Wing Metallization STC's
Cessna 120/140's

The STC's

To the right is the listing of all of the STC's for metallization on the 120/140 or 140A planes. All of the possible search options of the FAA's STC site were explored to cull them. Applications for STC's were sent to the responsible FAA office of an area. Consequently, there were a lot of STC's for wing covering because no area office talked to another area office and there has been no central depository by the FAA of the STC's. Some STC's, because of field office closures and consolidations, appear to have been lost. Many are no longer active but the FAA does not track them for activity so the listings remain. The suffixes on the more recent ones stand for the FAA office which assigned them. The older of the batch still on the FAA lists have no suffix of location, but the responsible office of each is listed in full on the presentations of data on later pages of this report.

SA388SO
SA1-39
SA1-259
SA4-89
SA4-341
SA4-79
SA4-360
SA54CE

From the 2000 A-768 certification (TCDS) for the 120/140 planes:

*611.	Metal Plating of Wings Models 120 and 140 are eligible for certification when wings are covered with metal skin per Technical Instruction Report No. 1401 by Birtcraft Engineering Co., 11836 Cherry Ave., Inglewood, California.
*612.	Metal wing skin installed in accordance with Ruleto Industries, Inc., 4823 Rosecrans Avenue, Hawthrone, California, Dwgs., Nos. R-1013, R-1014 and R-1015 and Installation Instructions CKW-1 and CKW-2.
*613.	Metal Skin installed in accordance with Met-Co-Aire, Fullerton, California, Drawing No. 6108.

Note that these are not defined as STC's but both Ruleto and Met-Co-Aire may also have been STC holders. Not well known is that some STC's, especially metallization, could be installed at the Cessna factory. Those listed on the cert were the most likely eligible ones. Whether they listed the change is uncertain, but they did not get a 337 because "they are on the cert".

Plans and Historical Files:

I have yet to see the plans from any metallization STC, but they have to be out there somewhere. The owner of the planes which were metalized must have received a package of the prints and instructions. Try to turn them up and let the International Association's Tech Advisor (Victor Grahn) know. Send them or a copy to Victor for the association so that some questions can be resolved.

Data plates:

Some Metallization STC's included a data plate calling out the manufacturer and this plate is often covered with paint and is riveted (usually) to the bottom side of the bottom left gas tank cover. All the planes were made with the bottom skin of metal below the gas tanks (covered with fabric) and this was not double covered when the wings were metalized. Some STC's plugged the outboard drain hole in both of these covers, some did not. At least one STC included teardrop shaped covers over the junctions where several layers met, and these covers stand proud of the top of the wing (and add a certain cachet to the covering}.

We found a plane with the teardrop-shaped covers and took pictures which are presented later in the article. Victor Grahn, the Technical resource of the International 120/140 Org, sent along a a story which states that a Farley Vincent of E. Texas claimed he was the originator of the covers so that he could walk by an airplane and "know he did it". The mystery remains as to whether he made it part of the STC/337, or just "did it".

All of of the plane wing were made with a metal nose attached to the spar as shown on the left. The fabric was placed over the nose. Depending on the STC for metalization, the top and bottom skins could be tied in with the nose and spar as shown in the middle, or the skin could be wrapped around the nose to make a double thickness there. Many with the overlay convince themselves that their double nose is "better" and less drag. NASA tested and proved that it made no significant difference.

These are the October '05 listings for STC's to install the metal on the wings. Note that many of them list the 140A as models to which the metal could be added...even though they were made with metal wings. Proof again that STC's aren't created or monitored very well. I went through the lists several times.

STC Number: SA1-259
This certificate issued to: Skycraft Design, Inc
STC Holder's Address:
85 North Main St.
Yardley PA 19067
United States
Description of the Type Design Change: Wing covering of alclad panels.

Application Date: My comment...amazing how many of these STC records lack a date of application or approval. It would make chasing the history so much easier. Neal

Status: Issued,
Responsible Office:
ANE-170 New York Aircraft Certification Office Tel: (516) 228-7300
TC Number -- Make -- Model:
5A2 -- Cessna Aircraft Company, The -- 140A
A-768 -- Cessna Aircraft Company, The -- 140
A-768 -- Cessna Aircraft Company, The -- 120

These two entries illustrate that the data in the STC lists is often wrong. Note that both are assigned to Skycraft Design but the addresses are different, one is in New Jersey, not the Pennsylvania of the one above. This address for the leading edge lights actually worked about a year ago, whereas the address above did not.

STC Number: SA1-436
This certificate issued to: Skycraft Design

STC Holder's Address:
P.O. Box 67
West Trenton NJ 08628
United States
Description of the Type Design Change:
Leading edge landing lights in left-hand wing.

More metallization STC's

STC Number: SA1-39
This certificate issued to: Boone County Aviation, Inc
STC Holder's Address:
P.O. Box 6

Erlanger KY 41018
United States
Description of the Type Design Change:
Recovering of wings with metal skin, .020 inch 24ST alclad, except ailerons.
Application Date:
Status:
Issued, 06/04/1970
Responsible Office:
ACE-115A Atlanta Aircraft Certification Office Tel: (770) 703-6035
TC Number -- Make -- Model:
A-768 -- Cessna Aircraft Company, The -- 140

STC Number: SA388SO
This certificate issued to: Robinson W F
STC Holder's Address:
P.O. Box 241
Lanett AL 36863
United States
Description of the Type Design Change:
Metalize wings, wing landing/taxi light installation.
Application Date:
Status:
Amended, 06/26/1970
Responsible Office:
ACE-115A Atlanta Aircraft Certification Office Tel: (770) 703-6035
TC Number -- Make -- Model:
A-768 -- Cessna Aircraft Company, The -- 120
A-768 -- Cessna Aircraft Company, The -- 140

STC Number: SA4-341
This certificate issued to: Burdick Frank A
STC Holder's Address:
43316 N. 20th Street, W.
Lancaster CA 93534
United States
Description of the Type Design Change:
Recovering of wings with .02024ST alclad sheet.
Application Date:
Status: Issued, 01/01/1960
Responsible Office:
ANM-100L Los Angeles Aircraft Certification Office Tel: (562) 627-5200
TC Number -- Make -- Model:
5A2 -- Cessna Aircraft Company, The -- 140A Note...Why would the 140A need an STC? It is made with metalized wings. Neal
A-768 -- Cessna Aircraft Company, The -- 120
A-768 -- Cessna Aircraft Company, The -- 140

STC Number: SA4-360
This certificate issued to: Carma Manufacturing Co
STC Holder's Address:
P.O. Box 11312 Municipal Airport
Tuscon AZ 85700
United States
Description of the Type Design Change:
Recovering of wings with aluminum alloy sheet.
Application Date:
Status: Issued,
Responsible Office:

ANM-100L Los Angeles Aircraft Certification Office Tel: (562) 627-5200
TC Number -- Make -- Model:
5A2 -- Cessna Aircraft Company, The -- 140A Another with the 140A which already has metal covered wings. Neal
A-768 -- Cessna Aircraft Company, The -- 120
A-768 -- Cessna Aircraft Company, The -- 140

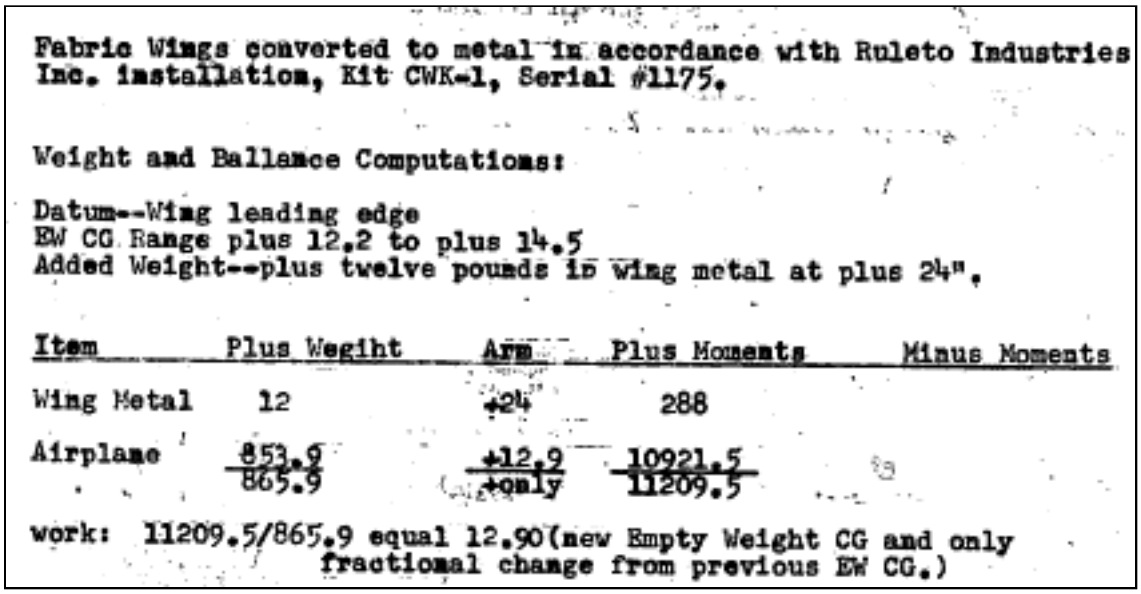
STC Number: SA4-79
This certificate issued to: Ochoa Francisco
STC Holder's Address:
4836 E. Mercer Way
Mercer Island WA 98040
United States
Description of the Type Design Change:
Recovering of wings with metal.020 aluminum 2024-T3 clad.
Application Date:
Status: Issued, 01/01/1960 Note how few have the Issued date included in the FAA's records. Neal
Responsible Office:
ANM-100S Seattle Aircraft Certification Office Tel: (425) 917-6400
TC Number -- Make -- Model:
5A2 -- Cessna Aircraft Company, The -- 140A
A-768 -- Cessna Aircraft Company, The -- 140

STC Number: SA4-89
This certificate issued to: Lane J E Jr
STC Holder's Address:
3504 Niblick Drive
La Mesa CA 92041
United States
Description of the Type Design Change:
Recovering of wings with metal .020 alclad 2024T3 aluminum alloy.
Application Date:
Status: Issued, 01/01/1960
Responsible Office:
ANM-100L Los Angeles Aircraft Certification Office Tel: (562) 627-5200
TC Number -- Make -- Model:
5A2 -- Cessna Aircraft Company, The -- 140A
A-768 -- Cessna Aircraft Company, The -- 120
A-768 -- Cessna Aircraft Company, The -- 140

STC Number: SA54CE
This certificate issued to: B & W Aircraft Repair, Inc
STC Holder's Address:
Unknown
St. Peters MO 63376
United States
Description of the Type Design Change:
Covering of wings with .020-inch 24ST aluminum.
Application Date:
Status: Issued, 06/05/1965
Responsible Office:
ACE-115W Wichita Aircraft Certification Office Tel: (316) 946-4100
TC Number -- Make -- Model:
5A2 -- Cessna Aircraft Company, The -- 140A
A-768 -- Cessna Aircraft Company, The -- 120
A-768 -- Cessna Aircraft Company, The -- 140

Eight of them.

Here is the record of metallization on my plane copied from the CD from the FAA. Done in 1958 but with no sketches as part of the modification. The mention of "Kit" implies that they furnished the materials as well as the plans.



Fabric Wings converted to metal in accordance with Ruleto Industries Inc. installation, Kit CWK-1, Serial #1175.

Weight and Ballance Computations:

Datum--Wing leading edge
EW CG Range plus 12.2 to plus 14.5
Added Weight--plus twelve pounds in wing metal at plus 24".

Item	Plus Weight	Arm	Plus Moments	Minus Moments
Wing Metal	12	+24	288	
Airplane	~~853.9~~ 865.9	+12.9 +only	~~10921.5~~ 11209.5	

work: 11209.5/865.9 equal 12.90(new Empty Weight CG and only fractional change from previous EW CG.)

The weight change is noted as 12 pounds. Others are 26 pounds or 22 pounds, all using the same thickness of aluminum, but NONE mention whether they actually weighed the plane before and after. What did the fabric removed weigh? Unless you weighed the plane before and after, how did you get the true net?

Some STC's must have called for the removal of the steel drag wires. If the fabric was removed and then the drag wires removed, you immediately had a wing a bit limber, spaghetti-like. One owner at least confirmed that his is twisted and lumpy from such a likely cause, but the plane flies like the others anyway. From our supposing, we believe that the drag wires should have been left in to retain the wing shape at least until either the top or the bottom metallization was secured to the structure and then it would have been safe to remove the wires. They weigh about 8 pounds. Bill Rhoades published the information in one of the Technical inserts to the newsletter about why it was okay to remove the wires when the wings were metalized. I can still see mine, not all of them, so the weight change would have been less than noted if they had been removed.

The URL to get to the STC listing the fastest for the 140 (open it and you can then shift to the 120).

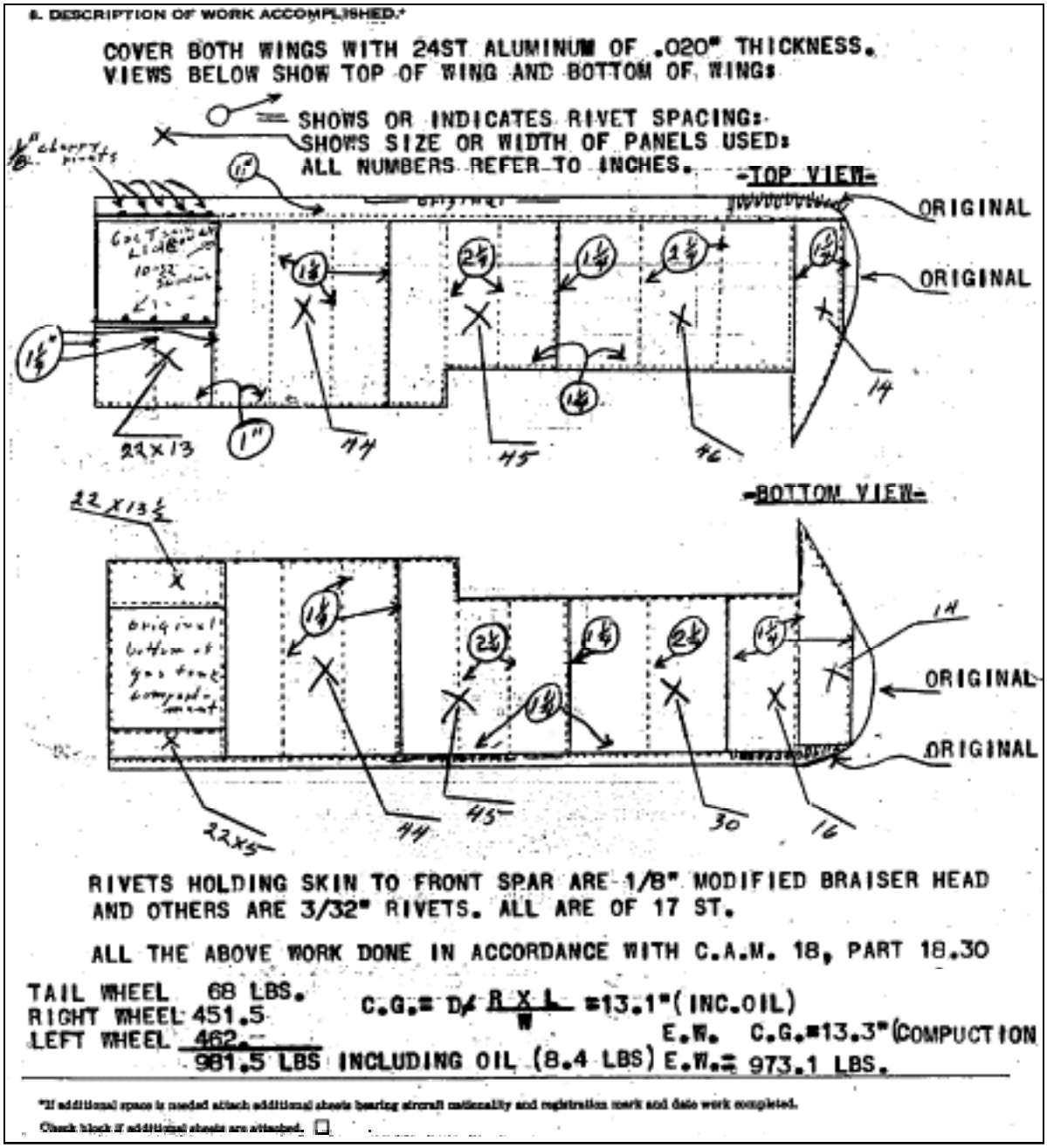
http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgSTC.nsf/STCMake!OpenView&Start=75&Count=200&Expand=81.2#81.2

If you want to look up an STC by any of these categories, this is the URL:
http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgSTC.nsf/

STC's by 'Make' or by 'Number' or by 'Type' or by 'Responsible Office' orby 'STC Number' or by 'TC Number'. (STC's by make was best for this search)

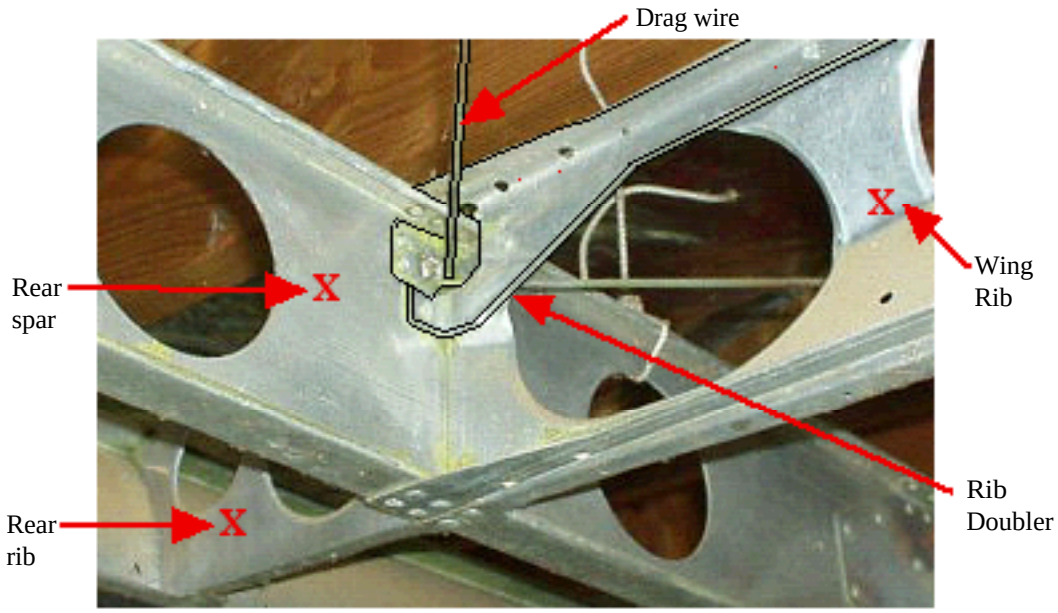
On the next page, the sketch from a 337 for a 140.

Note that there is no mention of the drag wires or of their weight if removed (they weigh 8 pounds). This is a page of a plane whose wings were metalized.

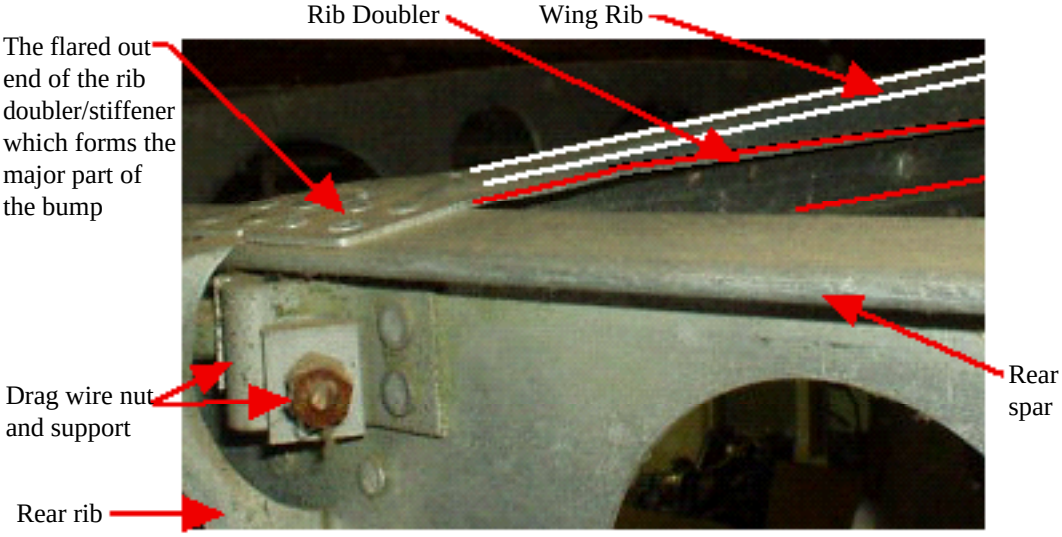


The Metalized Wings with the Bumps:

These next two figures illustrate the reason for the "bumps" on most metalized wings above the rear spar and these junctures of structure parts are what the airfoil-shaped covers are doing over these points on the top of the wing covered by the metallization plan (STC?) of at least one metallization source. When we find a plane with the neat covers and can discern which plan added them and take pictures, this file will be modified to show and explain.



Viewed from below, showing the outlined rib stiffener/doubler and suggesting the portion which goes on top of the spar and creates the "bump"

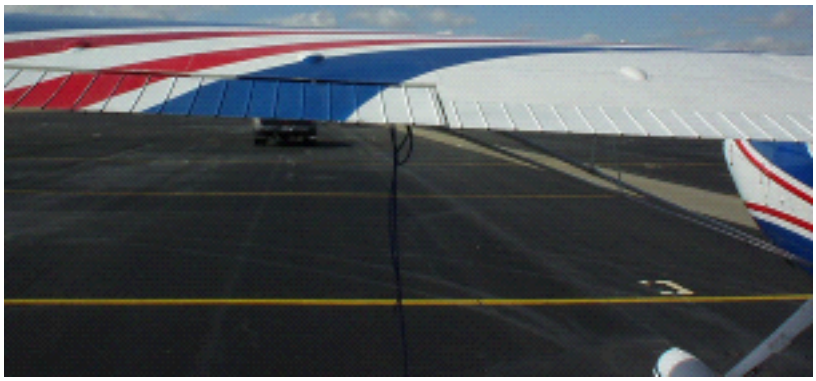


Red outlines the rib doubler and white outlines the top of the rib which terminates on the under side of the spar top flange. The bumps are only above three? or four ribs on each wing

The Metalized Wings with the Bumps:

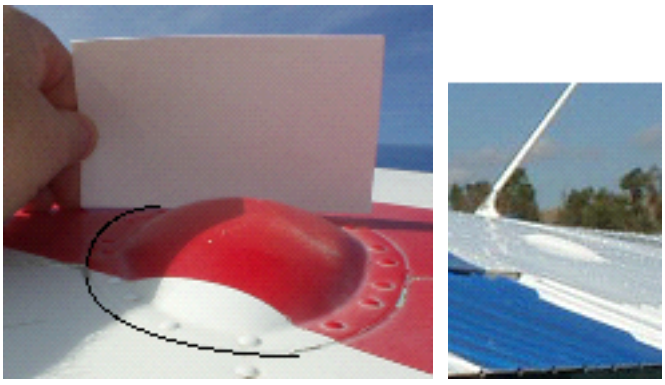
If anyone can identify the STC or the STC holder...any information...for the metallization effort which included the little teardrop shaped covers over the bumps on the wing as shown earlier, let me know and I will modify this file to include that information. They look something like this, though not so high as indicated, but very nicely made and well shaped.

Later, we located a plane with the bumps and present a few pictures to illustrate the installation. Three on each wing.



The wing picture is too wide, so I chopped the picture and present the three left wing bumps.

This picture includes a 3x5 inch note card to illustrate the relative size and the one on the right is here just to indicate the relative position of the most inboard bump. I outlined the edge of the bump in the white area to make it more conspicuous.



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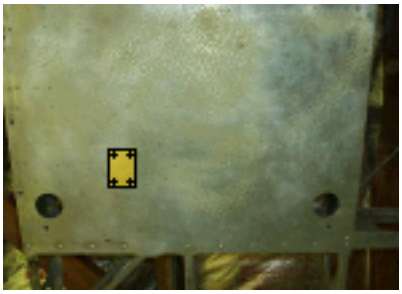

For those with fabric wings who have never seen the wing underside of the gas tank, all planes came with these bottom side covers. The two holes are to allow the installation of fuel tank drains and there are two so that the same piece of metal could be used on both the right and left wings. The data plate for some metallization STC installations would be about where indicated. Some of the metallization plans filled in or covered the outboard holes. For this view, imagine you are laying under the wing, feet to the tail, and looking up.

Want changes or more information, let me know. New inputs or suggestions will be incorporated in the next version.

Neal

Neal F. Wright Nov '05

cougarnfw@aol.com filed as Metallization STC's, Wing