



# NOvA Module End Caps & Manifolds



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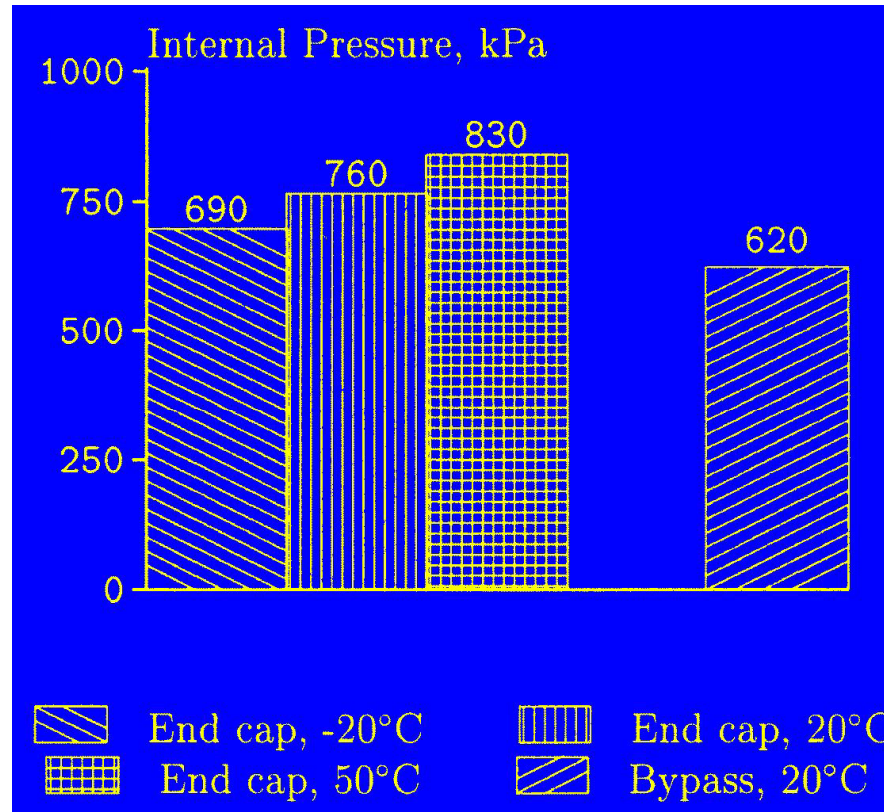


# End Cap Draft Specifications



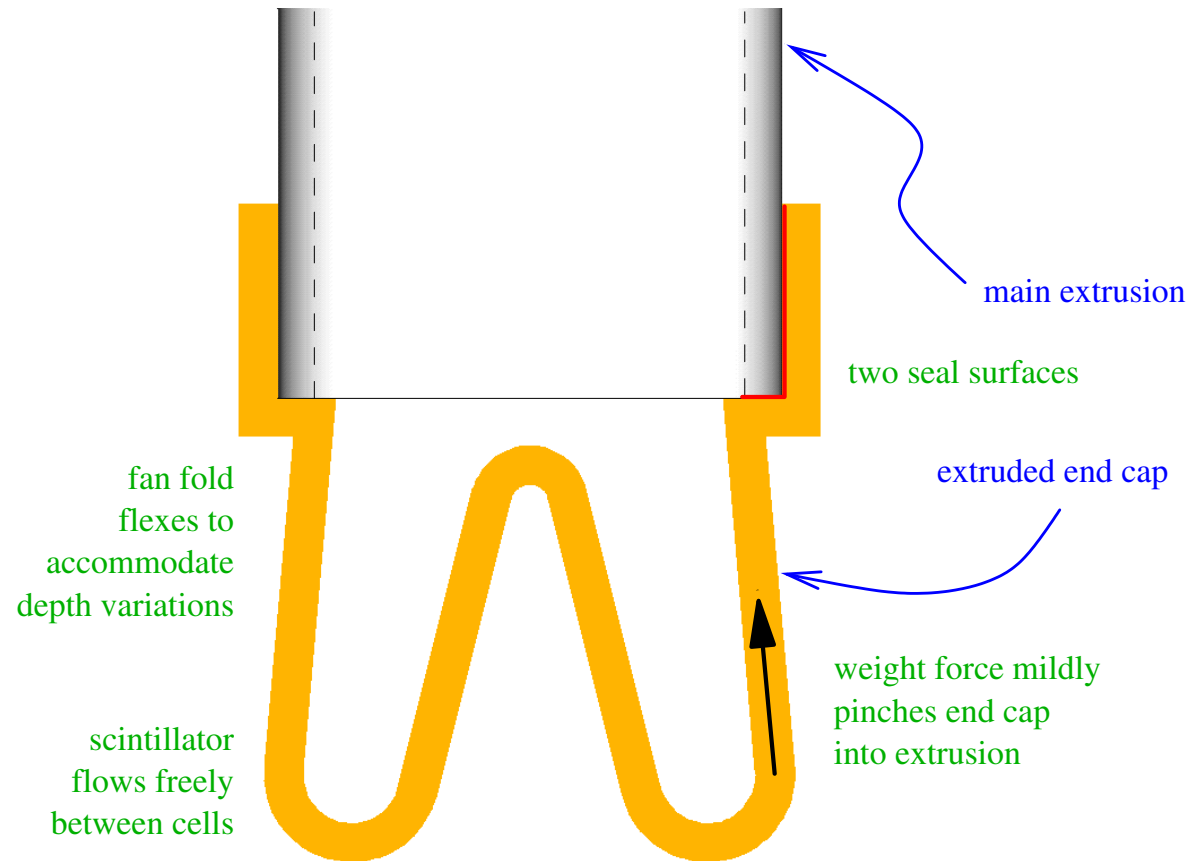
Metric	Units	Target	Marginal
Leak Initiation Pressure	kPa	450	300
Part Cost	\$	10	20
Installation Time	min	5	15
Extrusion Width Tolerance	mm	+/- 3	+/- 1
Extrusion Depth Tolerance	mm	+/- .5	+/- .2
Crush Force	kN	20	10
Fluid Transfer Area	mm <sup>2</sup>	100	0
Modification of Main Extru	Binary	No	Yes

# MINOS Liquid Burst Testing

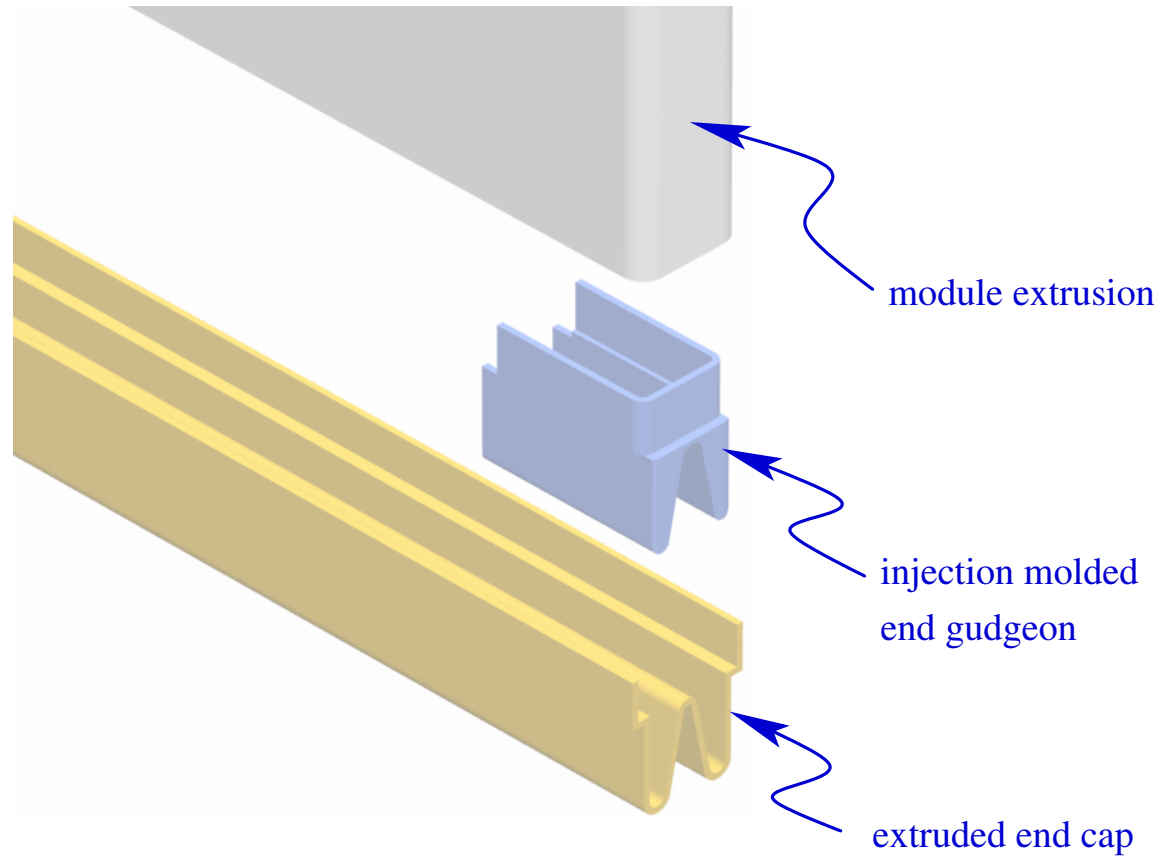


*Extrusion always failed before the end cap seal!*

# Extruded End Cap (Edge View)



# Sealing the Outer Edges of the End Cap





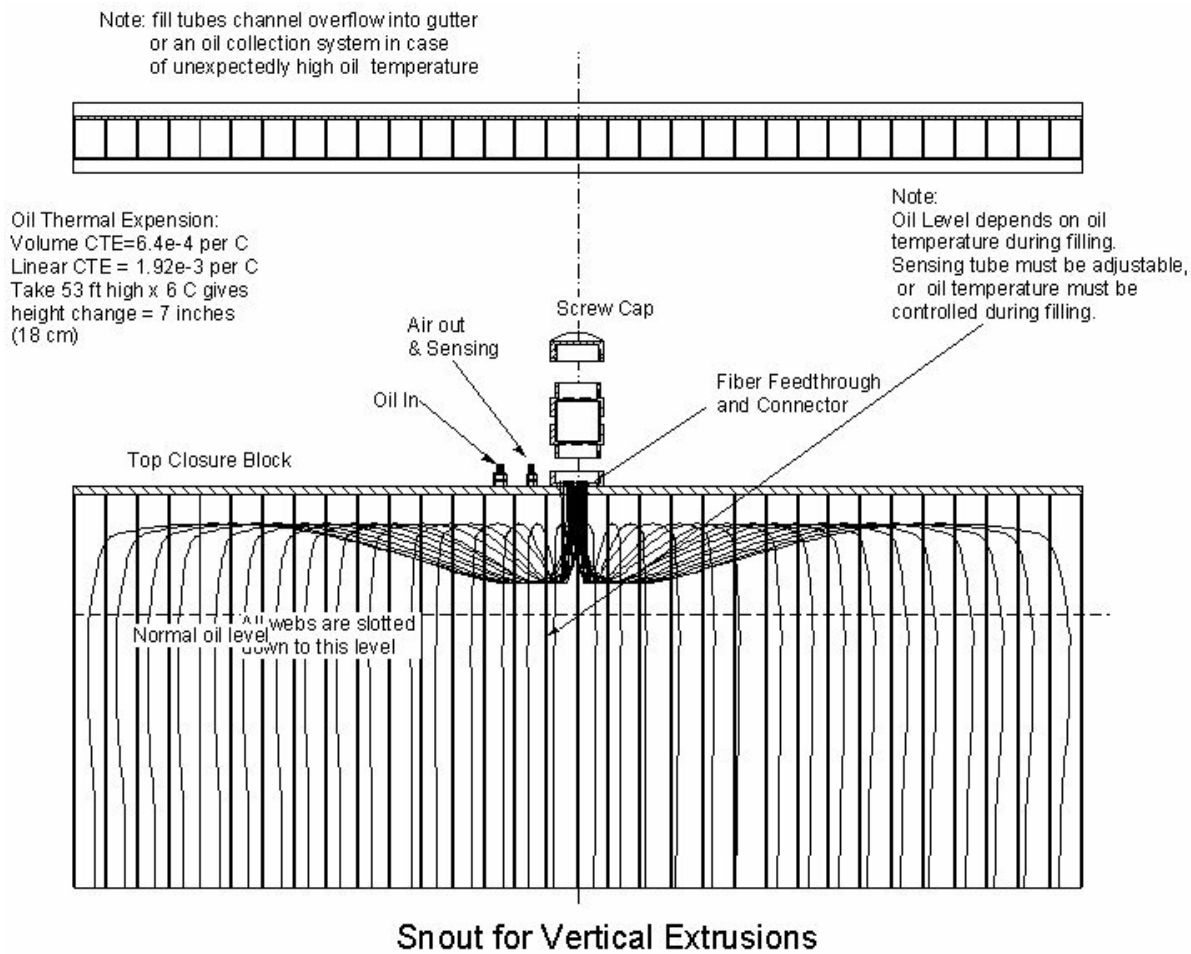
# Manifold Draft Specifications



Metric	Units	Target	Marginal
Leak Initiation Pressure	kPa	150	70
Part Cost	\$	35	75
Installation Time	min	15	30
Extrusion Width Tolerance	mm	+/- 3	+/- 1
Extrusion Depth Tolerance	mm	+/- .5	+/- .2
Expansion Volume	liters	10	6
Modification of Main Extruder	Binary	No	Yes
Positive fiber guidance	Binary	Yes	No

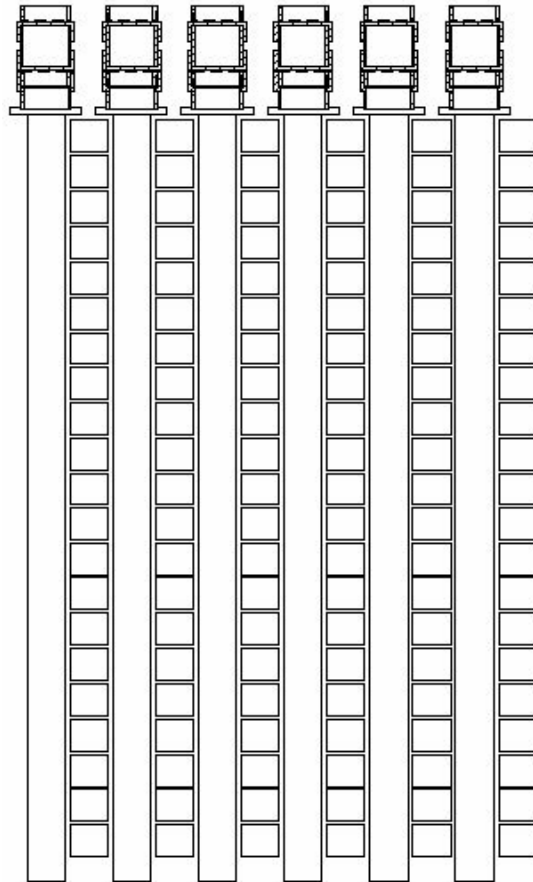
# Manifold Concept #1

## (Page 1 of 3)



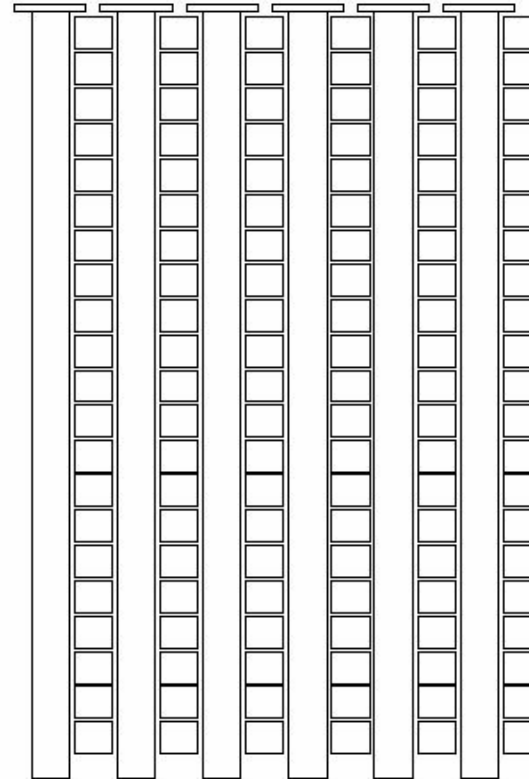
# Manifold Concept #1

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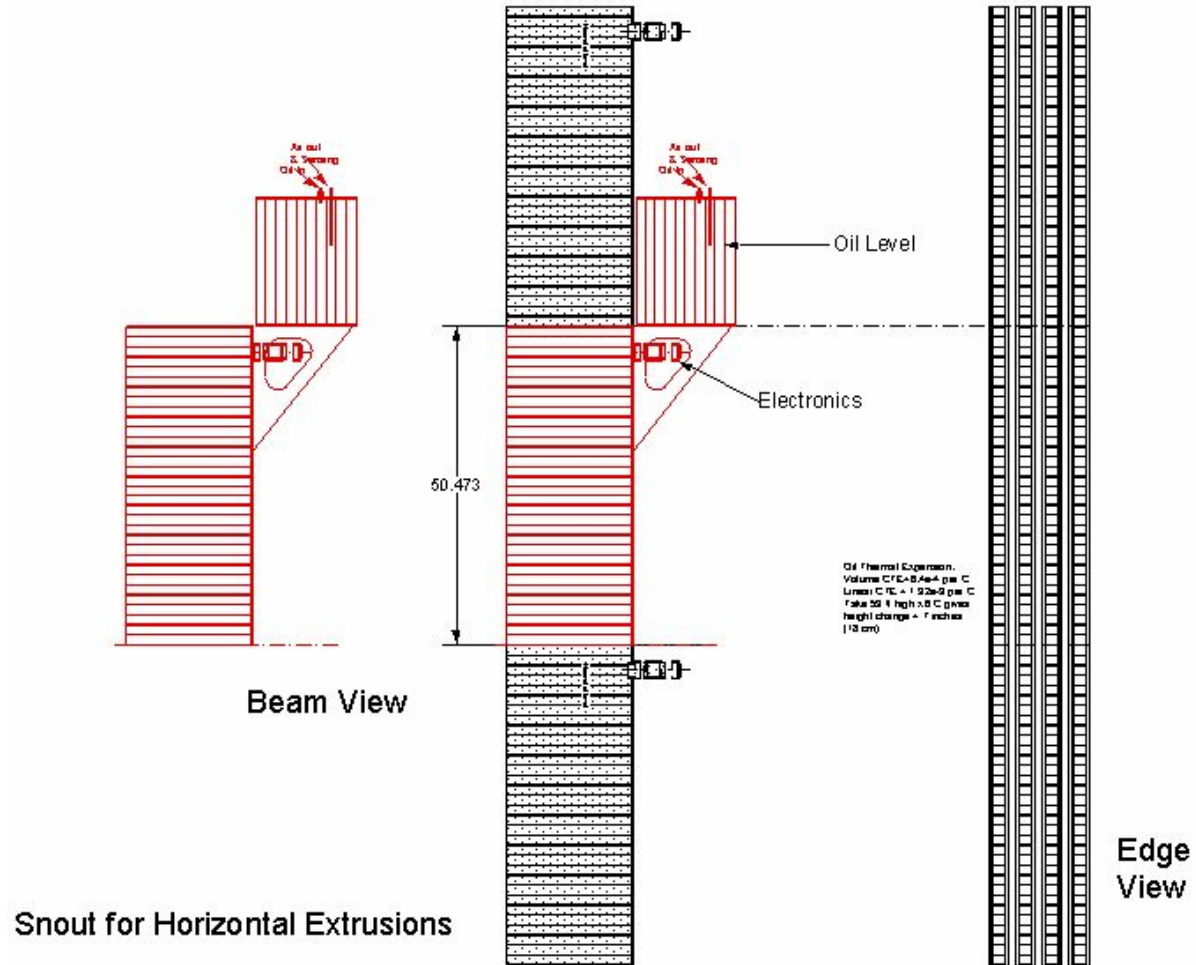
Top Snouts as a Work Floor

Closure blocks make a solid work floor.  
Cables and hoses run between plates

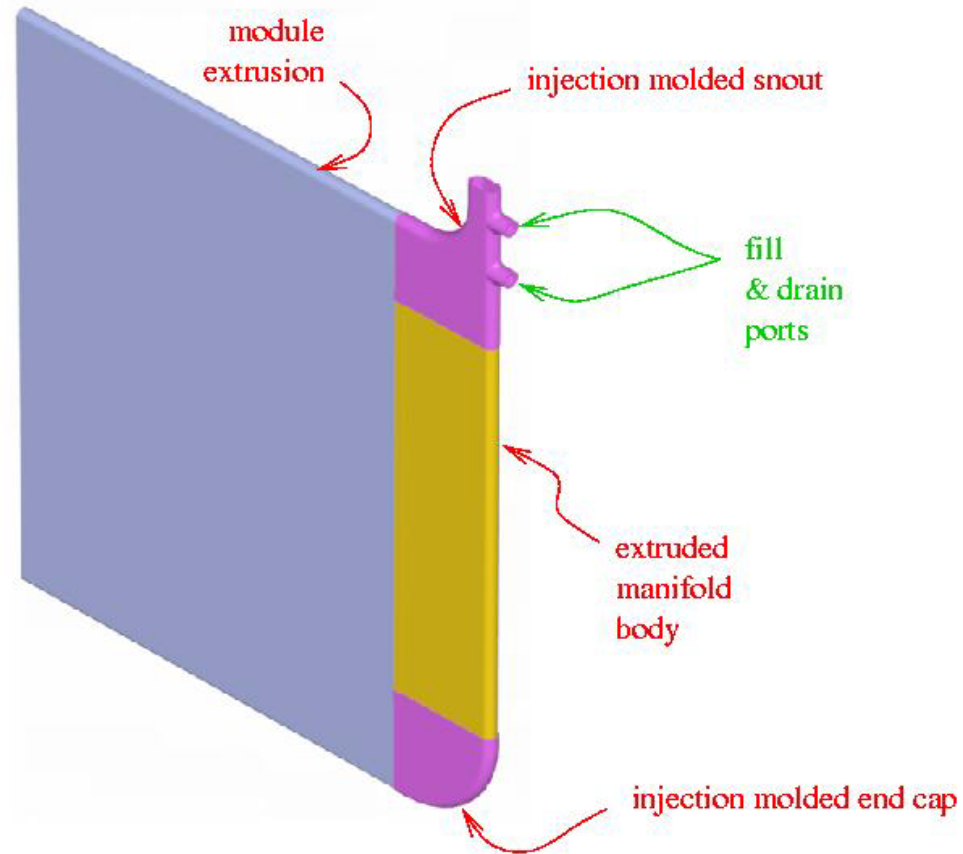




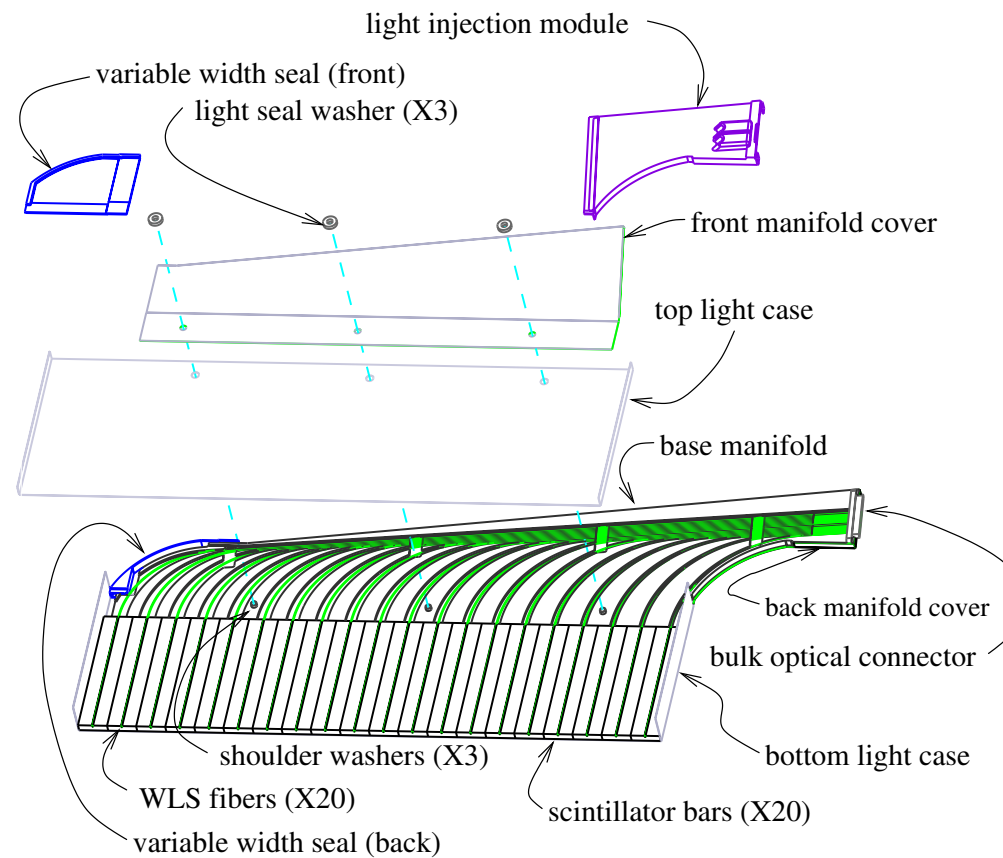
# Manifold Concept #1 (Page 3 of 3)



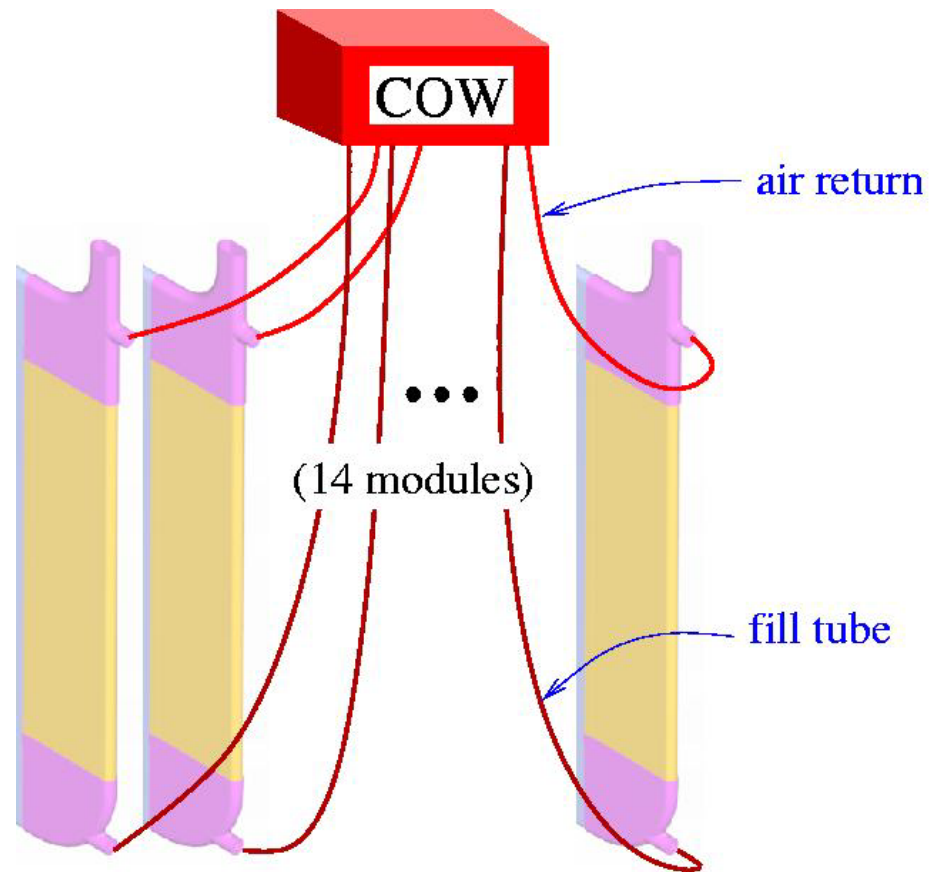
# Manifold Concept #2



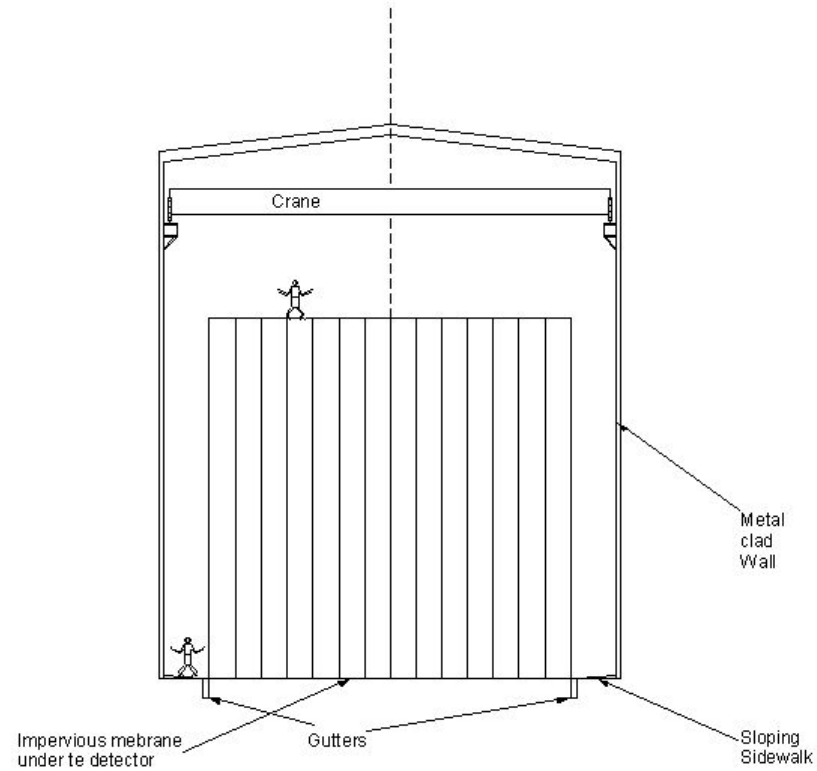
# MINOS Side Out Manifold



# Oil Filling: Hans Jostlein's "Cow"



# Overflow Protection



Oil Containment for the NOVA Detector

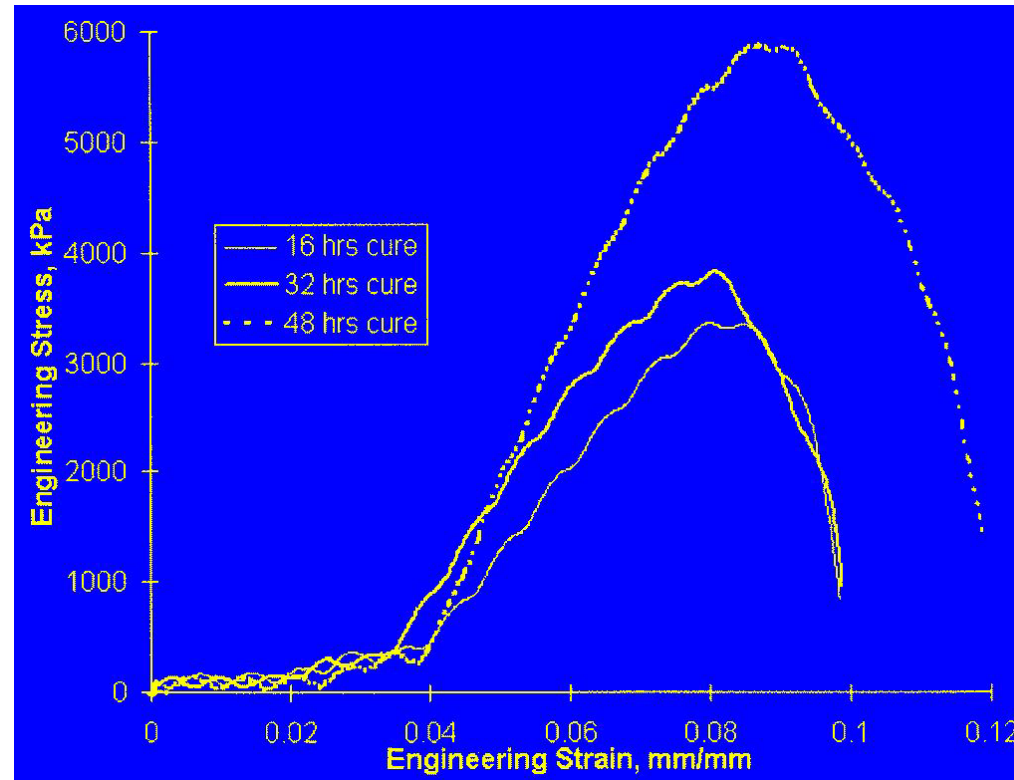


# Nominal Assembly Sequence



- Insert fibers in main extrusion cells
- Install end cap
- Leak test end cap (optional)
- “Nibble” interior webs or install routing tray
- Route & pot manifold fibers
- Fly-cut fiber ends
- Complete manifold assembly
- Leak test & light test

# Adhesive Cure Properties



*48 hour cure time is important to achieving full adhesive strength!*

# Summary



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- Physicist & structural engineer input needed to refine specifications for end cap & manifold
  - Two different manifold concepts are proposed:  
Which should be pursued?
  - End cap design must be coordinated with structural engineering
  - Manifold design must be coordinated with APD electronics design