INCREMENTAL CHANGE Release Notification Date: 01/12/2023

SPM 70-21-09 CLEANING METHOD NO. 9 - LIGHT-DUTY ALKALINE CLEANING OF TITANIUM ALLOYS

DISCLAIMER

The Incremental Changes published by GE Aviation are considered Instructions for Continued Airworthiness. These Incremental Changes, along with the current Manual revision and published Temporary Revisions, constitute the latest Instructions for Continued Airworthiness.

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HIGHLIGHTS

HIGHLIGHT REFERENCE	DESCRIPTION OF CHANGE
tk70-21-09-110-007	Technical Change: Added CAUTION and NOTE for the procedure.

TASK 70-21-09-110-007

1. General.

CAUTION: RESTRICT TITANIUM CLEANING TANK TO TITANIUM PARTS ONLY.

CAUTION: APPLICATION OF MASKING TO THE SEAL TEETH ALUMINUM OXIDE TOPCOAT IS NECESSARY FOR THIS CLEANING PROCESS UNLESS OTHERWISE SPECIFIED IN THE APPLICABLE REPAIR DOCUMENT.

NOTE: If the seal teeth aluminum oxide topcoat will be stripped and replaced before the part is returned to service, then the masking is not necessary.

A. This process is used to clean titanium and titanium alloys using a weak alkaline aqueous solution.

B. In the event of heavy contamination with grease, clean with appropriate solvents.

2. Equipment.

Subtask 70-21-09-110-071

A. The following equipment is required for the application of this process.

(1) Safety equipment and devices which are standard equipment in surface treatment shops such as: eye bath, emergency showers, protective clothing against electroplating products and means for neutralizing acid or alkaline splashing.

(2) Processing plant for neutralizing waste and used solutions.

(3) Efficient ventilation system for extracting and neutralizing vapors.

(4) An alkaline degreasing tank made from stainless steel with a heating coil that is capable of heating the solution to 190°F (88°C).

(5) A water rinse tank made from stainless steel, used after the alkaline degreasing bath.

(6) An air/hot water 150 to 200°F (66 to 93°C) spray gun.

3. Materials.

Subtask 70-21-09-110-072

Alkaline Degreasing Solution for Titanium - Table 1

Solution	No.	Operating Temperature °F (°C)
Turco 4181, Turco 4181-L or Turco 4181-GL	S1003	160-190 (71-88)
Turco Vitro-Klene	S1010	160-180 (71-82)
Cee-Bee C-46	S1030	160-190 (71-88)
Cee-Bee J-84A or Cee-Bee J-84AL	S1139	160-190 (71-88)
Ardrox 185 or Ardrox 185L	S1140	180-190 (82-88)
MagChem HDL-202	S1151	180-190 (82-88)
Eldorado HTP-1150 or 1150L	S1168	180-190 (82-88)
Applied 5-840	S1175	180-190 (82-88)

NOTE: If smutting is observed at the temperature specified in Table 1, reduce the tank temperature range to 160-170°F (71-77°C).

4. Requirements.

Subtask 70-21-09-110-075

A. Titanium is subject to the following requirements regarding chloride. Refer to Step 3 (Definitions and Test Protocol) in TASK 70-00-05-800-006, Water Types.

(1) If parts will be exposed to subsequent processing that operates above 500°F (260°C) (for example, welding or heat treating) the final rinse water used on the parts must not be more than 50 ppm chloride (10000 ohm-cm minimum resistivity, 100 Microsiemens/cm maximum conductivity).

(2) For parts that will not be exposed to subsequent processing that operates above 500°F (260°C), the final rinse water used on the parts can be potable water that must not be more than 250 ppm chloride (1800 ohm-cm minimum resistivity, 550 Microsiemens/cm maximum conductivity).

5. Procedure.

Subtask 70-21-09-110-073

A. In case of excessive dirt, preclean part using a solvent or light duty aqueous cleaning as indicated in the Engine/Shop Manual. Adhesive products such as paper, tape, and their residues should be removed from parts prior to cleaning. It is recommended that all temporary marking also be removed from parts prior to cleaning.

WARNING: ALKALINE SOLUTIONS ARE VERY ACTIVE AND CAUSE SERIOUS BURNS. AVOID CONTACT WITH SKIN, EYES, AND CLOTHING. IF CONTACT OCCURS, WASH IMMEDIATELY WITH ABUNDANT QUANTITY OF WATER. AVOID BREATHING VAPORS.

WARNING: OPERATOR SHOULD WEAR FACE SHIELD, GLOVES, PROTECTIVE CLOTHING, AND PROTECTIVE SHOES.

B. Immerse the part in a tank containing one of the alkaline degreasing solutions listed in Table 1 and maintain the solution at the specified temperature. The alkaline degreasing solutions are listed in Subtask 70-21-09-110-072, Materials.
Duration: 10 to 20 minutes.

C. Spray rinse with water over the alkaline solution tank.

D. Rinse by immersion in ambient water then pressure spray rinse.

E. Alternative Procedure Available. Rinse and dry the part as follows:
Option A. If the titanium engine part will go directly from this cleaning operation to a thermal repair process (such as welding, brazing, or heat treatment) the final rinse water shall contain less than 50 ppm chloride (as defined in TASK 70-00-05-800-006, Water Types). Any of the steps that follow will meet this requirement:

(1) An overflowing tank of potable water that is always below 50 ppm chloride (as defined in TASK 70-00-05-800-006, Water Types) provided that there is an adequate overflow rate and data to substantiate that the immersion time of the part in the tank is long enough for the dilution of any potential chemical drag-in to below the 50 ppm chloride limit.

(2) A final spray rinse with distilled or deionized water.

(3) A stagnant tank of deionized water (either for immersion or spray washer rinsing) that is maintained below 50 ppm chloride (as defined in TASK 70-00-05-800-006, Water Types).

NOTE: Conductivity probes are frequently used to maintain these tanks within control limits and the parts shall remain in the rinse water until the tank resistivity returns to at least 10,000 ohm-cm (100 Microsiemens/cm).

(4) Remove excess water by repositioning, suction, blotting with a clean absorbent material, or blowing off with an oil and water filtered shop air gun.

E. Alternative Procedure. Rinse and dry the part as follows:

A.

Option B. Final Rinse with Potable Water Before FPI:

NOTE: If an oven dry at 200°F (93°C) +/- 25°F (14°C) until the part stabilizes at the oven temperature is used after the potable water rinse operation, the potable rinse can be at ambient temperature.

(1) If the part is going directly to FPI, rinse by immersion in hot potable water at minimum 150°F (66°C). Keep the part submerged until the part reaches a temperature sufficient to provide for flash drying.

NOTE: The time required will vary with part size, water temperature and tank size. Proper flash drying is indicated by seeing the water on the surface of a part start to "flash" or "whisk" off as the part is being removed from the hot water tank.

(2) Remove excess water (and help flash drying) by repositioning, suction, blotting with a clean absorbent material, or blowing off with an oil and water filtered shop air gun.

6. Quality Assurance.

Subtask 70-21-09-110-074

A. Visually check the part for complete removal of oil and dirt.

B. Chloride analysis shall be performed in accordance with Step 3 (Definitions and Test Protocol) in TASK 70-00-05-800-006, Water Types.

C. Following cleaning, appropriate precautions should be taken to prevent chloride (more than 50 ppm) or other contamination of finished parts prior to any processing which generates temperatures in excess of 500°F (260°C). Clean gloves may be necessary for handling of parts to make sure that this requirement is met.

NOTE: Fingerprints may contain more than 50 ppm chloride.