

# Maryland State Highway ASR Specification

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# ASR Testing Protocol

- All aggregate used in PCC, both coarse and fine, shall be tested for ASR using ASTM 1260.
- Testing of coarse and fine will be done separately. Coarse aggregate sample will only represent coarse aggregate.
- Test frequency is once every three years.
- Results, if expansion is;
  - $\leq 0.10\%$  aggregate is considered innocuous- Class R0. No mitigation necessary.
  - $> 0.10\%$  but  $\leq 0.20\%$  aggregate is considered potentially reactive- Class R1. Mitigation is necessary, see Table.
  - $> 0.20$  but  $\leq 0.30\%$  (note change, previously 0.35%) aggregate is considered reactive. Class R2. A higher level of mitigation is required, see Table.
  - $>0.30\%$  is not permitted for use in PCC

# ASR New Addition- ASTM C 1293

- ASTM C 1260 is recognized as a fairly aggressive method to determine ASR status.
- ASTM C 1293 (The year long concrete prism test) is recommended for ASR results  $> 0.10\%$ . **Recommended, not mandatory.**
- If ASTM C 1293 is to be run we would also require an ASTM C 1260 be run on a split sample basis. This provides comparable data on the difference between the two tests. Timing of the comparable tests at the producers discretion. OMT to be provided with a reference sample of the splits.
- Coarse and Fine aggregates to be tested separately.
- Without a ASTM C 1293 split sample result only ASTM C 1260 will be considered applicable.
- Test frequency for ASTM C 1293 remains the same as 1260, once every 3 years.
- OMT will not run ASTM C 1293. Testing to be done by an accredited facility.

# ASTM C 1293 Acceptance Limits

- If the result is;
  - $\leq 0.04\%$  then the aggregate is considered innocuous. No mitigation is necessary. Class R0.
  - $> 0.04\%$  but  $\leq 0.12\%$  then the aggregate is considered moderately reactive requiring mitigation as a Class R1 aggregate.
  - $>0.12\%$  but  $\leq 0.24\%$ . Aggregate may not be used for structural applications and if used at all must be mitigated as a Class R2 aggregate.
  - $> 0.24\%$  may not be used in any PCC.

# ASR Table 1- Reactivity Class

Reactivity Class	ASTM C 1260	ASTM C 1293
R0	Expansion $\leq 0.10\%$	Expansion $\leq 0.04\%$
R1	Expansion $> 0.10\%$ to $\leq 0.20\%$	Expansion $> 0.04\%$ to $\leq 0.12\%$
R2	Expansion $> 0.20\%$ to $\leq 0.30\%$ OK for structural applications.	Expansion $> 0.12\%$ to $\leq 0.24\%$ Not for structural applications.

# ASR Mitigation Chart- Table 2

SCM Replacement	Low Alkali ( $\leq 0.7\%$ )	Low Alkali ( $\leq 0.7\%$ )	Normal Alkali ( $> 0.7 - \leq 1.0\%$ )	Normal Alkali ( $> 0.7 - \leq 1.0\%$ )
	R1	R2	R1	R2
Class F Fly Ash	20%	25%	25%	25%
Slag (GGBFS)	35%	50%	50%	50%
Ternary Blends	tbd	tbd	tbd	tbd