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**1 General**

The training to become a plastics welder is advanced vocational training. The successful participation in this course concludes with the welder qualification test according to the DVS® 2212-4 guideline.

**2 Educational facilities**

The course to become a plastics welder is staged at the DVS educational facilities<sup>1)</sup> correspondingly authorised for this purpose. These must possess the facilities required for staging the course. In this respect, particular attention must be paid to the regulations relating to health protection and safety at work.

<sup>1)</sup> According to the guidelines for the setting-up and authorisation of educational facilities for plastics joining technologists  
<sup>2)</sup> One TU corresponds to a period of 50 minutes

**3 Prerequisites for the participation in the course**

The following prerequisites apply to the participation in the course:

- Technical training in a relevant occupation.
- Proficiency in the course language to such an extent that the teaching can be followed and the theoretical qualification test can be taken.

Any interested parties who do not satisfy the prerequisites may be authorised to attend the course as non-enrolled students but they are not allowed to take part in the qualification test.

**4 Course duration and syllabus**

The course with a concluding qualification test encompasses a total duration of 50 teaching units<sup>2)</sup> (50 TUs). It is structured in the following course parts:

- Part 1: Specialist theory 14 TUs
- Part 2: Specialist practice 22 TUs
- Part 3: Qualification test 14 TUs

The course contents are indicated in the syllabus.

**Part 1: Specialist theory**

Cons. no.	Subject matter	TUs
<b>1</b>	<b>Polyethylene as a pipe material</b>	
1.1	Materials science – compositions, structures and properties of plastics – state ranges (solid, thermoelastic and thermoplastic)	1
1.2	Flow behaviour of thermoplastics – melt index (MFR) and weldability	1
1.3	Essential properties of polyethylene – density – ageing resistance – mechanical parameters – short-time and long-time behaviour	1
1.4	Cross-linked polyethylene – modification of the properties, especially of the shrinkage behaviour – areas of application	1
1.5	Marking, storage and transport – plastic shell pipes and fittings – semi-finished products and additives	1

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"  
 Working Group for Heat and the Combined Heating and Power Industry (AGFW) in the Association of the Electricity Industry (VDEW)  
 DVS, Education Committee, Working Group: "Training and Qualification Testing"

Cons. no.	Subject matter	TUs
<b>2</b>	<b>Welded joints</b>	
2.1	General fundamentals of the welding of PE-HD <ul style="list-style-type: none"> <li>– weldability</li> <li>– influences on the welding</li> <li>– weld preparation</li> </ul>	1
2.2	Welding of plastic shell pipes <ul style="list-style-type: none"> <li>– utilisation of the hot gas string-bead welding (WZ) and hot gas extrusion welding (WE) processes in the construction of district heating pipelines</li> <li>– plug welding</li> <li>– welding devices and equipment</li> </ul>	2
2.3	Tests and inspections on welded joints	1
<b>3</b>	<b>Sleeve techniques and pipe branches</b> <ul style="list-style-type: none"> <li>– longitudinal and round welds and welding of pipe branches</li> <li>– principle of sleeve welding with an incorporated heating element</li> <li>– sleeves with an integrated and inserted heating grid</li> <li>– wound sleeve</li> </ul>	1
<b>4</b>	<b>Hot gas string-bead welding (WZ)</b> <ul style="list-style-type: none"> <li>– process sequence</li> <li>– requirements on the welding devices</li> <li>– weld preparation, filler materials and weld configuration</li> <li>– welding parameters and ambient influences</li> </ul>	2
<b>5</b>	<b>Hot gas extrusion welding (WE)</b> <ul style="list-style-type: none"> <li>– process variants</li> <li>– requirements on the welding devices</li> <li>– weld preparation, filler materials and weld configuration</li> <li>– welding parameters and ambient influences</li> </ul>	2
<b>Total for specialist theory</b>		<b>14</b>

**Part 2: Specialist practice**

Cons. no.	Subject matter	TUs
<b>1</b>	<b>Welding exercises for the WE and WZ processes</b> <ul style="list-style-type: none"> <li>– various material thicknesses</li> <li>– single-V butt weld, fillet weld and pipe branches</li> </ul>	10
<b>2</b>	<b>Welding exercises from the area of application</b> <ul style="list-style-type: none"> <li>– welding exercises on pipe branches</li> <li>– manufacture of a specimen pipe branch</li> <li>– joint preparation</li> <li>– welding filler (type, condition and pretreatment)</li> <li>– devices (condition, setting and control measurement)</li> <li>– device handling (start and end of the weld)</li> </ul>	12
<b>Total for specialist practice</b>		<b>22</b>

**Part 3: Qualification test**

Cons. no.	Qualification test contents	TUs
1	Manufacture and evaluation of the test pieces according to the DVS® 2212-1 guideline, Qualification Test Groups I-3 and II-1.1	7
2	Manufacture and evaluation of the test piece according to the DVS® 2212-4 guideline	5
3	Theoretical qualification test	2
<b>Total qualification test</b>		<b>14</b>

<b>Teaching units in total</b>	<b>50</b>
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