

# ACTCHEM<sup>®</sup>

Allied Mineral Products Technology

## Superior Abrasion Resistant Materials

The ACTCHEM<sup>®</sup> product line offers refractory materials that have exceptional strength and abrasion resistance. We design our materials with only the most important characteristics in mind:

- Superior Abrasion Resistance
- Insensitivity to Minor Water Variations
- Stability in the presence of Water
- Consistent Properties

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### Abrasion Resistance

The superior abrasion resistance of ACTCHEM<sup>®</sup> 85 can be exemplified in **Table 1** after firing to various temperatures. The abrasion resistance is locked in after the material has taken a complete set.

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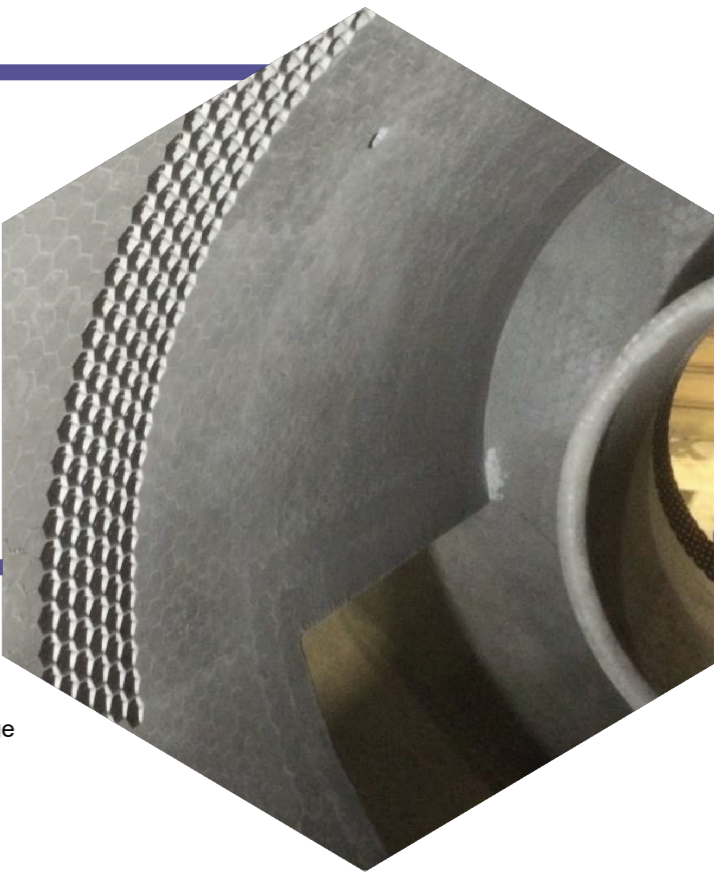
### Water Tolerance

The strength and abrasion resistance of ACTCHEM<sup>®</sup> products are relatively insensitive to water addition as shown in **Table 2**. Increasing water contents tend to make the material stickier.

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### Gunning Installations

ACTCHEM<sup>®</sup> 45, 75, and 85 can also be installed by gunning. This installation technique does tend to change the properties of the materials as shown in **Table 3**.



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### Slumping Resistance

ACTCHEM<sup>®</sup> 45, 75, and 85 are designed to be installed overhead in areas where vibration is present. The materials must be mixed to the proper consistency and installed with the appropriate anchoring system for this application.

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### Ease of Installation

ACTCHEM<sup>®</sup> 45, 75, and 85 are designed for easy installation into all refractory anchoring systems by handpacking. The material can also be installed using pneumatic rammers. In addition, our materials have a long working time, which greatly reduces material waste.

It is recommended that these products be mixed with a high intensity mixer, such as a Hobart mixer, for at least five minutes. Other mixers can be used, but this may affect the mixing time and the amount of water required.

**Table 1: ACTCHEM<sup>®</sup> 85 Properties as a Function of Curing and Heat Treatment**

	Cold Crush Strength psi (MPa)	C-704M Abrasion Loss (cc)
24 hr Air Cure	5,000 (34.5)	≤ 5.0
48 hr Air Cure	10,000 (68.9)	≤ 4.0
Dried 230°F	15,000 (103.4)	≤ 3.0
Fired 1500°F	>25,000 (>172.4)	≤ 2.5

**Table 2: Water Sensitivity of ACTCHEM<sup>®</sup> 85 (after firing to 1500°F / 815°C)**

Water (%)	Cold Crush Strength psi (MPa)	C-704M Abrasion Loss (cc)
4.25	>25,000 (<172.4)	2.0
4.50	>25,000 (<172.4)	2.1
4.75	>25,000 (<172.4)	2.4
5.00	>25,000 (<172.4)	2.4

**Table 3: ACTCHEM<sup>®</sup> 85 Gunning vs. Ramming Data (After firing to 1500°F / 815°C)**

	Gunned	Rammed
Density lb/ft <sup>3</sup> (g/cm <sup>3</sup> )	170 (2.72)	180 (2.88)
Linear Change (%)	-0.4	-0.4
Cold Crush (psi / MPa)	>12,000 (>82.7)	>25,000 (>172.4)
Abrasion C-704M (cc)	< 6	< 3

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### Consistent Properties

The abrasion resistance of ACTCHEM<sup>®</sup>'s materials is consistent throughout the thickness of the material. Therefore, as the material wears, the properties remain constant.

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### Stable In Presence of Water

Once the material has completely set, vessels lined with ACTCHEM<sup>®</sup> products can be hydro-tested without affecting the properties of the material. They can also be exposed to water after firing without affecting the integrity of the lining.

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### Rapid Firing

The abrasion resistance properties for ACTCHEM<sup>®</sup> products are nearly optimized when dried to 250°F (120°C). Thin Linings (less than 2" thick rammed with ACTCHEM<sup>®</sup> products (45, 75, 85) can be fired from ambient to operating temperature at 100°F (55°C) per hour.



OIL REFINING



CEMENT



POWER GENERATION

# ACTCHEM® Products\* Technical Data

Method of Application:	ACTCHEM® 45	ACTCHEM® 45 VC	ACTCHEM® 45 TF	ACTCHEM® 75	ACTCHEM® 75 VC	ACTCHEM® 85	ACTCHEM® 85 VC
Vibration Cast		<div><div></div></div>			<div><div></div></div>		<div><div></div></div>
Hand Pack	<div><div></div></div>			<div><div></div></div>		<div><div></div></div>	
Self-flow			<div><div></div></div>				
Gunned	<div><div></div></div>			<div><div></div></div>		<div><div></div></div>	
Physical Properties							
Max Service Temperature, °F (°C)	2700 (1482)	2700 (1482)	2700 (1482)	2300 (1260)	2800 (1538)	2300 (1260)	2800 (1538)
Abrasion loss, CC ASTM C704M	≤ 6 cc	≤ 7 cc	≤ 7 cc	≤ 4 cc	≤ 4 cc	≤ 3 cc	≤ 4 cc
Density, lb/ft³ / (g/cm³)							
Fired at 230°F (110°C)	147 (2.35)	139-147 (2.22-2.35)	141-147 (2.16-2.35)	172 (2.75)	155-165 (2.48-2.64)	180-188 (2.88-3.01)	183-188 (2.93-3.01)
1500°F (815°C)	142 (2.27)	138-149 (2.21-2.38)	139-145 (2.22-2.32)	170 (2.72)	155-165 (2.48-2.64)	178-186 (2.85-2.98)	180-186 (2.88-2.98)
Cold Crushing Strength, psi ASTM C133 / (MPa)							
Fired at 230°F (110°C)	>10,000 (>68)	>10,000 (>68)	>7,000 (>48)	>10,000 (>68)	>8,000 (>55)	>15,000 (>103)	>13,000 (>89)
1500°F (815°C)	>15,000 (>103)	>14,000 (>96)	>12,000 (>83)	>20,000 (>138)	>15,000 (>103)	>15,000 (>103)	>13,000 (>89)
Permanent Linear Change, (%)							
Fired at 230°F (110°C)	0.0 to -0.2	0.0 to -0.1	Nil	0.0 to -0.1	0.0 to -0.1	-0.1 to -0.2	Nil
1500°F (815°C)	-0.2 to -0.3	-0.2 to -0.3	-0.2 to -0.4	-0.2 to -0.4	-0.2 to -0.4	-0.2 to -0.4	-0.4
Chemical Analysis, %							
Alumina - Al <sub>2</sub> O <sub>3</sub>	46.2	43.4	48.5	75.0	80.0	83.4	85.8
Silica - SiO <sub>2</sub>	46.4	49.2	46.5	16.7	13.0	7.9	8.3
Calcium Oxide - CaO	3.2	3.3	3.2	3.1	2.4	2.3	2.4

**ACTCHEM®**

## Allied Mineral Products Technology

## Superior Abrasion Resistant Materials

## Refractory Product Line

ACTCHEM® 45

ACTCHEM® 45 VC

ACTCHEM® 45 TF

ACTCHEM® 75

ACTCHEM® 75 VC

ACTCHEM® 75 TF

ACTCHEM® 85

ACTCHEM® 85 VC



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