MATERIAL SPECIFICATIONS:

1) STRUCTURAL STEEL SHALL CONFORM TO ASTM A-36 SPECIFICATIONS. WELDING TO BE PER AWS CODE.

2) ALL EXPOSED STEEL TO RECEIVE ONE COAT PRIMER.

3) END ANGLES FOR GAGE PANEL SHOULD HAVE 3" GAP MINIMUM TO IMPROVE SHUNT RESISTANCE. REINFORCING MATERIAL AND CLADDING TO BE CONSTRUCTED TO MEET SHUNTING REQUIREMENT. A NON-CONDUCTIVE SPACER TO BE ATTACHED TO GAGE FRAME.

4) CLADDING ON ENDS OF PANELS SHOULD EXTEND BEYOND CONCRETE 1/8" (+1/8", -0") TO IMPROVE MATCH WITH ADJACENT PANELS.

5) REINFORCING STEEL SHALL CONFORM TO CURRENT ASTM A615 SPECIFICATION, GRADE 60. IF ANY WELDING OF REINFORCEMENT STEEL IS REQUIRED, MATERIAL SHALL CONFORM TO ASTM A706 SPECIFICATION, GRADE 60.

6) CONCRETE MATERIAL MIXING, PLACING AND CURING TO BE IN ACCORDANCE WITH PCI "MANUAL FOR QUALITY CONTROL: PRECAST AND PRESTRESSED CONCRETE." MANUAL 115, EDITION 4. CEMENT SHALL HAVE NO MORE THAN 0.6% TOTAL ALKALI CONTENT. MAXIMUM WATER/CEMENT RATIO=0.44
(BY WEIGHT). AIR ENTRAINMENT=6%+/- 1% IN PLASTIC CONCRETE. SLUMP 3" MAXIMUM.

7) COPIES OF THE CONCRETE DESIGN MIX TO BE SUBMITTED TO RAILROADS FOR APPROVAL PRIOR TO THE START OF THE CASTING OPERATION.

8) TOP SURFACE SHALL BE NON-CRACK DESIGN AND IS TO BE SEALED TO PREVENT ION MIGRATION DUE TO SALTING.

9) CURING SHALL FOLLOW THE RECOMMENDATIONS AND PROCEDURES OF PCI IN 4TH EDITION DIVISION 4.

10) 3/16" WEEP/INSPECTION HOLES SHALL BE PLACED EVERY 2-FT. MIN. ALONG THE TOP OF THE STEEL FRAME ALONG A LINE 3/4" FROM OUTSIDE EDGE.

11) FLANGEWAY FILLER TO BE PERMANENTLY PREATTACHED AND HAVE THE FOLLOWING PROPERTIES:

* A SAMPLE SECTION OF THE FLANGEWAY MATERIAL SHALL BE PHYSICALLY TESTED BY APPLYING A LATERAL FORCE OF 10 LB/IN AT 50 DEGREES CELSIUS. THE MAXIMUM LATERAL DISPLACEMENT OF THE TEST IS NOT TO EXCEED 1/4" (CROSSING TYPE 10C ONLY). TEST RESULTS MUST BE SUBMITTED FOR RAILROAD APPROVAL.

* MANUFACTURER TO DESIGN THE PREATTACHED FLANGEWAY FILLER TO ALLOW FOR REMOVAL OF PANELS FOR MAINTENANCE WITHOUT DAMAGING THE FLANGEWAY FILLER OR ANY OTHER COMPONENTS DESIGNED TO HOLD IT TOGETHER.

* SEE PAGE 2 FOR MATERIAL SPECIFICATIONS.

TOLERANCES:

1) OUT OF SQUARE 3/16" (MEASURED ALONG THE DIAGONAL)

2) LENGTH, WIDTH, AND THICKNESS: +/-1/8"

3) THE BOTTOM SURFACE, WHICH WILL BE IN CONTACT WITH THE TIES, SHALL NOT UNDULATE IN ANY DIRECTION MORE THAN 3/32". SEE SPECIAL TESTING NOTE 3 BELOW.

4) REINFORCEMENT PLACEMENT SHALL BE +/-3/4" HORIZONTAL, +/-1/8" VERTICAL.

FINISH:

1) ALL RECESSES AND MINOR CONCRETE SPALLS ARE TO BE FILLED AND FINISHED TO THE PANEL DIMENTIONS USING THE PROPER BONDING AGENT AND REPAIR MATERIAL SURFACE OF THE REPAIRED AREA IS TO MATCH THE COLOR AND TEXTURE OF THE SURROUNDING AREAS.

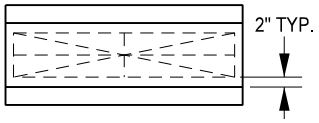
2) THE DRIVING SURFACE IS TO HAVE A LIGHT BROOM FINISH OR AS APPROVED BY RAILROADS. THE ADDITION OF WATER TO THE CONCRETE SURFACE FINISH DURING CASTING IS NOT PERMITTED.

SPECIAL TESTING:

1) TWICE ANNUALY, VENDORS SHALL SUBMIT (VIA AN INDEPENDENT TESTING LABORATORY TO THE RAILROADS) THE FOLLOWING TEST ON THE APPROVED MIXED DESIGN
* ASTM C666 FREEZE/THAW
* ASTM C227 MORTAR BAR METHOD
* ASTM C1260 AT TOTAL ALKALI BURDEN = 0.06%

2) GAUGE PANELS SHALL BE DESIGNED WITH SHUNT RESISTANT FEATURES IN ORDER TO PROVIDE A MINIMUM ELECTRICAL RESISTANCE IN ACCORDANCE WITH THE STANDARD ELECTRICAL TEST (DWG 500930).

3) A REPRESENTATIVE SAMPLE OF PANELS SHALL BE CHECKED PERIODICALLY FOR BOTTOM FLATNESS BY USING A STRAIGHT EDGE CALIBRATED TO WITHIN +/-1/32" AND A TAPER GAUGE AS FOLLOWS:
8 POSITIONS OF FLATBAR (----) CHECK FLATNESS AT EACH POSITION USING TAPER GAUGE.



GENERAL:

1) THE MANUFACTURER SHALL BE ISO 9000 OR AAR M-1003 CERTIFIED. ALL TESTING PERSONNEL SHALL BE A MINIMUM OF ACI LEVEL I CERTIFIED.

2) THE FABRICATOR SHALL BE RESPONSIBLE FOR LOADING AND PROPERLY SECURING ALL PRECASTCONCRETE MEMBERS FOR SHIPMENT.

3) THE MANUFACTURER SHALL WARRANTY PRODUCT FOR A MINIMUM OF TEN YEARS AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP.

4) MAUNFACTURER TO PERMANENTLY MARK EACH PANEL WITH A CONCRETE IMPRINT FOR SIZE OF RAIL, WEIGHT OF PANEL, MANUFACTURER'S I.D., MONTH/DAY/YEAR OF MANUFACTURE, AND CROSSING TYPE. END OF EACH PANEL TO BE STENCILED PAINTED WITH SIZE OF RAIL, WEIGHT OF PANEL AND CROSSING TYPE.

UNION PACIFIC RAILROAD ENGINEERING STANDARDS

GENERAL MANUFACTURING SPECIFICATIONS FOR ROAD CROSSINGS WITH CONCRETE PANELS

ADOPTED: SEP. 21, 2020
REVISED:
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NON-CONDUCTIVE FILLER COMPOUND MATERIAL SPECIFICATIONS

AN ALL EPDM BASED COMPOUND IS TO BE USED IN THE UPRR ATTACHED CONCRETE PANEL FILLERS. IT IS TO HAVE SUPERIOR WEATHERING, AGING AND HEAT RESISTANCE CHARACTERISTICS AND IS TO BE MADE USING ONLY NON-CONDUCTIVE INGREDIENTS AND PIGMENTED SO IT IS A NON-MARKING GRAY OR BLACK COLOR.

THE COMPOUND MEETS LINE CALLOUT ASTM D2000 3BA714, A14, B13, C12, F17, Z1, Z2, Z3, Z4, Z5, Z6, Z7
Z1 = ULTIMATE ELONGATION INCREASE TO 400%
Z2 = HARDNESS INCREASE TO 75 +/- 5 SHORE A
Z3 = ADD COMPRESSION SET AT 257°F
Z4 = ADD FLUID RESISTANCE TEST
Z5 = ADD VOLUME RESISTIVITY TEST
Z6 = ADD MEGGAR TEST
Z7 = ADD TEAR STRENGTH

PHYSICAL PROPERTIES	UNIT	REQUIRED	LIMIT	TEST METHOD	TESTING FREQUENCY		
					BATCH	5TH BATCH	ANNUALLY
TENSILE STRENGTH	PSI	1400	MIN	ASTM D412		X	
ELONGATION	% (Z1)	400	MIN	ASTM D412		X	
HARDNESS	SHORE "A" (Z2) DURO POINTS	75	+/- 5	ASTM D2240	X		
HEAT RESISTANCE:				ASTM D573 70 HRS @ 212°F			X
TENSILE STRENGTH	% CHANGE	-25	MAX				
ELONGATION	% CHANGE	-25	MAX				
HARDNESS	POINTS CHANGE	+10	MAX				
COMPRESSION SET	% (Z3)			ASTM D395 B			X
		25	MAX	22 HRS @ 158°F			
		75	MAX	22 HRS @ 257°F			
OZONE RESISTANCE	N/A	PASS	NO CRACKS	ASTM D1171 METHOD B 70 HRS @ 50 pphm @ 104°F			X
FLUID RESISTANCE	% CHANGE (Z4)	+/- 5	MAX	ASTM D471 (WATER) 70 HRS @ 212°F			X
LOW TEMPERATURE BRITTLENESS	N/A	PASS	NO CRACKS	ASTM D2137 CONDITIONED 3 MIN @ -40°F IN METHANOL			X
VOLUME RESISTIVITY	OHM-CM (Z5)	1.0×10^{12}	MIN	ASTM D257 (DRY)			X
VOLUME RESISTIVITY	OHM-CM (Z5)	1.0×10^{11}	MIN	ASTM D257 (CONDITIONED IN AN 18% NaCl SOLUTION FOR 168 HRS @ 25°C)			X
VOLUME RESISTIVITY - COMPRESSION	OHM-CM (Z5)	1.0×10^{12}	SEE NOTE 1	VOL RESISTIVITY ASTM D257 WHILE UNDER COMPRESSION PER ASTM D575 A (SEE NOTE 10)			X
MEGGAR TEST	OHM (Z6)	2G OHM	SEE NOTE 1	UPRR TEST (SEE NOTE 11)		X	
TEAR STRENGTH	lb/in (Z7)	150	MIN	ASTM D624 DIE "C"			X
RHEOMETER	N/A	NONE	SEE NOTE 1	ASTM D2084	X		
SPECIFIC GRAVITY	SG	NONE	SEE NOTE 1	ASTM D297	X		

NOTES:
1. TEST RESULTS FROM A REPRESENTATIVE SAMPLE ALONG WITH RECOMMENDED TOLERANCES ARE TO BE SUBMITTED TO UPRR FOR REVIEW AND APPROVAL.
2. A SAMPLE OF THE PROPOSED MATERIAL IS TO BE SUBMITTED TO UPRR FOR REVIEW AND APPROVAL.
3. MATERIAL SPECIFICATIONS APPLY TO BOTH GAGE SIDE AND FIELD SIDE FLANGEWAY MATERIAL.
4. ANY CHANGES IN MATERIAL COMPOSITION OF THE APPROVED SAMPLE WILL REQUIRE PRIOR APPROVAL FROM UPRR.
5. MANUFACTURER SHALL BE ISO 9001-2000 OR AAR M-1003 CERTIFIED.
6. ALL PERSONELL CONDUCTING MATERIAL TESTING SHALL BE AALA CERTIFIED FOR CONDUCTING MECHANICAL TESTING. ANY ALTERNATIVE LAB ACCREDITION WILL REQUIRE PRIOR APPROVAL.
7. MANUFACTURER SHALL MAINTAIN RECORDS FOR 10 YEARS AND RECORDS ARE TO BE OPEN TO REVIEW BY AUTHORIZED UPRR REPRESENTATIVES.
8. MANUFACTURER TO WARRANTY MATERIALS FOR 10 YRS.
9. EACH BATCH SHALL BE MARKED WITH A UNIQUE IDENTIFIER THAT WILL PERMIT TRACKING OF THE MATERIAL. EACH SAMPLE SHALL BE MARKED INDICATING IT IS "UPRR APPROVED".
10. REFER TO: VOLUME RESISTIVITY - COMPRESSION TESTS FOR ANNUAL MATERIAL CERTIFICATION 12-20-05
11. REFER TO: INSULATION RESISTANCE TESTING OF CONCRETE CROSSING PANEL FLANGEWAY FILLER - BOTH CENTER AND FIELD PANELS 12-19-05

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