

# *Polski Rejestr Statków*

## **PRZEPISY RULES**

PUBLICATION NO. 22/P

### **TESTING OF OVERWELDABLE SHOP PRIMERS**

**1994**

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GDĄŃSK

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PRS/TW, 04/94

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## **1 GENERAL**

**1.1** The influence of primers – not removed before welding – on the quality of welded joints is to be examined on test specimens.

A primer may be approved only for these welding techniques and welding consumables for which examination results proved lack of primer inferior influence on welding process and mechanical properties of weld.

Approval tests for primers are to be carried out on T-joints. PRS may require the additional tests on butt joints if necessary.

**1.2** Tests are to be carried out under the PRS survey. Application for approval tests may be made by the manufacturer of the primer or by the shipyard.

**1.3** Application for primer approval tests is to contain the following information:

- manufacturer and type of primer;
- characteristic of primer;
- range of usage of primer;
- instruction for use (preparation of surface, painting process, coat thickness, etc.);
- welding techniques;
- documentation relating to previous tests, approvals, etc.;
- place and date of proposed tests.

## **2 TEST PROGRAMME**

**2.1** Test programme is to be worked out by applying manufacturer according to the below mentioned instructions and is to be agreed upon with PRS.

**2.2** Tests are to be carried out for steel of the highest grade in the steel category, for which the primer is to be used. Tests are to be performed for the welding techniques which are provided to be used.

**2.3** Primer tests are to be carried out on test assemblies shown on [Fig. 2.3](#). Length of test assembly is to be sufficient for preparation of all required specimens. Primer is to cover half of test assembly including edges of plates to be welded. PRS may require some additional tests if found necessary.

**Table 2.3**  
Test assemblies for primer tests

Welding technique	Type of test assembly (1 assembly for certain range of thickness and for each welding position)	Material thickness (mm)	Edge preparation	Welding position
manual arc welding	Test assembly (Fig. 2.3)	12 – 15	without bevel *	horizontal
				vertical
submerged arc (automatic) welding		18 – 20	without bevel **	horizontal
semi-automatic CO <sub>2</sub> shielded welding		12 – 15	without bevel **	horizontal
				vertical upward
				vertical downward

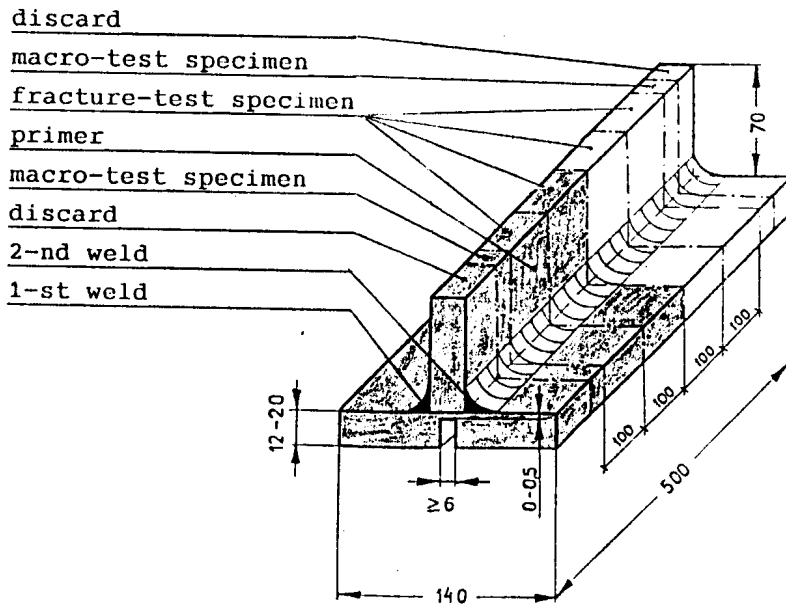
\* Electrodes of 4 mm in diameter are to be used.

\*\* Each fillet weld of 5-6 mm thickness made in one run.

**2.4** The thickness of the primer coat on the test assembly is to be 20% thicker than specified by the manufacturer for production purposes. In any case thickness of primer coat should not be less than 20 μm. The laboratory which performs examinations is to have instruments enabling measurement of the thickness of primer coat with sufficient precision.

**2.5** Test assemblies shown on Fig. 2.3 are to be welded with welding parameters normally used for this category of welding consumables. Tee joints are to be welded in vertical upward and vertical downward positions in CO<sub>2</sub> shield.

**2.6** Tests should be carried out in the laboratory recognized by PRS for that purpose.



Rys. 2.3 Tee joint test assembly

### 3 TEST SPECIMENS

**3.1** One set of test specimens is to be taken from the part of test assembly covered with primer, and the second set of test specimens is to be taken from part of test assembly not covered with primer.

Each set is to contain:

- 1 specimen for fracture test of the first weld;
- 1 specimen for fracture test of the second weld;
- 1 transverse macroscopic test specimen.

**3.2** Specimen for fracture test is to have length of 100 mm measured along the weld. Broken weld is examined, having on purpose detecting porosity and quality assessment on the basis of the fracture appearance.

### 4 TEST REPORT

**4.1** Report should contain the following results of the examination of test specimen fracture:

- total quantity of defects (porosity) on the test fracture (approx. 100 mm);

- total area of defects (porosity) on the test fracture ( $\text{mm}^2$ );
- total area of defects (porosity) related to the total area of the weld fracture (%).

**4.2** The photographs of macroscopic test specimens should be described taking into account direct observation of the specimen.

**4.3** Measurements of the primer coat thickness should be included as well as welding parameters applied for welding of each test assembly.

**4.4** The following should be attached to the test report:

- certificates of base material of test assembly;
- certificates of welding consumables (electrodes, wire-flux and wire-gas combinations).

## **5 ASSESSMENT OF TEST RESULTS**

**5.1** Macroscopic test specimens taken from primed and unprimed parts of test assembly have to confirm the same weld quality. Cracks, gas cavities, slag inclusions, lack of penetration, incomplete fusion and other defects can not occur. Special attention is to be paid to complete penetration in the root of weld.

**5.2** On the base of appearance of fillet weld fracture an evaluation of tendency to produce porosity in tee joint is to be made. Porosity and fracture appearance should be examined separately for the first and second weld.

The chain porosity in the root of weld disqualify the primer to be used for welding with applied weld technique.

The total area of porosity defects related to the area of the weld fracture should not exceed 6%.

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