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RWM ITALIA SPA
A RHEINMETALL DEFENCE COMPANY

New Generation & General Purpose MK82 IM signature

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Summary

1. BACKGROUND

2. IM ASSESSMENT

1. Fast Cook-off
2. Slow Cook-off
3. Bullet Impact
4. Light Fragment Impact

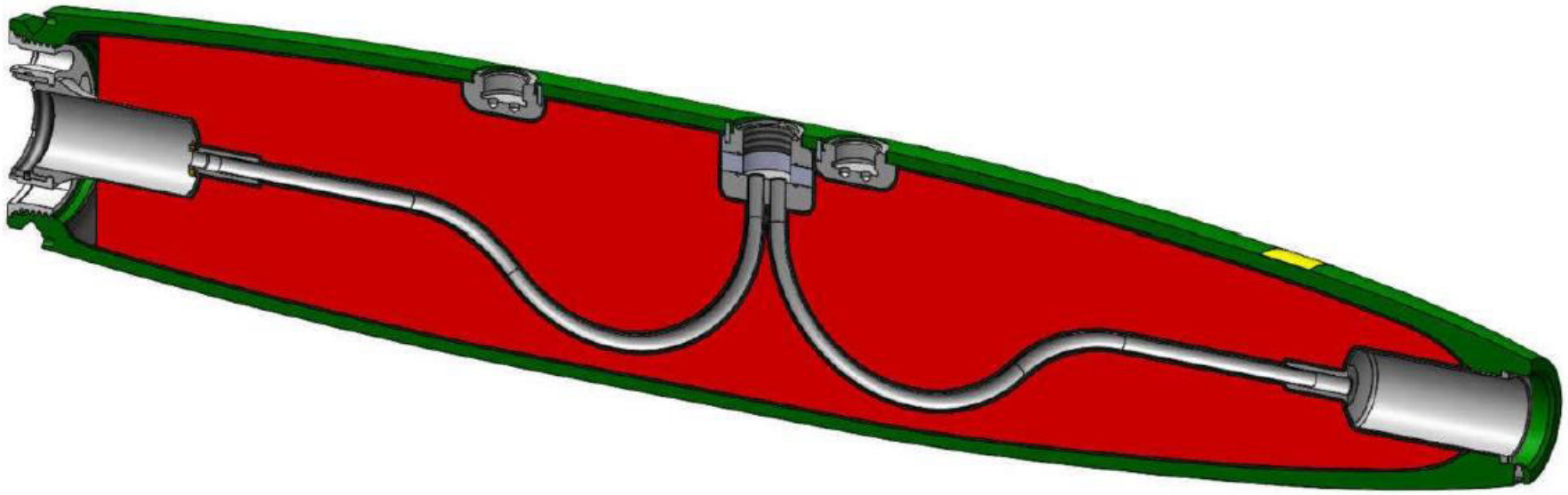
3. IM SIGNATURE

CONTEXT

- Program development for French MoD procurement agency DGA
- New generation MK82 General Purpose
- Follows a DGA research and technology program

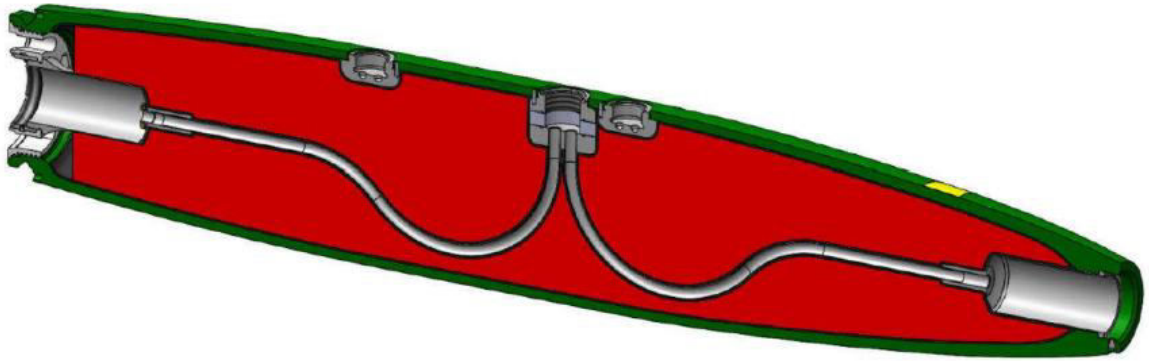
MK82 GP : general architecture

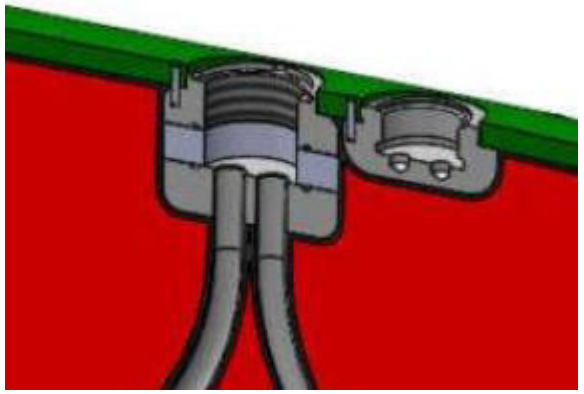
- **Bomb body dimensions and weight meet standard MK-82 requirements**
- **Fully adaptable to current bombs kits:**
  - Proxy sensors type DSU-33
  - Penetrator nose type MXU-735
  - End tail
  - Guidance kits type Paveway or AASM
  - Standard arming fuze type FBM21 or others



MK82 GP : structure

- High strength steel forged structure
- No welded parts
- Venting devices





MK82 GP : Main loading explosive PBXN-109 with EURENCO i-RDX

- **Cast cured PBX explosive :**
  - No exudation
  - Long service life
- **Filling under vacuum :**
  - Explosive defects minimised
- **High IM properties :**
  - Low friction sensitivity : no positive test over 30 @ 283N
  - High progressive heating ignition temperature > 200°C
  - Low shock sensitivity : 40 mm diameter Gap Test = 140 cards / 5600 MPa
  - Low friability sensitivity : < 10 MPa/ms @ 150 m/s

IM ASSESSMENT

- **12 Test specimens MK-82 manufactured**
- **Extensive qualification test program performed by DGA**
- **IM Tests performed by DGA EM :**
  - Fast Cook-Off
  - Slow Cook-Off
  - Bullet Impact
  - Light Fragment Impact

FUEL FIRE - Test set-up

- Test performed iaw STANAG 4240 is.2
- Kerosene fire

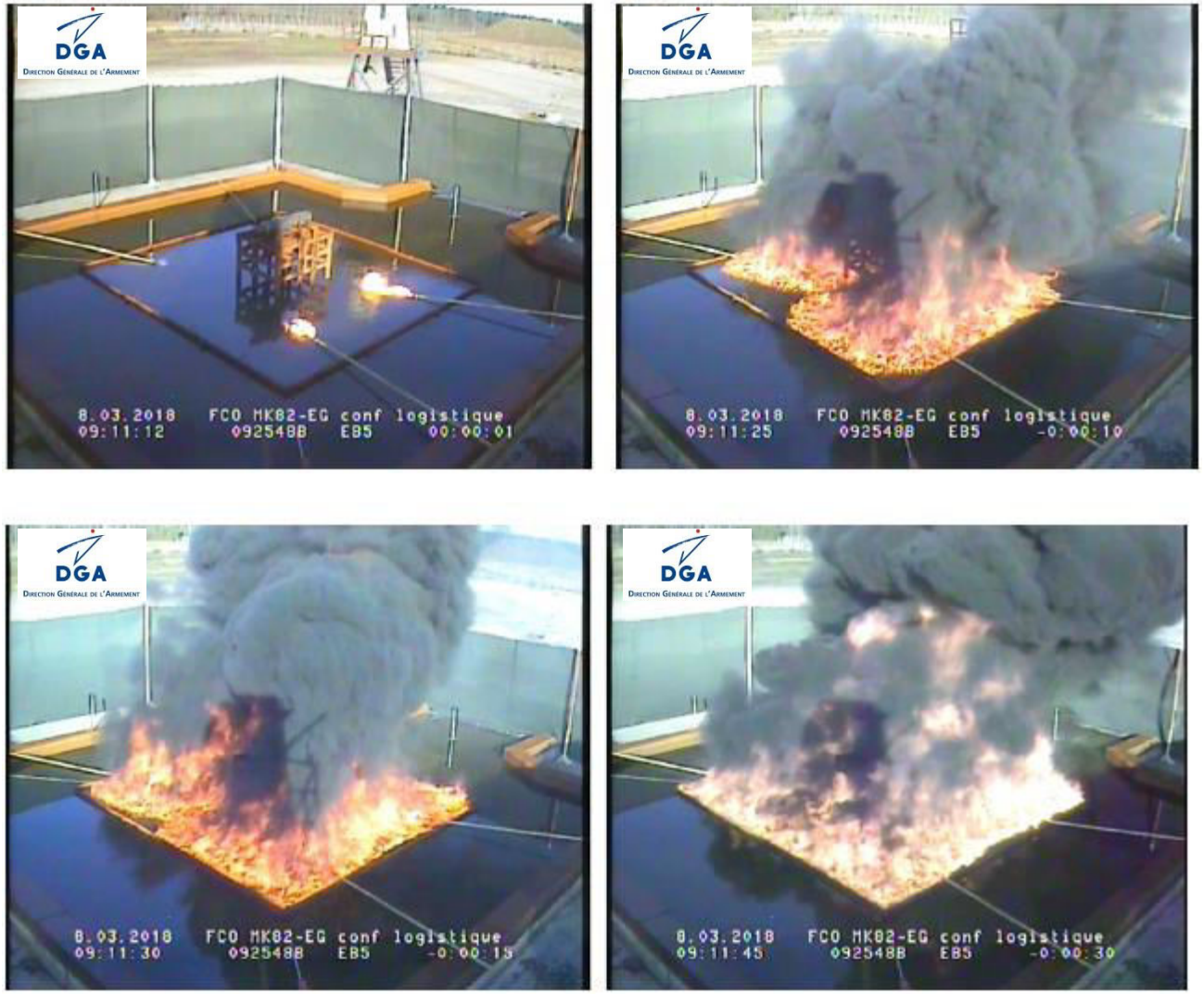
FUEL FIRE - Storage configuration

- Main loading : 84 kg PBXN-109
- Storage plugs
- Aft storage protection

FUEL FIRE – Test

Temperatures iaw STANAG 4240 :

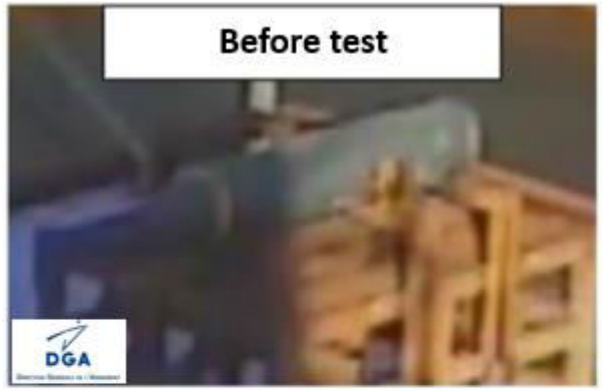
- Time to reach 550°C < 30 sec
- Minimum temperature : 800°C



FUEL FIRE – Test

Reaction @ T0+5’

EM combustion for 12’



FUEL FIRE – Results

- No projection of fragment
- No significant overpressure
- No test specimen movement

➔ TYPE V reaction

FUEL FIRE – Test

Reaction @ T0+4’

EM combustion for 11’

FUEL FIRE – Tactical configuration

- **Main loading : 84 kg PBXN-109**
- **Body equipped with**
  - End tail
  - Front nose MXU 735
  - FBM21 fuze

FUEL FIRE – Results

- No projection of fragment
- No significant overpressure
- No test specimen movement

➔ TYPE V reaction

SLOW COOK-OFF - Test set-up

- Test performed by DGA EM Gironde iaw STANAG 4382 is.2
- Equipped configuration : Front nose MXU 735 + FBM21 Fuze

SLOW COOK-OFF - Test

Pre-heating @ 50°C

T0 : Start of 3.3°C/h slope

Reaction : T0+35H

Temperature : 161,5°C

SLOW COOK-OFF– Results

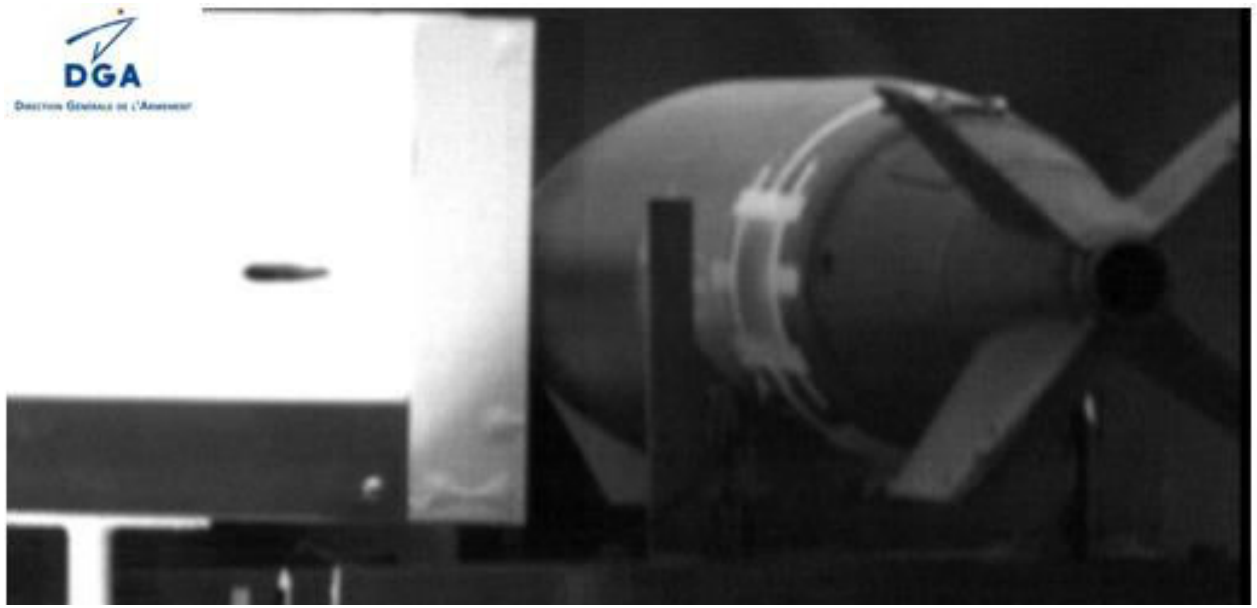
- Burning of all EM
- No projection of fragment
- No significant overpressure
- No test specimen movement

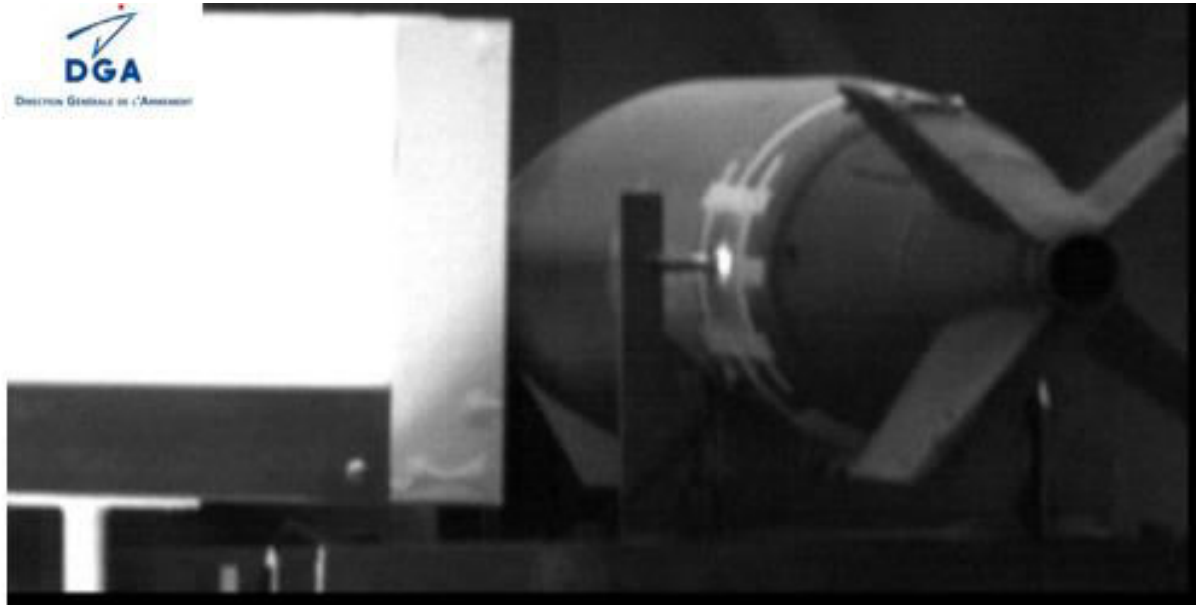
→ TYPE V reaction

BULLET IMPACT- Test

BULLET IMPACT- Test set-up

- Test performed by DGA EM Gironde iaw STANAG 4241 is.2
- Equipped configuration : Front nose MXU 735 + FBM21 Fuze
- Impact point = FBM21 fuze explosive load





BULLET IMPACT- Results

- Burning of all EM
- No projection of fragment
- No significant overpressure
- No test specimen movement

→ TYPE V reaction

LIGHT FRAGMENT IMPACT

- Test performed by DGA EM Gironde iaw STANAG 4496 is.1
- Equipped configuration : Front nose MXU 735 + FBM21 Fuze
- Impact point = FBM21 fuze explosive load

LIGHT FRAGMENT IMPACT - Results

- Burning of all EM
- No projection of fragment
- No significant overpressure
- No test specimen movement

➔ TYPE V reaction

MK82 GP IM SIGNATURE based on :

- Qualification test results
- Read across from experimental results in equivalent configurations
- Calculations or semi-empirical tools

Threat	MK82 GP
Fast Cook-Off	V
Slow heating	V
Bullet impact	V
Light fragment impact	V

PERSPECTIVES

- **Further developments on-going with same structure and enhanced IM cast PBX explosive NTO base**
- **Same or better IM signature expected, including :**
  - Sympathetic Reaction
  - Heavy Fragment Impact
  - Shape Charge Jet

Threat	MK82 GP	MK82 enhanced IM
Fast Cook-Off	V	V
Slow heating	V	V
Bullet impact	V	V
Sympathetic reaction	I	III
Light fragment impact	V	V
Shaped charge jet	I	V
Heavy fragment impact	I	V

ACKOWLEDGEMENTS

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- IM tests performed by DGA EM

A MEMBER OF