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SUBJECT: **TEMPORARY PROTECTION ON MACHINED PARTS AND PRODUCTION MATERIAL**

MATERIAL ENGINEERING & TECHNOLOGY DEVELOPMENT
ENGINEERING DIVISION / COMMERCIAL AIRCRAFT GROUP

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1. APPLICABILITY

Applicable to all projects.

2. SCOPE

This Process Specification (PS) establishes the materials and systems for application of temporary protection of production materials, parts and assemblies during manufacturing.

3. APPLICABLE DOCUMENTS

Except where a specific issue is indicated, the current issue of the following specifications shall be considered as part of this PS to the extent indicated herein.

3.1. IAI Ltd.

PS 21.0100	Hand Degreasing of Metal Parts
PS 21.0200	Vapor Degreasing
PS 24.1000	Finishing of Magnesium Alloy Parts
PS 90.1200	Corrosion Protective of Bearings
PS 90.1300	Storage of Cadmium Plated Parts
PS 90.1400	Storage of Double Pickled Mild Steel Sheet
PS 90.1800	Methods of Preservation of Aluminum Sheets

3.2. US Military

MIL-DTL-117	Bags, Sleeves and Tubing
MIL-PRF-121	Barrier Material, Greaseproof, Waterproofed, Flexible
MIL-PRF-131	Barrier Materials, Water-vapor-proof, Greaseproof, Flexible, Heat-Sealable
MIL-PRF-3420	Packaging Materials, Volatile Corrosion Inhibitor Treated, Opaque
MIL-C-11796	Corrosion Preventive Compound, Petrolatum, Hot Application
MIL-C-15074	Corrosion Preventive, Fingerprint Remover
MIL-PRF-16173	Corrosion Preventive Compound, Solvent Cutback, Cold Application
MIL-PRF-22019	Barrier Materials, Transparent, Flexible, Sealable, Volatile Corrosion Inhibitor Treated
MIL-PRF-32033	Lubricating Oil, General Purpose, Preservative (Water Displacing, Low Temperature)
MIL-C-81309	Corrosion Preventive Compounds, Water Displacing, Ultra-Thin Film

3.3. US Federal

A-A-203	Paper, Kraft, Untreated
A-A-1898	Cushioning Materials, Cellulosic, Packaging
A-A-59295	Corrosion Preventive Compounds, Cold Application for Motor Vehicles

4. ENGINEERING DRAWING CALL-OUT

The applicable Engineering document (drawing, E.O., route cards repair tag, etc.) or other relevant documents shall reference this PS by number and shall specify the applicable Grade (refer to para. 6.2).

5. TABLE OF CONTENTS

LIST OF TABLES

6. MATERIALS

6.1. Non-Adherent Film and Sheet Covering

6.1.1. Paper, grease proof, in accordance with MIL-PRF-121 Type I or II or MIL-PRF-131 Class 1.

6.1.2. Bags, grease proof, in accordance with MIL-DTL-117, Type II Class C.

6.1.3. Paper, Kraft laminated with 0.001 in. polyethylene, 40 pound test.

6.1.4. Paper, Kraft untreated, oil wax free in accordance with A-A-203.

6.1.5. Cushioning in accordance with A-A-1898 Grade II or III or equivalent.

6.1.6. Padding, foam, flexible, any approved source.

6.1.7. VCI treated materials per MIL-PRF-3420 and MIL-PRF-22019 for ferrous alloys.

6.1.8. VCI treated Kraft paper for aluminum, 40 AL-PAK; Manuf. Cromwell-Pheonix Chicago, IL, USA or equivalent.

6.2. Preservatives

6.2.1. Grade A - Hard Films in accordance with MIL-PRF-16173 Grade 1, or MIL-C-11796 Class 1.

6.2.2. Grade B - Soft Films in accordance with MIL-C-15074, or MIL-C-11796 Class 2, or MIL-PRF-16173 Grade 2, Grade 3, or Grade 5, or MIL-C-81309 or VCI products.

6.2.3. Grade C - Water Repellant in accordance with A-A-59295, or Preservative Lubricating Oil (water displacing, low temperature) in accordance with MIL-PRF-32033 Grade C.

NOTE: MIL-PRF-32033 preservative oil shall not be used to protect fuel system parts.

7. EQUIPMENT

7.1. Source of compressed air, filter and water separator in-line.

7.2. Spray guns.

7.3. Brushes of different sizes.

7.4. Infra-red heating lamps.

7.5. Dipping bath.

8. REQUIREMENTS

8.1. All metallic parts after machining, polishing, grinding or other technology that exposes a new unprotected surface shall be treated with corrosion preventive materials. This treatment shall be done immediately after the mechanical process

is finished. The variation between the different treatments depends on the time delay between the next stage in production or storage.

8.2. Some of the main factors that may cause and accelerate the corrosion of aluminum alloys between and during the mechanical stages are: traces of other metals, dirt and water. To prevent corrosion aluminum parts must be kept clean and dry. Except for cleaning there is no need for corrosion preventive materials (since the time between stages is usually short). All parts must be treated before final packaging and storage.

8.3. Selection of Corrosion Preventive Materials

The choice of corrosion preventive materials to use on each part depends on:

8.3.1. The alloy the machined part is made of.

8.3.2. The time period between the manufacturing stages that the part requires protection.

8.3.3. The type of storage area the part will be stored in - indoor or outdoor (cover).

8.3.4. The type of finish, polished, coated, tolerances, etc.

8.3.5. For choosing the proper treatment refer to the applicable Table:

- Table 1. Protection on Raw Materials
- Table 2. Protection on Machined Parts
- Table 3. Protection on Parts Made of Sheet Materials
- Table 4. Protection on Small Parts and Metal Coated Parts

8.3.6. For preservation of bearings refer to PS 90.1200.

8.3.7. For preservation of cadmium plated parts in storage refer to PS 90.1300.

8.3.8. For preservation of mild steel sheets in storage refer to PS 90.1400.

8.3.9. For preservation of aluminum sheets refer to PS 90.1800.

Table 1 - Protection on Raw Materials 1/

	INDOOR HEATED (120°F MAX.)			**INDOOR UNTREATED OR COVERED OUTDOOR**		
	2 Weeks	2 Weeks to 6 Months	6 Months and Up	2 Weeks	2 Weeks to 6 Months	6 Months and up
Raw stock: Bare Aluminum, Steel, Magnesium	Grade C	Grade B	Grade B	Grade B	Grade B	Grade A
Clad Aluminum	--	--	--	--	Grade C	Grade B
Titanium alloy	--	--	--	--	--	Grade B - non halogen containing composition
Stainless steel	--	--	Grade C	--	Grade B	Grade B

Note: 1/ According to para. 6.2.

Table 2 - Protection on Machined Parts

ALLOY	INDOOR			OUTDOOR UNDER COVER		
	1 Week	2 Weeks to 6 Months	6 Months to 12 Months	2 Weeks	2 Weeks to 3 Months	3 Months to 12 Months
Iron and Steel alloys	Grade C	Grade B	Grade A	Grade B	Grade A	Grade A
Stainless steel	--	--	Grade B	--	Grade B	Grade A
Aluminum - bare	Grade B 1/	Grade B	Grade A	Grade B	Grade A	Grade A
Magnesium 2/	Grade C	Grade B	Grade A	Grade B	Grade A	Grade A
Copper	--	Grade B	Grade A	Grade B	Grade A	Grade A

NOTES: 1/ Protection during manufacturing.

2/ Magnesium alloy parts should receive a special treatment as per PS 24.1000 immediately after machining.

Table 3 - Protection on Parts Made of Sheet Material

ALLOY	INDOOR STORAGE			OUTDOOR STORAGE UNDER COVER		
	1 Week	2 Weeks to 6 Months	6 Months to 12 Months	2 Weeks	2 Weeks to 3 Months	3 Months to 12 Months
Unprotected steel parts	Grade C	Grade B	Grade A	Grade B	Grade A	Grade A
Aluminum - bare	Grade B 1/	Grade B	Grade A	Grade B	Grade A	Grade A
Aluminum - clad	--	--	Grade B	--	Grade B	Grade A
Magnesium	Grade C	Grade B	Grade A	Grade B	Grade A	Grade A

NOTE: 1/ Protection during manufacturing.

Table 4 - Protection on Small Parts and Metal Coated Parts [1]/

ALLOY	INDOOR STORAGE			OUTDOOR STORAGE UNDER COVER		
	1 Week	2 Weeks to 6 Months	6 Months to 12 Months	2 Weeks	2 Weeks to 3 Months	3 Months to 12 Months
Nickel coated parts	--	--	Grade B	--	Grade B	Grade B
Chrome coated parts	--	--	Grade B	--	Grade B	Grade B
Cadmium coated parts 2/	--	Grade B	Grade B	--	Grade B	Grade A
Silver coated parts	Tarnish inhibiting paper Grade B			Tarnish inhibiting paper Grade B		
Small parts with stringent tolerances 2/	Grade A	Grade A	Grade A	Grade A	Grade A	Grade A
Springs	--	Grade B	Grade B	--	Grade B	Grade A
Chemical Conversion coated parts (alodine, phosphate anodization)	--	--	--	--	--	Grade B

NOTES: 1/ The parts are wrapped in envelopes.

2/ After production finger prints should be removed.

9. PROCEDURES

9.1. Application of Corrosion Preventive Materials

The selection of corrosion preventive material should be done as required in para. 8.3 in accordance with Tables 1 through 4. The materials may be applied by dipping, spraying or brushing. The applied film shall be homogenous on all the surfaces. The parts shall be left to dry till reaching the appropriate surface condition - "soft" or "hard" (depending on the material).

9.2. Preparation for Packaging and Storing

9.2.1. Remove all dirt from the machined parts by using cleaners as per PS 21.0200, vapor degreasing, or per PS 21.0100, hand cleaning.

9.2.2. Whenever corrosion spots appear on the metal surfaces they must be removed mechanically or chemically prior to application of preserving materials.

9.2.3. Parts which have a soft preservative surface materials shall be handled with care and packaged before storage.

9.3. General Procedures for Packaging

9.3.1. Types of film or sheet covering to be used are given in para. 6.1. The applicable covering to be used depends on the part to be packaged and the preservative used.

9.3.2. In the following cases the parts shall be wrapped prior of packaging:

9.3.2.1. Whenever a soft surface preventive material is used.

9.3.2.2. To prevent mechanical damage.

9.3.2.3. On silver coated surfaces (with a tarnish inhibiting paper).

9.3.2.4. To keep surfaces clean.

9.3.3. Heat sealable wrapping: isolate the parts from the surroundings. Generally, the wrappings are thin and have to be protected from mechanical damage by a corrugated paper box.

9.3.4. Waxed and oiled papers per para. 6.1.1 are strong enough to hold mechanical parts. The parts are wrapped and held by masking tapes. For small parts envelopes per para. 6.1.2 are preferred.

9.3.5. VCI Kraft paper – wrap the entire part and seal the edges.

10. QUALITY ASSURANCE

10.1. Inspection shall ensure that the application of temporary protection is carried out as called out in this PS.

10.2. Inspection shall further check that:

a. Workers use the correct equipment at all times.

b. Drying times for all coatings must be strictly adhered to.

c. The finish of the various coatings during painting and after drying shall ensure that they are smooth and of uniform quality.

11. SAFETY

Note: "Toxicity Card" issued for all potentially dangerous material and solutions by the IAI Safety Department or manufacturer's Material Safety Data Sheets (MSDS) contain all the relevant safety precautions and first aid information. These cards must by posted in a visible and accessible location of the work area.

IMPORTANT **IN CASE WHERE MEDICAL CARE IS REQUIRED, THESE DOCUMENTS MUST ACCOMPANY THE INJURED PERSON.**

11.1. The following procedures shall be observed when applying erosion resistant and anti-static coatings:

11.1.1. Coating operations shall be carried out in a dust free area, which is equipped with a fume exhaust ventilator.

11.1.2. Fire extinguishing equipment shall be readily available within the painting area.

11.1.3. Personnel engaged in coating and cleaning operations shall use protective face masks.

12. ENVIRONMENTAL REQUIREMENTS

This PS references other process specifications (such as cleaning), that use materials and processes that may have an effect on the environment. It is mandatory to handle the material and dispose of wastes (such as solvents, rinse water and oil saturated packaging materials) in accordance with the appropriate environmental requirements specified in the applicable IAI Ltd PS or in instructions of IAI Ltd Safety and Environment department, or in accordance with material "MSDS" (Material Safety Data Sheet).

NOTE: Where no requirements exist, contact Materials Engineering & Technology Development, Engineering Division.