

# Enhanced Microfluidic Interfaces for Gas Chromatography

ID: 2024-050

## Executive Statement:

An innovative pressure-controlled micro-brazing technique that significantly improves the interface of metallic microfluidic systems.

## Technology Overview:

This technology introduces a novel method for enhancing the interface of metallic microfluidic systems used in gas chromatography, utilizing pressure-controlled micro-brazing. The technique addresses common challenges such as dead volume and thermal instability, employing a stainless steel capillary tube sealed with a microcolumn through micro-brazing. This method uses copper in an inert environment to create a stable, zero dead-volume interface capable of withstanding extensive temperature cycling.

## Key Advantages:

- Significantly reduces dead volumes to near zero, enhancing separation efficiency
- Maintains thermal stability across a wide range of temperatures (up to 400°C)
- Prevents clogging and ensures durability through repeated thermal cycles
- Applicable to various microfluidic systems beyond gas chromatography

## Problems Addressed:

- Eliminates common dead volume issues, enhancing analytical precision
- Overcomes thermal instability at micro-column interfaces
- Prevents clogging and interface degradation over time

## Market Applications:

- Advanced gas chromatography systems
- Microfluidic devices for chemical and biological analysis
- On-board cooling systems in telecommunications and computing hardware