

MATERIAL SAFETY DATA SHEET

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY / UNDERTAKING

Product Name: 910 investment, 910X investment
Chemical name/synonyms: calcium sulfate bonded investment

Manufacturer: Ransom & Randolph
Address: 3535 Briarfield Boulevard
Maumee, Ohio 43537, United States of America

Information Telephone Number: (419) 865-9497
Emergency Telephone Number: (419) 865-9497 (not available outside office hours)

Product Use: investment for low temperature alloys and glass
Date of Last Revision: 8 October 2009

MSDS Number: R006

Contact person at above address: Don Youel email: don.youel@dentsply.com

SECTION 2 HAZARDS IDENTIFICATION

Emergency Overview: May cause eye irritation. Inhalation of dust may cause mucous membrane and respiratory irritation. Prolonged overexposure to respirable crystalline silica may cause lung disease (silicosis) and increase the risk of lung cancer. Risk of cancer depends on duration and level of exposure. Principal symptoms of lung fibrosis are cough and breathlessness. Occupational exposure to respirable dust and respirable crystalline silica should be monitored and controlled.

EU Preparation Classification (1999/45/EC): Harmful (Xn) R48/20

SECTION 3 COMPOSITION INFORMATION ON INGREDIENTS

Name	% by weight	CAS N°	EINECS N°	EU Classification
Constituents / minerals in the substance :				
Cristobalite	< 65 %	14464-46-1	238-455-4	Xn R48/20
Quartz	< 40 %	14808-60-7	238-878-4	Xn R48/20
Calcium sulfate	< 40 %	26499-65-0	231-900-3	No classification
Fibrous glass	< 5 %	65997-17-3	266-046-0	No classification

Constituents presenting a health hazard

The product contains crystalline silica (not listed in Annex I of Directive 67/548/EEC) in quantity up to 80 %.

See Section 16 for further information on EU Classification.

SECTION 4 FIRST AID MEASURES

Eye Contact: Flush eyes with large quantities of water for 15 minutes, holding the eyelids apart. Get medical attention if irritation develops and persists.

Skin Contact: No first aid is generally required. Wash skin with soap and water after use.

Ingestion: May cause gastrointestinal discomfort and intestinal blockage. If swallowed, drink 1 or 2 glasses of water to dilute. Never give anything by mouth to an unconscious or convulsing person. Get immediate medical attention.

Inhalation: Remove victim to fresh air. If irritation or other symptoms persist, get medical attention.

SECTION 5 FIRE FIGHTING PROCEDURES

Extinguishing Media: Use media appropriate to the surrounding fire.

Firefighting Procedures: Firefighters should wear full emergency equipment and NIOSH approved positive pressure self-contained breathing apparatus in fires involving chemicals.

Unusual Fire/Explosion Hazards: None known.

Known or Anticipated Hazardous Products of Combustion: Thermal decomposition (above 1450°C) may generate SO_x gases and leave calcium oxide solids behind.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Accidental Release Measures: Wear appropriate protective clothing as described in Section 8. Collect using dustless method (HEPA vacuum or wet method) and place in appropriate container for use. Do not use compressed air. Report releases as required by local, state and federal authorities.

Personal Precautions: Avoid contact with eyes and skin. Do not breathe dust.

Environmental Precautions: None known.

SECTION 7 HANDLING AND STORAGE

Handling: Avoid contact with the eyes and skin. Do not breathe dust. Wear protective clothing and equipment as described in Section 8. Use with adequate ventilation and proper dust collection methods to keep exposure level below occupational exposure limits. Wash thoroughly with soap and water after handling. Keep containers closed when not in use.

Storage: Store in a cool, dry, well ventilated area away from incompatible materials. Protect from physical damage.

SECTION 8 EXPOSURE CONTROL / PERSONAL PROTECTION

Exposure limit values Respect regulatory provisions for dust (total and respirable) and for respirable crystalline silica. Please refer to Annex 1 for the appropriate national exposure limit values.

Exposure controls

Use local exhaust ventilation to keep airborne concentrations of dust below permissible exposure levels. Wash hands before breaks and at the end of the workday. Remove and wash soiled clothing.

Personal Protective Equipment:

Eye Protection: Safety glasses or goggles if needed to avoid eye contact

Skin Protection: Wear rubber or other impervious gloves to avoid prolonged or repeated contact.

Respiratory Protection: If the exposure limits are exceeded, an approved particulate respirator appropriate for the form and concentration of the contaminants should be used. Selection and use of respiratory equipment must be in accordance with applicable regulations and good industrial hygiene practice.

ENVIRONMENTAL EXPOSURE CONTROLS

No special requirement.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

General information

Physical state powder
Color white
Odor odorless

Important health, safety and environmental information

Melting temperature	Not applicable
Boiling point	Not applicable
Flash point	Non flammable
Explosion hazard	Non explosive
Specific gravity	2.6
Solubility in water	1.5% by weight
pH value in water (100 g/l)	6-8

SECTION 10 STABILITY AND REACTIVITY

Stability: Stable

Conditions to Avoid: Contact with water or high humidity.

Incompatibility with Other Materials: Avoid oxidizing agents and acids.

Hazardous Decomposition Products: Crystalline silica will dissolve in hydrofluoric acid and produce silicone tetrafluoride. Reaction with water or acids generates heat. Thermal decomposition (above 1450°C) may generate calcium oxide and sulfur dioxide.

Hazardous Polymerization: Will not occur

SECTION 11 TOXICOLOGICAL INFORMATION

Potential Health Effects:

Eyes: Contact may cause mechanical irritation and possible injury.

Skin: May cause irritation. When mixed with water in a container, this material hardens and generates some heat, may warm container's exterior sides.

Ingestion: No adverse effects expected for normal, incidental ingestion. Large amounts may cause gastrointestinal irritation and blockage.

Inhalation: Inhalation of dust may cause irritation to the nose, throat and upper respiratory tract with coughing and shortness of breath.

Medical Conditions Aggravated by Exposure: Individuals with pre-existing skin and respiratory disorders may be at increased risk from exposure.

Acute Toxicity Data:

Crystalline Silica (as Quartz)	Oral Rat LD50 - >22,500 mg/kg.
Crystalline Silica (as Cristobalite)	No data available
Calcium Sulfate Hemihydrate	Oral Rat LD50: >5000 mg/kg

Chronic effects

Prolonged inhalation of respirable crystalline silica

In 1997, the International Agency for Research on Cancer (IARC) concluded that crystalline silica inhaled from occupational sources can cause lung cancer in humans. However it pointed out that not all industrial circumstances, nor all crystalline silica types, were to be incriminated. (IARC Monographs on the evaluation of the carcinogenic risks of chemicals to humans, Silica, silicates dust and organic fibers, 1997, Vol. 68, IARC, Lyon, France). In June 2003, the European Commission's Scientific Committee for Occupational Exposure Limits (SCOEL) concluded:

"that the main effect in humans of the inhalation of respirable crystalline silica is silicosis. There is sufficient information to conclude that the relative lung cancer risk is increased in

persons with silicosis (and apparently, not in employees without silicosis exposed to silica dust in quarries and in the ceramic industry). Therefore, preventing the onset of silicosis will also reduce the cancer risk. Since a clear threshold for silicosis development cannot be identified, any reduction of exposure will reduce the risk of silicosis."

(SCOEL SUM Doc 94-final on respirable crystalline silica, June 2003)

There is a body of evidence supporting the fact that increased cancer risk would be limited to people already suffering from silicosis. Worker protection against silicosis should be assured by respecting the existing regulatory occupational exposure limits and implementing additional risk management measures where required (see Section 16).

SECTION 12 ECOLOGICAL INFORMATION

Crystalline Silica (as Quartz)	72 hr LC50 carp: >10,000 mg/L
Crystalline Silica (as Cristobalite)	No data available
Calcium Sulfate Hemihydrate	No toxicity data available

Not persistent, not bio-accumulative.

SECTION 13 DISPOSAL CONSIDERATIONS

Waste from residues / unused products

Can be land filled in compliance with local regulations. The material should be buried to prevent airborne respirable dust being emitted. Where possible, recycling should be preferred to disposal.

Packaging

No specific requirements. In all cases dust formation from residues in the packaging should be avoided and suitable worker protection assured. Recycling and disposal of packaging should be carried out by a suitable waste management company.

SECTION 14 TRANSPORT INFORMATION

No special precaution required under the regulation on transport of dangerous goods. Avoid dust spreading.

Road/Rail transport - DOT (USA) Shipping Name: Not Regulated

DOT Hazard Class: N/A

UN Number: N/A

DOT Labels Required (49CFR172.101): N/A

Air transport - IATA Shipping Name: Not Regulated

IATA Hazard Class: N/A

UN Number: N/A

IATA Hazard Labels Required: N/A

Sea transport - IMDG Shipping Name: Not Regulated

IMDG Class: N/A

UN Number: N/A

IMDG Label: N/A

SECTION 15 REGULATORY INFORMATION

Respect regulatory provisions for dust (total and respirable) and for respirable crystalline silica. Please refer to Annex 1 for the appropriate national exposure limit values.

European Community Labeling:

Harmful

Contains Crystalline Silica (Quartz and Cristobalite)
R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.
S22 Do not breathe dust.
S38 In case of insufficient ventilation, wear suitable respiratory equipment.

Respect regulatory provisions for dust (total and respirable) and for respirable crystalline silica. Please refer to Annex 1 for the appropriate national exposure limit values.

U.S. FEDERAL REGULATIONS:

CERCLA 103 Reportable Quantity: This product is not subject to CERCLA reporting requirements. Many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

SARA TITLE III:

Hazard Category For Section 311/312: Chronic health

Section 313 Toxic Chemicals: This product contains the following chemicals subject to Annual Release Reporting Requirements Under SARA Title III, Section 313 (40 CFR 372): None

Section 302 Extremely Hazardous Substances (TPQ): None

EPA Toxic Substances Control Act (TSCA) Status: All of the components of this product are listed on the TSCA inventory.

U.S. STATE REGULATIONS

California Proposition 65: This product contains the following substances known to the State of California to cause cancer: Crystalline Silica as Quartz (<1%)

INTERNATIONAL REGULATIONS:

Canadian Environmental Protection Act: All of the components in this product are listed on the Domestic Substances List (DSL).

Canadian WHMIS Classification: Class D Division 2A (quartz and cristobalite)

European Inventory of New and Existing Chemicals Substances (EINECS): All of the components in this product are listed on the EINECS inventory.

Australian Inventory of Chemical Substances: All of the components in this product are listed on the AICS for Australia.

China Inventory of Existing Chemicals and Chemical Substances: All of the components in this product are listed on the IECSC for China.

Japanese Existing and New Chemical Substances: All of the components in this product are listed on the Japanese ENCS list.

Korean Existing Chemicals List: All of the components in this product are listed on the KECL for Korea.

Philippine Inventory of Chemicals and Chemical Substances: All of the components in this product are listed on the PICCS.

SECTION 16 OTHER INFORMATION

Training

Workers must be informed of the presence of crystalline silica and trained in the proper use and handling of this product as required under applicable regulations.

Social Dialogue on Respirable Crystalline Silica

A multi sector "Agreement on Workers' Health Protection Through the Good Handling and Use of Crystalline Silica and Products containing it" was signed on 25 April 2006. This autonomous agreement, which received the European Commission's financial support, is based on Good Practice Guide. The requirements of the agreement came into force on 25 October 2006. The agreement was published in the Official Journal of the European Union (2006/C 279/02). The text of the agreement and its annexes, including the Good Practice Guide, are available from <http://www.nepsi.eu> and provide useful information and guidance for the handling of products containing respirable crystalline silica.

Liability

Such information is the best of Ransom & Randolph's knowledge and believed accurate and reliable as of the date indicated. However, no representation, warranty or guarantee is made to its accuracy, reliability or completeness. It is the user's responsibility to satisfy itself as to the suitability and completeness of such information for their own particular use.

HMS Hazard Rating:

Health –1* Fire Hazard – 0 Reactivity – 0

*Chronic Health Hazard

EU Classes and Risk Phrases for Reference (See Sections 2 and 3):

Xn Harmful

R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.

Annex 1 – Information Only - User to Verify Applicable Regulations

Occupational Exposure Limits in mg/m³ (respirable fraction)
for the 27 EU member states (excluding Latvia) + Norway & Switzerland

Country	Non specified dust	Quartz	Cristobalite	Tridymite	Amorphous silica	Kaolin	Mica
Austria	6	0.15	0.15	0.15			
Belgium	3	0.1	0.05	0.05	2	2	3
Bulgaria	4	0.07	0.07	0.07			
Czech Republic		0.1	0.1	0.1			2
Cyprus		10*K/Q ^a			2		
Denmark	5	0.1	0.05	0.05		2	
Estonia		0.1	0.05	0.05	2		
Finland		0.2	0.1	0.1			
France ^b		25*K/Q ^c or 5 ^d					
France ^e	5	0.1	0.05	0.05		10 ^f	
Germany	3	^g	0.15	0.15			
Greece	5	0.1	0.05	0.05			
Hungary		0.15	0.1	0.15			
Ireland	4	0.05	0.05	0.05	2.4	2	0.8
Italy	3	0.05	0.05	0.05		2	3
Lithuania	10	0.1	0.05	0.05			
Luxembourg	6	0.15	0.15	0.15			

Malta ^h							
Netherlands	5	0.075	0.075	0.075			
Norway	5	0.1	0.05	0.05	1.5		3
Poland		0.3	0.3	0.3			
Portugal	5	0.05	0.05	0.05		2	3
Romania	10	0.1	0.05	0.05		2	3
Slovakia		0.1	0.1	0.1	2		2
Slovenia		0.15	0.15	0.15			
Spain	3	0.1	0.05	0.05		2	3
Sweden	5	0.1	0.05	0.05			
Switzerland	6	0.15	0.15	0.15	0.3	3	3
United Kingdom	4	0.1	0.1	0.1	2.4	2	0.8

^a $K = 1 - Q = \text{quartz percentage}$

^b Empoussiérage de référence (Ministère de l'Industrie (RGIE))

^c $K = 1 - Q = \text{quartz percentage}$

^d Lowest of the two values.

^e Valeur limite de moyenne d'exposition (Ministère du Travail)

^f Inhalable fraction

^g Germany has no OEL for quartz. Employers are obliged to minimize exposure as much as possible and to follow certain protective measures. ^h When needed, Maltese authorities refer to United Kingdom values for OELVs which do not exist in Maltese legislation.