



RULES
PUBLICATION 30/P

PRINCIPLES FOR CERTIFICATION OF WELDERS

January
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Publications P (Additional Rule Requirements) issued by Polski Rejestr Statków
complete or extend the Rules and are mandatory where applicable.

GDAŃSK

Publication 30/P – Principles for Certification of Welders – January 2021, extends the requirements of Part IX – *Materials and Welding* of the *Rules for the Classification and construction of Sea-going Ships*.

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1 GENERAL

1.1 Application

1.1.1 The present *Publication* specifies the principles for examining welders and issuing welder's qualification certificates by PRS.

1.1.2 For examining welders, PRS applies valid standards on examining welders.

1.1.3 The manufacturer employing welders is obliged to keep a record of the welders qualified by PRS. The record shall include:

- the welder's full name,
- national personal identity number or date and place of birth,
- the welder's code used for marking the welds that he performed,
- designation of welder's qualification,
- welder's qualification expiry date,
- *Welder's Certificate* number.

1.1.4 The present *Publication* refers to the provisions of other documents (e.g. standards). These provisions, through reference to this text, constitute the requirements of the present *Publication*. Standards, current at the time of the present *Publication* issue, are specified in sub-chapter 1.4. In practice, current editions of the reference documents should be used.

1.1.5 This *Publication* fulfils the unified requirements of IACS UR W32 for hull steel welders.

1.2 Declaration of Impartiality

Within the scope of welders' certification, the Polish Register of Shipping S.A. applies the principle of impartiality, i.e.:

- does not advise the applicants how to omit the difficulties on the way to certification,
- does not provide any other products and services that when offered would damage confidentiality or impartiality of certification and decision making processes,
- does not conduct advisory and training activity which could endanger confidentiality, impartiality or objectivity, it also has no formal liaisons, either personal or structural, with any associated unit.
- manages the conflicts of interest.

1.3 Definitions

Certification mark – document designation, consisting of PRS S.A. logo and the No. of surveyor issuing the *Welder's Certificate*.

IACS – International Association of Classification Societies.

Qualification test – test carried out to issue PRS qualification certificate to a welder for the first time or to extend the range of qualification already granted by PRS.

Revision test – test carried out at the request of PRS Surveyor, e.g. where the quality of the welds performed by welder has decreased significantly, to check the welder's current skills.

Test piece – welded joint made during the welder's test.

Welder's qualification prolongation test – test carried out to prolong the validity of the welder's qualification, granted by PRS, for further period.

1.4 Normative References

- EN ISO 4063 – Welding and allied processes. Nomenclature of processes and reference numbers.
EN ISO 6947 – Welding and allied processes. Welding positions.
PN-EN ISO 9606-1 – Qualification test of welders. Fusion Welding. Part 1: Steels.
EN ISO 9606-2 – Qualification test of welders. Fusion welding. Part 2. Aluminium and aluminium alloys.
PN-EN ISO 9606-3 – Qualification test of welders – Fusion welding. Part 3: Copper and copper alloys.
PN-EN ISO 9606-4 – Qualification test of welders – Fusion welding. Part 4: Nickel and nickel alloys.
PN-EN ISO 9606-5 – Qualification test of welders – Fusion welding. Part 5: Titanium and titanium alloys, zirconium and zirconium alloys.
PN-EN ISO 14732 – Welding personnel – Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials.
EN ISO 14175:2009 – Welding Consumables. Gases and gas mixtures for fusion welding and allied processes.
EN ISO 14731:2008 – Welding coordination. Tasks and responsibilities
TR/ISO 15608:2008 – Welding. Guidelines for a metallic materials grouping system.
UR W32 – Qualification scheme for welders of hull structural steels.

2 APPLICATION AND ASSESSMENT PROCESSES

2.1 General

2.1.1 The firm holding the welder's test aimed at acquiring PRS authorizations shall request its direct supervision from the relevant PRS Branch Office. The list of welders, together with their application forms as shown in Annex 1, shall be enclosed with the request.

2.1.2 The Examination board shall consist of PRS Surveyor (examiner), representatives of the firm holding the examination or the welded structures manufacturer. PRS Surveyor is the chairman of the examination board. The representatives of the firm holding the examination or the welded structures manufacturer and of shall be a person dealing with welding matters and having appropriate experience and competences in the field of welding (e.g. in accordance with the requirements of PN-EN ISO 14731 Standard).

2.1.3 Training courses which the welder-in-training has underwent to, as well as the hand-on experience in welding shall be documented, e.g. confirmed by appropriate entries in the *Welder's Book*.

2.1.4 The representative of the firm holding the test or the welded structures manufacturer are responsible for providing such practical test conditions, which will allow PRS Surveyor to monitor the test welding processes carried out by particular welders – see 2.1.5.

2.1.5 The welding of test pieces may be carried out in places specially designated for that purpose or directly on the welding site. The welding site shall be provided with appropriate welding and other additional equipment so as to allow the welder to control both the welding process and to satisfy all requirements specified in the welding procedure specification pWPS or WPS for the test piece. The welding procedure specification shall contain basic data and welding process of test piece, to be executed during the qualification test.

2.1.6 Examination of the test pieces shall be performed by laboratories approved by PRS, or surveyed directly by the PRS Surveyor.

2.2 Admission to Qualification Test

2.2.1 A welder may be admitted to the welder's qualification test, provided he/she completed training course in the welding process being the subject of test (e.g. fillet welds, butt welds of plates, circumferential welds of pipes). The training is not required to be approved by PRS. Additionally, it is recommended that the welder should have appropriate hand-on experience in using this process for welding a group of parent materials to be welded during the qualification test.

2.2.2 Only a welder who has completed the training course in single-side butt welding on temporary backing strips, which form the weld root, shall be admitted to the qualification test within the scope of single-side butt welding on temporary backing strips.

3 EXAMINATION PROCESS

3.1 Job Knowledge Test

3.1.1 It is required that the job knowledge test shall be performed at the first qualification test.. Performance of the job knowledge test at subsequent welder's examinations or after a break in welding longer than 6 months is recommended.

Job knowledge test shall be limited to the check of the welder's knowledge of the essential problems related to the welding process used during the test.

Job knowledge test shall comprise:

- identification of the range of qualification based on the current qualification test,
- properties and identification of parent materials within the material groups or sub-groups of the test pieces,
- properties and identification of parent materials within the material groups or sub-groups covered by the range of the qualification certificate to be issued,
- characteristic features of the welding process being the subject of the qualification test,
- properties and identification of welding consumables used for the particular welding process,
- the principles of edge preparation for welding and pre-welding assembly,
- the principles of selecting proper welding parameters,
- the principles of pre-heating and pre-heating control,
- proper interpass temperatures and their control,
- weld imperfections and their causes,
- method of repair of the welds below the acceptance level.

3.1.2 The form of job knowledge test shall be agreed with PRS Surveyor supervising the examination test. The job knowledge test result shall be stated as 'accepted' or 'not accepted'. The results of the test shall be documented in a report.

3.2 Practical Test

3.2.1 During the practical test, the welder shall perform the test weld to prove the skill necessary to obtain a relevant qualification certificate.

3.2.2 Parent materials and welding consumables used during the test shall be properly selected for the applied examination programme and their grade and quality shall be certified with *Materials Certificate 2.2* or *3.1*, or *Type Approval Certificate*.

3.2.3 In qualification tests for welders of sea-going ship hulls, the plates of higher-strength hull steel ($R_{eH} \geq 355$ MPa) of minimum 8 mm in thickness are recommended for the test pieces.

3.2.4 The dimensions of typical test pieces shall be in accordance with the dimensions given in the standard, being the basis for examination test. The length of submerged-arc welded test pieces shall be not less than 600 mm.

3.2.5 Tack welding of the test piece shall be performed by a welder. Welding consumables used for tack welding shall be the same as those used for actual welding. The use of other welding consumables is permitted if such provision has been made in the pWPS or WPS for the test piece welding process. The preparation of edges and gap shall comply with the pWPS or WPS; the prestrain of the tack-welded parts may be left at the discretion of welder.

3.2.6 Each test piece shall be identified with a durable mark. The mark shall allow an unambiguous identification of the welder performing the test piece, the welding process and the welding position.

3.2.7 It is recommended that, after compliance of the tack-welded piece with the scope of the test has been checked, the test piece should be marked by PRS Surveyor in two places with PRS stamp.

3.2.8 The procedure of welding the test piece shall comply with the welding procedure specification pWPS or WPS, which shall be available at the practical test welding stand. The welding time for the test piece shall correspond to the working time under usual production conditions. Any post-weld heat treatment required in the pWPS or WPS may be omitted unless bend tests are required.

3.2.9 The test piece with the butt weld applied on both sides shall be performed entirely in the same welding position.

3.2.10 Replacement of the initiated test piece by a new one is possible only in the case where, according to an examiner, difficulties, not associated with the welder's qualifications, have occurred and the consequential defects cannot be removed without worsening the quality of the test piece.

3.2.11 The examiner may stop the practical test if:

- welding conditions do not comply with the relevant requirements,
- skills of the welder making a test piece are insufficient for the correct performance of welding process to be tested,
- safety or impartiality rules are breached.

3.3 Test Piece Examination

Prior to any examination, all slag and spatters shall be removed carefully from the test piece and the weld profile and dimensions shall be checked. No grinding on the root and the face side of the weld is permitted. Stop and restart location of the welding process to make the weld root and face shall be explicitly identified and marked with PRS stamp.

The same marking and PRS stamp shall be placed on each test specimen taken from the examination test piece for destructive testing.

The results of all examinations shall be documented with test report. The reports of the test piece examination shall contain identification marks of such test piece and the results obtained by the laboratories. The tests are commissioned to be performed by an approved laboratory or are witnessed by PRS Surveyor.

It is recommended that the test methods to be used for examination of the test piece, as well as the scope of such examination should comply with the standard the examination is based on.

4 DECISION ON CERTIFICATE, THE SCOPE OF CERTIFICATION, PERIOD OF VALIDITY

4.1 Assessment of Qualification Test Results and Welder's Certificate Issue

4.1.1 The *Welder's Certificate* may be issued by PRS only when the overall result of the qualification test is considered satisfactory, if the results of the job knowledge test and the results of all examinations of the test piece performed during the test are satisfactory.

4.1.2 The results of the qualification test and other decisions shall be documented in a collective record.

4.1.3 A set of documents of the qualification test carried out shall include:

- application forms,
- welding procedure specifications (WPS) for the test pieces,
- copies of certificates for both parent materials and welding consumables used for the qualification test,
- records of all examinations of the test pieces,
- a collective record.

4.1.4 For each test piece a separate *Welder's Certificate* shall be issued. If more than one piece is welded, a single *Welder's Certificate* can be issued that combines the ranges of qualification of the individual pieces. Only one of the below essential variables may be changed:

- type of weld,
- welding position,
- weld thickness.

4.2 Re-tests

If the result of practical test or the job knowledge test fails to comply with the requirements, the welder shall be given an opportunity to repeat the qualification test, however, no earlier than 14 days after the failed test.

4.3 Validity and Range of Qualification

4.3.1 A welder is qualified for scope of welding according to the standard the examination is based on.

4.3.2 The granting of qualifications and their renewal in accordance with this publication is carried out by PRS. The skills of welders should be checked periodically in accordance with the guidelines below.

4.3.2.1 The welder shall be re-tested every 3 years.

4.3.2.2 Every two years, two welds made during the last 6 months of the 2 years validity period shall be tested by radiographic or ultrasonic testing or destructive testing and shall be recorded. The weld tested shall reproduce the initial test conditions except for the thickness. These tests revalidate the welder's qualifications for an additional 2 years. After this period the new test is required.

4.3.2.3 A welder's qualification for any certificate shall be valid as it is signed every 6 months according subject that the following conditions are fulfilled. In this option, the fulfilment of all the conditions is to be verified by the PRS. The frequency of verification by the Society is to be no longer than 3 years and is to be agreed between the Society and the shipyards/manufacturers.

a) The welder is working for the same shipyard/manufacturer which is responsible for production weld quality as indicated on his or her qualification certificate.

- b) Society shall verify that the welder quality management system of the shipyard/manufacturer includes as minimum:
- A designated person responsible for the coordination of the welder quality management system.
 - List of welders and welding supervisors in shipyard/manufacturer.
 - If applicable, list of subcontracted welders.
 - Qualification certificate of welders and description of the associated management system.
 - Training requirements for welder qualification program.
 - Identification system for welders and WPS used on welds.
 - Procedure describing the system in place to monitor each welder performance based on results of welds examination records (e.g. repair rate, etc.) including the criteria permitting the maintenance of the welder qualification without retesting.
- c) The shipyards / manufacturers have to document at least once a year that the welder has produced acceptable welds in accordance with construction quality standards and Classification Society's requirements in the welding positions, type of welds and backing conditions covered by its certificate. Which documents are required and how to document the evidences should be in agreement between the Society and the shipyards / manufacturers.

The Society has to verify compliance with the above conditions and sign the maintenance of the welder's qualification certificate.

Issue of a certificate in accordance with point 4.3.5 is possible only in shipyards / plants which have PRS approval for the production of welded structures. The interested shipyard / manufacturer, during such approval or its extension, has the opportunity to present at least once every three years the required documentation, i.e. procedures, instructions for managing welding personnel.

4.3.3 The qualification maintains validity, provided that the person duly authorised by the employer to supervise welding operations and granted authorizations in accordance with PN-EN ISO 14731 Standard, endorses every 6 months the Welder's Certificate. The person confirms that the welder has been working within his/her range of qualification. **Confirming the continuity of work every 6 months is independent of the period for which the certificate was issued.**

4.3.4 The welder's qualification expires where he/she has not performed any welding operations within the scope of possessed qualifications for a period longer than 6 months.

4.3.5 The welder's qualification may be withdrawn at the request of PRS Surveyor who supervises the welding operations if the welder has failed to comply with the good welding practice.

4.4 Designation of Welder's Qualification

4.4.1 The designation of a welder's qualification in the *Welder's Certificate* is a conventional record of the test held. It constitutes a set of symbols (items) which define the conditions of the test piece performance. The designation is consistent with the standard, referred to at the beginning of the record. The designation items are arranged in one row; the order of particular items of the designation and information which the items provide are given in Table 4.4.1-1. The designation examples are given in Table 4.4.1-2.

4.4.2 The order in which the items of welder's qualification designation are arranged is the same for all types of qualification test.

Table 4.4.1-1
Designation of welder's qualification

The order of a particular item in qualification designation	Successive items of qualification designation and information they contain
1	Number of reference standard for the welder's qualification test, e.g.: PN-EN ISO 9606-1 for steel, and EN ISO 9606-2 for aluminium and its alloys
2	Three numbers which indicate numerical designation of the welding process used for the test piece in accordance with EN ISO 4063, e.g. 111; however, where two welding processes were used for the butt weld of the test piece, e.g. for the root run: 141 and for the filling run: 111, the designation of both processes is indicated as 141/111.
3	Capital letter – indicates the test piece type: P – plate, T – pipe.
4	Two capital letters – indicate the test piece weld type: BW – butt weld, FW – fillet weld.
5	For examinations acc. to Standard PN-EN ISO 9606-1 – numerical and letter designation indicates the group of the welding consumable used for the test piece in accordance with <i>Annex 2</i> . For examinations acc. to Standards PN-EN ISO 9606-2, PN-EN ISO 9606-3 – numerical designation indicates the group of the parent material used for the test piece, acc. to TR/ISO15608, see <i>Annex 3</i> .
6	Letter designation indicates a welding consumable used for the test piece: nm – test piece made without a consumable, S – solid wire/rod, one or two capital letters indicate the type of electrode coating of a covered electrode or powder type for flux-cored wires, see EN ISO 14175 Standard. If two different welding processes, e.g. 141/111 were used for the test piece with butt weld, then the designation of the consumables for both processes shall be S/B where electrodes with basic covering were used in process 111.
7	Designation of the welded material thickness. It consists of a small letter <i>t</i> for fillet welds, a letter <i>s</i> for butt welds and the number indicating the parent material thickness in accordance with the material approval certificate. If two different welding processes were used for the test piece with butt welds, then the welded material thickness designation is followed by the thicknesses (given in brackets) of the welds made using the particular processes, e.g. s 20 (5/15).
8	Where pipe T was used for the test piece, the designation of the pipe outside diameter consists of capital letter <i>D</i> and the number indicating the outside diameter of the welded pipe in accordance with the approval certificate.
9	Designation of the test piece welding position in accordance with EN ISO 6947. This usually consists of two capital letters, the first of which is P, indicating the test piece welding position.
10	Letter designation – indicates the test piece welding details; for butt welds BW, one of the following: ss nb, ss mb, bs, ss gb, ci, ss fb; for fillet welds FW, one of the following: sl, ml; for oxy-acetylene welding (311), additionally: lw, rw.

Table 4.4.1-2
Qualification designation examples

Standard	Welding process	Product type	Weld type	Filler material group	Filler material designation	Filler/material thickness	Pipe outside diameter	Welding position	Weld details
ISO 9606-1	111	T	BW	FM1	B	s10	D60	PA	ss nb
ISO 9606-1	141/111	T	BW	FM1	S/B	s20(5/15)	D60	HL045	ss nb/ss mb
ISO 9606-1	141	T	BW	FM1	S	s5	D60	HL045	ss nb
ISO 9606-1	111	T	BW	FM1	B	s15	D60	HL045	ss mb
ISO 9606-1	135	P	BW	FM5	S	s10		PC	ss mb
ISO 9606-1	136	P	FW	FM2	B	t12		PD	ml
EN ISO 9606-2	131	P	FW	22	S	t6		PB	ml

5 SUSPENSION, WITHDRAWAL OR EXTENSION OF CERTIFICATION

5.1 Extension of certification range is based on a separate application. The proceedings are as described in paragraphs 3 and 4. Limitation of certification range is not provided.

5.2 The certificate may be suspended after a claim or complaint to certified welder activities has been received in PRS S.A. The suspension covers a limited time period, until explaining the complaint grounds and carrying out corrective actions.

5.3 The certificate may be cancelled (withdrawn) when the welder action was found non-conforming with concluded certification agreement. Certificate withdrawal is preceded by a written notification specifying the grounds for it. The certificate withdrawal may be preceded by its suspension.

6 RE-CERTIFICATION PROCESS

6.1 Re-certification takes place after submitting the welder's exam application. The request shall be submitted to PRS before the expiry date of the welder's qualification to enable verification of the submitted documents regarding welder's qualification prolongation in due time. The rules and procedure, depending on the period for which the previous certificate was issued, are described in point 4.3.3. The documents related to welder's qualification prolongation shall be retained for the period of validity of the certificate.

6.2 If conditions, referred to in 4.3.3.2 and 4.3.3.3 are not satisfied, in order to prolong the welder's qualification, the welder shall take and pass a test which should be held in accordance with the general principles applicable to welder's qualification tests.

7 APPLICATION OF CERTIFICATES AND CERTIFICATION MARKS

7.1 The Applicant (welder) has the right to refer to certification in the scope of qualifications specified in the *Welder's Certificate*.

7.2 PRS S.A. supervises the use of issued certificates and certification marks in the process of re-certification, acc. to 6 and by verifying the use of the certificate during performing PRS supervised works. In such case the verification is made by the PRS Surveyor at PRS request execution.

7.3 Where a case of misleading use of the certificates and/or certification marks has been ascertained, PRS S.A. shall take appropriate actions, e.g. corrective actions, certificate withdrawal, making public information on the fact of transgression and taking legal actions, if necessary.

7.4 PRS is the exclusive owner of the certificates.

8 COMPLAINTS AND APPEALS TO PRS DECISIONS

8.1 The Applicant (welder) has the right to appeal against the decision on issuing the *Welder's Certificate* (the appeal may concern the scope of qualifications or the decision on non-issuance or withdrawal of the certificate)

8.2 Appeals to the decisions of PRS S.A. shall be submitted within 30 days from the day of decision receiving from PRS S.A.

The appeals and complaints shall contain:

- the name and address of applicant or certificate holder,
- the description of appeal/complaint subject together with its justification.

8.3 Appeals and complaints concerning the certification proceedings and substantive assessment shall be sent by a registered letter addressed to the Ship Division Director of PRS S.A.

8.4 All appeals to the decision, as well as complaints/claims of applicants or *Welder's Certificate* holders are considered by PRS S.A. impartially, maintaining the principle of protection of interested parties concerns. Appeals and complaints are considered by the persons which have not been engaged in the assessment/certification process.

8.5 Decisions made by PRS S.A. regarding reasonability of appeals/complaints are transferred, in writing, by the Ship Division Director within 30 days from the day of the appeal/complaint receipt in PRS S.A.

Annex 1**Groups of welding consumables for steels
according to PN-EN ISO 9606-1**

Group of welding consumable	Type of steel	Example designations of welding consumables
FM1	Low-alloy steels and fine grain steels	E 42 5 B 42 H5, G 42 4 M G 3Si1, W 46 5 W3Ni1, T 46 4 P M 1 H10
FM2	High strength steels	G 69 5 M Mn3Ni1CrMo, T 89 4 Mn2NiCrMo B M / 3 H5
FM3	Steels with chromium content Cr < 3.75%	E Mo B 4 2 H5, W CrMo1Si, S CrMo2, T CrMo1 B M / 3 H5
FM4	Steels with chromium content 3.75 ≤ Cr ≤ 12%	E CrMo5 B 4 2 H5, W CrMo5Si, S CrMo5, T CrMo5 B M / 3 H5
FM5	Stainless steels and high-temperature resistant steels	W 19 9 L, T 19 9 L MM 1
FM6	Nickel and nickel alloys	E Ni 6625 (NiCr22Mo9Nb), S Ni 6625 (NiCr22Mo9Nb)

Annex 2

**Grouping system for aluminium and aluminium alloys
according to Technical Report TR/ISO 15608**

Group number	Sub-group number	Examples of alloy designation ¹⁾	
		Grade	Reference standard
Pure aluminium with ≤ 1% of impurities or alloy content			
21		EN AW-1098, EN AW-1198A, EN AW-1090, EN AW 1085, EN AW-1450, EN AW-1050A, EN AW-1060, EN AW-1070A, EN AW-1080A, EN AW-1100, EN AW-1200	EN 573-3
Not heat-treated alloys			
22	Aluminium-manganese alloys		
	22.1	EN AW-3003 (EN AW-AlMn1Cu); EN AW-3103 (EN AW-AlMn1); EN AW-3004 (EN AW-AlMn1Mg1); EN AW-3005 (EN AW-AlMn1Mg0.5); EN AW-3105 (EN AW-AlMn0.5Mg0.5)	EN 573-3
	Aluminium-magnesium alloys with Mg ≤ 1.5%		
	22.2	EN AW-5005 (EN AW-AlMg1(B)); EN AW-5050 (EN AW-AlMg1.5(C))	EN 573-3
	Aluminium-magnesium alloys with 1.5% < Mg ≤ 3.5%		
	22.3	EN AW-5052 (EN AW-AlMg2.5); EN AW-5251 (EN AW-AlMg2); EN AW-5149 (EN AW-AlMg2Mn0.5(A)); EN AW-5249 (EN AW-AlMg2Mn0.8Zr); EN AW-5454 (EN AW-AlMg3Mn(A)); EN AW-5754 (EN AW-AlMg3); EN AW-5154 A (EN AW-AlMg3.5(A)); EN AW-5154 B (EN AW-AlMg3.5Mn0.3), EN AC-51000 (EN AC-AlMg(b)); EN AC-51100 (EN AC-AlMg(a))	EN 573-3
	Aluminium-magnesium alloys with Mg > 3.5%		
	22.4	EN AW-5086 (EN AW-AlMg4); EN AW-5083 (EN AW-AlMg4.5Mn0.7); EN AW-5056A (EN AW-AlMg5); EN AW-5456A (EN AW-AlMg5Mn1(A)); EN AW-5383 (EN AW-AlMg4.5Mn0.9); EN AW-5186 (EN AW-AlMg4Mn0.4), EN AW-5383 (EN AW-AlMg4.5Mn0.9)	EN 573-3
EN AC-51400 (EN AC-AlMg5(Si));		EN 1706	
EN AC-51200 (EN ACAlMg9); EN AC-51300 (EN AC-AlMg5) 5059		Part IX of PRS Rules	
Heat-treated alloys			
23	Aluminium-magnesium-silicon alloys		
	23.1	EN AW-6005A (EN AW-AlSiMg(A)); EN AW-6060 (EN AW-AlMgSi); EN AW-6061 (EN AW-AlMg1SiCu); EN AW-6013 (EN AW-AlAg1Si0.8Cu); EN AW-6063 (EN AW-AlMg0.7Si), EN AW-6081 (EN AW-AlSi0.9MgMn); EN AW-6082 (EN AW-AlSi1MgMn), EN AW-6106 (EN AW-AlMgSiMn)	EN 573-3
	Aluminium-magnesium-zinc alloys		
23.2	EN AW 7020 (EN AW-AlZn4.5Mg1); EN AW-7003 (EN AW-AlZn6Mg0.8Zr)	EN 573-3	

Group number	Sub-group number	Examples of alloy designation ¹⁾	
		Grade	Reference standard
Aluminium-silicon alloys with Cu ≤ 1%			
24	Aluminium-silicon alloys with Cu ≤ 1% and 5% < Si ≤ 15%		
	24.1	EN AC-44000 (EN AC- AlSi11); EN AC-44400 (EN AC- AlSi9); EN AC-44100 (EN AC- AlSi12(b)); EN AC-44200 (EN AC- AlSi12(a)); EN AC-44300 (EN AC- AlSi12(Fe)); EN AC-47000 (EN AC- AlSi12(Cu))	EN 1706
	Aluminium-silicon-magnesium alloys with Cu ≤ 1%; 5% < Si ≤ 15% and 0.1% < Mg ≤ 0.80%		
	24.2	EN AC-43300 (EN AC- AlSi9Mg); EN AC-42000 (EN AC- AlSi7Mg); EN AC-42100 (EN AC- AlSi7Mg0.3); EN AC-42200 (EN AC- AlSi7Mg0.6); EN AC-43000 (EN AC- AlSi10Mg(a)); EN AC-43100 (EN AC- AlSi10Mg(b)); EN AC 43200 (EN AC- AlSi10Mg(Cu)); EN AC-43300 (EN AC- AlSi9Mg); EN AC 43400 (EN AC- AlSi10Mg(Fe))	EN 1706
Aluminium-silicon-copper alloys with 5.0% < Si ≤ 14.0%; 1.0% < Cu ≤ 5.0% and Mg ≤ 0.8%			
25		EN AC-45000 (EN AC- AlSi6Cu4); EN AC-45100 (EN AC- AlSi5Cu3Mg); EN AC-45200 (EN AC- AlSi5Cu3Mn); EN AC-45300 (EN AC- AlSiCu1Mg); EN AC-45400 (EN AC- AlSi5Cu3); EN AC-46000 (EN AC- AlSi9Cu3(Fe)); EN AC-46100 (EN AC- AlSi11Cu2(Fe)); EN AC-46200 (EN AC- AlSi8Cu3); EN AC-46300 (EN AC AlSi7Cu3Mg); EN AC-46400 (EN AC- AlSi9Cu1Mg); EN AC-46500 (EN AC- AlSi9Cu3(Fe)(Zn)); EN AC-46600 (EN AC- AlSi7Cu2); EN AC-47100 (EN AC- AlSi12Cu1(Fe)); EN AC-48000 (EN AC- AlSi12CuNiMg)	EN 1706
Aluminium-copper alloys with 2% < Cu ≤ 6%			
26		EN AC-21000 (EN AC- AlCu4MgTi); EN AC-21100 (EN AC AlCu4Ti)	EN 1706

¹⁾ Numerical designation of the alloys intended for plastic working is in accordance with EN 573-1. The designation of cast alloys is in accordance with EN 1780-1. Designation of those alloys using chemical symbols according to EN 573-2 or EN 1780-2, respectively, is given in brackets.

Annex 3

**Grouping system for copper and copper alloys
according to Technical Report TR/ISO 15608**

Group number	Sub-group number	Examples of alloy designation ¹⁾		
		Grade	Reference standard	
Copper with up to 6% Ag and 3% Fe				
31		Cu-ETP, Cu-FRTP, Cu-OF, Cu-DLP, Cu-DHP	PN-EN 1652, PN-EN 1653, PN-EN 1654	
Copper-zinc alloys				
32	Double copper-zinc alloys			
	32.1	CuZn5, CuZn10, CuZn15, CuZn20, CuZn30, CuZn33, CuZn36, CuZn37, CuZn40		
	Multi component copper-zinc alloys			
32.2	CuZn20Al2As, CuZn23Al2Co, CuZn38AlFeNiPbSn, CuZn38Sn1As, CuZn39Sn1			
Copper-tin alloys				
33		CuSn4, CuSn5, CuSn6, CuSn8, CuSn3Zn9		
Copper-nickel alloys				
34		CuNi25, CuNi9Sn2, CuNi10Fe1Mn, CuNi30Mn1Fe		
Copper-aluminium alloys				
35		CuAl8Fe3, CuAl9Ni3Fe2, CuAl10Ni5Fe4		
Copper-nickel-zinc alloys				
36		CuNi10Zn27, CuNi12Zn24, CuNi12Zn25Pb1, CuNi12Zn29, CuNi18Zn20, CuNi18Zn27		
Copper alloys with other components below 5%, not specified in groups 31 to 36				
37		CuBe1.7, CuBe2, CuCo2Be, CuFe2P, CuNi2Be, CuNi2Si, CuZn0.5		
Copper alloys with other components 5% or above, not specified in groups 31 to 36				
38		-		

List of amendments effective as of 1 January 2021

Item	Title/Subject	Source
4.3	Scope and period of validity of qualification	UR W32 REV. 1 Sep. 2020
6.1.6.2	Re-certification process	UR W32 REV. 1 Sep. 2020