

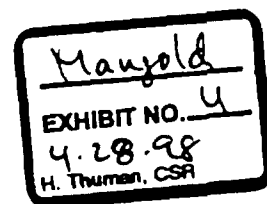


RE: GARLOCK, INC. RESEARCH PROJECTS SUMMARY

(Prepared by Carl A. Mangold, CIH)
(and others as noted)

Ref: Gaskets.wps
October 1997

<u>DATE</u>	<u>TITLE & DATA</u>
1. October 1982 (Mangold)	Actual Contribution of Garlock Gasket Materials to the Occupational Exposure of Workers. a. U.S. Navy - 1978 PSNS Report - basis & review b. Hand Punching Machine Punching Machine Shearing [Average .02 fibers/cc, 8 hr TWA Machine Nibbling for all operations tested] Flange Gasket Process c. Cities Average .01 to .02 fibers/cc d. Clothing Up to 1.4 fibers/cc from clothes
2. December 1982 (Mangold)	Actual Occupational Exposure to Airborne Asbestos Released by Garlock Spiral Wound, Braided and Encapsulated Gaskets. a. Breathing Zone (Bz) Average .004 fibers/cc, 8 hr TWA b. Background Average .004 fibers/cc, 8 hr TWA
3. March 1983 (Mangold)	Asbestos Fibers in the Ambient Air in the Greater San Francisco Bay Area. Cities: S.F, Oakland, Vallejo - Average .02 fibers/cc over 5 days.
4. November 1983 (Mangold)	The Actual Contribution of Asbestos Fiber Exposure During Gasket Removal from Pipe Flanges Aboard Ship. a. USN Gypsy Average .03 f/cc, 8 hr TWA b. Off-Shore 1 Average .02 f/cc, 8 hr TWA c. Remote locations Average .02 f/cc, 8 hr TWA d. About 40 to 50% Garlock gaskets were found when flanges were opened.
5. December 1983 (Mangold & Wendlick)	Ambient Asbestos Fiber Levels in the Metropolitan Areas of Norfolk-Portsmouth-Newport News, Virginia. a. Four Sample Locations b. Five Days of Sampling c. Average .01 to .02 f/cc, 8 hr TWA



6. September 1985
(Mangold) The Actual Release of Asbestos Fibers from New, Used and Flanged Garlock, Inc. Asbestos Gasket materials.
- a. Five day trials each in a 10' x 10' x 10' enclosure.
 - b. Intact Gaskets Average .002 f/cc
 - c. Newly Cut Gaskets Average .005 f/cc
 - d. Old Used Gaskets Average .006 f/cc
7. June 1987
(Mangold) Asbestos Composition of Garlock, Inc. Braided Gasket Materials.
(Valve Packing Study)
- a. Styles 733 Black & 5862 White Garlock, Inc Valve Packing.
 - b. Breathing zone samples did not exceed .005 f/cc.
 - c. Composition data shows 40 to 60% *Chrysotile*
8. July 1986
(Mangold) Comparison of the Tyndall Phenomena to the Actual Concentration of Airborne Asbestos Fibers in the Breathing Zone of Workers.
- a. Visible fibers are not directly related to asbestos fibers of toxicological significance.
 - b. The Tyndall Effects cannot be used as a measure of exposure to tiny fibers unseen by the eye.
 - c. Viewing fibers in a box with strong light does not relate to actual occupational exposures.
 - d. Estimates of airborne fiber concentrations are not possible.
9. January 1989
(Mangold) The Actual Contribution of Airborne Asbestos Fibers to the Occupational Exposures of Bystanders during Selected Processing of Encapsulated Gaskets. (8 hour time-weighted Average)
- 1. Cutting with a Circular Cutter Bz .005 f/cc
 Bystr .003 f/cc
 - 2. Gasket Cutting with Hand Shears Bz .005 f/cc
 Bystr .004 f/cc
 - 3. Gasket Cutting with Ball Peen Hammer Bz .005 f/cc
 Bystr .005 f/cc
 - 4. Scribing of Gasket Materials Bz .005 f/cc
 Bystr .003 f/cc
 - 5. Opening of Old Flanges and Removal of Asbestos Gaskets (USN Gypsy) Bz .005 f/cc
 (some gaskets 40 years old) Bystr .001 f/cc

6. Flange Face Scraping with a Putty Knife	Bz	.005 f/cc
	Bystr	.001 f/cc
7. Hand Wire Brushing of Asbestos Gasket Residual from Flanges	Bz	.007 f/cc
	Bystr	.003 f/cc
8. Power Wire Brushing of Flange Faces	Bz	.009 f/cc
	Bystr	.001 f/cc

Notes: 1. Bz = Breathing Zone of Worker

2. Bystr = Bystander 5 to 10' from Worker

10. January 1992
(Mangold & Gay)

Garlock Packing Removal and Installation from Valves.
(8 hour time-weighted average for 8 valves)

a. Operator # 1 (Carl Mangold, CIH)	Bz	.014 f/cc
b. Operator # 2 (Robert Gay, PhD)	Bz	.009 f/cc
c. 5' away from operation (4 locations)	Bystr	.005 f/cc
d. 10' away from operation (4 locations)	Bystr	.004 f/cc