

DynaStage™ Perforating Gun System

Intrinsically Safe Design Delivers the Ultimate in Wellsite Perforating Safety

Fully Factory-Assembled, Performance Assured™



Working with perforating guns can be one of the most dangerous activities performed at a wellsite. The chance of an unintentional detonation—either during preparation, gun arming, or after a misrun has fueled perforating gun manufacturers to develop and invest in new technology designed to make perforating operations and associated logistics safer.

Using resistorized detonators to arm perforating guns is common, but because they can be susceptible to inadvertent detonation from stray current, voltage and/or radio frequency (RF) sources, all other wellsite activities must be suspended during gun-arming procedures. In today's fast-paced environments, disruption of parallel wellsite activities is not practical.

The DynaEnergetics DynaStage™ perforating system, with its low-voltage digital communication platform and intrinsically safe detonator, can solve these issues by providing an efficient, safe perforating platform when operating in and around a modern-day wellsite.

MANUFACTURE AND SHIP GUNS SAFELY

Loaded perforating guns are considered explosive devices. Shipping loaded guns is regulated by PHMSA, who recently updated its guidelines to restrict transporting guns with pre-installed detonators. DynaStage guns are fully modular, factory-assembled and transported in an unarmed state, with the detonator transported separately from the gun assembly. This process reduces risks and ensures compliance with regulations.

REDUCE SURFACE INVISIBLE LOST TIME

Because the system complies with API RP 67 fourth edition guidelines, and the detonator is completely immune to RF interference, an RF-exclusion zone from the wellhead is not required (resistorized detonators may require exclusion zones of several hundred feet or more). Gun-arming can occur at any time, without disrupting parallel wellsite operations.

NEW REGULATIONS FURTHER IMPROVE WELLSITE SAFETY

Perforating gun safety procedures are regulated by three main regulatory bodies—API, PHMSA and IME. Each of these governs certain aspects of how perforating guns are designed and manufactured, transported to a wellsite, and operated once on-site. Recent updates to controlling documents have resulted in new guidelines.

- API RP 67, fourth edition: introduces strict standards for safely arming detonators away from RF sources. By design, the DynaStage system complies with API RP 67, since the intrinsically safe detonator is immune from interference from RF signals, direct and indirect current, and voltage.
- PHMSA HMR: 49 CFR: restricts transporting perforating guns from a manufacturing center or gun-loading location to a wellsite with a detonator already installed. The detonator used in DynaStage guns is shipped separately from the system's gun modules, which eliminates the risk of shipping armed perforating guns.
- IME SLP-20: details RF-safe distances for handling resistorized detonators from the wellhead for various transmitter types. This ranges from 3,000 feet for AM transmitters to less than five feet for a single cellular signal. The intrinsically safe DynaStage detonator virtually eliminates the minimum safe distance from the wellhead.



In addition, radio communication can be maintained during all phases of gun-arming, testing and operation.

IMPROVE WELLSITE CONFIDENCE AND EFFICIENCY

Using an intrinsically safe integrated-switch detonator greatly improves wellsite safety and enhances efficiency. The DynaStage system can be armed by inserting the wire-free plug-and-go detonator—no additional gun-loading, explosives handling, or assembly is required. There are no wires to connect, no explosives to prepare, no booster or caps to crimp, no remnants to handle, and no port plugs to install. The system's truly modular design allows each component, along with the detonator and igniter, to be quickly tested before running downhole.

DynaStage guns are immune to unintentional detonation due to any electrical interference, such as a lightning strike, induced static electricity, or an accidental Megger test of the wireline cable. The communications platform allows uninterrupted communication with all detonators and igniter while in the well, giving the operator full control over the complete downhole system.

Once guns return to surface, they are considered live devices until successful and complete initiation can be confirmed. The DynaStage detonator allows the disarming process to proceed smoothly and efficiently without halting other wellsite activities. The system does not produce explosive remnants, and there are no subs to clean—so there is nothing to handle or dispose—and no associated safety concerns.

The **DynaStage** system marks a whole new era in perforating solutions. It improves your wellsite safety, is easier to test, safer to use, and more efficient to operate. Contact your local DynaEnergetics sales representative to learn more about reducing HSE risks on your next perforating job. For more information, visit www.dynastage.com.

WHAT IS INTRINSIC SAFETY? WHY IS IT BETTER THAN RF SAFE?

For a product to be classified as intrinsically safe, it must have a special design or construction that guarantees that no unsafe conditions are created in the event of failure.

Intrinsically safe equipment is essential for operating in Class 1/ Division 1 or Class 1/Division 2 locations, as determined by the National Electric Code (NEC) NFPA 70. Those locations are defined as areas where concentrations of flammable gases, vapors or liquids can exist all or some of the time (Class 1/Div 1), or areas where flammable gases, vapors or liquids would be present under abnormal conditions, such as when a leak exists (Class 1/ Div 2). A wellsite falls under these guidelines, and the distance from the wellhead determines whether Division 1 or 2 operating protocols apply.

DynaStage perforating guns use an integrated switch detonator with an injection-molded connector—eliminating crimped wire connections and associated risks of wiring damage and potential high-voltage sparking. The design produces an intrinsically safe detonator that can be safely used in any hazardous area.

The DynaStage system has marked advantages over guns that are deemed RF-safe or can be used with a minimal RF-exclusion zone. The latter are seemingly made safe by including an electronic switch in the design before a resistorized detonator. However, requiring an RF-exclusion zone to work and handling—no matter how small—is disruptive to parallel wellsite activities, drives up costs, and introduces invisible lost time into wellsite operations.