

Inside TPC/FC final design

Components needed

- Screws, nuts, washers
- Spacers, rods, Kapton film, Delrins, PEEKs
- Resistors
- Rings, Meshes and epoxy glue
- Wirings, terminals, LEMO cables

Screws, nuts, washers

- Pan Head Phillips Machine Screws => x 250
 - 316 SS, 4-40, length 7/16" - 91735A105
 - 316 SS, 4-40, length 3/8" - 91735A104
 - 316 SS, 4-40, length 5/16" - 91735A103
 - 316 SS, 4-40, length 1/4" - 91735A102
- Machine Screw Hex Nuts x 250
 - 316 SS, 4-40, width 1/4" height 3/32" - 90257A005
- Undersized Machine Screw Hex Nuts => x 250
 - 18-8 SS, 4-40, width 3/16" height 1/16" - 90730A005
- General Purpose Stainless Steel Washers => x 250
 - 316 SS, type 4, id 1/8", od 5/16", thick 0.02-0.04" - 90107A005

Spacers, rods, Kapton films, Delrins, PEEKs

- Antistatic Acetal dia = 0.5", length = 3 ft => x 6 – 8753K24
- Moisture-Resistant Acetal Threaded Rod, 10-32 Thread, 4 Feet Long, Fully Threaded => x 8 – 98873A105
- Kapton ® Polyimide Film, .020" Thick, 13-1/2" x 23-1/2" => x 6 - 7161T21 (Pricey ~ \$250 per film ie total ~ \$1500)
- White Delrin ® Acetal Resin Sheet, 1/16" Thick, 12" x 12" => x 2 – 8573K11
- PEEK Sheet 1/8" Thick, 12" x 12" => x 4 – 8504K258504K25
- PEEK Sheet 1/16" Thick, 12" x 12" => x 2 - 8504K21
- Kurtis asked we order the following items below to facilitate the spacer production w/ the CNC machine
 - 3244A213 carbide insert, negative rake, grade R231, diamond, CNGG-431 x 1
 - 8947A159 118 degree point high-speed steel short-length drill bit, bright finish, wire gauge 9, 2-1/4" overall length x 2
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Resistors

I contacted 3 vendors: Caddock, Ohmite and Vishay. Vishay should give me their prices and lead times in the next 48hrs.

1d. Caddock P/N: MG721-100M-0.1% lead time 10 weeks

Order Quantity	Unit price (USD)
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25 to 99	\$31.48 each
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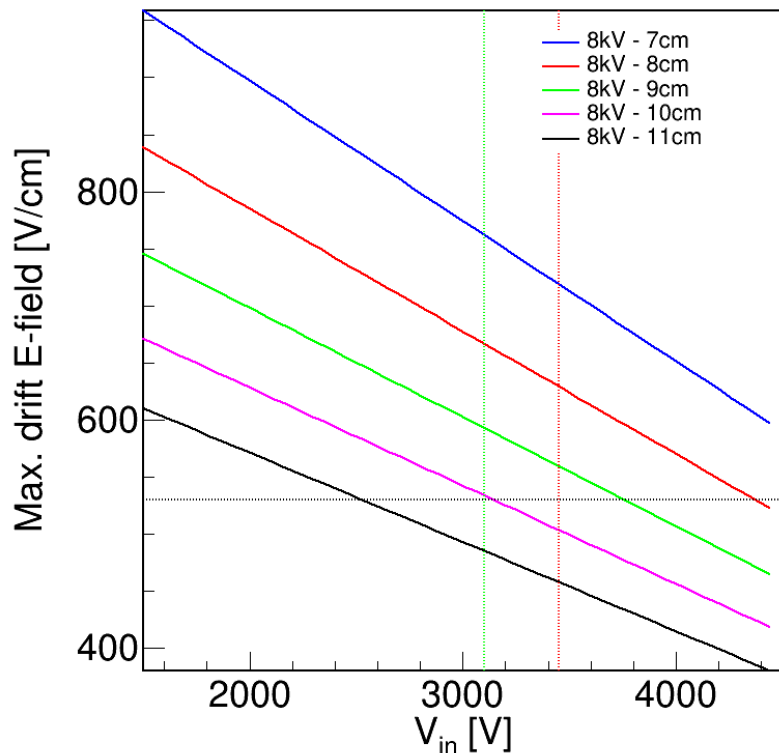
100 to 249	26.23
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250 to 999	23.61
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We need 100 resistors for the two (phase1) prototypes and 8 others for phase 2 TPCs.

Rings, cathodes, Meshes, epoxy glue

- We agreed for 10 cm drift length and not to change the design and the vendors.
- NB: to operate with a gain higher than 2000 ($V_{in} = 3.1$ kV), the drift field will have to be decreased.



- Gain 2000 → 10000
- 530 V/cm → 500 V/cm
- 10 μm/ns → 9.5 μm/ns

We need:

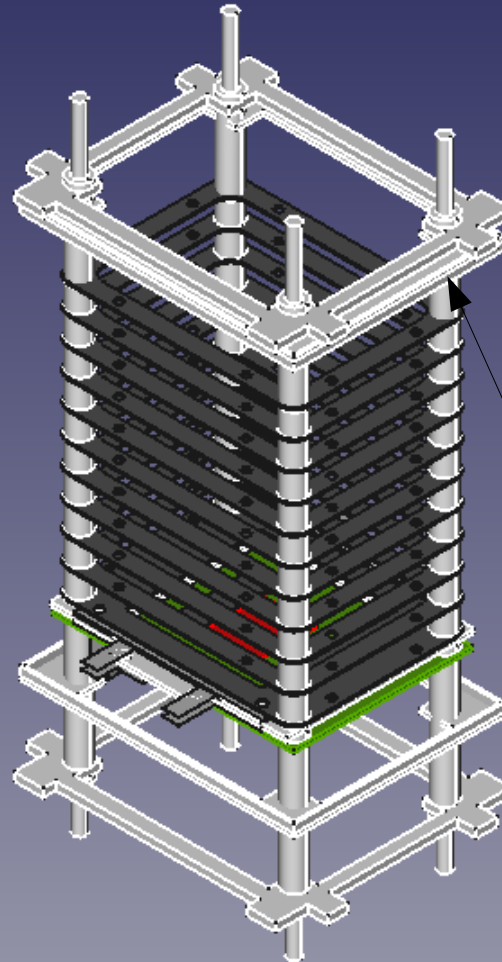
- 70 rings
- 7 cathodes
- 7 meshes
- + spares 10 rings, 2 cathodes and 2 meshes
- + at least 3 bags of epoxy glue

Marc should contact ASAP the vendors to minimize lead time

FC final CAD v0

Kapton film holders:

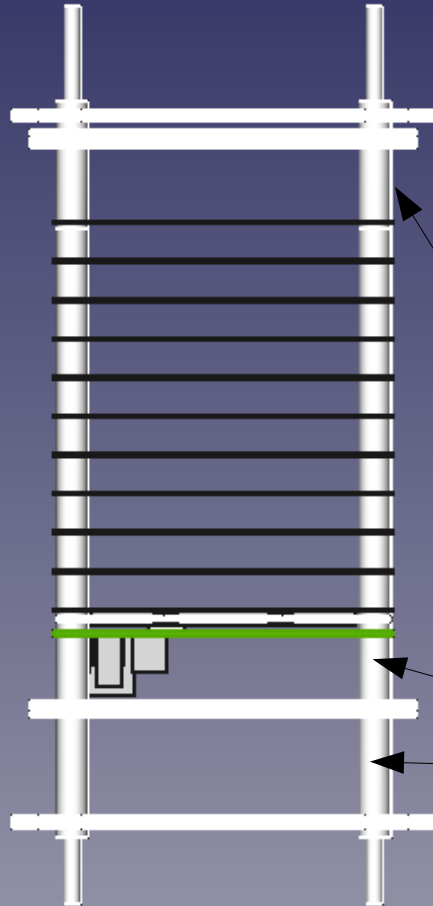
Delrin piece with a wall (the wall does not have to be continuous) of few millimeter to hold the film. Films can be easily mount and remove by bending it



Kapton Film holders



FC final CAD v0

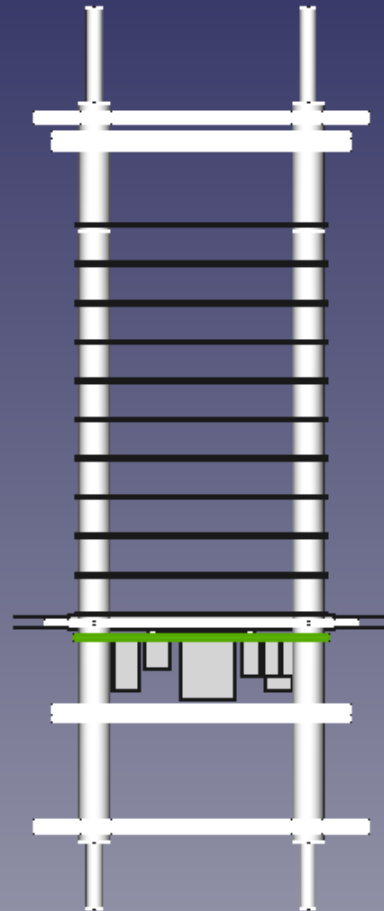


I would like to have additional spacers between:

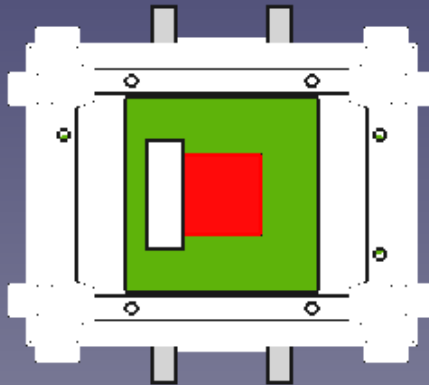
- 1/ FC bot. support plate and bot. Kapton film holder
- 2/ Bot. Kapton film holder and board
- 3/ mesh and top Kapton film holder
- 4/ top Kapton film holder and GC top support plate

To have reproducible and similar FC in each vessels

FC final CAD v0



FC final CAD v0



I would like to test the HV wiring and lugs before ordering enough for 10 TPCs.



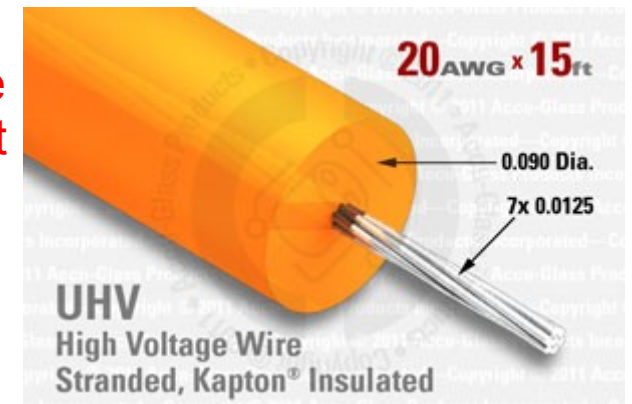
Wirings, terminals, LEMO cables

- Ring Terminals for 10 to 22 AWG wire, Gold Plated 10 per package - RT-1822-6-10 x 5
- Spade Terminals for 10 to 22 AWG wire, Gold Plated. 10 per package.- ST-1822-10 x 5
- Solid core wire 22 AWG, Kapton Insulated Wire. 30' ft. long. - 100680 ? Rated 2kV
- Solid core wire 24 AWG, Cryogenic Service, Kapton Insulated Stainless Steel Wire. 15' ft long. - 112746 ? Rated 3kV
- 20 AWG, Kapton Insulated High-Voltage Wire, 10kVAC / 30kVDC, 15' ft. long. - 112716 => rated 30 kV x 5

I did not find solid core wire rated more than 3 kV, the best choice is the HV wire Stranded Kapton (we already have this one but not in enough quantity, the wirings used inside TPC #2 have much smaller wire diameter 0.006")

All above items are from <http://accuglassproducts.com/>

- 15 LEMO cables to canabalize



Conclusion

- 10cm drift field
- FC 1 cm spacer, ring, cathode and mesh design are decided => same as before
- GEM support design decide => same as before
- **Marc should ASAP contact vendors for ring, cathode and mesh to minimize lead time**
- Resitors, we have one vendor but I would like to check if price can go down with other vendors
- To finalize Kapton film and sources holders, I need final dimension, drawings, CAD file of newest vessel
- Wirings might need more discussion ...
- What is the wiki page where I can put the “final” CAD inside of TPC

Last remaining question: should we order everything at once or by stage ? Except the wirings, I would be in favor to order everything at once