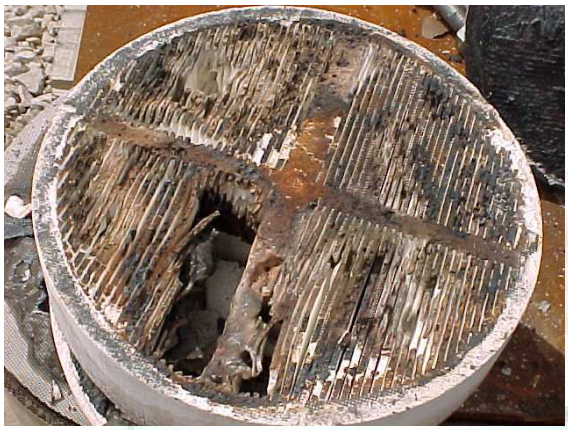
PARADOX INTELLECTUAL PROPERTIES INC.

The Dangers Involved With Using 316L SS for Crimped Ribbon Element Construction.

Continuous Burn Test Results



Introduction

Exert from 3rd party laboratory test report in regards to a continuous burn test using a detonation flame arrester with 316L stainless steel material for the element. Keep in mind that the device passed both of the USCG and the CSA-Z-343 continuous burn tests. The phenomenon did not occur with a detonation flame arrester of the exact design that was made from 304 SS. Without more extensive and costly research the cause of this phenomenon has not been definitively found, but from conversations with metallurgists it is assumed that the composition of the 316L is at the core of the problem. Whatever the component is that initiated the reaction, it is not present in 304SS.

The Phenomenon

It appears that for this type of unit, if the core is heated to a sufficiently high temperature for a period of time, the material inside the flame arrester begins to react in a self-sustaining exothermic chemical reaction, requiring only an air flow be sustained. This reaction causes the temperature of the unit to increase dramatically, and also causes very substantial portions of the element to be completely destroyed, almost certainly rendering it completely ineffective as a flame arrester.

Once this reaction is initiated by exposure to heat, it does not require a combustible mixture to sustain it. Only an air flow through the unit is required to allow the reaction to continue, through to total destruction of the flame arrester. Interruption of air flow will only be effective *in* stopping the reaction if the interruption is of a duration to allow sufficient cooling of the flame

By Dwight Brooker, President of Paradox Intellectual Properties Inc.

arrester. If the interruption is of insufficient duration, the exothermic chemical reaction will recommence. This was demonstrated in our laboratory. A period of several minutes is required to allow the unit to cool so that it will not reignite.

Summary

In the context of the CSA Z-343 continuous burn test, the reaction is believed initiated at some point during the test, and continues if an air flow is maintained through the unit after the test. During USCG endurance burn testing, using gasoline-air mixtures, the unit did not ignite internally. However, after the USCG endurance burn test, we altered the mixture and flow conditions of the gasoline vapor-air mixture to heat the unit internally, and it once again exhibited the exothermic chemical reaction. This reaction continued in spite of the gasoline supply being cut off, with only air flowing through the unit. This in our opinion poses serious safety risks for the field, stabilized burn conditions in the field do occur, and such burn conditions could well provide enough heat to the arrester to initiate the above reaction, with possible disastrous consequences. For this reason regardless of the fact that a detonation flame arrester passed the USCG burn test as a Type I when made from 316L, we will not give a Type I rating for any device that is requested to be built from 316L. If a Type I rating is needed, request 304 SS as the element material (standard).

Caution: This phenomenon could occur with any design made by any manufacturer .