## DUCT LINES - MAINTENANCE PRACTICES

*EFFECTIVITY: ALL*

1. General

   A. This section gives the procedures to repair the thermal insulation of the duct lines of the engine and APU air bleed systems.

   B. These procedures are applicable to the LH/RH engine and APU air bleed systems.

   C. The procedures in this section are given in the sequence below. The tasks identified with (♦) are part of the Scheduled Maintenance Requirements Document (SMRD).

| *TASK NUMBER* | *DESCRIPTION* | *EFFECTIVITY* |
|---|---|---|
| 36-11-09-300-801-A | THERMAL INSULATION OF THE DUCT LINES OF AIR BLEED SYSTEM - REPAIR | ALL |
| 36-11-09-820-801-A | ENGINE-BLEED SYSTEM DUCT LINES - ADJUSTMENT | ALL |

TASK 36-11-09-300-801-A
*EFFECTIVITY: ALL*

## 2. THERMAL INSULATION OF THE DUCT LINES OF AIR BLEED SYSTEM - REPAIR

### A. General

(1) This task gives the instructions to repair the thermal insulation of the duct lines of the air bleed system.

### B. References

| *REFERENCE* | *DESIGNATION* |
|---|---|
| AMM MPP 06-30-00/100 | - |
| AMM MPP 06-41-01/100 | - |
| AMM MPP 06-43-00/100 | - COMPONENT LOCATION |
| AMM TASK 20-40-01-860-801-A/200 | ENERGIZATION OF THE AIRCRAFT WITH AN EXTERNAL POWER SOURCE |
| AMM TASK 25-23-01-000-801-A/400 | - |
| AMM TASK 25-23-01-000-802-A/400 | - |
| AMM TASK 25-23-01-400-801-A/400 | - |
| AMM TASK 25-23-01-400-802-A/400 | - |
| AMM TASK 36-11-09-200-802-A/600 | DUCT LINES OF THE AIR-BLEED SYSTEM - ALIGNMENT INSPECTION |
| AMM TASK 53-01-02-000-801-A/400 | - |
| AMM TASK 53-01-02-000-802-A/400 | - |
| AMM TASK 53-01-02-400-801-A/400 | - |
| AMM TASK 53-01-02-400-802-A/400 | - |
| AMM TASK 53-01-03-000-801-A/400 | BAGGAGE-COMPARTMENT FLOOR PANELS - REMOVAL |
| AMM TASK 53-01-03-400-801-A/400 | BAGGAGE-COMPARTMENT FLOOR PANELS - INSTALLATION |
| IPC 36-15-00 | ENGINE BLEED AIR SYSTEM |

### C. Zones and Accesses

| *ZONE* | *PANEL/DOOR* | *LOCATION* |
|---|---|---|
| 193 | 193 | Aft wing-to-fuselage fairing |
| 194 | 194 | RH side of wing-to-fuselage fairing |
| 195 | 195 | LH side of wing-to-fuselage fairing |
| 261 | 261BF | Passenger floor panel |
| 261 | 261DF | Passenger floor panel |
| 262 | 262AF | Passenger floor panel |
| 262 | 262BF | Passenger floor panel |
| 262 | 262CF | Passenger floor panel |

(Continued)

| *ZONE* | *PANEL/DOOR* | *LOCATION* |
|---|---|---|
| 271 | 271AF | Floor panel of the baggage compartment |
| 271 | 271BF | Floor panel of the baggage compartment |
| 271 | 271BLW | Inside baggage compartment |
| 272 | 272DR | In the aft electronic compartment |
| 272 | 272AF | Floor panel of the baggage compartment |
| 272 | 272BF | Floor panel of the baggage compartment |
| 272 | 272CRW | Inside baggage compartment |
| 320 | 322 | Dorsal Fin |
| 320 | 323 | Vertical Stabilizer Leading Edge |
| 412 | 412BT | LH Engine upper cowling |
| 422 | 422BT | RH Engine upper cowling |
| 414 | 414DB | LH pylon |
| 424 | 424DB | RH pylon |
| 813 | 813 | Baggage compartment |

D. Tools and Equipment

Not Applicable

E. Auxiliary Items

Not Applicable

F. Consumable Materials

| *SPECIFICATION (BRAND)* | *DESCRIPTION* | *QTY* |
|---|---|---|
| SEMICOSIL 960 RED | Red sealing compound | AR |
| RTV 960 RED | Red sealing compound | AR |
| FED. SPEC. TT-S-00230 | Sealant RTV 780 (WHITE) | AR |

G. Expendable Parts

| *ITEM* | *IPC REFERENCE (VENDOR REFERENCE)* | *QTY* |
|---|---|---|
| Ceramic Fiber Insulation (Kaowool) | IPC 36-15-00 | AR |
| Teflon Tape type III | IPC 36-15-00 | AR |
| Tape, large (50 mm) | IPC 36-15-00 | AR |
| Tape, narrow (20 mm) | IPC 36-15-00 | AR |
| Tape, Hydraulic cardboard sheet (1.6 mm) | IPC 36-15-00 | AR |

H. Persons Recommended

| *QTY* | *FUNCTION* | *PLACE* |
|---|---|---|
| 1 | Does the task | Inside and outside the aircraft |

I. Preparation

*SUBTASK 841-002-A*

(1) Deenergize the aircraft ( AMM TASK 20-40-01-860-801-A/200).

(2) Remove access panel 272DR (AMM MPP 06-41-01/100).

(3) Open baggage compartment door 813 (AMM MPP 06-30-00/100).

(4) Remove sidewall linings 271BLW and 272CRW (AMM TASK 25-23-01-000-801-A/400) for EMB-145 () models and (AMM TASK 25-23-01-000-802-A/400) for EMB-135 () models, as applicable.

(5) On the EMB-145 () models remove floor panels 271AF, 271BF, 272AF, and 272BF ( AMM TASK 53-01-03-000-801-A/400), 261BF, 261DF, 262AF, 262BF, and 262CF (AMM TASK 53-01-02-000-801-A/400), as applicable.

(6) On the EMB-135 () models remove floor panels 271AF, 271BF, 272AF, and 272BF ( AMM TASK 53-01-03-000-801-A/400), 261DF, 262BF, and 262CF (AMM TASK 53-01-02-000-802-A/400), as applicable.

(7) Remove panels 193, 194 and 195 (AMM MPP 06-30-00/100).

(8) Remove access panels 412BT and 422BT ( AMM MPP 06-43-00/100).

(9) Remove access panels 414DB and 424DB ( AMM MPP 06-43-00/100).

(10) Remove the Dorsal Fin access panel 322 and the Vertical Stabilizer Leading Edge access panel323 (AMM MPP 06-30-00/100), as applicable.

J. Repair the Thermal Insulation of the Duct Lines of Air Bleed System

*SUBTASK 350-002-A*

**WARNING: DO NOT TOUCH THE BLEED-AIR SYSTEM DUCTS OR COMPONENTS IMMEDIATELY AFTER THE ENGINES OR APU STOP BECAUSE OF THE HIGH BLEED-AIR TEMPERATURE.**

CAUTION: IF IT IS NECESSARY TO REMOVE A DUCT SECTION TO REPAIR THE THERMAL INSULATION, PUT PLASTIC PLUGS AT THE DUCT ENDS AS A PROTECTION.

(1) Repair the ducts installed in the fuselage as follows (Figure 201):

(a) Remove the damaged portion of the thermal insulation.

(b) Apply a layer of ceramic fiber insulation to the part to be repaired.

(c) Attach the duct ceramic fiber insulation with tape. Make sure that the part to be repaired is covered and attached with tape.

NOTE: Attach the duct ceramic fiber insulation with tapes as follows:

- On straight parts, use large tape.
- On the curved parts, use narrow tape.

(d) At the duct, wind tape around the ceramic fiber insulation, until the blanket is totally covered and attached.

NOTE: The new turns must make correct overlaps on the old turns.

(e) If the repair is at the tube end, do this procedure refer to sheet 2:

NOTE: Do not apply tape on the tubular section of the flanges.

1 Use narrow tape.

2 Start the tape application on the second layer of large tape, and do one complete rotation parallel to the end of the insulation fiber layer.

3 Continue to apply the tape to the metallic surface of the tube, and do two complete rotations, while you hold the tape firmly.

4 Continue to apply the tape to the metallic surface of the tube, and do two complete rotations, while you hold the tape firmly.

5 Cut the tape and make sure that the tape end bonds well to the insulation.

(2) Repair the ducts in the pylons and powerplant as follows (Figure 202):

(a) Remove the damaged portion of the thermal insulation.

(b) Apply a layer of ceramic fiber insulation to the part to be repaired.

(c) Attach the ceramic fiber insulation with Teflon tape.

(d) Cover the ceramic fiber insulation with fiberglass tape. Keep it attached to the duct and fully around it.

(e) Apply a coat of red sealing compound and let it dry for 30 minutes, maximum, at an ambient temperature of 4 to 38°C (39.2 to 100.4°F) and a humidity of 75 ± 15%.

(f) Apply a second coat of the red sealing compound and let it to dry for 30 minutes, maximum, at an ambient temperature of 4 to 38°C (39.2 to 100.4°F) and humidity of 75 ± 15%.

(3) Repair the hydraulic cardboard sheet at the duct. To do this procedure, refer to (Figure 201), sheet 2, Detail B.

(a) If necessary, repair the thermal insulation, as given in step (1).

1 Remove the damaged portion of the hydraulic cardboard sheet.

2 Apply a new layer of hydraulic cardboard sheet to the part to be repaired.

NOTE: When there is a small misalignment in the installation of the ducts ( AMM TASK 36-11-09-200-802-A/600), layers of hydraulic cardboard sheets can be applied to align them and reduce tension on the assembly.

CAUTION: IF YOU APPLY TOO MUCH HYDRAULIC CARDBOARD SHEET TO THE DUCT, IT WILL NOT BE POSSIBLE FOR YOU TO INSTALL THE CLAMP.

3 Chamfer the edges of the hydraulic cardboard sheet and adjust its edges get good finishing.

4 Apply the hydraulic cardboard sheet as follows:

- Each turn must correctly overlap the preceding one.

5 Firmly hold and apply adhesive tape to the hydraulic cardboard sheet.

6 Cut the tape and make sure that the end of the hydraulic cardboard sheet is correctly attached.

(4) Repair the precooler outlet duct. To do this procedure, refer to Figure 202, sheet 1 and sheet 2:

(a) Remove the damaged portion of the thermal insulation.

(b) Apply a layer of ceramic fiber insulation. Refer to Figure 202, sheet 2, View J.

(c) Attach of the ceramic fiber insulation with Teflon tape.

(d) Apply a coat of red sealing compound at fiberglass tape. Refer to Figure 202, sheet 2, View G and VIEW F.

(e) Let it dry for 30 minutes, maximum, at an ambient temperature of 4 to 38°C (39.2 to 100.4°F) and a humidity of 75 ± 15%.

(f) Apply a second coat of the red sealing compound and let it to dry for 30 minutes, maximum, at an ambient temperature of 4 to 38°C (39.2 to 100.4°F) and humidity of 75 ± 15%.

(g) Cover the ceramic fiber insulation with impregnated fiberglass tape. Keep it attached to the duct and fully around it.

(h) Cut and adjust the insulation. Refer to Figure 202, sheet 2, Detail G.

(i) Apply white sealing at the border of the thermal insulation. Refer to Figure 202, sheet 2, Detail H.

K. Follow-on

*SUBTASK 842-002-A*

(1) Install sidewall linings 271BLW and 272CRW (AMM TASK 25-23-01-400-801-A/400) only for EMB-145 () models and (AMM TASK 25-23-01-400-802-A/400) only for EMB-135 () models, as applicable.

(2) On the EMB-145 () models install floor panels 271AF, 271BF, 272AF, and 272BF ( AMM TASK 53-01-03-400-801-A/400), 261BF, 261DF, 262AF, 262BF, and 262CF (AMM TASK 53-01-02-400-801-A/400), as applicable.

(3) On the EMB-135 () models install floor panels 271AF, 271BF, 272AF, and 272BF ( AMM TASK 53-01-03-400-801-A/400), 261DF, 262BF, and 262CF, (AMM TASK 53-01-02-400-802-A/400), as applicable.

(4) Install access panel 272DR (AMM MPP 06-41-01/100).

(5) Close baggage compartment door 813 (AMM MPP 06-30-00/100)

(6) Install panels 193, 194 and 195 (AMM MPP 06-30-00/100).

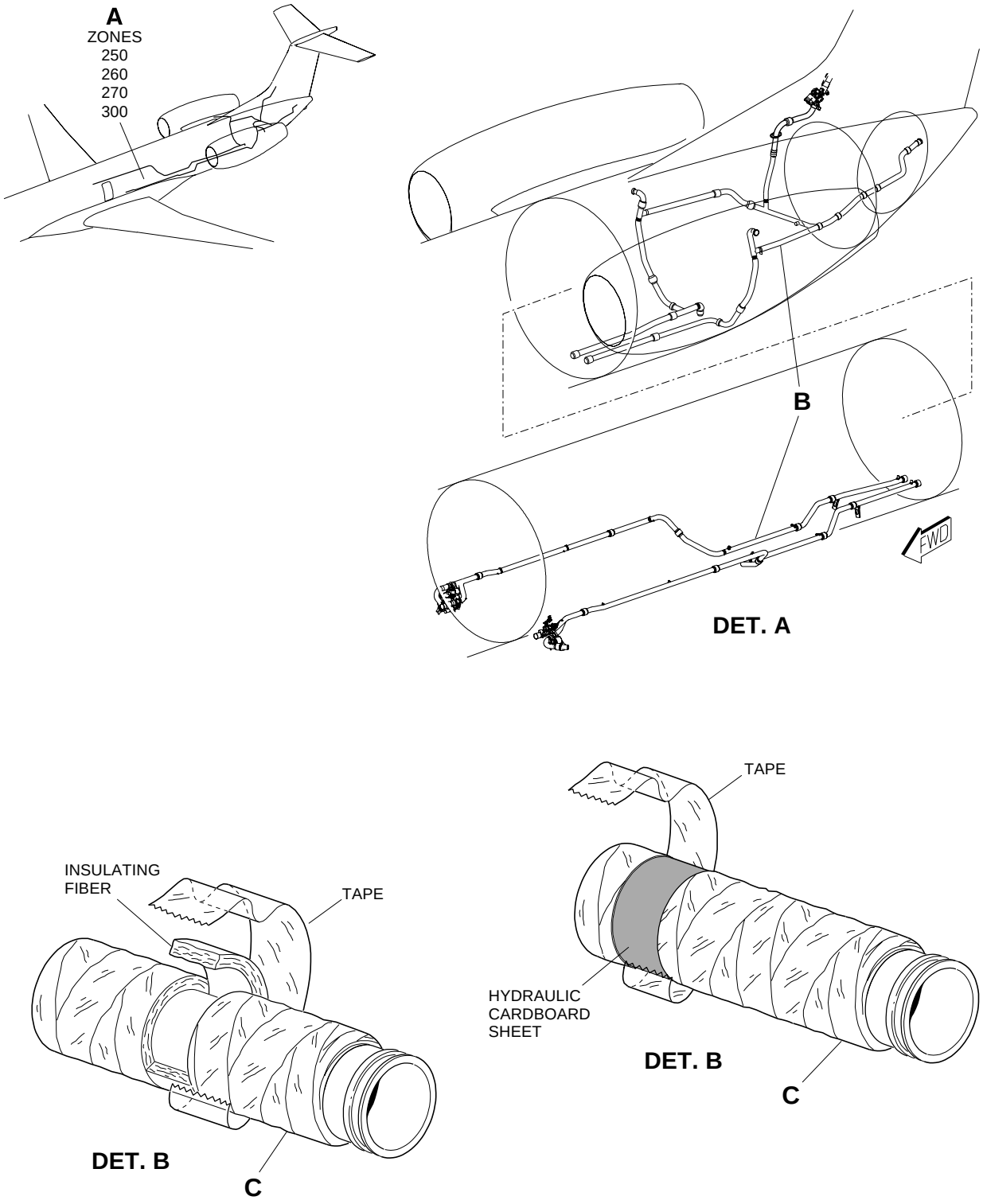
(7) Install access panels 414DB and 424DB ( AMM MPP 06-43-00/100).

(8) Install access panels 412BT and 422BT ( AMM MPP 06-43-00/100).

(9) Install the Dorsal Fin access panel 322 and the Vertical Stabilizer Leading Edge access panel 323 AMM MPP 06-30-00/100, as applicable.

*EFFECTIVITY: ALL*

Thermal Insulation of the Air Bleed System on the Fuselage - Repair
Figure 201 - Sheet 1

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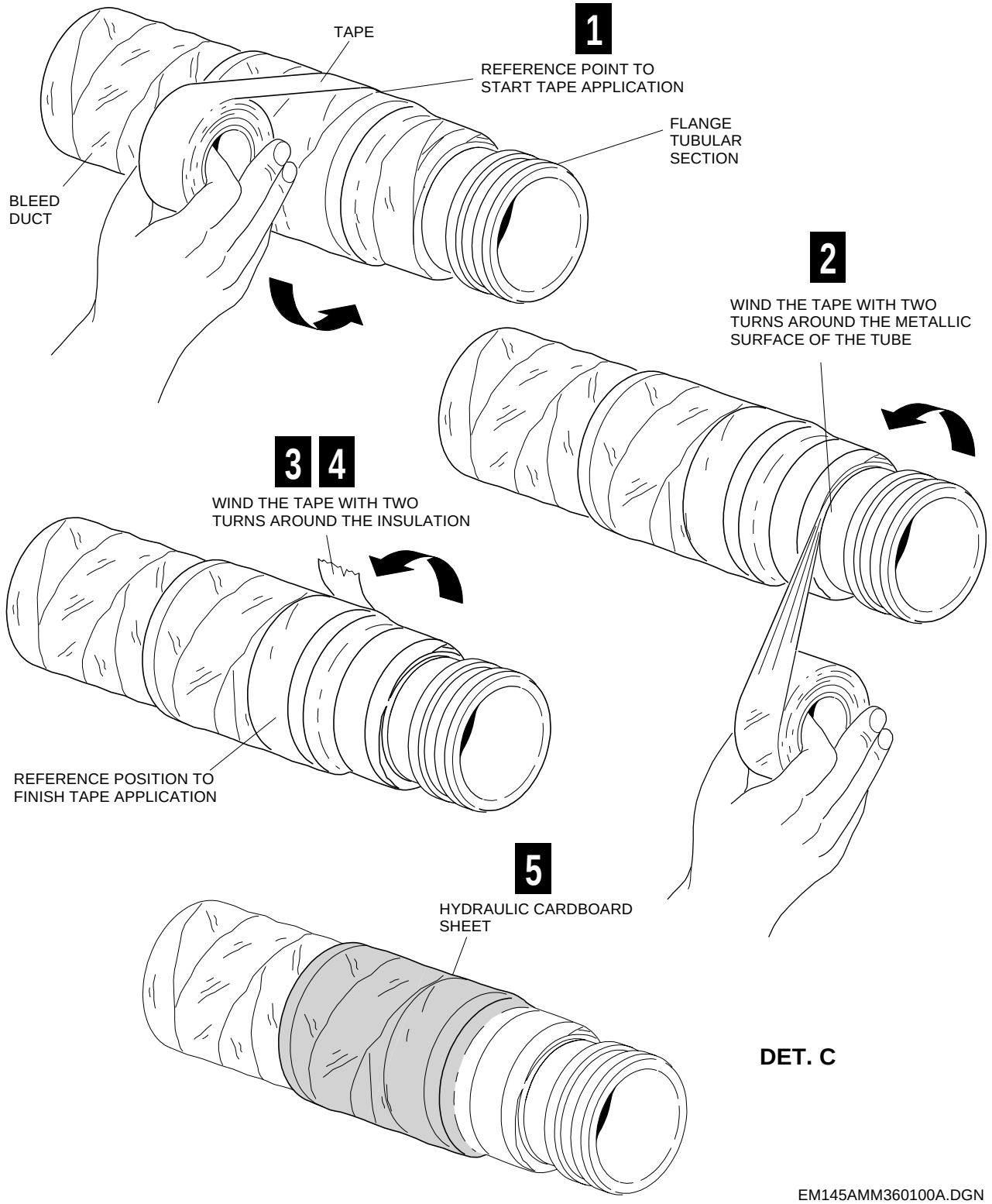
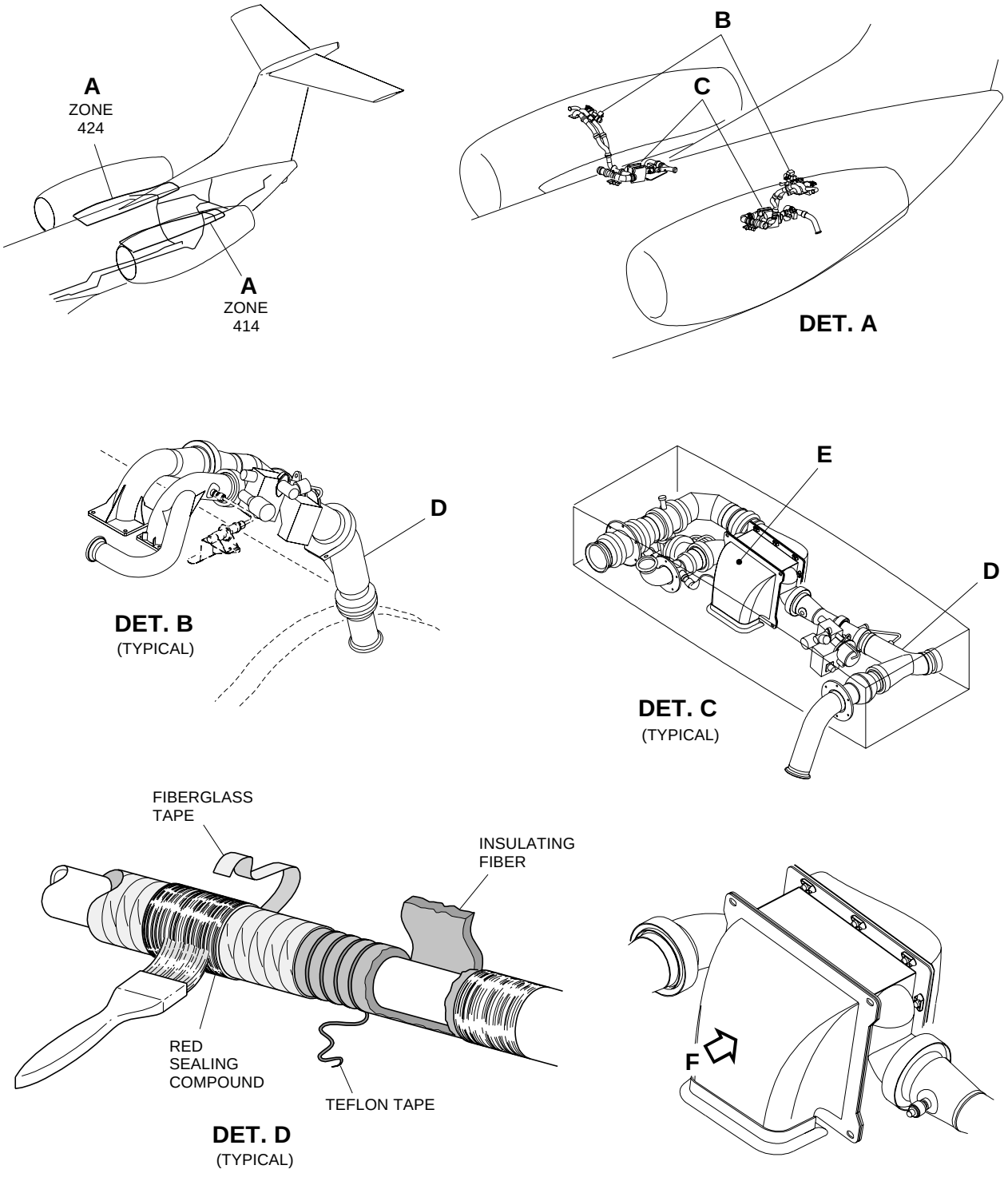
*EFFECTIVITY: ALL*

Thermal Insulation of the Air Bleed System on the Fuselage - Repair
Figure 201 - Sheet 2



*EFFECTIVITY: ALL*

Thermal Insulation of the Air Bleed System on the Pylons and Powerplant - Repair
Figure 202 - Sheet 1

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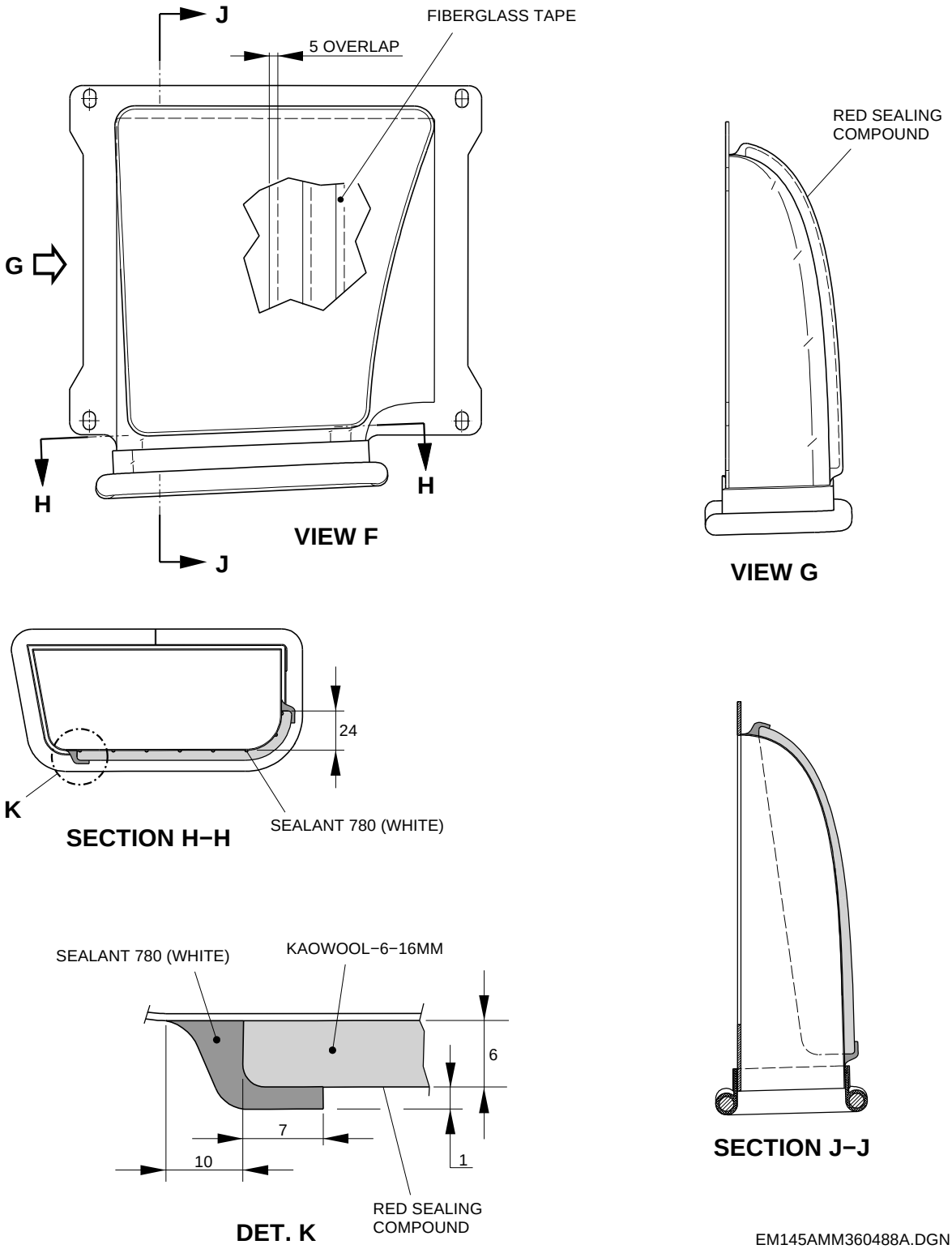
*EFFECTIVITY: ALL*

Thermal Insulation of the Air Bleed System on the Pylons and Powerplant - Repair
Figure 202 - Sheet 2



TASK 36-11-09-820-801-A
*EFFECTIVITY: ALL*

3. ENGINE-BLEED SYSTEM DUCT LINES - ADJUSTMENT

A. General

(1) The access to the engine-bleed duct lines is got through the LH/RH engine upper cowling.

(2) These procedures are applicable to the LH/RH engine air bleed systems.

B. References

| *REFERENCE* | *DESIGNATION* |
|---|---|
| AMM MPP 06-43-00/100 | - COMPONENT LOCATION |
| AMM TASK 20-10-10-910-801-A/200 | V-BAND CLAMPS - INSTALLATION |
| AMM TASK 20-40-01-860-801-A/200 | ENERGIZATION OF THE AIRCRAFT WITH AN EXTERNAL POWER SOURCE |
| AMM TASK 36-00-00-700-803-A/500 | AIR BLEED SYSTEM - OPERATIONAL TEST |
| AMM TASK 71-11-01-000-801-A/400 | ENGINE UPPER COWLING - REMOVAL |
| AMM TASK 71-11-01-400-801-A/400 | ENGINE UPPER COWLING - INSTALLATION |

C. Zones and Accesses

| *ZONE* | *PANEL/DOOR* | *LOCATION* |
|---|---|---|
| 414 | 414CB | LH Pylon |
| 424 | 424CB | RH Pylon |
| 412 | 412 | LH Engine upper cowling |
| 422 | 422 | RH Engine upper cowling |

D. Tools and Equipment

Not Applicable

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

| *QTY* | *FUNCTION* | *PLACE* |
|---|---|---|
| 1 | Does the task | Outside of aircraft |

I. Preparation

*SUBTASK 841-003-A*

(1) Deenergize the aircraft ( AMM TASK 20-40-01-860-801-A/200).

(2) Remove upper cowlings 412 and/or 422 (AMM TASK 71-11-01-000-801-A/400).

(3) Remove access panels 414CB and/or 424CB ( AMM MPP 06-43-00/100).

J. Check for Tension at Joints - Adjustment (Figure 203)

*SUBTASK 820-002-A*

**WARNING:**
- **MAKE SURE THAT THE WORK AREA IS SAFE FOR MAINTENANCE TO PREVENT INJURIES TO PERSONNEL.**
- **DO NOT TOUCH THE DUCTS OR COMPONENTS OF THE SYSTEM IMMEDIATELY AFTER THE SYSTEM IS TURNED OFF. THE HIGH AIR TEMPERATURE CAN CAUSE INJURY TO PERSONS.**

CAUTION: DO THIS TASK FOR ALL COMPONENTS REMOVED TO MAKE SURE THAT THE ENGINE BLEED DUCTS ARE CORRECTLY ALIGNED AND THAT THERE IS NO TENSION AT THE CONNECTION BETWEEN THE ENGINE BLEED DUCTS AND THE AIRCRAFT BLEED SYSTEM DUCTS.

(1) Loosen the Marman V-clamps and bolts as follows. Refer to Figure 203, Sheet 1.

(a) Loosen the Marman V-clamp (9) that attaches the pylon tube (8) to the pylon tube (10).

(b) Loosen the Marman V-clamp (7) that attaches the duct (11) to the pylon tube (8).

(c) Loosen the Marman V-clamp (6) that attaches the ducts (5) and (11).

(d) Loosen the clamp (4) from the duct (5).

(e) Loosen the Marman V-clamp (3) from between the duct (5) and the high-stage valve (REF.).

(f) Loosen the Marman V-clamp (2) that attaches the high-stage valve (REF.) to the duct (1).

(g) Loosen the bolts (17) that attach the support (REF.).

(h) Loosen the Marman V-clamp (12) that attaches the ducts (11) and (13).

(i) Loosen the bolts (14) that attach the duct (13) to the support (REF.).

(j) Loosen the bolts (15) that attach the duct (1) to the engine (REF.).

(k) Loosen the Marman V-clamp (16) that attaches the engine anti-icing valve (REF.) to the duct (10).

(l) Loosen the clamps(18) and (19) to the duct (10).

CAUTION: • MAKE SURE THAT ALL THE COMPONENTS, SPECIALLY THE BALL JOINTS, ARE CORRECTLY ASSEMBLED IN THE NEUTRAL POSITION.

• USE THE POWERPLANT BUILD-UP MANUAL (PPBM-145/1139) TO MAKE SURE THAT THERE ARE NO COMPONENTS OF THE ENGINE DUCTS MISSING.

NOTE: • Make sure that the ducts are correctly aligned and there is no tension.

• To tighten the Marman V-clamps and bolts, refer to AMM TASK 20-10-10-910-801-A/200.

Tighten the Marman V-clamps and bolts as follows. Refer to Figure 203, sheet 2.

(a) Tighten the bolts (14) and (15).

(b) Tighten the Marman V-clamp (16) installed between the duct (1) and the engine anti-icing valve (REF.).

(c) Tighten the Marman V-clamp (2) installed between the duct (1) and the high-stage valve (REF.).

(d) Tighten the Marman V-clamp (12) installed between the duct (11) and the duct (13).

(e) Tighten the Marman V-clamp (6) installed between the duct (11) and the duct (5).

(f) Tighten the Marman V-clamp (3) installed between the duct (5) and the high-stage valve (REF.).

(g) Tighten the clamp (4) to the duct (5).

(h) Tighten the Marman V-clamp (7) installed between the pylon tube (8) and the duct (11).

(i) Tighten the bolts (17) to attach the support (REF.).

(j) Tighten the Marman V-clamp (9) installed between the pylon tube (10) and the pylon tube (8).

(k) Tighten the clamp (18) to the duct (10).

(l) Tighten the clamp (19) to the duct (10).

(3) NOTE: Make sure that there is no leakage.

Do a test of the air bleed system ( AMM TASK 36-00-00-700-803-A/500).

K. Follow-on

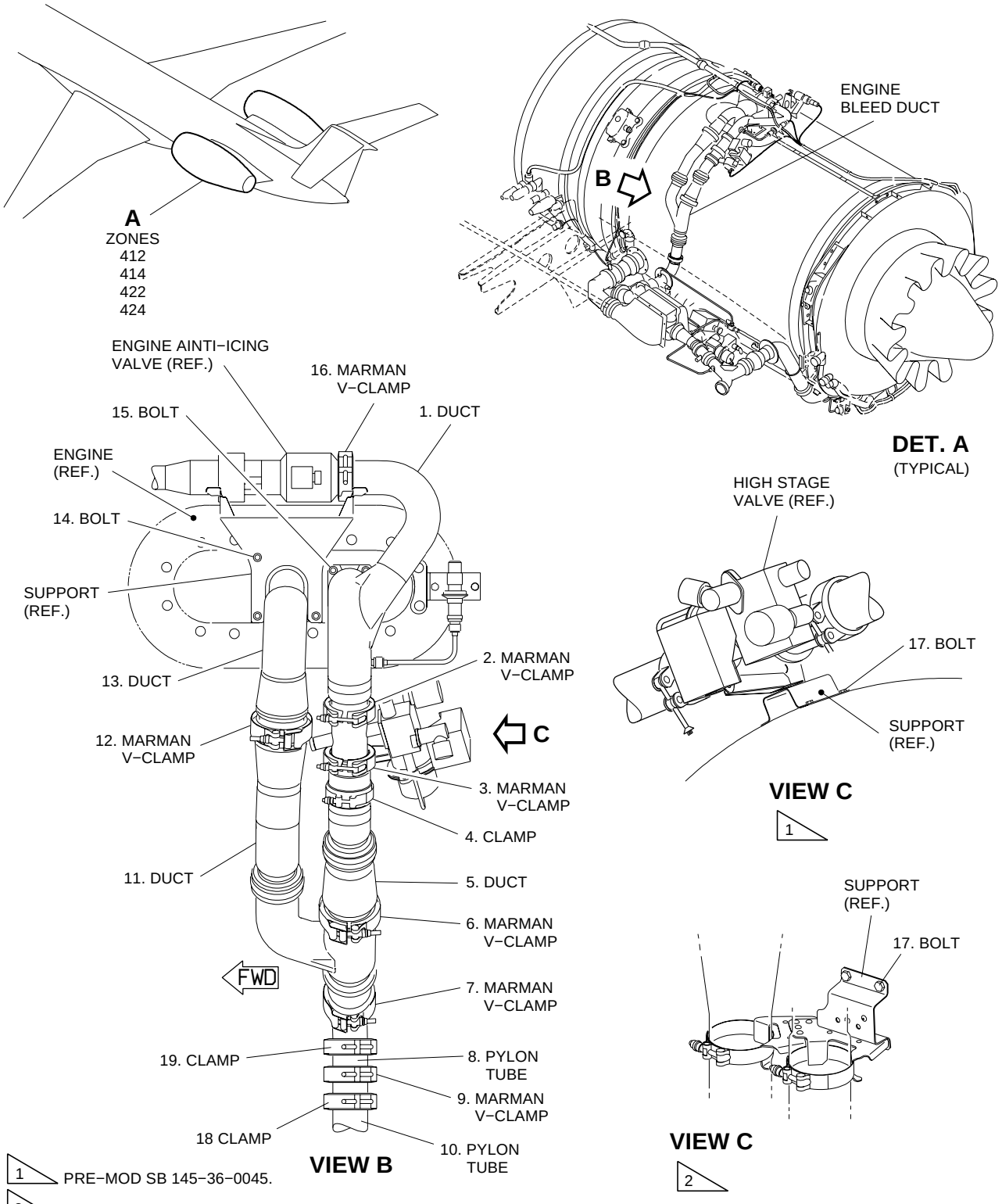
*SUBTASK 842-003-A*

(1) Install access panels 414CB and/or 424CB ( AMM MPP 06-43-00/100).

(2) Install upper cowlings 412 and/or 422 (AMM TASK 71-11-01-400-801-A/400).

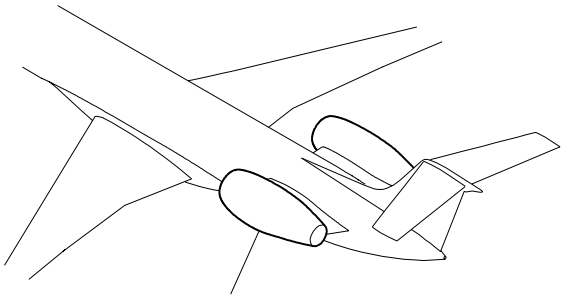
*EFFECTIVITY: ALL*

Engine-Bleed System Duct Lines - Adjustment
Figure 203 - Sheet 1

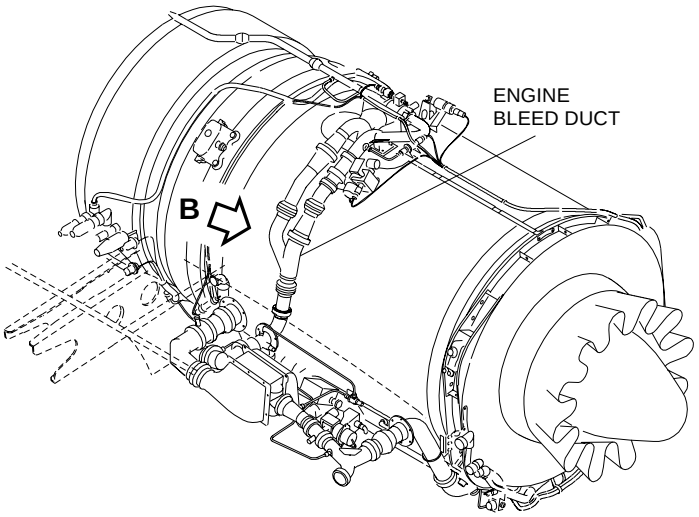


*EFFECTIVITY: ALL*

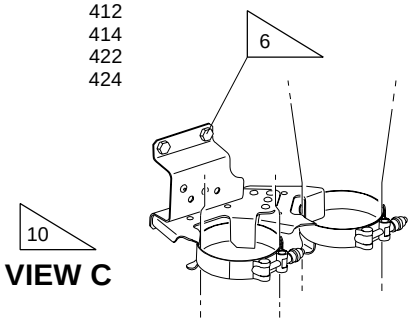
Engine-Bleed System Duct Lines - Adjustment
Figure 203 - Sheet 2



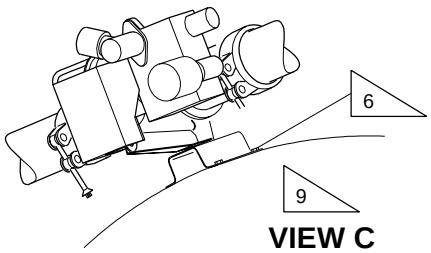
**A**
ZONES
412
414
422
424



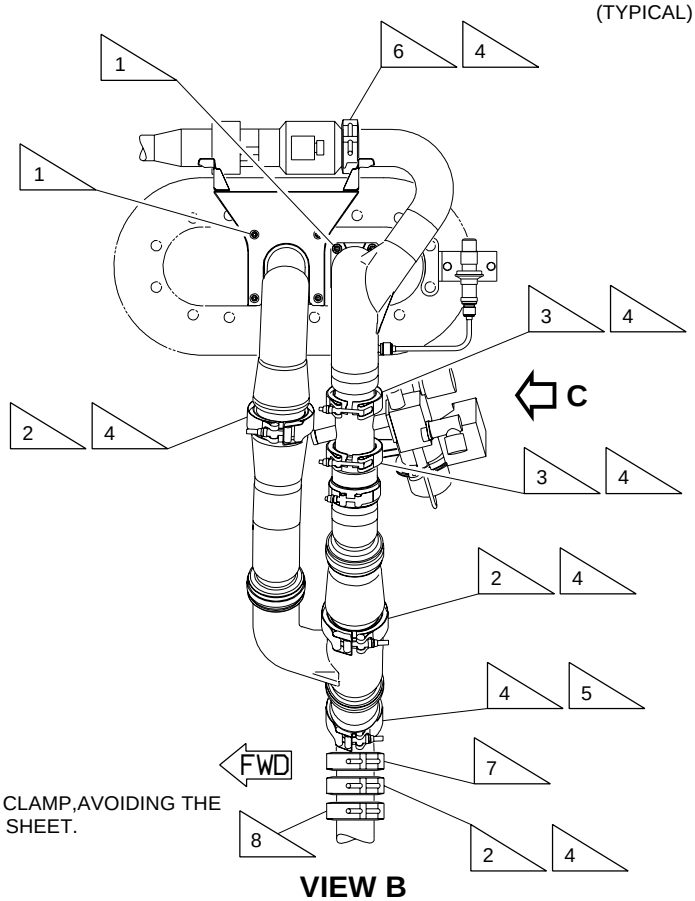

**DET. A**
(TYPICAL)




**VIEW C**




**VIEW C**




**VIEW B**

1 TORQUE: 8.4 − 10.1 N.m (74 − 89 lb.in).

2 TORQUE: 6.8 − 7.3 N.m (60 − 65 lb.in).

3 TORQUE: 5.7 − 6.2 N.m (50 − 55 lb.in).

4 REFER TO TASK 20−10−10−910−801− A FOR CORRECT INSTALLATION OF V−CLAMP.

5 TORQUE: 3.38 TO 3.95 N.m (30 TO 35 lb.in).

6 TORQUE: 3.95 − 5.08 N.m (35 − 45 lb.in).

7 TORQUE: 2.26 − 2.82 N.m (20−25 lb.in) TO THIS CLAMP,AVOIDING THE SMASHING OF THE HYDRAULIC CARD BOARD SHEET.

8 TORQUE: 4.5 − 5.6 N.m (40−50 lb.in).

9 PRE−MOD SB 145−36−0045.

10 POST−MOD SB 145−36−0045.

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