



## Chemical & Process Applications

The chemical and process industries are continually seeking new advanced materials to help extend the life of critical components. Syalons play an important role in this regard due to their excellent resistance to chemical corrosion and erosion often at high temperatures.

### Syalons

**Syalons**, as manufactured by **International Syalons**, are the first commercially available ceramics based on the sialon system of advanced ceramic alloys. The principle materials manufactured for the chemical and process industries are **Syalon 101** and **Syalon 050**.

**Syalon 101** is a general purpose advanced ceramic whose unique combination of physical properties such as **high strength**, **toughness** and **hardness** impart **excellent wear resistant properties**. In addition **Syalon 101** has excellent **thermal shock resistance**, **corrosion resistance** and can be used at temperatures **up to 1000°C**.

**Syalon 050**, although not as strong and tough as Syalon 101 has significantly **greater hardness**, making it particularly suitable for arduous wear applications. In addition **Syalon 050** as well as possessing excellent **corrosion resistance** can be used in applications **up to 1400°C**.

These unique physical properties give **Syalon 101** and **Syalon 050** a distinct advantage in many chemical and process applications over metals and other ceramics such as alumina and silicon carbide.



### Seals

**Mechanical seals are used in rotating equipment such as pumps and compressors.** In a pump, when a shaft rotates, the liquid can leak out between the shaft and the pump casing. In this case, to prevent leakage a mechanical seal would be used. This consists of a hard material embedded in the casing and a softer material in the rotating shaft. These are made to be in intimate contact.

The choice of seal materials depends on the material being pumped, its chemical reactivity, the temperature and the pressure. In many cases, **Syalon 101** makes an excellent choice for the hard seal material. Due to its extreme hardness, high strength and toughness, and low coefficient of friction, Syalon 101 has **excellent wear resistance**. This combined with outstanding chemical stability, and excellent thermal properties, make it an obvious candidate material for many mechanical seal applications.





## Chemical & Process Applications continued...

### Impellers

**Impellers** are used in the chemical and process industries often for **mixing or stirring highly corrosive chemicals and abrasive slurries**.

Traditionally, impellers have been made from metal or plastic coated metals. These suffer badly from wear, thus contaminating the chemical, which in clean environments is unacceptable. Also, corrosion, particularly for metallic impellers, also contaminates the chemical. This wear and corrosion, results in short lifetimes for these impellers.

**International Syalons** manufacture ceramic impellers which in many instances solve these problems. **Syalon 101 is a ceramic which possesses excellent corrosion resistance and wear resistance**. For example Syalon 101 is resistant to corrosion by many acids such as boiling hydrochloric and sulphuric acid, and alkaline materials such as sodium hydroxide. This chemical stability, combined with high strength, hardness and toughness make Syalon 101 an ideal material for many demanding chemical applications.



### Tubes

In the chemical and process industries, **the handling and movement of often very corrosive chemicals** requires materials with excellent chemical stability.

Traditionally, metals such as inconel have been used for components such as tubes for transporting chemical. However, inconel, in many applications has a limited life. **International Syalons manufacture Syalon tubes, which in many cases last significantly longer than inconel**.

**Syalon 101 and Syalon 050** have outstanding **resistance to chemical attack by both acids and alkalis, such as hydrochloric acid, sulphuric acid and sodium hydroxide and gases such as chlorine**. Both grades of Syalon also have outstanding mechanical and thermal properties, with Syalon 101 maintaining its properties up to about 1000°C and Syalon 050 up to about 1400°C.



### Summary of Benefits

In the chemical and process industries Syalons offer the following benefits over traditional materials such as metals and other ceramics:

- **Outstanding chemical stability in contact with many acids and alkalis.**
- **Excellent wear resistance for handling abrasive slurries.**
- **Improved component life and increased productivity.**

### Technical Support

The successful integration of ceramics into industrial and engineering systems requires close collaboration between you, the end-user, and us, the material suppliers. Our Technical Specialists are available to discuss your requirements in detail and assist in exploiting the significant advantages which **Syalon 101** and **Syalon 050** have to offer. Outlined above are just a few successful **chemical and process applications of Syalon**. Should you feel Syalon may be of benefit to your application please contact us.