DESIGN OBJECTIVES

The product described in this document has not been fully tested to ensure conformance to the requirements outlined below. Therefore, AMP (Japan), Ltd makes no representation or warranty, express or implied, that the product will comply with these requirements. Further, AMP (Japan), Ltd. may change these requirements based on the results of additional testing and evaluation. Contact AMP Engineering for further details.

In case when "product specification" is referred to in this document, it should be read as "design objectives" for all times as applicable.

PREINSULATED BUTT SPLICES FOR SIGNAL WIRE CABLES (Catalog No. 170765-1)

1. SCOPE

1.1 SCOPE

This specification describes the product and defines the test requirements for preinsulated butt splices used for signal wire cables.

1.2 DESIGN AND CONSTRUCTION

The splice comprises an insulation sleeve and a tin-plated copper body for splicing signal wire cables in applicable wire range end to end by crimping.

1.3 APPLICABLE WIRE RANGE

The splices shall conform to the requirements of the wire range specified on the applicable drawings.

2. APPLICABLE MATERIAL SPECIFICATIONS

ASTM B152 - COPPER No. 110
POLYVINYL CHLORIDE RIGID

3. PRODUCT SPECIFICATION

3.1 SPLICE MATERIALS

The materials specified on the applicable splice drawings shall be used for fabricating the splices.

3.2 DESIGN, CONSTRUCTION AND DIMENSIONS

The design, construction and dimensions of the splices shall conform to the requirements specified in the applicable product drawings.

3.3 ELECTRICAL PERFORMANCE

3.3.1 MILLIVOLT DROP

When tested in accordance with the test method described in

Paragraph 4.3.1, the millivolt drop measured between two wires throught the crimped splice shall not exceed the applicable values of Table 1. before and after conducting the tests described in Paragraphes 4.3.7 & 4.3.8.

Table 1

Wire Size		DC Current for Millivolt Drop Test (A)	Millivolt Drop (mV)	Current for Temperature Rise (A)	Tensile Test Load (kg)
AWG	mm^2				
#17	$1.06mm^2$ Stranded	4	3.30	20	20
#14	$2.00mm^2$ Solid $2.00mm^2$ Stranded	6	2.65	30	30

3.3.2 TEMPERATURE RISE

When tested in accordance with Paragraph 4.3.2, the measured value of the temperature rise at the splice shall be less than 5°C above the temperature at the measuring point located 500mm away on the wire from the measuring point on the splice.

3.3.3 DIELECTRIC STRENGTH

When tested in accordance with Paragraph 4.3.3, the insulation on the splice barrel shall withstand 2,200 volts of commercial frequency for one minute.

3.4 MECHANICAL PERFORMANCE

3.4.1 TENSILE STRENGTH

When tested in accordance with Paragraph 4.3.4, the tensile strength of the crimped portion of the splice shall be greater than the applicable value of Table 1 before and after conducting the test of Paragraph 4.3.8.

3.4.2 OIL-RESISTING QUALITIES

When tested in accordance with Paragraph 4.3.5, the insulation of the splice barrel shall withstand 2,200V test voltage of commercial frequency for one minute, and there shall be no evidence of cracking, breaking, swelling or other change that impairs the normal operation of the splice.

3.4.3 LOW TEMPERATURE CRIMPING

When tested in accordance with Paragraph 4.3.6, the insulation of the splice barrel shall withstand 2,200V test voltage of commercial frequency for one minute, and there shall be no evidence of cracking, breaking or other abnormal change.

3.4.4 INCOMBUSTIBILITY

When tested in accordance with Paragraph 4.3.9, the flame ignited to the splice barrel insulation shall naturally cease.

4. QUALIFICATION REQUIREMENTS

4.1 TEST CONDITIONS

Unless otherwise specified, the performance tests and examinations shall be conducted under any combination of conditions within the following ranges.

TEMPERATURE : 20 ± 15°C

RELATIVE HUMIDITY: 65 ± 20%

4.2 TESTING

4.2.1 TEST SAMPLES

The test samples being used for the performance tests shall be crimped with applicable manual tool to each wire having specified size shown in Table 2.

4.2.2 WIRE

The wires being used for the performance tests shall conform to the requirements on Table 2.

Table 2

Wire Size (AWG)	Sectional Area (mm^2)	Dia. of Strande(mm)	No. of Strands	Plating
#17	1.06	0.45	7	None
#14	1.96	0.60	7	None
#14	2.01	1.60	1	None

4.3 TEST METHODS

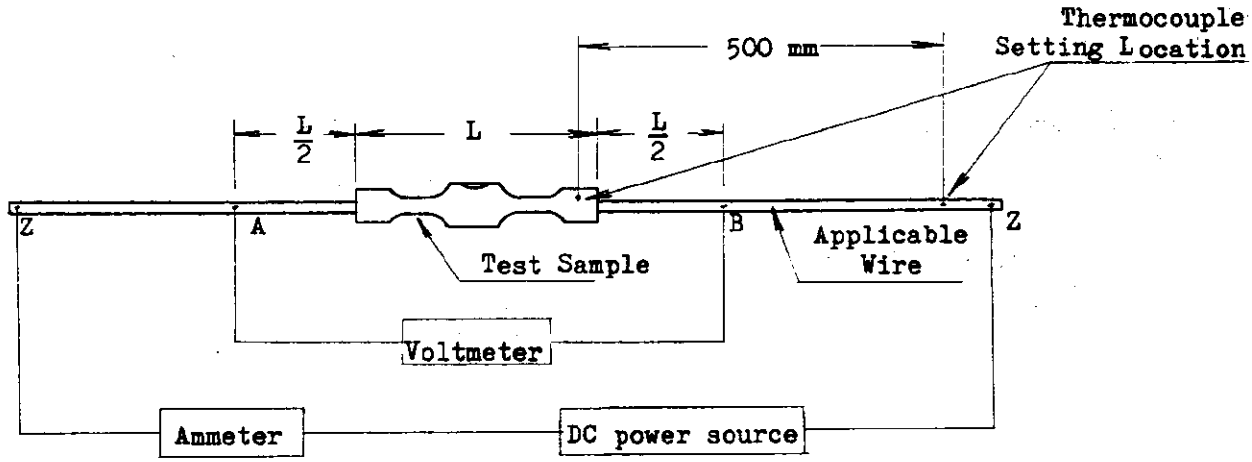
4.3.1 MILLIVOLT DROP TEST

Connect DC power sourece to Points Z-Z and apply to the circuit the test current applicable for the wire size as shown in Table 1. The millivolt drop shall be measured between Points A-B with a DC voltmeter in a draft-free chamber after temperature rise of sample due to the test current has stabillized.
The millivolt drop measurement after the salt spray test shall be taken using such as needles in order to avoid incorrect reading affected by oxidized film on the surface.

4.3.2 TEMPERATURE RISE TEST

The measurement for the temperature rise shall be taken by contacting the thermocouples to the points shown in Fig. 1 after the temperature rise due to application of applicable test current of Table 1 has stabilized. The thermocouple shall directly contact the splice barrel metal after removing the splice insulation.

Fig. 1 TEST METHOD FOR MILLIVOLT DROP AND TEMPERATURE RISE



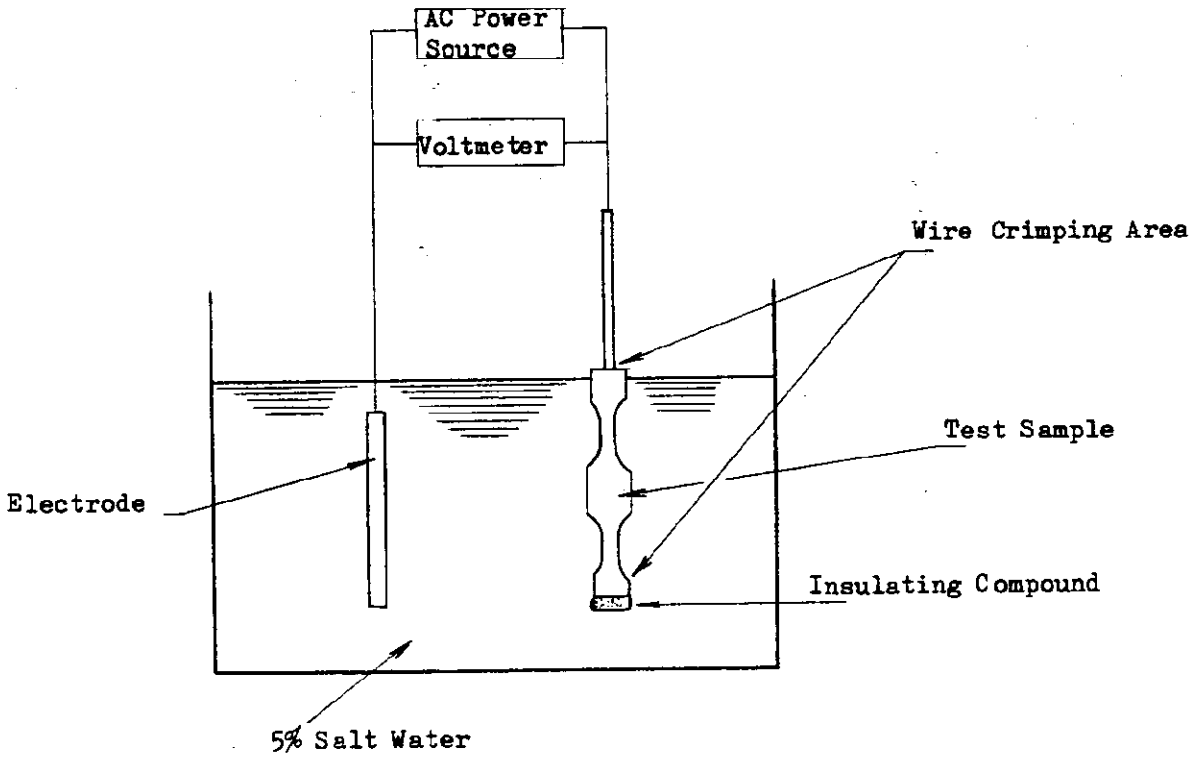
L: Length of metal barrel of the sample splice (L = 26mm)

A,B: Remove the insulation and uniformly solder the exposed portion of the stranded wire to provide the probe area.

4.3.3 DIELECTRIC STRENGTH TEST

Crimp the applicable wires on the test sample and cut off one wire at an end of the splice as shown in Fig. 2.
Then, apply proper insulating compound such as beswax to the cut end of the wire and the exposed portion of the barrel metal. Make sure that the insulating compound will not flow and cover the crimping barrel of the splice.
Vertically suspend the crimping barrel of the splice and submerge in 5% salt water as shown in Fig. 2 and apply the specified test voltage.

Fig. 2 TEST METHOD FOR WITHSTAND VOLTAGE



4.3.4 TENSILE STRENGTH TEST

Place the sample splice crimped to the applicable wires in a standard tensile testing machine and apply an axial load at a rate of 25.4 mm per minute. The tensile strength shall be measured when the wire is broken or pulled out of the wire crimp of the splice.

4.3.5 OIL RESISTANCE TEST

Immerse the sample splice crimped to applicable wires to the insulating oil per JIS C 2320 maintained at the temperature of 70±3° C for 4 hours. Then, inspect the crimped portion and conduct the dielectric strength test in accordance with Paragraph 4.3.3.

4.3.6 LOW TEMPERATURE CRIMPING TEST

Crimp the sample splice to applicable wires with an applicable crimping tool at an ambient temperature of -20° C. Then, inspect the crimped area and conduct the dielectric strength test in accordance with Paragraph 4.3.3.

Fig. 3

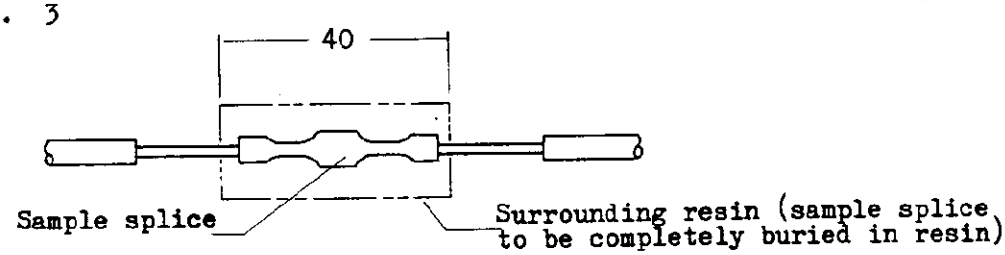
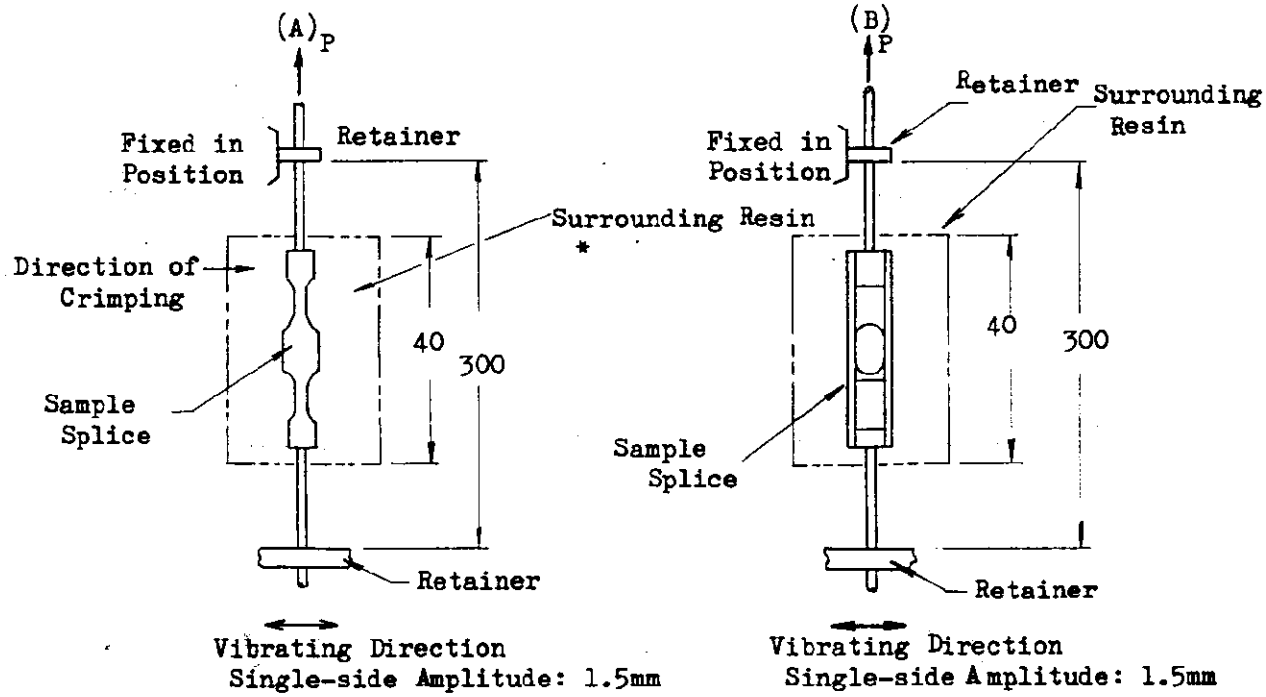


Fig. 4 METHOD FOR VIBRATION FATIGUE TEST



* Bury the samples in resin only those are tested for tensile strength after vibration fatigue test.

Remarks: Using a spring balance or other proper means, adjust the sample splice to be hung up with a proper tension in P-direction. Then, fix the sample with the retainer.

4.3.7 SALT SPRAY TEST

The sample splice crimped to applicable wires of proper length and buried in resin* as shown in Fig. 3 shall be held horizontally in a salt spray chamber with a minimum distance of 6.4 mm from adjacent object. The sample splice shall not contact any metallic or wooden object during this test. Use 5% aqueous solution of Class 1 sodium chloride for this test. Three cycles of the salt spray test shall be conducted, each cycle comprising 8-hour salt spray and 16-hour repose period.

* Note: SCOTCH Cast Resin No. 4 of SUMITOMO 3 M Co.

4.3.8 VIBRATION TEST

The test sample shall be continuously vibrated for eight hours with 1.5mm single-side amplitude at 33 c/s frequency in a manner illustrated in Fig. 4. Two vibrating directions shall be used as indicated in (a) and (b) of Fig. 4, and the test shall be conducted twice in each direction. The sample shall be in resin as shown in Fig. 3, for this test if the tensile strength test is required for the samples after this vibration test. Each sample shall be centered and fixed between two retainers.

4.3.9 INCOMBUSTIBILITY TEST

Hold the test sample horizontally in a draft-free chamber and apply the test flame of a gas burner or alcohol lamp to the center of the splice insulation until the insulation is ignited. Then, remove the flame and inspect the condition of the insulation.