



121 North Henry Street  
Alexandria, VA 22314-2903  
T: 703 739 9543 F: 703 739 9488  
arsa@arsa.org www.arsa.org

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Delivered by Electronic Mail to: david.hempe@faa.gov  
Original delivered by certified mail, return receipt requested  
Receipt no. 7009 2250 0000 4119 4468

David Hempe  
Manager  
Federal Aviation Administration  
Aircraft Certification Service  
Aircraft Engineering Division  
FAA National Headquarters  
950 L'Enfant Plaza North, S.W., Fifth Floor  
Washington, D.C. 20024-2123

RE: Issuance of Parts Manufacturer Approval for "Consumables"

Dear David:

It has come to the Aeronautical Repair Station Association's (ARSA) attention that controversy exists over the Federal Aviation Administration's (FAA) "policy" that a Parts Manufacturer Approval (PMA) is an inappropriate method for approving a "consumable"; a term not defined in or recognized by 14 Code of Federal Regulations (CFR).<sup>1</sup>

ARSA strongly opposes issuance of PMA for "materials" or "processes"; such approvals create unnecessary, unintended consequences for the maintenance community and are contrary to the regulations.

To ensure that article approvals will be accomplished appropriately and consistently under 14 CFR, ARSA respectfully requests that the FAA—

- (1) Update its guidance to clearly define the following terms, as used in the regulations:
  - (a) "material,"
  - (b) "part,"
  - (c) "component,"
  - (d) "process";
- (2) Emphasize the definition for "appliance" in § 1.1; and,
- (3) Withdraw any PMAs issued for materials or processes.

### *Need for Approval*

To determine whether a civil aviation article<sup>2</sup> even needs approval,<sup>3</sup> one must first analyze the pertinent regulations.

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<sup>1</sup> All references are to 14 CFR unless otherwise noted.

<sup>2</sup> See, § 21.1(b)(2) states: "Article means a material, part, component, process, or appliance."

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In the design and production world, all design data<sup>4</sup> must be approved; that approval is accomplished under part 21,<sup>5</sup> which ensures that changes made to a material (or indeed any article) are not performed in a vacuum, but are evaluated in relation to the design or production process.<sup>6</sup> Materials must be approved in relation to a specific part or process to establish initial compliance, and continued compliance, with the specified airworthiness standards and requirements.

The need for approval under part 21 is also triggered by whether a replacement or alteration article is being produced for sale for installation in a type certificated product (outside of a design and/or production approval holder’s quality system).<sup>7</sup> In other words, if one is producing and selling an article into the “aftermarket” (i.e., outside another design or production approval holder’s system), one may need an approval.

Section 21.9(a) clearly requires approval of a replacement or alteration part, component or appliance.<sup>8</sup> However, § 21.9(a) does not require approval of a replacement or alteration *material or process* that is not covered by the design or production holder’s design and quality system. The permissibility of using materials and processes “in the aftermarket” depends upon the maintenance, preventive maintenance and alteration regulations, not approval of the material or process under part 21.

Under the maintenance, preventive maintenance and alteration regulations, the requirement for approval of an article is triggered by whether the result of a repair or alteration is major or minor.<sup>9</sup> Under these regulations, no article may be approved in a vacuum. A part, component or appliance is installed in the course of the maintenance, preventive maintenance, or alteration of a particular assembly. Materials and/or processes are often used, but they are not themselves parts, components, or appliances. All maintenance, preventive maintenance and alterations must use the methods, techniques and practices required by § 43.13(a), and the end result must meet the quality standard of § 43.13(b).

### *Types of Approval*

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<sup>3</sup> See, § 21.8, which states, in pertinent part: “**If an article is required to be approved** under this chapter, it may be approved....” (Emphasis added.)

<sup>4</sup> See, § 21.31, in particular § 21.31 paragraphs (a) and (b) and § 21.303(a)(3).

<sup>5</sup> See, §§ 21.93 through 21.97, 21.319 and 21.619.

<sup>6</sup> See, generally, Chapter 2 of Order 8110.37E, for a Designated Engineering Representatives’ authority and limitations. All technical data must be approved within the context of the airworthiness standards, i.e., it is clear that technical data cannot be approved in a vacuum; it must be applicable to some aspect of the design of a product.

<sup>7</sup> See, 14 CFR § 21.9.

<sup>8</sup> See, Advisory Circular 43.18, which has set the FAA’s policy for the definition of the word part as “...an article that...is eligible for installation on a certificated aircraft **without further manufacturing processes**. NOTE: The definition...**would not include raw materials or repair segments being utilized for the repair or alteration of a part, (i.e., sheet metal stock, sealants, lubricants, raw forgings, or castings, billet material, etc.)**.” (Emphasis added.)

<sup>9</sup> See, 14 CFR §§ 1.1, 65.95(a)(1), 121.379(b), 135.437(b), and 145.201(c)(2).

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The Association submits that the types of approvals, and the situations in which they apply, are clear under the plain language of § 21.8. Specifically—

- (1) Paragraph (a) applies to parts, components and appliances for which the FAA has not issued a Technical Standard Order (TSO).
- (2) Paragraph (b) applies to parts, components, appliances and materials for which the FAA has issued a TSO.
- (3) Paragraph (c) applies to any article that is approved as an element of a type or supplemental type certificate’s design under the provisions of part 21, and is subsequently produced by a production approval holder in conformity with that approved design.
- (4) Paragraph (d) applies to articles that do not fall under paragraphs (a) to (c) and would include, but not be limited to, materials and processes that need to be approved as an element of a major repair and/or alteration.

#### *Current Situation*

The FAA has issued PMA for a material (sealant) and has concluded that it did so in compliance with § 21.303. We respectfully disagree with that conclusion, and believe that it is contrary to the regulations.

- (1) First, and most important, the sealant does not *need* an approval. When the sealant is being used in the original production of articles, it is approved as part of the design.

When the sealant is used in maintenance, preventive maintenance or alteration operations, it must be applied in accordance with § 43.13, and if the sealant is applied in the course of major repairs or alterations, the technical data supporting each separate repair or alteration must be approved separately.<sup>10</sup>

Issuance of a PMA for a material is extremely misleading; it indicates that the material is an “approved replacement” for something that is, first, not a part, and second, cannot be used without the use of appropriate methods, techniques and practices. In other words, in the case of a sealant, it cannot be applied everywhere the original sealant is called for in maintenance instructions without further analysis. If the sealant is not applied in conjunction with the appropriate methods, techniques and practices, the application will not return the article to at least its original (or properly altered) condition as required by § 43.13. In addition to the regulations, the FAA has numerous policy documents that support this conclusion, including Order 8110.37 (cited numerous times in this letter) and Order 8110.42, which states that “[a]ny specific inspection procedure, materials, or processes...approved as part of a PMA [is] valid only for that particular part.” (Emphasis added.)

- (2) Second, and equally important, for an applicant to establish compliance with § 21.303, a *design* for the article must be submitted. Specifically, the applicant must submit “drawings

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<sup>10</sup> See, Order 8100.37E, paragraph 2-6, subparagraph a.(2), which states: A DER only needs this delegation if Form 8110-3 will be referenced as the approved data for a specific major repair or major alteration. (Emphasis added.)

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and specifications” and “[i]nformation on dimensions, materials, and processes.”<sup>11</sup> With that information, the applicant must undertake tests and computations to show compliance with an applicable airworthiness standard.<sup>12</sup> Not just the general airworthiness standard, e.g., part 25, 33 and the like, but specific regulatory sections and paragraphs applicable to the installation of the part in a specific location in a specified product. These requirements are directed at parts, components or appliances, *not* to materials and processes used in the “design” of those parts, components, or appliances.

Indeed, it is impossible to fulfill the requirements of § 21.303 with respect to materials (or processes for that matter). First, there is no drawing for a material, and therefore no associated specifications to establish configuration. Next, a material has properties, but no dimensions and rarely processes (these elements are associated with a part, component or appliance made from the material). Finally, there are no airworthiness standards applicable to stand alone “materials”; the regulations reference materials used in the *design*, and the design consists of the drawings and specifications establishing configuration.

In order for the FAA to approve a part under a PMA, the applicant must show exactly where and how that article is installed and obtain approval for each particular installation. Indeed, if the applicant wishes to add an installation, it must submit a separate design package for approval.

- (3) Materials are not “installed”; they are applied or used as required by a method, technique or practice in original production activities (in which case they are approved as part of the design) or when performing maintenance, preventive maintenance or alterations.
- (4) Just because a material has been assigned an identification number does *not* make it a part. If that were the case, the agency would issue PMA for tools, equipment and raw materials. Design and production approval holders use “part numbers” for many things, not just completed parts, components and appliances. For instance, raw material and stock is referenced by part number, and even processes are assigned identification or “part” numbers. The regulations do not support issuance of a PMA merely because an article has an identification (or part) number.
- (5) Contrary to the conclusion in the Oct. 20, 2008 letter from the Chicago Aircraft Certification Office to PPG (copy attached), although tests and computations were accomplished on the “replacement part” referenced, i.e., the sealant, that does not mean the replacement is ‘equal to or better’ than<sup>13</sup> the “original” material in every application. Indeed, persons authorized to perform maintenance, preventive maintenance and alteration under part 43 must establish

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<sup>11</sup> See, § 21.303(a)(3).

<sup>12</sup> See, § 21.303(a)(4)-(5).

<sup>13</sup> A phrase used in the maintenance world, not in the design and production world.

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that the application of the sealant to the article<sup>14</sup> will return that article to “at least its original (or properly altered) condition with respect to the work performed.”<sup>15</sup>

The regulatory framework deliberately precludes a “blanket” approval of materials; that framework ensures that approval of a material is never made in a vacuum; rather, it must always be analyzed to ensure the particular use of the material being considered falls within the appropriate methods, techniques and practices for a specific application.

### *Conclusion*

The discussion of whether PMA can or should be issued for “consumables” is distracting the FAA from the real issue: the issuance of PMA for materials is contrary to the regulations. The pertinent regulations apply to “articles” and yet it is important to recognize that not all articles are treated the same under the regulations. A careful reading of the regulations makes clear whether, and if so, how, each type of article must be approved.

We respectfully ask the FAA to issue guidance which establishes—

- (1) The definitions of the following regulatory terms as—
  - (a) “Material” means an article that is not itself a part, component, process, or appliance; that is applied to, or filled in to, or otherwise used in design, production (fabrication), maintenance, preventive maintenance or alteration of a part, component, or appliance. A material is distinguishable from a part, component, or appliance because it is defined by its chemical or physical properties.
  - (b) “Part” means an article that is eligible for installation in a component, appliance, or product, without further design or production processes; that consists of materials, processes, and dimensions; and that is distinguishable from a material because it has taken on the attributes identified in the type design of the product.
  - (c) “Component” means an article composed of one or more parts that is eligible for installation in another component, appliance, or product without further design or production processes.
  - (d) “Appliance” will continue to be defined by § 1.1 to mean “any instrument, mechanism, equipment, part, apparatus, appurtenance, or accessory, including communications equipment, that is used or intended to be used in operating or controlling an aircraft in flight, is installed in or attached to the aircraft, and is not part of an airframe, engine, or propeller.”
  - (e) “Process” means a method, technique, or practice used in production or in maintenance, preventive maintenance, alteration, or rebuilding activities.
- (2) That an article needs to be approved—

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<sup>14</sup> See, § 145.3(b), which states “*Article* means an aircraft, airframe, aircraft engine, propeller, appliance or component part.” Clearly, for persons that must work under part 43, a material or process cannot be an “article”.

<sup>15</sup> See, § 43.13(a) and (b) in conjunction with § 43.9(a)(4).

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- (a) Under part 21, when used in design and production activities, either for original installation, or for replacement of, or changes to, the article in connection with design or production activities.
  - (b) Under part 43, in conjunction with the use of an article in a major repair or major alteration in part 43 maintenance, preventive maintenance, alteration or rebuilding activities.
- (3) That—
- (a) Section 21.8(a) applies to parts, components and appliances for which FAA has not issued a Technical Standard Order (TSO).
  - (b) Section 21.8(b) applies to parts, components, appliances and materials for which the FAA has issued a TSO.
  - (c) Section 21.8(c) applies to any article that is approved as part of a type or supplemental type certificate's design under the provisions of part 21, and is subsequently produced by a production approval holder in conformity with that approved design.
  - (d) Section 21.8(d) applies to articles that do not fall under paragraphs (a) to (c), and would include, but not be limited to, materials and processes that need to be approved as part of a major repair and/or alteration.

Finally, we request that any PMAs already issued on materials or processes be withdrawn as unnecessary and contrary to the regulations, since it is impossible for the applicant to establish compliance with the plain language of § 21.303.

We appreciate your attention, and we look forward to the prompt resolution of this matter.

Your Servant,



Sarah MacLeod  
Executive Director

Attachment Letter from Chicago Aircraft Certification Office to PPG, dated Oct. 20, 2008

cc: E. Tazewell Ellett	Tazewell.ellett@hoganlovells.com
John G. Sands	john.sands@prc-desoto.com
John Hickey	john.hickey@faa.gov
Dorenda Baker	dorenda.baker@faa.gov
Frank Paskiewicz	frank.paskiewicz@faa.gov
Jim Seipel	james.seipel@faa.gov
Bruce Kaplan	bruce.kaplan@faa.gov
Angelia L. Collier	angelia.collier@faa.gov
John King	john.king@faa.gov
Gary Michel	gary.michel@faa.gov

**Attachment**



U.S. Department  
of Transportation

Federal Aviation  
Administration

October 20, 2008

Mr. John G. Sands  
Platform Business Manager-Sealants  
PPG Aerospace PRC DeSoto  
12780 San Fernando Road  
Sylmar, California 91342

Dear Mr. Sands,

This letter is in response to your September 5, 2008 letter, requesting a review of the process that was used to support the issuance of a Parts Manufacturer Approval (PMA) to Aerospace Sealants, Roselle, IL. We have reviewed your letter and the testing and analysis that was conducted to determine compliance to our regulations. We offer the following for your consideration:

You mentioned Federal Aviation Administration (FAA) Order 8110.42C (Parts Manufacturer Approval Procedures) in your letter. This Order provides guidance on how to conduct material, product, processes or part certification to show compliance to 14 CFR Part 21, Subpart K. As you noted, Chapter 1, paragraph 6a, of this Order states that "PMA is not for the approval of inspection procedures, materials or processes. Any specific inspection procedures, materials, or processes (such as hardening, plating, or shot peening) approved as part of a PMA are valid only for that particular part. Any person performing only specialized processes or procedures on parts intended for installation on type certificated products must do so within production or other approvals for those parts." In the case of materials, the Order is referring to raw materials such as metals or composite preregs, etc. that do not have a specific part number identification defined by the type certificate (TC) approval holder. In this case your sealants have a specific part identification number included in the TC approval holder's instructions for continued airworthiness. The identification numbers are called out in those documents. Eligibility for PMA was determined using that published information.

You also mentioned Chapter 1, paragraph 6g, of the Order which states that "Production and sale of standard parts for type certificate products do not require a PMA. These parts conform to established industry or U.S. specifications. However, a Production Approval Holder (PAH) may buy standard parts, subject them to more restrictive inspection criteria and assign new part numbers. These parts are no longer standard parts. If questions arise, contact the certifying aircraft certification office (ACO), manufacturing inspection district office (MIDO), or both to determine if the part design meets the criteria for standard parts." The ACO determined that sealants were a specialized formulation that does not meet the intent of an "off the shelf" standard part, and that a PMA test and computation program was the appropriate means to determine compliance to 14 CFR Part 21, Subpart K. This is the same approach we have used on other sealant PMA approvals. Other ACO's have also issued PMA approval for sealants in their geographic regions.

You expressed concerns related to the proprietary nature of your product. We recognize that specialized manufacturing formulations and processes exist and are considered proprietary to a company. Our office reviews and processes hundreds of propriety and confidential data packages each year. Aerospace

Small Airplane Directorate  
Chicago Aircraft Certification Office  
2300 E. Devon Avenue  
Des Plaines, IL 60018

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Sealants did not present any of your company's proprietary data to show compliance to the applicable regulations. An extensive back-to-back testing and analysis program was accomplished to show that their sealants performed in an "equal to or better" manner compared to the existing "approved" sealants. Aerospace Sealants materials were qualified to the appropriate Aerospace Material Specifications (AMS), Military specification (MIL), or Original Equipment Manufacturers (OEM) specifications. Aerospace Sealants has met the Performance Review Institute (PRI) qualification as required by the applicable specification. In addition, Aerospace Sealants has performed flammability and microbial testing. Third party laboratories were used to perform the testing, including the University of Dayton Research Institute (UDRI). The entire PMA program took approximately four years to complete which resulted in the final product analysis report that was reviewed and accepted for the FAA PMA Approval. No "shortcuts" were taken.

The Aerospace Sealant PMA was properly issued. It is necessary to identify what the PMA'd item replaces. We cannot comply with your request to remove the PRC-Desoto name from the PMA Supplement. Some OEMs specifically callout the PRC-DeSoto name and part number in their instructions for continued airworthiness publications. Having the name identified in the supplement does not indicate that the product formulations are identical, only that the performance of the PMA'd product equals or exceeds that of the referenced item. Likewise we cannot remove the listing of airframe and engine manufacturers from the "Model Eligibility" column of the PMA. The installation eligibility is an essential element of the approval.

As a point of information Aerospace Sealants has recently indicated that a number of Original Equipment Manufacturers (OEMs) have (or are in the process of) independently evaluating their sealants for use in manufacturing production.

Finally with respect to our mutual concern for safety, we must note that a PMA holder is required to report to us any failure, malfunction or defect related to their product approval. We have not received any reports of performance problems or other quality issues related to the Aerospace Sealants PMA'd products.

We trust that our explanation answers and satisfies your concerns. If you have any additional information, please contact Mr. Tim Smyth of my Propulsion Branch at (847) 294-7132 or by e-mail at [timothy.smyth@faa.gov](mailto:timothy.smyth@faa.gov).

Sincerely,

Charles L. Smalley  
Acting Manager,  
Chicago Aircraft Certification Office

Cc: ACE-118C

ACE-118C:tsmyth:X7132:TPS:10-20-2008: PPG PRC PMA Letter.doc

8110.3.b PPG Letter of Inquiry (PMA Approval)  
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