

## Internationell svetskonstruktör, IWSD - Kursprogram

### Modul 1: WELDING TECHNOLOGY

### Modul 1: Svetsteknologi

#### 1.1 Welding terminology/svetsterminologi, 3 timmar

**Objective:**

The students will understand key terms and abbreviations and be acquainted with basic standards pertaining to welding and welded joints.

**Scope:**

Definitions and terminology related to:

- basic types of welded joints;
- joint preparation;
- fusion joints.

**Expected result at comprehensive and standard levels:**

Review standard terminology in EN ISO 17659 "Welding. Multilingual terms for welded joints with illustrations".

Review standard terminology in EN ISO 4063:2000 "Welding and allied processes – Nomenclature of processes and reference numbers".

Present proper terms when discussing with welding engineers and welding technicians.

Illustrate how to locate information from relevant standards.

Classify various types of fusion joints based on proper terminology.

Classify various weld joint types based on proper terminology.

Classify weld preparations based on proper terminology.

#### 1.2 Welding symbols and design drawings/ Svetsbeteckningar, 3 timmar

**Objective:**

The students will be acquainted with welding symbols and characters used in design drawings and how to produce engineering drawings for production.

**Scope:**

Welding symbols

Weld drawing characters

Weld process abbreviations

**Expected result at comprehensive and standard levels:**

Review standard EN 22553:1994 "Welded, brazed and soldered joints – Symbolic representation on drawings".

Interpretation of correct welding process based on standard representations.

Illustrate correct markings or engineering drawings for a weld process.

Explain specifications for weld quality for design and inspection.

Explain the procedure for edge preparation and the common symbols used.

#### 1.3 Overview of welding processes / översikt över svetsprocesser, 9 timmar

**Objective:**

The student will become acquainted with the most common welding processes designated and designations for welding processes.

**Scope:**

For mechanical and process engineering the following welding process are recommended. The specific processes included in this section may vary depending on the target industry of the audience.

Manual metal arc

MIG/MAG

TIG

Submerged arc

Electron beam

Laser welding

Resistance welding

Friction stir welding

**Expected result at comprehensive and standard levels:**

Explain the working principals of the most common welding processes.

Explain the goals for selecting a suitable welding process for an application.

Review nomenclature in EN ISO 4063:2000 "Welding and allied processes – Nomenclature of processes and reference numbers".

Explain the range of applications for the methods being presented.

Explain constructional and material requirements for the welding processes.  
Illustrate proper welding parameters for an application.  
Explain the selection of welding consumables.  
Formulation and interpretation of a welding procedure specification (WPS).

## **1.4 Materials and weld metallurgy/Material och svetsmetallurgi, 10 timmar**

### **Objective:**

The students will understand effects of welding on the material metallurgy. This includes effect on material microstructure, hardness, hot cracking, ductility, etc.

### **Scope:**

Welding of constructional materials and their properties in the as-welded condition

Basics of welding metallurgy

Effect of heat input

Fe-C equilibrium- and TTT- diagrams

Microstructures and the effect on the mechanical properties of weld

Typical imperfections and errors

### **Expected result at comprehensive and standard levels:**

Explain aspects of welded joint design to ensure ductility.

Illustrate the control of heat input for weld processes.

Explain basic aspects of control the microstructures by heat input.

Explain proper selection of filler materials for common applications.

Review common weld imperfections and their sources.

Explain methods to avoid common weld imperfections.