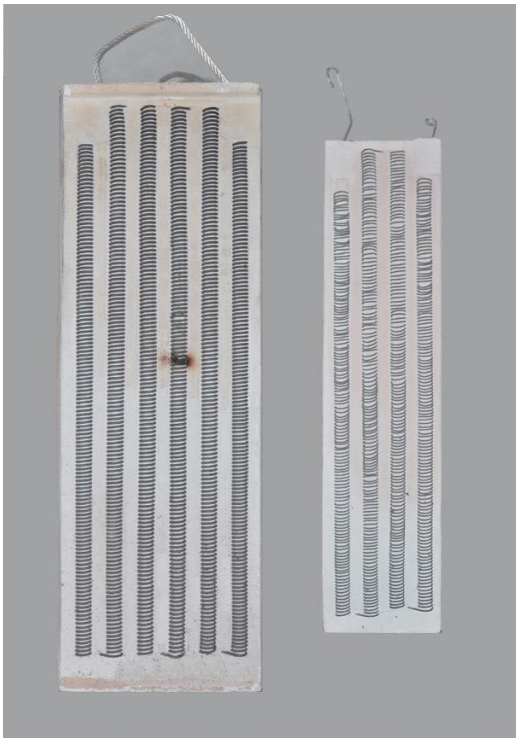
COMPARING SINGLE-REFRACTORY PANEL-TYPE HEATING ELEMENTS WITH RAYTEQ DUAL-REFRACTORY ELEMENTS

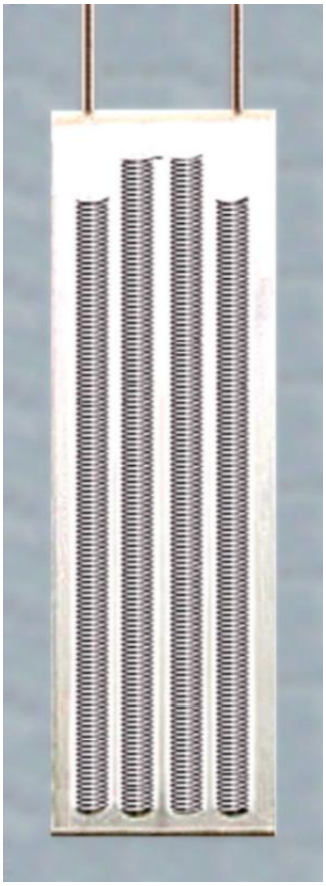
INTRODUCTION – Frank B. Smith, founder of Rayteq, set a new world standard with his invention of the dual-refractory heating element design some years back. These elements have been known to last five to 10 years in full production melting operations, a feat never achieved by conventional heating elements of any design.

SINGLE-REFRACTORY HEATING ELEMENTS – However, over the years a number of competitors have attempted to copy Smith's highly successful design but all have taken a fatal shortcut: To reduce costs so they can undercut the price of the more expensive-to-produce dual-refractory element, they cast the heater wire coils ***directly*** into the wet caustic cement used to form the support panel. Since this cement takes many hours to dry, there is more than sufficient time for the caustic cement to attack the metallic heater coils, forming tiny "scabs" on the surface of the wire. These scabs prevent the wire's aluminum in the alloy from forming its protective layer of aluminum oxide over the surface of the wire. Since the scabs are highly porous, oxygen can easily penetrate the unprotected wire and oxidize the chrome in the wire alloy which increases the electric resistance, which in turn produces hot spots, which after a period of just weeks or months results in fatal burnouts (note burnout near center of large element from the the UK which is shown in the photo below).



SINGLE-REFRACTORY HEATING ELEMENTS PRODUCED IN THE UNITED KINGDOM

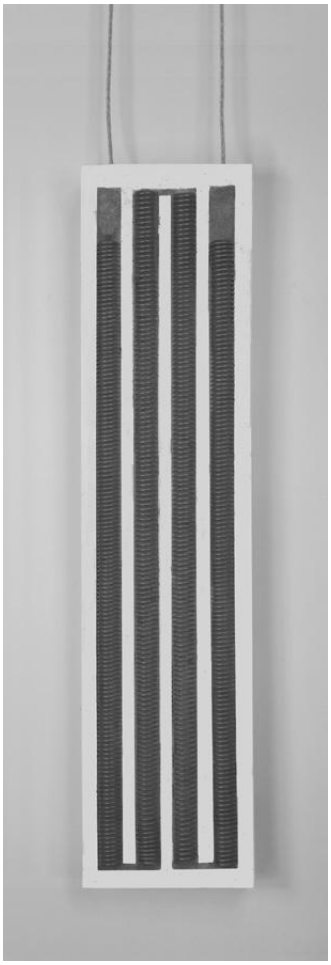
While the majority of competitors producing these single-refractory elements have stopped making them due to their unacceptable operating life, a few still remain. However, the buyer can easily avoid these short-life elements by making a close inspection. If the heating element wire has been cast directly into the element support cement as shown in the photos above and directly below, it should be avoided. But if it has been grouted into slots in the element support panel using grout that is usually a different color (see last photo), it is a dual-refractory element. Making this quick and easy check can save the buyer a lot of unnecessary wasted time and money!



DOMESTICALLY MANUFACTURED SINGLE-REFRACTORY HEATING ELEMENT

DUAL-REFRACTORY HEATING ELEMENTS – One secret of this design is that the iron-chrome-aluminum heating wire coils never come into contact with the harmful caustic cement that forms the sturdy support panel of the element. Instead, slots are cast in the support panel, and the panel is fired to high temperature in a kiln which converts the caustic cement into harmless ceramic bonds that give the support panel its great strength. Then a

different refractory grout that contains no caustic cement is used to cement the heater coils into the slots in the support panel. In this way the wire can never be subjected to a caustic chemical attack that can greatly reduce heating element operating life. A photo of a Rayteq heating element is shown below. The darker colored cement holding the coils in place can be readily seen.



RAYTEQ DUAL-REFRACTORY HEATING ELEMENT

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PASSION FOR PEAK PERFORMANCE

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