# TABLET COATING

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Tablet coating is a process that can be summarized as the application of an “edible paint” to the surface of a pharmaceutical dosage form. In the past, sugar coating was a common solution for coating tablets, but this process has many disadvantages. Modern tablet coatings are typically film coatings, flexible formulations that are applicable to a wide range of dosage forms (such as tablets, capsules, pellets, granules and drug crystals). The tablet coating process is complex, and involves parameters such as the spray pattern, drop size, and nozzle spacing (in addition to multiple other non-spray related parameters) which must all be precisely controlled in order to ensure uniform distribution of the coating material.

**ONLINE RESOURCES**

- Bulletin 599C, Pharmaceutical & Biopharmaceutical Processing
VMAU SPRAY SET-UPS

A spray set-up consists of a fluid tip and an air cap. Spray set-ups are interchangeable, but each set-up uses a different size needle. The VMAU can utilize a number of different spray set-ups depending on the desired performance. Reference the information below to determine the most appropriate spray set-up for your application.

ANTI-BEARDING SET-UPS

Frequent shutdowns to clean coating material from air atomizing spray gun components have a serious impact on productivity. Anti-bearding spray set-ups can help to improve process quality, volume, and profitability in these situations.

P-SERIES ANTI-BEARDING SET-UPS*

The patent-pending P-Series Anti-Bearding Spray Set-Ups are designed to virtually eliminate nozzle build-up while greatly reducing product waste and maintenance downtime.

PERFORMANCE DATA

Click on the link to view an interactive PDF with the following data for VMAU Spray Set-Ups ►

<table>
<thead>
<tr>
<th>Data on Spray Set-Up(s)</th>
<th>Type of Data</th>
<th>Available Spraying Material(s) for Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUVM113AAB SUVM113AABP*</td>
<td>Coverage and Flow Rate</td>
<td>Water</td>
</tr>
<tr>
<td></td>
<td>Drop Size Information</td>
<td>OPADRY® / EUDRAGIT®</td>
</tr>
<tr>
<td></td>
<td>Spray Velocity</td>
<td>OPADRY® / EUDRAGIT®</td>
</tr>
<tr>
<td>SUVM113AAB SUVM113AABP*</td>
<td>Coverage and Flow Rate</td>
<td>Water</td>
</tr>
<tr>
<td></td>
<td>Drop Size Information</td>
<td>OPADRY® / EUDRAGIT®</td>
</tr>
<tr>
<td></td>
<td>Spray Velocity</td>
<td>OPADRY® / EUDRAGIT®</td>
</tr>
</tbody>
</table>

*P-Series anti-bearding spray set-ups are designated with a ‘P’ suffix. For the purposes of spray coverage, flow rate, drop size, and spray velocity, performance is approximately equivalent to anti-bearding spray set-ups. For performance data on other available spray set-ups not listed in this catalog, contact your local sales representative.

SPRAY TIP: DRAMATICALLY REDUCE NOZZLE BUILD-UP

The patent-pending P-Series anti-bearding set-ups allow users to run their spray operations for up to two times as long as standard anti-bearding set-ups with minimal nozzle build-up, greatly reducing maintenance downtime due to cleaning or clogging.

Results after spraying OPADRY®. The P-Series cap is pictured after being sprayed for twice as long as the standard air cap.
DETERMINING SPRAY NOZZLE SET-UPS

A VMAU spray set-up consists of a fluid tip and an air cap, each of which has its own part number consisting of several smaller numbers (as shown below) which correspond to basic characteristics, such as orifice size and diameter. Determining the correct size spray set-ups when placing an order is critical to ensure that you get exactly the performance you need from your spray nozzle. After viewing the example below, use the chart to choose the right spray set-up for your application.

**EXAMPLE: VMAU SET-UP NUMBER SUVM113AAB**

Fluid Tip No. VMFAB3578  +  Air Cap No. VMAAB113289-60°

**FLUID TIP PART NUMBER EXAMPLE**

- Fluid Cap
- Anti-Bearding Set-up
- Orifice Dia.
- Shoulder Dia.

**AIR CAP PART NUMBER EXAMPLE**

- Air Cap
- Anti-Bearding Set-up
- Center Orifice Dia.
- Number of Side Orifices
- Side Orifice Dia.
- Side Orifice Angle

*Note: VMAU fluid caps have a prefix of "VMF" while air caps have a prefix of "VMA." Anti-bearding set-ups bear the additional prefix "AB," so for the anti-bearding spray set-up SUVM113AAB, the air cap would have a combined prefix of "VMAAB."

**ORDERING INFORMATION**

VMAU spray set-ups can be used for the VMAU spray nozzle (see p, the VMAU Lab Coater and the 54000 Modular Manifold. To determine which nozzle set-up is right for your nozzle, reference the performance data for VMAU Spray Set-Ups ➤
STANDARD AND SANITARY VMAU SPRAY NOZZLES

PRODUCT OVERVIEW

The VMAU variable automatic spray nozzle is designed with modular components to provide solutions to even the most demanding spray application challenges.

FEATURES AND BENEFITS

• Maximizes uniform spray distribution
• Modular design offers the flexibility to fit various unique spray applications
• Easy access dramatically cuts cleaning and maintenance downtime
• Threadless sanitary design with no internal threads in the liquid chamber
• Increases throughput with improved spray and product quality

ONLINE RESOURCES

Literature
Bulletin 558, VMAU Spray Nozzles

Performance Data
VMAU Spray Set-Ups

3D CAD Models
Sanitary VMAU Standard VMAU

SPRAY TIP: IMPROVE PERFORMANCE FOR AIR ATOMIZING SPRAY APPLICATIONS

In addition to tablet coating, VMAU nozzles are also suitable for use in a wide variety of other applications. With multiple body styles, actuator assemblies, and interchangeable spray set-ups available, VMAU spray nozzles are suited to virtually any air atomizing spray application.
ORDERING INFORMATION – STANDARD AND SANITARY VMAU SPRAY NOZZLES

To customize your VMAU nozzle, specify the following:

**BODY STYLE**

First, select either a standard or sanitary body with NPT or BSPT connections.

<table>
<thead>
<tr>
<th>Standard Body</th>
<th>1/4VMAU-XX</th>
<th>1/4 NPT Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B1/4VMAU-XX</td>
<td>1/4 BSPT Connections</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sanitary Body</th>
<th>S1/4VMAU-XX</th>
<th>Sanitary fluid connections and 1/4 NPT air connections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SB1/4VMAU-XX</td>
<td>Sanitary fluid connections and 1/4 BSPT air connections</td>
</tr>
</tbody>
</table>

**Example**

Model No. – Material Code

1/4VMAU – 316SS

**SPRAY SET-UP**

Next, choose from a wide range of spray set-ups to fit your application’s needs.

<table>
<thead>
<tr>
<th>Anti-Bearding Spray Set-Ups</th>
<th>P-Series Spray Set-Ups</th>
<th>Orifice Dia. in. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUVM113AAB-XX</td>
<td>SUVM113AABP-XX</td>
<td>.035 (0.89)</td>
</tr>
<tr>
<td>SUVM113AB-XX</td>
<td>SUVM113ABP-XX</td>
<td>.040 (1.02)</td>
</tr>
<tr>
<td>SUVM128AB-XX</td>
<td>SUVM128ABP-XX</td>
<td>.060 (1.52)</td>
</tr>
</tbody>
</table>

**Example**

Model No. – Material Code

SUVM113AAB – 316SS

**ACTUATOR ASSEMBLY**

Last, choose an actuator assembly to match the desired spray set-up.

<table>
<thead>
<tr>
<th>Single Action (52519)</th>
<th>NPT Style</th>
<th>BSPT Style</th>
<th>Corresponding Set-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Spray</td>
<td>004</td>
<td>104</td>
<td>SUVM 113A</td>
</tr>
<tr>
<td></td>
<td>005</td>
<td>105</td>
<td>SUVM 113</td>
</tr>
<tr>
<td></td>
<td>006</td>
<td>106</td>
<td>SUVM 128</td>
</tr>
<tr>
<td>Anti-Bearding Spray</td>
<td>404</td>
<td>504</td>
<td>SUVM 113A AB or ABP</td>
</tr>
<tr>
<td></td>
<td>405</td>
<td>505</td>
<td>SUVM 113 AB or ABP</td>
</tr>
<tr>
<td></td>
<td>406</td>
<td>506</td>
<td>SUVM 128 AB or ABP</td>
</tr>
</tbody>
</table>

**Example**

Actuator Style – Actuator Endcap – Material Code

52519 – 004 – 316SS

Material Code = XX

SS = 303 stainless steel

316SS = 316 stainless steel
VMAU LAB COATER SPRAY NOZZLE

PRODUCT OVERVIEW
The 54200 VMAU Lab Coater spray nozzle features a compact design and simple assembly ideal for your R&D/laboratory scale spray applications.

FEATURES AND BENEFITS
• Maximizes uniform spray distribution
• Threadless sanitary design with no internal threads in the liquid chamber
• Increases throughput with improved spray and product quality
• 316 stainless steel nozzle and fittings for corrosion resistance
• Disassembles quickly
• Uses the same set-ups as our VMAU nozzle

ONLINE RESOURCES
Literature
Bulletin 672, VMAU Spray Nozzles ➤
Performance Data
VMAU Spray Set-Ups ➤
3D CAD Models
VMAU Lab Coater ➤
Videos
VMAU Lab Coater ➤

SPRAY TIP: SCALE UP YOUR R&D COATING APPLICATIONS WITH EASE
The spray set-up (fluid tip and air cap) on the 54200 VMAU Lab Coater is the same size as used for the 54000 Modular Air Atomizing Manifold, making it simple to scale up from smaller lab scale applications to full production.
### DIMENSIONS AND WEIGHTS – VMAU LAB COATER SPRAY NOZZLE

<table>
<thead>
<tr>
<th>Nozzle Type</th>
<th>A in. (mm)</th>
<th>B in. (mm)</th>
<th>C in. (mm)</th>
<th>D. in. (mm)</th>
<th>Net Weight lbs (oz.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>54200</td>
<td>2.0 (50.8)</td>
<td>2.18 (55.5)</td>
<td>1.5 (38.1)</td>
<td>3.74 (95.1)</td>
<td>1.8 (0.82)</td>
</tr>
</tbody>
</table>

### ORDERING INFORMATION – VMAU LAB COATER SPRAY NOZZLE

To order, specify body, spray set-up, needle assembly, and optional rod mount kit (28945-007-316SS).

### OPTIONS

<table>
<thead>
<tr>
<th>Spray Set-Ups</th>
<th>Orifice Dia. in. (mm)</th>
<th>Needle Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUVM113AABP-VIF</td>
<td>.035 (0.89)</td>
<td>54200-304-316VIF</td>
</tr>
<tr>
<td>SUVM113ABP-VIF</td>
<td>.040 (1.02)</td>
<td>54200-305-316VIF</td>
</tr>
<tr>
<td>SUVM128ABP-VIF</td>
<td>.060 (1.52)</td>
<td>54200-306-316VIF</td>
</tr>
<tr>
<td>SUVM113AABP-EPF</td>
<td>.035 (0.89)</td>
<td>54200-314-316EPF</td>
</tr>
<tr>
<td>SUVM113ABP-EPF</td>
<td>.040 (1.02)</td>
<td>54200-315-316EPF</td>
</tr>
<tr>
<td>SUVM128ABP-EPF</td>
<td>.060 (1.52)</td>
<td>54200-316-316EPF</td>
</tr>
</tbody>
</table>

### BODY STYLE

**Example**

Model No. − Tube Size* − Material Code

| 54200 − 1/4 − 316L |

### SPRAY SET-UP

**Example**

Model No. − Material Code

| SUVM113AAB − 316VIF |

### NEEDLE ASSEMBLY

**Example**

Model No. − Needle Assembly − Material Code

| 54200 − 304 − 316VIF |

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**Vmau Sprays**

**Material Code**

- SS= 303 stainless steel
- 316L= 316 stainless steel
- 316VIF = FDA Viton
- 316EPF = FDA EPDM
**JAU AND J-TYPE SPRAY SET-UPS**

Spray set-ups are interchangeable, but each set-up uses a different size needle. The JAU can utilize a number of different spray set-ups depending on the desired performance and nozzle configuration.

**1/4J SET-UPS**

The standard 1/4 JAU nozzle can utilize a number of different interchangeable spray set-ups available in standard and anti-bearding versions. (Example: SUE15)

**JAUSF SET-UPS**

JAUSF set-ups are designed to fit the sanitary 54160-JAUSF spray nozzle and are available in anti-bearding versions. (Example: SUE15ABP)

**53000 J-TYPE SET-UPS**

53000 J-Type set-ups are specially designed to fit our 54000 modular manifolds, and are available in anti-bearding versions. (Example: 53000-SUE15AB)

*Performance for 53000 J-Type Set-Ups is approximately equivalent to JAUSF set-ups.

**PERFORMANCE DATA**

Click on the link to view an interactive PDF with the following data for JAU Spray Set-Ups ▶

<table>
<thead>
<tr>
<th>Data on Spray Set-Up(s)</th>
<th>Type of Data</th>
<th>Available Spraying Material(s) for Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUE15 (.028&quot; / 0.7 mm Orifice)</td>
<td>Coverage and Flow Rate</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td></td>
<td>Drop Size Information</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td></td>
<td>Relative Span Factor</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td>SUE25B (.035&quot; / 0.9 mm Orifice)</td>
<td>Coverage and Flow Rate</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td></td>
<td>Drop Size Information</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td></td>
<td>Relative Span Factor</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td>SUE25A (.040&quot; / 1.0 mm Orifice)</td>
<td>Coverage and Flow Rate</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td></td>
<td>Drop Size Information</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td></td>
<td>Relative Span Factor</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td>53000-SUE15AB SUE15AB / SUE15ABP (.028&quot; / 0.7 mm Orifice)</td>
<td>Coverage and Flow Rate</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td></td>
<td>Drop Size Information</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td></td>
<td>Relative Span Factor</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td>53000-SUE25BAB SUE25BAB / SUE25BABP (.035&quot; / 0.9 mm Orifice)</td>
<td>Coverage and Flow Rate</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td></td>
<td>Drop Size Information</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td></td>
<td>Relative Span Factor</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td>53000-SUE25AAB SUE25AAB / SUE25AABP (.040&quot; / 1.0 mm Orifice)</td>
<td>Coverage and Flow Rate</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td></td>
<td>Drop Size Information</td>
<td>Water / OPADRY®</td>
</tr>
<tr>
<td></td>
<td>Relative Span Factor</td>
<td>Water / OPADRY®</td>
</tr>
</tbody>
</table>
DETERMINING SPRAY NOZZLE SET-UPS

A JAU or J-Type spray set-up, like a VMAU set-up, consists of a fluid cap and an air cap, each of which has its own part number. A standard 1/4 J anti-bearding spray set-up is shown below. Our JAUSF nozzle uses a modified version of this set-up, as do our 54000 manifolds.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SUE15AB</td>
<td>PF28100AB</td>
<td>PA84228-45-C</td>
</tr>
<tr>
<td>SUE25BAB</td>
<td>PF35100AB</td>
<td>PA134225-45</td>
</tr>
<tr>
<td>SUE25AAB</td>
<td>PF40100AB</td>
<td>PA134225-45</td>
</tr>
</tbody>
</table>

EXAMPLE: JAU SET-UP NUMBER SUE25BAB

Fluid Cap No. PF35100AB + Air Cap No. PA134225-45

FLUID CAP PART NUMBER EXAMPLE

<table>
<thead>
<tr>
<th>PF</th>
<th>Orifice Dia.</th>
<th>Shoulder Dia.</th>
<th>Anti-Bearding Set-up</th>
</tr>
</thead>
</table>

AIR CAP PART NUMBER EXAMPLE

<table>
<thead>
<tr>
<th>PA</th>
<th>Center Orifice Dia.</th>
<th>Number of Side Orifices</th>
<th>Side Orifice Dia.</th>
<th>Side Orifice Angle</th>
</tr>
</thead>
</table>

*Note that anti-bearding set-ups bear the additional prefix “AB.”

ORDERING INFORMATION

JAU, JAUSF and 53000 J-Type spray set-ups can be used for either the standard 1/4 JAU spray nozzle, the JAUSF spray nozzle or the 54000 Modular Manifold.

To determine which nozzle set-up is right for your nozzle, reference the performance data for JAU Spray Set-Ups ➤
JAUSF SPRAY NOZZLE

PRODUCT OVERVIEW

The new, sanitary 51460-JAUSF spray nozzle is an update to the popular JAU series of spray nozzles. Designed for sanitary applications, the nozzle features a simpler design for easier cleaning and a welded external mount configuration.

FEATURES AND BENEFITS

• New, simpler design offers greatly improved cleanability
• Available in a wide variety of configurations
• Air atomizing nozzle helps achieve precise, consistent coating
• Offers similar performance to standard JAU
• No internal seals
• Features a pull-out needle for easy clean out
• Sanitary design features no internal threads in the liquid chamber

ONLINE RESOURCES

Performance Data
JAU Spray Set-Ups ➤

3D CAD Models
JAUSF Spray Nozzle ➤

Video
JAUSF Spray Nozzle ➤

SPRAY TIP: REPLACE OLDER NOZZLES FOR IMPROVED CLEANABILITY

The 54160-JAUSF uses the same orifice sizes as our standard 1/4JAU nozzle and provides similar performance with fewer components for improved cleanability. It can be used as a direct replacement for older style JAU nozzles without the need for revalidation.
DIMENSIONS AND WEIGHTS – JAUSF SPRAY NOZZLE

<table>
<thead>
<tr>
<th>Nozzle Type</th>
<th>A in. (mm)</th>
<th>B in. (mm)</th>
<th>C in. (mm)</th>
<th>D in. (mm)</th>
<th>Net Weight lbs (oz.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>51460</td>
<td>3.25 (82.5)</td>
<td>4.44 (112.8)</td>
<td>1.50 (38.1)</td>
<td>3.74 (95.1)</td>
<td>1.6 (.72)</td>
</tr>
</tbody>
</table>

ORDERING INFORMATION – JAUSF SPRAY NOZZLE
To order, specify body, spray set-up and needle assembly.

OPTIONS

<table>
<thead>
<tr>
<th>Spray Set-Ups</th>
<th>Orifice Dia. in. (mm)</th>
<th>Needle Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUE25AABP-XX</td>
<td>.040 (1.02)</td>
<td>54008-705-XX</td>
</tr>
<tr>
<td>SUE25BABP-XX</td>
<td>.035 (0.89)</td>
<td>54008-704-XX</td>
</tr>
<tr>
<td>SUE15ABP-XX</td>
<td>.028 (0.71)</td>
<td>54008-703-XX</td>
</tr>
</tbody>
</table>

BODY STYLE

Example

Model No. - Material Code

54160 – JAUSF – 316L

*Add B for BSPT connections, leave blank for NPT connections

SPRAY SET-UP

Example

Model No. - Material Code

SUE25AABP - 316VIF

NEEDLE ASSEMBLY

Example

Model No. - Needle Assembly - Material Code

54008 - 705 - 316VIF

Material Code = XX

- SS = 303 stainless steel
- 316L = 316L stainless steel
- 316VIF = FDA Viton
- 316EPF = FDA EPDM
MODULAR AIR ATOMIZING MANIFOLDS

PRODUCT OVERVIEW

54000 series modular manifolds are customizable, integrated coating systems designed to cut costs, simplify installation, and reduce maintenance. Each manifold consists of an end hub, connection hub, spacer blocks, and 2-12 spray nozzles—all configured to suit your process needs.

FEATURES AND BENEFITS

• Superior surface finish reduces contamination risk
• Manufacturing environment exceeds industry standards for hygienic products
• Complete turnover package available with material test reports, welder certification and other relevant data
• Lightweight—half the weight of other manufacturers’ designs
• Disassembles in seconds, saving time and money
• Polished 316/316L stainless steel and stain-resistant TecaPro® for easy cleaning
• Improved spray performance maximizes throughput and product quality
• Ideal for spraying viscous liquids
• Can be used in batch or continuous processes

STANDARD 54000 MANIFOLD

• For precision coating in batch coating applications
• Fully customizable, designed to meet your coater’s exact specifications
• Houses up to 6 spray nozzles in a single manifold

LARGE CAPACITY 54000-LC MANIFOLD

• Ideal for large scale batch or continuous coating applications
• Houses up to 12 spray nozzles in a single manifold

INDIVIDUALLY FED 54000 MANIFOLD

• Ideal for large scale batch or continuous coating applications
• Houses up to 12 spray nozzles in a single manifold
• Patent-pending individually fed, internal-recirculating nozzles minimize clogging and enable highest precision of coating distribution for the most demanding coating applications

ONLINE RESOURCES

Literature
Bulletin 562b, Modular Air Atomizing Manifolds
Bulletin FA107, TABCOATER

Performance Data*
VMAU Spray Set-Ups
JAU Spray Set-Ups

Specification Sheets
54000 Manifold
54000-LC Manifold
TABCOATER Manifold

Video
54000 Manifold

(*54000 Manifolds use either VMAU or JAU spray set-ups)
**MODULAR AIR ATOMIZING MANIFOLD ASSEMBLY**

**SAVE TIME WITH ADJUSTABLE SANITARY MOUNTING CLAMPS**

All of the 54000 family manifolds are available with a patent-pending fully-adjustable sanitary mounting clamp which permits users to quickly and precisely rotate the manifold to the necessary spray angle – eliminating the hassle of trial-and-error positioning. The sanitary clamp can be customized to your coater’s exact specifications and allows for easy installation of the manifold in a variety of different coating systems.