



CELANESE CORPORATION OF AMERICA

CHEMCEL PLANT
OPERATING TECHNICAL REPORT

SUBJECT: Corrosion Tests of
Various Gasket
Materials

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PURPOSE: To determine the servicability of various gasket materials
when used with stainless steel under specific conditions.

SUMMARY: Results of test racks #14 and #15 indicate that Anchor
Acitex Sheet, Garlock 8748, and Johns Manville 84 are
slightly superior to Crane 888 Sheet, now specified for
stainless equipment.

Results also substantiate previous test results which in-
dicate that materials containing no asbestos or fibrous
materials dispersed in the gasket binder were far superior
to those which contained these materials. These sheets
listed in order of preference, as determined from racks
#14 and #15, are:

1. Garlock 8998 (brass wire insert, Hycar sheet).
2. Darcoild Hycar sheet.
3. J. M. Neoprene--(asbestos and copper wire insert)
4. Teflon
5. Ebonite 214 (brass wire insert sheet).
6. Mundex--Neoprene Cork Sheet.

Wire insert and woven asbestos wire insert sheets have a
definite advantage where gasket surface corrosion and
hardening of gasket materials are a problem.

DISCUSSION:

Data is presented to show the results of two additional
tests of gasket materials exposed in AR-3-T effluent column base.

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The design of test racks and procedure followed were the same as described under discussion of supplement #2 Operating Technical Report #67 (for test racks #12 and #13). The contact surfaces of these racks were ground with 120 grit paper.

Test racks #14 and 15 were exposed in AR-3-T from November 1, 1950, to November 6, 1951, for a total of 8,880 hours.

The best materials found on these tests were classed as sheets superior to asbestos composition sheets, and are listed in order of preference.

1. Garlock 8998 (brass wire insert Hycar sheet)
2. Darcoid Hycar sheet.
3. J. M. Neoprene (asbestos and copper wire insert sheet)
4. Teflon
5. Ebonite 214 (brass wire insert sheet)
6. Mundex--Neoprene cork sheet.

The materials of asbestos composition type were all inferior to the above sheets. However, three sheets were rated better than Crane 888 which is our present standard. These are, in order of preference:

1. Anchor Acitex sheet
2. Garlock 8748--Hycar asbestos sheet
3. Johns Manville--84 Hycar asbestos sheet

Table I C at the end of this report lists the overall rating of each of the materials used along with the test conditions.

Table II C lists material types, type of attack and results.

Photographs No. 1C and 2C, attached, show the results of racks #14 and #15.

These test results bear out our previous findings, that gasket materials which do not allow fibrous materials (asbestos) to come in contact with the gasket surface are superior to those which do. Those which do not are Teflon, Garlock 8998, Darcoid Hycar Sheet, J. M. Neoprene Wire and Asbestos Insert, Ebonite 214, and Mundex Neoprene Cork. Those which do are Anchor Acitex, Crane 888, JM-84, Darcoid A-97425, Melrath 750, Quoprene, Garlock 8748, US-19069,

Sterling 417, KM-238, and Raybestos Manhattan K-68. Of the asbestos composition sheets, only three; Anchor Acitex, Johns Manville 84, and Garlock 8748, appear superior to Crane 888. Of the other non-fibrous sheets, Teflon, Garlock 8998, Darcoid Hycar sheet, and JM Neoprene Asbestos and Wire insert sheet were the best. Ebonite 214 lacks solvent resistance, and Mundex Neoprene Cork deteriorated badly and adhered tightly to the gasket surfaces.


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TABLE I C

Test Data and Conditions

Racks #14 and #15

Location.....AR-3-T Base
Length of Exposure...8880 hours

Corrosive Media:
Acetic Acid.....0.6%
Formic Acid.....1.6%
H₂O.....Remainder

Aeration.....None
Agitation.....Rapid
Temperature.....230°F

OVERALL RATINGS OF MATERIAL

Rack #14

<u>Material</u>	<u>Rating</u>
Anchor Acitex Sheet	G
Crane 888	F
Ebonite 214	G
Garlock 8998	E
Mundex Cork	G
JM Neoprene Asbestos & Brass Wire Insert	G
JM 84	F+
Darcoid A-97425	U
Darcoid Hycar Sheet	E

TABLE I C (continued)
OVERALL RATINGS OF MATERIAL
Rack #15

<u>Material</u>	<u>Rating</u>
Anchor Acitex Sheet	G-
Garlock Wire Insert, Hycar	E
Melrath 750	U
Quoprene--Neoprene Asbestos	U
Garlock 8748	G-
US-19069	F-
Sterling 417	U
KM-238	F-
Raybestos Manhattan K-68	U
Teflon	E

E - Excellent
G - Good
F - Fair
U - Unsatisfactory

TABLE II C - Results - Rack #14 AR-3-T Base

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Spec. No.	Brand and Type Material	Type Attack on Plate	Maximum Pit Depth	Condition of Material
1.	Anchor Acltex Sheet (Asbestos Composition)	15% area pitted. Shallow pits around edge only.	0.009	Flexible. Easily removed.
2.	Anchor Acltex Sheet (Asbestos Composition)	20% area pitted. Shallow pits around edge only.	0.005	Flexible. Easily removed.
3.	Crane 888, Neoprene Asbestos Composition	20% area pitted. Pits over entire surface.	0.014	Brittle. Material sticks to gasket surface.
4.	Crane 888, Neoprene Asbestos Composition	30% area pitted. Pits over entire surface	0.034	Brittle. Material sticks to gasket surface.
5.	Ebonite 214, Brass Wire Insert Sheet	<1% pitted. Pit on one edge only.	0.002	Hard on edges, softened in center. Easily removed.
6.	Ebonite 214, Brass Wire Insert Sheet.	No pitting.	-----	Hard on edges, softened in center. Easily removed.
7.	Garlock 8998 Hycar-Brass Wire Insert Sheet	No pitting.	-----	Hardened on edges. Material flexible & easily removed.
8.	Garlock 8998 Hycar-Brass Wire Insert Sheet	No pitting.	-----	Hardened on edges. Material flexible & easily removed.
9.	Mundex Neoprene Cork Sheet	5% shallow pits on entire surface.	0.014	Material flexible, but stuck tight to surface.
10.	Mundex Neoprene Cork Sheet	5% shallow pits on entire surface.	0.019	Material flexible, but stuck tight to surface.
11.	JM Neoprene Asbestos and Brass Wire Insert	2% pitted. Shallow pits on entire surface.	0.002	Material flexible and easily removed.

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TABLE II C (Continued) - Results - Rack #14

AR-3-T Base

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Spec. No.	Brand and Type Material	Type Attack on Plate	Maximum Pit Depth	Condition of Material
12.	JM Neoprene Asbestos and Brass Wire Insert	2% pitted. Shallow pits on entire surface.	0.010	Material flexible and easily removed.
13.	JM-84 Hycar Asbestos Composition Sheet	15% pitted. Shallow pits on entire surface.	0.007	Material hard and brittle, but easily removed.
14.	JM-84 Hycar Asbestos Composition Sheet	20% pitted. Shallow pits on entire surface.	0.004	Material hard and brittle, but easily removed.
15.	Darcold A-97425 Hycar Asbestos Composition Sheet	45% pitted. Deep pits on entire surface.	0.034	Material brittle. Hard to remove.
16.	Darcold A-97425 Hycar Asbestos Composition Sheet	45% pitted. Deep pits on entire surface.	0.073	Material brittle. Hard to remove.
17.	Darcold Hycar Rubber Sheet.	No pitting.	-----	Material flexible and easily removed.
18.	Darcold Hycar Rubber Sheet.	No pitting.	-----	Material flexible and easily removed.

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TABLE II C (continued) - Results - Rack #15 AR-3-T Base

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Spec. No.	Brand and Type Material	Type Attack on Plate	Maximum Pit Depth	Condition of Material
1.	Anchor Acitex Sheet (Asbestos Composition)	10% pitted. Shallow pits around edges.	0.006	Material flexible and easily removed.
2.	Anchor Acitex Sheet (Asbestos Composition)	15% pitted. Shallow pits around edge.	0.010	Material flexible and easily removed.
3.	Garlock 8998 Wire Inserted Hycar Sheet	<1% pitted. Only one pit.	0.004	Material flexible and easily removed.
4.	Garlock 8998 Wire Inserted Hycar Sheet	No pitting.	-----	Material flexible and easily removed.
5.	Melrath 750 Neoprene Asbestos Composition Sheet	45% pitted. Deep pits on entire surface.	0.059	Material brittle and stuck to surface.
6.	Melrath 750 Neoprene Asbestos Composition Sheet	40% pitted. Deep pits on entire surface.	0.014	Material brittle and stuck to surface.
7.	Quoprene Neoprene Asbestos Composition Sheet	40% pitted. Deep pits on entire surface.	0.038	Material brittle and stuck to surface.
8.	Quoprene Neoprene Asbestos Composition Sheet	45% pitted. Deep pits on entire surface.	0.028	Material brittle and stuck to surface.
9.	Garlock 8748 Hycar Asbestos Composition Sheet	7% pitted. Shallow pits on entire surface.	0.009	Material brittle and stuck to surface.
10.	Garlock 8748 Hycar Asbestos Composition Sheet	10% pitted. Shallow pits on entire surface.	0.018	Material brittle and stuck to surface.
11.	US-19069 Hycar Asbestos Composition Sheet	20% pitted. Shallow pits on entire surface.	0.011	Material brittle and stuck to surface.

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TABLE II C (continued) - Results - Rack #15

AR-3-T Base

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Spec. No.	Brand and Type of Material	Type Attack on Plate	Maximum Plt Depth	Condition of Material
12.	US-19069, Hycar Asbestos Composition Sheet	25% pitted. Shallow pits on entire surface.	0.020	Material brittle and stuck to surface.
13.	Sterling 417 Neoprene Asbestos Composition Sheet	30% pitted. Shallow pits on entire surface.	0.021	Material brittle and stuck to surface.
14.	Sterling 417 Neoprene Asbestos Composition Sheet	25% pitted. Shallow pits on entire surface.	0.025	Material brittle and stuck to surface.
15.	KM-238 Neoprene Asbestos Composition Sheet	30% pitted. Shallow pits on entire surface.	0.010	Material brittle and stuck to surface.
16.	KM-238 Neoprene Asbestos Composition Sheet	25% pitted. Shallow pits on entire surface.	0.010	Material brittle and stuck to surface.
17.	Raybestos Manhattan K-68 Neop. Asbestos Comp.	35% pitted. Shallow pits on entire surface.	0.013	Material brittle and stuck to surface.
18.	Raybestos Manhattan K-68 Neop. Asbestos Comp.	30% pitted. Shallow pits on entire surface.	0.008	Material brittle and stuck to surface.
19.	Teflon	No pits.	-----	Material flexible and easily removed.
20.	Teflon	No pits.	-----	Material flexible and easily removed.

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