Trip Report- Movesa,S.A. , pressure vessel mfr

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1 Movesa, S.A. Madrid Spain

A potential manufacturer for our pressure vessel, Movesa, in Madrid, Spain was visited by Igor Liubarsky, Sara Carcel, and myself, on Thursday Nov 17, 2011 for the purpose of assessing the suitability of this manufacturer to fabricate the Next-100 pressure vessel successfully. This was the first visit for all of us. We showed the latest version of the pressure vessel which now incorporates the 12 cm copper liner, but did not discuss the latest or earlier draft specification, in any detail.

1.1 Impressions

Movesa's primary business is reactor systems for food, chemical and pharmaceutical industries. These are pressure vessels that have internal components such as stirrers, heaters, as well as much external piping, valving and controls. They typically mount a system on a skid. Movesa also has the ability to do work to nuclear standards. They are used to working closely with clients, especially for pharmaceutical work; these clients are often on-site to oversee fabrication.

Jose Antonio Moya Ruiz is the director general and met with us. He seemed very relaxed and knowledgeable. He did not speak English, and had someone from the shop translate, however Sara did most of the translation. We started by showing him our latest design, with discussion, and then visited the plant. He saw no initial problems in the design. He was very familiar with the 316Ti grade which is evidently common. He mentioned that 150 bolts were a lot of bolts and thought this maybe excessive, however I explained this is done to minimize flange OD. He indicated that his engineer would be taking a look at this, and either would have to come to agreement or conider a design change.

Regarding the delays that will be present in making radiopurity measurements, he indicated this is no problem. We will need to present a list of measurements to be made once we know what the fabrication plan is (what tooling is used, etc). Also he had no problem using either material provided by us and using dedicated tool bits and abrasive wheels, etc. on our job.

Regarding the flange material and type, like ETM , he suggested we use roll forgings. This allows forming an integral hub so as to place the weld off the flange. However, in addition, he has no problem using a full penetration (hubless) weld of the flange to the vessel, and indicated there is no problem doing the necessary radiography. He said he would start with a thicker flange, make a deep full penetration weld, then machine down to size. He did not think a post-weld heat treatment would be necessary, but saw no problem in doing it. We discussed tolerances, how he would achieve them. For highest

Figure 1: typical reactor vessels

tolerances he would weld the vessel shell to the flange on a vertical axis table, slowly spinning, the weld being done manually, welder stationary. For looser tolerances the vessel axis would be horizontal.

We asked about how he performs welds on stainless; if they use a trailing gas shield on both sides of the weld in addition to the main electrode holder gas flow. This is to protect the weld from oxidation as it cools. He indicated that they do not use a backside gas shield but instead use a ceramic backing plate. This is an acceptable method, but I have a concern that there could be (U,Th) contamination from the ceramic. We should test samples. Also we would specify that these welds be ground flush afterward, though this also could introduce contamination. We should find out what type of grinding wheels they use and obtain samples to test.

We asked about the possibility of drilling bolt holes after welding and post-weld heat treatment, he said this is no problem.

We did not see a vertical lathe large enough to perform the final machining, and remarked about this, his response was that he would contract this to another mfr. close by who has one of the appropriate size. The two vertical axis machines he has, in the stainless room appeared to be radial drills, not vertical lathes.

The factory works in both steel and stainless steel, and there are separate facilities for each. There is a lot of rust in the steel fabrication room, which is the reason for the segregation.

We also talked about electropolishing, they can do this (or contract it out locally). The food a pharmaceutical clients use this, but often a mechanical polish is what is used, as in the preceding picture. They also machine down welds, either by machine or by hand as was done in the pictures below:

We did not see any automatic TIG welders with wire feeds, as we did with ETM; he said most welding is done manually. We did see small automatic pipe welders (not sure if TIG, probably so) and a GMAW (MIG) welder. He said the flange to vessel welds would be manual, done on a slow spinning table. For highest tolerances, the axis would be vertical, for less accurate work they typically spin the vessels on a horizontal axis. The large tank in work (4m dia.) was manually welded this way.

He has a large separate building, that is used for special projects. They setup a clean room inside,

Figure 2: radial drill 1

Figure 3: radial drill 2

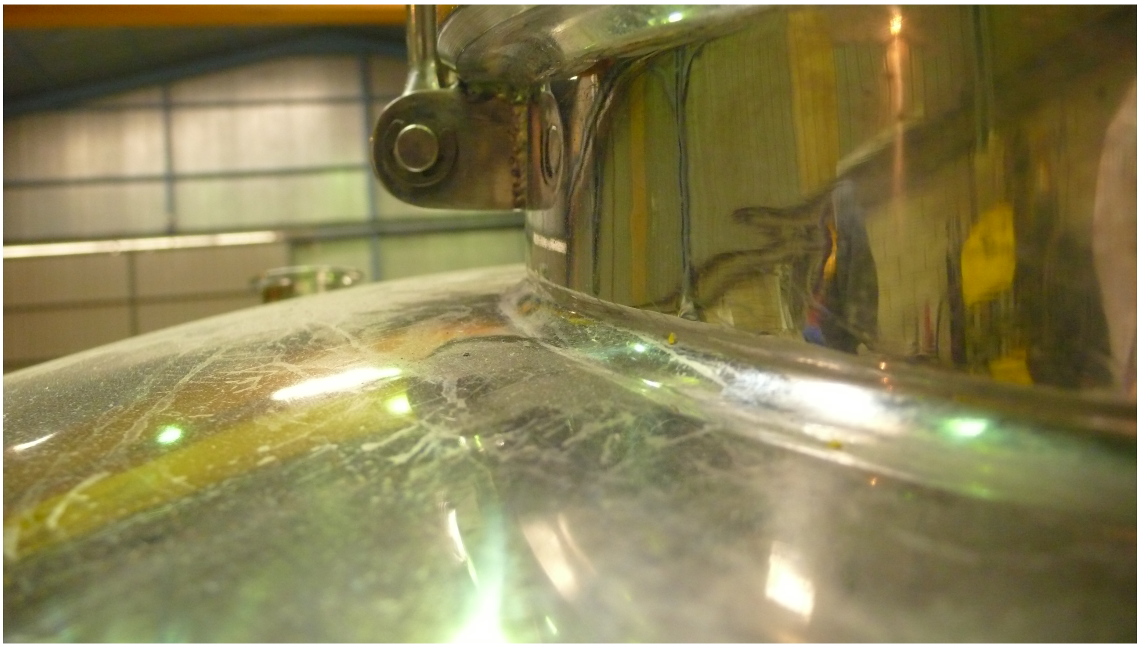

Figure 4: ground and polished welds

Figure 5: ground and polished welds

Figure 6: manifold fabrication, orbital welder on rigtht

Figure 7: large steel tank, on motorized rollers

Figure 8: plate rolling mill, stainless steel only

when necessary. It was not very clean at the moment. It was adjacent to the cutting room where there is a large plasma cutter. The plates are laid on slats which become covered with slag. He would change out the slats for our cutting or contract the cutting to a nearby company that does non-abrasive water jet cutting. The plate rolling mill in the stainless room appeared to be very clean.

He showed a typical Manufacturer's Design Report that they produce; it was a binder 4 inches thick containing material certs, design calculations, welder qualifications and procedures, inspection and test reports, all very similar in scope and apparent quality to ETM. They do not use a PV design software code, but code the calculations manually. They can work to the various ASME divisions and/or other codes such as ?Merkblatte?

1.2 Conclusion

It was our feeling that this manufacturer is a better fit to make the kind of vessel we need, they seem more flexible, have more resources at hand, and do a wider range of projects, compared to ETM, though both mfr's seem fully capable. It will be easier to supervise the fabrication at Movesa.