

MOTT MICRO SPARGER TIPS FOR BENCH-TOP LAB BIOREACTORS & FERMENTORS



THE MOTT ADVANTAGE

Due to the low solubility of oxygen in many cell culture mediums, optimizing this critical nutrient can be difficult. Maximizing the surface area between the media and the aeration bubble can improve the mass transfer rates of oxygen or carbon dioxide significantly.

A widely accepted method of maximizing the surface area is using a Mott porous metal micro sparger. These micro spargers can greatly reduce the size of the aeration gas bubbles which will increase the amount of surface area for a given volume of gas. It is not unusual to effectively increase mass transfer rates by 100-400% over standard drilled pipe or single opening dip tubes.



OPTIMAL PORE SIZES FOR OPTIMAL MASS TRANSFER

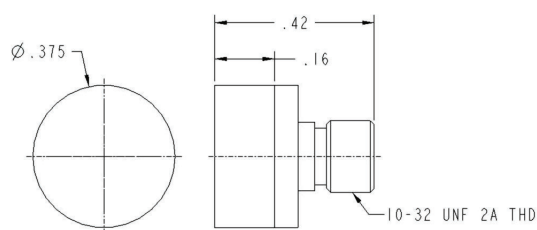
Mott Corporation offers a wide variety of porous metal sparger tips for laboratory and pilot scale bioreactors and fermentors. With media grades ranging from 2 μm to 15 μm , Mott porous spargers offer the flexibility to generate bubble sizes which are optimal for your specific media, organism and mass transfer requirements. Whether your application calls for optimal oxygen mass transfer or oxygen or CO_2 stripping, there is a Mott micro sparger tip for your needs. Sparger tips come with a M5 thread, 10-32 UNF thread, or weld stubs. If these connections don't work for you, we offer an adapter kit with other common connection styles and sizes.

Specifications	
Materials of Construction	All 316L SS
Dimensions	See Dimension Diagrams
Porous Media Grades	2 μm , 5 μm , 10 μm , and 15 μm
Connections	M5 thread with O-ring grooves, 10-32 UNF threads, hose barb, NPT threads and butt weld ends available
Optional Adapter Kit for M5 Threaded Spargers - CPN: 210099-KIT	Adapts M5 Thread to the Following Connection Types: <ul style="list-style-type: none">- 10-32 Thread- 1/4-20 Thread- 1/8 Tube- M2.5 Thread- M3.5 Thread



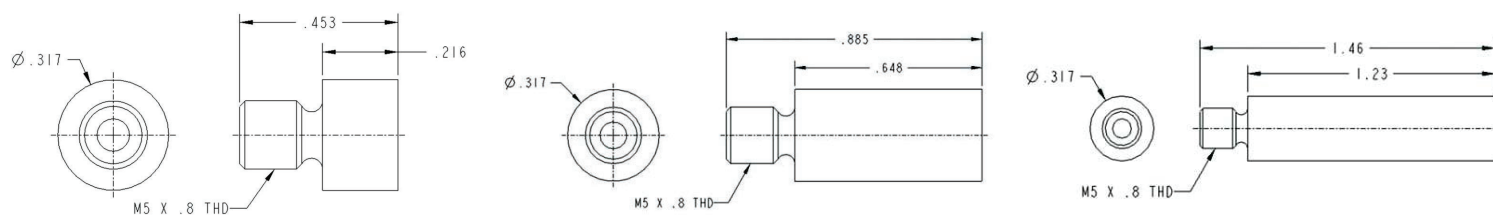
BIOTECH FLUIDICS

UNF THREADED SPARGER TIPS



Part Number	Media Grade	Overall Length Inches/mm	Active Porous Length Inches/mm	Diameter Inches/mm	Connection Thread
4000401-020-H	2 µm	0.420 / 10.66	0.16 / 4.1	0.375 / 9.52	10-32-UNF 2A Thread
4000401-050-H	5 µm	0.420 / 10.66	0.16 / 4.1	0.375 / 9.52	10-32-UNF 2A Thread
4000401-100-H	10 µm	0.420 / 10.66	0.16 / 4.1	0.375 / 9.52	10-32-UNF 2A Thread
4000401-150-H	15 µm	0.420 / 10.66	0.16 / 4.1	0.375 / 9.52	10-32-UNF 2A Thread

M5 THREADED SPARGER TIPS WITH 568-007 SIZE O-RING GROOVES



Part Number	Media Grade	Overall Length Inches/mm	Active Porous Length Inches/mm	Diameter Inches/mm	Connection Thread
1242439-01-020-H	2 µm	0.453 / 11.5	0.216 / 5.5	0.317 / 8.05	M5 x .8
1242439-01-050-H	5 µm	0.453 / 11.5	0.216 / 5.5	0.317 / 8.05	M5 x .8
1242439-01-100-H	10 µm	0.453 / 11.5	0.216 / 5.5	0.317 / 8.05	M5 x .8
1242439-01-150-H	15 µm	0.453 / 11.5	0.216 / 5.5	0.317 / 8.05	M5 x .8
1242443-01-020-H	2 µm	0.885 / 22.5	0.648 / 16.4	0.317 / 8.05	M5 x .8
1242443-01-050-H	5 µm	0.885 / 22.5	0.648 / 16.4	0.317 / 8.05	M5 x .8
1242443-01-100-H	10 µm	0.885 / 22.5	0.648 / 16.4	0.317 / 8.05	M5 x .8
1242443-01-150-H	15 µm	0.885 / 22.5	0.648 / 16.4	0.317 / 8.05	M5 x .8
1242451-01-020-H	2 µm	1.46 / 37.1	1.23 / 31.2	0.317 / 8.05	M5 x .8
1242451-01-050-H	5 µm	1.46 / 37.1	1.23 / 31.2	0.317 / 8.05	M5 x .8
1242451-01-100-H	10 µm	1.46 / 37.1	1.23 / 31.2	0.317 / 8.05	M5 x .8
1242451-01-150-H	15 µm	1.46 / 37.1	1.23 / 31.2	0.317 / 8.05	M5 x .8



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Quick Change Sparger System for Bioreactors and Fermentors



figure 1 Mott porous metal sparging elements with sparger wand and quick change trident adapter

Sparging and Mass Transfer from Gases to Liquids

In bioreactor and fermentor systems, optimal mass transfer of gases like oxygen or carbon dioxide is perhaps the most difficult task to accomplish. Oxygen, in particular, is poorly soluble in water - and even less in cell culture and fermentation broths. Oxygen transfer is aided by agitation used to mix nutrients and to keep the cell culture or fermentation homogeneous. There are limits to agitation speed due to high power consumption as well as damage to organisms resulting from excessive tip speed. Agitation alone does not provide adequate mass transfer.

Using a Mott porous sparger greatly increases mass transfer rates in bioreactors and fermentors. The introduction of gases into stirred or unstirred reactor vessels via millions of tiny bubbles increases the gas-to-liquid contact areas allowing for optimal mass transfer rates. In-tank applications, with sparging elements located inside the tank, can be batch or continuous flow, with or without agitation.

Quick Change Spargers* Provide Fast and Easy Installation and Validation

In the past Mott porous metal sparger elements, or “frits” as they are sometimes called, were welded to the end of sparger assemblies. This fixed method of attachment required either a cut and re-weld method of replacement or a clean out-of-place method for the entire sparger assembly to meet GMP validation methods.

Today, Mott offers a Quick Change Sparger that reduces the time and effort to replace the porous metal sparger element.

With the Quick Change Sparger system (see figure 2), the porous metal element can be removed and replaced after each use. Eliminating the need to re-weld the tip or clean the entire assembly. After each batch, a new tip can be installed on the end of the assembly and is ready for steam in place operation. Or the

sparger tip can be cleaned out of place utilizing a number of methods including ultrasonic cleaning or detergent and water flush. Either way, the Quick Change Sparger can help make sparger change out simple and easy. Changing to new clean sparger tips after each batch provides an excellent method of maintaining GMP process validation methods.

Available for Retrofit

The Quick Change Sparger consists of a trident adapter (sold separately) for the end of the sparging wand or assembly and a mating porous metal sparging tip (See figure 4). The adapter can be used to modify existing sparger assemblies to accept the Quick Change Sparger tip. The trident adapter design provides optimal support for the porous element without the need for threads, clamps or other excessive areas that cannot be sterilized during SIP cycles.

Mott Porous Metal Spargers – a Biotech Industry Standard

The ultimate goal of the bioprocess engineer is to provide an optimum environment for biological processes. One major concern is the shear sensitivity of certain cell cultures. The use of shear protective additives such as Pluronic F-68 or methyl-cellulose are proven to reduce the shear impact of bubble rupture from sparged gas in cell cultures. Industry studies have continually proven that the simplest and most effective method of oxygen transfer is direct sparging of gas into the system.

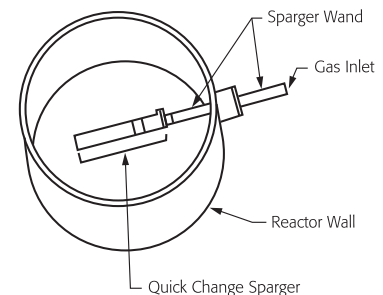


figure 2

For decades bioreactor and fermentor designers and operators have relied on Mott porous metal spargers to provide this uniform bubble size and dispersion rate. The 316L SS porous metal spargers are robust and capable of withstanding temperatures in excess of 400°C (752°F) and differential pressure in excess of 500 psid. This rugged material allows for repeated sterilizations via autoclave or through steam in place methods. The 316L SS material also ensures zero out-gassing and no extraction of harmful contaminants.

* Patent Pending

high purity products



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Quick Change Sparger – Product Offering

The Quick Change Spargers (See figure 3) are available in the following standard sizes:

Inlet Tube sizes are all 1/2 inch OD with the following porous element sizes:

- 3/4 inch OD sparger tubes with 1 inch, 2 inch, 3 inch and 4 inch porous element lengths. Porous metal media grades are 0.5 µm, 2 µm, 5 µm and 10 µm.
- 1 inch OD sparger tubes with 1 inch, 2 inch, 3 inch and 4 inch porous element lengths. Porous metal media grades are 0.5 µm, 2 µm, 5 µm and 10 µm.

Materials of Construction

Standard porous media for spargers is 316L stainless steel, which provides excellent corrosion resistance and high temperature capability, up to 400°C (750°F). Standard sparger hardware is 316L stainless steel. Other materials are available on special order, including 304L SS, 347 SS, 430 SS, Inconel® 600, Monel®400, Nickel 200; Hastelloy® C276, C22 and X; and Alloy 20.

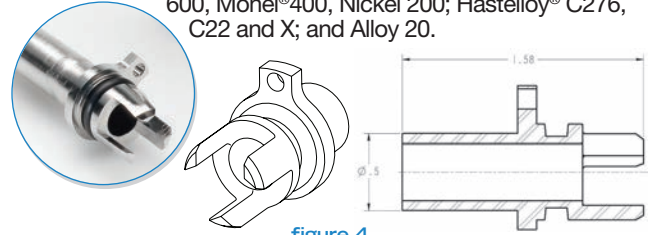
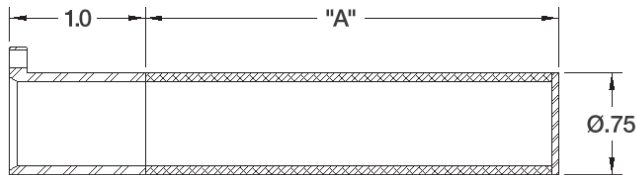


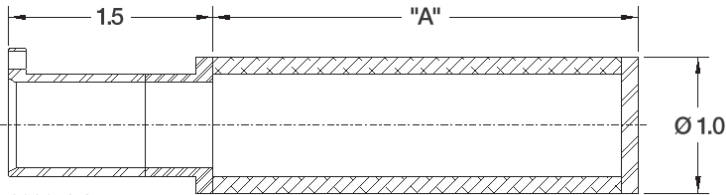
figure 4

Quick Change Sparger Trident Adapter #207680

Quick Change Sparger



6892-0.75



6892-1.0

figure 3

Order O-Ring Separately

O-Rings for Trident Adapter

CPN	Material
101041-00 Size 111	Viton USP Class VI
101042-00 Size 111	EPDM USP Class VI
101043-00 Size 111	Kalrez USP Class VI
101044-00 Size 111	Platinum Cured Silicon USP Class VI

Bio-Pharm Sparger Part Description

Code	Product Family
6892	Removable Sparger Elements
	Code OD/ID
	0.75 0.75 OD / .625 ID
	1 1.0 OD / .750 ID
	Code Specific Porous Length See Dimension A above
	1 1.0 inch
	2 2.0 inch
	3 3.0 inch
	4 4.0 inch
	Code Media Grade
	0.5 0.5 µm
	2 2 µm
	5 5 µm
	10 10 µm
	Code Material
	AA 316L SS Porous/Hardware
	Code Material
	QC Quick Change

Example: 6892 0.75 1 5 AA QC

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