

Residential Roofing –Market Update

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Our Purpose: Our people and products make the world a better place.

Agenda



Owens Corning/Trumbull Introduction

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Residential Roofing Market Overview

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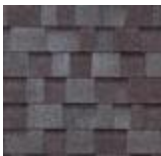
Trends and Challenges in Asphalt Supply

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Asphalt Institute – Roofing Technical Advisory Committee

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Owens Corning at a Glance



Founded in **1938**,
an industry leader in
glass fiber insulation,
roofing and glass
fiber reinforcements

17,000 employees
in **33** countries

Component
of **Dow Jones
Sustainability
World Index**

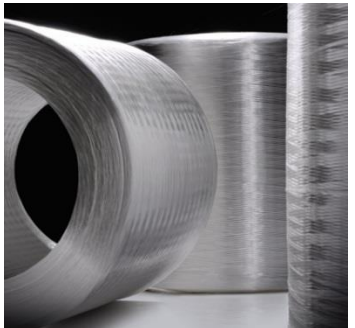


2016 sales:
\$5.7 billion

Fortune 500
company for
63 consecutive
years

**Three powerful
global businesses,
three valuable
franchises**

- Insulation
- Roofing
- Composites



Owens Corning Trumbull



- Largest Specialty Asphalt producer in the world
- Built on several unique businesses
 - Supply all of Owens Corning Asphalt needs
 - Built-Up-Roofing-Asphalt (BURA)
 - Industrial Specialties
 - Saturant and Coating
- Asphalt Infrastructure
 - 12 Asphalt plants
 - Science & Technology capability
 - 150+ years of asphalt science experience
 - AMRL accredited testing laboratory
 - State-of-the-Art pilot plant
 - Extensive material characterization capability



Trumbull®



U.S. Asphalt Shingle Market



- Multi-billion dollar asphalt shingle and accessories market
- New construction support some demand growth
- Strong Re-roof in 2016 due to storms in the mid-continent
- Re-roof represents 75% of the demand with volatility in storm activity



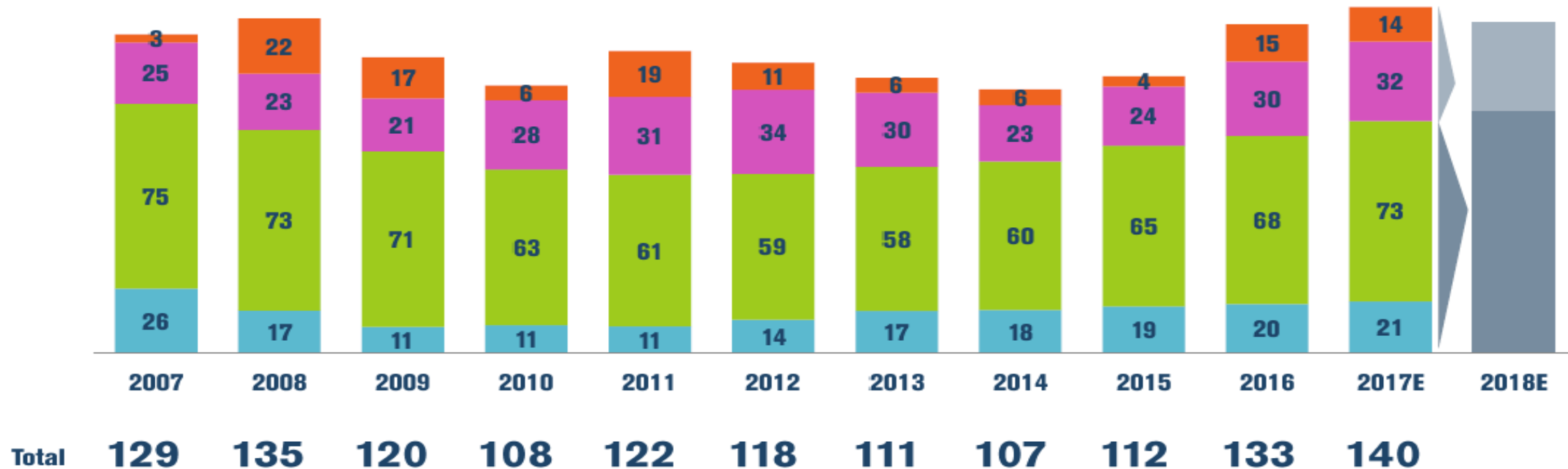
Source: Owens Corning management estimates and various industry sources and publications

Shingle Demand in North American



U.S. asphalt shingle market in mm squares

■ New construction ■ Remodeling ■ Weather events ■ Major storms



Source: Owens Corning management estimates based on data provided by Asphalt Roofing Manufacturers Association - Summary of Asphalt Roofing Industry Shipments, National Oceanic and Atmospheric Administration, National Association of Realtors, U.S. Energy Information Administration, Moody's Analytics, Oxford Economics reports, U.S. Bureau of Labor Statistics and U.S. Bureau of Economic Analysis

Industry Consolidation



	'70s	'80s	'90s	Current
	OC FRY GAF ELK CERTAINTEED TAMKO CELOTEX MANVILLE IKO BIRD ATLAS GEORGIA PACIFIC FLINTKOTE GLOBE PABCO MALARKEY LUNDAY THAGARD CUSTOM ROOFING BIG CHIEF BEAR PHILP CAREY	OC GAF ELK CERTAINTEED TAMKO CELOTEX MANVILLE IKO BIRD ATLAS GEORGIA PACIFIC GENSTAR GLOBE PABCO MALARKEY LUNDAY THAGARD CUSTOM ROOFING	OC GAF ELK CERTAINTEED TAMKO CELOTEX IKO ATLAS GEORGIA PACIFIC GS ROOFING GLOBE PABCO MALARKEY	OC GAF/ELK CERTAINTEED TAMKO IKO ATLAS PABCO MALARKEY
Top 90%	16	13	10	4
Total	21	17	13	8

Favorable Industry Structure for the Future

Changes in Crude/Asphalt Production

Past	Present	Future
<ul style="list-style-type: none"> ▪ >3% of production ▪ Asphalt Imports (Venezuela) ▪ ANS ▪ >135 refineries producing asphalt in NA ▪ OPEC Centric ▪ Demand ~40 MM tons 	<ul style="list-style-type: none"> ▪ ~2% of production ▪ WCS, Syncrude, Shale Oil ▪ Less than 60 refineries producing asphalt in NA ▪ US becomes exporter ▪ Demand ~25 MM tons 	<ul style="list-style-type: none"> ▪ <1% of production ▪ <i>Recycled and bio-based streams</i> ▪ Less than 20 refineries producing in NA ▪ No imports (?) ▪ Demand >25 MM tons

Shingle Past/Present/Future



Past

- Organic-based
- Slower line speeds
- 3 Tab shingles
- Non-modified
- Catalyzed coatings

Present

- Fiberglass-based
- Faster line speeds
- Laminate shingles
- SBS modified
- Modified adhesives and sealants
- PPA catalyzed coatings
- Self-adhered underlayments

Future

- Increase performance
- Performance-based vs. prescriptive specifications
- Move away from Type 15 and Type 30

Present – Anatomy of a Shingle



Filled Coating: Substrate for Granules

Asphalt:

- Water-shedding
- Durability

Filler:

- Mechanical properties
- Fire resistance

Topcoat

Backcoat

Backdust:

- Ease of handling and installation

Headlap

Granules:

- UV protection
- Aesthetics (color & texture)

Glass mat:

- Strength
- Durability
- Fire resistance

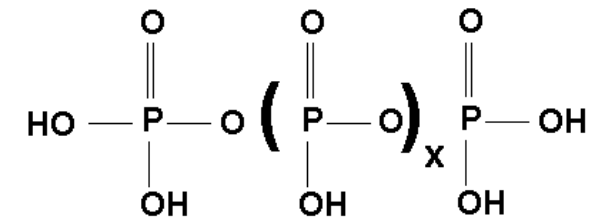
Trends in the Industry



Need to Be More Flexible in the Composition of the Asphalt Coating

Acid Catalyzed Coatings

- Polyphosphoric Acid
- Ferric Chloride
- Other



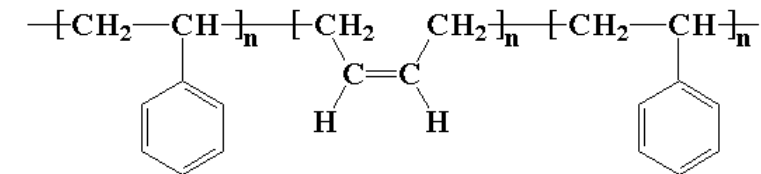
Polyphosphoric Acid

Non-asphalt Flux Based Coating

- Bio-based
- REOB (Re-refined Engine Oil)
- Recycled asphalt

Polymer Modified Coating

- Meet Class IV (Impact Resistance) requirements
- Potentially moving into mainstream laminate coating



Styrene Butadiene Styrene

Asphalt Coating Specifications



Move from Empirical to Fundamental “PG – Type”

- Engineered properties
- Rheological measurements
- Well-defined aging tests/parameters

Allow for Alternative Compositions

- Non-asphalt based (REOB, etc.)
- Polymer modified
- Bio-based

Strict Adherence to Pen/SP Will Not Be Enough!

* Roofing Contractor, “State of The Industry Report, Feb. 2014

Roofing Technical Advisory Committee



- **Purpose of the Committee:**
 - The RTAC oversees and provides direction regarding Institute activities related to education, training, and research, and develops programs to address technical issues that impact the asphalt roofing industry.
 - Consist of 18 voting members
 - Meets at least three times a year (Spring, Summer and Annual Asphalt Institute Meetings)
- **Key Areas of Focus:**
 - Education Task Force
 - Rheology Testing Standards
 - REOB/VTAE Task Force

RTAC Education Committee



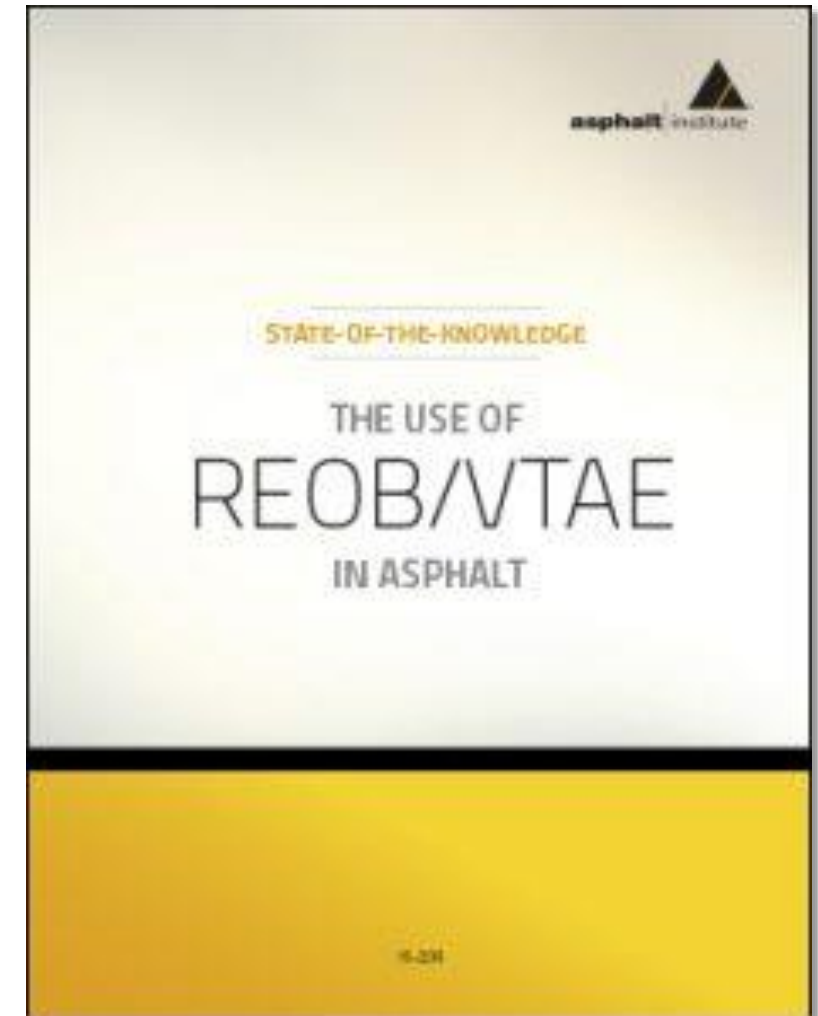
- Established a Roofing Binder Technician Course
- Held first training session the week of January 30th

Date	January 30 – February 1, 2018
Course Length	2.5-days (anticipated)
Location	Asphalt Institute – Lexington, KY
Capacity	6 students, maximum
Cost	\$1,195 ^a
Instructor(s)	Mike Beavin, Mike Anderson, Wes Cooper
Text	MS-25, MS-26, Other?

RTAC REOB/VTAE Task Force



- The Asphalt Institute Published “IS-235 State-Of-The-Knowledge, The Use of REOB/VTAE In Asphalt”
- Focus was on use in Asphalt Paving Applications
- RTAC looks to create a document which addresses the use of REOB/VTAE in roofing applications (Commercial and Residential)
- Target Publication Summer 2019





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