Termination Procedure for "748" Series SolderTacts® Contacts for Twisted Pair Cable: D-602-54, D-602-55

1 Scope

1.1 This Engineering Standard contains the termination procedures, inspection requirements, and rework procedures for the SOLDERTACTS® contacts D-602-54 and D-602-55.

2. References

2.1 Raychem Specification Control Drawings
D-602-54: Shielded Contact, Plug, Twisted-Pair (Inner socket/outer pin)
D-602-55: Shielded Contact, Receptacle, Twisted-Pair (Inner pin/Outer socket)

2.2 Other Specification
Federal Standard QQ-S-571

2.3 Raychem Instructions
AA-400 Super Heater Instructions
AD-1319 Holding Fixture Instructions
HL1920E and HL2020E Heat Guns® Heating Tool Instructions
IR-550 Two-Station Heater Instructions

2.4 Other Instructions
Visual inspection standards: "Verification Photos"
Video Tape: "SolderTacts® Contacts Installation Procedures"

3. Application Equipment and Tools

Heating Tool	Reflector	Holding Fixture
AA-400 Superheater (Portable, compressed air)	#979663 Mini SolderSleeve® Reflector	AS-1319 Holding Fixture with AT-1319-14 Adapter Or AD-1480 Repair Holding Fixture
HL1920E / HL2020E Steinel Hot Air Gun △1	EH0600-000 HL-Solder-Sleeve® Reflector	
IR-550 Two-Station heater (Bench-mounted, focused infrared)	993770-000 RG-2 Solder sleeve Reflector	Tooling set #2, AT-1044-15

△1 Steinel HL1920E / HL2020E Replaces CV5300 MiniGun®. But they still can be used.

3 .2 Other Tools
AD-1496 Trimmer for twisted-pair wires for 24 and 26 AWG wire. Raychem AA-400-140 magnifier bracket assembly for use with AA-400 heating tool.

4 General Information

4.1 Description

The contacts D-602-54 and D-602-55 are designed for use in the following connectors having size 16 cavities:

MIL-C-28748 rectangular rack and panel connectors and Raychem RD-1 high-density circular connectors.

These single-piece contacts solder to twisted-pair cables by means of preinstalled solder preforms in heat-shrinkable insulating sleeves.

4.2 Twisted-Pair Wire Accommodation

D-602-54 and D-602-55 contacts will accommodate twisted-pair cables of the following constructions:

Size: AWG 30 through 24
Plating: Tin or silver
Stranding: Solid or stranded
Insulation diameter: .055 inch (1,4 mm) max.

Consult Raychem for other wire constructions.

5 Termination Procedures

5.1 Twisted-pair cable Preparation

5.1.1 Untwist and straighten the wires for a length of approximately 1.5 inches (40mm).

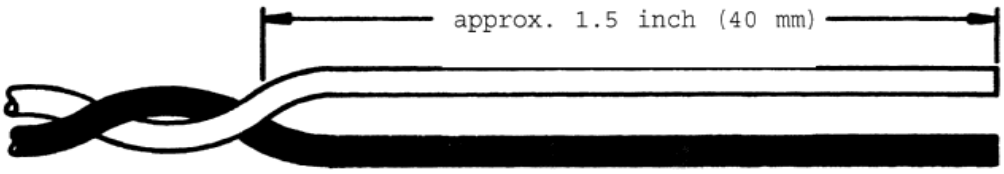


FIGURE 1

5.1.2 (J) Strip both wires per Figure 2.

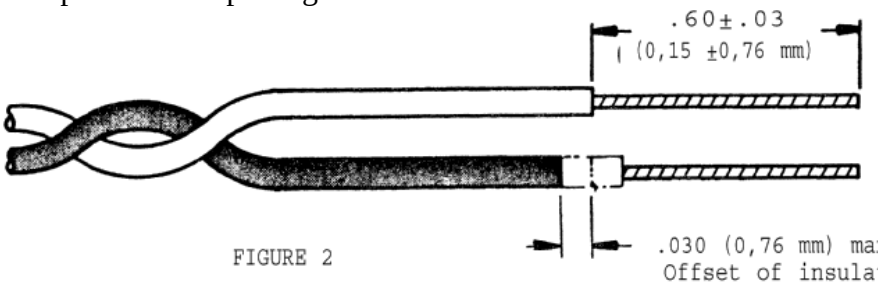


FIGURE 2

5.1.3 Make sure that stranded conductors are twisted into their normal lay. Retwist and smooth the strands with fingers, if necessary.

5.1.4 Pretin stranded wire and unplated solid wire to within 0.05 inch (1.3 mm) of the insulation, using Sn63 solder and RMA flux per QQ-S-571.

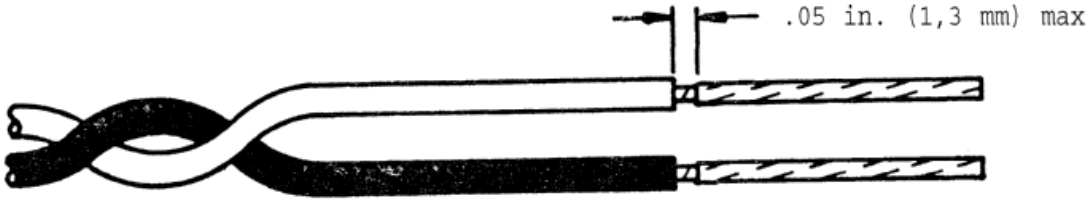


FIGURE 3

5.1.5 (J) <u>Standard Method</u> (Recommended for 24 and 26 AWG)

Trim the signal conductor to 0.350 ± 0.015 inch (8,9 ± 0,4 mm).
Trim the ground conductor to 0.125 ± 0.015 inch (3,2 ± 0,4 mm)

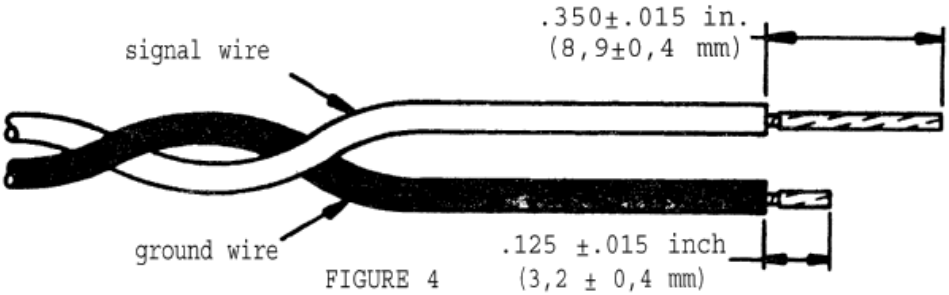


FIGURE 4

5.1.6 (M) Optional Method, (Recommended for 28 and 30 AWG stranded wire, or size 26 thru 30 AWG solid wire.)

5.1.6.1 (J) Trim the signals and ground conductors per Figure 4.

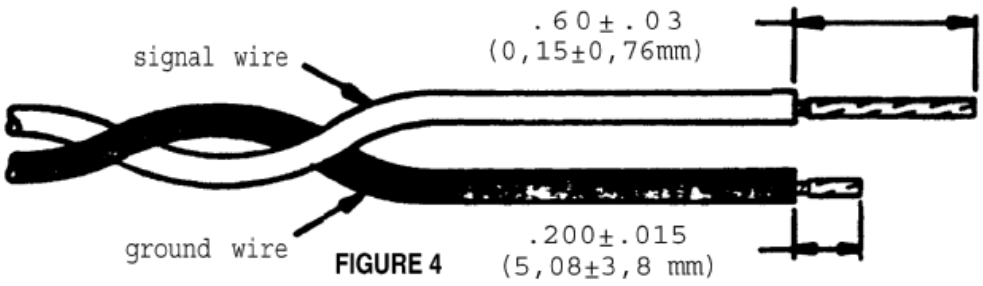


FIGURE 4

5.1.6.2 (J) Fold both leads back as shown in Figure 5.

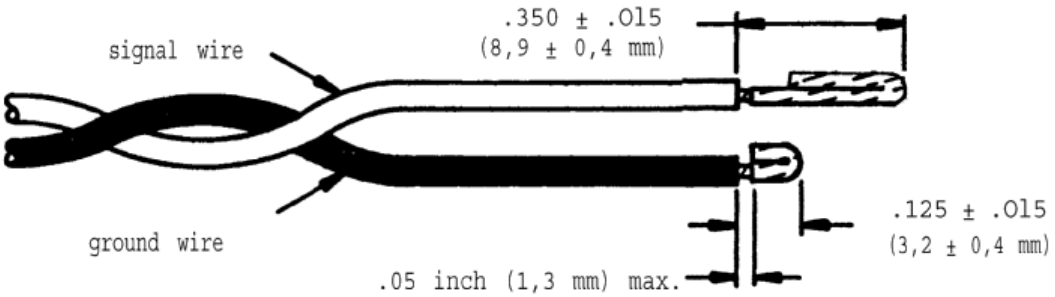


FIGURE 5

5.1.7 Make sure that both wires are straight.

5.2 (J) Inserting Prepared Cable Into Contact (all wire Sizes)

5.2.1 Start conductors into the contact as follows:
Signal wire (long strip length) into the inner (smaller diameter) insulating sleeve.

Ground wire (short strip length) between the two insulating sleeves, at a point not in line with either of the rear inspection windows.

5.2.2 Push both wires into the contact until they are fully inserted as shown below.

NOTE
While pushing the wires in, rotate the contact slightly back and forth to prevent the wires from catching. Be careful not to force wires too far into the contact. Do not twist contactor wires

5.2.3 Inspection for Proper Wire Position

5.2.3.1 The signal wire must be visible through the forward inspection window (Figure 6) and must be under (inside) the solder preform.

5.2.3.2 Ground conductor should be positioned BETWEEN the two rear inspection windows (Figure 7B), and not directly IN either window (Figure 7A). It must not extend into the forward inspection windows. The trimmed insulation end should be within the dimensional limits of Figure 6.

NOTE: The ground conductor should be positioned on the side of the contact that will face down during heating (See Figure 10A).

5.2.3.3 If the wires cannot be positioned correctly, remove them and check for improper strip dimensions, splayed or bent conductors, and excess solder on conductors.

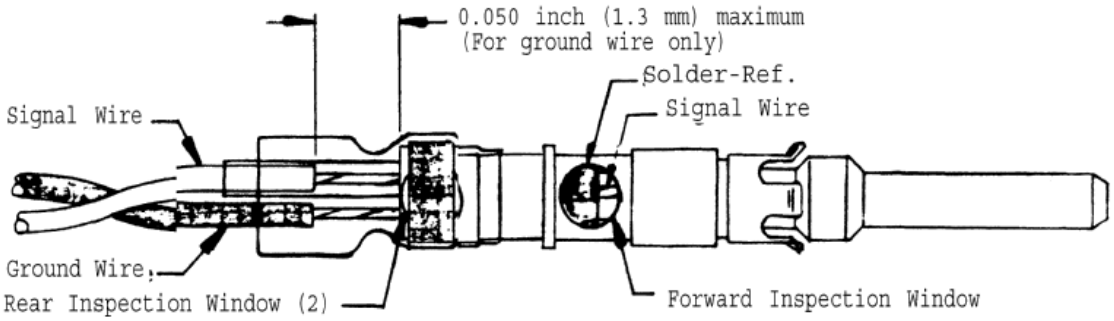


FIGURE 6

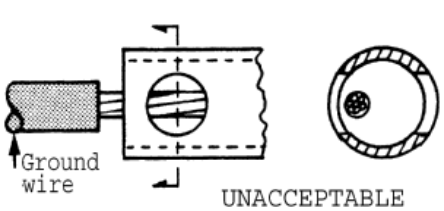


FIGURE 7A

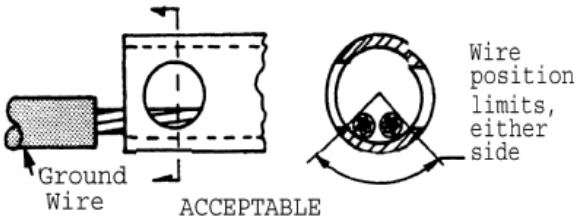


FIGURE 7B

5.3 Heating Procedure: Manually Operated Heating Tools

IMPORTANT: Either the AD-1319 holding fixture and adapter or the AD-1480 repair holding fixture MUST be used, to prevent damage to the contacts.

5.3.1 If the AD-1319 holding fixture is to be used, install the AD-1319-14 adapter, insert a contact, and set up the dimensions as shown in Figure 8.

Make sure that the contact is inserted in the appropriate end of the adapter: D-602-0126 pin contact in the “P” end and D-602-012 socket contact in the “S” end.

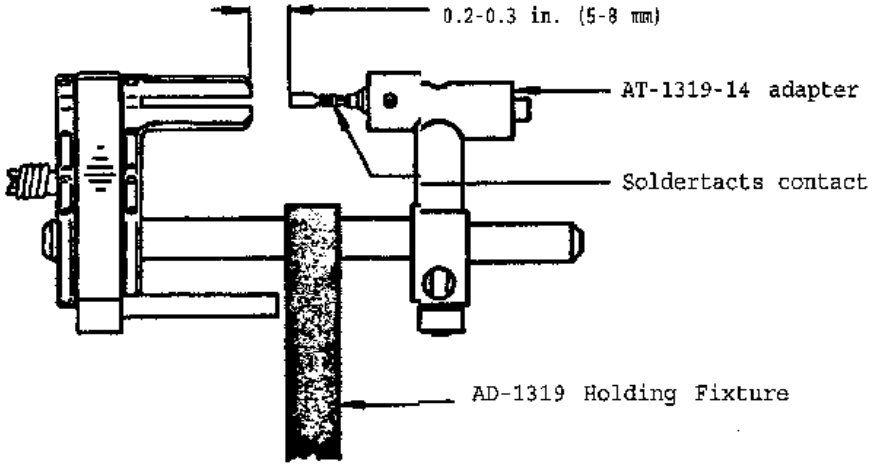
5.3 Heating Procedure: Manually Operated Heating Tools.
J

NOTE
Either the AD-319 holding fixture and adapter or the AD-1480 repair holding fixture must be used to prevent damage, to the contacts.

CAUTION
The AD-1480 Tool is designed to be used during the replacement of contacts where access will not permit the use of the AD-1319 fixture. The AD-1480 Tool is not designed for use as a Production tool.

5.3.1 If the AD-1319 holding fixture is to be used, install the AD-1319-14 adapter, insert a contact, and set up the dimensions as shown,

Make sure that the contact is inserted in the appropriate end of the adapter: D-602-54 into the “P” end and D-602-55 into the “S" end.



SET-UP DIMENSIONS FOR AD-1319 HOLDING FIXTURE
FIGURE 8

5.3.2 Insert, the contact/cable assembly into the appropriate end of the AT-1319-14 adapter or AD-1480 repair holding fixture, as shown.

D-602-54 contacts (Inner socket/Outer pin): “P” end.
D-602-55 contacts (Inner pin/Outer socket): “S” end.

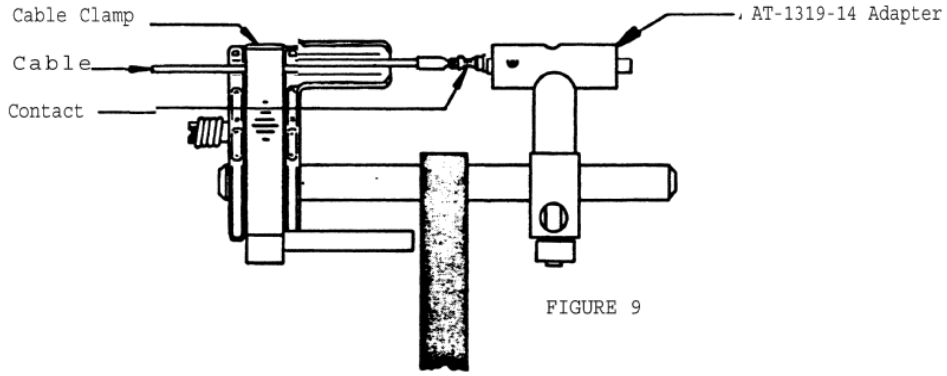


FIGURE 9

AD-1319 HOLDING FIXTURE AND AT-1319-14 ADAPTER WITH CONTACT/CABLE ASSEMBLY

FIGURE 10 AD-1480 REPAIR HOLDING FIXTURE WITH CONTACT/CABLE ASSGMBLY
(OUTER PIN CONTACT SHOWN FOR REFERENCE)

5.3.3 Clamp the twisted-pair cable in the AD-1319 holding fixture (if used).

- The cable must be fully inserted in the contact (see Section 5.2).
- The contact must be fully inserted in the adapter.
- The cable must be straight between the contact and the cable clamp.

5.3.4 Applying Heat with Hot Air Heating Tool (HeatGun or SuperHeater)

5.3.4.1 Attach the appropriate reflector to the heating tool (see Section 3 for reflector selection).

5.3.4.2 Turn the heating tool on and allow to warm up (see instructions for tool used).
Steinel settings: 700°F ± 50°F, setting Air Flow Stage II, Duration-20 to 30 Secs

CAUTION
The heating tools have hot nozzle surfaces and produce hot air that can cause burns. To prevent burns, do not touch the nozzle, and keep hands and fingers away from the hot air stream.

5.3.4.3 Using one of the required holding fixtures, position the contact in the hot air stream within the reflector (Figures 10A, 11, and 12).

- Make sure that the ground conductor stays between the rear inspection windows.
- It is recommended that the ground conductor be positioned against the downward facing side of the contact (Figure 10A).

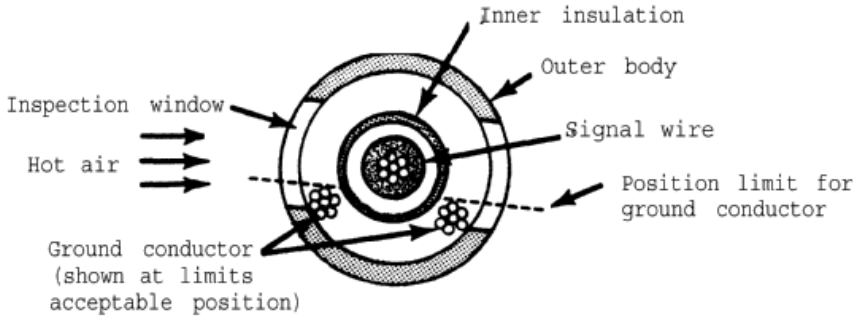
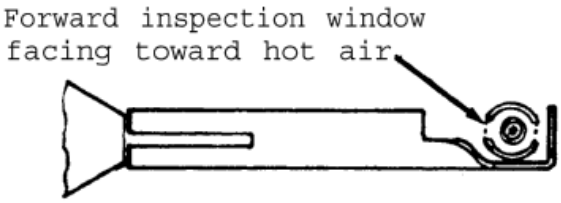


Figure 10A. Positioning of Ground Conductor During Hot Air Heating

5.3.4.4 For best heating, position the contact as shown in Figure 11 or 12. Center the forward inspection window in the reflector. Position the forward inspection window toward the hot air stream such that the inner solder preform can be seen during termination.

- Use of magnification is recommended during termination to aid viewing. The AA-400-140 magnifier and bracket accessory provides suitable magnification with the AA-400 SuperHeater heating tool.



Mini SolderSleeve Reflector
for SuperHeater

FIGURE 11

HL SOLDER SLV REFLECTOR

Figure 12

5.3.4.5 Continue to direct hot air around the contact until the small solder preform in the forward inspection window has melted and flowed. The large solder preform in the rear inspection window should have melted and flowed by this time; if it has not, direct hot air around the rear inspection window until it does.

- IMPORTANT: Be sure to allow the solder to solidify before removing the contact from the holding fixture or disturbing the cable position.

5.3.5 Heating Procedure: IR-550 Two Station Infrared Heater)
Set up the IR-550 heater according to the IR-550 instructions. Heat the contacts according to the IR-550 instructions.

- Inspection windows should be facing straight up and down.

- The ground conductor may be positioned to either side of the inspection windows, but should not be positioned directly in either one of the inspection windows (Figure 12A).

The IR-550 may require readjustment when a cable change is made. Inspect the completed termination in accordance with Section 6.

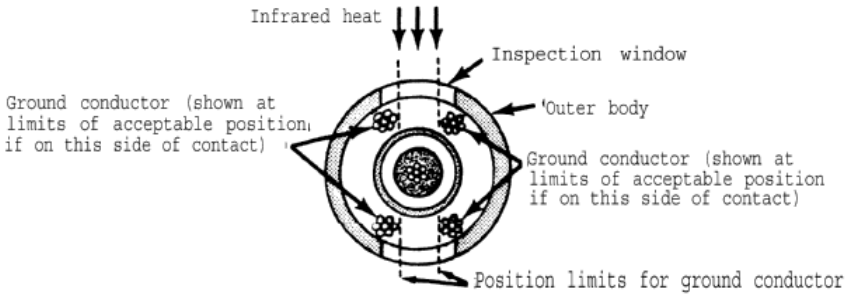


Figure 12A. Positioning of Ground Conductor During Infrared Heating

6 Inspection

6.1 Assembly Inspection
Use of a magnifying glass is recommended for visual inspection.

6.1.1 The distance from the rear end of the contact body to the ground wire insulation should not exceed 0.05 inch (1,3 mm).

6.1.2 The signal conductor must be visible through one of the forward inspection windows.

6.1.3 The ground conductor should not be positioned in either rear inspection window, but should be soldered to the inside surface of the contact body between the two rear inspection windows. See 5.2.3 for details.

6.2 Heating Inspection Visually inspect the completed termination for proper heating according to the following criteria:

(K) The small solder preform in the forward inspection window must be melted and flowed so that:

Preform shows no trace of its original form (underheated condition). A band of solder trace which is wetted to the substrate is acceptable.

Solder fillet is visible between signal conductor and inner contact soldering surface.

6.2.1 The large solder preform in the rear inspection window must be melted and flowed, so that:

(K) Preform shows no trace of its original form (underheated condition). A band of solder trace which is wetted to the substrate is acceptable.

The solder has flowed into the contact through the rear inspection windows.

6.2.2 The insulating sleeves must be shrunk over the area of exposed conductor between the wire insulation and the contact.

NOTE
Insulating sleeves may remain flared at end.

6.2.3 The insulating sleeves must not be darkened so that the solder joints are obscured or inspection hindered (overheated condition).

6.2.4 The twisted-pair cable insulation must not show signs of damage or over-heating outside of the insulating sleeve.

6.3 Visual inspection standards ("Verification Photos") are available from Raychem.

7.0 Repair and Rework

7.1 Underheated Terminations

Reheat underheated areas as directed in Section 5.3 and reinspect per Section 6. Avoid reheating areas that have been properly heated.

7.2 Overheated or Improperly Assembled Terminations

1. Remove the contact from the cable as directed in Paragraph 7.3.
2. Check the cable for damage and incorrect stripping.
    - If the cable is damaged, cut off the damaged portion and restrip as described in Section 5.1.
3. If stripping is incorrect, restrip as required (Section 5.1).
4. Install new contact (Sections 5.2 and 5.3).

7.3 Removing Contact From Twisted Pair Cable

1. Use a sharp knife or razor blade to score the outer insulating sleeve full length on two opposite sides of the contact.
    - Avoid cutting into wire insulation.
2. Peel off the outer insulating sleeve.
3. Slit the inner sleeve in the area outside of the contact body.

CAUTION
Safety glasses must be worn during the following operation. Hot solder can fly off the wires and cause burns to unprotected eyes.

4. Holding the contact with pliers, heat the contact until the solder melts, and quickly pull the heated contact off the cable.
    - Use the same heating tool and reflector as for contact termination (See Section 3.1).