



Mini-Circuits

**HAND
FLEX™**

Coaxial Cable

141-20SMNB+

50Ω 20 inch DC to 12.5 GHz

THE BIG DEAL

- Bulkhead Female Type-N connector at one end
- Low Loss, 1.0 dB at 12.5 GHz
- Excellent Return Loss, 18 dB at 12.5 GHz
- Hand formable to almost any custom shape without special bending tools
- 8mm bend radius for tight installations
- Anti-torque nut prevents cable stress during installation
- Insulated outer jacket standard¹
- Ideal for interconnect of assembled systems



Generic photo used for illustration purposes only

Model No.	141-20SMNB+
Case Style	KQ1669-20
Connectors	SMA-Male to N-Female Bulkhead

+RoHS Compliant

The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

APPLICATIONS

- Replacement for custom bent 0.141" semi-rigid cables
- Communication Receivers and Transmitters
- Military and Aerospace System
- Environmental and Test Chambers

PRODUCT OVERVIEW

141 SMNB+ series Hand-Flex™ coaxial cables are ideal for integrating rack-mounted coaxial components and sub-assemblies in tight spaces and dense system configurations. N-Type female bulkhead connector at one end is equipped with a nickel-plated brass flange for secure connections to rack mounted equipment. SMA-connector has a passivated stainless steel coupling nut over a gold-plated connector body. The outer shield is tin-soaked copper braid, which minimizes signal leakage with high flexibility for easy bending, and dielectric is low loss PTFE. 141-SMNB+ series Hand-Flex™ coaxial cables are available in various lengths for different system requirements.

KEY FEATURES

Features	Advantages
Single N-Type female bulkhead connector	Eliminates need for a bulkhead adapter and connects directly to the front panel of rack-mounted equipment, improving reliability and reducing system cost
Hand-Formable	141 SMNB+ series Hand-Flex™ cables avoid the need for cable-bending tools, alleviating the risk of damage during bending processes typical of semi-rigid cable assemblies.
8mm Bend Radius	Ideal for making connections in tight spaces and dense system assemblies.
Excellent Return Loss	Typical return loss of 21 dB to 12.5 GHz or better makes 141-SMNB series cables ideal for connecting a wide variety of RF components while minimizing VSWR ripple contribution due to mating cables & connectors.
High Power Handling Capability: • 546W at 0.5 GHz • 110W at 12.5 GHz	141-SMNB coaxial cables can support medium to high RF power levels and can be used in the transmit path. (Power rating at sea-level).
Built-in Anti-torque Nut	Anti-torque feature supports the SMA connector body during installation, preventing stress to the connector/cable interface. Connector interface meets MIL-STD-348.

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ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Units
Frequency Range		DC		12.5	GHz
Length ¹		20			inches
Insertion Loss	DC - 2	—	0.31	0.51	dB
	2 - 6	—	0.60	0.94	
	6 - 10	—	0.78	1.26	
	10 - 12.5	—	1.01	1.70	
Return Loss	DC - 2	22.0	31.0	—	dB
	2 - 6	17.0	21.0	—	
	6 - 10	17.0	19.0	—	
	10 - 12.5	17.0	18.0	—	

1. Custom sizes available, consult factory.

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-55°C to +105°C
Storage Temperature	-55°C to +105°C
Power Handling at 25°C	546W at 0.5 GHz 387W at 1 GHz 273W at 2 GHz
Sea Level	156W at 6 GHz 121W at 10 GHz 110W at 12.5 GHz

Permanent damage may occur if any of these limits are exceeded.





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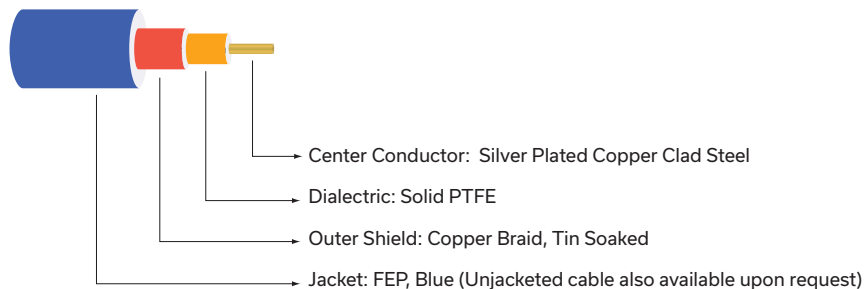
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CABLE CONSTRUCTION



SMA-Male Connector:

Washer Nut: Stainless Steel

Passivated Body: Stainless Steel

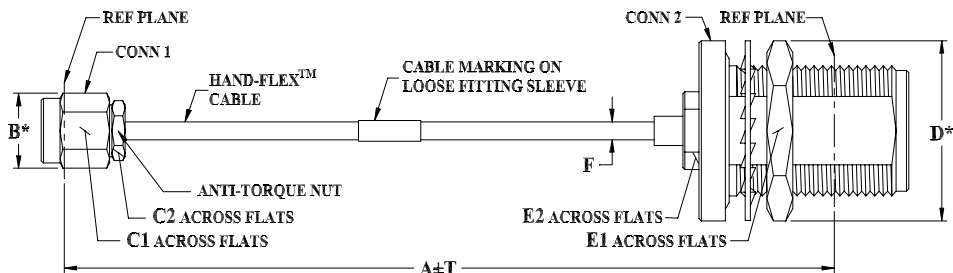
Gold Plated Center Pin: Silver Plated Copper Clad Steel

N-Female Connector:

Washer, Nut & Body: Brass Nickel Plated.

Center Pin: BecuB, Gold Plated

OUTLINE DRAWING



* OVERALL CONNECTOR DIMENSION
(CONNECTOR SHAPE MAY VARY)

OUTLINE DIMENSIONS (Inch mm)

A	B	C1	C2	D	E1	E2	F	T	wt grams
20.0	.36	.313	.250	.87	.750	.531	.163±.004	.15	64.13
508.00	9.14	7.95	6.35	22.10	19.05	13.49	4.14±0.10	3.81	

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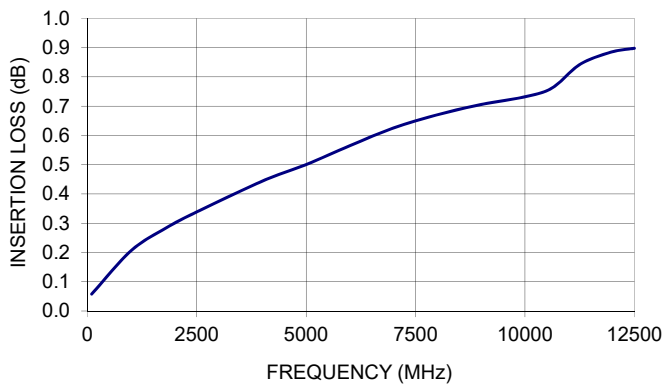
141-20SMNB+

50Ω 20 inch DC to 12.5 GHz

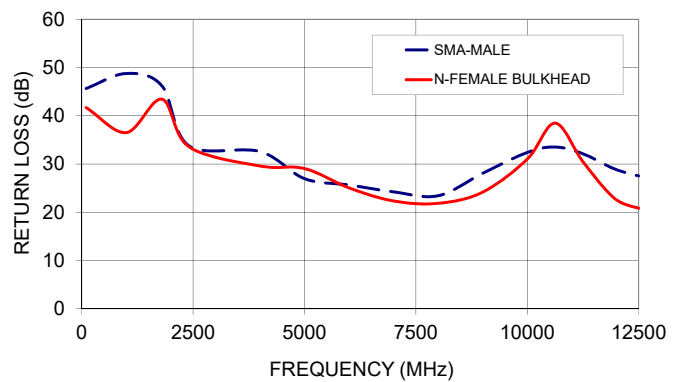
TYPICAL PERFORMANCE DATA AND CHARTS

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)	
		SMA-Male	N-Female Bulkhead
100	0.06	45.7	41.7
1000	0.21	48.8	36.5
1800	0.28	46.2	43.4
2404	0.33	33.8	33.6
4001	0.44	32.6	29.6
5000	0.50	27.0	29.1
6000	0.56	25.6	25.0
7001	0.63	24.2	22.3
8001	0.67	23.4	21.8
9000	0.71	28.1	24.2
10000	0.73	32.4	31.0
10626	0.76	33.5	38.5
11251	0.84	32.1	30.5
11951	0.88	29.0	22.9
12500	0.90	27.5	20.8

141-20SMNB+
INSERTION LOSS



141-20SMNB+
RETURN LOSS





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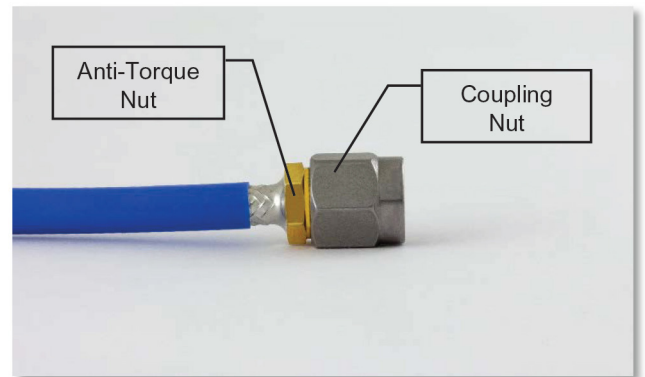
50Ω 20 inch DC to 12.5 GHz

PROPER CABLE CONNECTION USING ANTI-TORQUE NUT

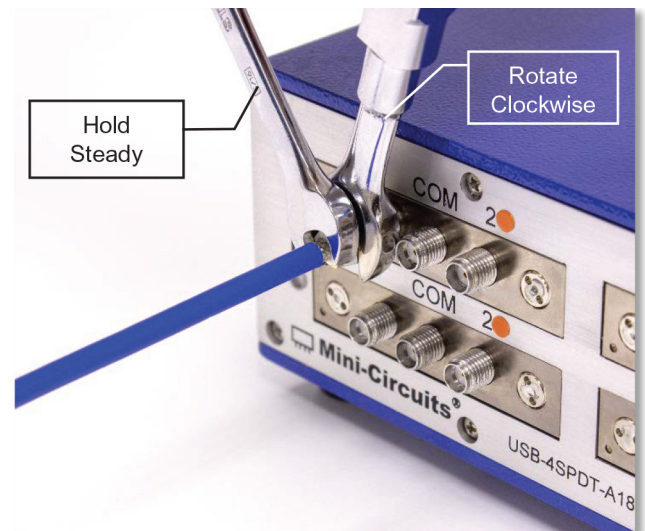
Mini-Circuits 141-series HandFlex™ interconnect cables are constructed with an anti-torque nut adjacent to the connector coupling nut. When used properly, this feature prevents possible damage to the cable due to torqueing and twisting when tightening the cable connector.

TO PROPERLY TIGHTEN THE CABLE CONNECTOR:

1) The cable connector includes a coupling nut which rotates to fasten the connector, and an anti-torque nut, which is fixed to prevent the cable from twisting during connection.



2) To properly tighten the cable, use a standard 1/4 inch open end wrench to brace the anti-torque nut.



3) Using a 5/16-inch open end wrench, rotate the coupling nut clockwise to tighten the cable connector.

*NOTE: Mini-Circuits recommends using a 5/16-inch open end wrench calibrated to 8 inch-pounds maximum torque to prevent damage due to over-torqueing the connector.

NOTES

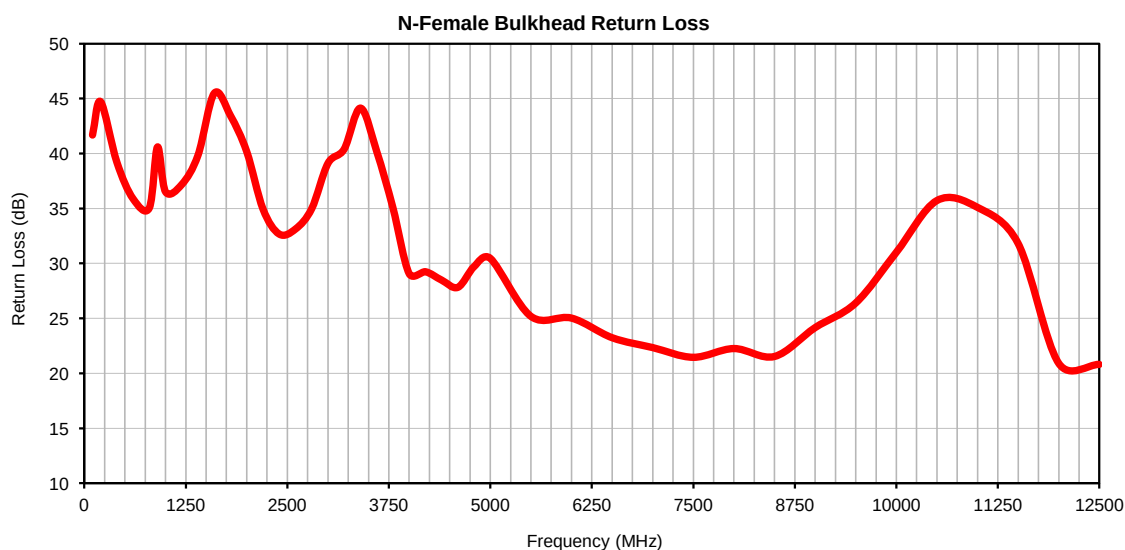
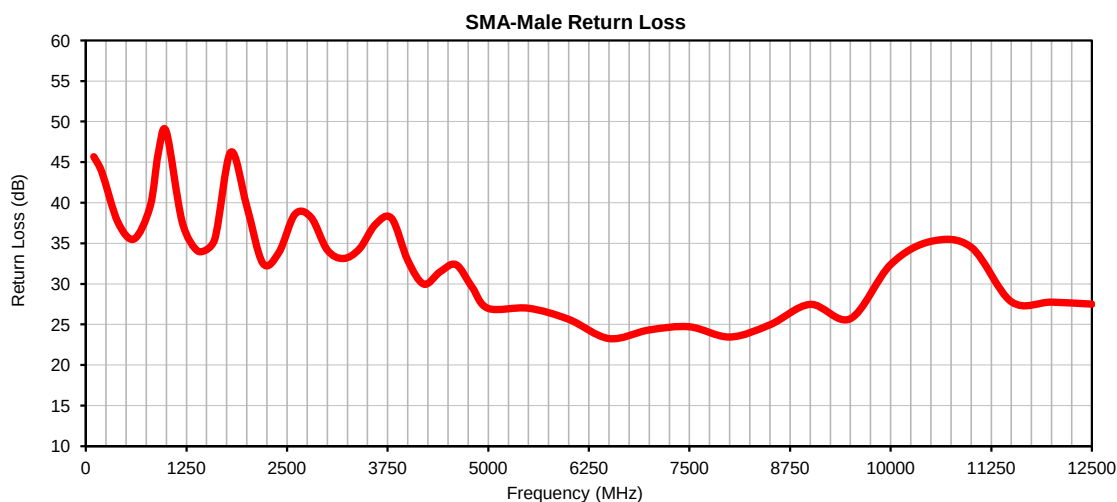
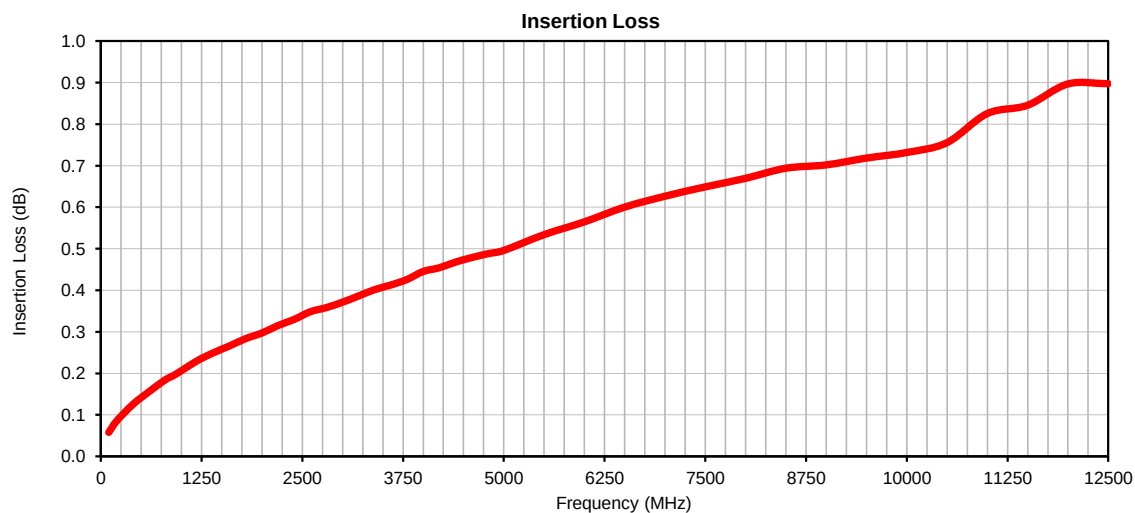
- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/terms/viewterm.html



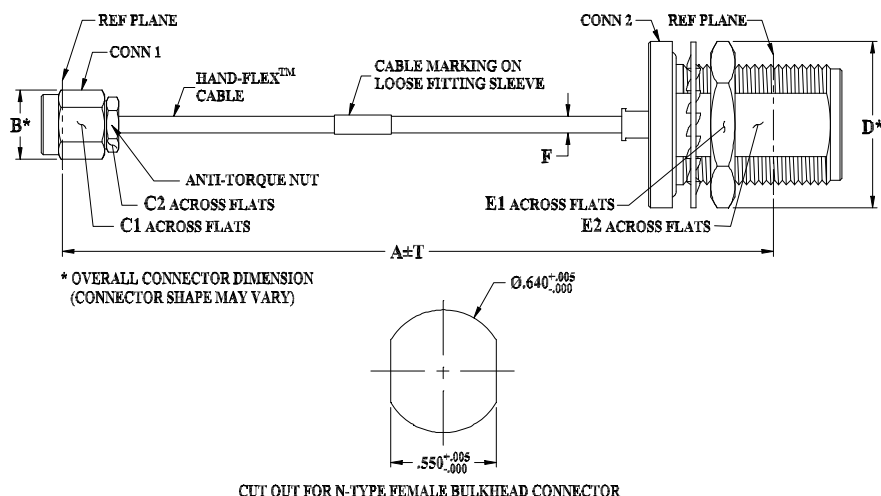
Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	SMA-MALE RETURN LOSS (dB)	N-FEMALE BULKHEAD RETURN LOSS (dB)
100.0	0.06	45.7	41.7
200.0	0.09	43.8	44.7
400.0	0.13	37.6	39.2
600.0	0.16	35.5	35.9
800.0	0.18	39.5	35.1
900.0	0.19	46.0	40.6
1000.0	0.21	48.8	36.5
1200.0	0.23	37.6	37.2
1400.0	0.25	34.0	39.9
1600.0	0.27	35.4	45.5
1800.0	0.28	46.2	43.4
2000.0	0.30	39.6	40.2
2200.0	0.32	32.5	34.9
2400.0	0.33	33.9	32.7
2600.0	0.35	38.6	33.1
2800.0	0.36	38.2	35.0
3000.0	0.37	34.2	39.1
3200.0	0.39	33.1	40.4
3400.0	0.40	34.3	44.1
3600.0	0.41	37.3	40.2
3800.0	0.43	38.1	35.1
4000.0	0.45	32.9	29.1
4200.0	0.45	30.0	29.2
4400.0	0.47	31.5	28.5
4600.0	0.48	32.4	27.8
4800.0	0.49	29.6	29.7
5000.0	0.50	27.0	30.5
5500.0	0.53	27.0	25.2
6000.0	0.56	25.6	25.0
6500.0	0.60	23.3	23.2
7000.0	0.63	24.3	22.3
7500.0	0.65	24.7	21.5
8000.0	0.67	23.5	22.3
8500.0	0.69	25.0	21.5
9000.0	0.70	27.5	24.2
9500.0	0.72	25.7	26.4
10000.0	0.73	32.4	31.0
10500.0	0.76	35.2	35.7
11000.0	0.83	34.5	35.1
11500.0	0.85	27.8	31.8
12000.0	0.90	27.8	20.9
12500.0	0.90	27.5	20.8

Typical Performance Curves



Outline Dimensions



KQ1669 SERIES
SMA MALE (CONN-1)
N FEMALE BULKHEAD (CONN-2)

CASE STYLE #	A		B	C1	C2	D	E1	E2	F		T		WEIGHT GRAMS
	INCH	MM							141U-ASMNB+	141-ASMNB+	INCH	MM	
KQ1669-3	3.00	76.20	.36 (9.14)	.313 (7.95)	.250 (6.35)	.87 (22.10)	.750 (19.05)	.531 (13.49)	.141±.003 (3.58±0.07)	.163±.004 (4.14±0.10)	.05	1.27	44.73
KQ1669-4	4.00	101.60									.05	1.27	45.87
KQ1669-5	5.00	127.00									.05	1.27	47.02
KQ1669-6	6.00	152.40									.05	1.27	48.16
KQ1669-7	7.00	177.80									.10	2.54	49.30
KQ1669-8	8.00	203.20									.10	2.54	50.44
KQ1669-9	9.00	228.60									.10	2.54	51.59
KQ1669-10	10.00	254.00									.10	2.54	52.73
KQ1669-11	11.00	279.40									.10	2.54	53.87
KQ1669-12	12.00	304.80									.10	2.54	55.02
KQ1669-14	14.00	355.60									.15	3.81	57.30
KQ1669-16	16.00	406.40									.15	3.81	59.59
KQ1669-18	18.00	457.20									.15	3.81	61.87
KQ1669-20	20.00	508.00									.15	3.81	64.16
KQ1669-24	24.00	609.60									.15	3.81	68.73
KQ1669-30	30.00	762.00									.20	5.08	75.59
KQ1669-36	36.00	914.40									.20	5.08	82.45

Unless otherwise specified dimensions are in inches (mm).

Tolerances: 2Pl. ± .03; 3Pl. ± .015

Note:

1. 141 Hand-Flex™ Coaxial Cable.
2. "A" represents length of cable.



INTERNET <http://www.minicircuits.com>
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Mini-Circuits ISO 9001 & ISO 14001 Certified



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 105°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 105°C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 100°C, 50 Cycles	MIL-STD-202F; Method 107G
Multiple Bend Radius	40 mm, 5 times for 141 series cables 30 mm, 5 times for 086 series cables	
Single Bend Radius	8 mm for 141 series cables 6 mm for 086 series cables	