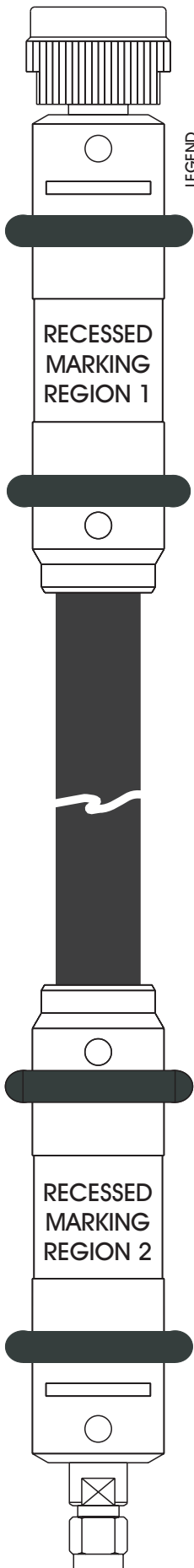


FORTIS VECTOR SERIES ORDERING OPTIONS



SERIES	CONNECTOR 1	GENDER 1	CONNECTOR 2	GENDER 2	LENGTH
TPX	18NMD	F	18NMD	M	26 IN (660mm)
RESERVED	RESERVED		24NMD	F	39IN (991mm)
			29NMD		CUSTOM
					RESERVED

LEGEND

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

18NMD	29
24NMD	35PEI
29NMD	35AL
18	N
24	RESERVED

*PEI: Polyetherimide thermally stable plastic

EXAMPLE: TPX-NMDF-29F-26

FORTIS CONNECTOR FAMILY

18NMD-M	18NMD-F
24NMD-M	24NMD-F
29NMD-M	29NMD-F
N-M	N-F
18M	18F
24M	24F
29M	29F
35PEIM	35PEIF
35ALM	35ALF

NOTES

Cable shall have an aluminum plate of approximate thickness 0.003 inches applied to the test port end and it shall wrap the recessed area of the type III anodized hand grip. The label shall be serialized with a permanent stamping and it shall be applied with 3M-468 adhesive as pictured below.

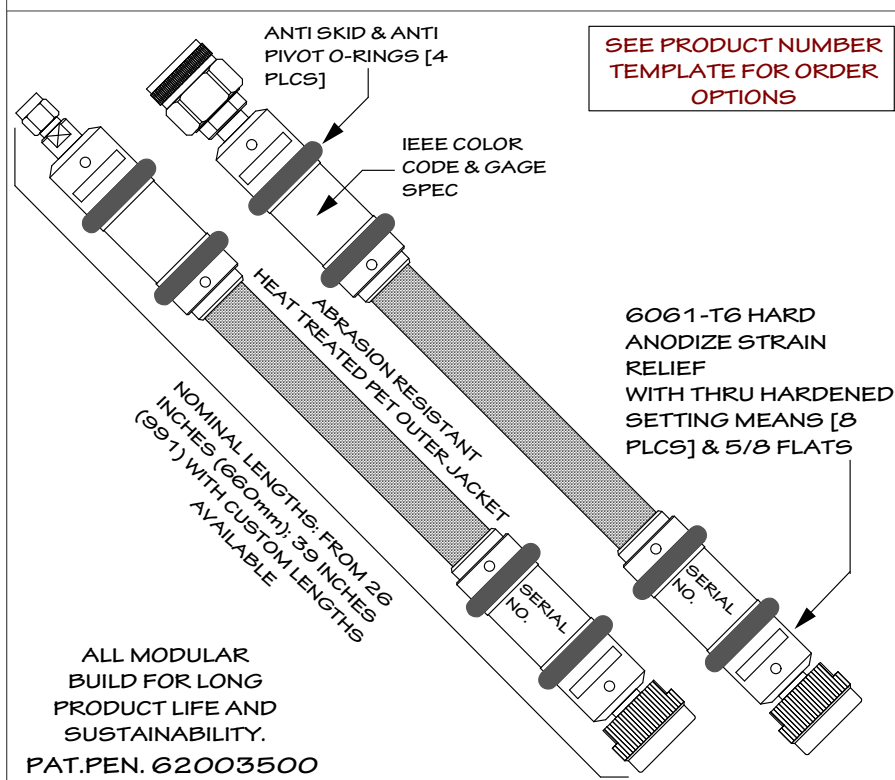
PRECISION - MODULAR **Vp**
TEST PORT EXTENSION ASSEMBLY 84-87
 2.92mm, NMD, HYBRID 3.5mm, TYPE N - WARP SERIES
 PATENT PENDING - SERIAL No. **STAMPED SERIAL #**
VELOCITY MICROWAVE ~ div. ATX Labs
www.velocitymicrowave.com

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



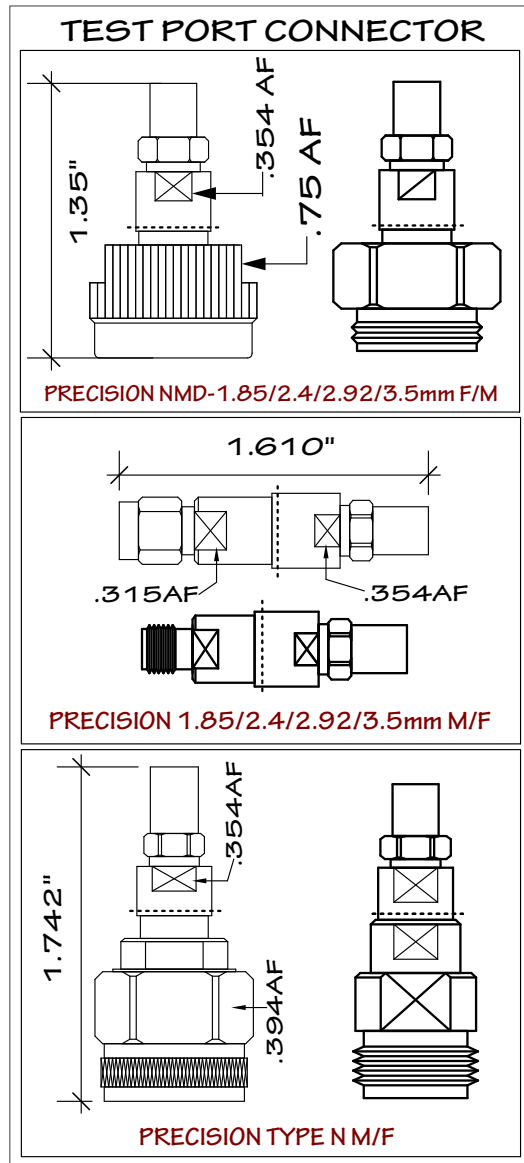
NOTE: FEMALE APPLIED ART NOT SHOWN

PLUG FEATURE		MATERIAL	FINISH	ELECTRICAL PERFORMANCE	
CENTER CONTACT		BERYLLIUM CU ASTM B-196	GOLD	SWR	1.25 TYP. / 1.45 MAX
OUTER CONTACT		STAINLESS STEEL ASTM A-582	PASSIVATED	ATTENUATION	SEE CHART
COUPLING NUT		STAINLESS STEEL ASTM A-582	PASSIVATED	MAX LOSS [dB] VS TEMP [C]	$(2\alpha[.0038(T-20) + 1])^{1/2}$ *
SOLDER FERRULE		BRASS MIL-G-45204 PLATED	GOLD	PHASE Δ: IEC-60966-8.6.2.1	MAX 18 DEGREES P-P
DIELECTRIC		POLYETHER IMIDE (PEI)	-----	MAX PHASE DELTA TEMP	SEE CHART
RETAINING RING		BERYLLIUM CU ASTM B-196	NICKEL	MAX FREQUENCY 3.5MM-PEI	27 GHZ [MAX OPERATING]
GASKET		MVQ [SILICONE RUBBER]	-----	MAX FREQUENCY 2.92mm	40 GHZ [MAX OPERATING]
MECHANICAL CHARACTERISTICS				MAX FREQUENCY TYPE N	18 GHZ [MAX OPERATING]
COMPRESSION (COSMETIC DEFECT & SWR IMPAIRMENT)	800 lbs WITH MIL-T-81490 PLATE	COMPRESSION PER MIL-T-81490 SEC. 4.7.18 CONCENTRATED LOAD 7-9 IN. FROM CONNECTOR; FLEXURE		NOMINAL IMPEDANCE	50 OHMS
FLEXURE (CYCLES)	25,000 MIN	ENDURANCE PER IEC60966 SEC. 9.3		PROPAGATION VELOCITY	84%
				* $(2\alpha [dB])$ IS LOSS AT 20C, T IS TEMP OF INTEREST	



CONSTRUCTION / DIMENSIONS	
CENTER CONDUCTOR	SP-OFHC COPPER PER ASTM B298
DIELECTRIC	MULTI-PLY EPTFE TYPE F6 MIL-C-17
INNER BRAID/SHIELD	HELICALLY WRAPPED SILVER
OUTER BRAID	38 AWG SPC PER ASTM B-298
INNER JACKET	FEP PER ASTM D-2116
CRUSH PROTECTION	SPCW PER ASTM B-501; S9304 SQ. LOCK
OUTER ASSEMBLY	S9304 SQUARE LOCK W/ PET DRESS
OUTER JACKET	POLYETHYLENE TEREPHTHALATE (PET)
STRAIN RELIEF	6061T6 MIL-A-8625 Type III HARD COAT
SOLDER	PB-FREE, ROHS COMPLIANT

GENERAL SPECIFICATION	
CABLE DIAMETER [NOM]	.510 +/- 0.01
MINIMUM BEND RADIUS	2 INCHES
CONNECTOR RETENTION	150 LBS
TEMPERATURE RANGE	-55 / + 135 DEGREES C
MATING TORQUE	7 - 12 IN-LBS
CONNECTOR INTERFACES	MIL-STD-348A; MIL-C-39012
CAPACITANCE NOMINAL	24 pF/FT
PROPAGATION VELOCITY NOM.	84%
RF LEAKAGE	>100 dB->18 GHZ [MIL-T-81490]
INSULATION RESISTANCE	>3X10E5 MOhm/m
RF POWER	SEE CHART
FLAMMABILITY	UL94
ABRAISION RESISTANCE	CALIBRASE H-18/500G/800CYC
WEIGHT JR84	8.6 oz



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 GUARANTEED LONGER TERM SUSTAINABILITY BY VIRTUE OF MODULAR PLATFORM AND GEOMETRY.

VECTOR SERIES

FORTIS MODULAR TEST CABLE FOR DEDICATED VNA DEPLOYMENT

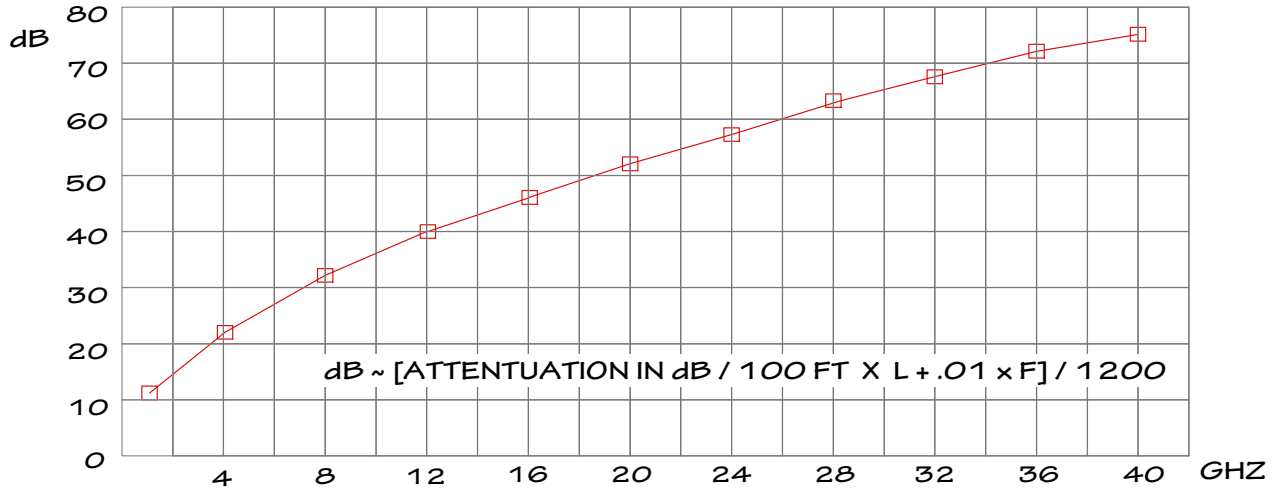
ULTRA PHASE STABLE WITH TEMPERATURE & FLEXURE

Velocity Microwave ~ div. ATX Labs

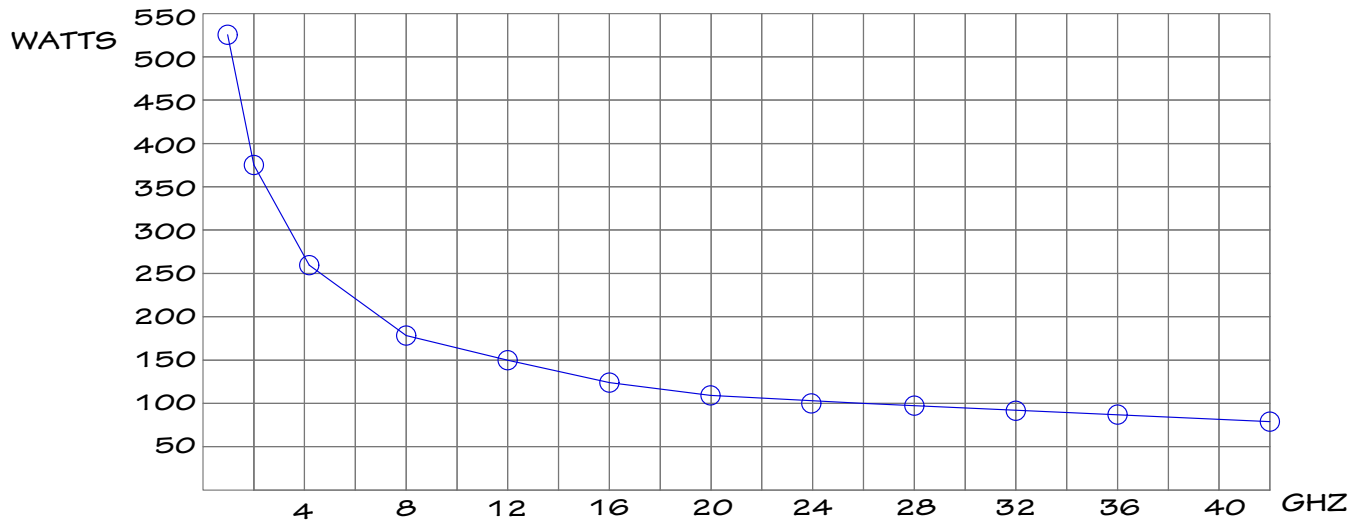
www.velocitymicrowave.com PAT.PEND.

PLUG FEATURE		MATERIAL	FINISH	ELECTRICAL PERFORMANCE	
CENTER CONTACT		BERYLLIUM CU ASTM B-196	GOLD	SWR	1.25 TYP. / 1.45 MAX
OUTER CONTACT		STAINLESS STEEL ASTM A-582	PASSIVATED	ATTENUATION	SEE CHART
COUPLING NUT		STAINLESS STEEL ASTM A-582	PASSIVATED	MAX LOSS [dB] VS TEMP [C]	$(2\alpha(.0038(T-20) + 1))^{1/2}$ *
SOLDER FERRULE		BRASS MIL-G-45204 PLATED	GOLD	PHASE Δ: IEC-60966-8.6.2.1	MAX 18 DEGREES P-P
DIELECTRIC		POLYETHER IMIDE (PEI)	-----	MAX PHASE DELTA TEMP	SEE CHART
RETAINING RING		BERYLLIUM CU ASTM B-196	NICKEL	MAX FREQUENCY 3.5MM-PEI	27 GHZ [MAX OPERATING]
GASKET		MVQ [SILICONE RUBBER]	-----	MAX FREQUENCY 2.92mm	40 GHZ [MAX OPERATING]
MECHANICAL CHARACTERISTICS				MAX FREQUENCY TYPE N	18 GHZ [MAX OPERATING]
COMPRESSION (COSMETIC DEFECT, SWR IMPAIRMENT)	400/800# PER 2 IN. STEP PLATE	COMPRESSION PER MIL-T-81490 SEC. 4.7.18 CONCENTRATED LOAD 7-9 IN. FROM CONNECTOR; FLEXURE		NOMINAL IMPEDANCE	50 OHMS
FLEXURE (CYCLES)	25,000 MIN	ENDURANCE PER IEC60966 SEC. 9.3		PROPAGATION VELOCITY	84%
				* $(\alpha_{20} [dB])$ IS LOSS AT 20C, T IS TEMP OF INTEREST	

ATTENUATION IN dB / 100 FT.



MAX RF POWER AT 20 DEGREES C & SEA LEVEL



GENERAL SPECIFICATION	
CABLE DIAMETER [NOM]	.510 +/- 0.01
MINIMUM BEND RADIUS	2 INCHES
CONNECTOR RETENTION	150 LBS
TEMPERATURE RANGE	-55 / + 135 DEGREES C
MATING TORQUE	7 - 12 IN-LBS
CONNECTOR INTERFACES	MIL-STD-348A; MIL-C-39012
CAPACITANCE NOMINAL	24 pF/FT
PROPAGATION VELOCITY NOM.	84%
RF LEAKAGE	>100 dB->18 GHZ [MIL-T-81490]
INSULATION RESISTANCE	>3X10E5 MOhm/m
RF POWER	SEE CHART
FLAMMABILITY	UL94
ABRAISION RESISTANCE	CALIBRASE H-18/500G/800CYC
WEIGHT JR84	8.6 oz

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 GUARANTEED LONGER TERM SUSTAINABILITY BY VIRTUE OF MODULAR PLATFORM AND GEOMETRY.

VECTOR SERIES

FORTIS MODULAR TEST CABLE FOR DEDICATED VNA DEPLOYMENT

ULTRA PHASE STABLE WITH TEMPERATURE & FLEXURE

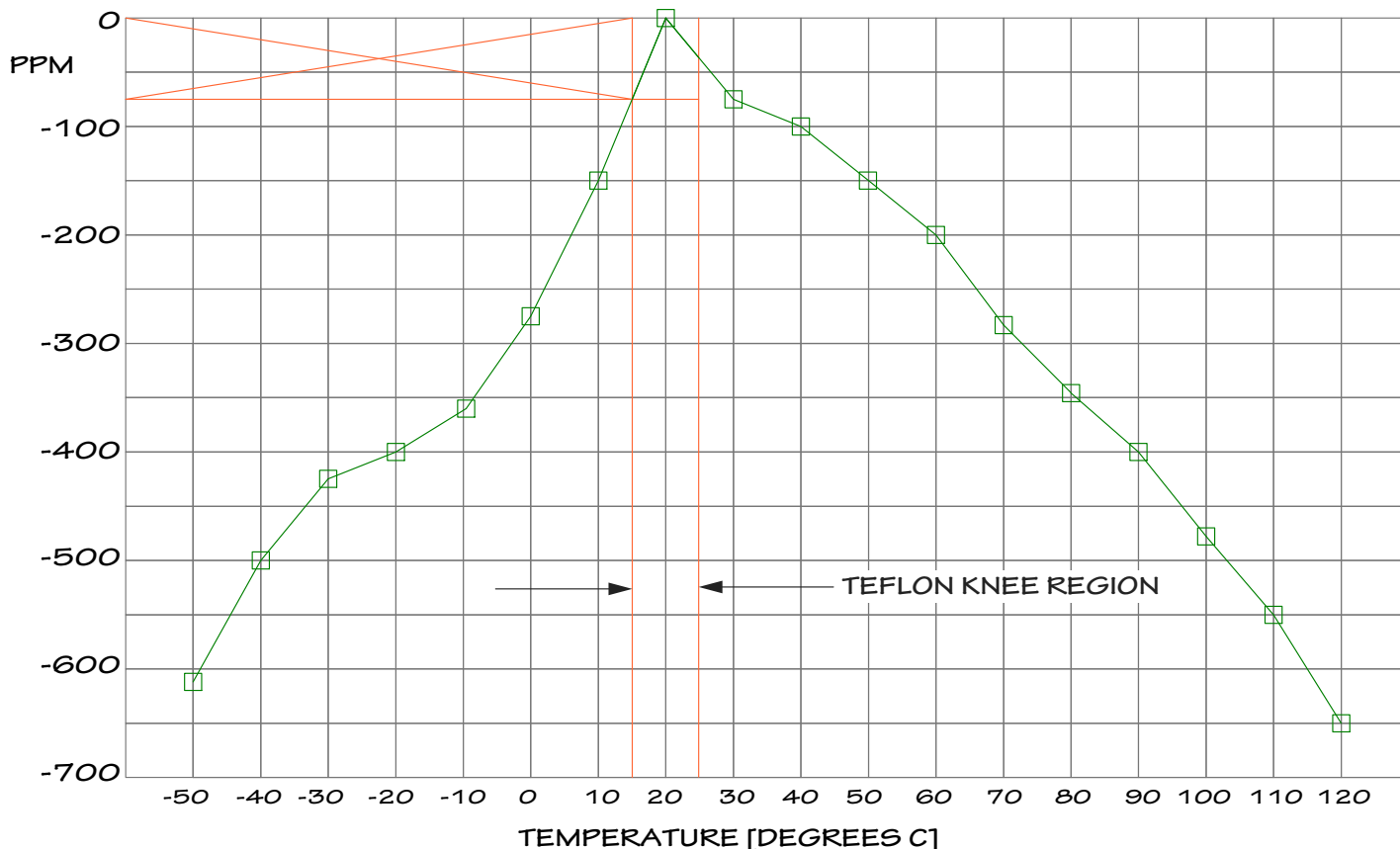
Velocity Microwave ~ div. ATX Labs

www.velocitymicrowave.com

PAT.PEND.

PLUG FEATURE		MATERIAL	FINISH	ELECTRICAL PERFORMANCE	
CENTER CONTACT		BERYLLIUM CU ASTM B-196	GOLD	SWR	1.25 TYP. / 1.45 MAX
OUTER CONTACT		STAINLESS STEEL ASTM A-582	PASSIVATED	ATTENUATION	SEE CHART
COUPLING NUT		STAINLESS STEEL ASTM A-582	PASSIVATED	MAX LOSS [dB] VS TEMP [C]	$(2\alpha[.0038(T-20) + 1])^{1/2}$ *
SOLDER FERRULE		BRASS MIL-G-45204 PLATED	GOLD	PHASE Δ: IEC-60966-8.6.2.1	MAX 18 DEGREES P-P
DIELECTRIC		POLYETHER IMIDE (PEI)	-----	MAX PHASE DELTA TEMP	SEE CHART
RETAINING RING		BERYLLIUM CU ASTM B-196	NICKEL	MAX FREQUENCY 3.5MM-PEI	27 GHZ [MAX OPERATING]
GASKET		MVQ [SILICONE RUBBER]	-----	MAX FREQUENCY 2.92mm	40 GHZ [MAX OPERATING]
MECHANICAL CHARACTERISTICS				MAX FREQUENCY TYPE N	18 GHZ [MAX OPERATING]
COMPRESSION (COSMETIC DEFECT, SWR IMPAIRMENT)	400/800# PER 2 IN. STEP PLATE	COMPRESSION PER MIL-T-81490 SEC. 4.7.18 CONCENTRATED LOAD 7-9 IN. FROM CONNECTOR; FLEXURE		NOMINAL IMPEDANCE	50 OHMS
FLEXURE (CYCLES)	25,000 MIN	ENDURANCE PER IEC60966 SEC. 9.3		PROPAGATION VELOCITY	84%
				* $(\alpha_{20} [dB])$ IS LOSS AT 20C, T IS TEMP OF INTEREST	

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.

GENERAL SPECIFICATION	
CABLE DIAMETER [NOM]	.510 +/- 0.01
MINIMUM BEND RADIUS	2 INCHES
CONNECTOR RETENTION	150 LBS
TEMPERATURE RANGE	-55 / + 135 DEGREES C
MATING TORQUE	7 - 12 IN-LBS
CONNECTOR INTERFACES	MIL-STD-348A; MIL-C-39012
CAPACITANCE NOMINAL	24 pF/FT
PROPAGATION VELOCITY NOM.	84%
RF LEAKAGE	>100 dB->18 GHZ [MIL-T-81490]
INSULATION RESISTANCE	>3X10E5 MOhm/m
RF POWER	SEE CHART
FLAMMABILITY	UL94
ABRAISION RESISTANCE	CALIBRASE H-18/500G/800CYC
WEIGHT JR84	8.6 oz

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 GUARANTEED LONGER TERM SUSTAINABILITY BY VIRTUE OF MODULAR PLATFORM AND GEOMETRY.

VECTOR SERIES

FORTIS MODULAR TEST CABLE FOR DEDICATED VNA DEPLOYMENT

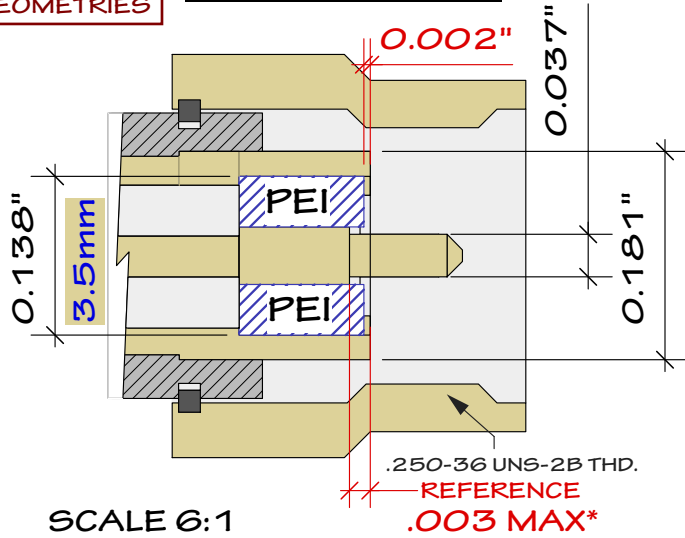
ULTRA PHASE STABLE WITH TEMPERATURE & FLEXURE

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**COMMON
INTERFACE
GEOMETRIES**

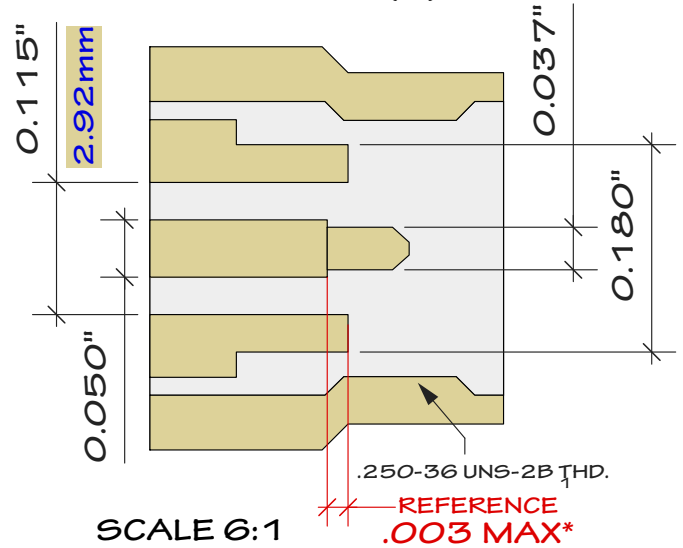
HYBRID 3.5mm



SCALE 6:1

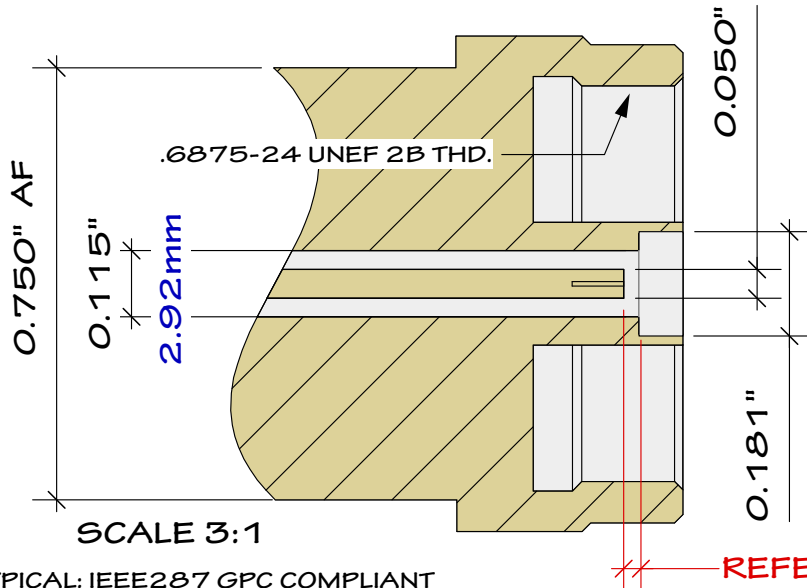
NOTE: IN THE HYBRID *THIN CORE* 3.5mm DESIGN THE DIELECTRIC IS MINIMIZED IN LENGTH AND DIAMETER WHILE THE DOWNSTREAM SIGNAL PATH IS DOMINATED BY AN AIRLINE. DESIGN OFFERS EXCEPTIONAL COMPATIBILITY WITH SMA, 2.92MM AND 3.5MM AND IS MODE FREE WITH SUPERIOR RETURN LOSS TO 32 GHZ. RATED FOR 2000 MATING CYCLES. DIELECTRIC IS POLYETHER IMIDE [PEI], A TOUGH PLASTIC WITH ABOUT HALF THE THERMAL EXPANSION OF TEFLON.

2.9mm (K)



SCALE 6:1

NOTE: THE 2.92mm OR K CONNECTOR IS DESIGNED AS GENERAL PRECISION CONNECTOR FOR TEST AND MEASUREMENT USE AND HAS THE ABILITY TO WITHSTAND MANY MORE MATING CYCLES THAN LOWER COST ALTERNATIVES. IT IS AN AIRLINE AND MODE FREE TO BEYOND 40 GHZ. RATED FOR 2000 MATING CYCLES.



SCALE 3:1

NOTE: THE RUGGEDIZED FEMALE NMD CONNECTOR IS DESIGNED FOR ROBUST MATING TO THE PORT OF A NETWORK ANALYZER AND OBVIATES THE NEED FOR A PORT ADAPTERS. IT HAS THE SAME REFERENCE RECESSON AS OTHER FEMALE 2.92MM CONNECTORS. IT CAN ONLY BE GAGED FOR RECESSON BY USING VM'S 2.92mm PRECISION GAGE KIT. OBSERVE THAT IT IS MATED ONLY TO A MALE NMD CONNECTOR. ONE OF THE ADVANTAGES OF THE NMD MATING PROCESS IS THAT IT IS MUCH EASIER TO ACHIEVE MATING WITHOUT ANY ROTATIONAL SHEAR FORCES BEING PUT ON THE FEMALE PIN. SEE PAGE 5 FOR COMPATIBILITY. RATED FOR 3000 MATING CYCLES.

*TYPICAL: IEEE287 GPC COMPLIANT
MALE & FEMALE IN SUBMINATURE FAMILIES
SHARE SAME RECESSON SPEC.

2.92mm NMD FEMALE

GENERAL SPECIFICATION	
CABLE DIAMETER [NOM]	.510 +/- 0.01
MINIMUM BEND RADIUS	2 INCHES
CONNECTOR RETENTION	150 LBS
TEMPERATURE RANGE	-55 / + 135 DEGREES C
MATING TORQUE	7 - 12 IN-LBS
CONNECTOR INTERFACES	MIL-STD-348A; MIL-C-39012
CAPACITANCE NOMINAL	24 pF/FT
PROPAGATION VELOCITY NOM.	84%
RF LEAKAGE	>100 dB->18 GHZ [MIL-T-81490]
INSULATION RESISTANCE	>3X10E5 MOhm/m
RF POWER	SEE CHART
FLAMMABILITY	UL94
ABRAISION RESISTANCE	CALIBRASE H-18/500G/800CYC
WEIGHT JR84	8.6 oz

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 GUARANTEED LONGER TERM SUSTAINABILITY BY VIRTUE OF MODULAR PLATFORM AND GEOMETRY.

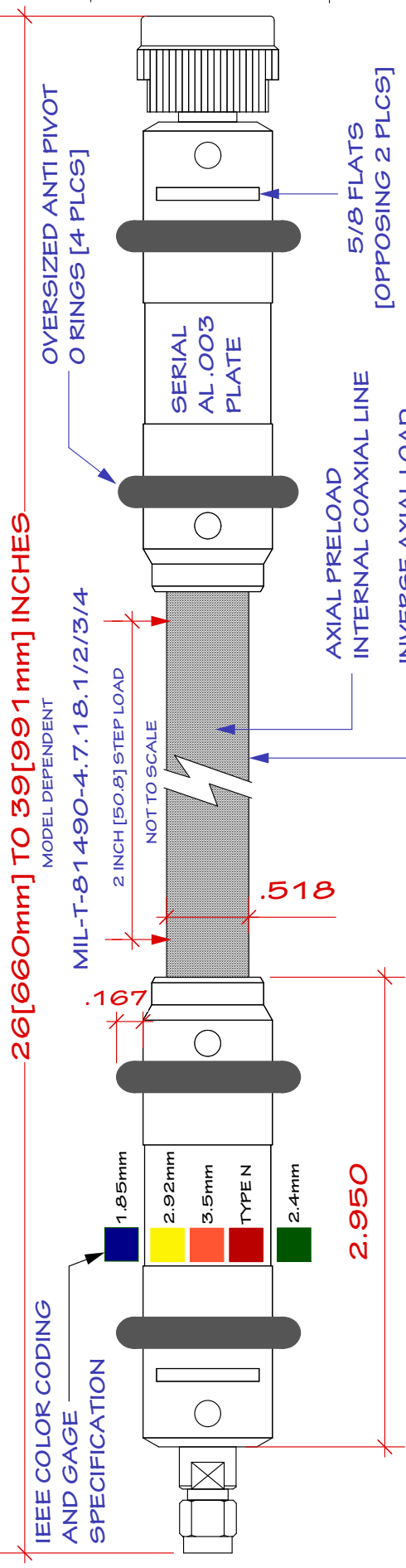
VECTOR SERIES

FORTIS MODULAR TEST CABLE FOR DEDICATED VNA DEPLOYMENT

ULTRA PHASE STABLE WITH TEMPERATURE & FLEXURE
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10	9	8	7	6	5	4	3	2	1
MODULARIZED MICROWAVE CABLE ASSEMBLY WITH AXIAL PRELOADING AND EXTENDED LIFE PAT. PEND. 62003500					REVISIONS ZONE REV. DESCRIPTION DATE APPROVED				

E



D

- C
- STRAIN RELIEF COMPONENTS 6061-T6 FOR REDUCED WEIGHT
 - TYPE III HARD ANODIZE PER MIL-A-8625 Type III FOR LONG WEAR
 - POLYETHYLENE TEREPHTHALATE (PET) FINAL DRESS JACKET
 - STAINLESS STEEL SS304 0.015 OUTER SQUARE LOCKED JACKET
 - FULL VERTICAL BUILD MODULARITY FOR EXTENDED SERVICE LIFE
 - STAINLESS STEEL NMD AND 2.92MM/3.5MM/TYP N CONNECTORS
 - HIGH VELOCITY INTERNAL COAXIAL LINE WITH HELICAL GEOMETRY
 - THROUGH HARDENED KNURLED SETTING MEANS [EIGHT PLACES]
 - ACRYLONITE BUTADENE O RINGS [4 PLCS] SURFACE PROUD > 150 MILS
 - LOADING MEANS FOR COAX & JACKET PAIR FOR IMPULSE LOAD BUFFERING
 - COMPRESSION RESISTANCE (LOAD NORMAL) BETWEEN 400 AND 800 LBS PER MIL-T-81490-1 972 TWO INCH STEP TEST MODEL DEPENDENT.

B



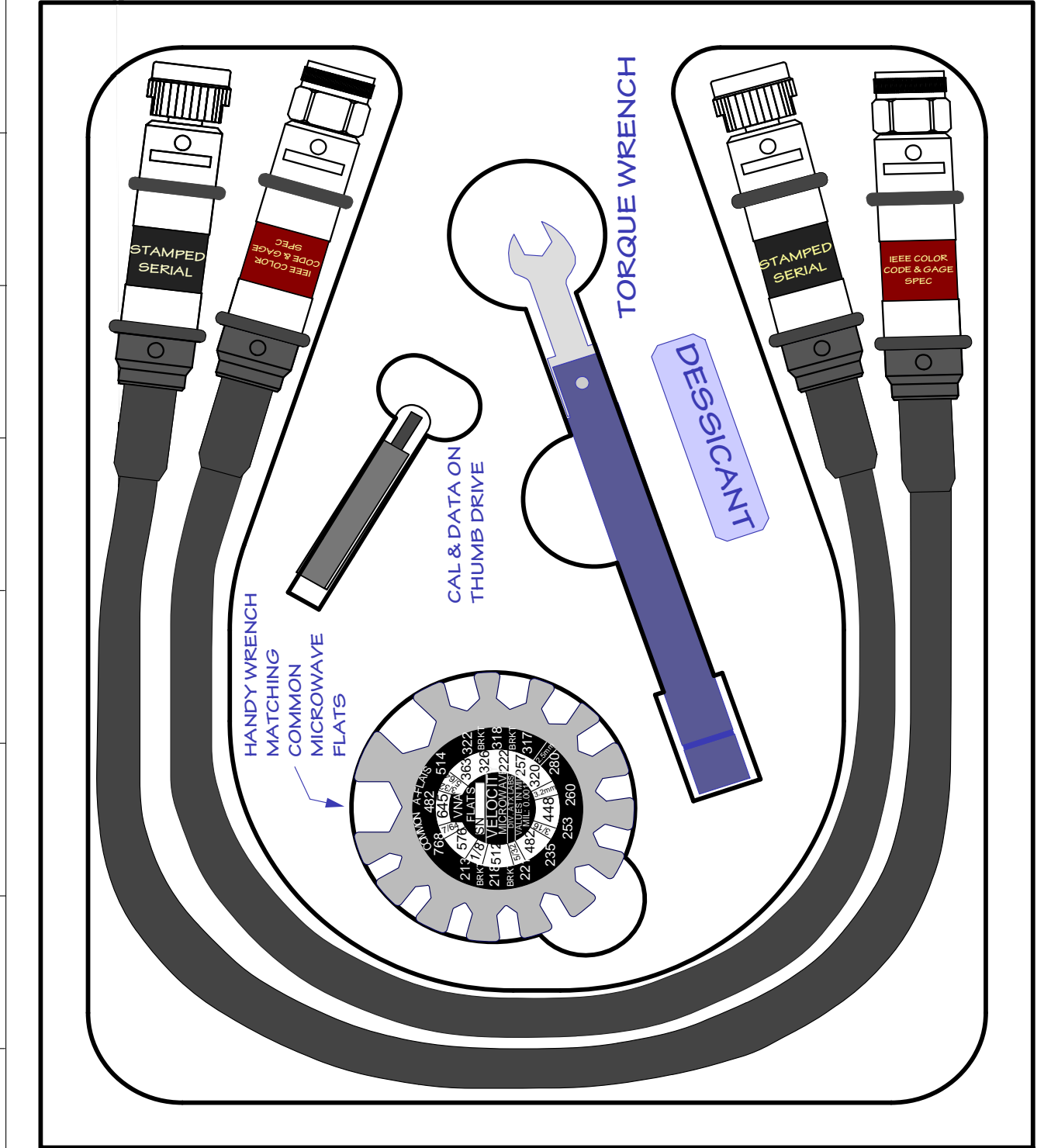
A

UNLESS OTHERWISE SPECIFIED:		DRAWN	NAME	DATE	ATX LABS Chilmark, MA 02535	
DIMENSIONS ARE IN INCHES		CHECKED	em	1-09-2014	TITLE MODULAR CABLE ASSEMBLY	
TOLERANCES:		ENG APPR	vs	2-05-2014	SIZE	DWG. NO.
ANGULAR: MACH +/- .5 DEG.		MFG APPR	jm	2-27-2014	A	ATX-102
BEND: +/- 1 DEG.		Q.A.	ds	3-19-2014	REV	3
TWO PLACE DECIMAL: +/- 0.01		COMMENTS:				
THREE PLACE DECIMAL: +/- 0.001		GOLD				
MATERIAL: 6061-T6 SRC/SS304-JKT						
FINISH: <R432		SCALE 1:1		SHEET: 1 OF 1		

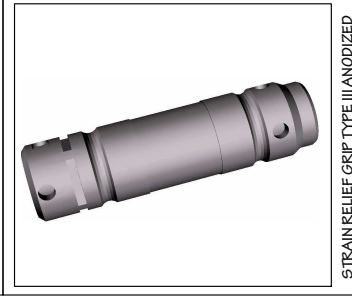
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ATX: SMALL FORM A

10 9 8 7 6 5 4 3 2 1



ATX LABS Chilmark, MA 02535		REV 3	
TITHE CUT FOAM & LAYOUT FOR VECTOR SERIES		DWG. NO. ATX-115	
SCALE 1:1	SHEET 1 OF 1	DATE	
DRAWN	NAME	CHECKED	DATE
12-18-14	em	VS	12-21-14
ENG APPR		MFG APPR	
Q.A.			
COMMENTS:			
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES			
TOLERANCES:			
ANGULAR: MACH +/- .5 DEG.			
BEND: +/- 1 DEG.			
TWO PLACE DECIMAL: +/- 0.01			
THREE PLACE DECIMAL: +/- 0.001			
MATERIAL: 6061-T6			
FINISH: K832			
PLATING			
DESCRIPTION: EY.			
NOTE: SHOWING TYPICAL CONTENTS. NOTE THAT NMD-F IS COMMON AS PROT TERMINATION; DUR TERMINATION CAN BE 2.92MM, 3.5MM OR TYPE N PER USER PREFERENCE.			
DATE			
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.			



10 9 8 7 6 5 4 3 2 1

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