



Łukasiewicz
Instytut Spawalnictwa

Łukasiewicz – Institute of Welding





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.

Łukasiewicz – Instytut Spawalnictwa (Łukasiewicz – Institute of Welding) is a leading welding research centre in Poland. The Institute, now belonging to the Łukasiewicz Research Network, was established in 1945.

The Institute is the only research organisation of its kind in Poland. It is strengthening close links with the industry and research centres in Poland and from overseas.



Łukasiewicz – Instytut Spawalnictwa functions as:

ANB – Authorised Nominated Body – European Federation for Welding, Joining and Cutting (EWF) and International Institute of Welding (IIW), authorised for qualification of welding personnel

ANBCC – Authorised Nominated Body in EWF and IIW authorised for certification of enterprises according to the PN-EN ISO 3834 standard

Accredited in Polish Centre for Accreditation (PCA) organisation for certification of welding processes, Factory Production Control, welding and NDT personnel and quality management systems

Notified Body in the European Union in the scope of 2014/68/EU Directive and Regulation (EU) No. 305/2011 of the European Parliament and of the Council.



Scope of activities

- 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, welding processes and Factory Production Control
- 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.

Areas of activity

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

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

APPLIED AND DEVELOPMENT RESEARCH

Research constitutes the basis of Łukasiewicz – Instytut Spawalnictwa activities. Research is conducted under Polish and European projects as well as projects conducted in cooperation with research organisations and industrial enterprises. Research activities cover the following areas:

WELDING TECHNOLOGIES

- laser welding and surfacing
- hybrid laser + arc welding (HLAW)
- laser and plasma cutting
- electron beam welding and surfacing
- resistance welding
- conventional friction welding, FSW and ultrasonic welding
- flame, induction and oven brazing
- arc welding and surfacing
- MIG/MAG braze welding
- laser braze welding
- welding of thermoplastics
- flame spraying

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

WELDABILITY OF STEELS AND NONFERROUS 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:

- strength and fatigue testing
- static tensile and impact testing
- CTOD
- bending and shear strength tests
- hardness measurements.

Non-destructive testing:

- visual examination
- penetrating tests
- magnetic-particle tests
- radiographic examination
- ultrasonic and pressure testing (including TOFD and Phased Array)
- testing using leak detection method.

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
- measurement of exploitation and welding stresses
- fatigue testing of welded joints.



**APPLIED AND DEVELOPMENT
RESEARCH**



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

Research and testing in the field of:

- fume emission
- acoustic pressure in the range of audible noise
- acoustic pressure in the range of ultrasounds
- optical radiation of welding arc
- 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 training and examining of operators of robotised stations.

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

Łukasiewicz – Instytut Spawalnictwa 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 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 Łukasiewicz – Instytut Spawalnictwa help industry to prepare for the implementation of innovation technologies.

Technologies and services offered by the Institute can be implemented within the frames of home and international projects conducted institutions financing the development of enterprises.

Łukasiewicz – Instytut Spawalnictwa participates in research programmes, including applied research projects of National Centre for Research and Development.

TESTING FOR CE MARKING, CERTIFICATION AND APPROVALS

Instytut renders services for the purposes of:

- CE marking by Polish and foreign producers in the scope of:
 - Directive 2014/68/EU – pressure equipment
 - Regulation (EU) No. 305/2011 of the European Parliament and of the Council
- declaration and/or acceptance of conformity with standards
- 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
- electric welding equipment.

The Laboratory is accredited by the Polish Centre for Accreditation (PCA) and is approved by UDT, TDT, PRS and BV.

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 (IIW) in the field of organisation and conducting of welding courses in accordance with the EWF and IIW 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 having responsibility for welding coordination in accordance with principles approved in the European Union and worldwide
- training of non-destructive testing personnel
- specialist courses for engineers and technicians
- courses for welders, solderers and operators of mechanised equipment
- courses in the field agreed with the customer.



Laboratory for Welding Technology has the certified quality management system in accordance with PN-EN ISO/IEC 17025 standard.





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CERTIFICATION OF PERSONNEL, QUALITY MANAGEMENT SYSTEMS, WELDING PROCESSES AND FPC

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** – Institute issues diplomas for international and European welding personnel and personnel engaged in adhesive bonding. It conducts qualification of the personnel with the responsibility for macroscopic and microscopic examination of joints and welding of reinforcing bars as well as for heat treatment of welded joints. Institute conducts certification of personnel performing joints in plastics (CEPW)
- **personnel in the field of anti-corrosion coatings** within the range of the PN-EN 1090-2 standard
- **non-destructive testing personnel** in accordance with PN-EN ISO 9712 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 and PN-EN ISO 3834 standards
- **welding processes** in accordance with PN-EN ISO 3834 standard
- **Factory Production Control** in accordance with PN-EN 1090-1 standard.

STANDARDISATION

Łukasiewicz – Instytut Spawalnictwa collaborates with Polish and international organisations in the field of drafting and approval of welding standards. In the Institute there 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.

QUALIFICATION OF INDUSTRIAL ENTERPRISES, SUPERVISION OF STRUCTURE MANUFACTURING

Łukasiewicz – Instytut Spawalnictwa, on the request of industrial enterprises, after inspection 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 supervises manufacture of liable structures such as bridges, buildings, pressure vessels, containers etc.

SCIENTIFIC-TECHNICAL AND ECONOMIC INFORMATION

Within the scope of its active information services Łukasiewicz – Instytut Spawalnictwa provides the public with:

Library, which has a stock of about 12000 books and over 30 specialist journals on welding and allied techniques

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

Moreover, the Institute organises:

Conferences, symposia, seminars International Welding Conference

during 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

e-BIS – Biuletyn Instytutu Spawalnictwa (Welding Institute Bulletin) in English language available online <http://bulletin.is.gliwice.pl>

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

Sets of course books

Catalogues, guide-books, dictionaries, manuals, seminar proceedings etc.

NATIONAL AND INTERNATIONAL LINKS

Łukasiewicz – Instytut Spawalnictwa 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.)

and 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 "SVARKA" (MAC)

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





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