



Engineered Granite Product Manual

Product Manual Index

1. Introduction
2. Health and Safety
3. Product Colors and Codes
4. Product Set-up
5. Mixing Procedures
 - a. Resin Suggestion Chart
6. Pouring
7. Finishing
8. Trouble Shooting
9. Appendix
 - a. Resin to Terra Bella Mix Ratio Chart
 - b. Material Safety Data Sheet

Terra Bella Engineered Granite Product Manual

1. Introduction.

This manual describes the general guidelines to be used for the manufacturing of the Terra Bella engineered granite product line as well as previously marketed Granite Fill 2000 colors. The materials required for the process are similar to those used for cultured granite. Each 50 pound bag contains all of the necessary ingredients and is ready to be mixed with resin and catalyst. Outlined in this manual are the procedures for mixing, pouring, and repairing. Charts in the back of the manual provide various resin ratios for your convenience.

Some manufactures have inquired as to the ability of not using gel-coat with the Terra Bella product line. Initial in-house tests have shown that some colors can be sanded like natural stone. Diamond sandpaper or grinding wheels are highly recommended as is used in finishing natural granite surfaces and proper safety considerations should be taken for sanding natural minerals as silica may be present. Please note that outside tests were not preformed on a surface *without* gel-coat. For further information, please contact ACS.

ACS International Inc. does not assume responsibility for any injury or damages resulting from this product nor does it assume responsibility for the finished product. For further safety information, refer to the material safety data sheet (MSDS) contained in this manual.

2. Health and Safety

Quartz is the second most common mineral found on Earth. Resulting from quartz is silica., which is a naturally occurring substance found in natural quartz products. Most of the Terra Bella colors contain a form of quartz: Amethyst, Tigers Eye, Quartz Crystals, Citrine, and basic aggregate sand all contain a form of quartz. High levels of exposure to quartz particulates can result in silicosis. Remember to where proper ventilation masks when exposed to the powder form of this product. Though the silica dust levels are approximately less than 1% per mix, caution should be taken and proper safety gear worn.

3. Product Colors and Codes

a. Terra Bella Color Line

i. Amethyst Crystal	GTBE 315
ii. Amethyst Regio	GTBE 305
iii. Antigua Blue	GTB 306
iv. Blue Crystal	GTBE 316
v. Blue Mosaic	GTB 308
vi. Citrine Crema	GTB 303
vii. Citrine Crystal	GTB 317
viii. El Tigre	GTB 301
ix. Green Crystal	GTB 318
x. Hematite Gold	GTB 307
xi. Monte Bianco	GTB 300
xii. Obsidian Crystal	GTB 320
xiii. Paprika	GTB 312
xiv. Pompeii	GTB 302
xv. Red Crystal	GTBE 319
xvi. Roma	GTB 311
xvii. Rosa	GTB 304
xviii. Turquoise Montagna	GTBE 310
xix. Verde Mosaic	GTB 309
xx. Vittoria	GTB 313

b. Granite Fill 2000 Color Line

i. Mist Grey	G 20
ii. Golden Sand	G 80
iii. Caramel	G 200

- | | | |
|-----------|-------|--|
| iv. Cameo | G 110 | |
| v. Walnut | G 220 | |
| vi. Snow | G 100 | |
- c. **Discontinued colors.** The following Granite Fill 2000 colors are discontinued and will no longer be manufactured. Please contact ACS to check on our remaining inventory levels.
- | | | |
|------------------|-------|-------|
| i. Bombay Black | G 40 | |
| ii. Country Grey | G 170 | |
| iii. Sunset Blue | | G 210 |
| iv. Peach | G 180 | |
| v. Raspberry | G 190 | |
| vi. Desert Rose | G 90 | |
| vii. Fog Grey | G 30 | |

4. Product Set-up

- a. Terra Bella does not shrink to the same extent as cultured marble when cured. Therefore it is not necessary to allow for this as much when laying out panel molds. All other aspects of set up are identical to that of marble.

5. Mixing Procedures

- a. Since many different types of mixing equipment exist, the procedures outlined here should be used as a general guideline. The Terra Bella and Terra Bella colors are sold complete with filler already mixed in the bag so that resin and catalyst are the only ingredients that need to be added.
- b. Resin Usage. The correct amount of resin to add to the Terra Bella varies depending on the temperature, type of resin used, and its viscosity. For this reason a resin ratio chart is supplied in this manual. The amount of resin required will range from 17%-23% of the total matrix weight. Standard marble resin works well with Terra Bella, but the best results can be obtained by using a high centipoise resin with a fast gel time. A good way to determine what percentage of resin works best for you is to start with a mixture of 18% resin (eg. 100 pound mix would have 18 pounds resin and 82 pounds of Terra Bella), and add resin until the mix is thoroughly wet out. Resin floating to the surface of the matrix after the mixer has been shut off is an indication of too much resin. If the mixture is correct the stone texture should be visible on the back side of the finished part with no excessive resin.

IMPORTANT: The following resin information is based on in-house tests and has small sample quantities using a resin of **1,000 cps**. Tests were also performed using resin with a 500 cps, which required an average of *2% less resin by weight*. When first using Terra Bella, it might be prudent to hand mix a small batch to get the feel of the product and calculate an accurate resin demand based on the viscosity of the resin being used.

Color Name/Code	Resin Percent by Weight	Sample Mix
Monte Bianco GTB 300	20% resin on average. It is likely that in a production environment, an 18 to 19% resin demand will occur.	500 grams GTB 300 130 grams resin @1000 cps 2.6 g catalyst
El Tigre GTB 301	18% resin on average. It is likely that in a production environment, 17% or less resin demand will occur.	500 grams GTB 304 112 grams resin @1000 cps 2.24 grams catalyst
Pompeii GTB 302	20% resin on average. It is likely that in a production environment, an 18 to 19% resin demand will occur.	500 grams GTB 302 130 grams resin 2.6 g catalyst
Citrine Crema GTB 303	20% resin on average. It is likely that in a production environment, an 18 to 19% resin demand will occur.	500 grams GTB 303 130 grams resin 2.6 g catalyst
Rosa GTB 304	18% resin on average. It is likely that in a production environment, 17% resin demand will occur.	500 grams GTB 304 112 grams resin 2.24 grams catalyst
Amethyst Regio GTBE 305	20% resin on average. It is likely that in a production environment, 18% resin demand will occur.	500 grams GTB 305 130 grams resin 2.93 grams catalyst
Antigua Blue GTB 306	20% resin on average. It is likely that in a production environment, an 18 to 19% resin demand will occur.	500 grams GTB 306 130 grams resin 2.6 g catalyst
Hematite Gold GTB 307 <i>* This color contains over 6% pyrite, which retards the cure time. More catalyst might be desired.</i>	20% resin on average. It is likely that in a production environment, an 18 to 19% resin demand will occur.	500 grams GTB 307 130 grams resin 2.93 g catalyst <i>*2.25% catalyst suggested</i>
Blue Mosaic GTB 308 <i>* This color contains over 5% pyrite, which retards the cure time. More catalyst might be desired.</i>	22% resin on average. It is likely that in a production environment, a 20% resin demand will occur.	500 grams GTB 308 140 grams resin 3.15 g catalyst
Verde Mosaic GTB 309 <i>* This color contains over 5% pyrite, which retards the cure time. More catalyst might be desired.</i>	22% resin on average. It is likely that in a production environment, a 20% resin demand will occur.	500 grams GTB 309 140 grams resin 3.15 g catalyst
Turquoise Montagna GTBE 310	20% resin on average. It is likely that in a production environment, a 19% resin demand will occur.	500 grams GTB 310 130 grams resin 2.6 g catalyst
Roma GTB 311	20% resin on average. It is likely that in a production environment, 19% resin demand will occur.	500 grams GTB 311 130 grams resin 2.6 grams catalyst
Paprika GTB 312 <i>(The color formerly known as Espresso)</i>	20% resin on average. It is likely that in a production environment, 19% resin demand will occur.	500 grams GTB 312 130 grams resin 2.26 grams catalyst
Vittoria GTB 313	20% resin on average. It is likely that in a production environment, an 18 to 19% resin demand will occur.	500 grams GTB 313 130 grams resin 2.6 g catalyst
Crystal Colors GTBE and GTB colors 315 to 320	20% resin on average. It is likely that in a production environment, a 20% resin demand will occur.	500 grams GTB 308 130 grams resin 2.6 g catalyst

- c. **Mixing Time.** Most of the Terra Bella colors can be mixed for any desired length of time so long as the matrix is completely wet out. It is important to be fairly consistent with the amount of time each matrix gets mixed from one batch to the next in order to assure a perfect match in appearance. Mix time will affect the matrix temperature and alter resin viscosity. Both factors will affect the color of the finished part.
 - d. **Initiator usage.** Catalyst should be added either with the resin or while the resin is mixing with the filler. Catalyze Terra Bella colors the same as you would catalyze marble.
 - e. **Thickening Agents.** Certain additives may be used to change the characteristics of the filler if desired. Materials used to reduce the weight of the material work well but alter the appearance of Terra Bella, creating a slightly hazy look. Thickening agents such as cab-o-sil improve the suspension and adhesion characteristics of the filler. A thickening agent is recommended if the resin used is so thin that it allows particle separation in the product or if the matrix does not adhere to the vertical surfaces of the mold or if too much resin has been added to the mix.
 - f. The most important thing to remember about mixing Terra Bella is to be consistent. This means always adding the same percentage of resin and catalyst and mixing for the same length of time for each color. Changing any one of these factors may cause slight variations in the finished product.
6. **Pouring.** Since no veining is required with granite the material may be poured using any method. However, there are some rules you should follow for the best results.
- a. Pour mix over the mold surface as evenly as possible so leveling is easier. Terra Bella is **much thicker than cultured marble** so do not rely on vibrating alone to level. *The mix will likely need to be pulled to the edges.*
 - b. When pouring any mold, be sure to get an adequate skin coat over the entire mold surface before vibrating. This will prevent any resin that may vibrate to the surface from being pulled onto exposed surfaces of the mold.
 - c. When pouring bath tubs, fill cavity completely before vibrating. This prevents resin lines from forming between pours made from multiple mix vessels.
 - d. For vertical mold surfaces it may be necessary to pull material up to assure adequate coverage. If this is difficult, remember that cab-o-sil added to the mix greatly increases the adhesion characteristics of the matrix.
 - e. **Vibration time should be kept to a minimum.** Typically 30 seconds to a minute is recommended to avoid having the large stone sink and result in the finished part warping. If the matrix is thick and does not have excessive resin, vibration times may be increased to a desired length of time as long as the large rocks do not all settle.
 - f. If excessive resin appears on the back surface after vibrating and the granite texture is no longer visible, there is too much resin in the mix. This should be corrected by reducing the ratio of resin, using higher centipoise resin or adding a thickening agent to the mix. Attempt to remove any excess resin prior to curing to reduce potential warping.
 - g. **Vessel bowls.** When casting vessel bowls or parts where the backside needs to look its best, increasing the resin percentage will assist in air release in the part. It has been found that the air bubbles form on the back side of vessel bowls. Besides increasing the resin usage, spraying the backside or female side of the mold with a stone matrix creates an exceptional looking part. For more information on this technique, please contact ACS directly.
7. **Finishing.** Terra Bella is a harder substance than cultured marble and may require more time to grind. Silicon carbide grinding discs work the best with this natural stone product. Carbide drill bits and saw blades are also recommended for tooling. Repairs are relatively easily done using clear gel coat for minor repair work. A small stone mixture can be surface applied for major repairs.
8. **Trouble shooting.**
- a. **RESIN FLOATING ON BACK OF PART**
 - i. If too much resin is added to Terra Bella colors and it floats (resin) to the backside of the part, excess should be removed (scrapped) in order to salvage the part and prevent warping. (See warping section below)

- b. CLOUDY APPEARANCE
 - i. This may be the result of air entrapment in the gel coat that normally may not be noticeable with cultured marble product, but is with Terra Bella engineered granite. A clear gel coat will produce a much nicer looking part.
 - ii. Too much additive. If you're using cab-o-sil, too much can result in a cloudy appearance. Testing different ratios before making a part might be prudent.

- c. WHITE BLOTCHES OR INCONSISTENT COLOR
 - i. This may be the result of uneven resin distribution or under mixing. If two or more batches of mix go into the same mold it is very important that each batch have identical resin ratios and mix for the same length of time.
 - ii. A white blotch may also be the result of scraping unmixed material from the side of the bucket and applying it directly to the mold surface.

- d. RING AROUND VERTICAL EDGES IN BOWL
 - i. This happens if the batch is poured too thin or the resin used is not thick enough to suspend the granite particles evenly. The vertical areas of the bowl may appear lighter than the deck when this happens. Some ways to solve this problem are:
 - 1. Use less resin in the mix. The mix has the correct amount of resin when the back side of the part retains a granite appearance with very little resin on top.
 - 2. Add a thickening agent to the resin. Cab-o-sil greatly improves the suspension of particles in the mix.
 - 3. Using a higher viscosity resin also may keep this from occurring. A good range is 2000-3000 centipoise.
 - 4. It is also important that the mixture goes into a gel within a short period of time after being poured. This will give the mix less time to settle out.
 - 5. Vibration time should be only 30 seconds to one minute as air passes through the granite mixture very quickly.

 - ii. WARPING
 - 1. This is normally the result of excessive resin build up on the back side of the part. The resin contracts more than the granite matrix and tends to pull the edges up. This can always be solved by thickening the mixture either by reducing the resin content or adding a thickening agent.

 - iii. THERMAL SHOCK
 - 1. There are many factors that can lead to thermal shock failure. Terra Bella passes thermal shock when it is used correctly, based on the independent results of Universal Laboratory Inc. in a gel-coat application. A failure in thermal shock is usually the result insufficient gel coat in the drain area. The recommended thickness of gel coat is 18 mils. Since every shop uses different gel coats, resins, catalysts, and procedures it is the responsibility of each shop to insure its own thermal shock results.

 - iv. RIPPLES IN SURFACE
 - 1. Slight ripples in the gel coat surface are inevitable with Terra Bella. These ripples can be minimized by having a thick layer of gel coat and waiting until it is completely cured before pouring.

Appendix

To use this chart, first decide how much total weight of mix (resin + matrix) is needed for the application. If 20 pounds of material is needed to fill a sink mold, use 16.4 pounds of Terra Bella dry matrix. Then decide how much resin to mix in depending on the colors resin demand. For example, if mixing El Tigre, start with 16.4 pounds of dry mix to 17% resin or 3.4 pounds for a total mix of 20 pounds.

Pounds of Total Matrix*	Pounds of Granite Fill	17%	18%	19%	20%	21%	22%	23%	24%
1	0.82	0.17	0.18	0.19	0.2	0.21	0.22	0.23	0.24
10	8.2	1.7	1.8	1.9	2	2.1	2.2	2.3	2.4
20	16.4	3.4	3.6	3.8	4	4.2	4.4	4.6	4.8
30	24.6	5.1	5.4	5.7	6	6.3	6.6	6.9	7.2
40	32.8	6.8	7.2	7.6	8	8.4	8.8	9.2	9.6
50	41	8.5	9	9.5	10	10.5	11	11.5	12
60	49.2	10.2	10.8	11.4	12	12.6	13.2	13.8	14.4
70	57.4	11.9	12.6	13.3	14	14.7	15.4	16.1	16.8
80	65.6	13.6	14.4	15.2	16	16.8	17.6	18.4	19.2
90	73.8	15.3	16.2	17.1	18	18.9	19.8	20.7	21.6
100	82	17	18	19	20	21	22	23	24
110	90.2	18.7	19.8	20.9	22	23.1	24.2	25.3	26.4
120	98.4	20.4	21.6	22.8	24	25.2	26.4	27.6	28.8
130	106.6	22.1	23.4	24.7	26	27.3	28.6	29.9	31.2
140	114.8	23.8	25.2	26.6	28	29.4	30.8	32.2	33.6
150	123	25.5	27	28.5	30	31.5	33	34.5	36
160	131.2	27.2	28.8	30.4	32	33.6	35.2	36.8	38.4
170	139.4	28.9	30.6	32.3	34	35.7	37.4	39.1	40.8
180	147.6	30.6	32.4	34.2	36	37.8	39.6	41.4	43.2
190	155.8	32.3	34.2	36.1	38	39.9	41.8	43.7	45.6
200	164	34	36	38	40	42	44	46	48
250	205	42.5	45	47.5	50	52.5	55	57.5	60
300	246	51	54	57	60	63	66	69	72

The above chart is to act as a guide. Each fabrication shop mixes differently as resins can affect the percentage used. Most mixes should have a lower resin demand.

**Total matrix is the dry filler and resin combined.*

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Trade name: Terra Bella; includes all colors including Crystal Series
 General use: Engineered Granite Filler

Manufacturer Name

ACS International, Inc.
 4775 S. Third Avenue
 Tucson, AZ 85714

Emergency Information

Emergency Telephone: 1-800-669-9214
 M–Th 7 a.m. to 4:30 p.m. F 7 a.m. to 11 a.m.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Abbr.	CAS No.	Weight %	Class	ACGI H TLV	OSHA PEL	Other Limits
Alumina try-hydrate	Al (OH) 3	21645-51-2	20–40%		N/A	10	10
Filler*			60–80%				15 mg/M3 (total)
Quartz**	SiO ₂	148-08-60-7	1–10% of Filler Weight *Total dust <1%	6 mg/M ³		80 mg/M ³	

*Filler is propriety, trade secret ingredients. Filler consists of natural semi-precious gemstones, minerals and aggregate minerals. With the exception of quartz minerals, all remaining ingredients are considered non-hazardous.

With the **exception of Antiqua Blue, Hematite Gold, Red, Green, and Blue Crystal Series colors, **all remaining** Terra Bella colors have a form of quartz in various sizes and types in the filler matrix. Read the hazards regarding silica.

3. HAZARDS IDENTIFICATION**Most Important Hazards:**

Forms of crystalline silica (quartz) in Terra Bella include: Amethyst, Citrine, Obsidian, and aggregates called Ruby Red and Desert Gold, which have the potential to contain trace amounts of quartz. It (Terra Bella) is not flammable, combustible or explosive. It does not cause burns or severe skin or eye irritation. A single exposure will not result in serious adverse health effects. Crystalline silica (quartz) is not known to be an environmental hazard.

Crystalline silica (quartz) is incompatible with hydrofluoric acid, fluorine, chlorine trifluoride or oxygen difluoride.

Specific Hazards: Quartz ingredients are considered hazardous under the OSHA Hazard Communications Standard (29 CFR 1910.1200). All other ingredients in Terra Bella are non-hazardous.

Potential health effects

Primary routes of exposure: Eye Contact—Yes; Inhalation—Yes; Skin—Yes;
 Ingestion—No; Skin Absorption—No

Symptoms of acute overexposure:

Skin: Not a known skin irritant.

Eyes: Crystalline silica (quartz) may cause abrasion of the cornea.

Inhalation:

- Silicosis. Breathable (dust) crystalline silica (quartz) can cause silicosis, a fibrosis (scarring) of the lungs. Silicosis may be progressive; it may lead to disability and death.

- b. Lung Cancer Crystalline silica (quartz) inhaled from occupational sources is classified as carcinogenic to humans.
- c. Tuberculosis Silicosis increases the risk of tuberculosis.
- d. Autoimmune and Chronic Kidney Diseases Some studies show excess numbers of cases of scleroderma, connective tissue disorders, lupus, rheumatoid arthritis, chronic kidney diseases and end-stage kidney disease in workers exposed to breathable crystalline silica.
- e. Non-Malignant Respiratory Diseases (other than silicosis). Some studies show an increased incidence in chronic bronchitis and emphysema in workers exposed to breathable crystalline silica.

Ingestion: Not applicable under normal industrial situations

4. FIRST AID MEASURES

Skin: Not a skin irritant.

Eyes: May cause eye irritation. If contact lenses are present, remove. Immediately flush eyes with running water for a minimum of 15 minutes. Seek medical attention if irritation persists.

Inhalation: Inhalation of dust may produce respiratory tract irritation, characterized by burning, sneezing and coughing. Remove individual to fresh air and allow to rest. Obtain medical assistance if breathing remains labored. No specific first-aid is necessary since the adverse health effects associated with exposure to crystalline silica (quartz) result from chronic exposures. If there is a gross inhalation of crystalline silica (quartz), remove the person immediately to fresh air, give artificial respiration as needed, seek medical attention as needed.

Ingestion: Not applicable under normal industrial situations. Give large quantities of water to induce vomiting. Seek medical attention.

5. FIRE FIGHTING MEASURES

Extinguishing Media: Water—Yes Carbon Dioxide—Yes Dry Chemical—Yes Foam—Yes

Alcohol Foam—No Use a self-contained breathing apparatus approved by NIOSH for all fires.

Flash Point: N/A

Explosive limits in air: N/A

Unusual Fire and Explosion Hazard: Generally non-flammable. In a sustained fire, product components may degrade to form carbon monoxide, hydrogen cyanide, and other hazardous byproducts.

NFPA Classification: Flammable: 0 Health: 0 Reactivity: 0 Specific Hazards: 0

6. ACCIDENTAL RELEASE MEASURES

Ventilate area of leak or spill. Wear appropriate personal protective equipment.

Spill Control: For small spills vacuum or scoop-up material for recovery or disposal in a sanitary landfill. **Avoid dust producing conditions** and use good ventilation.

7. HANDLING AND STORAGE

Handling precautions: Avoid direct contact with eyes. Do not breathe dust in concentrations above established limits. After handling, always wash hands thoroughly with soap and water before eating, drinking, or smoking. Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels low.

Storage: Store in a dry, cool and well ventilated area. Avoid damaging storage containers. Storage color code: Orange, general storage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Store/use in a well ventilated area. Mechanical ventilation is recommended.

Personal Protection Equipment

Respiratory: Wear a NIOSH approved filtering face piece dust mask wear ventilation is not adequate with particulate filters in atmosphere to 10X the PEL. Use in a well ventilated area.

Eye: Safety glasses with side shields are recommended.

Skin: Where skin exposure is likely to occur, long sleeved clothing is recommended. Gloves are also recommended. May cause dry irritated skin.

Exposure Limits: See Section 2.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form: Granular solid **Color:** Various **Odor:** None

Specific Gravity: Various **Boiling Point:** N/A **Melting Point:** 1517° F (825° C)

Solubility: 0.001 gm in 100 ml water, soluble in dilute acids. Quartz minerals will dissolve in hydrofluoric acid and produce a corrosive gas – silicon tetrafluoride.

10. STABILITY AND REACTIVITY

Stability: This product is stable under ordinary conditions.

Incompatibility: Contact with powerful oxidizing agents, such as fluorine, chlorine trifluoride and oxygen difluoride, may cause fires.

Decomposition: In a sustained fire, calcium carbonate can produce calcium oxide fumes and liberates carbon dioxide.

11. TOXICOLOGICAL INFORMATION

- A. **SILICOSIS:** The major concern is silicosis, caused by the inhalation and retention of respirable crystalline silica dust. Silicosis can exist in several forms, chronic (or ordinary), accelerated, or acute.
- Chronic or Ordinary Silicosis (often referred to as Simple Silicosis) is the most common form of silicosis, and can occur after many years of exposure to relatively low levels of airborne respirable crystalline silica dust. It is further defined as either simple or complicated silicosis. Simple silicosis is characterized by lung lesions (shown as radiographic opacities) less than 1 centimeter in diameter, primarily in the upper lung zones. Often, simple silicosis is not associated with symptoms, detectable changes in lung function or disability. Simple silicosis may be progressive and may develop into complicated silicosis or progressive massive fibrosis (PMF). Complicated silicosis or PMF is characterized by lung lesions (shown as radiographic opacities) greater than 1 centimeter in diameter. Although there may be no symptoms associated with complicated silicosis or PMF, the symptoms, if present, are shortness of breath, wheezing, cough and sputum production. Complicated silicosis or PMF may be associated with decreased lung function and may be disabling. Advanced complicated silicosis or PMF may lead to death. Advanced complicated silicosis or PMF can result in heart disease secondary to the lung disease (cor pulmonale).
- Accelerated Silicosis can occur with exposure to high concentrations of respirable crystalline silica over a relatively short period; the lung lesions can appear within five (5) years of initial exposure. Progression can be rapid. Accelerated silicosis is similar to chronic or ordinary silicosis, except that lung lesions appear earlier and progression is more rapid.
- Acute Silicosis can occur with exposures to very high concentrations of respirable crystalline silica over a very short time period, sometimes as short as a few months. The symptoms of acute silicosis include progressive shortness of breath, fever, cough and weight loss. Acute silicosis is fatal.
- B. **B. CANCER**
- IARC - The International Agency for Research on Cancer ("IARC") concluded that there was "*sufficient evidence* in humans for the carcinogenicity of crystalline silica in the forms of quartz or cristobalite from occupational sources", and that there is "*sufficient evidence* in experimental animals for the carcinogenicity of quartz and cristobalite." The overall IARC evaluation was that "crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is *carcinogenic to humans (Group 1)*." The IARC evaluation noted that "carcinogenicity was not detected in all industrial circumstances studies. Carcinogenicity may be dependent on inherent

characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." For further information on the IARC evaluation, see IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 68, "Silica, Some Silicates..." (1997).

NTP - The National Toxicology Program's Eleventh Annual Report on Carcinogens classifies "silica, crystalline (respirable size)" as a known human carcinogen.

OSHA - Crystalline silica (quartz) is not regulated by the U. S. Occupational Safety and Health Administration as a carcinogen.

- C. **AUTOIMMUNE DISEASES:** Several studies have reported excess cases of several autoimmune disorders, -- scleroderma, systemic lupus erythematosus, rheumatoid arthritis -- among silica-exposed workers. For a review of the subject, the following may be consulted: "Occupational Exposure to Crystalline Silica and Autoimmune Disease", Environmental Health Perspectives, Volume 107, Supplement 5, pp. 793-802 (1999); "Occupational Scleroderma", Current Opinion in Rheumatology, Volume 11, pp. 490-494 (1999).
- D. **TUBERCULOSIS:** Individuals with silicosis are at increased risk to develop pulmonary tuberculosis, if exposed to persons with tuberculosis. The following may be consulted for further information: Occupational Lung Disorders, Third Edition, Chapter 12, entitled "Silicosis and Related Diseases", Parkes, W. Raymond (1994); "Risk of pulmonary tuberculosis relative to silicosis and exposure to silica dust in South African gold miners," Occup Environ Med., Volume 55, pp.496-502 (1998).
- E. **KIDNEY DISEASE:** Several studies have reported excess cases of kidney diseases, including end stage renal disease, among silica-exposed workers. For additional information on the subject, the following may be consulted: "Kidney Disease and Silicosis", Nephron, Volume 85, pp. 14-19 (2000).
- F. **NON-MALIGNANT RESPIRATORY DISEASES** The reader is referred to Section 3.5 of the NIOSH Special Hazard Review cited below, for information concerning the association between exposure to crystalline silica and chronic bronchitis, emphysema and small airways disease. There are studies that disclose an association between dusts found in various mining occupations and non-malignant respiratory diseases, particularly among smokers. It is unclear whether the observed associations exist only with underlying silicosis, only among smokers, or result from exposure to mineral dusts generally (independent of the presence or absence of crystalline silica, or the level of crystalline silica in the dust).

12. ECOLOGICAL INFORMATION

Ecotoxicity: Low toxicity for humans or animals under normal conditions of use. This product is water soluble.

13. DISPOSAL CONSIDERATIONS

Waste disposal or recycling: Recover and place material in a suitable container for intended use or disposal. Recycle when possible.

14. TRANSPORT INFORMATION

DOT/TDG Classification: Not controlled.

15. REGULATORY INFORMATION

U.S. Regulatory Guides:

TSCA No.: Crystalline silica (quartz) appears on the EPA TSCA inventory under the CAS No. 14808-60-7. All other ingredients are not considered hazardous.

RCRA: None of the product ingredients are considered hazardous waste under RCRA. Crystalline silica (quartz) is not classified as a hazardous waste under the Resource Conservation and Recovery Act, or its regulations, 40 CFR §261 et seq.

CERCLA: None of the product ingredients are considered hazardous under CERCLA. Crystalline silica (quartz) is not classified as a hazardous substance under regulations of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 40 CFR §302.

Emergency Planning and Community Right to Know Act (SARA Title III): None of the product ingredients are considered hazardous under the SARA Title III. Crystalline silica (quartz) is not an

extremely hazardous substance under Section 302 and is not a toxic chemical subject to the requirements of Section 313.

Clean Air Act: None of the ingredients in Terra Bella are ozone depleting substances.

NTP: Respirable crystalline silica, primarily quartz dusts occurring in industrial and occupational settings, is classified as Known to be a Human Carcinogen.

OSHA Carcinogen: No ingredient

California Proposition 65: Crystalline silica (airborne particles of respirable size) is classified as a substance known to the State of California to be a carcinogen. All other ingredients are non-carcinogens under California health and safety guides.

California Inhalation Reference Exposure Level (REL): California established a chronic REL of 3 ug for silica (crystalline, respirable). A chronic REL is an airborne level of a substance at or below which no adverse health effects are anticipated in individuals indefinitely exposed to the substance at that level.

Massachusetts Toxic Use Reduction Act: Silica, crystalline (respirable size, <10 microns) is "toxic" for purposes of the Massachusetts Toxic Use Reduction Act.

CANADA

Domestic Substances List: All ingredients in Terra Bella are naturally occurring substances, are on the Canadian DSL.

WHMIS Classification: D2A

OTHER

EINECS No.: 238-878-4

R-phrases: R 40/20: Limited evidence of a carcinogenic effect/ Harmful by inhalation (Quartz silica dust)

R 48/20: Danger of serious damage to health by prolonged exposure/Harmful by inhalation (Quartz silica dust)

R36: Irritating to eyes. R42: May cause sensitization by inhalation.

S-phrases: S22: Do not breathe substance.

S38: In case of insufficient ventilation wear suitable respiratory equipment.

S25: Avoid contact with eyes.

16. OTHER INFORMATION

National Fire Protection Association (USA) Ratings:

Health: 0 Flammability: 0 Reactivity: 0

Store in a cool, dry, well-ventilated area. Keep containers closed. Prolonged exposure to moisture will lead to caking of the product. No hazard entailed, but will result as a detriment in handling.

Dissolves in strong acids.

ACS International Disclaimer

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, express or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects that may be caused by purchase, resale, use or exposure to our product.

Customers-users of Terra Bella must comply with all applicable health and safety laws, regulations, and orders, including the OSHA Hazard Communication Standard.