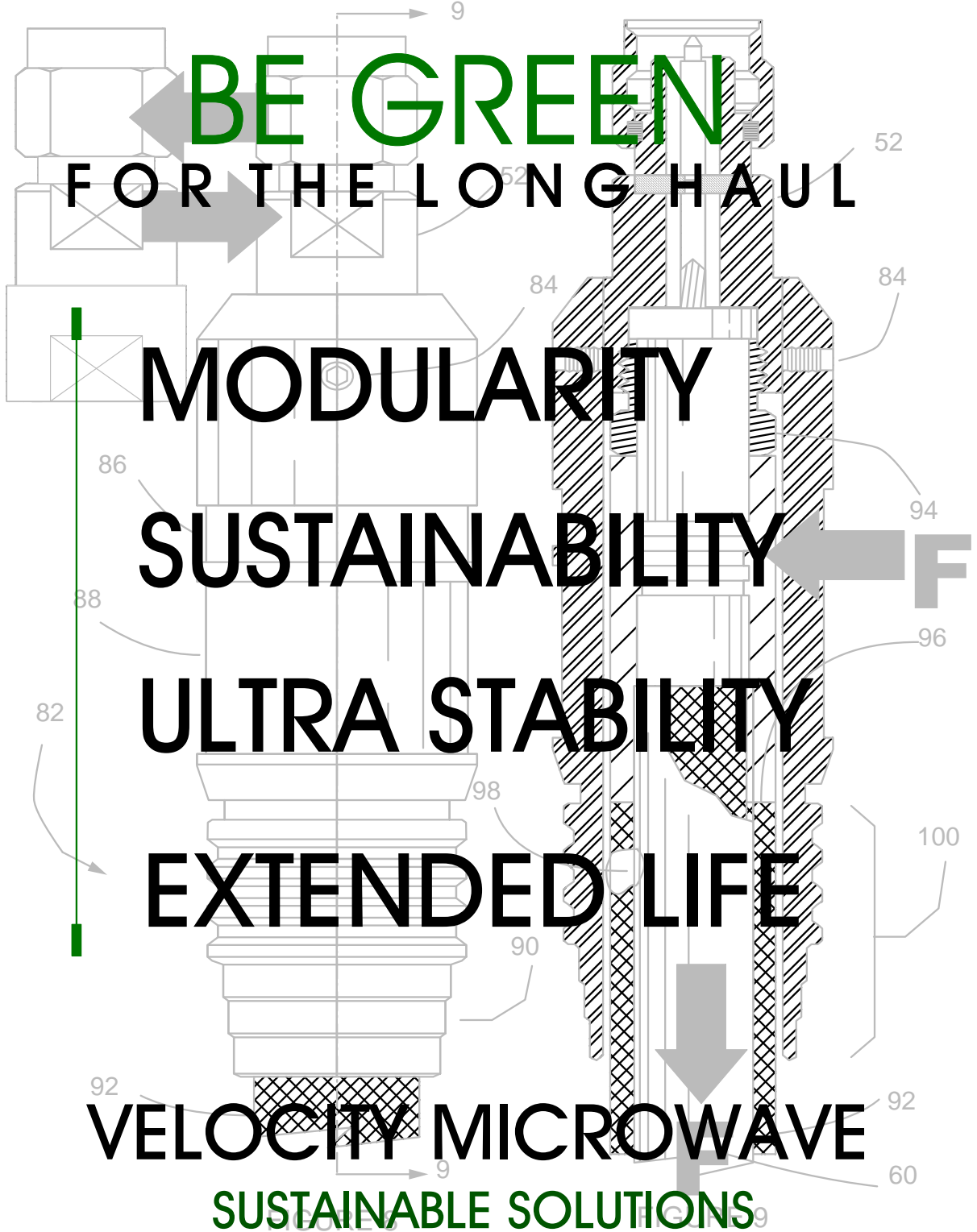


# VECTOR

CABLE ASSEMBLIES FOR ROBUST TEST PORT EXTENSION

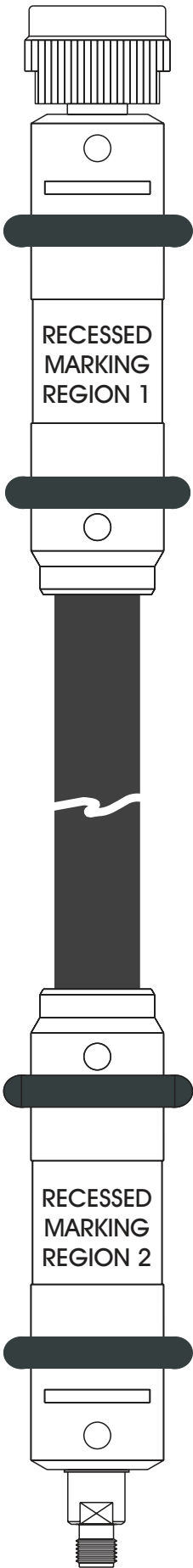


**VELOCITY MICROWAVE**

**SUSTAINABLE SOLUTIONS**

in Microwave Design

# VECTOR TEST PORT SERIES ~ ORDERING OPTIONS



SERIES	CONNECTOR 1		GENDER 1	CONNECTOR 2		GENDER 2	LENGTH
TPX	18NMD	24NMD	F	18NMD	29	M	26 IN (660mm)
RESERVED	35NMD	29NMD		24NMD	35		F
	APC7	N	M	29NMD	N		CUSTOM
				18	APC7		
				24			

## LEGEND:

18NMD	1.85mm ruggedized connector	65 GHz
24NMD	2.4mm ruggedized connector	50 GHz
29NMD	2.92mm ruggedized connector	40 GHz
35NMD	3.5mm ruggedized connector	27 GHz
18	1.85mm subminiature	65 GHz
24	2.4mm subminiature	50 GHz
29	2.92mm subminiature	40 GHz
APC7	3.5mm subminiature PEI* core	33 GHz
35	3.5mm subminiature airline core	33 GHz
N	Type N connector	20 GHz

## NOTES

Cable shall have an 3 mil aluminum plate applied to the test port hand grip that shall be serialized with a permanent

**PRECISION ~ MODULAR** **Vp**  
**TEST PORT EXTENSION ASSEMBLY 84~87**  
 2.92mm, NMD, HYBRID 3.5mm, TYPE N ~ WARP SERIES  
 PATENT PENDING ~ SERIAL No. **STAMPED SERIAL #**  
**VELOCITY MICROWAVE ~ div. ATX Labs**  
[www.velocitymicrowave.com](http://www.velocitymicrowave.com)

Cable shall have an applied vinyl label indicating per IEEE color code the species of connector at the DUT end as pictured below.

NOTE: FEMALE APPLIED ART NOT SHOWN

**TYPE N**  
**ATX LABS**  
**207-204 MILS**  
**NMD: 2 MILS**

**2.92mm**  
**ATX LABS**  
**PIN: 2 MILS**  
**RECESSION**

**3.5mm**  
**ATX LABS**  
**PIN: 2 MILS**  
**RECESSION**

**2.4mm**  
**ATX LABS**  
**PIN: 2 MILS**  
**RECESSION**

**1.85mm**  
**ATX LABS**  
**PIN: 2 MILS**  
**RECESSION**

**VELOCITY**  
**APC7**  
**7mm**

## EXAMPLE: TPX-NMDF-29F-26

## FORTIS CONNECTOR FAMILY

	<b>18NMD-M</b>		<b>18NMD-F</b>
	<b>24NMD-M</b>		<b>24NMD-F</b>
	<b>35 29NMD-M</b>		<b>35 29NMD-F</b>
	<b>N-M</b>		<b>N-F</b>
	<b>18M</b>		<b>18F</b>
	<b>24M</b>		<b>24F</b>
	<b>29M</b>		<b>29F</b>
	<b>35M</b>		<b>35F</b>
	<b>7 mm</b>	APC7 IS A HERMAPHRODITIC CONNECTOR MODE FREE TO 18 GHZ. <b>APC7</b>	

PHASE & AMPLITUDE STABILITY [TYP/MAX]**				SWR / ATTENUATION [ft.]		ELECTRICAL CHARACTERISTICS & NOTES			
ASSEMBLY	PHASE Δ		AMPLITUDE Δ		MAX [GHz]	SWR	MIN [LINE ONLY]	CONNECTOR MATING CYCLES	5000 [SUBMATURE, N] *
1.85mm - 28	+/-5.0	+/-9.5	+/-0.055	+/-0.100	65 GHz	1.50	4.30 dB	* ASSUMES MATING WITH CALIBRATED TORQUE WRENCH, AXIAL ALIGNMENT, AND THE ABSENCE OF ECCENTRICITY UPON THREADED ENGAGEMENT	
1.85mm - 39	+/-6.5	+/-11	+/-0.085	+/-0.15		MAX	6.59 dB		
2.4mm - 28	+/-3.75	+/-5.25	+/-0.035	+/-0.85	50 GHz	1.45	2.32 dB	COMPRESSION (SWR IMPAIRMENT WITH RECOVERY)	
2.4mm - 39	+/-4.95	+/-9.95	+/-0.055	+/-0.15		MAX	3.55 dB		
2.9mm - 28	+/-3.25	+/-4.95	+/-0.035	+/-0.85	40 GHz	1.45	1.54 dB	FLEXURE (CYCLES)	
2.9mm - 39	+/-4.50	+/-7.90	+/-0.055	+/-0.15		MAX	2.36 dB		
3.5mm - 28	+/-3.50	+/-4.50	+/-0.035	+/-0.85	26.5 GHz	1.40	1.25 dB	SHIELDING EFFECTIVENESS	
3.5mm - 39	+/-4.95	+/-7.75	+/-0.055	+/-0.15		MAX	1.92 dB		
APC7 / N - 28	+/-2.95	+/-3.50	+/-0.045	+/-0.85	18 GHz	1.35	1.00 dB	** PER IEC-60966, SEC. 8.6.1 METHOD 2, ONE PORT SHORTED TRANSMISSION LINE.	
APC7 / N - 39	+/-3.95	+/-5.70	+/-0.059	+/-0.15		MAX	1.54 dB		

# MODULAR BUILD

ANTI SKID, ANTI PIVOT O-RINGS & GRIPPING MEANS [4 PLCS]

IEEE COLOR CODE & GAGE SPEC

PHASE MATCHED INTRA SPECIES MALE AND FEMALE CONNECTORS

HEAT TREATED PET OUTER AND ANTI ABRASION RESISTANT TORSION JACKET

6061-T6 HARD ANODIZE STRAIN RELIEF WITH THRU HARDENED SETTING MEANS [8 PLCS] & 5/8 FLATS

STAMPED SERIAL ON 3 MIL ALUMINUM

NOMINAL LENGTHS: FROM 26 INCHES (660mm); 39 INCHES (991mm) CUSTOM LENGTHS AVAILABLE

**RoHS COMPLIANT**

**SUSTAINABLE FEATURES FOR EXTENDED OPERATIONAL LIFE**

## CONNECTOR OPTIONS

1.35" .354 AF .75 AF

PRECISION NMD 1.85mm / 2.4mm 2.92mm / 3.5mm ~ MALE / FEMALE

.315AF .354AF

PRECISION 1.85mm / 2.4mm / 2.92mm 3.5mm ~ FEMALE

1.742" .354AF .394AF

PRECISION TYPE N M/F AND APC7 (NOT SHOWN)

GENERAL SPECIFICATION	
CABLE DIAMETER [NOM]	~ .60 INCHES [15.2 mm]; MID SPAN
DYNAMIC BEND RADIUS	2.5 INCHES
OUTER JACKET	POLYETHYLENE TEREPHTHALATE
TEMPERATURE RANGE	-55 / + 135 DEGREES C
MATING TORQUE	8 - 12 IN-LBS
CONNECTOR INTERFACES	IEEE287 GPC / LPC
CRUSH PROTECTION	STAINLESS STEEL SQUARE LOCK
PROPAGATION VELOCITY NOM.	83%
RF LEAKAGE	>100 dB->18 GHZ [MIL-T-81490]
STRAIN RELIEF	6061T6 MIL-A-8625 Type III HARD COAT
FLAMMABILITY	UL94
ABRAISION RESISTANCE	CALIBRASE H-18/500G/800CYC
WEIGHT [26 INCH ASSEMBLY]	~9.6 oz [3.5mm ASSEMBLY]

**NOTES:** [1] THE VECTOR SERIES WAS DESIGNED AS A LONG TERM SERVICE SOLUTION FOR DEDICATED TEST CABLE DEPLOYMENT TO SATISFY VNA CONNECTIVITY ACROSS ALL SPECIES FROM TYPE N TO 1.85mm; VVVV INDUSTRY LEADING 2 YEAR WARRANTY WITH LONG TERM SUSTAINABILITY BY VIRTUE OF MODULAR PLATFORM AND GEOMETRY.

# VECTOR SERIES

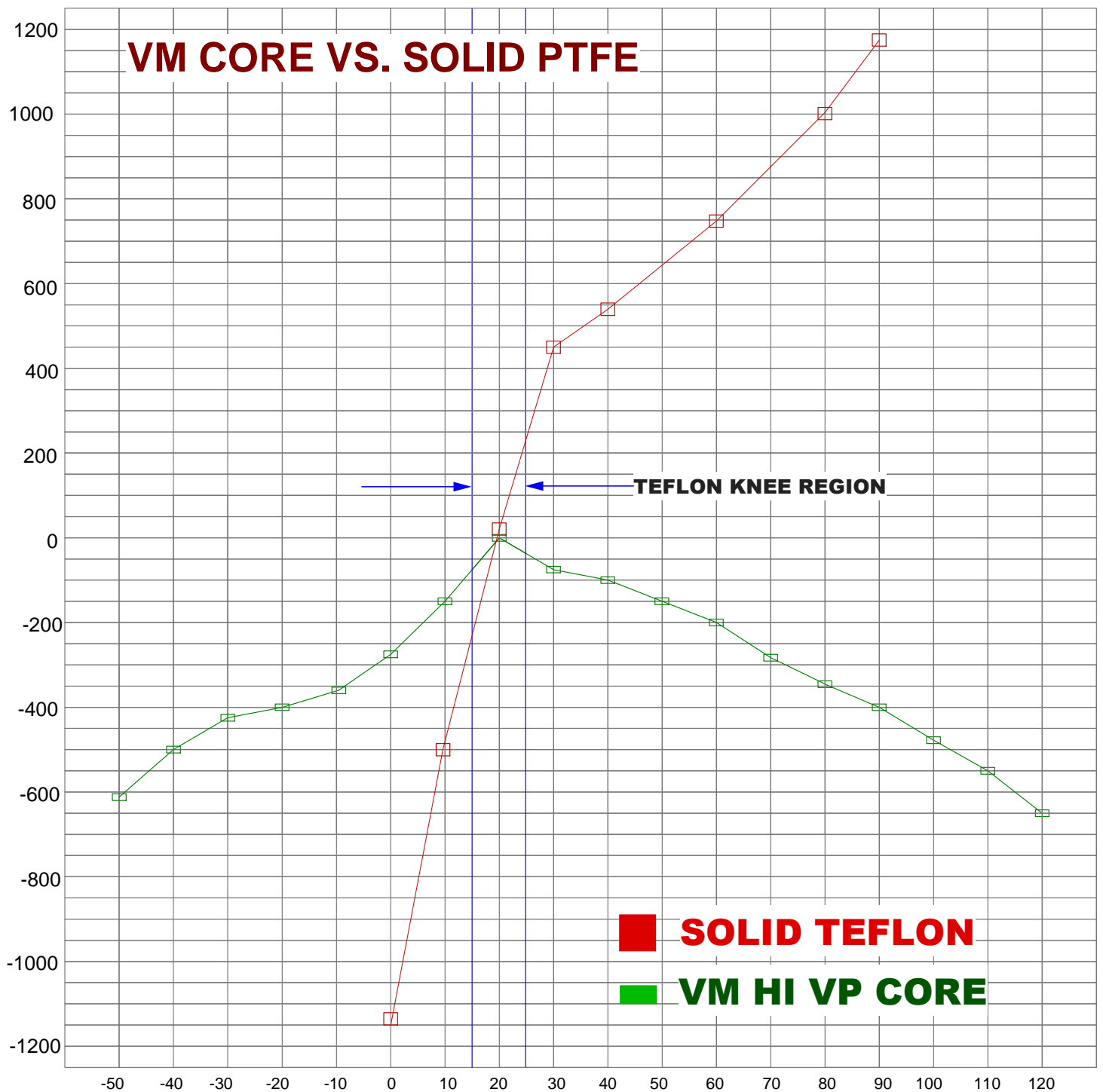
MODULAR TEST CABLES FOR DEDICATED VNA DEPLOYMENT

ULTRA PHASE STABLE WITH TEMPERATURE & FLEXURE

Velocity Microwave ~ div. ATX Labs

www.VelocitybyGTE.com

# MAXIMUM PHASE CHANGE VS TEMPERATURE



$\Delta\Phi = 3.63E-05 \times L \times F \times PPM$ , WHERE L [INCHES], F [GHZ], & PPM AS GIVEN PER CHART. FOR EXAMPLE, FOR L = 24 INCHES, F = 40 GHZ, PPM = 75, THEN  $\Delta\Phi = 2.6$  DEGREES MAX PHASE VARIATION IN THE REGION OF THE TEFLON KNEE BETWEEN 15C AND 25C.

P3

**NOTES:** [i] THE VECTOR SERIES WAS DESIGNED AS A LONG TERM SERVICE SOLUTION FOR DEDICATED TEST CABLE DEPLOYMENT TO SATISFY VNA CONNECTIVITY ACROSS ALL SPECIES FROM TYPE N TO 1.85mm; [ii] INDUSTRY LEADING 2 YEAR WARRANTY WITH LONG TERM SUSTAINABILITY BY VIRTUE OF MODULAR PLATFORM AND GEOMETRY.

## VECTOR SERIES

MODULAR TEST CABLES FOR DEDICATED VNA DEPLOYMENT

ULTRA PHASE STABLE WITH TEMPERATURE & FLEXURE

Velocity Microwave ~ div. ATX Labs  
[www.VelocitybyGTE.com](http://www.VelocitybyGTE.com)



**ATX LABS**  
Chilmark, MA 02535

TITLE DIE CUT FOAM & LAYOUT  
FOR VECTOR SERIES

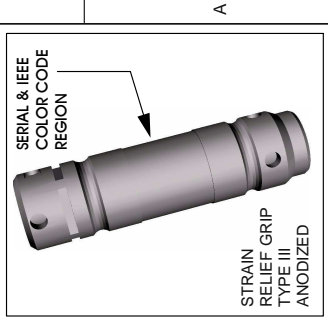
SCALE 1:1 SHEET: 1 OF 1  
DRAWN NAME DATE  
CHECKED em 12-18-14  
ENG APPR VS 12-21-14  
MFG APPR  
Q.A.

SIZE	DWG. NO.	REV
B	ATX-115	3

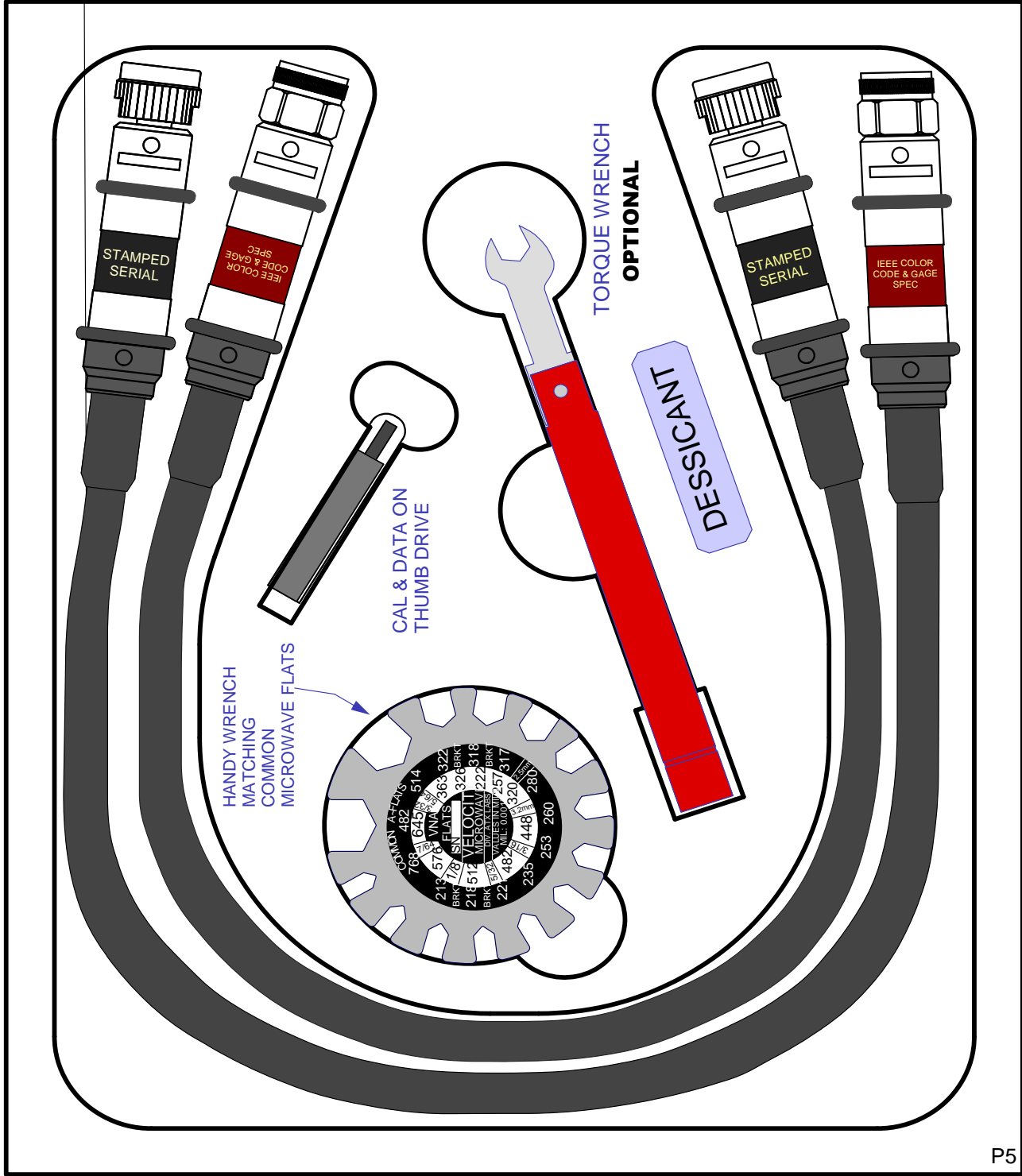
COMMENTS:  
  
DIMENSIONS ARE IN INCHES  
TOLERANCES:  
ANGULAR:  $\pm$ 0.001  
BEND:  $\pm$ 0.1 DEG.  
TWO PLACE DECIMAL:  $\pm$ 0.001  
THREE PLACE DECIMAL:  $\pm$ 0.001  
MATERIAL: 6061-T6  
FINISH: NA  
PLATING

DESCRIPTION  
  
NOTE:  
SHOWING TYPICAL  
CONTENTS AND LAYOUT;  
TORQUE MEANS OPTIONAL;  
CONNECTOR GAGE (NOT  
SHOWN) OPTIONAL OR  
COMPLIMENTARY DEPENDING  
ON OPTIONS, SET QUANTITY  
AND CONFIGURATION.

NOTICE - PROPRIETARY &  
CONFIDENTIAL MATERIAL: THE  
INFORMATION CONTAINED  
HEREIN IS THE SOLE PROPERTY  
OF ATX LABS. ANY  
REPRODUCTION IN PART OR AS  
A WHOLE WITHOUT THE  
WRITTEN PERMISSION OF ATX  
LABS IS PROHIBITED.



STRAIN  
RELIEF GRIP  
TYPE III  
ANODIZED



P5

# **— RoHS / REACH —**

COMPLIANCE CERTIFICATION

# Velocity Microwave (div. ATX Labs) RoHS Compliance Certification



Velocity Microwave [hereafter designated VM], a division of ATX Labs, certifies that all of the products manufactured under the Velocity Microwave brand are in compliance with EU Directive 2011/65EU on the use of certain substances employed in electrical, electronic and microwave equipment that have been designated as hazardous.

Restricted Substance	Maximum Threshold Limit
Cadmium and its compounds	100 ppm (0.01 weight %)
Mercury and its compounds	1000 ppm (0.1 weight %)
Hexavalent chromium and its compounds	1000 ppm (0.1 weight %)
Lead and its compounds *	1000 ppm (0.1 weight %)
Polybrominated biphenyls (PBB)	1000 ppm (0.1 weight %)
Polybrominated diphenyl ethers (PBDE)	1000 ppm (0.1 weight %)
Decabromine diphenyl ether (DECA BDE)	1000 ppm (0.1 weight %)

\* Except when allowed by the Directive. For example, 3500 ppm in steel, 4000 ppm in aluminum alloys and 40000 ppm in copper alloys.

\*\*\*\*\*

## VM Partial Materials List

The products in the following classes: **Labflex** cable assemblies; **Benchflex** cable assemblies; **Conexus** cable assemblies; **Conexus HD** cable assemblies; **Continuum** cable assemblies; **Vector** cable assemblies; **Ergon** interface gages and kits, **Legacy** interface gages and kits, **Element** interface gages and kits, **Datum** interface gages and kits; **VM repair** kits; VM connectors of species **SMA, 2.92mm (K); 3.5mm; 2.4mm; 1.85mm; Type N; TNC; APC-7** – contain some or all of the following materials – as well as materials not listed though nevertheless fully compliant with **EU Directive 2011/65EU**.

Material Class	Finish, Construction or Reference Standard
Alloy Steel	Copper Clad per ASTM B-501
Soft Copper	Silver plated per ASTM B-298
Copper foil	Silver plated per ASTM-B-298



Expanded PTFE	Type F6 per MIL-C-17 or ASTM D-14577		
FEP	Per ASTM D-2116, FQQ flammability test UL94		
(BLANK)			
Stainless Steel	Class AISI-303 UNS20200 SAE30303 – Per:		
	per AMS 5664U Type 1	ASTM A582 12	ASTM A262 10 Practice A/E
	AASTM E112 96	Federal Spec QQ-S-764B	DFARS 232.225.7009 10-4-11
	ASTM A484 13	DIN 50049/en10204 Type 3.1	ASTM 484 13
	Passivation per ASTM A967, AMS 2700, QQ-P-35		
PEI (Polyetherimide)	Resin certified to ASTM D 5205 PEI 0113		
Solder	SnAgCu: ~ 2.5% Silver, 0.9% copper, (100-2.5-0.9)% Tin balance; Typ.		
Aluminum	6061T6, anodized TYPES II & III per		
Polyolefin	Thin wall Heat shrinkable polyolefin MIL-DTL-23053/5 Class 1 & 3 UL224 corrosion and fire rated		
	Thick wall Heat shrinkable polyolefin MIL-DTL-23053/5 Class 1 & 3 UL224 corrosion and fire rated; encapsulating modified polyamide adhesive		
	Ultra thin wall Heat shrinkable polyolefin MIL-DTL-23053/5 Class 1 & 3 UL224 corrosion and fire rated		
Foam	Closed cell polyethylene, 2.3 lb – 4 lb. ASTM D 3575-93		
	Convuluted static dissipative <10e11 ohms polyurethane pink foam laminated to top and fitted in bottom; California 117 - Note: All Testing Done By ASTM D 3574Standard Rev. 1, 12-3-02		
Jacketing	Polyethylene terephthalate FMVSS302, UL94 flame resistance, ASTM G21 Fungus resistance		
Rubber	Oil resistant Buna N O-ring SAE J200 Durometer A70		
	High temperature Silicone SAE J200 Durometer A70		
	Steam Resistant EPDM SAE J200 Durometer A70		
Packaging	ESD shielding with lid closed; “Faraday Cage” effect restricting electrostatic charges to exterior; tested per FED-STD-101, Method 3005 for reducible sulfur		
Vinyl	Connector caps durometer of 75A, maximum temperature of 180° F. - assorted colors.		
	Vinyl substrate 30 mil (.08mm) magnetic mats and signage		
Pigments	Inkjet applied Orcal eco-solvent based inks UV protected		
Adhesives	Polyacrylate, Acrylate polymers permanent, transparent		
(BLANK)			

Velocity Microwave  
(div. ATX Labs)  
**REACH** Compliance Certification



Velocity Microwave is deeply committed to the European Union Regulation governing the Registration, Evaluation and Authorization of Chemical (**REACH EC Regulation Number 1907 / 2006**).

[I] Velocity Microwave further represents that it monitors both its internal manufacturing process, as well as that of components in its supply chain, to be free of any substance on the Candidate List of Substances of Very High Concern for Authorization (SVHC) – published in accordance with **Article 59(10) of the REACH Regulation** – and deemed authentic in only the following locus:

**<https://echa.europa.eu/candidate-list-table>**

[II] Velocity Microwave still further represents that no substances on the REACH SVHC Candidate list, per the above, shall be found in a concentration greater than 0.1% - by weight – in any of the products below in the list designated as **2016 PMVM**, manufactured by Velocity Microwave, or transferred through Velocity Microwave as a pass through agent by either inattention or design.

**2016PMVM**

### **Microwave Test and Measurement Cable Assemblies**

**Labflex** microwave test cable assemblies commonly designated with the prefix LF; **Benchflex** microwave test cable assemblies commonly designated with the prefix BF; **Conexus** microwave test cable assemblies commonly designated with the prefix GP; **Conexus HD** microwave test cable assemblies commonly designated with the prefix GP and the subsequent designator HD; **Continuum** microwave test cable assemblies commonly designated with the prefix CN; **Vector** microwave test cable assemblies commonly designated with the prefix TPX; **Custom** Assemblies developed to meet specific customer requirement; **VM repair kits** deployed as field repair aids for the above microwave test cables.

### **Microwave Gaging Apparatus**

**Ergon** microwave connector interface gages and kits containing ancillary components, **Legacy** microwave connector interface gages and kits containing ancillary components, **Datum** microwave connector interface gages and kits containing ancillary components; **Element** microwave connector interface gages and kits containing ancillary components; **Ancillary data port** connectors and devices for Datum Gage.

## **Microwave Connectors ~Subminiature and Larger Families**

**SMA** microwave connector of the subminiature class; **2.92mm (K)** microwave connector of the subminiature class; **3.5mm** microwave connector of the subminiature class; **2.4mm** microwave connector of the subminiature class; **1.85mm** microwave connector of the subminiature class; **Type N** microwave connector 7mm class; **APC7** hermaphroditic microwave connector of the 7mm class; **TNC** microwave connector.

## **Microwave Torquing Apparatus**

**8 in-lb Torque wrench** with 5/16 dimension designated for use with subminiature microwave connectors; **12 in-lb Torque wrench** with 19mm dimension designated for use with 7mm of the Type N class microwave connectors; **12 in-lb Torque wrench** with 20 dimension designated for use with 7mm of the Type N class microwave connectors; **12 in-lb Torque wrench** with 19mm dimension designated for use with NMD class microwave connectors; **12 in-lb Torque wrench** with 20 dimension designated for use with NMD class microwave connectors; **8 in-lb Torque wrench** with 19mm dimension designated for use with NMD class microwave connectors; **8 in-lb Torque wrench** with 20 dimension designated for use with NMD class microwave connectors; **20 in-lb Torque wrench** with 5/16 dimension designated for use with subminiature microwave connectors as a repair and installation aid.

### **Velocity Microwave**

[Div. ATX Labs]

Located at:

#### **Production**

151 Beach Road, Unit 1B  
Vineyard Haven, MA 02568  
Phone: 508-338-2333

#### **Material Test & Development**

9 Beechtree Road,  
Chilmark, MA 02535  
Phone: 508-645-7980

[www.velocitybyGTE.com](http://www.velocitybyGTE.com)