

# Product Information

## NAK Sealing Technology for the Engine

NAK offers rotary seals for the automotive engine application including crankshaft and camshaft seals. Crankshaft and camshaft seals are critical components in the automotive engine system. As nowadays the automotive engine has become more and more subtle, the requirement for better sealing of the crankshaft and camshaft has become one of the major concerns in the design of the engine system. To meet with different requirements NAK offers various seal types and styles, improved high-performance materials, and excellent hydrodynamic helix design.

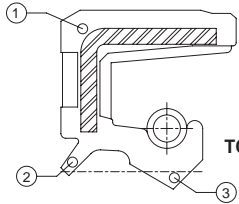

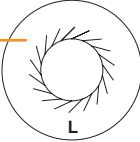
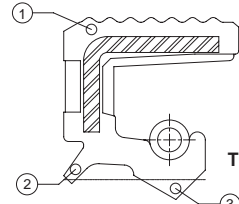

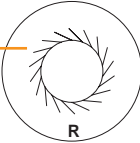


# Product Description

## Various Seal Types and Styles for Different Design Consideration of the Engine

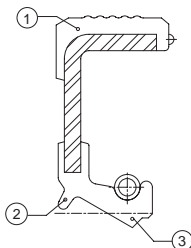
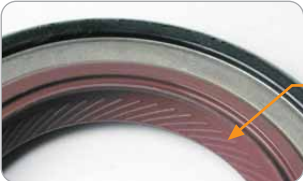
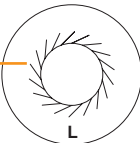

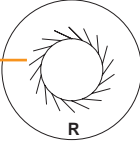
### Traditional Engine Seal Types TC, TG with Clockwise / Counterclockwise Hydrodynamic Aid (Camshaft, Front and Rear Crankshaft Seals)

Description: Rubber covered, spring loaded sealing lip and dust lip design.

 <p>TCR / TCL</p>		 <p>L</p>	No	Element
			1	Rubber O.D.
 <p>TGR / TGL</p>		 <p>R</p>	2	Dust lip
			3	Main sealing lip
			4	
			<b>Media</b> <ul style="list-style-type: none"> <li>Mineral engine oils</li> <li>Semi-Synthetic engine oils</li> <li>Fully Synthetic engine oils</li> </ul>	
			<b>Linear velocity:</b> ; 10m/s	

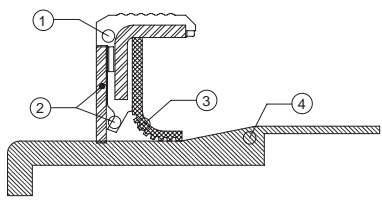

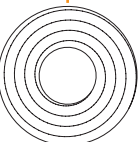
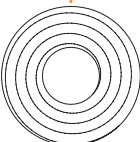
### BI Type Engine Seals (Camshaft, Front and Rear Crankshaft Seals)

Description: ACM rubber O.D., spring loaded FKM sealing lip and dust lip design.

		 <p>L</p>	No	Element
			1	Rubber O.D.
<p><b>Features</b></p> <ul style="list-style-type: none"> <li>Economy of material</li> <li>Dust prevention</li> <li>Longer service life</li> </ul>		 <p>R</p>	2	Dust lip
			3	Main sealing lip
			4	
			<b>Media</b> <ul style="list-style-type: none"> <li>Mineral engine oils</li> <li>Semi-Synthetic engine oils</li> <li>Fully Synthetic engine oils</li> </ul>	
			<b>Linear velocity:</b> ; 10m/s	

### PA Series PTFE Lip Type Engine Seals (Camshaft, Front and Rear Crankshaft Seals)

Description: PTFE main lip, and dust lip with felt composed

		 <p>L2</p>	No	Element
			1	Rubber O.D.
<p><b>Features</b></p> <ul style="list-style-type: none"> <li>High speed capability</li> <li>High temperature capability</li> <li>Self-lubrication</li> <li>Increased dust-proof capability</li> </ul>	 <p>R2</p>	2	Dust lip with felt composed	
		3	PTFE sealing lip	
			4	Installation Tool
			<b>Media</b> <ul style="list-style-type: none"> <li>Mineral engine oils</li> <li>Semi-Synthetic engine oils</li> <li>Fully Synthetic engine oils</li> </ul>	
			<b>Linear velocity:</b> ; 30m/s	

# Technical Information

## PTFE Material Selection

For engine seals, **NAK** provides a wide range of materials including ACM, Silicon, FKM and PTFE. Among different materials, PTFE are the trend for future development as nowadays the engine is running at higher speed, generating more heat and creating more friction.



## Features of PTFE include

### a High Chemical Resistance

PTFE has good chemical stability. It does not react with strong acids, bases, oxidants or organic solvents.

### b Good Thermal Resistance

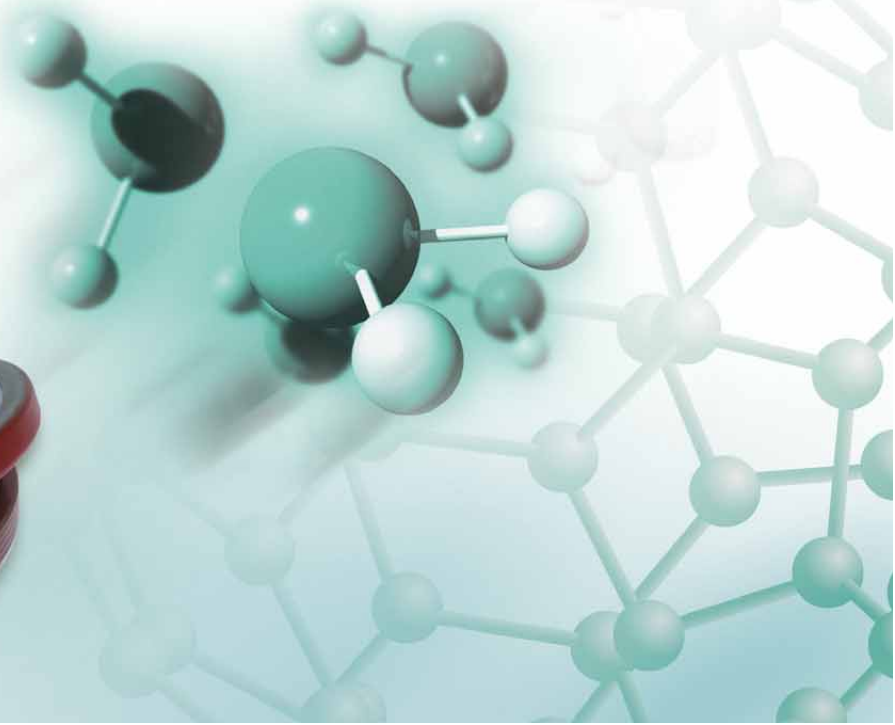
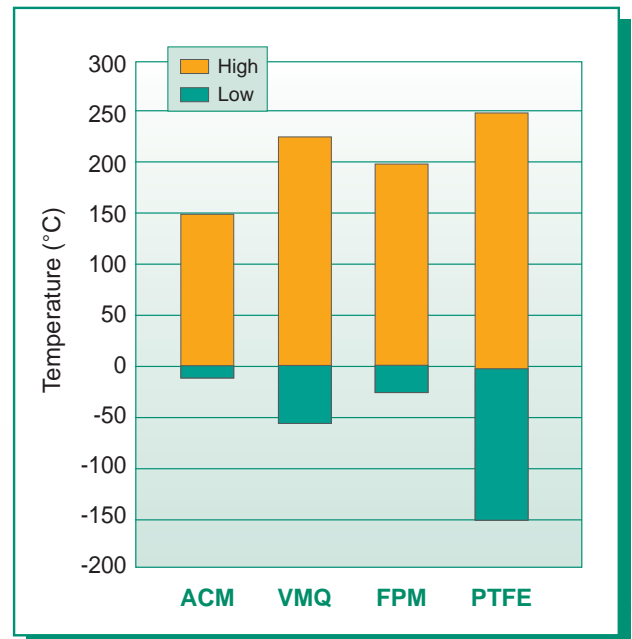
The dissolution temperature of PTFE is higher than 400°C. It has exceptionally wide thermal application range from -150°C to 250°C.

### c Low Friction

PTFE material has low friction property that results in good wear resistance and less power loss. And it has excellent performance in high-speed application.

### d Excellent Self-Lubricity

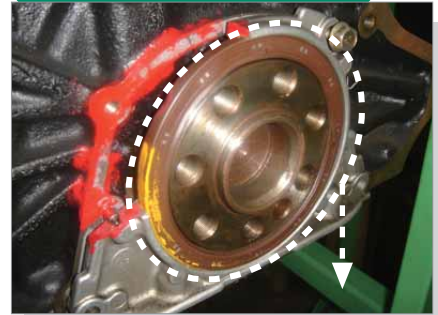
PTFE surface has self-lubricity and all solid materials and other materials show little or no adhesion to PTFE. It has good dry-running ability.



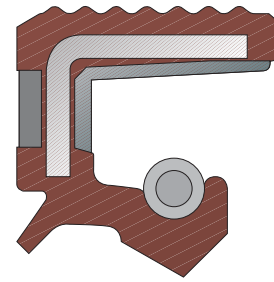
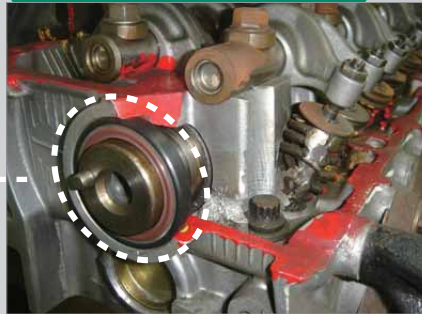
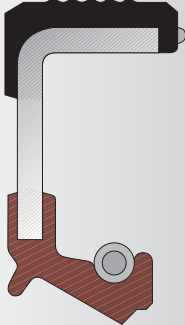
# Application

NAK engine rotary seals series with better rubber sealing element and excellent quality exhibits high performance in various engine systems. They are suitable for high speed, high temperature, and mist lubrication applications of the engine system. NAK supplies to both OEM and AF markets with various designs and materials.

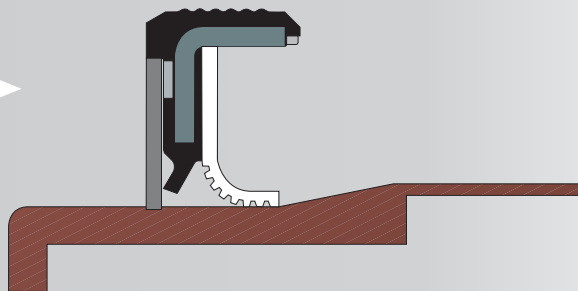
Crankshaft Seal Application



Camshaft Seal Application



Crankshaft Seal Application



## 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  
ISO14001 / 9001 TS16949 OHSAS18001