014-02-05 12:52:53	Abstains	No	No	No	No
Ireland (NSAI)	2014-01-30 15:47:43	Abstains	No	No	No Answer	No Answer
Italy (UNI)	2014-01-28 15:47:33	Yes	No	Yes	No	No
Latvia (LVS)	2014-02-03 09:45:42	Yes	No	No	No Answer	No Answer
Lithuania (LST)	2014-02-03 12:35:28	Yes	No	No	No	No
Luxembourg (ILNAS)	Not Voted	-	-	-	-	-
Malta (MCCAA)	2013-12-24 09:07:36	Yes	No	No	No	No
Netherlands (NEN)	2014-01-28 11:38:38	Yes	Yes	Yes	No	No
Norway (SN)	2014-02-05 14:35:28	Yes	Yes	Yes	No Answer	No Answer
Poland (PKN)	2014-02-04 07:34:15	Yes	No	No	No	No
Portugal (IPQ)	2014-01-24 17:35:14	Yes	No	No	No	No
Romania (ASRO)	2014-02-04 07:51:24	Yes	No	No	No Answer	No Answer
Slovakia (SUTN)	2014-01-30 09:49:35	Yes	No	No	No	No
Slovenia (SIST)	2014-01-09 10:42:26	Abstains	No	No	No Answer	No Answer
Spain (AENOR)	2014-02-03 10:26:42	Yes	No	No	No Answer	No Answer
Sweden (SIS)	2014-02-03 17:32:48	Yes	Yes	Yes	No	No

Switzerland (SNV)	Not Voted	-	-	-	-	-
The Former Yugoslav Republic of Macedonia (ISRM)	2014-02-03 10:16:09	Yes	No	No	No Answer	No Answer
Turkey (TSE)	2014-01-31 12:35:58	Abstains	No	No	No Answer	No Answer
United Kingdom (BSI)	2014-02-05 16:46:52	Abstains	No	No	No Answer	No Answer

Answers to Q.1: "Possible acceptance as a European Standard"		
19 x	Yes	Austria (ASI) Bulgaria (BDS) Croatia (HZN) Czech Republic (UNMZ) Finland (SFS) Germany (DIN) Italy (UNI) Latvia (LVS) Lithuania (LST) Malta (MCCAA) Netherlands (NEN) Norway (SN) Poland (PKN) Portugal (IPQ) Romania (ASRO) Slovakia (SUTN) Spain (AENOR) Sweden (SIS) The Former Yugoslav Republic of Macedonia (ISRM)
3 x	No	Belgium (NBN) Denmark (DS) France (AFNOR)
7 x	Abstains	Cyprus (CYS) Estonia (EVS) Iceland (IST) Ireland (NSAI) Slovenia (SIST) Turkey (TSE) United Kingdom (BSI)

Answers to Q.2: "Comments of editorial nature"		
8 x	Yes	Belgium (NBN) Denmark (DS) Finland (SFS) France (AFNOR) Germany (DIN) Netherlands (NEN) Norway (SN) Sweden (SIS)
21 x	No	Austria (ASI) Bulgaria (BDS) Croatia (HZN) Cyprus (CYS) Czech Republic (UNMZ) Estonia (EVS) Iceland (IST) Ireland (NSAI) Italy (UNI) Latvia (LVS) Lithuania (LST) Malta (MCCAA) Poland (PKN) Portugal (IPQ) Romania (ASRO)

		Slovakia (SUTN) Slovenia (SIST) Spain (AENOR) The Former Yugoslav Republic of Macedonia (ISRM) Turkey (TSE) United Kingdom (BSI)
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Answers to Q.3: "Comments of technical nature"		
10 x	Yes	Belgium (NBN) Bulgaria (BDS) Denmark (DS) Finland (SFS) France (AFNOR) Germany (DIN) Italy (UNI) Netherlands (NEN) Norway (SN) Sweden (SIS)
19 x	No	Austria (ASI) Croatia (HZN) Cyprus (CYS) Czech Republic (UNMZ) Estonia (EVS) Iceland (IST) Ireland (NSAI) Latvia (LVS) Lithuania (LST) Malta (MCCAA) Poland (PKN) Portugal (IPQ) Romania (ASRO) Slovakia (SUTN) Slovenia (SIST) Spain (AENOR) The Former Yugoslav Republic of Macedonia (ISRM) Turkey (TSE) United Kingdom (BSI)

Answers to Q.4: "National legislative/administrative deviation"		
0 x	Yes	
16 x	No	Austria (ASI) Bulgaria (BDS) Czech Republic (UNMZ) Denmark (DS) Finland (SFS) France (AFNOR) Germany (DIN) Iceland (IST) Italy (UNI) Lithuania (LST) Malta (MCCAA) Netherlands (NEN) Poland (PKN) Portugal (IPQ) Slovakia (SUTN)

Sweden (SIS)		
13 x	No Answer	Belgium (NBN) Croatia (HZN) Cyprus (CYS) Estonia (EVS) Ireland (NSAI) Latvia (LVS) Norway (SN) Romania (ASRO) Slovenia (SIST) Spain (AENOR) The Former Yugoslav Republic of Macedonia (ISRM) Turkey (TSE) United Kingdom (BSI)

Answers to Q.5: "National technical/economic deviation"		
0 x	Yes	
16 x	No	Austria (ASI) Bulgaria (BDS) Czech Republic (UNMZ) Denmark (DS) Finland (SFS) France (AFNOR) Germany (DIN) Iceland (IST) Italy (UNI) Lithuania (LST) Malta (MCCAA) Netherlands (NEN) Poland (PKN) Portugal (IPQ) Slovakia (SUTN) Sweden (SIS)
13 x	No Answer	Belgium (NBN) Croatia (HZN) Cyprus (CYS) Estonia (EVS) Ireland (NSAI) Latvia (LVS) Norway (SN) Romania (ASRO) Slovenia (SIST) Spain (AENOR) The Former Yugoslav Republic of Macedonia (ISRM) Turkey (TSE) United Kingdom (BSI)

Comments from Voters		
Member:	Comment:	Date:
Belgium (NBN)	<i>Comment File</i>	2014-01-27 14:46:41
CommentFiles/prEN_ISO_15614-1_rev_NBN.doc		

Bulgaria (BDS)	Comment File	2014-01-28 14:37:23
CommentFiles/prEN_ISO_15614-1_rev_BDS.doc		
Cyprus (CYS)	Comment File	2014-01-24 09:54:40
CommentFiles/prEN_ISO_15614-1_rev_CYS.doc		
Denmark (DS)	Comment File	2014-01-29 11:32:52
CommentFiles/prEN_ISO_15614-1_rev_DS.doc		
Estonia (EVS)	Comment File	2014-01-06 07:36:39
CommentFiles/prEN_ISO_15614-1_rev_EVS.doc		
Finland (SFS)	Comment File	2013-12-18 15:12:58
CommentFiles/prEN_ISO_15614-1_rev_SFS.doc		
France (AFNOR)	Comment File	2014-02-05 10:39:46
CommentFiles/prEN_ISO_15614-1_rev_AFNOR.doc		
Germany (DIN)	Comment File	2014-01-31 14:34:58
CommentFiles/prEN_ISO_15614-1_rev_DIN.doc		
Iceland (IST)	Comment File	2014-02-05 12:52:53
CommentFiles/prEN_ISO_15614-1_rev_IST.doc		
Ireland (NSAI)	Comment File	2014-01-30 15:47:43
CommentFiles/prEN_ISO_15614-1_rev_NSAI.doc		
Italy (UNI)	Comment File	2014-01-28 15:47:33
CommentFiles/prEN_ISO_15614-1_rev_UNI.doc		
Netherlands (NEN)	Comment File	2014-01-28 11:38:38
CommentFiles/prEN_ISO_15614-1_rev_NEN.doc		
Norway (SN)	Comment File	2014-02-05 14:35:28
CommentFiles/prEN_ISO_15614-1_rev_SN.doc		
Slovenia (SIST)	Comment File	2014-01-09 10:42:26
CommentFiles/prEN_ISO_15614-1_rev_SIST.doc		
Sweden (SIS)	Comment File	2014-02-03 17:32:48
CommentFiles/prEN_ISO_15614-1_rev_SIS.doc		
Turkey (TSE)	Comment File	2014-01-31 12:35:58

CommentFiles/prEN_ISO_15614-1_rev_TSE.doc		
United Kingdom (BSI)	<i>Comment File</i>	2014-02-05 16:46:52
CommentFiles/prEN_ISO_15614-1_rev_BSI.doc		

Comments from Commenters		
Member:	Comment:	Date:
CEN/Consultant Pressure Equipment 1	<i>Comment File</i>	2014-01-23 21:22:05
CommentFiles/prEN_ISO_15614-1_rev_CEN_Consultant Pressure Equipment 1.doc		

Template for comments and secretariat observations

Date:2014-02-12

Document:

Project: ISO/DIS 15614-1
(Ed 2)

MB/ NC ¹	Line number	Clause/ Subclause	Paragraph/ Figure/Table	Type of comment ²	Comments	Proposed change	Observations of the secretariat
BSI 001					No positive endorsement of this project has been notified by the UK national committee		
CH 002					Abstains due to lack of expertise		
CY 003				ge	Lack of technical expertise		
DK 004	General			te	Level 1 is a quite different approach compared to the existing EN ISO 15614-1. Taking into account that man application standards today refer to EN ISO 15614-1 without addressing the use of level 1 respectively Level 2, this will lead to many misunderstandings. This specific topic is of high concern in Denmark and the reason for the negative vote.		
EE 005				ge	Lack of expertise		
FR 006				ge	French member body disapproves this draft international standard, because its gives two different levels of welding procedure test which is not globally relevant. In addition it is not possible to have two levels in a standards concerning safety of pressure equipment. For ISO standards developped in parallel between CEN and ISO and intended to be harmonized at the European level, the ISO/DIS shall contain an Annex ZA giving the relationship between the European standard and the essential requirements of EU Directive. In this DIS this annex is missing for the relationship with directive 97/23 CE. Therefore no information is given at this stage about levels 1 and 2 and the pressure equipment European directive.	To delete one of these two levels. In case where the two levels remain in the standard, it is absolutely necessary to limit Table ZA.1 to level 2.	

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2 **Type of comment:** **ge** = general **te** = technical **ed** = editorial

Template for comments and secretariat observations

Date:2014-02-12

Document:

Project: ISO/DIS 15614-1
(Ed 2)

MB/ NC ¹	Line number	Clause/ Subclause	Paragraph/ Figure/Table	Type of comment ²	Comments	Proposed change	Observations of the secretariat
FR 007				ge	At the beginning of the standard there should be an explanation of the main aim of the qualification test procedure. What we want to demonstrate and what should be verified before using a WPQR. A WPQR is formal authorization of welding with a process and with an associated range of validity for several variable. If a manufacturer fails for this test, it's highly probable that he is not able to use this process for fabrication. If the manufacturer passes the test it's not a proof that he will make a weld with the good quality. Before applying a welding process, the manufacturer must verify that the variable as preheating temperature, heat input are suitable to the production joint (thickness, constraint, ambiance...) The WPQR mainly validates the mechanical properties but gives only information concerning the hardness and impact test because the test coupon is not welded with the worst conditions for each variable. Several test coupons should be welded with different combination of variables in order to fully validate all the variables. It is not the aim of the procedure qualification test, it's the responsibly of the manufacturer to select correctly the range for each variable in accordance with his knows how and material data sheet and all necessary metallurgical documentation, R&D....)	Add an explanation of the main goal of a procedure test qualification.	
IE 008					No Comment		
IS 009				ge	Abstention - Lack of expertise.		
NL 010	7		7	ge	Welding direction has another number than in figure 5; not logical	Change numbering by exchanging "2" and "4".	
NL 011	8		Table 7	ed	Footnote a should be rephrased	"shall" to be changed to "has been"	

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² **Type of comment:** **ge** = general **te** = technical **ed** = editorial

Template for comments and secretariat observations

Date:2014-02-12

Document:

Project: ISO/DIS 15614-1
(Ed 2)

MB/ NC ¹	Line number	Clause/ Subclause	Paragraph/ Figure/Table	Type of comment ²	Comments	Proposed change	Observations of the secretariat
NL 012	8		Table 7	ed	Column header 4 th column shall be “Multi run” rather than “Multi Layer”	Change as proposed	
NL 013	8		Table 8	ed	The text as written under the table as “For level 2” shall better be written IN the table just above Note 1 and Note 2.	Change according to proposal.	
NL 014	8		Table 7	ed	Footnote a should be rephrased	Change “...testing shall be performed.” To “...testing has be performed.”	
NL 015	Page 36			ed	The 8 th line should be separated from the rest as it belongs to the table underneath.	Insert one line between “Joint Type...” and “Weld Preparation...”	
NL 016	Page 37			ed	Fourth line, left side, gives “Tensile Tests”. This is the wrong place.	“Tensile Tests” shall be one line lower, as it belongs to the table underneath.	
NL 017	7		7	ge	Welding direction has another number than in figure 5; not logical	Change numbering by exchanging “2” and “4”.	
NL 018	8		Table 7	ed	Footnote a should be rephrased	“shall” to be changed to “has been”	
NL 019	8		Table 8	ed	The text as written under the table as “For level 2” shall better be written IN the table just above Note 1 and Note 2.	Change according to proposal.	
NL 020	Page 36			ed	The 8 th line should be separated from the rest as it belongs to the table underneath.	Insert one line between “Joint Type...” and “Weld Preparation...”	
SIST 021					We do not have interest.		
TR 022					Abstains		
FR 023		Bibliography			Reference of ISO 9692-1 and ISO 9692-2 quoted in 6.2 should be added in Bibliography	To add reference of ISO 9692-1 and ISO 9692-2 in Bibliography	
NL 024		Foreword	7 th and 8 th par.	ed	Sentence “ISO 15614.... Test” is there twice	Remove one of them.	
DE 025		Introduction		ge	<i>.... Does not invalidate previous welding procedure tests made to former national standards or specifications or previous issues of this standard.</i>	Add: Any technically changes in the qualification, requires additional tests and test pieces to fulfil this Standard.	

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Template for comments and secretariat observations

Date:2014-02-12

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Project: ISO/DIS 15614-1
(Ed 2)

MB/ NC ¹	Line number	Clause/ Subclause	Paragraph/ Figure/Table	Type of comment ²	Comments	Proposed change	Observations of the secretariat
DE 026		Introduction		ge		Please specify "ASME" by giving the full name in parenthesis, e.g.	
GB 027		Introduction		ed	National/proprietary names e.g. "ASME" should not appear anywhere in an international standard.	Remove the last line of the introduction and anywhere else in the standard where ASME etc. are quoted.	
GB 028		Introduction	Second para	ge	Can the Secretariat consider amending this paragraph to take into account a transition period for new qualifications?	Consider	
IT 029		New paragraph		te/ge	The standard lacks of a section dedicated to the critical activities of reparation of defective welds, especially in the construction of a new junction. Procedure repairs should be coded.	Add par. 8.4.14, a dedicated paragraph containing the requirement of the impact test on repaired parts.	
DE 030		1	2nd paragraph	ed	Cast steel is excluded from the scope.	Add: <i>This standard does not cover any production welding, repair welding or build-up welding on cast steel.</i>	
DE 031		1		te	"build up" added. However, boundary conditions and requirements not defined.	Define boundary conditions and requirements for "build up weldings", like test piece, scope of inspection, scope of applicability	
EH 032		1	4 th paragraph	te	"The primary purpose of welding procedure qualification is to demonstrate the mechanical properties of the weldment."	Replace with: "The primary purpose of welding procedure qualification is to demonstrate <u>that</u> the mechanical properties of a weldment <u>can be consistently achieved</u> ." or align with other parts of the series. For example, prEN ISO 15614-7 which states: "This standard specifies how a preliminary welding procedure specification for overlay welding is qualified by welding procedure tests."	
FR 033		1	9 th paragraph	ed	The edition of ISO 4063 is not correct.	To replace ISO 4063:2011 with ISO 4063:2009.	
BE 034	Page 2	2	Whole	ge	Why are some norms dated?	No dated norms in the Normative references	
DE 035		2	Page 7	ed	Reference for standard ISO 9692-1 has to be added, because this standard is referenced in paragraph 6.2	ISO 9692-1, Welding and allied processes - Types of joint preparation - Part 1: Manual metal arc welding, gas-shielded metal arc welding, gas	

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(Ed 2)

MB/ NC ¹	Line number	Clause/ Subclause	Paragraph/ Figure/Table	Type of comment ²	Comments	Proposed change	Observations of the secretariat
						welding, TIG welding and beam welding of steels	
DE 036		2	Page 7	ed	Reference for standard ISO 9692-2 has to be added, because this standard is referenced in paragraph 6.2	ISO 9692-2 , Welding and allied processes - Joint preparation - Part 2: Submerged arc welding of steels	
EH 037		2		te	The standard text states: "For undated references, the latest edition of the referenced document (including any amendments) applies." However, where a reference is used in another normative clause which is listed in annex Z as providing presumption of conformity to the PED, only the version of the reference which is valid at the time of publication of the standard applies. (PED Guideline 10/5 refers)	Qualify the text in clause 2 or annex(es) Z.	
FR 038		2		ed	The edition of ISO 4063 is not correct.	To replace ISO 4063:2010 with ISO 4063:2009	
FR 039		2		ed	For ISO 15609-1 and ISO 15609-2, the latest edition should apply	ISO 15609-1 and ISO 15614-2 should be undated.	
NO 040		2		ed	Typing error.	Corrected the reference to ISO 14175:2008	
BE 041	Page 9	Table 2	Table 2	Ed	Footnote f does not have anything to do with Visual, nor surface crack detection, US examination, Hardness or macro ex.	Place footnote f in the column "test piece" for T-joint and fillet weld.	
BE 042	Page 9	Table 2	Table 2	TE	The tests for fillet welds apply also for partial penetration T-joints. Because a partial penetration T-joint is in design equal to a "sunken" executed fillet weld. therefor partial penetration T-joints should be tested as fillet welds	Add in the 2 nd row also : T-joint with partial penetration	
EH 043		3		te	This refers to ISO/TR 25901 for terms and definitions.	Consider if this reference is sufficiently robust	
FR 044		3		ed	This draft refers to multi-layer welding and multi-run welding, but only multi-run welding is defined in ISO/TR 25901	To replace in the whole standard "multi-layer" with "multi-run". If not accepted, to add a definition of multi-layer welding.	

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FR 045		3		ed	The definition of the French wording for “butt joint” doesn’t not correspond to the one commonly used and lead to many misunderstanding for French speaking person	It would be helpful to copy in this draft the definition given in ISO/TR 25901 and to complete it by the following drawing.  Butt weld.docx (see enclosure 1)	
DE 046		3.1		ge	Please check if that definition can be referenced without repeating the definition given in ISO/TR 17671-2. When the repetition of a definition is necessary, an informative dated reference shall be made to the source document from which it is reproduced. [see ISO/IEC Directives - Part 2:2011, D.1.5]	Replace the note by: [SOURCE: ISO/TR 17671-2:2002, 3.2]	
FI 047		3.1		ed	Terms shall start with small letter and the definition without article	<u>run</u> out length the length of a ...	
FI 048		3.2		ed	Terms shall start with small letter	<u>initial</u> heat treatment	
BE 049	Page 17	Tabel 4	1.6	te	Incomplete root penetration is not permitted. What do we do with branch qualifications performed with a “narrow” angle alfa and a preparation in accordance with fig. 3.10 of the AWS D1.1. where root penetration is incomplete in the heel area?	Incomplete root penetration is allowed for branch weld connection qualifications, when covered by other codes. Fe. AWS D1.1.	
EH 050		5	2 nd paragraph	te	The wording used is not sufficiently precise for compliance with the PED.	Replace with: ... relevant part of national/ international standard ISO 9606 being applied, providing that the relevant testing requirements of that standard are met	
FR 051		6.1	Level1	ed	The word “weld” is not correct. It should be replaced with “joint”. For level 1, the word “Qualification” is not useful	To replace for level 1 “ Qualifications , any butt weld test qualifies all joint configurations.” with “Any butt joint test qualifies all joint configurations.”	
FR 052		6.1	Level 2	ed	“Where the production/joint geometry requirements are not represented by the standard...” : It's not clear, test coupon never represents the production weld (chamfer thickness tube diameter...)	To replace with: "The use of ISO 15613 is authorized when the test coupon defined in this International standard is not fitted to the production joint or geometry."	

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GB 053		6.1		ed	Sentence for level 2 is confusing, change.	Change to: Where the production/joint geometry requirements are not represented by the standard test pieces as shown in this standard, the use of ISO 15613 shall be required.	
GB 054		6.1	Including the Introduction and all subsequent clauses	ge	The column separation style is considered to be confusing to the user.	The previous proposals prepared by GB and submitted but not taken in previous SC 10 meetings to create separate level 1 and level 2 sections within the draft need to be taken up in the comments resolution meeting. See TC 44/SC 10/N 1064.	
BE 055	Page 3	6.2	3	te	Pieces of different thickness can also be tested as a butt weld when tapered.	Ad to the last paragraph.....shall be the same for both plates; pipes to be welded at the joint preparation. Pieces of different thicknesses are tapered to an equal thickness at the joint.	
FR 056		6.2	Note	ed	The reference for joint preparations, see ISO 9692-1 and ISO 9692-2, is not useful	Delete the note	
FR 057		6.2		ed	Hanging paragraph shall be avoided since reference to them is ambiguous. Indeed does the reference to 6.2 in 6.1 refer only to the 6 paragraphs of item 6.2 (before 6.2.1) or to the whole subclause, including 6.2.1, 6.2.2, 6.2.3?	To add after "6.2 Shape and dimensions of test pieces" " the following heading : 6.2.1 General To renumber suclause 6.2.1 into 6.2.2 To renumber suclause 6.2.2 into 6.2.3 To renumber suclause 6.2.3 into 6.2.4 To renumber suclause 6.2.4 into 6.2.5.	
GB 058		6.2		ed	There is a hanging clause between 6.2 and 6.2.1 – this is not in accordance with ISO rules.	Give the first part of the clause a sub-clause number and title and renumber subsequent sub clauses.	
GB 059		6.2	Page 4, 1st sentence	te	Delete or move to Table 2 as a footnote to make it more relevant. Does there need to be a reference to the "application standard"?	Delete or move:" If required by the application standard, the direction of plate rolling shall be marked on the test piece when impact tests are required to be taken in the Heat Affected Zone (HAZ)."	
FR 060		6.2.1		ed	Wording improvement	To replace the heading with "butt joint in plate with full penetration weld »	
FR 061		6.2.2		ed	Wording improvement	To replace the heading with "butt joint in pipe with full penetration weld »	

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FR 062		6.2.3	2 nd paragraph	ed/te	Wording improvement	To replace "fully penetrated butt welds or fillet weld" with "fully penetrated welds or fillet weld »	
GB 063		6.2.3	Under second line	te	Clarification on fully penetrated T butt welds needed	Add: As a new third line: For level 1, no test piece is required for a fully penetrated T butt weld.	
FR 064		6.2.4	Level 1	te	"No test piece required" leads suggesting that it is not necessary to qualify "branch connection"	To replace "No test piece required" with "the test piece shall be a butt joint according to 6.2.1 or 6.2.2."	
FR 065		6.2.4	Level 1	te	Wording correction	To replace : "This test piece applies to fully penetrated joints (set-on, set-in or set-through joint) and for fillet welds" with "This test piece applies to fully penetrated welds (set-on, set-in or set-through joint) and for fillet welds"	
DE 066		6.3	2	te	<i>Examiner or examining body</i> Examiner and examining body shall be defined.	Add the following: <i>The welding of the test pieces shall be witnessed by the examiner or examining body. The testing shall be verified by the examiner or examining body.</i>	
GB 067		6.3	Figure 1 and all figures	ed	To be consistent with ISO 9606-1 the word value is non-optimal for English text.	Replace "value" with "dimension"	
US 068		7	Table 1 Note b	ed	The last sentence in note b says that only certain parameters "shall" be the same. This could be interpreted that any other parameters "shall not" be the same	Replace the word "shall" with the words " are required to be".	
US 069		7	Table 2 Note f	ed	The last sentence in note f says that only certain parameters "shall" be the same. This could be interpreted that any other parameters "shall not" be the same	Replace the word "shall" with the words " are required to be".	
DE 070		7.1	Table 2	te	Footnote e in Table 2. What is different for dissimilar welds between material sub-group 1.1 and group 8 with view on hardness test?	Add in footnote e: <i>...41 to 48 and dissimilar weld between these material groups.</i>	
DK 071		7.1	2 nd paragraph	te	An application standard may specify additional tests, e.g.: ↓ longitudinal weld tensile test;	In clause 7.1 for Level 2, delete: Hardness test and NDT	

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					↓ all weld metal bend test; ↓ corrosion tests; ↓ chemical analysis; ↓ microscopic examination; ↓ delta ferrite examination; ↓ cruciform test; ↓ hardness test ; – impact test; – NDT .	(These are already specified in Table 2 as requirements).	
FR 072		7.1		te	Cruciform test cannot be performed on one of the test piece defined in this standard. Cruciform test is more relevant to ISO 15613	To delete for level 1 and level 2 any reference to cruciform test	
FR 073		7.1		te	Hardness test and impact test are relevant for level 1 and not for level 2	To move hardness test and impact test from the list of level 2 to the one of level 1.	
FR 074		7.1	Table 1 footnote b Table 2 footnote f	te	Subjective wording as "relevant to the application" could be subject to interpretation and should be avoided. Where mechanical properties are relevant to the application, the preheating temperature for the additional test piece should also be identical. The definition of the welding parameters is missing.	To change note b as follows: Where mechanical properties are requested by an application standard it shall be tested accordingly. If an additional test piece is needed, the dimensions should be sufficient enough to allow testing of the mechanical properties. For this additional test piece only the welding parameters range (amperage and voltage range), parent material group, filler metal, preheating temperature and heat treatment shall be the same.	
FR 075		7.1	Table 2 footnote d	ed/te	How are the impact properties specified?	To replace "having specified impact properties" with "having specified impact properties in the material standard and if appropriate according to the conditions of use"	
FR 076		7.1	Table 2 footnote e	te	Why limiting the exception to dissimilar joints between sub-group 1.1 and group 8 ?	To delete from note e) : "except for dissimilar joints between sub-group 1.1 and group 8"	
FR 077		7.1	Table 2 footnote g	te	For outside diameter ≤ 50 mm radiographic testing should also not be required	For outside diameter ≤ 50 mm no ultrasonic nor radiographic testing is required	
GB 078		7.1	Both levels columns on page 7	ed	Tables should read Table	Tables should read Table	

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GB 079		7.1	Both levels columns on page 7	te	Examples (indents) not needed.	Delete all examples in the indents with a full stop after the word tests Both levels columns on page 7	
GB 080		7.1	Table 1	te	T- joint with full penetration is covered by a butt weld already	Delete " T- joint with full penetration - Figure 3" row 2.	
GB 081		7.1	Table 2, footnote e	te	Change footnote e to address dissimilar groups correctly. SC 10 have only partly addressed dissimilar groups with the requirement of 1.1 and group 8 requiring hardness testing.	e Hardness test is required for 7.1 and 10 but it is not required for parent metals: sub-group 1.1 welded to 1.1, groups 8 welded to 8, and 41 through to 48. Hardness test is required for all dissimilar material groups.	
IN 082		7.1	Table 2	te	In this section, impact test is included again in the additional tests that may be required as per application standard. This needs to be modified. First of all for all type of steels and Ni base alloys impact tests of welds need to be made a mandatory requirement in the procedure qualification. Most of the austenitic stainless steels and Ni base alloy show excellent toughness and do not have ductile to brittle transition behavior. And these materials are used for high temperature applications and hence impact toughness is not important service requirement.	Hence, impact test can be an optional requirement based on the application standard.	
IT 083		7.1	Table 1	te	Considered that Level 1 is based on ASME IX, should be requests 4 or 5 in the macro as ASME IX.	Macroscopic examination – 4 specimen	
NL 084	7	7.1		ed	Clarify the sampling position to be in accordance with the relevant standard.	Add sentence: "Sampling of test specimens to be in accordance with the referenced standards in 7.4	
NL 085	7	7.1		ed	Due to the lay out the essential requirements for level 1 tests for hardness and impact are obscured.	Edit lay out to bring the columns on one page.	
NL 086	7	7.1	2 nd line	Ed	"Tables" shall be "Table" (in both columns!)	Delete the "s"	
NL 087	7	7.1		ed	Clarify the sampling position to be in accordance with the relevant standard.	Add sentence: "Sampling of test specimens to be in accordance with the referenced standards in 7.4	

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NL 088	7	7.1		ed	Due to the lay out the essential requirements for level 1 tests for hardness and impact are obscured.	Edit lay out to bring the columns on one page.	
BE 089	Page 10	7.2	2 nd	te	Prior to cutting the test specimens all NDT has to be performed <u>and accepted</u> .	Add a note: "Prior cutting the test specimens make sure that all NDT is performed and accepted (Ref. to 7.3)"	
DE 090		7.2		ed	<i>It is acceptable to take the test specimens from locations avoiding areas which have imperfections within the acceptance limits for the NDT method(s) used.</i> It should be pointed out the fact "for the NDT method(s) used" by hyphens.	<i>It is acceptable to take the test specimens from locations avoiding areas which have imperfections within the acceptance limits - for the NDT method(s) - used.</i>	
DE 091		7.2	Table 2	te		Footnote f for hardness test only, delete footnote	
DE 092		7.2	Table 2	te	Impact test should be added in the footnote.	Add new footnote: ^h For thicknesses $t > 50$ mm two additional test sets for impact test, one from the weld metal and one from the HAZ or from the root shall be taken.	
DE 093		7.2	Figure 6	ed	For explanation: Welding position PH respectively PG should be mentioned.	Add PH and PG	
DE 094		7.2	Table 2	ed	Add the reference for fillet weld test piece application of branch connection on according to Figure 4 (use the same definition as recommended above)	Fillet weld on T-joint with full penetration — Figure 3 Fillet weld on branch connection with full penetration — Figure 4	
FR 095		7.2	Figure 6	te	By analogy with upwards welding (left sketch of Figure 6), the location of the test specimens for downwards welding is not correct (right sketch of Figure 6).	To modify right sketch of Figure 6 concerning upwards welding as follows.  Figure 6.tif (see enclosure 2)	

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NL 096	7	7.2	Figure 6	te	Specimen locations are indicated for fixed pipe, but it is unclear how to proceed for rotating pipe, e.g. in case of manual welding with mechanised pipe rotation. To avoid interpretation discussions between parties specimen location should be clarified.	Include a note in Figure 6: "For a butt joint in rotating pipe specimens may be randomly distributed along the weld seem."	
DK 097		7.3	2 nd paragraph	te	If the ISO/TR is not applicable, it is preferable to set a safe time delay.	Add at the end of the sentence: "... see ISO/TR 17671-2 or use alternatively 48 hours as time delay"-	
EH 098		7.3	first sentence	te	Table 1 does not specify NDT	Replace with: "All non-destructive testing in accordance with 7.1 and Tables 1 and Table 2 shall be carried out..."	
EH 099		7.3	2 nd paragraph	ed		Replace "should" with "shall" or convert to a note.	
FR 100		7.3		te	Reference to the acceptance levels defined in 7.5 is missing	To add : "Acceptance levels shall be in accordance with 7.5"	
NL 101	7	7.3	1 st line	ed	"Tables" shall be "Table"	Delete the "s"	
FR 102		7.4.1	3 rd paragraph	ed/te	Wording improvement	To read : "For pipes ≤ 50 mm outside diameter, for which the transverse tensile test is performed on the full pipe , the excess weld metal may be left undressed on the inside surface of the pipe."	
FR 103		7.4.1	5 th paragraph	ed	Bad wording in the French version for dissimilar (see 2.92 of ISO/TR 25901)	To replace « dissemblables » with « mixtes »	
NL 104	7	7.4.1	Last par	Ed	".... Shall not te be less than..." is not correct	Delete "to"	
BG 105		7.4.2	Before last paragraph	te	To be added a new paragraph defining more accurately the former diameter of the former or the inner roller	When the calculated diameter of the former or the inner roller is not whole number (for example ø 42,8) shall to use the closest higher whole number (for example ø 43).	
DE 106		7.4.2		te	What exactly is meant by "any flaw > 3 mm" ? Which dimension is concerned?	Please check and specify.	

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DE 107		7.4.2		te	Symbol <i>t</i> is not defined (thickness).	Please define <i>t</i> or ad <i>t</i> _s	
EH 108		7.4.2	2 nd paragraph	ed	"recommended"	Is this normative text or an alternative?	
FR 109		7.4.2	4 th paragraph	ed/te	According to 3.4.2 of EN ISO 6892-1:2009 or ISO/TR 25679:2005, <i>A</i> is the percentage elongation after fracture.	To replace : " <i>A</i> is the minimum tensile elongation required by the material specification With " <i>A</i> is the percentage elongation after rupture required by the material specification"	
FR 110		7.4.2	3 rd paragraph	ed	Bad wording in the French version for dissimilar (see 2.92 of ISO/TR 25901)	To replace « dissemblables » with « mixtes »	
NL 111	7	7.4.2	3 rd par	ed	"or heterogeneous butt joint..." is not correct	Add "s" after "joint"	
GB 112		7.4.3	Second paragraph	ed	Spelling mistake	Change " photo" to "photograph"	
BE 113	Page 15	7.4.4	3 rd	te	Why is for Level 2 referred to 8.4.1.	remove	
DE 114		7.4.4	Table 3	ed	In Table 3 title should be added additional footnote d regarding hardness test.	Add footnote d): If single hardness values in different test areas above the values specified in table 3, additional tests may be done (on the backside of the probe or after grinding of the tested area).	
DE 115		7.4.4	4th paragraph, 1st sentence	ge	Addition	Add: Application standards can be required further notch location.	
DE 116		7.4.4	6th paragraph	ge	Re-wording	For each notch location one individual value may be below max. 30% under the minimum average value specified.	
DK 117		7.4.4		te	We expect that the intention is to test the root area. Mid thickness is not necessary the root area of a double sided weld as many double sided welds are asymmetric.	Delete: "at the mid thickness"	

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EH 118		7.4.4	last paragraph	ed	"For level 2: See additional restriction in 8.4.1."	Check if reference to 8.4.1 is correct	
FR 119		7.4.4	3 rd paragraph	ed	According to the 2 nd paragraph "with Charpy V-notch" is not useful.	To read : "Specimens shall be sampled from a maximum of 2 mm below the surface of the parent metal and transverse to the weld."	
FR 120		7.4.4	5 th paragraph	te	To simplify by requiring either in the root area of the weld or at backgouging area	To read : "For test piece thicknesses $t > 50$ mm, two additional sets of specimens shall be taken, one from the weld metal and one from the HAZ in the root area of the weld or at backgouging area."	
FR 121		7.4.4		te	Hardness location for combination of process shall be clarified	Add a sentence in order to specify that for a combination of welding process all the process and corresponding HAZ shall be tested.	
FR 122		7.4.4	7 th paragraph	ed	Bad wording in the French version for dissimilar (see 2.92 of ISO/TR 25901)	To replace « dissemblables » with « mixtes »	
NL 123	7	7.4.4	1 st par	ed	Add reference to footnote d of table 2 after "temperature of testing..."	Add footnote	
NL 124	7	7.4.4	1 st par	te	Why use a 2 mm radius for ISO 148-1 impact toughness test? A 2 mm striker radius shows more scatter in data. Besides impact values are slightly higher and thus acceptance is reach more easily (less conservative) up to 200J. Only above 200J the 8 mm striker radius delivers progressively higher impact values. Since it is most important to determine whether or not material is brittle or tough (transition around 27J), it is most interesting to be conservative at low impact values, especially for thick sections. Thus an 8 mm striker radius would be a more obvious choice. Moreover the 8 mm striker radius coincides with ASTM A370 requirements, which will ease acceptance of the ISO standard by American parties/societies. See "SCK-CEN presentation - Influence of Striking Edge Radius".	Change the striker radius of 2mm to 8 mm.	

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NL 125	7	7.4.4	1 st par	ed	Add reference to footnote d of table 2 after “ temperature of testing...”	Add footnote	
NO 126		7.4.4.	Para. 5	te	"---- at the mid thickness or in the root area of the weld." The area from where the test piece is taken should be more clearly defined	The area from where the test piece is taken should be more clearly defined.	
BE 127	Page 15	7.4.5	1 st par at the end	ed	Change “...are shown in Figures 1 a), b), e) and f) of ISO 9015-1 and Figures 3 and 4.” to “...are shown in Figures 1 a), b), e) and f) and Figures 3 and 4 of ISO 9015-1.”	Change accordingly	
DK 128		7.4.5	Table 3	te	Those figures given are for non-sour service. Suggest to add also hardness applicable for sour service.	Add footnote d). If welding procedure is to be used for H ₂ S containing environment the acceptance criteria of ISO 15156 are acceptable.	
EH 129		7.4.5	table 5, footnote b	ed		Replace N/mm ² by MPa	
FR 130		7.4.5	Table 3	te	Steel group 11 is missing in the Table.	To replace in the first line, 1 st column of the Table : "1 ^a , 2 ^b " With "1 ^a , 2 ^b , 11".	
FR 131		7.4.5	Table 3 footnote c	te	The conditions for which higher value may be accepted should be defined	To read for table footnote c : "For certain materials higher values may be accepted, if specified before the welding qualification test "	
FR 132		7.4.5	4 th paragraph	ed	Bad wording in the French version for dissimilar (see 2.92 of ISO/TR 25901)	To replace « dissemblables » with « mixtes »	
IT 133		7.4.5	Table 3	te	Too conservative	Add a footnote “d)For certain fabrication specifications lower values may be required“	
BE 134	Page 15	7.4.5.	1 st	ed	upper and lower surfaces of the welded joint....	Remove one time “of the”	
DK 135		7.5	Table 4	ed		Change 1. column to be in numerical order.	
FR 136		7.5	Table 4	te	If for level 2, crack (100), lack of fusion (401) or incomplete root penetration (4021) are not permitted, there is no reason to require level B of ISO 5817	To replace for level 2 : "B (not permitted)" with "not permitted"	

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GB 137		7.5	Table 4, column 4	te	Level 1 column, where the words "No specific requirements" are used – this would mean "any" profile imperfection / external imperfections are supposedly permitted.	Replace this wording by "Quality level D of ISO 5817"	
DE 138		7.6	4 th paragraph	te	Delete the following words "... except for the macroscopic examination.." Errors due to manual skill that may be in the region of the removal of the macro test specimen, a macro test specimen should be able to be repeated.	Delete the following words "... except for the macroscopic examination.."	
DE 139		7.6	note	ge	Notes shall not contain any information considered indispensable for the use of the document. [see ISO/IEC Directives – Part 2:2011, 6.5.1]	Please check if the information given in this note isn't rather important for the use of this document and consider to write it as a statement of fact instead.	
DE 140		7.6	2nd paragraph, 4th sentence	ge	Change wording The meaning of this paragraph is not clear and confused the user of this standard. The paragraph shall be reviewed.	...is not procedure related and due to insufficient welder's skill,...	
DE 141		7.6	1st paragraph	ge, te	Additional paragraph should be added to require a stronger test.	If all destructive tests provide acceptable test results, can in case of a failed macro section test two additional test specimen for macro section test can be taken.	
DE 142		7.6	3rd paragraph	te	Additional text after 3rd paragraph.	If the mechanically tests provide sufficiency results, single higher hardness values can be accepted. Footnote c in table 3 applies for all materials.	
EH 143		7.6	2 nd paragraph after the Note	ed	What happens if adequate material is NOT available?		
FR 144		7.6	2 nd paragraph and note	ed/te	The note should be linked to the 2 nd paragraph	To incorporate the note in the 2 nd paragraph as follows : "If the test piece fails to comply ... shall be added to the report. In this case, in accordance with clause 5 the welder qualification test has failed. "	
FR 145		7.6	4 th paragraph	ed	The word "alternatively" is meaningless and should be deleted	To read for the beginning of the 4 th paragraph : "In the case of failure of any destructive test	

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						specimen ...".	
FR 146		7.6	4 th paragraph, last sentence	te	This requirement is not relevant. Indeed, if a test piece fails to comply with any of the requirements for NDT, further test piece with new parameters shall be welded and it is not relevant to perform an analysis on these new parameters with regards to the previous parameters.	To delete last sentence "If the new test piece passes, the welding conditions that were determined to cause the previous test failure shall be addressed by the manufacturer to ensure that the required properties are achieved in production" If this deletion is not accepted, this sentence should be moved after the 3 rd paragraph to read : "In the case of failure of the test piece, another test piece may be welded. If the new test piece passes, the welding conditions that were determined to cause the previous test failure shall be addressed by the manufacturer to ensure that the required properties are achieved in production."	
FR 147		7.6	5 th paragraph, last sentence	ed	ISO/TR 25901 defines "test piece" and "welding procedure test" but not "welding procedure test piece"	To read for the last sentence: "If any of the additional test specimens do not comply with the requirements, the test piece shall be considered failed."	
FR 148		7.6	6 th paragraph	ed	Wording improvement	To read : For hardness tests, if there are single hardness values in different test zones above the values indicated in Table 3, additional rows of indentations shall be carried out (on the reverse of the specimen or after sufficient grinding of the tested surfaces). None of the additional hardness values shall exceed the maximum hardness values given in Table 3."	
FR 149		7.6	7 th paragraph, last sentence	ed/te	As written, the average value is not clearly defined.	To read : "The average value of these three specimens and of the three initial specimens shall not be lower than the required average."	
FR 150		7.6	1 st and 5 th paragraph	ed	Wording improvement in the French version	To replace « comme défectueux » with « comme non satisfaisant »	
GB 151		7.6	Last para 1 st line on page 17	te	Text not needed	Delete the words ",except for macroscopic examination,"	

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NL 152	7	7.6	1 st par	te	Add after first sentence : “unless the other criteria of this paragraph are met.”	Add proposed text	
NL 153	7	7.6	end	te	Add at the end of the paragraph: “All measured hardness values shall be reported (including the failed ones).”	Add proposed text	
SE 154		7.6		te	What is the reason for not allowing two new macro samples from the original test piece	Change back or explain technical reason.	
BE 155	Page 17	7.6 (Page 17)	2 nd par of page 17	te	How many additional hardness tests are required if one hardness value is failed (above value as indicated in table 3) in a certain zone?	Proposal: 2 additional hardness measurements for each failed hardness value on the same zone.	
DK 156		8	Table 5	ed	Table 5 seems difficult to understand. E.g. welding 3 to 3 will qualify 3-3, 3-2, 3-1. Why not also 2-1, 2-2 and 1-1?	We suggest to make Table 5 easier to read by changing the qualification range.	
DK 157		8	Table 5	te	Chemistry is an important parameter for the properties of welding procedures. E.g. group 3 can be delivered with carbon equivalent tolerances from e.g. 0.30 to 0.50 (and even more). It makes no sense performing a welding procedure in steel with CE = 0.30 and then use the procedure in steel with CE = 0.50.	Add footnote d). Test piece materials in group 1, 2, 3 and 11 qualify CE + 0.03 or lower. CE = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15	
DE 158		8.3.1	Table 6	ed	Reference “to table 6” is incorrect	Change to “refer to table 5”	
EH 159		8.3.1	Tables 5 and 6	te	Should the notes in the tables be normative text in sub-clause(s) of 8.3.1?		
DE 160		8.3.1.1	4th paragraph note		Definition of „similar grades“ is necessary.	<i>Composition of materials with similar mechanically and metallurgical properties.</i>	
DK 161		8.3.1.1		te	ISO/TR 15608 gives the system for grouping of material. ISO/TR 20172 and ISO/TR 20173 are listing the actual grouping of steel but are not referenced.	Reference to the ISO/TR 20172 steel grouping should be included in a note.	
FR 162		8.3.1.1	Note	ed/te	What is the meaning of "minor compositional differences"? Grouping system of parent material makes the note useless	To delete this note.	

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US 163		8.3.1.1	Note	ge	Who is going to decide what constitutes a minor difference. Trace elements can have quite an impact on properties. In ASME Section, sub-group International Materials Specifications, we have been having an on-going discussion on the definition of essentially equivalent, and have not been able to come up with good criteria for Section II to use. Do we really want a manufacturer to make this decision?	A possible solution may be to change to “—similar grades with equivalent properties”. When you solve this one, let me know so we can add this decision to our discussion in Sub-group IMS	
DK 164		8.3.1.2	Table 5 Note ^a	te	This note ^a refer to the yield strength for steels, In a Welding procedure the transverse tensile test is only giving results for the Tensile strength of the joint (no results for the yield strength is recorded) Is the Yield strength the best method for “Range of qualification” with regard to welding procedures?	Use tensile strength as the essential variable for welding procedure “Range of qualification” with regard to strength.	
FR 165		8.3.1.2	Table 5	te	A lot of combinations are missing in this table. This will lead to interpretation difficulties.	To add the following missing combinations : Group 3-2 shall cover 2-2, 2-1, 1-1 Group 3-3 shall cover 2-2, 2-1, 1-1 Group 4-2 shall cover 4-1 Group 4-3 shall cover 4-2 , 4-1 Group 6-2 shall cover 6-1 Group 6-3 shall cover 6-2, 6-1 Group 6-4 shall cover 6-3, 6-2, 6-1 Group 6-5 shall cover 6-4, 6-3, 6-2, 6-1 Group 9-2 shall cover 9-1 Group 9-3 shall cover 9-2,9-1 Group 11-2 shall cover 11-1 Group 11-3 shall cover 11-2, 11-1	
GB 166		8.3.1.2	Table 5, Page 19	te	Range of qualifications of some combinations are incomplete	Row 3 col 1 add 1-1 Row 4 col 2 add 4-1 Row 4 col 3 add 4-2 and 4-1	

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						Row 11 col 2 add 11-1 Row 11 col 3 add 11-2 and 11-1	
FR 167		8.3.1.3	Table 6	te	Test piece and range of qualification for material of groups 7 to 11 are missing in the Table. As example case of steel group 8 or group 5 on nickel alloy.	As minimum, to complete Table 6 with common cases : 41-8 shall cover 41-8 42-8 shall cover 42-8 etc. 41-5 shall cover 41-5 etc.	
FR 168		8.3.1.3	Table 6	ed	The note and table footnote c) are redundant.	The first part of the note should be deleted.	
DE 169		8.3.1.4	Table 5	te	For the scope regarding the parent material group to the parent material of the test piece A at 5, the pairings 5-1, 5-2 are missing. Since this combination is also available in group 6 as 6-1 and 6-2, it should not be distinguished technically at 5 here.	add 5-1 and 5-2 for test piece A regarding 5	
SE 170		8.3.1.4	Table 5		The footnotes in the draft apply to both materials compared to the current edition. This is an unnecessary restriction. It is only necessary to have a restriction for one of the materials in the material combination. See current edition and also table 6 in the draft.	The footnotes shall only apply to one of the materials in the material combination.	
SE 171		8.3.1.4	Table 5 Footnote c		The current edition of ISO 15614-1 is technically correct, that for a test in group 8.2 to cover welding in group 8.1 materials.	Move group 8 from footnote c back to footnote b	
DE 172		8.3.2	Table 7	ge, te	Footnote a: Re-wording necessary.	<i>...are specified, the range of qualification is limited to the upper value. If performed no impact testing, the upper limit is 12 mm.</i>	
DE 173		8.3.2	Table 7	te	Right column in 3rd, 4th and 5th line shall be proofed with view of „max. 2s when s < 20“		
DE 174		8.3.2	Table 8	te	2nd and 3rd line: Change of thickness from „38 mm“ to „30 mm“, otherwise the user of this standard will get problems for already qualified WPS according to the current issue of EN ISO 15614-1.	Change the limit.	

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SE 175		8.3.2	Table 8	te	The change from 30 to 38 mm implies unnecessary cost for the industry (no added value). On one hand a lot of new qualifications for companies that work to product standards. On the other hand, a thicker test piece means higher cost, especially when mechanical properties shall be tested as a complement to the fillet weld test.	Change back to 30 mm	
DE 176		8.3.2.1	2 nd paragraph	te	The size definition for the material thickness of a thickness of ≥ 38 mm is not plausible to understand for which reason the limit of $D \geq 30$ mm was changed according to a still valid standard; today in the valid standard, for example, a fillet weld includes a butt joint. If $D \geq 38$ mm, then only a butt joint with ≥ 19 mm is qualified. Hence, an additional test specimen is required.	add the limit of a thickness of ≥ 30 mm again	
DE 177		8.3.2.1			<i>Both parts...shall be within the limits of thickness qualified...</i> This is in contradiction to 8.3.2.2. For Level 1: Each fillet weld test qualified all weld dimensions and material thicknesses.	For butt welds, T-joints (as well as fillet weld Level 2) both to weld parts shall be within the material limits...	
DE 178		8.3.2.1		te	Welding of intermediate metal conduit resp. welded pocket as pipe-in-pipe connection are not defined. Usually a seal weld is applied with partial HV-shaped bevel or fillet weld.	please add: f) socket weld the WT of inside pipe For joints (seal weld) between intermediate metal conduit resp. welded pocket and weldolet nozzle (pipe in pipe fillet weld connection / socket weld) the geometry (diameter and wall thickness) of inner pipe are representative for range of validity	
FR 179		8.3.2.1	1 st paragraph	ed/te	The sentence " except that weld thickness associated with the fillet in combination butt/fillet welds shall not be considered" is not clear	To read : "except that weld thickness associated with the apothem of butt weld of T-joint shall not be considered"	
FR 180		8.3.2.1	2 nd paragraph	te	It is written that both parts of the parent material to be welded shall be within the limits of thickness qualified, while it is written after Table 8 that for level 2, the range of qualification is based on the thicker material.	In order to be consistent, to add a sentence at the end of the second paragraph, as follows : Both parts of the parent material to be welded shall be within the limits of thickness qualified except that for dissimilar thickness parent materials, there is no limit on the thicker part provided the qualification	

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						was performed on parent material of 38 mm or greater. Nevertheless, in case of fillet weld according to level 2, only the thickness of the thicker material shall be within the limits of thickness qualified."	
GB 181		8.3.2.1	Second paragraph	te	New para in place of existing to bring into line with existing standard ISO 15614-1:2004 A2:2012.	In the case of T joints , butt welded and fillet welded, both parts of the parent material to be welded shall be within the limits of thickness qualified except that for dissimilar thickness parent materials, there is no limit on the thicker part provided the qualification was performed on parent material where both members are 30 mm or greater in thickness.	
DE 182		8.3.2.1 8.3.3	 table 9	ed + te	c) set-on branch connection: thicker parent material. footnote a: D is the outside diameter of the pipe or outside diameter of the branch pipe. Both paragraphs cannot be combined in case of heavy wall thickness on base pipe (e.g. OD 508 x 70mm) and small diameter of branch pipe (e.g. OD38 x 10mm), because a test piece cannot qualify heavy wall thickness of base pipe and small diameter of branch.	Change to: c) set-on branch connection: thickness of branch pipe.	
DE 183		8.3.2.2	2 nd paragraph	te	The size definition for the material thickness of a thickness of ≥ 38 mm is not plausible to understand for which reason the limit of $D \geq 30$ mm was changed according to a still valid standard; today in the valid standard, for example, a fillet weld includes a butt joint. If $D \geq 38$ mm, then only a butt joint with ≥ 19 mm is qualified. Hence, an additional test specimen is required.	add the limit of a thickness of ≥ 30 mm again	
DE 184		8.3.2.2	Table 7	te	The second line probably has a spelling mistake: thickness of the test piece $3 < t \leq 12$ mm, parent material thickness level multi-run: here it is stated 3 to 2 t, it should be 0.5 to 2 t, a comparison with the other listed restrictions to $t \leq 100$ suggests this	change into 0.5 to 2 t ($3 < t \leq 12$, level 2 multi-run)	
DE 185		8.3.2.2	Table 7	te	Scopes are defined incorrectly for the thickness of the weld metal level 1 and level 2 with thickness of the test pieces t for the case 6:	Case 6 (thickness of the test piece) $100 < t < 150$: for thickness of the weld metal change in max 300 if $s \geq 20$	

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					100 < t < 150 and the case 7 t > 150, the max value is only based on level 1; at 100 < t < 150, the value should be 2 t and thus max 300 instead of max 200, so it covers both stages 1 and 2, analogue that also applies to the line for the case t > 150	Case 7 (thickness of the test piece) t > 150: Max 2 s if <= s < 20 Level 2: max. 300 if s > = 20 Level 1: max 1.33 s if s > = 150	
DE 186		8.3.2.2	Table 8	te	Regarding the thickness of the test piece, the value was changed from 30 mm to 38 mm with respect to lines 2 and 3: 3 mm < T < 38 mm and t > = 38 mm. The size definition for the material thickness of a thickness of >= 38 mm is not plausible to understand for which reason the limit of D>= 30 mm was changed; today in the valid standard, for example, a fillet weld includes a butt joint. If D>= 38 mm, then only a butt joint with >= 19 mm is qualified. Hence, an additional test specimen is required.	Change the values for level 2 into 30 mm again: 3mm < t < 30 mm and t > = 30 mm	
DE 187		8.3.2.2	Table 7	te	This table (thickness of the parent material) not applies to butt welds in combined processes.	<i>multilayer^b</i> <i>b) for combined processes:</i> <i>t = Σ qualified range of thickness for each single process (this is in accordance with 8.4.1)</i>	
DE 188		8.3.2.2	Table 7	te	20 < t ≤ 40: Range of qualification regarding thickness of weld metal and parent material shall be clarified: e.g.: combined process t = 40mm root S ₁ = 10 mm (141) fill- and coverlayer S ₂ = 30 mm (111) Range of qualification: max 2t ≤ 80 mm Range of qualification S ₁ = 2s ≤ 20 mm (141) Range of qualification S ₂ = 2t ≤ 80 mm (111) Range of qualification weld metal: 20 mm + 80 mm = 100 mm Range of qualification max material ≠ max weld metal. What is the relevant range of qualification?		

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DE 189		8.3.2.2	Table 7	te	What is the range of qualification for build-up welding?		
DE 190		8.3.2.2	Table 8	te	<i>For level 2: The range of qualification, see table 8, is based on the thicker material.</i> This is in contradiction to 8.3.2.1 General: <i>Both parts of the parent material...shall be within the limits of thickness qualified...</i> What is the range of qualification for T joint: $t_1 = 40 \text{ mm}$ on $t_2 = 50 \text{ mm}$? According to 8.3.2.1 General: $t_1 = 40 \text{ mm}$ and $t_2 \geq 5 \text{ mm}$	Text <u>For level 2</u> shall deleted or For level 2: The range of qualification for $t \geq 38 \text{ mm}$ (see Table 8) relates to the thicker material.	
DE 191		8.3.2.2	Table 8	te	<i>Note 2: Where a fillet weld is qualified by means of a butt weld test,....</i>	What is the definition of the qualified range of material thickness?	
DE 192		8.3.2.2	Table 9	te	^a $D \dots$ is the outside diameter of the branch pipe for a branch connection.	What about the range of qualification for the main pipe?	
DE 193		8.3.2.2	Table 7	te	We do not agree to the table 7. To fulfill the old scope (table 5) opposite the new scope, more must be proved against process inspection and testings.	We make the request to correct the table 7 and to take on the values (line 1, 2 and 3) from the old table 5.	
DE 194		8.3.2.2	Table 7	te	For thickness of test piece $3 < t \leq 12$, multilayer, Range of qualification is "0,7t to 2t". It is incomprehensible, not logical and technically not necessary to reduce the range of qualification for this WT-range of test piece to min. 0,7t. For all other WT $t < 3 \text{ mm}$ and $t > 12 \text{ mm}$ the qualified range is "0,5t to 2t", which is technically comprehensible and has to be applied for $3 < t \leq 12$ too.	Change to: Range of Qualification "0,5t to 2t",	
DE 195		8.3.2.2	table 7	te	$3 < t \leq 12$: Multilayer: 0,7t to 2t change, because scope of applicability in upper thickenss range too small	change to 3 to 2t	
FR 196		8.3.2.2	3 rd paragraph, level 2	te	The range of qualification defined for level 2 is in contradiction with the last paragraph, which is applicable to both levels 1 and 2.	To read for level 2 : " <u>For level 2</u> : The range of qualification of fillet welds qualified by a full penetration butt joint or fillet weld test is given in Table 8. "	

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FR 197		8.3.2.2	Table 7	ed	The foot of the Table contains footnote, key and a text related to level 1. This must be changed to be in accordance with 6.6.6.6 of ISO/IEC directive, Part 2.		
FR 198		8.3.2.2	Table 7 Text related to level 1	te	The thickness limit of 16 mm for impact testing is only applicable to level 1 and should be identical to the one of the previous edition (2004) of ISO 15614-1	To read : "Where impact testing is a requirement, for test pieces 12 mm thick or greater, the minimum thickness qualified is 12 mm. For test pieces less than 12 mm thick, the minimum thickness qualified is the thickness of the test piece."	
FR 199		8.3.2.2	1 st paragraph		Wording improvement in the French version	To read : « La qualification d'un mode opératoire de soudage par épreuve obtenue sur une épaisseur t qualifie les épaisseurs selon les domaines de validité donnés dans les Tableaux 7 et 8. »	
FR 200		8.3.2.2	Table 7	ed	Error in the French version	To replace « 1,5 à 2 » with « 1,5 à 2t »	
GB 201		8.3.2.2	Second paragraph	te	Change 38 mm to 30 mm as above and reinforce clause.	For dissimilar thickness parent materials, there is no limit on the thicker part provided the qualification was performed on parent material of 30 mm or greater. This is only applicable to T joints , butt welded or fillet welded.	
GB 202		8.3.2.2	Table 7	ed	For clarification for the user, make two separate tables, one for level 1 and another for level 2. Errors or anomalies as a consequence of this confusion in the current table can then be addressed. As level 2 will qualify for level 1, the requirements for level 1 must not be more stringent than for level 2. Footnote for level 1 – needs clarification from SC 10 in relation to 7.1 and impact testing.	For clarification for the user, make two separate tables, one for level 1 and another for level 2. Several general editorial errors need to be addressed in this process. Split the paragraphs in the footnotes accordingly.	
GB 203		8.3.2.2	Table 7, footnote a	ed	Spelling mistake	"shall been" change to "has been"	
GB 204		8.3.2.2	Table 8	te	Change 38 mm to 30 mm in two places. Should t be in italic styte? Delete 0,75 from row 3 under the single run column.	Change 38 mm to 30 mm in two places, Delete 0,75 from row 3 under the single run column.	

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GB 205		8.3.2.2	Table 8	te	Under table 8 for level 2 change clause to read as proposed:	For level 2: The range of qualification, see table 8, is based on both component parts separately.	
NL 206	8	8.3.2.2	2 nd par	ed	Delete paragraph as it is in 8.3.2.1	Delete paragraph	
NO 207		8.3.2.2	Table 8	te	"For level 2: The range of qualification, see table 8, is based on the thicker material." We do not understand this statement.	Please clarify or delete the statement:	
NO 208		8.3.2.2	Table 8	te	We prefer the 30 mm value given in ISO 15614-1:2004	Change 38 mm back to 30 mm.	
SE 209		8.3.2.2	Table 7 Footnote a		The draft now says that a test with s and t 12 mm and no impact testing cover t24 and s12.	Amend footnote a also for the parent material range.	
NO 210		8.3.2.2.	For level 2:	te	"For level 2: The range of qualification of fillet welds qualified by a butt weld or fillet weld test is given in table 7 and table 8. The text does not correspond to Table 7 But welds and Table 8 Fillet welds. Fillet welds shall be qualified according to table 8.	" ----- is given in table 7 and table 8."	
DE 211		8.3.3	Paragraph 2	te	Qualification given for plates also covers pipes when the outside diameter is > 500 mm or when the diameter is > 150 mm welded in the PA or PC rotated position.	We demand here the positions. Please, complements PF the rotated position	
DE 212		8.3.3	Table 9, footnote a	ed	Understanding of note is not satisfactory. You may suggest that in case of a branch connection you have the choice to select pipe or branch for creating validity range, because the sentence separates "pipe" and "branch pipe" by an "or". In our understanding pipe(see key figure 2) means a pipe-pipe connection (butt joint), while a pipe in a branch connection should consequently be named "base pipe" or "main pipe" (see. key D1 in figure 4).	Separate sentences for a better understanding: "In case of a pipe-pipe connection or set-in branch connection, D is the outside diameter of the base pipe. In case of an attached branch connection, D is the outside diameter of the branch pipe."	
DE 213		8.3.3	table 9	te	Case D > 25: (25 min too small)	(25 mm min.) remove	
EH 214		8.3.3	Table 9 note a	ed	The meaning of the word "respectively" is unclear		

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FR 215		8.3.3	Table 8	ed	To simplify the table for the range of qualification for throat thickness in single run	To merge the cells of these 3 identical lines.	
FR 216		8.3.3	Level 2	ed	To clearly indicate that the diameter > 50 mm is an outside diameter	To read : "... Qualification given for plates also covers pipes when the outside diameter is > 500 mm or when the outside diameter is > 150 mm welded in the PC or PA rotated position."	
FR 217		8.3.3	Table 9, note	te	The note does not be applied to rectangular hollow section.	To replace the note with : "NOTE : For curve hollow section other than circular (for example elliptic), D is the dimension of the smaller side"	
FR 218		8.3.3	1 st paragraph, level 2	ed	Wording improvement in the French version	To read : « La qualification d'un mode opératoire de soudage par épreuve obtenue sur un diamètre D qualifie des diamètres selon les domaines de validité donnés dans le Tableau 9 »	
GB 219		8.3.3.3	Level 1	te	The product form should be restricted to just plate and pipe.	For level 1: The diameter is not an essential variable. Any product form i.e. plate, pipe qualifies for all product forms.	
BE 220	Page 23	8.3.4	For Level 2:	te	2 nd sentence "A test piece with a branch below 90° in the procedure test qualifies the angle $60^\circ \leq \alpha < 90^\circ$." to be modified; it is not clear.	Replace the sentence by: "A test piece made with a branch angle (α) between 90° and 60° in the procedure test qualifies the angle $60^\circ \leq \alpha < 90^\circ$."	
NL 221	8	8.3.4	Level 2	te	1 st sentence to be deleted; is not clear	Delete this sentence. Add at the end of this paragraph the sentence: "For α see Figure 4."	
BE 222	Page 24	8.4.1	For level 2	Te	Each degree of mechanization shall be qualified independently: This is because it has to do with performance qualification and not with procedure qualification.	Degree of mechanization is not an essential variable	
DK 223		8.4.1	1 st paragraph for Level 2	te	By increasing the degree of mechanizing we get better stability and better control of heat input which may give better mechanical properties	- Automatic welding - Fully mechanized welding - Partly mechanized welding - Manual welding. 4 qualifies for 1, 2, 3 and 4 3 qualifies for 1, 2 and 3 2 qualifies for 1 and 2 1 qualifies for 1 only	

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DK 224		8.4.1	4 th paragraph for Level 2	te	It is important to make it clear that the process used in production has been tested. The way the clause is written does not ensure this.	Change to: " <u>For level 2</u> : The qualification of a multi-process procedure is only valid for the processes where all required destructive tests for each process have been performed and accepted.	
EH 225		8.4.1	4 th paragraph, right column for level 2	te		Replace with: "The qualification of a multi-process procedure is only valid for the process sequence carried out during the multi-process procedure test, unless the required destructive testing covers <u>each individual welding process used</u> ."	
FR 226		8.4.1	4th paragraph, level 1, a)	ed	Wording improvement	To replace "WPS" with "pWPS".	
FR 227		8.4.1	4th paragraph, level 2	te	It is written for level 2: "The qualification of a multi-process procedure is only valid for the process sequence carried out during the multi-process procedure test, unless the required destructive testing covers all welding processes used." In case of production back welding based on the welding procedure specification without back welding, this paragraph is in contradiction with 8.4.3 level 2 e), f) and i).	To read : "The qualification of a multi-process procedure is only valid for the process sequence carried out during the multi-process procedure test, unless the required destructive testing covers all welding processes used. Nevertheless in case of a qualification of a multi-process procedure, it is allowed for a given process to perform a back welding in accordance with 8.4.3, level 2 e), f) and i). "	
GB 228		8.4.1	Level 2	te	Delete the word "destructive"	Delete the word "destructive"	
DE 229		8.4.1 2b		te	When impact testing is required, the test piece shall be subjected to PWHT time of at least 80 % of the aggregated time(s) at temperature(s) that will be encountered by production welds. The total time(s) at temperature(s) may be applied in one test piece heating cycle., leaves room for interpretation	Define unambiguously: Annelauing time 100% Production --> 80 % VP-test and not the other way around!	
BE 230	Page 24	8.4.2	3 rd par	te	Change "... impact requirements in different welding positions" to "... impact requirements, two test pieces in different welding positions ..."	Change accordingly	
BE 231	Page 24	8.4.2	3 rd par	ed	Add comma between "... are required" and "unless a single ..."	Add comma	

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DE 232		8.4.2	2nd Paragraph	ed	When impact and/or hardness requirements are specified and/or conjunction is confusing	Improve wording as follows: <i>For qualification of all welding positions, the following requirements shall be fulfilled:</i> - Specimens for impact test shall be taken from the weld metal in the highest heat input location - Specimens for hardness test shall be taken from the weld in the lowest heat input location	
DK 233		8.4.2		te	Vertical downwards is significant different to the other positions.	Remove the full stop and add at the end of the 1 st sentence: "with the exception of vertical downwards which shall be qualified seperately".	
DK 234		8.4.2		te	For duplex stainless steel there is no need to limit the lowest heat input as it is only an advantage to cool fast.	Change to: "For material of Group 10 the highest heat input positions shall be subject to impact testing."	
EH 235		8.4.2	2 nd paragraph	ed		Move to clause 7.2	
EH 236		8.4.2	Note	ed	This is unclear but may be in the wrong clause		
FR 237		8.4.2	3 rd paragraph	ed	Wording correction	To delete "in" in order to read : "To satisfy both hardness and impact requirements in different welding positions are required unless a single position qualification is required."	
FR 238		8.4.2	2 nd paragraph	ed	Bad wording in the French version for location	To read : "Lorsque des exigences de résistance à la flexion par choc et/ou de dureté sont spécifiées, les essais de flexion par choc doivent être réalisés dans la soudure obtenue avec l' emplacement correspondant à l'apport de chaleur le plus élevé, et les essais de dureté doivent être réalisés dans la soudure obtenue avec l' emplacement correspondant à l'apport de chaleur le plus faible, ceci afin d'obtenir une qualification pour toutes les positions."	
GB 239		8.4.2	First para	te	Add at the end of the sentence, "except welding positions PG, PJ and J-L045."	Add at the end of the sentence, "except welding positions PG, PJ and J-L045."	
GB 240		8.4.2	Second and third	te	Delete both paragraphs and replace with a new text.	Add: " When impact and/or hardness requirements are specified, all positions (except welding positions	

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			pararaphs			PG, PJ and J-L045) shall be qualified when production welding heat input is within the requirements of 8.4.8. Where production welding exceeds the requirements of 8.4.8, a separate weld test(s) might be required to reflect the highest and lowest heat input positions."	
GB 241		8.4.2	4 th para		Add hardness testing and delete the NOTE following.	For material of Group 10, the lowest and highest heat input positions shall be subjected to impact and hardness testing.	
NL 242	8	8.4.2	2 nd par	ed	Add comma between "specified" and "impact tests"	Add comma	
NL 243	8	8.4.2	3 rd par	ed	Change "... positions are required..." to "...positions, test pieces are required..."	Change accordingly	
NL 244	8	8.4.2	note	ed	Change "...reduced length..." to "...reduced in length..."	Change accordingly	
NO 245		8.4.2	Para. 1	te		Add the following text from ISO 15614-1:2004: "---in all positions (pipe or plate) <u>except for PG, PJ and J-L045 where a separate welding procedure test shall be required</u> "	
NO 246		8.4.2	Para. 3	te	The text in sentence 1 is incomplete.	"To satisfy both hardness and impact requirements <u>welding tests</u> in different welding positions"	
SE 247		8.4.2	Para 3		Welding position has no impact on the weld properties. It is the heat input that influence the properties of the weld. However, the position (not welding position) where the samples shall be taken should be referenced . It is very important to differentiate between these two.	Change 3 rd paragraph to Both hardness and impact requirements are satisfied, and no extra tests are necessary as long as the requirements for heat input in 8.4.8 are met. NOTE The heat input can be different for different techniques used for certain welding positions Amend reference to figure 5 concerning the position (not welding position!) where the samples shall be taken.	
US 248		8.4.2	First sentence	te	Is it really the intent to have parameters developed on a pipe welded in the horizontal rolled position (essentially flat) qualify for a fixed pipe in all positions?	Add more restrictive positional requirements as currently exist.	

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US 249		8.4.2	First sentence and Figure 6	te	The sentence says that any position will qualify for all, but the sketch shows up and down hill welding for the test pieces.	If more restrictive positional requirements are not initiated, add a reference for Figure 6 in the second paragraph where it talks about high and low heat input areas.	
US 250		8.4.2	Third paragraph	ed	The first sentence of the third paragraph is incomplete and does not make sense.	No suggestion since I'm not sure what the intent is.	
DE 251		8.4.2, 8.4.5, 8.4.8	note	ge	Notes shall not contain requirements ("shall"; see 3.3.1 and Table H.1) or any information considered indispensable for the use of the document, e.g. instructions (imperative; see Table H.1), recommendations ("should"; see 3.3.2 and Table H.2) or permission ("may"; see Table H.3). Notes may be written as a statement of fact. [see ISO/IEC Directives – Part 2:2011, 6.5.1]	Please check and correct.	
BE 252	Page 24	8.4.3	For Level 2: Par b)	te	The sentence "Butt joints in pipe qualify branch connections with an angle $\geq 60^\circ$;" is not so clear	Add some more details to the sentence like: "Butt joints in pipe qualify branch connections with an angle $\alpha \geq 60^\circ$ (see Figure 4 for α);"	
BE 253	Page 24	8.4.3	For Level 1: Par i)	te	What is the maximum criteria regarding "additional build-up welding" (e. g. wide root gap) and what are the limitations?	Maximum criteria = mm. Limitation range (WPQR) = from mm until ... mm	
DE 254		8.4.3	Level 2 a j)	te	The indication under j) "additional overlay welding" offers considerable room for interpretation and it should be therefore specified	Adapt here the formulation so that it is clearly described that butt joints should include overlay welding.	
DE 255		8.4.3	For Level 2 a)	te	a) <i>Full penetration butt welds in butt joints qualify full and partial penetration butt welds and fillet welds in any type of joints;</i> Applies this to partial penetration T-butt joints also? If yes, what is the range of qualification for the deposit weld thickness and definition of material thickness? In case of T-butt joints the material thicknesses t1 and t2 according to table 7 were considered?		
DK 256		8.4.3		ed	For both Level 1 and Level 2 sections	Delete: "in butt joints" after butt welds.	

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DK 257		8.4.3	e) first column	ed	Typing mistake.	Change to same wording as for Level 2.	
EH 258		8.4.3		ed		Change the numbering of sub-clauses a) to i) (for level 1) or a) to j) (for level 2) to make it clearer where the requirements are the same.	
FR 259		8.4.3	Level 1 i) Level 2 j)	te	What is an "Additional build-up" Add the type of test coupon which qualifies the "build-up"	To delete "additional" To add: build up is qualified by butt weld t	
FR 260		8.4.3	Level 1 c) Level 2 d)	ed	Bad French translation	To read: "les soudures d'angle ne qualifient que les soudures d'angle"	
GB 261		8.4.3	Level 2 a)	te	Reword a as proposed should not cover T joints butt welded	a) Full penetration butt welds in butt joints qualify full and partial penetration butt welds, excluding T joints butt welded, Fillet welds are qualified within the ranges specified in this standard.	
GB 262		8.4.3	Level 2 i)	te	Re-instate from current standard	i) it is not permitted to change a multi-run deposit into a single run (or single run on each side) or vice versa for a given process;	
GB 263		8.4.3	Level 1 e)	te	Reword a as proposed	e) Welds made with backing qualify welds made from both sides;	
FR 264		8.4.4	Niveau 2	ed	Wording improvement in the French version	To read: " <u>Pour le niveau 2</u> : Les matériaux d'apport couvrent d'autres matériaux d'apport à condition que selon la désignation de la Norme internationale appropriée correspondant au matériau d'apport concerné , ils aient des propriétés mécaniques équivalentes, le même type d'enrobage ou de flux, la même composition chimique nominale et une teneur en hydrogène inférieure ou égale."	
DE 265		8.4.5		te	<i>Note: This provision...</i> Relates this provision to sentence 2 and 3 or to sentence 3 of this paragraph only?	Is the note already relevant, because solid wire and rods (for Level 2) according to 8.4.4 were considered?	
DE 266		8.4.5		te	We apply to change the manufacturer at a filler metal according to the norm and the same quality guaranteed	e.g. E Mo B 4 2 H5	

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DE 267		8.4.5		te	For impact energy the exchangeability of equivalent filler metal should be permissible	If a charpy V test is required, the scope of applicability of welding processes 111, 114, 12, 136 und 137 is limited to the specific kind of manufacturing, which has been used for the welding procedure qualification. It is permissible, to change from the specific kind of manufacturing of the filler metal to another, provided this has the same binding designation with respect to chemical composition and the mechanical-technological properties. Comment:: this requirement does not apply for solid wires and bars with the same designation and nominal chemical composition.	
EH 268		8.4.5	Note	te	This is unclear	Write in normative text what is permitted for solid wire and rods with the same designation and nominal chemical compositions.	
GB 269		8.4.5	1 st para	te	Change -20 to 0 for safety reasons	less than 0 °C, for.....	
IT 270		8.4.5		te	It is better to keep the actual situation (par 8.4.5 of EN 15614-1:2004)	When impact testing is required for processes 111, 114, 12, 136 and 138, the range of validity is restricted to the manufacturer trade name of the filler material used in the procedure test. It is permissible to change the manufacturer of filler material to another with the same compulsory part of the designation when an additional test piece is welded. This test piece shall be welded using the identical welding parameters as the original test and only weld metal impact test specimens shall be tested.	
SE 271		8.4.5			The process 138 shall be excepted from this requirement due to the difference in precision in manufacturing in comparison with flux cored wires. The change in manufacturer trade name within the same consumable designation for metal cored wires is not essential to the properties, in the same way that a change of flux cored wires is.	Delete process 138.	
DE 272		8.4.8	Paragraph 3		Averaging criteria in combination with upper and lower limits for the heat input regarding impact properties and hardness limit the linear energy too much in a the way that realistic welding parameters	Consider the old text from the valid standard: When impact requirements apply, the upper limit of heat input qualified is 25 % greater than that used	

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					during manual welding of quality assured seams are no longer realizable in the implementation of the given scope in relation for example to the parent material thickness without qualifying additional procedure tests in order to open the parameter range of welding instructions. Here is an example: plate t = 10 mm qualified with process 141 PA, 45 °, I = 120 A, U = 14 V, line energy 6.72 kJ / mm, welding speed vs = 9 m/ min, a plate of t = 3 mm is in the scope, however, it is not quality assured to weld: Here, realistic parameters for t = 3mm, process (141): I = 67 A, U = 12 V, vs = 12 m / min, linear energy 2.41 kJ / mm	in welding the test piece. When hardness requirements apply, the lower limit of heat input qualified is 25 % lower than that used in welding the test piece.	
DE 273		8.4.8		te	What is the definition for mean value of heat input?	Add definition for mean value of heat input.	
DE 274		8.4.8		ed	The heat input shall be calculated in accordance with ISO/TR 17671-1 for typical runs...for each diameter in order to define the maximum qualified heat input.	The text shall be improved as follows: The heat input shall be calculated in accordance with ISO/TR 17671-1 for typical runs...for each <u>used</u> diameter in order to define the maximum qualified heat input.	
DE 275		8.4.8	formula	te	The energy input per unite length is calculated by this equation. The heat input Q is calculated under consideration of the thermal efficiency of the process (see EN 1011-1, paragraph 8.7)	Replaces word as follows: NOTE The <u>energy input per unite length</u> may be... For process 111, the <u>energy input per unite length</u> may also be...	
DK 276		8.4.8		te	By accepting that upper and lower heat input will qualify for all heat inputs between we will see welding procedures where one layer will be welded with an unrealistic low heat input and one other layer with an unrealistic high heat input.	Delete the following 2 sentences: "- the maximum heat input used when welding the test piece, or" And "- the minimum heat input used when welding the test piece".	
DK 277		8.4.8		te	Only the maximum qualified heat input is defined. The minimum qualified heat input is perhaps even more important to avoid brittle high hardness structure. Also important to avoid hydrogen cracks.	Change to: "The heat input shall be calculated in accordance with ISO/TR 17671-1 for typical runs in the root, filling and capping layers. For covered electrode the heat input average shall be calculated for each diameter in order to define the maximum and minimum qualified heat input."	

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FI 278		8.4.8	NOTE	ed	Use ISO terms.	Replace Voltage by <u>arc voltage</u> , current by <u>welding current</u>	
FR 279	17	8.4.8	Paragraph after the note	te	In the alternative methods to determine the arc energy, the link between these parameters and the range of qualification defined for the heat input is not clearly defined.	Guidelines should be given to explain how to apply the rules concerning the heat input in the case where arc energy is only determined using instantaneous energy or power.	
FR 280		8.4.8	Last sentence	ed	Bad French translation for "amperage"	To read : "il est recommandé de ne contrôler que les paramètres réglables, tels que l'intensité et/ou la tension."	
GB 281		8.4.8		te	Arc energy applies to level 1 only and heat input to level 2.	All reference to arc energy move to a level 1 column	
IT 282		8.4.8		te	It's not clear if it should be applied to the higher or the lower of the two values	When hardness requirements apply the lower limit of heat input qualified is: — the minimum heat input used when welding the test piece; or an average value of the heat input used when welding the test piece, minus 25 %.	
SE 283		8.4.8			To use the option of the maximum heat input used in the test to set the range is not technically correct. One run with high and the rest of the runs with relative low heat input can create a weld with relative good properties. But this high energy run gives the possibility to do all runs with the high heat input, which is not correct. This is unfortunately something that is frequently attempted.	Delete the second option for the range of heat input.	
NO 284		8.4.8.	Para 3	te	Add requirement on reporting of heat input.	"The heat input----- the root, filling and capping layers, <u>and recorded separately</u> ."	
FR 285		8.4.8 8.4.9 8.4.10		te	A new modification of the rules concerning heat input is not acceptable. It was, +/- 15% then +/- 25% and now max /min recorded or the average +/-25% per sequence. The aim of a qualification test coupon shall be clarified at the beginning of the standard.	Come back to last edition +/- 25% Add the possibility to validate the heat input and the min preheating temperature by another way that the welding procedure qualification i.e. material data, preheating temperature and heat input may be specified e. g. by a material data sheet and depends on the material thickness. ISO/TR 17671-2 gives information regarding preheating.	

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DK 286		8.4.9		te	The preheat temperature is an important parameter for avoiding hydrogen cracks. Therefore the preheat temperature shall not be lower than what was qualified during the procedure test.	Change to: "When preheating is used in the welding procedure test, a decrease from the recorded value preheating temperature on the WPQR requires a re-qualification."	
FI 287		8.4.9		te	Reading this clause as such could cause some confusion. A decrease by 50°C is not possible without a decrease in the material thickness. This clause should be clarified.	Add the following sentence. A decrease of the preheating temperature is permitted only if the requirements concerning preheating (especially the combined thickness) according to ISO/TR 17671-2 are fulfilled. Delete the note	
FR 288		8.4.9	Note	ed	This note is useless in a welding test procedure.	To delete the note	
GB 289		8.4.9		te	Delete paragraph and re-instate existing clause in current standard	Delete paragraph and re-instate existing clause in current standard	
IT 290		8.4.9		te	Reduction of 50°C of preheating temperature for all cases could be dangerous.	For level 1: When preheating is used in the welding procedure test, a decrease of more than 50°C from the recorded preheating temperature on the WPQR requires a re-qualification. For level 2: When preheating is required the lower limit of qualification is the nominal preheat temperature applied at the start of the welding procedure test.	
NL 291	8	8.4.9	note	te	Welding below freezing point shall be prohibited	Add Note 2 to read: "Welding shall not be performed at temperatures below 5 °C unless specifically qualified."	
NL 292	8	8.4.9		te	A decrease in preheat for the process 111-c could lead to detrimental welding defects, cold cracking. See attachment for technical support for this change.	For all welding processes, except for process 111-C, a decrease of 50 C in preheat is allowed.	
SE 293		8.4.9			It is a significant change to apply "when pre-heating is required" as in the current edition, compared to "when pre-heating is used in the test". Further, 50 degrees lower pre-heat temperature can be devastating for the forming of defects.	Change back to be at least the pre-heat temperature used in the test, however only if pre-heat is required, e.g. according to a product standard or for the thickness range, see ISO/TR 17671-2.	

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NO 294		8.4.9.		te		Add a new para. 2: <u>An increased preheat temperature intentionally applied during welding of the capping passes to reduce hardness in HAZ of a welding procedure test, shall be considered as an essential variable. Both minimum preheat temperature applied, and the preheating temperatures applied during welding of the capping passes shall be reported.</u>	
FR 295		8.4.10	Level 2	te	The exemption to the limitation of the interpass temperature should also be appropriate for level 2.	To read for level 2 "For level 2: The upper limit of the qualification is the highest interpass temperature reached in the welding procedure test. This limitation does not apply when a WPS qualified with a PWHT above the upper transformation temperature or when an austenitic material is solution annealed after welding. "	
DE 296		8.4.12		te	There is no technical need to change from temperature controlled PWHT to time controlled PWHT. Is change to time controlled PWHT really wanted? If change to time controlled PWHT is wanted, please correct the following: Restriction (0,8 x T) of aggregated time(s) was taken from ASME code. In ASME the restriction of PWHT time is a supplementary essential for steels, that bears risk of brittle fracture (e.g. low design metal temperature). For others cases it is not essential and not required. There is no technical need for restriction of aggregated time (0,8 x T) for all materials. (Acc. EN material standards impact testing is required for all materials) In ASME code aggregated time is not restricted, only indirectly by qualified wall thickness. Aggregated time could be adopted to production weld adequate to wall thickness (e.g. acc. DIN EN 13480)	1. Use para 8.3.12 of ISO15614:2004 or 2. para 8.4.12, last sentence: Change "When impact test is required the test piece shall be subjected to PWHT time of at least 80%..." to "When the material for production has a MDMT (minimum design metal temper-ature) below - 10°C or bears risk of brittle fracture the test piece shall be subjected to PWHT time of at least 80%..." (Undifferentiated restriction for all materials is not acceptable.)	

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					Planned change would reduce validity range of all existing PQRs (by 40%), due to the following situation. For example: PQR with material group: 6.4 with WT 12 mm Aggregated time: 30 Min (acc. DIN EN 13480) Production with material group: 6.4 with WT 15 mm Aggregated time: 60 Min (acc. DIN EN 13480) 60 x 0,8 = 48 Min / PQR cannot be used anymore.		
DE 297		8.4.12	Last paragraph	te	A WPQ Level 2 Gr. 6-6 (e. g. X10CrMoVNb9-1, butt weld pipe 51.0 diam. x 6.3 mm, 141, annealed at 760 °C / 30 min) has a range of approval for wall thicknesses of 3 to 12.6 mm according to Table 7. Considering Table 2, Index d (application standard) impact tests are required which were fulfilled. The included "80-percent-minimum regulation" for the holding time has the effect that production circumferential welds of 60.3 diam. x 10 which are annealed at 760 °C / 60 min. are not covered by the above mentioned WPQ. Conversely, a WPQ (see above) with a holding time of 60 min. which is to qualify production welds of 38.0 diam. x 4.0, would not provide sufficient safety as regards toughness, if these welds could be annealed for 30 minutes for reasons of economic efficiency. Qualification of the minimum holding time with sufficient impact strength referred to the wall thickness approval range of the WPQ is technically advisable and reduces the required WPQ. Adjustment of the holding time (increase) to the component dimensions of production is a matter of course because of the dependence holding time - impact strength.	Omission of this "80-percent-minimum regulation " and retaining of the regulation as in issue 2012-06, Clause 8.4.12, 2. Paragraph 2. sentence ... (<i>... and the holding time are to be related to the component.</i>)	
FR 298		8.4.12		ed	Bad numbering of the dashes in the French version	To replace "k)" with "a)" and "a)" with "b)".	
GB 299		8.4.12	Last paragraph	te	The last paragraph only applies to level 1	Make it a level 1 column	

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(Ed 2)

MB/ NC ¹	Line number	Clause/ Subclause	Paragraph/ Figure/Table	Type of comment ²	Comments	Proposed change	Observations of the secretariat
FR 300		8.4.13		te	Why a change in the initial heat treatment condition (that is a metallurgic concern) is an essential variable for level 2 and not for level 1.	The range of qualification shall be identical for both levels	
DE 301		8.5.1	Level 2 2nd Paragraph		Flux are regulated in classification standards, therefore, the classification of the flux type is relevant and not the trade name	Replace trade name and manufacturer restrictions by: .. is limited to the standard classification of the flux used ...	
DE 302		8.5.1	Level 2 a)	ed	...Also a change of more than $\pm 10\%$ of the ratio of the supplementary filler material to the electrode require re-qualification. Unclear meaning.	Text should be formulated precise.	
DE 303		8.5.1	Table 10	ed	Table 10 — Grouping of filler metals and electrodes for qualification (Grouping of welding electrodes and rods for qualification)	Add Note in Table 11 <i>Note: Apply to Level 1 only, see 8.4.4</i>	
DE 304		8.5.1	Table 11	ed	Table 11 — Grouping of ferrous weld metal by chemical analysis Not applicable to nonferrous materials	Add Note in Table 11 <i>Note: Apply to Level 1 only, see 8.4.4</i>	
DE 305		8.5.1	Matrix	te	Heat input* *if required	<i>Heat Input**</i> <i>**If required in 8.4.8</i>	
DE 306		8.5.2.1	3rd paragraph	ed	This paragraph should be clarified to avoid misinterpretation: it might be confused with the tolerances according to ISO 14175. The tolerances according to the standard allow larger deviations up to 0.5 %	Identify percentage as an absolute value that does not refer to the tolerances according to ISO 14175, but only on a self-mixed gas composition	
DE 307		8.5.2.1	Page 38 4. para	ed	Add the issue date for ISO 14775 standard in line to reference list in 2 Normative references.	The designation ISO 14175:2008 may be used to specify the shielding gas composition, e.g. M21 (82/18).	
FR 308		8.5.2.1	4 th paragraph	te	The designation of shielding gases according to ISO 14175 shall not be optional, but mandatory.	To read : "The designation of ISO 14175 shall be used to specify the shielding gas composition, e.g. M21 (82/18).	
BE 309	Page 32	8.5.2.3	8.5.2.3	ed	Change Subclause "8.5.2.3" "Filler material" to "8.5.3.3"	Change accordingly	
FR 310		8.5.2.3	Last sentence	ed	Bad French translation for "pulse transfer"	To read : "La qualification à l'aide du transfert par pulvérisation, pulsé ou globulaire qualifie ces types de transfert."	

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FR 311		8.5.2.3 and 8.5.3		ed	Bad subclause numbering in the English version	To renumber 8.5.2.3 "Filler material" to 8.5.3.2. To renumber 8.5.3 "Plasma arc welding (Process No 15)" to 8.5.4.	
BE 312	Page 32	8.5.3	end	ed	Subclause 8.5.3 "Plasma arc welding"	Should be Subclause 8.5.4	
BE 313	Page 32	8.5.3.1	2 nd	Ed	Changenominal composition of the helium....tonominal composition or the helium	Change accordingly	
DE 314		8.5.3.1	3rd paragraph	ed	This paragraph should be clarified to avoid misinterpretation: it might be confused with the tolerances according to ISO 14175. The tolerances according to the standard allow larger deviations up to 0.5 %	Identify percentage as an absolute value that does not refer to the tolerances according to ISO 14175, but only on a self-mixed gas composition	
DE 315		8.5.3.1	Page 39 4. para	ed	Add the issue date for ISO 14775 standard in line to reference list in 2 Normative references.	The designation of ISO 14175:2009 may be used to specify the shielding gas composition, e.g. I3 (ArHe-30).	
FR 316		8.5.3.1	4th paragraph	te	The designation of shielding gases according to ISO 14175 shall not be optional, but mandatory.	To read : "The designation of ISO 14175 shall be used to specify the shielding gas composition, e.g. I3 (ArHe-30).	
FR 317		8.5.3 (2 nd one)	2 nd paragraph	ed	Reference to plasma arc welding (PAW) is not necessary in the subclause related to plasma arc welding. In addition PAW is not defined in ISO 4063	To read : "If impact tests are required, a change in the type of joint preparation (groove) requires a re- qualification."	
FR 318		8.5.3.2	1 st paragraph, 2 nd sentence	te	Reference should be made to ISO 14175 for inert low reactive and reducing backing gases.	To replace : "All inert low reactive and reducing backing gases cover each other, except for groups 7, 8, 10, 41 to 48." with "All inert backing gases of main group I, N or R according to ISO 14175 cover gases with the same classification, except for groups 7, 8, 10, 41 to 48."	
NL 319	8	8.5.3.2	Whole	te	This paragraph is relevant to other processes as well.	Add the same paragraph for processes 13, and 15.	
DK 320		9		te	No reference and traceability to base material and filler metal used for the procedure qualification are mentioned.	Add: "For level 2 the procedure qualification record shall include the 3.1 certificates for the base material and filler metal used for the qualification."	

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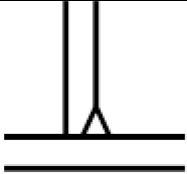
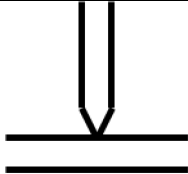
MB/ NC ¹	Line number	Clause/ Subclause	Paragraph/ Figure/Table	Type of comment ²	Comments	Proposed change	Observations of the secretariat
DE 321		Annex A		te	Missing information regarding tack welds.	Tack weld yes/no residual yes/no	
FR 322		Annex A	Record of weld test	ed	Metal transfer appears twice: in line 6 and in Table concerning welding details	To delete "Mode of Metal Transfer" in line 6.	
EH 323		Annex Z		te	There are no annexes Z correlating clauses of the standard to the Essential Safety Requirements in the Pressure Equipment or Simple Pressure Vessels Directives.	Prepare these annexes, making it clear that the presumption of conformity applies only to level 2. Note: the present layout with levels 1 and 2 in some clauses will make this task difficult. An alternative layout may be preferable or necessary. Additionally, the Simple Pressure Vessels Directive is currently being aligned to the NLF and the new version of the Directive may be available before the standard is proposed for formal vote.	

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Enclosure 1

to comment no. 045 (France)

Butt weld (Soudure bout à bout)			
			
T-joint (Assemblage en T)		Butt joint (Assemblage bout à bout)	

Enclosure 2

To comment no. 095 (France)

