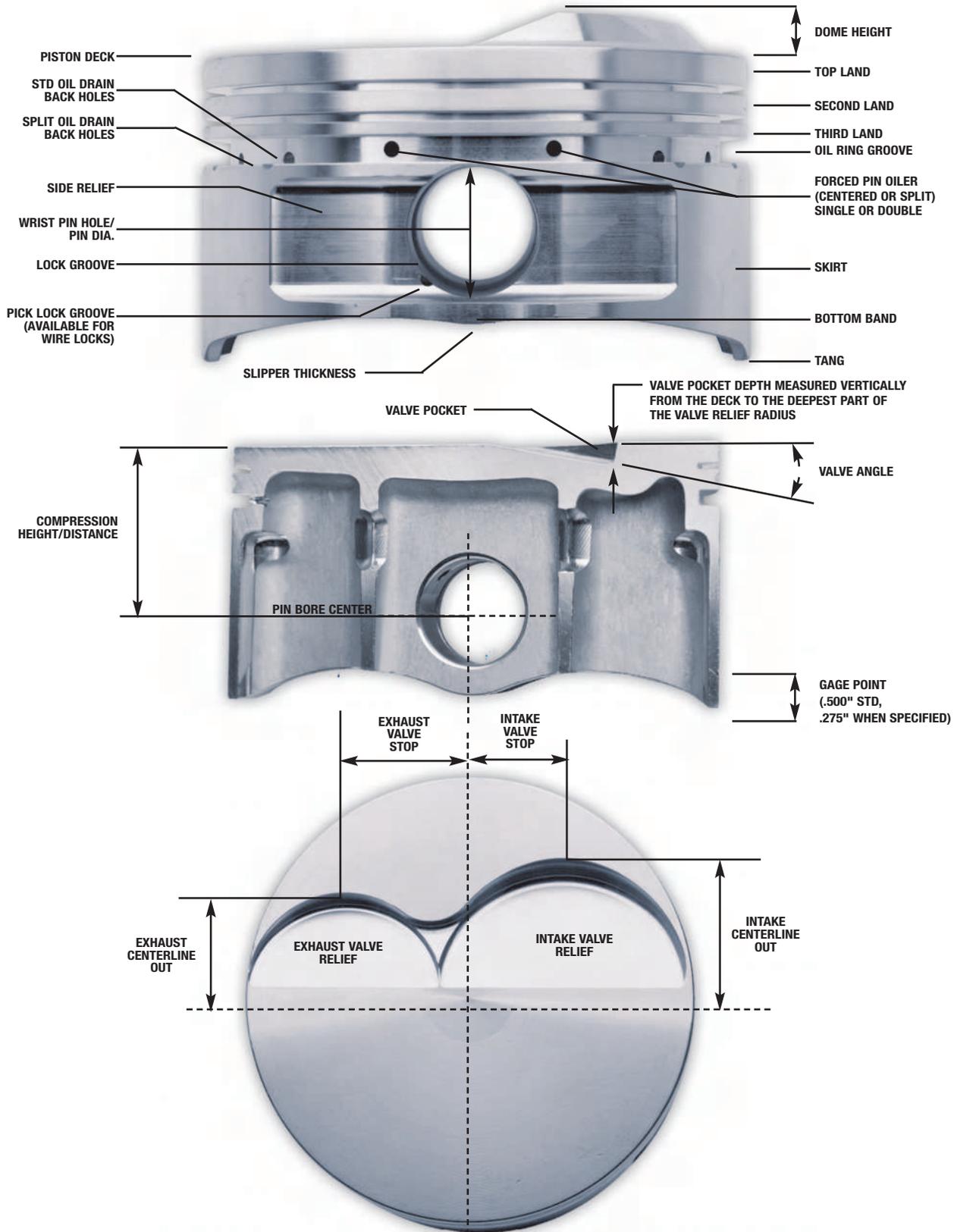




# PISTON TERMINOLOGY

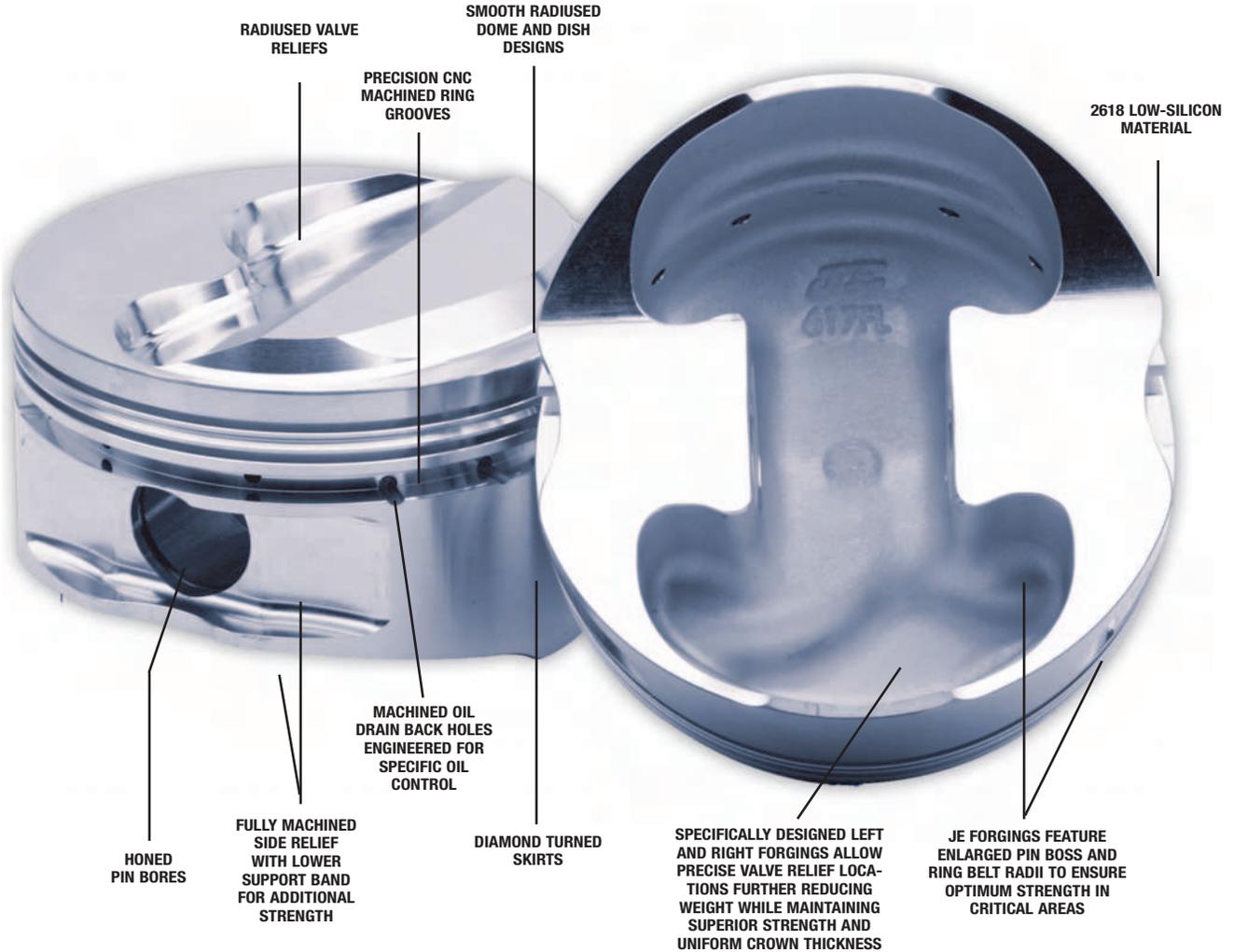
OVER SIXTY YEARS IN RACING



# SHELF PISTON TERMINOLOGY



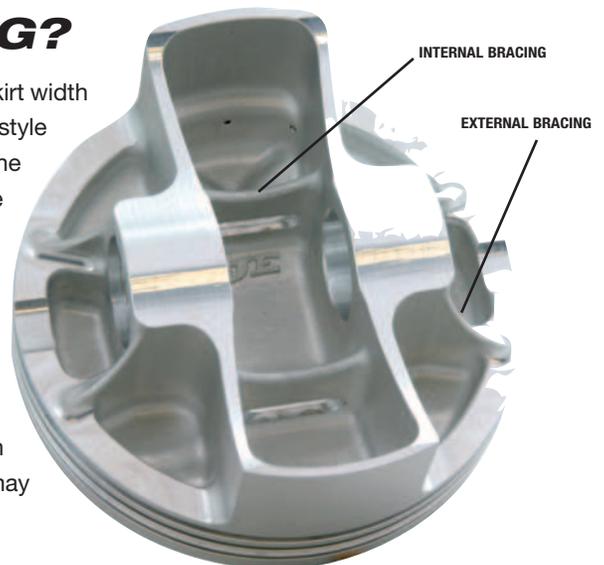
With over 300 individual forgings to choose from, JE is able to achieve specific piston design requirements while reducing overall weight.



## WHAT IS AN FSR FORGING?

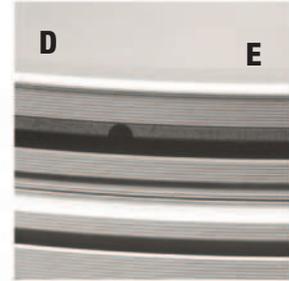
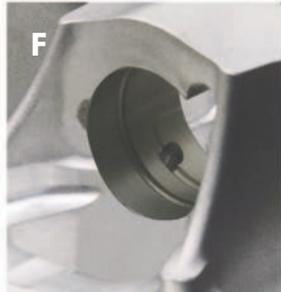
FSR (Forged Side Relief) forging designs feature a reduced skirt width and shorter wrist pin when compared to traditional “full round” style forgings. The narrow skirt helps minimize piston contact with the cylinder wall that can cause friction and power loss while the shortened wrist pins reduces the overall weight.

Some FSR forgings feature internal and external bracing to provide a more rigid construction while minimizing overall weight. With thousands of race miles logged in the most demanding applications like NASCAR, NHRA Pro Stock and IRL, these pistons provide the ultimate combination of low-friction, lightweight design with increased stability and strength. (Tech note: In extreme horsepower applications the use of oil squirters may be required)





## PISTON COATINGS



OVER SIXTY YEARS IN RACING

- A. The thermal barrier crown coating is applied to the top of the piston and is designed to reflect heat into the combustion chamber, thereby increasing exhaust gas velocity and greatly improving scavenging potential. The .0015" thick coating can also assist in extending piston life by decreasing the rate of thermal transfer.
- B. Skirt Coating, This is a "break-in" coating applied to the skirt of the piston only, designed to show wear. This coating is a .0003" to .0005" thick spray-on dry film that will help reduce friction and inhibit galling. No manufacturing allowance is required as this application is made to wear in to the cylinder wall.
- C. Tuff Skirt is a JE Pistons' trademark coating that is a lubricating, anti-friction / anti-wear coating applied to the piston skirt only. Unlike our standard Skirt Coating, Tuff Skirt will not wear and is designed to withstand many different types of endurance applications, similar to those commonly found in NASCAR. Buildup is .0005" per surface and finished diameter of skirt should include the coating buildup.
- D. Top groove hard anodize, this coating has proven to increase power output by allowing for extremely tight ring clearances. Available exclusively to top-level racing teams until now, this top ring groove coating creates a hard mating surface which virtually eliminates micro-welding while decreasing ring groove wear. Buildup is .00025" per surface and clearance must be added during manufacturing to accommodate the change.

- E\*. Anodize option B, also a ring groove coating, Offers twice the buildup of the standard process (.0005" per surface). Through extensive R & D and field-testing, the Option B process has shown to be more durable in maximum effort, high endurance applications. Appropriate manufacturing allowances apply.
- F\*. Anodize Option C, This coating is the same material as the Anodize Option B except is applied to the wrist pin bore instead of the top ring groove. This coating provides increased lubricity, smoother oil transfer, and better wear in the pin bore. The wrist pin hole must be honed both before and after anodizing.
- G. KoolKote is an aerospace quality hard anodize applied to all surfaces of the piston with a buildup of .001". This coating is designed for use in nitro-methane engines such as Top Fuel Drag Racing to endure the corrosive effects of this fuel type. It will withstand greater temperatures and will not flake, chip or peel. This coating does alter the heat transfer and expansion characteristics of the piston. Consult the JE Pistons technical department for specific applications. Manufacturing allowances are required on all surfaces.
- H. Oil Shed coating, this coating is applied to the underside of the piston. It is intended to reduce the reciprocating weight by repelling oil quicker than an untreated part. No additional manufacturing is required.

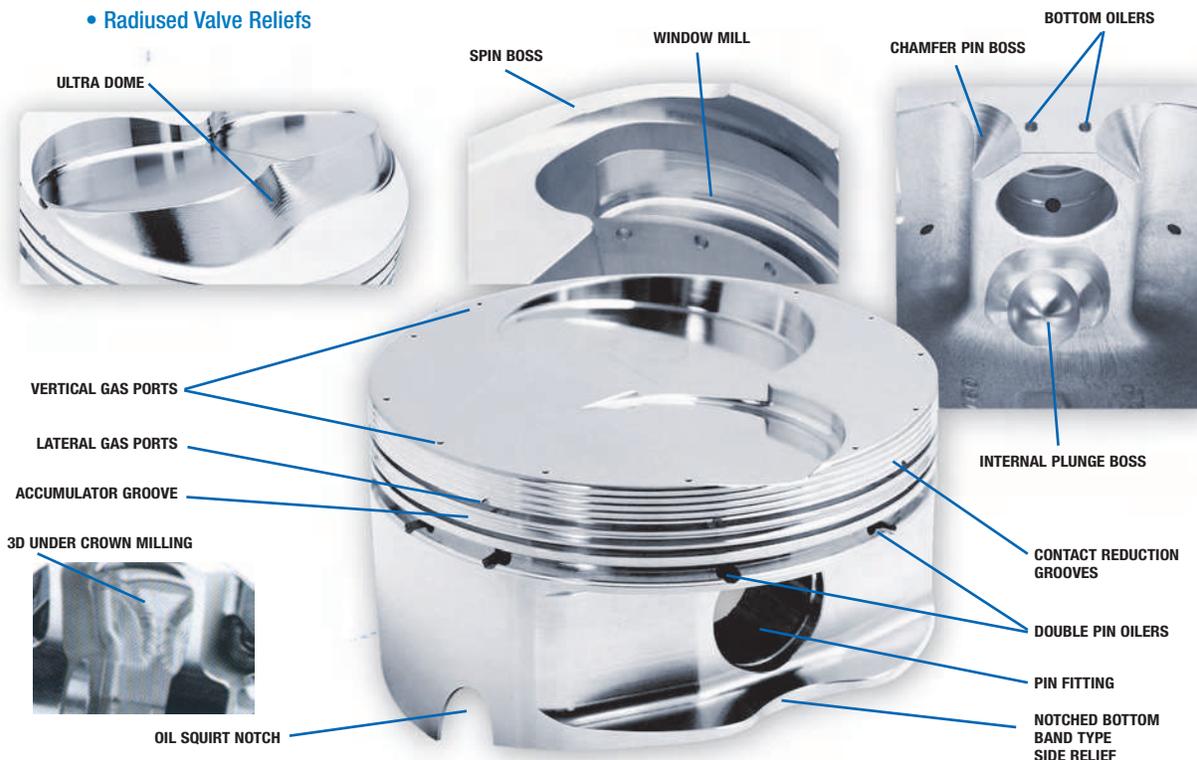


# CUSTOM PISTONS

To order custom pistons, please use the Custom Piston Order Form located in the back of this catalog, or download one from our website [www.jepistons.com](http://www.jepistons.com). Custom pistons do not come with pins, locks or rings. Please see the components section of this catalog to find the proper parts you need to complete your order.

## STANDARD CUSTOM PISTON FEATURES

- Fully CNC Machined Piston
- Precision Machined CNC Ring Grooves
- 2618 Low-Silicon or optional 4032 High Silicon Material Available on some applications
- Diamond Turned Skirts
- Radiused Valve Reliefs
- Single Forced Pin Oilers
- Pick Lock Grooves (for use with wire locks)
- Machined Side Reliefs on full round forgings
- Lock Grooves Machined for Carbon Steel Spiro Locks (other options available)



**Ultra Crown Dome Ultra Crown Inverted Dome:** The Ultra Crown machining process allows incredibly precise dome to cylinder head tolerances. By mapping the exact shape of a piston or cylinder head, optimum compression and quench characteristics can be achieved.

**3D Under Crown Milling:** The Under Crown machining process allows for uniform deck thickness, therefore creating a lighter and more durable piston.

**Vertical Gas Ports:** Vertical holes in the deck of the piston, allows combustion pressure to directly enter behind the top ring on the power stroke, thus pressurizing the area behind the top ring for greater ring to cylinder wall seal. During the rest of the cycle, the ring has normal tension for reduced friction. (Most commonly used for drag race applications).

**Lateral Gas Ports:** This process mills slots into the top of the top ring groove and provides a pathway for combustion pressure to get behind the top ring. This process helps to increase ring seal and is most common in circle track applications.

**Ultra Groove:** Ultra Groove is a special ring groove machining process that provides near perfect groove flatness and surface finish. Tolerances are held to millionths of an inch.

**Spin Boss & Window Milling:** In certain applications window milling will remove a significant amount of weight from the skirt of the piston while maintaining its strength and integrity. Spin Boss refers to machining on the bottom of the pin boss, which removes weight where it is not needed for strength.

**Plunge Boss & Chamfer Pin Boss:** Machining process that removes additional material for added weight savings.

**Contact Reduction Grooves:** The purpose of machining these grooves is to reduce the amount of contact area against the cylinder wall when the piston "rocks over". Contact reduction also serves to disrupt the flame travel into the crevice area thus helping to reduce detonation.

**Accumulator Grooves:** An accumulator groove is machined into the land between the top and second ring. It provides additional volume where residual combustion gases that have "blown by" the top ring can collect. This additional volume helps to reduce pressure between the top & second ring, thus aiding in top ring seal and minimizing ring flutter.

**Double Pin Oilers:** Double Pin Oilers deliver twice the amount of oil to the wrist pin as compared to the standard single pin oiler.

**Pin Fitting:** The pin bore is precision honed to attain an exact pin clearance. Clearances typically range from .0003 to .0010 between the wrist pin and pin bore.

**Oil Squirt Notch:** Notching can be done on pistons for motors with oil squirters, or to avoid contact between pistons and/or pistons and crankshaft.

**Bottom Oilers:** This process machines one or two holes into the bottom of the pin boss to assist in splash pin lubrication.

**Tulip Valve Pockets:** Most commonly used on Hemi and motorcycle engines, this process leaves a raised area on plunged valve pockets to achieve maximum compression.