



The ultimate high ignitability spark plug from NGK



# RUTHENIUM HX™

## The NGK Difference

### High Ignitability DFE and PSPE® tip designs

Patented specialized OEM designs to meet the demands of modern engines (see Illustration A)

### Enhanced blistering/anti-peeling

Prevents physical wear-out and the peeling of microparticles on the center electrode

### Superior oxidation resistance

Prevents chemical breakdown of the center electrode (see Illustration B)

### Patented OEM Ruthenium Technology

Provides greater durability than traditional Iridium/Platinum spark plugs in high heat engines

### High-grade alumina silicate ceramic

Stronger insulator provides best in class dielectric strength

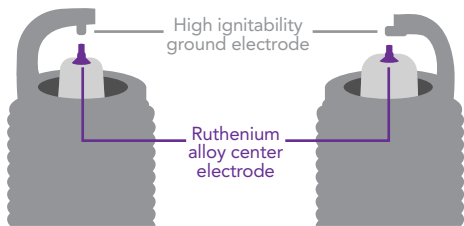
### Trivalent plated, cold-rolled threads

Prevents cross-threading and damage to cylinder heads; no anti-seize required.



DFE design

PSPE® design



## DESIGN Illustration A

**DFE** (double fine electrode) maximizes ignitability while reducing emissions for conventional engines. NGK patented design recommended for normally aspirated applications.

**PSPE®** (projected square platinum electrode) provides the best ignitability and service life for high heat engines. NGK patented design recommended for turbo and supercharged engines.

Modern engines demand spark plugs that provide top performance while enduring the most severe conditions.

## NGK Ruthenium HX™ is up to the task.

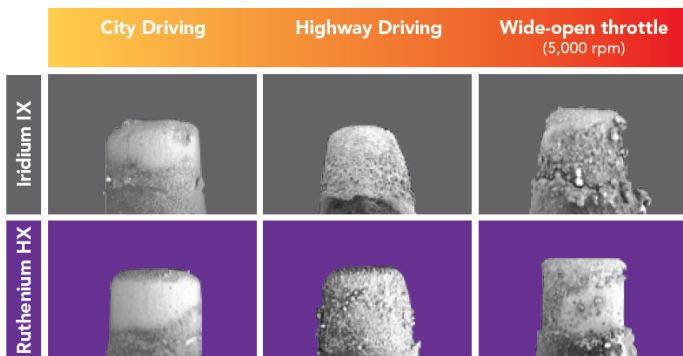
NGK Spark Plugs is introducing the latest technology in high ignitability spark plugs to the automotive aftermarket: NGK Ruthenium HX™. NGK's Ruthenium technology provides maximum durability and performance in newer engines where greater ignition efficiency is demanded.

Today's engine designs utilize advanced technologies to create more power with less fuel. This results in greater heat and pressure in the combustion chamber, which shortens the life the spark plug. In response, NGK created Ruthenium HX™, a high ignitability spark plug with outstanding service life.



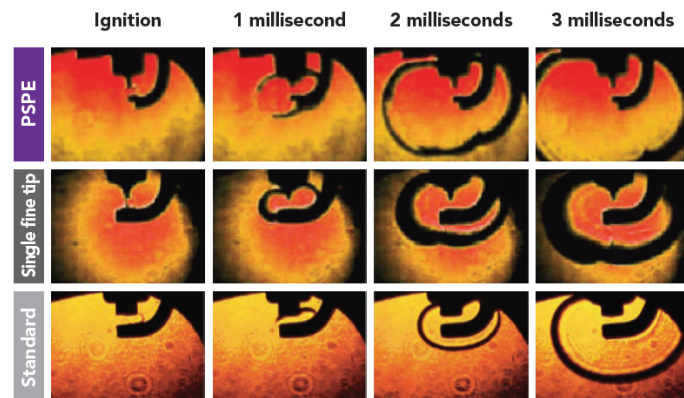
## DURABILITY Illustration B

NGK's Ruthenium technology is available in our most advanced OEM designs to provide the most optimal durability at high temperatures in various driving conditions.



## HIGH IGNITABILITY Illustration C

NGK RUTHENIUM HX™ provides a more complete fuel burn than other precious metal spark plugs. The results are quicker throttle response, smoother idle and better cold starts.



Note: Based on flame kernel growth tests comparing an NGK Ruthenium HX™ PSPE® design with Iridium and Nickel J-gap designs.

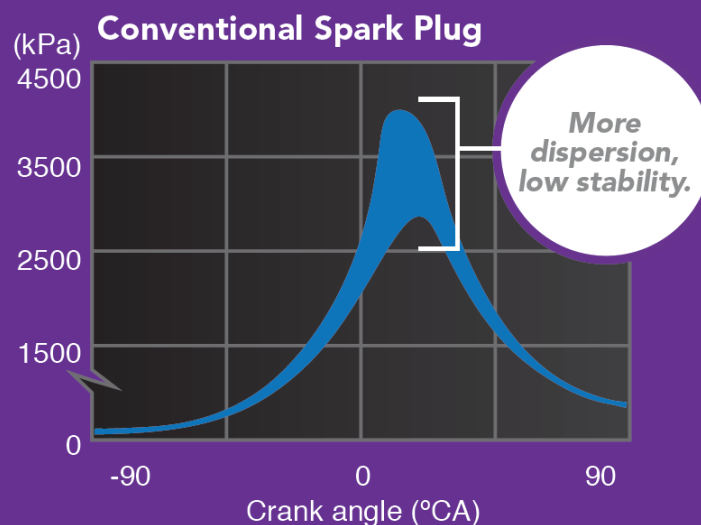
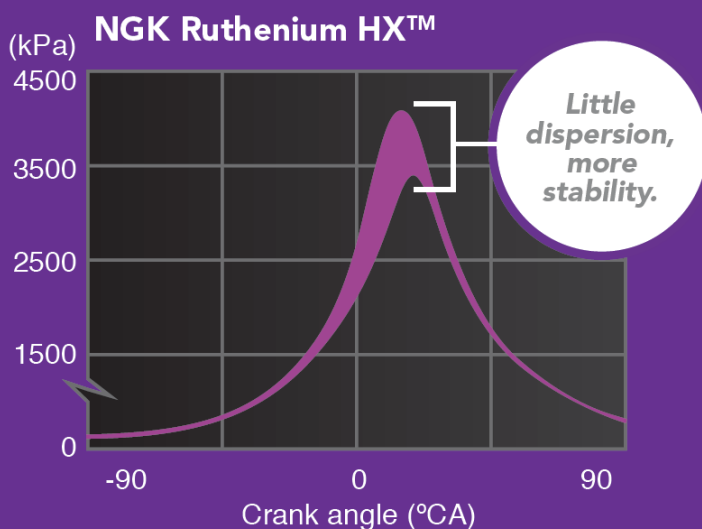
## TESTING & MANUFACTURING

All NGK spark plugs must pass extensive testing procedures and quality checks to ensure fit and performance.

- Combustion pressure testing to maintain stable performance (Diagram 1)
- Acceleration testing for improved performance
- Mechanical vibration testing
- Thermal shock testing to -40°C

- Tightest tolerance resistor manufacturing process in the industry
- Manufacturing in our ISO 11565 certified manufacturing facility
- Gap measurement with laser precision throughout production process
- Ground electrodes are accurately positioned with 360° welding process

## COMBUSTION PRESSURE TEST Diagram 1



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