# 200-R-401 RECYCLED FOUNDRY SAND

*(Revised 05-23-13)*

**Description**

Recycled foundry sand, RFS, consists of a mixture of residual materials used from ferrous or non-ferrous metal castings and natural sands. The Contractor shall have the option of incorporating RFS into applicable operations in accordance with 105.03.

**Materials**

RFS sources are to be selected from the Department's list of approved Foundry Sand Sources. RFS may be substituted for B borrow (211) or Borrow (203) upon the approval of the Department's Geotechnical Section.

The Contractor shall provide a copy of the Indiana Department of Environmental Management's, IDEM, waste classification certification for Type III or IV residual sands prior to use. The IDEM certification shall clearly identify the stockpiles with regard to their extent and geographical location.

The Contractor shall provide the Engineer with a type A certification in accordance with 916 for RFS prior to use of the materials. The type A certification shall consist of applicable laboratory tests results of gradation. Consultants on the Department's list of approved Geotechnical Consultants shall perform the testing of RFS materials.

RFS use is restricted to the following additional requirements:

1. RFS derived from Type III residual sand shall not be permitted within 100 ft, horizontally, of a stream, river, lake, reservoir, wetland or any other protected environmental resource area.
2. RFS derived from Type III or Type IV residual sand shall not be placed within 150 ft, horizontally, of a well, spring, or other ground source of potable water.
3. RFS shall not be permitted adjacent to metallic pipes, or other metallic structures.
4. RFS shall not be used as encasement material.
5. RFS shall not be used in MSE wall applications.

If RFS is used in embankment, excavation and replacement operations as a replacement for B borrow or borrow, the following additional restrictions will be required.

1. Borrow: RFS shall be in accordance with 203.
2. B borrow: RFS shall be in accordance with 211.

**Construction Requirements**

RFS shall be transported in a manner that prevents the release of fugitive dust and loss of material. Adequate measures shall be taken during construction operations to control fugitive dust from RFS. RFS shall not be applied when wind conditions result in problems in adjacent areas or result in a hazard to traffic on any adjacent roadway. The spreading of RFS shall be limited to an amount that shall be encased within the same workday. If weather causes stoppage of work or exposes the RFS to washing or blowing, additional RFS may be spread

when the work resumes. Spraying with water, limewater, or other sealing type sprays will be considered to be acceptable methods for dust control.

When RFS is used as borrow or B borrow, compaction of the materials shall be in accordance with 203. Compaction will be determined by dynamic cone penetrometer, DCP, testing in accordance with ITM 509. The moisture content shall be controlled within -3 and +2 percentage points of the optimum moisture content determined in accordance with AASHTO T 99. The DCP criteria will be determined from a test section using the DCP and a sand cone in accordance with AASHTO T 191. If compaction operations are deemed to be insufficient, the Contractor shall coordinate with the Department's Geotechnical Section, to develop and conduct alternative compaction procedures for the material. Nuclear density testing of RFS will not be allowed.

When RFS is used in embankment construction, the sideslopes of the RFS shall be encased with 1 ft of non-RFS borrow materials. All RFS shall be encased with a minimum of 1 ft of non-RFS borrow materials prior to the completion of construction operations in a calendar year. The encasement materials shall be placed and compacted concurrently with the RFS lifts. Encasement materials not meeting the AASHTO M 145 Classifications of A-6 and A-7 shall be submitted to the Department's Geotechnical Section for approvals.

**Method of Measurement**

RFS applications will be measured in accordance to the respective uses for borrow or B borrow.

**Basis of Payment**

RFS will be paid for at the contract unit price in accordance with the respective uses for borrow or B borrow.

No payment will be made for the transportation, handling, or any special construction requirements such as alternative compaction means or encasement activities, when using RFS materials.

The cost of the use of water, limewater, sprays, or other activities necessary for dust control, shall be included in the cost of the respective pay item.

The cost of geotechnical testing for the use of RFS materials shall be included in the cost of the respective pay item.

## RECYCLED FOUNDRY SAND SOURCE APPROVAL CRITERIA

The following procedures covers the requirements for Foundry Sand source approvals or otherwise prescribed subject matter to be added, maintained and removed from a Department's approved list.

The procedures for approval may involve hazardous materials, operations, and equipment. These procedures do not purport to address all of the safety problems associated with the use of the product. The source's responsibility is to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

**General Requirements**

1. A source, requesting approval for addition to the Department's list, shall provide to the Office of Materials Management the following:

   (a) Name and location of source or manufacturer,
   (b) List of material and specification reference for the material that the approval is being requested,
   (c) Average monthly production of the material by size, type or grade,
   (d) Name, address, and telephone number of responsible contact person,
   (e) Facility layout or production process of the material,
   (f) Quality parameters of the material,
   (g) Raw material sampling and testing frequency,
   (h) Procedures for conforming materials which provides a positive linkage between the furnished materials and the quality control test data,
   (i) Procedures for non-conforming materials,
   (j) Procedures for marking and tracking materials,
   (k) Procedures for documentation maintenance,
   (l) Finished material sampling and testing frequency,
   (m) Procedures for reviewing and updating the source operations,
   (n) Testing laboratory quality system,
   (o) Names, titles and qualifications of sampling and testing personnel,
   (p) Location and telephone number of the laboratory testing office,
   (q) Sample management describing procedures for samples identification, maintenance of the samples prior to testing, sample retention and disposal of samples,
   (r) Testing report procedures,
   (s) Methods used to identify improper test results and procedures followed when testing deficiencies occur,
   (t) Statistical analysis of test results, and
   (u) Maintenance of test records

The application shall be signed and dated by the source's or manufacturer's representative at the time the application is submitted for acceptance. The application shall be maintained to reflect the current status and revisions shall be provided to the Department in writing.

2. Testing may be required which will be performed outside the Department's laboratories. A recognized laboratory shall be the following:

   (a) A State transportation agency testing laboratory,
   (b) A testing laboratory regularly inspected by the AMRL, or
   (c) A testing facility approved by the Department.

**Approval Requirements**

In addition to the general requirements, the source shall also submit the following to the Office of Materials Management.

   (a) Name of Testing Facility
   (b) Dates samples were obtained
   (c) Dates samples were tested

(d) Test method used for IDEM classification
(e) Letter from IDEM indicating the waste classification of the materials
(f) Test results for TCLP and neutral leachate
(g) Stockpile sampling locations, including depths and available historical testing results
(h) Gradation test results
(i) Recycled Foundry Sand (RFS) Source Certification

The Recycled Foundry Sand (RFS) source certification is included as Attachment A. A new approval submission shall be required when re-sampling is required in accordance with 329 IAC 10-9-4(e) (2). (In accordance with 329 IAC 10-9-4 (e)(2) for foundry waste, re-sampling is conducted: at two-year intervals whenever the process changes or according to a schedule for re-sampling by the IDEM Commissioner based on variability noted in previous sampling and other factors affecting the predictability of waste characteristics.)

When metal concentration of the Type III residual sand exceeds 80% of the allowable limits within IDEM classification, an indemnification clause is required. The "Recycled Foundry Sand (RFS) Indemnification Clause" is included as Attachment B.

**Maintaining Approval**

Test reports shall be generated in accordance with specification requirements for the material and submitted monthly to the Office of Materials Management. If the material is not produced by the source in a given month, the monthly submittal shall state:

"No _____ was manufactured during _____."
Material month/year

Samples of material may be obtained randomly for verification at the source or at the point of incorporation into the work in accordance with 106.02.

The source shall provide written notification of any changes, revisions or updates of their operations, source name or address, contact person or product name to the Office of Materials Management.

To maintain approval, a summary of new stockpile test results for the acceptance analysis shall be submitted monthly indicating testing every 2,000 t. Tested and approved RFS stockpiles shall be properly signed for easy identification. If no new stockpiles are created in a given month, a letter indicating, "no new RFS stockpiles for month/year were created" shall be submitted to the Office of Materials Management.

**Removal From Approved List**

A source will be removed from the approved list for the following, but not limited to, reasons:

(a) Test failures determined by Department verification sampling,
(b) Monthly test reports not provided for three consecutive months,
(c) Test reports generated by the source which indicate non-compliance with specification requirements, or
(d) Performance of the product no longer meets the intended purpose.

Attachment A

RECYCLED FOUNDRY SAND (RFS) SOURCE CERTIFICATION

This is to certify recycled foundry sand (RFS) stockpiles geographically located as follows:

RFS _____

_____

RFS was produced by the _____ _____ Company located in _____ (City), and _____ (State) and was shipped for use on Indiana Department of Transportation projects is Type _____ (III or IV) material according to the IDEM's restricted waste criteria. If any metal concentration exceeds 80% of the allowable limits for a Type III material the foundry shall provide the Department with an acceptable indemnification clause. The _____ RFS source also agree that processes and stockpiles associated with the production of such RFS may be inspected and sampled at regular intervals by properly identified representatives of the Department or a duly assigned representative.

_____(Date of Signing)_____ (RFS Producer)

_____ (Title)

_____ (Signature)

State of _____ SS: County of _____

Subscribed and sworn to before me by _____

of the firm of _____ this _____ day of _____ 20__

_____ Notary Public

My Commission Expires: _____

This certification has been reviewed and approved by:

_____ _____

(INDOT Representative) Date

Attachment B

RECYCLED FOUNDRY SAND (RFS) INDEMNIFICATION CLAUSE

_____ RFS producer shall indemnify, defend, exculpate, and hold harmless the State of Indiana, its officials, and employees from any liability of the State of Indiana for loss, damage, injury, or other casualty of whatever kind or to whomever caused, arising out of or resulting from a violation of the federal or Indiana Occupational Safety and Health Acts (OSHA), the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), or any other environmental law, regulation, ordinance, order or decree (collectively referred to hereinafter as "Environmental Laws"), as a result of the supply, testing, and application of residual sand or other materials supplied under this Contract by _____ source, whether due in whole or in part of the negligent acts or omissions of: (1) _____ Foundry, its agents, officers, or employees, or other persons engaged in the performance of the contract; or (2) the joint negligence of them and the State Of Indiana, its officials, agents, or employees.

This contract shall include, but not be limited to, indemnification from: (1) any environmental contamination liability due to the supply, testing, and application of residual sand in road base, embankments, or other projects designated by the Department as agreed to by the parties, and (2) any liability for the clean up or removal of residual sand, or materials incorporating such sand, pursuant to any Environmental Law.

The RFS producer also agrees to defend any such action on behalf of the State of Indiana, to pay all reasonable expenses and attorneys fees for such defense, and shall have the right to settle all such claims. Provided, however, that no liability shall arise for any such fees or expenses incurred prior to the time that _____ Foundry shall have first received actual and timely written notice of any claim against the State which is covered by this Indemnification Agreement. If timely written notice of any claim hereunder is not received by _____ Foundry, and _____ Foundry is thereby prejudiced in its ability to defend or indemnify, then to the extent of such prejudice, this Indemnification Agreement shall be void.

This Indemnification Agreement does not create any rights in any third party, and is solely for the benefit of the State of Indiana and its agents, officials, and employees.