



# Central Plains Cement Company

## Cement Mill Test Report

Month of Issue: February 2018

<b>Plant:</b>	Tulsa, OK
<b>Product:</b>	Portland Cement Type I/II
<b>Silos:</b>	1, 12, 13, 15, 16
<b>Manufactured:</b>	January 2018

### ASTM C 150-16 and AASHTO M 85-16 Standard Requirements

CHEMICAL ANALYSIS			PHYSICAL ANALYSIS		
Item	Spec limit	Test Result	Item	Spec limit	Test Result
Rapid Method, X-Ray (C 114)			Air content of mortar (%) (C 185)	12 max	5
SiO <sub>2</sub> (%)	---	20.0	Blaine Fineness (m <sup>2</sup> /kg) (C 204)	260 - 430	427
Al <sub>2</sub> O <sub>3</sub> (%)	6.0 max	5.0	-325 (%) (C 430)	---	95.9
Fe <sub>2</sub> O <sub>3</sub> (%)	6.0 max	3.4	Autoclave expansion (%) (C 151)	-0.2 min 0.80 max	0.00
CaO (%)	---	62.9	Compressive strength (PSI) (C 109)		
MgO (%)	6.0 max	1.9	1 day	---	2250
SO <sub>3</sub> (%)	3.0 max *	3.0	3 days	1740 min	3680
Loss on ignition (%)	3.0 max	1.9	7 days	2760 min	4500
Insoluble residue (%)	0.75 max	0.4	28 days (Reflects previous month's data)	---	5530
CO <sub>2</sub> (%)	---	0.6	Time of setting (minutes)		
Limestone (%)	5.0 max	1.7	Vicat Initial (C 191)	45 - 375	106
CaCO <sub>3</sub> in Limestone (%)	70 min	89	Heat of Hydration (KJ/Kg, [cal/g]) (C 186)		
Inorganic Process Addition	5.0 max	---	7 days (for information only)	---	368 (88.0)
Adjusted Potential Phase Composition (C 150)					
C <sub>3</sub> S (%)	---	55			
C <sub>2</sub> S (%)	---	16			
C <sub>3</sub> A (%)	8 max	7			
C <sub>4</sub> AF (%)	---	10			
C <sub>3</sub> S+4.75*C <sub>3</sub> A (%)	100 max	90			

#### ASTM C 150-16 and AASHTO M 85-16 Optional Chemical Requirements:

NaEq (%)	0.60 Max	0.51
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\* Cement with SO<sub>3</sub> > 3.0 complies with ASTM C1038-14

We certify that the above described cement, at the time of shipment, meets the chemical and physical requirements of ASTM C 150-16 & AASHTO M 85-16 STANDARD SPECIFICATIONS FOR TYPE I AND TYPE II CEMENT.

Certified By:

John Tierney

Central Plains Cement Co. LLC - Tulsa Plant  
2609 North 145th East Ave  
Tulsa, OK 74012  
918-437-3902

February 13, 2018



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### Additional ASTM C 150-16 and AASHTO M 85-16 Standard data

#### Limestone Addition - Additional Data

Item	Test Result
SiO <sub>2</sub> (%)	7.9
Al <sub>2</sub> O <sub>3</sub> (%)	0.8
Fe <sub>2</sub> O <sub>3</sub> (%)	0.5
CaO (%)	48.4
SO <sub>3</sub> (%)	0.3
CO <sub>2</sub> (%)	38.9

#### Base Cement Phase Composition

Item	Test Result
C <sub>3</sub> S (%)	56
C <sub>2</sub> S (%)	16
C <sub>3</sub> A (%)	8
C <sub>4</sub> AF (%)	11

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