

ADVANCED PYROTECHNIC SOLUTIONS



FUSEHEADS IGNITERS DETONATORS COMPONENTS



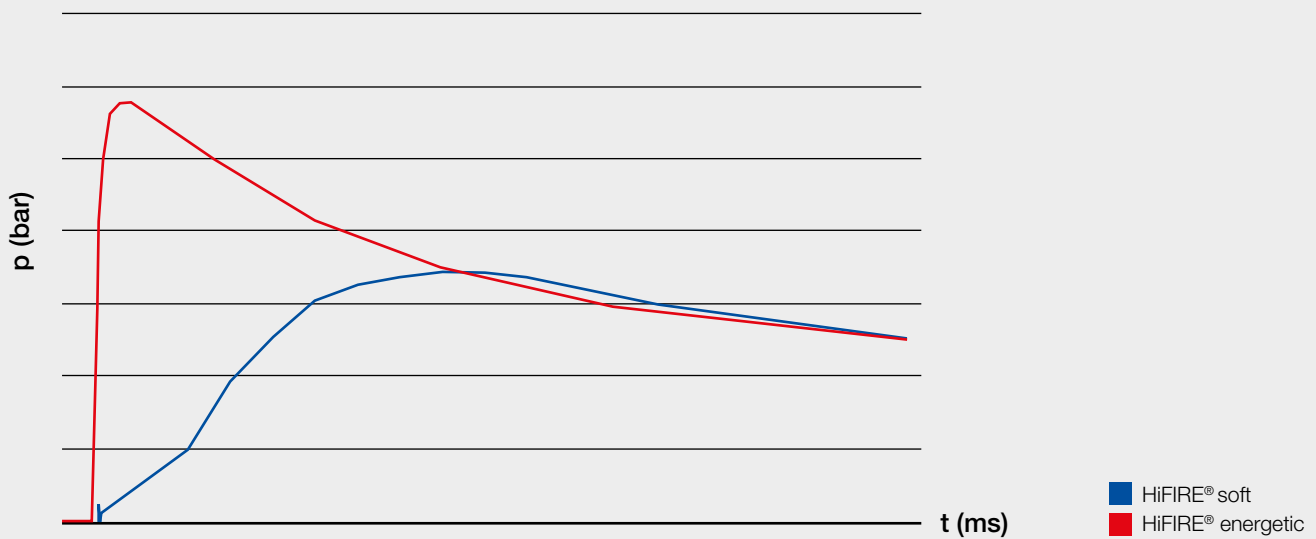
ADVANCED PYROTECHNIC SOLUTIONS

We are an innovative manufacturer of high-precision pyrotechnical ignition products. Our success is based on customer satisfaction and the dependability of our products.

We offer customers unique advantages, with development and production expertise from a single source, plus experience going far beyond our own value creation chain. Our decades of experience as a dependable manufacturer of civilian blasting detonators makes us the first place to turn for pyrotechnical igniters.

Our modern production facility in Winzendorf has punching, soldering, welding, and explosives processing, dipping and drying capabilities. We set great store by autonomy in the development and quality assurance of our products. Accordingly, we maintain a state of the art in-house test and measurement laboratory to make sure that we fully monitor all processes and meet our own and our customers' quality requirements.

AGILITY (HiFIRE® SOFT VS. HiFIRE® ENERGETIC)



The liveliness of pyrotechnics can be adjusted from extremely high to very moderate, depending on the installation and the intended effect.

FUSEHEADS

HiFIRE® FOR YOUR SUCCESS

HiFIRE® fuseheads provide high precision and reliability in their electrical and pyrotechnical parameters, and are therefore used by preference in seismic and electronic blasting detonators for civil use, as well as in a wide range of applications in the film and fireworks industries.

HiFIRE® fuseheads consist of two tin-plated metal lamellas embedded in a polymer chamber. They are clamped and welded to provide a firm mechanical connection and assured contact between the bridgewire and lamellas under all conditions.

The bridgewire is coated in a primary and secondary reactive high-energy pyrotechnic composition. Specific to each application, special coating systems protect the pyrotechnics from mechanical, chemical and thermal damage, as well as from various environmental effects. The fusehead base can be formed to customer requirement and connected to the application by crimping, soldering or welding.



HiFIRE® FUSEHEADS

CATEGORY OF FUSEHEADS	CATEGORY I		CATEGORY II	CATEGORY IV
TYPE	A	FA	F	P
Bridge resistance	1.4 - 1.6 Ω	0.8 - 0.9 Ω	0.4 - 0.8 Ω	$\leq 0.1 \Omega$
No-fire current	$\leq 0.18 \text{ A} / 10 \text{ s}$	$\leq 0.25 \text{ A} / 10 \text{ s}$	$\leq 0.45 \text{ A} / 10 \text{ s}$	$\leq 4 \text{ A} / 10 \text{ s}$
All-fire current	$\geq 1 \text{ A} / 10 \text{ ms}$	$\geq 1.35 \text{ A} / 10 \text{ ms}$	$\geq 1.5 \text{ A} / 10 \text{ ms}$	$\geq 25 \text{ A} / 10 \text{ ms}$

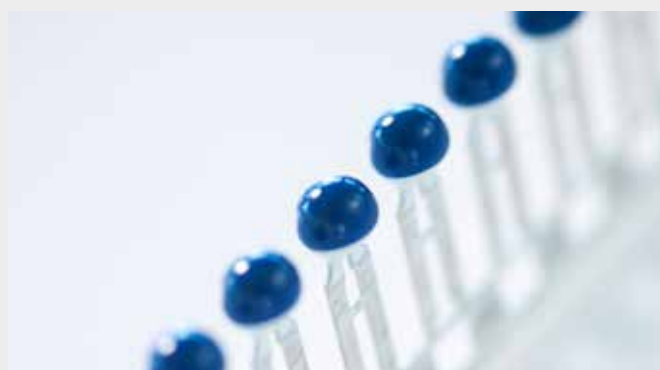
TYPE	A SEISMIC		F SEISMIC	
Reaction time $\leq 1 \text{ ms}$	$\geq 2.5 \text{ A}$		$\geq 5.5 \text{ A}$	

HiFIRE® FUSEHEADS SENSITIVE

TYPE	4.5 OHM	8.5 OHM	11.5 OHM	18.0 OHM
Bridge resistance	4.1 - 4.9 Ω	8.0 - 9.5 Ω	10 - 13 Ω	16 - 22 Ω
No-fire current	$\leq 0.10 \text{ A} / 10 \text{ s}$	$\leq 0.06 \text{ A} / 10 \text{ s}$	$\leq 0.04 \text{ A} / 10 \text{ s}$	$\leq 0.03 \text{ A} / 10 \text{ s}$
All-fire current	$\geq 0.31 \text{ A} / 10 \text{ ms}$	$\geq 0.27 \text{ A} / 10 \text{ ms}$	$\geq 0.23 \text{ A} / 10 \text{ ms}$	$\geq 0.11 \text{ A} / 10 \text{ ms}$

HiFIRE® FUSEHEADS 2 OHM

TYPE	LEAD-FREE 800	LEAD-FREE 1200
Bridge resistance	$2.0 \pm 0.2 \Omega$	$2.0 \pm 0.2 \Omega$
No-fire current	$\leq 200 \text{ mA}$	$\leq 400 \text{ mA}$
All-fire current	$\geq 800 \text{ mA}$	$\geq 1200 \text{ mA}$





HPP FUSEHEADS

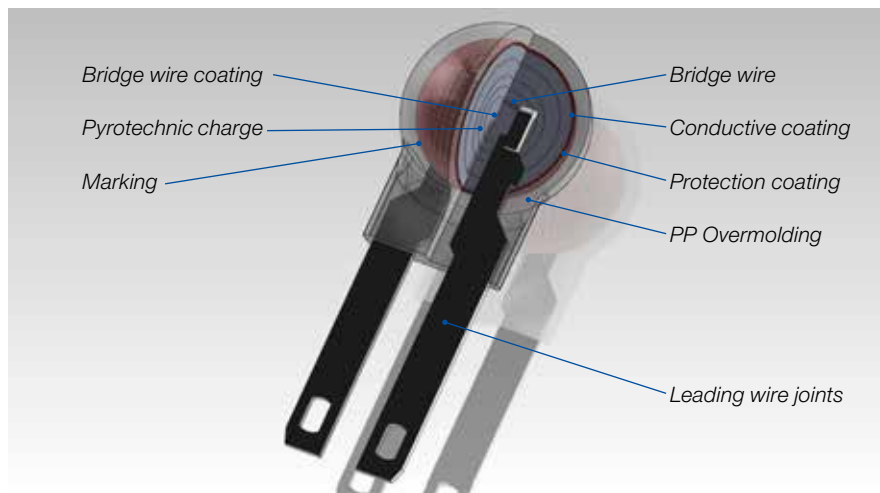
The HPP series is a further development of the automotive safety product family and is ideal for ignition situations calling for low scatter in terms of delay, pressure increase and maximum pressure.

The gas pressure is specifiable within a wide range, from 10 to 100 bar (3.5 ccm pressure bombe) at a constant overall geometry. HPP fuseheads are a preferred solution for igniting substances that are difficult to initiate and

where a combination of hot gas and particle ignition is required. The HPP series is among the most efficient ways to convert electrical into pyrotechnical energy.

The hermetic plastic overmolding gives high contour precision, which is a great asset for automated processing. The purpose-developed plastic ensures compliance with the 1A/1W/10hm requirement of MIL-DTL-23659.

1W FUSEHEAD PP OVERMOLDED

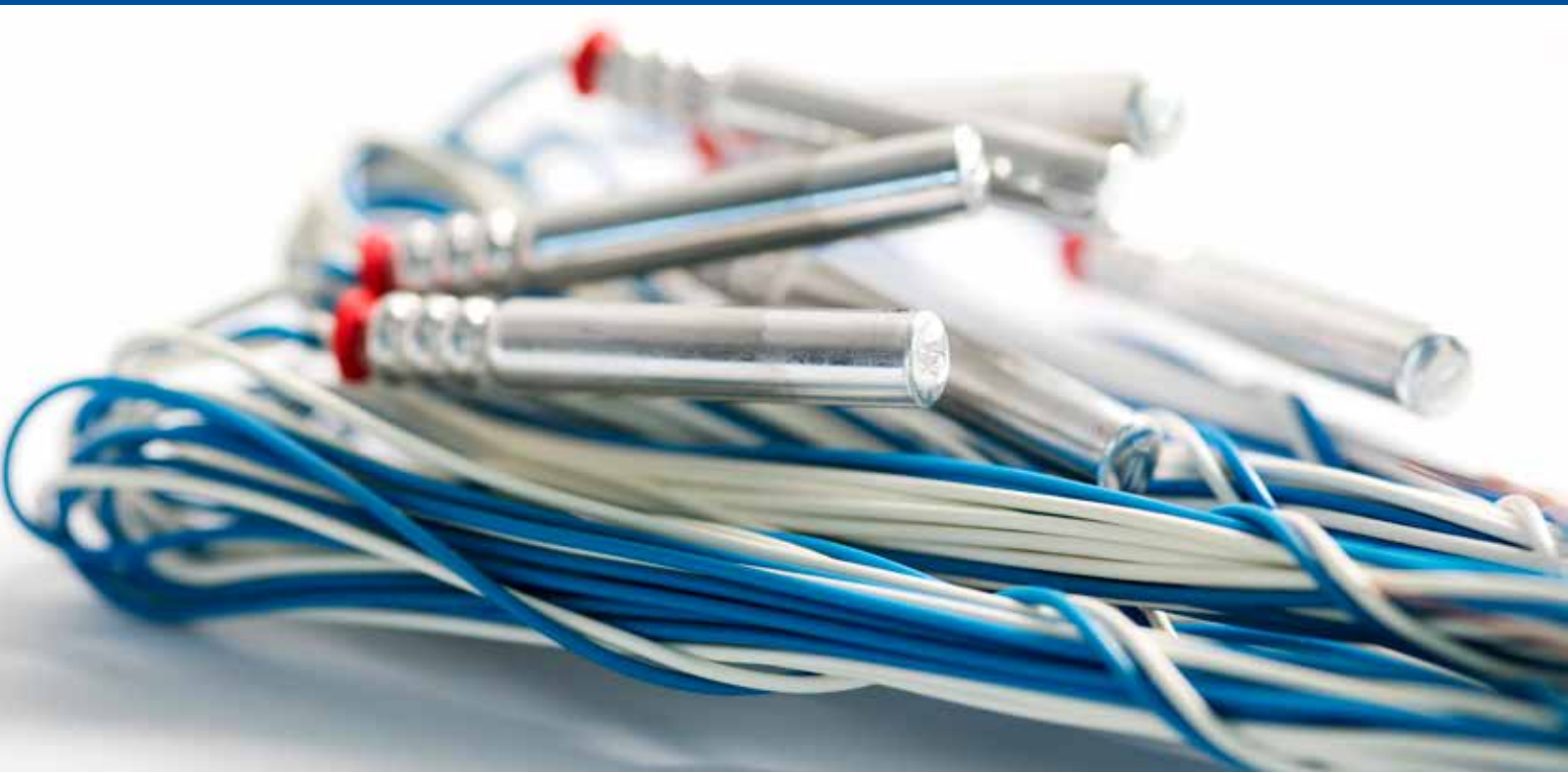


Specification	el. characteristics acc. MIL-DTL-23659E
Bridge resistance	1.0 ± 0.2 Ω
No-fire current	≤ 1 A / 5 min
All-fire current	≥ 5 A / 50 ms

SPECIAL PRODUCTION FUSEHEADS

With the many production options at our disposal, we can offer pyrotechnical products made to customer order.

This includes heavy-metal and halogen-free pyrotechnical substances, and special fuseheads for uses up to 260°C.



INSTRUCTION FOR USE HiFIRE® IGNITERS may only be used by experts who obtain the proper applicable licenses, permits, etc. to receive, possess and use our products.

IGNITERS

TOP QUALITY AND PRECISION

For years, HiFIRE® igniters have been distinguished by their excellent quality, top precision and reliability. We manufacture them on modern production lines that are constantly upgraded to remain state of the art. Before shipping, each igniter is subjected to rigorous final checks. The wide variety of HiFIRE® igniters enables their use in many different areas, especially blasting caps for civil, safety and defense-related applications, and stage and film pyrotechnics.

HiFIRE® igniters can be produced to customer order as regards the fusehead (A, FA, F, P or special types), wire length, wire colour, wire material and delivery form (with shipping protection, plug or sleeve).

HiFIRE® igniters are classified per ADR as 1.4S or by UN number as 0454.

CONFIGURATIONS

HiFIRE® offers a wide range of standard configurations. The single elements of the HiFIRE® IGNITERS are shown in the tables on the next pages and can be put together modularly in order to get the required information. Preferred configurations with reduced delivery time are marked in yellow.

HiFIRE® also offers customized designs for igniters with regard to:

- Fusehead types
- Wire lengths and colours
- Flexible wire conductors (up to 0,25 mm²)
- Classification UN0454 1.4S

Please get in touch with us to receive an individual offer.

DENOMINATION EXAMPLE

For a HiFIRE® IGNITER with F-fusehead, 1m white/yellow lead wires with copper conductor and standard plastic plug:

HiFIRE® F HST 1.0M Cu WT/YL

FUSEHEAD: F PLUG: HST WIRE LENGTH: 1.0M CONDUCTOR MATERIAL: Cu WIRE COLOURS: WT/YL

Preferred configurations with reduced delivery time are marked in yellow.

TYPE	A	FA	F	P	R95	X1
Bridge resistance (fusehead)	1.4 - 1.6 Ω	0.8 - 0.9 Ω	0.4 - 0.8 Ω	≤ 0.1 Ω	0.15 - 0.25 Ω	4.1 - 4.9 Ω
No-fire current	≤ 0.18 A / 10 s	≤ 0.25 A / 10 s	≤ 0.45 A / 10 s	≤ 4 A / 10 s	≤ 1 A / 10 s	≤ 0.10 A / 10 s
All-fire current	≥ 1A / 10 ms	≥ 1.35 A / 10 ms	≥ 1.5 A / 10 ms	≥ 25 A / 10 ms	≥ 4 A / 10 ms	≥ 0.31 A / 10 ms

Total resistance depends on wire length and wire material.

WIRE LENGTH Straight wires	10 cm to 90 cm; in steps on 1 cm
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WIRE LENGTH Folded from 1 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m	4.0 m	5.0 m
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CONDUCTOR	CU
Wire material	tinned copper

WIRE COLOUR SINGLE-Wires		Lead wire 1						
		White	Red	Yellow	Green	Blue	Pink	Black
Lead wire 2	White	WT/WT						
	Red	WT/RD	RD/RD					
	Yellow	WT/YL	RD/YL	YL/YL				
	Green	WT/GN	RD/GN	YL/GN	GN/GN			
	Blue	WT/BL	RD/BL	YL/BL	GN/BL	BL/BL		
	Pink	WT/PK	RD/PK	YL/PK	GN/PK	BL/PK	PK/PK	
	Black	WT/BK	RD/BK	YL/BK	GN/BK	BL/BK	PK/BL	BK/BK

WIRE COLOUR DUPLEX-Wires		Lead wire 1			
		Red	Yellow	White	Black
Lead wire 2	Red	RD/RD DX			
	Yellow		YL/YL DX		
	White			WT/WT DX	
	Black				BK/BK DX

DESIGN



WITHOUT PLUG

(with transport protection cover)



OS



STANDARD PLASTIC PLUG



HST



PLASTIC PLUG TZ



TZ



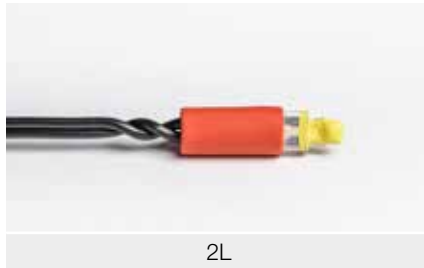
PLASTIC PLUG WITH COLLAR



SA



PLASTIC PLUG DUAL HOLES



2L



OPEN AL-SHELL

Shell diameter: 7.5 mm
Standard shell lengths: 42 mm / 50 mm



BMO



OPEN AL-SHELL WITH STOPPER FLAPS

Shell diameter: 7.5 mm
Standard shell lengths: 42 mm / 50 mm



BMO-L



STANDARD OVERMOLDING

Diameter: 4 mm
Length: 18 mm



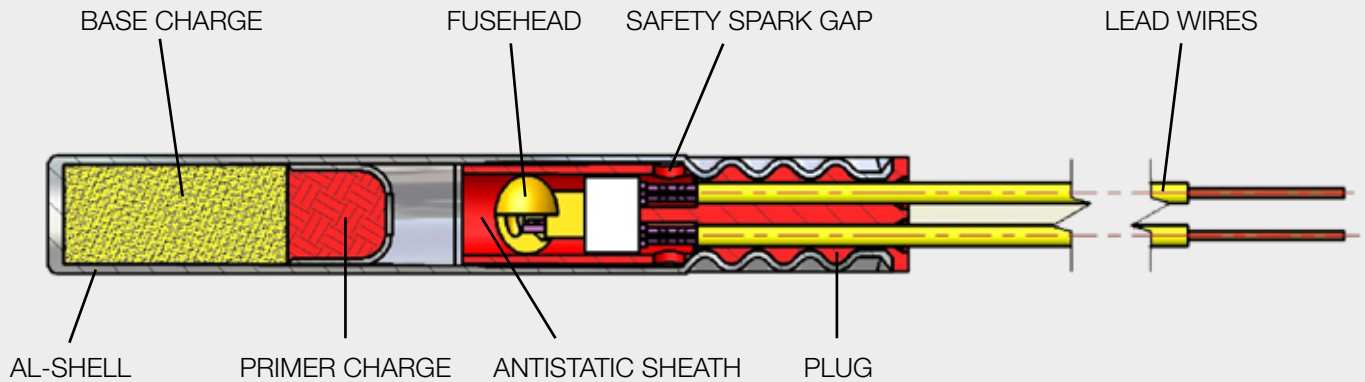
OM

SPECIAL IGNITERS

In addition to standard products, we offer a number of special products developed in close cooperation with our customers. These include special functions like double igniters for safety applications, or gas generators used successfully in fire prevention and mobility. For stage and film use we produce combinations of pyrotechnical and blasting components, including in small runs.



ELECTRIC INSTANT DETONATOR



CE-Certified

Available types: A (Class I), F (Class II) and P (Class IV)

DETONATORS

NORMAL SENSITIVE DETONATOR TYPE A (CLASS I)

Insulation colour of leading wires	white/white
Length of leading wires	customized
Wire material	tinned copper
No-fire current	$\leq 0.18 \text{ A} / 10 \text{ s}$
All-fire current	$\geq 1 \text{ A} / 10 \text{ ms}$

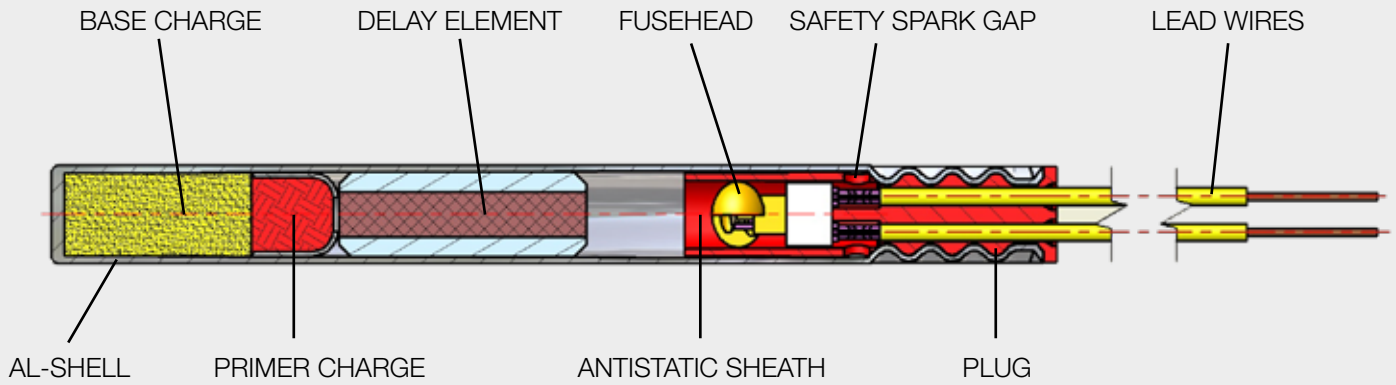
INSENSITIVE DETONATOR TYPE F (CLASS II)

Insulation colour of leading wires	white/yellow
Length of leading wires	customized
Wire material	tinned copper
No-fire current	$\leq 0.45 \text{ A} / 10 \text{ s}$
All-fire current	$\geq 1.5 \text{ A} / 10 \text{ ms}$

HIGHLY INSENSITIVE DETONATOR TYPE P (CLASS IV)

Insulation colour of leading wires	white/dark blue
Length of leading wires	customized
Wire material	tinned copper
No-fire current	$\leq 4 \text{ A} / 10 \text{ s}$
All-fire current	$\geq 25 \text{ A} / 10 \text{ ms}$

ELECTRIC DELAY DETONATOR



CE-Certified

DELAY NUMBER	MIZ 20 (Time in ms)	MIZ 25 (Time in ms)	MIZ 40 (Time in ms)	MIZ 80 (Time in ms)	TZMS (Time in ms)
0	0	0	0	0	0
1	20	25	40	80	500
2	40	50	80	160	1000
3	60	75	120	240	1500
4	80	100	160	320	2000
5	100	125	200	400	2500
6	120	150	240	480	3000
7	140	175	280	560	3500
8	160	200	320	640	4000
9	180	225	360	720	4500
10	200	250	400	800	5000
11	220	275	440	880	5500
12	240	300	480	960	6000
13	260	325	520		
14	280	350	560	1120	
15	300	375	600		
16	320	400	640	1280	
17	340		680		
18	360	450	720	1440	
19					
20		500		1600	
21					
22		550			
23					
24		600			

COLOUR OF LEADING WIRES

DELAY TIMES	Instant	ms	A- Detonators (Class I)		F- Detonators (Class II)		P- Detonators (Class IV)	
			0	white	white	white	yellow	white
	MIZ 20	20	light green	light green	light green	yellow	light green	dark blue
	MIZ 25	25	pink	pink	pink	yellow	pink	dark blue
	MIZ 40	40	dark green	dark green	dark green	yellow	dark green	dark blue
	MIZ 80	80	light blue	light blue	light blue	yellow	light blue	dark blue
	TZMS	500	red	red	red	yellow	red	dark blue

COMPONENTS

FROM SCHAFFLER

We help customers focus on their core competencies by providing pyrotechnical and blasting product components. These can be thermo-plastic injection moulded parts,

metallic turned parts, pyrotechnical delay elements or energetic substances produced to customer order.

PYROTECHNICAL COMPOSITIONS

We provide energetic substances in powder and granulate form for the customer-side production of pyrotechnical actuators and generators.



TRANSITION ELEMENTS

To round out energy cascades, we supply easily and dependably ignitable and igniting pyrotechnical delay elements with exact burning times.



HIGH-ENERGY IGNITION ELEMENTS

For technical and safety applications we deliver components that supply not just ignition, but also release pyrotechnical energy.



INERT COMPONENTS

We supply the necessary plastic parts to go with our pyrotechnical product applications.



"All data provided on this brochure is intended as a non-binding guideline only. Any warranty is excluded. A certain suitability or possible use of the products may not be construed or deducted from this data. A guarantee or any warranty in this regard is therefore excluded in any case. Furthermore, our General Terms and Conditions of Sale, Delivery and Service are applicable".

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