UC-146-2

UNION CARBIDE

INTERNAL CORRESPONDENCE

PLAINTIFF'S EXHIBIT UC-939

UNION CARBIDE CHEMICALS COMPANY • P. O. BOX 471, TEXAS CITY, TEXAS

To (Name) Mr. D. A. Bernard
BROWNSVILLE PLANT

Date July 2, 1964

File H Gas Process

Copy to Mr. A. L. Barefoot - 526
Mr. O. T. Carlisle
Mr. H. B. Coons - 526
Mr. D. W. Moody, Jr. - 511
Mr. J. E. Murray/Mr. W. S. Jackson
Mr. L. B. Trenholme
Mr. W. M. Watkins, II - 511
MECCO

Subject Failure of Spiral Wound Gaskets - H Gas Unit

Dear Mr. Bernard:

We have examined several stainless steel spiral wound gaskets (Flexitallic) which you sent us in an effort to determine the cause of the failure of the gaskets. Two 8-inch diameter gaskets and one 4-inch diameter gasket were found to have the spiral components broken into many pieces. One 3-inch gasket was also received which was in good condition. All four of the gaskets were in service in the preheater outlet piping at an operating temperature of approximately 500°C (930°F). Fig. 1 shows the condition of the 4-inch gasket with the broken stainless spirals and pieces of the asbestos packing from between the spirals.

Close examination of the damaged gaskets revealed the type 304 stainless steel spiral material to be embrittled or cracked in a large number of places and the asbestos packing to be very hard, brittle, and shiny black. Metallographic examination of the stainless spiral revealed the attack to be intergranular corrosion of sensitized 304 stainless steel. An example of this corrosion may be seen in Fig. 2. With the temperatures involved, it appears that some decomposition of the asbestos packing and its filler material has taken place, releasing some corrosive constituent such as HCl. By comparison, the 3-inch gasket was found to be built of 316 stainless spirals and the asbestos packing was still soft and fibrous in nature. The three gaskets which failed were part of the original material ordered for the unit, while the 316 gasket was taken from the Brownsville plant stores.

A review of the Flexitallic catalog indicates that they have two types of asbestos which are supplied in their gaskets. One is the Canadian asbestos which is compounded with some filler material, and the second is a blue African asbestos. The 316 gaskets at the Brownsville plant use the blue African asbestos filler. Because of the difference in the appearance of the asbestos packing in the used gaskets, we have assumed that the 304 gaskets which failed contained the Canadian asbestos. The organic filler, or polymer material, which was used to bind the fibers together, is believed to have caused the corrosion of the stainless steel.

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As a result of this investigation, we recommend that all the Flexitallic gaskets used in the hot zones of the H gas reaction system be specified as type 304 stainless steel with blue African asbestos. We surmise from the catalog and from discussions with Mr. W. S. Jackson, of our Purchasing Department, that when a Flexitallic gasket is ordered as "stainless steel with asbestos filler," one would receive 304 stainless and the Canadian asbestos. This is the standard run-of-the-mill gasket. If a particular stainless alloy, or more resistant asbestos material is required, it will be necessary to specify them individually.

If we may be of any further assistance in this matter, please contact us.

Very truly yours,

W. G. Ashbaugh

W. G. Ashbaugh

WGA/ab



Fig. 1 This is the 4" Flexitallic gasket which fell apart as the result of corrosion of the stainless spiral.

Approximately 1/3 natural size.

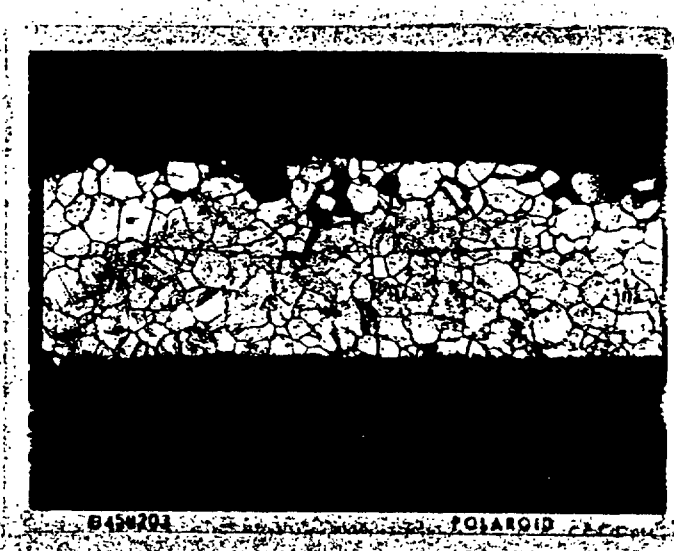


Fig. 2 A portion of the corroded 304 stainless steel spiral is shown in this photomicrograph. This intergranular attack is believed to have been caused by decomposition products of the filler in the asbestos packing.

150 X - Electrolytic Oxalic Acid Etch.