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In the latest of his exclusive refractory analyses, P. Carlo Ratto* talks to AG about whether or not the low-cost fused cast AZS refractory market will evolve under the pressure of new product applications?

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While moving into Q2-2013, here we are again with a specific update concerning my loved fused cast and other refractories for the glass industry.

Since very minor are the real “technical” news in this specific segment, focus is, once more, on the low-cost manufacturers, their cost vs. value positioning and trends.

We have noted that the technical and technological progresses on low-cost area of fused cast manufacturers are scarce, while the costing position is seriously inflating, making it progressively harder (if not impossible) maintaining the pricing leverage at the level requested by a western clientele so as to consider low-cost procurement a viable option.

Some of the several low-cost Chinese manufacturers have begun adjusting their pricing, announcing very significant increases (in some case a double-digit jump), in the attempt to discharge part of the cumulated cost increase coming from raw materials but mostly from labor, these moves are seriously challenging the factual acceptability threshold of price advantage from the customers perspective.

The brute and progressively unacceptable alternative, from the supplier perspective, is selling at a loss.

One could question why western customer, in order to consider buying Chinese AZS fused-cast are still requesting a premium on price advantage that, based on common feeling, is at the present time, not less than 25-30% on a delivered base, versus the major western manufacturers.

This is not merely imputable to a certain degree of quality difference and not even to a different expected long term performance, of which there is not enough reliable historical data.

The major difference stays with the fact that, while western suppliers are quoting and providing “services” associated to a “product”, low-cost manufacturers are generally selling only a “product”.

When comparing price of western against low-cost manufacturers, therefore, we are not comparing apples with apples and buyers of low-cost products must consider associated costs that will have to be appended to the products in order to get the needed package (which is already included in the western products price).

These services, to make it clear, are pretty substantial, such as:

• Review/debugging of customer’s drawings, production of new & clean drawing relevant to assemblies, details and single pieces.

• Cooperative teaming with customer, offering improvement proposals for blocks and lining improvements, qualities applications (chemistry, casting techniques), alternate solution definition to improve the quality/cost ratio. This is part of the “fidelization package” offered by major western players.

• Discussion and negotiation of technical specifications against specific customer’s demands and real needs, support to customer’s inspection process, removing language and cultural barriers.

All the above, and others, are provided “for free” by western manufacturers, and its cost is included in the materials price.

Since most of these are not offered by low-cost manufacturers, but generally needed, somebody else will have to provide these add-ons; few large glassmakers have internal resources to cover part of these, while medium-small must generally outsource most of this from third parties.

Some time, these cost add-ons can be not clearly attributed to the low-cost products, and therefore not properly associated in the procurement financial records.

In some case, a third part (and not a glassmaker) is the customer buying low-cost refractories; they will append the services and re-sell the package to glassmakers. These third parties are, typically, engineering, refractorists not producing fused-cast or other providers introduced in the supply chain of the glass industry.

Whatever will be the case, these added services have a cost (and a “western” cost), that in various ways will be eventually associated to the refractories, and charged to the final customer.

This is, indeed, one major reason for the advantage threshold requested when buying a low-cost fused-cast refractory.

The day after Chinese manufacturers will apply the prices increases when buying low-cost fused-cast refractories, they will append the services and re-sell the package to glassmakers. These third parties are, typically, engineering, refractorists not producing fused-cast or other providers introduced in the supply chain of the glass industry.

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The day after Chinese manufacturers will apply the prices increases needed to maintain their business profitability, we will have to seriously double-check the viability of these suppliers from the western angle of view, unless these “cheap” manufacturers/vendors will be able to supply the mentioned services, eventually becoming more “regular” suppliers and therefore bringing their competitive profile to an easier evaluation of cost/quality ratio.
Complicated purchases

Another complication when buying low-cost AZS fused casts is the consolidated practice of procuring only parts of furnaces and not entire projects from the cheap source.

Since there still is enough quality and performance concerns, critical parts like throats of container furnaces (but also bottom bubblers, cross walls, bottom electrode blocks and other highly stressed areas), typically low-cost materials provided are superstructure and a limited amount of glass contact, standard pavers, when the block size limitations (normally more severe for low-cost) do not represent an issue.

To be considered that materials (e.g. regular cast superstructure) with a higher content of labor per mass unit are expected to be more competitive than high-tech blocks, when procured from low-cost sources.

As a consequence, most western glassmakers buying Chinese AZS fused casts, do procure low-cost superstructure (and some glass contact) while buying critical parts from European/US manufacturers. As a consequence they will have to handle duplicate procurement processes and afford replicate inspection costs, long range trips.

These are issues that represent, sometime, a significant barrier to access low-cost procurement, particularly for medium-small western glassmakers having limited resources dedicated to technical aspects of refractory purchasing.

In addition to the fact that superstructure materials are (should be) the most competitive group of low-cost products, this same materials represent invariably the “Trojan horse” used to introduce cheap brands, since western glassmakers perceive (not always rightly) that superstructure represents a lower level of technical risk, when assessing a new source on a financial advantage stance.

It is consequential that the amplitude of the “fused-cast for superstructure” application niche is strategically important to the penetration of low-cost fused-cast in the western markets. This niche has been, for decades, representing a relatively stable share of the total fused cast refractory used for container glass furnaces, while for the float glass market, a variable amount has been balanced with the application of fused cast beta alumina.

One risk of downsizing the mentioned niche has been the advent of oxy-fuel combustion, since alpha-beta and beta alumina did prove to be incomparably more stable than AZS fused cast in the oxy-fuel atmosphere, where combustion and evaporation products are not diluted by nitrogen.

Under such conditions, some negative consequence of the stressed AZS fused-cast is the increased exudation and, consequently, the increased refractory wear and glass pollution. But, due to a relatively slow penetration of the oxy-fuel technological platform, and the advent of “low exudation AZS fused casts” (and we could open an intriguing discussion on the technical profile of these “lowex”), the niche of AZS fused-cast for superstructure has been pretty much preserved, until yesterday.

Somehow unexpectedly, the class of refractory representing today the major threat against AZS fused-cast in superstructure applications (for air- and oxy-fuel technologies) is not a member of the fused-cast family!

In today’s most advanced container furnaces, managed by the major global glassmaking groups, are progressively lined with sinter AZS in superstructure.

This special type of refractories are an high-tech evolution of a relatively old concept of pre-cast shapes; they are cast, dried and fired as large shapes, capable to produce arches in a single piece, with undeniable advantages in construction costs and speed.

These materials, that conceptually existed for a long time, have been carefully modified through well targeted R&D in order to make them highly resistant to vapor corrosion, largely improving the resistance to nephelic refractory conversion, confirming the intrinsically low (or nil) tendency to exudate, refractory body homogeneity, lower than fused-cast thermo conductivity.

The described new class of advanced materials are not cheaper than superstructure AZS fused-cast (particularly the low-cost version), but represent and bring along advantages and cost saving in the construction stages, furnace engineering (number of pieces) and glass quality, as a consequence of a very minor amount of exudate polluting the glass.

The high-tech special shapes, so far produced mostly by a specialized US company, are progressively replacing fused cast AZS superstructure niche, with a number of consequences, among other effects, they are negatively impacting the marketing penetration of low-cost AZS fused cast that, as described above, utilize this application niche as a major introductory device for the west.

The potential market for these special shapes, only considering the glass furnaces superstructure application, is very large since, as a raw estimate, more than 20,000 TPY of AZS fused cast are installed, worldwide, in superstructure.

This evolution in application could represent the first significant reduction ever of the global niche of fused cast refractory for glass, in a market already stagnant in most of western markets.

It is also an important obstacle to the expansion of low-cost AZS fused cast in the west, and a strong incentive for Chinese producers toward accelerating their evolution, in the direction of becoming rapidly regular players, being capable of providing products in bundle with services, offering world level quality of such packages, in exchange of a more regular pricing, so as to restore a due level of profitability. In this process, it will be inevitable to reduce the huge overcapacity existing in the low-cost area, in view of a reduced niche expansion.

Once more, the advent of a technological evolution in the glass refractory application, will contribute to modify equilibria and, ultimately, determine or accelerate progresses in the global market.