

Monsanto

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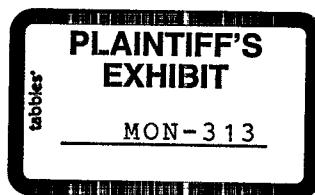
to B. Howard / 7-1-80
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Texas City
file

DATE : September 9, 1980

SUBJECT : GASKET RECOMMENDATIONS FOR
HOT STYRENE SERVICE

REFERENCE :

TO : D. E. Danzer - F4WB

cc. J. C. Benjamin - 1890
W. G. Bir - F4WC
C. M. Cruse - 1890
D. R. Frikken - F3WD
W. R. Furley - 1890
J. Kanyok - F4WB
D. D. Kos - 1890
A. S. Krishner - F4EF
W. E. Larson - F4WB
J. C. Parks/
M. M. McLane - 1890
D. R. Ruggeri - F4EF
D. J. Schulz - F3WD
L. D. Shayer - F4WA
G. E. Small - 1890
D. W. Snow - F2WA

The March 27, 1980, gasket failure at the Texas City styrene plant raised the question of what is the proper gasket for "hot" styrene service. This incident spilled about 150 gallons of styrene monomer and was identified by the plant as the twelfth gasket failure in thirty months. The plant defined "hot" styrene service as temperatures greater than 60°C (140°F).

Current practice for selecting gaskets for styrene service was reviewed. This included Monsanto Texas City styrene monomer plant, Monsanto process styrene monomer licensee plants worldwide, Monsanto polystyrene plants worldwide and Monsanto ABS (acrylonitrile-butadiene-styrene co-polymer) plants worldwide. These findings were consistent with a recommendation that D. R. Frikken of AC&M's Piping Group made to D. W. Snow of S&PP on August 26, 1980, and with an action plan developed by the Texas City plant in late July. CED's recommended gasketing for styrene service should be:

1. Garlock 8748 or equal for temperatures below 350°F. This is a compressed asbestos gasket for general solvent service, including aromatics. The composition of the gasket is white asbestos with a nitrile binder.
2. Spiral wound gaskets must be used for temperatures greater than 350°F based on flammability limits.
3. A nitrile binder should be used for the asbestos gasket or the asbestos filler of the spiral wound gasket.
4. Weld-neck flanges rather than slip-on flanges must be used to get an acceptable seal with a spiral wound gasket.

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It is further recommended that plant feedback be sought periodically to verify that this recommended change in gasketing produces the anticipated results.

The basic cause of the gasket failures has been standardization of Monsanto styrene monomer plant technology on Garlock 7021 gaskets, which use SBR for a binder. This binder apparently dissolves in styrene and other aromatic hydrocarbons. The Garlock guide for selecting gaskets says 7021 is hot oil resistant but does not recommend it for aromatics. The use of Garlock 7021 dates back for many years, possibly several decades, because this is "demonstrated technology." About two years ago the Springfield plant had an asbestos gasket fail in ambient temperature styrene service inside a building. Therefore, failures are not restricted to "hot" styrene service.

The CED recommendation of Garlock 8748 gaskets for styrene service at all temperatures essentially duplicates that recently issued by the Texas City plant. The only apparent difference between this gasket and the Garlock 7021 that failed is the binder material. The Garlock 8748 has a nitrile binder, which is intended for general solvent service, including exposure to aromatic hydrocarbons such as styrene. The Texas City plant has a program underway to replace all Garlock 7021 gaskets in "hot" styrene service with Garlock 8748 and to establish Garlock 8748 as the new standard gasket for Texas City plant maintenance Zone 1 (EB and Styrene plants). The styrene plant licensing group plans to make a similar change in their technology package and to notify current licensees of this change.

The polymer plant (ABS and polystyrene) standards require spiral wound gaskets at all temperatures because product quality requirements will not tolerate any fragments of deteriorated asbestos gaskets in the polymer. Pipe specification F2B4, Issue 7 is the standard for this service. Weld-neck flanges are required to assure a good seal with the spiral wound gasket. This spec does not speak to binder used in the asbestos filler of the spiral wound gasket, but it must be one that is not attacked by the process fluid such as a nitrile binder.

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