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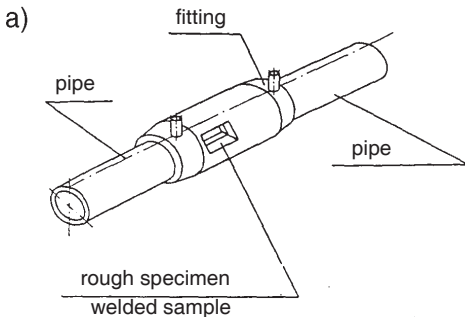
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**1 Scope**

This supplement applies to the testing of socket joints and is valid for heated tool socket and electrofusion fittings welded to pipes with a minimum wall thickness of 5 mm. The procedures are given in directive DVS 2203-4 except for the sampling, preparation of test specimens, recommended test stress and the evaluation of the test results. The test results can be used for comparative purposes and can be used to optimize e.g. the welding process or the construction of the fitting. The comparison between electrofusion and heated tool socket fitting systems is not possible without additional analysis.

**2 Number and cutting of test specimens**

At least 6 specimens shall be cut from each side of the welded joint and shall be equally spaced around the circumference. An exception to this are electrofusion fittings where both sides are welded simultaneously. In this case 3 specimens from each side are sufficient. If there are significant differences between the two sides the number of specimens shall be increased to 6.

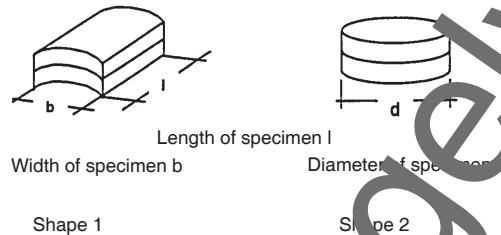


**Figure 1.** a) Cutting the rough specimen from the socket joint,  
b) longitudinal cross-section of electrofusion weld assembly showing the location of the rough specimen,  
c) longitudinal cross-section of heated tool socket weld assembly showing the location of the rough specimen.

The test specimens shall be prepared by initially cutting rough specimens<sup>1)</sup> with larger dimensions than the desired final dimensions, from the joint by e.g. a jig-saw or a hole-driller. These rough specimens will later be machined to the final dimensions. The specimens shall be taken from the middle of the fusion length according to fig. 1. For electrofusion fittings, the specimens shall be cut such that there are 2 wires from within the fusion length either side of the cross section of the specimen.

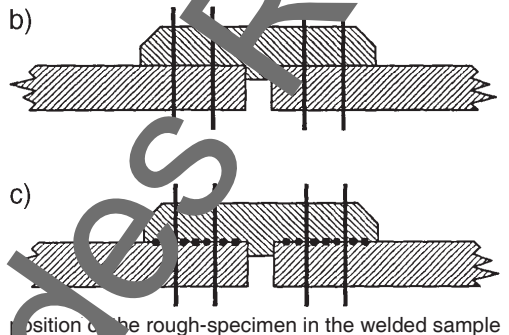
**3 Shape and preparation of test specimens**

The test specimens are shown in fig. 2.



**Figure 2.** Shapes and geometries of specimens

<sup>1)</sup> The final specimen is produced by welding clamping bars to the rough specimen and then machining to the final dimensions.



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DVS, Technical Committee, Working Group "Plastics, Welding and Bonding"

**Shape 1:**

The width of the specimen  $b$ , shall be equal to the pipe wall thickness  $s$ , but with a minimum value of 10 mm and a maximum value of 20 mm.

The length of the specimen is different for heated tool socket and electrofusion fittings.

Heated tool socket fittings:  $l = 1.5 \times b$

Electrofusion fittings:  $l = 2 \times b$

**Shape 2:**

The diameter of the specimens shall be between 10 and 25 mm.

Specimens cut from electrofusion fittings shall contain at least 3 wires.

In order to test the specimens clamping bars can be welded to the specimen, as shown in fig 3. Heated tool butt welds have been proved to be suitable for this.

During welding of clamping bars heating of the test specimens fusion line between the pipe and the socket shall be minimized. If necessary the test specimens can be quenched directly after welding of the clamping bars.

The final specimen dimensions and preparation shall be as given in section 3 of DVS 2203-4.

**4 Testing**

**4.1 Heated tool socket fittings (HD)**

The heated tool socket joints shall be considered as butt welded joints. The specimen cross section is given by the width of the test specimen multiplied by the length for shape 1 or by the area of the circle of the test specimen for shape 2. The test loads shall be calculated from these respective cross-sections.

**4.2 Electrofusion fittings (HM)**

Specimens cut from electrofusion joints shall be tested at lower test stress than specified in DVS 2203-4. This is due to the notch effect and the decrease in the effective cross-section area etc. caused by the wires.

The specimen cross section is given by the width of the test specimen multiplied by the length for shape 1 or by the area of the circle of the test specimen for shape 2. The reduction of the cross-section due to the wires is not taken into account.

The recommended test parameters for PE-joints are:

Test temperature (°C)	Test stress (N/mm <sup>2</sup> )
80	3
95	2

There are insufficient data available for other materials.

**5 Evaluation**

As defined in DVS 2203-4 a at least 30 % of the fracture surface shall be brittle. If not lower test stresses shall be used.

In order to evaluate the test results the geometric mean value is calculated from the single rupture times and is used as a comparative value.

Only test specimens that do not fail in the clamping bar or in the butt welds between specimens and clamping bars shall be used in the evaluation.

The determination of the long term welding factor is not required in this supplement.

**6 Test report**

DVS 2203-4 chapter 7 shall be applied except "long term welding factor".

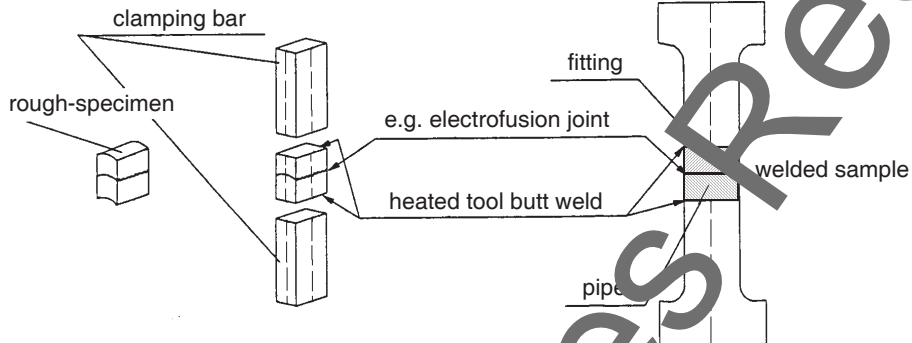


Figure 3. Assembly of specimen.