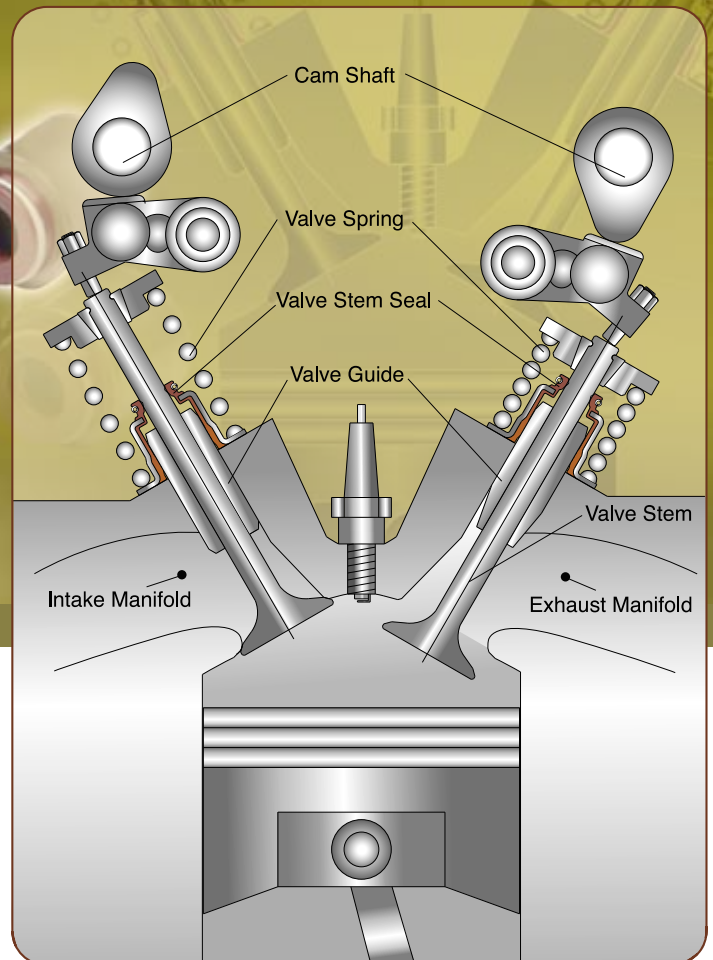


Product Information

Valve Stem Seals

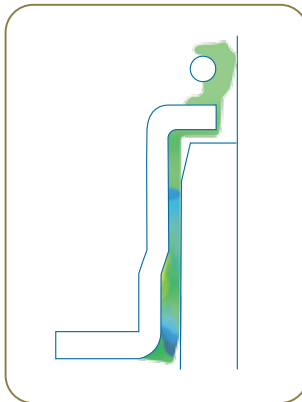
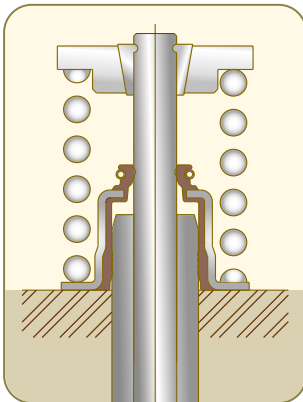
Valve Stem Seals are important components for efficiency of engine operation. Their function is to control the leakage of oil to lubricate the interface of valve stem and valve guide. If too much oil enters into the valve guide, the carbon deposits will raise and spark plug will foul, probably resulting in engine to break down. On the contrary, if the oil is restricted overly, the lack of lubrication will cause valve stem and valve guide to wear. Therefore, valve stem seals will lose the efficacy. The optimal lubrication varies according to engine types.



Design Factors of Valve Stem Seals

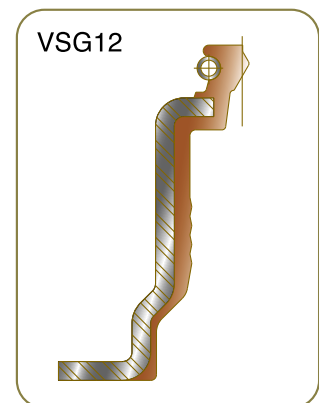
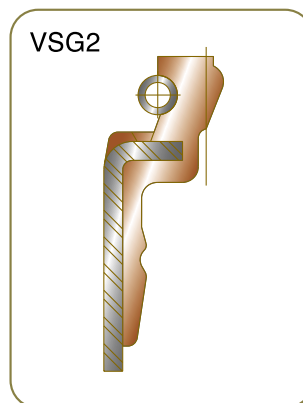
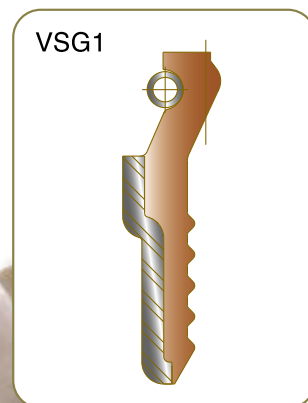
There are many factors to affect the design of valve stem seals and are described as following:

- Requirement of lubrication
- Operating temperatures
- Running speed
- Categories of using fuel
- Materials
- Design of engine cylinder head
- Cost



To achieve decreases in overhead costs and come out with the finest designs, NAK fully implements FEA software to complete theoretical analyses for materials, pressure, temperature rise, oil film and etc.

Three basic types of the NAK valve stem seal are shown as below. Other custom designs are available. Please contact us for more information.



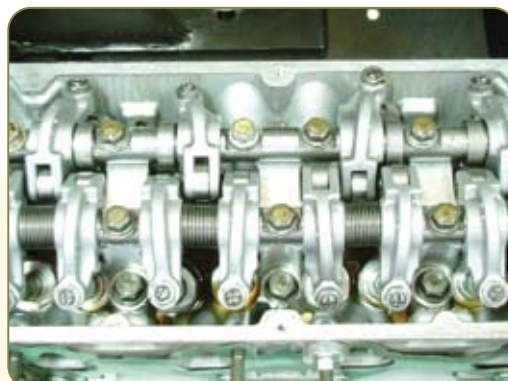
Technical Information Notice of Assembly for Valve Stem Seals

- The seals can be installed manually or by automatic assembly equipment. The factors to affect assembly as follows:
 - Chamfer and Angle of Valve Guide
 - O.D. Roughness of Valve Guide
 - Lubricant Condition of Valve Guide
 - Installation Speed
 - Centering Position of Valve Stem Seal
 - Interference force of Valve Guide O.D. and Seal I.D.
- During the high temperature condition, the strip-down force cannot drop below 50N. This is to assure valve stem seal to be fixed in correct position.
- The gap between the bottom of the spring retainer and the top of the seals should exceed 1.5mm when the valve is entirely open. This is to avoid retainer touching to seal lip and get the lip worn.



Dynamic Testing Capabilities in NAK

Valve Stem Seal is to provide controlled oil lubrication of the valve and guide according to different designs of engine. Thus, precise tools and equipment for testing are very useful during the development period. NAK's engine simulation equipment performs the real head condition and provides the authentic testing data.



Various Material Selections in NAK

NAK provides not only a wide range of material selections but also technical consultation services for customers. Our capabilities of doing material research and analysis can provide suitable materials for different applications. Fluoroelastomers (FKM) is common used in valve stem seals. It has high temperature resistance and good chemical properties. The above characteristics of FKM make products more reliability.

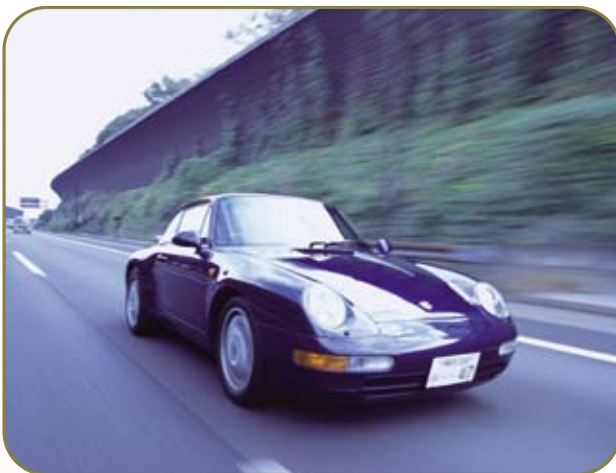


Application

NAK not only in partnership with international automotive tier 2 manufacturers but also develops valve stem seals for tier 1 car makers!!



Through years, we have acquired approvals from many international automotive tier 2 of valve stem seals. In the Middle East, NAK's valve stem seals have been used widely in many famous cars, i.e. Pride, Nissan, Peugeot, Paykan, and etc. In India, NAK's valve stem seals are being used in many local cars.



Disclaimer

1. NAK product is prohibited to use, install or apply in or on any aerospace related instrument and equipment.
2. NAK has no liability under any express or implied Warranty if NAK Product:
 - is modified or tampered;
 - is misused, abused or misapplied;
 - is used in a critical environment or specific equipment without NAK prior written acknowledgement;
 - is not used in accordance with the printed user instruction materials;
 - is damaged owing to natural deterioration, decomposition or transformation of chemical structure.
3. If NAK's product to be applied in critical environment or specific equipment, it is only allowed to launch into mass production when the sample has been passed the testing conducted by the user.



NAK Sealing Technologies Corporation

Address: No. 336, Industrial Rd., Nankang Industrial Zone, Nantou, Taiwan
Tel: +886-(0)49-2255011 Fax: +886-(0)49-2250035 Web: www.nak.com.tw
ISO9001 / 14001 TS16949 OHSAS18001 Company