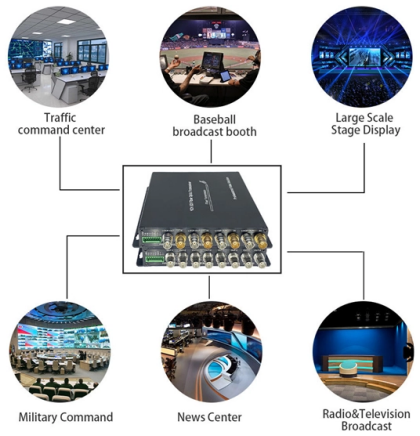
# High-temperature resistant ceramic inserts for subway use




## Overview

WIDIA ceramic inserts offer exceptional performance and versatility in a wide range of applications and exhibit remarkable hardness, heat resistance, and wear properties.

## Key Takeaways

Sialon and whisker-reinforced ceramic inserts are ideal for high-temperature, high-wear subway applications due to their exceptional heat resistance, toughness, and durability.

### Ceramic Types and Properties

Sialon Ceramics: These are silicon-aluminum-oxynitride ceramics that offer high hardness, thermal stability, and wear resistance, making them suitable for rough machining and high-speed operations in heat-intensive environments. Sialon grades like CS300 provide enhanced toughness compared to standard grades, which is critical for components exposed to vibration or mechanical stress in subway systems.

### Whisker-

Reinforced Ceramics: These inserts incorporate silicon carbide whiskers within the ceramic matrix, improving fracture toughness, thermal conductivity, and edge stability. They are widely used in machining nickel-based superalloys and hardened materials, demonstrating their ability to withstand high temperatures and continuous mechanical load, which is analogous to the conditions in subway braking or traction systems.

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### Advantages for Subway Applications

High Heat Resistance: Both sialon and whisker ceramics maintain structural integrity at elevated temperatures, preventing deformation or wear under frictional heat. Wear and Abrasion Resistance: These ceramics resist surface degradation, extending the service life of components such as rollers, guides, or cutting inserts used in maintenance machinery. Mechanical Stability: The toughness of reinforced ceramics reduces the risk of chipping or cracking under dynamic loads, which is essential for subway operations where vibrations and shocks are frequent.

Versatility: Available in various geometries and grades, these inserts can be tailored for turning, grooving, or milling operations in industrial maintenance or component fabrication.

### Implementation Considerations

Rigid Setup: To prevent chipping, components should be mounted with minimal overhang and smooth entry/exit angles. Temperature Management: While whisker ceramics tolerate high heat, proper cooling or thermal management ensures optimal performance and longevity. Feed and Speed Optimization: Low depths of cut and controlled feed rates are recommended to maximize tool life and maintain edge stability.

### Conclusion

For subway applications requiring high-temperature resistance, wear durability, and mechanical toughness, sialon and whisker-reinforced ceramic inserts are highly suitable. They provide long service life, maintain performance under thermal stress, and can be customized for specific operational needs, making them a reliable choice for both maintenance machinery and high-load components in subway systems.

## Article Content

Ceramic Inserts

WIDIA ceramic inserts offer exceptional performance and versatility in a wide range of applications and exhibit remarkable hardness, heat resistance, and wear properties.

Ceramic Inserts | McMaster-Carr

Made from heat-resistant ceramic, these inserts are reinforced with strands of silicon carbide to add strength and prevent chips or fractures. Also called whisker ceramic inserts, they last up to four times

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Ceramics like it hot

Solution: Correctly applied ceramic insert grades offer a powerful alternative. Sialon and whisker ceramics are viable alternatives for both turning and milling of heat-resistant super alloys

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They therefore must be rated for floor use (you cannot use wall tiles) and need to be made from a heat resistant and highly durable material. Some of the best tiles for

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