

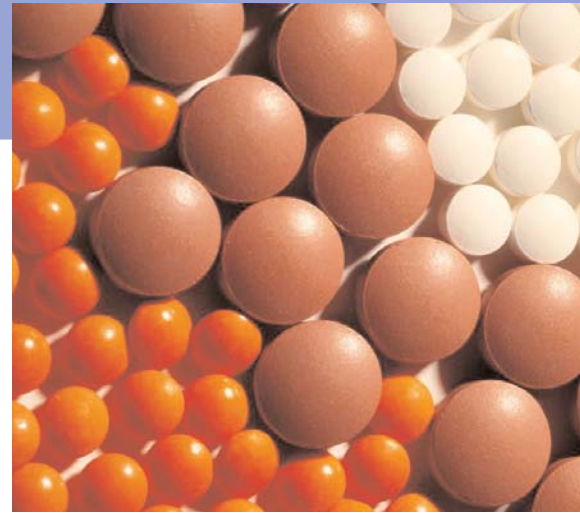
LET THOMAS ENGINEERING HELP YOU SELECT THE RIGHT SPRAY EQUIPMENT FOR YOUR TABLET COATING PROCESSES.

We offer total design flexibility to handle a limitless range of spray options:

- High viscosity, high solids suspensions
- Functional coatings
- Active drug sprays
- Clear and color film coatings
- Sugar solutions
- Aqueous and organic solvent formulations

Thomas Spray System Benefits:

- Minimize change parts for handling your range of spray processes.
- Hardware and measurement devices meet GMP requirements to facilitate cleaning; easy and efficient product changeovers.
- Solution delivery systems are engineered to provide consistently good performance over all control ranges; processes are repeatable and easy to validate.
- COMPU-COAT controls are available for total process automation; optional solution preparation systems can be built to customer specifications and fully integrated with coating system.



THOMAS ENGINEERING SPRAY SYSTEM

TOTAL COVERAGE...EVERY TABLET...EVERY PROCESS...EVERY TIME...



MANUAL SPRAY CONTROLS

AN ECONOMICAL CHOICE FOR RETROFIT AND NEW INSTALLATIONS

Accela-Spray 4 Cabinet-Mounted Spray System

- Fully integrated cabinet-mounted spray system with local spray process controls on the front panel; cabinet features external access to air and solution line connections for fast setup and easy removal for cleaning. These great features make the Accela-Spray 4 an ideal choice for retrofit onto existing Accela-Cotas, or for new systems where manual control is desired.
- Fully integrated assembly of quality components; pre-wired, plumbed, and ready for connection to coater spray manifold and customer solution tank.
 - solution pump
 - volumetric flow meter
 - spray gun and pump controls
 - recirculation valve
 - solution delivery totalizer
- Standard manual controls package includes:
 - spray on/off (which operates the re-circulation valve)
 - pump on/off and speed control
 - spray mode (continuous/cycle)
 - intermittent clean-out cycle
 - indicators for atomizing air pressure, solution flow rate, and delivery total.
- Automatic shut-off at solution delivery endpoint (endpoint is adjustable by user)



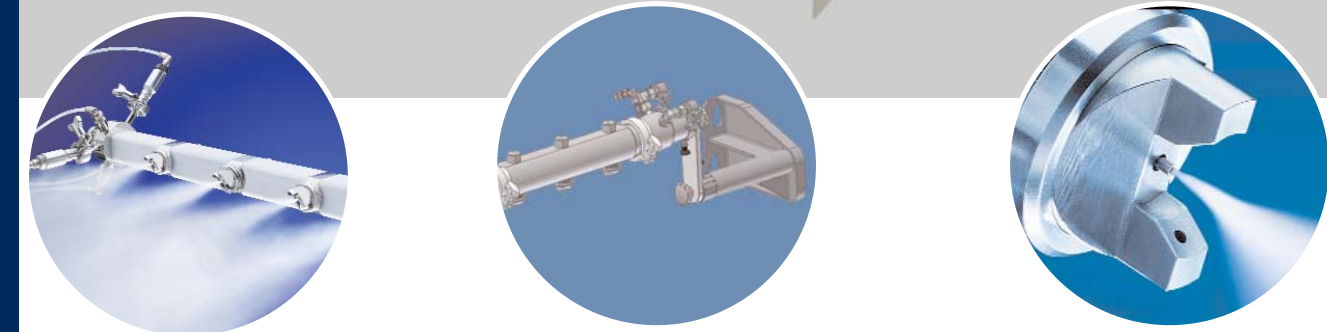
Thomas Engineering continually explores new product technologies for equipment and process improvements. We therefore reserve the right to make changes to specifications and sales literature without notice. Equipment photos are for illustration only, and may not reflect actual devices/models used in a build project.

Thomas Engineering - Equipment Range

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|---|---|
| • ACCELA-COTA ® Spectrum | - Containment Batch Coaters |
| • ACCELA-COTA ® "D" and ACCELA-COTA ® "S" | - Production Size Batch Coaters |
| • 24" and 36" COMPU-LAB | - Fully-Integrated Laboratory Size Coaters |
| • Continuous Coaters | - High Throughput for Continuous Applications |

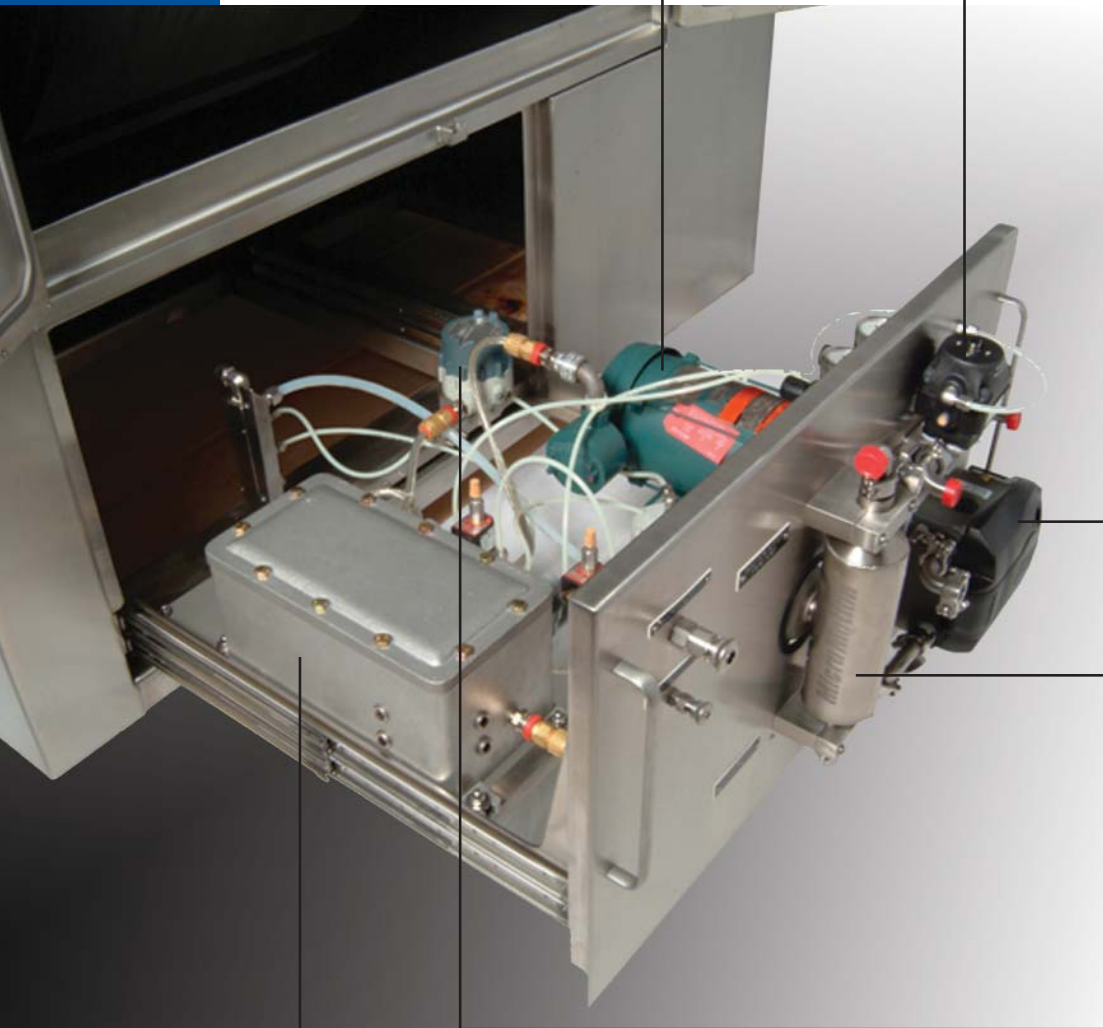


The Thomas Engineering spray system integrates a carefully selected range of instruments and control devices to deliver a regulated flow of coating solution and compressed air to the tablet bed inside the coater. The system delivers a precise flow of coating solution, compressed air for atomization and compressed air for pattern control. Thomas Engineering offers the greatest design flexibility to meet your process requirements.



You have a Process...We have Solutions!

Design, Flexibility and Innovative Technology to meet the needs of today's pharmaceutical spray coating process



Rugged Pump Drive Motor and Gearbox

- Cast aluminum pump head adapter with coupling.
- Sealed gear box for maintenance-free operations.

Solution Recirculation Valve

- Standard feature on Accela-Cota, Spectrum, and Continuous Coater.
- Reduces settling of solids in suspensions.
- Solution return to tank during spray and pause cycles helps maintain consistent temperature when using heated tanks.

Choice of Solution Spray Pumps

- Wide range of industry standard pumps are available.
- Choice of single and dual channel pumps; multiple head pumps also available.
- Instrumentation options for individual line monitoring of solution pressure and flow rate.

Choice of Proven Flow Meter Technologies

- Mass Flow Meter measures flow rate using Coriolis effect for superior mass flow accuracy.
 - Straight tub is self-draining and easy to clean
 - No moving parts - no maintenance required
- Volumetric Flow Meter (not shown) also available - Magnetic sensing and transmitter provide calibrated signal to read milliliters per minute.

Atomization and Pattern Air Control Devices

- Reliable pneumatic actuators and air volume boosters.
- Capacitive pressure transducers for air pressure measurement.
- Optional instrumentation for air flow measurement.

Electro-Pneumatic Interface

- Class 1, Division 2 rating of the Spray Drawer assembly.
- Suitable for aqueous coating, sugar coating, active drug sprays and coating with organic solvents.

Innovative Coating Spray Technology



Conventional Spray Manifolds

- Spray guns mount onto stainless steel manifold for leak-free feeding and easy disassembly.
- Design flexibility - manifolds may be built to utilize any choice of commercially available spray guns.
- Choice of recirculation or "dead heading" solution flow.



Thomas-Schlick Spray Bar

- Clean GMP design eliminates all lines into coating pan.
- Delivers solution and compressed air to integral spray gun assemblies.
- Capable of combining atomizing and pattern air supplies - or, feed these channels separately and with independent control.
- Available in 2- and 3- gun modules to create spray bars assemblies with 2 or more guns.

Dynamic Spray Gun Positioning

- Increase or maintain gun-to-bed distance during process; especially useful for high weight gain coating applications.
- Automated gun indexing for repeatable setups and changes based on recipe stages.
- Precision servo drives and actuators for consistently good positioning accuracy.
- Proven design; field tested to ensure reliable operation.

Custom Spray System Designs

- Individual pumps or multi-channel heads for "per-gun" solution feeding.
- Solution and air delivery to individual guns.
- Gun center distances to suit customer specifications.
- Gun-to-Bed distance measurement.
- Tablet bed temperature measurement.

