TB-2077

WORKMANSHIP CRITERIA FOR VHDM DAUGHTERCARD CONNECTORS

Revision "M"

Specification Revision Status

Revision	SCR No.	Description	Initial	Date
"K"	S0697	Added Paragraphs 6a.1 to 6a.7 & Figures 6a.1 to 6a.5	WC Tan	11-02-07
"L"	S1592	Added figure 8.18.1 re: plastic damage	D. Smith	11-19-10
"M"	S4550	Remove Teradyne	D. Covey	5/2/16

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1.0 SCOPE

1.1 This document applies to all VHDM Daughtercard Connector assemblies with an Amphenol-TCS part-number lead off of AV95X, AV96X-XXXXX, for VHDM, VHDM-HSD, VHDM H-Series, and VHDM L-Series

1.2 This document defines the acceptable limits of various defects not specifically described or referenced on Amphenol product drawings. The defects described herein are typically included within the broad category of “workmanship”.

1.3 Users of this document are encouraged to consider any and all abnormalities, and weigh them against the specific criteria described in this bulletin and/or the appropriate Amphenol product drawing. In cases where the user is uncertain as to the acceptability of any condition, the factory should be consulted.

1.4 This document provides criteria for visually evaluating or measuring specific features as part of the inspection process during connector application to PWBs as well as evaluation of conditions as a result of normal mating and handling during integration and in use.

2.0 REFERENCE DOCUMENTS

2.1 Dimensional values should be verified by consulting the appropriate Amphenol assembly drawing.

2.2 TB-2025 – Process for Installation of Right Angle Press Fit VHDM Daughtercard

2.3 TB-2079 – Component Replacement Procedure for Loose VHDM Daughtercard Connectors

3.0 EQUIPMENT/TOOLS/MATERIALS

3.1 Microscope, 10X Minimum Magnification, Suitable for Viewing a Connector at Various Orientations Used After Suspected Defects are Detected Using Magna Light

3.2 Dynamic Functional Template, Amphenol Part No. 699-1383-000

3.3 Magna Light or Equivalent (See Sections 5.0 and 7.0)

4.0 GENERAL HANDLING OF CONNECTORS

4.1 The user should thoroughly review the handling specification referenced in Paragraph 2.2. VHDM daughtercard connectors have a number of features that can be easily damaged if mishandled.

4.2 Connectors that are dropped while handling should be thoroughly inspected for impact damage. Impact damage generally compromises one or more functional features. Connectors thus compromised should be scrapped or reworked. Refer to Paragraph 9.0 for defects and to TB-2079 for connector rework procedure.

4.3 All incoming packages shall be examined for shipping damage. Connectors should be inspected for foreign debris. Connectors should be free of damage outlined in this document as a rejectable condition. Connectors exhibiting signs of normal mating and handling, and minor physical wear that are designated as acceptable in this document are to be considered as non critical to the function of the product and accepted for use in production.

4.4 If connectors must be placed on any surface other than the Amphenol packaging tray or tube, they should be placed dynamic tails up to reduce the risk of damage to the compliant pins (see Figure 4.1).

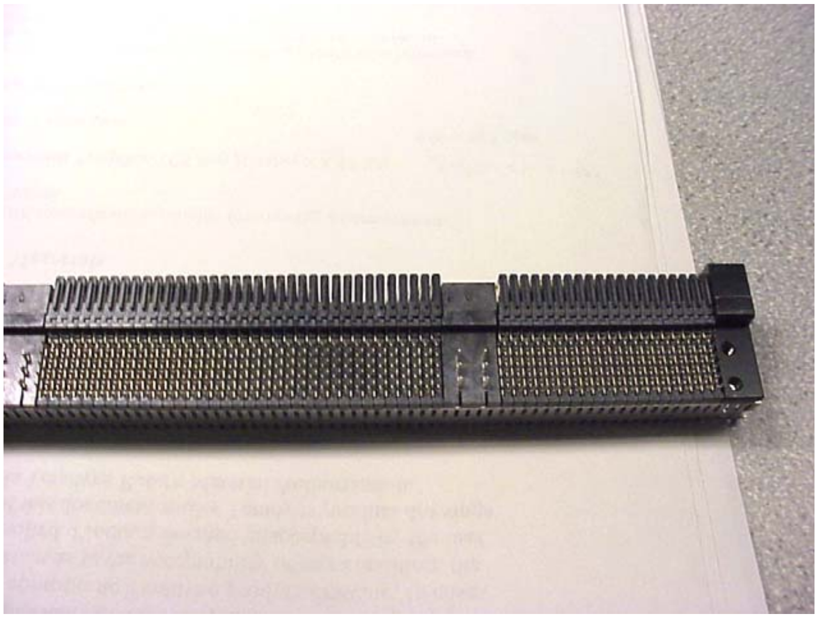


Figure 4.1

5.0 MAGNA LIGHT (RING LIGHT) USE

5.1 The Magna Light should be used as the primary inspection tool to inspect connectors to identify defects to any of the critical functional features of the specific component (See Figure 5.1). Refer to Section 8.0 for defects. Microscopes should only be used to in "referee" situations that require closer inspection and not as a general inspection tool.

Figure 5.1

6.0 DYNAMIC FUNCTIONAL TEMPLATE USE

6.1 Verify the calibration of the template before use (Figure 6.1).

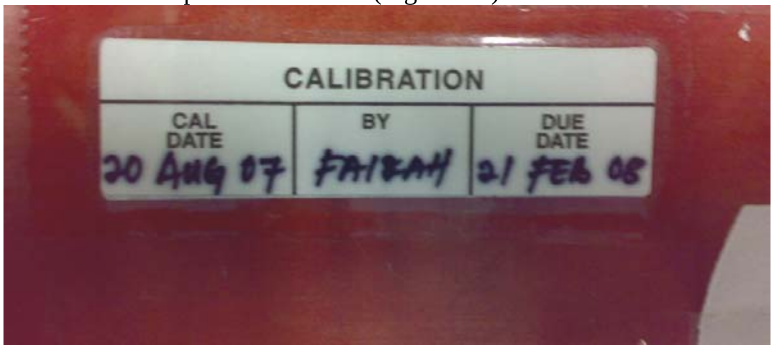


Figure 6.1

6.2 Hold the connector with the dynamic tails facing up as shown in Figure 6.2. Refer to Paragraph 2.2.

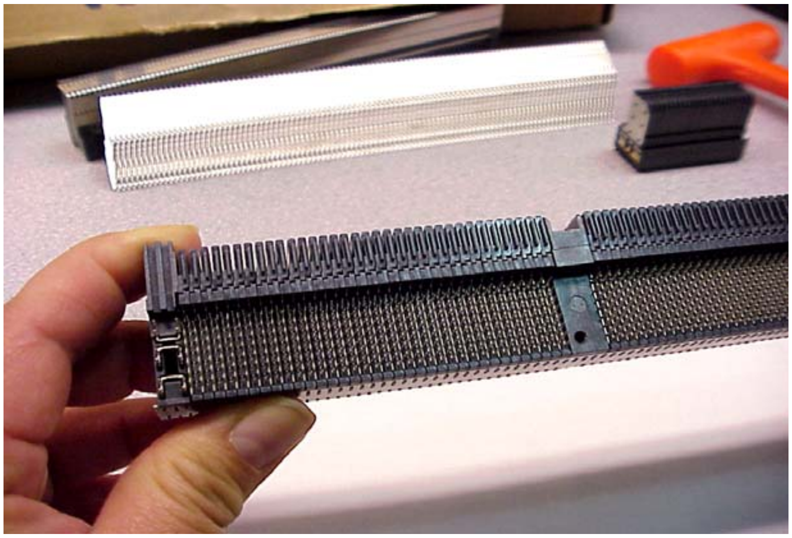


Figure 6.2

6.3 Gently place the template onto the connector. Start with the most upper left pin (A6 or A8 depending on a 6 or 8 row connector). Get entire row and roll connector into template. Pressure applied to seat the template should be slight (Figures 6.3 and 6.4).

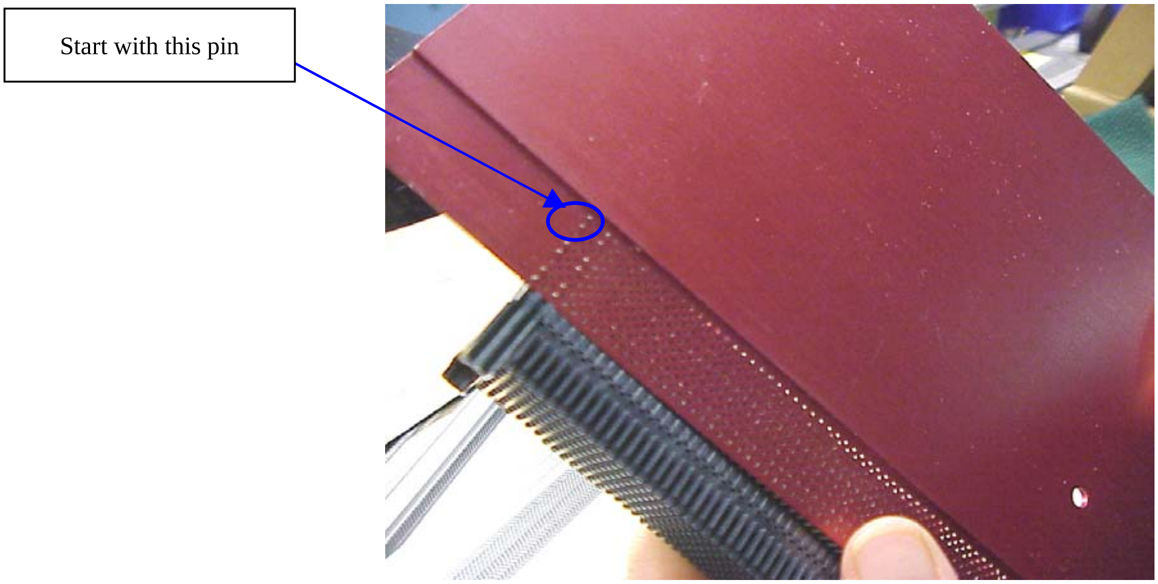


Figure 6.3

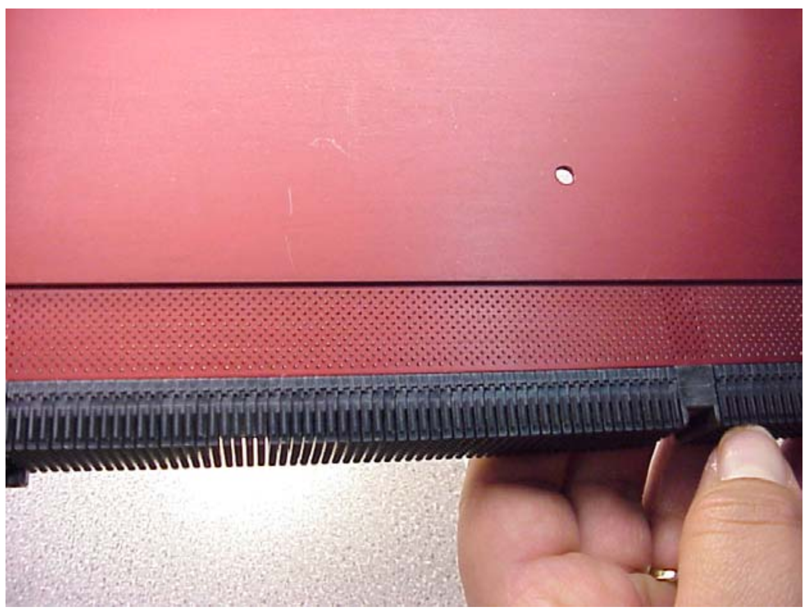


Figure 6.4

6.4 The tips of the dynamic section of the tails should fit smoothly into the holes of the template (Figure 6.5).

Figure 6.5

6.5 Tips of the dynamic section of the tails should be visible and protrude through the template in all locations. Additionally, the connector should sit evenly and not “rock” in the template when light pressure is applied along the stiffener (Figures 6.6).

Figure 6.6

6.6 Gently remove connector from gauge straight and evenly.

6.7 If connector does not fit onto gauge, inspect for damaged dynamics (See Section 8.0 for defects). If damage is found, refer to TB-2079 for Rework procedure (Refer to Section 2.0).

6a.0 OPTIONAL DYNAMIC FUNCTIONAL TEMPLATE USE (RECOMMENDED)

6a.1 Verify the calibration of the template before use (Figure 6.1).

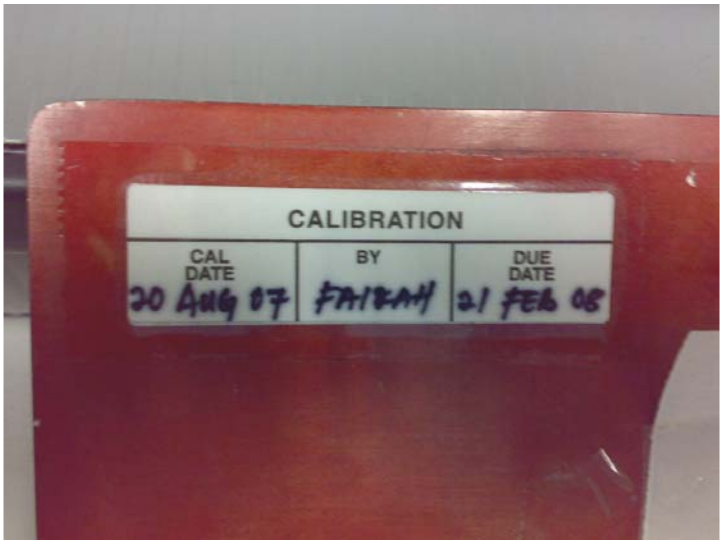


Figure 6.1

6a.2 Grasp connector by the ends using both hands and hold it with compliant pins facing down. NOTE: Do not touch compliant pins (Figure 6a.1).

Figure 6a.1

6a.3 Using appropriate gauge attached to the gauge stand, carefully line up compliant pins with the holes in the gauge.

6a.4 Begin by lining up compliant pins from the sides or the front of the connector with a line of gauge holes. (Figure 6a.2)

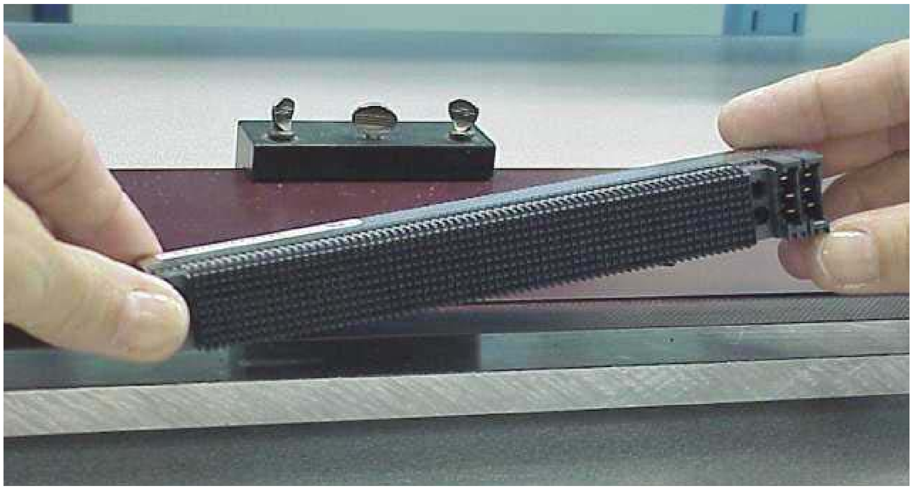


Figure 6a.2

6a.5 VERY GENTLY roll the connector onto the gauge and lightly press down so compliant pins pass through the holes in the gauge. (Figure 6a.3)

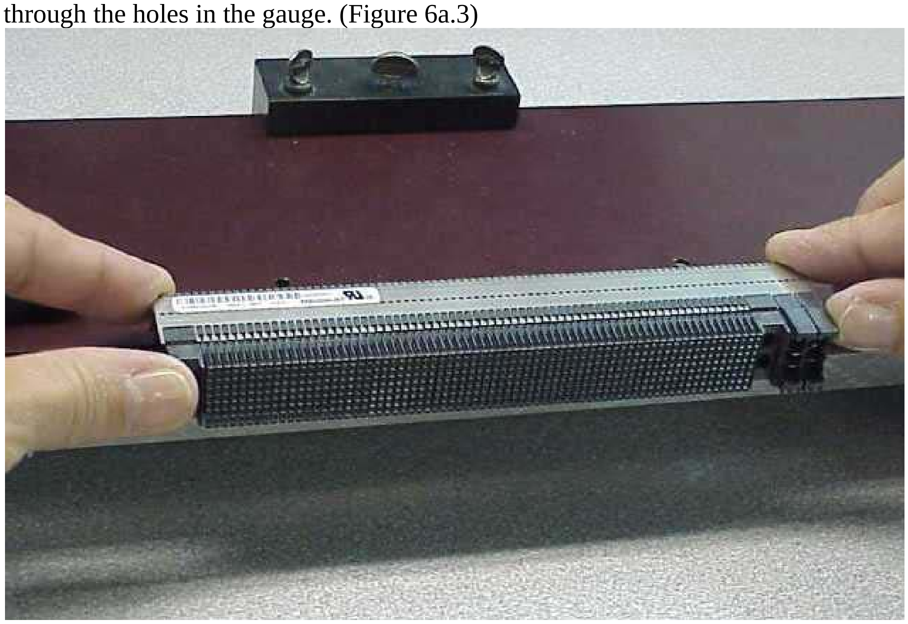


Figure 6a.3

NOTE: Compliant pins are very fragile and easily bent. Use extreme care when lining

6a.6 After successfully inserting the connector onto the gauge, swing gauge up while holding connector securely in place. Check to see that all compliant pins are showing through the holes in the gauge. (Figure 6a.4)

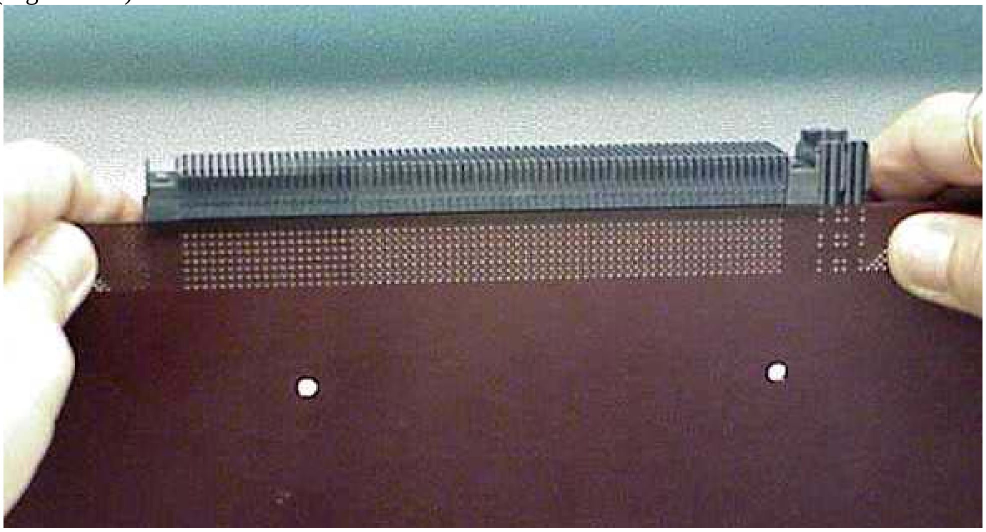


Figure 6a.4

NOTE: All compliant pins must penetrate through the gauge holes in order to pass the gauging inspection. (Figure 6a.5)

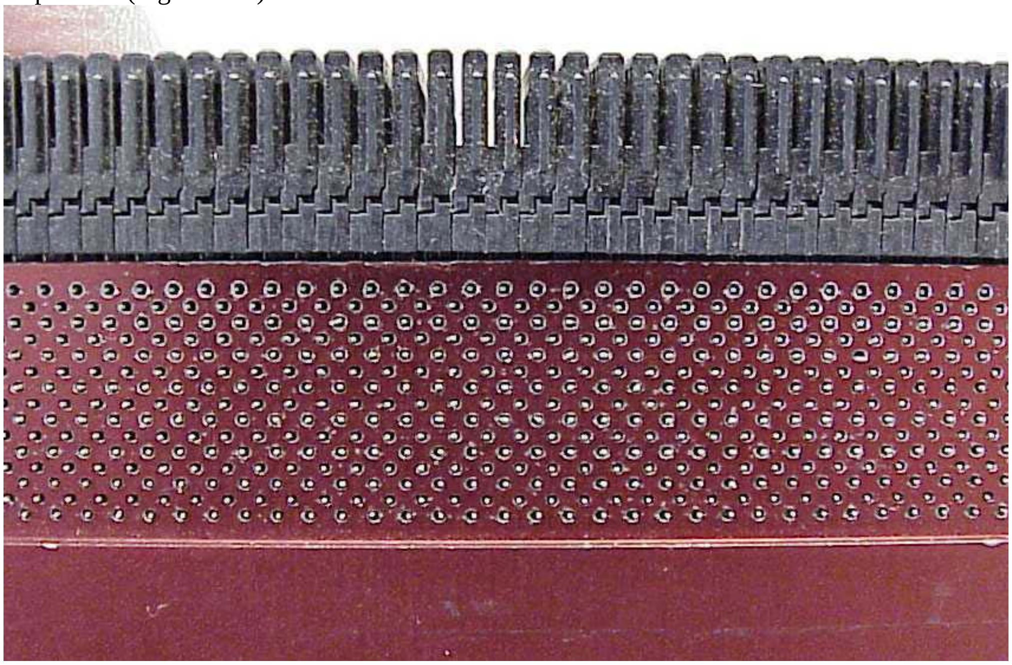


Figure 6a.5

6a.7 Swing gauge back down to the horizontal position before removing connector. Remove connector from the gauge by gently lifting it STRAIGHT up off the gauge, using care not to damage connector pins.

7.0 MICROSCOPE USE

7.1 Microscopes should only be used after suspected defects are detected using the magna light. Magnification levels should be 10X to 30X maximum (See Figure 7.1).

Figure 7.1

8.0 VHDM CONNECTOR TERMINOLOGIES AND FEATURE LOCATION

The following sections describe the VHDM connector system and its components. Figure 8.1 below shows an assembled VHDM Daughtercard connector and its components.

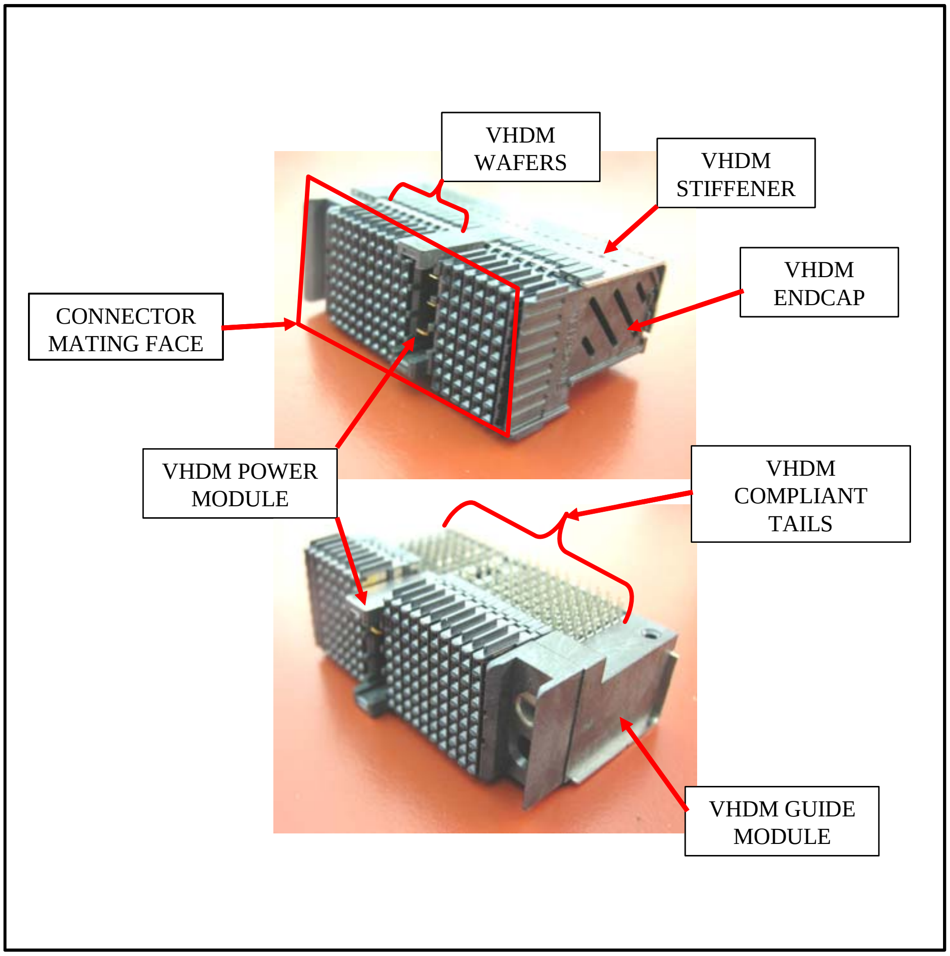


Figure 8.1. VHDM 8 Row Daughtercard connector

8.1 WAFER TERMINOLOGY AND FEATURE LOCATION

The VHDM wafer showed in Figure 8.2 highlights inspection areas. Critical areas are:

1. Connector Mating Face
2. Wafer Mating Ribs
3. Wafer Retention Hat
4. Compliant Pins

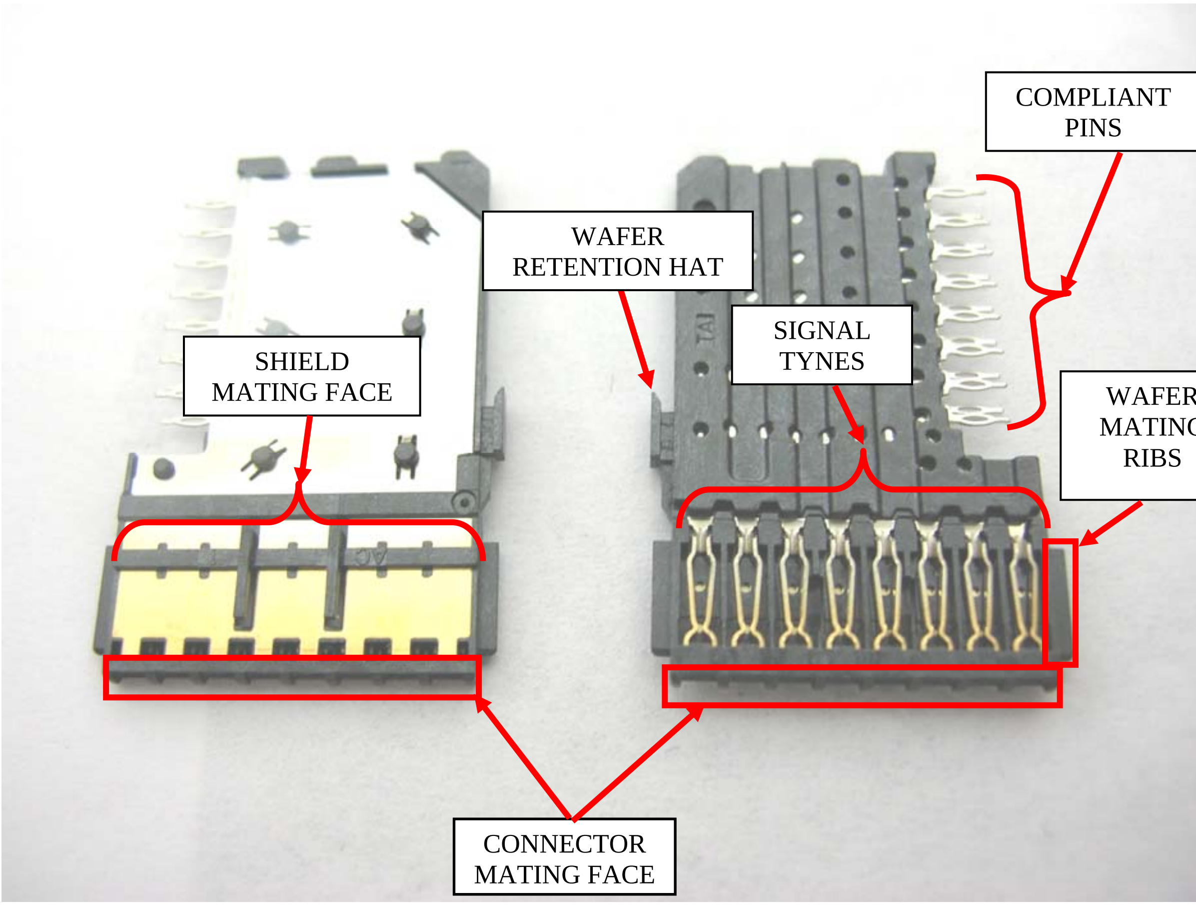


Figure 8.2. VHDM wafer detail and terminology.

8.1.1 Signal pin entry windows and shield slots.

When assembled onto a stiffener, the VHDM wafers should be inspected for damage to the signal pin entry window lead in area and shield slots as shown in Figure 8.3. Damage is considered unacceptable if it impacts the ability for the connector to mate with a corresponding backplane connector. Plastic damage on the wafer mating face that does not impact the ability of the connector to mate and un-mate is acceptable and is explained in Section 8.1.1.1. Plastic damage on the wafer mating face that does pose a risk to the connector to mate and un-mate is rejectable and is explained in Section 8.1.1.2.

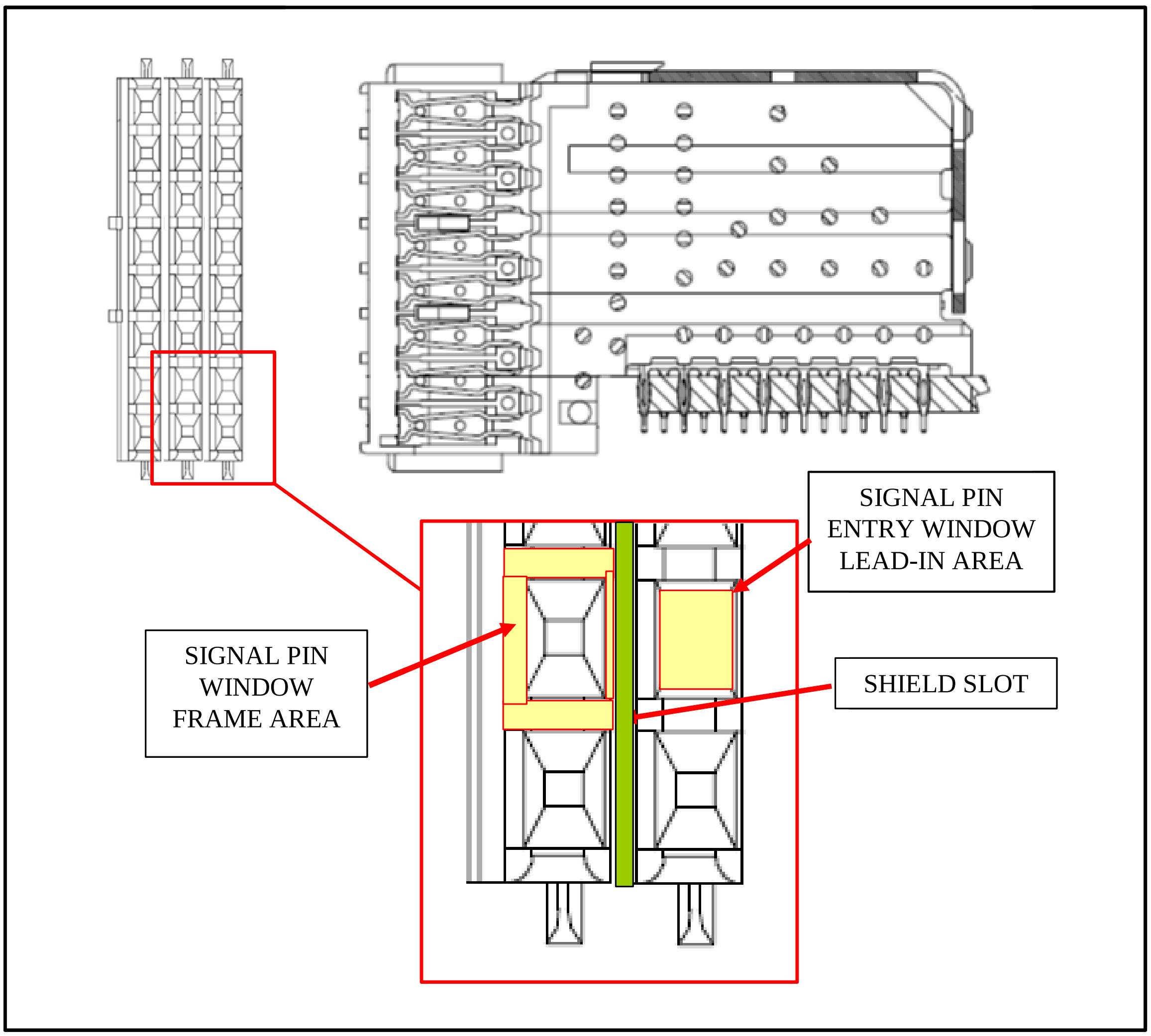
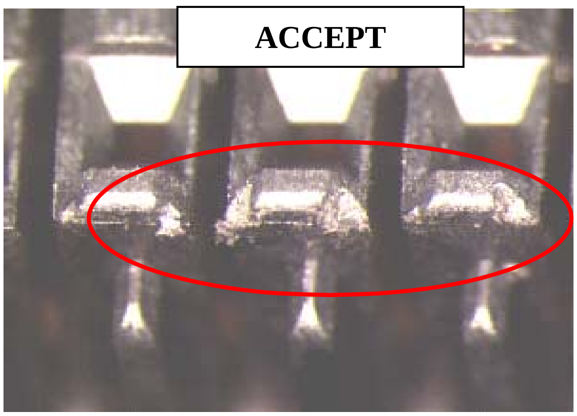


Figure 8.3. VHDM mating face highlighting the wafer signal pin entry window and shield slot.

8.1.1.1. Acceptable plastic damage at signal pin entry window fame and lead in area.

Scratches, dents, and loose plastic in this area are acceptable provided that damage does not impact the mating of the connector. Loose plastic in the mating window that does not impact the mating of the connector is acceptable. Broken or missing window frame standoffs are acceptable. The following figures show conditions that are a result of handling or mating and do not impact the ability for the connector to perform, and are ACCEPTABLE.

Figure 8.4 shows a dented signal pin window frame standoff from handling (8.4). Figure 8.5 shows dented frame areas from a backplane shield hitting the surface of multiple frame standoffs (8.5). Both conditions are acceptable.



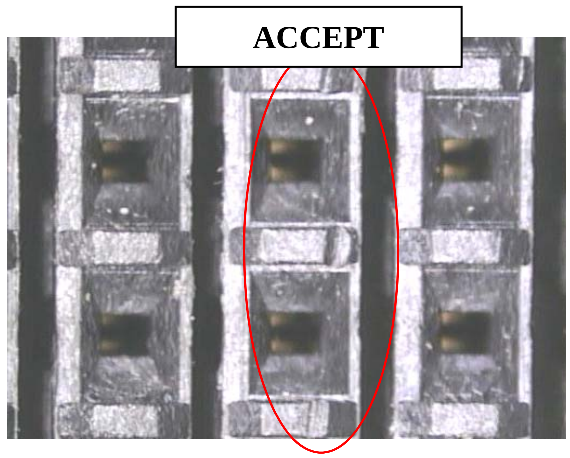
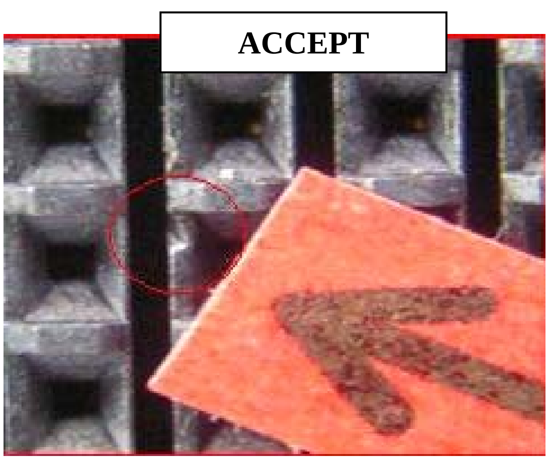


Figure 8.4. Signal pin window frame dent.

Figure 8.5. Signal pin window standoff dent.

Figures 8.6 shows dented plastic on the signal pin window frame. Figure 8.7 shows dented window frames and standoffs from a backplane shield hitting the face due to improper mating. Both conditions are acceptable because they do not create obstructions to the signal pine of shields when mating.



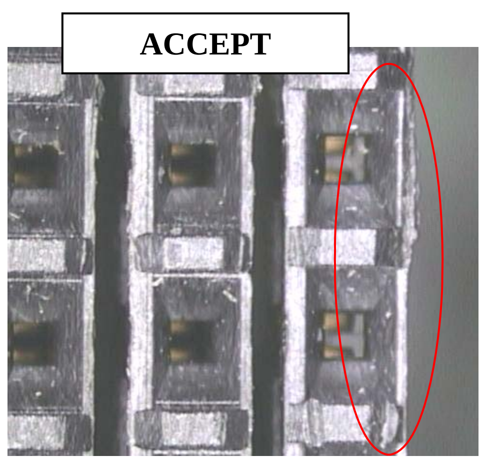


Figure 8.6. Signal pin window frame dent.

Figure 8.7. Signal pin window frame dent.

Figure 8.8 shows loose plastic from a window frame area protruding into the signal window. The plastic is loose and very thin in size. The plastic sliver is typically a result of the chevron of the shield conditioning to the mating wafer. Figure 8.9 shows signal pin lead in wear from multiple mating events. The lead in area only has surface wear and the window and shape of the lead in is still in tact. This wear will not impact the mating process. Any dent in the mating window under ½ of the signal pin size is acceptable and will not impact mating. Both conditions are a result of normal mating cycling and are acceptable.

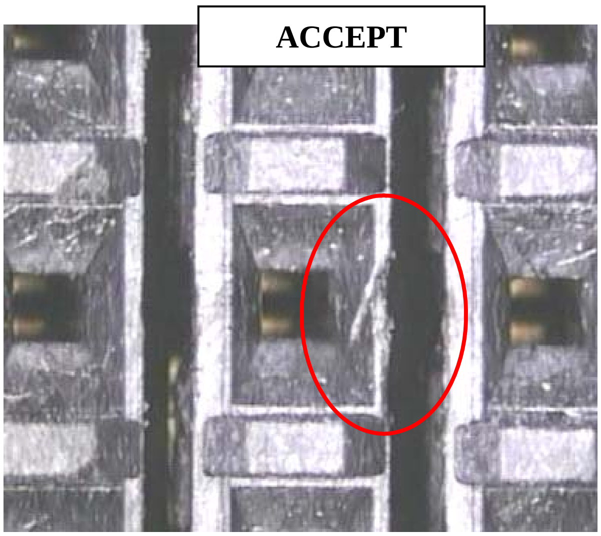


Figure 8.8. Signal pin window frame loose plastic.

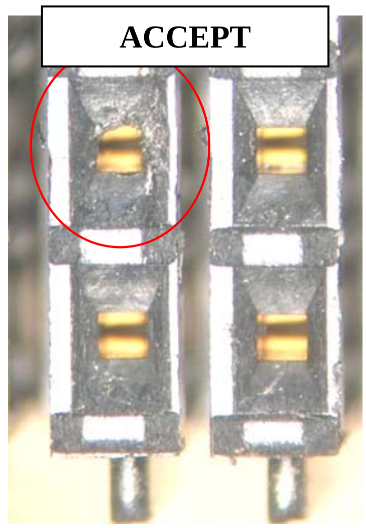


Figure 8.9 Signal pin window lead in wear tracks.

Figure 8.10 is loose plastic on the outside of the window frame standoffs. Figure 8.10 is a result of normal mating cycling and is acceptable.

ACCEPT

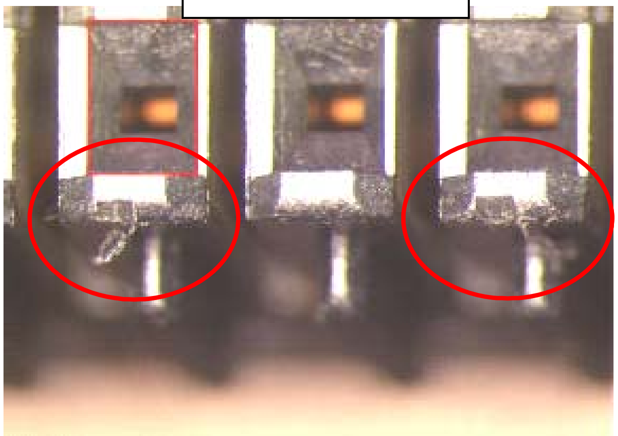


Figure 8.10 Signal pin standoff loose plastic.

8.1.1.2. Rejectable plastic damage at signal pin entry window fame and lead in area.

Dents and loose plastic in window frame area that creates damage in the lead in window or blocks signal pins or shields from mating are rejectable. The following figures show conditions that are a result of handling or mating that impact the ability for the connector to perform, and are to be rejected. Components that are rejected should be reworked per Amphenol-TCS recommendations (refer to Section 2.0). Figure 8.11 shows window lead in areas that are deformed as a result of improper mating. Figure 8.12 shows window lead in areas that are deformed as a result of improper handling. These conditions are to be rejected.

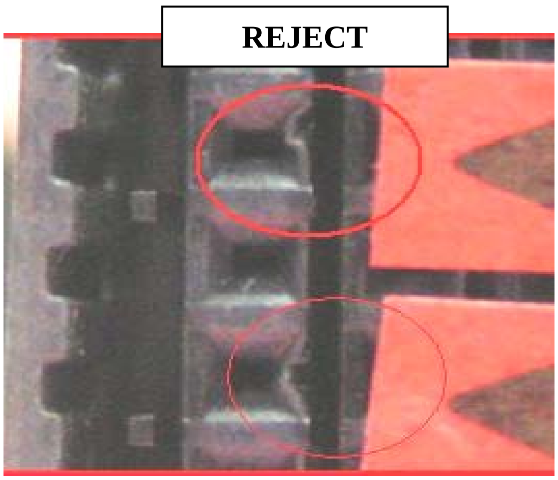


Figure 8.11. Signal pin window lead in dent.

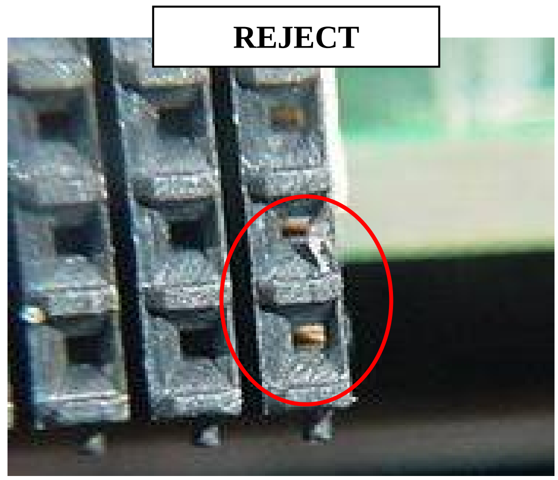


Figure 8.12 Signal pin window lead in dent.

Figure 8.13 shows the shield slot being obstructed by plastic damage. Figure 8.14 shows a hole in the window lead in area as a result of an improper mating. These conditions are to be rejected

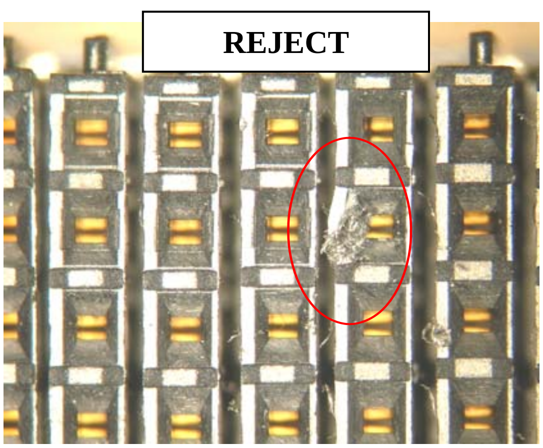


Figure 8.13. Shield slot obstruction.

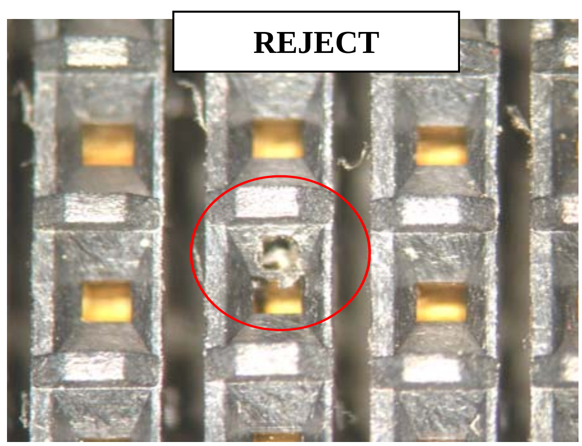


Figure 8.14 Signal pin window hole.

Figure 8.15 shows a window lead in areas that is deformed and is obstructing the signal window. Figure 8.16 has a signal lead in that is damaged The shape of the lead in is deformed. These both may impact mating and are to be rejected.

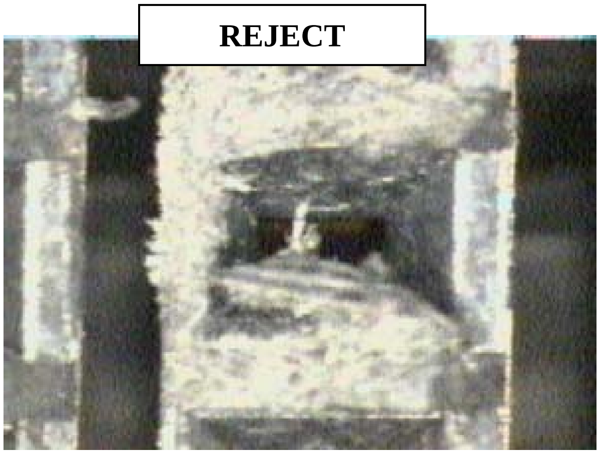


Figure 8.15 Signal pin window obstruction.

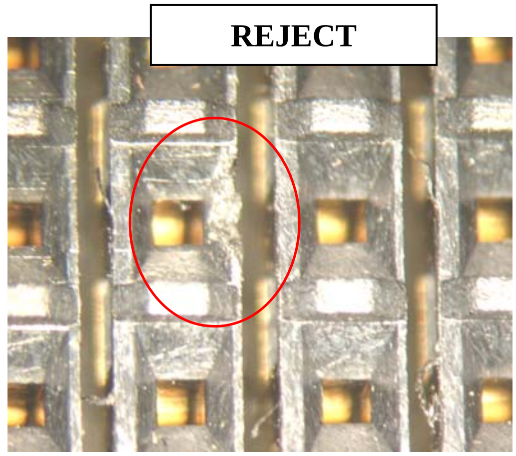


Figure 8.16 Signal window lead in damage.

Figure 8.17 shows the shield slot obstructed by plastic damage. Figure 8.18 shows a damaged standoff that has created a shield slot obstruction. These conditions are to be rejected.

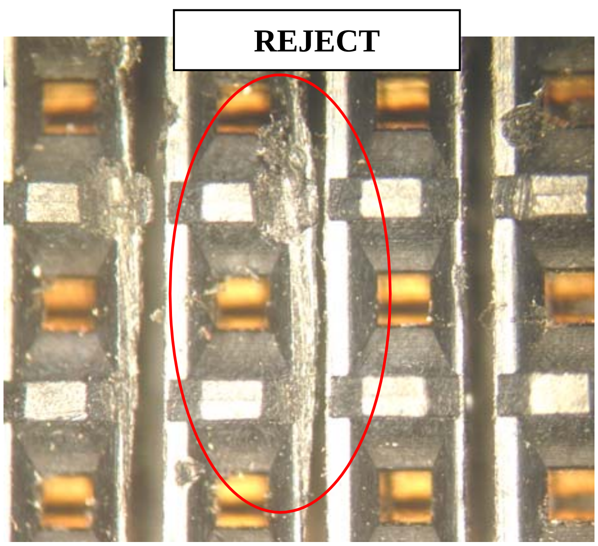


Figure 8.17. Signal pin window obstruction.

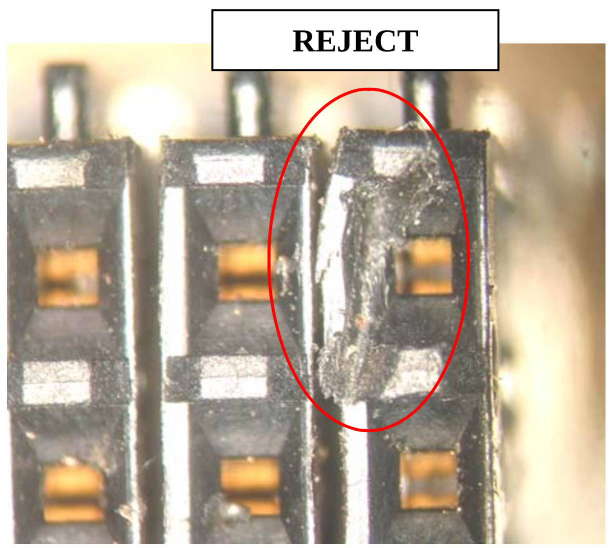


Figure 8.18 Shield slot obstruction.

Figure 8.18.1 shows the signal wafer and shield wafer assembly with minor plastic damage. The damage is in the area where the signal tines engage with the shield mold. This minor plastic deformity is acceptable for use.

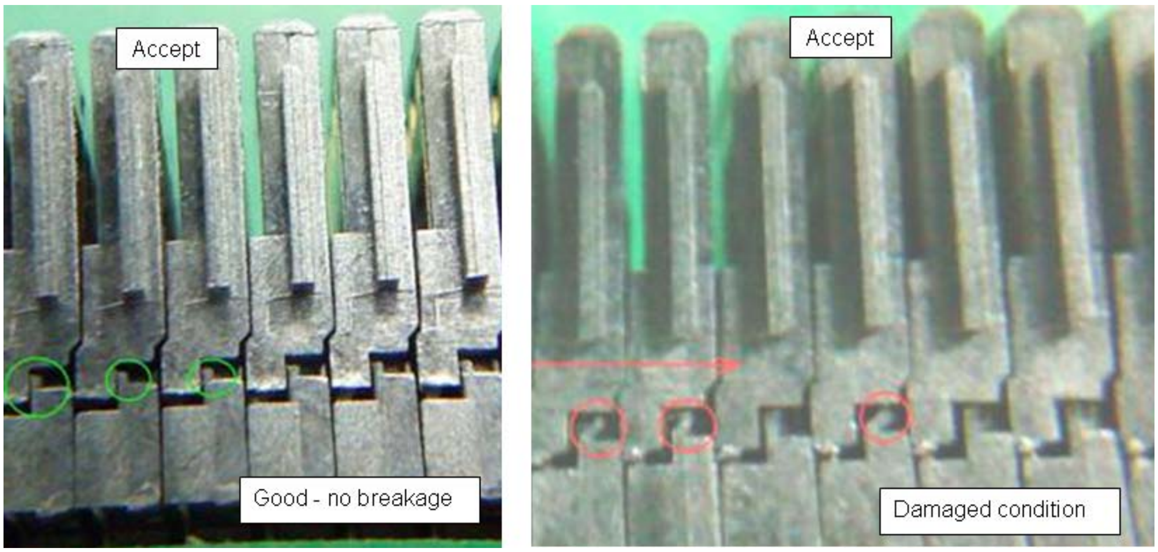


Figure 8.18.1

8.1.2 Signal wafer mating ribs.

When assembled onto a stiffener, the VHDM wafers should be inspected for damage to the wafer mating ribs as shown in Figure 8.19. Damage is considered unacceptable if it impacts the ability for the connector to mate with a corresponding backplane connector. Plastic damage that does not impact the ability for the connector to mate and un-mate is acceptable and is explained in Section 8.1.2.1. Plastic damage that poses a risk to the connector to mate and un-mate is rejectable and is explained in Section 8.1.2.2.

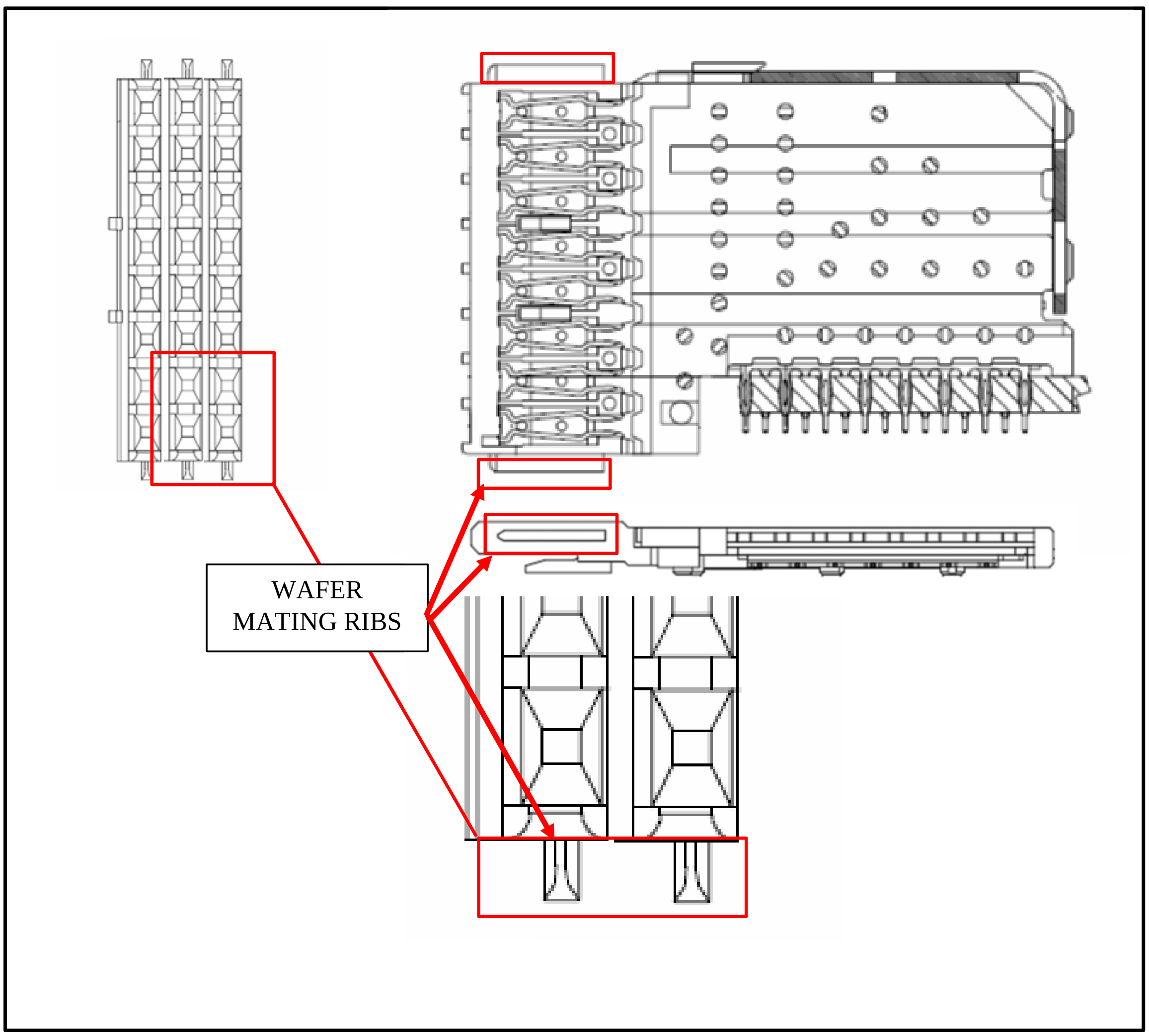


Figure 8.19. VHDM wafer detail highlighting the wafer mating ribs.

8.1.2.1. Acceptable plastic damage at wafer mating ribs.

Damage to the wafer mating ribs that does not impact the ability for the wafer to mate with the backplane slot is acceptable. Due to the design of VHDM, every wafer must have in tact wafer ribs. Damage to the rear of the mating rib is not as critical as damage to the tip of the rib. Figure 8.20 shows ideal mating ribs.

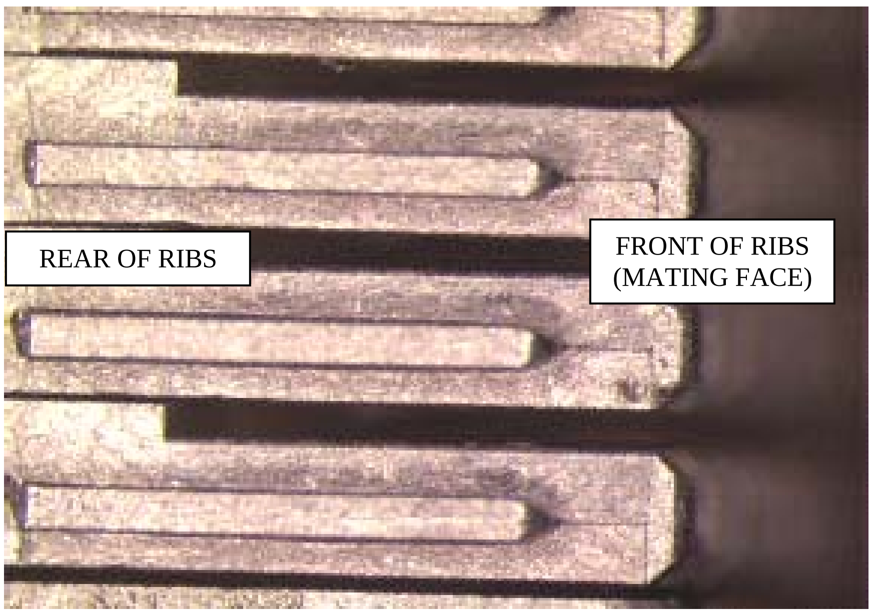


Figure 8.20. Ideal mating ribs.

Figure 8.21 shows a mating rib with a slight scraping of the tip. This is acceptable because the tip center is still in tact and will provide functional gathering of the wafer. Figure 8.22 shows a mating rib tip with a slight dent. This is acceptable because the outer edge of the tip is in tact, providing gathering capabilities of the wafer.

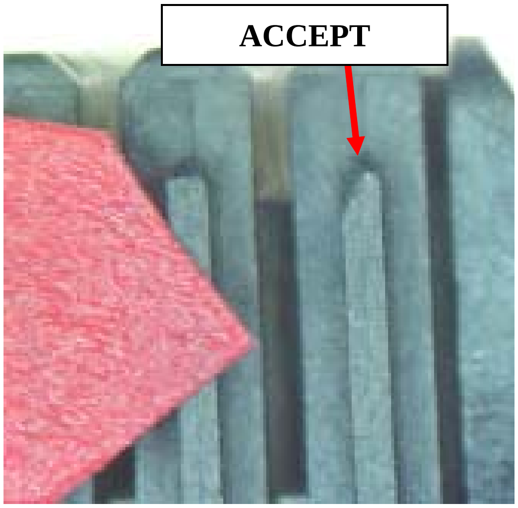


Figure 8.21. Mating rib tip scrape.

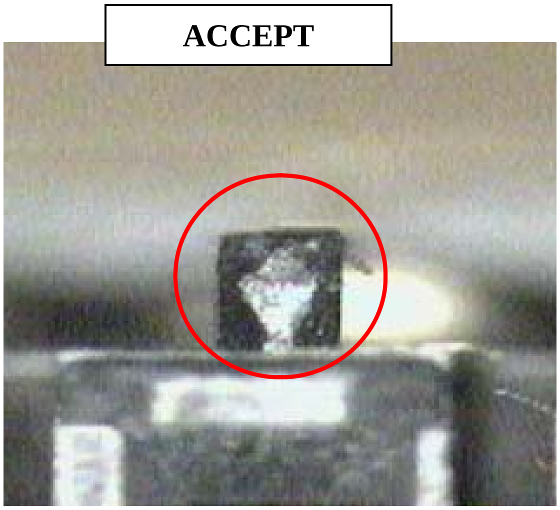


Figure 8.22 Mating rib tip dent.

Figure 8.23 shows mating ribs that have the rear portion missing due to handling. This is acceptable because the rib is structurally intact and poses no risk to mating and is not missing more than 25% of the rear of the rib. No loose debris should be present. Figure 8.24 shows a mating rib with a side dent. This is acceptable because the tip of the rib is intact and the dent is at the rear of the rib. There is no risk to mating due to the tip being in tact. The maximum deformation of any rib in this manner is 25% increase in overall width.

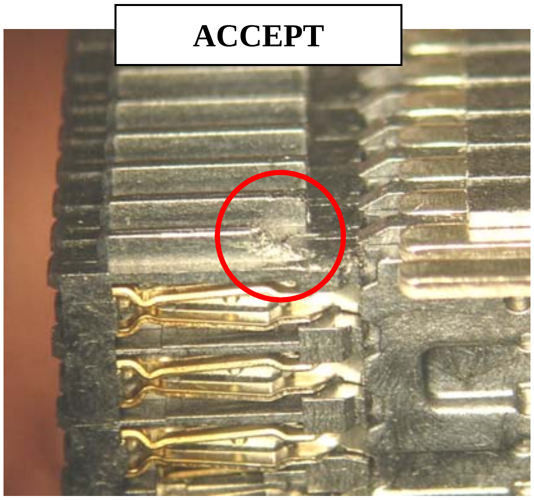


Figure 8.23. Mating ribs with rear removed.

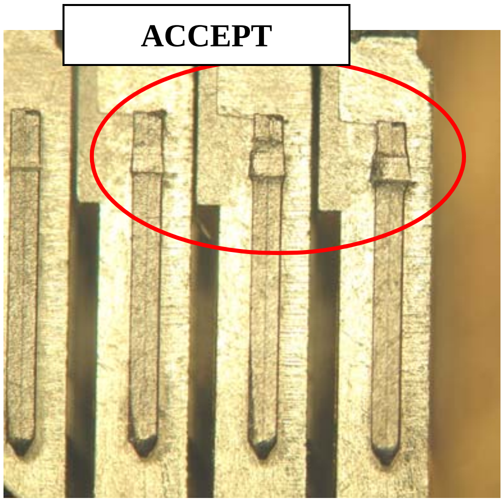


Figure 8.24 Mating rib side dent.

8.1.2.2. Rejectable plastic damage at wafer mating ribs.

Rejectable damage to the wafer mating ribs is defined as defects that prevent the VHDM wafer form mating successfully with a backplane slot. Due to the design of VHDM, every wafer must have intact wafer ribs. Any damage equivalent to or exceeding the examples shown should be repaired per Amphenol-TCS recommendations (Refer to Section 2.0). Figure 8.25 shows a dented wafer rib tip. The dent deforms the tip of the rib, damaging the lead in and the gathering ability of the rib. Figure 8.26 shows a missing and a broken wafer rib tip. These conditions prevent the wafer from properly gathering and aligning prior to the signal pins entering the window area of the rib. Both of these figures are to be rejected.

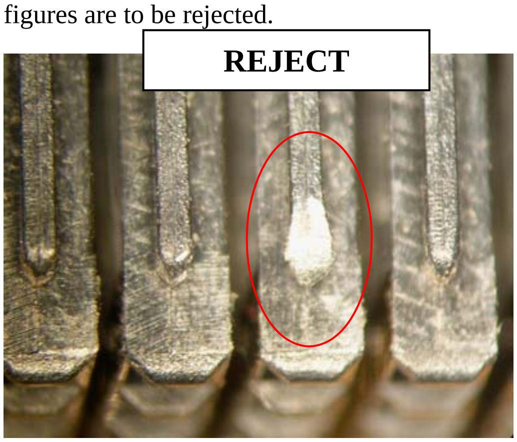


Figure 8.25. Mating ribs with rear removed.

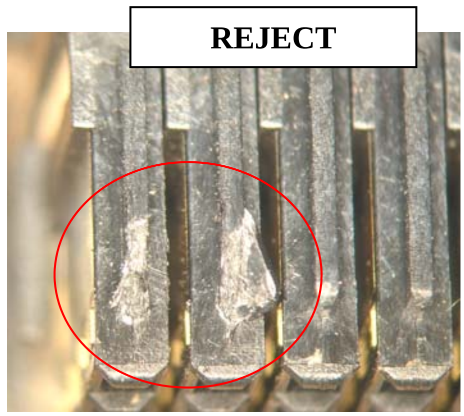


Figure 8.26 Mating rib side dent.

Figure 8.27 shows broken wafer ribs at the tip. Figure 8.28 shows missing wafer ribs. These conditions prevent the wafer from properly gathering and aligning prior to the signal pins entering the window area of the rib. Both of these figures are to be rejected.

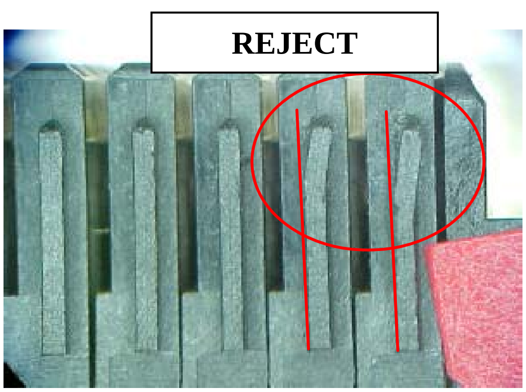


Figure 8.27. Mating ribs with rear removed.

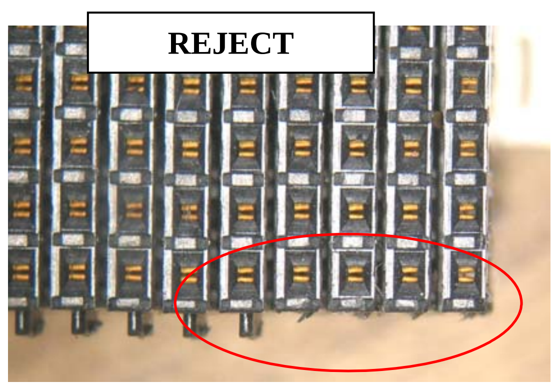


Figure 8.28 Missing mating ribs.

8.1.3.1. Acceptable plastic damage at shield fingers.

The shield fingers provide support to the backplane shield plate when mated to a daughtercard connector. Figure 8.29 shows the location of the shield fingers. Figure 8.30 shows ideal shield fingers. Note that the shield fingers are parallel with the shield plate. Flash (excess plastic) and surface scraping is acceptable.

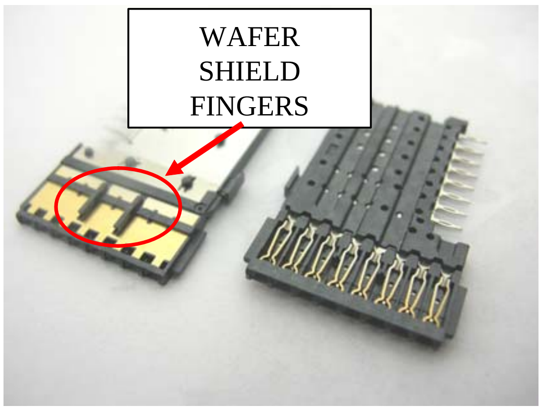


Figure 8.29. Wafer shield fingers.

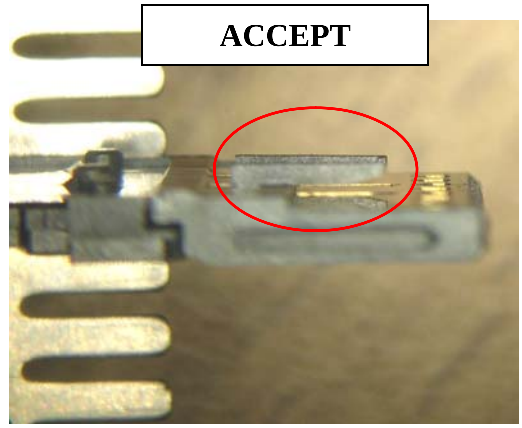


Figure 8.30 Ideal shield fingers.

8.1.3.2. Rejectable plastic damage at shield fingers.

Any damage to the shield fingers that bends or breaks the fingers is to be rejected and repaired as recommended by Amphenol-TCS (See Section 2.0). Figure 8.31 shows a bent shield finger. Figure 8.32 shows missing shield fingers. Both of these conditions are to be rejected.

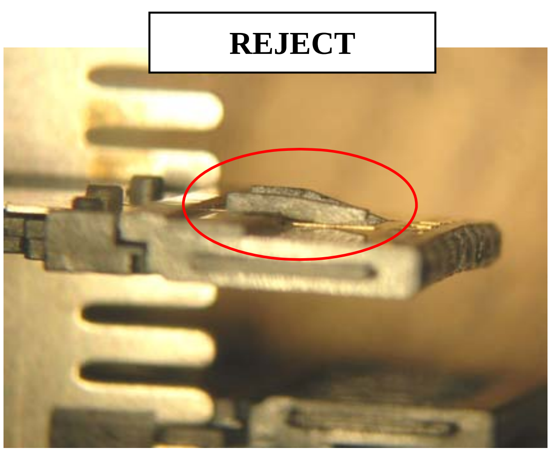


Figure 8.31. Wafer shield fingers.

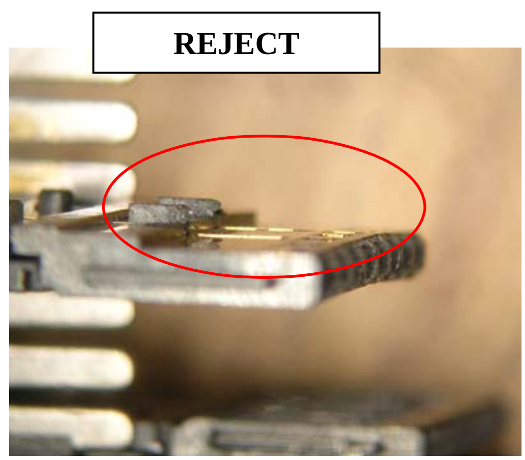


Figure 8.32 Ideal shield fingers.

8.2 GUIDE MODULE TERMINOLOGY AND FEATURE LOCATION

The VHDM guide module and its critical features are outlined in Figure 8.33 below.

1. Board Pegs – Optional feature. Guide modules can either come equipped with or without pegs.
2. Polarizing pin hole and guide pin hole.
3. Stiffener retention hat.

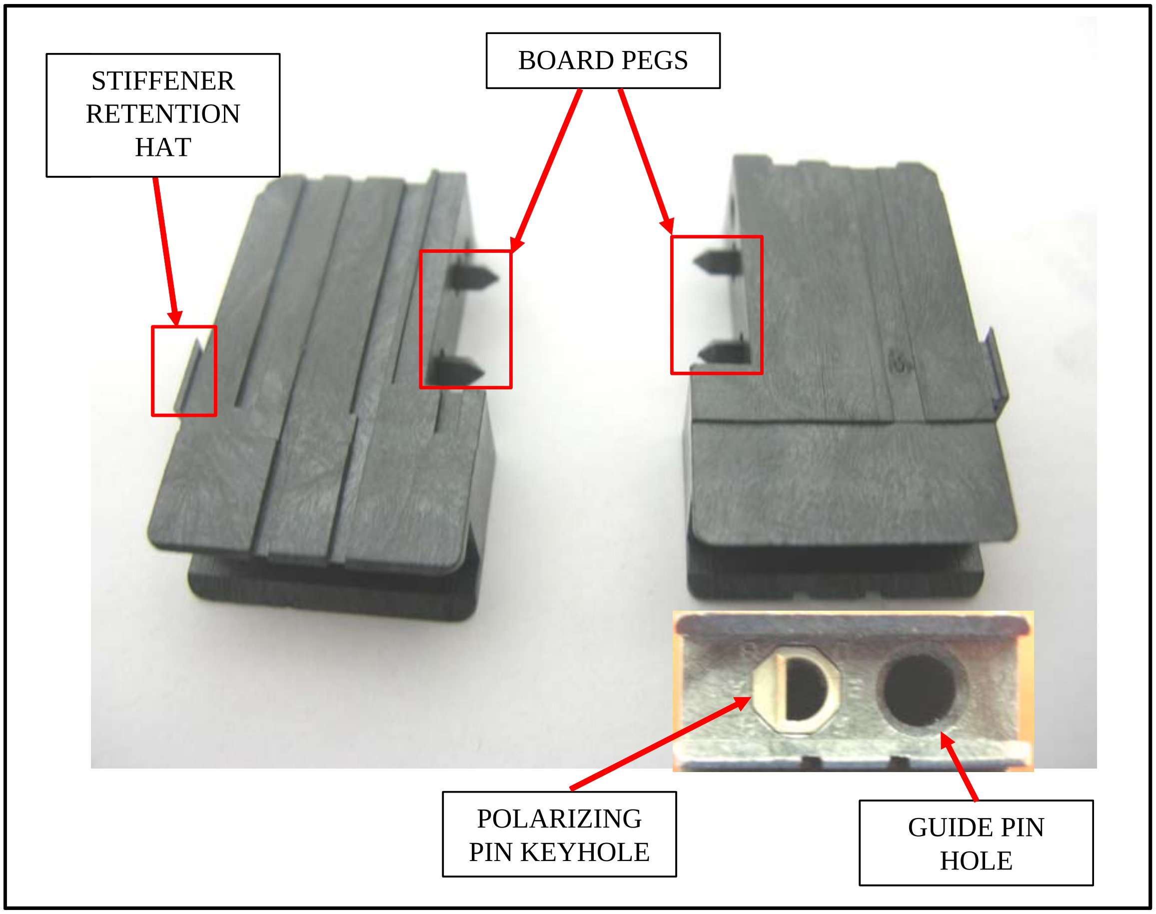


Figure 8.33. VHDM Guide module detail and terminology.

8.2.1 Guide pin and polarizing pin holes – mating face

When assembled onto a stiffener, the VHDM guide modules should be inspected for damage in the guide pin and polarizing pin locations as shown in Figure 8.34. Damage is considered unacceptable if it impacts the ability of the connector to mate with a corresponding backplane connector. Plastic damage on the guide module that does not impact the ability for the connector to mate and un-mate is acceptable and is explained in Section 8.2.1.1. Plastic damage on the guide module that does pose a risk to the connector to mate and un-mate is rejectable and is explained in Section 8.2.1.2.

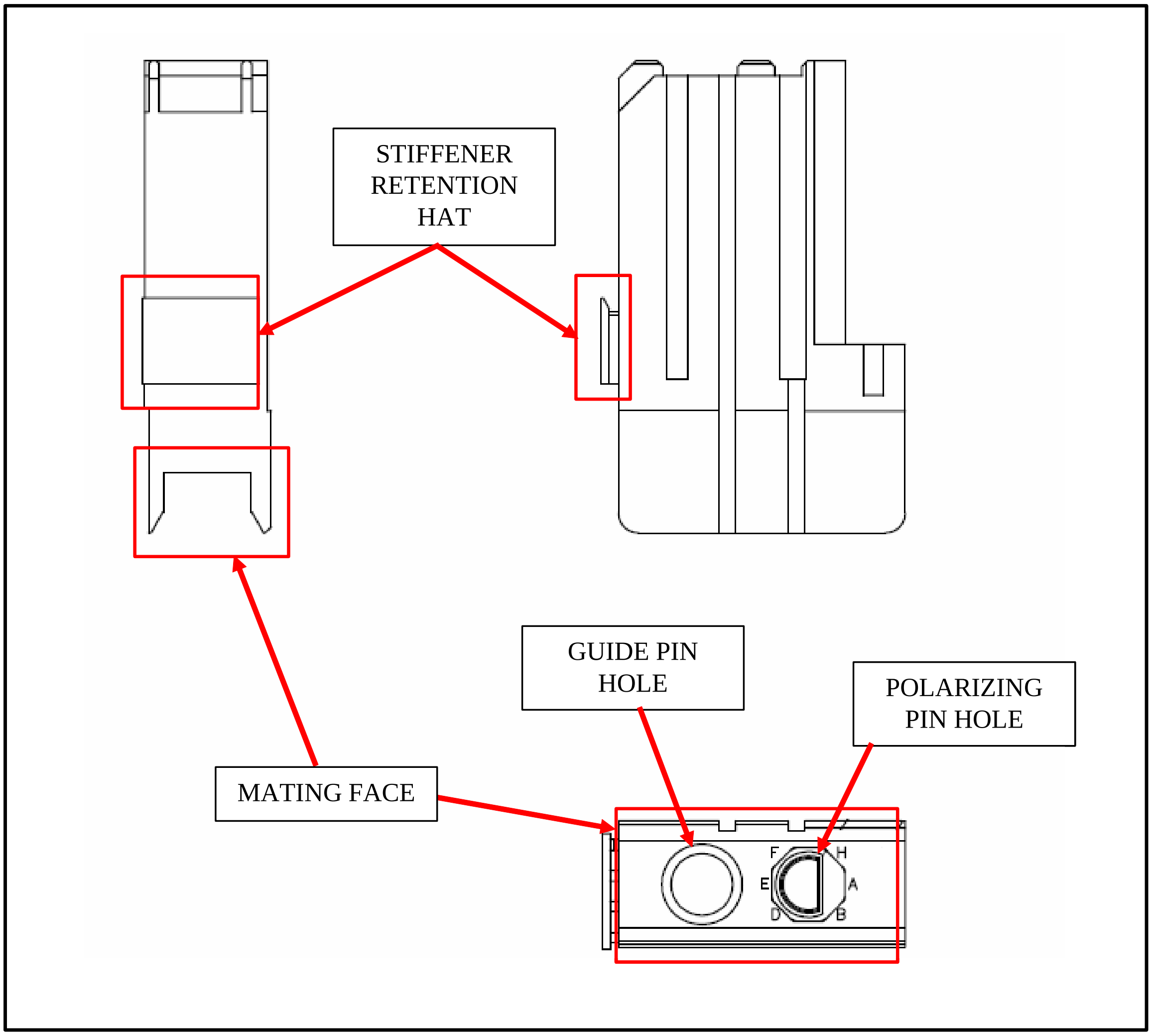


Figure 8.34 VHDM guide module highlighting critical features.

8.2.1.1 Acceptable plastic damage to the guide pin and polarizing pin area.

Figure 8.35 shows a wear track on the guide module from normal mating and un-mating. Figure 8.36 shows a stub from a guide pin during a mating attempt. Both of these conditions are acceptable because they do not degrade the gathering capability of the guide module.

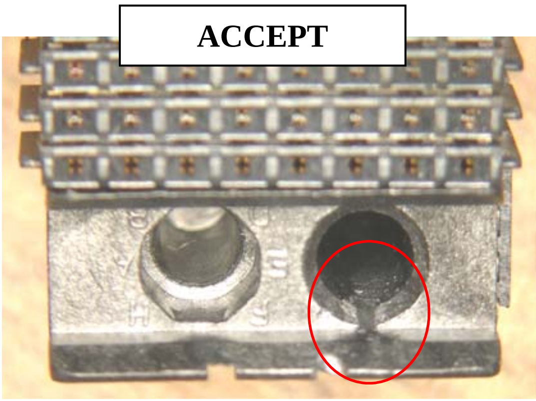


Figure 8.35. Guide module mating wear.

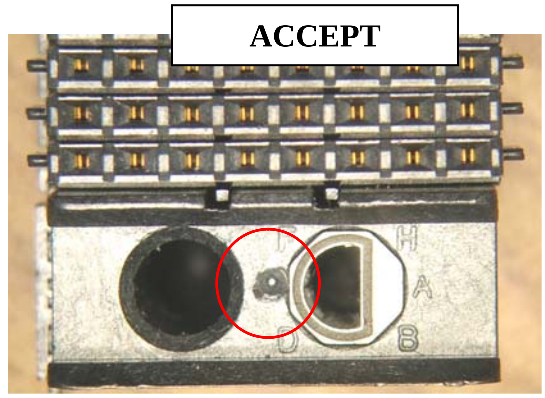


Figure 8.36 Guide module minor stub.

Figure 8.37 shows a dent on the guide module wing as a result of handling. This condition is acceptable because the wings provide NO gathering capability to the guide module.

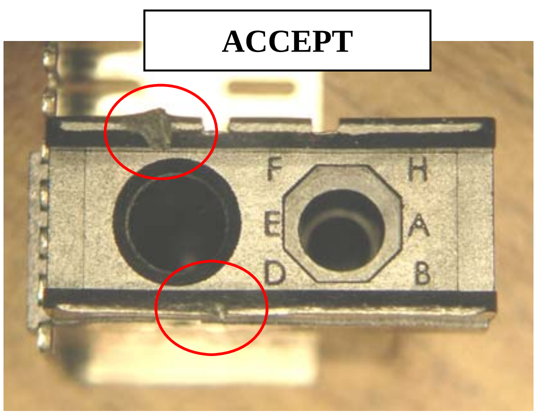


Figure 8.37. Guide module edge dent.

8.2.1.2 Rejectable guide pin and polarizing pin holes plastic defects

Figure 8.38 shows a guide module wing that is broken due to handling and may stub the guide pin during mating. Figure 8.39 shows a guide pin hole that has a damaged lead in. Both of these conditions are to be rejected because they may impact the connector’s ability to gather during mating.

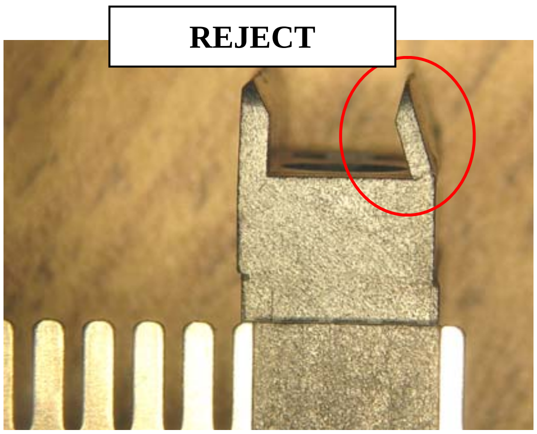


Figure 8.38 Guide module wall broken.

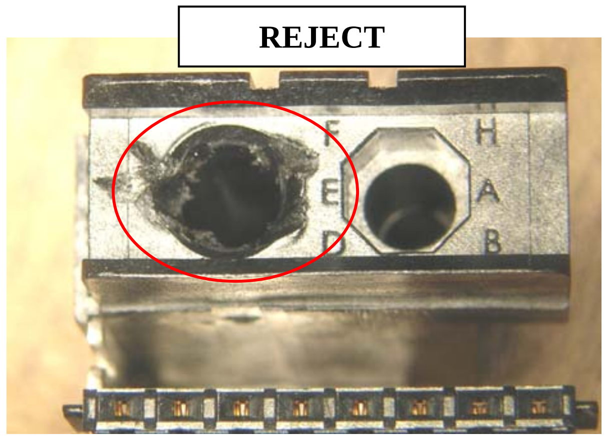


Figure 8.39 Guide module hole damage.

8.3 POWER MODULE TERMINOLOGY AND FEATURE LOCATION

The VHDM power module and its critical features are outlined in Figure 8.40 below.

1. Power module compliant pins.
2. Mating face.
3. Stiffener retention hat.

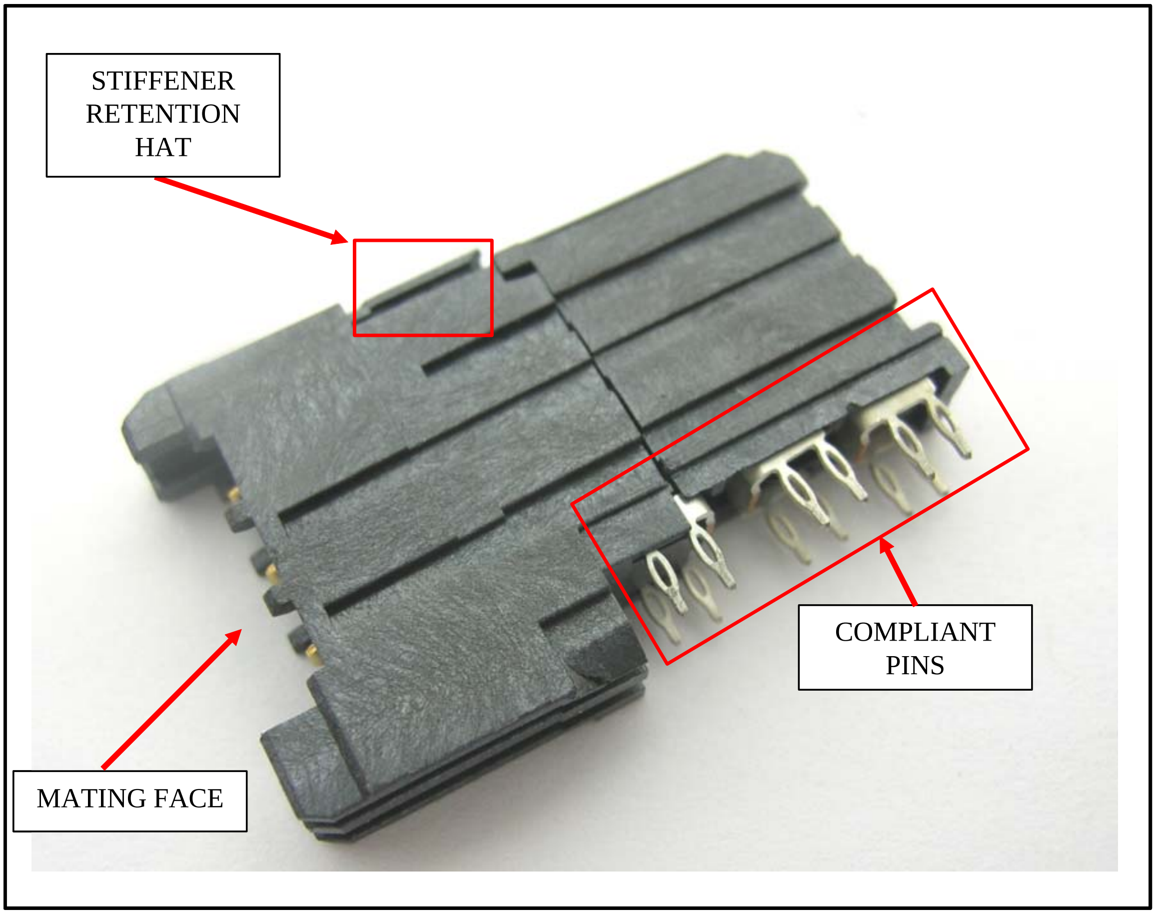


Figure 8.40 VHDM power module detail and terminology.

8.3.1 Mating face and alignment features

When assembled onto a stiffener, the VHDM power modules should be inspected for damage in the mating face area including the lead in area alignment features (mating face) and power blades as shown in Figure 8.41. Damage is considered unacceptable if it impacts the ability of the connector to mate with a corresponding backplane connector. Plastic damage on the power module that does not impact the ability for the connector to mate and un-mate is acceptable and is explained in Section 8.3.1.1. Plastic damage on the power module that does pose a risk to the connector to mate and un-mate is rejectable and is explained in Section 8.3.1.2.

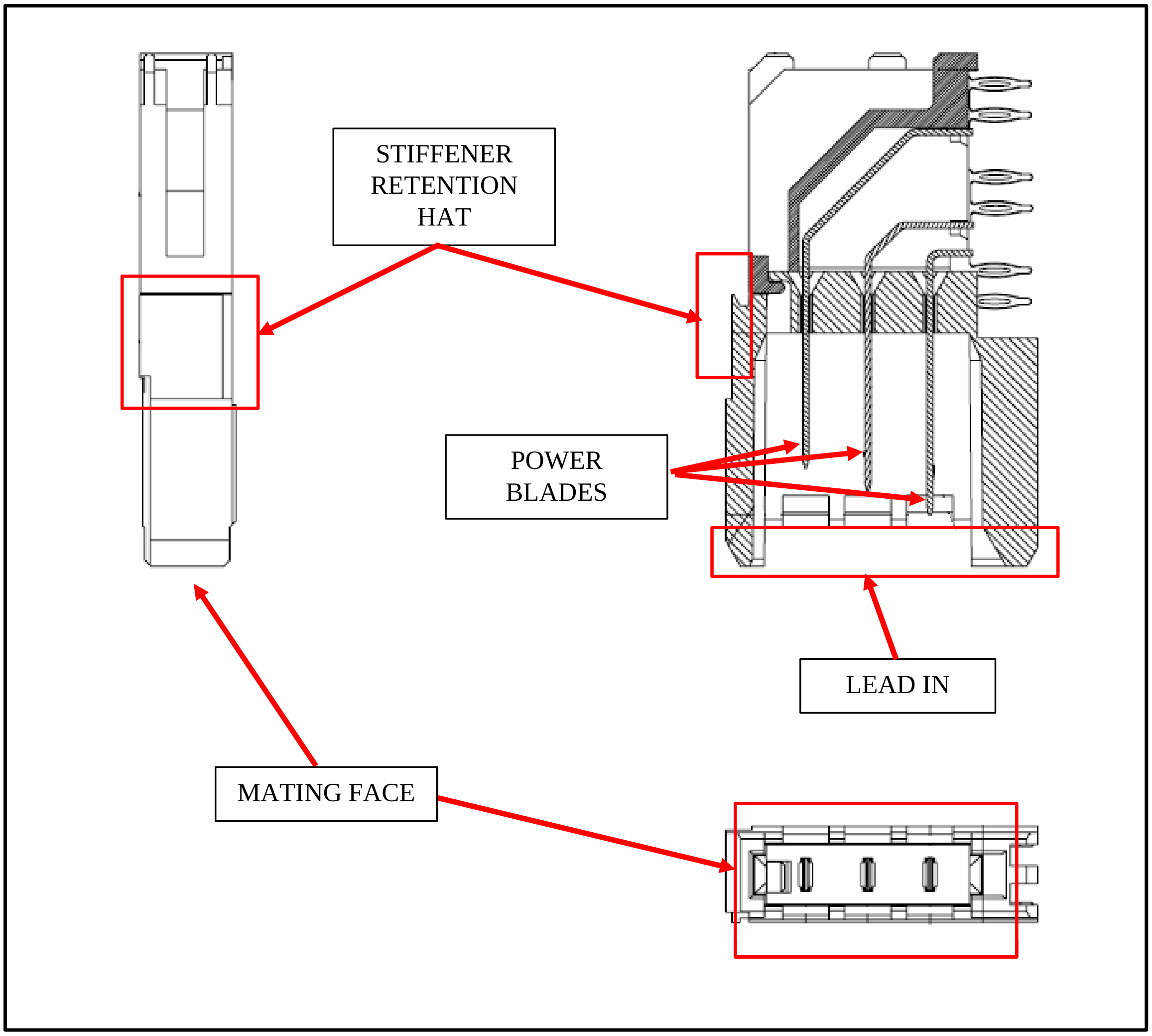


Figure 8.41 VHDM power module detail highlighting critical inspection areas.

8.3.1.1 Acceptable damage to the power module mating face lead in area and power blades.

Figure 8.42 an ideal mating face of a VHDM 8 Row power module with ideal blade location.

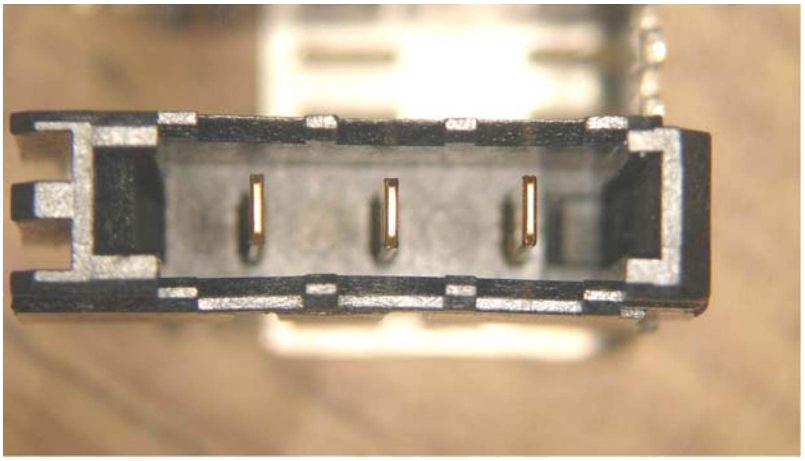


Figure 8.42 Defect free power module.

Figure 8.43 shows a wear track on the power module lead in entry from multiple mating cycles. Figure 8.44 shows a minor dent to the lead in area of the power module. Both of these conditions are acceptable. Dents along the mating face are acceptable as long as they do not impact the ability of the power module to mate without any binding effects. Figure 8.44 has a dent that does NOT protrude past the entry angle of the power module, therefore posing no risk to mating.

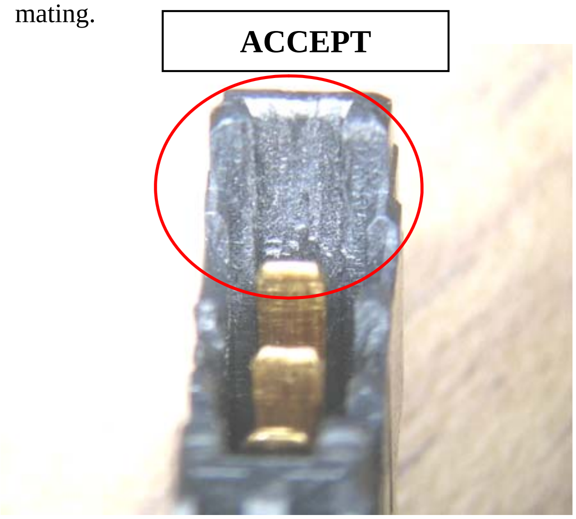


Figure 8.43 Wear track on power module

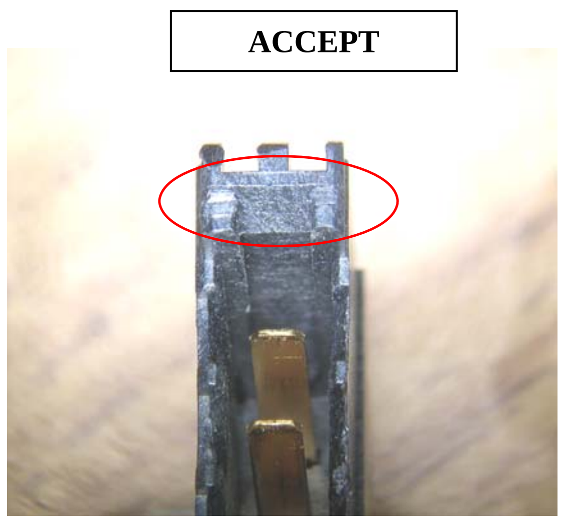


Figure 8.44 Dent on power module

8.3.1.2 Rejectable damage to the power module mating face lead in area and power blades.

Figure 8.45 shows a dent in the lead in of the power module that is interfering with the ability of the power module to mate without binding. Figure 8.46 shows a blade that damaged and bent out of alignment. Both of these conditions are to be rejected and repaired per Amphenol-TCS recommendations (See Section 2.0).

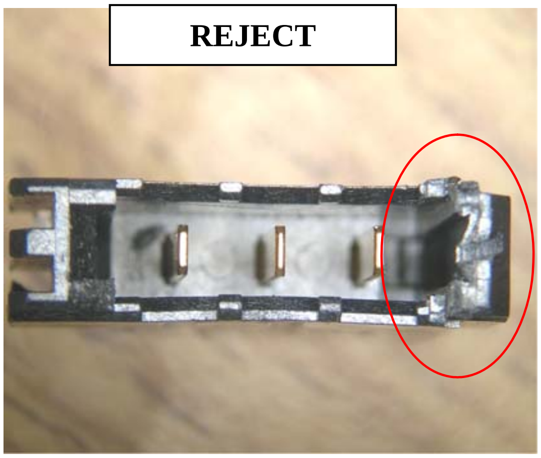


Figure 8.45 Power window dent.

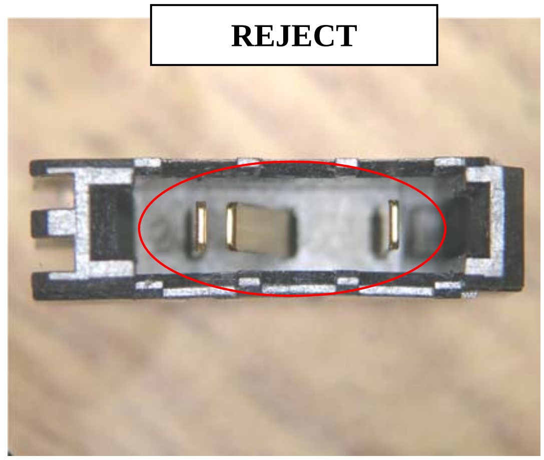


Figure 8.46 Bent power blade.

8.4 END CAP TERMINOLOGY AND FEATURE LOCATION

The VHDM endcap showed in Figure 8.47 highlights inspection areas. Critical areas are:

1. Wafer Mating Ribs
2. Stiffener Retention Hat
3. PWB Board Mounting Pegs – Optional (not shown in this picture, See Figure 8.48). Endcaps can be equipped with or without mounting pegs.
4. Mating Face

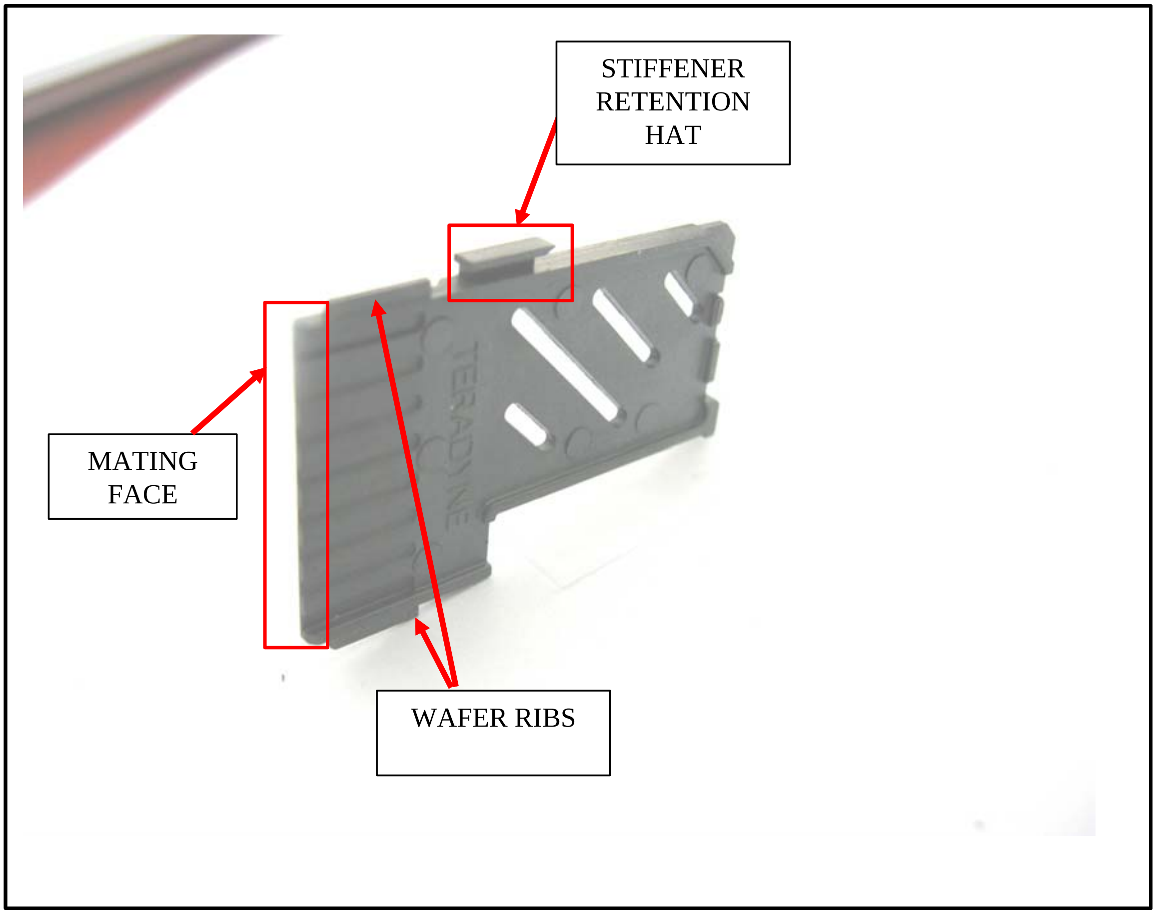


Figure 8.47 VHDM Endcap detail and terminology

8.4.1 VHDM Endcap Pegs, Wafer Ribs and Mating Face

When assembled onto a stiffener, the VHDM endcaps should be inspected for damage to the wafer mating ribs as shown in the wafer section (See Section 8.2). The wafer mating ribs for the endcap are identical in design and criticality as the wafer ribs and the same defect criteria hold. Further detail on rib defects will not be provided in this section. The mounting pegs and mating face defects will be detailed in this section as shown in Figure 8.48. Damage is considered unacceptable if it impacts the ability for the connector to mate with a corresponding backplane connector or with a PWB. Plastic damage on the endcap that does not impact the ability for the connector to mate and un-mate or be applied to a PWB is acceptable and is explained in Section 8.4.1.1. Plastic damage on the endcap that does pose a risk to the connector to mate and un-mate or be applied to a PWB is rejectable and is explained in Section 8.4.1.2.

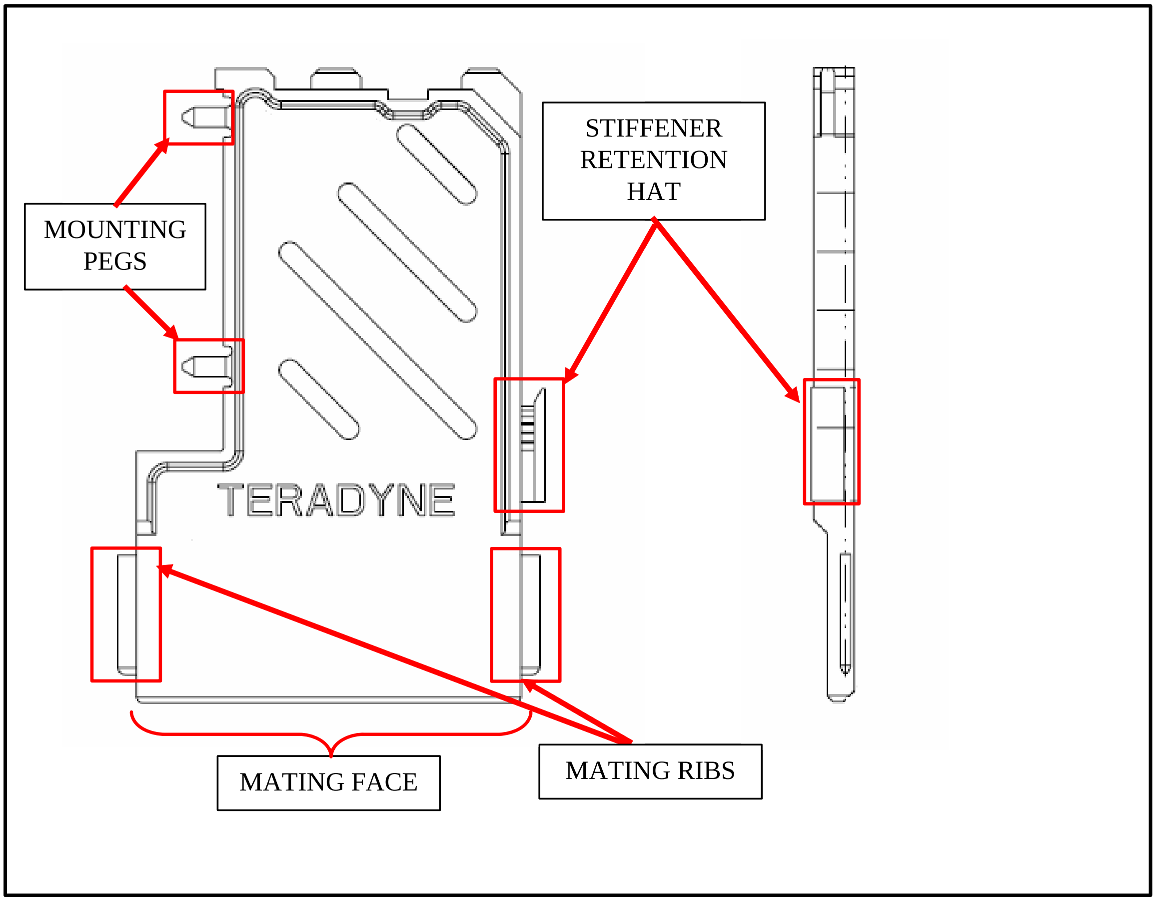


Figure 8.48 VHDM endcap detail highlighting critical inspection areas.

8.4.1.1 Acceptable plastic damage of endcap.

Figure 8.49 shows an ideal 8 Row VHDM endcap properly assembled onto a stiffener. Unique to 8 Row endcaps, depending if the endcap is on the right or left side of the connector, there will be a noticeable gap in the mating face pattern. This is due to the asymmetrical design of the mating face of the endcap by design. Figure 8.50 and 8.51 show this asymmetry. This asymmetry is not noticeable on 5 Row or 6 Row endcaps.

Figure 8.49. 8 Row VHDM endcap on stiffener.

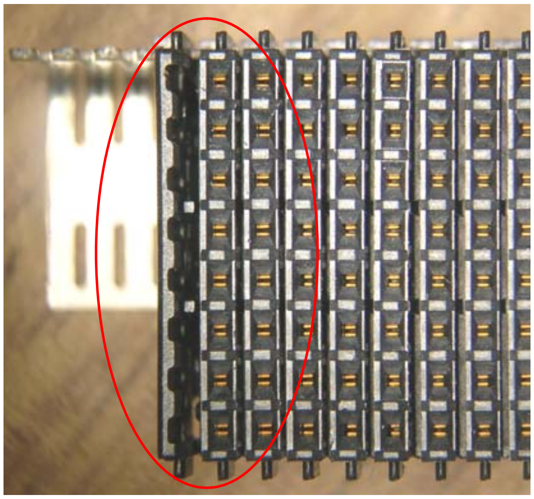


Figure 8.50. 8 Row VHDM endcap on left end.

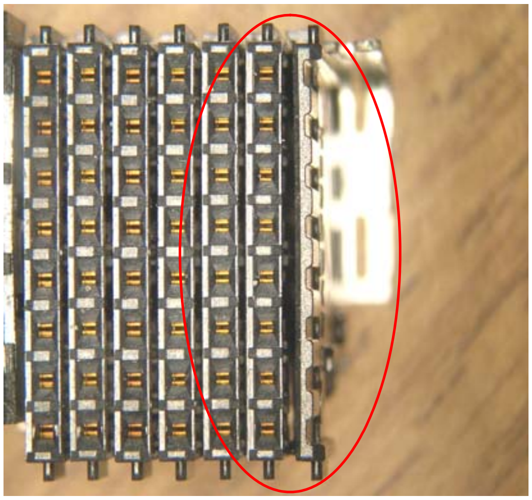


Figure 8.51. 8 Row VHDM endcap on right end

Although the mating faces of the endcaps show the asymmetry, the mating ribs remain on the standard VHDM 2 mm pitch as can be seen in Figures 8.50 and 8.51. This condition is intentional by design of the component.

Figure 8.52 shows normal mating wear of the VHDM endcap. Figure 8.53 shows a crack on the main body of the endcap. Both of these conditions do not impact the mating ability or the mechanical strength of the endcap and are acceptable.

ACCEPT

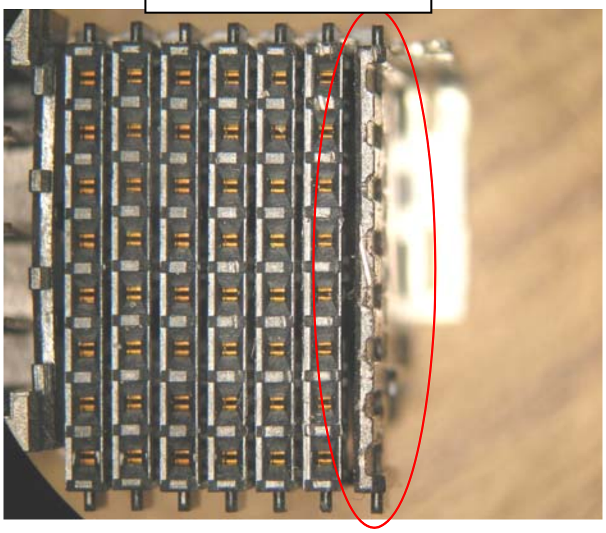


Figure 8.52. Dented 8 Row endcap mating face.

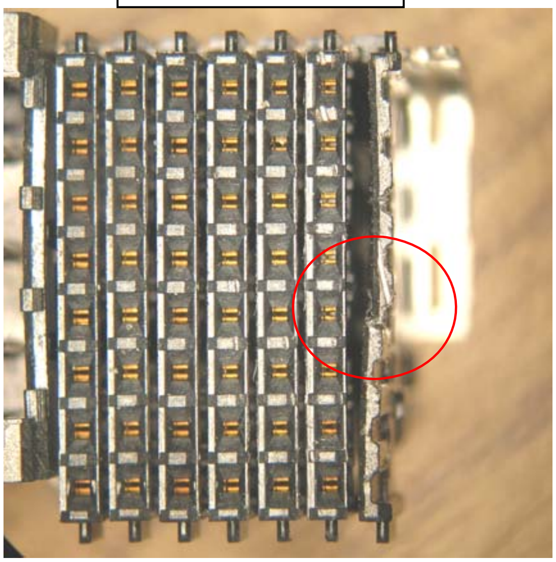
ACCEPT

Figure 8.53. Cracked body of 8 Row VHDM endcap

8.4.1.2 Rejectable plastic damage of endcap

Figure 8.54 shows a mating face that is deformed and cracked. Figure 8.55 shows a board mounting peg that is broken. Both of these conditions are to be rejected and repaired per Amphenol-TCS recommendations (See Section 2.0).

REJECT



REJECT

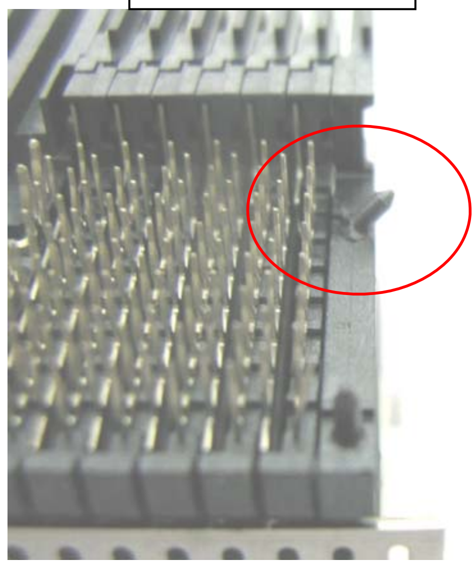


Figure 8.54. Deformed 8 Row endcap mating face.

Figure 8.55. Broken board mounting peg.

8.5 CONNECTOR-LEVEL TERMINOLOGY AND FEATURE LOCATION

The VHDM connector shown in Figure 8.56 highlights connector level inspection areas. Critical areas are:

1. Component retention hats
2. Component alignment tabs
3. Component compliant pins

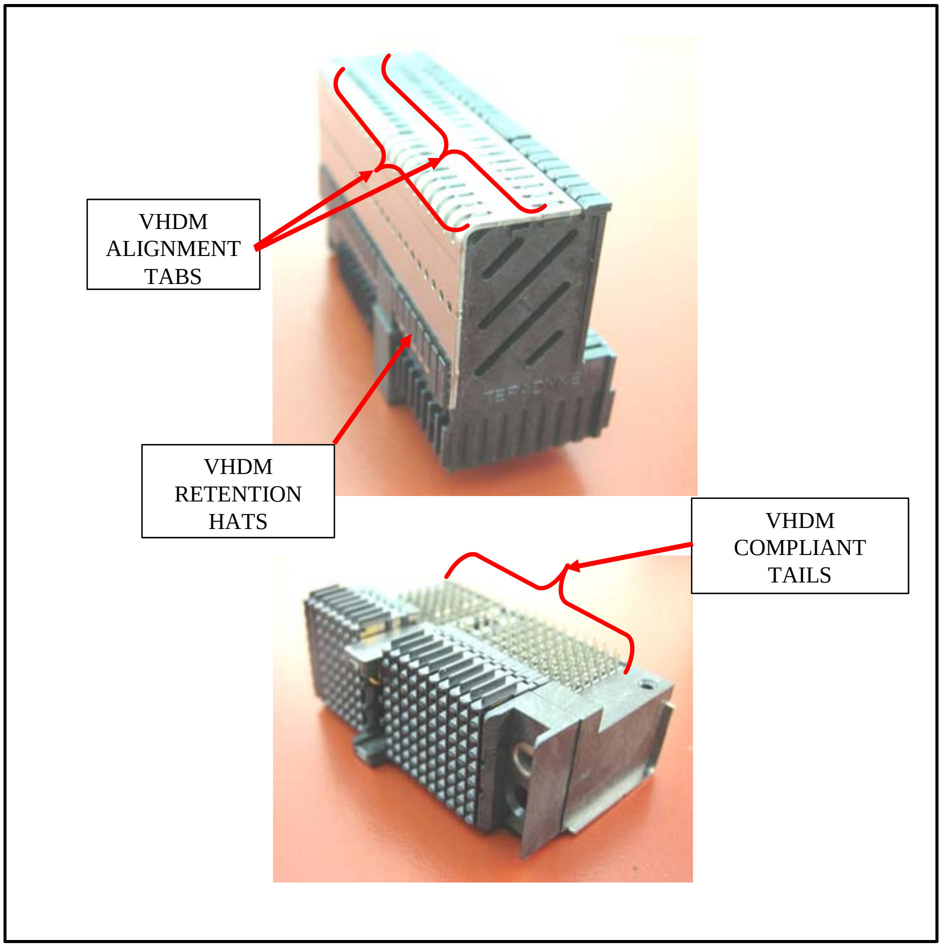


Figure 8.56. VHDM connector level assembled critical areas for inspection.

8.5.1 VHDM Retention Hats

When assembled onto a stiffener, the VHDM components are retained by the stiffener retention hats as shows in Figure 8.56. The critical area of the retention hat is the area that is "pinched" by the stiffener fingers, and not the top of the hat that is "covering" the stiffener. Damage to the retention hat area is considered unacceptable if it impacts the ability of the feature to properly retain a component onto a stiffener. Plastic damage that does not impact the retention hat's ability to properly hold a component onto a stiffener is considered acceptable and explained in section 8.5.1.1. Damage to a stiffener retention hat that does pose a risk to the retention of the components onto a stiffener is rejectable and explained in section 8.5.1.2.

8.5.1.1 Acceptable plastic damage of stiffener retention hat.

Figures 8.57 and 8.58 shows ideal VHDM stiffener retention hats on a stiffener.

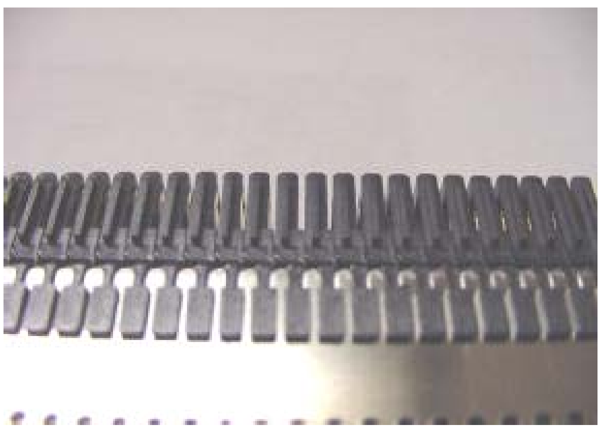


Figure 8.57. VHDM stiffener hats top view.

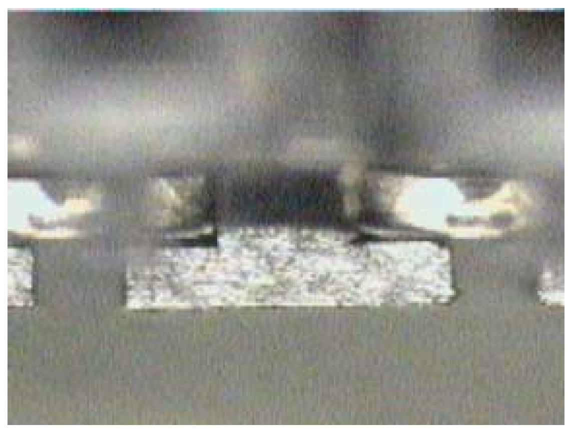


Figure 8.58. VHDM stiffener hats bottom view.

Figure 8.59 shows stiffener retention hats that are slightly lower than other retention hats. Figure 8.60 shows slight dents on the faces of the retention hats. Both of these conditions are acceptable. Height variation can be caused by variation in dimensions of the retention hat between components or due to slight seating variation (See Section 8.5.2). Slight surface dents to non critical areas of the retention hat such as the edges and corners of the hat will not compromise the feature's ability to adequately retain the component onto a stiffener. This is because the actual retention feature is only what is being "pinched" by the stiffener fingers.

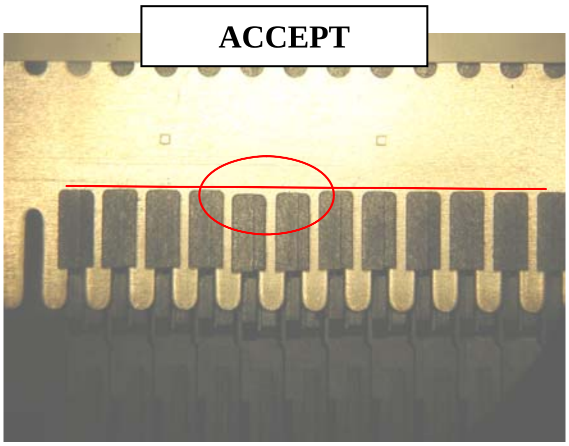


Figure 8.59. VHDM stiffener hat height variation.

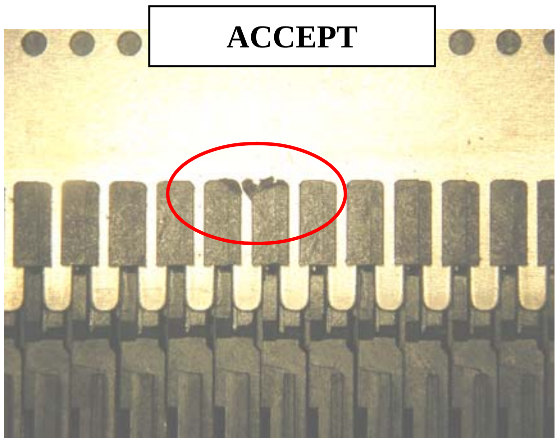


Figure 8.60. VHDM stiffener hat slight dent.

8.5.1.2 Rejectable damage to the VHDM stiffener retention hats.

Figure 8.61 shows a retention hat missing the top portion of the hat. Although the retention of the component may still remain high, it is difficult to ensure that the retention hat is not damaged in other ways that cannot be seen. Figure 8.62 shows a missing top to the retention hat. Even if the retention hat rib is present, the component may still have lowered retention as a result of the defect. Both of these conditions are to be rejected and repaired per Amphenol-TCS recommendations (See Section 2.0).

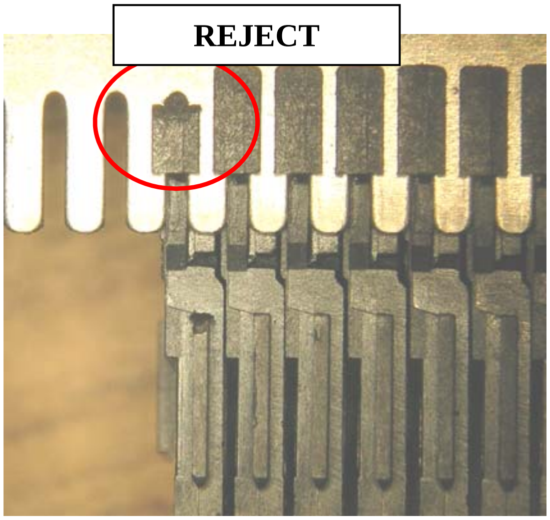


Figure 8.61. Damaged VHDM stiffener hat.

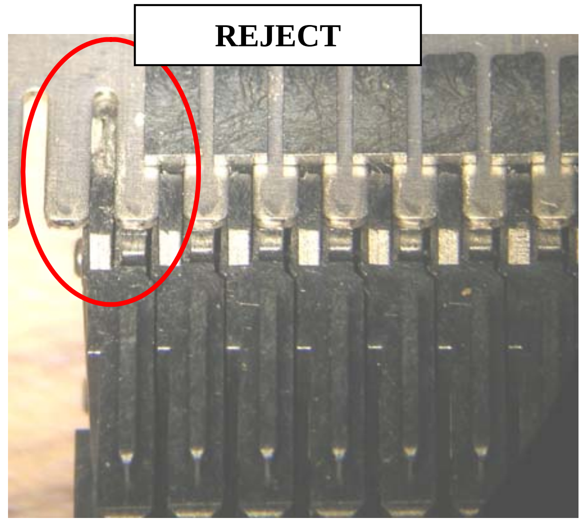


Figure 8.62. Missing VHDM stiffener hat.

8.5.2 VHDM Component seating height and alignment ribs.

When assembled onto a stiffener, the VHDM components are aligned by the alignment tabs as shown in Figure 8.56. As long as the alignment tabs are protruding into the stiffener, the tabs are adequately engaged such that individual components are properly seated onto a stiffener. Variation in the protrusion of alignment tabs can be attributed to component seating height tolerances and stiffener bend angle tolerances. Damage to the alignment tabs is considered unacceptable if it impacts the ability of the feature to properly engage a stiffener hole. Plastic damage that does not impact the alignment rib's ability to properly align a component onto a stiffener is considered acceptable and explained in section 8.5.2.1. Damage to an alignment tab that does pose a risk to the alignment of the components onto a stiffener is rejectable and explained in section 8.5.2.2.

8.5.2.1 Acceptable damage of alignment tabs.

Figure 8.63 shows ideal alignment tabs fully protruding through stiffener holes.

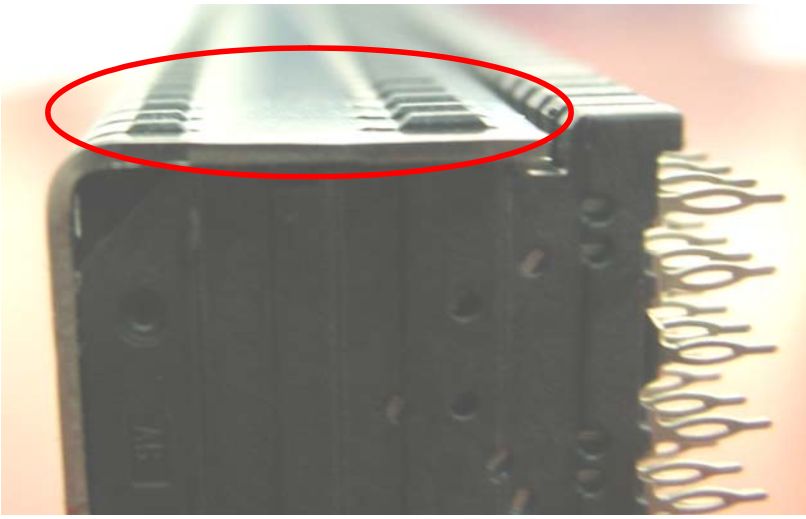


Figure 8.63. VHDM alignment tabs fully protruding.

Figures 8.64 and 8.65 show a component seated onto a stiffener with the alignment tab partially engaged into a stiffener hole. Both of these conditions pose no risk to retention or alignment of the component on the stiffener and are acceptable as long as the alignment tabs protrude into the stiffener at least up to the stiffener thickness.

ACCEPT

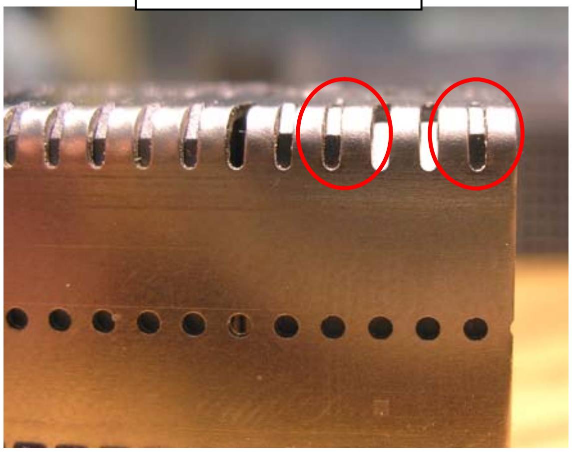


Figure 8.63. VHDM alignment tabs partially protruding.

ACCEPT

Figure 8.65. VHDM alignment tabs partially protruding.

8.5.2.2 Rejectable damage of alignment tabs

Figure 8.66 shows a component seated onto a stiffener with the alignment tabs not engaged into the stiffener hole. Figure 8.67 shows a component seated onto a stiffener with the alignment tabs also not engaged into a stiffener hole. Both of these conditions are rejectable because they impact the seating, retention and alignment of the components on a stiffener. Any protrusion of an alignment tab less than a stiffener thickness is to be considered an under seated component and rejectable. These are to be repaired per Amphenol-TCS recommendations (See Section 2.0).

REJECT

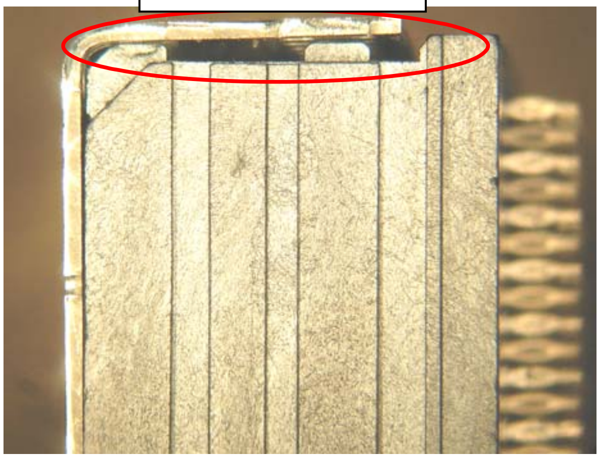


Figure 8.66. VHDM alignment tabs not protruding.

REJECT

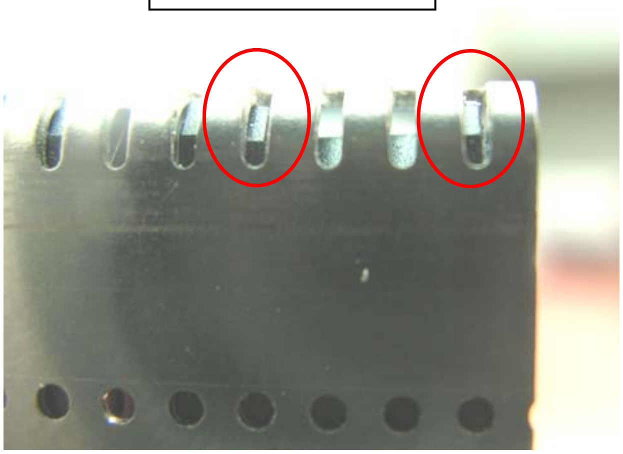


Figure 8.67. VHDM alignment tabs not protruding.

8.5.3 VHDM compliant pins.

When assembled onto a stiffener, the VHDM complaint pins should be in alignment with each other and not exhibit any bent or damaged pins (See Figure 8.56). Compliant pins can vary in position but not to a degree where the seating onto a PWB is compromised. If the VHDM connector can be successfully preloaded onto a PWB (ALL complaint pins are in the correct holes on the PWB), then the complaint pins are in the correct position and will not pose a risk to performance. Damage that does not impact the connector's ability to properly align onto a PWB is considered acceptable and explained in section 8.5.3.1. Damage to complaint pins that does pose a risk to the alignment connector onto a PWB is rejectable and explained in section 8.5.3.2.

8.5.3.1 Acceptable damage to VHDM complaint pins.

Figures 8.68 and 8.69 show ideal alignment of VHDM complaint pins.

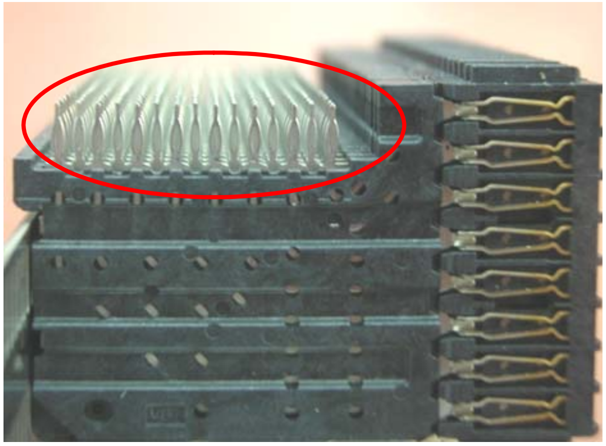


Figure 8.68. VHDM complaint pins properly aligned.

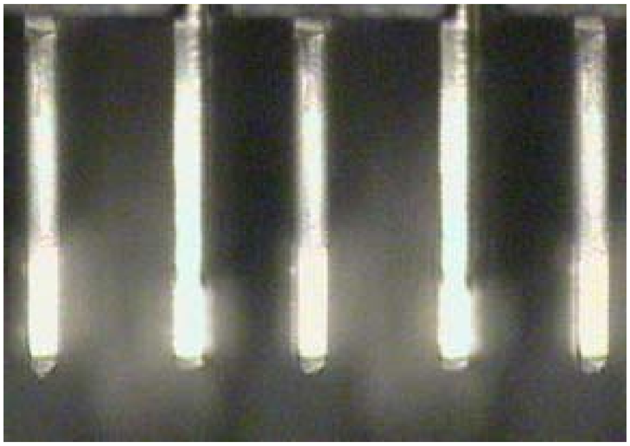


Figure 8.69. VHDM complaint pins properly aligned.

Figure 8.70 shows a complaint pin tie bar that is cut off slightly high, but below the component PWB standoff feature. Above the standoff feature is considered a KEEP-OUT zone. Figure 8.71 shows a complaint pin shoulder that is slightly twisted from an assembly process. Both of these conditions are acceptable.

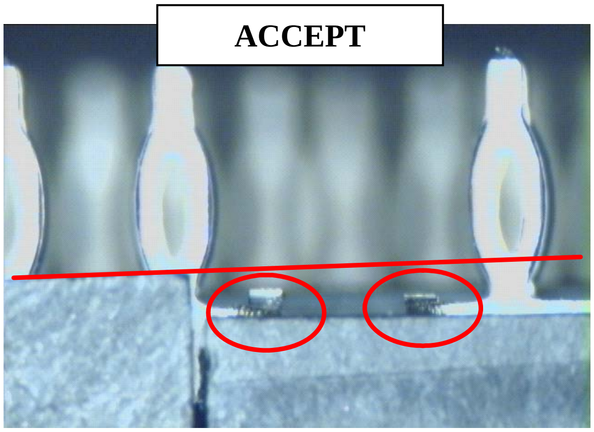


Figure 8.70. VHDM tie bars below the standoffs.

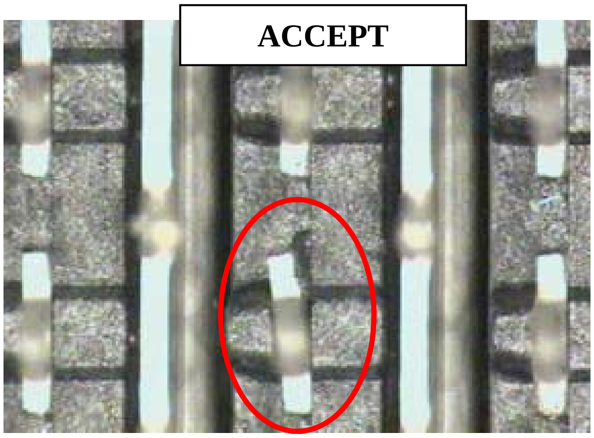


Figure 8.71. VHDM tie bars slightly bent.

8.5.3.2 Rejectable damage to VHDM complaint pins.

Figure 8.72 shows a compliant pin slightly bent with respect to other pins on the same connector. Figure 8.73 shows a grossly bent complaint pin in a VHDM pin field. Figure 8.74 shows a complaint pin field with a missing complaint pin. All of these conditions are to be rejected and repaired per Amphenol-TCS recommendations (See Section 2.0).

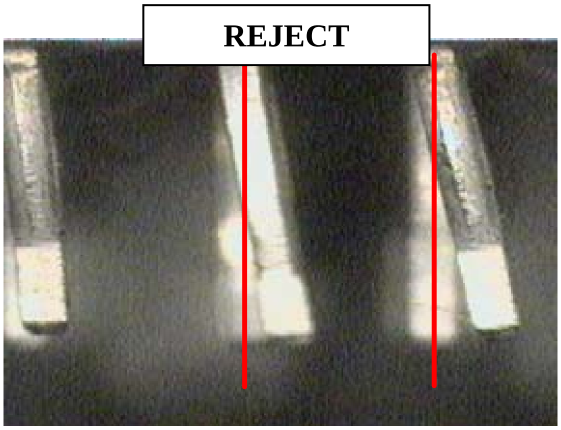


Figure 8.72. VHDM compliant pin bent.

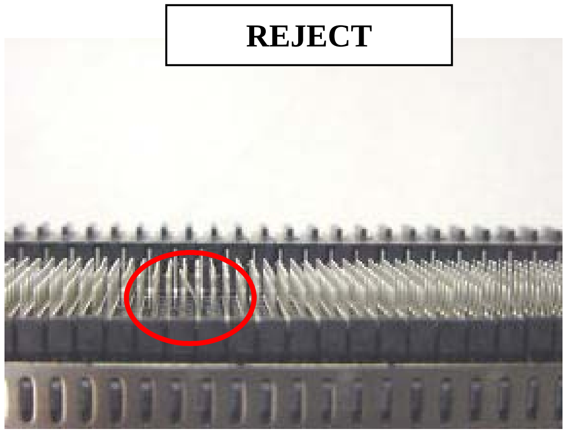


Figure 8.73. VHDM complaint pin bent.

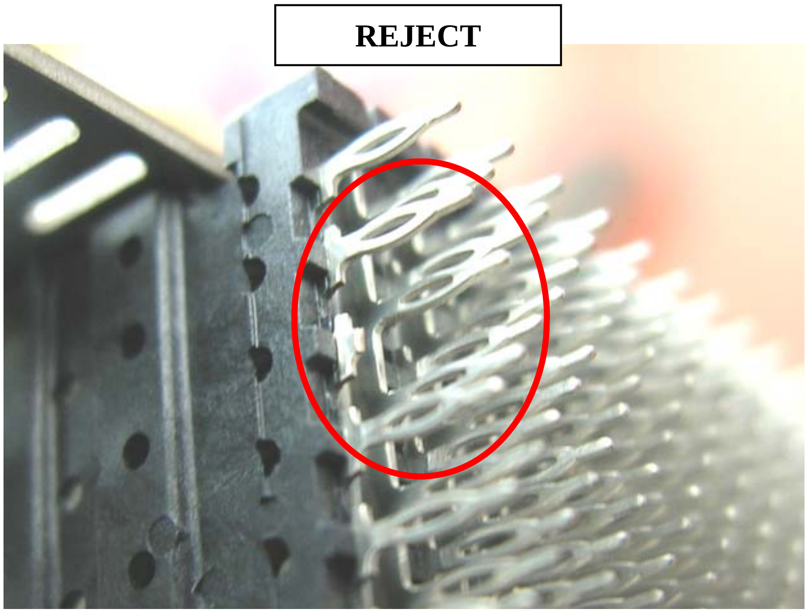


Figure 8.74. Missing Complaint pin.

9.0 CONNECTOR MEASUREMENTS

9.1 The intent of the measurement criteria for the daughter card connectors is to define the dimensions and product fixtures used by Amphenol-TCS to measure the wafer position.

NOTE: All dimensions in this section are in mm.

9.2 Equipment

9.2.1 Optical Vision System – Optical Gauging Product or Acu-Gauge, or comparable vision inspection system.

9.2.2 Data analysis software – i.e. Quality America, or other preferred package. Choice of software may depend on the equipment used for measurement.

9.2.3 Appropriate Connector Fixture

9.3 Dimensional Requirement – Wafer Rib from Guide Module

9.3.1 The measurement programs used at Amphenol-TCS skew the part against the fixture, so as to ensure accurate measurements of the connector features.

9.3.2 The wafer position is measured on connectors using the guide module as the starting point. The center of the guide pin, mating receptacle is set as the origin for measurement. The wafers are then measured, with respect to the guide module, using the alignment tabs as the measured features. The measurements are taken from the center of the guide pin, mating receptacle to the far end of the alignment tabs, depending on the direction of measurement – i.e. the position of the wafers relative the guide module. See Figures 9.1 and 9.2 for feature dimensions and measurement.

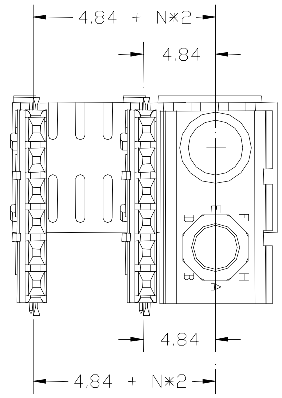


FIGURE 9.1: WAFERS LOCATED TO THE LEFT OF THE GUIDE

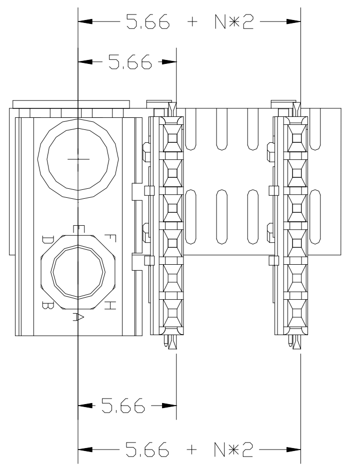


FIGURE 9.2: WAFERS LOCATED TO THE RIGHT OF THE GUIDE

9.3.3 In Figures 9.1 and 9.2, ‘N’ represents the number of stiffener slots after the first wafer. The tolerance on the wafer position is +/- 0.35mm. This value is to be measured on a connector that is applied to a PWB as wafer position is greatly influenced by PWB hole positions as well as connector seating tooling and processes. Chart 1 below is an example of a connector with 10 wafers to the right and left of a guide module, with no empty spaces between the guide module and/or the wafers.

CHART 1: EXAMPLE FOR LEFT AND RIGHT

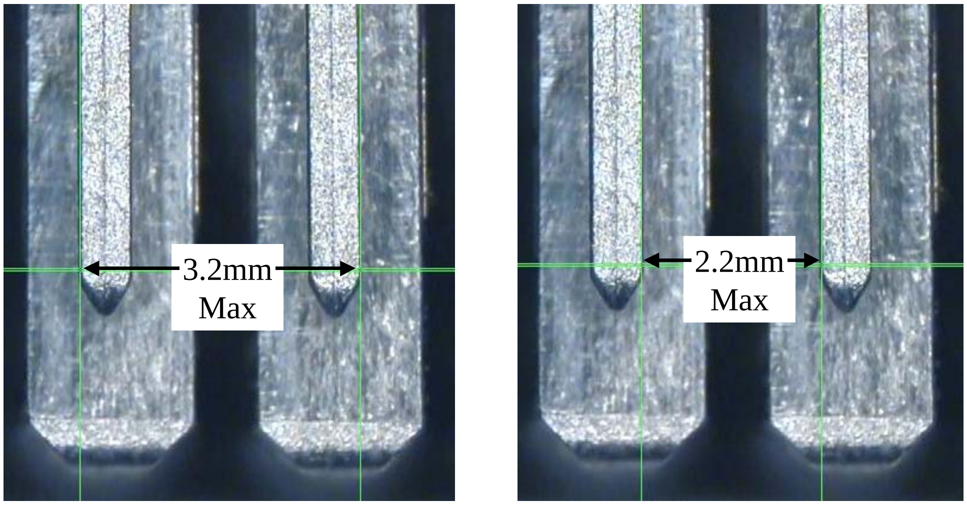
	N*2	LEFT	RIGHT	TOL
WAFER 1	0	4.84	5.66	± .35 mm
WAFER 2	1	6.84	7.66	± .35 mm
WAFER 3	2	8.84	9.66	± .35 mm
WAFER 4	3	10.84	11.66	± .35 mm
WAFER 5	4	12.84	13.66	± .35 mm
WAFER 6	5	14.84	15.66	± .35 mm
WAFER 7	6	16.84	17.66	± .35 mm
WAFER 8	7	18.84	19.66	± .35 mm
WAFER 9	8	20.84	21.66	± .35 mm
WAFER 10	9	22.84	23.66	± .35 mm

9.4 Dimensional Requirement – Wafer to Wafer Spacing

9.4.1 In the case that measurement from the guide receptacle is not possible, a criteria between wafers has been established. This criteria applies for any wafer and/or wafer/endcap combination.

9.4.2 The distance between adjacent wafer alignment ribs is not to exceed 2.2mm. The distance to the outside of adjacent ribs is not to exceed 3.2mm. These dimensions are based on the nominal dimensions between ribs plus the maximum tolerance as noted in CHART 1 above.

9.4.3 If an optical measurement system is used to check this dimension, the rib spacing should be measured above the lead-in at the tip of the rib according to the criteria above. See Figure 9.3.



Outside Rib to Rib   Inside Rib to Rib

Figure 9.3 Measurement from wafer rib to wafer rib.

9.4.4 If a gauge is used to check this dimension, the rib tip lead-ins will be accounted for. The gauge should be designed such that the outside rib-to-rib dimension does not exceed 2.8mm. If two consecutive wafer ribs cannot be inserted into a 2.8mm slot, the part is considered defective. See Figure 9.4.

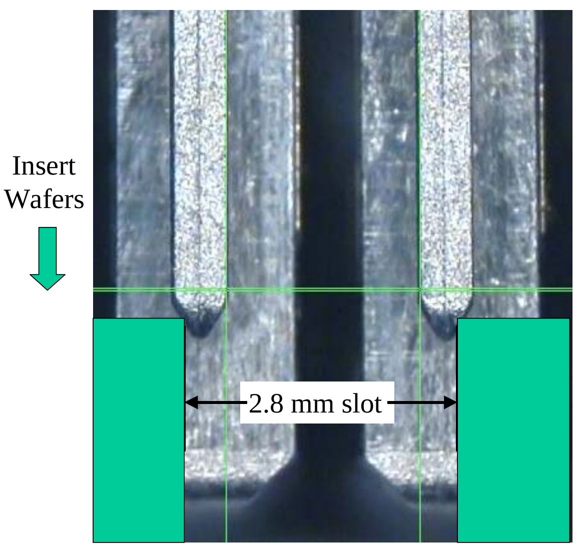


Figure 9.4 Gauge measurement of wafer rib position.