Environmental Requirements

NOTE Samples of this product have been type-tested in accordance with the Agilent Environmental Test Manual and verified to be robust against the environmental stresses of storage, transportation and end-use; those stresses include but are not limited to temperature, humidity, shock, vibration, altitude and power-line conditions. Test methods are aligned with IEC 60068-2 and levels are similar to MIL-PRF-28800F Class 3.

Table 2-1 Environmental Requirements

Parameter	Required Values/Ranges
Temperature	
Operating[a]	+20 °C to +26 °C
Storage	-40 °C to +71 °C
Error-corrected range[b]	±1 °C of measurement calibration temperature
Altitude	
Operating	< 4,500 meters (ª15,000 feet)
Storage	< 15,000 meters (ª50,000 feet)
Relative humidity	Type tested, 0% to 95% at 40 °C non–condensing

a. The temperature range over which the calibration standards maintain conformance to their specifications.
b. The allowable network analyzer ambient temperature drift during measurement calibration and during measurements when the network analyzer error correction is turned on. Also, the range over which the network analyzer maintains its specified performance while correction is turned on.

Temperature—What To Watch Out For

Due to the small dimensions of the devices, electrical characteristics will change with temperature. Therefore, the operating temperature is a critical factor in their performance, and must be stable before use.

IMPORTANT Avoid unnecessary handling of the devices during use because your fingers are a heat source.

Mechanical Characteristics

Mechanical characteristics such as center conductor protrusion and pin depth are *not warranted* performance specifications. They are, however, important supplemental characteristics related to electrical performance. Agilent Technologies verifies the mechanical characteristics of the devices in this kit with special gaging processes and electrical testing. This ensures that the device connectors do not exhibit any improper pin depth when the kit leaves the factory.

"Gaging Connectors" on page 3-6 explains how to use gages to determine if the kit devices have maintained their mechanical integrity. Refer to Table 2-2 on page 2-4 for typical and observed pin depth limits.

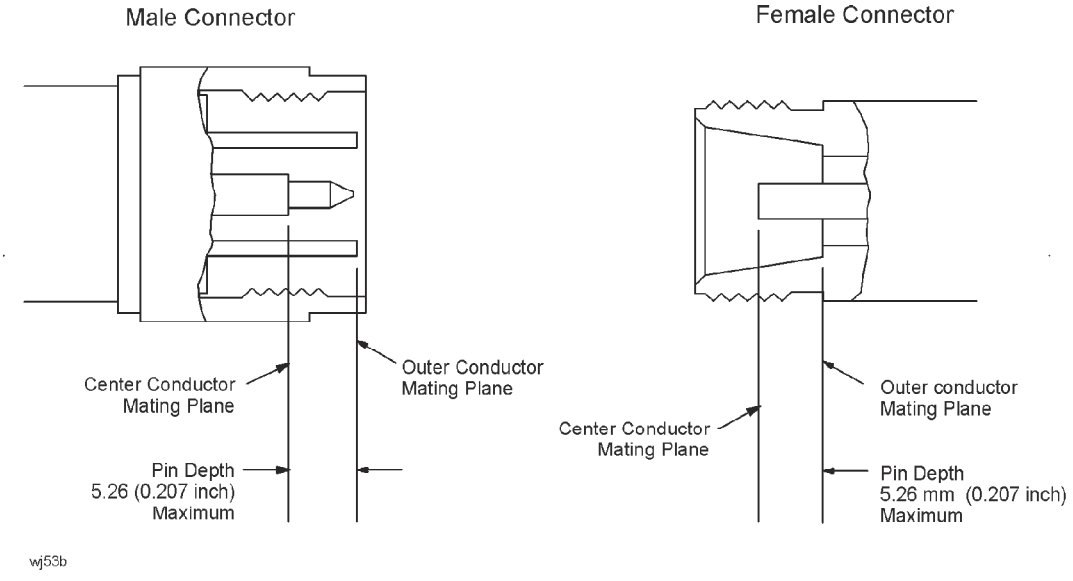
Pin Depth

Pin depth is the distance the center conductor mating plane differs from being flush with the outer conductor mating plane. See Figure 2-1. Some coaxial connectors, such as 2.4 mm and 3.5 mm, are designed to have these planes nearly flush. Type-N connectors, however, are designed with a pin depth offset of approximately 5.26 mm (0.207 inch), not permitting these planes to be flush. The male center conductors are recessed by the offset value while the female center conductors compensate by protruding the same amount. This offset necessitates the redefining of pin depth with regard to protrusion and recession.

Protrusion refers to a male type-N connector center conductor having a pin depth value less than 5.26 mm (0.207 inch), or a female type-N connector center conductor having a pin depth value greater than 5.26 mm (0.207 inch).

Recession refers to a male type-N connector center conductor having a pin depth value greater than 5.26 mm (0.207 in), or a female type-N connector center conductor having a pin depth value less than 5.26 mm (0.207 inch).

Figure 2-1 Connector Pin Depth



NOTE The gages for measuring type-N connectors compensate for the designed offset of 5.26 mm

(0.207 inch), therefore, protrusion and recession readings are in relation to a *zero* reference plane (as if the inner and outer conductor planes were intended to be flush).

Table 2-2 Connector Pin Depths

Connectors	Allowable Recession	
	millimeters	inches
Attenuators		
Male	0.0000 to +0.0076	0.000 to +0.003
Female	0.0000 to +0.0076	0.000 to +0.003
Airlines[a]	–0.0025[b] to -0.0100	–0.0001[b] to –0.0004

a. The relationship between the length of the inner conductor and the length of the outer conductor determines the airline center conductor recession. Refer to "Gaging the Airline" on page 3-10.
b. In this case, the center conductor is 0.0025 mm (0.0001) inch longer than the outer conductor.

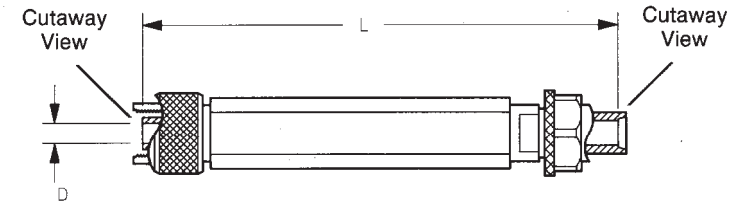
Airline Mechanical Characteristics

The dimensions of the airline outer conductor are shown in Figure 2-2. This outer conductor is common to both airlines. Two conductors are provided with the kit.

The dimensions of the 50Ω airline and the 25Ω mismatch airline are shown in Figure 2-3 and Figure 2-4.

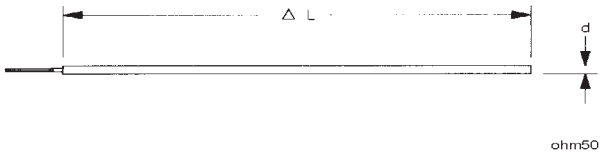
CAUTION The center and outer conductors of the airlines in this kit have been mechanically measured and matched. Do *not* use the center or outer conductors provided in this kit with a center or outer conductor from any other airline. Damage to the airline or attaching connector may result.

Figure 2-2 Airline Outer Conductor



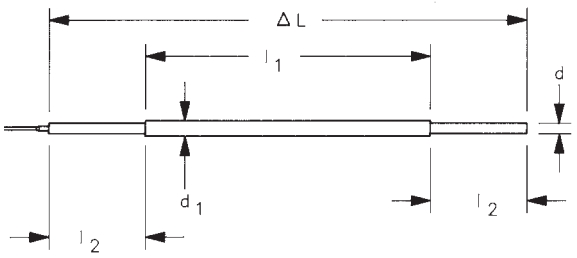
Dimension	millimeters	inches
D	7.000 ±0.004	0.27560 ±0.00016
L	124.873 ±0.025	4.9163 ±0.0010

Figure 2-3 50 Ω Airline Center conductor



Dimension	millimeters	inches
d	3.0400 ±0.0025	0.1197 ±0.0001
ΔL	+0.0025 το -0.0100	+0.0001 to -0.0004

Figure 2-4 25 Ω Mismatch Airline Center Conductor



Dimension	millimeters	inches
d	3.010 ±0.008	0.1197 ±0.0003
d_1	4.613 ±0.005	0.1816 ±0.0002
l_1	74.930 ±0.019	2.95000 ±0.00075
l_2	25.002 ±0.050	0.9843 ±0.0020

Dimension	millimeters	inches
ΔL	+0.0025 to -0.0100	+0.0001 to -0.0004

Electrical Specifications

At the factory, each verification device is electrically characterized on a network analyzer measurement system. These factory measurements are traceable to the National Institute of Standards and Technology (NIST) through mechanical and electrical paths (for more information on traceability, contact your nearest Agilent Technologies office. Refer to
"Contacting Agilent" on page 5-5.

The factory-measured data for each device is supplied in print and on USB drive with your kit.