



# Central Plains Cement Company

## Cement Mill Test Report

Month of Issue: September 2018

<b>Plant:</b>	Tulsa, OK
<b>Product:</b>	Portland Cement Type I/II
<b>Silos:</b>	1, 3, 4, 6, 10, 11, 12, 13, 14, 15, 16
<b>Manufactured:</b>	August 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	7
SiO <sub>2</sub> (%)	---	19.9	Blaine Fineness (m <sup>2</sup> /kg) (C 204)	260 - 430	422
Al <sub>2</sub> O <sub>3</sub> (%)	6.0 max	4.9	-325 (%) (C 430)	---	95.4
Fe <sub>2</sub> O <sub>3</sub> (%)	6.0 max	3.3	Autoclave expansion (%) (C 151)	-0.2 min 0.80 max	-0.01
CaO (%)	---	62.2	Compressive strength (PSI) (C 109)		
MgO (%)	6.0 max	2.1	1 day	---	1890
SO <sub>3</sub> (%)	3.0 max *	3.1	3 days	1740 min	3240
Loss on ignition (%)	3.0 max	2.2	7 days	2760 min	4090
Insoluble residue (%)	0.75 max	0.35	28 days (Reflects previous month's data)	---	5590
CO <sub>2</sub> (%)	---	0.8	Time of setting (minutes)		
Limestone (%)	5.0 max	2.0	Vicat Initial (C 191)	45 - 375	106
CaCO <sub>3</sub> in Limestone (%)	70 min	88	Heat of Hydration (KJ/Kg, [cal/g]) (C 186)		
Inorganic Process Addition	5.0 max	---	7 days (for information only)	---	276 (66.0)
Adjusted Potential Phase Composition (C 150)					
C <sub>3</sub> S (%)	---	52			
C <sub>2</sub> S (%)	---	17			
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	87			

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

NaEq (%)	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

September 5, 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> (%)	7.4
Al <sub>2</sub> O <sub>3</sub> (%)	0.8
Fe <sub>2</sub> O <sub>3</sub> (%)	0.5
CaO (%)	48.1
SO <sub>3</sub> (%)	0.2
CO <sub>2</sub> (%)	38.7

#### Base Cement Phase Composition

Item	Test Result
C <sub>3</sub> S (%)	53
C <sub>2</sub> S (%)	18
C <sub>3</sub> A (%)	8
C <sub>4</sub> AF (%)	10

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