



RUSSIAN MARITIME REGISTER OF SHIPPING

CIRCULAR LETTER

No. 314-04-1751c

dated 21.04.2022

Re:

amendments to the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships, 2022, ND No. 2-020101-156-E

Item(s) of supervision:
materials and welding

Entry-into-force date:
15.05.2022

~~Cancels/amends/adds Circular Letter No.~~

~~dated~~

Number of pages: 1 + 18

Appendices:

Appendix 1: information on amendments introduced by the Circular Letter

Appendix 2: text of amendments to Part III "Technical Supervision During Manufacture of Materials"

Director General

Konstantin G. Palnikov

Text of CL:

We hereby inform that the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships shall be amended as specified in the appendices to the Circular Letter.

It is necessary to do the following:

1. Bring the content of the Circular Letter to the notice of the RS surveyors, interested organizations and persons in the area of the RS Branch Offices' activity.
2. Apply the provisions of the Circular Letter when performing technical supervision during manufacture of materials, welders' qualification procedure and certification of welding processes on ships contracted for construction or conversion on or after 15.05.2022*, in the absence of a contract, in accordance with 5.10, Part II "Technical Documentation" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships, starting from 15.05.2022.

* Refer to the definition of the "Date of contract for construction of a ship (series of ships)" given in 1.1.2 of Part I "Classification" of the Rules for Classification and Construction of Sea-Going Ships.

List of amended and/or added paras/chapters/sections:

Part III: paras 2.1.3, 2.4.1.1.2, 2.4.1.1.4, 3.5.5, 4.3.1, 4.3.2.1, 4.3.2.2, 4.3.3.2, 4.4.4.1, 4.4.4.4, 4.5.1 — 4.5.3, 4.5.6, Table 4.5.7-1, paras 4.5.8 and 4.6.8.1, Appendices 1 and 2 to Section 4, paras 6.2.2.2 — 6.2.2.5

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"Thesis" System No. 22-39967

**Information on amendments introduced by the Circular Letter
(for inclusion in the Revision History to the RS Publication)**

No.	Amended paras/chapters/ sections	Information on amendments	No. and date of the Circular Letter introducing the amendments	Entry-into-force date
1	Para 2.1.3	Requirements for issuing the Recognition Certificate for Manufacturer (СПИ) have been specified	314-04-1751c of 21.04.2022	15.05.2022
2	Para 2.4.1.1.2	Requirements for steel acceptance have been specified	314-04-1751c of 21.04.2022	15.05.2022
3	Para 2.4.1.1.4	New para with the conditions of steel supply without the Recognition Certificate for Manufacturer (СПИ) has been introduced	314-04-1751c of 21.04.2022	15.05.2022
4	Para 3.5.5	Requirements for roughness of the surface have been specified considering ISO 8501-1	314-04-1751c of 21.04.2022	15.05.2022
5	Para 4.3.1	The terms and definitions have been specified in considering the latest ISO and GOST welding standards	314-04-1751c of 21.04.2022	15.05.2022
6	Paras 4.3.2.1 and 4.3.2.2	Welding terminology has been specified in accordance with the ISO and GOST standards	314-04-1751c of 21.04.2022	15.05.2022
7	Para 4.3.3.2	Terminology has been specified in accordance with ISO and GOST standards	314-04-1751c of 21.04.2022	15.05.2022
8	Para 4.4.4.1	Requirements for welded joints testing have been specified	314-04-1751c of 21.04.2022	15.05.2022
9	Para 4.4.4.4	Requirements for welded joints testing have been specified	314-04-1751c of 21.04.2022	15.05.2022
10	Paras 4.5.1 — 4.5.3	Terminology has been specified; requirements for the range of approval have been specified considering ISO and GOST standards	314-04-1751c of 21.04.2022	15.05.2022

No.	Amended paras/chapters/ sections	Information on amendments	No. and date of the Circular Letter introducing the amendments	Entry-into-force date
11	Para 4.5.6	Terminology has been specified	314-04-1751c of 21.04.2022	15.05.2022
12	Table 4.5.7-1	Symbolic notation has been specified	314-04-1751c of 21.04.2022	15.05.2022
13	Para 4.5.8	Requirements for the range of approval of the Welder Approval Test Certificates depending on welding positions have been specified considering IACS UR W32	314-04-1751c of 21.04.2022	15.05.2022
14	Para 4.6.8.1	Requirements for prolongation of the Welder Approval Test Certificate validity have been specified considering IACS UR W32	314-04-1751c of 21.04.2022	15.05.2022
15	Appendix 1 to Section 4, Figures 1 — 4	Terminology has been specified	314-04-1751c of 21.04.2022	15.05.2022
16	Appendix 2 to Section 4	Appendix has been completely revised; requirements for welding positions have been specified	314-04-1751c of 21.04.2022	15.05.2022
17	Paras 6.2.2.2 — 6.2.2.5	Terminology and references have been specified	314-04-1751c of 21.04.2022	15.05.2022

RULES FOR TECHNICAL SUPERVISION DURING CONSTRUCTION OF SHIPS AND MANUFACTURE OF MATERIALS AND PRODUCTS FOR SHIPS, 2022,

ND No. 2-020101-156-E

PART III. TECHNICAL SUPERVISION DURING MANUFACTURE OF MATERIALS

2 METALS

1 **Para 2.1.3** is replaced by the following text:

"2.1.3 Issuing the Recognition Certificate for Manufacturer (СПИ).

2.1.3.1 The Recognition Certificate for Manufacturer (СПИ) (form 7.1.4.1), if not otherwise stated (refer to 2.1.1.3), shall be issued by the RS Branch Office that performed the survey of the manufacturer.

2.1.3.2 The issued Recognition Certificate for Manufacturer (СПИ) shall contain in its annex information on the process and special features of material manufacture, dimensions of semi-finished products supplied, procurement documentation and, if needed, special features of product marking (refer to 1.4.2, Part XIII "Materials" of the Rules for the Classification and Construction of Sea-Going Ships).

The code of an item shall be given for each material in the Recognition Certificate for Manufacturer (СПИ) form according to the RS Nomenclature (refer to Appendix 1 to Part I "General Regulations for Technical Supervision")."

2 **Para 2.4.1.1.2** is replaced by the following text:

"2.4.1.1.2 The Register may perform technical supervision during the manufacture and approve the use of materials specified in 2.4.1.1, but supplied by the manufacturer having no valid Recognition Certificate for Manufacturer (СПИ) of these materials, provided that:

the manufacturer submits to the Register a request for issue/extension of the scope of application of the Recognition Certificate for Manufacturer and technical supervision during manufacture of material according to the scope of supply;

together with the request, the documentation specified in the delivery contract (order) is submitted for the agreement. This documentation (standard, specification, special requirements, order, etc.) shall be reviewed as specified in 2.4.1.1.1;

scope of requirements for the products and the manufacturer all be equal to that for the initial survey;

tests are performed on metal of supply and their results fully meet the requirements of the RS rules and documentation in compliance with 2.4.1.1.1 for the particular conditions of supply;

drawing up the C/C3 and supply are performed after or simultaneously with issuing the Recognition Certificate for Manufacturer (СПИ).

As an alternative, considering the provisions of 2.4.1.1.3 and 2.4.1.1.4, the RS Branch Office may decide to perform technical supervision of material on the particular contract (order)."

3 **New para 2.4.1.1.4** is introduced reading as follows:

"2.4.1.1.4 The Register may perform technical supervision during manufacture and approve the use of materials specified in 2.4.1.1 (except of rolled steel product) but supplied by a manufacturer having no valid Recognition Certificate for Manufacturer (СПИ). The decision on the possibility of carrying out such technical supervision shall be taken considering the following:

the RS Branch Office shall be provided with necessary information, confirming the firm's (manufacturer's) ability to execute the respective order;

volume of the order shall be limited;
the scope of tests and their criteria shall be agreed upon with the Register before the tests are carried out.

The information on the firm (manufacturer) ability to execute the respective order may be based on the following:

the manufacturer had a Recognition Certificate for Manufacturer (СПИ) which was not renewed due to absence of orders;

the manufacturer has valid Recognition Certificate for Manufacturer (СПИ) but not for the products under consideration (a variant of extension of the Certificate scope of application);

the manufacturer has an approval of other classification societies for manufacture of the products under consideration or similar ones;

the firm is a manufacturer of the required or similar products having at least 5-year experience of manufacture."

3 NON-METALLIC MATERIALS

4 **Para 3.5.5** is replaced by the following text:

"3.5.5 The requirements for surface preparation prior to application of ice resistant coatings. Process of surface preparation prior to application of ice resistant coatings shall comply with the requirements of ISO 8501-1. When ice resistant coatings are applied, the grade of surface preparation shall be equal to Sa 2½ in compliance with ISO 8501-1.

Roughness of the surface shall be medium (G) as per ISO 8503-1. Abrasive applicable for the surface cleaning shall meet the requirements of ISO 11126, Parts 1 — 8 and have a certificate, as appropriate.

Content of water-soluble chlorides (ISO 11127, Part 7) at the steel surface immediately prior the coating application shall not exceed 50 mg/m².

Prior to application of ice resistant coatings, dust ratio of the surface shall be examined in compliance with ISO 8502-3. Dust quantity rating "1" for dust particles of classes "3", "4" or "5". Dust having the particles of lower classes shall be removed when visually available without image magnification at the surface subject to coating application."

4 WELDING. REGULATIONS FOR WELDERS' CERTIFICATION

5 **Para 4.3.1** is replaced by the following text:

"4.3.1 Terms and definitions.

Certification is a combination of actions to determine the welder's skill level with a view to ascertain the possibility of his approval for performance of the specific type of welding works.

Certification panel is a team of certification centre specialists that is responsible for the organization of works and the reliability of the results on welders' certification.

Certification centre is a competent body authorized by the Register for performing tests on welders' certification according to the requirements of the RS rules.

Approval test is a special procedure providing the determination of a welder's skill through his certification and the issuance of an official document, i.e. the Welder Approval Test Certificates (CДC, forms 7.1.30-1 and 7.1.30-2), for verifying permission to perform welding in objects under the RS technical supervision within the range of approval specified by the Certificate.

Filling run (runs), in multilayer welding is (are) the run(s) deposited after the root run(s) and before the capping run(s).

Root run (root pass) is first run deposited in the root of a multirun weld.

Range of approval is the extent of welder's skill recognition by the Register basing on the tests carried out in certification.

Capping run in multilayer welding, is (are) the run(s) visible on the weld face(s) after completion of welding.

Test specimen is the part of a test piece used for performance of destructive tests.

Backing is material placed at the reverse side of a joint preparation for the purpose of supporting molten weld metal.

Test piece is a welded assembly used in practical tests for welder's certification.

Welder is a person who holds and manipulates the electrode holder, torch or blowpipe during welding.

Welding operator is person who controls or adjusts any welding parameter for mechanized welding or automatic welding.

Welder Approval Test Certificate (CДC) (forms 7.1.30-1 and 7.1.30-2) is the RS document verifying that a particular welder has succeeded in passing the approval test in the scope of the RS rules requirements and is approved for welding in structures under the RS technical supervision, within the range of approval specified by the Certificate.

Weld metal thickness is thickness of the weld metal, including any reinforcement.

Design (effective) throat thickness is thickness of the weld, excluding any reinforcement. Design value of the height of the largest triangle that can be inscribed in the section of a fillet weld.

Fillet weld (F) is a triangle section weld between two and more components in tee, corner or lap joint."

6 Paras 4.3.2.1 and 4.3.2.2 are replaced by the following text:

"4.3.2.1 Welders shall be qualified according to the below requirements separately for each of the following welding type:

M — manual welding in which welding wire is fed and welding torch is moved along and across weld by the welder (manually);

S — semi-automatic, partly mechanized welding in which welding wire is fed mechanically and welding torch is moved along and across weld by the welder;

A — fully mechanized welding or automatic welding in which welding wire is fed and welding torch is moved mechanically without direct involvement of the welder;

T (TIG welding) — tungsten inert gas welding;

FSW — friction stir welding.

4.3.2.2 Welders shall be qualified separately for each welding process in accordance with Table 4.3.2.2.

Table 4.3.2.2

Welding Processes for Welders Qualification

Symbol of welding type	Welding process in actual welding works		Code acc. to ISO 4063:2009
M	Manual welding	Manual metal arc welding with covered electrode (SMAW)	111
		Oxy-acetylene welding (OAW)	311
S	Semi-automatic welding (partly mechanized welding)	Metal inert gas welding (MIG)	131
		Metal active gas welding (MAG)	135
		Flux-cored wire metal arc welding with metal cored wires in active gas (MAG)	138 ¹⁾
		Flux-cored wire metal arc welding with slag cover in active gas (MAG), FCAW-G	136 ²⁾
		Flux cored inert gas arc welding (MIG)	133
		Flux cored self-shielded arc welding (FCAW-S)	114
A	Automatic welding or fully mechanized welding	Submerged arc welding with solid wire electrode (SAW)	121
		Submerged arc welding with flux cored electrode (SAW)	125
		Plasma arc welding	15
		Electroslag welding (ESW)	72
		Electrode gas welding (EGW)	73
T	Tungsten welding in inert gas	Tungsten inert gas (TIG) arc welding with or without solid filler material (wire/rod)	141, 142
FSW	Friction stir welding	Refer to 1.2.1, Part XIV "Welding" of the Rules for the Classification and Construction of Sea-Going Ships	43

¹⁾ A change from Metal active gas welding (MAG) (135) to that with flux-cored wire metal arc welding with metal cored wires in active gas (MAG) (138), or vice versa is permitted without additional testing.

²⁾ A change from metal active gas welding (MAG) (135) or flux-cored wire metal arc welding with metal cored wires in active gas (MAG) (138) to flux-cored wire metal arc welding (MAG), FCAW-G (136) requires a new welder qualification test.

7 **Para 4.3.3.2** is replaced by the text reading as follows:

"4.3.3.2 For welders qualification, the following specific features of welding joints are subdivided to be coded using the following indices:

.1 butt welds:

A — single-sided weld with backing;

B — single-sided weld without backing;

C — double-sided weld with back gouging;

D — double-sided weld without back gouging.

.2 fillet welds — F:

sl — single-layer weld;

ml — multilayer welding;

For fillet welds, welders who passed the qualification tests for multilayer welding can be deemed as qualified for single-layer weld, but not vice versa.

Note. Fillet weld is a triangle section weld between two and more components in tee, corner or lap joint.

Weld is a result of welding. A weld includes weld metal and heat-affected area."

8 **Para 4.4.4.1** is replaced by the text reading as follows:

"4.4.4.1 After welding each test piece completed shall be tested according to Table 4.4.4.1 in the as-welded condition. Before cutting out bend and fracture test specimens, visually examine the welds. Specimens shall be tested in the presence of the Register surveyor.

Table 4.4.4.1

Methods of testing of welded joint test pieces in welders' practical tests

Testing methods	Type of welded joint test piece											
	P ₁		P _{1back}	P ₃		P ₂ and P ₄	P _{2back}	P ₅ and P ₆		P ₇	P ₈	
	3 ≤ t < 12	t ≥ 12		3 ≤ t < 12	t ≥ 12			3 ≤ t < 12	t ≥ 12		C ₁ and C ₂	C ₃ and C ₄
Visual and measurement testing	+	+	+	+	+	+	+	+	+	+	+	+
Radiographic test	+ ^{1,2}	+ ^{1,2}	—	+ ^{1,2}	+ ^{1,2}	—	—	+ ^{1,2}	+ ^{1,2}	—	+	—
Ultrasonic test	+ ²	+ ²	—	+ ²	+ ²	—	—	+ ²	+ ²	+	+	—
Bend test	Weld root and top		+ ^{1,3}	—	—	+ ^{3,4}	—	—	+ ^{1,3,4}	—	—	—
	Side bend		—	+ ^{1,3}	—	—	+ ^{1,3,4}	—	—	+ ^{1,3,4}	—	—
Fracture test	+ ^{1,3}	+ ^{1,3}	+ ⁵	+ ^{1,3,4}	+ ^{1,3,5}	+ ⁶	+ ⁵	+ ^{1,3,4}	+ ^{1,3,4}	—	—	—
Macro examination	—	—	—	—	—	+ ⁶	—	+1 pc.	+1 pc.	+3 pc.	+3 pc.	—
Magnetic particle or dye penetrant testing	—	—	—	—	—	+ ⁶	—	—	—	+	+	—

¹ Either radiographic testing or bend or fracture tests (but not both at the same time) shall be used for continuity of weld joints metal.
² For thickness of 8 mm and more, the radiographic testing may be replaced by an ultrasonic testing except for austenitic and austenitic ferritic steels (groups 8 and 10, respectively) and for aluminum and copper alloys.
³ When radiographic or ultrasonic testing (rather than bend or fracture tests) is used, then additional bend or fracture tests are mandatory for welding processes 131, 135, 138, 141 and 311.
⁴ For outside pipe diameter of butt joints D ≤ 25 mm, the bend or fracture tests may be replaced by a notched tensile test of the complete test piece (refer to Fig. 4.4.4.4-2).
⁵ Additional tests may be required at the discretion of the Register.
⁶ Instead of the fracture test of a weld, it is allowed to examine the welding quality using magnetic particle/dye penetrant testing in combination with at least two macro examinations.

Where the remaining backings were used during the qualification tests, they shall be removed prior to destructive (mechanical) tests.

The test specimen for macro examination shall be prepared and etched on one side to clearly reveal the weld. Polishing is not required.

In accordance with the indications in Note 3 to Table 4.4.4.1 for welding processes 131, 135, 138, 141 and 311, the testing shall be supplemented by either two additional bend tests (one face and one root or two side bends) or two fracture tests (one face and one root)."

9 **Para 4.4.4.4** is replaced by the text reading as follows:

4.4.4.4 Test pieces P_3 of butt pipe joints. The continuity of weld metal of butt pipe joint test pieces shall be checked by radiographic testing or, if agreed with the Register, for thickness of 8 mm and more ultrasonic testing is allowed. Therewith, for welding processes 131, 135, 138, 141 and 311, the number of additional fracture and transverse bend specimens depends on the welding positions used in the test. For welding positions PA and PC testing shall be supplemented by either two additional bend tests, one root and one bend (refer to Fig. 4.4.4.4-1, a). For all other welding positions two additional specimens shall be tested for the root bend and face side bend (refer to Fig. 4.4.4.4-1, b).

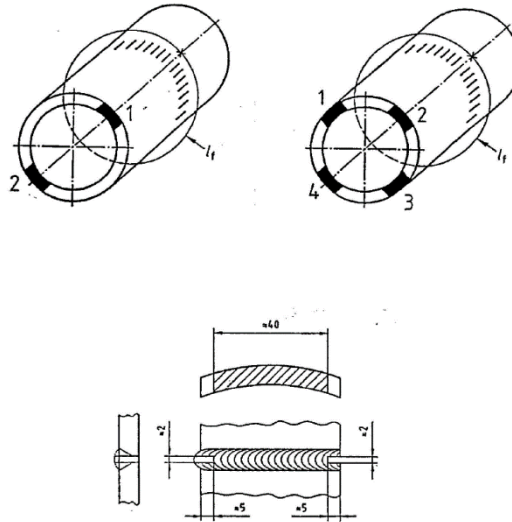


Fig. 4.4.4.4-1

Diagram of cutting-out of test pieces P_3 , P_5 and P_6 of butt pipe joints:

a) for welding positions PA and PC (1, 2 — places for selection of fracture test or bend test specimens;

l_f — examination length of the weld);

b) for welding positions PF, PG, H-L045 and J-L045

(1, 2, 3, 4 — places for selection of fracture test or bend test specimens;

l_f — examination length of the weld);

c) fracture test specimen with "q" type notch profile

$t \geq 1,8$ mm: $d = 4,5$ mm

$t < 1,8$ mm: $d = 3,5$ mm

As an alternative to non-destructive testing, fracture or static bend tests may be used to check the continuity of weld metal. During the fracture test the whole examination length shall be tested (refer to Fig. 4.4.4.4-1, a) for which at least four specimens of sizes according to Fig. 4.4.4.4-1, c, shall be tested. If the pipe diameter is too small (examination length of the weld is less than 150 mm) and does not allow making the required number of test specimens, then additional test pieces shall be made and tested in accordance with 4.4.2.4.

In order to achieve a fracture in the weld of the test specimen, the latter may be longitudinally notched on both ends of the specimen as shown in Fig. 4.4.4.4-1, c.

In the case of single-side welding without the remaining backing, half of the inspection length of the test piece shall be tested on test specimens loaded on the face side and the other half on the root side according to Fig. 4.4.4.2-2.

Where weld metal continuity is checked by bend tests, the diagram of cutting-out and number of test specimens depend on the test types and are similar to the ones specified in 4.4.4.2 for butt plate joint. When only side bend test is carried out, the places of cutting-out of side bend test specimens are according to Fig. 4.4.4.4-1, b.

For test pieces of butt pipe joints with outside pipe diameter $D \leq 25$ mm, the fracture and bend tests may be replaced by tension test of the welded joint test piece with holes and removed reinforcement of the weld as shown in Fig. 4.4.4.4-2. The holes are not allowed in start and stop areas, and in order to create the destruction plane in the centre of the weld, additional or alternative "q" or "s" type notch profiles are also allowed in circumferential direction according to ISO 9017:2017 (refer to Fig. 4.4.4.2-1, b).

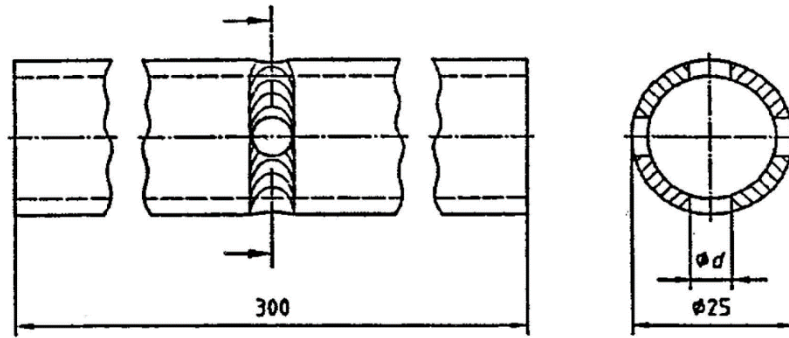


Fig. 4.4.4.4-2

Tension test specimen for testing butt pipe joints with outside diameter $D \leq 25 \text{ mm}$ ".

10 **Paras 4.5.1 — 4.5.3** are replaced by the text reading as follows:

"**4.5.1** The assessment of welders' practical skills in the course of practical tests for defining the range of approval for issuing the Welder Approval Test Certificates is based on the following essential variables of:

- .1 welding process and type;
- .2 product type/structure (plate and pipe);
- .3 type of welded joint (butt and fillet);
- .4 base metal group;
- .5 welding consumable;
- .6 dimensions of welded joint (thickness of materials and outside pipe diameter);
- .7 welding positions;
- .8 special features of welding process (backing, back gouging, single-side welding, double-side welding, single-layer weld, multilayer welding, leftward and rightward welding).

Some types of welding may be singled out as requiring individual tests:

pipe welding under conditions of the limited access (refer to 4.4.3.7);

pipe assembly welding (refer to 4.4.3.6 and 4.4.3.8);

repair of casting and forging defects (refer to 4.4.3.9).

All welded joint test pieces shall be generally welded using the essential variables independently, except for combination of two or more welding processes in one test piece (refer to 4.5.2), as well as dimensions and welding positions (refer to 4.5.7 and 4.5.8).

4.5.2 Every practical test is generally limited by the range of approval for one welding process/type designated by indices according to the requirements of 4.3.2.1 and 4.3.2.2.

The change of a welding process in the product manufacture calls for performance of new tests on welders' approval.

If a specific joint is welded in production by one welder using the combination of two or more welding processes, the practical approval tests may be performed as follows:

.1 a test piece is welded in testing using the combination of two or more welding processes in a similar way as in production (e.g. the root — single-side tungsten inert gas welding without backing, groove filling — manual welding with covered electrodes);

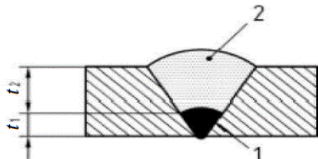
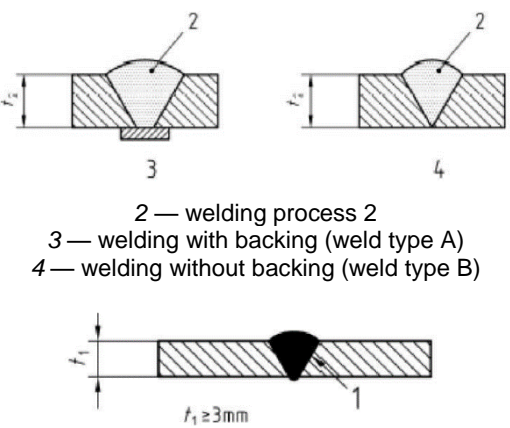
.2 in the approval testing, two test pieces are welded for the separate welder's certification for each welding process.

The range of approval of the Welder Approval Test Certificates on the base metal thicknesses for each applicable welding process and for butt welded joints made by multi-process welding is specified in Table 4.5.2 (refer also to Table 4.5.7-1).

It shall be considered that the use of any variants of testing for combination of two or more welding processes shall not result in reduction of the requirements to the extent of the examination of the welded joint test pieces specified by the requirements of Table 4.4.4.1 for bend tests.

Note. It is allowed to carry out the practical test of welders for two or more welding processes by welding one test piece (multi-process welding) or by conducting two or more practical tests.

Range of approval of the Welder Test Approval Certificate for base metal thicknesses made by single or multi-process welding

Welding process (combination of welding processes) used for the test piece	Ranges of approval of the Welder Test Approval Certificate for base and weld metal thicknesses for butt welds in accordance with Table 4.5.7-1	
	Single process joint	Multi-process welding
 <p>1 — welding process 1 (weld type B) 2 — welding process 2 (weld type A)</p>	<p>For welding process 1: $t = t_1$ For welding process 2: $t = t_2$</p>	<p>$t = t_1 + t_2$</p>
 <p>2 — welding process 2 3 — welding with backing (weld type A) 4 — welding without backing (weld type B)</p> <p>1 — welding process 1 $t_1 \geq 3\text{mm}$</p>	<p>For welding process 1: $t = t_1$ For welding process 2: $t = t_2$</p>	<p>$t = t_1 + t_2$ Welding process 1: only for welding of the root area</p>

4.5.3 The type of test piece for practical tests, in accordance with the instructions of 4.4.3, is assigned depending on the product/structure type (plate or pipe) for welding of which the welder is allowed. Table 4.5.8-1 — 4.5.8-3 on the range of approval of the Welder Approval Test Certificates shall be complied with taking into account the following:

.1 the range of approval of welding pipes with the outside diameter $D > 25$ mm may cover welding of plates;

.2 the range of approval of welding plates may cover welding of pipes:
in fixed position with the outside diameter $D \geq 150$ mm;
in rotating position with the outside pipe diameter $D \geq 75$ mm in PA, PB, PC and PD positions."

11 **Para 4.5.6** is replaced by the text reading as follows:

"**4.5.6** Specifying the range of approval of the Welder Approval Test Certificates, a type of electrode covering and flux-cored wire filler which were used for the practical test pieces welding shall be taken into account.

The appropriate ranges of approval of the Welder Approval Test Certificates for the types of electrode covering and flux-cored wire filler are given in Table 4.5.6.

The approval tests performed with the use of filler material, e.g. for welding processes 141, 15 and 311, have the range of approval of the Welder Approval Test Certificates for the same welding process without filler material, but not vice versa.

Table 4.5.6

Range of approval of the Welder Approval Test Certificates for types of welding consumables¹

Welding process	Welding consumables used for tests ²		Range of approval as per test results		
			A, RA, RB, RC, RR, R	B	C
111	A, RA, RB, RC, RR, R		x	—	—
	B		x	x	—
	C		—	—	x
—	—		Solid wire (S)	Type of electrode core	
				(M)	(B)
131	Solid wire (S)		x	x	—
135	Type of electrode core	(M)	x	x	—
136		(B)	—	—	x
141		(R, P, V, W, Y, Z)	—	—	x
136		(R, P, V, W, Y, Z)	—	—	x

¹ Symbols of welding consumable types comply with 4.3.2.3.
² Type of welding consumables used in approval tests for root run welding without backing with reverse root formation (B) is a type of welding consumables qualified by the approval for root run welding in production.
Symbols:
"x" — indicates those welding consumables (electrode covering, electrode core) for which the welder is qualified.
"—" — indicates those welding consumables (electrode covering, electrode core) for which the welder is not qualified.

12 **Table 4.5.7-1** is replaced by the following:

"Table 4.5.7-1

Ranges of approval of the Welder Test Approval Certificate for base and weld metal thicknesses for butt welds

Base metal ¹	Thickness of test piece metal in tests t , in mm	Range of approval of base metal and weld metal thickness, in mm
Steels	$t < 3$	from t to $2t^2$
	$3 \leq t \leq 12$	from 3 to $2t^3$
	$t \geq 12$	from 3
Aluminum and its alloys	$t \leq 6$	from $0,7t$ to $2,5t$
	$6 < t \leq 15$	$6 < t \leq 40^4$
Copper and its alloys	t	from $0,5t$ to $1,5t^5$

¹ For multi processes t_1 and t_2 apply according to the instructions in Table 4.5.2.
² For gas (oxy-acetylene) welding — from t to $1,5t$.
³ For gas (oxy-acetylene) welding — from 3 mm to $1,5t$.
⁴ For base metal having thickness more than 40 mm, separate certification is required which shall be indicated in the Welder Approval Test Certificates and in the test report.
⁵ For gas (oxy-acetylene) welding the welder shall be qualified for the thinnest and thickest base metal thickness, for which he is qualified in practice.

13 **Para 4.5.8** is replaced by the text reading as follows:

"**4.5.8** The range of approval of the Welder Approval Test Certificates depending on welding position of the test piece welded during practical test is defined according to the requirements of Table 4.5.8.1 — 4.5.8.3, as well as considering the requirements of 4.5.3 and 4.5.4.

Table 4.5.8-1

Range of approval of the Welder Approval Test Certificates for welding positions of butt weld test pieces of plates

Test welding position	Range of approval as per test results	
	Butt welds	Fillet welds
PA	PA	PA, PB
PC	PA, PC	PA, PB, PC
PE	PA, PC, PE	PA, PB, PC, PD, PE
PF	PA, PF	PA, PB, PF
PG	PG	PG

Range of approval of the Welder Approval Test Certificates for welding positions of fillet weld test pieces of plates

Test welding position	Range of approval as per test results	
	Fillet welds	
PA	PA	
PB	PA, PB	
PC	PA, PB, PC	
PD	PA, PB, PC, PD, PE	
PE	PA, PB, PC, PD, PE	
PF	PA, PB, PF	
PG	PG	

Table 4.5.8-3

Range of approval of the Welder Approval Test Certificates for welding positions of weld test pieces of pipes

Test welding position	Range of approval as per test results	
	Butt welds	Fillet welds
PA	PA	–
PB	–	PA, PB
PC	PA, PC	–
PD	–	PA, PB, PC, PD, PE
PH (fixed pipe joint)	PA, PE, PF	–
PH (fillet pipe with plate)	–	PA, PB, PC, PD, PE, PF, PH (fillet)
PJ (pipe joint)	PA, PE, PG,	–
PJ (fillet pipe with plate)	–	PA, PB, PD, PE, PG
H-L045	PA, PC, PE, PF	–
J-L045	PA, PC, PE, PG	–

Welding of test pieces during practical tests shall be conducted at nominal angles of welding positions to the horizon according to ISO 6947:2019 ([refer to Appendix 2](#)).

The welding positions J-L045 and H-L045 for pipe practical tests cover the range of approval of Welder Approval Test Certificates for all pipe angles.

Welding of two pipes with the same outside pipe diameter, one in welding position PF and one in welding position PC, also covers the range of approval of the Welder Approval Test Certificates for the pipe welded in welding position H-L045.

Welding of two pipes with the same outside pipe diameter, one in welding position PG and one in welding position PC, also covers the range of approval of the Welder Approval Test Certificates for the pipe welded in welding position J-L045.

Welding of pipes with outside diameters $D \geq 150$ mm may be carried out in two welding positions using only one welded joint test piece (PH or PG — 2/3 of circumference, PC — 1/3 of circumference). This test covers all welding positions applicable to the test (refer to Fig. 4.5.8).

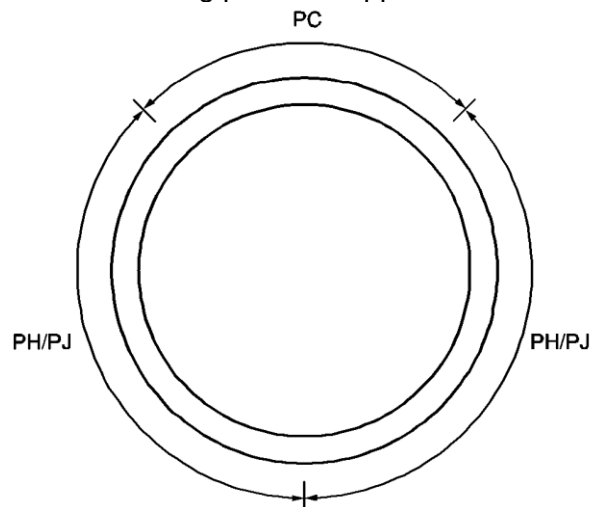


Fig. 4.5.8".

14 **Para 4.6.8.1** is replaced by the text reading as follows:

4.6.8.1 Terms of the Welder Test Approval Certificate validity prolongation as per option a) in accordance with 4.6.7.

The Welder Test Approval Certificate may be prolonged by the Register for up to three years provided the welder has passed new practical testing. At that, passing theoretical examination is not required unless otherwise decided by the certification panel.

Note. For prolongation of the Welder Approval Test Certificates the following deviations from the conditions of the initial tests are permitted:

material thickness may vary within the initial range of approval of the Welder Approval Test Certificates;

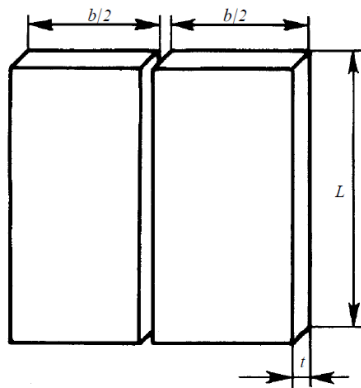
outside pipe diameter may vary $\pm 50\%$ from the initial test piece.

The prolongation of the Welder Approval Test Certificates for the next three-year period shall be performed by the Register subject to requirements in 4.6.6, and the manufacturer (employer) shall submit to RS the test report based on the results of practical testing with the attached conclusion on the specific non-destructive testing of weld test pieces."

APPENDIX 1

15 **Figures 1 — 4** are replaced by the following:

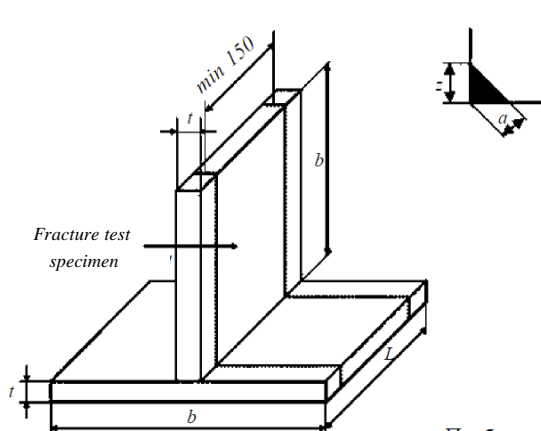
"



Welding type	Dimensions of test piece, mm	
	L	b
M, S, A, T	≥ 350	$\geq 250 (300)^1$
	≥ 800	$\geq 300 (400)^1$

¹ Values b in brackets are given for aluminum and its alloys.

Fig. 1
Test piece of P₁ plate butt joint



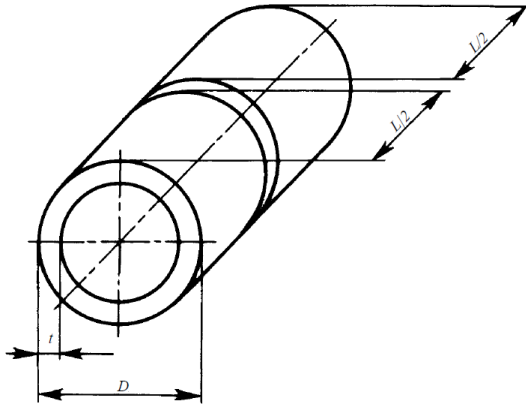
$$z = a\sqrt{2}$$

For $t \geq 6 \text{ mm}$, $0,5t \leq a \leq 0,5t + 3 \text{ mm}$
 For $t < 6 \text{ mm}$, $0,5t \leq a \leq t$

Welding type	Dimensions of test piece, mm	
	L	b
M, S, A, T	≥ 200	$\geq 100 (150)^1$
	≥ 800	$\geq 125 (200)^1$

¹ Values b in brackets are given for aluminum and its alloys.

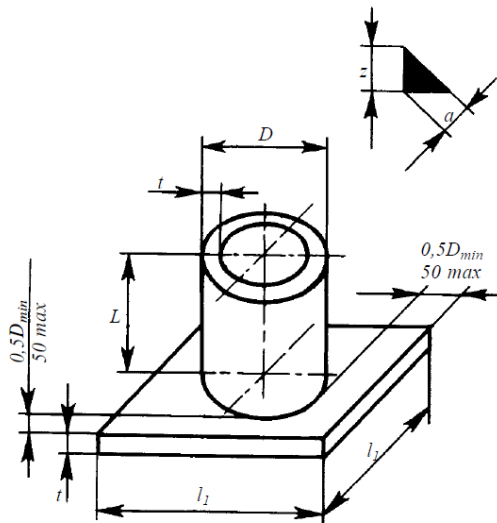
Fig. 2
Test piece of P₂ plate T-joint



Welding type	Dimensions of test piece, mm	
	D	L
M, S, A ¹ , T	≤ 25	≥ 150
	25 < D ≤ 150	≥ 250 (300) ²
	> 150	≥ 300 (400) ²

¹ The test piece size shall be sufficient for reliable equipment operation.
² Values L in brackets are given for aluminum and its alloys.

Fig. 3
Test piece of P₃ butt pipe joint



$$z = a\sqrt{2}$$

$$t \geq 6 \text{ mm}, a \leq 0,5t$$

$$t < 6 \text{ mm}, 0,5t \leq a \leq t$$

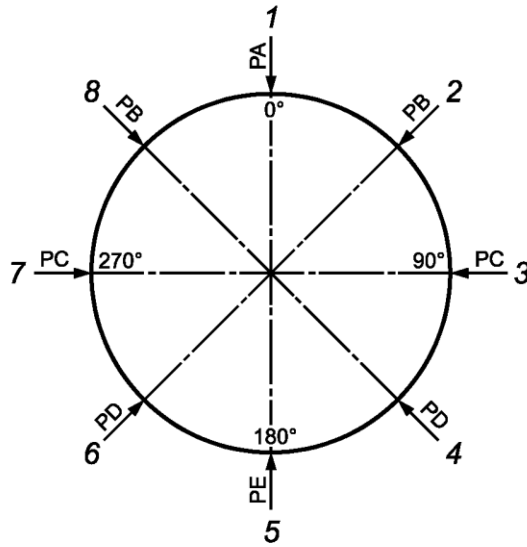
$$(z \approx 0,7t)$$

Welding type	Dimensions of test piece, mm	
	D	L
M, S, A ¹ , T	≤ 25	≥ 75 (100) ²
	25 < D ≤ 150	≥ 125 (150) ²
	> 150	≥ 150 (200) ²

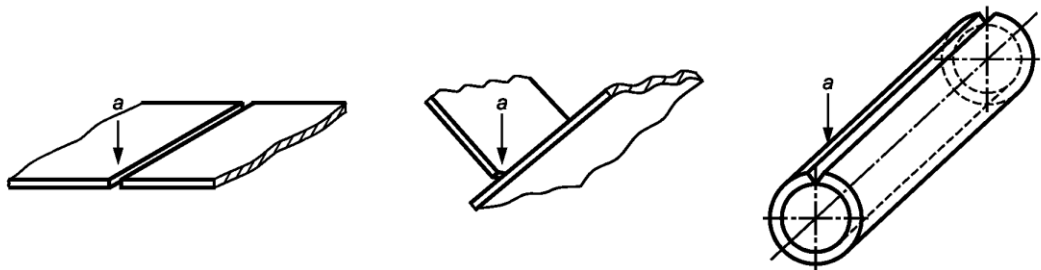
¹ The test piece size shall be sufficient for reliable equipment operation.
² Values L in brackets are given for aluminum and its alloys.

Fig. 4
Test piece of P₄ fillet-welded pipe joint".

WELDING POSITIONS

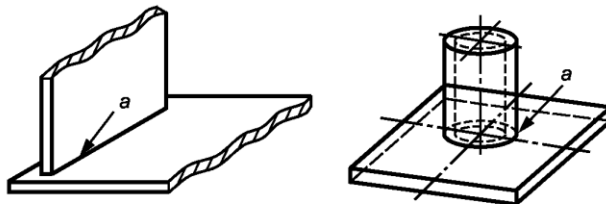


1 — flat; 4, 6 — overhead T-joint and overhead position at vertical pipe axis position; 2, 8 — horizontal T-joint position and horizontal position at vertical pipe axis position; 5 — overhead; 3, 7 — horizontal



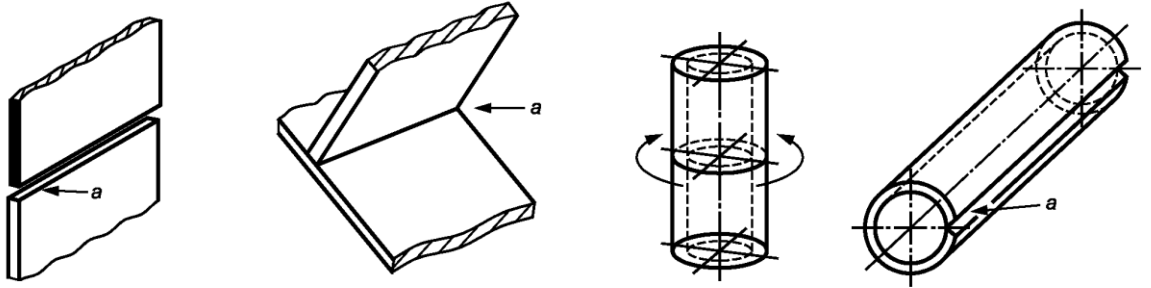
a — arrow shows position during welding

a) PA — flat position



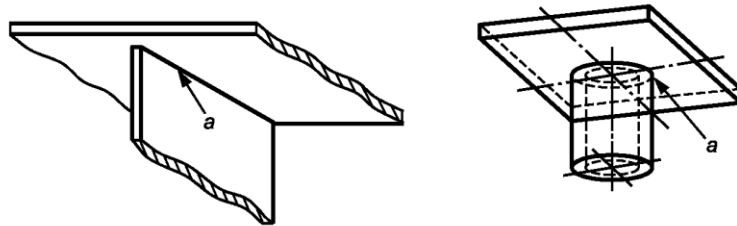
a — arrow shows position during welding

b) PB — horizontal T-joint position and horizontal position at vertical pipe axis position



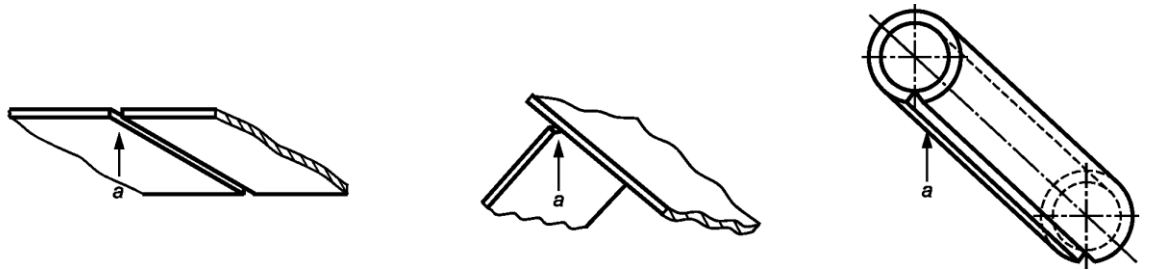
a — arrow shows position during welding

c) PC — horizontal position



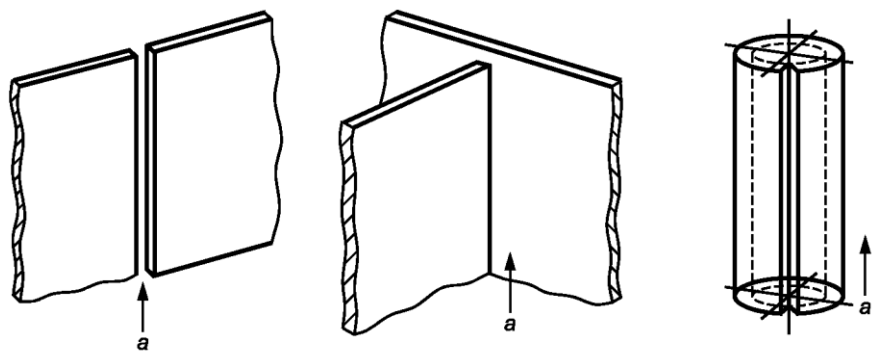
a — arrow shows position during welding

d) PD — overhead T-joint position and overhead position at vertical pipe axis position



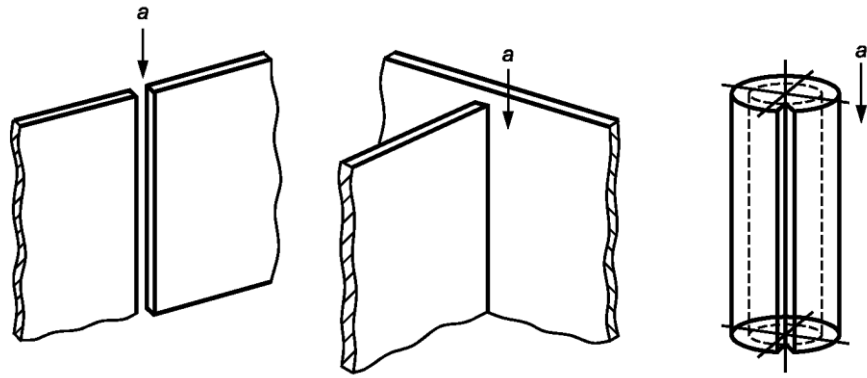
a — arrow shows position during welding

e) PE — overhead position



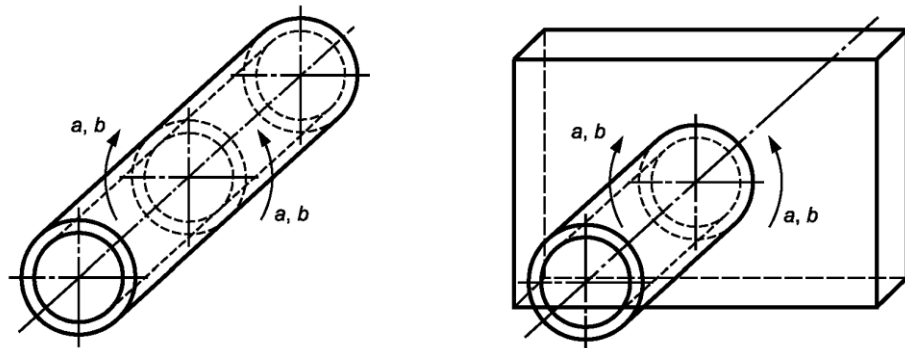
a — arrow shows position during welding

f) PF — vertical position (welding upwards)



a — arrow shows position during welding

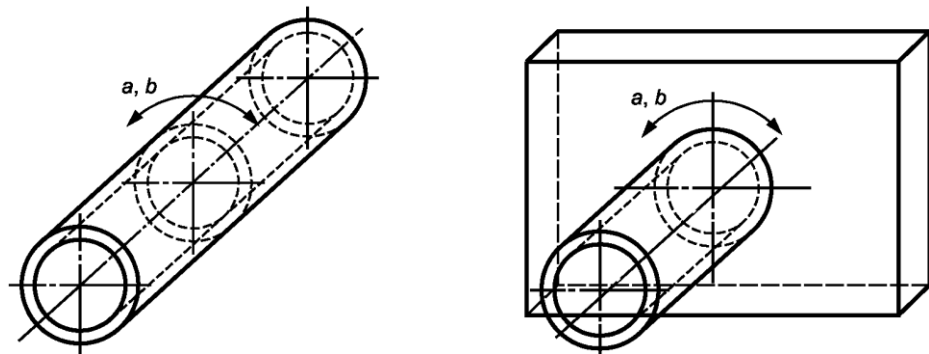
g) PG — vertical position (welding downwards)



a — arrow shows position during welding

b — for special purposes, such as testing of welders, this position is considered as the main

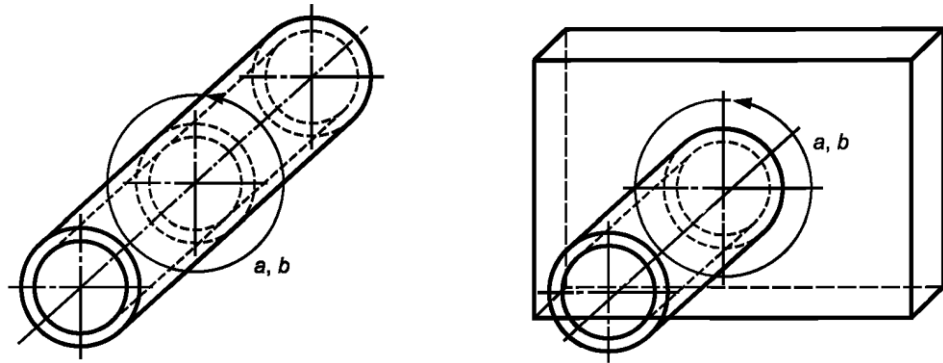
h) PH — vertical position for welding upwards (fixed pipe)



a — arrow shows position during welding;

b — for special purposes, such as testing of welders, this position is considered as the main

i) PJ — pipe position for welding downwards (fixed pipe)



a — arrow shows position during welding;
b — for special purposes, such as testing of welders, this position is considered as the main

j) PK — pipe position for orbital welding

Fig. 1
 Welding positions".

6 APPROVAL OF WELDING PROCESSES FOR STEEL STRUCTURES AND ITEMS

17 **Paras 6.2.2.2 — 6.2.2.5** are replaced by the text reading as follows:

6.2.2.2 Approval of welding processes and assigning of the range of approval on the basis of test results may be done with reference to base metal groups of typical composition in compliance with international standard ISO/TR 15608:2017 as given in Table 4.3.3.1-1.

6.2.2.3 When executing the documentation related to the approval of welding processes, it is recommended to use coding of welded joint types as follows:

- A — single-sided weld with backing;
- B — single-sided weld without backing;
- C — double sided weld with back gouging;
- D — double sided weld without back gouging;
- F — fillet weld;
- ss — single-side welding;
- bs — welding from both sides;
- sl — single-layer weld;
- ml — multilayer welding;
- nb — welding without backing;
- mb — welding with backing;
- gb — welding with gas backing;
- gg — welding with back gouging or back grinding of welds;
- ng — welding without back gouging.

6.2.2.4 Welding conditions applied to the welding of test pieces and range of approval for welding processes shall be specified with reference to unified welding positions, the designations for which according to ISO 6947:2019 are given in Appendix 2 to Section 4.

6.2.2.5 Symbols of components of gas and gas mixtures used in welding (welding processes 131, 133, 135, 136, 141 and 15) shall meet the requirements of ISO 14175:2008 and are given in Table 6.2.2.5.

Table 6.2.2.5

**Classification of process gases for fusion welding and allied processes according to ISO
14175:2008**

Symbol		Components in nominal percentage of volume					
Main group	Subgroup	Oxidizing		Inert		Reducing	Low reactivity
		CO ₂	O ₂	Ar	He	H ₂	N ₂
I	1			100			
	2				100		
	3			backing ¹	0,5 ≤ He ≤ 95		
M1	1	0,5 ≤ CO ₂ ≤ 5		backing ¹		0,5 ≤ H ₂ ≤ 5	
	2	0,5 ≤ CO ₂ ≤ 5		backing ¹			
	3		0,5 ≤ O ₂ ≤ 3	backing ¹			
M2	4	0,5 ≤ CO ₂ ≤ 5	15 < CO ₂ ≤ 25	backing ¹			
	0	5 < CO ₂ ≤ 15		backing ¹			
	1	15 < CO ₂ ≤ 25		backing ¹			
	2		3 < O ₂ ≤ 10	backing ¹			
	3	0,5 ≤ CO ₂ ≤ 5	3 < O ₂ ≤ 10	backing ¹			
	4	5 < CO ₂ ≤ 15	0,5 ≤ O ₂ ≤ 3	backing ¹			
	5	5 < CO ₂ ≤ 15	3 < O ₂ ≤ 10	backing ¹			
M3	6	15 < CO ₂ ≤ 25	0,5 ≤ O ₂ ≤ 3	backing ¹			
	7	15 < CO ₂ ≤ 25	3 < O ₂ ≤ 10	backing ¹			
	1	25 < CO ₂ ≤ 50		backing ¹			
	2		10 < O ₂ ≤ 15	backing ¹			
	3	25 < CO ₂ ≤ 50	2 < O ₂ ≤ 10	backing ¹			
C	4	5 < CO ₂ ≤ 25	10 < O ₂ ≤ 15	backing ¹			
	5	25 < CO ₂ ≤ 50	10 < O ₂ ≤ 15	backing ¹			
	1	100					
R	2	backing	0,5 ≤ O ₂ ≤ 30				
	1			backing ¹		0,5 ≤ H ₂ ≤ 15	
N	2			backing ¹		15 ≤ H ₂ ≤ 50	
	1			backing ¹			100
O	2			backing ¹			0,5 ≤ N ₂ ≤ 5
	3			backing ¹			5 < N ₂ ≤ 50
	4			backing ¹		0,5 ≤ H ₂ ≤ 10	0,5 ≤ N ₂ ≤ 5
	5					0,5 ≤ H ₂ ≤ 50	backing
O	1		100				
Z	Gas mixtures containing components not listed, or mixtures outside the composition ranges listed ²						
¹ For the purpose of this classification, argon may be substituted partially or completely by helium.							
² Two gas mixtures with the same Z-classification may not be interchangeable.							