AIA & IDCEC Continuing Education Program

### UNDERSTANDING THE ART OF QUARTZ

PRESENTED BY:

HanStone® Quartz











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#### AIA & IDCEC CONTINUING EDUCATION PROGRAM

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- Format:
  - Presented face-to-face in real-time
- Course Credit:
  - AIA: 1 Learning Unit (LU)
    - Course #:004QS
  - IDCEC: .1 Health & Safety
    - Course #: 40276
  - RAIC: 1 Self-Reporting Hour
- Completion Certificate:
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#### **LEARNING OBJECTIVES**

- Gain knowledge about natural quartz surfacing:
  - Composition and Uses
  - Product Characteristics
  - Manufacturing and Fabrication
  - Application and Design Options





# INTRODUCTION TOQUARTZ

#### **QUARTZ FACTS**

- Quartz is the 4th hardest crystalline mineral on Earth, and it's found abundantly all over the world in a variety of forms.
- It is the most common mineral on the planet, making up 12% of the Earth's crust by volume.



#### **QUARTZ FACTS**

- Quartz is found in many countries and many geologic environments.
- China, Japan, and Russia are the world's primary producers of quartz.
- Belgium, Brazil, Bulgaria, France, Germany, South Africa, and the United Kingdom also mine significant quantities of the mineral.
- Soil of the region affects the coloration of quartz.



Spirit Quartz



Citrine Quartz



Aqua Aura Quartz



Rose Quartz

#### PRIMARY SOURCES OF QUARTZ IN THE US

• In the US, the greatest number of usable quartz crystals has come from Arkansas, California, North Carolina and Virginia.



#### OUACHITA MOUNTAINS, ARKANSAS

- Arkansas' Ouachita Mountains are home to one of the largest deposits of quartz crystals in the world.
- Prospectors have unearthed quartz over 1,000 years old at Mt. Ida, located in Arkansas' Ouachita Mountains.



#### **QUARTZ MINING OPERATIONS**

There are three types of quartz mining operations:

- General
- Commercial
- Non-Commercial





#### THE MINING PROCESS

- 1. Quartz crystals are hosed with water to remove the clay and dirt.
- 2. Crystals are covered in a weak oxalic acid solution.
- **3.** Blend is slowly heated to just under boiling at about 180 to 200 degrees Fahrenheit.
- **4.** Held at that temperature for 4 to 5 hours, then allowed to re-cool to room temperature.
- **5.** Crystals are removed and thoroughly rewashed with water.
- **6.** Crystals are then sorted and graded.



#### MINING AND SUSTAINABILITY

- In many parts of the world where quartz is mined, the mining industry is the heartbeat of local economic growth and development, sustaining employment opportunities for generations.
- The Yukon Territory in Canada has developed specific legislation that ensures development, competitiveness and sustainability of the quartz mining industry in the Yukon Territory, keeping in mind the fragility of the territories environment and the land in which it encompasses.



#### THE NATURE OF QUARTZ

- Versatile in color and application beyond surfacing.
- Pure quartz is colorless or white.
- Common colored varieties include: rose quartz, amethyst, smoky quartz, milky quartz and others.
- Other applications include: eyeglass lenses, circuits for consumer electronics products such as computers, cell phones, televisions, radios, and electronic games.



# THE BEAUTY OF QUARTZ

#### **QUARTZ VARIATIONS**

Chalcedony

Agate

Onyx

Jasper

Rock Crystal

Amethyst

**Rose Quartz** 

Milk Quartz

**Smoky Quartz** 

Cernelian

Citrine

#### DESCRIPTIONS

Generally only used for white or lightly colored material.

Multi-colored, banded chalcedony. Semi-translucent to translucent.

Agate where the bands are straight, parallel and consistent in size.

Opaque quartz, typically red to brown.

Clear, colorless.

Purple, transparent.

Yellow to reddish orange to brown, greenish yellow.

Pink, translucent.

White, translucent to opaque.

Brown to grey, opaque.

Reddish orange chalcedony, translucent.



Smoky Quartz

#### **QUARTZ RATES A 7.0 ON MOHS HARDNESS SCALE**





#### THE COMPOSTION OF QUARTZ SURFACING

- Quartz slabs are composed of approximately 93% raw quartz and 7% resin binders and pigments.
- Quartz slabs can have up to 7 different sizes of raw quartz.
- Quartz slabs are free of fissures and cracks.
- Quartz slabs are impermeable to water, moisture or bacteria.
- Quartz surfaces are up to 2x stronger than granite.



#### CHARACTERISTICS OF QUARTZ SURFACES



#### **QUARTZ SURFACES**

- Quartz surfaces come in a variety of colors.
- Recently, manufacturers have produced marble patterns for a more natural appearance of stone.



#### **TECHINCAL DATA**

Property		Test Method	Result
1.	Abrasion Resistance	ASTM D 4060	1094 mg
2.	Boiling Water Resistance	NEMA LD3 2000 3.5	No Effect
3.	Density	KSF 2530	2.465 g/cm3
4.	Flammability		
	Flame Speed	ASTM E-84, NFPA 255	Class A
	Smoke Developed		
5.	Freeze & Thaw Cycling	ASTM C 1026	Unaffected
6.	Fungal & Bacterial Resistance	ASTM G 21	No Growth
7.	Rockwell Hardness (HRM)	ASTM D 785 (Procedure A)	115
8.	Slip Resistance		
	Static Coefficient of Friction (Dry)	ASTM C1028	0.67
	Static Coefficient of Friction (Wet)	ASTM C1028	0.49
9.	Stain Resistance	ANSI Z124.6.5.2	Pass
10.	Tensile Strength	ASTM D 638	17.8 MPa
11.	Thermal Expansion	ASTM D-696	1.52 x 10-5 in/in/°C
12.	Wear & Cleanability	ANSI Z124.6.5.3	Pass



## THE MANUFACTURING PROCESS

#### THE MANUFACTURING PROCESS



#### **QUALITY CONTROL**

- At the end of the polishing line the slabs are inspected for defects and color consistency
- Slabs are loaded onto A-frame racks for shipment
  - Never store flat
  - Avoid extreme weather/temperature conditions
  - Avoid direct exposure to sunlight



#### THE QUARTZ ADVANTAGE

- NSF51: nonporous and bacteria resistant requires no sealing
- Requires no conditioning or polishing
- Stain resistant
- Heat resistant (up to 300°)
- Chip and scratch resistant
- Easy to maintain and clean (mild soap and water)
- Leaves a minimal eco footprint



#### **FABRICATION OVERVIEW**

- Because of its density, quartz surfaces are less likely to break during fabrication.
- Unlike natural stone, quartz is less likely to chip or fracture when cut and has tighter seams.
- All corners must have a minimum radius of 3/8".



#### FABRICATION OVERVIEW CONTINUED

- Measure all sides.
- Measure the diagonal lengths.
- Measure the mid point of the cutouts and setbacks.
- Measure the clearance from the doors and drawers to the top of the face frames.
- Measure for overhangs at standing appliances for clearance and fit.
- Make sure to check with the Fabrication Shop for other important information they might require.

#### FABRICATION OVERVIEW CONTINUED

- Mark radius corners
- Mark edge details
- Mark backsplash
- Mark cutouts







#### **FABRICATION OVERVIEW CONTINUED**

- Review and sign off
  - Material color and edge finish
  - Edge details (thickness)
  - Corner details
  - Backsplash
  - Seam location
  - Overhang







### **FABRICATION PROCESS**

- First, a routine surface inspection.
- Next, slab is sent to bridge saw cut according to template.
- Then, off to either CNC or work tables for:
  - Edge applications
  - Edge polishing
  - Under-mounting sink application
- Material passes through quality inspection to check edges, polish and surface uniformity.





#### **EDGE PROFILES**



#### EDGE PROFILES

- Colors and patterns run all the way through the material and cannot wear off, allowing flexibility of edge designs.
- Edge details are dependent on the fabricator and are not representative of all quartz manufacturers.



#### EDGE OPTIONS



#### SEAMING TECHNIQUES

- A variety of factors influence when it is necessary to seam two pieces of material together:
  - Length to get maximum yield
  - Minimizing the number of seams
- Avoid placement of seams:
  - Over dishwashers or trash compactors
  - Within 6" of cutouts (sinks, cooktops, etc)
  - Within 18" of a finished end





#### SITE INSPECTION OVERVIEW

- Check site access
  - Parking and unloading area
  - Entrance gate and front door sizes
- Verify cabinetry conditions
- Inspect stability and rigidity of floor and wall areas under and around the cabinets where the new surfaces will be installed
- Note electrical and plumbing positioning and any irregular wall conditions



### SITE INSPECTION OVERVIEW - ADHESIVES

- There are 2 types of silicone used in a natural quartz surface installation:
  - 100% pure silicone
  - Paintable silicone
  - Colored silicones which can be used to caulk splash to countertop connection
  - A semi-transparent or translucent silicone tends to take on the color of the quartz to create a more acceptable caulk joint





















NATURAL QUARTZ SURFACING DELIVERS THE BEST OF BOTH WORLDS – PROVIDING TREMENDOUS DESIGN FLEXIBILITY WITH PRECISION AND THE BEAUTY OF NATURAL STONE.

#### SOURCES

- "Countertops: Stylish and Strong", Consumer Reports, August 2008
- ISFA-International Surface Fabricators Association
- National Sanitation Foundation
- HanStone Quartz Fabrication Manual
- HanStone Quartz DVD



1) List 3 quartz variations.

2) List 2 other industries that use quartz.

3) What level is quartz on Mohs Scale of Mineral Hardness?

4) List 3 edge options.

5) List the natural quartz manufacturing process.

6) In the fabrication process, what is the minimum radius of all corners?

7) List 3 different commercial applications of quartz.

8) Name one of the U.S. states with the greatest number of usable quartz crystals?

9) How many different sizes of raw quartz can be used in quartz slabs?

10) How many types of silicone are used in the installation process?

#### **CITED WORKS**

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#### THANK YOU FOR PARTICIPATING

This concludes The American Institute of Architects and The Interior Designers Continuing Education Council Continuing Education Systems Program



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