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DVS-PersZert®	Specialist for plastics welding	DVS PERSZERT® Guideline DVS® 2213

Replaces August 1996 edition

This text is intended for men and women to an equal extent. However, for better readability, it was decided not to use the consistent formulation in the male/female form in the text and only the male form is specified.

Contents:

1 Scope of application and purpose

This guideline applies to the qualification testing to become a specialist for plastics welding. This proof of the qualification is a prerequisite for the deployment as a welding supervisor in order to ensure the quality of welding work with thermoplastics in tank construction, apparatus engineering, piping construction and dump construction as well as for sealing and lining. In particular, the specialist for plastics welding should be active wherever the customer or the responsible agencies demand his deployment or wherever stringent requirements are set on safety and/or loadability. Furthermore, he is responsible for the scheduled monitoring of the welders through which an extension to the period of validity of the welder qualification test can be achieved. This guideline does not apply to the welding supervision of welding work on pipes and piping parts made of PE-HD in the public gas and water supply or to industrial series welding.

2 Prerequisites

Only those people whose training and previous activities mean that they are expected to have adequate specialist knowledge and skills in order to pass the qualification test are allowed to take part in the qualification test to become a specialist for plastics welding. As a rule, this is the case when the Conditions 2.1 to 2.4 listed below are fulfilled:

2.1 Vocational training and experience in plastics welding according to Table 1

2.2 Qualification test certificate according to DVS® 2212, at least for the subgroups listed in 2.4, whose period of validity may have lapsed max. one year before

2.3 Adequate knowledge of spoken and written German

2.4 Required plastics welder qualification tests

There must be three subgroups in total, one each from the field of heated tool welding (HS, HD, HM or HH), hot gas welding (WF, WZ or WU) and hot gas extrusion welding (WE).

3 Profile of the knowledge and the skills

3.1 Knowledge

3.1.1 Materials

– structures and properties of the plastics, recognition of plastics and state ranges

– plastics important in welding technology: PVC, PE, PP, PVDF and other thermoplastics

– utilisation limits (temperature, strength and chemical resistance)

Table 1. Vocational training and experience in plastics welding.

Vocational training with a final qualification as:	Additional experience in plastics welding		
	None	2 years	3 years
a. An industrial foreman specialising in plastics and rubber with the focus on plastics processing			
b. An industrial foreman specialising in plastics and rubber with the focus on plastics and rubber processing		X	
c. A skilled trade or industrial foreman specialising in metals or from other technical occupations		X	
d. A technologist or engineer specialising in plastics, wood or metal processing		X	
e. In the case of people with comparable proven knowledge and skills, the qualification test commission takes a decision in mutual agreement with the training centre.			

This publication was drawn up by a group of experienced experts in cooperative work on an honorary basis and was approved by the "Training and Qualification Testing" working group. It is binding for DVS educational facilities. The user must always check whether the version in his possession is still valid.

DVS, Technical Committee, Working Group "Joining of Plastics"
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3.1.2 Structural designing

– joint types and groove and weld shapes
– representation of welds on drawings
– designing appropriate for the materials and the welding

3.1.3 Measures before the welding

– transport and storage of the semi-finished products, mouldings and welding filler materials
– protection of the welding position from ambient influences
– checking of the semi-finished products, mouldings and welding filler materials
– checking of the weldability

3.1.4 Behaviour of the plastics during the welding

– characteristic technological data
– residual welding stresses as well as measures for their reduction

3.1.5 Welding processes and devices, welding parameters and application limits

– hot gas fan welding and hot gas string-bead welding
– heated tool butt welding, heated tool sleeve welding, heated wedge welding and sleeve welding with an incorporated heating element
– hot gas extrusion welding
– additional welding processes, e.g. friction welding
– requirements on machines, devices and facilities

3.1.6 Testing and inspection of welded joints between plastics

– non-destructive tests and inspections: visual inspection, dimensional check, radiographic test, ultrasonic test, test using electrical high voltage, pressure test and vacuum test
– destructive tests: tensile test, technological bending test, tensile impact test, notched-bar bend impact test, pin indentation test, creep tests and shear/peeling tests
– leak test and pressure test

3.1.7 Measures for quality assurance

– tasks and responsibility
– internal monitoring
– external monitoring
– welding personnel (training and certification)
– testing material monitoring

3.1.8 Sets of technical rules and statutory regulations

– DVS guidelines, technical codes and technical bulletins
– standards and other sets of technical rules
– health protection and safety at work

3.2 Skills

3.2.1 Preparation for the welding and handling of welding machines and devices

– determination of the good working order of welding machines and devices
– checking of the weldability using pull-off, stretching and adhesion tests
– setting, checking and recording of the parameters
– manufacture of test pieces and evaluation of the welding operations
– production of test specimens

3.2.2 Test and inspection procedures for quality assurance and assessment of the results

– non-destructive tests and inspections on welded joints: visual inspection, dimensional check and test using electrical high voltage
– destructive tests on welded joints: tensile test, technological bending test, torsion test and peeling test
– measures in order to avoid and rectify defects

4 Proof of the knowledge and the skills

In compliance with the qualification test regulations according to the DVS® 2213 guideline, Supplement 1, the qualification test is taken before a qualification test commission appointed by DVS. The knowledge must be proven in a written qualification test relating to the subject fields according to Section 3.

In the skills qualification test, the qualification test participant must prove that he is capable of implementing his knowledge in practice. A task which includes essential contents of Sections 3.2.1 and 3.2.2 is set for this purpose.

The qualification test result, the subsequent qualification test and the certificate are governed by the qualification test regulations (DVS® 2213, Supplement 1).