

**Pellet Fuels Institute**  
**Residential/Commercial Densified Fuel**  
**QA/QC Handbook**

**Draft manual**

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<b>1</b>	<b>QA/QC Handbook BACKGROUND AND GOAL .....</b>	<b>3</b>
<b>2</b>	<b>applicability.....</b>	<b>4</b>
<b>3</b>	<b>Reference Documents.....</b>	<b>4</b>
<b>4</b>	<b>definitions.....</b>	<b>4</b>
4.1	<i>Accredited Auditing Agency .....</i>	4
4.2	<i>Accredited Testing Laboratory .....</i>	4
4.3	<i>Additives .....</i>	5
4.4	<i>Certification Body.....</i>	5
4.5	<i>Chemically Treated Materials.....</i>	5
<b>5</b>	<b>Product Quality Grade classifications.....</b>	<b>5</b>
<b>6</b>	<b>Quality Management of densified fuel production .....</b>	<b>6</b>
6.1	<i>Overview .....</i>	6
6.2	<i>Quality Responsibility and Authority.....</i>	7
6.3	<i>Training.....</i>	7
6.4	<i>Documentation.....</i>	7
6.5	<i>Records.....</i>	8
6.6	<i>Management of Change.....</i>	8
6.7	<i>Raw Material Control.....</i>	8
6.8	<i>Equipment and Operating Processes.....</i>	9
6.9	<i>Quality Control and Quality Assurance Testing.....</i>	9
6.10	<i>Quality Control of Daily Production .....</i>	10
6.11	<i>Final Quality Assurance Inspection and Testing .....</i>	10
6.12	<i>Nonconforming Materials .....</i>	10
6.13	<i>Corrective Action Requests.....</i>	11
6.14	<i>Product Storage, Handling, and Delivery .....</i>	11
<b>7</b>	<b>Certification of Residential/Commercial Densified Fuel.....</b>	<b>11</b>
<b>8</b>	<b>Labeling of certified product.....</b>	<b>12</b>

## 1 QA/QC HANDBOOK BACKGROUND AND GOAL

This manual provides quality control and quality assurance procedures for the production of residential/commercial densified fuels. For the purpose of PFI's North American Certification of Residential/Commercial Densified Fuel, this manual is to be considered the minimum requirements for certified densified fuel production facilities.

To assure consistent quality of densified fuel leaving the production facility, this manual covers all aspect of densified fuel quality management. As the quality of the densified fuel leaving the production facility is not decisive for customer satisfaction, but rather the quality of the densified fuels that arrive at the end consumer's location, the complete supply chain is considered.

For the purpose of certification, four densified fuel grades have been defined by PFI's Standard Specifications for Residential/Commercial Densified Fuel. It is the intent of this document that densified fuel production facilities identify the grade(s) they intend to produce and develop appropriate QA/QC practices using this manual as a guide to assure that the minimum QA/QC requirements are met and to assure that the final product is in compliance with the specific requirements for the intended grade(s).

This manual provides the following essential components:

- Entities involved in the certification process
- Grade options for certified product
- Minimum requirements for the quality management of residential/commercial densified fuel production
- The certification and certification monitoring process for densified fuel producers
- Labeling requirements for certified product

This manual will be reviewed and revised as necessary by the Pellet Fuels Institute.

## **2 APPLICABILITY**

PFI's QA/QC Handbook applies to all densified fuel production facilities that intend to certify their product in accordance with PFI's North American Certification of Residential/Commercial Densified Fuel. This manual contains the minimum requirements for certification by an accredited auditing agency.

## **3 REFERENCE DOCUMENTS**

PFI Standard Specification for Residential/Commercial Densified Fuel

PFI North American Certification of Residential/Commercial Densified Fuel

PFI Residential/Commercial Densified Fuel Enforcement Regulations

PFI Residential/Commercial Densified Fuel Certification Oversight Standard

## **4 DEFINITIONS**

### **4.1 Accredited Auditing Agency**

As part of PFI's North American Certification for Residential/Commercial Densified Fuel, auditing agencies are accredited by a certification body to implement and enforce the certification system by performing audits and issuing certificates in accordance with PFI's Residential/Commercial Densified Fuel Enforcement Regulations.

### **4.2 Accredited Testing Laboratory**

As part of PFI's North American Certification for Residential/Commercial Densified Fuel, testing laboratories are accredited by a certification body to assure that testing is being conducted in accordance with PFI's Standards Specifications for Residential/Commercial Densified Fuel and that testing services are being provided in accordance with PFI's Residential/Commercial Densified Fuel Enforcement Regulations.

### **4.3 Additives**

Any substance other than cellulosic material that has been intentionally introduced into the fuel feed stock prior to pellet extrusion (except steam/water). Incidental amounts of grease or other lubricants that are introduced into the fuel processing stream as part of normal mill operations are not considered additives.

### **4.4 Certification Body**

As part of PFI's North American Certification for Residential/Commercial Densified Fuel, a certification body is selected to provide independent oversight to the certification system. The certification body accredits auditing agencies and testing laboratories in accordance with PFI's Residential/Commercial Densified Fuel Enforcement Regulations. In addition, the certification body also evaluates certification effectiveness in accordance with the PFI Residential/Commercial Densified Fuel Certification Oversight Standard. Effectiveness is evaluated by means of inspections performed at certified densified fuel production facilities. The certification body also maintain a densified fuel laboratory proficiency program for all accredited testing laboratories.

### **4.5 Chemically Treated Materials**

With the exception of de minimis levels, any feed stock material (cellulosic or otherwise) that has at any time been processed, formed, treated or contaminated with any bonding agent, resin, preservative, surface coating or other finish, or any other chemical compound. Trace amounts of grease or other lubricants that are introduced into the fuel processing stream as part of the normal mill operations are not considered as chemically treated materials.

## **5 PRODUCT QUALITY GRADE CLASSIFICATIONS**

PFI's North American Certification of Residential/Commercial densified fuel covers the four grades of densified fuel that are defined in PFI's Standard Specifications for Residential/Commercial Densified Fuel. As the basis for any densified fuel production facility's quality management program it is imperative that the facility identify the grade(s) intended for production. Grade classifications are as follows:

- Super Premium
- Premium
- Standard
- Utility

If a densified fuel production facility decides to produce more than one grade of product, the quality management system must account for the differences in materials, production requirements, inspections, testing requirements, documentation, record keeping, etc. This does not apply to multiple product labels (e.g., if the same grade of product is marketed under two or more labels.).

For densified fuel producers that have more than one physical plant location, each plant location must have its own quality management program. In addition, each plant location is required to certify independently.

## **6 QUALITY MANAGEMENT OF DENSIFIED FUEL PRODUCTION**

### **6.1 Overview**

It is required that each densified fuel production facility that intends to certify under PFI's North American Certification of Residential/Commercial Densified Fuel develop a written quality management program for monitoring the production process and verify through testing and auditing that final product meets the specifications of the intended grade(s) as outlined in PFI's Standard Specifications for Residential/Commercial Densified Fuel. The essential components of a quality management program for densified fuel production facilities include:

- Defining responsibility and authority throughout the organization
- Training of affected employees
- Documentation to track processes and test data
- Record keeping
- Managing changes to the program
- Controlling the quality of raw materials
- Defining necessary equipment and operating processes
- Daily quality control and quality assurance processes
- Final product inspections and testing
- Disposition of nonconforming materials and products
- Corrective actions for identified deficiencies
- Requirements for proper packaging, storage, handling, transport, and delivery

- Labeling of certified product

## 6.2 Quality Responsibility and Authority

Production facility management is responsible for establishing densified fuel production quality policy. Management must have a means of measuring quality performance and monitoring the progress toward meeting applicable quality standards. Production facility management must appoint an employee, trained in quality control procedures, as a quality manager. To minimize conflicts of interest, the quality manager should not be in charge of production or finance. .

The quality management program must identify who makes decisions if the quality manager is absent as well as outline a hierarchy of the reporting structure.

## 6.3 Training

The quality management plan must specify that quality training is required on an annual basis for all involved employees. Training must cover production requirements as well as applicable standards and specifications.

## 6.4 Documentation

The quality manager must ensure the orderly documentation of operating processes that have an effect on the quality of the densified fuel produced. Documentation must encompass the following components:

- Administrative: organizational structure, job descriptions outlining quality responsibilities, training records
- Raw materials receiving: date, quantity, name of the supplier, type of material, origin, inspection status – meets or does not meet raw material requirements, free of chemically treated materials (with the exception of de minimus levels), material accepted or rejected
- The production process: date, time/hours of operation, tons produced, raw material characteristics, additives used (type as well as dosage), equipment used, quality control monitoring inspection results, description of any nonconformance, disposition of nonconforming product, description of mechanical deficiencies (type of malfunction, measures taken, etc.)

- Quality verification of finished product: test results demonstrating product is in compliance with grade requirements, disposition of product that does not meet grade requirements
- Periodic inspections: equipment inspections, inspections for contaminants or moisture intrusion, inspections of product storage areas
- Customer complaints: date, description of complaint, investigation findings, measures taken to remedy any deficiencies, etc.

Documentation must be kept up-to-date and regularly presented to management. Discovered defects are to be immediately disclosed to the responsible employees and to be remedied.

### **6.5 Records**

Information to be recorded includes all quality documents, forms, inspection instructions, standard operating procedures, testing procedures, testing reports, and data generated to provide the above listed documentation as well as any additional records necessary to demonstrate the effective operation of the quality management system. Records must be available for review for auditing purposes (internal or external).

Records shall be retained for a minimum of 5 years. Storage containers shall be clearly marked as to contents and retention dates.

### **6.6 Management of Change**

Changes to product specifications and production practices shall be documented. The quality manager shall assure that all affected employees are informed and trained accordingly.

### **6.7 Raw Material Control**

When raw materials are received their adequacy must be checked by a receiving inspection to verify that they are in compliance with the minimum specifications deemed necessary for the densified fuel producer to meet the intended grade requirements. Adequacy may also be demonstrated through supplier certification to the minimum specifications. Chemically treated materials as defined in section 4.5 must not be accepted as raw material for PFI certified densified fuel. Other materials that are to be specifically excluded include: construction waste debris, recycled pallets, post consumer recycled wood.

## **6.8 Equipment and Operating Processes**

The production facility must have adequate equipment for the production of densified fuel at its disposal. The function and condition of this equipment must be regularly inspected.

Contaminates of the raw materials or final product by foreign substances such as soil, stones, or other debris must be excluded. Handling areas, silos, conveyor equipment, storage containers, and transport vehicles must be regularly checked for soil and/or debris. Equipment is to be cleaned if necessary to prevent contamination. This also applies to co-mingling of densified fuel products. Certified densified fuel of one grade must not be allowed to co-mingle with densified fuel product of another grade or with non-certified product.

In the case of malfunctions in the production process, it must be identified as to what quantity of densified fuel was produced up until the malfunction was noticed. This densified fuel must be evaluated for grade compliance or it must not be allowed to be sold as certified product. After maintenance work has been completed, the densified fuel must undergo a quality inspection.

## **6.9 Quality Control and Quality Assurance Testing**

Quality control and quality assurance testing must be performed to demonstrate densified fuel compliance with the intended grade specifications. Quality control testing may be performed at the production facility provided appropriate laboratory testing equipment is provided to assure compliance with the established methods and provided an accredited testing laboratory is periodically used (at least twice annually) as a quality assurance measure to verify the accuracy of in-house testing equipment and methods. Conversely an accredited testing laboratory must be used for quality control and quality assurance testing if in-house laboratory testing equipment is not provided.

Testing for quality control purposes should be conducted in accordance with the methods outlined in PFI's Standard Specifications for Residential/Commercial Densified Fuel, however alternate test methods may be used to expedite production data provided the alternate test methods used are periodically cross-checked (at least twice annually) with established methods for accuracy. Testing for quality assurance purposed must be conducted in accordance with the methods outlined in PFI's Standard Specifications for Residential/Commercial Densified Fuel.

All measuring and test equipment used at the densified fuel production facility to determine densified fuel conformance to specified grade requirements must be maintained and calibrated in accordance with manufacturer specifications and/or other applicable standards.

#### **6.10 Quality Control of Daily Production**

Densified fuel production facilities must regularly inspect the quality of the manufactured product to verify that daily production of the densified fuel produced is in conformance with the intended grade specifications. At a minimum, densified fuel production facilities are required to routinely assess bulk density, fines, pellet length and moisture content. Additional parameters may be analyzed at the discretion of the production facility or may be stipulated by the production facility's contracted accredited auditing agency if reasonable doubts exist as to the quality of the densified fuel being produced.

The frequency and location of sampling and testing for quality control purposes must be sufficient to mitigate reasonable doubts concerning pellet quality compliance with grade specifications. When reasonable doubts concerning the pellet quality exist, the accredited auditing agency can stipulate more frequent internal inspections.

#### **6.11 Final Quality Assurance Inspection and Testing**

Densified fuel production facilities must conduct a final inspection and perform quality assurance testing on all product that is intended to be sold as North American Certified Residential/Commercial Densified Fuel. Testing must include all grade specifications outlined in PFI's Standard Specifications for Residential/Commercial Densified Fuel. Samples shall consist of one (1) 40-pound bag taken directly from bagging operations. For bulk shipments, 40-pound samples shall be collected at transfer points after the pellet cooler. Samples shall be collected at a frequency of one sample per every one thousand tons of certified product produced, but not less than one sample per quarter. Bags shall be date stamped and/or numbered by the bagging system to assure time or quantity separation of the samples.

#### **6.12 Nonconforming Materials**

All raw materials and finished products that are found to be nonconforming against specified requirements must be identified, documented, segregated (if possible), evaluated and dispositioned to prevent unintended use or delivery.

This applies to raw materials, in-process product, final product, and customer returned product.

### **6.13 Corrective Action Requests**

A Corrective Action Request (CAR) may be the result of internal or external observations affecting product quality. A CAR form must be initiated as promptly as practicable to correct assignable conditions that could result in defective product.

Findings that identify assignable conditions that are adverse to quality must be corrected on an expedited, high priority basis.

The quality manager shall monitor progress of the corrective action. Initial review of the adequacy of improvements and corrections and the monitoring of the effectiveness of actions taken shall be recorded on the CAR form. The review and monitoring schedule shall be determined by the quality manager.

### **6.14 Product Storage, Handling, and Delivery**

To assure the consistent quality of densified fuel leaving the production facility, certified product must be packaged, stored, handled, transported, and/or delivered in a manner that will maintain the integrity of the densified fuel produced. As the quality of the densified fuel leaving the production facility is not decisive for customer satisfaction, but rather the quality of the densified fuels that arrive at the end consumer's location, the complete supply chain is considered. The minimum requirements for certified densified fuel packaging, storage, handling, transport, and delivery are as follows:

- Densified fuel must not be exposed to moisture, e.g., through contact with condensed water, rain or snow.
- Handling areas, silos, conveyor equipment, storage containers, and transport vehicles must be regularly checked for soil and/or debris. Equipment is to be cleaned if necessary to prevent contamination.
- Certified densified fuel of one grade must not be allowed to co-mingle with densified fuel product of another grade or with non-certified product.

## **7 CERTIFICATION OF RESIDENTIAL/COMMERCIAL DENSIFIED FUEL**

Upon completion of the implementation of a written quality management system based on PFI's Residential/Commercial Densified Fuel QA/QC Handbook, densified fuel

production facilities can pursue certification through accredited auditing agencies. A list of accredited auditing agencies can be found on PFI's website at the following address:

[www.pelletheat.org](http://www.pelletheat.org)

To gain certification, prospective densified fuel production facilities must enter into an agreement with an accredited auditing agency. The accredited auditing agency will issue an application as well as a copy of PFI Residential/Commercial Densified Fuel QA/QC Handbook and PFI Standard Specifications for Residential/Commercial Densified Fuel. The prospective densified fuel production facility must complete and submit the application to the accredited auditing agency. Upon approval of the application by the accredited auditing agency an initial audit of the densified fuel production facility will be performed by the accredited auditing agency to verify compliance with PFI Residential/Commercial Densified Fuel QA/QC Handbook and PFI Standard Specifications for Residential/Commercial Densified Fuel. If deficiencies are found during the audit the applicant must prove to the accredited auditing agency that corrective measures have been taken. Once all deficiencies have been corrected the accredited auditing agency will issue a certificate to the applicant.


Certified densified fuel production facilities are monitored by the accredited auditing agency in accordance with PFI's Residential/Commercial Densified Fuel Enforcement Regulations. As part of this monitoring process densified fuel production facilities are audited initially as well as periodically thereafter.

## **8 LABELING OF CERTIFIED PRODUCT**

When a certificate is issued to a densified fuel production facility by an accredited auditing agency, the certificate holder acquires the right to use PFI's Certification Mark to label the certified product(s) and to use for advertising purposes. The Certification Mark must be exclusively used in direct connection with the certified product(s). Certified densified fuel production facilities who manufacture certified and non-certified products must avoid the impression that the complete production and traded quantities are certified.

PFI's Certification Mark must be displayed as follows:

PFI CERTIFIED FUEL



**PFI Fuel Grade: Super Premium**

**Manufacturers Guaranteed Analysis:**

Reg. #1234

Type of Material:	Softwood fiber
Additives:	2.0% corn oil by weight
Bulk Density:	40–46 lbs/ft <sup>3</sup>
Diameter:	.230–.285 in/5.84–7.25 mm
Durability:	≥96.5
Fines:	≤0.50%
Ash Content (as received):	0.5%
Length:	≤1% >1.5 in.
Moisture:	≤8.0%
Chlorides:	≤300 ppm

© For more information, please visit the PFI website at [www.pelletheat.org](http://www.pelletheat.org).

Certification Mark is displayed on the front, lower third of the bag. Additives may not exceed two percent by weight and the additive type must be stated. Materials must also be disclosed. Material classifications may include: hard wood, soft wood, mixed hard wood and soft wood, agricultural grasses, nutshells, etc.

Densified fuel production facilities that are not certified in accordance with this certification system are not authorized to use the Certification Mark. Any misuse of the Certification Mark will be pursued by PFI to the full extent of the law.