



PROPOSAL FOR A EUROPEAN STANDARD ON SHELL & TUBE HEAT EXCHANGERS

Shell & Tube Heat Exchangers are by far the most important pressure items of all chemical, petrochemical and energy plants. With an approximate estimation, we may say that the cost of shell & tube heat exchangers may be about 30-50% of the total cost of these plants. This is the reason why there is a strong need for the standardization of these very peculiar pieces of equipment, in all areas where the normal pressure vessel standards do not contain specific prescriptions, and namely:

1. Heat exchanger types: the three basic types - U-tubes, fixed tubesheets, floating heads – may have several variations depending on the specific service (cocurrent or countercurrent flow, number of tube passes, contemporary presence of vapours and liquids, condensing or boiling service)
2. Need for cleaning of the tubes (inside and outside).
3. Tolerances to be adopted for drilling tubesheets and baffles.
4. Size of nozzles, as well as dimensions of the inlet and exit areas to the tube bundle to avoid erosion of the tubes.
5. Standard dimensions of shells, tubes, main flanges and other components (bolts, gaskets, baffles)
6. Value to be adopted for fouling factors in specific service environments.
7. Type of the specific testing devices.
8. Prescriptions to avoid tube vibrations.

Note that thermal design is already provided by specific software companies, working in close collaboration with universities and research centres, while mechanical design of the heat exchanger components is already provided by the existing pressure vessel standards: however, the a.m. specific prescriptions, although they are not related neither to the design nor to the manufacture or the testing, are certainly relevant also from the point of view of the essential safety requirements imposed by the European directives.

The most widely used standard for Shell & Tube Heat Exchangers is the American TEMA standard, elaborated by the American Tubular Exchanger Manufacturers Association. This standard certainly contains important prescriptions and therefore may also be considered for guidance, however some of its prescriptions seem sometimes to cause an unreasonable increase in the final cost of the equipment (which is logical considering that it has been established by Manufacturers only, who therefore have an interest in this direction). Moreover, this standard makes continuous reference to other American standards, which sometimes conflict with the EN standards. More recently, a similar document has been elaborated in the Chinese Republic: GB/T 151 Edition 2014 (the first edition was published in 1999).

We think therefore that also a European standard published by CEN and prepared by the joint effort of European manufacturers, users, engineering companies and notified bodies, considering the specific needs of the European industry, of the European legislation and the European standardization system would deserve the Commission's attention.

Fernando Lidonnici
EPERC Chairman

Milano, October 11th, 2021