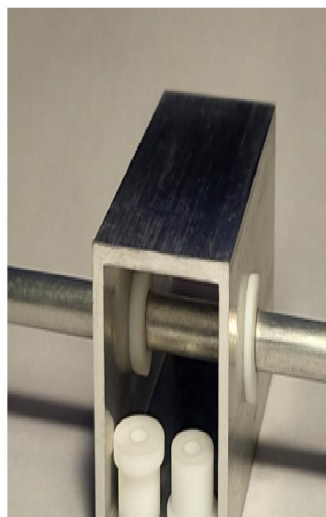


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**PTFE (Teflon) VHF Air  
Insulators  
by George Chaney W5,  
revisited**

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PTFE (Teflon) VHF Antenna Insulators



George Chaney W5JTL-SK published an article in Ham Radio magazine October 1985 on how to make the required tooling for insulating elements in long boom Yagi's.

When George began selling the PTFE bushings and tooling some time later my friend and EME partner built a 903 MHz antenna. When a storm brought down the antenna some 20 years later, Joe found the insulators looked like new! Since we were planning to build a new EME array Joe challenged me to find a suitable source for 3/16" diameter elements. I found a source and bought a run of 1,000 flanged PTFE bushings, the installation tooling and a flash drive with a video showing the process of installing the

K1FO furniture bushings with metal keepers for 3/16" elements

G0KSC furniture bushings in undersized holes for 1/4" elements

DG7YBN PTFE flanged bushings for 3/16" elements

Photo showing Flanged PTFE bushings Holding a 3/16" element in a 1" square boom. If you look closely with the new ones sitting in the boom you can almost see that the flange is a bit thinner and the insulator is slightly expanded. The video shows the process of using the flange to remove expanded PTFE bushings from the boom

## Element insertion and use of expansion tool video

the range to remove expanded PTFE bearings from the boom.

We all appreciate having PTFE insulation in Coax and Coax connectors, We know that it is an excellent material when we go to solder the connections. But the property of virgin PTFE that George Chaney focuses on is that a 1/8" center hole is expanded to 13/64" with a tool to insert a 3/16" element it will try to crack the PTFE. This happens quickly so George cautioned the antenna assembler to adjust element position before the grip will become firmer.

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YBN: Ideally elements are marked at center and half booms width plus length of head of the PTFE to adjust their position while or instantly after pushing them in.

# Element insertion and use of expansion 1

<https://youtu.be/ahma2J0vIIE>

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## Tools:

### 1. Tapered Drill rod to expand PTFE bushing

- 13/64" for 3/16" elements
- 11/64" for 4mm elements
- Countersink on blunt end

### 2. Small wood dowel handle to push drill rod & elements

### 3. Wood block with countersink



Test Yagi for PTFE Length factor determination:

Boom Shape	Boom Dim	Insulator Height/Spec	Element Diam	Half Length	Full Length	Position in NEC	Base-EC	Full BC
Ref1	Square	1 in	ins thru	4.76	164.40	328.80	0.00	5.81
DE	Square	1 in	ins thru	10.00	148.30	296.60	110.00	6.73
D1	Square	1 in	ins thru	4.76	155.50	311.00	172.00	5.58
D2	Square	1 in	ins thru	4.76	152.90	305.80	307.00	5.53
D3	Square	1 in	ins thru	4.76	148.00	296.00	429.00	6.98

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## PTFE (Teflon) VHF Antenna Insu

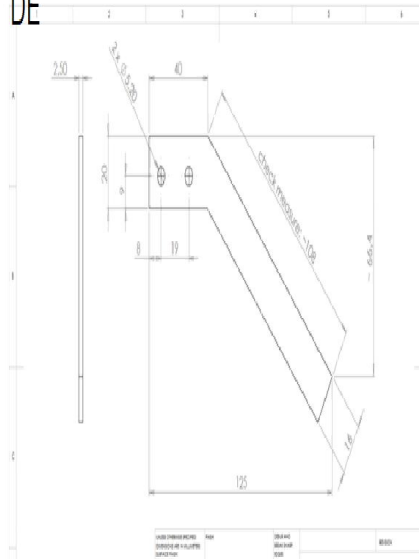
GTV70-7n PTFE Test Antenna built  
with 2.967mm PTFE factor  
(longer elements)

	DG7YBN
	Start mm
Ref	336.59
DE	305.31
D1	318.57
D2	313.31
D3	304.96
D4	296.31
D5	283.86

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GTV70-7n tested with DG7YBN blade

DE



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## PTFE (Teflon) VHF Antenna Insulators

GTV70-7n	Test Results	Target
Resonate @	432.4MHz	432.1M
Return Loss	-50 dB	-29.5 dB
Z	(49.8 + 0.1) $\Omega$	(53 + 0)
VSWR	1.01:1	1.03:1



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Test Yagi GTV70-19

XPO

Horizontal plane only with  
2.967mm PTFE factor

@432.1 MHz as target freq.

Return Loss	-39 dB
Z	(49.9-1.0) Ω
VSWR	1.02:1

GTV 70-19 by DG7YBN						WC8RH
						1 wave le
			DG7YBN			1/4 wave
			X-POL design w/40mm spacing			mm/MBE
			with W3JTL PTFE insulators			
Horizontal						
	station		length*	TT		
	mm	spacing	mm	length		
	R	40.0	0.0	343.80	1.56	R
	DE	144.5	104.5	326.48	1.47	DE
	D1	193.0	153.0	324.74	1.46	D1
	D2	286.0	246.0	321.20	1.45	D2
	D3	468.0	428.0	310.93	1.39	D3
	D4	681.0	641.0	305.08	1.37	D4
	D5	928.0	888.0	301.56	1.36	D5
	D6	1192.0	1152.0	298.53	1.33	D6
	D7	1465.5	1425.5	294.98	1.31	D7
	D8	1747.0	1707.0	290.73	1.29	D8
	D9	2032.0	1992.0	289.41	1.29	D9
	D10	2310.5	2270.5	287.59	1.28	D10
	D11	2585.0	2545.0	286.17	1.27	D11

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## PTFE (Teflon) VHF Antenna Ins

Conclusion: PTFE is a great yagi element insu  
grip thanks to the materials creep behavior.

Boom correction recommendations for elemer

Use SM5BSZ BC.exe and add a fix offset of

144 MHz - add 0.00 mm

432MHz - add 0.65 mm