

REPAIR OF PAINTED COATINGS OF AIRCRAFTS IN FIELD CONDITIONS

I. PAINT AND VARNISH MATERIALS

Table 44

Prog N°	Name of materials	Number of Standard	Scope	Possible replacement
1	Dope first coating A1N	NCAP, NKXP, TU734-41	To brush on the tissue lining of aircraft and attaching patches.	No
2	Dope second coating green AMT4 (k)	NCAP, NKXP, TU714-41	For coloring fabric, wood and metal surfaces prepared by appropriate means.	-
3	Dope second coating black AMT6 (k)	NCAP, NKXP, TU679-41	Ditto	-
4	Dope second coating blue AMT7 (k)	NCAP, NKXP, TU795-41	"	-
5	Dope second coating red AIIKr (k)	280 SMTU with a sheet of changes	For the application of markings - the stars.	-
6	Nitro glue AK20	NCAP, NKXP, TU720-41	For attaching fabric to wood and fabric labels patches on wood, fabric and metal plating.	Dope A1N
7	Nitro putty ASH22	NCAP, NKXP, TU271-41	For puttying primed wood and fabric, glued to the wood.	Caulking ASH30
8	Nitro enamel DM yellow	265 SMTU	To paint the gasoline systems.	Enamel A6
9	Nitro enamel DM brown	265 SMTU	To paint the oil systems.	Enamel A8

Prog. N°	Name of materials	Standard number	Scope	Possible replacement
10	Nitro enamel DM green	265 SMTU	To paint water systems	Enamel A 7
11	Nitro enamel DM red	265 SMTU	To paint sprinkler systems identification markings	Enamel A 13
12	Nitro enamel DM black	265 SMTU	To paint air systems	Enamel A 12
13	Nitro enamel DM blue, light blue	265 SMTU	To paint oxygen systems	Enamel A 10
14	Nitro enamel DM blue	265 SMTU	To paint hydraulic systems	Enamel A 9
15	Nitrocellulose lacquer AV4 d/l	NCAP, NKXP, TU718-41	For varnishing pine skis.	Nitro glue AK20
16	Thinner RDV or RDV2	NCAP, NKXP, TU776-41	To dilute nitrocellulose lacquer enamels and nitrocellulose putty	As an exception SD (special)
17	Special SD paint remover	198 AMTU	For softening and washing off old nitrocellulose coatings.	RDV
18	Ordinary SD paint remover	NCAP, NKXP, TU906-42	For washing off from metal old enamel and oil coatings.	No
19	Green enamel A24m	NCAP, NKXP, TU674-41	For coloring the external skin of metal aircraft	No
20	Black enamel A26m	NCAP, NKXP, TU671-41	Ditto	No
21	Blue enamel A28m	---	"	No
22	Yellow enamel A6	252 SMTU	For coloring the gasoline system.	M

Prog. N°	Name of materials	Standard number	Scope	Possible replacement
23	Green enamel A7	253 SMTU	For coloring the water system.	Nitro enamel DM of appropriate color
24	Brown enamel A8	254 SMTU	For coloring the oil system.	Nitro enamel DM of appropriate color
25	Blue enamel A9	310 SMTU	For painting the hydraulic system.	--
26	Light blue enamel A10	255 SMTU	For painting the oxygen system.	--
27	White enamel A11	256 SMTU	For painting gasoline pumps and first aid kits.	--
28	Black enamel A12	257 SMTU	For painting the air system.	--
29	Red enamel A13	258 SMTU	For painting markings and fire systems.	--
30	Steel color enamel A14	259 SMTU	For painting interior surfaces of metal aircraft.	A28m
31	White camouflage paint MK7	VTU	For repainting aircraft during the snow season of the year.	No
32	Nitro primer DD113	--	For priming the internal surfaces of wooden planes.	AK20

2. TOOL AND ACCESSORIES

- Brushes for applying dope lacquers, enamel paints, painting small parts are used bristle - flat and round No. 22-24. To apply camouflage casein paints of different colors, badger or bristle flutes (soft) are used.
- Spatulas for applying putties - steel, plywood or sheet balinite.

3. Rubber sheet for applying putties on curved surfaces 100 x 60 x 3 - 4 mm.
4. Glass or emery paper No. 2-1 for stripping behind the putty surface and No. 0 for cleaning varnished and painted surfaces.
5. Iron mugs with a capacity of 0.5, 1 and 2 liters for paints and varnishes.
6. Soft rags or wiping ends.

3. REPAIR OF PAINT COATINGS ON THE EXTERNAL SURFACES OF WOOD PANELING SURFACES

(Allowed at temperatures not lower than 0 ° C)

Minor damage to the paint and varnish coating without violating the integrity of the pasted over fabric (scratches, cracks, etc.) must be repaired as follows:

1. Wipe the damaged surface with a clean cloth moistened with gasoline, RDV solvent or special SD wash and clean with sandpaper No. 1-0.
2. Prime with a layer of AK20 nitro glue and dry for 40 - 50 minutes.
3. Fill with a thin layer of ASh22 or ASh30 nitro-filler, dry for 1-1¹/₂ hours and clean with sandpaper No. 0.

If the surface is insufficiently leveled, make a secondary puttying with the same putty, diluted with 10 - 15% of AK20 nitro glue or A1N dope, dry for 1 - 1¹/₂ hour and clean with sandpaper No. 0.

4. Paint with nitro varnish of the second coating to match the color of the surface to be repaired and dry for 1-1¹/₂ hours.

The destruction of the coating to wood or an insert of a plywood patch on an area of up to 150 cm² must be repaired as follows:

1. Tear off the edges of poorly adhered fabric from wood and cut them off with a sharp knife. Remove, if present, poorly adhered layer of old filler.
2. Prime with a layer of AK20 nitro-glue or A1N nitro-varnish and dry for 40-50 minutes.
3. Fill with a thin layer of ASh22 or ASh30 nitro putty, diluted with 10 - 15% AK20 nitro glue or A1N dope. Dry for 1-1¹/₂ hours.
4. Repeat the spackling operation until the putty surface is level with the edges of the main coating. Dry for 1-1¹/₂ hours and carefully clean with sandpaper No. 0.
5. Paint in one go with a thick layer of pigmented nitro varnish of the appropriate color. Dry for 1-1¹/₂ hour.

Full restoration of the coating (with pasting with a cloth) on clean wood on an area of more than 150 cm² must be carried out in the following way:

1. Prepare surfaces. Tear off and cut off the loose pasted over fabric, remove the poorly adhered layers of the old putty, blur the edges of the main one to the fabric (a layer of colored varnish and putty)

around the place being repaired. Washing is carried out by applying a layer of emulsion consisting of 100 parts of A1N dope and 10 parts of water.

A layer of emulsion for 10-15 minutes it is tightly covered with an old varnished cloth, then the cloth is removed, and the softened layer of the coating can be easily removed with a spatula. Dry for 15 minutes.

2. Prime the wood surface and blurred edges of the main coating with AK20 nitro-glue and dry for 40-50 minutes.
3. If there is time and there are significant flaws, putty with ASh22 or ASh30 nitro-filler the existing irregularities and holes from nails, screw heads, etc. Dry for 1 hour.
4. Apply on the entire surface to be pasted a dense layer of AK20 nitro glue or A1H dope and immediately apply the pasted over cloth (AOD, calico, coarse calico) on it with an overlap of the fabric over the main coating by 15–20 mm. After thoroughly leveling the fabric with your hands, apply another layer of AK20 nitro glue. Dry for 2 hours. Clean with glass paper no. 1.
5. Fill with ASh22 or ASh30 nitro-filler. Dry for 1 hour.
6. Repeat step 5. Dry 1-1½ hour and thoroughly cleaned glass paper № 0.
7. Paint with one thick layer of pigmented dope of the appropriate color. Dry for 2 hours.

4. REPAIR OF PAINT COATINGS ON INTERNAL SURFACES OF WOODEN STRUCTURES

Internal surfaces are painted:

a) **Resin glue VIAM-BZ.**

The advantage of resin glue is its high water and fungal resistance, fast drying, especially when using local heating.

Disadvantages - inability to use at temperatures below 4-15 ° C and on airplanes glued with casein glue.

b) **Nitro paints.** Application and drying of nitro paints is permissible at temperatures up to 10 ° C.

c) **Enamel paints.** At low temperatures, enamel paints dry very slowly ': 36-48 hours.

Painting order

1. Remove dust, dirt, casein glue stains, old paintwork and grease stains.
2. Apply brush layer nitro DD113 and dry 1 ½ -2 hr.
3. Apply a thick layer of aluminum dope AIIAI (K) or blue AMT7 (k) and dry for 1-2 hours.

The enamel paint is applied in two successive layers. Drying of each layer 24 hours.

For painting are used gray enamel A14, blue AE14 or A24 m.

Resin glue VIAM-BZ is applied to the prepared surface with a brush in a freshly prepared state and diluted with 10% acetone. Do not use thinned resin glue for bonding.

5. REPAIR OF PAINT COATINGS OF THE CANVAS COVERING

Damage to the varnish coating without violating the integrity of the canvas is repaired in the following order:

1. Remove dust, dirt and grease stains from damaged surfaces using soft cloths and aviation gasoline.
2. Soften the damaged varnish layer with RDV thinner or with a thick layer of A1N dope or a layer of emulsion (100 parts of A1N dope and 10 parts of water). Cover the emulsion layer tightly with a piece of old varnished cloth for 15 - 20 minutes.
3. Use a wooden or metal spatula to remove the softened varnish layer.
4. After drying, lightly sand the edges of the old paintwork.
5. On the surface prepared in this way, apply successively three layers of dope varnish A1N with intermediate drying of each layer for 45 minutes and one dense layer of colored dope to match the color of the surface being repaired. Drying 3 hours.

Damage to varnish-and-paint coatings in case of damage to linen sheathing is repaired by applying patches followed by varnishing and painting (see the section Repairing linen sheathing).

6. VARNISHING OF THE CANVAS COVERING

Clean linen sheathing is varnished in the following order:

1. With a soft bristle brush, remove dust, thread scraps, pieces of fabric, etc. from the newly supplied fabric.
2. Apply with a brush four coats (in the case of linen) and five coats (in the case of cotton) dope varnish of the first coat A1N. Dry each layer for 45 minutes, dry the last layer for at least three hours.
3. Apply a dense layer of colored dope to match the color of the surface to be repaired. Dry for at least 12 hours before the plane takes off.

Note. Identification marks should be applied with red AIK nitro lacquer or DM red nitro enamel.

7. REPAIR OF PAINT AND VARNISH COATINGS ON METAL SKIN

A. Defects in the form of cracks, swelling, peeling, local exposure of the metal due to peeling of the varnish-and-paint coating

1. Apply a layer of SD remover heated to 40 ° C on the damaged surface.
2. After 20-30 minutes remove the softened varnish-and-paint layer with wooden scrapers and wipe with a cloth soaked in gasoline.
3. Remove traces of corrosion by sanding with No. 0 sandpaper and wipe with clean gasoline.
4. Apply successively two coats of enamel paint of the corresponding color (A24m - green, A26m - black or A28m - blue).

Drying of each layer continues at a temperature of +15 ° C for 18-20 hours; at a temperature of +5° C 28-36 hours.

B. Small cracks, hazards, bare metal of 0.5 m² without signs of peeling of the varnish-and-paint coating

1. Rinse with gasoline and wipe the damaged surface with a clean cloth.
2. Sand lightly.
3. Apply a thick layer of enamel paint to match the color of the surface to be repaired.

C. Painting of clean metal sheets

1. Wipe the surface to be painted with clean rags soaked in gasoline.
2. Apply two consecutive coats of enamel of the corresponding color.

Dry each layer as indicated in point 4 of section A.

D. Painting of interior surfaces

1. Remove damaged coating (cracks, peeling, etc.) with a SD wash heated to 40 ° C.
2. Wipe clean with a cloth dampened with aviation gasoline.
3. Apply a layer of A14 gray enamel or a mixture of A14 enamel and ALG1 group (1: 1).

Dry in accordance with point 4 of section A.

8. PAINTING OF AIRCRAFT FITTINGS

To paint the aircraft fittings, they use varnish-oil enamels, very durable, but drying for a long time (18-20 hours at 15-20° C), or nitro-enamels, less durable, but quickly drying (1-2 hours at temperatures of +1 to -5° C). In the field, it is more profitable to use nitro-enamel for painting reinforcement.

The procedure for resuming painting is as follows:

1. Remove old lingering paint with a metal scraper or wash off with a SD remover.
2. Wipe with clean rags soaked in aviation gasoline.
3. Apply a layer of nitrocellulose sludge of lacquer-oil enamel of the corresponding color (see the table of lacquers and paints).

Chapter V

COVERING OF CABLES

I. AVIATION ROPES

The cables are used exclusively steel, made of special grades of steel by twisting galvanized wires in a certain order.

There are two types of cables:

- 1) plain weave cables, obtained by wrapping thin wires around a central straight wire;
- 2) Double braid cables, the most widely used in aviation and obtained by wrapping six others around the center strand, each strand being a plain weave cable.

Chapter IV. "Repair of aircraft paintwork in the field" translated by Dr. Daniele M. Righi from "Colonel Engineer Platonov G.P. Engineer-Captain Karlov G.I.- FIELD REPAIR OF AIRCRAFT- Military Publishing House of the NKO of the USSR, 1943 .-- 160 p. / Edited by Major General of the Aviation Engineering Service Volkov G.K."

"FIELD REPAIR OF AIRCRAFT: The book is intended for repair organs and combat units of the Red Army Air Force. It outlines the ways and methods of repairing airplanes in the field.

When compiling the book, were used instructions and guidelines from the Air Force Directorate of the Red Army, VIAM, TsAGI and NKAP factories.

Separate parts and chapters are written by: engineer-captain G.I. KARLOV, - part one and chapters of part three: sections - 1, 2, 3 chapters I and chapters II, V and VI, engineer-colonel G.P. PLATONOV - part two and chapters of part three: section 4 of chapter I and chapters III, IV, VII and VIII."

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Part three

REPAIR OF UNITS AND AIRCRAFT PARTS

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Notes:

NKAP = People's Commissariat for Aviation Industry.

NKXP = People's Commissariat of Chemical Industry

TU = Technical Specification

SMTU = Aircraft specifications for materials and semi-finished products

AMTU = Aviation specifications for materials and semi-finished products

VTU = Temporary Technical Specifications.

(k) = To be used with brush

Balinite = similar to Delta-wood, is wood reinforced with formaldehyde resin

How the repair of aircraft coatings was conducted in practice, is told in M-Hobby of May 1999, with the memoirs of V. V. Pshenichnov, head of the PARM-1 No. 1087 of the 562nd IAP of the Air Defense in 1941-1945, issued with Yaks.

It has been partially reprinted on pages 283-285 of the book "Real colors of WWII - Aircraft" by AK, by Mr. Orlov.

To consult the originals is strongly suggested, but the main facts are as follows.

From the start of the war to the Summer 1942 the situation was so difficult, that aircraft colors were of much less concern than keeping the planes flying, but in the winter all the planes were camouflaged in white, with a very coarse texture that diminished the speed of the airplanes.

In spring the white color was washed off.

Only damaged parts were repainted, following the standards, and only certified aviation paints were used.

The PARM personnel tried to maintain a certain uniformity in the appearance of the Yaks, but if a color was lacking, they simply increased the surface of another available paint.

The most widespread defect for Soviet aircraft was the poor quality of the paintwork, and if the

plane survived for 18 months, it was usually necessary to strip it of all its fabric covering, and applying it all again, following the prescribed procedures, and always using the prescribed aviation material.

The painters had no knowledge of official schemes, but as said before tried to maintain a certain uniformity.