

Full scale fire test

Full-scale Fire Test of ANE Matrix in Aluminium and Stainless Steel Tanks

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Participants



- **Authorities**
 - **SRV**
Swedish Rescue Services Agency
Flammables and Explosives Department
 - **DSB**
The Directorate for Civil Protection
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- **Explosive Industry**
 - **Forcit Oy**
 - **Orica Mining Services**
 - **Skanexplo AB**
 - **Kimit AB**

Full scale fire test



- Tanks
 - ◆ Insulated aluminium tank
 - ◆ Un-insulated stainless steel tank
- 6 000 kg ANE matrix
- 400 litres of diesel fuel and eight tyres

ANE-matrix

- Oxidation Solution
AN/SN, 16% H₂O, pH 3-4
- Fuel phase
21% emulsifier, mineral oil
- Matrix
6% fuel phase, 1.41 g/ml
- UN3375



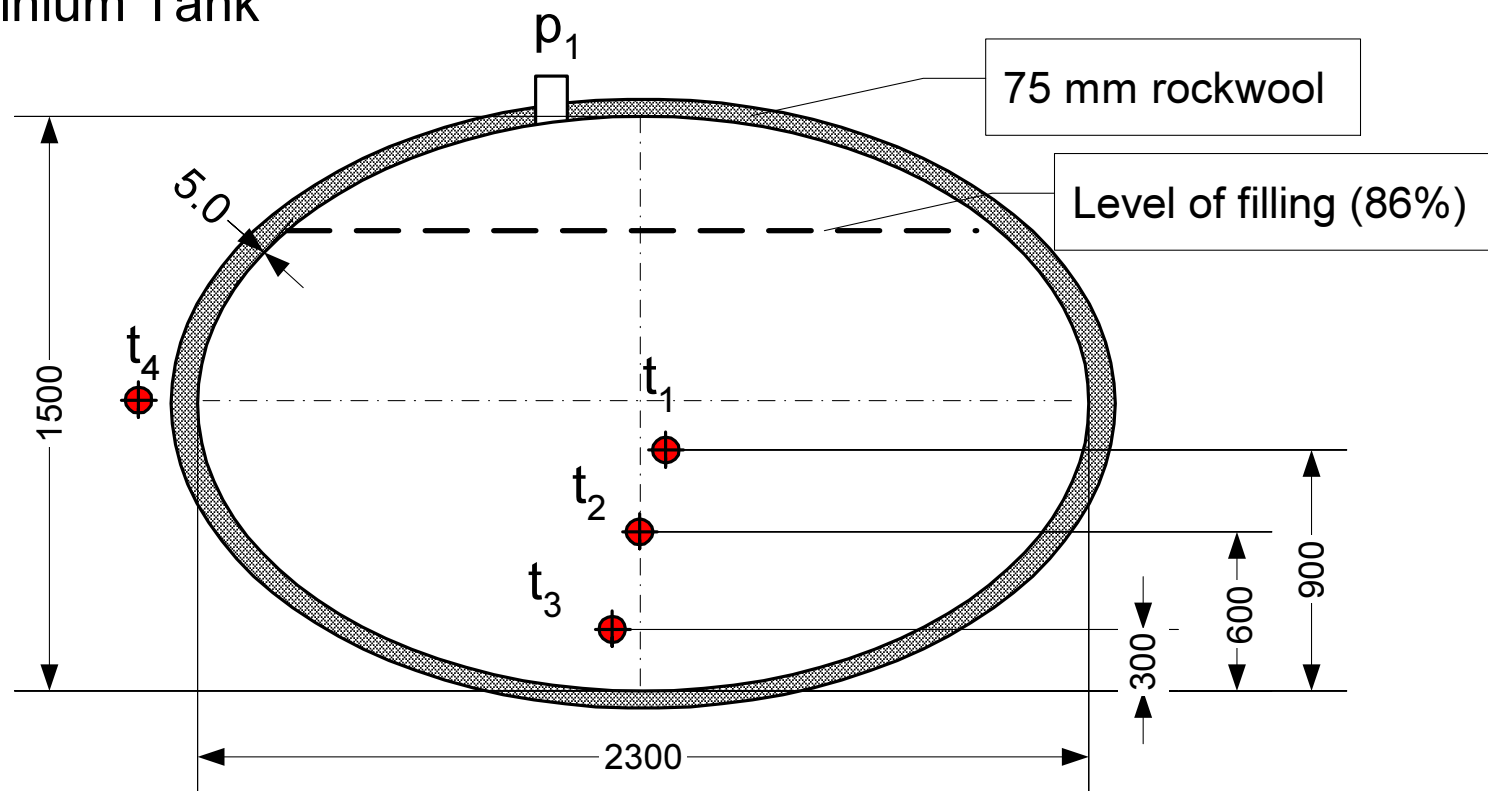
Aluminium tank



Aluminium tank

Insulated
Aluminium Tank

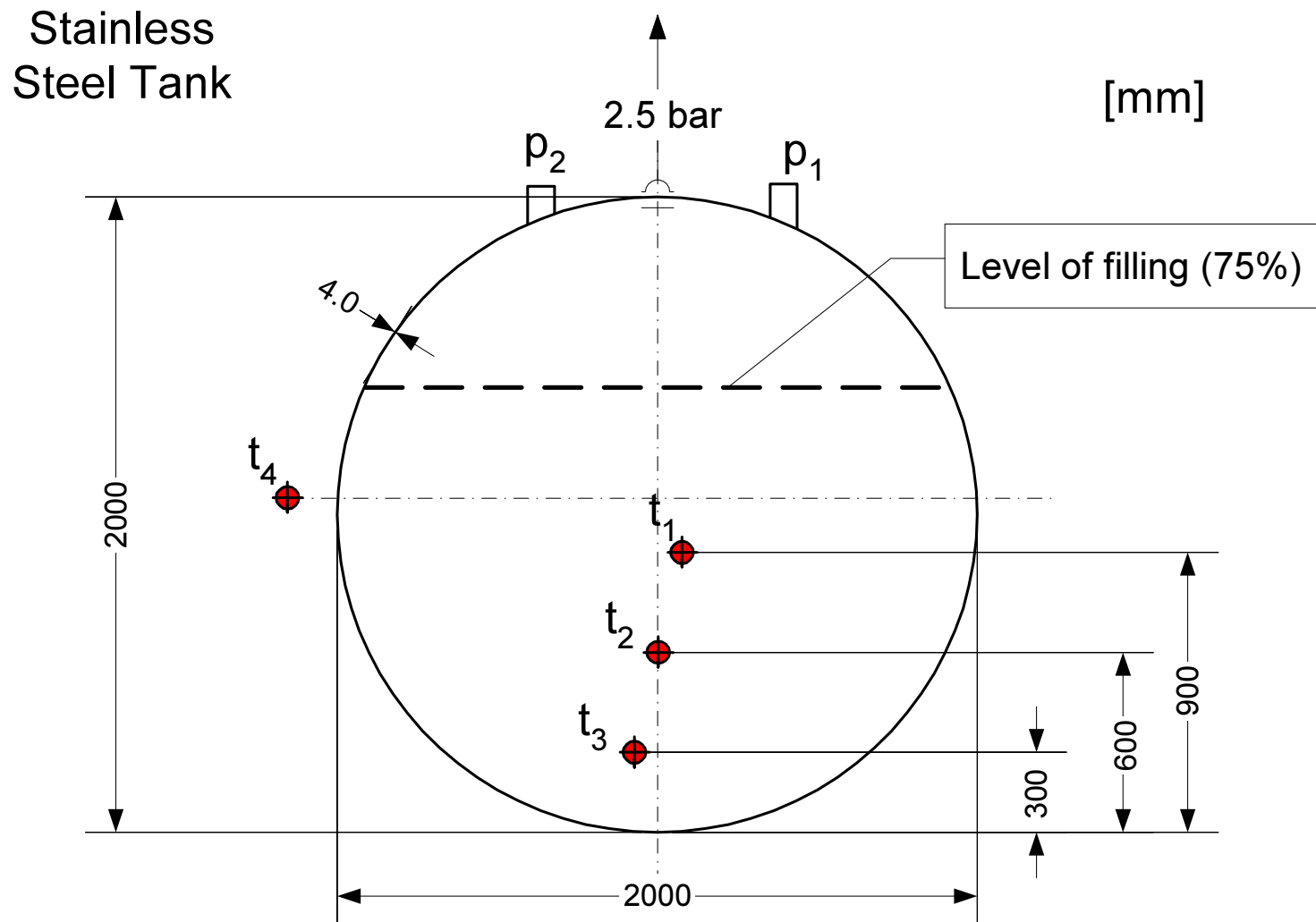
[mm]



Stainless Steel Tank



Stainless Steel Tank



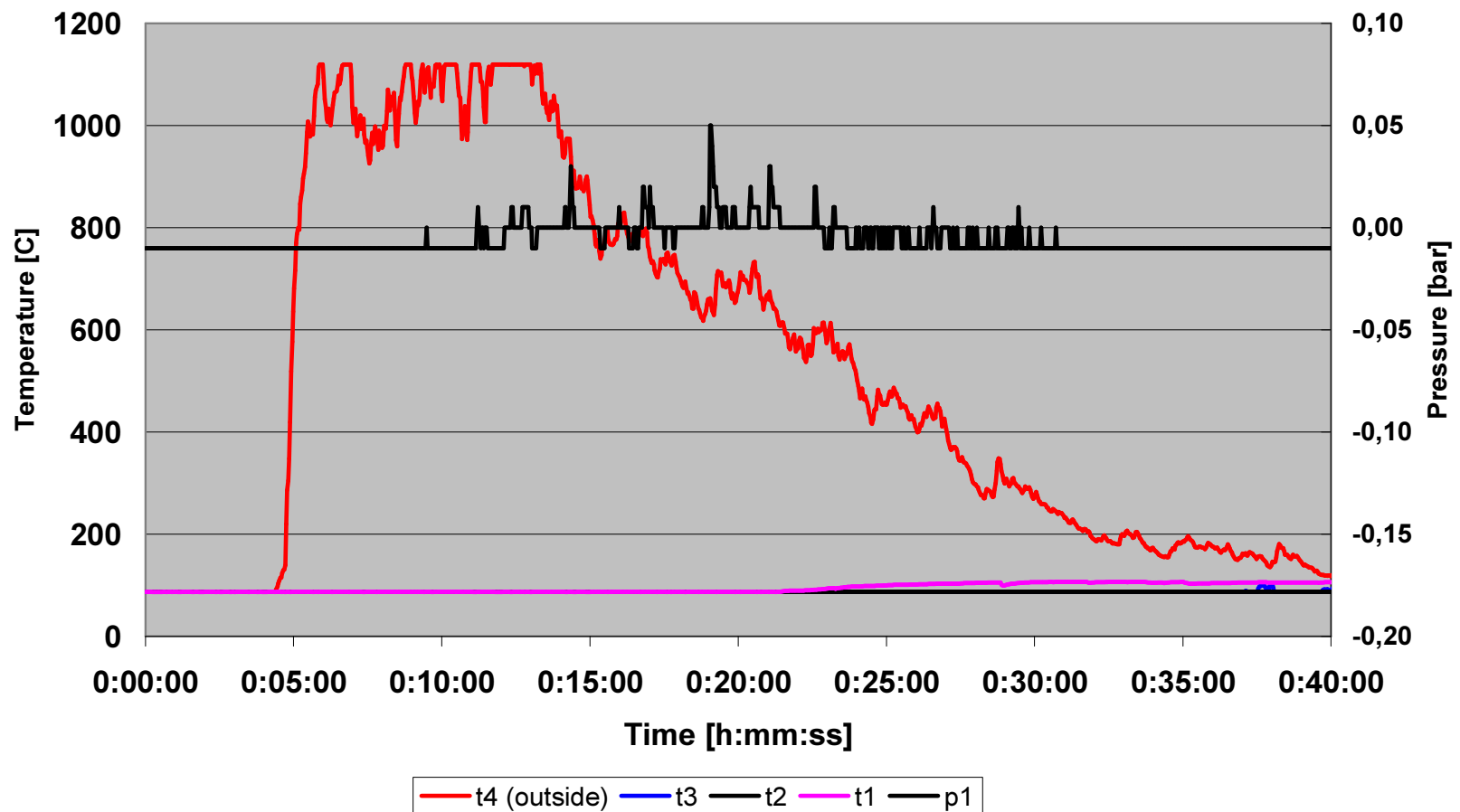
Full scale fire test



Full Scale Fire Test – The Movie

Result - Aluminium tank

ANE Matrix in Insulated Aluminium Tank
Temperature and pressure measurements



Result - Aluminium tank



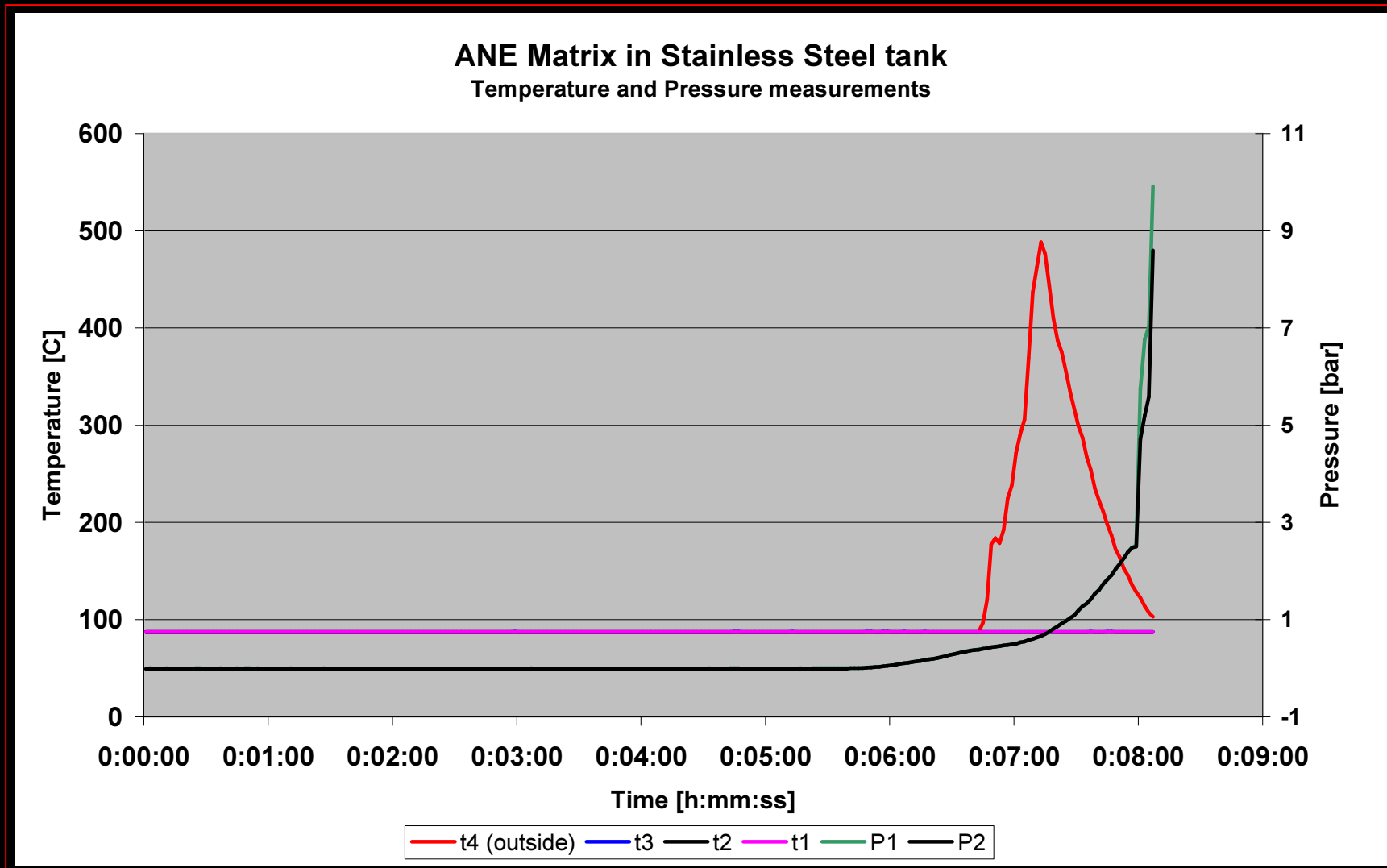
Result - Aluminium tank



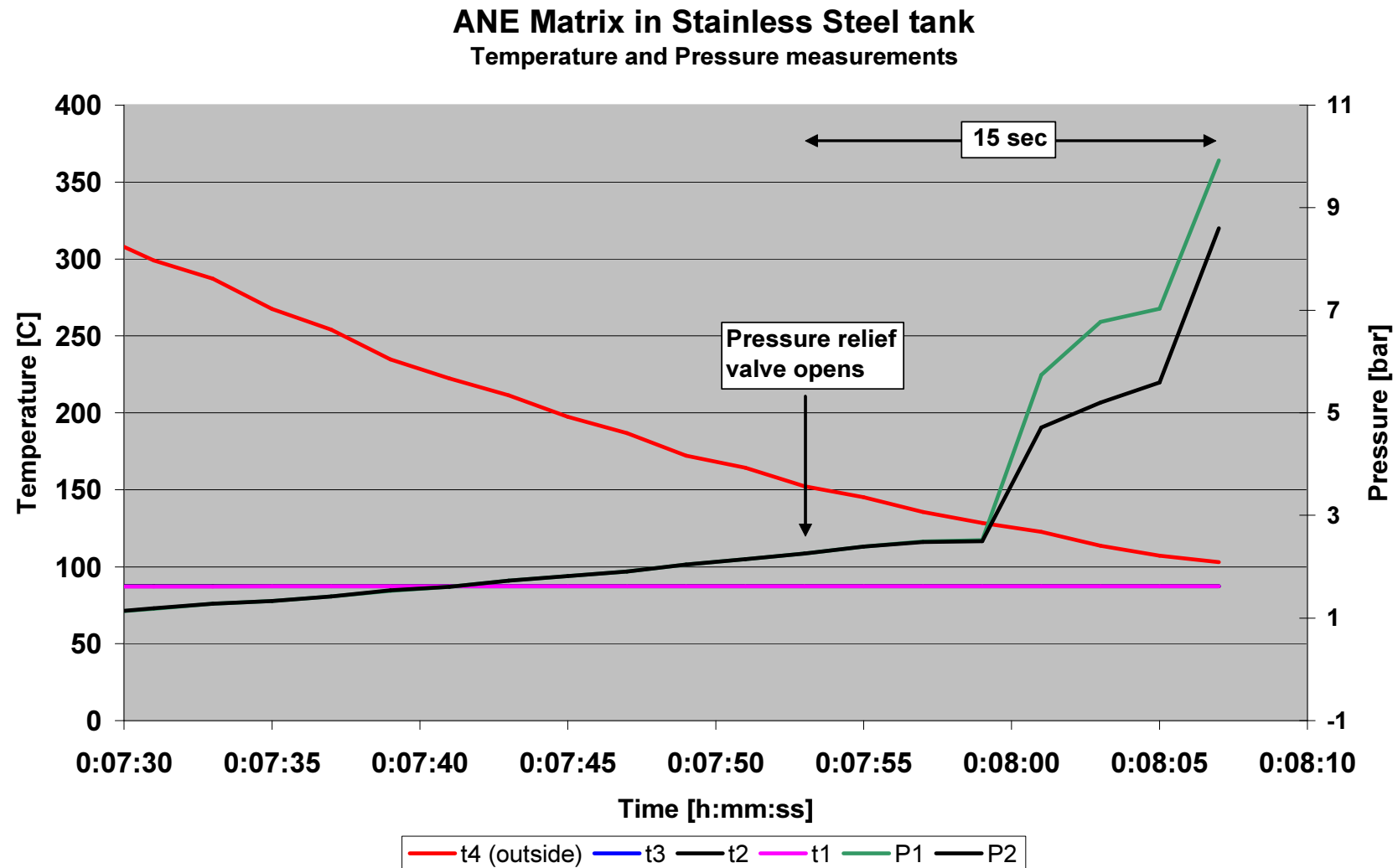
Result - Aluminium tank



Result – Stainless steel tank



Result – Stainless steel tank



Result – Stainless steel tank



Result – Stainless steel tank



Conclusions



- Heating ANE matrix will start a decomposition reaction that produces gases.
- Aluminium will soften and open a venting hole in a non-violent fashion.
- Stainless steel will, without proper pressure release system, open a venting hole through a tank explosion.

Conclusions



Aluminium or materials with similar thermomechanical properties, i.e. materials that undergo adequate weakening when subjected to the heat from a fire, could be used in tanks for transportation and storage of ANE emulsions, suspensions or gels in order to prevent violent decomposition reactions in cases of fire.

The End



Thank you for your attention

Questions?

Conclusions

