CASE STUDY

A 2025 Grand-Prize Winner in the Medical/Dental category for metal injection molded components.

A-to-Z Expander Assembly

Process:
Metal injection molding (MIM)

Material:
MIM-17-4 PH stainless steel

Density:
7.5 g/cm^3

Tensile Strength:
1,200 MPa (174,000 psi)

End Use and Function

The expander assembly, used in dental orthodontic treatment and sleep apnea, comprises seven MIM parts designed for precise fitting and function. It widens the palatal arch to enhance nasal airflow. It features critical threading and profiling, ensuring durability and minimizing defects during production.

Fabrication

Manufactured using the metal injection molding (MIM) process, seven precisely designed MIM-17-4 PH stainless steel parts are required for this assembly. A four-cavity tool facilitates creation, employing a submarine gate for optimal flow. Staging during sintering is crucial for thread integrity, while stepped V-block saggers minimize defects. The components feature intricate profiles and tailored thread configurations, ensuring seamless assembly and the necessary strength and durability for orthodontic applications.

Results

The A-to-Z expander assembly effectively widens the palatal arch, improving airflow and supporting orthodontic treatment for sleep apnea. Its sustainability stems from the MIM process, which reduces material waste and simplifies production while ensuring high-quality, durable components, making it an eco-friendly choice in dental applications.