

IAST Job Field Guide



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Last Updated January 2016

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Current procedures for setting up NEW IAI PROJECTS in the IAST files and Database

All Projects must meet and **follow** the *current year* MnDOT **IAST Schedule of Materials Control** for all State and Federal Aid Projects.

1. First review a copy of the Project plans & proposals for construction projects in the district.
 - a) Each district has their own process for getting a set of plans for IAST review: receive a hard copy set, place printing request for a hard copy set, or reviewing an electronic copy. Remember also to include State Aid/ Coop Agreement projects.
 - b) Before you proceed too far, you first need to determine if the Project even requires IAI involvement/oversight. **Most** all of the Projects we receive require IAI review, but some State Aid jobs, or 100% locally funded jobs do not require IAI involvement, if in doubt, be sure to check the funding source. Projects that fall below IAST minimums or have no federal or state funding still need to be documented and tracked somewhere for future reference, either in the IAST database and/or a separate spreadsheet.
 - c) Once you determine the current year IAST Schedule of Materials Control, then go to the back of the proposal and under the **Schedule of prices**, and find / compute / highlight any of the above Project materials quantities, and see if they meet IAI minimums.
 - d) When going through the plans/proposals, there are several important items which must be looked up, researched, and documented in order to enter the project in the IAST database. Write the information down on the plan/proposal outer jacket for quick future reference.
 - First find the Projects **LOW SP #** Also include the Fed ID # if it is applicable (for example... STPX 8207(045))
 - Find the Projects **starting** and **ending** dates (or # of working days).
 - Find out who the **Project Engineer** is. If it is a Consultant, be sure to get **ALL** of the following information: Engineer's complete name, company name, office address (or where they want all project information sent to), contact telephone #, and most important – their current E-Mail address.
 - The next thing is to find out if the Project meets the **minimum quantities** which will require IAI oversight. This is accomplished by consulting the most current IAST Schedule for the construction year. (Remember-all estimated quantities are **approximate!**- if they are close to IAI review, for example; 190 cy3 concrete, or 470 tons bit-err on the side of caution and do IAI reviews).
 - e) Go through the proposal and locate the following sections that detail: (2105) or (2106) Excavation & Embankment; & (2211) Aggregate Base: & (2221) Aggregate Shouldering. Determine by reading through that section of the proposal whether compaction will be achieved by "**Quality Compaction Method**" or the "**Specified Density Method**". This will decide whether to check "Sand Cone" or "DCP" requirements in the database & which tests IAI are required to observe for the job. If the proposal says "Excavation & Embankment shall be performed in accordance with the provisions of MnDOT "2105" or "2106" and the following: and remains

silent on the above wording, it automatically defaults to “**Specified Density Method**”. If it says “Compaction shall be achieved by the “Quality Compaction Method” you will not need to do sand cone or DCP’s. Also be sure to check all sections, they may specify a different compaction method than “2105”- possibly using, LWD, or Nuke Gage could be specified.

- f) Be sure to check for any Concrete Paving (2301) on the project. If there are any, you should note that on the front of the proposal and check all appropriate boxes in the “Required Project Observations” when you create the requirements in the IAST database.
- g) Once the current IAST Schedule is established, then go to the back of the proposal and under the Schedule of prices, and find / compute / highlight any of the above Project materials quantities, and see if they meet IAI minimums.
- h) If the Project meets even **one** of the above IAI requirements, then it requires an IAI packet/Lead letter be sent to the Project Engineer.

2. **Next go through set of plans, you need to keep only the following sheets:**

- First page- (Cover/title sheet with location, SP’s index on it)
- General layout sheets
- Estimated Quantities & tabulations sheets
- Standard plates with Construction & Soils notes attached
- Earthwork tabulation & summary sheets
- Typical Sections
- Any construction plan, details, or misc. sheets which may be pertinent.
- General layouts

If you have a set of hard copy plans & proposals, band these together and save in a file area. It is helpful to save them until the project is done & finalized out.

3. **Enter the project into the IAI database.**

- Log to IAI Database : <http://ias/>
- Click the grey “**Project**” tab and in dropdown “Search project”.
- Type in project Sp. (or use dropdown & choose) then click “search”.
- Government unit dropdown, check appropriate box.
- If the project doesn’t show up under search, then click “create new project”. You will then need to find & enter manually all the information in the tab before you can save the project.
- If project shows up after search, click the “hand/edit” icon at the far left.
- When the project details show up, the body items should already be populated from PPMS, but you will manually need to enter the following data in order to save the project in the database and print reports:
 - Project type
 - After your plan review, you should have determined whether it met IAST requirements, **IF NOT** then check the “below IA minimum” box.
 - Start date-click calendar & pick correct date
 - Federal Project number (if any)

- District- check correct dropdown box
 - Project Engineer- click “select”- type in last name and click search. When pick list comes up, click “select” on correct name.
 - Materials Engineer- click “select”- type in last name and click search. When pick list comes up, click “select” on correct name.
 - End date- click calendar & pick correct date
 - Project comments: This is an important box to fill out since it will populate the comments areas in all reports. If below IAST minimums, type it in here.
 - Click “save” should come up “**The Project saved successfully**”
-
- Click “**IA Requirements**” tab and then select either “add Bituminous requirements”/ add Concrete requirements” / add Grading & Base requirements”
 - Once in the tab select every box that meets IA requirements, then click “save”
 - Exit out of data entry menu to main (opening) menu
 - Click back to Project details tab and click “Preview Email (to logger user). This action will generate a project “Lead Letter” and send it to your Outlook in-box. Here you can edit it if necessary, and send it out directly from your Outlook. Just a note: if you happen to click the “Send Lead Letter” box in the Project details tab, it will send a corrupted copy generated from the database- remember as of now, this function on the IAST database isn’t working correctly!
 - Click the grey “**Report**” tab, and then click “the blue “Reports (click here to access the reports)”. When the reports folders comes up, click “Project Summary”. Fill in all the appropriate parameters, and then click “View Report” at the bottom left of the page.
 - The database will then print a Crystal Report of the project details, requirements, and comments. This is the copy you need to send to the Project Engineer, and also print a copy for the IA hard copy files.
 - Send a copy of the Lead Letter, Project Summary IA requirements, and IA staff contact information the Project Engineer. **Note: you are not required to send out a lead letter, summary, or IA contact info if the project has no IA requirements or is below IA minimums!**

1. Create an IA hard copy Project file (optional- but very helpful for project certification!)

- Create a project file in cabinet and label it with SP. & highway designation.
- Enclose in the file a copy of the lead letter & Project Summary Requirements from the database, plus any other contact information you may have.
- As the job progresses, you will create additional contacts with each IA review. When you enter these IA reviews into the IAS database, you will need to **print out** an individual contact report for each person, and staple it to the job paperwork/reports/worksheets you collected from the field review - put all these in the hard copy file.
- All District (STD) lab reports, equipment calibrations, plant reports, test tolerances, and any other project information will be gathered and kept in the hard copy file. You will need this when reviewing and signing the Project Materials Exception Summary.

Procedure for reviewing and processing “Materials Certification Exception Summary packet”

- Materials Certification Exceptions Summary sheets typically come into District offices a few months after job completion; (sometimes though it may take *years* (from State-aid/Consultants). In addition there may be some Project Exception Summaries that were sent back to the Engineer for an enhanced resolution, tolerance issues, missing paperwork, missing deducts/penalties, etc.. Only to be re-submitted a year or two latter with nothing changed to “try it again”- and see if they can “slide” it through the process this time. This is a reason to track them on a spreadsheet.
- First make sure the Exception Summary Certification packet is *Complete*- this means **all** required documentation must be included in order to correctly review & process:
 - Project tester roster- listing only technicians who performed *physical testing* on the job.
 - Bit/Concrete plant materials summary-this report is generated by whoever (Agency or Consultant) did the Quality Assurance (QA) at the plants on the project. It should document any/all materials exceptions or tolerances found at the plant during production, plus list any recommended deducts for the non-conforming materials.
 - Supporting Project paperwork- copies of any change orders, supplemental agreements, back sheet item exceptions, disincentive worksheets.
- The Materials Exception Summary (Form TP-02171-04) **must** document every materials or personnel *Exception* they are aware from the field and have a proper resolution.
- If the packet is complete, pull out the IAI Project file from the main cabinet and go through the lab/field reports and job paperwork available in the files/database look for any problems or exceptions.
- There may be some IA Exceptions (lab/field test tolerance, missing tests, non-certified personnel, non-approved materials, plant issues) that the Project Engineer may not be aware of. IAI must then document on the summary form: the specialty, exception description, doc. reference, & IAI initials on the form, but leave the resolution box blank, and **RETURN** the packet the Project Engineer for a valid, appropriate resolution. IA staff is not responsible for deciding resolutions-but we may make suggestions if asked.
- The Materials Exception Summary Form should be signed in blue ink and dated by the Project Engineer in the proper area (lower right hand corner of the sheet). The Project Engineer should not sign in the District Materials Engineer spot nor check any of the IAI check boxes in the lower left hand side of the form.
- If it is determined that all the paperwork is correct, and any/all job exceptions have been rectified, check the appropriate IA box in the lower left hand corner of the sheet, initial & date it after the box.
- Deliver the reviewed, signed packet to the District Materials Engineer for their signature. Once signed, return to sender/Project Engineer for final disposition.



Minnesota Department of Transportation

To: All Construction Resident Engineers;
Materials Engineers; Project Engineers;
Project Supervisors; Project Personnel;
Consultants

Date: 11/18/2008

From: Keith Shannon
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Subject: Materials Certification Process;

With the many new faces in MnDOT over the past few years, and with an increased use of Consultants in Project Administration, clarification of the Final Materials Certification process and the required supporting information needed is necessary. The goal is to develop a better understanding of the Materials Certification Exceptions Summary Form TP-02171-04 (“Exceptions Summary”), and create a Packet for submittal that is simple and complete. This will also expedite the Exceptions Summary through the certification process. This memo is meant to be a **quick summary guide** of the *detailed* process, consult the Contract Administration Manual for in-depth explanations and Exception Clarifications. We are operating off the process defined in the Contract Administration Manual last updated May 12, 2008; under “Documentation of Pay Item Quantities” (5-591.410). The website can be found at: <http://www.dot.state.mn.us/const/tools/conadminmanual.html> .

This process for Materials Certification applies to all MnDOT (including MnDOT Consultants) Construction and Maintenance Contract projects, whether or not Federal–Aid funding is involved. Projects administered by local agencies shall follow the process required by the State Aid Division, which has elected to follow the Standard Certification process in Federal-Aid projects as explained above, unless the project is funded by **100%** state aid or local funds (no Federal-Aid), in which case the IAST schedule does not apply. Please contact appropriate District Materials Office or State Aid Office if you are unsure if the project status is subject to State Aid requirements.

BACKGROUND;

Federal requirement (23 CFR 637) states that for all Federal-Aid highway projects, State DOT’s have a Quality Assurance Program in place to insure compliance. The MnDOT Quality Assurance Program consists of all those planned and systematic actions necessary to provide confidence that the product or service provided by a highway construction contractor, personnel, or construction product vendor meets MnDOT’s requirements for quality.

The Quality Assurance Program consists of three parts:

2. **Acceptance Program** (QC/QA program, Technician, Lab, Plant, and Equipment Certifications, Approved Products, Schedule of Materials Control).
3. **Independent Assurance Program** (Inspector evaluations and reviews, calibrations, laboratory companion and proficiency samples).
4. **Materials Certification** (Project Materials Certification-current tech memo, Office of Materials and Road Research Annual Project Compliance Reviews, State Aid Project Audits/Reviews).

MATERIALS CERTIFICATION PROCESS

Field Documentation

The Acceptance Program is used to verify material quality as materials are incorporated into a project, accepted, and paid for. Whenever Exceptions to the Acceptance Program requirements occur, those Exceptions and corresponding Resolutions **must** be documented.

During the course of the project, and prior to or at the time of Final Acceptance of Work (MnDOT Spec 1516.2), The Project Engineer will record Exceptions and Resolutions on the Exceptions Summary and/or document Exceptions and Resolutions by Supplemental Agreement, Change Order, or Back sheet Items. The Project Engineer will consult with and request input from the appropriate Specialty Offices, or District Materials Engineer. Both the Project Engineer and District Materials Engineer sign the Exceptions Summary to indicate that they have had the *opportunity* to review the project during construction, and provide input. The Specialty Offices upon request will provide **separate documentation** that allows the Project Engineer to complete the form. At the time of final acceptance of work, the Exceptions Summary **must** be completed and **all** Exceptions resolved.

If the Exceptions Summary is not submitted correctly, or if all Exceptions and Resolutions have not been addressed, the Office of Construction and Innovative Contracting will delay submittal of the Final Payment Voucher and may not certify the project which may result in funding for the project to be questioned.

All Exceptions to the Acceptance Program requirements must be recorded on the Exceptions Summary, or listed on the Summary Report of Supplemental Agreements, Change Orders, and Back sheet items attached to the Exceptions Summary.

The following are job **EXCEPTIONS**:

Failing Tests Any failure of an acceptance test (ie. a field test, quality control test, verification companion test, etc.). Corrections or deductions resulting from failing tests **must** be listed as Resolutions of Exceptions.

Missing Tests Any missed field test, quality control test, or verification test. Tests include required observations of quality control tests.

Test Tolerance Any tolerance failure between an acceptance test and the corresponding companion proficiency or Independent Assurance sample test. Companion sample tests are performed between:

- Field and Laboratory samples
- Quality control and Quality assurance samples
- Verification and verification companion samples
- Field and Independent Assurance samples
- Quality control and Independent Assurance samples
- Plant monitor's quality assurance or verification samples and IA

Note: When an acceptance test passes and the companion proficiency or Independent Assurance sample fails, but is *within* the allowed tolerance, there is **no** Exception that has to be documented.

Non-Certified Testers Any acceptance samples taken or tests performed by non-certified or under-certified testers. This includes contractor quality control tests when used for acceptance and Agency verification tests. Tests not performed in a **qualified** (certified) laboratory or field testing lab.

Other Exceptions

- Material accepted from a non-approved source
- Missing Certificates of Compliance, etc...
- Paving without an approved Mix Design
- Independent Assurance tests fails **and** is out of tolerance
- Mix or paving out of a non-certified plant

The following are **NOT Exceptions**:

- Low concrete cylinder strength break. This is not an exception unless cylinder strength is specified on that project. Any pattern of bad breaks should send up a red flag to be investigated (past years thru 2015).
- **NOTE: Starting in 2016 concrete cylinder break failures and lab to lab tolerances will become an exception and need to be listed & resolved on the summary under the new “ASTM 2461 Contractor mix design” specification.**
- Independent Assurance test fails, but is *within* tolerance of the passing field test.

Note: This is a partial list of the most common Non-Exceptions; consult the Contract Administration Manual and/or the Spec book for a complete list.

RESOLUTIONS:

Resolutions are required for **all** Exceptions recorded on the Exceptions Summary. Resolutions can be brief, but must describe the action taken or the rationale for taking no action. Supporting documentation should be contained in the file and the document location referenced in the appropriate column. Examples of actions taken as Resolutions may include “standard deduction applied”, or “\$ per unit deducted applied”, or “mix rate changed and testing rate increased”, or “testing equipment recalibrated, test rerun and passed”, or “area re-watered and re-compacted, test rerun and passed” etc.

Resolutions may also result in no actions having been taken. This is an acceptable resolution when accompanied by appropriate rationale. Often, “substantial compliance” or “Materials incorporated in-place performing satisfactory” or “in close conformity” will be used for resolutions in these situations. Generally, these resolutions should *only* be used for a **minor** test failure or the omission of a **couple** of tests out of **many** required tests. Also rationale for taking no action **must** be included on the form. If any of the above resolutions are overused, it will result in the Summary Form being returned.

Final Materials Certification Exceptions Summary Form (TP-02171-04)

It is the responsibility of the Project Engineer to verify that all aspects of the Acceptance Program were complied with and that any Exceptions are appropriately resolved and duly documented on the form. By signing the Materials Certification Summary form in the lower **right** hand corner of the sheet, the Project Engineer is certifying that all aspects of the project have been properly completed.

The District Materials Engineer is responsible for making sure all Independent Assurance activities are completed, tracked, and reported on the form in the lower **left** hand corner. The District Materials Engineer or their representative is responsible for checking the appropriate box in the lower left hand corner of the form, not the Project Engineer.

The Independent Assurance summary is reported annually to the Federal Highway Administration and is *separate* from the Materials Certification Process. It is an unbiased and independent evaluation of all the sampling and testing procedures used in the Acceptance Program, and aids the Project Engineer in assuring overall Project compliance.

The following paperwork **MUST** be attached and included in the overall Packet to expedite the Exceptions Summary through the process:

- Materials Certification Exceptions Summary Form (TP-02171-04) completely filled out and **signed in blue ink** by the Project Engineer in the lower right hand corner. (Do not check IA boxes in the lower left hand corner of the form). Include all material specialty items used and any Exception descriptions and subsequent Resolutions.
- Project Technician roster listing **ONLY** the technicians/testers/samplers that actually did physical testing on the project (density, DCP, gradations, air, slump cylinders, etc.) Do not list observers or personnel involved in checking finals/office personnel.
- If MnDOT, an outside Agency or Consultant lab did the QA work, include their test results from the project and any Resolutions.
- Bit/Concrete plant materials summary-this report is generated by whoever (Agency or Consultant) did the Quality Assurance (QA) at the plants on the project. It should document any/all materials exceptions or tolerances found at the plant during production, plus list any recommended deducts for the non-conforming materials.
- Any Supplemental Agreements, Change Orders, or Back Sheet Item Exceptions.

Note: Any errors or missing documentation will result in returning the form back to the Project Engineer for corrections.

With all of the required information included or attached from above, the process for Final Materials Certification begins. Independent Assurance will review their Project records and lab reports, and check sample IAI/ Field/Lab tolerances. If an IAI missing, failing, uncertified, or test tolerance Exception is found; it, along with the lab reports, will be sent back to the Project Engineer to be included on the Exceptions Summary, along with the suitable Resolution from the Engineer.

If after reviewing the Exception Summary all is found correct, IAI then checks the appropriate box in the lower left hand corner of the form, initials and dates it, and then sends it on the District Materials Engineer. Who after review, either signs and returns the form/packet to the Project Engineer for final processing, or can elect to return it unsigned for incomplete paperwork or improper/missing Resolutions to Exceptions.

Hopefully this memo will provide assistance through the process of Materials Certification. Please remember the purpose of this method is to provide *reasonable* assurance that all aspects of the Acceptance program have been satisfactorily completed and that the materials incorporated are in conformance to the Contract Specifications.

If you have any questions regarding this memo, contact either:
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To: All Contractors- Plant and field; Consultants;
Project Engineers; Project Supervisors;
Project Personnel, Metro Inspection, IAI

Date: 3/01/2015

Subject: Provisional Certification Clarification:

There have been some questions that have arisen lately regarding Provisional Certification of Technicians. There needs to be some clarification to just what “Provisional Certification” means, who issues them, and how long they are good for. This letter should help clarify these uncertainties.

The in-depth answers for these questions can also be found in the **Technical Certification Handbook** on the MnDOT - TCP website-www.dot.state.mn.us/const/tcp/pubs.html

The intent of Provisional Certification is that it allows companies or agencies to utilize new or temporary employees to perform routine field and/or laboratory sampling/testing, normally requiring formal certification, during the current construction season.

Provisional certification is limited to **only** specific level #1 testing procedures (i.e. air, slump, gradations, moisture, sand cone, DCP etc...). A provisionally-certified technician cannot be used in lieu of a certified technician, but must be under the direct supervision of a Level 1 or Level 2 individual formally certified in the same technical area. An exception is given if the provisional tester carries a communication device that provides immediate contact with their certified supervisor. Supervisor must be available during all operating hours and must be available at the location within 1 hour if requested.

In regards to Concrete and Bituminous Plant level #1 Certifications: Due to the requirement from the Concrete Office that the technician must be fully plant #1 certified and be able to review and sign batch tickets, Concrete Plant #1 provisional Certifications cannot be issued. Sampling/splitting, moisture, and gradation provisionals can still be issued, but only for testing, this will **not** permit signing of batch tickets or mix design changes. For bituminous plant testing there will not be a Bit plant #1 provisional, but upon demonstrating the knowledge and ability to perform all the individual tests, the tester will be issued provisional certifications for each of the tests they can do correctly.

Only Full time students working construction jobs can be provisionally certified **each summer** until graduation, with no fees. They must be in” full time “status- meaning full credits the previous winter and again for the fall quarter.

An individual other than a full time student *may* be provisionally certified for **one** additional year with the written approval of the MnDOT District Materials Engineer, who will consider each exception on an individual basis. While there is no fee for the first provisional, a \$150 fee, payable to the Commissioner of Transportation, will be charged for the second review if granted. You will get one try for passing a second provisional; there are no re-do’s.

All Provisional certification cards are issued by Mn/DOT District Materials Independent Assurance Inspectors (IAI). All Provisional certification cards must be signed by the granting authority and **will expire December 31 of the year in which it was issued** (i.e. 12/31/2015 for this current season). Individuals who are provisionally certified and expect to be testing again next year **must** attend and **pass** formal certification training classes during the next training season- (try to sign up ASAP in the fall, not in the spring). After January 1 of the following year, the provisional card is expired no longer valid for any purpose, there is no grace period between the time it expires (on 12/31) and you take formal certification classes. If you elect to continue testing without formal certification, you run the risk that all testing done between provisional expiration and formal certification will be considered uncertified, and subject to penalties.

BITUMINOUS REVIEWS



IAI Field Review Guide Checklist Bituminous Bulk Specific Gravity (Gmb)

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A or Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Bituminous Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Mix Type : _____ MDR # _____ Sample ID : _____

Test Results : _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: **Bulk Specific Gravities** ****

- | | | |
|---|---------|----------|
| 1) Cool specimens to room temperature. | CORRECT | IMPROPER |
| 2) Clean edges of specimens & wipe off loose material-make sure disc is off & specimen marked. | CORRECT | IMPROPER |
| 3) Insure Gyrotory compactor is working & can print out specimen heights. (Tolerance 115 ± 5mm) | CORRECT | IMPROPER |
| 4) Weigh specimens in air and record to the nearest 0.1 grams. (Dry) | CORRECT | IMPROPER |
| 5) Immerse specimens in water for at least 3 minutes-no longer than 5 minutes, and record weight to the nearest 0.1 grams. * Water tank temp 77 ± 1.8* | CORRECT | IMPROPER |
| 6) Immediately after obtaining Immersed weight, remove from water & blot specimen with damp towel & re-weigh in air and record to the nearest 0.1 grams. (SSD) (Complete in 15 seconds) | CORRECT | IMPROPER |
| 7) Perform calculations for Bulk Specific Gravity record to the nearest 0.001
* Air/(SSD-IMM)= Bulk | CORRECT | IMPROPER |
| 8) Average the specimens (Tolerance 0.020 from each other) | CORRECT | IMPROPER |
| 9) Perform calculations for air void:
* ((Max Spg - Bulk Spg)/Max Spg)*100 = Void | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IA Field Review Guide Checklist CAA % Crushing

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A OR Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Bituminous Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Mix Type : _____ MDR # _____ Sample ID : _____

Test Results : _____

Pit # : _____ Plant # _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: **Course Aggregate % Crushed** ****

- | | |
|---|------------------|
| 1) Obtain the pre-washed & dried Extracted gradation sample (typically around 2000 g.). After running the gradation, collect all of the plus #4 (course) particles from the sample. | CORRECT IMPROPER |
| 2) Weigh plus #4 particles and record to the nearest 0.1 g. (If using virgin aggregate, wash & dry sample to a constant weight before running gradation and % crush test). | CORRECT IMPROPER |
| 3) Spread all the plus #4 test sample on a clean, flat surface large enough to permit the material to be spread out thinly for a careful inspection and evaluation of individual particles. | CORRECT IMPROPER |
| 4) Using a spatula or a similar tool, separate all the particles into one of the following three (3) categories:
a) Crushed Particles: manufactured using the criteria of "one or more fractured faces" or "two or more fractured faces" as is consistent with the requirements in the specifications and/or special provisions.
b) Uncrushed Particles: natural, rounded, smooth particles
c) Questionable Particles: worn natural fractured face, flat or elongated particles | CORRECT IMPROPER |
| 5) Determine the weight of the "Crushed particles" and "Questionable particles" separately. Record each weight separately to the nearest 0.1g.

<i>*Note: The weight of the questionable particles shall not exceed 20% to the total test sample weight. If the questionable particle weight is in excess of 20%, re-examine (evaluate) all of the particles in the questionable portion and make a more definitive determination, so the questionable portion is not greater than 20%. But in no case shall the total NUMBER of particles examined in any fraction be less than 150 particles.</i> | CORRECT IMPROPER |
| 6) Calculate the % of crushed particles in each fraction as follows: | CORRECT IMPROPER |

$$\text{Percent crushed particles (CP)} = \frac{A + (B/2)}{C} \times 100$$

A= weight of crushed particles with at least the specified # of fractured faces, in grams.

B= Weight of questionable particles, in grams

C= Weight of the initial test sample, in grams.

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI Field Review Guide Checklist Bituminous Density Cores

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A OR Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Bituminous Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Mix Type : _____ MDR # _____ Sample ID : _____

Test Results : _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: **Density Cores** ****

- | | | |
|---|---------|----------|
| 1) Insure samples cores are DRY - air dry in front of fan for 30 minutes | CORRECT | IMPROPER |
| 2) Locate core log sheet, arrange cores to make sure each core is made & accounted for. | CORRECT | IMPROPER |
| 3) Clean edges of specimens & wipe off loose material, do any trimming if necessary- Re-DRY Measure core 3 times to determine average thickness, record on core worksheet. | CORRECT | IMPROPER |
| 4) On Core worksheet: record each pan I.D. and weigh empty pans. Record weight. | CORRECT | IMPROPER |
| 5) Weigh each core in air and record to the nearest 0.1 grams. (Dry) | CORRECT | IMPROPER |
| 6) Immerse specimens in water (no more than 3 cores at a time) for at least 3 minutes-no longer than 5 minutes, and record each core weight to the nearest 0.1 grams. * Water tank temp $77 \pm 1.8^{\circ}$ | CORRECT | IMPROPER |
| 7) Immediately after obtaining Immersed weight, remove from water (1 at a time) & roll specimen on damp towel & re-weigh in air and record to the nearest 0.1 grams. (SSD) (Complete in 15 seconds) | CORRECT | IMPROPER |
| 8) Place each core in pre-weighed/labeled pans, and place in $230^{\circ} \pm 9^{\circ}$ F oven for 3 hours. | CORRECT | IMPROPER |
| 9) After 3 hours , break apart core with knife, re-weigh every 15 minutes until constant weight. | CORRECT | IMPROPER |
| 10) Record constant weight on coresheet, perform Density calculations. | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI Field Review Guide Checklist BIT: Extracted Gradation

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A or Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Bituminous Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Mix Type : _____ MDR # _____ Sample ID : _____

Test Results : _____

COMMENTS / REMARKS: _____

****** Field Testing Procedure review: Extracted Gradation ******

- | | |
|--|------------------|
| 1) Check all scales, sieves, & shakers: make sure they have been calibrated & tagged for the season. | CORRECT IMPROPER |
| 2) Remove basket wire & cover, and very <i>carefully</i> (with small, fine brush) empty all loose material and Aggregate from basket & bottom pan into wash bowl. | CORRECT IMPROPER |
| 3) Weigh and record the weight of material sample in wash bowl to nearest 0.1g. | CORRECT IMPROPER |
| 4) Add sufficient water (temp not to exceed 100° F) to bowl to cover the sample, add liquid dish (1 gram per liter of water) and gently stir to disperse fines. Only a small amount of suds wanted. Let sample soak for 15 minutes ± 5 before washing over #200 sieve. | CORRECT IMPROPER |
| 5) Wash sample over #200 sieve by repeatedly stirring sample and carefully pouring the cloudy water on to the #200 sieve. Repeat this procedure until water is fairly clear. (usually cloudy appearance dissipates and settles in 5-10 seconds). | CORRECT IMPROPER |
| 6) Rinse the material retained on the #200 sieve back into the bowl (careful not to lose any), lightly tap outside of bowl with spoon till water comes to top. Let settle for 30 seconds, and carefully pour final excess water off, taking care not to lose any material. | CORRECT IMPROPER |
| 7) <i>Carefully</i> dry sample in oven or hotplate to constant weight, cover with screen to prevent loss. | CORRECT IMPROPER |
| 8) Allow to cool to room temp, weigh & record to nearest 0.1g. Subtract this dry washed weight from the initial sample dry weight to obtain loss by washing. | CORRECT IMPROPER |
| 9) Pour entire cooled sample into 12" round sieve nest, place in shaker & shake. Shaking time shall be determined for each individual mechanical shaker by a calibration procedure. | CORRECT IMPROPER |
| 10) When done, remove from shaker and completely clean and weigh each individual sieve to the nearest 0.1g. Record on gradation worksheet, then enter into Computer Test Summary sheet. | CORRECT IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI Field Review Guide Checklist BIT: Extraction -Solvent

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A or Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Bituminous Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season? Yes or NO Date/Unit # _____

Mix Type : _____ MDR # _____ Sample ID : _____

Test Results : _____

COMMENTS / REMARKS: _____

****** Field Testing Procedure review: Extraction by Solvent ******

- | | | |
|--|---------|----------|
| 1) Use appropriate quartering sampling method to obtain sample of 2000-2100 grams. | CORRECT | IMPROPER |
| 2) Correctly prepare sample. Assure that sample is dried to a constant weight (moisture free). | CORRECT | IMPROPER |
| 3) Weigh an empty, clean centrifuge bowl and record to the nearest 0.1 gram. | CORRECT | IMPROPER |
| 4) With the bowl on the scale, tare the scale to zero and distribute the sample evenly throughout the entire bowl. | CORRECT | IMPROPER |
| 5) Record weight of sample and bowl to nearest 0.1 gram. | CORRECT | IMPROPER |
| 6) Weigh out 50.0 grams of celite and sprinkle it over all the mixture in the bowl. | CORRECT | IMPROPER |
| 7) Fit bowl into the centrifuge and add solvent until entire sample is covered. | CORRECT | IMPROPER |
| 8) Weigh and record weight of a new, dried filter ring to the nearest 0.1 gram. | CORRECT | IMPROPER |
| 9) Place filter ring on top of bowl and assemble centrifuge apparatus snugly together. | CORRECT | IMPROPER |
| 10) Allow solvent to dissolve within sample for a minimum of one hour. | CORRECT | IMPROPER |
| 11) Extract solvent into capture container by spinning centrifuge, slowly increasing speed to 2000-2500 rpm's | CORRECT | IMPROPER |
| 12) Run (spin) until flow rate is reduced to a dripping rate. | CORRECT | IMPROPER |
| 13) Stop spin, add additional 200-400 ml. of solvent into the top of extractor and allow it to dissolve throughout the sample for 5-10 minutes. | CORRECT | IMPROPER |
| 14) Again, run (spin) centrifuge until the solvent flow slows to a dripping rate, | CORRECT | IMPROPER |
| 15) Repeat this solvent washing cycle at least 2 more times, or until extracted solvent is a light straw color. | CORRECT | IMPROPER |
| 16) After the final solvent rinse cycle, spin bowl @ approx. 3000 rpm's for 1 minute to remove as much solvent as possible and flow is again reduced to a dripping rate. | CORRECT | IMPROPER |
| 17) Dry the aggregate left in the centrifuge bowl along with the filter ring, at a temperature of 230° ± 9 ° F , until a constant weight is obtained. Record to 0.1 gram. | CORRECT | IMPROPER |
| 18) Brush off any remaining fines from the filter ring into the bowl or pan & record the ring weight to the nearest 0.1 gram. (The trapped fines in the ring are considered -200 material and need to be accounted for in the extracted gradation). | CORRECT | IMPROPER |
| 19) Record the final weight of the bowl and extracted aggregate to the nearest 0.1 gram. | CORRECT | IMPROPER |

* Note: be sure to check all calculations.

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI Field Review Guide Checklist Bituminous: Fine Aggregate Angularity (FAA)

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A OR Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Bituminous Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Mix Type : _____ MDR # _____ Sample ID : _____

Test Results : _____

Pit # : _____ Plant # _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: FINE AGGREGATE ANGULARITY (FAA) ****

- | | | |
|--|---------|----------|
| 1) Obtain a "Correct Blend" sample (tests run on extracted or belt run mixture samples considered to be the "correct blend" for the FAA test). | CORRECT | IMPROPER |
| 2) Obtain & inspect equipment needed to perform the FAA test: calibrated 100mL cylinder with inside diameter of 39mm & inside height of 86mm, funnel & stand, glass plate 60x60x4mm, pan, metal straight edge spatula, scale. | CORRECT | IMPROPER |
| 3) Get the required material needed to run the test procedure - these are acquired during the washed sample's gradation test by saving the weighted material <u>retained</u> on the #16, #30, # 50, & #100 sieves separately in bowls. | CORRECT | IMPROPER |
| 4) Weigh out separately, then combine the following quantities of the fine aggregate blend that had been saved in the bowls: #16 = 44g. #30 = 57g. # 50 = 72g. #100 = 17g. Combine for total of 190g. (tolerance for each ±0.2g.) | CORRECT | IMPROPER |
| 5) Once combined in a larger bowl, thoroughly mix the individual sieve increments with a spatula until it appears to be a homogeneous 190 gram sample. | CORRECT | IMPROPER |
| 6) Position the jar/funnel section in the stand & center the cylinder measure directly underneath. | CORRECT | IMPROPER |
| 7) Using a finger, block the opening of funnel end, carefully pour entire test sample into funnel & level with spatula. | CORRECT | IMPROPER |
| 8) Remove finger carefully (do not bump cylinder or funnel!) and allow material to fall freely into cylinder below. | CORRECT | IMPROPER |
| 9) After the funnel empties & cylinder measure is overflowing full, strike off the excess fine aggregate with a single pass of the spatula using the straight edge of the blade <u>vertically</u> & in light contact with top of cylinder measure.
<i>Note: until this operation is completed avoid any vibration that could cause material to compact in cylinder!</i> | CORRECT | IMPROPER |
| 10) After strike-off, lightly tap the cylinder to compact the material so none will be lost when transferring the cylinder to the scale, brush off any material adhering to the outside of the cylinder back into bowl before weighing. | CORRECT | IMPROPER |
| 11) Determine the mass (weight) of cylinder and material to the nearest 0.1g. and record. | CORRECT | IMPROPER |
| 12) Repeat steps # 5-11 twice and determine the average of the 2 readings minus the weight of the cylinder. | CORRECT | IMPROPER |
| 13) Calculate the Uncompacted Voids as follows: | CORRECT | IMPROPER |

$$(U) \frac{V - (F/G)}{V} \times 100$$

U= Uncompacted Voids

V= Volume of measure

F= Net mass of FA in measure (average weight determined in step # 12 above)

G= Bulk dry specific gravity of the BLEND of fine aggregate

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI Field Review Guide Checklist Bituminous Gyrotory

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A OR Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Bituminous Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season? Yes or NO Date/Unit # _____

Mix Type : _____ MDR # _____ Sample ID : _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: **Gyrotory Compaction** ****

- | | | |
|--|---------|----------|
| 1) Check gyrotory mix design for correct number of gyrations to N _{design} only. | CORRECT | IMPROPER |
| 2) Use 200-300° preheated mold & base plates, at temp at least 60 min. prior to compaction. | CORRECT | IMPROPER |
| 3) Weigh up amount required by mix design to achieve the required height of 115 ± 5mm per mold. approx. 4800-4900 g. sample will provide intended height, but this will vary depending upon aggregates & gyration level of the mix design. (Be sure to verify). | CORRECT | IMPROPER |
| 4) Refer to manufacturer's recommendation for Pre-heating Specimen to Correct Temperature for PG Binder temp. prior to gyration. <i>*30 minutes maximum heating at compaction temp</i> | CORRECT | IMPROPER |
| 5) Place Paper Disk at bottom of empty mold and pour mix into mold in one lift.
<i>*Avoid segregation of mix in the mold. Level mix & place another paper disk on top of mix.</i> | CORRECT | IMPROPER |
| 6) Load mix & mold into Gyro Compactor, center ram and start compactor.
<i>*Ram will stop when pressure reaches and maintains 600 ± 1.8kPa, check calibration for correct internal angle. Tilt mold to internal angle of 1.16° ± 0.02° (AASHTO TP71 method)</i> | CORRECT | IMPROPER |
| 7) Insure the compactor has stopped after reaching desired N _{design} gyrations number
<i>*The angle will release & the ram will rise.</i> | CORRECT | IMPROPER |
| 8) Remove mold from compactor and Extrude specimen immediately.
<i>*(for lean, rich, or tender mix cool for 5 - 10 minutes in front of fan)</i> | CORRECT | IMPROPER |
| 9) Remove paper disks & Identify each specimen using a china marker or crayon. | CORRECT | IMPROPER |
| 10) Cool specimen to room temperature 77° ± 9°. A fan will facilitate the cooling process. | CORRECT | IMPROPER |
| 11) Before reusing the mold again, place it back into oven and reheat for at least 5 min | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI Field Review Guide Checklist BIT: Incineration Oven % A/C

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A or Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Bituminous Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Mix Type : _____ MDR # _____ Sample ID : _____

Test Results : _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: **Incineration - Oven** ****

- | | | |
|--|---------|----------|
| 1) Oven dry sample to a constant mass in oven at 230±9°F or adjust for moisture. | CORRECT | IMPROPER |
| 2) Check air flow & preheat calibrated ignition furnace to 538 °C (1000 °F).
* 482 °C (900 °F) for sample contains more than 20 percent Class "B" Carbonate. | CORRECT | IMPROPER |
| 3) Weigh and record the weight of basket cage and catch pan. | CORRECT | IMPROPER |
| 4) Confirm weigh of 2000 to 2100 grams of mixture split from the preheated sample is available.
Take basket apart & evenly distribute each half of sample between top & bottom of basket, keeping mix 1/2" from sides. Replace top cover & wire clip making sure they are secure. | CORRECT | IMPROPER |
| 5) Weigh and record the sample and basket assembly to the nearest 0.1 gram. | CORRECT | IMPROPER |
| 6) If applicable-Input the weight of the sample in whole grams into the ignition furnace controller. | CORRECT | IMPROPER |
| 7) Open door and place Sample & basket on balance platform in the center of the furnace.
* Do not slide on the scale platform! | CORRECT | IMPROPER |
| 8) Press start/stop button. This will lock oven and start the combustion process. | CORRECT | IMPROPER |
| 9) Allow the test to continue until indicator signals the test is complete (weight stable for 3 min).
Press the start/stop button. This will unlock the furnace door. | CORRECT | IMPROPER |
| 10) Cool sample & basket to room temperature in air for 30 ± 5 minutes. | CORRECT | IMPROPER |
| 11) Weigh and Record sample & Basket to the nearest 0.1 gram. | CORRECT | IMPROPER |
| 12) Perform calculations for % Asphalt Cement ** | CORRECT | IMPROPER |

**Calculations:

Corrected AC % = $\frac{(C-E) \times 100}{C}$ - C F * note it there is a moisture correction for the sample, subtract it from the "Corrected AC %" before reporting.

Where:

C = Initial weight of the basket and sample minus the basket

E = Final weight of the basket and sample minus the basket

C F = Correction factor

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI Field Review Guide Checklist
Bituminous Maximum Specific Gravity (RICE) Gmm

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A or Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Bituminous Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Mix Type : _____ MDR # _____ Sample ID : _____

Test Results : _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: **Maximum Specific Gravities (RICE)******

- | | | |
|---|---------|----------|
| 1) Weigh Rice Sample. (2000 - 2050 Grams) | CORRECT | IMPROPER |
| 2) Cool to room temperature & break fines down (1/4 " Maximum Diameter) | CORRECT | IMPROPER |
| 3) Place entire Sample into rice container (verify dry wt. of container <i>including</i> screen), then Weigh Sample, Container, & screen (dry weight) to nearest 0.1g. | CORRECT | IMPROPER |
| 4) Fill Container with (77° ±1.8° F) water at least 1/2" above basket or mix. | CORRECT | IMPROPER |
| 5) Add aerosol OT to water if need for floaties, (5 - 15 drops) | CORRECT | IMPROPER |
| 6) Place sample on vibrating table, secure vacuum chamber cover & apply vacuum-check for leaks. | CORRECT | IMPROPER |
| 7) When meter reaches (30mm Hg.), start timer & vibration (15 minutes). | CORRECT | IMPROPER |
| 8) After 15 minutes, turn off Vibration & slowly release Vacuum, remove cover from container. | CORRECT | IMPROPER |
| 9) Remove container from chamber/table & submerge any floating particles. | CORRECT | IMPROPER |
| 10) Carefully submerge container & mix in water weighing tank, making sure mix is not exposed to air while dunking. Leave container submersed for 10 ± 1 minutes.
<i>* When scale settles, tare, then set container on scale basket.</i>
<i>* Immersion of container should be completed within 3 minutes after vacuum release.</i> | CORRECT | IMPROPER |
| 11) When time is complete record weight of sample & container in water to nearest 0.1g. | CORRECT | IMPROPER |
| 12) Perform calculations to determine *Maximum Specific Gravity.
<i>* sample wt/[sample wt-(sample & container wt in h20 - container wt in h20)]</i> | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI Field Review Guide Checklist Bituminous Field Sampling Splitting

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A or Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Bituminous Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Mix Type : _____ MDR # _____ Sample ID : _____

Pit # _____ Plant # _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: Sampling and Splitting ****

- | | |
|---|------------------|
| 1) Document Project SP, Sample Location, Tons, date, time, & Truck Number. | CORRECT IMPROPER |
| 2) Obtain enough mix from paver hopper or windrow <i>prior</i> to replace mix from sample hole in mat. | CORRECT IMPROPER |
| 3) Take sample from mat behind paver . (only sample from truck box with prior approval).
Dump mix previously taken from hopper into hole created in mat from sample, rake smooth. | CORRECT IMPROPER |
| 4) Obtain a sufficient quantity of a "Representative" sample for all parties testing.
Usually 8 FULL 6" X 12" cylinders- 2 for IAI > 2 for Agency > 4 for Contractor (including 10 day comp.) | CORRECT IMPROPER |
| 5) Properly field sample and split by "District Materials approved means" (quartermaster, cylinder-in-pail, board & shovel per G&B manual, or truck box methods).
<i>* be sure to always use square nose shovel, square hole-no Agg contamination from base (if 1st lift).</i> | CORRECT IMPROPER |
| 6) Properly label sample cylinders and set aside (Q/A). | CORRECT IMPROPER |
| 7) Transport sample back to Lab in a insulated container (Q/C). | CORRECT IMPROPER |
| 8) Place sample in oven (if cold) to re-heat to correct splitting temp 160 to 230. | CORRECT IMPROPER |
| 9) Place sample in pan, re-mix and and blend evenly, quarter into 4 test samples. | CORRECT IMPROPER |
| 10) Weigh out enough mix for Extraction, Gyro, and Rice test, plus 10 day companion | CORRECT IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

CONCRETE REVIEWS



IAI Field Review Guide Checklist CONCRETE- AIR test

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A OR Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Concrete Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Concrete TYPE (mix design) _____ TEST RESULTS = _____ % ENTRAINED AIR

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: AIR CONTENT TEST ****

- | | | |
|---|---------|----------|
| 1) Check "Certificate of Compliance" ticket for: SP, date, mix type, time batched, time arrived. | CORRECT | IMPROPER |
| 2) Properly obtain (by diverting chute OR pass through entire stream) a sufficient quantity of a " Representative" sample (use square nose shovel), start testing within 5 minutes. | CORRECT | IMPROPER |
| 3) Place and consolidate the concrete in the pot, in 3 equal lift layers. | CORRECT | IMPROPER |
| 4) Rod each layer 25 times with a 5/8" rounded-tip rod; penetrate previous layer 1". | CORRECT | IMPROPER |
| 5) After each layer is rodded, smartly rap sides of pot 10-15 times with rubber mallet. | CORRECT | IMPROPER |
| 6) Strike off 3rd layer level with top of bowl; (use bar or rod in "sawing" motion)
Carefully clean concrete off rim of bowl, clean & moisten inside top of meter cover, zero the gauge, open petcocks on cover and clamp cover tightly onto bowl. | CORRECT | IMPROPER |
| 7) Inject water (let water sit for 5 min. before using if from pressurized tank) into one petcock until it flows freely out the other petcock. Switch to other petcock and continue to inject water while lightly tapping the meter with hand until water stream is completely free of air bubbles, and no leaking detected. (do not tilt pot at any time!) | CORRECT | IMPROPER |
| 8) With bleeder nut closed, pump air into the air chamber up to the pot calibrated "initial pressure" line. While lightly tapping gauge, allow a few seconds for needle to stabilize, then bring needle to exact "initial pressure" line by adding or bleeding off air through the bleeder knurl nut. | CORRECT | IMPROPER |
| 9) Check the open petcocks for air bubbles in the water, if no bubbles are present, close both petcocks. Push down on lever to release air from chamber into pot, also check the seal and side of pot for signs of water leaking. | CORRECT | IMPROPER |
| 10) Read the air % (to 0.1%) while lightly hand tapping the gauge to stabilize the needle. | CORRECT | IMPROPER |
| 11) Tester follows proper procedure and follow-ups if material FAILS | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IA Field Review Guide Checklist Concrete Coarse Agg. - #200 Wash

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A OR Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

PLANT NAME & LOCATION: _____ TIME TEST STARTED: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Concrete TYPE (mix design) _____ F.A. PIT # _____ C.A. PIT # _____

LIMS # : _____

COMMENTS / REMARKS: _____

**** Plant Coarse Aggregate - #200 wash test) ****(as per Concrete manual 5-694.146)

- | | | | | | | | | |
|--|-----------------------|-----------------------|-------------------|----------------|--------------------|------------------|---------|----------|
| 1) Check to ensure scales, sieves, & test equipment are tagged and calibration up-to-date.
Check condition of sieves: not plugged, bent, torn, warped or loose wires. | CORRECT | IMPROPER | | | | | | |
| 2) Obtain <i>sufficient quantity</i> of a "Representative" sample of Aggregate needed for testing.
Reduce the sample obtained to a weight, <i>after air drying</i> , of not <u>less than</u> :
<table border="0" style="margin-left: 20px; width: 80%;"> <tr> <td style="text-align: left;"><u>Aggregate Size</u></td> <td style="text-align: left;"><u>Minimum Weight</u></td> </tr> <tr> <td>CA-5 through CA-8</td> <td>2500 g. (6lb.)</td> </tr> <tr> <td>CA-1 through CA-4M</td> <td>5000 g. (10 lb.)</td> </tr> </table> The test sample is obtained at the end of size reduction. Reduction to an <i>exact</i> predetermined weight (or hand sifting) is not permitted. Place prepared sample in wash bowl.
<i>*Note: The sample is to be dried, weighed, washed, re-dried, and re-weighed without leaving the original bowl. This is done to prevent inadvertent loss of material.</i> | <u>Aggregate Size</u> | <u>Minimum Weight</u> | CA-5 through CA-8 | 2500 g. (6lb.) | CA-1 through CA-4M | 5000 g. (10 lb.) | CORRECT | IMPROPER |
| <u>Aggregate Size</u> | <u>Minimum Weight</u> | | | | | | | |
| CA-5 through CA-8 | 2500 g. (6lb.) | | | | | | | |
| CA-1 through CA-4M | 5000 g. (10 lb.) | | | | | | | |
| 3) Dry the selected test sample to a "constant weight" at a temperature of 230°F ± 9°F. When dry weigh to the nearest 0.1 g. let sample cool down, then weight & record weight to nearest 0.1g | CORRECT | IMPROPER | | | | | | |
| 4) Add sufficient water to bowl to cover the sample. If necessary, add a detergent, dispersing agent or other wetting solution the the water to assure a thorough separation of the material finer than the #200 sieve from the coarser particles. | CORRECT | IMPROPER | | | | | | |
| 5) Agitate (stir) the sample with sufficient vigor to result in the complete separation of all particles finer than the #200 sieve from the coarser particles, and bring the fine particles into suspension. | CORRECT | IMPROPER | | | | | | |
| 6) Pour the wash water slowly over the nested sieves, (arranged with the coarser sieve on top); Take care to avoid, as much as possible, pouring the coarser particles onto sieves. Save the material that is retained on the sieves. | CORRECT | IMPROPER | | | | | | |
| 7) Repeat the washing and pouring process until the water becomes clear. | CORRECT | IMPROPER | | | | | | |
| 8) Wash the material retained on the sieves back into the sample, carefully pour off the excess water, then dry sample to a constant weight at a temperature of 230°F ± 9°F. | CORRECT | IMPROPER | | | | | | |
| 9) Once sample is dry, weigh and record sample weight to the nearest 0.1 g.
The difference between the original sample weight and the washed sample weight is the loss in washing of the material passing through the #200 sieve. | CORRECT | IMPROPER | | | | | | |
| 10) Calculate the % of material passing the #200 sieve by washing as follows:
Matl. Passing #200 = (original dry Wt. of sample - Wt. of dry washed sample) | CORRECT | IMPROPER | | | | | | |

% passing #200 = $\frac{\text{Matl. Passing #200} \times 100}{\text{Original Wt. of sample}}$ reported to nearest 0.1 %

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

**IAI Field Review Guide Checklist
CONCRETE-CYLINDER test**

S.P. _____ **DATE:** _____ **ENGINEER:** _____

TESTER NAME _____ **Q/A** or **Q/C** (circle one) **Cert #** _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Concrete Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season ? **Yes** or **NO** Date/Unit # _____

Concrete TYPE (mix design) _____ CYLINDER # _____

COMMENTS / REMARKS: _____

****** Field Testing Procedure review: CYLINDER TEST ******

- | | | |
|---|----------------|-----------------|
| 1) Properly obtain (by diverting chute or pass through stream) a sufficient quantity of a " Representative" sample (use square nose shovel), <i>start casting within 15 minutes.</i> | CORRECT | IMPROPER |
| 2) Place molds on level, solid location, free of vibrations and safely out of immediate work area. <i>(if mold is dirty, it is acceptable to wash it out- shake to remove all excess water inside of mold).</i> | CORRECT | IMPROPER |
| 3) Place concrete in mold with scoop in 2 equal layers (4"x 8") OR 3 equal layers (6" X 12"). | CORRECT | IMPROPER |
| 4) Rod each layer 25 times with rounded end, uniformly distributing the strokes and <i>slightly</i> penetrating previous layer. For 4"x 8" molds use 3/8" rod: for 6" x 12" molds use 5/8" rod. | CORRECT | IMPROPER |
| 5) Between each lift, <i>lightly</i> tap the sides of the mold 10-15 times with an <i>open hand</i> only. | CORRECT | IMPROPER |
| 6) Strike off excess concrete from the top surface using tamping rod or trowel to a smooth surface. | CORRECT | IMPROPER |
| 7) Make certain side of specimen is marked for positive identification. Do not mark on removable lids or top surface of the fresh concrete- mark on side of cylinder. | CORRECT | IMPROPER |
| 8) Move specimens <i>immediately</i> to a protected place of storage. Cure & protect for 24 hours. | CORRECT | IMPROPER |

OVERALL REVIEW: **PASS** **RETES**

I.A. Inspector's initials =



IAI Field Review Guide Checklist CONCRETE Paving: BEAM (flexural strength) test

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A OF Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Concrete Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season? Yes or NO Date/Unit # _____

Concrete TYPE (mix design) _____ BEAM # _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: BEAM TEST ****

- | | | |
|---|---------|----------|
| 1) Obtain a sufficient quantity of a "Representative" sample, start testing within 15 minutes. | CORRECT | IMPROPER |
| 2) Place beam(s) on level, solid location, free of vibrations and safely out of immediate work area. | CORRECT | IMPROPER |
| 3) Place concrete in beam by moving scoop or shovel around the perimeter to evenly distribute concrete throughout the entire layer of the beam. | CORRECT | IMPROPER |
| 4) Fill beam to 1/2 the depth and rod the required Mn/DOT number of 65 blows per layer. Distribute blows uniformly over the entire cross section. Rod bottom layer to its full depth. | CORRECT | IMPROPER |
| 5) After the layer is rodded, tap the sides of beam box 10 to 16 times to close up any voids left by the rodding process, and to release any large trapped air bubbles.
* Note: If using internal vibrator, frequency shall be at least 9000 per minute, and diameter of round end shall be no more than one-fourth the width of the beam mold. Insert vibrator at intervals not exceeding 6" along top, allow shaft to penetrate into bottom layer about 1". Generally no more than 5 seconds per insertion required to consolidate- until relatively smooth and large bubbles cease to break top. After each layer is vibrated, tap outside of beam at least 10 times with mallet to close holes left by vibrating and to release entrapped air voids. | CORRECT | IMPROPER |
| 6) After completing the rodding, spade the concrete down along the sides and ends of the beam box with a trowel or other suitable tool to close up any remaining voids & aid in beam removal. | CORRECT | IMPROPER |
| 7) Fill the beam to the top with the second layer of concrete and again rod the required number of roddings (65), allowing the rod to penetrate approximately 1 inch into the previous layer of the fresh concrete. | CORRECT | IMPROPER |
| 8) After rodding, tap the second layer and spade along the sides - repeating steps 5 & 6. | CORRECT | IMPROPER |
| 9) Strike off the top concrete surface with a straight edge to the required tolerance, then finish with a float or trowel. Finally use an edger along the sides to produce a flat, even surface. | CORRECT | IMPROPER |
| 10) Impress the specimen I.D. into the surface within 6 inches from the outside edge. | CORRECT | IMPROPER |
| 11) Properly cure and protect the specimen, and DO NOT DISTURB for 24 hours. | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =



IAI Field Review Guide Checklist

CONCRETE PAVING Plant Q/A (Agency Monitor)

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A or Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

PLANT NAME & LOCATION: _____ TIME TEST STARTED: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Concrete TYPE (mix design) _____ F.A. PIT # _____ C.A. PIT # _____

COMMENTS / REMARKS: _____

***PAVING Plant Q/A (Agency Monitor) Testing Procedure IA review:** (as per Concrete manual 3-694.014)

- | | | |
|--|---------|----------|
| 1) Verify Contractor's aggregate sources, and make sure preliminary testing has been done well in advance. "Concrete Paving Contact Report" (form 2164), signed, current, and on file and Contractor mix designs submitted & approved <i>before</i> start of paving operations. | CORRECT | IMPROPER |
| 2) Verify scale calibrations are complete and up-to-date: Verify that cement, fly ash, admix, and all aggregate sources are certified and approved for use in the mix. Collect invoices. | CORRECT | IMPROPER |
| 3) Ensure the <u>correct mix design</u> weights are being used, and entered in batch computer | CORRECT | IMPROPER |
| 4) Check condition of sieves: not plugged, bent, warped or loose wire. Tagged current calib. correctly, and batch person is using the MOST CURRENT moisture results. | CORRECT | IMPROPER |
| 5) Obtain <i>sufficient quantities</i> of all "Representative" Gradation sample fractions both FA & CA by using plant agreed upon means: 1) off of belt using sampling template or 2) from at least 3 areas of stockpile with square nose shovel and backboard. Make certain that all aggregate piles are not contaminated or inter-blended. | CORRECT | IMPROPER |
| 6) Properly collect moisture samples on all fractions, put in <i>sealed</i> container to bring back to lab <i>OR</i> collect sample, bring to lab, and begin moisture test <i>within 5 minutes</i> . | CORRECT | IMPROPER |
| 7) Moisture samples not put through riffle splitter or <i>hand sifted</i> to get exact weights; Correct sample size used for FA (at least 500g) and CA (at least 2500g) moistures. (since 2008, as per Concrete office -NO matched moisture samples are allowed!) | CORRECT | IMPROPER |
| 8) FA sample washed over #200 sieve correctly, then both FA/CA samples dried to constant weight (.1g or less). Reported moisture test results (in %) to batchman in timely manner. | CORRECT | IMPROPER |
| 9) Blend and run course gradation samples through riffle splitter <i>at least four (4) times</i> . Split out proper sample sizes, set aside and label verification/companion samples correctly. weight (.1g or less). Reported moisture test results (in %) to batchman in timely manner. | CORRECT | IMPROPER |
| 10) Run both FA & CA gradation samples through required sieves correctly: insure proper sieve shaking times; Insure sieves are cleaned & weighed properly & NOT overloaded. | CORRECT | IMPROPER |
| 11) Weigh separately the portions of the sample retained on each sieve to the nearest 0.1lb (CA) or 0.1 g. (FA). Record each weight on Gradation worksheet. Must be within check total. | CORRECT | IMPROPER |
| 12) Calculate % passing each sieve = Total wt. of material passing sieve / total wt. of sample X 100. Calculate JMF composite paving gradation & enter into spreadsheet, calculate F.M. | CORRECT | IMPROPER |
| 13) Complete "Microwave" test for W/C ratio (IA typically is not required to observe this). | CORRECT | IMPROPER |
| 14) Review (observe) Q/C's process <u>if gradation failure is detected</u> :
What is done & who contacted. What steps are taken to correct failure? | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IA Field Review Guide Checklist

CONCRETE PAVING plant Q/C (QUALITY CONTROL)

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A or Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

PLANT NAME & LOCATION: _____ TIME TEST STARTED: _____

Equipment Review- Calibrated for current Construction Season? Yes or NO Date/Unit # _____

Concrete TYPE (mix design) _____ F.A. PIT # _____ C.A. PIT # _____

LIMS #: _____

COMMENTS / REMARKS: _____

**** Plant Q/C (producer) Testing Procedure IA review: **** (as per Concrete manual 5-694.012)

- | | | |
|---|---------|----------|
| 1) Check to ensure scales, sieves, & test equipment are tagged and calibration up-to-date.
Check condition of sieves: not plugged, bent, torn, warped or loose wires. | CORRECT | IMPROPER |
| 2) Obtain <i>sufficient quantities</i> of all "Representative" Gradation sample fractions FA & CA by using plant agreed upon means: 1) off of belt using sampling template OR 2) From at least 3 areas of stockpile with square nose shovel and using backboard.
Make certain that all aggregate piles are not contaminated or inter-blended. | CORRECT | IMPROPER |
| 3) Properly collect moisture samples on <i>all fractions</i> , put in <i>sealed</i> containers to bring back to lab <i>OF</i> collect sample, bring to lab, and begin moisture tests <i>within 5 minutes</i> . | CORRECT | IMPROPER |
| 4) Moisture samples not put through riffle splitter or <i>hand sifted</i> to get exact weights; Correct sample size used for FA (at least 500g.) and CA (at least 2500g.) moistures.
Record wet weights. (since 2008, per Concrete office-NO matched moisture samples allowed!)
Also split out a FA sample for the companion sample, label & set aside. | CORRECT | IMPROPER |
| 5) Dry both FA/CA moistures samples dried to a "constant weight" (loss 0.1g. or less).
Record weight & do moisture calculations. Report the moisture test results (in %) to batchman in timely manner and entered into the batch computer. | CORRECT | IMPROPER |
| 6) Now take FA (moisture) sample and repeatedly wash over #200 (full side) sieve, continue process until clean. Wash back material retained on #200 sieve into sample.
Dry moisture sample to "constant weight". Record weight & calculate loss by washing. | CORRECT | IMPROPER |
| 7) On Course gradation samples: blend and run through riffle splitter at least four (4) times.
Split out proper sample sizes, record weight for gradation. Label & set aside companion. | CORRECT | IMPROPER |
| 8) Run both FA & CA gradation samples through required sieves correctly: insure proper sieve shaking times; Insure sieves are cleaned & weighed properly & NOT overloaded. | CORRECT | IMPROPER |
| 9) Weigh separately the portions of the sample retained on each sieve to the nearest 0.1lb (CA) or 0.1 g. (FA). Record each weight on Gradation worksheet. Must be within check total. | CORRECT | IMPROPER |
| 10) Calculate % passing each sieve = Total wt. of material passing sieve / total wt. of sample X 100. Calculate JMF composite gradation & enter into spreadsheet, calculate F.M. | CORRECT | IMPROPER |
| 11) Review (observe) Q/C's process <i>if gradation failure is detected</i> :
What is done & who contacted. What steps are taken to correct failure? | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IA Field Review Guide Checklist Concrete (Redi-mix/Paving) plant Coarse Gradation

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A OF Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

PLANT NAME & LOCATION: _____ TIME TEST STARTED: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Concrete TYPE (mix design) _____ F.A. PIT # _____ C.A. PIT # _____

LIMS # : _____

COMMENTS / REMARKS: _____

**** Plant COARSE Aggregate Sieve Analysis (Gradation) ****(as per Concrete manual 5-694.145)

- | | | |
|--|---------|----------|
| 1) Check to ensure scales, sieves, & test equipment are tagged and calibration up-to-date. Check condition of sieves: not plugged, bent, torn, warped or loose wires. | CORRECT | IMPROPER |
| 2) Obtain <i>sufficient quantities</i> of all " <i>Representative</i> " Gradation sample CA fractions by using plant agreed upon means: 1) off of belt using sampling template OR 2) From at least 3 areas of stockpile with square nose shovel and using backboard. Make certain that all aggregate piles are not contaminated or inter-blended. | CORRECT | IMPROPER |
| 3) Reduce sample down to the required size by approved reduction means (riffle splitter or by quartering method). Blend and run through riffle splitter at least four (4) times. Allow any excess water to drain off prior to the test. | CORRECT | IMPROPER |
| 4) Set-up nest of required sieves in mechanical shaker. The use of 1" & 1/2" filler sieves to lighten the load on the 3/4" & 3/8" respectively. | CORRECT | IMPROPER |
| 5) Place empty pail on scale and tare to zero. Weigh the sample record to nearest 0.1lb. | CORRECT | IMPROPER |
| 6) Pour sample into nest of sieves and shake. (Shaking time shall be determined for each individual mechanical shaker by a calibration procedure.) Do not hand fit rock through a sieve! | CORRECT | IMPROPER |
| 7) Examine material on each sieve for clay balls -crush these to bottom pan. Run separate test for clay balls in CA if necessary (see 5-694.147) | CORRECT | IMPROPER |
| 8) Clean sieves correctly-weight & record amount retained on each individual sieve. Total the amount retained on each sieve and the bottom pan. This check total <i>must</i> weigh within ± 0.2 lbs. of original weight.
*Note: be sure to check the "Maximum allowable quantity of material retained on a sieve" chart to insure a sieve is not overloaded! (figure B 5-694.145) | CORRECT | IMPROPER |
| 9) Calculate and record amount passing each sieve. The weight passing any sieve is the cumulative weight of all material retained on each individual smaller sieve and bottom pan. | CORRECT | IMPROPER |
| 10) Calculate and record the % passing each sieve by dividing the amount passing each sieve by the check total weight. Report percentages to the nearest whole number. | CORRECT | IMPROPER |
| 11) If using more than one CA fraction, Calculate composite gradation from source proportions by multiplying the % of material required (proportion) by the % passing each sieve. Add these values together, record % for each sieve to the nearest whole number. | CORRECT | IMPROPER |
| 12) Review (observe) Q/C's process <i>if gradation failure is detected</i> :
What is done & who contacted. What steps are taken to correct failure? | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IA Field Review Guide Checklist Concrete (Redi mix/Paving plant) FINE Gradation

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A OR Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

PLANT NAME & LOCATION: _____ TIME TEST STARTED: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Concrete TYPE (mix design) _____ F.A. PIT # _____ C.A. PIT # _____

LIMS # : _____

COMMENTS / REMARKS: _____

**** Plant FINE Aggregate Sieve Analysis (Gradation) ****(as per Concrete manual 5-694.148)

- | | | |
|---|---------|----------|
| 1) Check to ensure scales, sieves, & test equipment are tagged and calibration up-to-date.
Check condition of sieves: not plugged, bent, torn, warped or loose wires. | CORRECT | IMPROPER |
| 2) Obtain <i>sufficient quantity</i> of a "Representative" sample of sand by using plant agreed upon means: 1) off of belt using sampling template OR 2) From at least 3 areas of the stockpile
Make certain that all aggregate piles are not contaminated or inter-blended. | CORRECT | IMPROPER |
| 3) Reduce sample down to the required size (Approx. 500g. wet weight) by approved reduction means: small riffle splitter or "en mass" for uniformly graded, washed sand. | CORRECT | IMPROPER |
| 4) Dry the sample to constant weight, let it cool down, then weight & record weight to nearest 0.1g. | CORRECT | IMPROPER |
| 5) Wash the sample in the same pan, over #200 sieve by adding water to the sample and repeatedly stirring the sample, and pouring the cloudy water on to the #200 sieve, being careful not to lose any material or allow the #200 sieve to overflow. Repeat this process until water is fairly clean. | CORRECT | IMPROPER |
| 6) Rinse the #200 sieve back in to pan, being careful not to lose any material. Lightly tap outside of pan and let stand until fines have settled out of the water. Finally pour off excess water again, being careful not to lose any material. | CORRECT | IMPROPER |
| 7) Dry the sample to a constant weight, let cool, weight & record weight to nearest 0.1g.
Subtract this dry washed weight from the initial dry weight to obtain "loss by washing". | CORRECT | IMPROPER |
| 8) Pour entire sample into the nest of required sieves and shake a minimum of 7 minutes.
<i>*Note: Shaking time shall be determined for each individual mechanical shaker by a calibration procedure.</i> | CORRECT | IMPROPER |
| 9) Weight and record the amount retained on each individual sieve to nearest 0.1g. Total up amounts retained on each sieve, amount passing #200, and loss by washing. This number must check within $\pm 0.3\%$ (0.2 g.) of initial dry weight of sample.
<i>*Note: be sure to check the "Maximum allowable quantity of material retained on a sieve" chart to insure a sieve is not overloaded! (200 g. per sieve limit on 8" round sieves)</i> | CORRECT | IMPROPER |
| 10) Calculate and record the amount passing each sieve to the nearest 0.1g. The weight passing any sieve is the cumulative weight of all materials retained on each individual smaller sieve & bottom. | CORRECT | IMPROPER |
| 11) Calculate and record % passing each sieve by dividing the amount passing each sieve by the cumulative weight of all material retained on each individual smaller sieve and bottom pan. | CORRECT | IMPROPER |
| 12) Calculate and record the % passing each sieve by dividing the amount passing each sieve by the check total weight. Report percentages to the nearest whole number. (- # 200 to 0.1) | CORRECT | IMPROPER |
| 13) Calculate the F.M. Add % passing [3/8, No. 4, 8, 16, 30, 50, & 100] sieves, divide by 100 and subtract from 7. report F.M. to nearest 0.01 | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IA Field Review Guide Checklist Concrete plant "OVEN DRY" MOISTURE TEST

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A or Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

PLANT NAME & LOCATION: _____ TIME TEST STARTED: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Concrete TYPE (mix design) _____ F.A. PIT # _____ C.A. PIT # _____

LIMS # : _____

COMMENTS / REMARKS: _____

**** Plant "OVEN DRY" (Moisture) test ****(as per Concrete manual 5-694.142)

- | | | |
|--|---------|----------|
| 1) Check to ensure scales, sieves, & test equipment are tagged and calibration up-to-date. | CORRECT | IMPROPER |
| 2) Obtain <i>sufficient quantities</i> of all " <i>Representative</i> " moisture samples: FA & all CA fractions
<i>Great care</i> must be taken to insure samples are truly representative of current moisture content of the materials. To minimize moisture loss, use sealed containers, or start moisture test within 5 minutes of getting sample, limit handling of material- DO NOT hand sift to get exact weights and DO NOT RUN SAMPLE THRU SPLITTER! | CORRECT | IMPROPER |
| 3) Weigh out approx. 500 g. of fine agg. (sand) and 2500 g. of coarse agg. (rock) & record weights. Again-determine wet weights of all samples <i>immediately</i> after sampling to minimize the moisture loss by evaporation-this is a very important point! | CORRECT | IMPROPER |
| 4) After the wet weight is determined, dry the aggregate until <i>all</i> moisture is removed (constant weight condition). Constant weight is determined by alternately weighing & drying the material until there is no significant weight loss (0.01g). Take care in the drying process so that none of the aggregate particles are lost. (this will indicate a higher moisture loss than actual) | CORRECT | IMPROPER |
| 5) Once material is to a constant weight condition, weight & record the final weight. | CORRECT | IMPROPER |
| 6) Total moisture is determined by dividing the weight lost in drying by the dry weight of sample. | CORRECT | IMPROPER |
| 7) Report current moisture test results to batchperson ASAP! (prior to start of Agency production) | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI Field Review Guide Checklist Concrete **REDI-MIX** Plant Q/A (Agency Monitor)

S.P. _____ **DATE:** _____ **ENGINEER:** _____

TESTER NAME _____ **Q/A** or **Q/C** (circle one) **Cert #** _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

PLANT NAME & LOCATION: _____ **TIME TEST STARTED:** _____

Equipment Review- Calibrated for current Construction Season? **Yes** or **NO** Date/Unit # _____

Concrete TYPE (mix design) _____ **F.A. PIT #** _____ **C.A. PIT #** _____

COMMENTS / REMARKS: _____

* **REDI-MIX Plant Q/A (Agency Monitor) Testing Procedure IA review:** *(as per Concrete manual 5-694.011)

- | | | |
|---|---------|----------|
| 1) Confirm that Redi-mix plant is authorized to produce Certified concrete, and that a "Contact Report" (form 2163), signed by both Agency & Producer, is on file for the current year. | CORRECT | IMPROPER |
| 2) Check "Certificate of Compliance" for completeness & accuracy: Verify proper mix design, and design weights are being used, and batch person is using CURRENT moisture results. | CORRECT | IMPROPER |
| 3) Check to make sure producer completed the initial gradation & moisture tests prior to the start of concrete production each day. Verify first ticket of the day signed by Plant #1 Q/C. Check to make sure producer has run the required amount of moisture & gradation tests. | CORRECT | IMPROPER |
| 4) Verify all sieves and scales being used are checked, calibrated and tagged up-to-date year. Check condition of sieves: not plugged, bent, warped or loose wires. | CORRECT | IMPROPER |
| 5) Take appropriate materials/add mixture lab samples (if needed) correctly as required by "SMC" | CORRECT | IMPROPER |
| 6) Obtain sufficient quantities of FA & CA verification (Audit) samples per "SMC", by using plant agreed upon means: 1) Belt sample template 2) Grizzly 3) stockpile-square nose shovel. Make certain that all aggregate piles are not contaminated or inter-blended. | CORRECT | IMPROPER |
| 7) Blend and run course gradation samples through riffle splitter at least four (4) times. Split out proper sample sizes, correctly label and give split sample to producer. | CORRECT | IMPROPER |
| 8) Review producers gradation results with respect to project specifications. Compare Q/C results to previous audit & companion sample results. Verify producers aggregate and moisture Q/C charts and plant diary are accurate and up-to-date. | CORRECT | IMPROPER |
| 9) Review process if gradation failure is detected : What is done & who's contacted? | CORRECT | IMPROPER |
| 10) (If doing IA Annual plant monitor review: observe moisture and FA/CA gradation testing process-using same criteria as Q/C review. Also complete "written test portion" of Q/A Plant review process) | CORRECT | IMPROPER |

OVERALL REVIEW: **PASS** **RETEST**

I.A. Inspector's initials =

IA Field Review Guide Checklist

Concrete **REDI-MIX** plant Q/C (Quality control)

S.P. _____ **DATE:** _____ **ENGINEER:** _____

TESTER NAME _____ **Q/A** or **Q/C** (circle one) **Cert #** _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

PLANT NAME & LOCATION: _____ **TIME TEST STARTED:** _____

Equipment Review- Calibrated for current Construction Season ? **Yes** or **NO** **Date/Unit #** _____

Concrete TYPE (mix design) _____ **F.A. PIT #** _____ **C.A. PIT #** _____

LIMS # : _____

COMMENTS / REMARKS: _____

**** **Plant Q/C (producer) Testing Procedure IA review: ******(as per Concrete manual 5-694.012)

- | | | |
|---|---------|----------|
| 1) Check to ensure scales, sieves, & test equipment are tagged and calibration up-to-date.
Check condition of sieves: not plugged, bent, torn, warped or loose wires. | CORRECT | IMPROPER |
| 2) Obtain <i>sufficient quantities</i> of all " <i>Representative</i> " Gradation sample fractions FA & CA by using plant agreed upon means: 1) off of belt using sampling template OR
2) From at least 3 areas of stockpile with square nose shovel and using backboard.
Make certain that all aggregate piles are not contaminated or inter-blended. | CORRECT | IMPROPER |
| 3) Properly collect moisture samples on all fractions, put in <i>sealed</i> container to bring back to lab <i>OR</i> collect sample, bring to lab, and begin moisture test <i>within 5 minutes</i> . | CORRECT | IMPROPER |
| 4) Moisture samples not put through riffle splitter or <i>hand sifted</i> to get exact weights;
Correct sample size used for FA (at least 500g.) and CA (at least 2500g.) moistures.
Record wet weights. (since 2008, per Concrete office- NO matched moisture samples allowed!)
Also split out a FA sample for the companion sample, label & set aside. | CORRECT | IMPROPER |
| 5) Dry both FA/CA moistures samples dried to a "constant weight" (loss 0.1g. or less).
Record weight & do moisture calculations. Report the moisture test results (in %) to batchman in timely manner and entered into the batch computer. | CORRECT | IMPROPER |
| 6) Now take FA (moisture) sample and repeatedly wash over #200 (full side) sieve, continue process until clean. Wash back material retained on #200 sieve into sample.
Dry moisture sample to "constant weight". Record weight & calculate loss by washing. | CORRECT | IMPROPER |
| 7) On Course gradation samples: blend and run through riffle splitter at least four (4) times.
Split out proper sample sizes, record weight for gradation. Label & set aside companion. | CORRECT | IMPROPER |
| 8) Run both FA & CA gradation samples through required sieves correctly: insure proper sieve shaking times; Insure sieves are cleaned & weighed properly & NOT overloaded. | CORRECT | IMPROPER |
| 9) Weigh separately the portions of the sample retained on each sieve to the nearest 0.1lb (CA) or 0.1 g. (FA). Record each weight on Gradation worksheet. Must be within check total. | CORRECT | IMPROPER |
| 10) Calculate % passing each sieve = Total wt. of material passing sieve / total wt. of sample X 100. Calculate composite gradation (if required), calculate F.M. | CORRECT | IMPROPER |
| 11) Review (observe) Q/C's process if gradation failure is detected:
What is done & who contacted. What steps are taken to correct failure? | CORRECT | IMPROPER |

OVERALL REVIEW: **PASS** **RETEST**

I.A. Inspector's initials =

IAI Field Review Guide Checklist CONCRETE AGG. Sampling FA - CA

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A or Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

PLANT NAME & LOCATION: _____ TIME TEST STARTED: _____

Equipment Review- Calibrated for current Construction Season? Yes or NO Date/Unit # _____

Concrete TYPE (mix design) _____ F.A. PIT # _____ C.A. PIT # _____

COMMENTS / REMARKS: _____

*Concrete Agg. (CA & FA) Sampling Procedure IA review: (as per Concrete manual 3-694.130-132)

- | | |
|---|-------------------------|
| <p>1) Verify Contractor's Aggregate sources, and make sure any preliminary testing has been done well in advance. Verify Contractor's Aggregate stockpile handling was done in a manner to avoid:</p> <ul style="list-style-type: none"> * Segregation in stockpiles-causing an alteration of stockpile gradation * Contamination of Aggregate by deleterious foreign materials or differing Aggregates (inter-blending) * Non-uniformity in moisture content (loader taking material from different areas without blending) | <p>CORRECT IMPROPER</p> |
| <p>2) Obtain sufficient quantities of all "Representative" Agg sample fractions of Coarse Aggregate by using plant pre-agreed upon (location on contact report) means:</p> <ul style="list-style-type: none"> a) Off of belt using sampling template-completely removing all material from the short section of belt between the plates, place into pail(s) b) From goose-neck conveyer-make rapid pass back & forth through entire discharge with pail(s)
* take extreme care to intercept full cross section of flow! (use this same process for weight hopper) c) Stockpile sampling-(this is the least reliable, least preferable sampling method due to segregation).
If power equipment is available, secure several samples from various locations on the pile, or create a large shelf for multiple potholes, then combine all sample locations & split down.
<u>If power equipment is not available</u>, hand shovel using a square nose shovel and backboard. At each location, dig down to create a vertical face, place backboard against face to keep Agg from running down & contaminating the shelf area where sample is taken from. Take a sample from at least <u>three</u> different locations spread over the pile- one near the top, another near the middle, and at or near 1 foot off the base. Combine the individual samples, then reduce to correct same size by quartering or riffle splitter. | <p>CORRECT IMPROPER</p> |
| <p>3) Obtain a sufficient quantity and "Representative" sample of Fine Aggregate (Sand)
Unlike CA, damp sand does not segregate easily, sample sand with either a sampling tube or by hand shoveling: (multiple pothole flat area or vertical face on stockpile)</p> <ul style="list-style-type: none"> a) <u>When using a sampling tube</u>- first brush dry sand aside and sample only moist sand beneath. Ram tube into pile perpendicular to the surface of pile. Discard this first sample (charge tube with fines). Ram the tube into the pile again to obtain the actual sample. Take samples from a number of locations, then combine & split down to get proper sample size. b) <u>When using a hand shovel</u>- At each location, dig down to create a vertical face, place backboard against face to keep Agg from running down & contaminating the shelf area where sample is taken from. Take a sample from at least <u>three</u> different locations spread over the pile- one near the top, another near the middle, and at or near 1 foot off the base. Combine the individual samples, then reduce to correct same size by quartering or riffle splitter. c) <u>Off of belt using sampling template</u>-completely removing all material from the short section of belt between the plates, place into pail(s) | <p>CORRECT IMPROPER</p> |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI FIELD Review Guide Checklist CONCRETE- SLUMP test

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A or Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Concrete Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Concrete TYPE (mix design) _____ TEST RESULTS = _____ INCHES of slump

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: **SLUMP TEST** ****

- | | |
|---|------------------|
| 1) Properly obtain (by diverting chute or pass through stream) a sufficient quantity of a " Representative" sample (use square nose shovel), start testing within 5 minutes. | CORRECT IMPROPER |
| 2) Select a level, solid location, free of vibrations and safely out of immediate work area. Have all equipment conveniently located, inspect slump cone for suitable condition, dampen cone and place on a flat, moist, non-absorbant, rigid surface. | CORRECT IMPROPER |
| 3) Center cone on board, hold cone firmly in place by standing on both foot pieces so as to not allow any movement or concrete leaking out of the bottom of cone- at any time during test | CORRECT IMPROPER |
| 4) Place concrete in cone by moving the scoop around the top edge to distribute it. Fill the cone in (3) layers of equal volume; first layer approx. 2 5/8" second is 6 1/8", third somewhat overfilled. | CORRECT IMPROPER |
| 5) Rod each layer 25 times with rounded end of 5/8" rod, uniformly distributing the strokes. Slant the rod and distribute approx. half the strokes around the perimeter then work toward the middle. Rod 2nd & 3rd layers with rod slightly penetrating the layer below.
(keep rod away from water at all times- do not put rod in water pail between lifts!) | CORRECT IMPROPER |
| 6) When rodding the top layer, always keep an excess of concrete above the cone. If concrete drop below, stop, add concrete, and resume the count. NEVER use more than 25 rods per lift. | CORRECT IMPROPER |
| 7) Strike off excess concrete on surface with rod using a "sawing" motion: clean around base, always maintaining downward pressure on cone. | CORRECT IMPROPER |
| 8) Put hands on both top handles, raise cone up in 5 ± 2 seconds by a steady upward lift with no lateral or torsional motion to the cone. | CORRECT IMPROPER |
| 9) Invert cone and place carefully beside concrete; lay rod across top of cone, measure the slump from the top of cone to the middle of the original displaced center surface of the pile. Measure pile and record slump to the nearest 1/4". | CORRECT IMPROPER |
| 10) Complete the test from filling cone to removal in 2.5 minutes or less time. | CORRECT IMPROPER |
| 11) Tester follows proper procedure and follow-ups if material FAILS. | CORRECT IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI Field Review Guide Checklist CONCRETE Aggregate SPLITTING

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A or Q/C (circle one) Cert # _____

*****Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!**

PLANT NAME & LOCATION: _____ TIME TEST STARTED: _____

Equipment Review- Calibrated for current Construction Season? **Yes** or **NO** Date/Unit # _____

Concrete TYPE (mix design) _____ F.A. PIT # _____ C.A. PIT # _____

COMMENTS / REMARKS: _____

***Concrete Agg. (CA & FA) Splitting Procedure IA review: (as per Concrete manual 3-694.134)**

Blend the individual samples and *reduce* to the approximate sample size by use of a RIFFLE SPLITTER or by QUARTERING. Keep in mind that the sample size is *Doubled* for all samples requiring companions (Which is all IAI and verification samples!)

- | 1) | Verify correct sampling procedures have been done on all Agg test samples. | CORRECT | IMPROPER | | | | | | | | | | |
|-----------------------|--|-----------------------|--|-------------|---------|-----------|---------------|----------------|-----------|------|----------|--|--|
| | <table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Aggregate Size</u></th> <th style="text-align: left;"><u>Required Weight</u> (double weight for companion)</th> </tr> </thead> <tbody> <tr> <td>CA- 1, 2, 3</td> <td>25 lbs.</td> </tr> <tr> <td>CA- 5, 50</td> <td>10 to 15 lbs.</td> </tr> <tr> <td>CA- 60, 70, 80</td> <td>8-10 lbs.</td> </tr> <tr> <td>Sand</td> <td>5-8 lbs.</td> </tr> </tbody> </table> | <u>Aggregate Size</u> | <u>Required Weight</u> (double weight for companion) | CA- 1, 2, 3 | 25 lbs. | CA- 5, 50 | 10 to 15 lbs. | CA- 60, 70, 80 | 8-10 lbs. | Sand | 5-8 lbs. | | |
| <u>Aggregate Size</u> | <u>Required Weight</u> (double weight for companion) | | | | | | | | | | | | |
| CA- 1, 2, 3 | 25 lbs. | | | | | | | | | | | | |
| CA- 5, 50 | 10 to 15 lbs. | | | | | | | | | | | | |
| CA- 60, 70, 80 | 8-10 lbs. | | | | | | | | | | | | |
| Sand | 5-8 lbs. | | | | | | | | | | | | |
| 2) | By Riffle Splitter Method: Place the splitter on a clean, flat surface and place 2 sample pans under the discharge chutes so no material is lost. (Use additional 2 sample pans instead of pail) | CORRECT | IMPROPER | | | | | | | | | | |
| 3) | Pour the samples into the splitter, moving back & forth over all chutes to distribute the flow of material evenly. Continuously clear away material flowing into the pans to prevent clogging of the discharge chutes. Repeat procedure at least FOUR times to ensure the sample is thoroughly blended. (Moisture samples must not be put through riffle splitter!) | CORRECT | IMPROPER | | | | | | | | | | |
| 4) | After the material has been blended, run through splitter in consecutive operations to arrive at desired sample size. The last 2 pans should contain well-blended companions of the approximate sample size. (if 3-way split is desired, discard the extra forth sample). | CORRECT | IMPROPER | | | | | | | | | | |
| 5) | By Quartering Method: Place Aggregate on a clean, flat, smooth surface and mix well using a square nose shovel. Mix by forming an Agg cone, repeatedly going around the cone, shoveling material from around the base and carefully dumping it onto the top of the cone. | CORRECT | IMPROPER | | | | | | | | | | |
| 6) | With shovel, form a low, flat circular pile; using shovel cut pile into four equal pie-shaped parts. | CORRECT | IMPROPER | | | | | | | | | | |
| 7) | Completely remove and discard all material from the two opposite corners. (save if a 3-way split) | CORRECT | IMPROPER | | | | | | | | | | |
| 8) | Remix the remaining Aggregate, take care to include all fines & dust. | CORRECT | IMPROPER | | | | | | | | | | |
| 9) | If needed, continue to reduce the sample to a size that is satisfactory for testing by repeating the process. For companion samples, save both portions remaining from the last reduction. | CORRECT | IMPROPER | | | | | | | | | | |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =



IAI FIELD Review Guide Checklist

CONCRETE- Temperature Test

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A or Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Ambient Air Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Concrete TYPE (mix design) _____ TEST RESULTS = _____ ° temperature of mix

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: Concrete TEMPERATURE TEST ****

- | | | |
|--|---------|----------|
| 1) Insure temperature measuring device has been checked, calibrated, and is readable.
Accurate to ± 0.5 ° F and that is has been calibrated annually or whenever accuracy is questioned. | CORRECT | IMPROPER |
| 2) Properly obtain (by diverting chute or pass through stream) a sufficient quantity of a
" Representative" freshly mixed sample (use square nose shovel). Start test within 5 minutes. | CORRECT | IMPROPER |
| 3) Select a testing container large enough to provide at least > 3" of concrete in all directions
around the sensor of temperature measuring device (wheelbarrow or 5 gallon buckets are OK). | CORRECT | IMPROPER |
| 4) Place thermometer in center of 3" area and close the void left by placement by pinching
the concrete surface tight against the probe. | CORRECT | IMPROPER |
| 5) Allow at least two (2) minutes , but no more than five (5) minutes for temperature to stablize.
(more time may be required with large aggregate or in winter). | CORRECT | IMPROPER |
| 6) Read & record temp to nearest 1° F - Do not remove device from concrete when reading the temp | CORRECT | IMPROPER |
| 7) Complete measurement of concrete temperature within 5 minutes after obtaining the sample. | CORRECT | IMPROPER |
| 8) Good practice to observe and record ambient air temp at time of placement.
** Freshly mixed concrete temperature range = not less than 50° F. nor more than 90°F. | CORRECT | IMPROPER |
| 9) Tester follows proper procedure and follow-ups if material FAILS | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI Field Review Guide Checklist CONCRETE- UNIT WEIGHT test

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A OR Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

Weather / Temperature _____ Concrete Temp _____

LOCATION OF TEST: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

Concrete TYPE (mix design) _____ TEST RESULTS = _____ % ENTRAINED AIR

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: UNIT WEIGHT TEST ****

- | | | |
|---|---------|----------|
| 1) Check "Certificate of Compliance" ticket for: SP, date, mix type, time batched, time arrived. | CORRECT | IMPROPER |
| 2) Properly obtain (by diverting chute OR pass through entire stream) a sufficient quantity of a " Representative" sample (use square nose shovel), start testing within 5 minutes. | CORRECT | IMPROPER |
| 3) Weigh a clean, dry measure (air pot base commonly used) on scale to nearest 0.1 lb. | CORRECT | IMPROPER |
| 4) Place and consolidate the concrete in the pot, in 3 equal lift layers. | CORRECT | IMPROPER |
| 5) Rod each layer 25 times with a 5/8" rounded-tip rod; penetrate previous layer 1". | CORRECT | IMPROPER |
| 6) After each layer is rodded, smartly rap sides of pot 10-15 times with rubber mallet. | CORRECT | IMPROPER |
| 7) On completion of consolidation of 3rd layer the measure must not contain a substantial excess or deficiency of concrete, an excess of 1/8" on top is optimum. Add or remove a small representative amount of concrete to correct any deficiency before strike-off. | CORRECT | IMPROPER |
| 8) Strike off top surface of concrete and finish it smoothly using a flat, 1/2" thick, strike-off plate. Strike off measure by pressing plate down on surface to cover two thirds of surface, and withdraw with sawing motion towards you. Then place plate back on to cover original two thirds surface, again pressing down with sawing motion advance plate away from you to cover the entire surface, and continue until plate slides completely off measure. DO NOT LIFT plate up off surface at any time while sawing. Incline plate and perform final strokes with the edge of the plate to produce a smooth surface. | CORRECT | IMPROPER |
| 9) After strike off, clean all excess concrete off outside of measure. Re-weigh measure filled with concrete to nearest 0.1 lb. | CORRECT | IMPROPER |
| 10) Calculate Density (unit weight) of concrete mass: | CORRECT | IMPROPER |

$$\text{Density} = (M_c - M_m) / V_m$$

M_m = weight of measure

M_c = measure filled with concrete

V_m = volume of measure

$$\text{Yield: } Y(\%) = M / (D \times 27)$$

$$\text{Air Content: } A = [(T - D) / T] \times 100$$

T = max. theoretical density from mix design

D = density

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

GRADING & BASE REVIEWS



IAI Field Review Guide Checklist Grading Base: Alternate Method-Proctor

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A OR Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

SAMPLE (station) LOCATION: _____ TIME of test: _____

Field TEST # _____ ROADWAY: Position to centerline _____

SOIL CLASS: or 3138 class _____ Test Layer Depth : _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: Proctor test (Alternate method) (5-692.222E)****

*Note: A standard multi-point proctor is satisfactory in most cases. However, if the soil is fine grained, cohesive and difficult to break up (clay), use the following procedure:

- | | | |
|--|---------|----------|
| 1) Prepare the sample as outlined in the "standard method" proctor: following steps 2-4 on IA review sheet. | CORRECT | IMPROPER |
| 2) Select about 25 lbs. of prepared material using approved splitting procedure (riffle or quartering) | CORRECT | IMPROPER |
| 3) Moisten or dry the sample to about (4) four percentage points below the <i>estimated optimum moisture</i> .
<small>(To estimate starting point for granular soils (< 20% passing No. 200 sieve) moisten & mix the soil until it can be squeezed into a ball or "cast". The cast should crumble easily when touched with a single finger).</small> | CORRECT | IMPROPER |
| 4) Divide the sample into five (5) equal portions of about 5 lbs. each. | CORRECT | IMPROPER |
| 5) Place one portion into a water tight container (6" x 12" concrete cylinder molds work well) seal cover tightly, set aside & mark as "point No. 1" - use this as the "starting point". | CORRECT | IMPROPER |
| 6) Add enough water to one of the remaining portions to increase the moisture content about 2 percentage points. (45mls., cc's, or grams of water added to 5 lbs. of material will increase the moisture content 2.0 %.) Mix thoroughly and place this portion in a sealed container and mark as "point No. 2. | CORRECT | IMPROPER |
| 7) Continue this process with the remaining three portions and increase the amount of water each time until there is a series of points at about 2, 4, 6, & 8 percentage points over "point No. 1"
At least one point (usually the last one) should exceed the estimated optimum moisture. | CORRECT | IMPROPER |
| 8) Allow the mixed, sealed materials to "soak" in the molds overnight (12 hours minimum) to permit the moisture to disperse through the soil. | CORRECT | IMPROPER |
| 9) Compact each portion (point) following steps 5 through 14 of the IA review sheet "standard method" | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST
I.A. Inspector's initials =

IAI Field Review Guide Checklist Grading Base: Gradation (sieve analysis procedure)

S.P. _____ **DATE:** _____ **ENGINEER:** _____

TESTER NAME _____ **Q/A** OR **Q/C** (circle one) **Cert #** _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

SAMPLE (station) LOCATION: _____ **TIME of test:** _____

Field TEST # _____ **ROADWAY: Position to centerline** _____

SOIL CLASS: or 3138 class _____ **Test Layer Depth :** _____

Equipment Review- Calibrated for current Construction Season ? **Yes** or **NO** **Date/Unit #** _____

COMMENTS / REMARKS: _____

****** Field Testing Procedure review: Gradation (sieve analysis) test (5-692.215E)******

- | | | |
|--|---------|----------|
| 1) Check all equipment, sieves, & scales for calibration tag, accuracy, and reliability. | CORRECT | IMPROPER |
| 2) Insure proper <i>sampling & splitting</i> was completed on materials sample prior to sieve analysis. | CORRECT | IMPROPER |
| 3) Insure correct sample wt.(25-30 lbs.) Air dry sample to reduce fines that cling to large particles. | CORRECT | IMPROPER |
| 4) Set up the coarse sieve nest (using required sieves on rocker, pan on bottom & sieves arranged in the correct order. | CORRECT | IMPROPER |
| 5) Determine tare weight of a pail, ZERO scale. Weigh & record weight of sample to nearest 0.1lb. | CORRECT | IMPROPER |
| 6) Pour sample into sieve nest & shake until < 0.5 % by weight passes any seive during one minute.
<i>*Do NOT attempt to "hand fit" any rocks through a sieve, & pulverize any clay balls into bottom.</i> | CORRECT | IMPROPER |
| 7) Weigh separately the portions of the sample retained on each sieve & material in bottom pan, to the nearest 0.1lb. Record each weight on Gradation worksheet. The total of these weights must be within 0.2lbs. of the total weight of sample, if check total is not within, repeat steps. | CORRECT | IMPROPER |
| 8) Calculate % passing each sieve = Total wt. of material passing sieve / total wt. of sample X 100 | CORRECT | IMPROPER |
| 9) Fine sieve: select a <i>representative</i> sample from bottom pan. Use small riffle splitter (or other approved methods) to get at least 500 g. (air dried) of material passing # 4 for reliable test.
<i>***Do Not attempt to obtain an exact, predetermined weight for sample.***</i> | CORRECT | IMPROPER |
| <i>Note: If testing Class # 5BC or any material containing salvaged Bituminous, follow proper washing & drying procedures. (soak sample in suitable detergent for a time, wash out, then dry in oven or " 1.5" deep sand bath hot plate" method- BOTH temps NEVER to exceed 140° F.).</i> | | |
| 10) Dry the sample to a "constant weight" (using above method if Bit present) & record.
<i>Note: A way to prevent #200 material from baking into clumps is the "matched sample" method Prepare another sample that matches the weight & moisture content of the fine sieve sample. Dry this sample & record weight. While the matched sample is drying, wash the fine sieve sample (without first drying it!), then dry to a constant weight by correct method.</i> | CORRECT | IMPROPER |
| 11) Place the fine sieve sample into pan & add enough water to cover material. Stir the sample until the fine particles are in suspension. | CORRECT | IMPROPER |
| 12) Pour dirty water onto full height #200 sieve- do not allow sieve to overflow. Add more water to the sample and repeatedly add water, stir, & dump over #200 until water looks clean. Again carefully pour off the excess water from "clean" sample pan & correctly dry the sample. | CORRECT | IMPROPER |
| 13) After reaching a "constant weight", allow sample to cool, weigh it & record weight. | CORRECT | IMPROPER |
| 14) Pour sample into nest of fine sieves. Shake until < 0.5% by weight passing any sieve in 1 minute
If using mechanical shaker, sieving shaking time shall be determined by calibration procedure. | CORRECT | IMPROPER |
| 15) Weight material retained on each sieve & in bottom pan (DO NOT overload sieves: the maximum allowable quantity retained on a sieve = 8" 200 g. / 12" 450 g. - add filler sieve if necessary. | CORRECT | IMPROPER |
| 16) Cal. cumulative % passing each sieve, round to whole #, -#200 to 10th. X % each by % passing #4 | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI Field Review Guide Checklist Grading Base: DCP (Modified-Dynamic Cone Penetrometer)

S.P. _____ **DATE:** _____ **ENGINEER:** _____

TESTER NAME _____ **O/A** **OR** **O/C** (circle one) **Cert #** _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

SAMPLE (station) LOCATION: _____ **TIME of test:** _____

Field TEST # _____ **ROADWAY: Position to centerline** _____

SOIL CLASS: or 3138 class _____ **Test Layer Depth :** _____

Equipment Review- Calibrated for current Construction Season ? **Yes** or **NO** **Date/Unit #** _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: **DCP test (Modified) (5-692.255 mod)******

- | | | |
|--|---------|----------|
| 1) Insure gradation is completed: record the gradation % passing values that represent the area to be tested by the DCP on form or spreadsheet. Calculate <i>Grading Number (GN)</i> using formula. | CORRECT | IMPROPER |
| 2) Locate a predetermined, level, undisturbed area(test site)representative of material to be tested. | CORRECT | IMPROPER |
| 3) Record the test #, date, station, offset, & test layer depth in DCP data table on form/spreadsheet. | CORRECT | IMPROPER |
| 4) Place DCP device on the granular or aggregate base test site. Record the initial reading using the graduated rule on the DCP to the nearest 0.1 inch (2.5mm) under "Initial Reading" column. | CORRECT | IMPROPER |
| 5) To properly seat DCP (cone tip), two hammer blows are required. Carefully raise the sliding weighted hammer until it meets the handle, then release. Repeat process one more time for a total of two complete blows. | CORRECT | IMPROPER |
| 6) Record the penetration measurement <i>after</i> seating using the graduated rule on the DCP. The measurement is taken to the nearest 0.1 inch (2.5mm). Record this reading on form under "Reading after seating (2 blows)" column. | CORRECT | IMPROPER |
| 7) Carefully raise the hammer until it meets the handle, then release. Repeat this process two more times for a total of three times. | CORRECT | IMPROPER |
| 8) Record the final penetration measurement using the graduated rule on the DCP. The measurement is taken to the nearest 0.1 inch (2.5mm). Record this reading on form under "Reading after test (3 blows) column. | CORRECT | IMPROPER |
| 9) *After using the DCP, obtain a representative sample of material from <i>each</i> test site and determine the <u>MOISTURE</u> content (MC) of the material by "Burner" or "Speedy" method. | CORRECT | IMPROPER |
| 10) Fill in the Maxium Allowable SEAT & Maximum Allowable DPI columns. This information is in the penetration requirements table by using the recorded (GN) & (MC). Next calculate the SEAT by using the following formula: <u>SEAT= reading after seating (2 blows) - Initial Reading</u> . Compare calculated SEAT to Maximum Allowable SEAT column: SEAT> Max= Fail / SEAT< Max= Pass | CORRECT | IMPROPER |
| 11) Next calculate the DPI by using the following formula:
<u>DPI = (Reading after test (3 blows) - Reading after seating (2 blows)) / 3</u> . Then compare DPI:
If DPI > Maximum Allowable DPI = Fail If DPI < maximum Allowable DPI = Pass | CORRECT | IMPROPER |
| 12) <u>Adequate test Layer? = (Reading after test (3 blows) - Initial Reading) < Test layer depth</u>
If above Reading is larger than test layer depth, answer is NO . If less than test layer depth = YES | CORRECT | IMPROPER |
| 13) To determine whether DCP test passes or fails: check <u>Seat pass/fail</u> & <u>DPI pass/fail</u> along with <u>Adequate Layer? Yes/no</u> . If any of these columns have a fail or no : the test FAILS .
If all three columns have pass or yes : the test PASSES . (2 passing tests required per lot). | CORRECT | IMPROPER |

* no speedy testing on recycled materials!

OVERALL REVIEW: PASS RETEST

L.A. Inspector's initials = _____

IAI Field Review Guide Checklist Grading Base: Moisture by Burner Method

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A or Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

SAMPLE (station) LOCATION: _____ TIME of test: _____

Field TEST # _____ ROADWAY: Position to centerline _____

SOIL CLASS: or 3138 class _____ Depth Below Grade: _____

Equipment Review- Calibrated for current Construction Season? Yes or NO Date/Unit # _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: **Moisture test (burner method) (5-692.245)**

- | | | |
|---|---------|----------|
| 1) Insure scale is marked & calibrated, and that you have all the required test equipment | CORRECT | IMPROPER |
| 2) Select a <i>representative</i> soil sample for test, a minimum sample size of 500g. or more needed. | CORRECT | IMPROPER |
| 3) Weight the pan or container to be used to the nearest 0.1 gram and record weight. | CORRECT | IMPROPER |
| 4) Place moisture soil sample in pan & weigh wet sample & pan to nearest 0.1g ; record weight. | CORRECT | IMPROPER |
| 5) Turn on heat source, dry sample to a constant weight ; (weigh sample after it appears to be dry reheat it for a short time & weigh again. Continue weighing & drying sample until the weight remains constant or loss is < 0.1 grams). <i>Use a heat pad to prevent scale damage!</i> | CORRECT | IMPROPER |
| 6) Weigh the dry sample & container to the nearest 0.1G. and record weight | CORRECT | IMPROPER |
| 7) Determine weight of moisture in sample by subtracting the weight of the dry sample & pan from the weight of the wet sample & pan. | CORRECT | IMPROPER |
| 8) Determine the weight of the dry material by subtracting the weight of the pan from the weight of the dry material and pan. Record weight to the nearest 0.1g. | CORRECT | IMPROPER |
| 9) Calculate the % moisture of the dry weight by dividing the weight of the moisture by the weight of the dry material, and then multiply by 100. | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI Field Review Guide Checklist Grading Base: Sampling / Splitting

S.P. _____ **DATE:** _____ **ENGINEER:** _____

TESTER NAME _____ **Q/A** **OR** **Q/C** (circle one) **Cert #** _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

SAMPLE (Taken) LOCATION: _____ **TIME SAMPLE TAKEN:** _____

Sample/Field I.D.# _____ **SAMPLING** **SPLITTING** **BOTH** (circle one)

TYPE of Material _____ **Pit Location:** _____ **PIT # :** _____

Equipment Review- Calibrated for current Construction Season ? **Yes** or **NO** **Date/Unit #** _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: **Grading & Base-Sampling & Splitting (5-692.211-214)******

- | | | |
|--|---------|----------|
| 1) Verify sample location on roadway using "Random Sampling Test Method" | CORRECT | IMPROPER |
| 2) Obtain <u>Correct</u> sample size (<i>minimum</i> 50-60 lbs. including split) from roadbed at a time when material is ready for compaction. (but NOT after compaction!) In roadbed select a 2'x2' square or whatever size will give the correct quantity, given the thickness of the test layer. | CORRECT | IMPROPER |
| 3) From 3 locations of a cross section of Aggregate deposited on roadbed: using a square nose shovel, carefully remove <i>all material for the full depth of lift being placed</i> . (make certain they do not to get into underlying layer when getting sample). | CORRECT | IMPROPER |
| 4) <u>IF stockpile</u> sampling method is required: sample from at least 3 areas on the pile using a square nose shovel. Use the "step" method and a backboard to prevent material sliding down. | CORRECT | IMPROPER |
| 5) <u>IF windrow</u> sampling method is required: make vertical cut on the side of windrow & remove the loosened material full depth of the cut face. OR knock sides & top off windrow and remove all material from the <u>center</u> of the windrow only. Insure Uniformity **NOTE both windrow & stockpile sampling will need PRE-approval from G&B Office, Project Engineer & Contractor. | CORRECT | IMPROPER |
| 6) Reduce sample size with <u>Riffle Splitter</u> : Insure sample is in friable(dry) condition. Adjust correct chute size(if applicable). Place pan tightly against each side of splitter so chutes extend into pans. | CORRECT | IMPROPER |
| 7) Moving back & forth over hopper chutes, carefully pour in sample- do not pile it up in hopper! | CORRECT | IMPROPER |
| 8) Remove full pans, place next set empty pans tightly against splitter and repeat the process (recommended- process done at least 3 times to ensure sample is thoroughly blended & split). | CORRECT | IMPROPER |
| 9) Reduce sample size <u>Quartering Method</u> ; works best with <i>damp</i> material to reduce segregation. Dump all material on on clean, smooth floor, mix by shoveling (with square nose shovel) move material to adjacent area & form a continuous cone by emptying shovel directly over the center. | CORRECT | IMPROPER |
| 10) Repeat the coning process until material is thoroughly mixed. | CORRECT | IMPROPER |
| 11) With shovel make a clean pass bisecting the cone vertically, draw halves away from each other. | CORRECT | IMPROPER |
| 12) Recombine the diagonally opposite quarters to form samples. If still too big repeat the process. | CORRECT | IMPROPER |
| 13) Original sample (50-60lbs.) now split into two (2) equal 25-30 lb. samples. Label each sample, run one for field gradation & set aside (save) the companion sample as required. | CORRECT | IMPROPER |

OVERALL REVIEW: **PASS** **RETEST**

I.A. Inspector's initials =

IAI Field Review Guide Checklist Grading Base: Field Density by Sand Cone

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ O/A or Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

SAMPLE (station) LOCATION: _____ TIME of test: _____

Field TEST # _____ ROADWAY: Position to centerline _____

SOIL CLASS: or 3138 class _____ Depth Below Grade: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: **Grading & Base-Sand Cone Test (5.692-247/248)******

- | | | |
|---|---------|----------|
| 1) Review PROCTOR curve & results for accuracy: make sure nothing looks "out of the ordinary". | CORRECT | IMPROPER |
| 2) Insure sand, ring & cone is <i>calibrated</i> , and that you have all the required equipment needed. | CORRECT | IMPROPER |
| 3) Select proper test location and depth, using a square nose shovel smooth & level the surface area until ring can be evenly seated. Secure ring with nails through pre-drilled holes into soil. | CORRECT | IMPROPER |
| 4) Dig test hole the same size diameter as inside of ring, being careful not to disturb surrounding soil. Sides verticle & smooth, flat bottom. Deep enough to test compacted layer (typically 4.5"). carefully put <u>all</u> material dug from hole into sealed, airtight container and set aside. | CORRECT | IMPROPER |
| 5) With valve closed, Invert sand jar & place it on ring; match calibration marks on ring & funnel. Do not allow construction equipment to operate near test site while testing in progress. (if you can feel <i>any</i> vibration at test site, construction equipment is too close and must cease!) | CORRECT | IMPROPER |
| 6) Open valve & allow sand to fill hole & funnel. When sand stops, close valve & remove jar. | CORRECT | IMPROPER |
| 7) *If you hit a stone > 2", move to different location. If < 2" remove stone, finish digging hole, seat ring & jar, run <i>small</i> amount of sand, lift jar, bed stone in sand, reseal jar & continue test. | CORRECT | IMPROPER |
| 8) Remove nails & ring from test hole, gather container of soil from hole, jar, and other test equip. | CORRECT | IMPROPER |
| 9) After returning to lab, weigh & record the sand remaining plus jar. | CORRECT | IMPROPER |
| 10) Weigh the wet material removed from hole and record weight. | CORRECT | IMPROPER |
| 11) Determine the moisture content of a representative portion of material from hole by: "Burner method" or "Speedy moisture" method (as per G&B manual 5-692.245) | CORRECT | IMPROPER |
| 12) Do all the calculations to determine the "Relative Density" of the in-place compacted material. | CORRECT | IMPROPER |
| 13) <u>IF</u> the sand cone test <i>failed</i> , did the technician perform the correct follow-up procedures? | CORRECT | IMPROPER |

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI Field Review Guide Checklist Grading Base: Moisture by Speedy Method

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A OR Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

SAMPLE (station) LOCATION: _____ TIME of test: _____

Field TEST # _____ ROADWAY: Position to centerline _____

SOIL CLASS: or 3138 class _____ Depth Below Grade: _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: **Moisture test (26 gram Speedy moisture meter) (5-692.245)******

Only can be used only on non-granular soils (in general, no appreciable amount retained on #4 sieve)

- | | | |
|---|---------|----------|
| 1) Insure meter is marked & calibrated, and that you have all the required kit test equipment (CCGP meter, two 1.25" steel balls, cleaning brush & cloth, scoop, & "fresh" calcium carbide reagent). | CORRECT | IMPROPER |
| 2) Set up "Speedy" case on level, solid ground or bench, the tared scale must be level to be reliable. | CORRECT | IMPROPER |
| 3) Select a <i>representative</i> soil sample and weigh out an exact amount on the tared scale:
The scale weighs either a 26 or 13 gram sample. The pressure gage indicates up to 20% moisture in a 26 gram sample or 40% moisture in a 13 gram sample. If moisture is expected to be 5-20% use 26 gram sample; if 20-40%, a 13 g. sample; and if over 40 % use burner method. | CORRECT | IMPROPER |
| 4) Place the weighed soil sample in the cap of the meter. Be certain the cap is <u>clean</u> . | CORRECT | IMPROPER |
| 5) Place 3 full scoops of reagent & the 2 steel balls in body of the meter | CORRECT | IMPROPER |
| 6) Hold the body of the meter in an approximately horizontal position, insert cap into meter body, seal the unit by positioning & tightening the clamp. The reagent should not come into contact with the soil until a complete seal is made! | CORRECT | IMPROPER |
| 7) Tilt the meter so that the sample falls into the body and begins mixing with reagent. | CORRECT | IMPROPER |
| 8) Return the Speedy to the horizontal position. Shake the unit to pullerize any soil lumps, and to cause mixing so that the reaction between the reagent and all free moisture is complete.
(The meter should be shaken with a rotating motion so that steel balls will not damage gauge, hit the gauge end of meter, or imbed soil in the pressure diaphragm orifice. Attempt to roll balls rather than rattle them. Up to 4 minutes of shaking may be required in heavy clay type soils). | CORRECT | IMPROPER |
| 9) Hold the meter horizontal at eye level with dial facing you, when needle comes to rest, read the dial to the nearest 0.1 % and record the dial reading. | CORRECT | IMPROPER |
| 10) Calculate and record the % moisture of the wet weight by multiplying the dial reading by the sample size factor: | CORRECT | IMPROPER |
| 11) Determine & record the % moisture by dry weight by using the following formula: | CORRECT | IMPROPER |

$$\% \text{ moisture, dry wt.} = \frac{\% \text{ moisture wet wt.}}{1 - \% \text{ moisture wet wt.}} \times 100$$

example: % moisture wet wt. = 12.8%
 example: % moisture dry w

$$1 - \frac{12.8}{100} = 0.872$$

$$\frac{12.8}{0.872} = 14.7\%$$

OVERALL REVIEW: PASS RETEST

I.A. Inspector's initials =

IAI Field Review Guide Checklist Grading Base: Standard Proctor

S.P. _____ DATE: _____ ENGINEER: _____

TESTER NAME _____ Q/A or Q/C (circle one) Cert # _____

***Be sure to VISUALLY check the technician's certification card to verify that they are certified, and current card is valid & not expired!

SAMPLE (station) LOCATION: _____ TIME of test: _____

Field TEST # _____ ROADWAY: Position to centerline _____

SOIL CLASS: or 3138 class _____ Test Layer Depth : _____

Equipment Review- Calibrated for current Construction Season ? Yes or NO Date/Unit # _____

COMMENTS / REMARKS: _____

**** Field Testing Procedure review: **Proctor test (standard multi-point method) (5-692.222E)******

- | | | |
|---|---------|----------|
| 1) Check mold, hammer, sieves, & scale for calibration tag and reliability. Have all additional test equipment and pans needed to perform proctor test correctly available and in good condition. | CORRECT | IMPROPER |
| 2) Insure proper <i>sampling</i> was completed, including enough material (#30 lbs.) correct sample prep done. | CORRECT | IMPROPER |
| 3) Dry and break up sample until friable (if dried in oven-not to exceed 140°F). <u>IF needed-</u> for rock reduction: Sieve adequate quantity of dried sample over 2", 3/4", #4 & bottom pan to determine rock content. Discard stones retained on 2", weigh stones retained on 3/4" sieve, then discard. Replace stones retained on 3/4" sieve with equal weight of stones passing 3/4" & retained on #4 (swap larger stones for smaller ones.)
<small>*Note: the replacement stones may be obtained from remaining portion of sample, companion sample, or completed gradation. Pulverize clumps or clay balls in remaining sample. Recombine stones with pulverized sample in pan. sample. Select about #15 of prepared sample for the proctor test.</small> | CORRECT | IMPROPER |
| 4) Thoroughly mix #15 prepared sample with water, dampen to "starting point"(about 4 points below optimum) (To estimate starting point for granular soils: < 20% passing No. 200 sieve - moisten & mix the soil until it can be squeezed into a ball or "cast". The cast should crumble easily when touched with a single finger). | CORRECT | IMPROPER |
| 5) Determine weigh of mold, base plate, & pans. Record weight of mold/plate to nearest 0.01lb. 5 Pans to 0.1 g. | CORRECT | IMPROPER |
| 6) Reassemble mold, base plate, & collar, place on hard, solid surface for pounding, pan to catch spilled soil. | CORRECT | IMPROPER |
| 7) Fill mold in 3 equal lifts, compact loose material with 25 uniformly distributed full hammer drops per lift. | CORRECT | IMPROPER |
| 8) Remove collar and carefully trim compacted soil with straight-edge until even with top of mold. | CORRECT | IMPROPER |
| 9) Clean off all loose material from mold & base plate, place on scale weigh & record to nearest 0.01 lb. | CORRECT | IMPROPER |
| 10) Remove mold from base plate & loosen side locking screws, carefully slide out compacted soil from mold. | CORRECT | IMPROPER |
| 11) Quarter compacted material by slicing vertically twice, select 1 quarter, place in pre weighed pan & weigh soil + pan and record. Conduct moisture determination test according to procedure in 5-692.245 | CORRECT | IMPROPER |
| 12) Thoroughly break up remaining portions of specimen, and recombine (along with spillage) to main sample. | CORRECT | IMPROPER |
| 13) Remix sample & add 9cc's of water per pound (145cc's per #15) to increase moisture content about 2%. | CORRECT | IMPROPER |
| 14) Thoroughly re-mix sample and repeat steps 7 thru 13 until wt. wet soil+ mold (step 9) either decreases or fails to increase (proctor "breaks"- water now displaces soil particles). Record weight and plot curve. | CORRECT | IMPROPER |

OVERALL REVIEW: **PASS** **RETEST**

I.A. Inspector's initials =

NUCLEAR DENSITY & LWD REVIEWS



IA NUCLEAR DENSITY & LWD REVIEW PROCESS

Independent Assurance Check for Nuclear Density Gauges & LWD Device

1. **General Overview: LWD operators will follow a) b) c) requirements ONLY**

The following establishes a method for verifying whether a nuclear density gauge is properly operating, and whether the operator understands proper procedures for running the nuclear gauge.

Nuclear gauge operators are to demonstrate proficiency in operating the gauge at a project. This will represent the Independent Assurance portion of the program. If more than one type of nuclear gauge (different series or manufacture) might be used during the course of the project, then each gauge is to be checked by this procedure. For full procedure refer to AASHTO T310 or ASTM D6938.

On Pages 75 and 80 of the Grading and Base Manual it states that a nuclear gauge may be used to determine moisture content or density per AASHTO T 310 or ASTM D6938, Direct Transmission Method. AMRL (AASHTO Materials Reference Laboratory) Accreditation is required for QA of Federal Aid projects in 2015. **Provide copies of the following documentation to the Project Engineer:**

- a) Facility AMRL accreditation (required for QA of Federal Aid projects in 2015),**
- b) Annual training records of all nuclear device users and**
- c) Annual records of calibration of all nuclear devices used.**

2. Nuclear Gauge

The gauge should be properly warmed up per the manufacturer's recommendations before starting any check. This permits the electronics to warm up to operating temperatures.

3. OPERATOR

The operator is to demonstrate understanding of the gauge's fundamental operations, which include the following:

- a. Gauge turned on and permitted proper warm up time as per manufacturer? _____
- b. Set up, establish, and record a standard count? _____
- c. Maintained a minimum of 3 ft. (1 m) distance from gauge when in operation? _____
- d. Verified all offsets and correction factors were turned off? _____
- e. Gauge permitted to determine density and results recorded? _____
- f. Were there any vehicles within 10 ft. (3 m)? Yes / No
- g. Were there any nuclear gauges within 30 ft. (10 m) Yes / No
- h. What was the density determined? _____ lb./ft³ or kg/m³
- i. What was the moisture determined? _____ %.
- j. Obtain copies of required documentation as spelt out above in italics.

District or Agency

Works For

Operator's Name:

Prime Contractor

Project Number:

Date:

IA Inspector:

Comments:

APPENDIX L (continued)

Documentation of Nuclear Gauge Training

- 1) For projects let prior to January 1, 2105, IA review would be needed if Nuclear Density Devices are used and there are federal funds used. Follow the IA procedure attached.
- 2) For projects let after January 1, 2105, AMRL accreditation is required, an IA review IA not required but the AMRL documentation must be presented to the Engineer.
- 3) If you wish to provisionalize personal for densities on a nuclear device, I would accept one of the following
 - a. AMRL documentation as will be required after January 1, 2015
 - i. AMRL facility accreditation (for QA on Federal Aid projects let after 1/1/2105),
 - ii. Annual training records of all nuclear device users and
 - iii. Annual records of calibration of all nuclear devices used.
 - b. Use the IA procedure attached and
 - i. Annual training records of all nuclear device users and
 - ii. Annual records of calibration of all nuclear devices used.

Expectable Training for Nuclear Density Gauges

- i. “Consultant” Radiation Safety Course Content for Portable Gauge User Certification
 - b. 1.5 to 2 hours of radiation safety and regulatory requirements with the emphasis on practical subjects important to safe use of the gauge; the difference between exposure and contamination; internal and external exposure; using the ALARA concept to minimize exposure; security and surveillance of gauges; the location of the sealed sources within the gauge; inventory; record keeping; incidents and reporting; licensing and inspection by regulatory agency; need for accurate and complete information; employee protection; deliberate misconduct.
 - c. 1.5 to 2 hours of practical explanation of portable gauge theory and operation; operating, emergency, maintenance, and transportation procedures, and field training emphasizing radiation safety and including test runs of: setting up and making measurements with the gauge, controlling and maintaining surveillance of the over the portable gauge, performing routine cleaning and lubrication, packaging and transporting the gauge, storing the gauge, and following emergency procedures.
- i. “Consultant” Radiation Safety Course Examination
 - a. The individual must complete a 50 question closed book examination with at least an 80 percent correct score required to pass. The exam will emphasize radiation safety of portable gauge storage, use, sealed source location, types and quantities of radioactive material used, licensing and reciprocity, maintenance, and proper transportation procedures. A review of answers to missed questions will immediately follow the scoring of the test.

ii. Nuclear Density Company Training Certification

- a. A company or manufactures training program that covers safety and operation of portable nuclear gauge. A certification of successful completion of any training course is required upon request by any Agency personnel.

APPENDIX L (continued)

- iii LWD Density devise: **Follows the same paperwork requirements for IA reviews as the as the Nuke.**
Please follow the most current LWD procedures as specified in the current Grading & Base Manual:

<http://www.dot.state.mn.us/materials/manuals/GBase/2015gbmanual5222015.pdf>

5-692.256 Light Weight Deflectometer – LWD Procedure & Target Value Determination



Contact Report - Ready Mix 2015

Plant Name: _____ RM #: _____
 Address: _____ Date: _____
 _____ Phone: _____
 Batchman: _____ Email: _____

Prior to the production of Department concrete each construction season, a Department Representative shall perform a thorough on-site inspection of the concrete plant with a MnDOT Certified Plant Level 1 or Level 2 Technician representing the Producer.

Cement, Fly Ash, AFA, and Admixture - Sample the products anticipated for use in Agency concrete when the plant is certified and record below. If additional samples throughout the year are required, record below as well as in your diary.

Cement/Fly Ash - Mill/Power Plant	Date Sampled	Sample ID	Admixture - Product Name	Type	Date Sampled	Sample ID

In addition, the Concrete Producer must also provide the following copies of documentation:

Lab Equipment Calibrations - Date of self calibration: _____

Scale and/or Meter Calibrations - Date of scale/meter calibration: _____

Batch Ticket - A computerized ticket that includes all MnDOT Specifications and supporting information.

Technicians

MnDOT Certified Plant 1 Technician _____ Cert# _____
 MnDOT Certified Plant 1 Technician _____ Cert# _____
 MnDOT Certified Plant 2 Technician _____ Cert# _____
 MnDOT Certified Plant 2 Technician Cell phone # _____

Agency Representative: _____ Agency: _____
 _____ Cell #: _____

Approved Date: _____

Not approved for the following reason(s):

Re-Inspected and approved on _____ by _____

A MnDOT Certified Concrete Plant Level 1 or 2 Technician, representing the Producer, signs the report certifying compliance with the Certified Ready Mix requirements and continual maintenance of the plant to assure that the plant can produce concrete meeting MnDOT Specifications.

After completing the Concrete Plant Contact Report, any procedural changes that cause non-compliance with this program may result in de-certification of the plant and cessation of further production of Department concrete as determined by the Concrete Engineer in accordance with 2461.3.F.4.h, "Decertification."

Certified by: _____
Plant Representative

Email Contact Report and Certificate of Compliance to the Concrete Office at Conc1off.dot@state.mn.us or Fax to 651.366.5530.



Dryer Drum Plant – Certification Report

Name of Company	Plant name
Address	Plant location
Authorized Employee	Plant Operator
Telephone no.:	Telephone no.:
Plant Make	Model
	TPH Rating

Being a duly authorized agent of the above mentioned company, I hereby acknowledge that the following conditions have been met:

- Our Quality Assurance/Quality Control program is in compliance with all MnDOT specification requirements.
- All plant operations equipment and bituminous mixture testing equipment is in proper working order and has been calibrated in accordance with all MnDOT specifications and requirements
- All bituminous testing personnel have met MnDOT’s Technical Certification Program requirements for quality assurance projects.
- A site map is attached showing the type of material, description, and locations of all materials to be used.

Contractors Authorized signature: _____

Comments: _____



PLANT CERTIFICATION APPLICATION

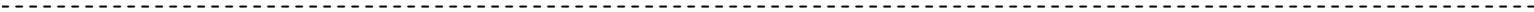
Name of Company: _____ Plant Name: _____
 Address: _____ Plant Location: _____
 Authorized Employee: _____ Plant Operator: _____
 Telephone No.: (____) _____ Telephone No. (____) _____

Being a duly authorized agent of the above mentioned company, I hereby acknowledge that the following conditions have been met:

- Our Quality Assurance/Quality Control Program is in compliance with all Mn/DOT Specification requirements.
- All plant operations equipment and bituminous mixture testing equipment is in proper working order and has been calibrated in accordance with all Mn/DOT Specifications and requirements.
- All bituminous mixture testing personnel have met Mn/DOT's certification requirements for quality assurance projects.
- A site map is available showing the type of material, description, and locations of all materials to be used.

Authorized Signature: _____

I hereby request a Mn/DOT Plant Inspection to complete this application.



Plant Inspected by: _____

Reasons for denial: _____

Comments: _____

Application Request:

_____ Approved
 _____ Denied

 Plant Inspector or Materials Engineer



Minnesota Department of Transportation

Contact Report - Ready Mix

2015

Plant Name: _____ RM #: _____
Address: _____ Date: _____
Phone: _____
Batchman: _____ Email: _____

Prior to the production of Department concrete each construction season, a Department Representative shall perform a thorough on-site inspection of the concrete plant with a MnDOT Certified Plant Level 1 or Level 2 Technician representing the Producer.

Cement, Fly Ash, AEA, and Admixture - Sample the products anticipated for use in Agency concrete when the plant is certified and record below. If additional samples throughout the year are required, record below as well as in your diary.

Table with 7 columns: Cement/Fly Ash - Mill/Power Plant, Date Sampled, Sample ID, Admixture - Product Name, Type, Date Sampled, Sample ID. Multiple empty rows for data entry.

In addition, the Concrete Producer must also provide the following copies of documentation:

Lab Equipment Calibrations - Date of seive calibration: _____
Scale and/or Meter Calibrations - Date of scale/meter calibration: _____
Batch Ticket - A computerized ticket that includes all MnDOT Specifications and supporting information.
Technicians
MnDOT Certified Plant 1 Technician _____ Cert# _____
MnDOT Certified Plant 1 Technician _____ Cert# _____
MnDOT Certified Plant 2 Technician _____ Cert# _____
MnDOT Certified Plant 2 Technician Cell phone # _____

Agency Representative: _____ Agency: _____
Cell #: _____

Approved Date: _____

Not approved for the following reason(s):

Empty rectangular box for providing reasons for non-approval.

Re-inspected and approved on _____ by _____

A MnDOT Certified Concrete Plant Level 1 or 2 Technician, representing the Producer, signs the report certifying compliance with the Certified Ready Mix requirements and continual maintenance of the plant to assure that the plant can produce concrete meeting MnDOT Specifications.

After completing the Concrete Plant Contact Report, any procedural changes that cause non-compliance with this program may result in de-certification of the plant and cessation of further production of Department concrete as determined by the Concrete Engineer in accordance with 2461.3.F.4.h, "Decertification."

Certified by: _____ Plant Representative

Email Contact Report and Certificate of Compliance to the Concrete Office at Conc1off.dot@state.mn.us or Fax to 651.366.5530.



MAXIMUM ALLOWABLE QUANTITY OF MATERIAL RETAINED ON A SIEVE
 References from ASSHTO T 27 - 97¹ and/or Mn/DOT Standards
 {+ #4 Sieve Quantities interpolated by this formula = [(2.5) x (Sieve opening, mm) x (Sieving Area, M2)] }

Nominal Dimensions of Sieve	Sieving Area m ²	203mm	8"	305mm	12"	305mm x 305mm	12"x12"	360mm x 360mm	14"x14"	400mm x 400mm	16"x16"	368mm x 572mm	14.5 x 22.5
		kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs
In.	Mm												
4	100	-	-	-	-	23.23	-	-	-	-	-	-	-
3 1/2	88	-	-	15.08	33.2	20.90	-	-	-	-	-	-	-
3	75	-	-	12.56	27.7	17.42	-	-	-	-	-	-	-
2 1/2	63	-	-	10.55	23.3	14.63	-	-	-	-	-	39.47	87.0
2	50	1.56	7.8	8.38	18.5	11.61	25.5	15.79	34.8	20.59	45.4	31.15	69.4
1 1/2	37.5	2.67	5.9	6.28	13.8	8.71	19.2	11.84	26.1	15.47	34.1	26.31	58.0
1 1/4	31.5	2.24	5.6	5.28	12.6	7.32	16.1	9.96	21.9	13.01	28.6	19.73	43.5
1	25	1.78	3.9	4.19	9.2	5.81	12.8	7.89	17.4	10.30	22.7	16.58	36.5
3/4	19	1.35	3.0	3.18	7.0	4.41	9.7	5.99	13.2	7.85	17.3	13.15	29.0
5/8	16	1.14	2.5	2.68	5.9	3.72	8.2	5.06	11.2	6.61	14.6	10.00	22.0
1/2	12.5	0.89	2.0	2.09	4.6	2.90	6.4	3.95	8.7	5.17	11.4	8.42	18.6
3/8	9.5	0.67	1.5	1.59	3.5	2.21	4.9	2.99	6.6	3.90	8.6	6.57	14.5
3	6.3	0.45	1.0	1.06	2.3	1.46	3.2	1.99	4.4	2.60	5.7	5.00	11.0
4	4.75	0.33	0.7	0.80	1.8	1.10	2.4	1.50	3.3	1.95	4.3	3.32	7.3

{- #4 Sieve Quantities interpolated by this formula = [(7kg/m²) x (Sieving Area in m²)] Mn/DOT Lab Manual

8" round sieves with openings smaller than the #4 (4.75mm) sieve = [7000 g x 0.02850] = 199.5 g 200 grams
 12" round sieves with openings smaller than the #4 (4.75mm) sieve = [7000 g x 0.06700] = 469.0 g 450 grams

Figure B 5-694.145

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