



MSIAC

Munitions Safety Information Analysis Center

Supporting Member Nations in the Enhancement of their Munitions Life Cycle Safety



The New Fast Heating Test STANAG 4240 IMEMTS, Rome, Italy 18th – 21st May 2015

Manfred Becker

TSO Warhead Technology

+32.(0)2.707.54.26

m.andrews@msiac.nato.int

MSIAC Office

+32.(0)2.707.54.16

info@msiac.nato.int

<http://www.msiac.nato.int>



This presentation will highlight changes being developed for STANAG 4240

Accomplishments of FFE working group

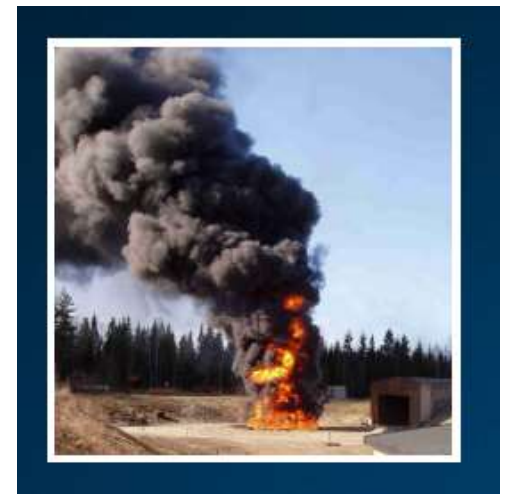
Addition of another test method

Changes to content location

The path forward

ATTEND SESSION 7B!!!

- A hydrocarbon pool fire
 - Temperature is defined
 - Closely resembles fuel fire accident scenario
 - Variability and wind
 - Economical and environmental concerns
- Another test was proposed
 - Propane
 - Well documented and reported



- Add another test that defines the fast heating scenario; not a pool of fuel
 - Not only propane
 - Not only one test apparatus or set up

and
- Leave existing tests unchanged (mostly...)
 - Except where new knowledge or technology dictates improvement
 - Similarity between test procedures

- Its more than temperature!
- What is Flux
- How is Flux measured
- What is appropriate level for the Standard



ATTEND SESSION 7B!!!

- **Average total absorbed heat flux** must be greater than 80kW/m^2 . The measurement locations that meet both the temperature and uniformity requirement must be shown to meet the total absorbed heat flux requirement. **The total absorbed heat flux is the sum of the absorbed radiative heat flux and the convective heat flux.** Care must be taken when performing total heat flux measurements to account for reflected and emitted heat fluxes from the measurement device. For example, a slug calorimeter can measure the total absorbed heat flux if the emitted heat flux ($\epsilon\sigma T^4$ where ϵ is the surface emissivity, σ is the Stefan-Boltzmann constant and T is the absolute temperature) is added to the stored heat flux.

- Hydrocarbon fuel
- Calibrate the “hearth”
 - Measure Flux and temperature
 - 80 kW/m² minimum
 - 800°C minimum
 - Uniform heating – not hot and cold spots
 - Re-calibrate when changes implemented
- During testing, monitor temperature

STANAG 4240 Ed 2

Test requirements and two procedures

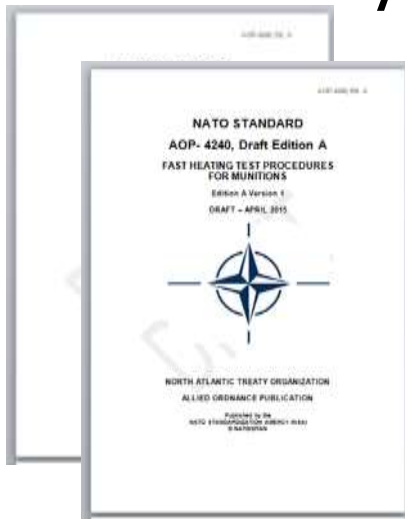



STANAG 4240 Ed A Ver1

Agreement to the Fast Heating Test

AOP 4240 Ed A Ver1

Test requirements
3 tests procedures



- Fuel Fire Experts (FFE) met this week 
 - Open questions resolved
 - Final comments being incorporated into (final) draft documents
- Draft documents will be posted on NATO DI Portal ~ July 2015
- Enter Review and Ratification phase for STANAG and AOP 4240 Fall 2015

- The Netherlands (Custodian)
 - Albert Bouma
- Chairman
 - Tom Swierk
- FFE Working Group
 - Science behind the Standard
 - Calibration and Analysis



ATTEND SESSION 7B!!!

QUESTIONS?