

Secure2 RF-Safe Electronic Detonator

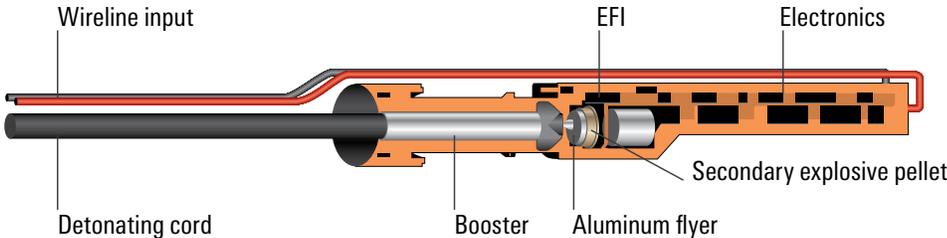
Improved detonation safety and reliability

APPLICATIONS

- Hollow carrier and exposed perforating gun systems
- Punchers
- Plug setting
- Pipe recovery

The Secure2* RF-safe electronic detonator is the fourth generation of S.A.F.E.* slapper-actuated firing equipment initiators, which have been in use worldwide since 1988. This latest iteration provides a step change in performance reliability, with all electronics contained in the detonator package and fully expendable. The reliability of the Secure2 detonator is comparable to that of a traditional resistor-based detonator, with an efficiency of 99.82%, while maintaining the safety benefits of a high-power initiator. The Secure2 detonator is also radio frequency (RF) safe, with certification from an independent third-party assessor, which improves overall operational efficiency by allowing radio transmitters to stay on and critical wellsite operations, such as helicopters, boats, cathodic protection, and welding in appropriate locations, to continue during perforation operations.

Inherent safety results from using exploding foil initiator (EFI) technology, which requires a specific high voltage and current pulse for detonation. No primary explosives are used within the Secure2 detonator, which reduces sensitivity to shock and burn detonation. Nor does the Secure2 detonator use pyrotechnic materials, which may burn to detonation if exposed to fire. When shooting power is applied to the EFI, a section of metal foil is instantly vaporized and converted to plasma. The plasma hits a neighboring explosive pellet to detonate and shear a small aluminum flyer. The flyer travels across a fluid-desensitization gap in the EFI housing and strikes a booster with sufficient force to initiate detonation of the perforating gun or cutter.



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Specifications

	Secure2 Detonator	High-Temperature Secure2 Detonator	Exposed Secure2 Detonator	Secure2 Detonator Igniter
Temperature rating	1 h: 340 degF [171 degC]	1 h: 400 degF [204 degC]	1 h: 340 degF [171 degC]	1 h: 340 degF [171 degC]
Pressure rating	na	na	15,000 psi [103 MPa]	na
Fluid desensitization	Yes	Yes	No	na
Combinability	Hollow carrier guns, puncher, cutter, severing tools	Hollow carrier guns, puncher, cutter, colliding tools	Exposed guns, backoff, string shot	Plug setting
UN classification code for shipping	1.4S	1.4S	1.4B	1.4S

na = not applicable

slb.com/perforating

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