CANADIAN FORGE & FARRIER

RESCO® PRODUCTS, INC.

Technical INSTALLATION Information

GENERAL GUIDELINES - CASTING
RESCO INSULATING CASTABLES

A. STORAGE:

1. Resco Insulating Castables are packaged in moisture resistant bags; however, they should be stored in a dry place free from excess dampness. Storage on dry concrete, asphalt, or other impervious surface will prevent moisture from the ground condensing under the plastic pallet cover and wetting the bags of material, which may result in loss of strength.

B. PREPARATION:

1. Use clean tools and equipment. Contamination can affect setting and strength of castables.
2. Waterproof all forms and surfaces. Mold release agents may be used.
2. Use only clean water suitable for drinking.
3. A paddle-type mechanical mixer is preferred.
4. For best results, material and ambient temperatures should be 60-85°F (16-29°C) during mixing, placing, and curing.

C. MIXING:

1. Mix only as much castable as can be placed immediately. Under ideal conditions, 20 minutes is the maximum placement time. Material left in pails or mortar box may develop a "false" set making it difficult to properly place.
2. Pre-dampen mixer prior to mixing first batch.
3. Add the dry material to the mixer. Then, quickly add the minimum amount of specified water to the mixer while mixing.
4. Insulating castables should be mixed for no more than two minutes after the water is added to the mix. Additional water should only be added after the two minute mixing and a visual inspection of the mix. Stay within the recommended water levels for the particular product.
5. If metal fibers are to be added, they should be slowly and uniformly distributed into the mixer during the beginning of the two minute mixing interval
6. Recommended wet mix temperature is 60-85ºF.

D. PLACING:

1. External vibrators are not recommended. Internal vibrators capable of a frequency of 10,000 vpm or greater are recommended to densify conventional castables, but vibration should be minimized for insulating castables to avoid excessive densification.

2. Be careful not to over vibrate. Stop when small bubbles no longer appear on the surface.

3. Don't overwork or excessively trowel the surface. A smooth surface inhibits moisture removal during curing and drying by bringing fines to the surface. Do not burn out wood forms.

E. CURING:

1. The cast material should cure for a minimum of 24 hours before drying can commence. Use wet burlap, plastic sheet or resin based curing compound. Water spraying should be avoided.

2. The cast material should not be disturbed, allowed to freeze, or be heated above 120°F during the curing stage.

F. EXTREME WEATHER PRECAUTIONS

1. Extreme Cold Weather:
   - Keep the material, and installation area above 60°F (16°C) during installation and 24 hour curing period.
   - Do not allow lining to freeze during 24-hour curing period. After the curing period, the lining may be subjected to freezing conditions, however, the castable should be at least 60°F (16°C) before dry out is started.
2. Extreme Hot Weather:
   - Keep the material, and installation area below 85°F (29°C) during installation and 24 hour curing period. Elevated temperatures may reduce working time, and cause cracking due to surface dryout.
   - Store the dry castable in a cool area prior to mixing.
   - Use cold water, less than 45°F (7°C) during mixing.
   - Shade or water spray the exterior surface of the unit.

PRODUCT DATA

RESCOCAST 8

Brand Name:

Description: RESCOCAST 8 is a medium weight, insulating castable with a service limit temperature of 2800°F. A low iron content makes it suitable for most furnace atmospheres, including CO Boilers. RESCOCAST 8 can be installed by either casting or gunning.

Physical properties shown are average values of samples taken under controlled conditions
ASTM test methods used where applicable

Maximum Service Temperature: 2800°F (1540°C)
Typical Water Required for Mixing (by weight) :

Cast 27.0%
Predampening for Gunning ..... 8.3 - 10.4%

	Casting Data		Gunning Data	
Bulk Density (pcf)				
After 1500°F (815°C)	89	(1.43 g/cm^3)	100	(1.60 g/cm^3)
Cold Crushing Strength (psi)				
After 1500°F (815°C)	950	(66.5 kg/cm^2)	1350	(94.5 kg/cm^2)
Thermal Conductivity (K Factor)				
Mean Temperature	BTU/ft^2/hr./°F/inch	W/mK	BTU/ft^2/hr./°F/inch	W/mK
500°F (260°C)	3.6	0.39	4.2	0.61
1000°F (540°C)	3.3	0.33	3.9	0.57
1500°F (815°C)	3.5	0.39	4.1	0.60
Permanent Linear Change (%)				
After 1500°F (815°C)	-0.3 to 0.0		-0.3 to 0.0	
After 2800°F (1540°C)	-2.0 to -1.2		-2.0 to -1.2	
Porosity (%)				
After 1000°F (540°C)	40.0		40.0	

Typical Chemical Analysis (%)
(Calcined Basis)

Alumina (Al_2O_3)	45.8
Silica (SiO_2)	45.2
Lime (CaO)	6.0
Iron Oxide (Fe_2O_3)	0.7
Titania (TiO_2)	1.0
Magnesia (MgO)	0.1
Alkalies (Na_2O+K_2O)	1.2

Standard Packaging: Brand Code: 0336 50 lb bag. 50 bags per pallet. Bulk packaging available.

The properties shown on this data sheet represent typical average results using standard ASTM test methods (unless otherwise noted) conducted under controlled condition (using standard rectangular shapes), and should not be considered to be guaranteed specifications. Properties are subject to normal manufacturing statistical standard deviation ranges, and Resco Products, Inc. reserves the right to modify the properties and specifications at any time without prior notice.

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03/22/17 is the date that this data sheet was updated. Check with your RESCO sales representative or RESCO website to determ ine you have the current sheet.

One Robinson Plaza - Suite 300, 6600 Steubenville Pike, Pittsburgh, PA, 15205 Phone: 888-283-5505

PRODUCT DATA

RESCOCAST 8

RESCOCAST 8 IS A MEDIUM WEIGHT HEAT INSULATING CASTABLE WITH A SERVICE LIMIT TEMPERATURE OF 1540°C. RESCOCAST 8 HAS BEEN SUCCESSFULLY USED IN FCC VESSELS AND ITS LOW IRON CONTENT MAKES IT SUITABLE FOR MOST FURNACE ATMOSPHERES INCLUDING CO BOILERS. RESCOCAST 8 IS A MULTIPURPOSE PRODUCT WHICH CAN BE CAST OR GUNNED FROM THE SAME BAG.

MAXIMUM SERVICE TEMPERATURE (M.S.T.)

(1540°C)

BULK DENSITY

@ 110°C	93 - 100	LBS/FT³	1489 - 1602	KG/M³
@ 815°C	86 - 93	LBS/FT³	1378 - 1490	KG/M³

COLD CRUSHING STRENGTH

@ 815°C	500 - 1400	P.S.I.	35 - 98	KG/CM²
@ M.S.T.	1200 - 1800	P.S.I.	84 - 126	KG/CM²

COLD MODULUS OF RUPTURE

@ 815°C	100 - 300	P.S.I.	7 - 21	KG/CM²
@ 1095°C	200 - 300	P.S.I.	14 - 21	KG/CM²
@ M.S.T.	300 - 500	P.S.I.	21 - 35	KG/CM²

PERMANENT LINEAR CHANGE

@ Green to 110°C	0.0 TO - 0.1 %
@ 110°C to 815°C	0.0 TO - 0.3 %
@ 110°C to M.S.T.	- 1.0 TO - 1.5 %

CONDUCTIVITY OR "K" FACTOR

MEAN TEMP	BTU/FT²/HR/°F/IN	W/mK
@ 540°C (1000°F)	3.8	0.55
@ 815°C (1500°F)	3.3	0.48
@ 1095°C (2000°F)	3.6	0.52

TYPICAL CHEMICAL ANALYSIS (%)

AL_2O_3	SiO_2	Fe_2O_3	CaO	MgO	TiO_2	AlK
46.0	43.5	0.8	6.5	0.3	0.8	1.2

The properties shown on this data sheet represent typical average results generated using standard ASTM test methods (unless otherwise noted) conducted under controlled conditions and should not be considered to be guaranteed specifications. Properties are subject to normal manufacturing statistical standard deviation ranges, and Resco Products, Inc. reserves the right to modify the properties and specifications at any time without prior notice.
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GUNNED DATA ON PAGE 2

RESCOCAST 8

RESCOCAST 8 CAN BE READILY APPLIED BY GUNITE APPLICATION. DATA SHOWN ARE AVERAGE RESULTS OF TESTS FOLLOWING THE GUIDE LINES SET FORTH IN ASTM C-903-70 "PREPARING REFRACTORY CONCRETE SPECIMEN'S BY COLD GUNNING".

MAXIMUM SERVICE TEMPERATURE (M.S.T.) (1540°C)

BULK DENSITY

@ 815°C	95 - 105	LBS/FT^3	1520 - 1680	KG/M^3

COLD CRUSHING STRENGTH

@ 815°C	900 - 1800	P.S.I.	63 - 126	KG/CM^2
@ M.S.T.	1000 - 1800	P.S.I.	70 - 126	KG/CM^2

COLD MODULUS OF RUPTURE

@ 815°C	200 - 350	P.S.I.	14 - 24	KG/CM^2
@ M.S.T.	300 - 500	P.S.I.	21 - 35	KG/CM^2

PERMANENT LINEAR CHANGE

@ Green to 110°C	0.0 TO - 0.1 %
@ 110°C to 815°C	0.0 TO - 0.3 %
@ 110°C to M.S.T.	- 1.0 TO - 1.5 %

CONDUCTIVITY OR "K" FACTOR

MEAN TEMP	BTU/FT^2/HR/°F/IN	W/mK
@ 260°C (500°F)	4.2	0.61
@ 540°C (1000°F)	3.9	0.57
@ 815°C (1500°F)	4.1	0.60

PACKAGING 25 KG BAGS

POROSITY 40 PERCENT @ 1000°F (540°C) (CAST)
40 PERCENT @ 1000°F (540°C) (GUNITED)

ASTM CLASS C-401 CLASSIFICATION "Q"

Rescocast 8

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 08/28/2018 Revision date: 08/28/2018 Supersedes: 03/15/2015

SECTION 1: Identification

1.1. Identification

Product form	:	Mixture
Product name	:	Rescocast 8
CAS-No.	:	Mixture
Product code	:	0336
Other means of identification	:	Alumina-Silicate Cement Bonded Castable

1.2. Recommended use and restrictions on use

Use of the substance/mixture	:	Refractory

1.3. Supplier

Resco Products, Inc.
One Robinson Plaza, Suite 300
6600 Steubenville Pike
Pittsburgh, PA 15205 - United States
T 412-494-4491
SDS@RescoProducts.com - WWW.RescoProducts.com

1.4. Emergency telephone number

Emergency number	:	EMERGENCY ONLY (CHEMTREC) USA & Canada 1-800-424-9300 Outside USA & Canada +1 703-741-5970

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Skin corrosion/irritation Category 2	H315	Causes skin irritation
Serious eye damage/eye irritation Category 2B	H320	Causes eye irritation
Carcinogenicity Category 1A	H350	May cause cancer (Inhalation)

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS-US labeling

Hazard pictograms (GHS-US) :

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) :
H315 - Causes skin irritation
H320 - Causes eye irritation
H350 - May cause cancer (Inhalation)

Precautionary statements (GHS-US) :
P280 - Wear eye protection, Dust respirator, protective gloves.
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P332+P313 - If skin irritation occurs: Get medical advice/attention.
P337+P313 - If eye irritation persists: Get medical advice/attention.
P260 - Do not breathe dust.

2.3. Other hazards which do not result in classification

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	GHS-US classification
Calcium Aluminate Cement	(CAS-No.) 65997-16-2	20 - 50	Skin Irrit. 2, H315 Eye Irrit. 2B, H320
quartz	(CAS-No.) 14808-60-7	10 - 20	Carc. 1A, H350
cristobalite	(CAS-No.) 14464-46-1	5 - 10	Carc. 1A, H350

Full text of hazard classes and H-statements : see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation : Allow victim to breathe fresh air. Allow the victim to rest.

First-aid measures after skin contact : Wash with plenty of soap and water. Wash contaminated clothing before reuse.

First-aid measures after eye contact : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention.

4.2. Most important symptoms and effects (acute and delayed)

Potential Adverse human health effects and symptoms : Based on available data, the classification criteria are not met.

Symptoms/effects after inhalation : May cause cancer by inhalation. Danger of serious damage to health by prolonged exposure through inhalation.

Symptoms/effects after skin contact : Causes skin irritation.

Symptoms/effects after eye contact : Causes eye irritation.

4.3. Immediate medical attention and special treatment, if necessary

No additional information available

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

Unsuitable extinguishing media : No unsuitable extinguishing media known.

5.2. Specific hazards arising from the chemical

Fire hazard : Not flammable.

Reactivity : Hydraulic setting.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions : Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures : Do not breathe dust.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.

Emergency procedures : Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : On land, sweep or shovel into suitable containers. Minimize generation of dust.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Avoid raising dust. Avoid contact with skin and eyes. Do not breathe dust.

Hygiene measures : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store this product in a dry location where it can be protected from the elements.

Incompatible products : Strong bases. Strong acids.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Calcium Aluminate Cement (65997-16-2)		
Not applicable		

cristobalite (14464-46-1)		
ACGIH	ACGIH TWA (mg/m³)	0.025 mg/m³ (Silica-Crystalline Cristobalite; USA; Time-weighted average exposure limit 8 h; TLV - Adopted Value; Respirable fraction)
OSHA	OSHA PEL (TWA) (mg/m³)	0.05 mg/m³ respirable dust

quartz (14808-60-7)		
ACGIH	ACGIH TWA (mg/m³)	0.025 mg/m³ (Silica-Crystalline Quartz; USA; Time-weighted average exposure limit 8 h; TLV - Adopted Value; Respirable fraction)

quartz (14808-60-7)		
OSHA	OSHA PEL (TWA) (mg/m³)	0.05 mg/m³ Respirable fraction
OSHA	Remark (OSHA)	(3) See Table Z-3.

8.2. Appropriate engineering controls
No additional information available

8.3. Individual protection measures/Personal protective equipment
Personal protective equipment:
Avoid all unnecessary exposure.

Hand protection:
Wear protective gloves.

Eye protection:
Chemical goggles or safety glasses

Skin and body protection:
Wear suitable protective clothing

Respiratory protection:
Wear appropriate mask

Other information:
Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Solid
Appearance	:	Granular mixture.
Color	:	Light gray
Odor	:	Earthy Odor
Odor threshold	:	Not applicable
pH	:	No data available
Melting point	:	> 2500 °F
Freezing point	:	Not applicable
Boiling point	:	Not applicable
Critical temperature	:	Not applicable
Critical pressure	:	Not applicable
Flash point	:	Not applicable
Relative evaporation rate (butyl acetate=1)	:	Not applicable
Relative evaporation rate (ether=1)	:	Not applicable
Flammability (solid, gas)	:	Non flammable.
Vapor pressure	:	Not Applicable
Vapor pressure at 50 °C	:	Not Applicable
Relative vapor density at 20 °C	:	No data available
Relative density	:	≈ 1.3
Solubility	:	Slightly soluble. in water.
Log Pow	:	No data available
Auto-ignition temperature	:	Not applicable
Decomposition temperature	:	No data available
Viscosity	:	Not Applicable
Viscosity, kinematic	:	Not Applicable
Viscosity, dynamic	:	Not Applicable
Explosion limits	:	Not applicable
Explosive properties	:	No data available
Oxidizing properties	:	No data available

9.2. Other information
No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity
Hydraulic setting.

10.2. Chemical stability
Not established.

10.3. Possibility of hazardous reactions
Not established.

10.4. Conditions to avoid
Avoid dust formation.

10.5. Incompatible materials
Strong acids. Strong bases.

10.6. Hazardous decomposition products
No additional information available

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	:	Not classified
Skin corrosion/irritation	:	Causes skin irritation.
Serious eye damage/irritation	:	Causes eye irritation.
Respiratory or skin sensitization	:	Not classified
Germ cell mutagenicity	:	Not classified
Carcinogenicity	:	May cause cancer (Inhalation).

cristobalite (14464-46-1)	
IARC group	1 - Carcinogenic to humans

quartz (14808-60-7)	
IARC group	1 - Carcinogenic to humans

Reproductive toxicity	:	Not classified
Specific target organ toxicity – single exposure	:	Not classified
Specific target organ toxicity – repeated exposure	:	Not classified
Aspiration hazard	:	Not classified
Potential Adverse human health effects and symptoms	:	Based on available data, the classification criteria are not met.
Symptoms/effects after inhalation	:	May cause cancer by inhalation. Danger of serious damage to health by prolonged exposure through inhalation.
Symptoms/effects after skin contact	:	Causes skin irritation.
Symptoms/effects after eye contact	:	Causes eye irritation.

SECTION 12: Ecological information

12.1. Toxicity
No additional information available

12.2. Persistence and degradability

Rescocast 8 (Mixture)	
Persistence and degradability	Not established.

cristobalite (14464-46-1)	
Persistence and degradability	Biodegradability: not applicable.
Biochemical oxygen demand (BOD)	Not applicable
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable

quartz (14808-60-7)	
Persistence and degradability	Biodegradability: not applicable.
Biochemical oxygen demand (BOD)	Not applicable
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable

12.3. Bioaccumulative potential

Rescocast 8 (Mixture)	
Bioaccumulative potential	Not established.

cristobalite (14464-46-1)	
Bioaccumulative potential	No test data available.

quartz (14808-60-7)	
Bioaccumulative potential	No bioaccumulation data available.

12.4. Mobility in soil
No additional information available

12.5. Other adverse effects
Effect on the global warming : None known

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Disposal methods

Product/Packaging disposal recommendations : Dispose in a safe manner in accordance with local/national regulations.

Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Not regulated

TDG

Not regulated

Transport by sea

Not regulated

Air transport

Not regulated

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

15.2. International regulations

CANADA

No additional information available

EU-Regulations

No additional information available

National regulations

quartz (14808-60-7)
Listed on IARC (International Agency for Research on Cancer)

15.3. US State regulations

Rescocast 8 (Mixture)	
U.S. - California - Proposition 65 - Other information	This product contains crystalline silica, a chemical known to the state of California to cause cancer.

cristobalite (14464-46-1)					
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significant risk level (NSRL)	Maximum allowable dose level (MADL)
Yes	No	No	No		

quartz (14808-60-7)					
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significant risk level (NSRL)	Maximum allowable dose level (MADL)
Yes	No	No	No		

cristobalite (14464-46-1)
U.S. - New Jersey - Right to Know Hazardous Substance List

quartz (14808-60-7)
U.S. - New Jersey - Right to Know Hazardous Substance List

SECTION 16: Other information

Revision date : 08/28/2018

Other information : Report language name. English. In the event of any conflict between English and other language versions, the English version shall prevail.

Full text of H-phrases:

H315	Causes skin irritation
H320	Causes eye irritation
H350	May cause cancer

SDS US (GHS HazCom 2012)

This information and recommendations set forth herein are taken from sources believed to be accurate as of the date herein, however, Resco Products, Inc. makes no warranty with respect to the accuracy of the information or the suitability of the recommendations, and assumes no liability to any user thereof.