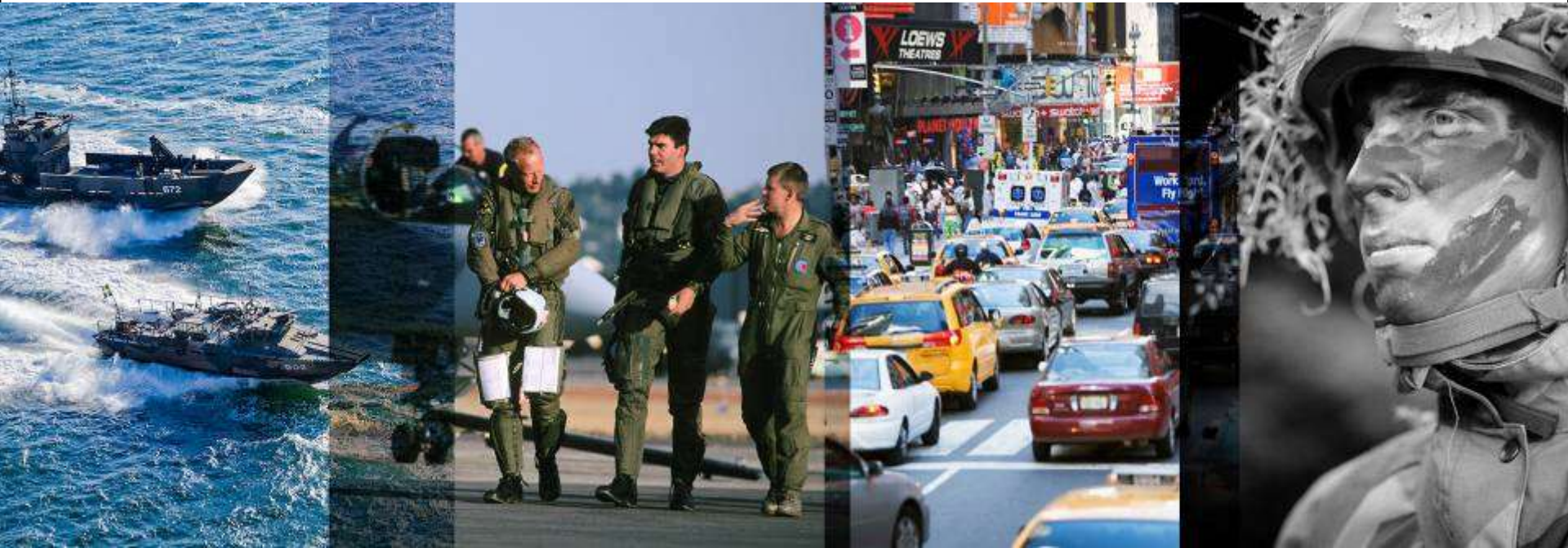


A new packaging design for the HEAT CS Sympathetic Detonation test



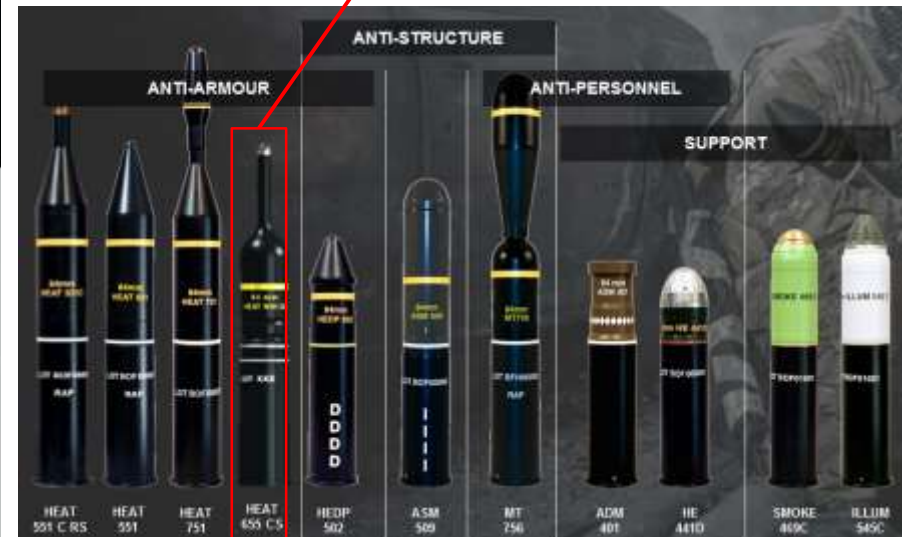
Thomas Widlund, Magnus Rådman

*Insensitive Munitions & Energetics Materials Technology Symposium
18-21 May 2015, Rome, Italy*

The 84-mm Carl-Gustaf system

- Weight: <7kg
- Length: <1000mm
- Advanced Sight (option)
- Communication Sight-Round (option)

M4

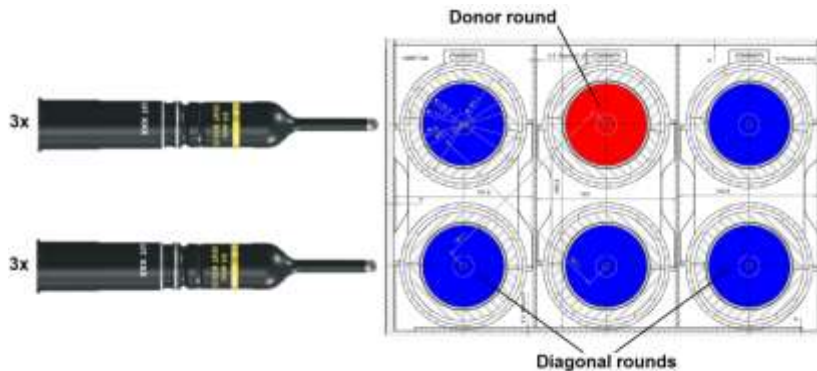


Unit Load

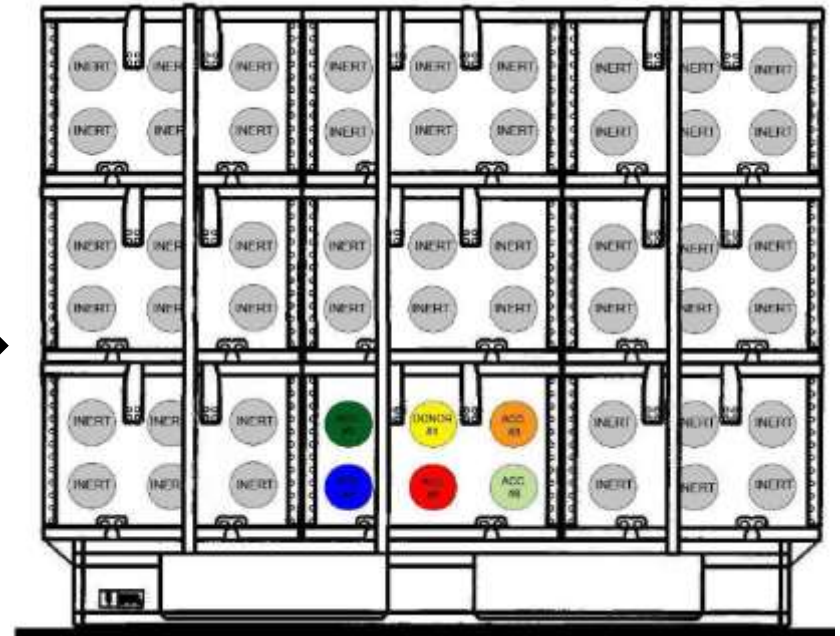
Transportation
box with 3 twin
containers



Rounds

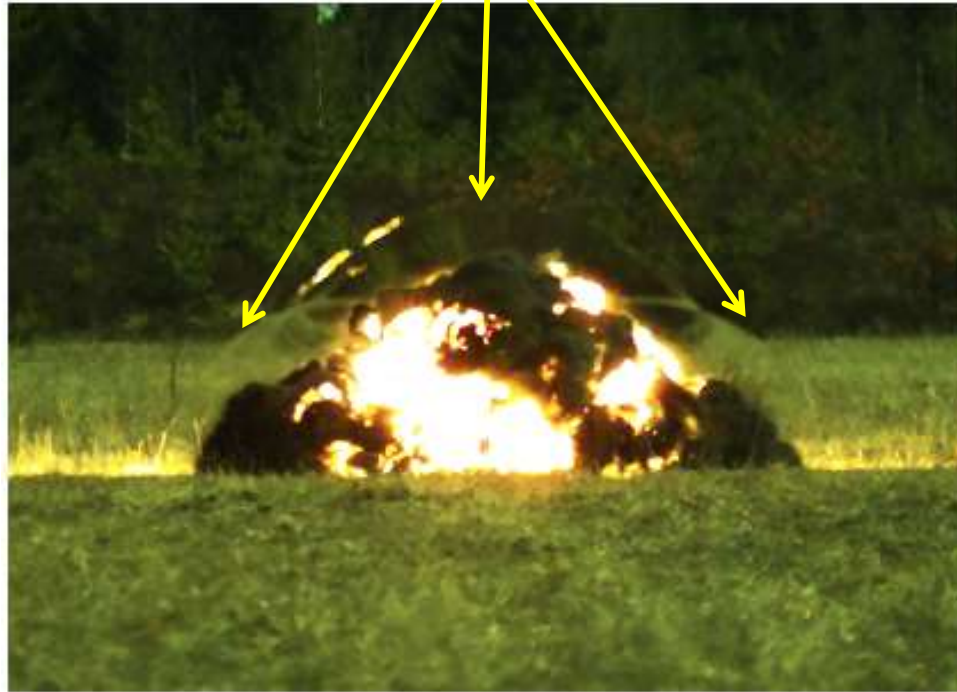


Unit Load

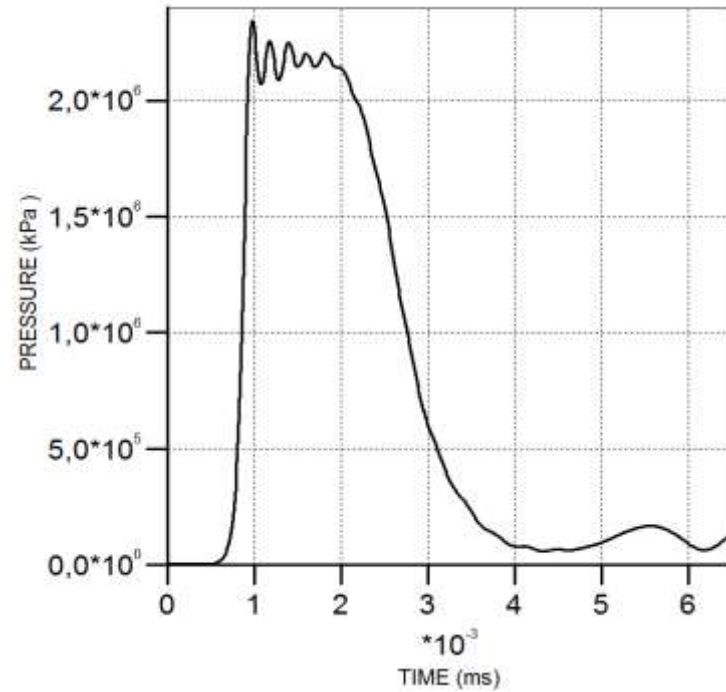
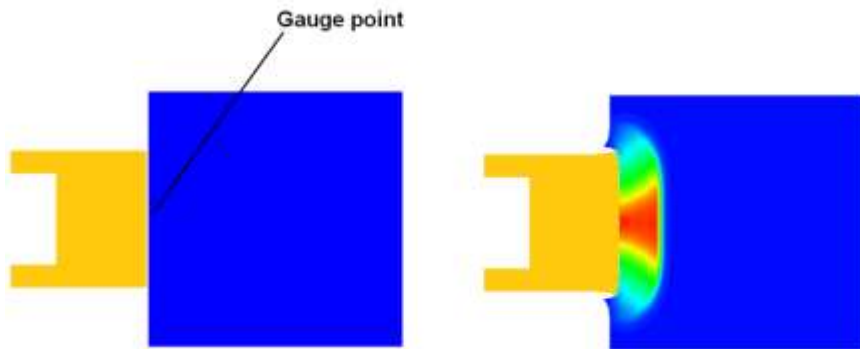


Sympathetic Detonation test result

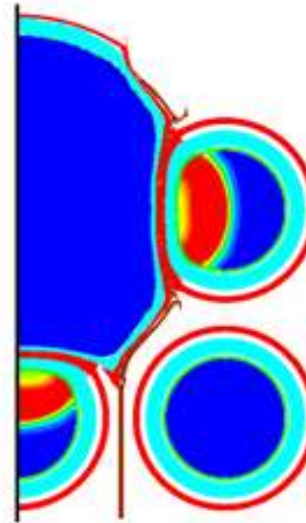
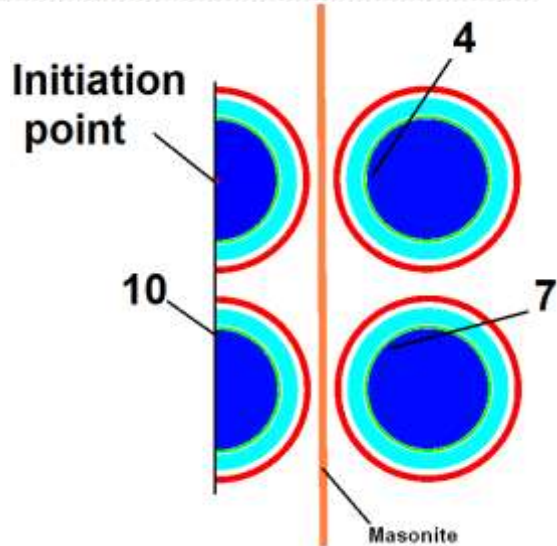
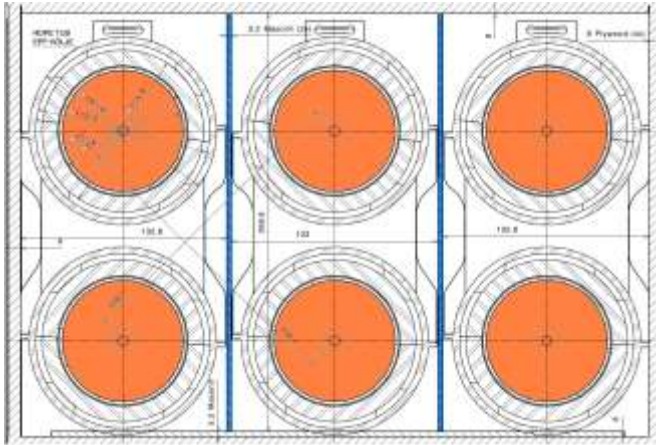
Pressure waves



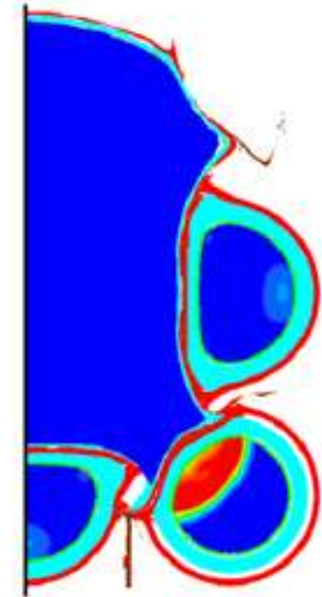
Projectile impact test



Simulation model

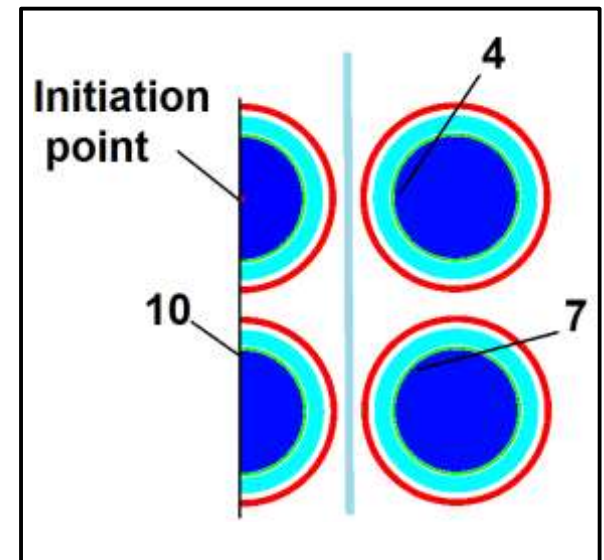
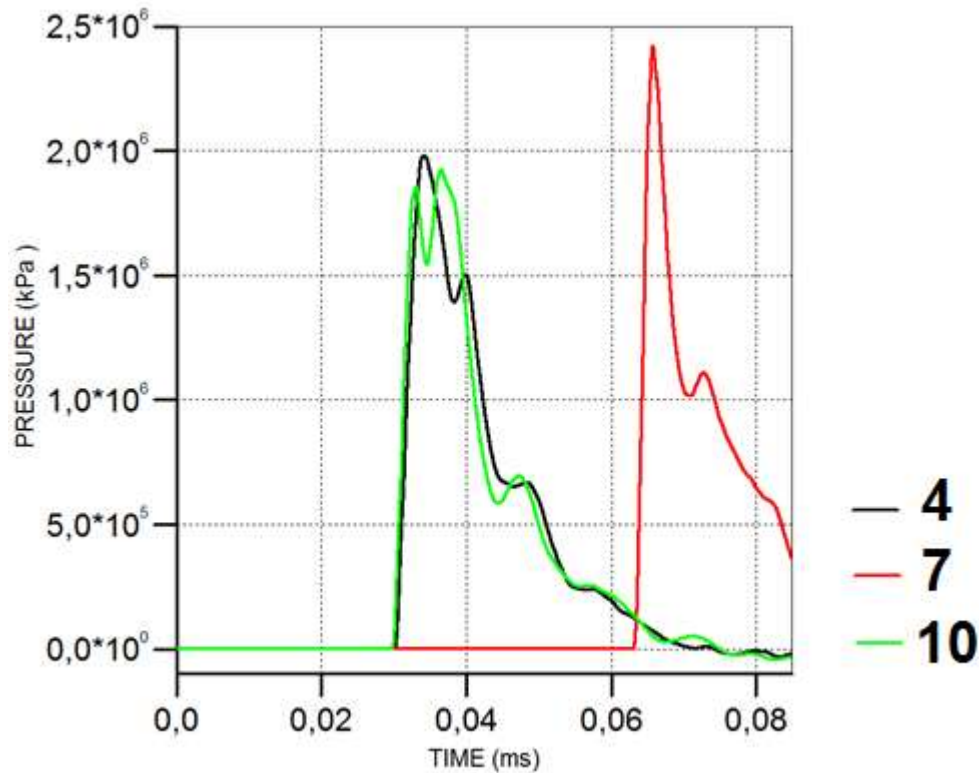


45 μ s

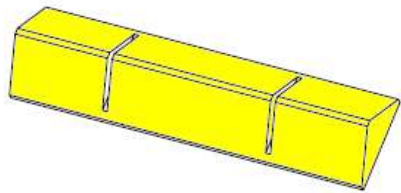


75 μ s

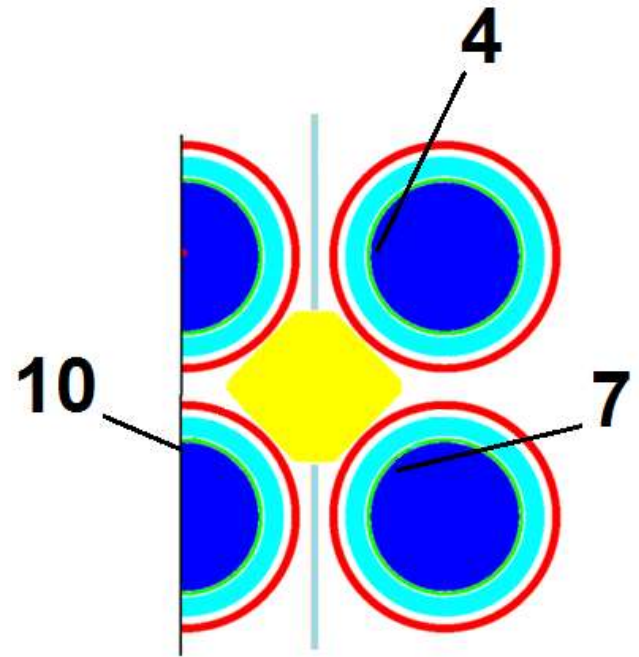
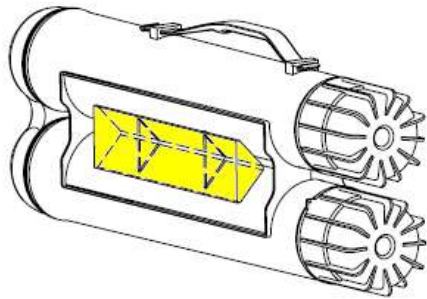
Pressure with nominal set up



Diagonal protection

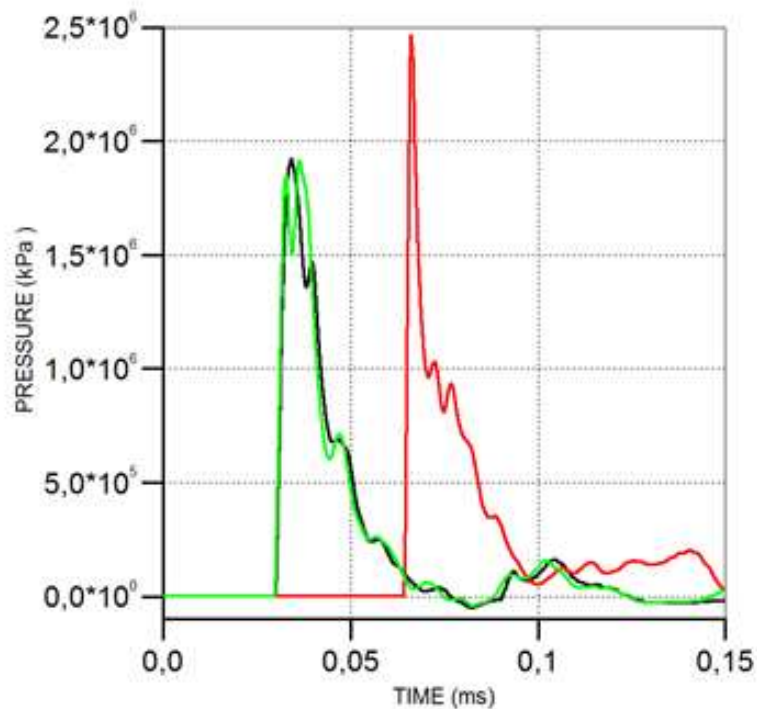


Polycarbonate

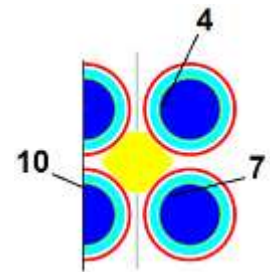
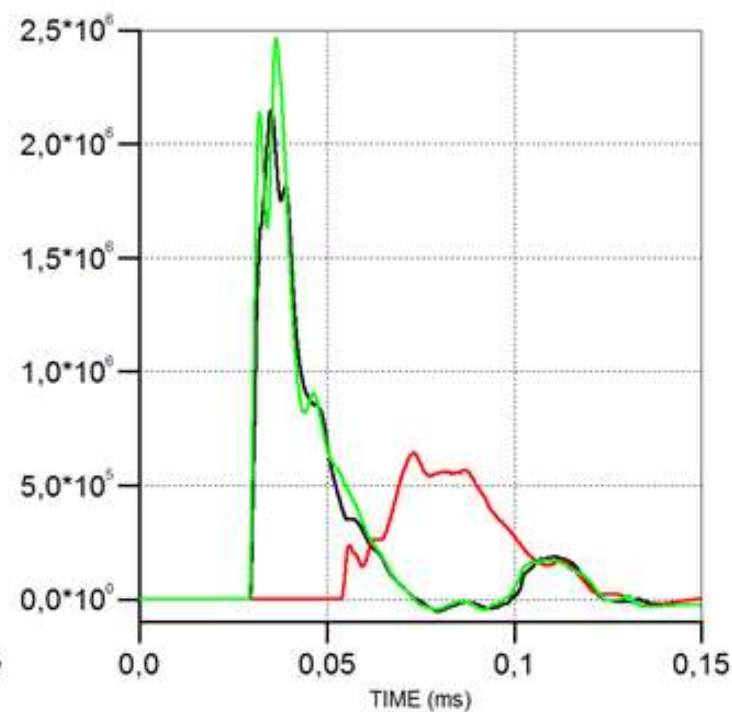


Pressure with polycarbonate wedges

Nominal



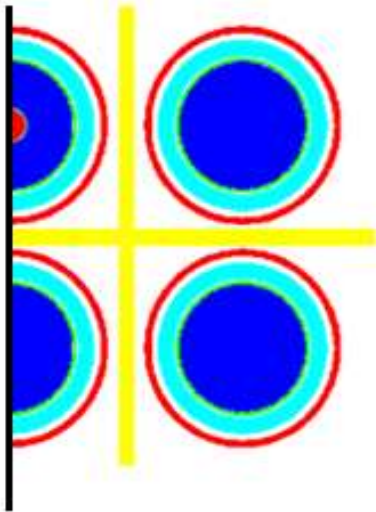
With polycarbonate wedges



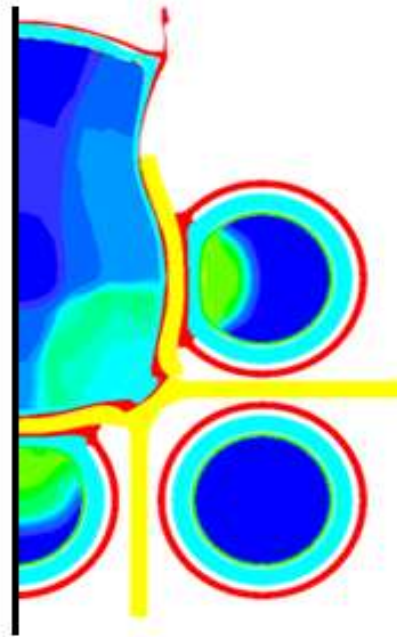
- 4
- 7
- 10

Simulation new design

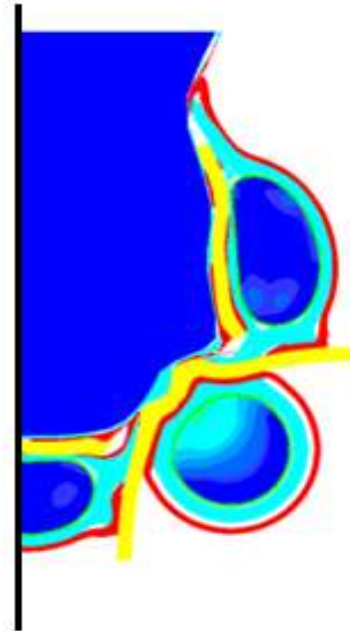
$t=1 \mu\text{s}$



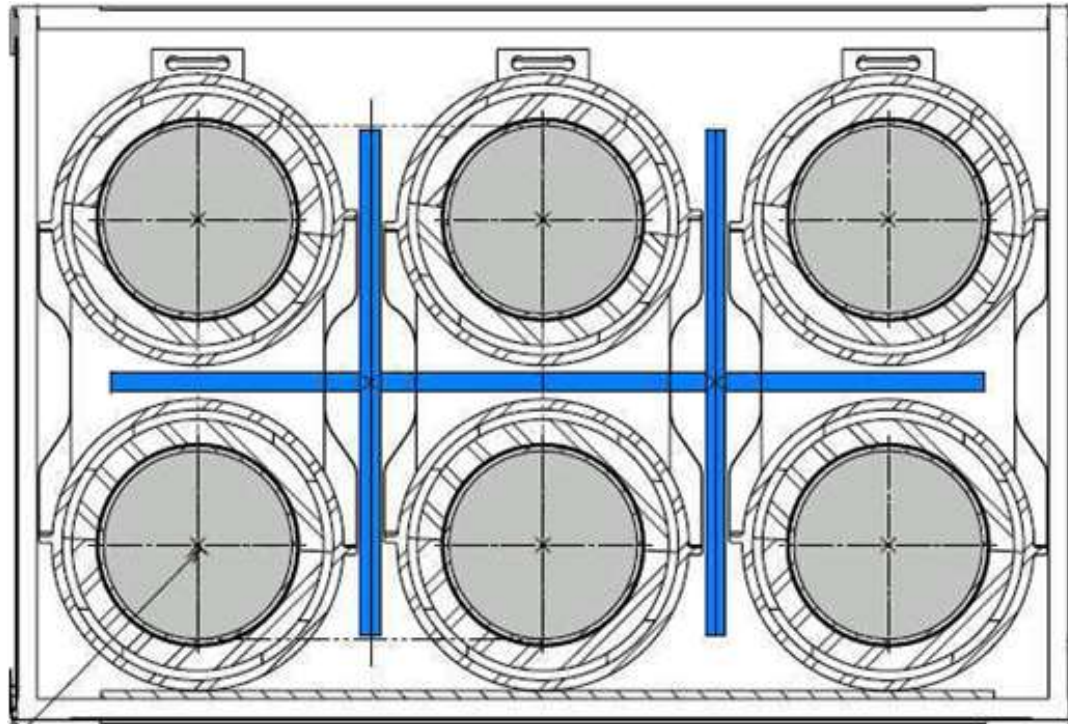
$t=60 \mu\text{s}$



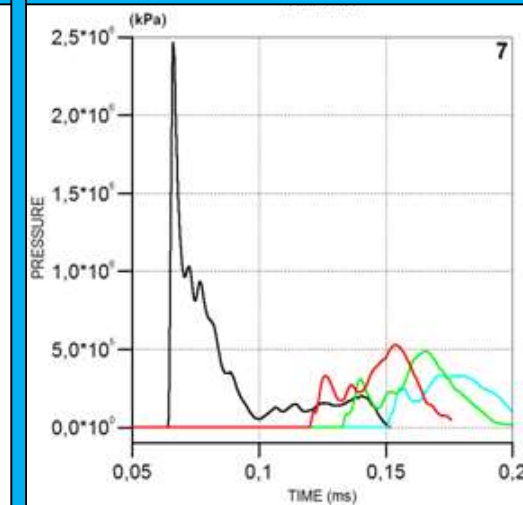
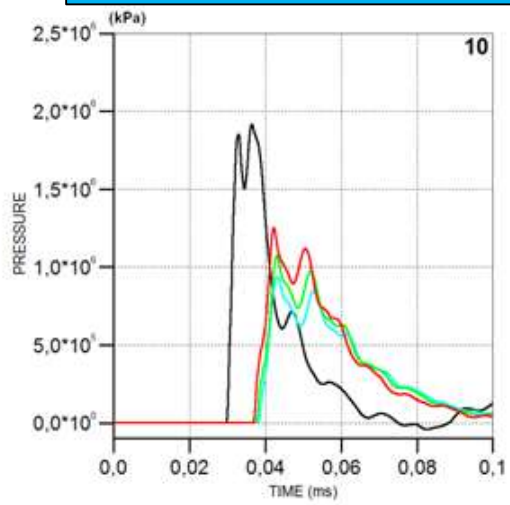
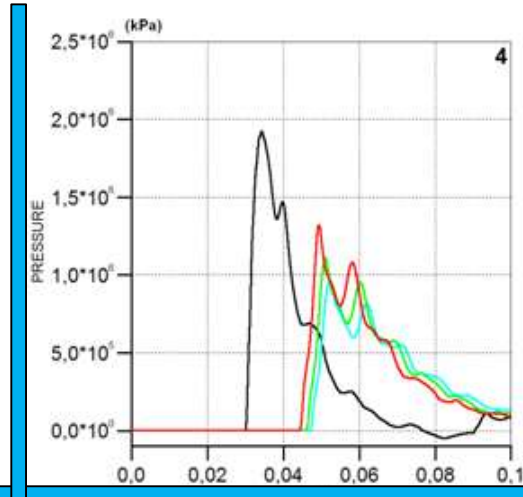
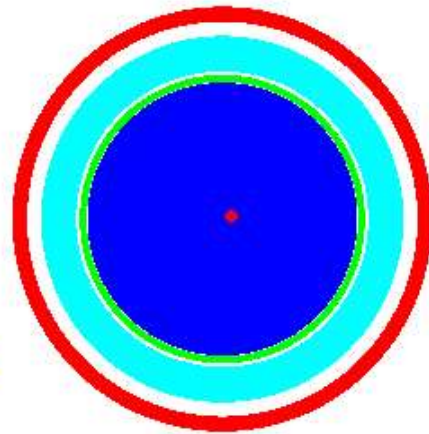
$t=180 \mu\text{s}$



New protection design

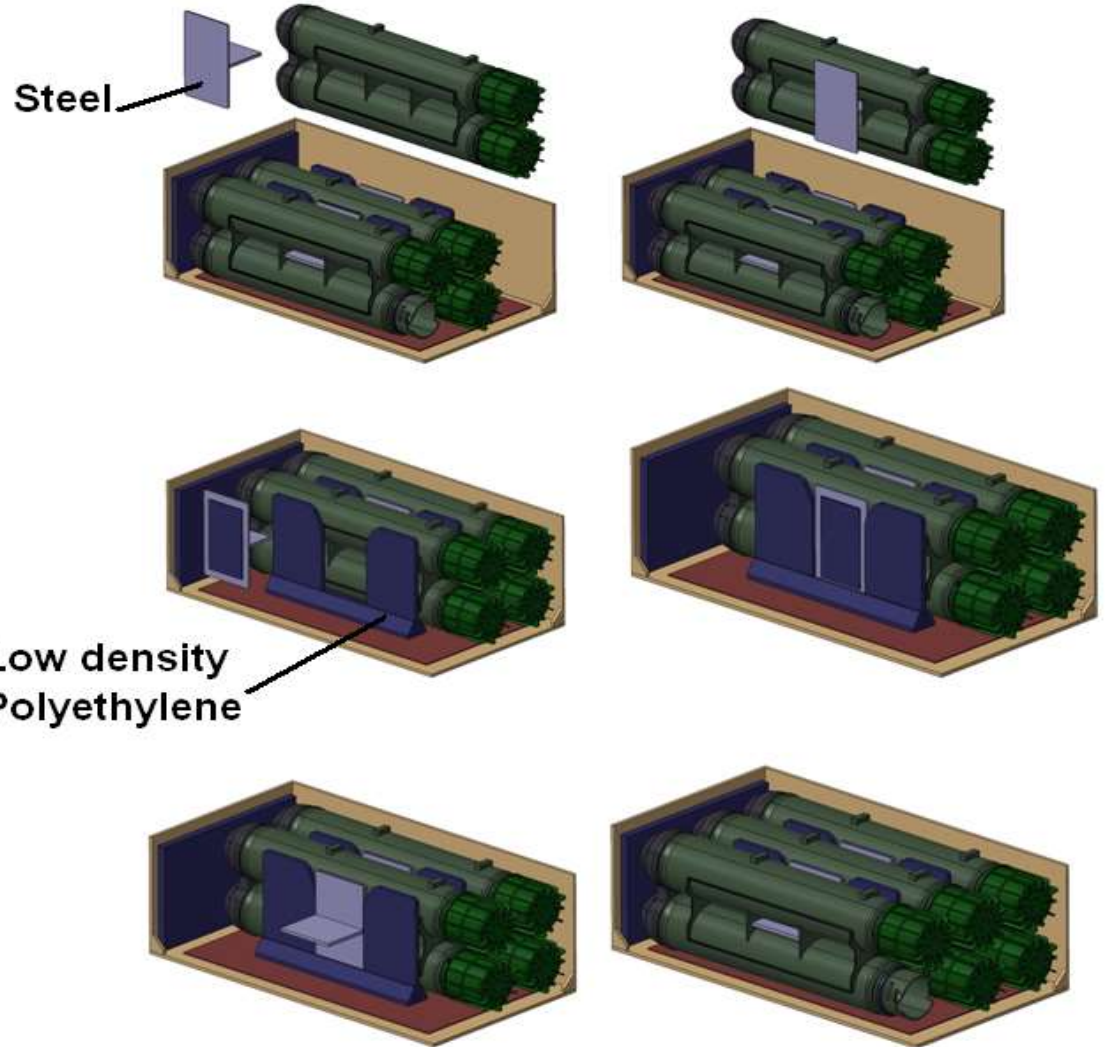
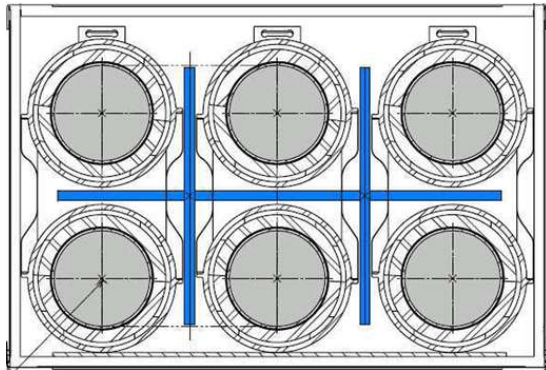


Pressure as a function of steel thickness



— Nominal
— 10 mm steel
— 8 mm steel
— 6 mm steel

Final design solution



Test result with the new packaging design and conclusion

- ▶ The test result was successful and the response was characterised as a type IV/V reaction, which is Deflagration/Burn.
- ▶ Do the simulations **before** the costly testing!



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