

Service Bulletin

Title: Improved Drain System for the Bell 429 Helicopter Air Conditioning System Aft Evaporator Installations 429EC-622-1 & -2 and 429EC-624-1

Date: 8 April 2011

Applicability: Bell Helicopter Model 429 Series Air Conditioning System
 Serial Numbers: AC429-002 thru AC429-061. Effective for 429 aircraft serial numbers 57001 through 57054.

Prerequisite: Bell Helicopter Technical Bulletin 429-11-12 must be accomplished prior to performing this service bulletin. TB 429-11-12 adds holes in the cabin top and fuselage panel necessary to route the drain hoses as part of this service bulletin.

Reference:

1. F.A.A. S.T.C. # SR00693DE, Bell Helicopter 429 Series Air Conditioning System
2. 429EC-200M-1 Instructions for Continued Air Worthiness
3. 429 Air Conditioner (Dual Fwd/Aft Evaporators) Drawing : 429EC-200
4. 429 Air Conditioner (Single Fwd/Aft Evaporators) Drawing : 429EC-202
5. Installation – Plumbing (Dual) Drawing number: 429EC-500
6. Installation – Plumbing (RH Single) Drawing number: 429EC-522
7. Installation – Aft Evaporators (Dual) Drawing number: 429EC-622
8. Installation – Aft Evaporator (RH Single) Drawing number: 429EC-624

Compliance: At the discretion of the operator.

Revision	Issue Date	Inserted By	Approved	Description of Changes
N/C	4/8/11	JB	-	Initial Release
A	4/20/11	JB	-	Improved clamping, water sealing and insulation of refrigerant lines
B	4/29/11	KP	-	Split into Phase I & II. Added Phase II removal of evaporators and internal modifications
C	6/10/11	RL	-	Combined Phase I and II BOMs and installation instructions; removed reducer plates from BOM
D	11/29/11	RL	-	Updated applicability; added man-hours for Single and Dual configurations; reconfigured numerous installation figures for clarity; added Detail A to figure 22; added notes to page 11 and 12
E	3/29/12	RL	MJK	Added warranty statement
F	8/11/15	JMB	FDP	Pg. 17: added warning & references to newly added figures. Pg. 21, 22: added figures 19 thru 21 Pg. 24-26: added figures 23 thru 26

A. Discussion:

This document provides instructions for changes to the aft evaporator installation to improve condensate drainage. The evaporator drain line configuration is revised. The existing routing along the cabin top is replaced by drain lines that are routed down the LH fuselage lift frame, aft along the LH keel beam and out through the bottom of the aircraft. Firesleeve is applied to the refrigerant suction lines near the aft evaporators to prevent condensate formation on these lines.

The evaporators are removed and a condensate containment mesh is installed on the lower surface of the evaporator interior, between the heat exchanger and the blower inlet. A drain sump with new drain fitting is added to the bottom of the enclosure. The original drain fitting location is plugged and an airflow barrier is added to the inlet side of the bottom of the heat exchanger.

B. Manpower:

Approximate man-hours required to complete the service bulletin (May vary with personnel and facilities available):

60.0 man-hours for the Single configuration

80.0 man-hours for the Dual configuration

These are the maximum number of hours authorized under the warranty labor claim statement detailed in section C below.

C. Warranty:

This is a no-charge service bulletin. There is no charge for parts associated with this bulletin. Contact Air Comm Corporation for ordering information. Contact Bell Helicopter Customer Support for warranty labor claim. Owners/Operators have until December 31, 2012 to file a claim to Bell.

D. Approval:

The technical aspects of this service bulletin are based on previously FAA approved data.

E. Weight & Balance:

There is a negligible change to the weight of the new drain installation compared to the installation being removed.

F. Material

SINGLE EVAPORATOR BILL OF MATERIALS
Order SB 429-622-1

Items to be Removed:

Qty.	Part Number	Nomenclature
1	429EC-6216-12	Tube, Drain – LH Aft Evaporator
1	429EC-6216-13	Tube, Drain – LH to RH Evaporator
2	MS21919WDG6	Clamp, Cushioned
4	MS21919WDG8	Clamp, Cushioned
4	MS21042L3	Nut
8	NAS1149F0332P	Washer
2	MS27039-1-08	Screw
6"	ES48150-2	Hose, Drain – ½" I.D.
2	CB4000G3CR8-750	Clickbond, Stud, Trimmed
4	MS3367-1-0	Cable Tie
1	429EC-6213-11	Drainage Bracket (part of 429EC-6302-3 & -4)
4	MS20470AD3-4	Rivet (drainage bracket)

Items to be Installed:

Qty.	Part Number	Nomenclature
2	NAS1802-3-9	Screw, Hex Head
17	NAS1149F0332P	Washer
3	NAS1149D1232K	Washer (Alt: NAS1149D1232J)
2	NAS1149C0332R	Washer (Alt: NAS1149E0332R)
1	MS35489-149	Grommet (Synthetic Rubber)
3	MS3367-1-0	Cable Tie (Alt: CT7B)
4	MS27039-1-08	Screw, machine- Pan Head
1	MS21919WDG6	Clamp, Loop Type, Cushioned
3	MS21919WDG11	Clamp, Loop Type, Cushioned
8	MS21919WDG12	Clamp, Loop Type, Cushioned
4	MS21042L3	Nut, Self Locking
6	ES30043-2	Clamp, Hose
2	CB4001G3CR16	Clickbond Standoff, Locking Thread
1	ES39340-2	Elbow, 90° Plastic, ½"
195"	ES48154-1	Hose Drain
1	AN924-8D	#8 Bulkhead Union Nut
1	S-6554EC-1	Fitting, Bulkhead
1	S-6552EC-1	Assembly, Check Valve
1	ES01001-4	Modification Label
15'	ES02127-10	Firesleeve, Black, 5/8"
1	1-608036-4	Fusion Tape, Roll, 1" x 15'
4	ES59110-4	Decal, Evaporator Water Drain
1	GE108RTV	Silicone Adhesive, Clear (Alt: GE103RTV BLK)
1	ES04122-1	7.75 x 7.65 Heat Exch. Water Screen
1	429EC-6242-1	Assembly, Water Screen
1	429EC-6318-2	Angle, Dam
1	429EC-6318-4	Screen (added to water screen)

1	429EC-6320-1	Sump, Water Drain
1	ES39320-1	Nut, Water Drain
2	AD32ABS	Rivet (drain angle)
12	AD34ABS	Rivet (sump)
3	AD46ABS	Rivet (drain nut)
3	NAS1149FN416P	Washer (drain nut)
1	ES39320-8	Drain Plug
1	ES43030-5	Drier Bottle

DUAL EVAPORATOR BILL OF MATERIALS

Order SB 429-622-2

Items to be Removed:

Qty.	Part Number	Nomenclature
1	429EC-6216-12	Tube, Drain – LH Aft Evaporator
1	429EC-6216-13	Tube, Drain – LH to RH Evaporator
2	MS21919WDG6	Clamp, Cushioned
5	MS21919WDG8	Clamp, Cushioned
4	MS21042L3	Nut
1	NAS43DD3-105FC	Spacer
7	NAS1149F0332P	Washer
2	MS27039-1-08	Screw
1	MS27039-1-34	Screw
1	AN3-3A	Bolt
1	ES39332-1	Fitting, Tee – Evaporator Drain
6"	ES48150-2	Hose, Drain – ½" I.D.
1	CB4000G3CR8	Clickbond, Stud
1	CB4000G3CR8-750	Clickbond, Stud, Trimmed
8	MS3367-1-0	Cable Tie
2	429EC-6213-11	Drainage Bracket (part of 429EC-6302-3 & -4)
8	MS20470AD3-4	Rivet (drainage bracket)

Items to be Installed:

Qty.	Part Number	Nomenclature
2	NAS1802-3-9	Screw, Hex Head
26	NAS1149F0332P	Washer
6	NAS1149D1232K	Washer (Alt: NAS1149D1232J)
2	NAS1149C0332R	Washer (Alt: NAS1149E0332R)
2	MS35489-149	Grommet (Synthetic Rubber)
6	MS3367-1-0	Cable Tie (Alt: CT7B)
4	MS27039-1-08	Screw, machine- Pan Head
1	MS21919WDG6	Clamp, Loop Type, Cushioned
3	MS21919WDG11	Clamp, Loop Type, Cushioned
16	MS21919WDG12	Clamp, Loop Type, Cushioned
4	MS21042L3	Nut, Self Locking
12	ES30043-2	Clamp, Hose
2	CB4001G3CR16	Clickbond Standoff, Locking Thread
2	ES39340-2	Elbow, 90° Plastic, 1/2 "
390"	ES48154-1	Hose Drain

2	AN924-8D	#8 Bulkhead Union Nut
2	S-6554EC-1	Fitting, Bulkhead
2	S-6552EC-1	Assembly, Check Valve
2	ES01001-4	Modification Label
15'	ES02127-10	Firesleeve, Black, 5/8"
1	1-608036-4	Fusion Tape, Roll, 1" x 15'
8	ES59110-4	Decal, Evaporator Water Drain
1	GE108RTV	Silicone Adhesive, Clear (Alt: GE103RTV BLK)
2	ES04122-1	7.75 x 7.65 Heat Exch. Water Screen
2	429EC-6242-1	Assembly, Water Screen
2	429EC-6318-2	Angle, Dam
2	429EC-6318-4	Screen (added to water screen)
2	429EC-6320-1	Sump, Water Drain
2	ES39320-1	Nut, Water Drain
4	AD32ABS	Rivet (drain angle)
24	AD34ABS	Rivet (sump)
6	AD46ABS	Rivet (drain nut)
6	NAS1149FN416P	Washer (drain nut)
2	ES39320-8	Drain Plug
1	ES43030-5	Drier Bottle

Overview

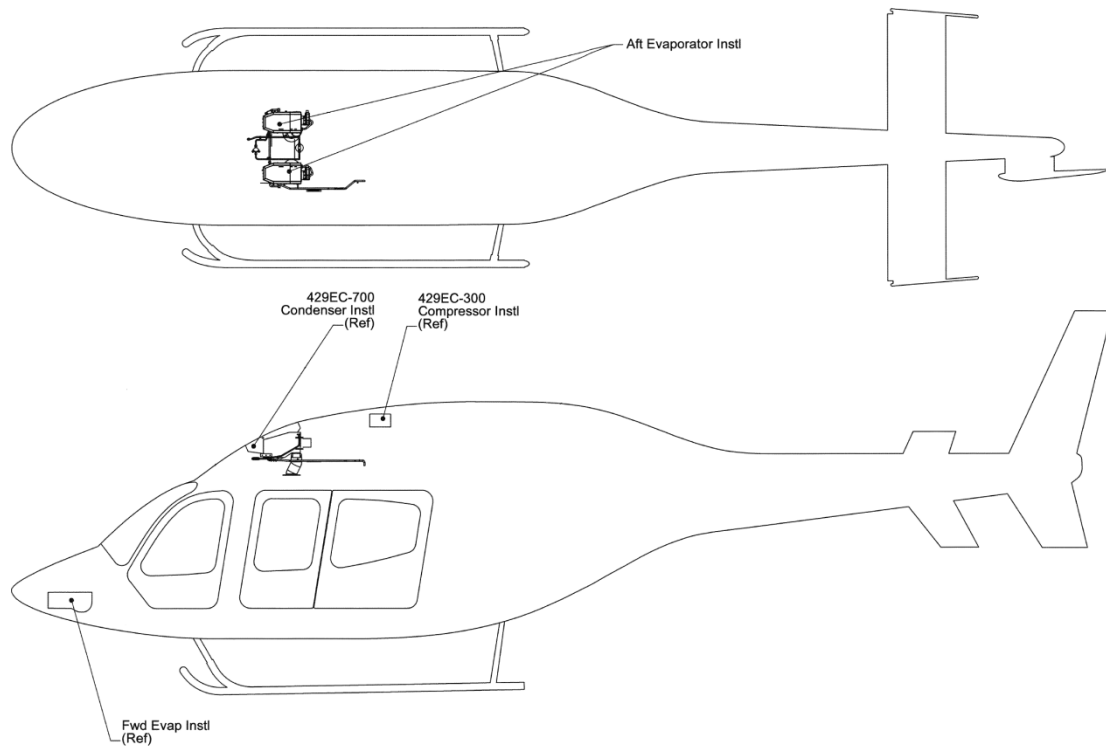


Figure 1: 429EC-200; Existing Dual Aft Evaporator Condensate Drain System

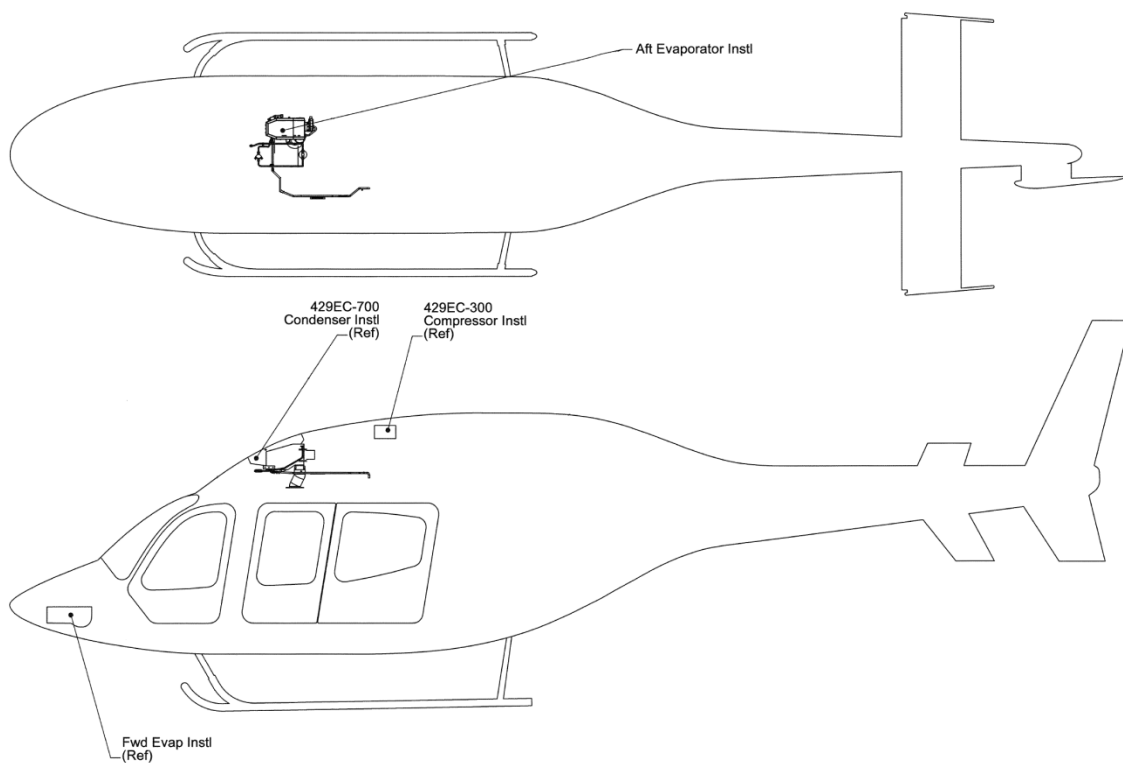


Figure 2: 429EC-202; Existing Single Aft Evaporator Condensate Drain System

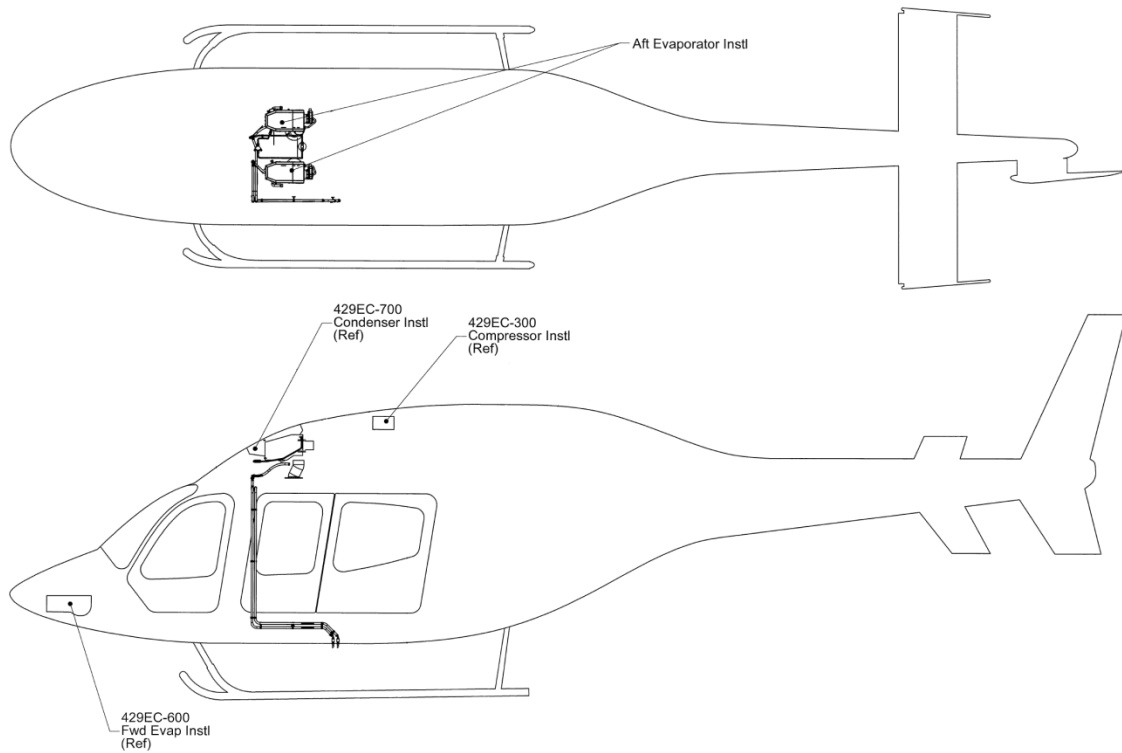


Figure 3: 429EC-200; Revised Dual Aft Evaporator Condensate Drain System

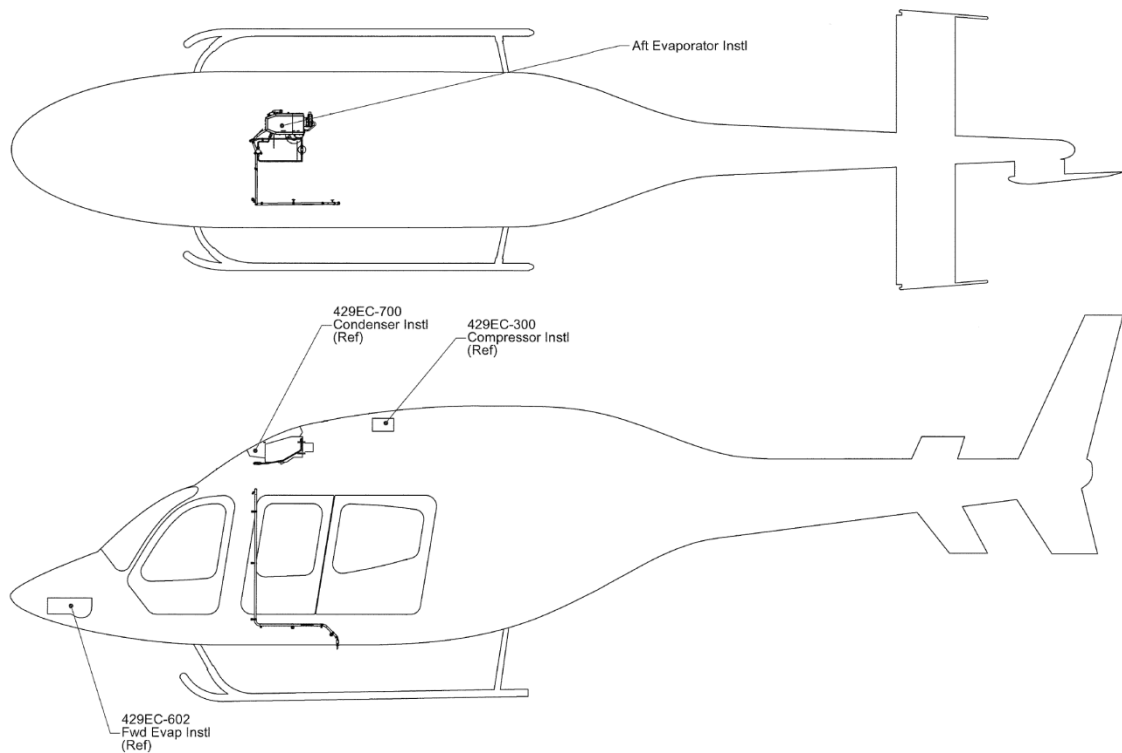


Figure 4: 429EC-202; Revised Single Aft Evaporator Condensate Drain System

G. Accomplishment Instructions:

WARNING

Disconnect aircraft electrical power and battery prior to maintenance.

CAUTION

Ensure air conditioning system refrigerant is depressurized or reclaimed by qualified personnel prior to removing system components.

1. Removal:

- a. Remove upper cowlings and interior panels as necessary to gain access to the aft evaporators and condenser and for installing drain line bulkhead fittings and routing new drain lines within aircraft structure. (Figures 1, 2, 3, 4)
- b. Evacuate (discharge) and reclaim the air conditioning refrigerant in accordance with ICA 429EC-200M-1.
- c. Remove condenser assembly and store in a secure location for reinstallation.
- d. Remove RH and LH (if applicable) evaporator assemblies and retain for modification.
- e. Remove drain tube 429EC-6216-12 & drain tube 429EC-6216-13 assemblies along with attaching hardware and discard. (Figure 5)
- f. Remove ES48150-2 drain Hose and tee fitting, ES39332-1 (Dual Evap) along with attaching hardware and discard. (Figure 5)

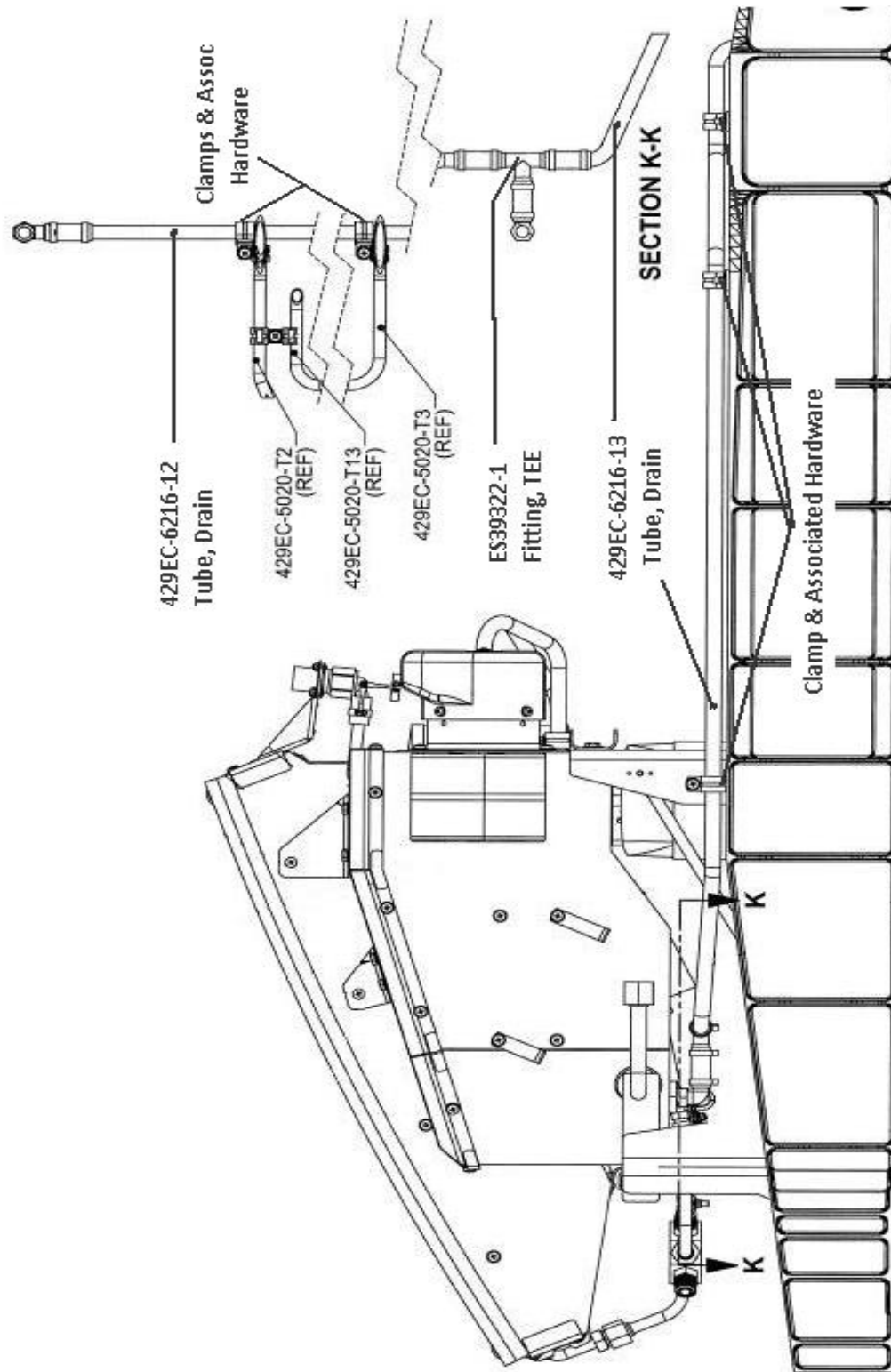


Figure 5: Removal of Existing Drain Lines and Attaching Hardware

2. Installation:

a. Evaporator Modification

- 1) Prepare evaporator for modification by removing and retaining attaching hardware (12X) MS27039-1-08 screws, (12X) NAS1149F0332P washers and evaporator lid. (Figure 6)
- 2) Inspect inside of evaporator to determine if ES04122-1 water screen is attached to aft side of heat exchanger (Figure 23, 24). If water screen is not installed, go to Paragraph 3 for installation instructions.
- 3) Remove ES39320-2 drain elbow from bottom of evaporator enclosure and retain for reuse.
- 4) Remove (4X) MS20470AD3-4 rivets and 429EC-6213-11 drainage bracket from evaporator enclosure and discard. (Figure 7)

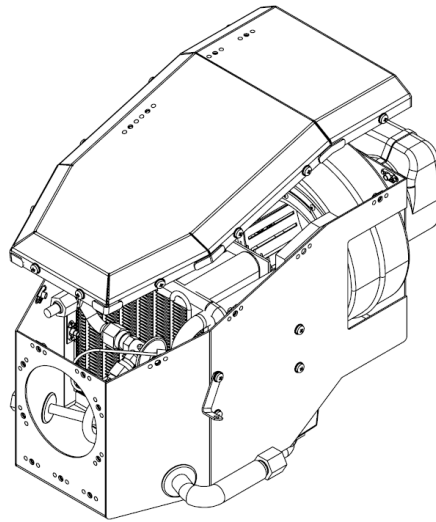


Figure 6: Evaporator Assembly (Remove Lid for accessibility)

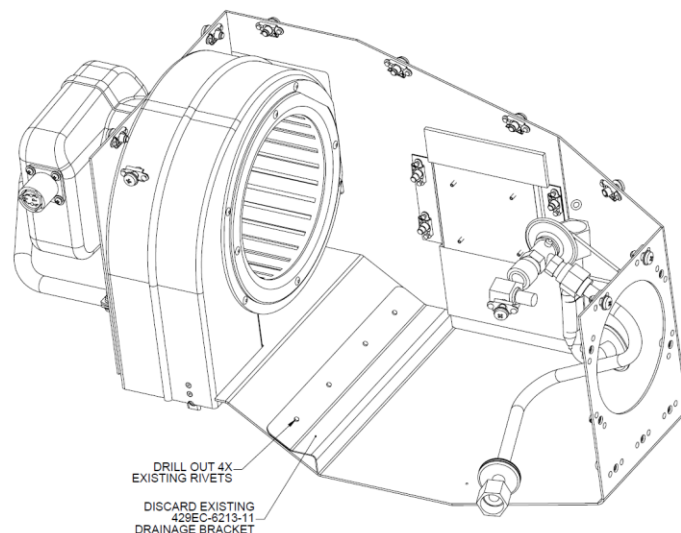


Figure 7: Remove 429EC-6213-11 Drainage Bracket

CAUTION

Ensure that the evaporator coil and associated tubing is not damaged while making enclosure cutout and match drilling for the water sump.

- 5) Using water sump cutout dimensions, mark cutout on the bottom of the evaporator enclosure. Carefully cut and remove cutout area on enclosure bottom. (Figure 8)

NOTE

It is permissible to remove blower motor/wheel assembly for ease of access (Figure 9).

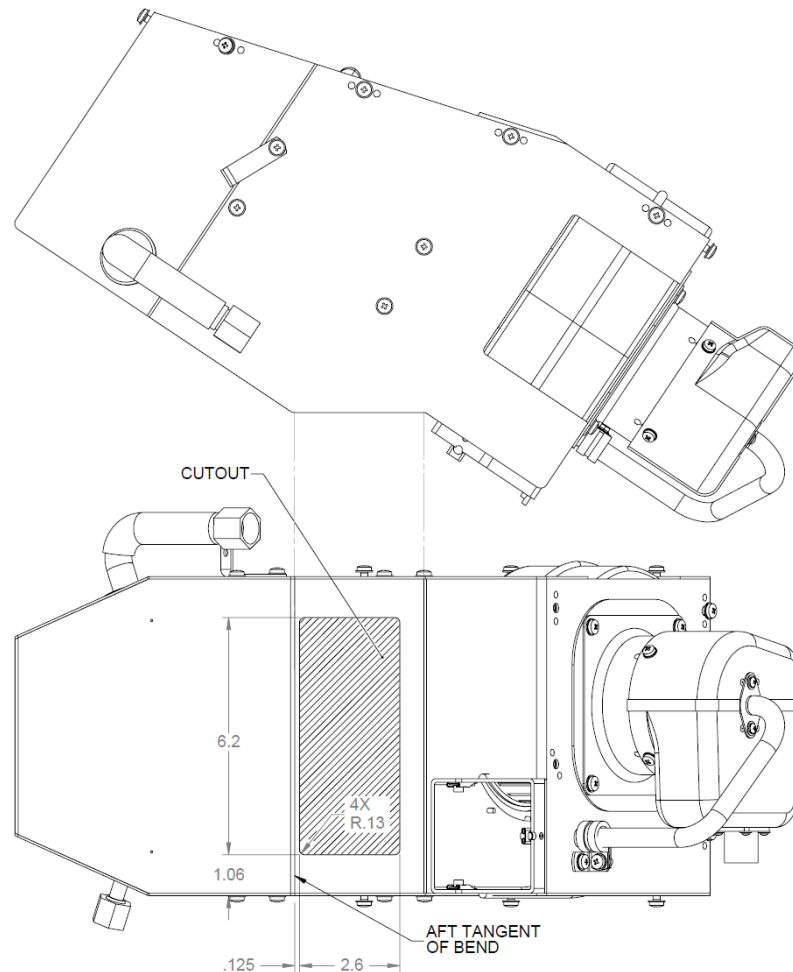


Figure 8: Water Sump Cutout Dimensions

- 6) Wet install ES39320-2 drain elbow and ES39320-1 nut to 429EC-6320-1 water sump using RTV103 black silicone rubber adhesive sealant. Leave drain elbow loose for evaporator reinstallation. (Figure 18) Match drill $\text{\O} .128$ and fasten with (3X) AD46ABS rivets and (3X) NAS1149FN416P Washers. (Figure 9)
- 7) Center 429EC-6320-1 water sump on new opening and wet install using RTV103 black silicone rubber adhesive sealant. Match drill $\text{\O} .098$ and fasten with (12X) AD34ABS rivets.
- 8) Wet install ES39320-8 drain plug into existing drain nut on bottom of evaporator enclosure using RTV103 black silicone rubber adhesive sealant.

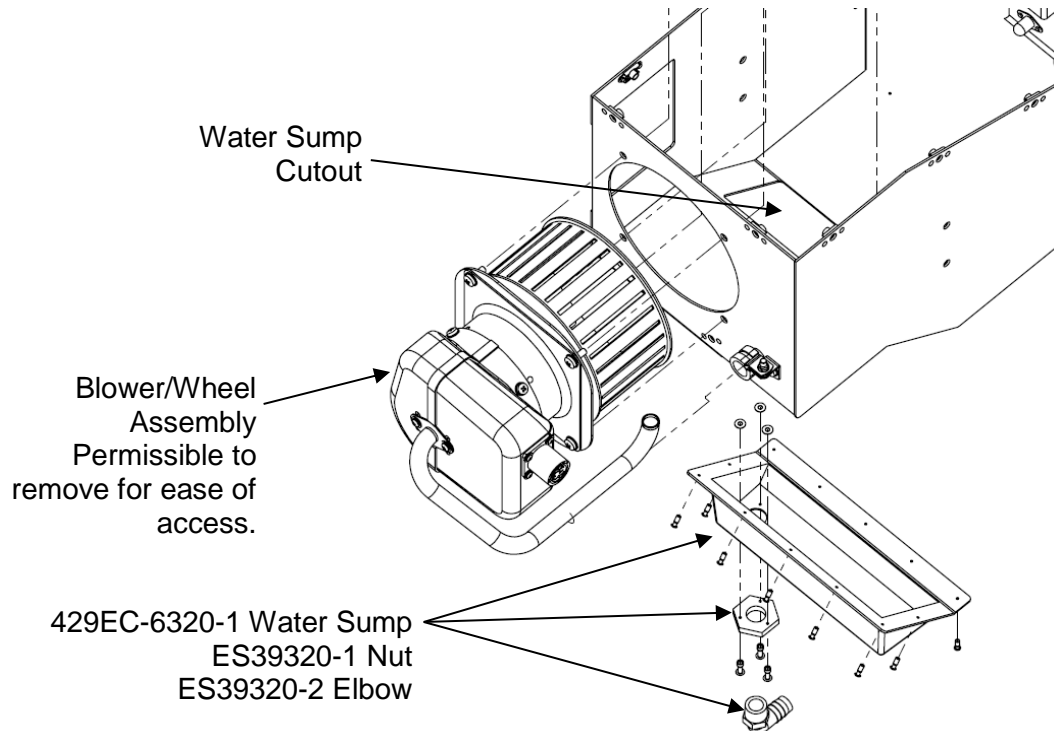


Figure 9: 429EC-6320-1 Water Sump with ES39320-2 Drain Elbow

CAUTION

If blower/wheel assembly is removed for access, do not handle the assembly by the blower wheel. Deformation, misalignment and imbalance may result. Carefully handle assembly by the motor to avoid disturbing the balance/alignment of the wheel.

- 9) Wet install 429EC-6318-2 dam angle as shown against evaporator coil using RTV103 black silicone rubber adhesive sealant. Match drill $\varnothing.098$ and fasten with (2X) AD32ABS rivets. Ensure that holes are not covered in bend. (Figure 10 & 11)

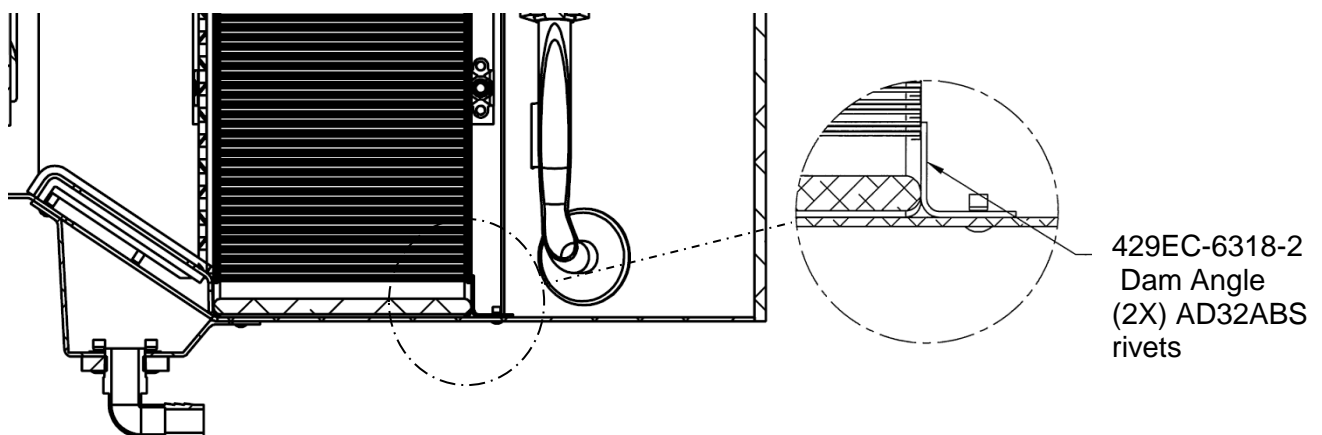


Figure 10: 429EC-6318-2 Dam Angle installed against Evaporator Coil

- 10) Install 429EC-6318-4 screen to coil ribbon with RTV103 black silicone rubber adhesive sealant. (Figure 11)

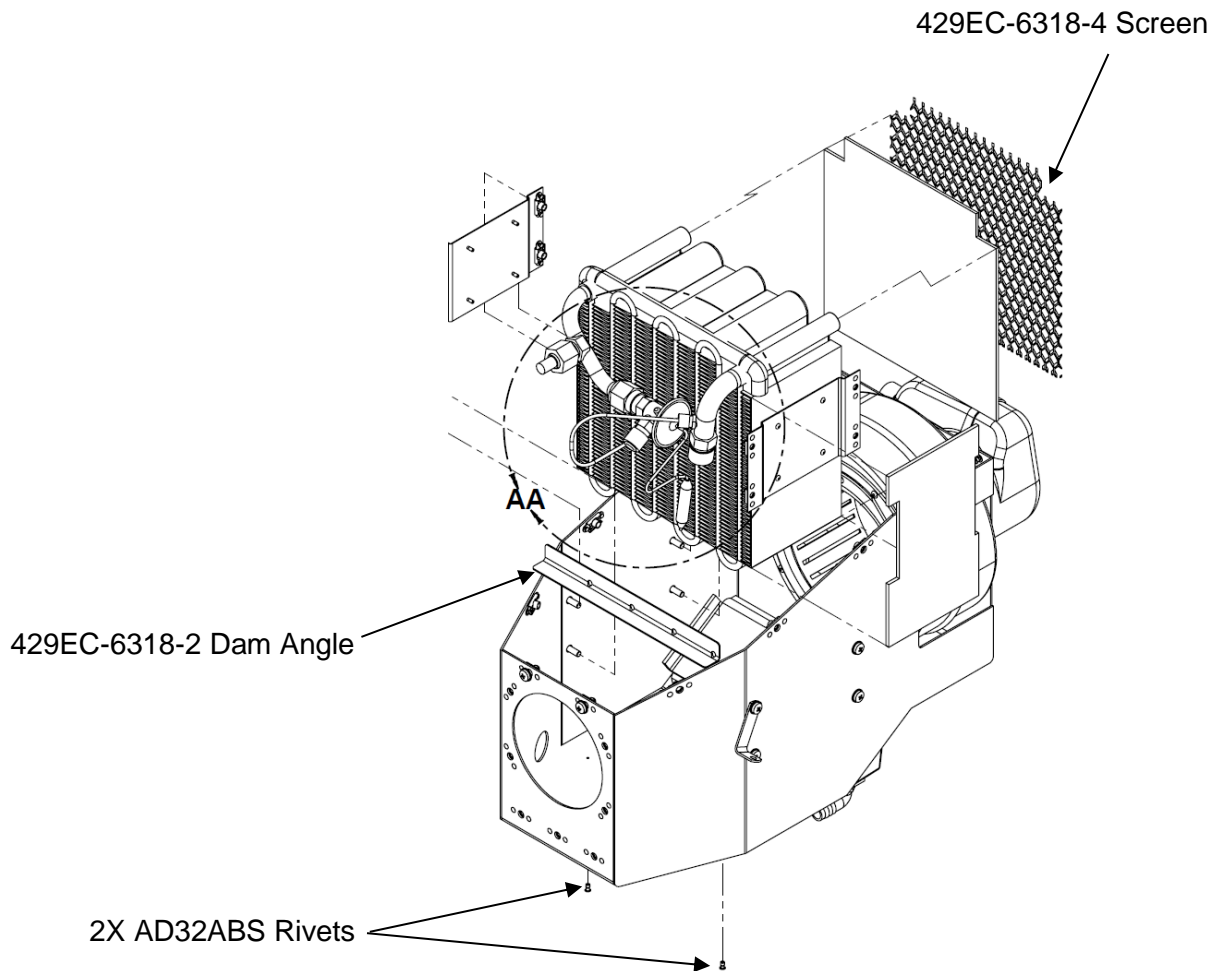


Figure 11: Exploded View of Evaporator

- 11) Fit 429EC-6242-1 water screen assembly as shown in Figure 12.

NOTE

When unfolded, sides of screen will fit snugly against the foam insulation on the interior sides of the evaporator and open edge facing forward against heat exchanger.

- 12) Ensure 429EC-6242-1 water screen assembly is seated fully against the existing ES04122-1 water screen material on the aft side of the heat exchanger. (Figure 13)
- 13) Seal sides of 429EC-6242-1 water screen assembly to interior of evaporator using RTV103 black silicone rubber adhesive sealant. (Figure 14)
- 14) Replace evaporator lid and attaching hardware (12X) MS27039-1-08 Screws, (12X) NAS1149F0332P washers. Seal edges with RTV103 black silicone rubber adhesive sealant.
- 15) Install ES01001-4 modification label on outside surface of each evaporator per Figure 18.

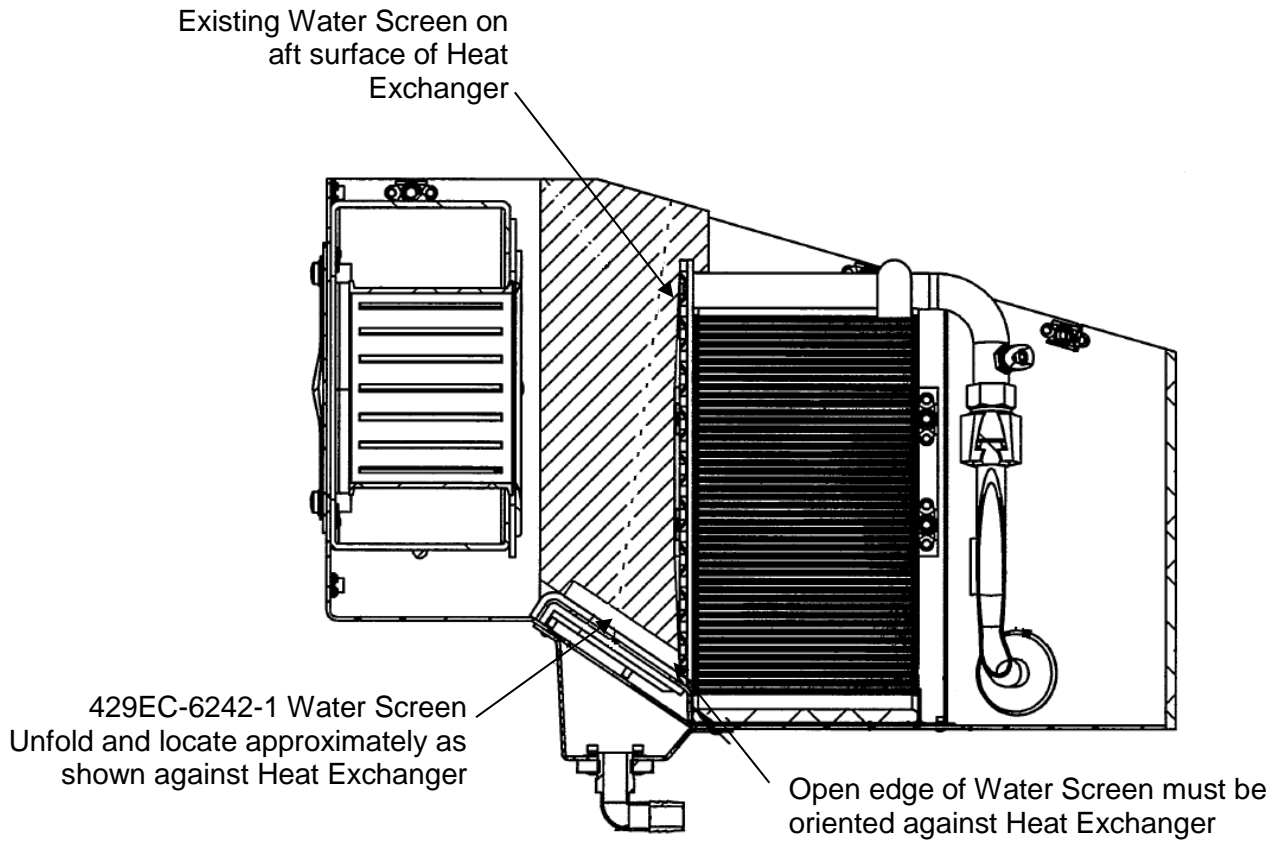


Figure 12: Aft Evaporator section shown with 429EC-6242-1 Water Screen Assembly installed

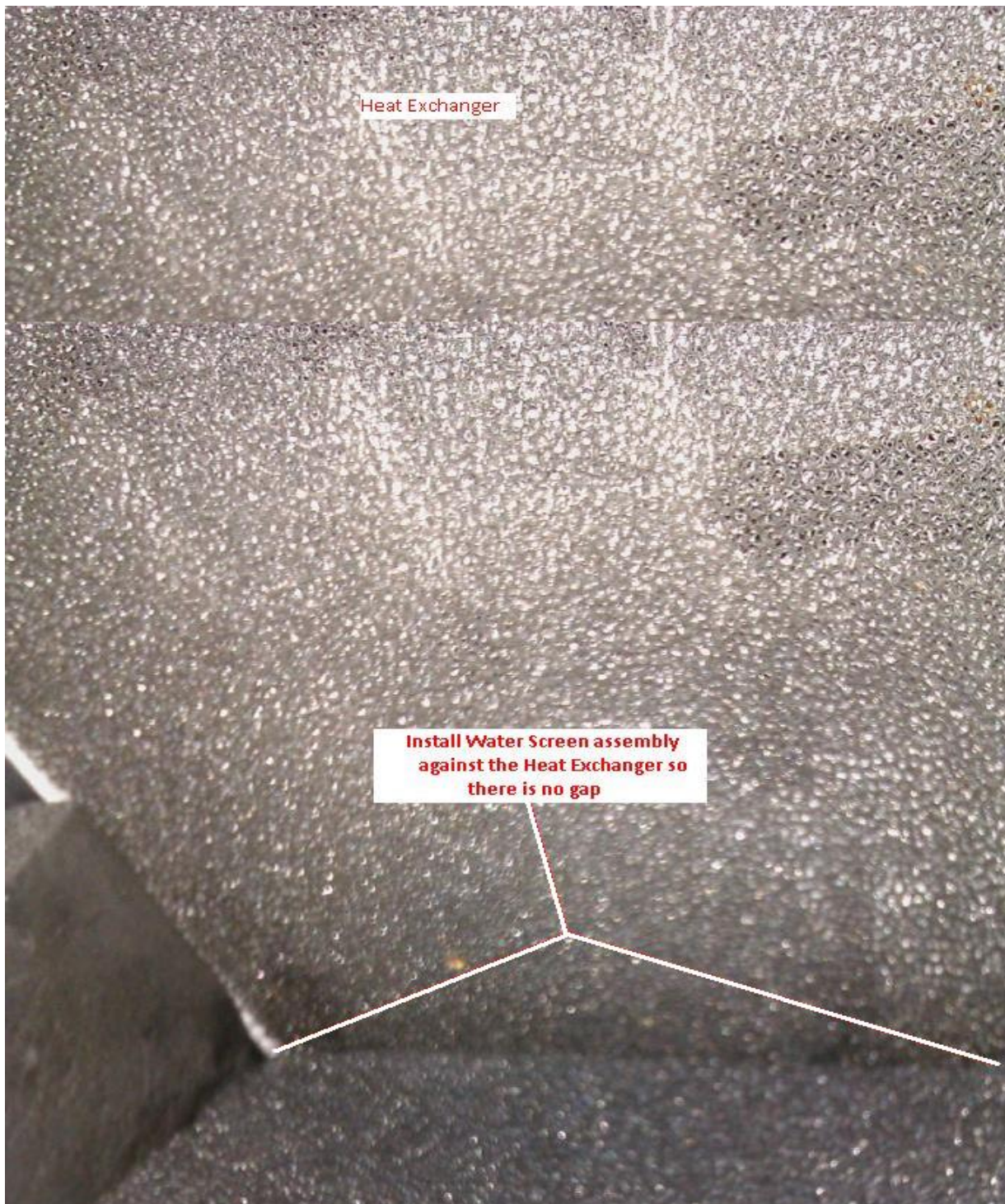


Figure 13: 429EC-6242-1 Water Screen Assembly Shown Against ES04122-1 Heat Exchanger Water Screen



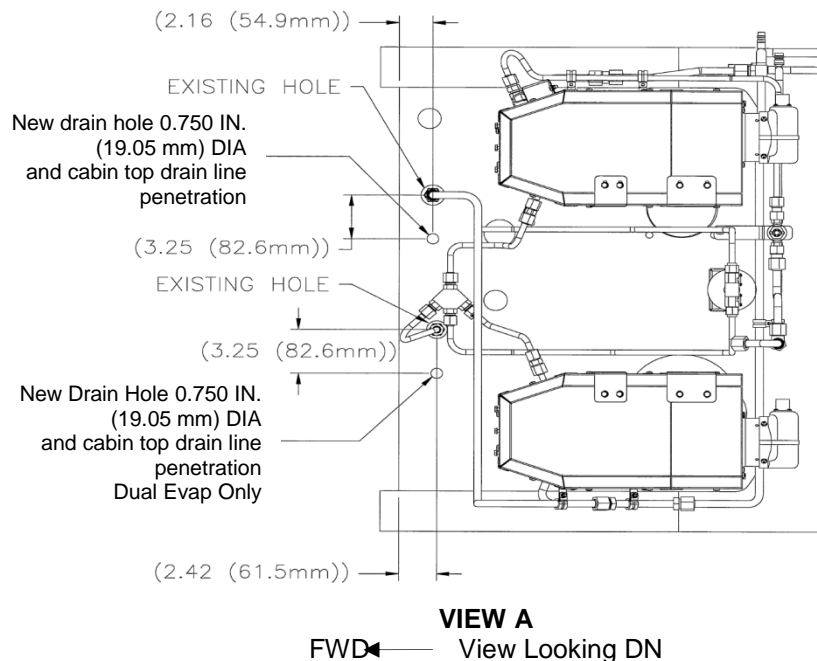
Figure 14: 429EC-6242-1 Water Screen Assembly Installed

b. Drain Line Reconfiguration

- 1) Ensure that Bell Technical Bulletin 429-11-12 is complied with prior to installing drain lines. The bulletin provides instructions to locate and drill passage holes allowing installation of additional drain lines. (Figure 15 & 16)
- 2) Locate and install 2X (1X for Single Evap) S-6554EC-1 bulkhead fittings, 6X (3X for Single Evap) NAS1149D1232K washers and 4X (2X for Single Evap) AN924-8D nuts and seal using Mil-PRF-81733 sealant, or equivalent. (Figure 17)
- 3) Install ES48154-1 drain hose as required from evaporator drain fittings to S-6554EC-1 bulkhead fittings and secure using ES30043-2 hose clamps. (Figures 17 thru 21)

WARNING: altering the drain hose routing and clamping from the configuration shown in figures 19 thru 21 may allow interference between the hose clamps and the flight control backshell.

- 4) Route ES48154-1 drain hose to underside of bulkhead fittings and secure using ES30043-2 hose clamps. (Figure 17)
- 5) Route and clamp ES48154-1 drain hose down the left side keel beam to check valves location. (Figures 22 thru 26)
- 6) Locate and install MS35489-149 grommets and P/N S-6552EC-1 check valves in lower left fuselage. (Figures 25 & 27)



**Figure 15: New Drain Holes Location; Roof Assembly
 (Dual Evap Installation Shown)
 Reference Bell Technical Bulletin 429-11-12**

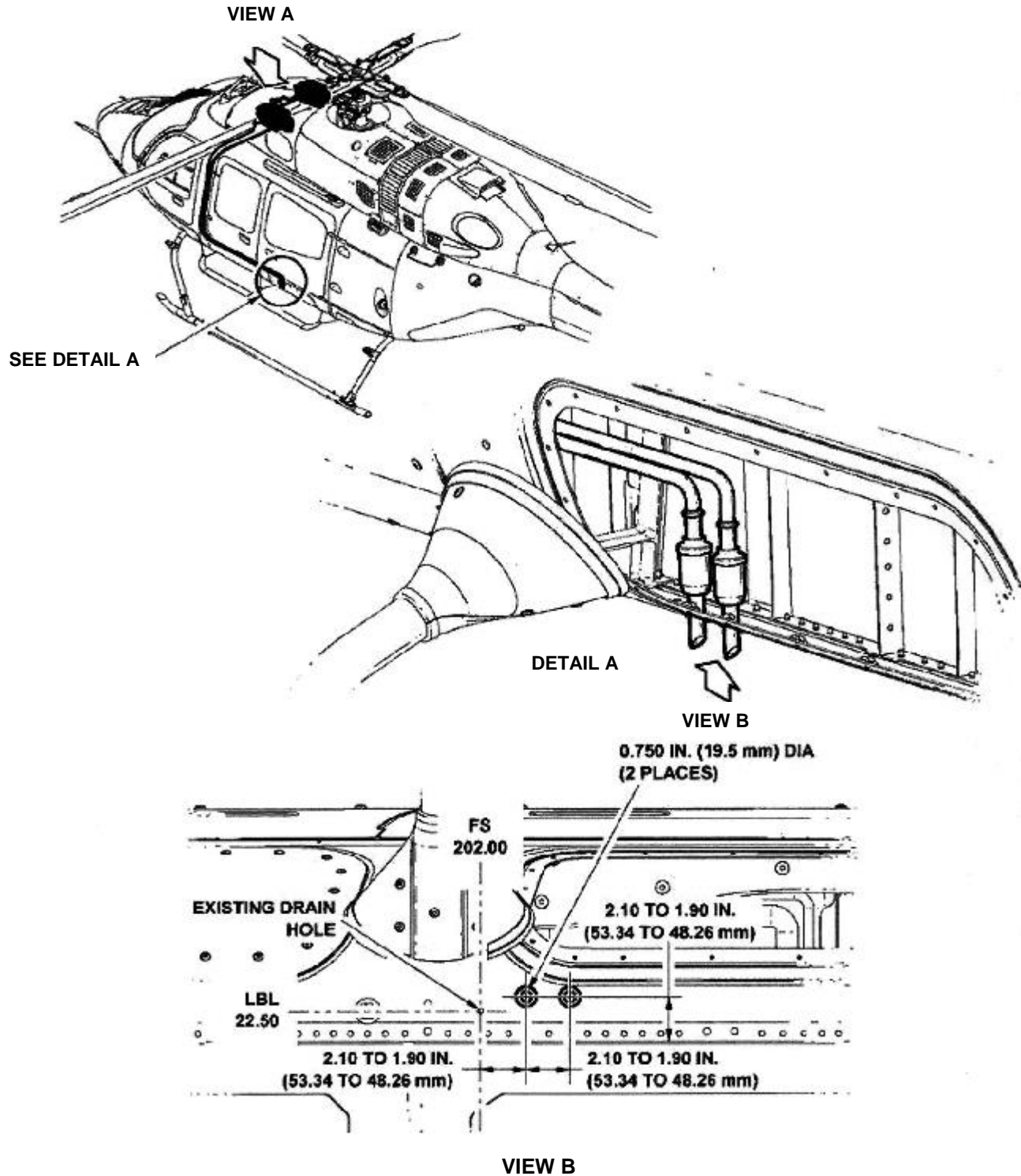


Figure 16: New Drain Holes Location; Left Side Fuselage Assembly
(Dual Evap Installation Shown)
Reference Bell Technical Bulletin 429-11-12

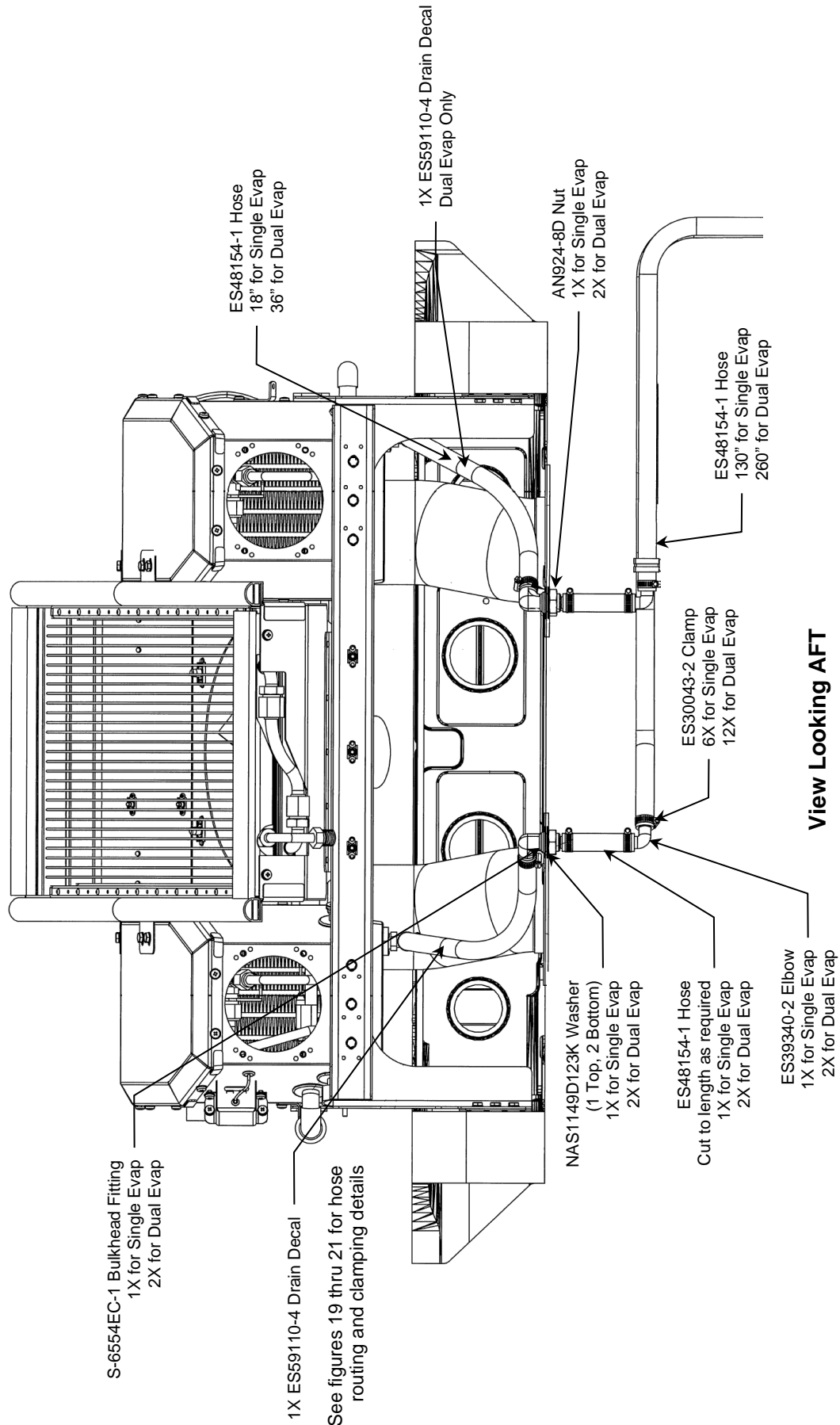
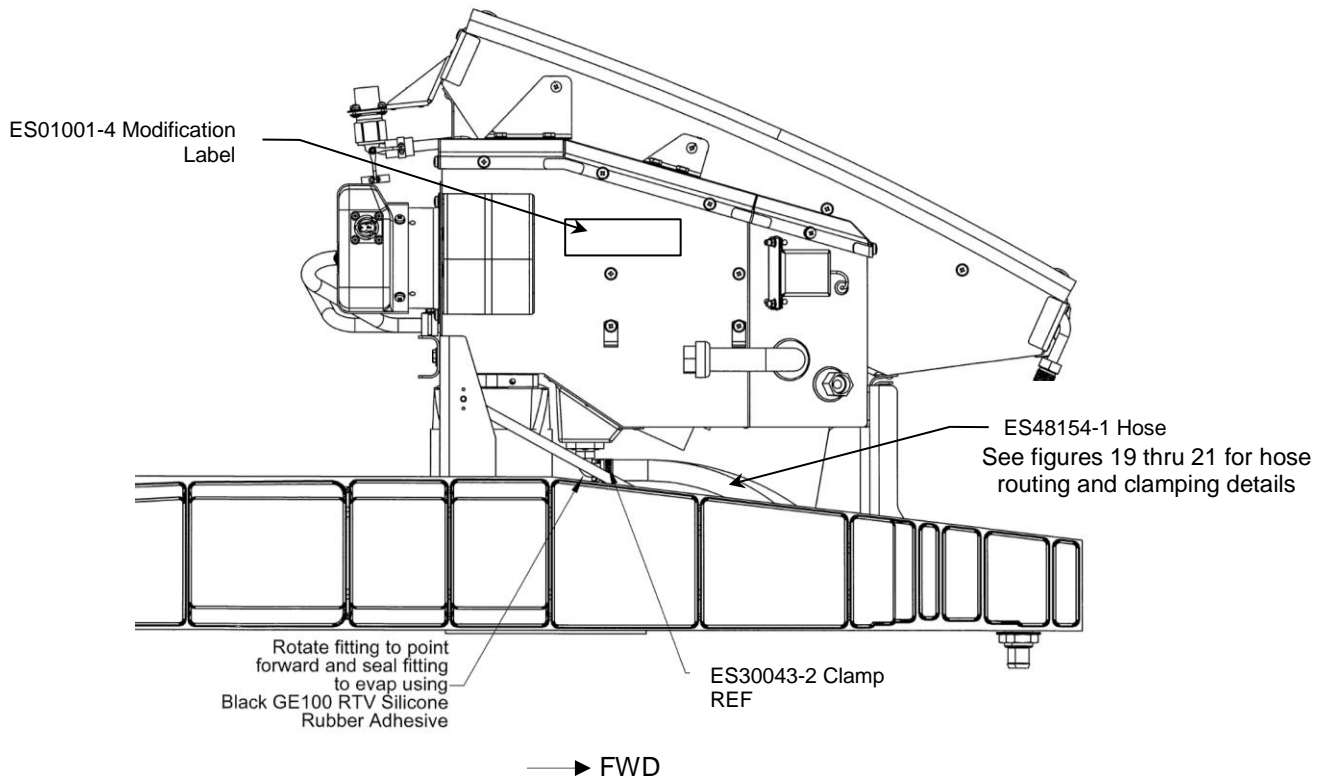


Figure 17: Fittings and Hardware placement. Dual Evap system shown. LH Components not used for Single Evap Systems.



View Looking INBD RH Side

**Figure 18: Aft Evaporator Drain Line Fitting and Hose
(LH Opposite for Dual Evap Installation)**

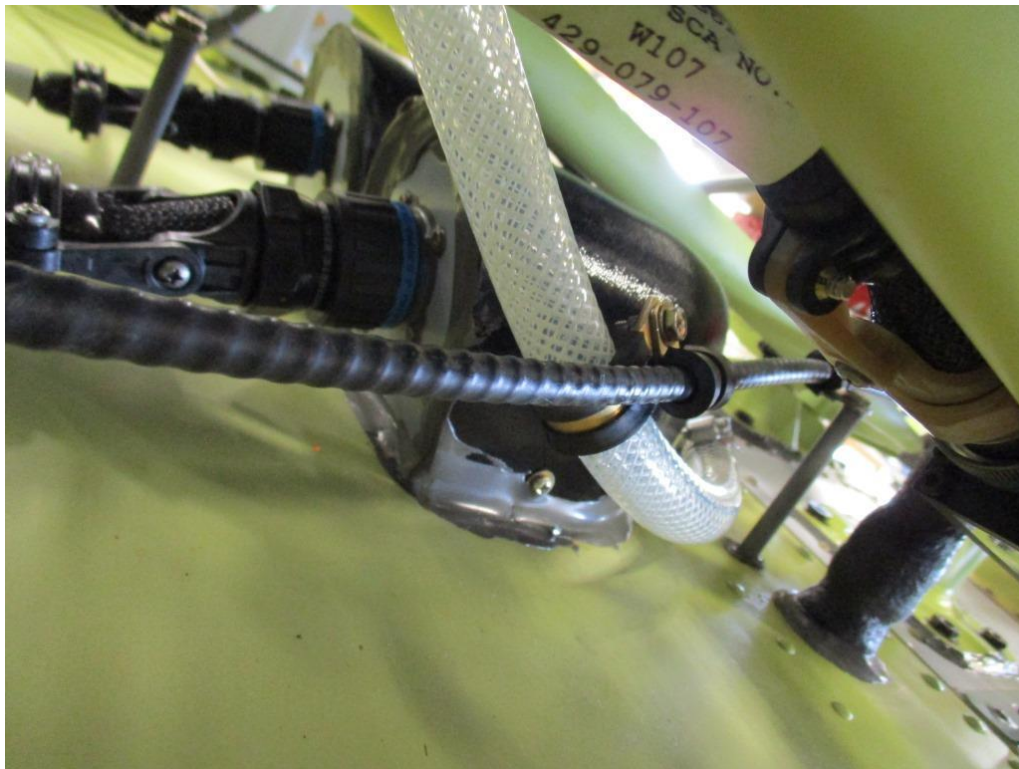


Figure 19: Rt side Aft Evaporator drain hose routing details between evaporator and transmission deck

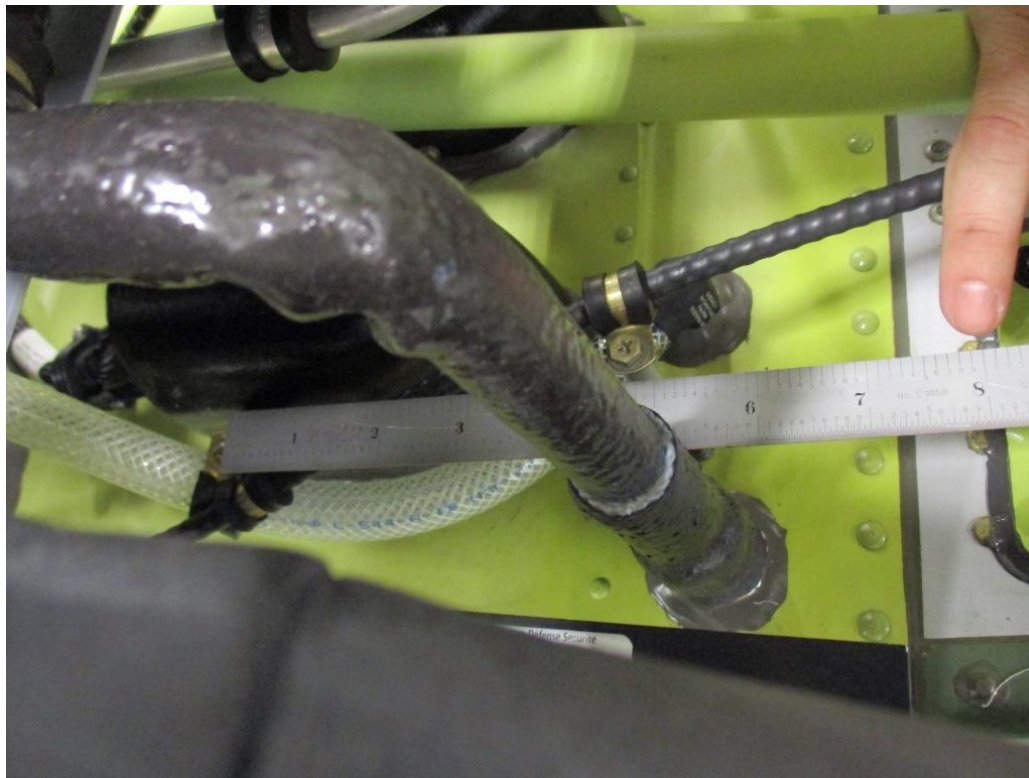


Figure 20: Rt side Aft Evaporator drain hose routing details between evaporator and transmission deck

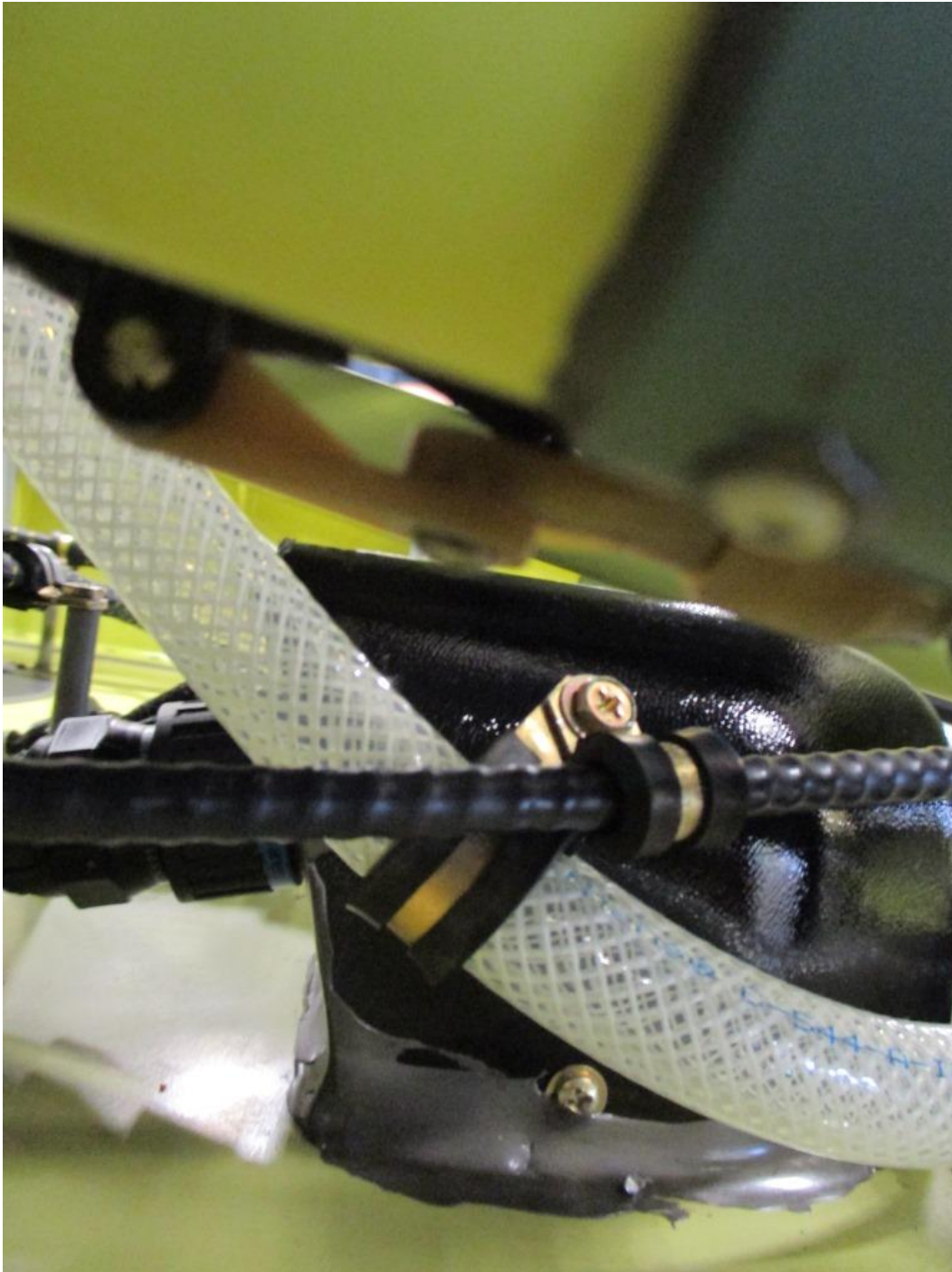


Figure 21: Rt side Aft Evaporator drain hose routing details between evaporator and transmission deck

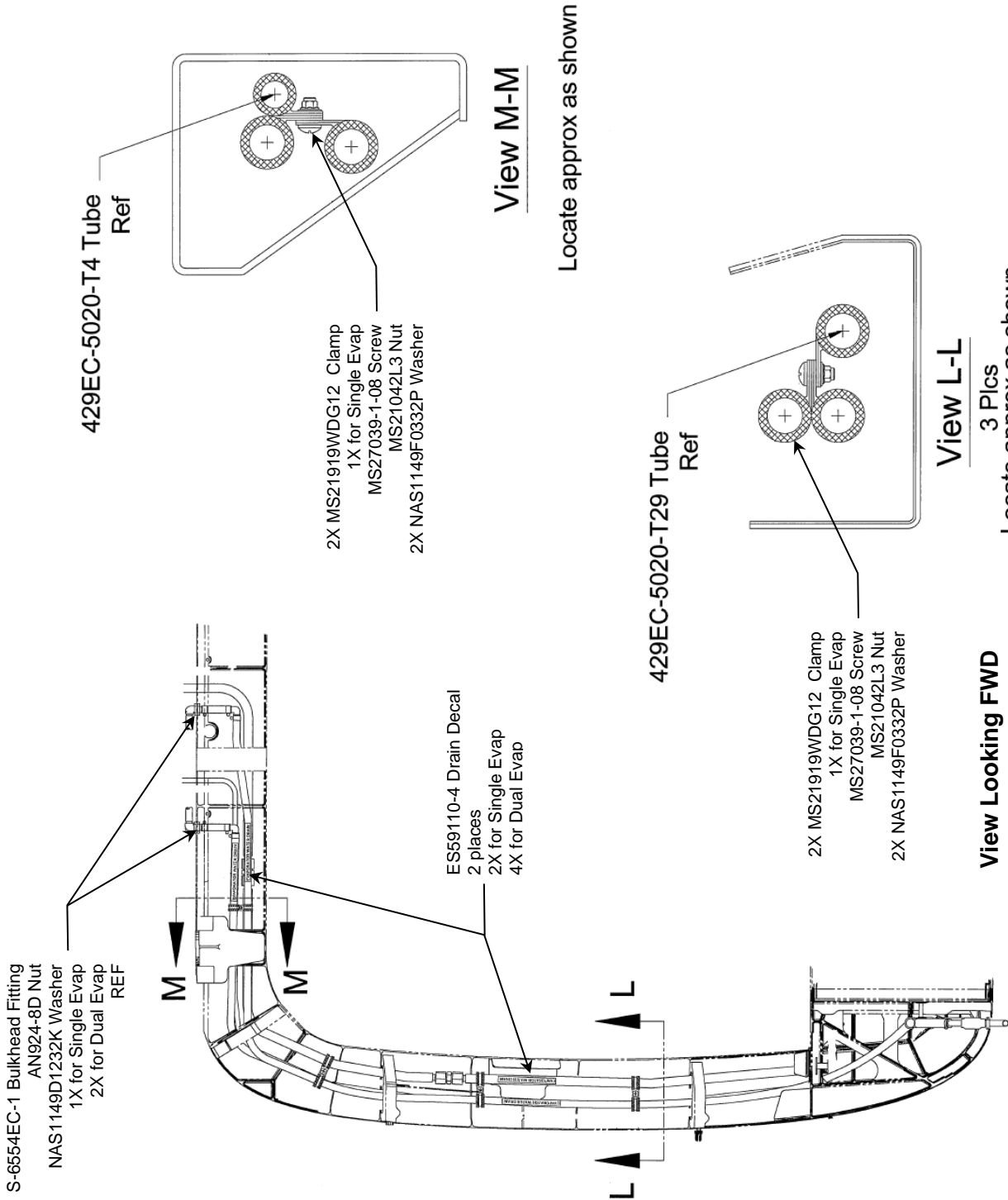


Figure 22: LH Side Fuselage Keel Beam Area
 Drain Line Routing and Clamping

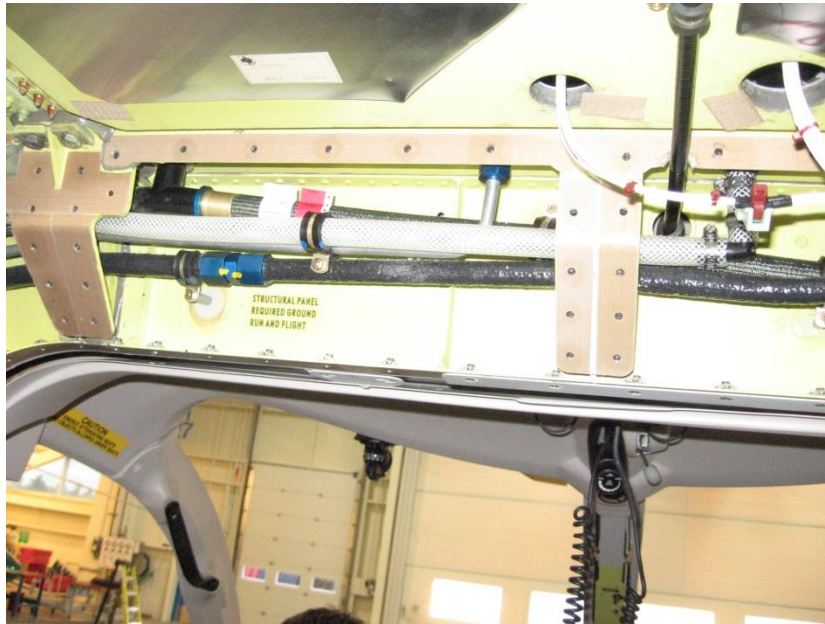


Figure 23: Drain Hose routing in overhead and lift frame showing clamping arrangement



Figure 24: Drain Hose routing in left door post showing clamping arrangement

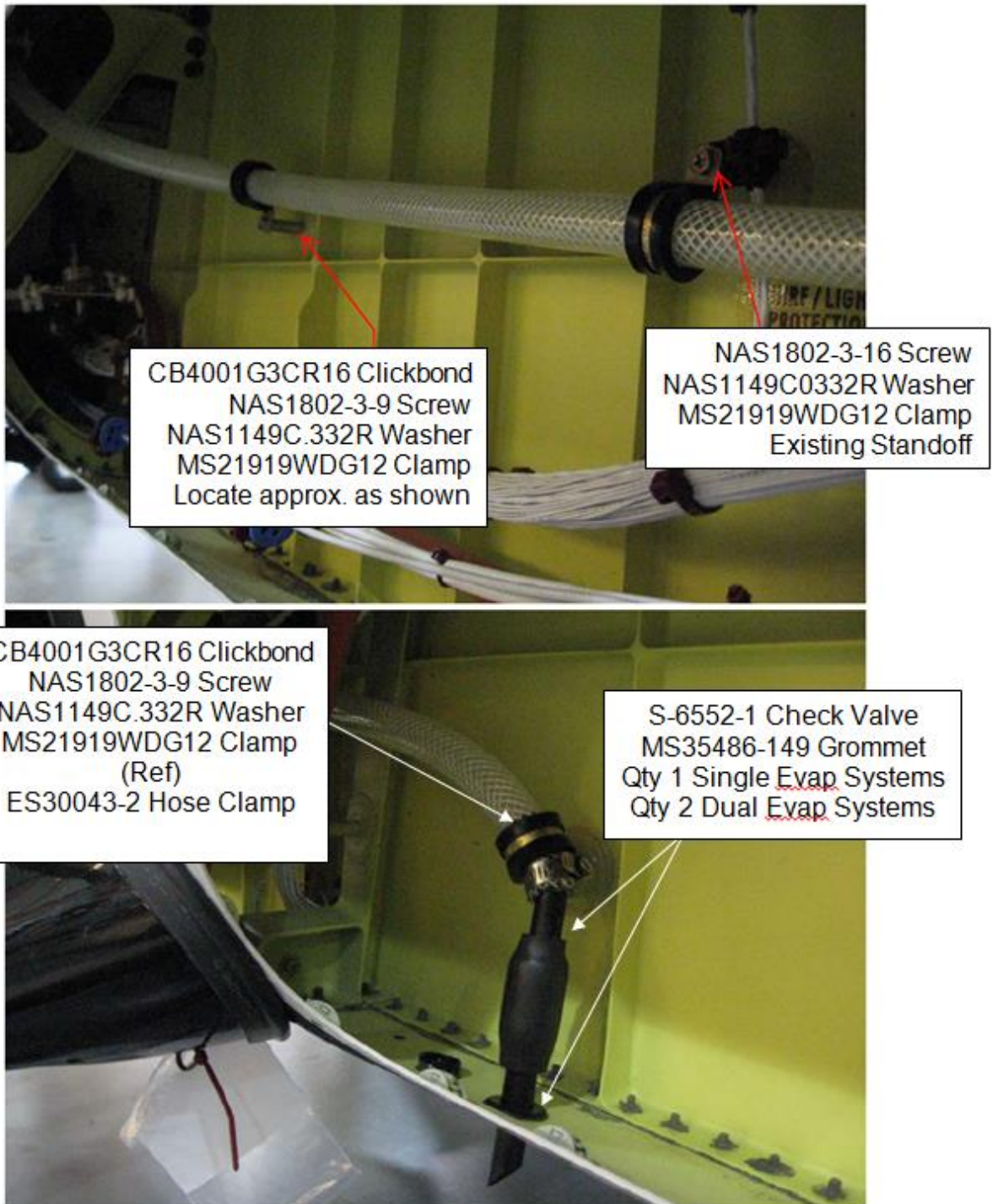
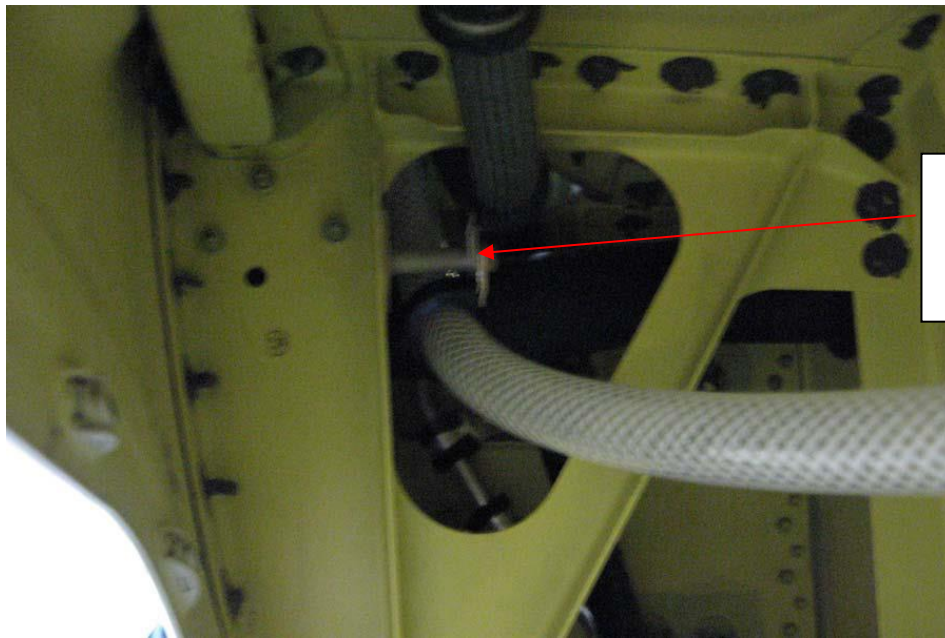


Figure 25: Hose Routing, Clamping and Check Valve Installation along LH Keel Beam. Qty 1 for Single Evaporator Systems, Qty 2 for Dual Evaporator Systems.



NAS1802-3-16 Screw
NAS1149C0332R Washer
MS21919WDG12 Clamp
Existing Standoff

Figure 26: Drain Hose Routing from Lift Frame to Keel Beam. Qty 1 shown for Single Evaporator Systems, Qty 2 Required for Dual Evaporator Systems.

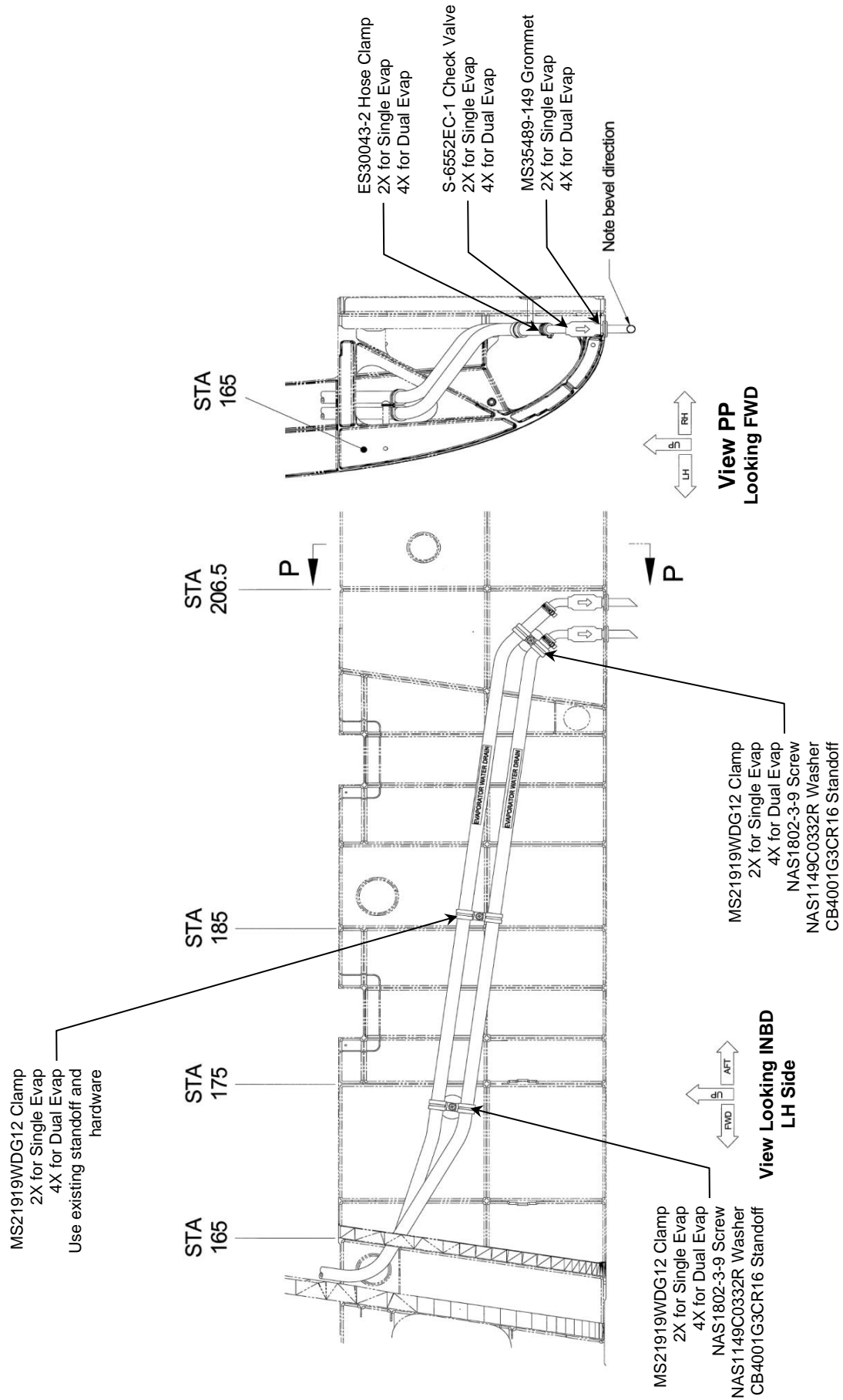


Figure 27: LH Side Lower Fuselage Area
 Drain Line Routing and Clamping

c. Refrigerant Line Insulation

- 1) Dual Evaporator Systems: Disconnect tube assemblies 429EC-5020-T9, 429EC-5020-T26, 429EC-5020-T31 and Y-fitting S-5080EC-10 (Figure 28). Cover tubes and Y-fitting with ES02127-10 firesleeve. Trim to fit. Seal ends with 1-608036-4 fusion tape.
- 2) Single Evaporator Systems: Disconnect tube assemblies 429EC-5020-T26, 429EC-5020-T31, 429EC-5020-T34 and Y-fitting S-5080EC-10 (Figure 29). Cover tubes and Y-fitting with ES02127-10 firesleeve. Trim to fit. Seal ends with 1-608036-4 fusion tape.

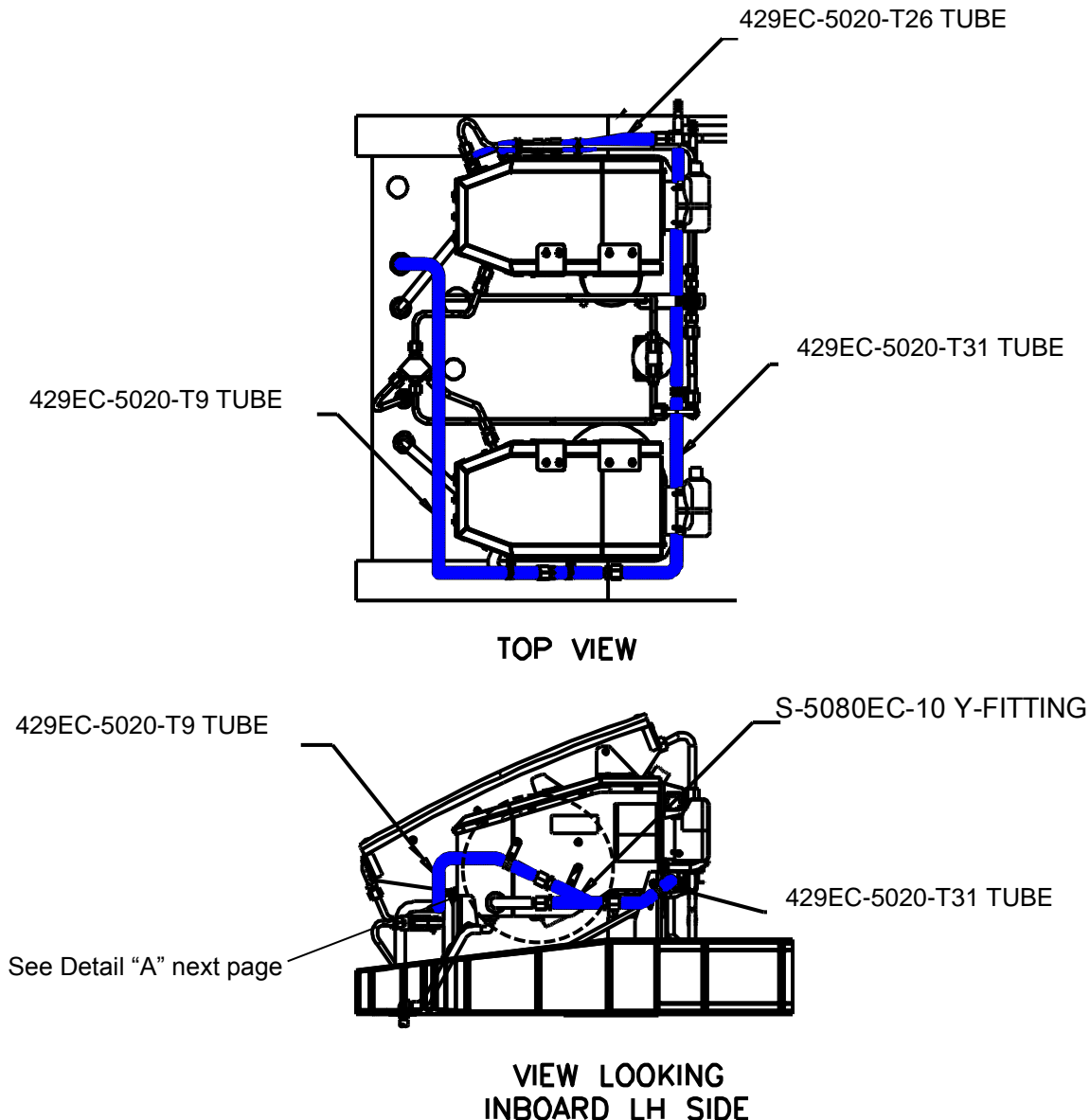


Figure 28: DUAL EVAPORATOR CONFIGURATION. Insulate tubing and Y-fitting with ES02127-10 Firesleeve. Seal ends with 1-608036-4 fusion tape.

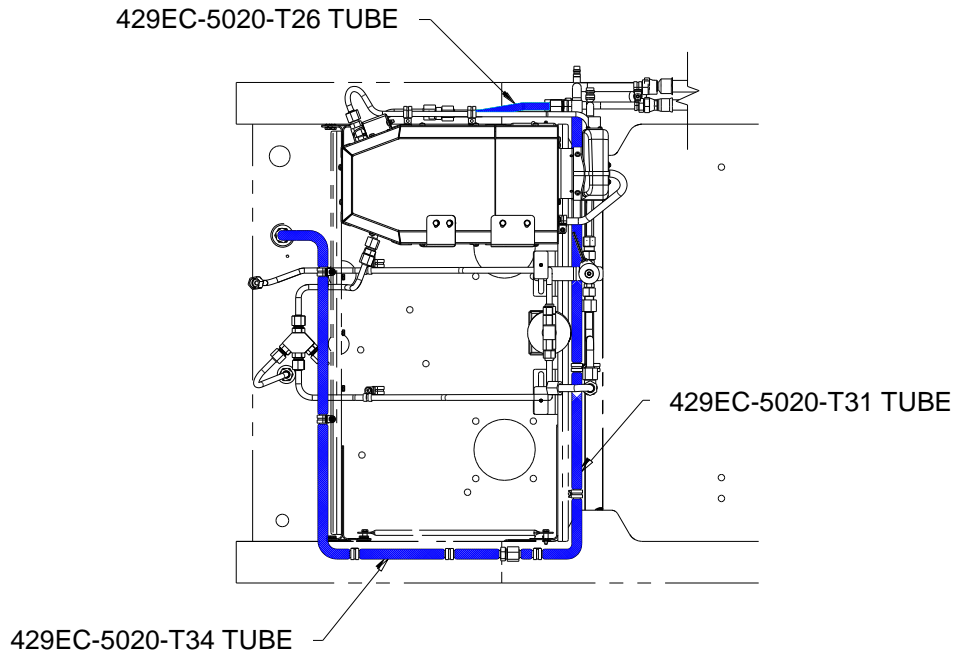
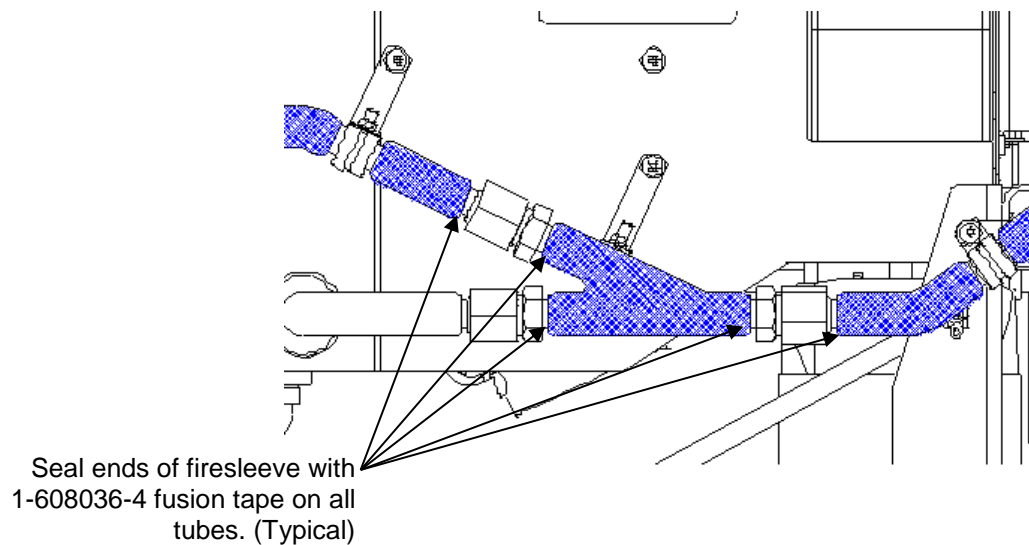


Figure 29: SINGLE EVAPORATOR CONFIGURATION. Insulate tubing and Y-fitting with ES02127-10 Firesleeve. Seal ends with 1-608036-4 fusion tape.



Detail "A"

- d. Reinstall Components and Water Drain Test
- 1) Reinstall aft evaporators. Leave upper return duct assemblies disconnected from evaporator air inlets for water drain test.
 - 2) Install ES48154-1 drain hose and ES30043-2 hose clamps to evaporator lower drain as required. Repeat for other evaporator if installed. (Figure 17 & 18)
 - 3) Reconnect all refrigerant lines.
 - 4) Replace ES43030-5 drier bottle.
 - 5) Reinstall condenser and charge system with refrigerant in accordance with ICA 429EC-200M-1.
 - 6) Water Drain Test Procedure: Pour approximately 1 quart of water into the air inlet (front of evaporator) to verify drain is working properly. Collect drainage and verify that most of the 1 quart of water drained through. Some residual water may be left in the line, especially at any low point and depending on the level of the aircraft. This is normal and does not constitute a failure of the drain system. Verify that there are no leaks in the tubing or joints.
 - 7) Reinstall upper return duct assemblies on aft evaporators.
 - 8) Reinstall upper cowlings and interior panels.
 - 9) Reconnect battery.

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3. ES04122-1 Water Screen Installation Instructions (if required):

NOTE

Some early aft evaporators did not have water screen material attached to the heat exchanger. If not installed, follow the instructions below.

- a. Clean back side of heat exchanger using de-natured alcohol.
- b. Run a bead of RTV 108 series clear silicone adhesive/sealant around perimeter of back side of heat exchanger. Place additional bead vertically down the center of the centermost tube.
- c. Install one of the ES04122-1 water screens on back of each evaporator heat exchanger. (Figure 30 and 31)



ES04122-1 Water Screen applied to aft side of heat exchanger. Install only if necessary.

429EC-6242-1 Water Screen Assembly shown in place on evaporator bottom

**Figure 30: ES04122-1 and 429EC-6242-1 Water Screens shown in place.
View looking forward through blower opening**

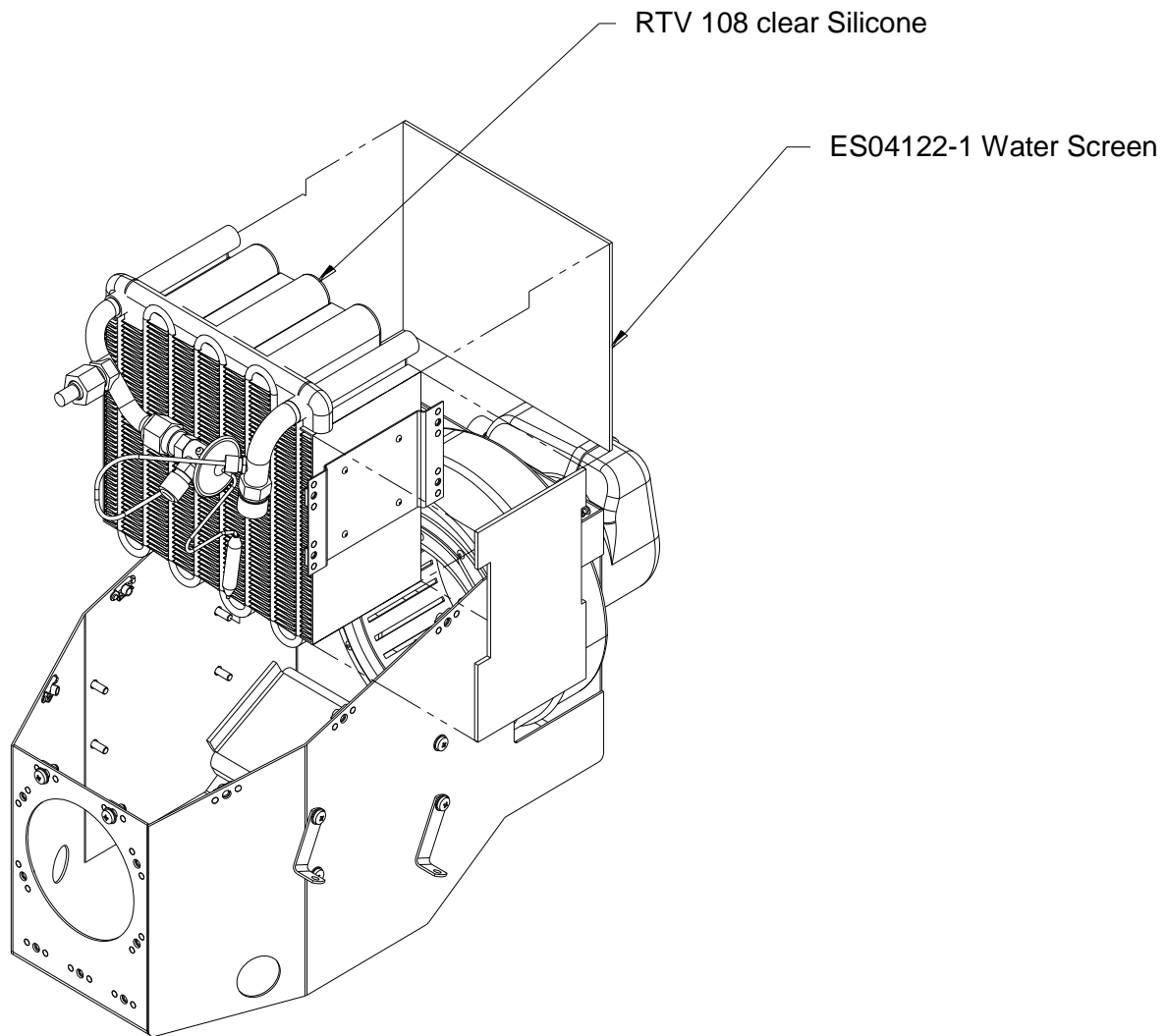


Figure 31: Placement of ES04122-1 Water Screen against heat exchanger, if required.