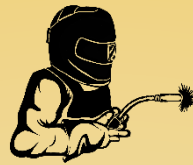




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MODULE C

Basic concepts and position during welding

Working positions during welding

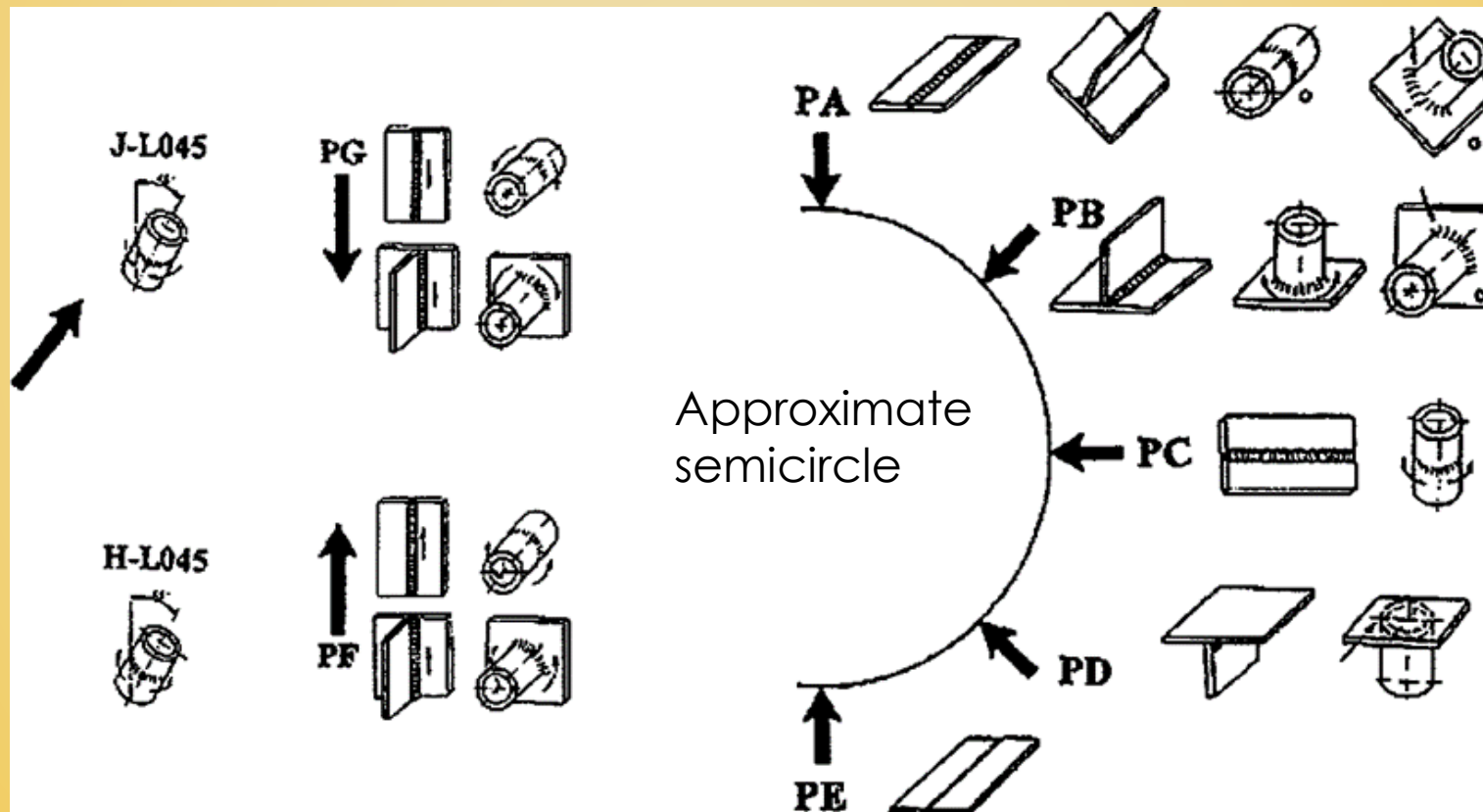


Working positions during welding

- Welding takes place depending on the complexity of construction in different welding positions.
- For testing needs welders, technological procedures, drawings etc. are normalized position according to EN ISO 6947 Welding - Working positions - Definitions of angles of inclination and rotation.



Welding positions according to EN ISO 6947 Welding - Working positions - Definitions of angles of inclination and rotation





Labeling positions during welding

- Position for welding are referred to as markers. PA, PC, PB etc.
- Brands They are normalized.
- They use is the creation of technologies for welding, for welding tests and more.
- Designation positions indicates the standard EN ISO 6947th



Naming and symbols of the primary positions

Name position	Characteristic	Labeling position
Horizontal position above	Welding the horizontal direction, the vertical axis of the weld, the top cover layer	PA
Horizontal position obliquely above	Horizontal direction of welding, the cover layer facing upwards obliquely	PB
horizontal position	Welding horizontal direction, the horizontal axis of the weld	PC
Horizontal position at an angle above your head	Horizontal direction of welding, overhead cover and obliquely downward	PD



Naming and symbols of the primary positions

Name position	Characteristic	Labeling position
Overhead horizontal position	Horizontal direction of welding, overhead, vertical axis of the weld, the bottom cover layer	PE
Vertical position up	Welding vertical direction from bottom to top	PF
Vertical position down	Welding vertical direction from top to bottom	PG
Welding seam up to the top	Welding direction upward inclination angle of 45 °	H-L045
Welding seam from the top down	Welding direction downward inclination angle of 60 °	J-L060

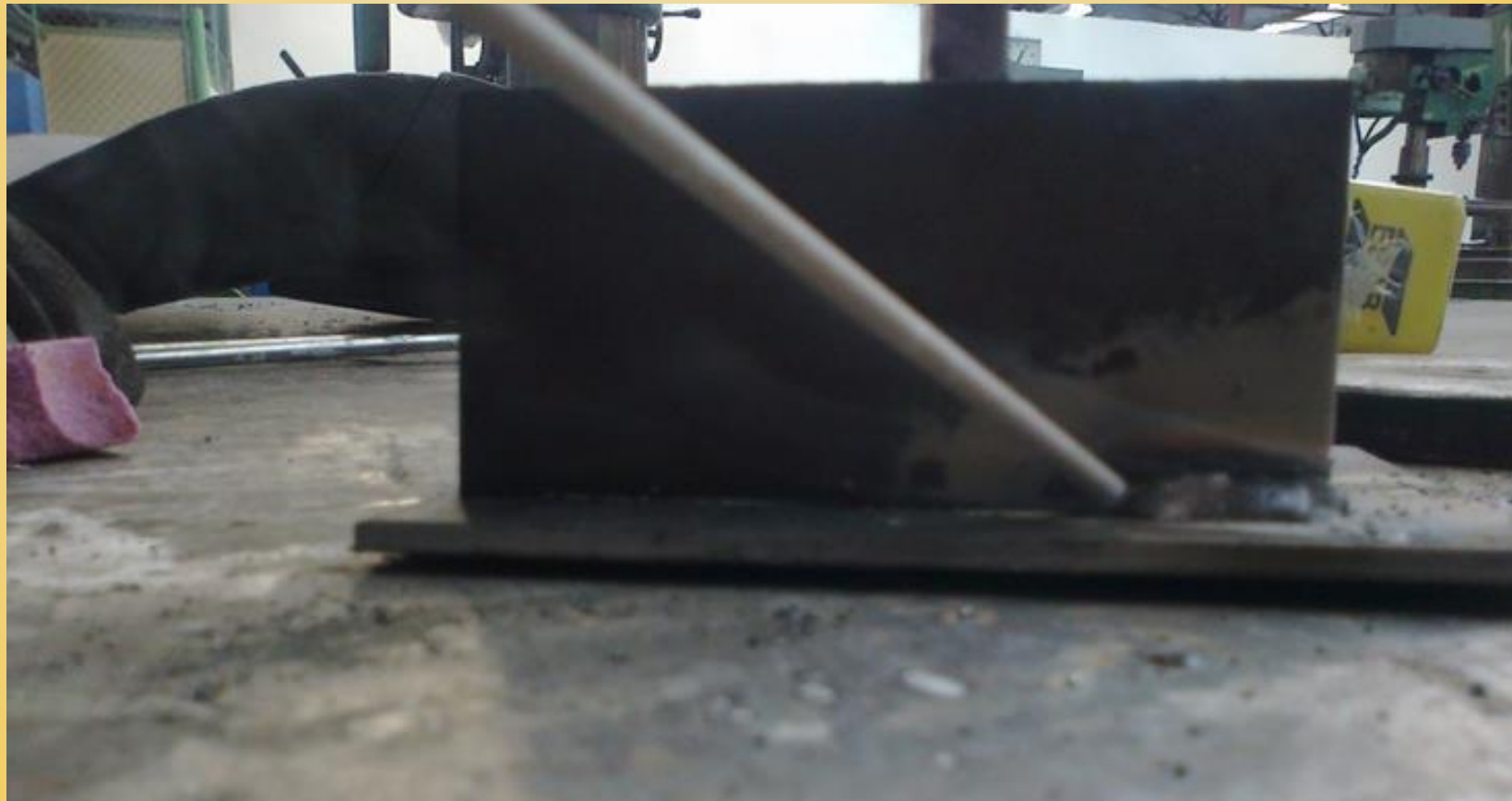
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A weld position PA



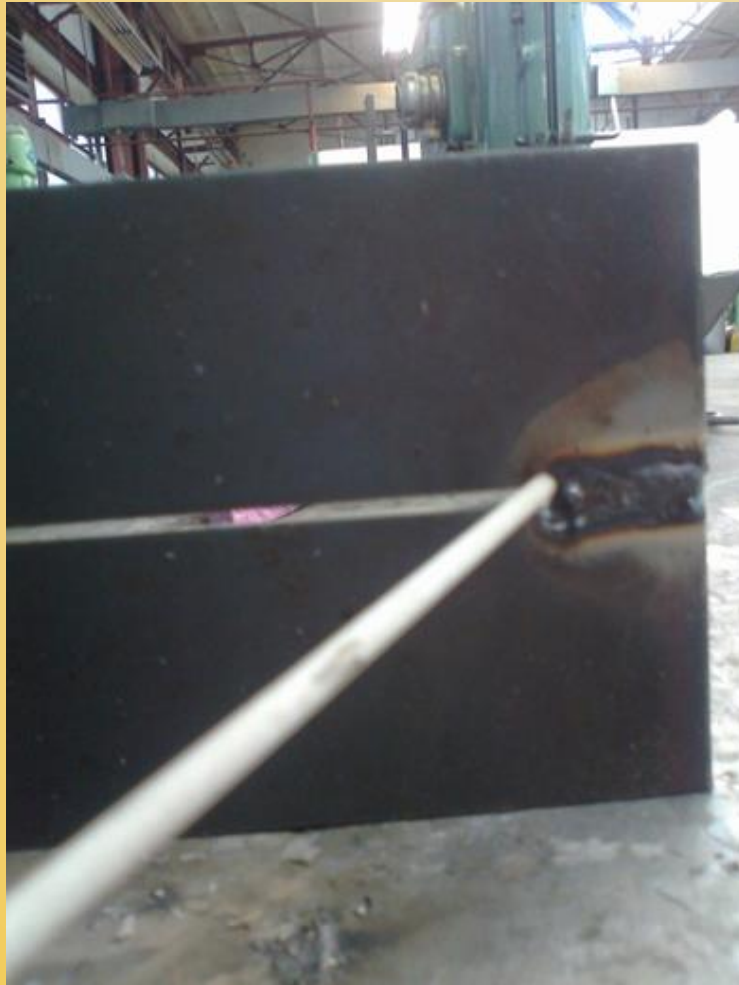


A weld position PB





A weld position PC





A weld position PG





A weld position PF





A weld position H-L045





Basic terminology used in welding

- In the field of welding is the need to establish welding procedures (WPS) návodek, control, design, drawings etc. must precisely define basic terms commonly used.
- On finished weld depth is determined by melting of base material such as penetration, weld height above the base material as the height of elevation and the root is a root elevation.
- For terminology needs there are several standards.

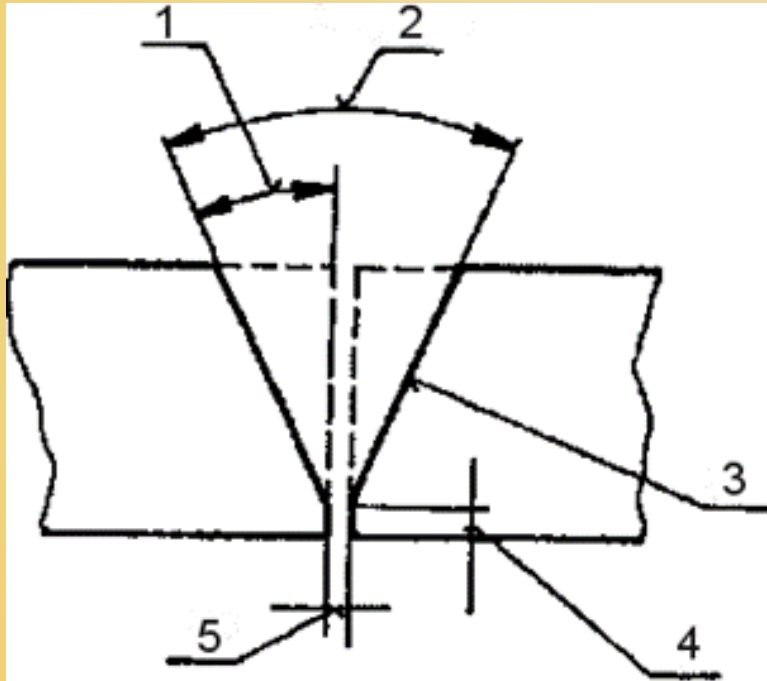


Basic terminology used in welding

- Basic the CSN 05 0000 Welding. Welding. Basic concepts and ISO 9692-1 to 4 Terminology - Basic concepts in welding / welding and allied processes - Recommendations for the preparation of welds - Part 1: steel welding manual arc welding with coated electrodes, GMAW shielding gas, flame welding, welding, tungsten inert gas welding beam.
- Gas welding valid EN 13622 Gas welding equipment.



The terms used for the adjustment in miter butt joint



Legend:

- 1 - bevel angle
- 2 - opening angle
- 3 - weld area
- 4 - blunting
- 5 - weld gap

KUBÍČEK, J. DANĚK, L. KANDUS, B. *Technologie svařování a zařízení. Učební texty pro kurzy svařovacích inženýrů a technologů.* Plzeň: ŠKODA WELDING, s. r. o., 2011. s. 10.

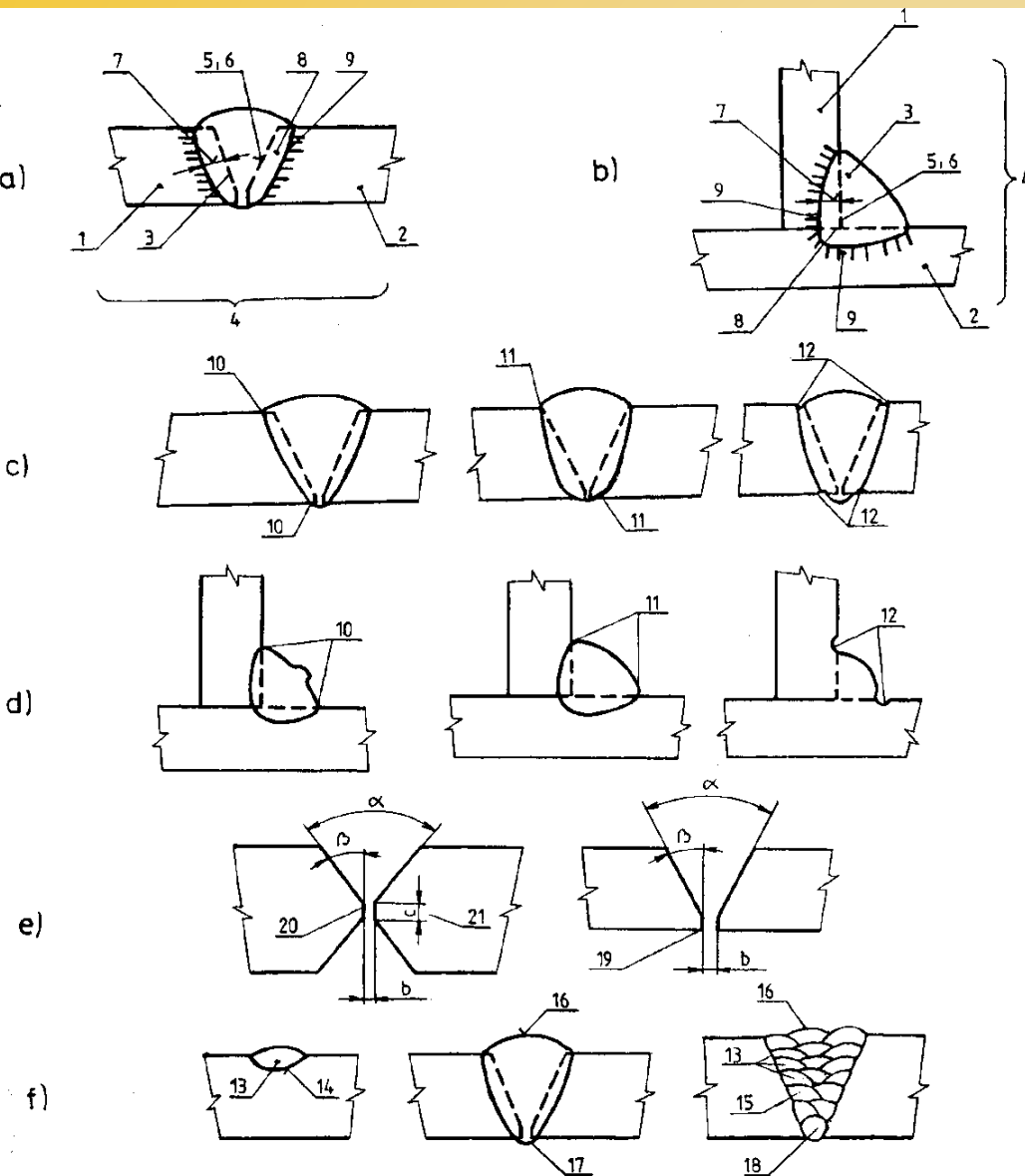


Basic concepts and terminology

- Welding are used in some fixed basic concepts and terminology.
- This Terminology is shown eg. to DIN 05000.



The terminology used in welding



a) a butt weld joint, b) a fillet weld joint, c) the transition metal to weld the base material, d) crossing the weld metal, e) preparation, f) placing weld layers

1 - Base material; 2 - Base material; 3 - weld metal; 4 - the weld seam; 5 - weld face; 6 - weld bevel; 7 - penetration depth; 8 - fusion penetration; 9 - a heat affected zone; 10 - smooth transition weld; 11 - sharp transition weld; 12 - transition weld notch; 13 - weld bead; 14 - single-layer weld; 15 - Multilayer weld; 16 - covering bead (layer); 17 - root fusion; 18 - founded root; 19 - bevel with a sharp edge at the root; 20 - bevel with blunt; 21 - height blunting; alpha - opening angle; beta - bevel angle; b - a gap in the weld root; c - blunting

AMBROŽ, O. A KOL. Technologie svařování a zařízení: učební texty pro kurzy svářečských inženýrů a technologů. Ostrava: ZEROSS, 2001. s. 20.



The terminology used in welding

- The weld joint formed by the two base materials of the same chemical composition and the same physico-chemical properties is called a homogeneous welded joint.
- In otherwise it is a heterogeneous welded joints.

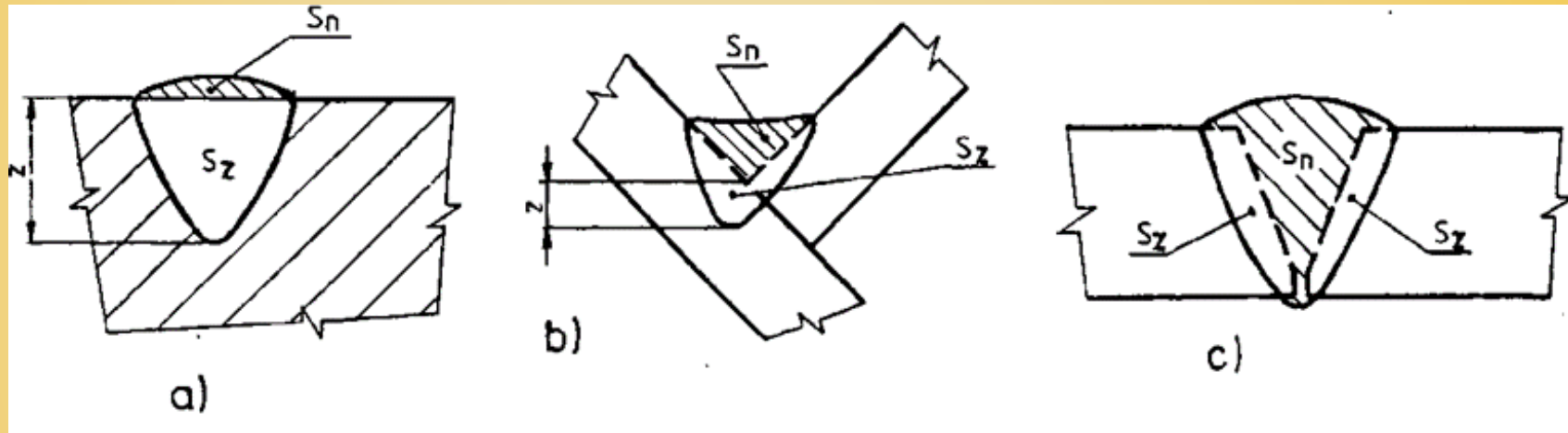


Dilution weld metal joint

- Fusion welding using filler material there is always a dilution of the base material of the metal electrode.
- Dilution is expressed in percent and, when molded around 5% to 10% for arc welding with covered electrode and a wire electrode in protective gases ranges from 40% to 60% depending on the welding parameters and welding electron beam or laser without filler material is 100%.



The dilution of the weld metal base material



a) weld welded joint

b) a fillet welded joint

c) blunt

S_n - the area of the weld metal

S_z - area of penetration



Questions to ponder

1. Describe the weld seam welding in terms of terminology.
2. What is the dilution of the weld metal and is calculated as?
3. What position welding phrase expresses PA?
4. What position welding phrase expresses PB?
5. What position welding phrase expresses PC?
6. What position welding expresses term PE?

7. What position welding phrase expresses PF?
8. What position welding phrase expresses PG?
9. Which position of the welding expression expresses H-L045?
10. What does it mean blunt?
11. What is the excess weld?



Recommended literature and information sources

- ▶ AMBROŽ, O. A KOL. Technologie svařování a zařízení: učební texty pro kurzy svářečských inženýrů a technologů. Ostrava: ZEROSS, 2001, 395 s. Svařování. ISBN 80-85771-81-0.
- ▶ KOUKAL, J., SCHWARZ, D., HAJDÍK, J. Materiály a jejich svařitelnost. 1. vyd. Ostrava: VŠB - Technická univerzita Ostrava, 2009, 240 s. ISBN 978-80-248-2025-5.
- ▶ KUBÍČEK, J. DANĚK, L. KANDUS, B. Technologie svařování a zařízení. Učební texty pro kurzy svařovacích inženýrů a technologů. Plzeň: ŠKODA WELDING, s. r. o., 2011, 242 s.