1. SCOPE

1.1 Purpose.- The purpose of this specification in to provide information concerning equipment, compounds, and procedures for removing dirt, grease, and paint from aircraft and assemblies to be reconditioned.

1.2 Application.- All cleaning operations covered by this specification may be accomplished where required without further authorization. Cleaning operations not authorized by this specification cannot be performed without further authorization.

1.3 List of Pages and Revisions.- This specification consists of the pages listed below. An asterisk (*) denotes pages revised at the current revision.

Page	Date	Description of Revisions	Serial Effectivity
1*	7-2-53	To note revision	
2	2-2-53		
3	2-2-53		
4	2-2-53		
5	2-2-53		
6	2-2-53		
7	2-2-53		
8	2-2-53		
9*	7-2-53	To delete unnecessary information	Any
10*	7-2-53	To delete unnecessary information	Any
11*	7-2-53	To delete unnecessary information	Any

APPROVED:

USAF Quality Control

WRITTEN BY	DATE ISSUED 2-2-53	OVERHAUL SPECIFICATION CLEANING PROCEDURES FOR RECONDITIONED AIRCRAFT		
PROJECT ENGINEER				
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2. APPLICABLE PUBLICATIONS

2.1 Specifications:

2.1.1 Military.-

MIL-C-5410A, Type II	Compound; Cleaner and Brightener, Non-flammable; for use on Aluminum
MIL-F-7179	Finishes and Coatings; General Specification for Protection of Aircraft and Aircraft Parts
MIL-S-5002	Surface Treatments (Except Priming and Painting) for Metals and Metal Parts in Aircraft

2.1.2 Air Force - Navy.-

AN-T-37a	Trichlorethylene; Stabilized Degreasing

2.1.3 Federal.-

P-S-661	Solvent; Dry Cleaning (Stanosol, Stoddard Solvent)
P-C-576	Compound; Grease Cleaning, Solvent-Emulsion Type (Kelite 5 Star, Turco 2844)
VV-K-211c	Kerosene

2.1.4 U. S. Air Force.-

14119C	Remover; Paint, Aircraft Finish
20015E	Compound; Cleaning, Aircraft
14128A	Compound; Steam Cleaning

2.1.5 Beech.-

OS 7003	Airframe and Control Antifriction Bearings
OS 7010	Removing Corrosion from Aluminum Parts
OS 7011	Removing Slushing Compound
OS 7012	Instrument Cleaning

2.2 Technical Orders.- Compliance with this specification constitutes compliance with the Technical Orders listed below:

TO 01-1-1	Cleaning of Aeronautical Equipment, February 3, 1949

2.2 Technical Orders (Continued)

TO 01-1-1C	Cleaning of Aeronautical Equipment
TO 07-1-7	General Removal of Paint from Aircraft Surfaces, May 27, 1948

3. REQUIREMENTS

3.1 Parts Involved.- This specification covers general cleaning and paint stripping of all aluminum, magnesium, steel, brass, bronze, copper, and zinc parts and assemblies. Fabric, plastics, wiring, and electrical equipment must be removed or protected from the cleaning and stripping solutions. Refer to the Overhaul Specifications listed below for requirements beyond the scope of this specification.

OS 7003	Airframe and Control Antifriction Bearings
OS 7010	Removing Corrosion from Aluminum Parts
OS 7011	Removing Slushing Compound
OS 7012	Instrument Cleaning

3.2 Cause for Rejection.- Refer to the detail overhaul specification for the specific part involved.

3.3 Reconditioning Operations.- The cleaning procedures are listed in the order of the cleaning ability of the compounds and solutions used. Mild cleaners are listed first. The strongest solutions are listed under paint removal and cold tank immersion for heavy carbon cleaning. Most reconditioned parts will be vapor, steam or spray cleaned and then given the paint removal application. For a final clean-up after using cleaning compounds and paint and carbon removers, use Turco L800 to remove any residue of the compounds or remaining soil or paint.

3.3.1 Cleaning with Solvents.- Items such as phenolic blocks and pulleys, engine accessories and all aluminum, magnesium, steel, copper, brass, and bronze assemblies and parts with light soil may be cleaned by this procedure.

3.3.1.1 Equipment.-

a. High pressure flushing equipment for cleaning with solvent or to use as a rinse after other compounds.

b. Suitable open top containers when the above equipment is not deemed necessary.

c. Stiff bristle brushes, medium size.

d. Clean rags for drying or air drying equipment.

3.3.1.2 Cleaning Solvents.- To be used as a cleaning fluid, mixed with cleaning compounds or used for rinsing.

a. VV-K-211 Kerosene

b. P-S-661 Stanosol, Stoddard Solvent

3.3.1.3 Procedure.-

a. Apply P-S-661 or Kerosene with brush, high pressure spray, or allow to soak in an open container.

b. Agitation of the surface with a brush will be necessary to remove soil.

c. Dry parts with rags or hot or cold air.

3.3.2 Vapor Degreasing.- Solvent vapor degreasing is a method for removing surface contamination from metal surfaces when the contaminants consist of oil, greases, or other materials soluble in the vapor solvents. Do not use on fabric, rubber, or other organic materials which are subject to deleterious attack by the solvent.

3.3.2.1 Equipment.- Detrex, Phillips or G.S. Blakeslee Degreaser. Models and sizes as required.

3.3.2.2 Solvents.- The solvents used in degreasing will be those specifically manufactured for vapor degreasing. They shall have been sufficiently purified and properly inhibited to prevent corrosion of parts during or after cleaning.

a. Trichlorethylene Perm-a-chlor, Blakosolv No. 1

b. Perchloroethylene Perm-a-kleen, Phillsolv

3.3.2.3 Procedure.-

a. All models of vapor degreasing units must be operated according to routines set up by the manufacturer. Directions for most efficient and most economical operation are available with the degreasing unit.

b. Vapor must be at the normal working level and the unit operating smoothly before any work is inserted into the degreaser.

c. Rack all work on jigs, hooks, in baskets or otherwise, so that parts give complete drainage, and all surfaces are exposed to vapors.

d. Speed of lowering or raising work into or out of vapors must be slow and gradual. A speed of 10 to 12 feet per minute is suggested.

e. The material is lowered to the work rest, to remain until cleaning is completed. The time when vapors stop condensing on the work is the signal that cleaning is at an end. Do not remove work until vapors have stopped condensing on it.

f. If an excessive amount of foreign matter is present on the material, the spray attachment should be used to flush parts. Time required is from 10 to 20 seconds. Do all spraying below the vapor line.

3.3.2.3 Procedure (Continued)

g. Take care to remove parts in such a manner as not to have liquid solvent trapped in cupped or recessed areas. If parts cannot be racked in accordance with Paragraph 3.3.2.3, c., then they must be given special attention when removed.

h. On very thin parts whose total heat capacity is small, it is advisable to lower into and out of the vapor solvent several times, leaving part out long enough each time so that it cools below the vapor temperature.

i. Parts should not be handled with bare hands during and after cleaning. Use clean canvas gloves and keep handling to a minimum.

3.3.2.4 Laboratory and Maintenance Control.- Process Engineering Chemical Laboratory shall check the solvent vapor and solvent in boiling chamber once a week and report upon the following items:

a. Acidity and moisture of solvent vapor.

b. Solvent in boiling chamber.

3.3.2.5 Safety Precautions.-

a. Fumes from vapor degreasing units are slightly toxic. Caution should be taken in leaning over top.

b. Do not place hands in the hot vapors.

c. Do not enter a unit unless cooled off and thoroughly aired out.

3.3.3 Steam Cleaning.- When the surfaces are only lightly soiled and too large for the vapor degreaser, steam cleaning may suffice. Steam cleaning may be used after the emulsion spray and cold tank immersion methods to give a cleaner and brighter surface.

3.3.3.1 Equipment.-

a. Steam generating unit or use plant boiler steam.

b. Solution lifting steam gun.

c. Pressure atomizing type gun to apply emulsion type cleaners.

d. Solution tanks, 1 to 3 barrel capacity.

e. Necessary steam and water hose lines.

3.3.3.2 Compounds and Materials.-

a. Live steam at 60 to 100 pounds gauge pressure.

b. Turco Steam Aero - 1 to 2 oz. per gallon.

c. Turco 3232 - 1 to 2 fluid oz. per gallon.

d. Kelite 24 - 1 to 1-1/2 oz. per gallon.

e. Oakite 92 - 1 to 2 oz. per gallon.

3.3.3.3 Procedure.-

a. If there is considerable grease and dirt, an emulsion spray may be applied as outlined in Paragraph 3.4. Allow to soak 15 to 30 minutes.

b. Steam the surfaces with steam cleaning solution until free of greases and dirt.

c. Rinse all surfaces thoroughly with clean cold water under pressure to remove all cleaning compounds.

3.3.4 Solvent Emulsion Spray.- This operation is applicable primarily to assemblies too large for the cold tank solvent immersion method; however, it may also be used to remove heavy deposits of oil and grease or dirt prior to the cold tank solvent immersion.

3.3.4.1 Equipment.-

a. Steel pressure pot with 15 to 25 gallon capacity.

b. Suitable length oil-resistant flexible rubber hose with atomizing spray attachment.

c. High pressure water rinsing apparatus, using water alone, or air-water pressure.

d. Rubber gloves, boots, and apron.

3.3.4.2 Compounds.- Use as listed to remove dirt and soil.

a. Turco 2844 - one part compound to four parts kerosene.

b. Oakite 9 - one part Oakite 9 to eight to ten parts kerosene or high flash distillate.

c. Kelite Five Star - one part Kelite Five Star to eight parts kerosene or high flash distillate.

3.3.4.3 Procedure.-

a. Using a pressure pot with 40 to 60 pounds pressure, spray a coat of cleaning compound, diluted as called out in Paragraph 3.4.2, over all dirt, grease, and oil film areas.

b. Allow the solvent coating to remain for 15 minutes to 1 hour, depending upon the nature of the soil.

c. Flush off surfaces with high pressure cold water and/or steam clean, whichever is most applicable. Agitation of the solvent emulsion layer with a bristle brush prior to rinsing will help loosen the dirt and yield a clean surface.

3.3.5 Cold Tank Solvent Immersion Soak.- This operation is applicable for the removal of oil, grease, dirt, asphaltic tarry matter, carbonaceous resins and carbon. The procedure remains the same for cleaning of the various types of soil and only the cleaning compounds vary. The length of immersion time will vary with the various types of soil and metals and only experience can dictate as to proper soak period. Assemblies and parts should be washed down by solvent emulsion spray method outlined in Paragraph 3.4 to remove as much as possible of the grease and dirt to prevent early contamination of the immersion solution.

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PROJECT ENGINEER R. B. Gaynor				
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3.3.5.1 Equipment.-

a. Steel tanks of suitable size. Tanks shall be provided with hinged covers.

b. Cold water pressure rinsing facilities and/or kerosene or high flash distillate rinsing facilities.

c. Rubber gloves and other protective covering as needed in handling parts.

3.3.5.2 Cleaning Compounds.-

a. Grease, oil, dirt, asphalts, tarry matter, and carbonaceous resins cleaners:

1. Kelite 555 - Use full strength.

2. Kelite 5 Star - Use full strength or 50-50 with kerosene or distillate.

3. Turco Penetrol - Use full strength or 50-50 with kerosene or distillate.

4. Turco Supertrol - Use full strength.

5. Oakite No. 9 - Use mixture of 50-50 with kerosene or distillate.

6. 74-A Emulsion Cleaner - 1 part emulsion to 5 parts hydrocarbon solvent.

b. Heavy carbon cleaner:

1. Turco Supertrol - Use mixture of 50-50 with Turco Paint-Gon.

2. Turco Transpo - Use full strength.

3. Turco Puntes - Use full strength.

4. Oakite 27 - Use mixture of 50-50 with water. This mixture may be heated to a temperature of 150° F for better results.

5. Kelite 3048 - Use full strength.

CAUTION: Heavy carbon cleaners will blister the skin. Wear protective clothing when using them.

3.3.5.3 Procedure.-

a. Remove all attachments of rubber, fabric, plastic, or leather from parts prior to immersion.

b. Immerse parts in cleaning solution.

1. Stack parts in such a manner as to give cleaner access to all surfaces.

2. Segregate all metal according to type to avoid galvanic action.

3. Have all parts submerged at least two inches below the surface of the cleaner.

3.3.5.3 Procedure (Continued)

4. Temperature - Use cleaner solution at room temperature, 70° F to 100° F.

5. Time - For ordinary cleaning the soaking time may vary from 15 minutes to 4 hours. For carbon cleaning the time may extend to 24 hours.

6. Circulation of cleaner fluid by means of a pump will speed up cleaning action but air agitation should be avoided.

c. Lift parts from the tank slowly and permit them to thoroughly drain above the tank in order to minimize drag-out losses.

d. Flush parts thoroughly to remove adhering cleaner and loosened dirt, carbon and contaminants.

1. By moderate pressure air-water stream, either hot or cold, by solution lifting steam gun, or high-pressure water accompanied by bristle brushing.

2. By flushing and washing in kerosene or high-flash distillate, accompanied by bristle brushing.

e. Dry parts by wiping with clean clothing, or by blowing off excess water or distillate with high pressure air-jet.

3.3.6 Paint Removal.- Nearly all reconditioned parts will be cleaned and stripped before going through the reconditioning process. There are several stripping compounds listed and experience will dictate as to the proper stripper to use for the many types of finishes encountered. The Process Engineering Chemical Laboratory is to be contacted when special stripping problems arise. Paint removers, like carbon cleaners, must be used with caution. These compounds are dangerous to the skin and protective clothing should be worn at all times. Cold water and soap should be used in copious quantities to remove cleaning compounds from the body.

3.3.6.1 Equipment.- As called out in Paragraphs 3.3.4.1 and 3.3.5.1.

3.3.6.2 Stripping Compounds.-

a. Turco 2423 - Use full strength for spray or brush on application. Use at room temperatures. Do not use in hot sun. Use cold water for rinsing.

b. Turco Superstrel - Full strength - An immersion type stripper. Temperature may be from room temperature (70° F) up to a maximum of 130° F.

c. Turco Paint-Gon - Same as a.

d. Turco Paint-Rip - Same as a.

e. Kelite Paint Lift - Same as a.

f. Turco 2822 (thick) a heavy bodies desealing compound - Used to remove abrasion shoes and deicer boots.

g. Kelite Deseal - Same as f.

3.3.6.2 Stripping Compounds.- (Continued)

h. Turco L800 - Used as a finish cleaner to remove other compound residues. May be used in the shop for small paint stripping jobs. This compound is not harmful to the skin.

NOTE: Paint and carbon removers should be used in covered containers when using the immersion tank method to proling their cleaning ability.

3.3.6.3 Procedure.-

a. Remove all grease and dirt by steam cleaning of solvent emulsion spray and clear water rinse. Surface must be free of all oil film and water before applying paint remover.

b. On a dry, clean surface, spray on a cover of paint remover or soak in an immersion tank containing paint remover.

c. Allow to stand or soak for 30 minutes to one hour and then hose down with high pressure water. The removal of stubborn paint may be helped if the area is briskly agitated with a bristle brush and additional paint remover applied. Hose off as outlined previously.

d. For final cleaning operations, spray or wipe on Turco L800. This cleaner will remove other compound residues and paint. Turco L800 may be used in the shop for small paint stripping jobs. Turco L800 may be wiped on and wiped off and does not need a final rinse.

3.3.7 Cleaning Communications Equipment:

3.3.7.1 Equipment.-

a. Exhaust ventilated booth.

b. Safety cans for storing toxic and inflammable solvents.

c. Brushes of suitable size.

d. Rubber gloves to protect hands from toxic reactions of cleaning fluids.

e. Clean rags for wiping and drying.

f. Air drying equipment where necessary.

3.3.7.2 Cleaning Solvents.-

a. P-S-661 (Stenosol)

b. TT-N-95 (Naphtha, Aliphatic)

c. AN-T-37 (Trichlorethylene)

d. Carbon Tetrachloride

3.3.7.3 Procedure.-

a. Solvent, Specification P-S-661 (Stanosol) will be used where heavy deposits of tar, oil, or grease require the use of a solvent in large quantities. Where the cleaned surface must be oil free, or rapid and complete evaporation of the solvent is required, the use of solvent P-S-661 may be followed with a wipe or rinse of aliphatic naphtha, trichlorethylene, or carbon tetrachloride, provided the precautions established for the use of each are followed.

b. Aliphatic naphtha may be used for cleaning of communications equipment in an exhaust ventilated booth. Naphtha is preferred over trichlorethylene and carbon tetrachloride for the following reasons: it is less toxic, less corrosive, and has good cleaning characteristics. When a type of soil is encountered that cannot be cut with naphtha, trichlorethylene or carbon tetrachloride may be used. After cleaning with carbon tetrachloride or trichlorethylene, rinse the part in naptha to reduce the possibility of corrosion and to leave a cleaner surface.

c. Trichlorethylene is considered preferrable to carbon tetrachloride for communications equipment cleaning for the following reasons: its effectiveness as a cleaner is at least as good; it is satisfactory insofar as pertains to non-inflammability, and non-deterioration of paints and finishes; its toxic limits are 200 parts per million as compared with 100 parts per million for carbon tetrachloride; and it has a distinctive odor that serves as a warning before concentration reaches the danger point. Trichlorethylene in the cold state may be kept conveniently in small (approximately 1 quart) safety cans and applied to the parts to be cleaned with a brush or rag.

d. Carbon tetrachloride is used only when trichlorethylene is not available. Carbon tetrachloride may be used for the cleaning of switch and relay contacts, and other parts of subject equipment where neither of the solvents designated in Paragraph a or b is suitable. Carbon tetrachloride is definitely toxic, and will be handled accordingly.

1. It shall be used only in a well ventilated room or in a spray booth where the fumes may be drawn off rapidly.

2. Application shall be in the smallest quantity consistent with the requirement for proper cleaning, and will be made preferably with a brush of suitable size. Continued contact with the skin will be avoided.

3.3.7.3 Procedure.- (Continued)

3. The whitish residue left after evaporation of the carbon tetrachloride will be carefully and completely wiped off, to prevent corrosion or other damage to the parts.

4. Carbon tetrachlorides will not be used for cleaning the following materials: Thermo-plastics; "Doped" coils; Nitro (natural rubber).

5. Storage for immediate use will be in a well stoppered nonporous container, preferably of nonferrous material and approximately pint or quart size.

4. INSPECTION

4.1 General.- The parts will be inspected to the general acceptable quality standards in Overhaul Specification 7002.