AASHTO / Concrete Admixture (CADD) Evaluation of:

Fritz-Pak Corporation
Super Air Plus
CADD-2025-01-055

Batch Date 05/06/2025
Final Report

Submitted to:
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Product Information

Product Name: Super Air Plus

Product Type: C260 AEA Air Entraining Admixture

DataMine Number: CADD-2025-01-055

Manufacturer: Fritz-Pak Corporation

Manufacturer Address: 4821 Eastover Circle
Mesquite, Texas, 75149

Manufacturer Contact: Cheryl Flores

Manufacturer Email/Phone: dot@fritzpak.com
12142219494

Date Received by Laboratory: 4/22/2025

NOTE: AASHTO Product Evaluation & Audit Solutions makes no judgement on evaluated products. AASHTO Product Evaluation & Audit Solutions conducts independent third party testing and provides the results of this testing to our state members. Any decision on product acceptability will be made by the individual state agencies, based upon their own internal specifications. Participation in the program does not guarantee acceptance to any state APL/QPLs.

Testing Results

Table 1. Admixture performance

Test Results	Super Air Plus	Specification Requirements
Water content (percent of control)	102%	NA
Time of setting, deviation of control		
Initial (hr:min)	0:23	-1:15 to +1:15
Final (hr:min)	0:33	-1:15 to +1:15
Compressive strength (percent of control)		
1 day	81%	NA
3 days	95%	>/=90%
7 days	91%	>/=90%
28 days	95%	>/=90%
56 days	91%	>/=90%
Flexural strength (percent of control)		
3 days	91%	>/=90%
7 days	95%	>/=90%
28 days	91%	>/=90%
56 days	101%	>/=90%
Length change, max shrinkage	114	</=120%
Relative durability factor	102%	>80 %
Bleeding of the net amount of mix water (% of control)	0.29%	</=2

*Provisional Requirement

Table 2. Mixture proportions and fresh concrete properties

Average of Three Separate Tests	Control	Super Air Plus	Specification Requirements
Cement factor (lb/yd^3)	517	517	517 +/- 5
Water (lb/yd^3)	238	244	NA
Water-cement ratio	0.461	0.472	NA
Coarse aggregate	1918	1918	NA
Fine aggregate	1205	1221	NA
Fine aggregate-total aggregate ratio	0.386	0.389	NA
Super Air Plus % by weight	0.0	0.018	NA
Vinsol Resin (oz/cwt)	0.33	0.00	NA
Slump (in.)	3.25	3.75	3 ½ ± ½
Air content (%)	5.6	5.4	5-7 (± 0.5 of control)
Density (lb/ft^3)	143.6	144.4	NA
Time of setting			
Initial (hr:min)	4:24	4:47	
dev. of control (hr:min)	NA	0:23	-1:15 to +1:15
Final (hr:min)	5:51	6:24	
dev. of control (hr:min)	NA	0:33	-1:15 to +1:15

Table 3. Properties of hardened concrete

Test Performed	Control Mixture	Super Air Plus
Compressive strength (psi)		
1 day	2290	1860
3 days	3230	3080
7 days	4100	3730
28 days	4830	4570
56 days	5530	5020
Flexural strength (psi)		
3 days	635	575
7 days	770	735
28 days	1010	915
56 days	810	820
Length change (%)	-0.035	-0.040
Durability factor (%)	95	97

Table 4: Properties of fine and coarse aggregates

Aggregate Information	Fine aggregate	Coarse aggregate
Manufacturer	State Rd	Harleysville
Aggregate Type	Fine	Coarse
Specific Gravity SSD	2.654	2.762
Absorption (%)	0.48%	1.20%

Table 5: Gradation of fine aggregate and ASTM C260 requirements

Percent passing		
Sieve	Fine Aggregate	Specifications Requirements
3/8"	100%	100
No. 4 (4.75 mm)	100%	95-100
No. 8 (2.375 mm)	92%	80-100
No. 16 (1.18 mm)	75%	50-85
No. 30	49%	25-60
No. 50 (300 µm)	20%	5-30
No. 100 (150 µm)	2%	0-10
No. 200 (75 µm)	1%	0-3

Table 6: Gradation of coarse aggregate and ASTM C260 requirements

Percent passing		
Sieve	Coarse Aggregate	Specifications Requirements
1.5 in. (37.5 mm)	100%	100
1.0 in. (25.4 mm)	95%	95 to 100
0.5 in. (12.5 mm)	28%	25 to 60
No. 4 (4.75 mm)	4%	0 to 10
No. 8 (2.36 mm)	3%	0 to 5

Table 7: Admixture information

Information	Admixture Information
Brand Name	Super Air Plus
Manufacturer	Fritz-Pak Corporation
Lot Size	Not Provided
Lot Number	Not Provided
Specific Gravity	NA
Solid content (%)	98.8
pH	NA
Chloride Content (% per BS EN 480-10:2009)	0.0004

Table 8: Cement information and test data

ASTM C 150 Type I/II cement			
Brand name	I/II Low Alk		
Manufacturer	Silvi Riverside		
Chemical Analyses by Mass (%)			
Silicon dioxide (SiO2)	18.9	Sulfur trioxide (SO3)	2.6
Aluminum oxide (Al2O3)	4.7	Loss on ignition (950ºC)	1.7
Iron oxide (Fe2O3)	3.822	Insoluble residue	0.05
Calcium oxide (CaO)	65.2	Alkalies as Na2O	0.51
Magnesium oxide (MgO)	1.5		
Calculated Potential Compounds as per ASTM C 150-05 (%)			
Tricalcium silicate (C3S)	77	Tricalcium aluminate (C3A)	6
Dicalcium silicate (C2S)	5.05	Tetracalcium aluminoferrite (C4AF)	12
Physical Testing and Results			
Fineness Specific Surface (Blaine) m2/kg	382	Air Content (%)	8
Setting Times (Vicat) Initial (minutes)	129	Autoclave Expansion (%)	-0.024
Compressive 3 Day Strength (psi)	4420	Compressive 7 Day Strength (psi)	5180
C1038 Expansion (%)	0.004	Density of Hydraulic Cement (g/cm3)	Not Reported

Table 9: Yield adjusted mixture proportions, fresh concrete properties, and time of set for three control batches

Materials & Plastic Properties	Control 1	Control 2	Control 3	Average
Cement factor (lb/yd3)	517	517	517	517
Water (lb/yd3)	236	239	239	238
Water-cement ratio	0.458	0.463	0.463	0.461
Coarse aggregate (lb/yd3)	1918	1918	1918	1918
Fine aggregate (lb/yd3)	1250	1193	1171	1205
Fine aggregate-total aggregate ratio	0.395	0.383	0.379	0.386
Super Air Plus	0.00	0.00	0.00	0.00
Vinsol Resin (oz/cwt)	0.29	0.35	0.35	0.33
Slump (in.)	3	3.5	3.5	3.25
Air content (%)	5	5.8	5.9	5.6
Density (lb/ft3)	145.2	143.2	142.4	143.6
Time of setting				
Initial (hr:min)	4:11	4:15	4:44	4:24
Final (hr:min)	5:28	5:48	6:16	5:51
Bleed				
Bleed (%)	0.25%	0.39%	0.49%	0.38%

Table 10: Yield adjusted mixture proportions, fresh concrete properties, and time of set for three test batches containing Admixture

Materials & Plastic Properties	Test 1	Test 2	Test 3	Average
Cement factor (lb/yd3)	517	517	517	517
Water (lb/yd3)	239	248	244	244
Water-cement ratio	0.463	0.480	0.472	0.472
Coarse aggregate (lb/yd3)	1918	1918	1918	1918
Fine aggregate (lb/yd3)	1236	1216	1209	1221
Fine aggregate-total aggregate ratio	0.392	0.388	0.387	0.389
Super Air Plus (% by weight of cement)	0.018	0.018	0.018	0.018
Vinsol Resin (oz/cwt)	0.00	0.00	0.00	0.00
Slump (in.)	3.5	4	4	3.75
Air content (%)	5.2	5.5	5.4	5.4
Density (lb/ft3)	144.8	144.4	144	144.4
Time of setting				
Initial (hr:min)	4:19	4:46	5:14	4:47
Final (hr:min)	5:43	6:25	7:03	6:24
Bleed				
Bleed (%)	0.54%	0.93%	0.54%	0.67%

Table 11 Properties of hardened concrete from three control test batches

Test Age	Control 1	Control 2	Control 3	Average
Compressive strength (psi)				
1 day	2390	2110	2360	2290
3 days	3260	3140	3300	3230
7 days	3960	3980	4350	4100
28 days	4740	4840	4910	4830
56 days	5550	5280	5770	5530
Flexural strength (psi)				
3 days	695	470	735	635
7 days	865	725	720	770
28 days	1055	885	1085	1010
56 days	865	710	850	810
Length change (%)	-0.032	-0.039	-0.033	-0.035
Durability Factor (%)	96	96	93	95

Approximate Total Cycles Completed	Fundamental Transverse Frequency, kHz			Relative Dynamic Modulus, (%) Average of 2 Beams per Mix			Average
	Control 1	Control 2	Control 3	Control 1	Control 2	Control 3	
0 cycles	2188	2188	2227	NA	NA	NA	NA
30 cycles	2188	2188	2188	100%	100%	97%	99%
60 cycles	2188	2148	2188	100%	96%	97%	98%
90 cycles	2148	2148	2188	96%	96%	97%	96%
120 cycles	2188	2188	2188	100%	100%	97%	99%
150 cycles	2188	2188	2188	100%	100%	97%	99%
180 cycles	2148	2148	2148	96%	96%	93%	95%
210 cycles	2148	2148	2148	96%	96%	93%	95%
240 cycles	2188	2188	2188	100%	100%	97%	99%
270 cycles	2188	2148	2188	100%	96%	97%	98%
300 cycles	2148	2148	2148	96%	96%	93%	95%

Table 12 Properties of hardened concrete from three test batches.

Test Age	Test 1	Test 2	Test 3	Average
Compressive strength (psi)				
1 day	2350	1610	1630	1860
3 days	3510	2760	2980	3080
7 days	3930	3690	3560	3730
28 days	5320	4720	3660	4570
56 days	5640	4870	4550	5020
Flexural strength (psi)				
3 days	545	580	600	575
7 days	765	690	750	735
28 days	1015	855	875	915
56 days	905	870	680	820
Length change (%)	-0.049	-0.031	-0.040	-0.040
Durability Factor (%)	96	96	100	97

Approximate Total Cycles Completed	Fundamental Transverse Frequency, kHz			Relative Dynamic Modulus, (%) Average of 2 Beams per Mix			Average
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3	
0 cycles	2188	2109	2070	NA	NA	NA	NA
30 cycles	2148	2109	2070	96%	100%	100%	99%
60 cycles	2188	2109	2070	100%	100%	100%	100%
90 cycles	2148	2109	2070	96%	100%	100%	99%
120 cycles	2148	2109	2070	96%	100%	100%	99%
150 cycles	2148	2109	2070	96%	100%	100%	99%
180 cycles	2148	2070	2031	96%	96%	96%	96%
210 cycles	2148	2109	2070	96%	100%	100%	99%
240 cycles	2188	2109	2070	100%	100%	100%	100%
270 cycles	2148	2070	2070	96%	96%	100%	97%
300 cycles	2148	2070	2070	96%	96%	100%	97%