



FARS & KHUZESTAN CEMENT HOLDING

F08/6

BOJNOURD CEMENT CO.

QUALITY CONTROL & LABORATORY DEPARTMENT



CEMENT TEST REPORT

Product	Portland Cement Type 2 C 42,5 (M400) Rapid Hardening, High Early Strength, MSR (Moderate Sulfate Resisting)
Standard of Sample	INSO 389 , ASTM C150-2020 , INSO 17518-1, EN 197-1, GOST 10178-85, GOST 30515-2013, GOST 31108-2016
Date of Report	July 2024

Chemical Analysis	Result	Standard Limitation ISIRI 389	Standard Limitation ASTM C150	Standard Limitation GOST 10178-85	Physical Analysis	Result	Standard Limitation ISIRI 389	Standard Limitation ASTM C150	Standard Limitation GOST 10178-85
SiO ₂ (%)	21.42	Min 20.00	*	*	Specific Gravity (ton/m ³)	3.173	*	*	*
Al ₂ O ₃ (%)	4.22	Max 6.00	Max 6.00	*	Normal Consistency (%)	24.0	*	*	*
Fe ₂ O ₃ (%)	3.08	Max 6.00	Max 6.00	*	Setting Time Vicat test	Initial	150	Min 45	Min 45
CaO (%)	63.75	*	*	*		Final	02:50	Max 6:00	Max 6:15
MgO (%)	2.03	Max 5	Max 6.0	Max 5	Soundness Expansion				
Na ₂ O (%)	0.33	*	*	*	Autoclave expansion (%)	0.03	Max 0.8	Max 0.8	*
K ₂ O (%)	0.69	*	*	*	Le Chatelier expansion (mm)	1	*	*	*
SO ₃ (%)	2.45	Max 3.00	Max 3.0	Max 3.5	Sulfate Resistance 14 days exp.(%)	0.04	*	*	*
Insoluble Residue (%)	0.72	Max 0.75	Max 0.75	*	Fineness				
Loss on Ignition (%)	2.44	Max 3.00	Max 3.0	*	Specific Surface, Blaine (cm ² /g)	3350	Min 2800	Min 2800	Min 2800
Free Lime (F.CaO) (%)	1.5	*	*	*	Retained on 45 μ Sieve (%)	11.8	*	*	80 μ Max 15
Chloride (%)	0.024	*	*	*	Strength Results, Compressive Strength (kg/cm ²)				
Equivalent Alkalies (%) (Na ₂ O+0.658*K ₂ O), Optional	0.78	*	*	Max 1.20	1 Day	*	*	*	*
Lime Saturation Factor (LSF)	92.65	*	*	*	2 Days	236	*	*	*
Minerological Composition (Bouge Relations)					3 Days	*	Min 100	*	*
					7 Days	364	Min 175	*	*
					28 Days	464	Min 315	*	Min 400
C3S , Tricalcium Silicate (%)	56.98	*	*	*	Heat of Hydration (cal/g), Optional				
C2S , Dicalcium Silicate (%)	18.45	*	*	*	7 Days	67.61	Max 70	Max 70	*
C3A ,Tricalcium Aluminate (%)	5.98	Max 8.00	Max 8	Max 8	28 Days	83.01	*	*	*
2C3A + C4AF	21.32	*	*	*					

Remarks :

Quality Control and Laboratory Management



Plant Management

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Passport of Quality

Product	Portland Cement Type 2 C 52,5 (M500 , CEM I 52,5 N) Rapid Hardening, High Early Strength, MSR (Moderate Sulfate Resisting)
Standard of Sample	INSO 389 , ASTM C150-2022 , GOST 10178-85, GOST 30515-2013, GOST 31108-2016
Date of Report	July 2024

Chemical Analysis	Result	Standard Limitation INSO 389	Standard Limitation ASTM C150	Standard Limitation GOST 10178-85	Physical Analysis	Result	Standard Limitation INSO 389	Standard Limitation ASTM C150	Standard Limitation GOST 10178-85
SiO ₂ (%)	21.61	*	*	*	Specific Gravity (ton/m ³)	3.185	*	*	*
Al ₂ O ₃ (%)	4.22	Max 6.00	Max 6.00	*	Normal Consistency (%)	26.0	*	*	*
Fe ₂ O ₃ (%)	3.53	Max 6.00	Max 6.00	*	Setting Time Vicat test	Initial	130	Min 45	Min 45
CaO (%)	64.15	*	*	*		Final	02:30	Max 6:15	Max 6:15
MgO (%)	1.97	Max 6.00	Max 6.0	Max 5	Soundness Expansion				
Na ₂ O (%)	0.32	*	*	*	Autoclave expansion (%)	0.02	Max 0.8	Max 0.8	*
K ₂ O (%)	0.68	*	*	*	Le Chatelier expansion (mm)	2	*	*	*
SO ₃ (%)	2.66	Max 3.00	Max 3.0	Max 3.5	Sulfate Resistance 14 days exp.(%)	0.04	*	*	*
Insoluble Residue (%)	0.41	Max 1.50	Max 1.50	*	Fineness				
Loss on Ignition (%)	1.49	Max 3.00	Max 3.0	*	Specific Surface, Blaine (cm ² /g)	3880	Min 2600	Min 2800	Min 2800
Free Lime (F.CaO) (%)	1.5	*	*	*	Retained on 45 μ Sieve (%)	4.2	*	*	80 μ Max 15
Chloride (%)	0.021	*	*	*	Strength Results, Compressive Strength (kg/cm ²)				
Equivalent Alkalies (%) (Na ₂ O+0.658*K ₂ O), Optional	0.77	*	*	Max 1.20	1 Day	*	*	*	*
Lime Saturation Factor (LSF)	91.89	*	*	*	2 Days	283	Min 204	*	*
Minerological Composition (Bouge Relations)					3 Days	*	*	*	*
C3S , Tricalcium Silicate (%)	55.92	*	*	*	7 Days	400	*	*	*
C2S , Dicalcium Silicate (%)	19.79	*	*	*	28 Days	539	Min 535	*	Min 500
C3A ,Tricalcium Aluminate (%)	5.22	Max 8.00	Max 8	Max 8	Heat of Hydration (cal/g), Optional				
2C3A + C4AF	21.18	*	*	*	7 Days	67.61	Max 70	Max 70	*
					28 Days	83.01	*	*	*

Quality Control and Laboratory Management

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Passport of Quality

Product	Portland Cement Type 2 C 52,5 (M600 , CEM I 52,5 N) Rapid Hardening, High Early Strength, MSR (Moderate Sulfate Resisting)
Standard of Sample	INSO 389 , ASTM C150-2022 , GOST 10178-85, GOST 30515-2013, GOST 31108-2016
Date of Report	July 2024

Chemical Analysis	Result	Standard Limitation INSO 389	Standard Limitation ASTM C150	Standard Limitation GOST 10178-85	Physical Analysis	Result	Standard Limitation INSO 389	Standard Limitation ASTM C150	Standard Limitation GOST 10178-85
SiO ₂ (%)	21.61	*	*	*	Specific Gravity (ton/m ³)	3.185	*	*	*
Al ₂ O ₃ (%)	4.22	Max 6.00	Max 6.00	*	Normal Consistency (%)	26.0	*	*	*
Fe ₂ O ₃ (%)	3.53	Max 6.00	Max 6.00	*	Setting Time Vicat test	Initial	130	Min 45	Min 45
CaO (%)	64.15	*	*	*		Final	02:30	Max 6:15	Max 6:15
MgO (%)	1.97	Max 6.00	Max 6.0	Max 5	Soundness Expansion				
Na ₂ O (%)	0.32	*	*	*	Autoclave expansion (%)	0.02	Max 0.8	Max 0.8	*
K ₂ O (%)	0.68	*	*	*	Le Chatelier expansion (mm)	2	*	*	*
SO ₃ (%)	2.66	Max 3.00	Max 3.0	Max 3.5	Sulfate Resistance 14 days exp.(%)	0.04	*	*	*
Insoluble Residue (%)	0.41	Max 1.50	Max 1.50	*	Fineness				
Loss on Ignition (%)	1.49	Max 3.00	Max 3.0	*	Specific Surface, Blaine (cm ² /g)	3880	Min 2600	Min 2800	Min 2800
Free Lime (F.CaO) (%)	1.5	*	*	*	Retained on 45 μ Sieve (%)	4.2	*	*	80 μ Max 15
Chloride (%)	0.021	*	*	*	Strength Results, Compressive Strength (kg/cm ²)				
Equivalent Alkalies (%) (Na ₂ O+0.658*K ₂ O), Optional	0.77	*	*	Max 1.20	1 Day	*	*	*	*
Lime Saturation Factor (LSF)	91.89	*	*	*	2 Days	283	Min 204	*	*
Minerological Composition (Bouge Relations)					3 Days	*	*	*	*
					7 Days	400	*	*	*
					28 Days	600	Min 535	*	Min 600
C3S , Tricalcium Silicate (%)	55.92	*	*	*	Heat of Hydration (cal/g), Optional				
C2S , Dicalcium Silicate (%)	19.79	*	*	*	7 Days	67.61	Max 70	Max 70	*
C3A ,Tricalcium Aluminate (%)	5.22	Max 8.00	Max 8	Max 8	28 Days	83.01	*	*	*
2C3A + C4AF	21.18	*	*	*					

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05/07/24

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