Quality Assurance of Welded Construction of Industrial Boilers

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For decades the use of pressure equipment in several industrial facilities is an undeniable reality. A special variant of pressure equipment are boilers (Fig. 1).

Contrary to what happened in the past, there are currently very specific building codes and standards, which have come to standardize the best construction rules and practices, to make the use of this equipment safe.

Manufacturers whose product is based on welded construction and subject to CE marking, are obliged to know and implement all the necessary provisions for the conformity of their product from its conception to the product's availability on the market.

In accordance with European community regulations and directives, for boilers subject to firetube direct flame action, the ISO12953 harmonized building code allows for the regulation of their manufacturing. As with any code, it contains most of the specific information about the construction, but it refers to the specific information about certain requirements for other standards, as it happens in several aspects related to welding. Although sometimes, final acceptance must be done according to the criteria of the parts of the main code.

One method to eliminate the possibility of failure to meet requirements is to identify all essential variables provided for in the building or qualification code, and then carry out a targeted and compliant needs assessment with the applicable harmonized code in accordance with the construction specification that must be derived from the design. This will allow tuning between project and execution within the domain of validity of each essential variable. Fig. 2 shows an example of macroscopic test for the survey of qualification needs of procedures and welding in accordance with ISO15614, based on the specification for the welded construction from each welding to be carried out, and on the observance of the particularities provided for in ISO12953-4 in concerning the design of welded joints.

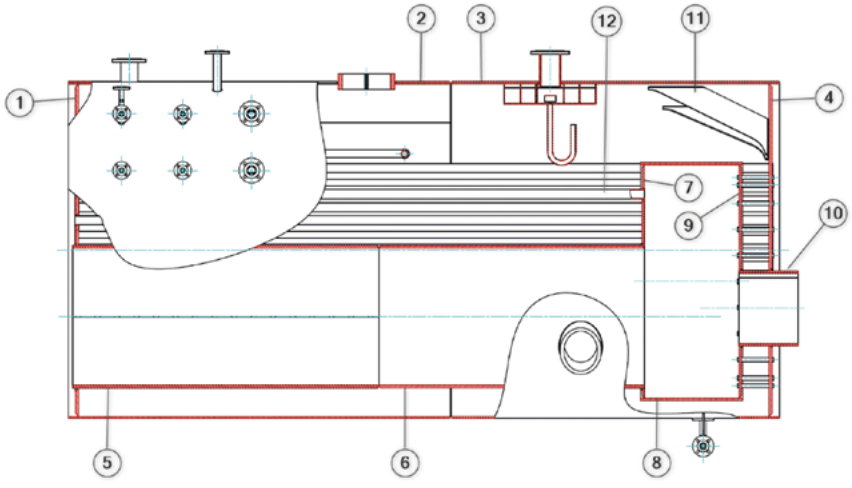


FIGURE 1
Sectional View of Steam Boiler: 1, 4 – Flat Ends; 2, 3 – Shell; 5, 6, 7, 8, 9, 10 – Combustion chamber; 11 – Anchors; 12 – Smoke tubes (exchanger).

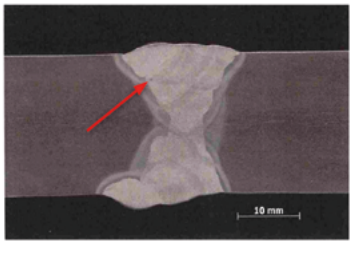
Test specimen		
Ref.	ST2	
Orientation	Cross section	
Etchant	Nital 2%	
Test Temp. (ºC)	21	
Imperfection reference	2011	
Dimension (mm)	h = 0,1	
Test Procedure	ISO 17639:2003	
Acceptance Criteria	ISO 15614-1:2017 + EN 12953-5	
Result	Imperfection below the acceptance criterion / Acceptable	

FIGURE 2
Results of macroscopic test for pWPS 01 - Cross Section 2.