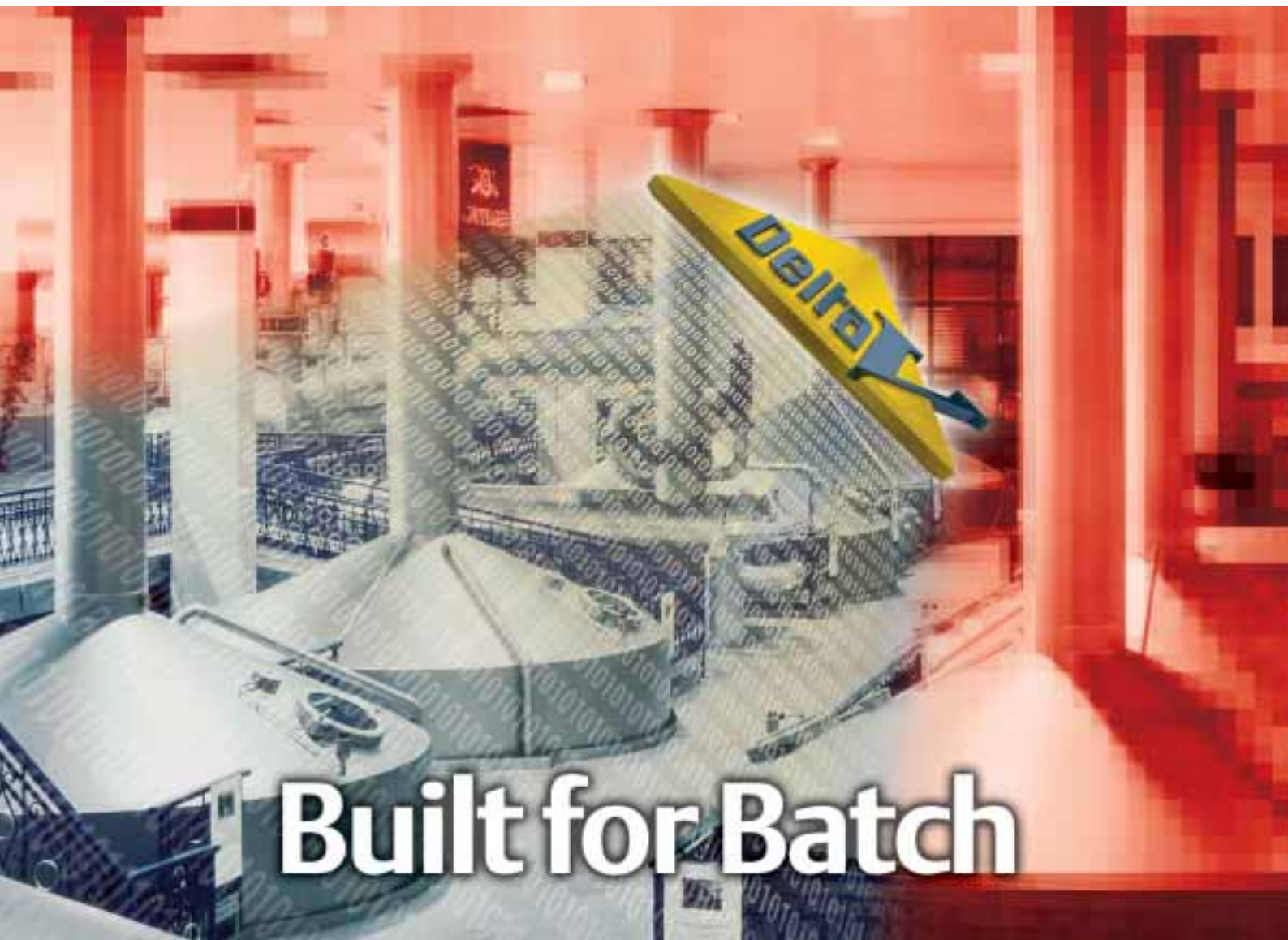


The DeltaV System



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Easy-to-use, self-revealing software tools based on Microsoft User Interface standards help you build your batch control strategies. The DeltaV system's built-in configuration audit trail helps you address regulatory requirements such as FDA's 21 CFR Part 11.

10 Batch User Interface

Powerful, intuitive Batch Operator Interface allows you to monitor and control batch execution. Detailed batch management capabilities including electronic signatures, action confirm and verify, and an electronic operator log are also supported.

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Electronic batch records are easily captured, stored and viewed with the DeltaV Batch Historian.

14 Enterprise Optimization

Foundations for executing your e-business strategies like integrated batch history, embedded security, and complete change management and control.

16 We are Emerson

Turnkey solutions are built on solid relationships and backed by global expertise.



Best in Batch



#1 *in Batch!*
Consistently recognized by industry authorities as the leading batch supplier, and winning numerous batch awards, we continue to make our batch offering better. With the DeltaV™ “built for batch” system’s capabilities, Emerson Process Management once again sets the standard in the field. The result has been better performance and cost savings—made easy.

The DeltaV system is built to S88 standards and fully supports compliance with the FDA’s 21 CFR Part 11 requirements with integrated recipe and campaign management, batch history, automatic version control and change management,

and electronic signature support.

From recipe scheduling to device control to advanced control; from simple sequencing to multi-product multi-stream formulations, the DeltaV system makes your batch operation easy—with features like:

- Easy, familiar tools
- Single point configuration and global database
- Formula, recipe and campaign management
- Recipe management and simulation
- Batch-to-batch history comparisons
- VB/VC++, OPC and XML integration
- Integrated batch history
- Batch-centered analysis tools.

From concept and architecture to configuration, execution, history and reporting, *DeltaV Batch makes it easy.*

“Not only is the batch control system very flexible and easy to use due to the application of the S88 standard, but the batch tracking capabilities are very advanced.”

—Michael Boudreaux
Akzo Nobel Chemicals, Inc.
USA

Design Benefits



What does “built for batch” mean?

The DeltaV Batch software is based on several fundamental concepts that provide powerful system functionality, while keeping implementation easy and cost-effective.

The DeltaV Batch software features a single, completely integrated database that coordinates all configuration activities. System information is transparently distributed globally in the run-time environment, so each part knows about the others. Unlike any other batch solution, DeltaV Batch seamlessly integrates all elements of your solution with:

- A single global system database with no database mapping or dual data entry required—applications use the same information.
- Unit-relative equipment handling.
- Access to all data by name—no physical location references are required.
- Request response and exception reporting communication between applications that's fast and transparent to the user.

- Controller based phase logic with an embedded interface to the batch executive that executes recipes—without data mapping.
- Integrated reporting, viewing and analyzing batch history data.
- PC-based soft phases for easy integration with external systems (LIMS, material tracking, barcoding, etc.).



- Out-of-the-box functionality supporting FDA 21 CFR Part 11 compliance including Configuration Audit Trail, Electronic Signatures, Operation Action Confirm/Verify and Electronic Operator Log.
- Totally integrated Campaign Management.

Bridging the communication gap

DeltaV Batch software is built based on the S88.01, Namur NE33 Batch and IEC 61131-3 programming standards. So the concepts and terms are all familiar. The Microsoft Windows-style interface leverages your day-to-day application familiarity to reduce the learning curve, and makes your work easy.

Supporting standardized batch concepts

DeltaV Batch software follows the ISA S88.01 standard, which defines a consistent set of terminology and models used to describe the control requirements for batch manufacturing plants. This international standard's procedural, physical and process models and terminology emphasize good plant design and operating practices. For detailed information, you can request a copy of this standard by visiting the ISA web site at www.isa.org.

*Flexible, modular—
based on industry standards.*

As DeltaV is built on the S88.01 and Namur standards, you'll see the familiar standard batch hierarchy in the DeltaV Explorer. You'll also recognize the implementation of S88.01 Procedural and Physical (equipment) Models.

DeltaV Batch design benefits include:

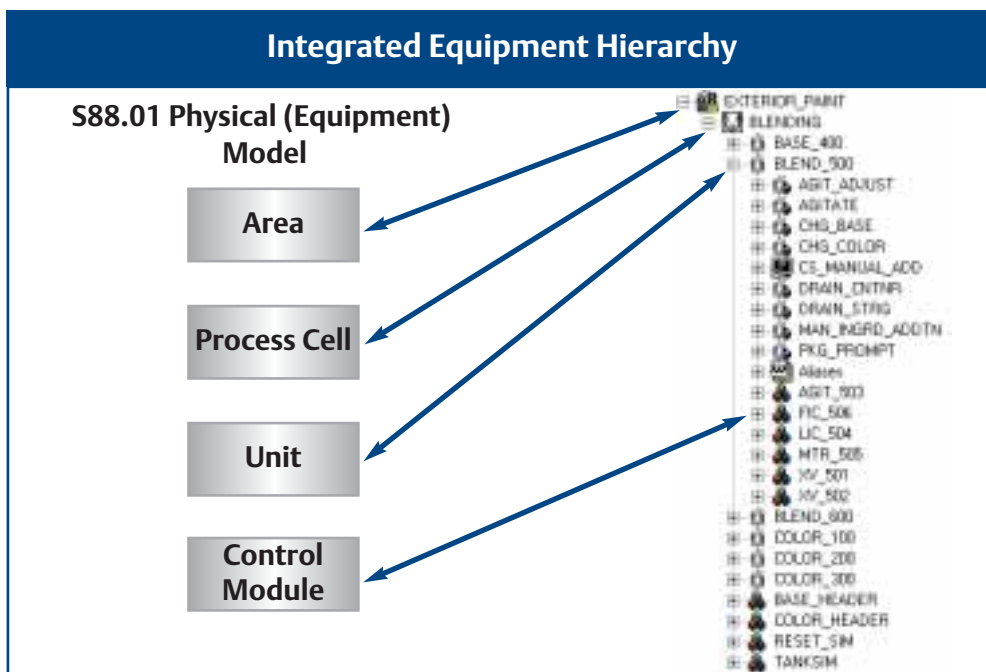
- Consistent terminology in a familiar environment, so you can quickly get up and running.
- Modular implementation for process flexibility, reusability, and Good Manufacturing Practices (GMP).
- Resource arbitration to avoid complex interlocks and bottlenecks.

Powerful system functionality—implementation is easy.



“DeltaV has built-in features that assure compliance with FDA regulations and can be interfaced with your current PLC systems. ...As a side benefit, using DeltaV with your current PLC system will provide expanded functionality in your processes.”

**—Purdue University
Department of Food Services
December 2000 INProcess Newsletter**



The S88.01 Equipment Model is directly reflected in the DeltaV Explorer.

Batch Architecture



If your process application requires complex batch processing, the DeltaV system's "built for batch" architecture is the answer. This architecture provides a comprehensive set of easy-to-use tools for designing and implementing cost-effective batch control solutions.

Unit management and batch control

Advanced Unit Management adds class-based units and phase logic used for batch processes and complex sequences in continuous and hybrid processes. With this class-based approach, you get reusable equipment control strategies—saving you time. Additionally, the state transition diagram logic built into the phase class provides you with multiple phase states, automatic state switching, and failure monitoring—all pre-engineered.

The phases and units executing in the controller support aliasing and dynamic referencing for your most demanding applications. And the phases may be orchestrated by the DeltaV recipe management and execution software, including the use of recipe parameters and history collection.

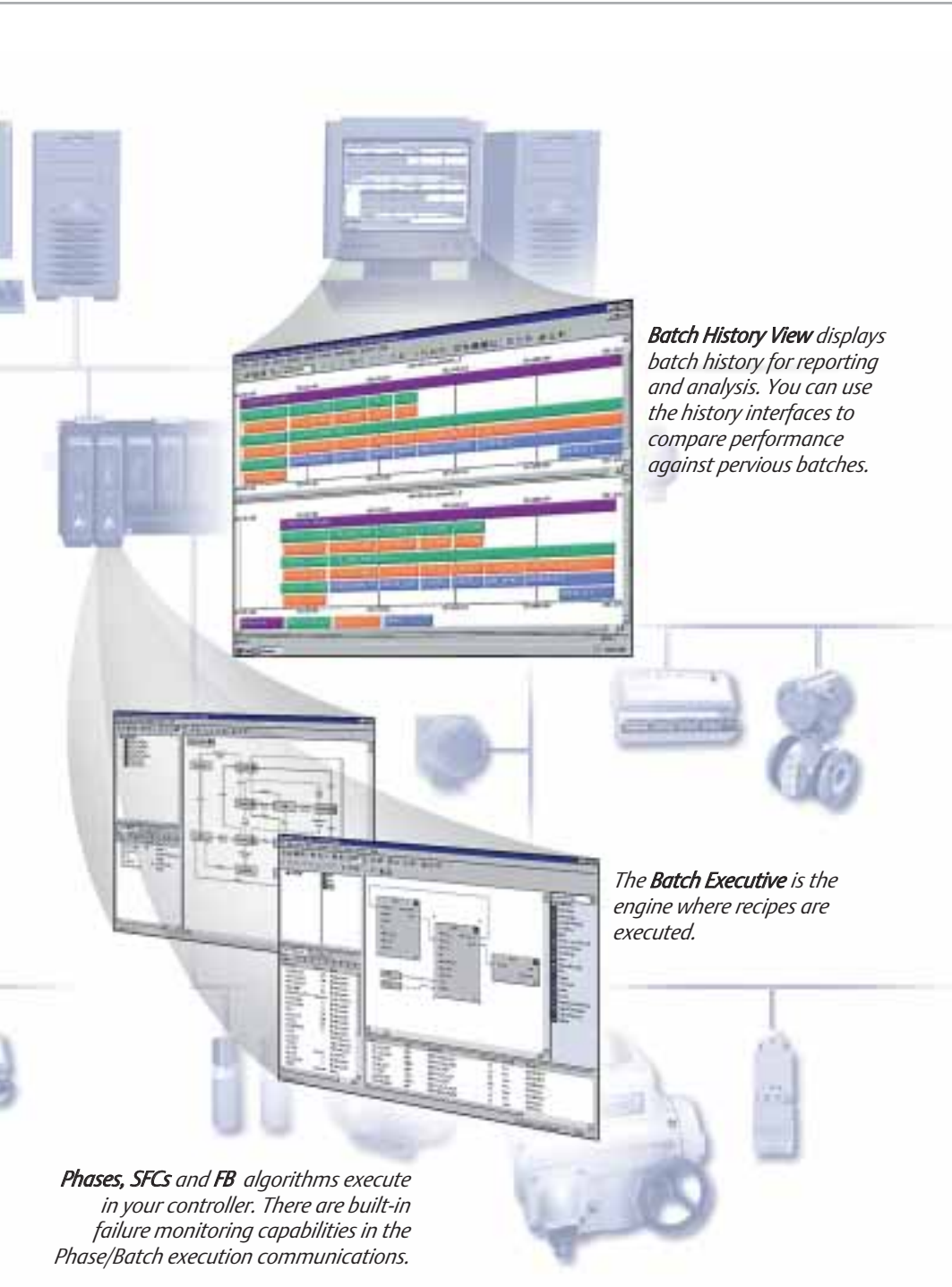
The DeltaV Batch solution has been built on the S88.01 standard, and addresses the entire scope of functionality identified in the S88.01 Control Activity model including:

- Device control
- Unit supervision and management
- Process management
- Recipe management
- Production scheduling
- Production information management.

Electronic signatures in Campaign Manager help you meet FDA 21 CFR Part 11.

The DeltaV Operator Interface with the Batch Operator Interface provides a simple yet powerful set of tools to control your batch process.

Complex batch made easy.



Batch History View displays batch history for reporting and analysis. You can use the history interfaces to compare performance against previous batches.

The Batch Executive is the engine where recipes are executed.

Phases, SFCs and FB algorithms execute in your controller. There are built-in failure monitoring capabilities in the Phase/Batch execution communications.

Built-in control strategies make configuration easy.



“Compared to ladder logic and other approaches we’ve used before, it’s much easier to configure. Any kind of control strategy you’d like is already there—it’s a 10:1 improvement in the labor involved in the control programming. And it’s fun!”

**—Rick Lucian
Los Angeles Dept. of
Water & Power,
USA
CONTROL Magazine**

Under the Hood



Offering a complete suite of products that support all components of the S88.01 Control Activity Model—no other batch solution is as well integrated as the DeltaV Batch.

Process control and unit supervision

Control and unit supervision is built into the DeltaV control hardware and software with built-in unit modules, unit phases, and control modules.

Process management

The DeltaV Batch Executive coupled with the Batch Operator Interface provide integrated process management.

Recipe management

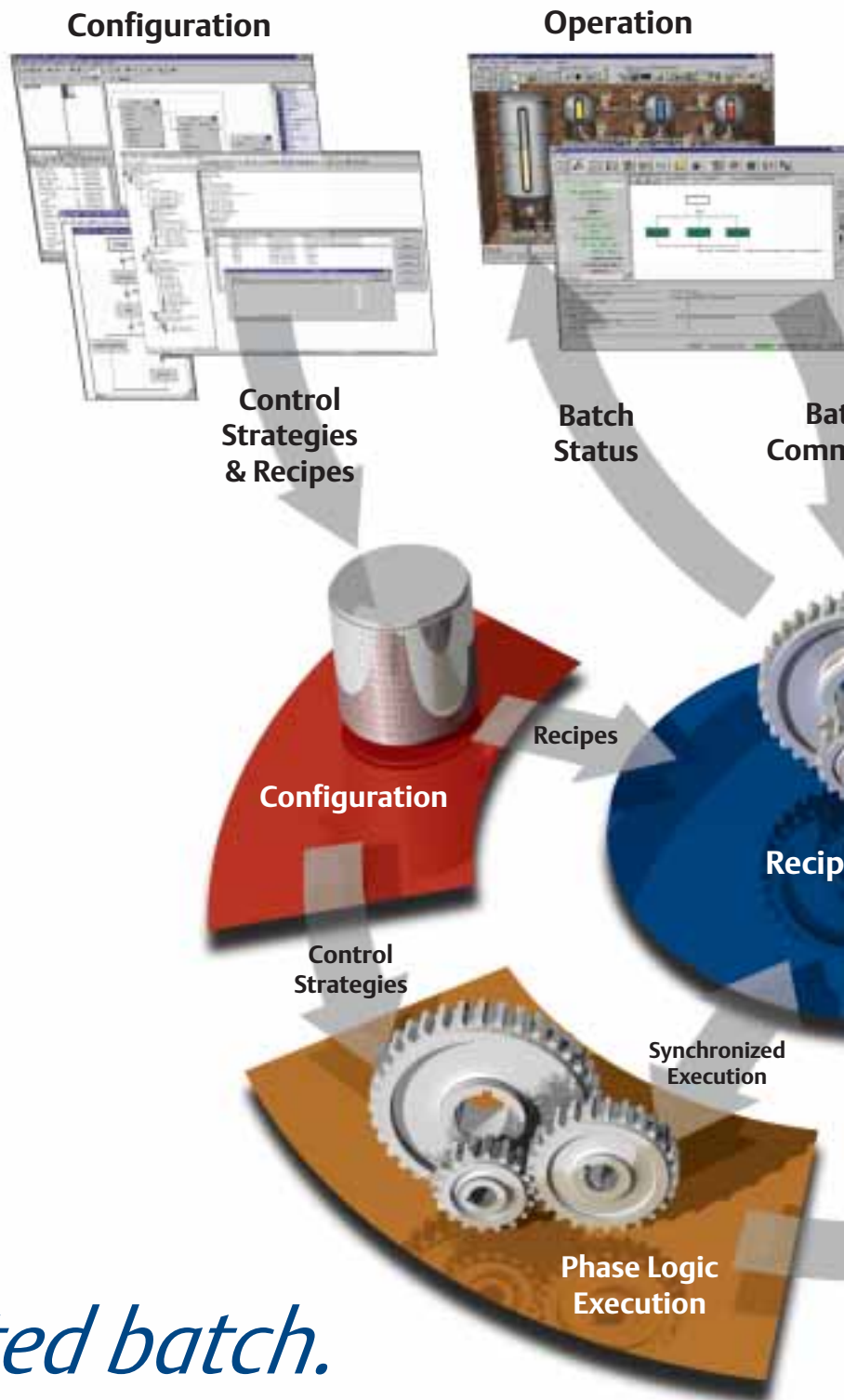
DeltaV Recipe Studio integrates recipe creation and management in the DeltaV engineering environment—easy.

Production planning and scheduling

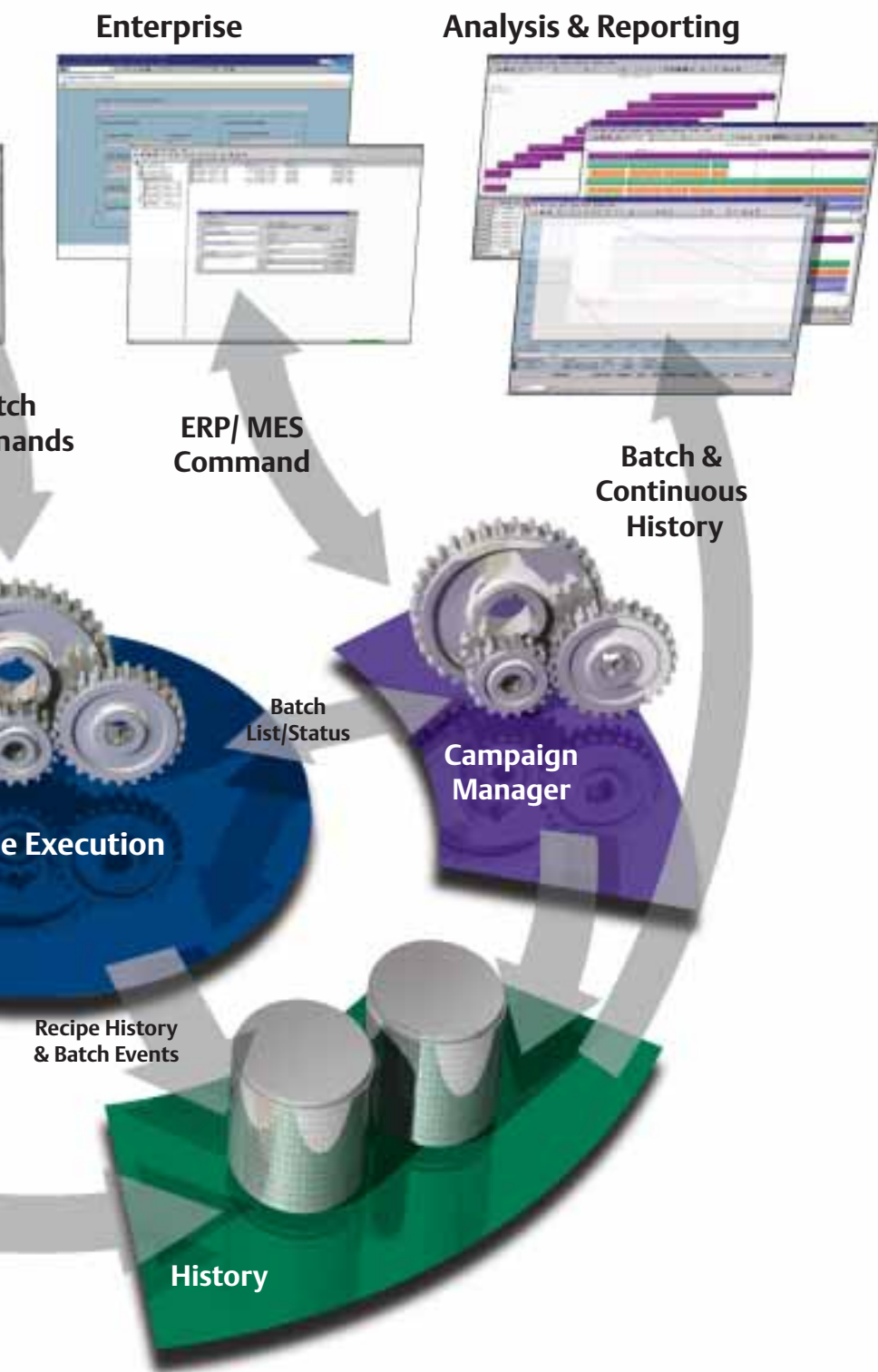
The DeltaV Campaign Manager easily integrates the creation and management of campaigns, both locally and working with production planning systems.

Production information management

The DeltaV Batch Historian integrates history collected by batch for easy analysis and record keeping.



Totally integrated batch.



Provides all elements of S88.01



“Our contract pharmaceutical manufacturing operation requires fast and frequent product changeovers. Our DeltaV system helps us easily change the control and information collection required for those products.”

**—James Yarger
Cedarburg Pharmaceuticals, LLC**

Engineering



Intuitive configuration environment

With DeltaV Batch software you have a totally integrated batch configuration environment. You benefit from easy-to-use, self-revealing software tools based on Microsoft's User Interface standards.

All your recipes, phases and units are configured using a state-of-the-art, drag-and-drop, intuitive user interface.

Behind the scenes with smart software

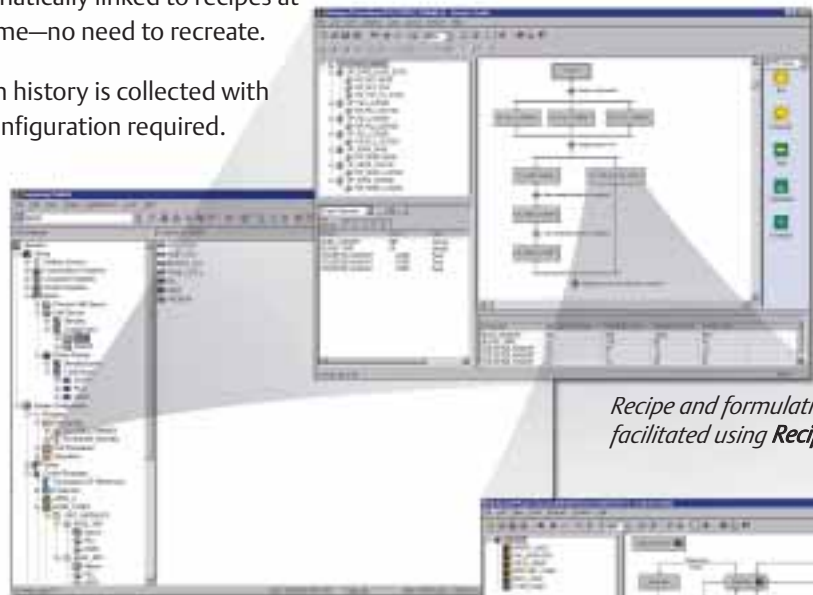
With DeltaV Batch, no-value engineering is eliminated—there is:

- Data entered once—all aspects of configuration are combined into one suite of tools and all data into one common global database.
- Communication between recipes executed in the Batch Executive and controllers is automatic—data mapping between recipe phases and controller code is eliminated.
- Moving data between recipes and controllers occurs automatically.

- State Transition diagram is embedded in the Phase Class—no need to build it yourself.
- Phases can be executed on multiple units without duplicating phase logic.
- Reusable batch objects are automatically linked to recipes at runtime—no need to recreate.
- Batch history is collected with no configuration required.

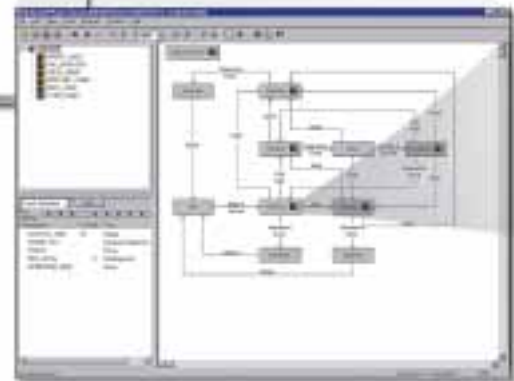
- Campaign manager browses existing batch configuration without additional setup.

Mapping data and long hours of configuration are a thing of the past. Smart software allows you to run your process—easily.



*Recipes, phases, equipment definitions and control strategies are all located readily in the **DeltaV Explorer**.*

*Recipe and formulation entry is facilitated using **Recipe Studio**.*



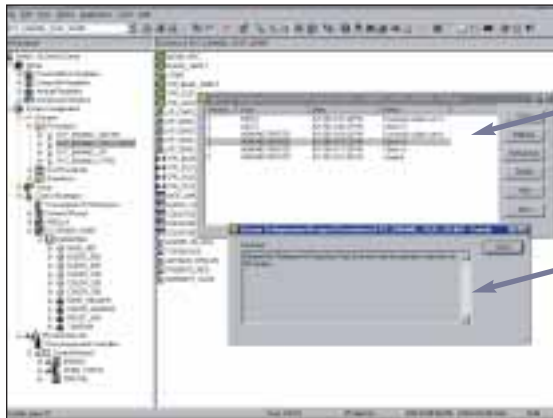
Built-in state transition diagrams reduce your engineering effort.

Intuitive software—easy.

Configuration Audit Trail

To help you meet your regulatory compliance requirements, such as the U.S. FDA's 21 CFR Part 11, as well as ISO 900 and OSHA, the DeltaV system completely integrates change management into your process automation. Now your engineering efforts are chronicled and saved as part of the DeltaV Configuration Audit Trail. This audit trail provides

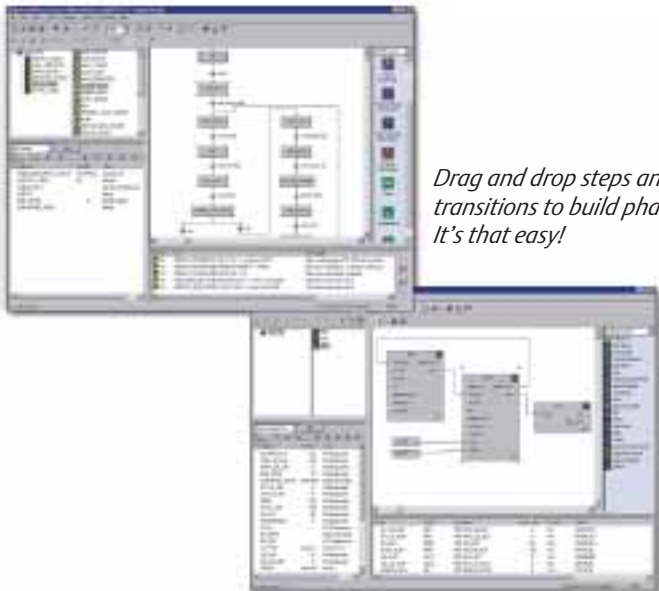
you with a complete version-to-version comparison—not just the who, when, where, and why of the change, but most importantly—the what!



Item History

Check-in Comment

Configuration Audit Trail provides a comprehensive change history.



Drag and drop steps and transitions to build phases. It's that easy!

*Control modules are implemented through **Control Studio** and function block diagrams.*

Changing the way you run your plant.



“With DeltaV Batch, recipes and phase logic are not only easy to configure, but easy to troubleshoot. I can view phase modules in realtime, determine when and where problems are, fix them, and view the changes in minutes.”

Keith Bellville
Texas Eastman Division of Eastman Chemical Company, USA

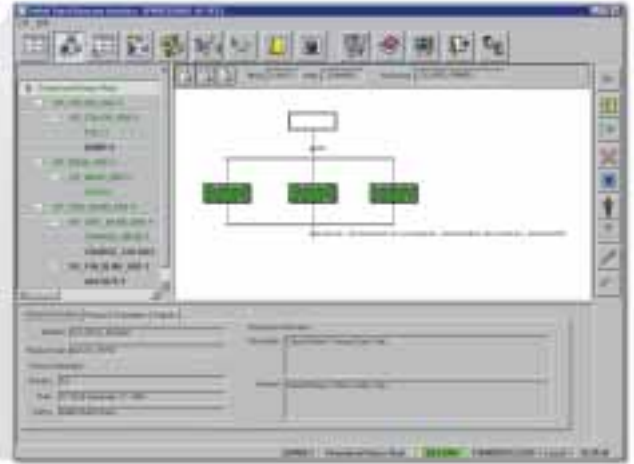
Operations



Powerful, intuitive Batch Operator Interface

With the Batch Operator Interface application you can easily perform scheduling and detailed batch management activities. Multiple views are available, providing a quick means for the operator to manage and interact with batches.

Standard pop-up faceplates are also provided, allowing operators to manually control individual phases.

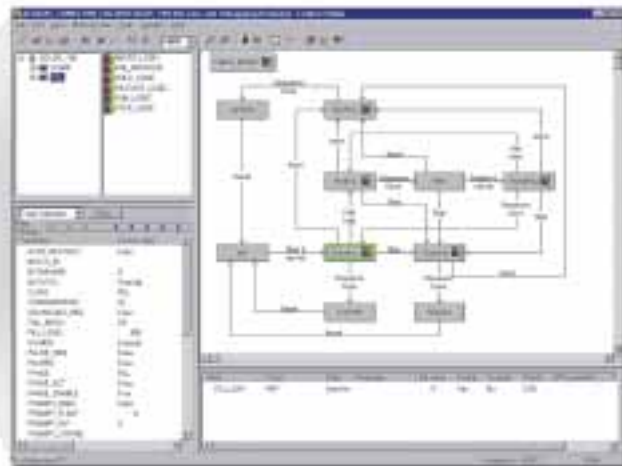


*Manage all your batches using the powerful **Batch Operator Interface**.*



From the pre-configured views, operators can view batch messages, respond to prompts and enter specific comments, as well as stop, start, pause, and abort executing recipes.

Operators have access to alarms, historical trending and event summary displays, and are notified of pending batch alarms and prompts.



*For power users, unit phase can be monitored even more closely using the run-time of **Control Studio**.*

Powerful operator interface.

Simulated recipes

With DeltaV Batch you can simulate recipe execution once the graphical layout is completed. Operator training can be conducted so you can go on-line with fewer upsets or loss of production.

Electronic Operator Log

Traditionally your operators have kept paper-based, clipboard logs to track issues associated with running batches. From the Batch Operator Interface, electronic operator logs are automated:

- Comments entered on-the-fly.
- Viewable by all, with sufficient privilege.
- Automatically collected with batch history.



Electronic Operator Log provides a better, easier way to view operator comments.



Verifier Confirmer

Electronic Signatures

To meet your regulatory compliance efforts like the FDA's 21 CFR Part 11, OSHA, and ISO 9000, DeltaV Batch incorporates action confirm/verify via electronic signatures from the Batch Operator Interface and Campaign Manager.

Any and all actions undertaken can be set up to require a user name and password to execute, and an additional verifier user name and password if required.

Meet regulatory compliance with electronic operator log and electronic signatures.



“Let's give credit where credit's due: Emerson Process Management or subsidiaries won in the most categories this year, 21, including the coveted process control system category.”

—By Dave Fusaro
Executive Editor
CONTROL, Jan. 2002

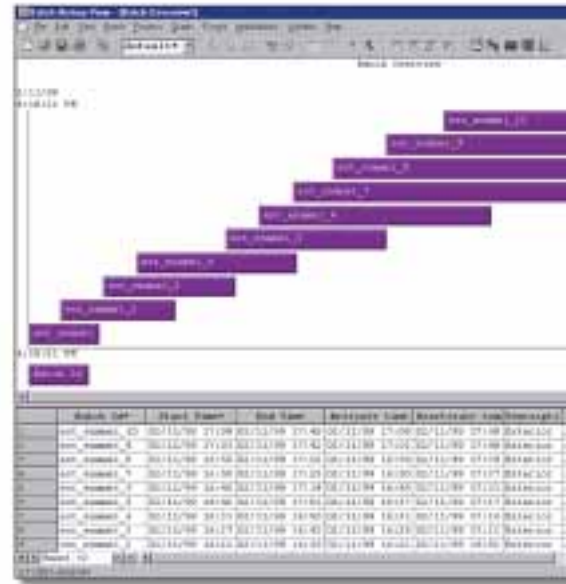
Batch History



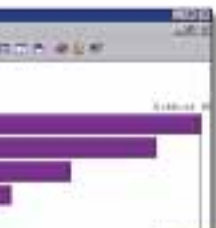
Using electronic batch records?

The DeltaV Batch Historian provides you with all of the key elements you need to easily capture, store and view batch historical data. With the Batch Historian you'll get:

- Non-intrusive data collection: data is collected and stored automatically without the use of embedded data collection requests in your phases or recipes.
- Easy-to-use tools: Batch History View displays batch data in an intuitive, graphical environment.
- Tight integration: Process alarms, events and trends can be accessed on a batch basis.
- Reliable data storage: A built-in buffering mechanism allows batch history to be collected even in the event that the Batch Historian is temporarily taken off-line.
- Open flow of data: Data can easily be read into other 3rd-party packages using a standard ODBC interface.
- Batch reporting & analysis: Out-of-the-box batch reports and query tools can be used as is or customized to suit your specific needs.
- Database management: Archiving batch-related data is safe and easy using the Batch Historian Administration Client, and the built-in cataloging feature makes finding and restoring data simple.



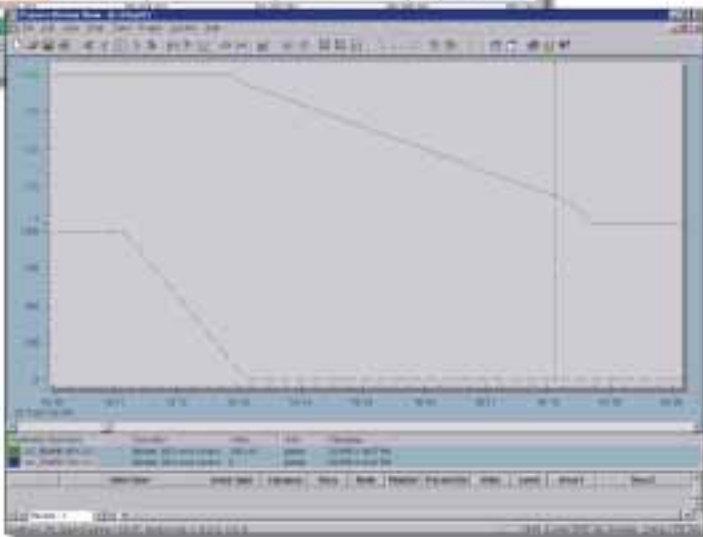
Totally integrated history—easy.



The **Batch Overview Chart** provides a quick and effective method to drill down to details of your batches. You can quickly identify issues or compare current batches with best batches.



Recipe execution details are available at the touch of a button. The **Batch Detail Chart** and **Batch Comparison Chart** provide an extremely easy-to-use comparison mechanism for viewing a single recipe's execution or doing a comparison between batches.



Historical Data Analysis capabilities include the ability to display continuously trended data for different batches on the same chart, facilitating comparison of trend profiles.

Remote operations —easy.



“The DeltaV Batch Historian makes it easy to track batch data because it automatically collects batch event data with no additional configuration.”

—Michael Boudreaux
Akzo Nobel Chemicals, Inc.
USA

Enterprise Optimization



Integrated batch history, embedded security, complete change management and control. These are the foundations for executing your e-business strategy and easily integrating your batch process with your enterprise systems. The DeltaV system can integrate with your scheduling, planning, and quality systems as easily as it integrates with existing legacy automation systems like PLCs and DCSs.



Soft phase integration

Running an efficient plant requires integration beyond the planning and scheduling systems. You need to

easily connect your laboratory systems (LIMS), quality, materials handling, and inventory systems, without using the paper and number of people it requires today.

being tied to the bar code readers and weigh scales. You can develop phases to address manual processing steps like adding raw materials, checking inventory levels, and checking materials expiration dates required for production of the batch.



Soft phases run in the workstation, making integration easy.

DeltaV Batch supports this integration through the use of soft phases; i.e. phases that run in a PC-based workstation, the same workstation that may have these software packages, as well as

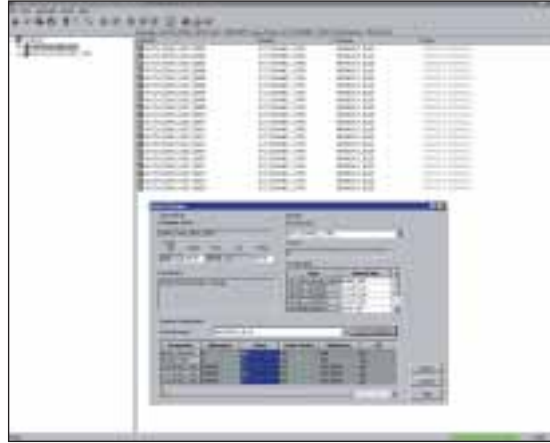
By integrating these manual operations into your batch production, you can take advantage of DeltaV Batch security verification, engineering audit trail, and complete history collection. This means more efficient operations and streamlined regulatory compliance.

Execute production campaigns, streamline engineering—easy.

Campaign Manager

The DeltaV Campaign Manager gives you an easy mechanism for executing production campaigns. There is no additional configuration required to streamline your engineering. Campaign Manager links directly with the Batch Executive to provide all the existing recipe information, equipment selection options, and available formulas and formula parameters, as well as security integration for your confirm and verify operational requirements.

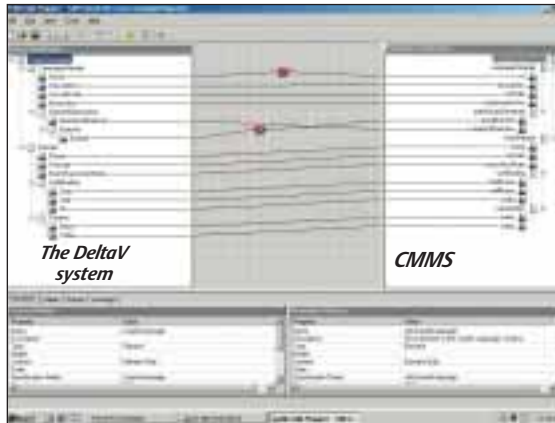
Sometimes changing production requirements or equipment problems can dictate the need to modify your campaign. With DeltaV



Batch existing campaigns can be easily edited to change formulas and equipment, based upon order changes or any processing equipment issues. You can even add or remove batches from the campaign for maximum flexibility.

Enterprise-based campaign management

For complete integration with your planning and scheduling systems such as SAP's R/3 and Oracle, the DeltaV Campaign Manager provides easy, integration methods via XML and ActiveX technologies. Now you can fully plan and schedule your campaigns to meet your customers' requirements, with much greater efficiency.



Microsoft Biztalk maps production requests from SAP to DeltaV Campaign Manager.

The right information
—when and where it's needed.



“Our quality has improved, customer satisfaction has increased, our machine breaks have been significantly reduced, and startup time was reduced 25%.”

—Rich Hatton
Abitibi Consolidated

We Are Emerson



Performance improvement is the primary objective of process management.

Creating greater potential for shareholders, customers and employees is the key. How best to do it is the question. And more than ever before Emerson is the answer. Our Performance Solutions division consolidates the expertise of more than 20 worldwide process improvement leaders—names like Fisher, Rosemount, Micro Motion and more—into a powerful, single source of experts focused on building productive risk/reward partnerships with clients in the power, pulp & paper, oil & gas, chemical, pharmaceutical, and food & beverage industries. Working together, we help companies achieve higher quality, greater reliability and faster time to market, while steadily advancing productivity and profitability. Time and again, we deliver proven performance improvement solutions.

Automation and integration expertise

Automation and instrumentation form the central nervous system of your plant or process. It's essential that all the components of this

system work together to help you achieve greater performance, reliability and return. Day after day. Year after year.

Emerson is at the leading edge of this movement. Through internal development and acquisition, we have created a broad, process improvement enterprise that incorporates many of the most respected product, service and engineering names in the business.

For a more detailed look at our capabilities visit: www.emersonperformancesolutions.com.

Pharmaceutical expertise

Our pharmaceutical specialists can help you achieve competitive advantage and hassle-free process control and validation through innovative, integrated applications and superior process management with the latest automation technologies, like the DeltaV system. And all of the world's top 24 pharmaceutical manufacturers use DeltaV Batch.

You can benefit from the experience of our global services organization implementing pharmaceutical automation projects with the



leading pharmaceutical and biotech manufacturers worldwide. Our engineers will help you plan and execute projects efficiently, climb the learning curve quickly, avoid mistakes, prepare your organization to deliver profitable results to your stockholders, and most of all reduce project risk.

Worldwide expertise in batch solutions.

Specialty chemical expertise

Because no two specialty chemical operations are alike and because your needs are unique, the last thing you need is a "standard" solution. Our solutions work because we understand the specific demands of the chemical industry. We help you solve problems and deliver projects with positive ROI.

Our experienced professionals focus on maximizing your operating efficiencies. We can work with you to retrofit a single area, renovate an existing plant, or even design and build a new operation.

We understand and use the latest technologies like DeltaV Batch, used by 18 of the 24 world's largest specialty chemical manufacturers, in your plant to improve quality, reliability, throughput and efficiency. And we can help you justify technology cost with higher returns on your investment.



Food and beverage expertise

The DeltaV system is in the world's largest brewery and is used by many leading food and beverage producers. Coupled with our consulting services, we can help you execute projects efficiently, avoid mistakes,

deliver profitable results and, most of all, reduce project risk.

We are not just suppliers to our customers, but integral partners in creating outsourced solutions for many of the challenges our customers face. This consolidated approach allows customers to draw on the enormous resources and expertise throughout our organization.



Validation expertise

Validation can be an intimidating task. To help your validation efforts go more smoothly, we offer validation training and consulting services. Our industry-recognized Systems Validation Workbook and Validation Project Planner help you execute a successful, well-organized validation project.

Optimization
and renewal
leadership.



"The Performance Solutions alliance agreement is the most successful of the twelve to fifteen key supplier agreements currently in place."

**-Michael Freytag
Bayer
USA**

Additional information about specific DeltaV products may be found in the following—

- **DeltaV System Overview** (brochure)
- **DeltaV. We Do Smart Plants** (brochure)
- **DeltaV. Interoperability** (brochure)
- **DeltaV. Precision Control** (brochure)
- **Comprehensive set of product data sheets**
- **Interactive demo CD**
- **Product information CD**
- **Customer Case Studies video CDs and DVD**

To locate an Emerson Process Management representative or sales office near you, or to receive any of the aforementioned brochures and cds, visit our website at:

www.EasyDeltaV.com, or call us at:

Asia Pacific: 65.777.8211
Europe: 31.70.4136.666
Latin America: 512-832-3800
North America: 1.888.FOR.FRSI
(1.888.367.3774)



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