



Dual Function Fuze DM173 for Cartridge 120mm x 570 HE

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Program Background

- Germany, Switzerland and The Netherlands have agreed to co- operate on a joint program

- Rheinmetall W&M and JUNGHANS Microtec have teamed up to develop a multi- purpose projectile for use against
 - Hard / soft targets
 - Anti- personnel
 - Vehicles
 - Buildings, etc.

Application

– 120mm smoothbore Tank Gun



Combat Battle Tank “Leopard 2”

Requirements

- STANAG 4157; STANAG 4187; STANAG 4235;
STANAG 4239; STANAG 4439
- MIL-STD 331C; MIL-STD 1316; MIL-STD 810
- Muzzle Safety Distance $\geq 20\text{m}$
- Arming Distance $\leq 80\text{m}$
- Overall functional Reliability $\geq 98\%$
- Functioning Temperature -46°C to $+63^{\circ}\text{C}$
- Storage Temperature -54°C to $+71^{\circ}\text{C}$

Fuze Functioning Modes

– Programming

- Impact mode with optional delay
- Airburst, programmable ignition time from 64ms to 12s
- Self- destruct function

– Default

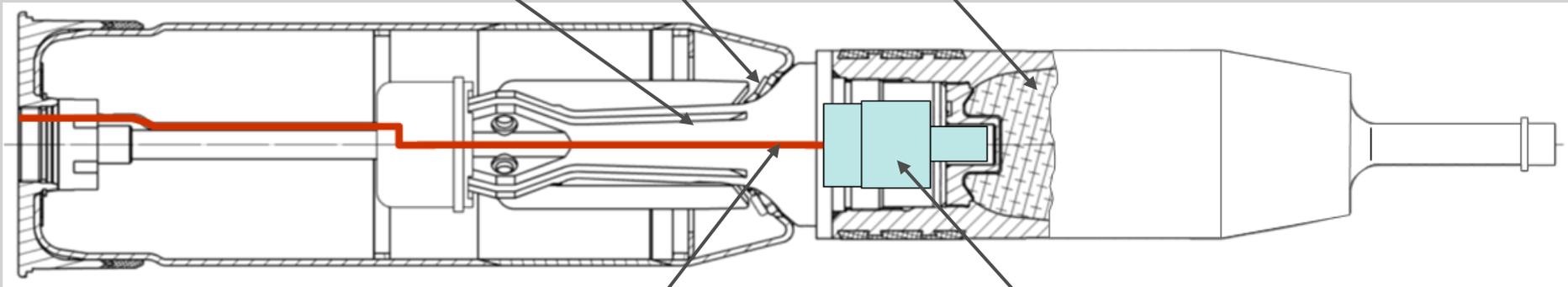
- Impact mode without delay
- Self- destruct function

Overview of the Cartridge DM11

Warhead with insensitive HE

Gas pressure switch

Tail Unit

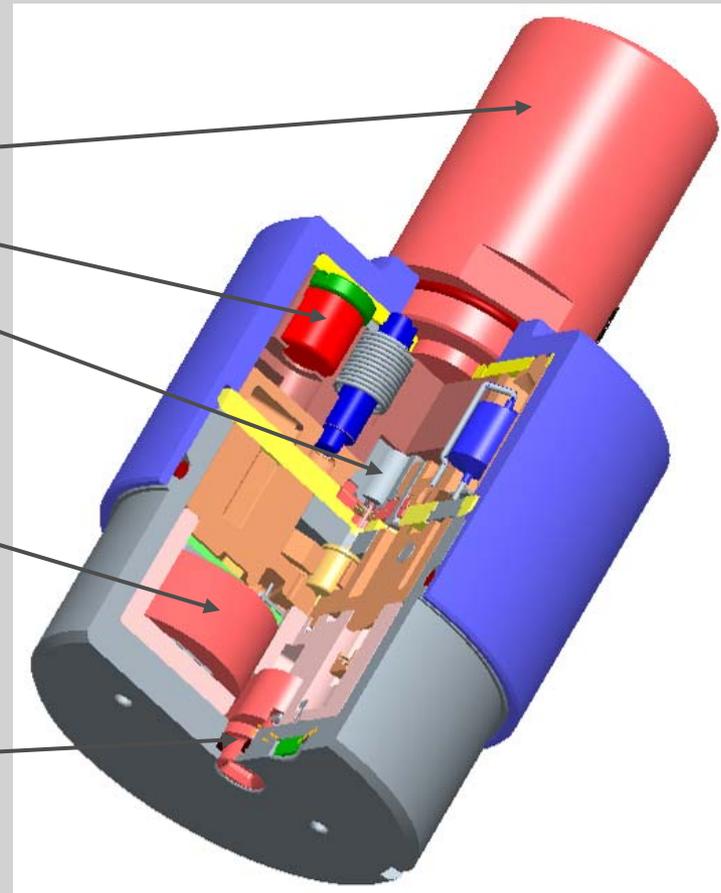


Programming Wire

Fuze

Main Fuze Components

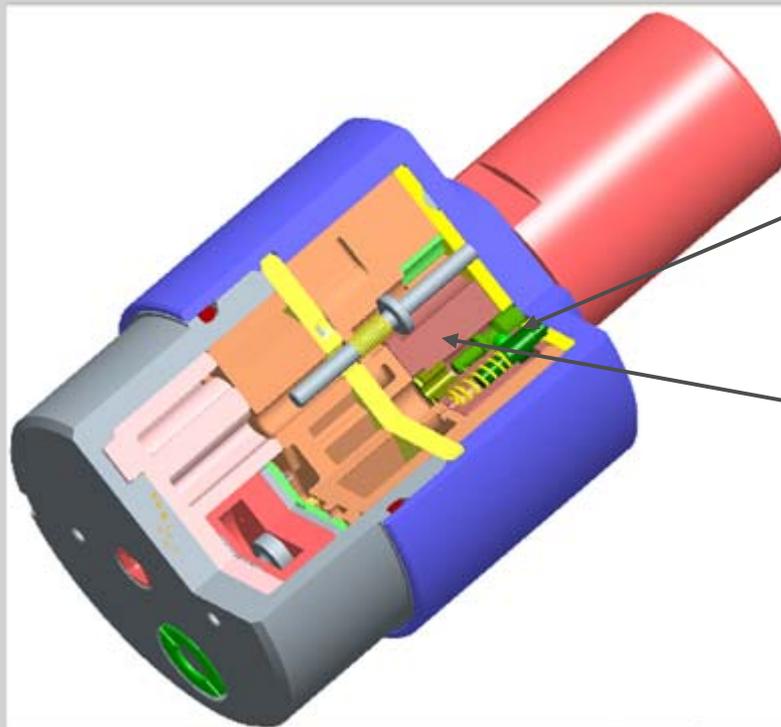
- Firing Train**
 - Insensitiv booster
 - Relay charge
 - Detonator
- Set back generator
- Electrical connector



Arming Criteria's

– 1st Safety

- Safety Element: Set back pins
- Arming Criteria: Acceleration



Set back pins

Rotor

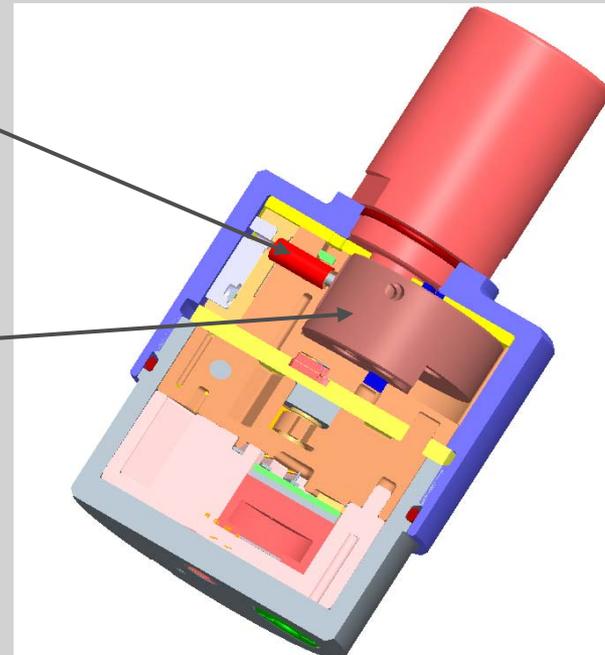
Arming Criteria's

– 2nd Safety

- Safety Element: Piston actuator / gas pressure switch
- Arming Criteria: Gas pressure of the propellant

Piston actuator

Rotor



Technical Solutions

– Safety Distance

- Electronical timer starts after gas pressure switch is closed
- Piston actuator will be fired when the time is elapsed

– Programming

- Digital
- Talk- back signal
- Continuous update

Technical Solutions

– Power Supply

- Via the control unit for the μP
- Basic fuze function via a set back generator

– Target Impact Detection

- Shock wave sensor (Piezo)
- Omni- directional switch

Photo of Fuze Hardware

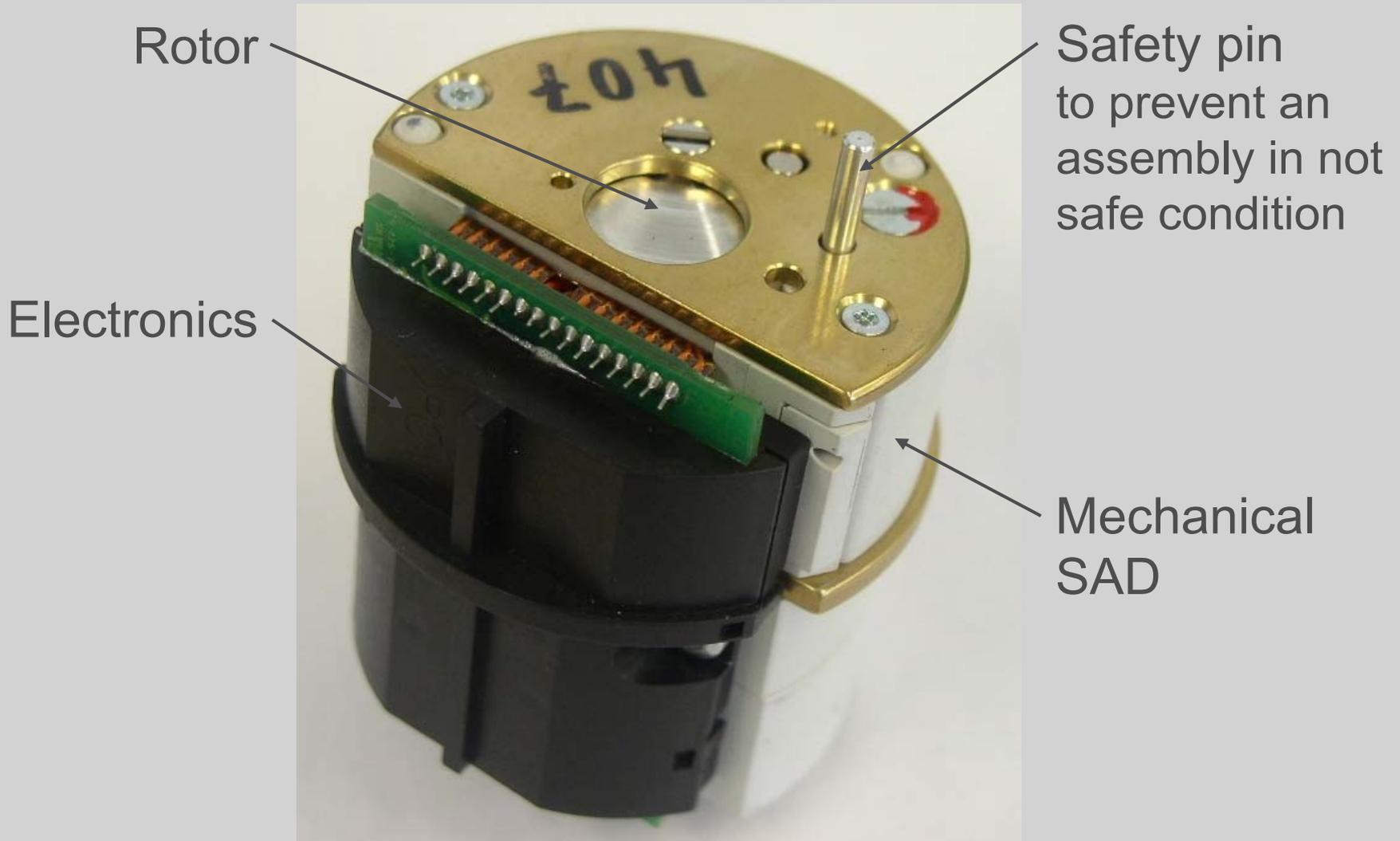
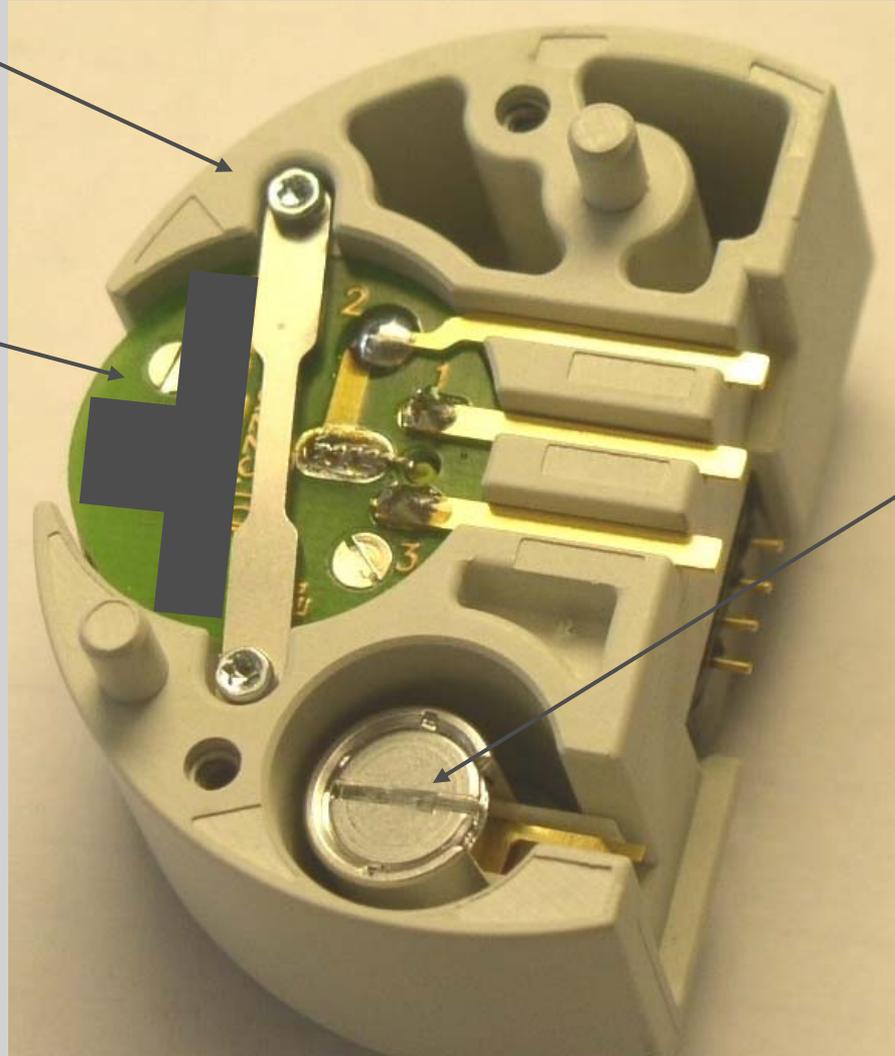


Photo of Fuze Hardware

Plastic part
of the SAD

Set back
Generator



Piezo, pre-
assembled

Project Status

- Development phase finished end of 2008

- Fuze qualification successful finished end of March 2009
 - 142 functioning / safety trials without failures conducted
 - Safety- and ESD / EMV tests conducted

- System qualification will be finished end of 2009
 - Cartridge qualification
 - Safety release for manned firing
 - Release of the system into service

Trial Results

- Firing against a 24cm brick wall, impact mode with time delay



Photo provided by



Trial Results

- Firing against a 8” double reinforced concrete wall, PD mode



Photo provided by



Trial Results

- Firing against an earth and timber bunker, PD mode



Video provided by



Trial Results

- Firing against a 10mm steel plate, PD mode

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Schuß Nr.: 368



Video provided by



Trial Results

- Firing against dismounted infantry, squad in wedge formation, AB mode

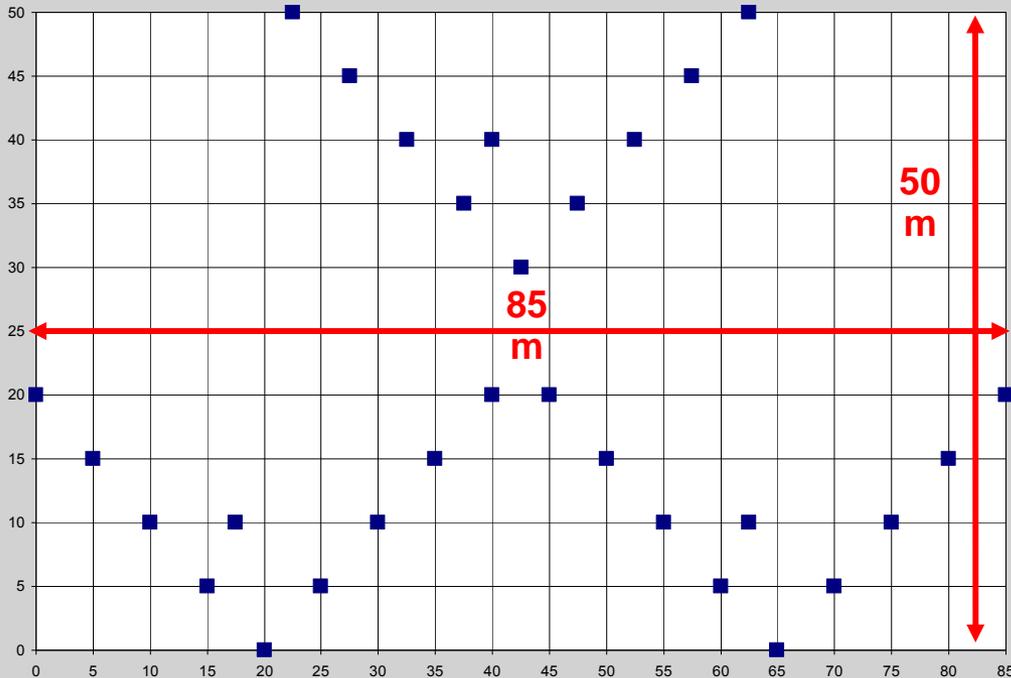


Video provided by



Trial Results

- Firing against dismounted infantry, squad in wedge formation, AB mode



Trial Results

- AB firing (see also following slow motion)

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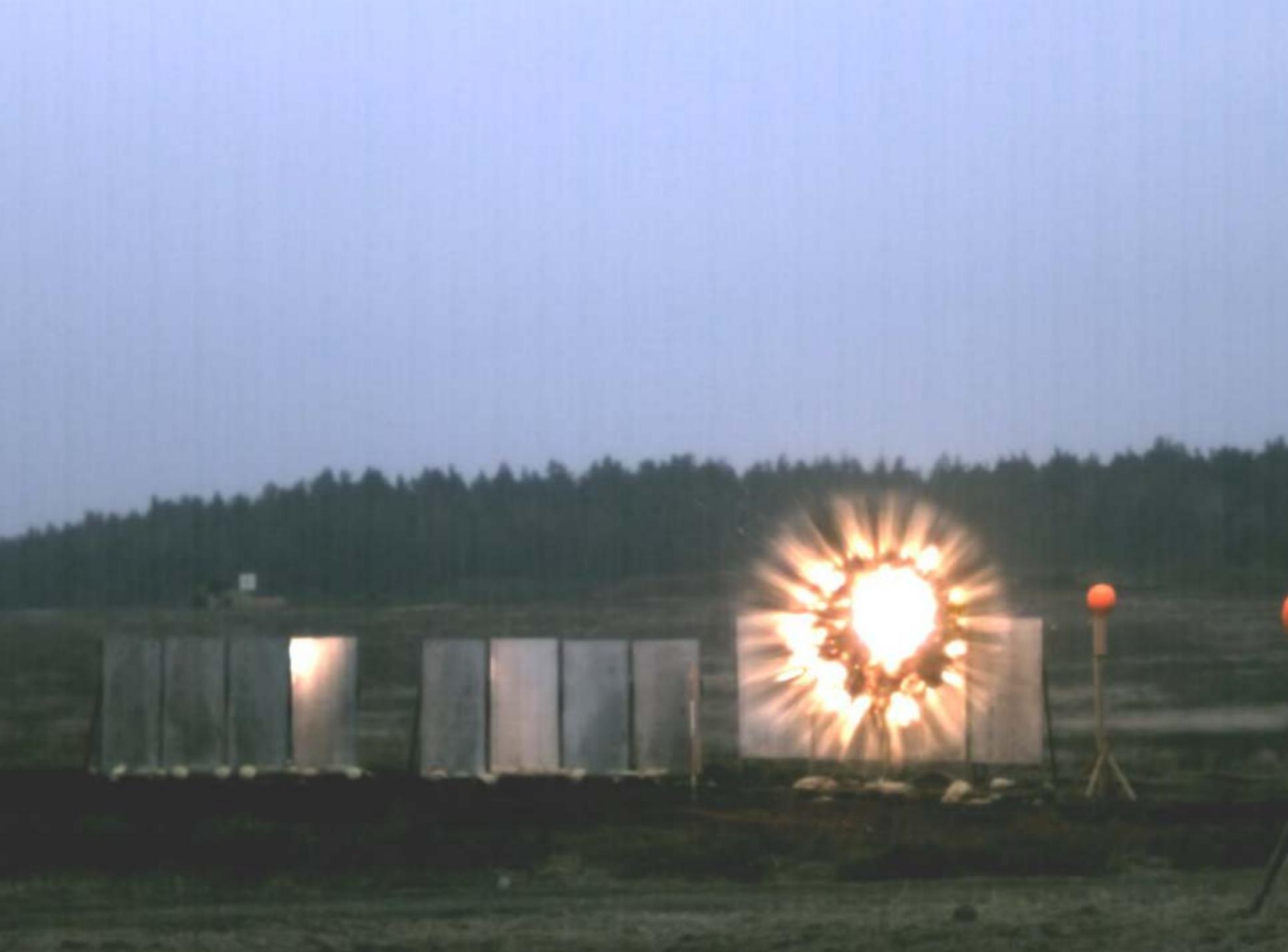


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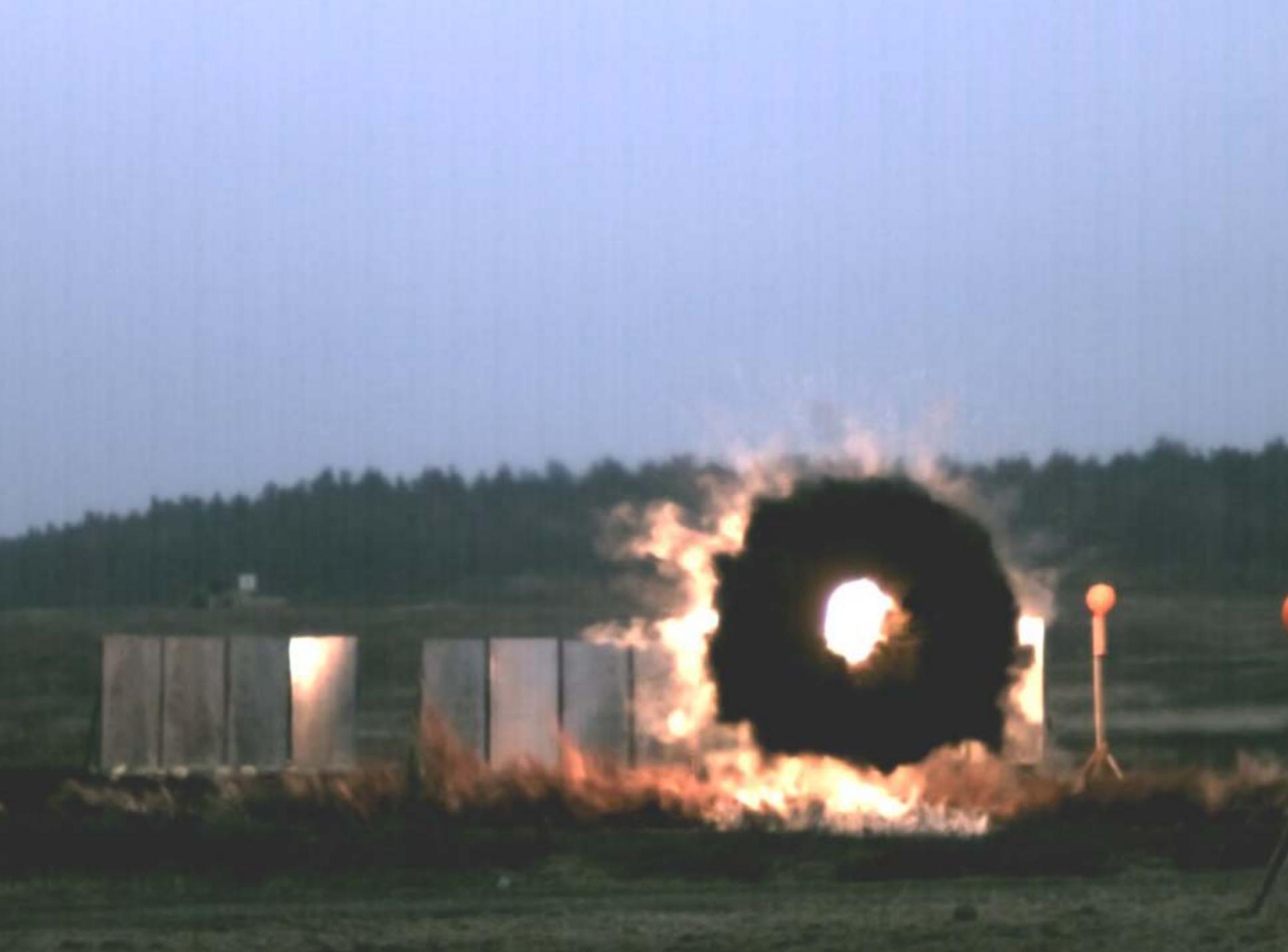


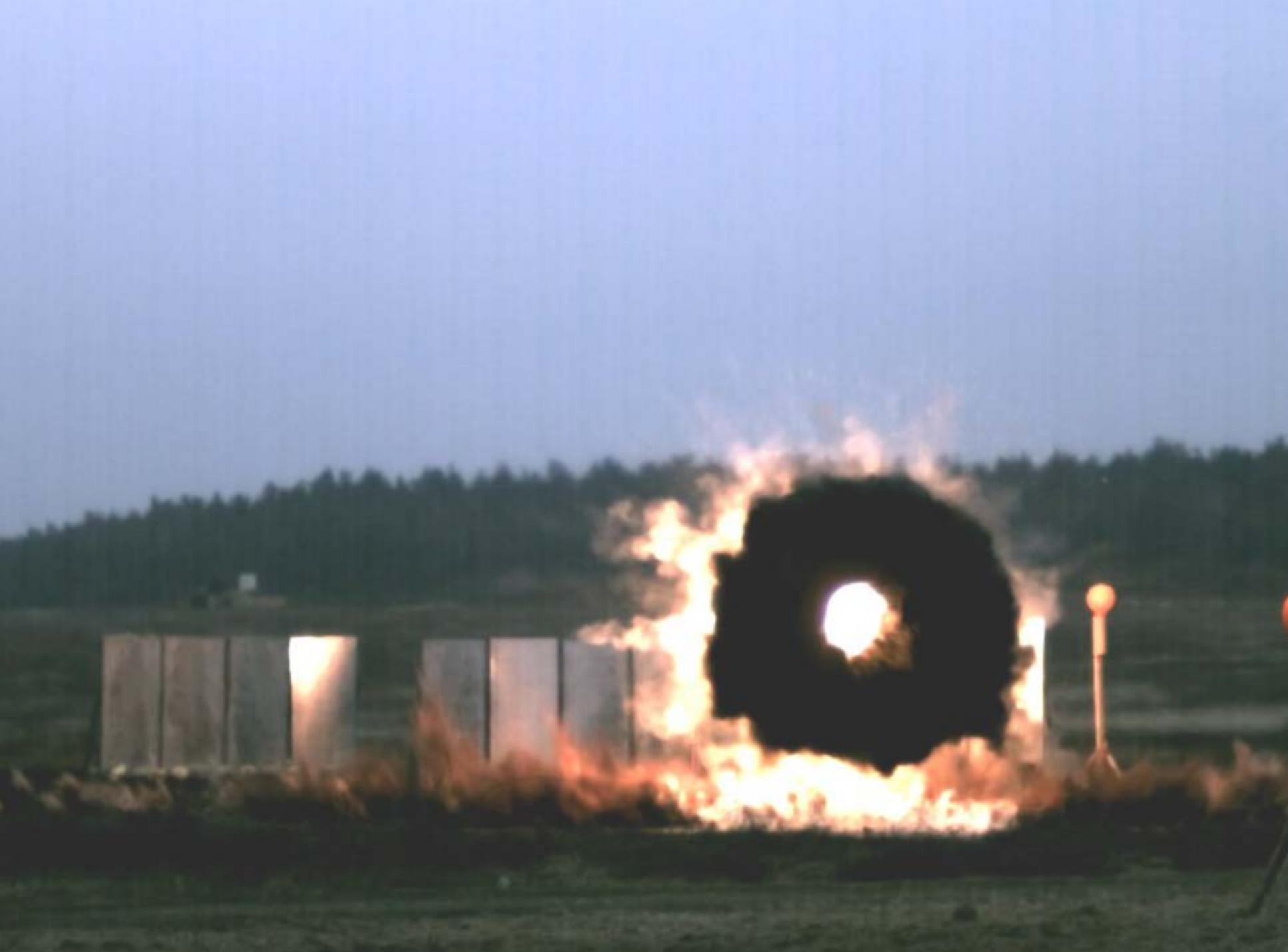


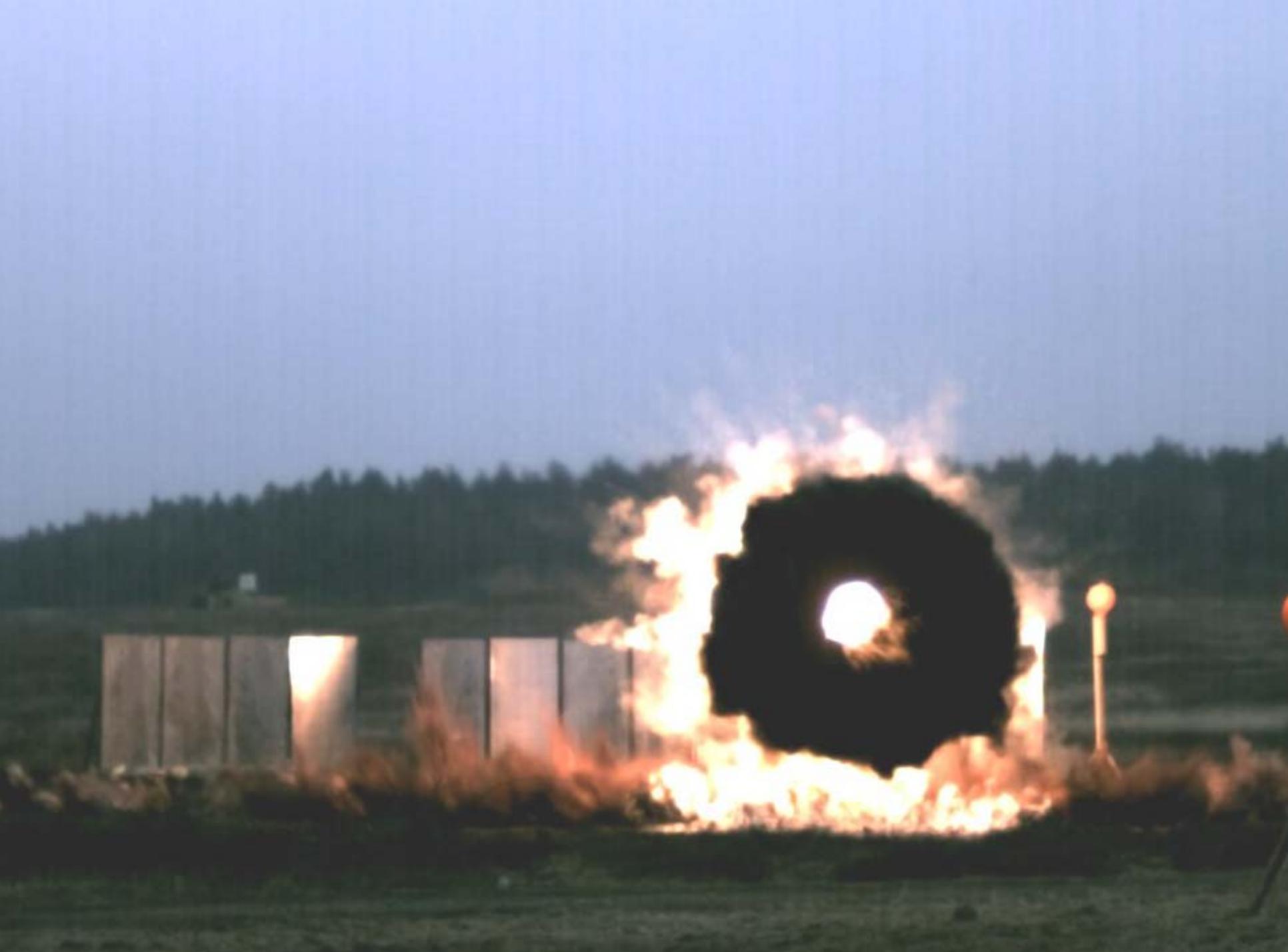


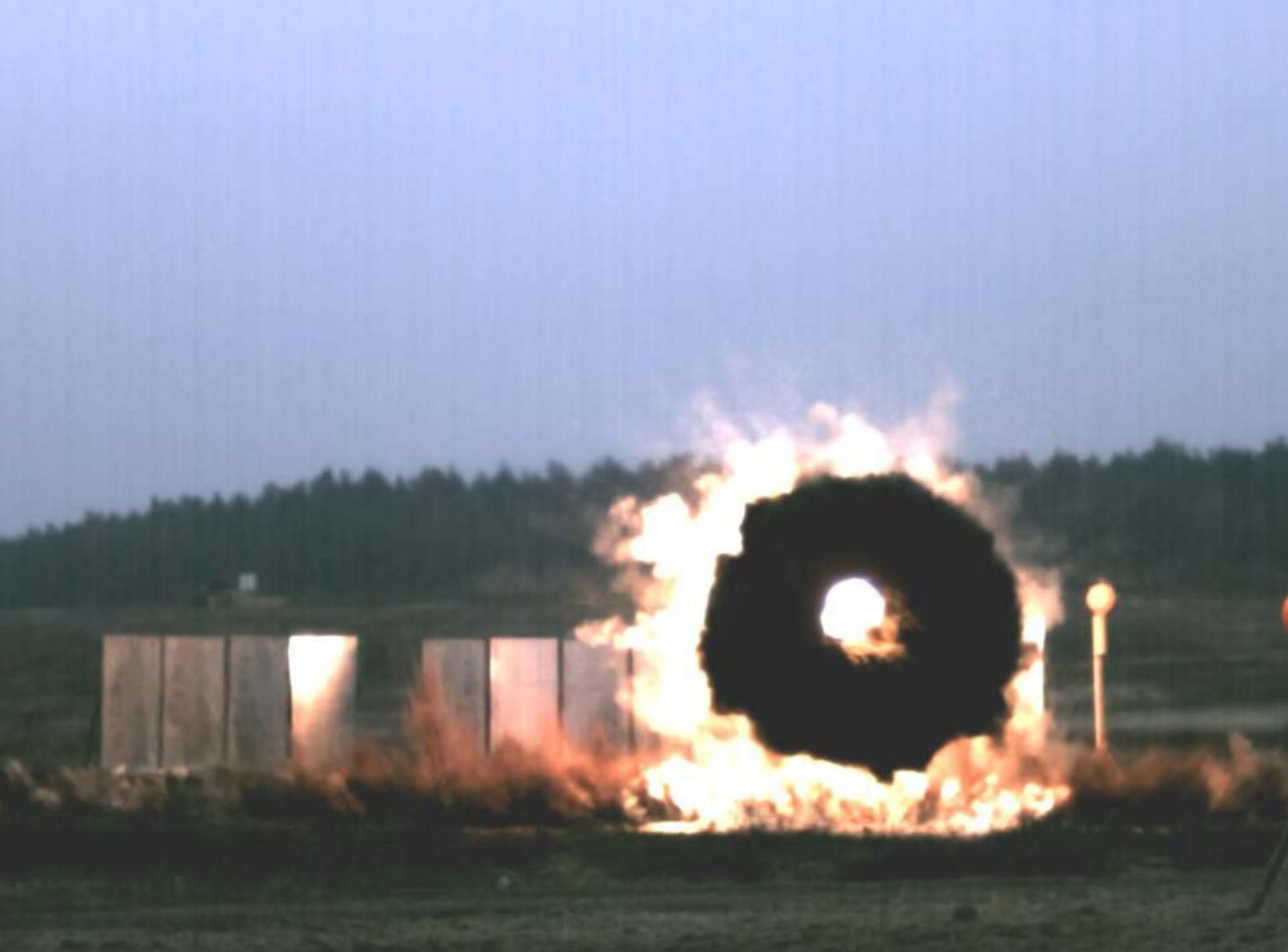


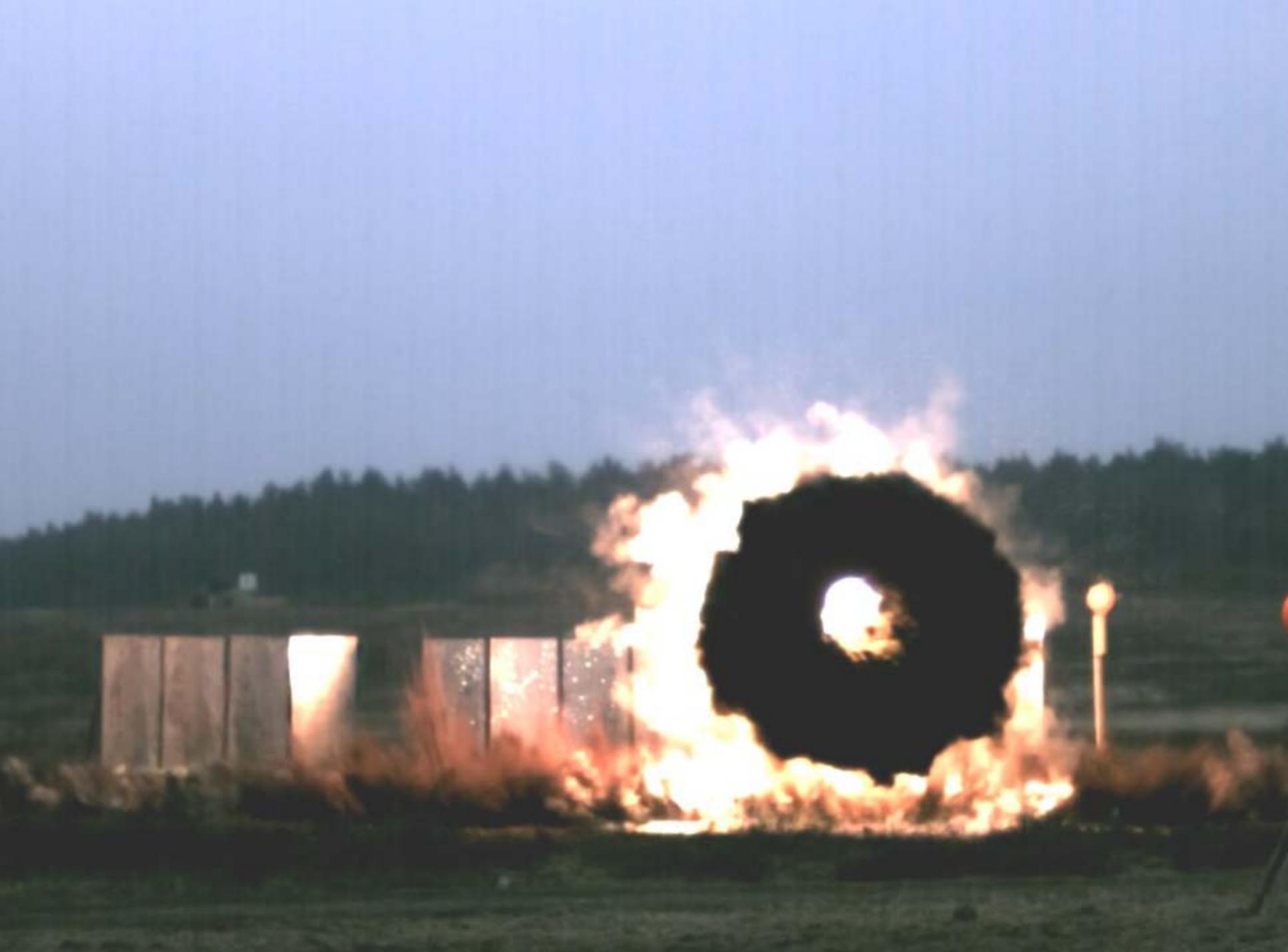


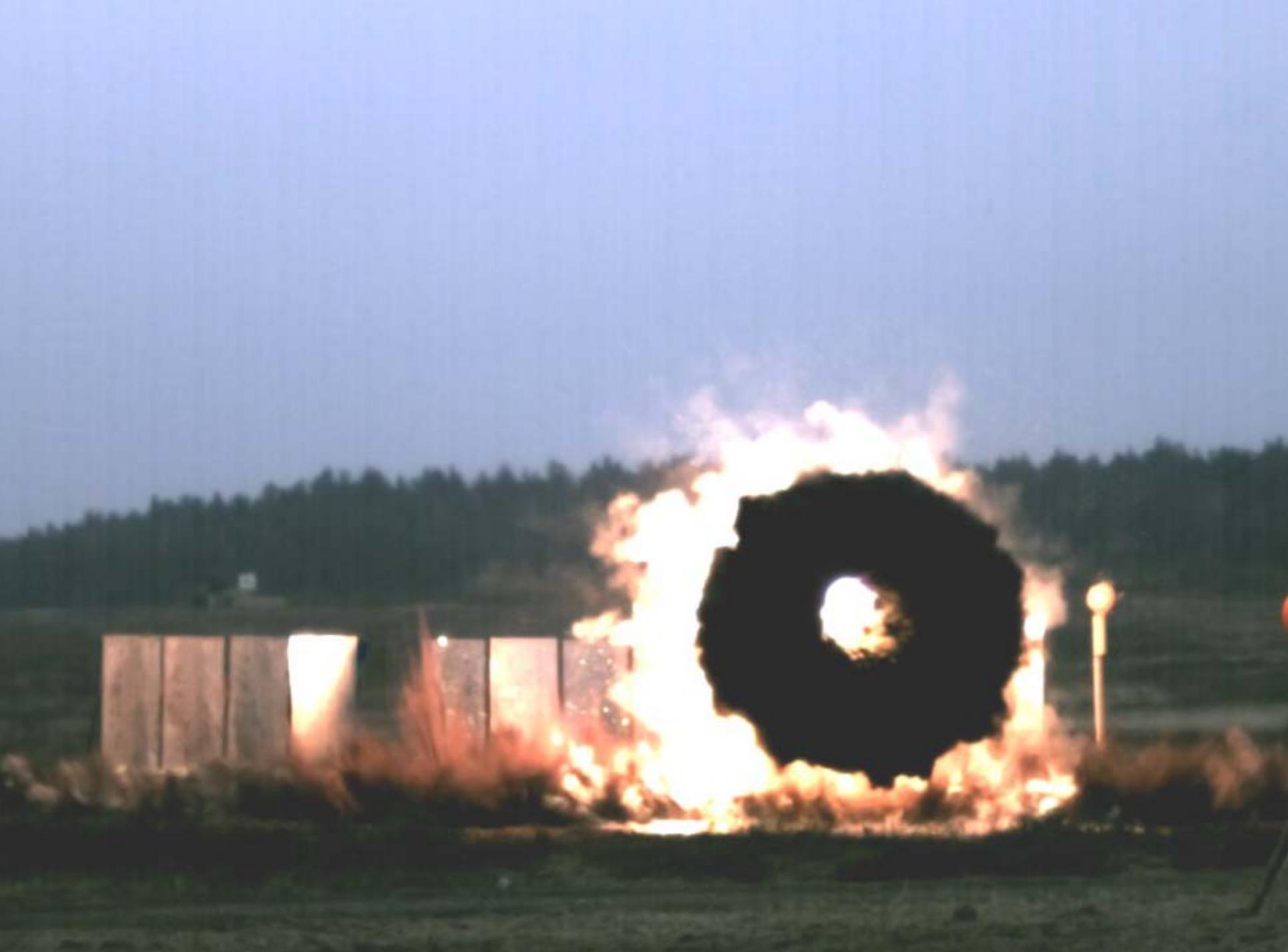


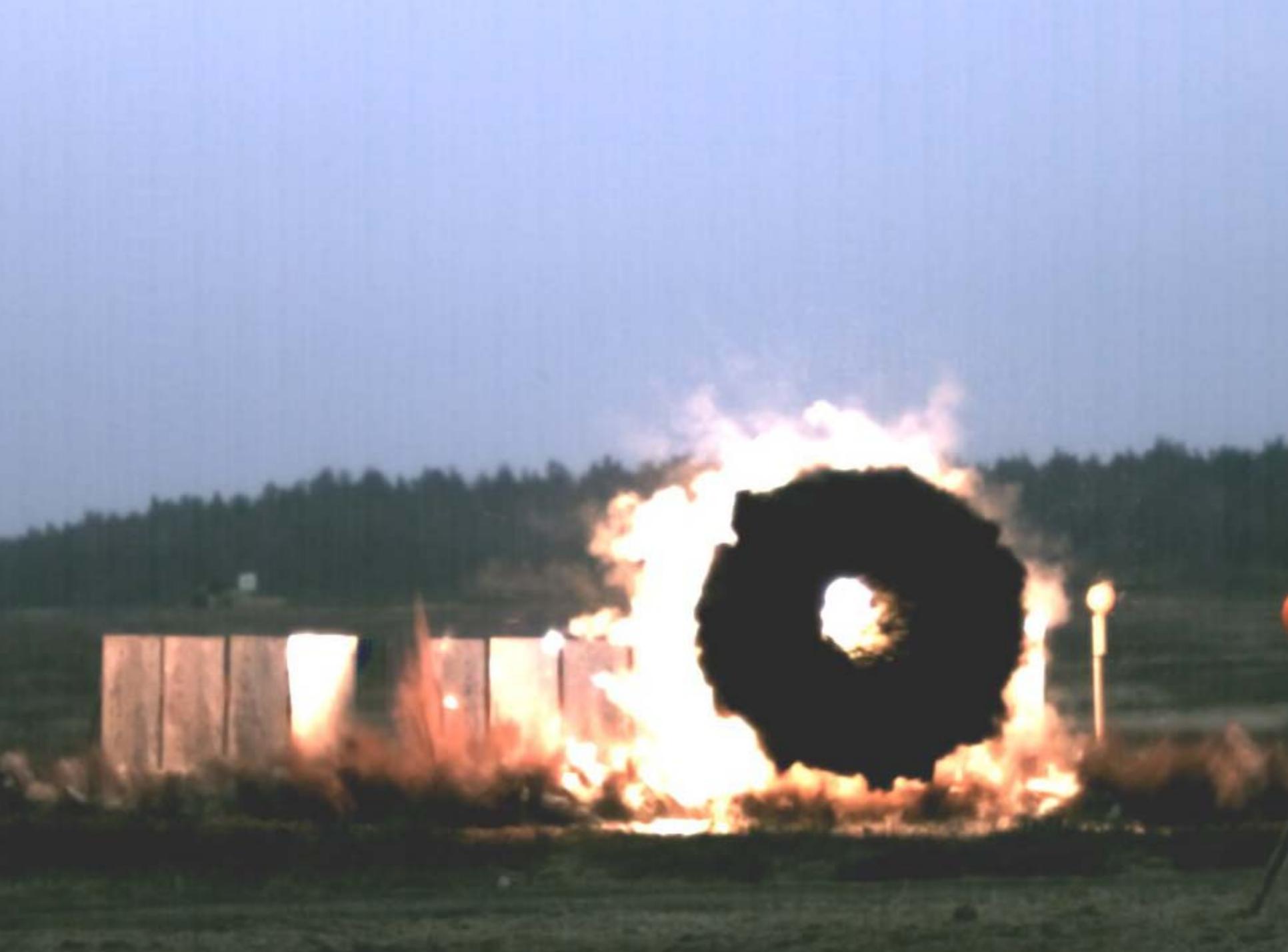




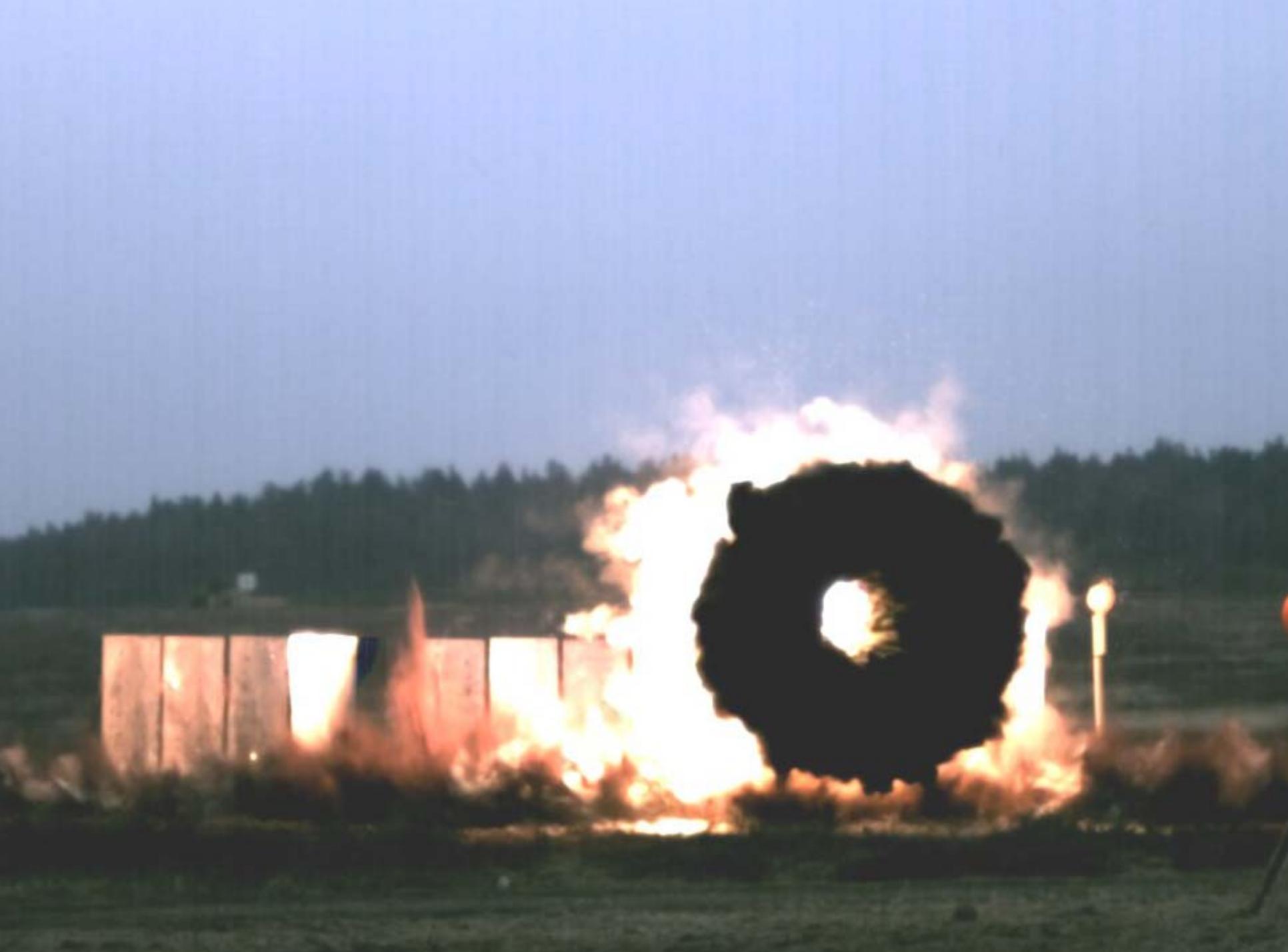






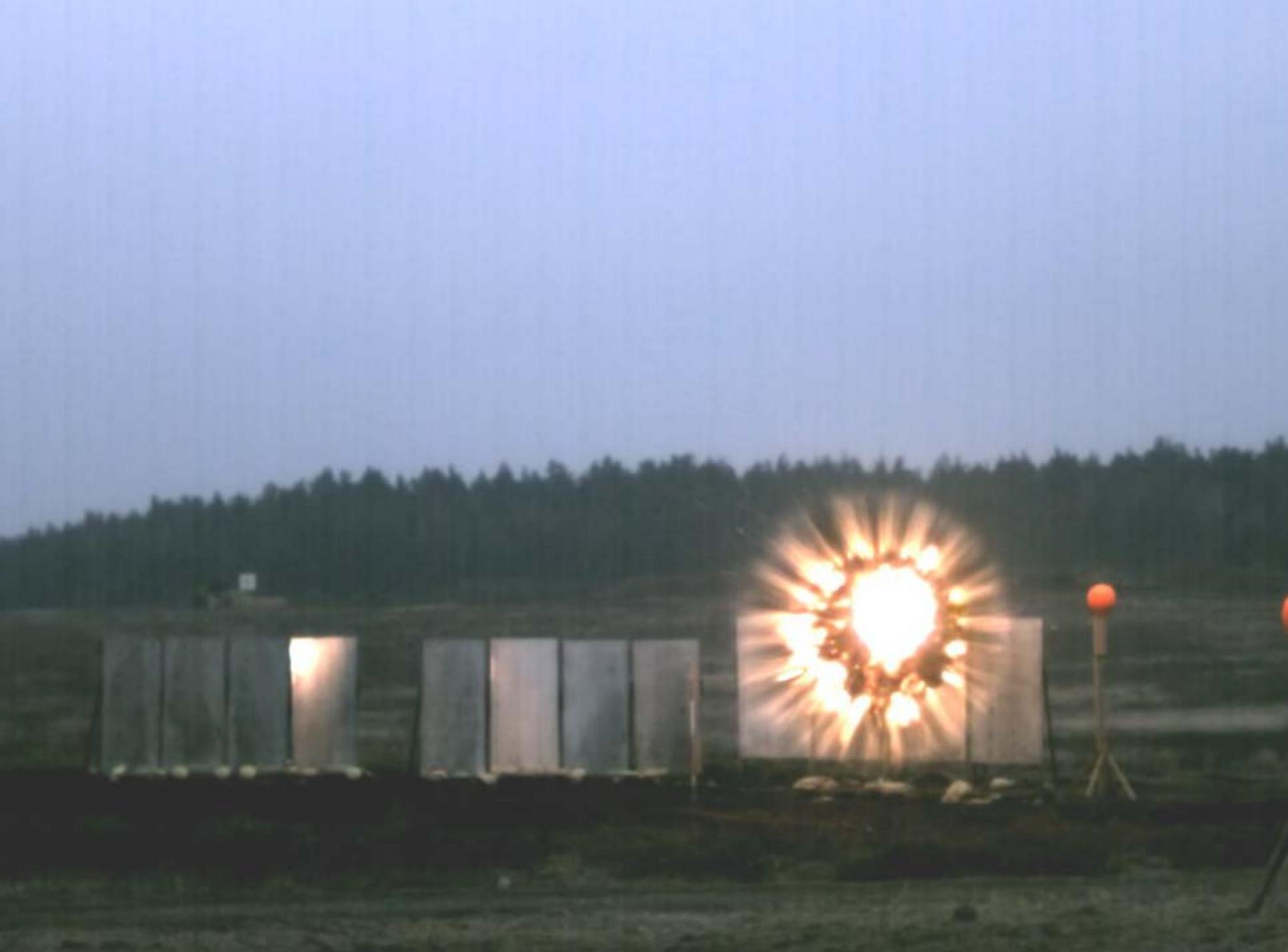














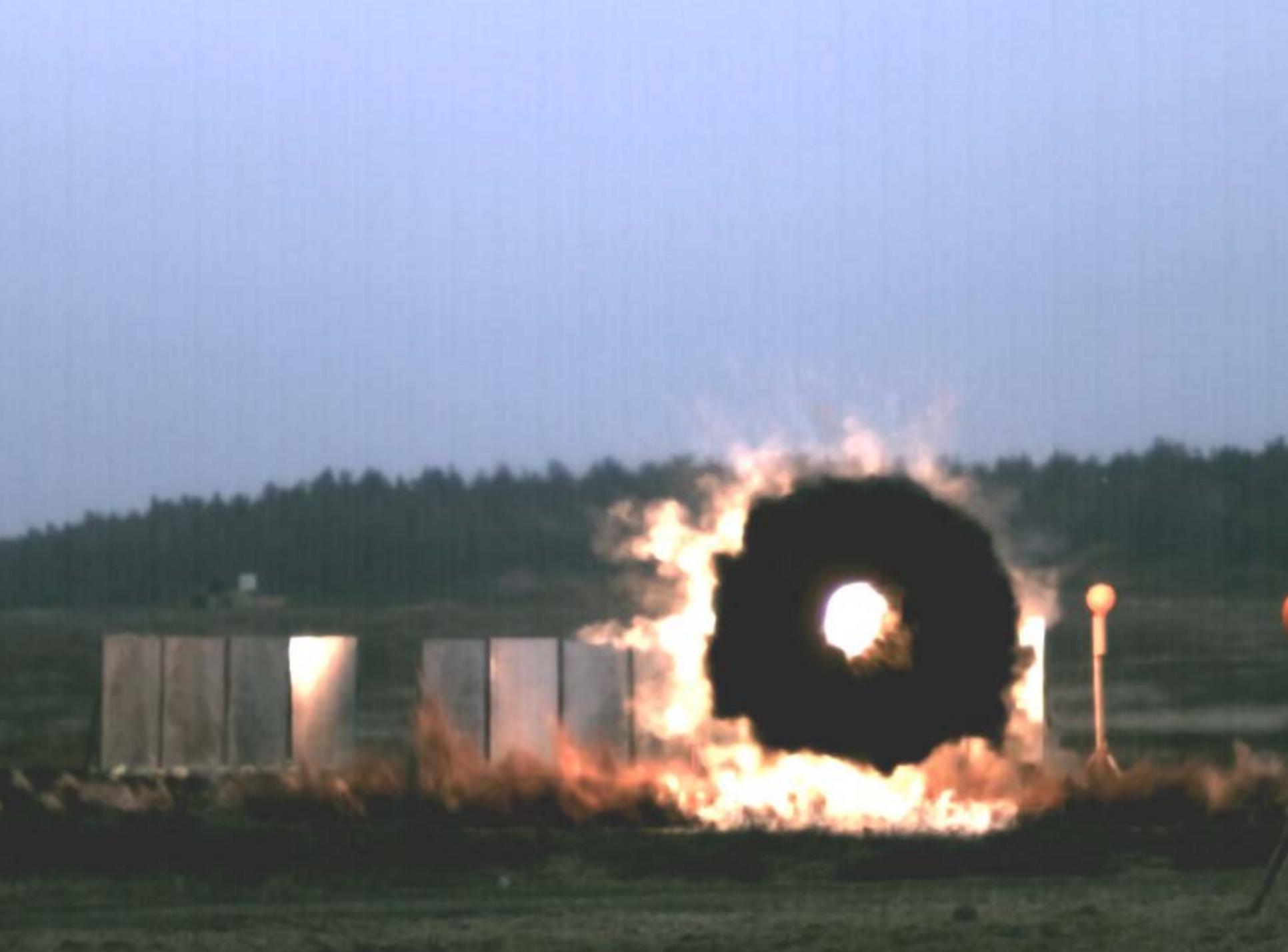


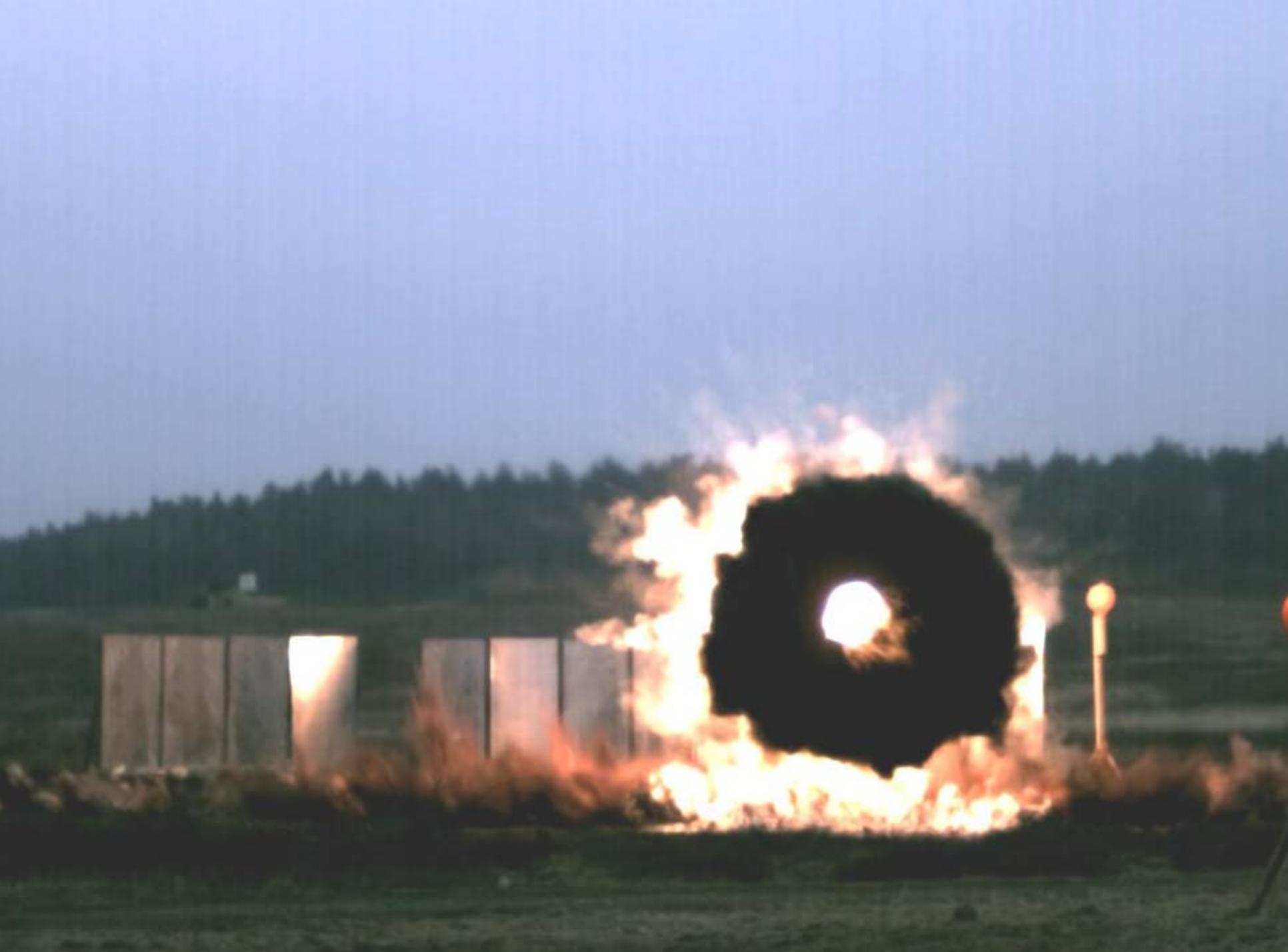


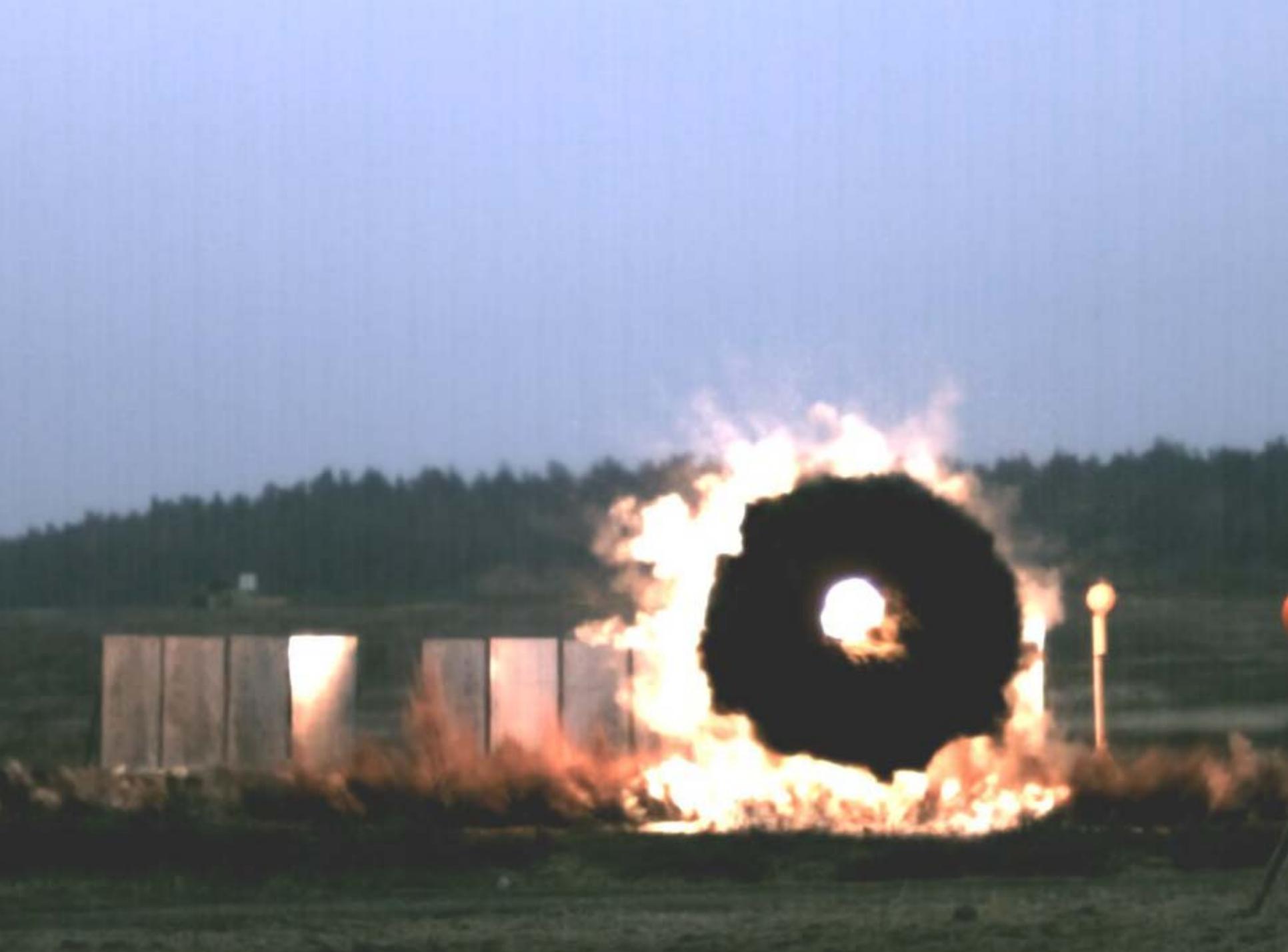


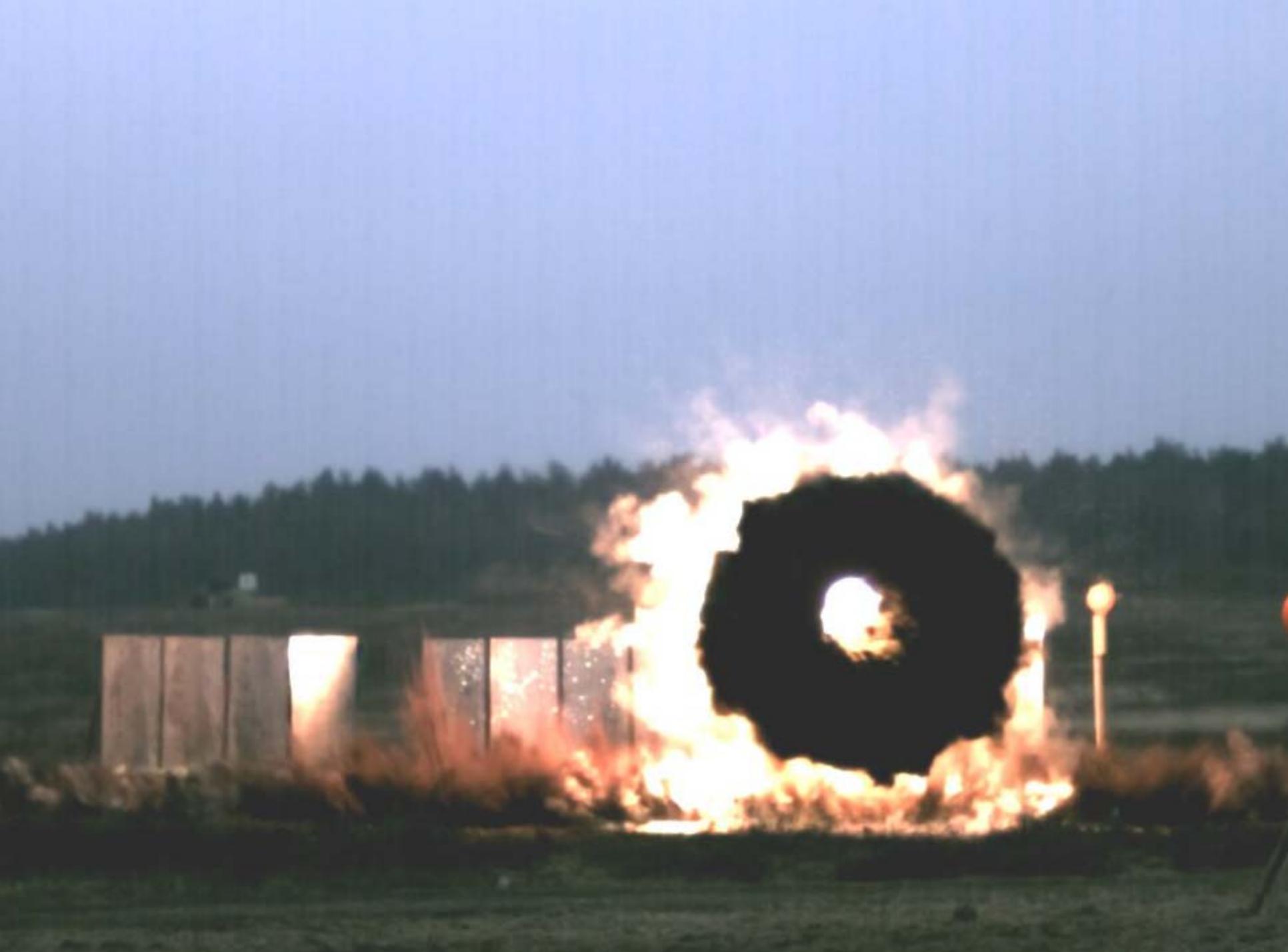


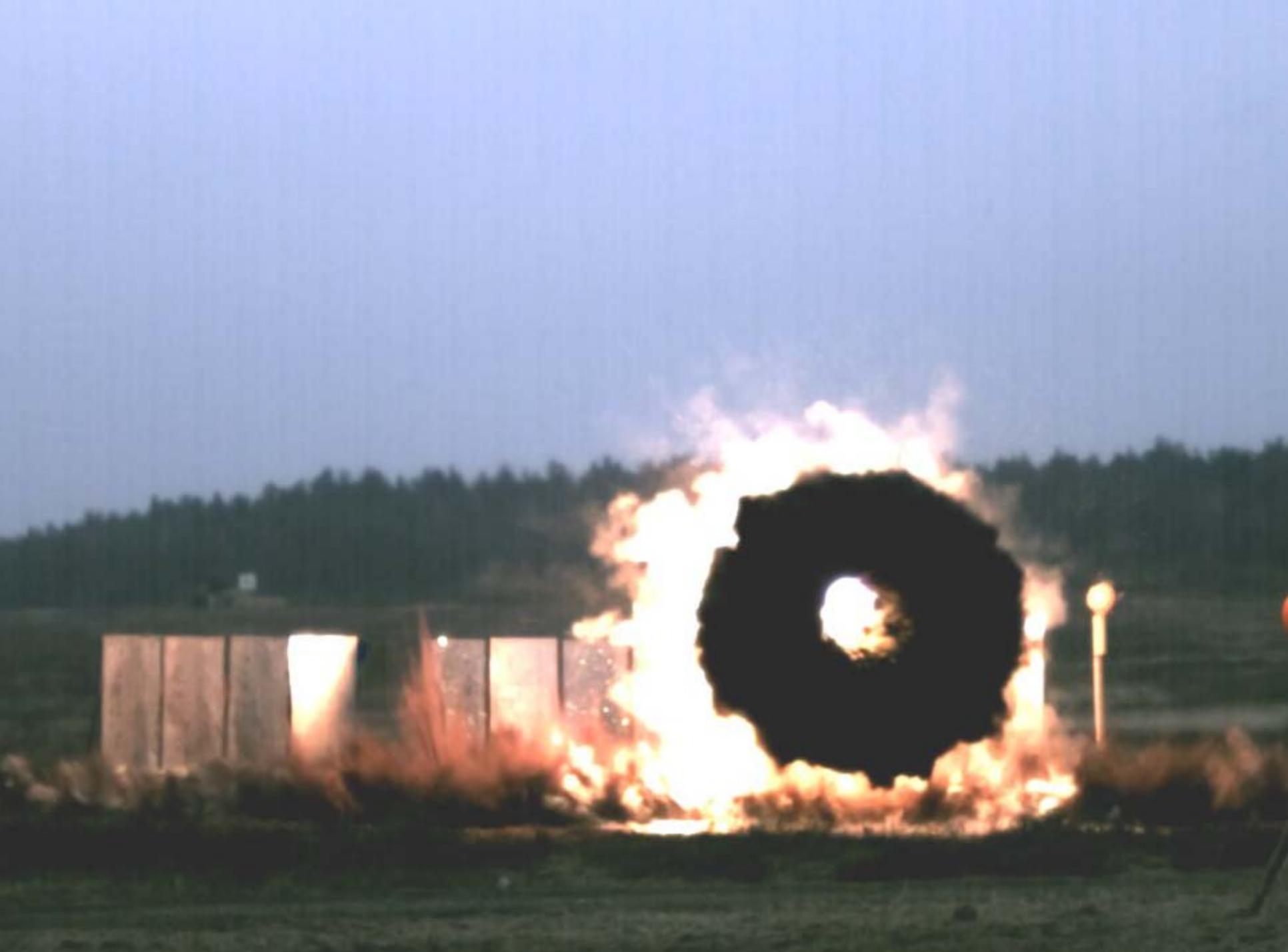


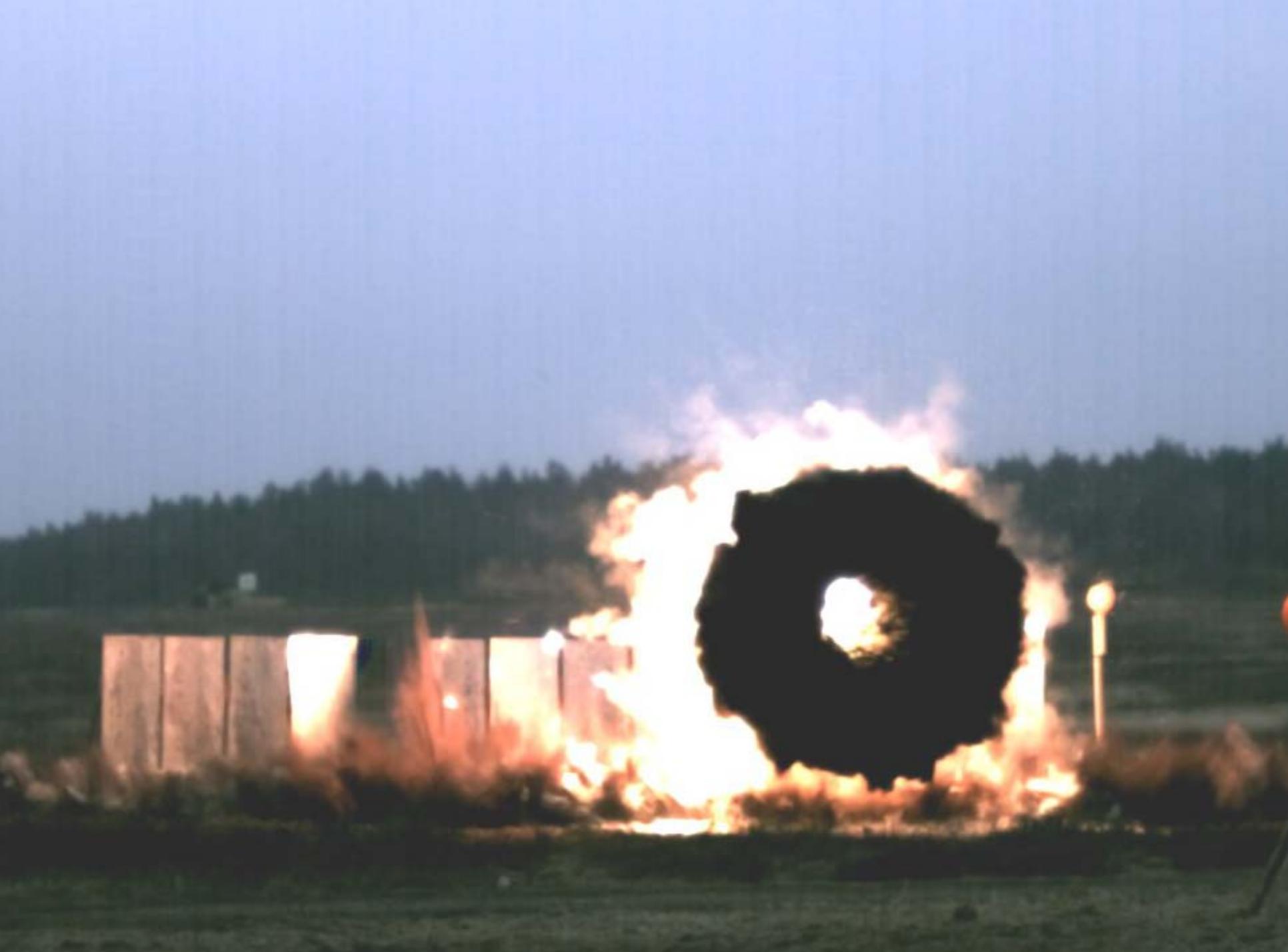




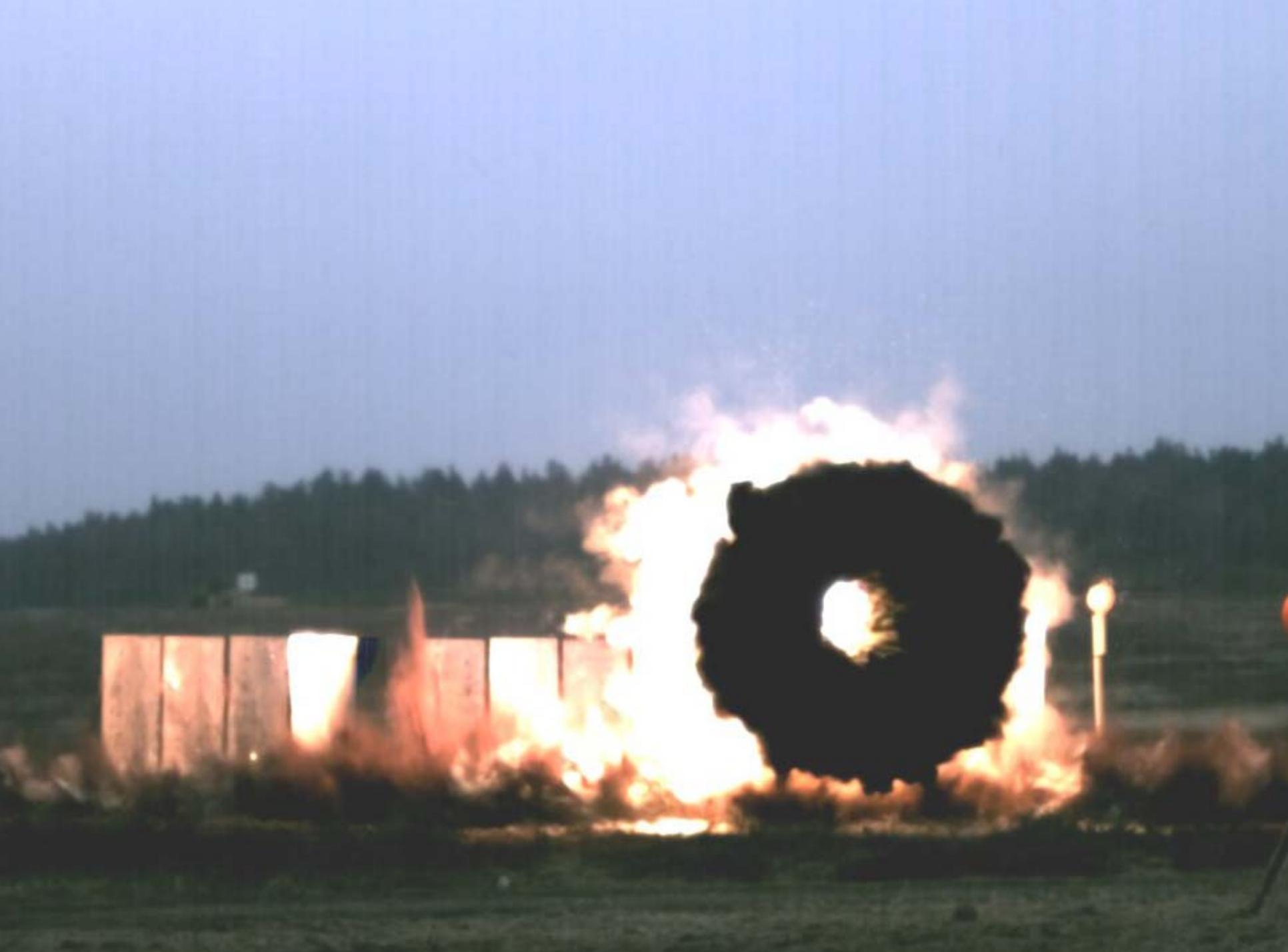












Trial Results

– Summary of all



 **RHEINMETALL**
DEFENCE

EZU
Erprobungszentrum Unterlüß



JUNGHANS *Microtec* GmbH

Thank you for your kind attention!

Any questions ?

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