MISSION

development and transfer of knowledge in the field of joining advanced structural materials in order to ensure innovation and competitiveness of producers of welded structures.
Established in 1945, Instytut Spawalnictwa is a leading and key welding research centre in Poland. In its long-standing activity Instytut Spawalnictwa has been solving problems in welding technology, coordinated numerous R&D projects and strengthened close links with the Polish industry and foreign centres.

Instytut Spawalnictwa is the only organisation of its type in Poland, has the status of the Centre of Excellence and functions as:

- **ANB** – Authorised National Body – in European Federation for Welding, Joining and Cutting (EWF) and International Institute of Welding (IIW), authorised for qualification of welding personnel
- **ANBCC** – Authorised National Body for Company Certification in EWF – authorised for certification of enterprises according to the PN-EN ISO 3834 standards
- **Accredited in Polish Centre for Accreditation** (PCA) organisation for certification of welding products and processes, Factory Production Control systems, welding and NDT personnel and quality management systems
- **Notified Body** in the European Union in the scope of 2006/95/WE, 97/23/WE, 87/404/WE Directives.

Institute has the certified quality management system in accordance with PN-EN ISO 9001:2009 standard.

Organised in 1956, at the moment an independent pilot plant Zakład Budowy Urządzeń Spawalniczych (ZBUS) Ltd., enable Instytut Spawalnictwa to conduct research work in a full cycle, i.e. research + development + implementation.

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**SCOPE OF ACTIVITIES**

Issues concerning processes of joining structural materials with the use of advanced technologies of welding, brazing, thermal cutting and allied technologies.

**AREAS OF ACTIVITY**

- development and applied research
- expert opinions, advice
- testing for CE marking, certification and approvals
- transfer of innovation into industry
- education and supervision of welding education in Poland
- certification of personnel, quality management systems and products, welding processes and Factory Production Control systems
- testing and qualification of welding technologies
- qualification of industrial enterprises, supervision of structures manufacture
- standardization
- scientific, technical and economic information
- collaboration with Polish and foreign organisations.
APPLIED AND DEVELOPMENT RESEARCH

constitutes the basis of the Institute’s activities. Research is conducted under Polish and European projects as well as projects conducted in co-operation with research organisations and industrial enterprises. Research activities cover the following areas:

WELDING TECHNOLOGIES:
- laser welding
- laser, plasma and oxygen cutting
- resistance welding
- conventional friction welding, FSW and ultrasonic welding
- flame, induction and oven brazing
- arc welding and surfacing (conventional and pulsed arc)
- MIG/MAG braze welding
- welding of thermoplastics.

Qualification of welding technologies (WPQR, WPAR, BPAR).

WELDABILITY OF STEEL AND NON-FERROUS METALS, TESTING OF WELDED STRUCTURES:

Structural testing:
metallographic testing,
testing with the use of thermal cycle simulator,
examination of microstructural transformations in steel.

Mechanical testing:
testing of strength, tensile and impact tests,
CTOD and COD, bend and hardness tests.

Non-destructive testing:
visual and penetrating,
magnetic-particle, radiographic,
ultrasonic and pressure testing.

Assessment of quality and usefulness of welded structures:
- verification of designs and assessment of producibility of welded structures
- numerical analysis of stresses and strains
- diagnosis of structures with the use of acoustic emission and computer-assisted methods
- measurement of exploitation and welding stresses
- fatigue testing of welded joints.
WELDING CONSUMABLES

Development and testing of consumables for welding, brazing and surfacing.

SPECIALIST EQUIPMENT

Development and testing of:
- inverter welding power sources for induction heating and plasma welding
- specialized stations for welding and allied processes
- quality control, measurement and recording systems used in welding
- control systems for welding, brazing, plasma and gas cutting as well as heat treatment processes
- equipment for vibratory stabilization of welded structures
- equipment for pressure inspection of welded joints.

ENVIRONMENTAL ENGINEERING IN WELDING

Testing of:
- dust and gas emission
- noise intensity, electromagnetic fields
- microclimate of work environment
- optical radiation
- welding consumables and processes in respect of pollutants emission.

AUTOMATION AND ROBOTISATION

- technical advice and economic analysis of profitability of implementation of robotised and mechanised stations,
- development and qualification of technology as well as instruction of service staff.

COMPUTER-AIDED MANUFACTURING OF WELDED STRUCTURES

Development of:
- welding CAD/CAM systems
- expert systems for determination of pollutant emission in welding environment
- educational programmes.
EXPERT OPINIONS AND ADVISORY SERVICE

The Institute offers quick help in solving any problems requiring immediate action, for instance:
- identification of reasons for failures of structures and investigation of accidents
- assessment of weldability of steels of repaired and exploited structures
- developing procedures related to welding of materials difficult to weld
- giving advice on the review of contracts
- expert opinions in the area of technology, inspection and quality of welded structures manufacture
- other issues resulting from customers’ needs.

TRANSFER OF INNOVATION INTO THE INDUSTRY

Transfer of research results and expert opinions into the industry is the main subject of the Institute’s activity. Such results, in the form of innovative technologies, products, methods, solutions, programmes etc. are implemented in the form of sale contracts, licences, know-how agreements, joint-venture projects. Training, seminars, conferences, workshops and publications offered by Instytut Spawalnictwa help industry to prepare for the implementation of innovation technologies.

Research and transfer of research results are financed from state resources, structural funds, funds of industrial enterprises and Instytut Spawalnictwa as well as other funds created to finance innovation-related initiatives.

Instytut Spawalnictwa supports industrial enterprises in their search for funds for research and implementation of research results while undertaking new research or transfer of knowledge.
TESTING FOR CE MARKING, CERTIFICATION AND APPROVALS

Instytut Spawalnictwa renders services for the purposes of:

- CE marking by Polish and foreign producers in the scope of:
  - Directive 2006/95/WE – low voltage equipment
  - Directive 97/23/WE – pressure equipment
  - Directive 87/404/WE – simple pressure vessels
- declaration and/or acceptance of conformity with standards requirements
- approval by technical supervision institutions and marine classification societies
- supervision required in quality management systems.

Testing in Laboratory for Welding Technology includes:

- base materials and welding consumables
- welded joints
- welding procedures
- electric welding equipment.

The Laboratory is accredited by the Polish Centre for Accreditation (PCA).

EDUCATION AND SUPERVISION OF WELDING COURSES IN POLAND

Instytut Spawalnictwa is Poland’s leading establishment in the area of continual education of welding staff. It collaborates with the European Federation for Welding, Joining and Cutting (EWF) and International Welding Institute (IWI) in the field of organisation and conducting of welding courses in accordance with the EWF and IWI syllabuses. The Institute also supervises welder training in Poland.

The offer of the Institute includes:

- issuance of certificates and accreditations for conducting welding courses
- education and training of welding staff and welders in accordance with principles approved in the European Union and worldwide
- training of non-destructive testing personnel
- specialist courses for engineers and technicians covering:
  - producibility of welded structures
  - design of welding process technologies
  - heat treatment of welded joints
  - inspection in welding
  - metallographic and mechanical testing
  - vibratory stabilisation of structures and other subjects agreed with customers
- courses for welders, solderers and operators of mechanised equipment.
The Certification Centre, separated from the Institute's structure, accredited by the Polish Centre for Accreditation, authorized by the European Federation for Welding, Joining and Cutting (EWF) and the International Institute of Welding (IIW), is a body dealing with the certification/qualification of:

- **welding personnel.** Instytut issues diplomas of international welding engineer, welding technologist, welding inspector, welding specialist, welding practitioner and welder as well as diplomas for personal responsible for macroscopic and microscopic examination of joints and PCA, EWF and IIW certificates of competence for engineers, technologists, specialists and practitioners.

- **non-destructive testing personnel** in accordance with EN 473 standard.
  The Centre issues certificates of competence for visual, penetrating, magnetic-particle, radiographic, and ultrasonic methods of testing.
- **quality management systems** in accordance with PN-EN ISO 9001:2009 and PN-EN ISO 3834 standards.
- **welding products** for confirmation of their conformity with the requirements of applicable standards or regulations.
- **welding processes** in accordance with PN-EN ISO 3834 standard.
- **Factory Production Control systems** in accordance with PN-EN 1090-1 standard.

The Institute collaborates with Polish and international organisations in the field of drafting and approval of welding standards. In the Institute is a secretariat of the Standardization Committee of the Polish Committee for Standardisation:

- KT 165 "Welding and Allied Processes".

The Institute offers information on standards in the field of welding and allied processes.

Instytut Spawalnictwa, on the request of industrial enterprises, after inspector and stating that an enterprise complies with the requirements of PN-87/M-69009 and PN-B-06200 standards, issues a Qualification Certificate which authorises the enterprise to manufacture welded structures in adequate class specified in PN-87/M-69008 and PN-B-06200 standards.

Instytut Spawalnictwa collaborates with SLV Germany (Schweisstechnische Lehr und Versuchsanstalt) in the scope of preparation and qualification of industrial enterprises in Poland which wish to export welded structures or conduct welding works in Germany under the construction supervision and/or PN-EN ISO 1090 standard or obtain qualification certificate "Eignungsnachweis" issued by German Training and Research Centres SLV. The area of qualification includes manufacture of elements of rail-vehicle in accordance with DIN 6700 standard.

In addition, Instytut Spawalnictwa supervises manufacture of liable structures such as bridges, buildings, pressure vessels, containers etc.
Within the scope of its active information services the Institute provides the public with:

**Library**, which has a stock of about 12300 books and over 30 specialist journals on welding and allied techniques

**Collection of abstracts of articles** published in welding journals and patent bulletins

**Thematic information services** prepared on individual order

**Welding Information Data Bank (SIBO)** which stores addresses of companies as well as information on welding products and services.

Moreover, the Institute organises:

**Conferences, symposia, seminars**
**International Welding Fair “ExpoWelding”**
(in co-operation with Expo Silesia in Sosnowiec)

**Exhibitions and shows.**

The Institute offers its publications:

**Biuletyn Instytutu Spawalnictwa (Welding Institute Bulletin)** — a bi-monthly magazine informing about all areas of the newest achievements, conducted research and events in welding

**Guidelines** — a number of issues on training programmes, repairs etc.

**Sets of lectures**

Catalogues, guide-books, dictionaries, manuals, seminar proceedings etc.
The Institute collaborates with the following organisations:

**in Poland:**
- Polish Centre for Accreditation (PCA)
- The Polish Committee for Standardization (PKN)
- producers of welded structures and products, welding materials and equipment
- technical universities
- scientific, R&D and training centres
- classification and acceptance societies
- professional organisations (Polish Welding Society, Polish Chamber of Steel Constructions, Polish Society for Non-destructive Testing, Federation of Scientific-technical Associations, Association of Polish Mechanical Engineers etc.).

**abroad:**
- The International Institute of Welding (IIW)
- The European Federation for Welding, Joining and Cutting (EWF)
- The European Committees for Standardization (CEN and CENELEC)
- The International Organisations for Standardization (ISO and IEC)
- The American Welding Society (AWS)
- The German Welding Society (DVS)
- The German Training and Research Centres (SLV)
- The International Association “SVAFKA” (MAC).

The Institute also co-operates with most European research welding institutes and research centres.