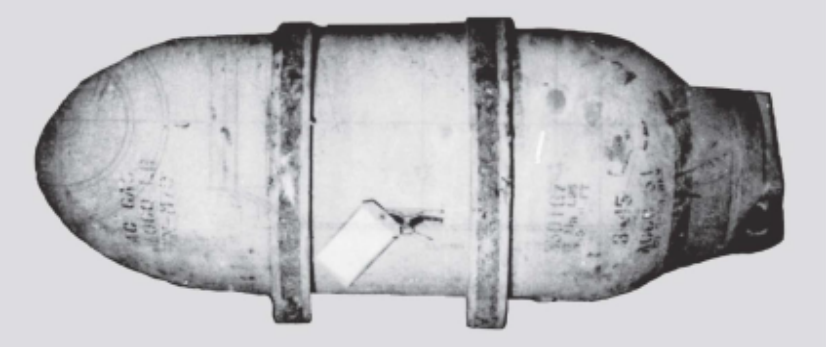
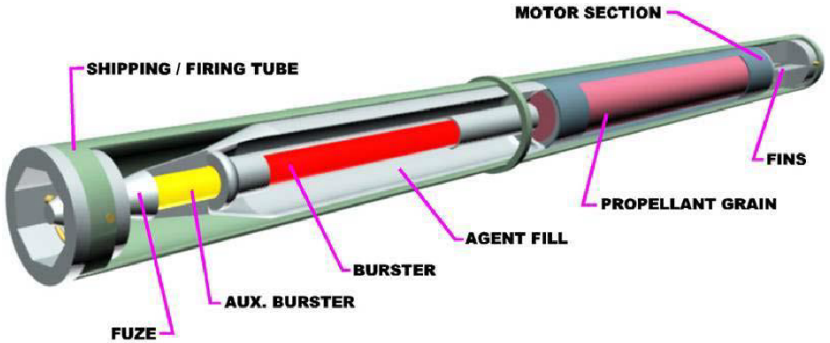
SAND2023-03657C

Vessel Design Specifications

- ✓**Must be able to process specific large munitions**
  - 1000lb M79 bomb
    - Length
    - Chemical agent quantity
  - M55 rocket
    - Length
- ✓**Must increase throughput of standard munitions**





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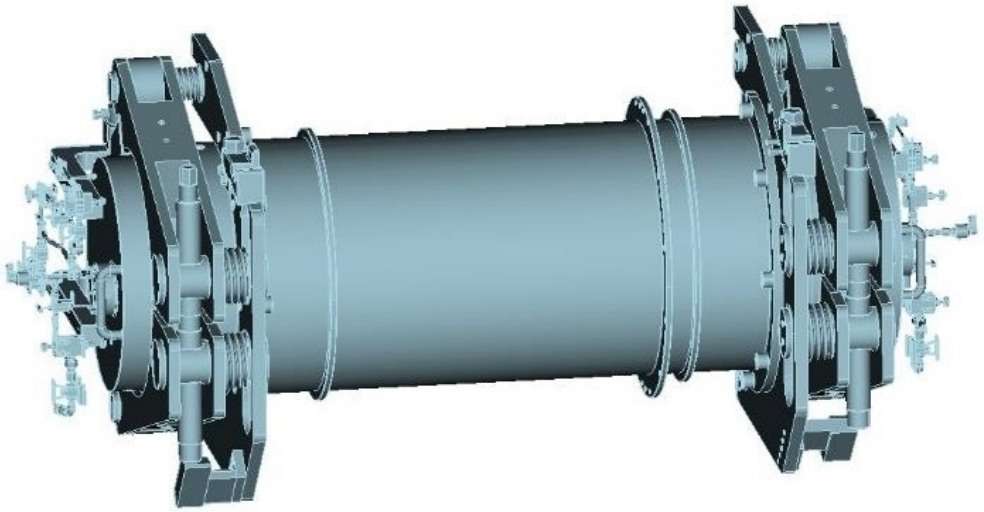
Vessel Design Specifications

- ✓Manufacturing limitations prohibited scaling up existing design
- ✓Instead, most recent design was modified to be 2x as long with doors on each end

P1



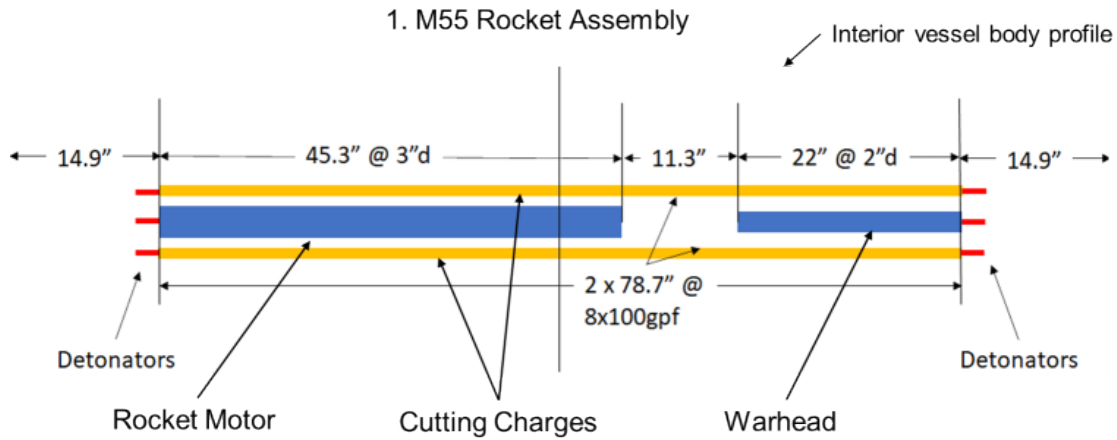
P2

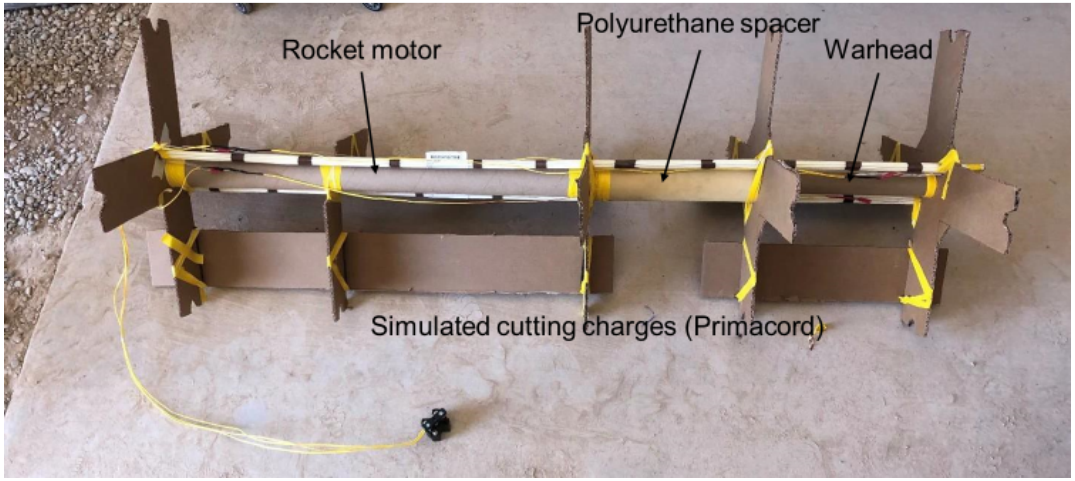
P3

Vessel Design Bases

- ✓M55 rocket motor and warhead (1.25x)
- ✓Single centrally-located charge
- ✓Multiple (12) evenly-distributed charges

Design Basis: M55



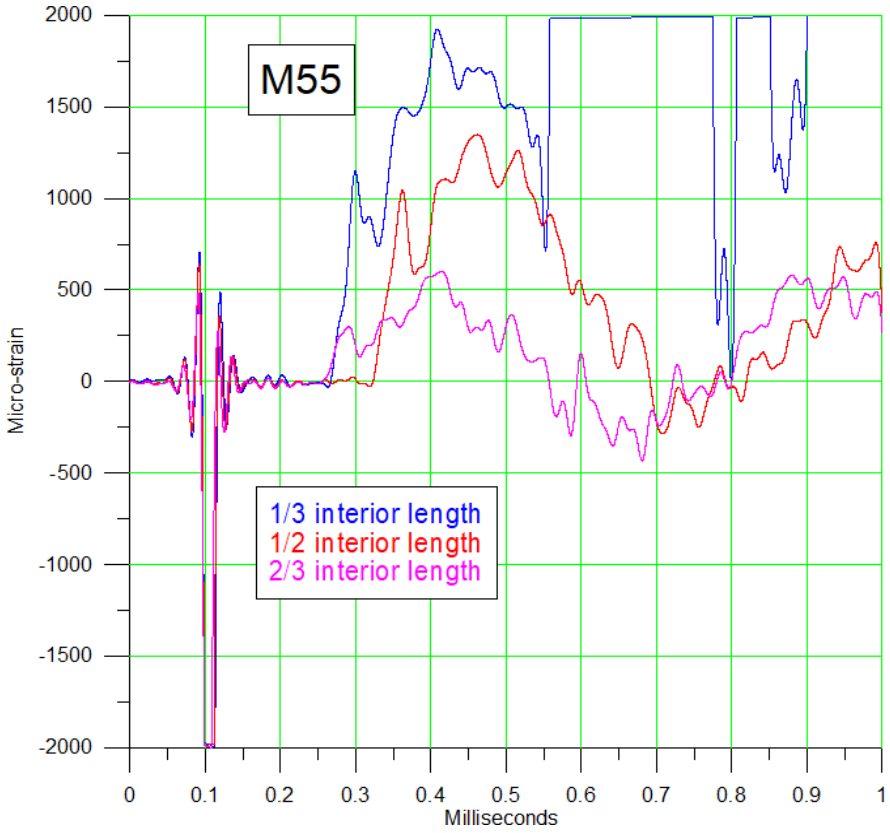


24-lbs Composition C4 (30-lbs TNT equivalent)

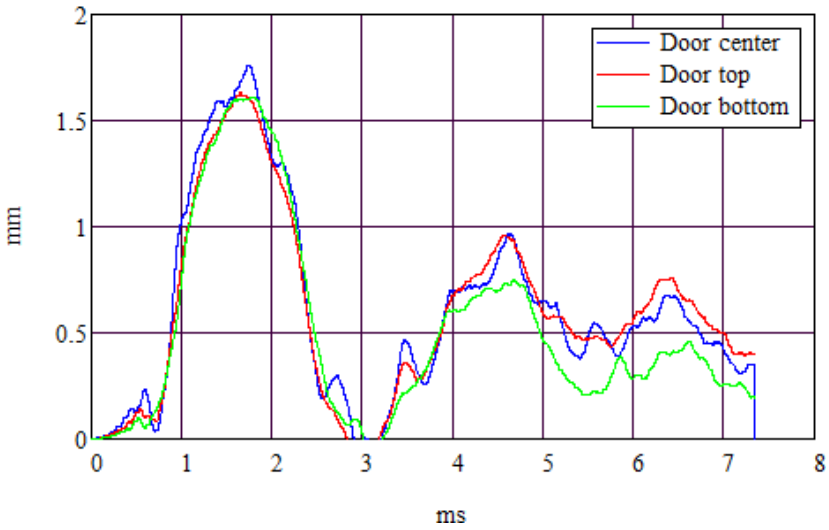
- *Rocket Motor*
  18.5-lbs Comp-C4
  (23.1-lbs TNT)
- *Warhead*
  4-lbs Comp-C4
  (5-lbs TNT)
- *Cutting charge*
  1.5-lbs Comp-C4
  (1.9-lbs TNT)

Design Basis: M55

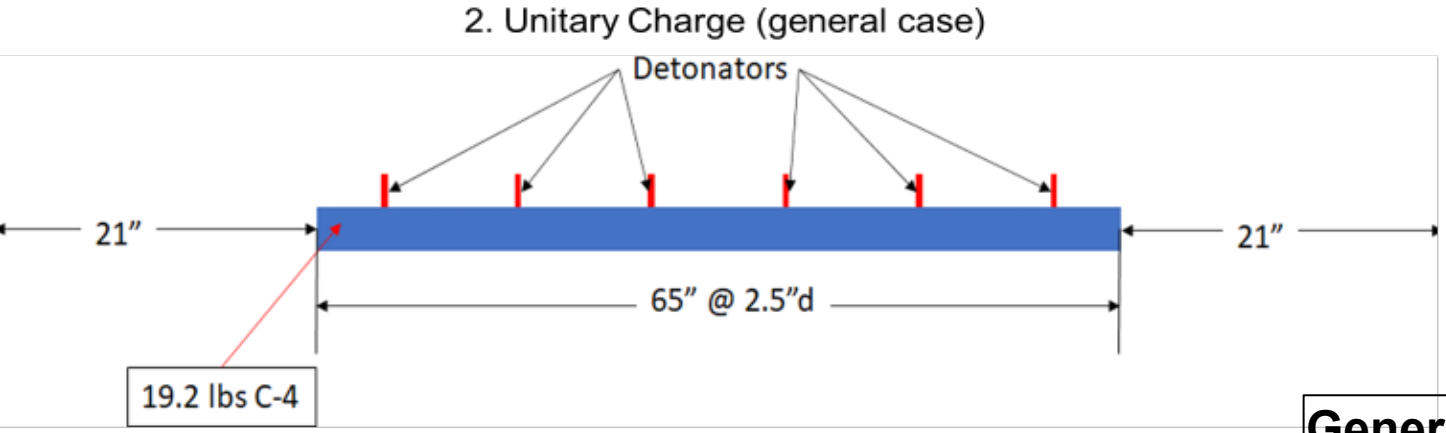
Vessel body hoop strain



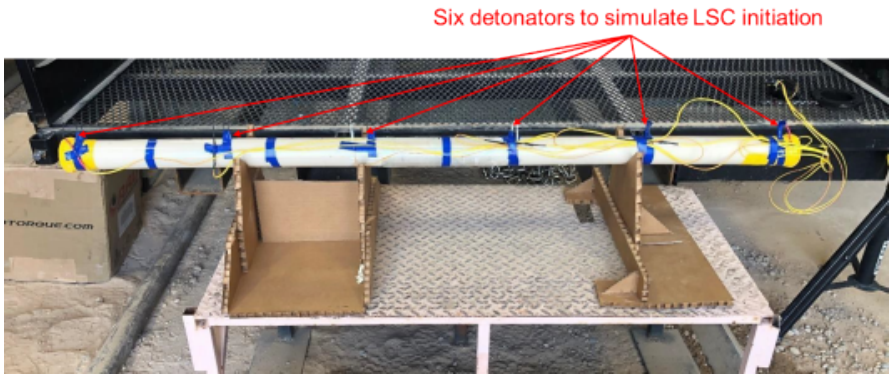
Door displacement



Design Basis: Single central charge

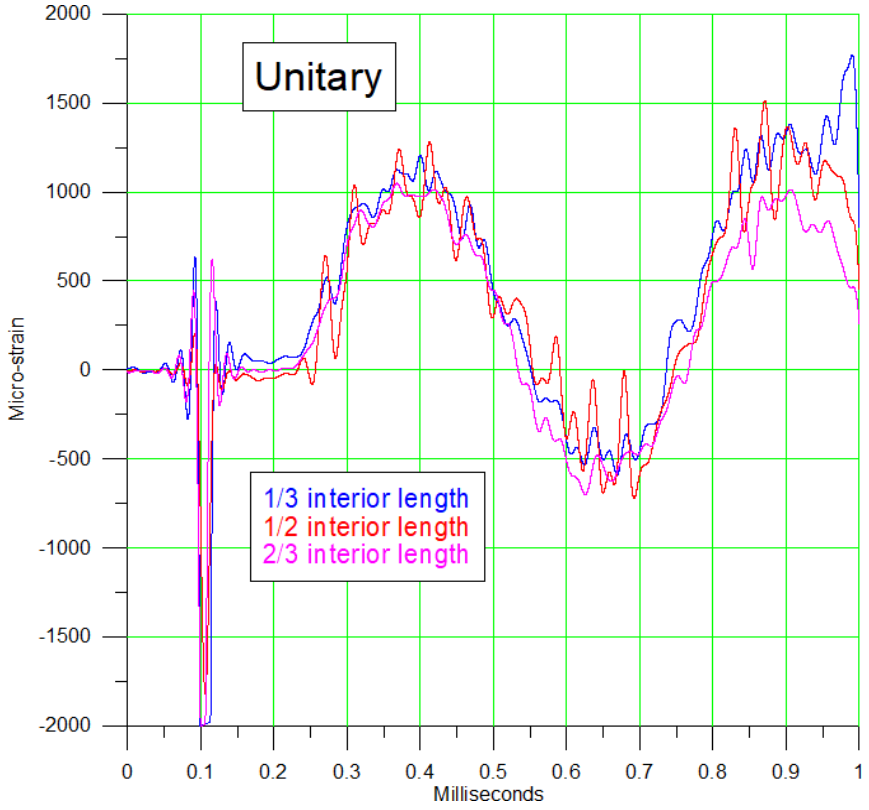


Generic, Unitary Charge:
19.2-lbs Composition C4
(24-lbs TNT equivalent)

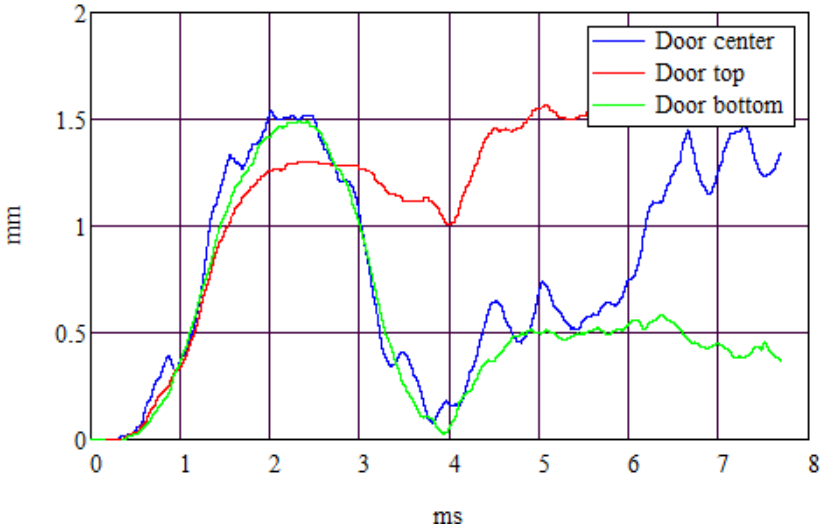


Design Basis: Single central charge

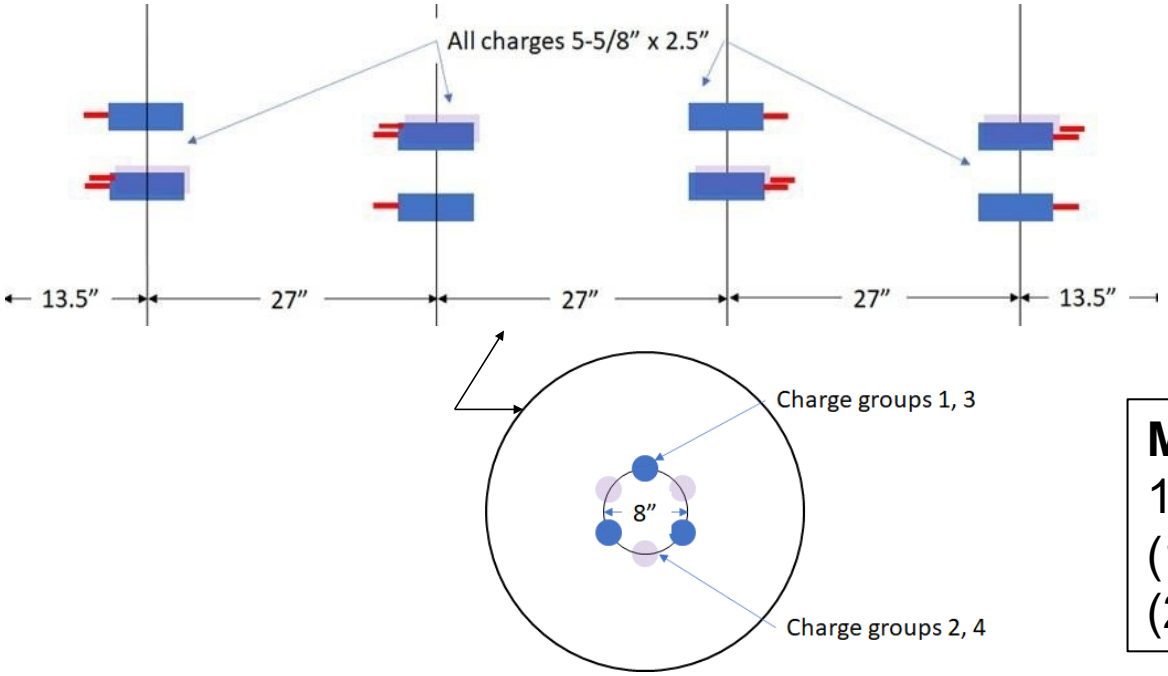
Vessel body hoop strain



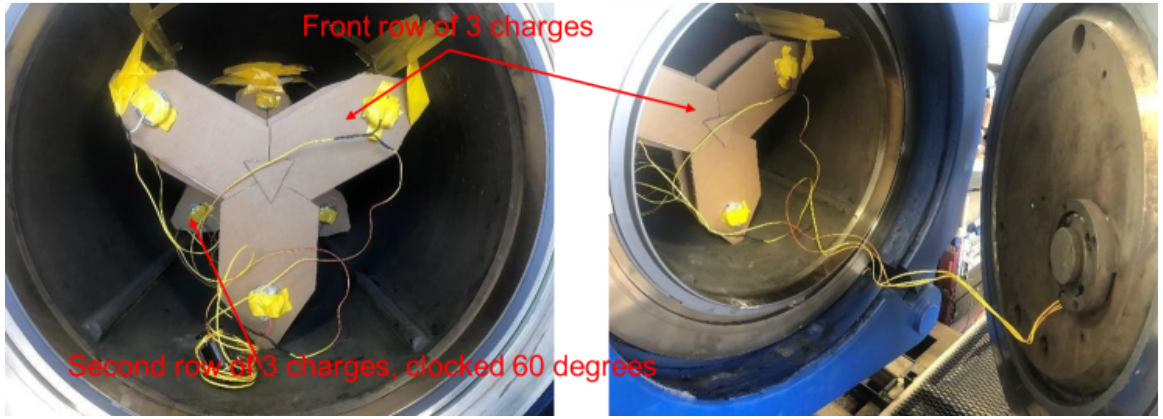
Door displacement



Design Basis: Multiple distributed charges

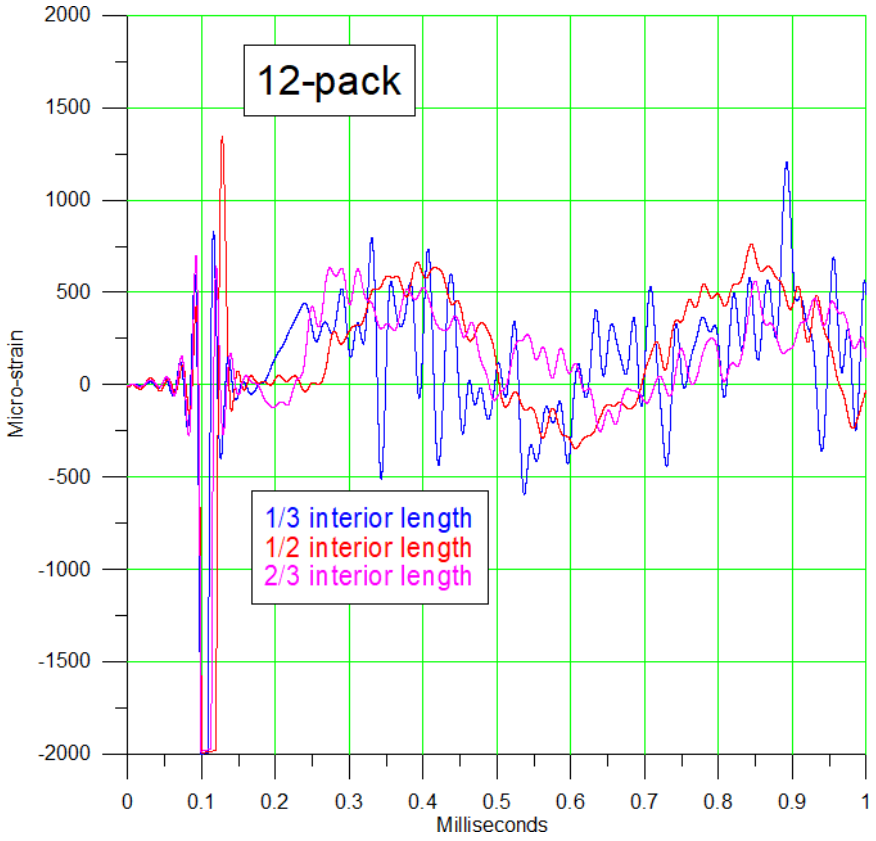


Multiple distributed charges
19.2-lbs Composition C4
(12 X 1.6-lbs C4)
(24-lbs TNT equivalent)

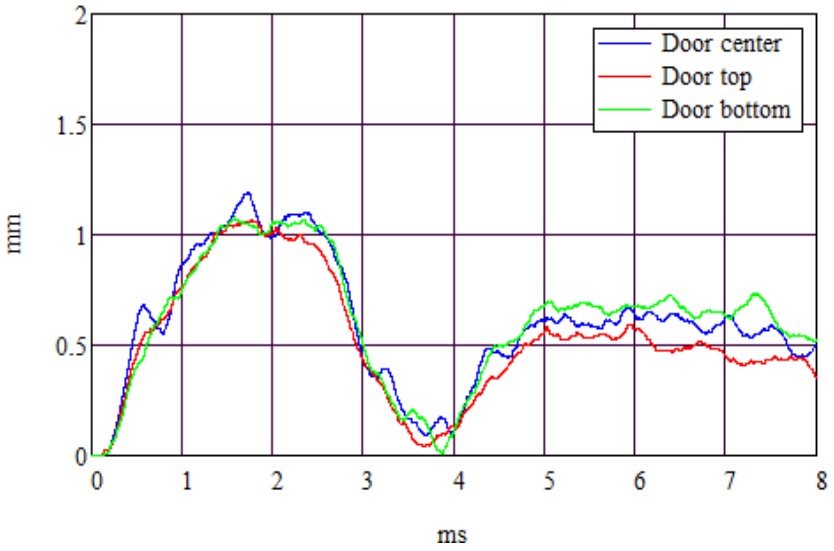


Design Basis: Multiple distributed charges

Vessel body hoop strain



Door displacement



Final Test Results

- ✓Strain limit was never exceeded
- ✓Vessel maintained seal of $2x10^{-3}$ atm-cc/sec or better
- ✓Vessel is therefore qualified to ASME Section VIII, Division 3, Code Case 2564

Measurement location (inches from drive mount ring) [cm from drive mount ring]	1 (-12) [-30.5]	2 (4.75) [12.1]	3 (24) [61.0]	4 (40.75) [103.5]
Test #1 – M55				
Pi tape (in) [mm]	0.004 0.102	0.014 0.356	0.012 0.305	0.005 0.127
Pi tape strain	**98.8**	**346**	**296**	**123**
STRAIN LIMIT		**780**		
Analytical (in) [mm]	N/A	0.010 0.254	No data	0.004 0.102
Test #2 – Unitary				
Pi tape (in) [mm]	0.005 0.127	0.003 0.076	-0.004 -0.102	0.008 0.203
Analytical (in) [mm]	No data	No data	No data	No data
Test #3 – 12-pack				
Pi tape (in) [mm]	0.000 0.000	0.006 0.152	0.003 0.076	0.005 0.127
Analytical (in) [mm]	N/A	0.004 0.102	0.006 0.152	0.005 0.127