1. SCOPE

1.1 Scope. This specification covers the requirements and procedures for producing identification plates, information plates, parts and panels using the photo-etch process or the Metalphoto process.

1.2 Application. The Metalphoto and photo-etch processes covered by this specification shall be used as specified in the following subparagraphs.

(a) Photo-Etch Process. The use of the photo-etch process shall be subject to the following limitations:

1. The photo-etch process shall only be used in applications where it is impractical to use the Metalphoto process. Manufacturing Engineering shall be responsible for determining the practicability of using the Metalphoto process.

2. When used, the photo-etch process shall be limited to those parts which are used in the interior of the helicopter and are not exposed to direct or indirect sunlight. (See 3.6 and 3.6.1 for limitations on the use of colors).

(b) Metalphoto process. The Metalphoto process may be used for both internal and external applications subject to the limitations on the use of colors as specified in 3.6 and 3.6.1. This process shall be used for all parts except when determined otherwise by Manufacturing Engineering. (See 1.2(a).)

NOTE: Metal plates by either process shall not be used in applications where contact with electrical components may cause short circuits.

2. APPLICABLE DOCUMENTS

2.1 The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated the issue specified in the applicable Sikorsky Aircraft Index of Material and Process Specifications shall apply.

DATE: 10/28/59 REVISED: (6) 3/2/72 (7) 10/19/78 (8) 7/24/96

UNITED TECHNOLOGIES SIKORSKY AIRCRAFT
Stratford, Conn. 06601-1381

SIKORSKY SPECIFICATION
MATERIAL & PROCESS

PREP J. Potak
APVD G. Field
GOVT
SUPERSEDES

PLATES, PHOTOGRAPHIC, (PHOTOSENSITIVE ALUMINUM), PHOTO-ETCH & METALPHOTO, PROCESS FOR

CAGE NO. 78286

SS 9048

SHEET 1 OF 8

2.1 (Con't)

SPECIFICATIONS

Federal

GG-P-455	Plates and Foils, Photographic (Photosensitive Anodized Aluminum)
QQ-A-250/1	Aluminum Alloy 1100, Plate and Sheet
QQ-A-250/11	Aluminum Alloy 6061, Plate and Sheet
QQ-A-1876	Aluminum Foil
TT-L-32	Lacquer, Cellulose nitrate, Gloss for Aircraft Use
TT-P-1757	Primer Coating, Zinc Chromate, Low Moisture Sensitivity

Military

MIL-C-5541	Chemical Conversion Coatings on Aluminum and Aluminum Alloys
MIL-L-19537	Lacquer: Acrylic-Nitrocellulose Gloss (For Aircraft Use)

OTHER DOCUMENTS

Code of Federal Regulations (DFR)

29CFR1910.1200 Standard	OSHA Hazard Communication

Sikorsky Aircraft

SS8642	Adhesive Bonding of Metal Nameplates

2.1 (Con't)

SS9001	Sikorsky Trademarks
SS9049	Engraving

STANDARDS

Military

MIL-STD-130	Identification Marking of U.S. Military Property.

2.2 Document Conflict. In the event of a conflict between the requirements of this specification and other applicable specifications referenced herein, this specification shall prevail. When an apparent conflict exists between the engineering drawing and this specification, the engineering drawing shall govern.

3. REQUIREMENTS

3.1 Materials

3.1.1 Material for Photo-etch Process. The material for photo-etched parts, other than identification plates, shall be as specified on the drawings. Only bare (nonclad) materials shall be used. The following materials shall be used for identification and information plates.

a) Aluminum Foil .003 to .005 inch thick conforming to QQ-A-1876 which is anodized, dyed, and sensitized. May be purchased from Graphtex Corp., Lodi, New Jersey or equivalent. This material is to be used for curved, irregular, or flat surfaces if subsequent markings on the plate will not be required and the plate will not be subject to abuse.

b) Aluminum alloy .010 and .020 inch thick 1100-H18 conforming to QQ-A-250/1. The .010 inch thick material is for use on curved surfaces which will require subsequent marking and/or which will be subject to abuse. The .020 inch thick material is

for use on flat surfaces which will require subsequent marking and/or which will be subject to abuse.

c) Aluminum alloy .010 and .020 inch thick, 6061, Temper "0" and "T6" conforming to QQ-A-250/11. The use of this material is the same as (b) above.

d) Instrument Black Lacquer conforming to TT-L-32.
e) AP-10, Unichrome Black Primer. May be purchased from Metal and Thermit Company, Rahway, New Jersey.

3.1.2 Materials for Metalphoto Process. The materials for the Metalphoto process shall be as follows:

a) Photographic plates conforming to GG-P-455, Grade A, (Thicknesses available are .003, .005, .008, .012, .020, .032, .063 and .125 inch).

b) Chemicals as required and as recommended by the Metalphoto Corporation for the Metalphoto Process.

3.1.3 Other Materials. Other materials which are not specified herein shall be as required to perform the Photo-etch process or the Metalphoto process.

3.2 Equipment

3.2.1 Photo-Etch Process Equipment. The equipment for the photo-etch process shall be as required and as recommended by Eastman Kodak Company to perform the process or shall be capable of performing the equivalent function of the Photo-etch process.

3.2.2 Metalphoto Process Equipment. The equipment for the Metalphoto process shall be as required and as recommended by the Metalphoto Corporation, or shall be capable of performing the equivalent function of the Metalphoto Process.

3.3 Design and Dimensioning Requirements. The design and dimensioning requirements shall be in accordance with the applicable requirements and shall be as specified on the drawing for the part.

3.3.1 Lettering. The lettering shall be as specified on the drawing.

3.3.1.1 Minimum Letter Size. Unless otherwise specified on the drawing, the minimum letter size shall be .047 ± .016 inch; however, the minimum value shall be avoided wherever possible.

3.3.2. Corner Radii. The corner radii shall be as specified on the drawing.

3.3.3 Mounting Holes. When required, the mounting holes shall be as specified on the drawing.

3.3.4 Trademarks. When specified on the drawing, Sikorsky Aircraft Trademarks shall be applied by Sikorsky Aircraft only. The trademarks shall be as specified on the drawings and shall be applied in accordance with SS9001.

3.4 Process

3.4.1 Photo-etch Process. The photo-etch process shall be in general accordance with the procedures recommended by the Eastman Kodak Company. Chemicals and solutions from different suppliers should not be mixed.

3.4.2 Metalphoto Process. The Metalphoto process shall be in general accordance with the procedures recommended by the Metalphoto Corporation. Chemicals and solutions from different suppliers should not be mixed.

3.4.3 Bonding Film. Except as otherwise specified on the drawing, all identification and information plates, except those which specify mounting holes, shall have bonding film in accordance with SS8642.

3.5 Finish. The colors and the finish of all characters, pads, borders, and background shall be as specified on the drawing. (See 3.6 and 3.6.1).

3.6 Available Colors. Background or letter colors for identification and information plates are available in red, blue, green, black, aluminum, grey, orange, gold, bronze, and copper for Photo-etch

material. Black, aluminum, gold, copper, red, blue, and green

colors are available for background or lettering in the Metalphoto process. Sikorsky Standards Department should be contacted for information regarding the addition of other colors that may become available. See 3.6.1 for caution on the use of colors.

3.6.1 Caution on the Use of Colors. The following limitations should be considered when specifying colors:

a) Photo-Etch. Color anodized markings fade when exposed to direct or indirect sunlight. Color fading on photo-etched parts ranges from red anodize, which begins to fade after approximately three months of exterior exposure, to black, which fades after approximately one year of exposure.

b) Metalphoto. The black image on a Metalphoto plate shall be capable of meeting the accelerated light and weather resistance requirements specified in GG-P-455. The colors used in the Metalphoto process will fade when subjected to direct or indirect sunlight. The red color is the least colorfast while the other colors are somewhat extended. The gold color is the most lightfast. Lightfastness is dependent upon the life of the dyes used, Ph controls, time of immersion in dye solutions, temperature, etc.; therefore, usage is to be in accordance with the manufacturer's recommendations for each dye. The use of a black outline around colors will retain readability after the color fades.

3.7 Installation Using Rivets or Screws. Identification or information plates which are to be installed with rivets or screws shall have two coats of primer conforming to TT-P-1757, or an equivalent sealant, applied to the mating surfaces prior to installation.

3.8 Application of Coating. Clear varnish conforming to DuPont VK5114 or colorless acrylic lacquer conforming to MIL-L-19537 may be applied to Photo-etched parts as a protective coating. This treatment is not required for Metalphoto plates.

3.9 Part Numbering. Unless otherwise specified on the drawing, the part number of the plate shall be photo-etched or Metalphotoed on the face of the plate. Only those plates which have insufficient area

on the face side shall be identified by rubber stamping the part number on the back side.

3.10 Alternate Method for Small Quantities. As an alternate, parts may be engraved in accordance with SS9049 if the total quantity required is six or less.

3.11 Typewritten Characters. For clarity, characters may be put on identification plates of suitable thickness by use of a typewriter adjusted to cut stencils, rather than by vibro-engraving the additional lettering (i.e. serial numbers) that may be required.

3.12 Alodine Treatment. Photo-etched aluminum parts shall be treated with Alodine 1000 (clear) conforming to MIL-C-5541.

3.13 Material Safety Data Sheets. Suppliers shall provide Material Safety Data Sheets that meet OSHA 29CFR1910.1200 to the Sikorsky Aircraft Occupational Health and Safety Department. Failure to provide a data sheet shall be a basis for rejection of material. Data sheets shall also be provided to any Sikorsky Aircraft designated contractors.

3.14 Written Communication. All communication in regard to this specification including requests for approval shall be directed through the Sikorsky Aircraft Purchasing Department.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements specified herein. Except as otherwise specified, the supplier may utilize his own inspection requirements specified herein. If the supplier elects to use inspection and/or test facilities other than his own, the specific approval must be obtained in writing from Sikorsky Aircraft Supplier Quality before these facilities may be utilized (see 3.14). Sikorsky Aircraft reserves the right to perform any of the inspections set forth herein.

4.2 Inspection of Materials. All material shall have been certified by the supplier as having met the requirements of the applicable specifications.

4.3 Inspection of Solutions. Solutions shall be checked, as required, to verify that the prescribed strength is being maintained. In general, the condition of Photographic solutions is best determined by visual inspection of the produced parts.

4.4 Inspection of End Item. Inspection shall be performed, as required, to verify conformance to the requirements of this specification.

5. PREPARATION FOR DELIVERY

5.1 This section is not applicable to this specification.

6. NOTES

6.1 Drawing Notes. The following drawing notes shall be used as required:

a) After photographic processing, form or roll in the direction of arrow to ---R, as required.

b) All lettering to be -- (Give size), except as indicated.

c) Identification plate to be in accordance with SS9048.

d) Identification plates to have lusterless characters on dull, matte or brush (State color) background.

e) Process in accordance with SS9048.