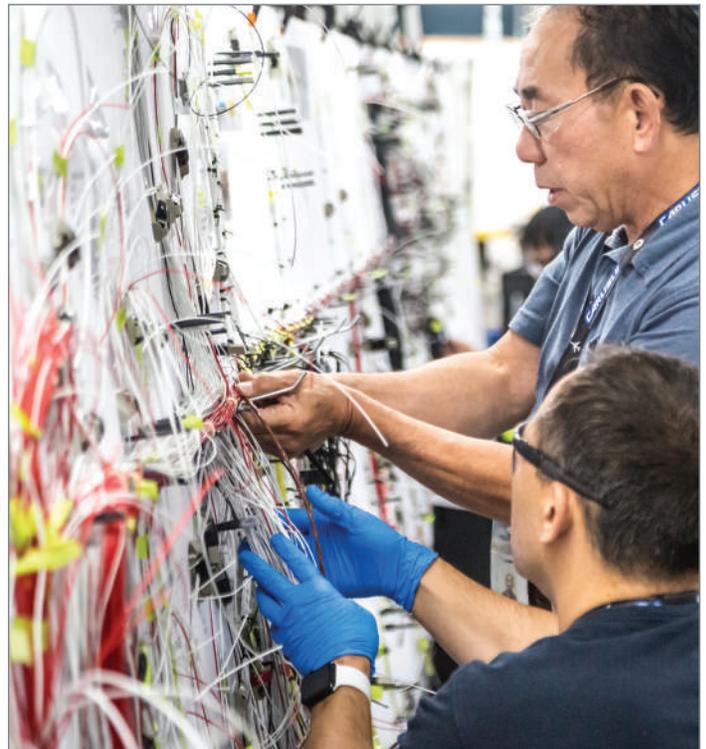
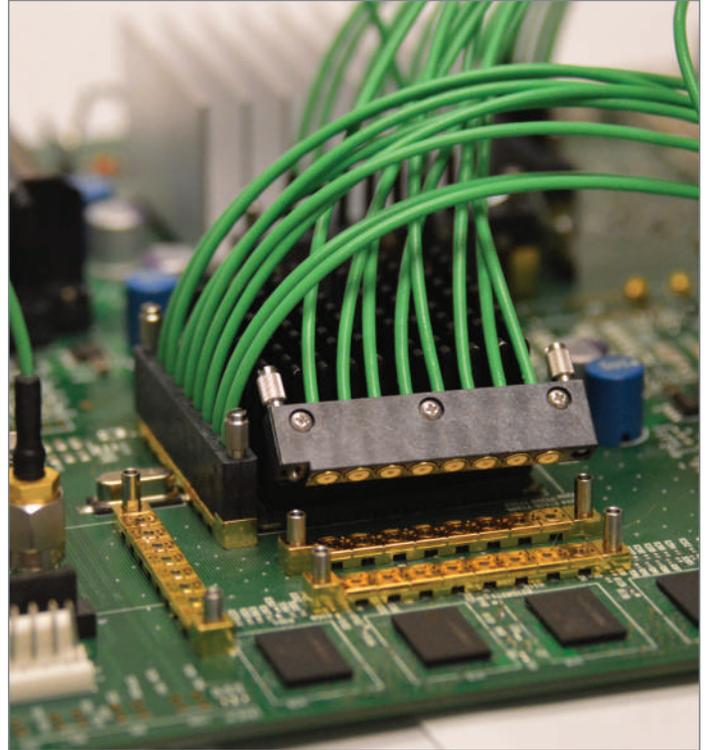


Cable Assembly & Harness Capabilities



RF Cable Assemblies

WITH AN EXCEPTIONAL FOCUS ON THE NEEDS OF OUR CUSTOMERS

Carlisle Interconnect Technologies (CarlisleIT) designs, builds, tests, certifies and delivers comprehensive, high-performance interconnect solutions. We have facilities across the globe, with locally managed design and engineering teams at our state-of-the-art facilities.

We partner with customers in the Commercial Aerospace, Military, Space, Test & Measurement, Medical Technology and Industrial markets, providing limitless cable assembly and harness solutions. We work with you to manage complete end-to-end solutions, eliminating the need to manage multiple vendors and helping to ensure your applications deliver on time and on budget.

ENGINEERING SUPPORT

CarlisleIT offers a wide array of engineering experience and capability across all our manufacturing locations worldwide, all of which can be utilized to support design, manufacture and qualification testing of assemblies and harnesses. Our capabilities include:

- » Electrical testing for AC, DC, RF and fiber-optic-based products, including EMC
- » Mechanical testing facilities for shock, vibration, crush resistance and flex life
- » Environmental testing
- » X-ray examination
- » Overmolding capability
- » In-house ability to design and manufacture custom-designed plastic and composite piece parts and connectors

QUALITY

CarlisleIT's worldwide manufacturing locations are certified to the latest standards, including AS9100, ISO 9001, ISO 14001 and IPC. Plus, our facilities hold additional customer-specific approvals from many of the world's best-known platform and system OEMs.

- » Assembly test capabilities
- » Electrical length
- » Skew
- » Impedance (characteristic, differential, common mode)
- » Insertion loss, return loss/VSWR
- » TDR (time domain reflectometry)
- » Eye pattern
- » Jitter
- » Bit error rate testing (BERT)
- » Crosstalk
- » Propagation delay
- » Rise time
- » Fall time
- » Rise time degradation
- » Continuity/DC resistance
- » Hipot/dielectric strength testing

LOGISTICS

CarlisleIT provides high-level service and support from our sales offices and manufacturing locations around the world. Our service levels include dedicated project-managed manufacturing cells that can deliver cable assembly and harness products to fit exactly with your specific production schedules. For many customers, we also stock product components to support particularly complex demands.

RF and Microwave Cable Assemblies

INTRODUCTION

When your applications call for high-performance coaxial cables and connectors, CarlisleIT's line of high-frequency RF/microwave assemblies are unparalleled.

CarlisleIT's capability to produce standard and custom RF connectors worldwide and our commitment to end-to-end program management mean we can support all your needs as a single local vendor for nearly every type of RF/microwave cable assembly.

We manufacture a broad range of standard and high-performance products at our facilities around the world, including UTiFLEX® high-performance flexible microwave assemblies, avionics standard RF cables and assemblies, and Semi-Flex® (conformable), semi-rigid and industry-standard flexible RG-series (QPL listed) coaxial cables that meet or exceed MIL-DTL-17 specifications. We specialize in phase, amplitude and delay-matched assemblies, and all assemblies are individually tested to ensure 100% compliance with your specifications.

If your applications involve test-and-measurement cable-assembly needs, we engineer a complete line of customizable, high-frequency RF test cables and assemblies, including single-position, ganged and high-frequency interconnects.



RF Cables for Test & Measurement

FLEXIBLE CABLES

CarlisleIT offers a complete line of high-performance, flexible microwave cables with excellent loss characteristics, outstanding phase stability, and unsurpassed flexibility, compared to standard flexible cables—all without sacrificing mechanical integrity. CarlisleIT has greatly increased connector reliability through a unique connector attachment that withstands mechanical and thermal stresses far better than standard connectors.

SEMI-RIGID CABLES

CarlisleIT has decades of experience in producing some of the highest-quality semi-rigid cable assemblies in the industry. We carry a vast selection of commercial, QPL and custom RF/microwave connectors, along with a variety of cable types and diameter sizes.

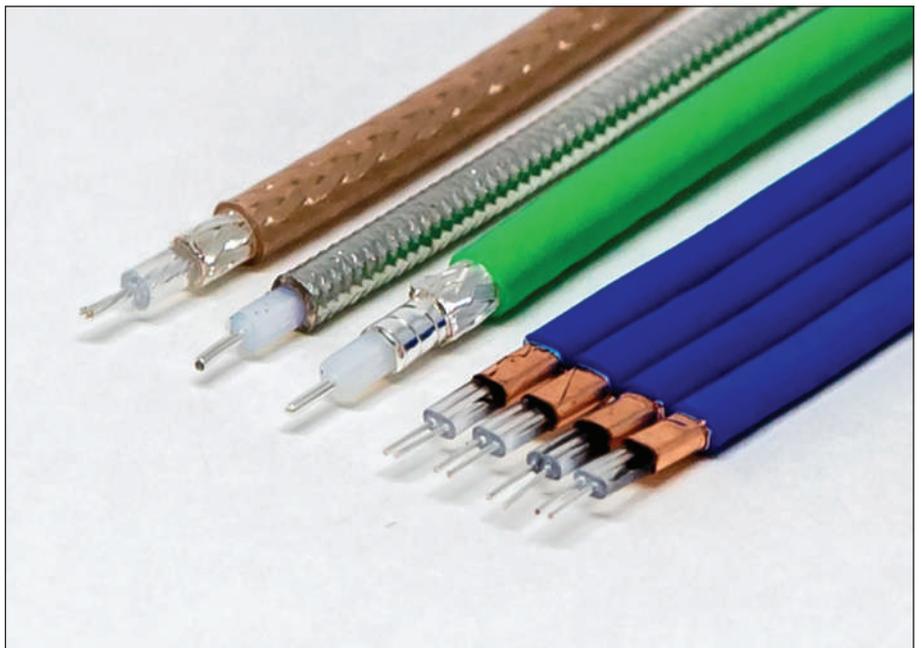
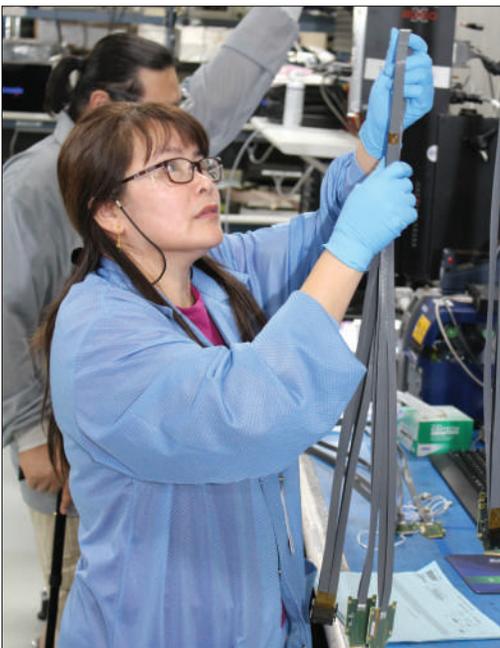
CarlisleIT's semi-rigid assemblies meet J-STD-001E cable assembly standards and MIL-C-17 specifications. These semi-rigid cables include different connector options, higher frequency coverage and extended electrical and environmental testing. Our semi-rigid cables offer tight physical tolerances, phase matching, minimal VSWR, and high-phase stability to meet your system design requirements. Semi-rigid cables are available at 50 ohm standard and as low-loss or ultra-low-loss cables with copper and aluminum outer conductors. Aluminum center conductors offer lighter weight cable assemblies. Dimensionally stable "M" and "DS" semi-rigid cables utilize a unique dielectric that provides significantly improved thermal stability for extended temperature ranges. Stainless steel 50 ohm semi-rigid cables are designed for applications where low thermal heat transfer is required, such as cryogenic feed cables for highly corrosive environments. Cables with impedances from 10 to 100 ohms and diameters from 0.020 to 0.250 inch are also available. CarlisleIT's odd impedance semi-rigid cables are the right solution for any impedance matching requirement.

SEMI-FLEX/CONFORMABLE CABLES

Semi-Flex coaxial cable assemblies allow simple formation for use within RF/microwave systems and for making external connections to other equipment.

RG CABLES

Standard Radio Guide (RG) coaxial cables are also available from CarlisleIT in various sizes and connector options. Low-cost RG cables offer excellent low loss performance for short distance, low-frequency applications like radio to antenna in electronic PCBs, home cable, phone and satellite television systems and standard 10/100Mbps ethernet communications.



CarlisleIT offers a complete line of high-performance, flexible microwave cables with excellent loss characteristics, outstanding phase stability, and unsurpassed flexibility, compared to standard flexible cables—all without sacrificing mechanical integrity. CarlisleIT has greatly increased connector reliability through a unique connector attachment that withstands mechanical and thermal stresses far better than standard connectors.

SEMI-RIGID CABLES

CarlisleIT has decades of experience in producing some of the highest-quality semi-rigid cable assemblies in the industry. We carry a vast selection of commercial, QPL and custom RF/microwave connectors, along with a variety of cable types and diameter sizes.

CarlisleIT's semi-rigid assemblies meet J-STD-001E cable assembly standards and MIL-C-17 specifications. These semi-rigid cables include different connector options, higher frequency coverage and extended electrical and environmental testing. Our semi-rigid cables offer tight physical tolerances, phase matching, minimal VSWR, and high-phase stability to meet your system design requirements.

Semi-rigid cables are available at 50 ohm standard and as low-loss or ultra-low-loss cables with copper and aluminum outer conductors. Aluminum center conductors offer lighter weight cable assemblies. Dimensionally stable "M" and "DS" semi-rigid cables utilize a unique dielectric that provides significantly improved thermal stability for extended temperature ranges. Stainless steel 50 ohm semi-rigid cables are designed for applications where low thermal heat transfer is required, such as cryogenic feed cables for highly corrosive environments. Cables with impedances from 10 to 100 ohms and diameters from 0.020 to 0.250 inch are also available. CarlisleIT's odd impedance semi-rigid cables are the right solution for any impedance matching requirement.

SEMI-FLEX/CONFORMABLE CABLES

Semi-Flex coaxial cable assemblies allow simple formation for use within RF/microwave systems and for making external connections to other equipment.

RG CABLES

Standard Radio Guide (RG) coaxial cables are also available from CarlisleIT in various sizes and connector options. Low-cost RG cables offer excellent low loss performance for short distance, low-frequency applications like radio to antenna in electronic PCBs, home cable, phone and satellite television systems and standard 10/100Mbps ethernet communications.

ARMOR BRAID

MKR armor braid cables use UTIFLEX microwave cables as a base with an additional highly flexible and abrasive resistant ruggedization. MKR cables are ideally suitable for lab test environments with greater mechanical strength and long-term reliability in a compact package. These cables are extremely flexible and have excellent crush, torque and kink resistance.

TWINAX CABLES

Twinax cables consist of two inner conductors instead of one and are ideal for short-range, high-speed differential signaling applications. Twinax cables are available in different sizes like 28, 30 and 32AWG operating up to 40GHz with very low typical insertion loss in the range of 5 to 7dB at fmax. Typical applications are optical network interconnects, PCI Gen4 and higher interconnects.



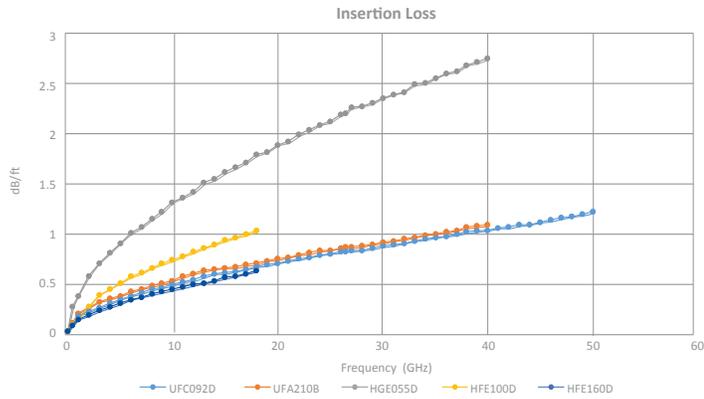
PERFORMANCE & SPECIFICATIONS

Type	Product Name	Frequency	Outer Shield / Center Conductor Diameter	Speed	Loss @ fmax	Connector Options	Use Cases
		fmax GHz	Inch	vp % Nom	Max dB/ft		
Flexible High Performance Low Loss	UTIFLEX/UFC092D	70	0.092 (with jacket); 0.079 (w/o jacket)	78	1.94	SMA, 2.92, 2.4 and 1.85mm	ATE systems, emulation systems, adapters and pitch translators, antenna systems, navigation and feedback control systems
	UTIFLEX/UFA125A	50	0.125 (with jacket); 0.105 (w/o jacket)	77	1.19	SMA, 2.92, 2.4 and 1.85mm	
Flexible Standard	UF-70-047-042-011	26.5	0.047 (outer shield); 29AWG (center conductor)	70	2.6	SMA, 2.92, 2.4 and 1.85mm	
	UF-70-087-073-020	40	0.087 (outer shield); 24AWG (center conductor)	70	1.8	SMA, 2.92, 2.4 and 1.85mm	
	UF-70-141-129-037	18	0.141 (outer shield); 19AWG (center conductor)	70	0.62	SMA, 2.92, 2.4 and 1.85mm	
Conformable/ Semi-Flex	047 Type Semi-Flex	20	0.047	70	1.9	MCX, SMA, SMP, SSMP	
	086 Type Semi-Flex	40	0.086	70	1.92	MCX, TNC, Type N, BMA, SMA, K, SMP, SSMP	
	141 Type Semi-Flex	26.5	0.141	70	0.94	TNC, N, BMA, SMA	RF test enclosures with tight space
Semi-Rigid	M17/151-00001	20	0.047	70	1.9	SMP, 3.5 and SMA	Create short delays in RF/microwave systems; RF signal propagation on PCB, board-to-board signal transmission; radar and differential signal propagation; Used in oscillators, amplifiers, printed circuit boards, delay lines and capacitor sections
	UT-047-TP	20	0.047	70	1.56	SMP, 3.5 and SMA	
	M17/130-RG402	20	0.141	70	0.64	SMA, TMP, BMA, TNC, TYPE N	
	UT-141C-LL	20	0.141	70	0.5	SMA, TMP, BMA, TNC, TYPE N	
	M17/133-RG405	20	0.087	70	1.3	SMP, SMA, SMK, TMP, BMA, TNC, TYPE N	
	UT-085-DS	20	0.087	70	1	SMP, SMA, SMK, TMP, BMA, TNC, TYPE N	
RG Cables	RG178	2.4	0.071	70	6	SMA, Type N, TNC, SMC, MCX, MMCX, BNC, SMB	Motor control systems; satellite and security camera systems; home cable TV systems; lab test environments
	RG316	2.4	0.098	70	4.1		
	RG142	10	0.116	70	5.5		
Armor Braid	MKR300C	22	0.3	81	0.44	NMD	VNA Test; Lab Test Environment
Twinax	IPT-70-058-100-015	40	0.015; 28AWG	70	5.48	Custom, Direct Attach	Optical transceivers, high- frequency loss inter- or intra- board communication
	IPT-70-030-100-009	40	0.009; 32AWG	70	6.7		

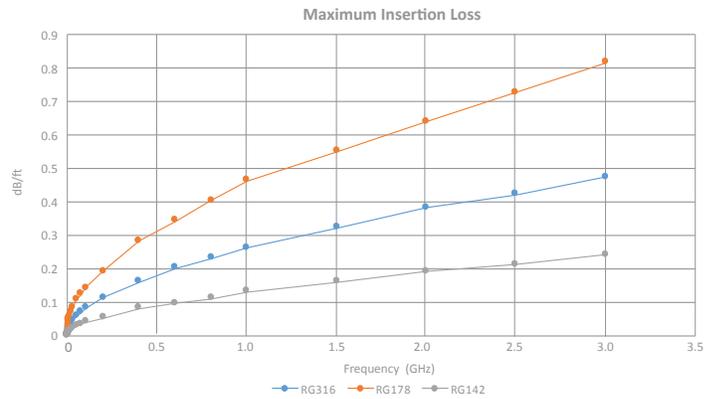
Product Type	Customer Features and Benefits
Flexible Cables	<ul style="list-style-type: none"> » Versatile low loss cables offer outstanding performance in almost any environment » Low loss cables have the lowest insertion loss available at 18, 26.5, 40, 50, 65GHz » Low SWR (1.25:1 at 40GHz typical) » Excellent shielding effectiveness and precision phase matching
Semi-Flex/Conformable Cables	<ul style="list-style-type: none"> » Semi-flex cables are hand formable without the need for bending tools » Semi-flex cables have lower leakage and improved bending radius than semi-rigid types
Semi-Rigid Cables	<ul style="list-style-type: none"> » RF shielding in excess of -130 dB provides excellent insulation » Lowest attenuation and lightest weight » Very tight bend radii allow utilization in the tightest configurations » Uniform conductor and dielectric forming results in unequalled impedance control and VSWR performance » Availability of unique dielectric to provide significantly improved thermal stability for extended temperature ranges
RG Cables	<ul style="list-style-type: none"> » Low cost for use in wide variety of general purpose RF communication » Low-loss performance for short-distance, low-frequency applications
Armor Braid	<ul style="list-style-type: none"> » Excellent crush, torque and kink resistance for use in rugged environment » Higher mechanical strength and long-term reliability for use in lab test setups
Twinax	<ul style="list-style-type: none"> » 100 ohm impedance for high performance differential signaling » Optimum conductor sizes and shielding for low loss performance at high frequencies » Excellent phase matching guaranteed by design and construction

INSERTION LOSS PERFORMANCE

Flexible Cables



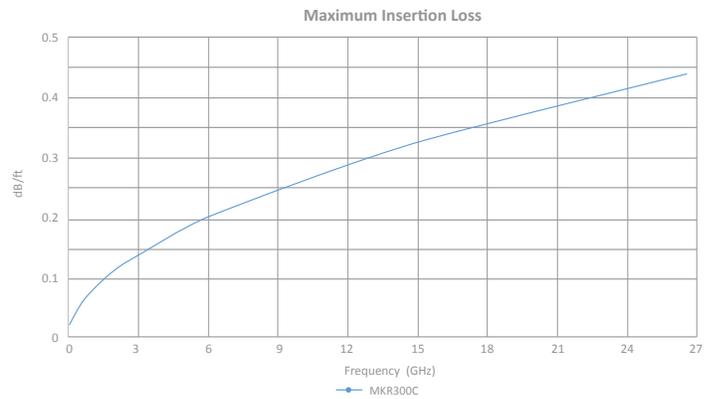
RG Cables



Semi-Flex/Conformable Cables



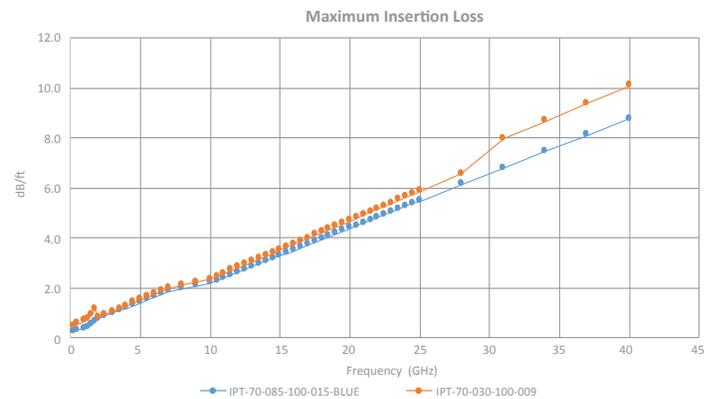
MKR Armor Braid Cables



Semi-Rigid Cables



Twinax Cables





INTRODUCTION

Erroneous Radio Altimeter (Rad Alt) height indications are a frequent nuisance for flight crews and a costly problem for flight operations. More often than not, these spurious warnings are due to water ingress into the Rad Alt coax cables and/or Rad Alt antenna itself. The typical maintenance procedure to correct this problem has been to replace the antennas or the antenna cables every time a fault occurs!

To address this issue, CarlisleIT has developed the FlightGear™ Rad Alt Cable Assemblies that are designed and proven to withstand the constant pressurization cycles and the harsh SWAMP (Severe Weather and Moisture Prone) environment of the aircraft belly. The FlightGear™ Rad Alt Cable Assemblies help to greatly reduce or eliminate the costly problems and aircraft maintenance associated with radio altimeters and water ingress frequently occurring in other standard coax cable assemblies.

With a full suite of engineering and manufacturing services, CarlisleIT is capable of supporting any of your system installation and certification requirements no matter what aircraft you're flying.

When Performance Matters - Carlisle Interconnect Technologies has set the standard for interconnect solutions in the Aerospace, Defense, Medical, Industrial, T&M and more for over 70 years.

FEATURES

- » Robust design and construction
- » Special seals prevent water ingress into the cable and connector
- » Compatible with OEM and Airframe requirements
- » Available for multiple airframes
- » Easy installation and maintenance
- » Airworthiness Approved
- » In-house engineering and certification services

TECHNICAL INFORMATION

- » 6,000+ submerged pressurization life-cycles
- » Flammability per 14CFR Part 25.869
- » Vibration, Shock, Thermal Shock, Corrosion and Moisture Resistance per Mil-Std-202

CONNECT WITH US TODAY

See CarlisleIT's line of **Cable Assemblies & Harnesses** at:
CarlisleIT.com/products/cable-assemblies-harnesses/

1-800-327-9473
Sales@CarlisleIT.com

Global Manufacturing. Local Support.

Wherever you are, so are we. With manufacturing centers around the globe, our highly qualified team of nearly 350 engineers is up to any challenge. Our extensive worldwide manufacturing capabilities, coupled with end-to-end local project management and engineering support, allow us to design, build, test, and certify your product in-house, saving you the time and hassle of managing multiple vendors.



FACILITIES CERTIFICATIONS

- » AS 9100
- » ISO 9001
- » ISO 13485
- » ISO 14001
- » ITAR registration
- » MIL-SPEC / SAE
- » RoHS compliance

UNITED STATES

ALABAMA

2150 Michigan Ave.
Brookley Complex
Mobile, AL 36615
(251) 650.0600

CALIFORNIA

2731 Loker Avenue West
Carlsbad, CA 92010
(760) 931.1844

12900 Alondra Blvd.
Cerritos, CA 90703
(562) 498.0901

4200 Garner Road
Riverside, CA 92501
(951) 788.0252

12840 Bradley Ave
Sylmar, CA 91342
(818) 362.3300

6740 Nancy Ridge Drive
San Diego, CA 92121
(858) 450.1591

FLORIDA

100 Tensolite Drive
St. Augustine, FL 32092
(904) 829.5600

PENNSYLVANIA

206 Jones Blvd.
Pottstown, PA 19464
(601) 495.0110

WASHINGTON

7911 South 188th St., Ste. 100
Kent, WA 98032
(425) 251.0700

34935 SE Douglas St.
Snoqualmie, WA 98065
(425) 396.8861

WISCONSIN

5300 W. Franklin Drive
Franklin, WI 53132
(414) 421.5300

MEXICO

Bldv. Luis Donaldo Colosio M. 1195
Colonia Obrera
84048 Nogales Sonora, Mexico
+52 63.1314.6105

Av. Ferrocarril # 1730 int. 16 y 17
Parque Industrial Los Pinos II
Tijuana, B.C. Mexico 22120
(760) 517-1805

EUROPE

SWITZERLAND

Nord-Sud, Stabile 3A, CH-6934
Bioggio, Switzerland
+41 91.611.5161

UNITED KINGDOM

Unit 9 Walker Rd., Walker Industrial Estate,
Guide, Blackburn, Lancashire, BB1 2QE, UK
+44 1254.660054

Dakota House
Coventry Airport
Baginton, Coventry
CV8 3AZ, UK
+44 2476.882695

ASIA

CHINA

Qiaolong Rd. No. 7 Xinghu Industrial Park,
DengWu Village, QiaoTou Town 523533
Dongguan Guangdong, China
+86 769.8102.6363

MEDICAL TECHNOLOGIES

(DONGGUAN) CO., LTD.

Qiaolong Rd. No. 2, Xinghu Industrial Zone,
DengWu Village, QiaoTou Town 523533,
Dongguan Guangdong, China
+86 769.8255.6339

Let's connect.



CarlisleIT.com

CARLISLE
INTERCONNECT TECHNOLOGIES