



Welding Applications

Welding applications, such as resistance welding, orbital welding and plasma welding often require the use of components with a demanding set of properties. **International Syalons** produce a range of ceramic components, made from **silicon nitride** and **zirconia**, which possess the required properties, and are firmly established in this field.

Weld location and control pins are used in resistance welding of captive nuts in automotive and commercial vehicle assembly. International Syalons manufacture a comprehensive range of these components in silicon nitride and zirconia.

International Syalons also manufacture a variety of welding jigs, fixtures, shrouds and nozzles, which for example may be used in orbital welding, tungsten inert gas (TIG) welding, metal inert gas (MIG) welding, induction welding and plasma welding.

Syalon 101 & Zircalon

Syalon 101 is a grade of silicon nitride characterised by excellent thermal, mechanical and wear resistant properties meaning it is unaffected by thermal cycling stresses and thermal shock which can be generated during welding. Its high strength, toughness and hardness make Syalon 101 less susceptible to mechanical damage than many other ceramics, resulting in greater life expectancy. Syalon 101 is also resistant to weld spatter, which greatly reduces production down time for cleaning. Furthermore, it is electrically insulating, which is particularly important for resistance welding.

Zircalon, an advanced yttria stabilised zirconia, although not matching the excellent thermal behaviour of Syalon 101, does have excellent wear properties combined with greater toughness, making it more suited to applications in which impact is likely. It too is electrically insulating.



Weld Location Pins – Case Histories

International Syalons have been manufacturing and supplying weld location pins for over 30 years. It is through the close relationship between end users and our technical team that many specific welding problems have been solved.

A typical case involved Nissan Manufacturing (UK) Limited in Sunderland. One of the rear axle production lines had a serious problem with the level of down time required to replace the stub axle bearing housing location pin. The housing requires accurate repeatable positioning within the rear axle pre-form followed by high definition, high integrity weld. With the introduction of Syalon 101, International Syalons were able to offer a pin that has since performed without failure in excess of 100,000 operations.

A large European manufacturer used steel pins to resistively weld captive nuts to vehicle chassis. These pins performed around 70,000 operations before failure and production times were slow due to repetitive cleaning of the pins. Syalon 101 pins performed more than 7 million operations without wear or damage.

Welding Jigs & Fixtures – Case Histories

International Syalons produce a variety of welding jigs and fixtures for various welding operations. In orbital welding, Syalon 101 gas shrouds have given hundred-fold increases over conventional materials when welding aircraft fuel manifold inlet tubes. In the TIG welding of steel tubes in heat exchanger cores, Syalon 101 nozzles have outlasted alumina nozzles by a factor of 10 to 1. In a plasma welding operation, Syalon 101 nozzles were found to be more durable than alumina.

