



Findings from Epidemiological Studies

Since 1987, the University of Cincinnati has been conducting a study of current and former refractory ceramic fiber (RCF) workers to identify possible health effects associated with exposure to RCF.

- Exposure levels at manufacturing sites have been monitored and are lower than historic levels.^{1,2}
- The study of chest X-rays has shown that exposure to RCF is associated with an increase in pleural plaques.³⁻⁶ Pleural plaques as related to RCF exposure are areas of thickening involving the lining of the inside of the chest wall and outside the lungs and have not been associated with a risk for future lung problems.
- The study of chest X-rays has not shown any association between RCF exposure and scarring of tissue within the lung itself (fibrosis).³⁻⁶
- No association was found between exposure to RCF after 1987 and pulmonary function test (PFT) results through 2004.⁷ The initial 1987 PFT results did demonstrate an initial loss in lung function most likely from higher exposures prior to 1987.⁸
- The ongoing study of deceased Carborundum/Unifrax workers has revealed no excess rate of death. This was true for all cancers combined as well as diseases of the respiratory system including lung cancer.⁹
- The rate of one type of cancer death, kidney and bladder, was higher than expected.⁹ The number of individuals with these types of cancers was small. It is unclear whether this is related to work exposures. This study is on-going and will be followed up.
- The study of chest X-rays and deceased workers is currently scheduled to continue through 2015.
- A long term analysis did identify that RCF fibers can however remain within human lung tissue for extended periods of time.

References:

1. Rice CH, Lockey JE, LeMasters GK, Levin LL, Staley P, Hansen KR. Estimation of historical and current employee exposure to Refractory Ceramic Fibers during manufacturing and related operations. *Appl Occup Environ Hyg*. 1997;12(1):54-61.
2. Rice CH, Levin LS, Borton EK, Lockey JE, Hilbert TJ, LeMasters GK. Exposures to Refractory Ceramic Fibers in manufacturing and related operations: A 10-year update. *Journal of Occupational and Environmental Hygiene*. 2005;2:462-473.
3. LeMasters G, Lockey J, Rice C, McKay R, Hansen K, Lu J, Levin L, Gartside P. Radiographic changes among workers manufacturing refractory ceramic fibre and products. *Ann Occup Hyg*. 1994;38(S1):745-751.
4. Lockey J, LeMasters G, Rice C, Hansen K, Levin L, Shipley R, Spitz H, Wiot J. Refractory ceramic fiber exposure and pleural plaques. *Am J Respir Crit Care Med*. 1996;154:1405-1410.
5. Lockey JE, LeMasters GK, Levin L, Rice C, Yiin J, Reutman S, Papes D. A longitudinal study of chest radiographic changes of workers in the refractory ceramic fiber industry. *Chest*. 2002;121:2044-2051.
6. Lockey JE, Roggli VL, Hilbert TJ, Rice CH, Levin LS, Borton EK, Biddinger PW, LeMasters GK. Biopersistence of refractory ceramic fiber (RCF) in human lung tissue and a 20-year follow-up of radiographic pleural changes in workers. *J Occup Environ Med* 2012;54(7):791-788.
7. McKay RT, LeMasters GK, Hilbert TJ, Levin LS, Rich CH, Borton EK, Lockey JE. A long term study of pulmonary function among U.S. refractory ceramic fiber workers. *Occup Environ Med*. 2011;68:89-95.
8. Lockey JE, Levin LS, LeMasters GK, McKay RT, Rice CH, Hansen KR, Papes DM, Simpson S, Medvedovic M. Longitudinal estimates of pulmonary function in refractory ceramic fiber manufacturing workers. *Am J Respir Crit Care Med*. 1998;157:1226-1233.
9. LeMasters GK, Lockey JE, Yiin JH, Hilbert TJ, Levin LS, Rice CH. Mortality of workers occupationally exposed to refractory ceramic fibers. *J Occup Environ Med*. 2003;45:440-450.