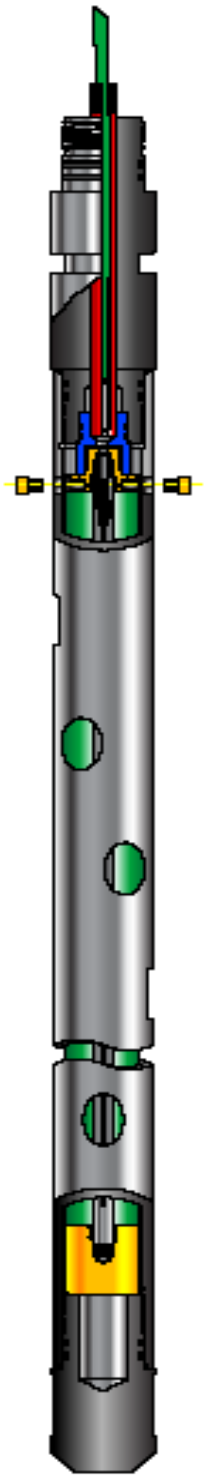
PERFXTENDER™

DESCRIPTION:

PerfXtender™ treatments utilize the deflagration of solid propellant to generate large volumes of high-pressure. The pressurized gas induces multiple fractures in the formation and increases formation permeability for improved reservoir communication and flow of hydrocarbons to the wellbore. The **PerfXtender**™ system provides a cost-effective, versatile, and efficient means of stimulating oil and gas wells by offering four sizes of propellant and tools for a large variety of applications. Magnum also offers an optional computer-modeling program that can be accessed by service company personnel to aid in the proper design of propellant stimulation treatments.



APPLICATIONS:

- ***Cleanout of casing perforations and mitigation of near-wellbore damage from drilling, cementing, and perforating operations.***
- ***Stimulation of mature wells where migration of fines, scaling, wax buildup, or other conditions have reduced near-wellbore permeability and well productivity.***
- ***Formation breakdown treatments prior to hydraulic fracturing.***
- ***Treatment of targeted intervals in vertical and horizontal wells to increase the effectiveness of subsequent fracturing operations.***
- ***Increased injectivity in water injection wells to lower pumping costs in secondary recovery and water disposal applications.***
- ***Stimulation of wells with productive formations in close proximity to potential water production.***

OPERATION:

The **PerfXtender™** system can be conveyed into the wellbore on either wireline or tubing. It can be run in tandem with a perforating gun or as propellant alone for open holes or in wellbores where perforations already exist. The system comes in a variety of sizes and configurations for both through-tubing applications or for use in wells where the tubing has been pulled. Magnum's modularized system allows the combination of multiple propellant grains for the effective treatment of virtually any productive interval thickness. The **PerfXtender™** system has been designed for high reliability and ease of assembly by service company personnel.

PerfXtender™ Propellant System

Introduction

Magnum Oil Tools International, LLC is the manufacturer and patent holder of the **PerfXtender™** line of solid propellant stimulation products. Magnum has applied its extensive experience in the design and manufacture of down-hole oilfield tools and systems to the creation of a safe and economic line of propellant products for the oil industry. **PerfXtender™** products have been shown to be effective for use in the cleanout of casing perforations and mitigation of near-wellbore damage from drilling, cementing, and perforating operations. Our products have been extensively tested and utilized successfully in numerous well applications to date. Magnum and its distributors are offering the **PerfXtender™** line of products to oilfield service companies as an addition to the current services that they provide, as well as an enhancement in the level of demand for their wireline and related services.

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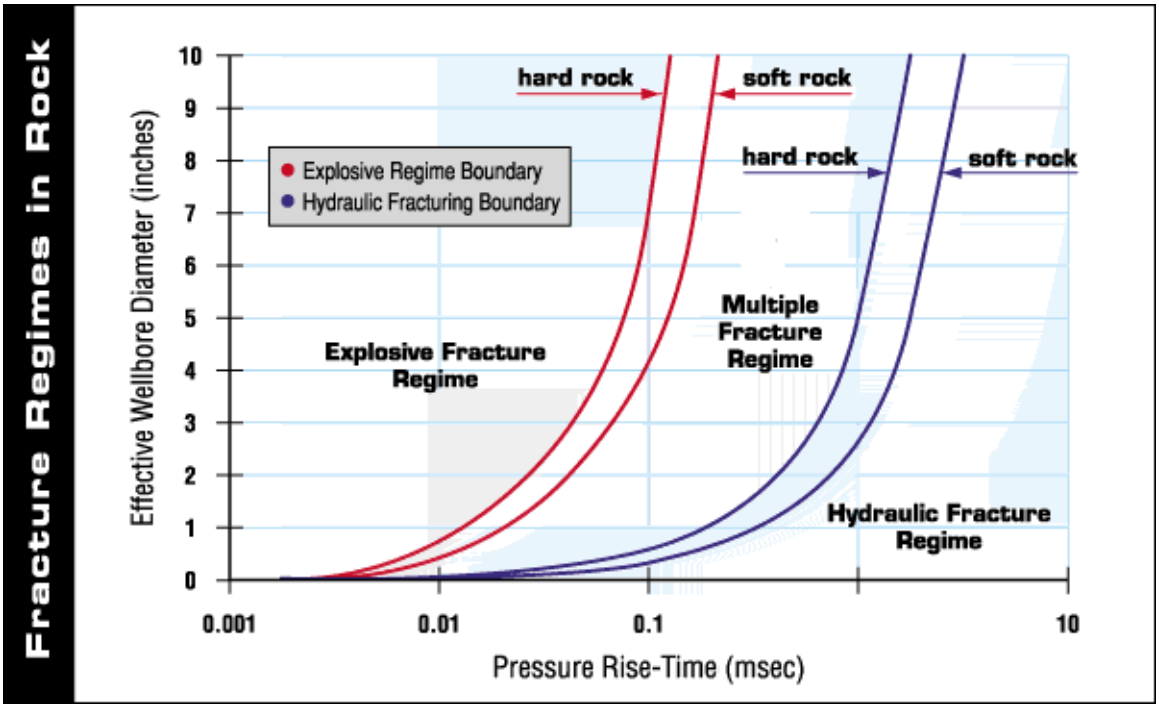
Propellant Technology

PerfXtender™ treatments employ the deflagration of solid propellant adjacent to a well's productive interval. The resultant generation of large volumes of high-pressure gas over a short period of time induces fractures in the formation and increases formation permeability for improved communication and flow of hydrocarbons to the wellbore.

Propellants that are suitable for use in formation stimulation must first exhibit physical properties that allow them to remain stable at the extreme temperatures and confining pressures encountered in many wellbores. Secondly, a suitable propellant must have a burn rate that accelerates predictably under these conditions and results in a pressure rise time that falls within defined limits for stimulation treatments to be effective. The peak pressures that are generated during the propellant event must exceed the tensile strength of the adjacent rock to initiate fracturing, yet remain below those pressures that will cause a failure of the rock in compression or possibly damage the wellbore. Lastly, produced gas volumes must also be sufficient to propagate fractures to a distance beyond the wellbore that is effective in improving a well's production.

The figure below is a plot of the pressure rise-time of a propellant event versus the effective wellbore diameter (inside diameter of the casing) of an oil or gas well. This chart is from the work of Dr. Norm Warpinski of the Sandia National Laboratories. Dr. Warpinski performed propellant treatments in a number of shallow wells and then mined back the overburden to evaluate the types of fractures produced from the use of varying amounts of propellants with a wide range of burn rates. It was found that the pressure rise-time of the propellant was the primary factor in determining the types of fractures produced. The **PerfXtender™** formulation of propellant was developed to produce fractures within the Multiple Fracture Regime, and optimize production from oil and gas wells.



PerfXtender™ products are specially tailored and formulated for superior performance in standard operating conditions as well as in harsh down-hole environments. Our propellant system has been used in a large number of wells with depths ranging from a few thousand feet to below 15,000 feet, and have provided a cost-effective means for operators to improve well production and economics while limiting surface impact and logistical support inherent in many other forms of treatment.