

**VIRGINIA DEPARTMENT OF TRANSPORTATION**

**MATERIALS DIVISION**

**MEMORANDUM**

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| <b>GENERAL SUBJECT:</b><br>Chapter IV: Hydraulic Cement Concrete  | <b>NUMBER:</b><br>MD 440-21  |
| <b>SPECIFIC SUBJECT:</b><br>Update and clarify Chapter IV to current practices and provide guidance to Department personnel | <b>DATE:</b><br>April 14, 2021                                       |
|   | <b>SUPERSEDES:</b>   |
| <b>APPROVED:</b>  | Charles A. Babish, PE<br>State Materials Engineer<br>Approved: _____ |

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**EFFECTIVE DATE**

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- This memorandum is effective May 1, 2021
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**PURPOSE/NEED/SCOPE/REQUIREMENTS**

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- The purpose of the updates to Chapter IV include updating language to current policies and practices regarding concrete field certifications and concrete mix design approval and renewal processes. Additional editorial edits were also made to update the flow and ease of comprehension throughout the chapter.
  - Updates to Chapter IV of the Manual of Instructions can be found at the following link:  
<https://www.virginiadot.org/business/resources/Materials/bu-mat-MOI-IV.pdf>
  - The only substantial revision to current practices being made at this time is to certifications and mix designs, as included below. Otherwise, the reader is referred to the entire Chapter IV in the link given above.
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Changes are **Shaded**

**PROCEDURES**

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- **SECTION 403 CERTIFICATIONS** has been updated to below:

HCC Field Technician — Reference the Virginia Road and Bridge Specifications (VRBS), Sections 200.06 and 217.07. This certification is required when performing acceptance tests in the field. The VDOT HCC Field Technician certification consists of both the ACI Concrete Field Testing Technician Grade I and the VDOT HCC Field School.

American Concrete Institute's Concrete Field Testing Technician Grade I, WACEL Concrete I or NICET— (VRBS, Sections 200.06; MOI Chapter 1 Section 114). This certification is required when performing acceptance tests in the field.

- Changes regarding mix design approvals are below:

### **Section 408.02**

#### **Approval Process**

To approve an HCC mix design, the following procedure is used:

1. The mix design is submitted by the HCC Producer on a TL-27 *Statement of Hydraulic Cement Concrete Mix Design* form to the District Materials Engineer or designee.
2. If the HCC mix is specific to a contract, the contract is referenced for HCC mix design parameters.
3. All materials used in proportioning HCC shall be from VDOT approved sources and shall be listed on TL-27 with appropriate approved list code number, name and source/plant location. Approved cement sources are located on Approved List No. 85. Approved Chemical Admixtures are located on Approved Lists 1, 2, 3 and 4. Approved aggregate sources are found on Approved List No. 5. Approved mineral admixtures are located on Approved List No. 24. The yield is calculated to ensure the material volumes sum to 27.0 cubic feet with tolerances of -0.02 CF and + 0.1 CF..
4. The water/cementitious ratio is calculated by dividing the total water in pounds by the sum of the total cementitious materials content in pounds. This value is checked against the maximum water/cementitious ratio specified in the contract (typically found in Table II-17 of the VRBS).
5. The minimum required mineral admixture content is verified by dividing the pounds of mineral admixture by the pounds of total cementitious materials and multiplying by 100. This value must equal or exceed the corresponding minimum value found in Table 1 but may not exceed the maximum mineral admixture content in the VRBS, Section 217.02 unless otherwise approved by the District Materials Engineer or designee.
6. If all of the above criteria are met, then District Materials Engineer or designee signs and dates the HCC mix design denoting approval. A copy is retained on file in the District Materials Section. The original is sent to the HCC producer to be retained in his file and available to VDOT personnel upon request.
7. After determining the weight for each of the components of the mix, the contract may specify or the District Materials Engineer (at their discretion) may request that the Contractor perform a trial batch using the approved mix design. (See the Batch Weights / Allowable Adjustments Section for more detail.) The trial batch must meet all contract document requirements before being used on a VDOT project.

8. Since the specific gravity of aggregate varies widely with type, it must be known for the aggregate being used. Small differences in specific gravity can mean large differences in batch weights.

9. The approved mix design is intended to be valid for a period of 1 calendar year as long as the material type, sources and quantities do not change and as long as the material continues to perform satisfactorily. HCC mix designs submitted towards the end of the year will have following calendar year listed on them.

10. For re-approval of the mix design for the following calendar year, the producer shall submit the mix design from the previous year to be re-approved to the District the plant is located in. If no changes were made and there were no performance issues the mix shall be approved without trial batching. Trial batch data shall be valid for up to 3 years and re-approval of HCC mix design within that time frame shall not require additional trial batching.

11. If HCC mix have not been produced for more than 3 years and no historical data is available as per VRBS 217.07 trial batching shall be required for approval.

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## NOTES

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## REFERENCES

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Deputy Chief Engineer  
Division Administrators  
District Administrators  
District Location & Design Engineers  
District Construction Engineers  
District Maintenance Engineers  
District Bridge Engineers  
District Traffic Engineers

VDOT Resident Engineers  
Federal Highway Administration  
Virginia Ready Mix Association  
Precast Concrete Association of Virginia  
Virginia Transportation Construction Alliance  
Virginia Asphalt Association  
American Concrete Paving Association Mid-Atlantic Chapter  
Old Dominion Highway Contractors Association