

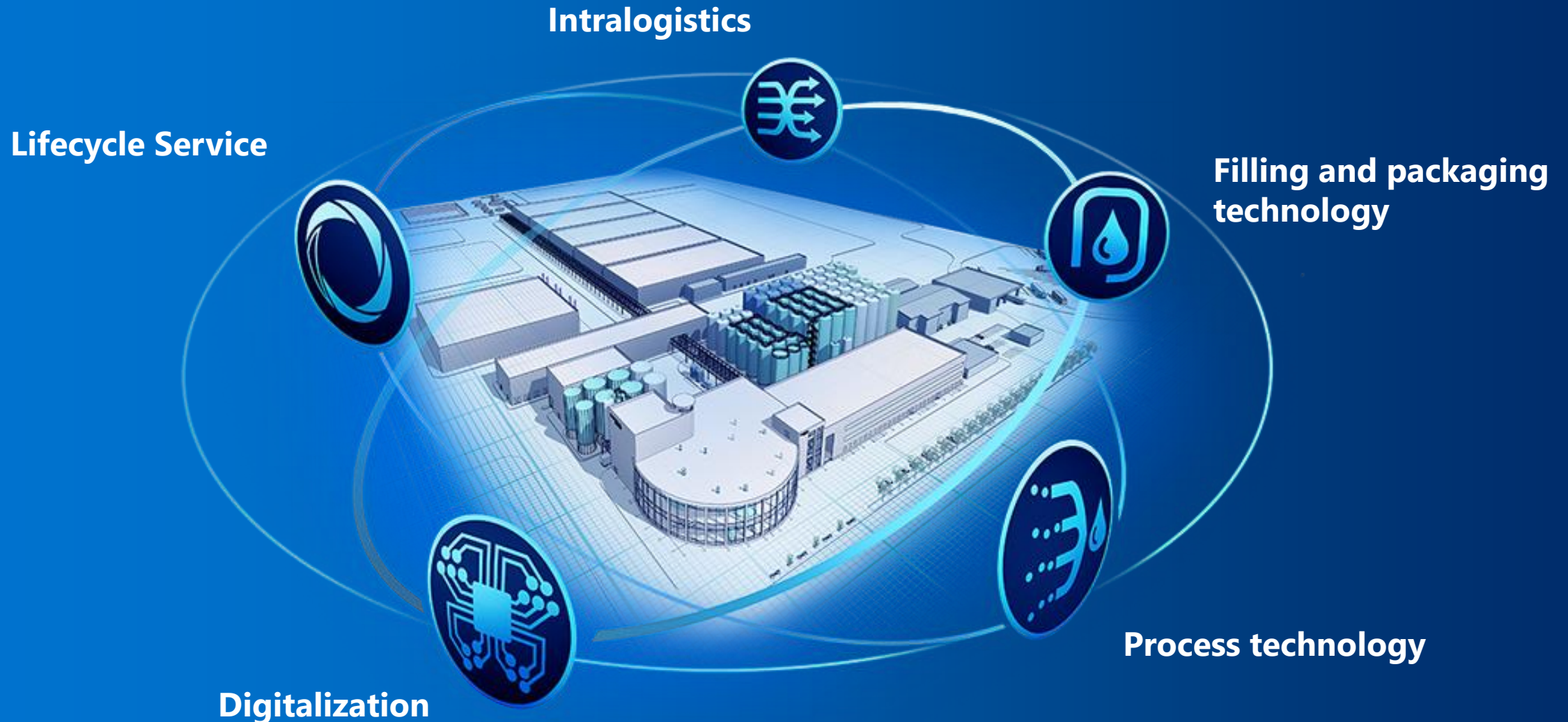


Krones Process Group North America

Company Overview

2023

Global Portfolio – Krones Solutions



What Sets Us Apart – Global Footprint



A global network covering every region of the world.

- More than 5,300 employees in the global service team
- Prompt spare-parts supply
- Lifecycle Service for an entire line
- Digitalized support solutions and connectivity
- Immediate support



Where We Work – Global Footprint



17,200

Experts

24

Production sites

48

Engineering sites

58

Further subsidiaries
and representative
offices

15

Centers

Krones Processing Worldwide



The Krones Group knows process technology. We understand each product has its own unique needs, and we offer tailored solutions from a single source no matter your location.



At a glance:

- Comprehensive support and individual engineering from our experts in a wide variety of product lines
- Process solutions and lifecycle service
- Engineering Hubs: 10
- Employees: > 1,000

Krones Process Group North America



The Krones Process Group North America provides sanitary process system expertise backed by the global depth and experience of Krones. We serve the *Beverage, Food, Dairy, Home/Personal Care, and Pharmaceutical industries.*

Process Solutions

- Process Engineering | Engineering Consulting | Project Management

Automation

- Software | Hardware | Integration

Installation

- Process Installation | Shop Fabrication

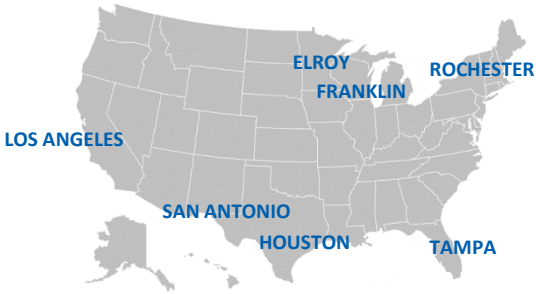
Fabrication

- Tanks | Brewhouses | Skidded Systems

Lifecycle Services

- Distribution | Maintenance & Service | Engineered Solutions

168	Combined years in business
85%	Repeat business, built on Customer Satisfaction
100+	Staff including Engineers, Technicians, Sales and Support
7	Office locations throughout the US

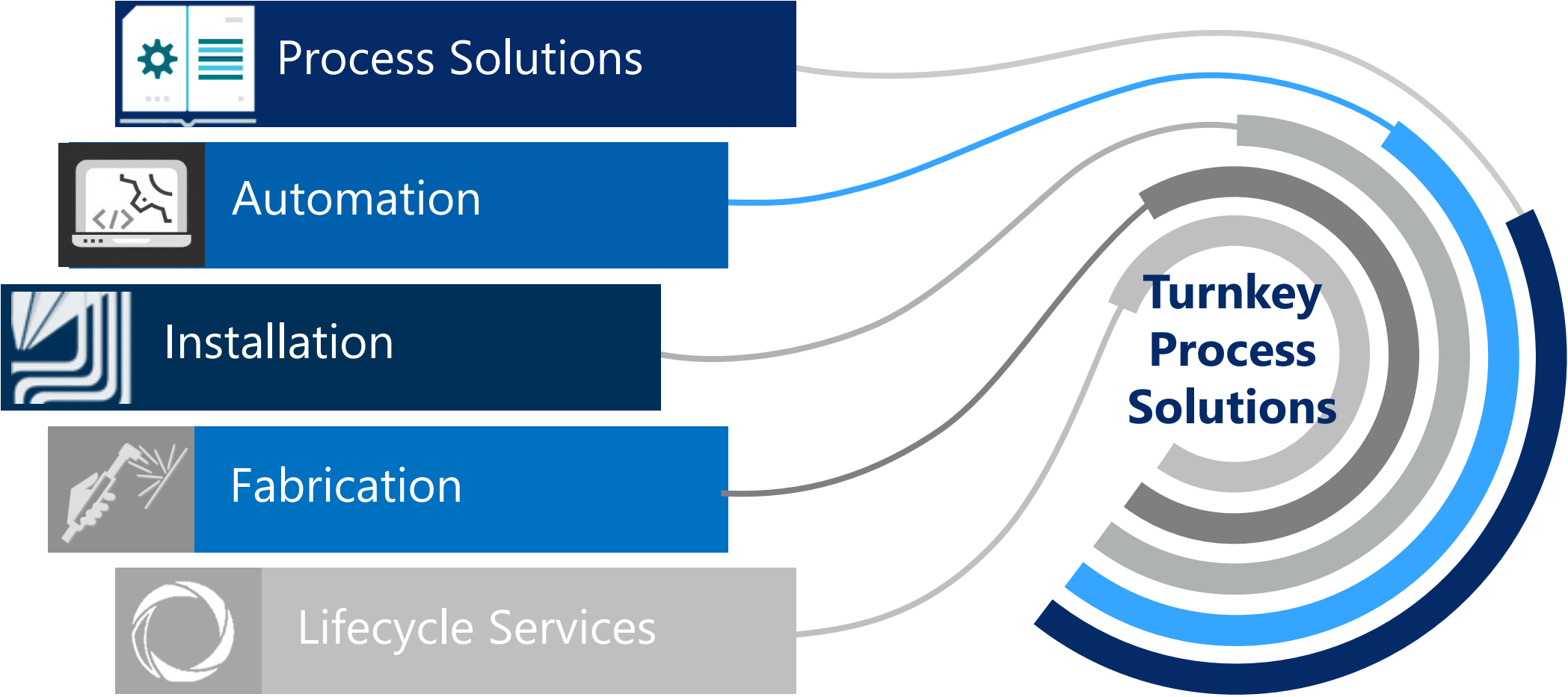


COAST TO COAST COVERAGE

Who we work for – in detail

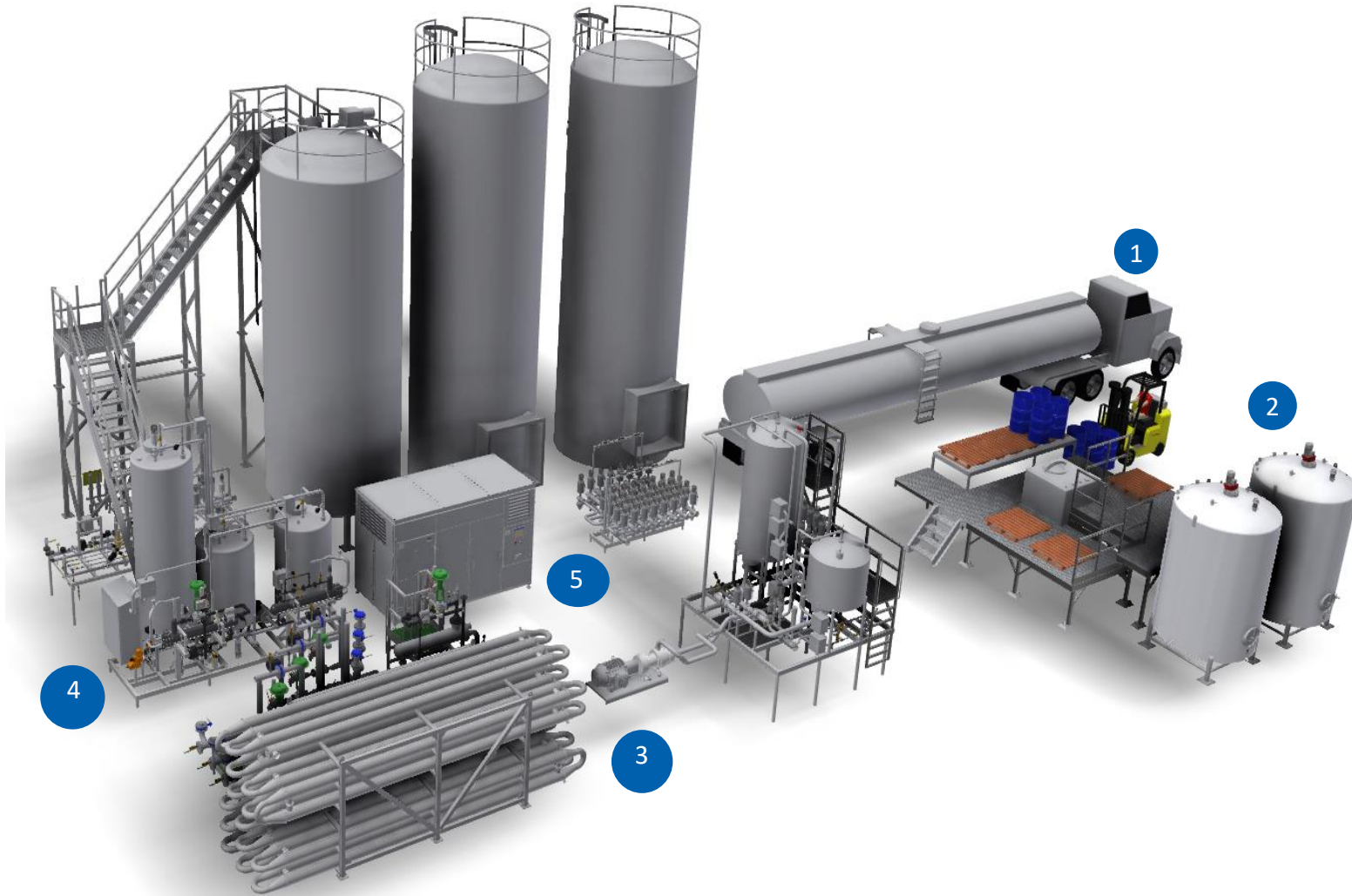


We Know Process.



Individualized Services | Combined Solutions

Comprehensive Process Solutions



1 Ingredient Handling

- Receiving bays
- Drum and tote unloading
- Dry ingredients
- Hand adds



2 Blending

- Batch blending
- In-line blending

3 Pasteurization

- Extended Shelf Life (ESL)
- High Temperature Short Time Flash pasteurization (HTST)
- Aseptic processing
- Hot Fill
- Ultra-High Temperature processing (UHT)

4 Cleaning

- Clean In Place (CIP)
- Sterilization In Place (SIP)

5 Conservation Technology

- Product recovery
- Water conservation

Solutions to Fit Customers' Needs



Design-Build

- Partnership with customers from the initial stages of design through implementation
- Single point of contact
- Saves time by overlapping the design phase with the installation phase
- We maintain our resources in-house, providing tighter control on quality, cost and time to market

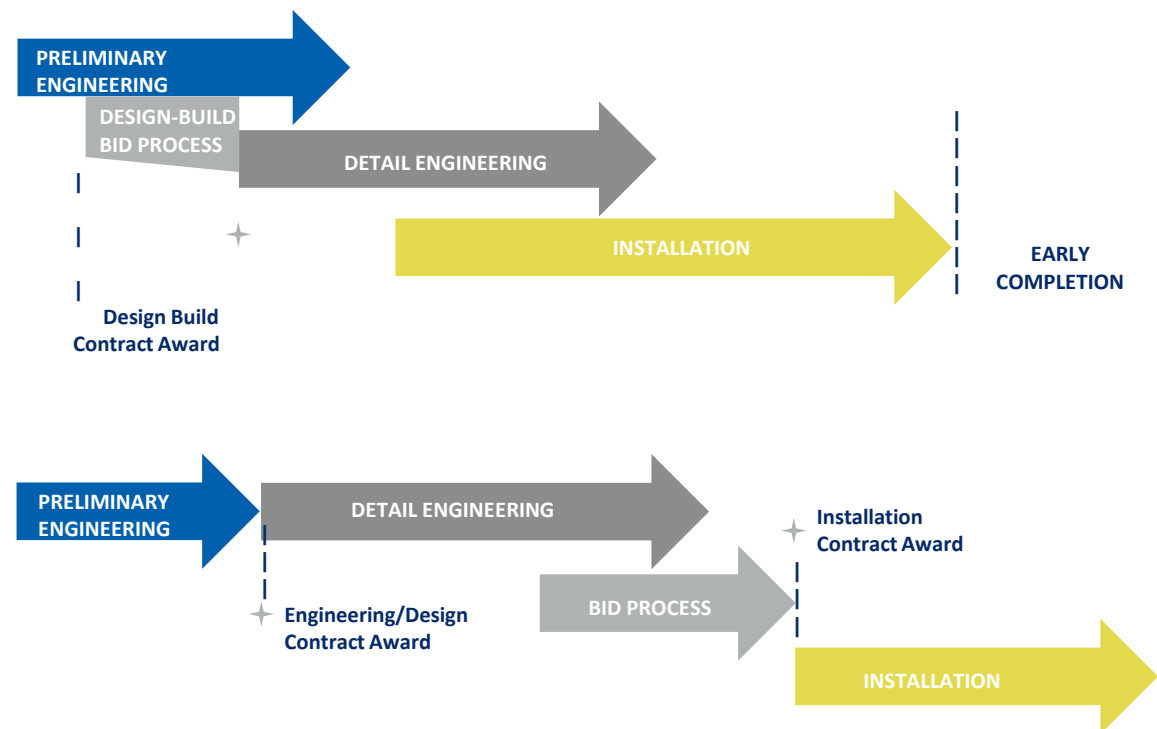
Design-Bid-Build

- Preliminary and detailed engineering packages delivering bid specifications
- Fixed price proposals based on detailed RFQ
- Complete turnkey process systems or individualized services

Time & Material

- Krones Process Group offers all our resources on a Time & Material basis
- Ideal for projects with dynamic requirements or undefined scopes
- Flexibility to modify the scope or workloads

We know all projects are unique, so we deliver solutions to fit our customer's needs.



Process Solutions – Process Engineering and Consulting



Process Engineering:

Process Design

- System design
- Fluid dynamic calculations
- Thermodynamic calculations
- Mass balances
- Utility load calculations
- Modular system design
- Equipment sizing and specification
- Procurement

Drawings

- Block Diagrams
- Process Flow Diagrams (PFD)
- Piping & Instrumentation Diagrams (P&IDs)
- Layout drawings
- AutoCAD Inventor 3D modeling
- Virtual Reality 3D

Documentation

- System documentation
- Training
- Maintenance guides

Engineering Consulting:

- Preliminary engineering
- RFQ development
- Detailed engineering
- Engineering design packages
- Cost estimates
- Budgeting and ROI calculations
- Process troubleshooting
- System optimization



Our Engineering experience is the foundation of our success.

We are proud to be active members in the organizations that lead our industries.



Process Solutions – Project Management



Certified Project Management Professionals (PMP), leading projects from initiation through closing.

Initiation

- Scope definition
- Stakeholder engagement

Planning

- Project execution planning
- Scheduling
- Risk analysis

Executing

- Site management
- Plant coordination
- Subcontractor management
- Commissioning
- Validation
- Support

Monitoring and Controlling

- Communication
- Project dashboard
- Quality control
- Change management
- Cost controls

Closing

- Quality checklist
- Documentation
- Training

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Process Solutions - Drawings



Block Diagrams

- High level diagrams showing the process functions and concepts
- Utilized as a starting point for preliminary design options

Process Flow Diagrams (PFD)

- Easy to read representation of the general flow and processes
- Identifies major equipment and process functionality

Piping & Instrumentation Diagrams (P&IDs)

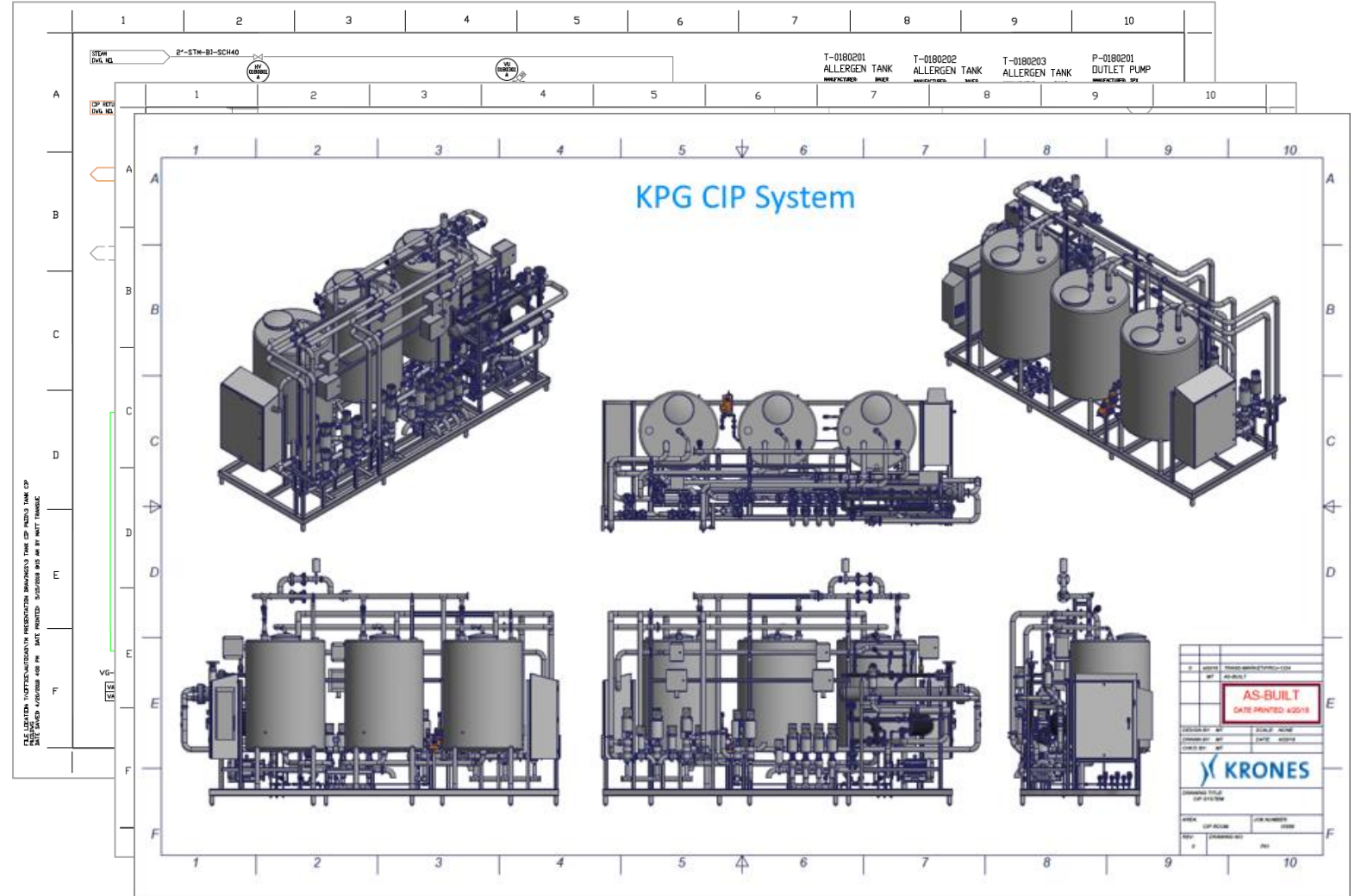
- Detailed P&ID's following ISA standards
- Preliminary, For Construction and As Built revisions utilized during project implementation

Layout Drawings

- Scaled plan view layout drawing of process equipment
- Integrated into facility architectural plans

AutoCAD Inventor 3-D modeling

- Detailed 3-D drawings for design reviews and approvals
- Designs generate shop drawings used for cut sheets, material take-offs and fabrication



Process Solutions – Virtual “Walk Through”



Virtual Reality 3D

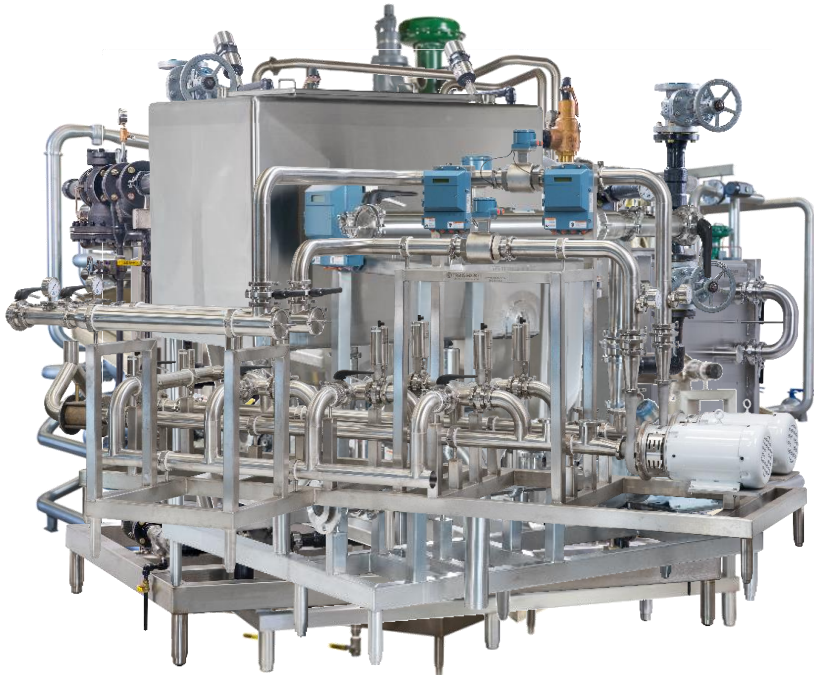
- Immersive virtual reality experience
- Visualize the solution, see it before it's built
- Improved feedback from all stakeholders
- Approve designs with confidence
- Avoid changes and construction delays
- No technical expertise required
- Provided in multiple formats
 - Video walk through tour
 - Browser-based room viewer
 - VR with Oculus Rift



Process Solutions – Modular Systems

Modular designs offerings:

- Shop assembly
- Quality control
- Expedited schedule
- Reduced installation labor travel costs
- Reduced downtimes and installation time
- Minimize impact to plant operations
- Factory Acceptance Testing (FAT)



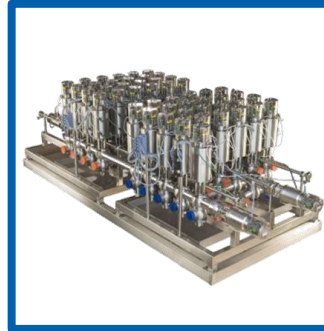
HTST Pasteurizer with glycol
and hot water utility support
skid



Balance Tanks for
Hot Fill Process System



Holding loop and flow plate
for variable speed
pasteurizer



Mix proof valve group
with support structure
and drain pan



Outlet skid assembly for
4-Tank 2-Circuit CIP Unit



Utility sanitizer skid



Chemical dosing skid



Heat exchanger skid
for 2-Circuit CIP Unit



Hot Water Set for
Pasteurizer

Process Solutions – Additional Offerings & Capabilities



Krones Process Technology



Components

- Evoguard valves
- Evoguard pumps
- Ampco pumps & mixers
- HST homogenizers
- Tubular heat exchangers



Tanks

- Manufactured by Krones



Units

- Thermal product treatment
- Water treatment system
- Inline Mixers
- CIP systems


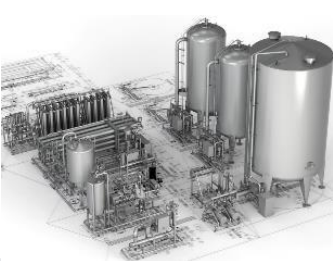





Systems Engineering

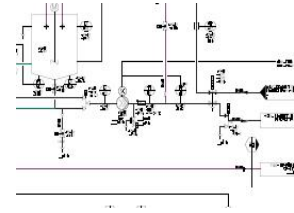
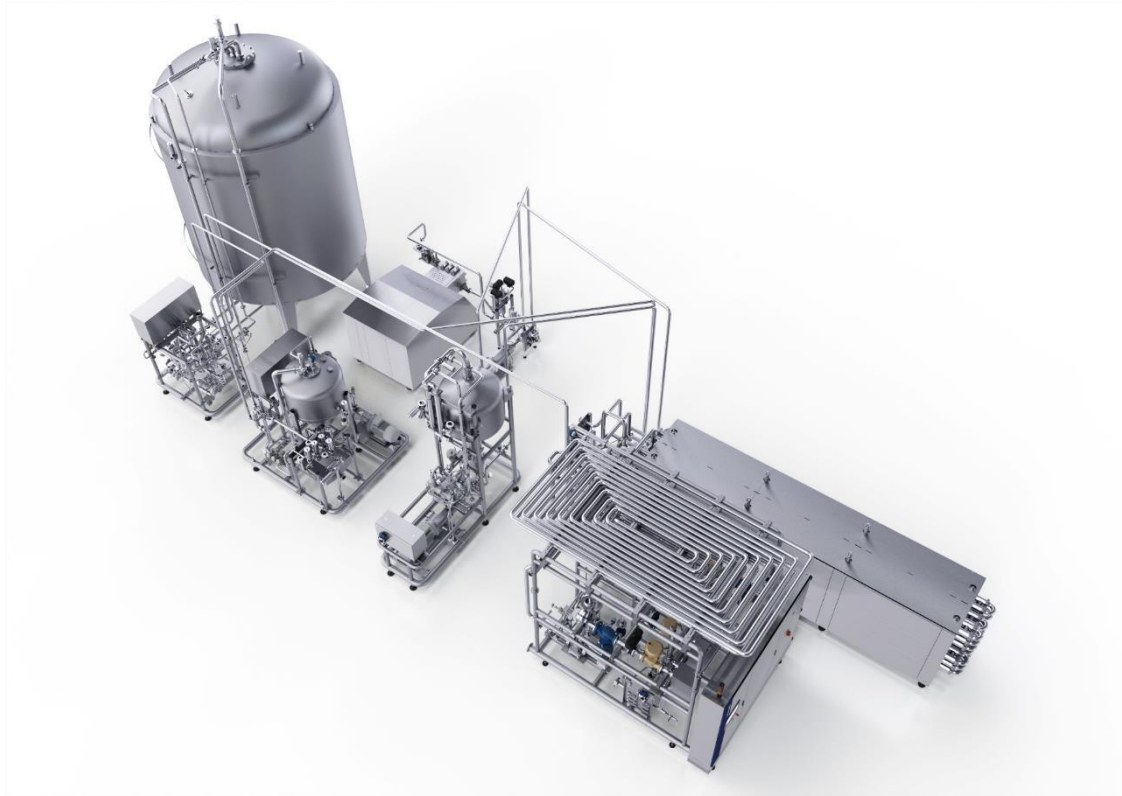
- Sugar dissolvers
- Mixing systems
- Raw material handling
- Powder dissolvers
- Concentrate dissolvers
- Retrofits

Units & Components



Components	Water	Thermal Product Treatment	Continuous Blending & Carbonization	CIP Filtration
				
<p>Valves by Evoguard</p> <p>Pumps by Evoguard and Ampco</p> <p>Homogenizers by HST</p> <p>Tubular Heat Exchangers by Krones</p>	<p>Hydronomic</p> <p>MediaFiltration (MF) UltraFiltration (UF) ReverseOsmosis (RO) Softener</p> <p>UV / ozone / chlorine dioxide treatment</p>	<p>VarioFlash B / J flash pasteurizer Beer / Juice</p> <p>VarioFlash H hotfill flash pasteurizer</p> <p>VarioAsept J / M aseptic pasteurizer Juice / Milk</p> <p>VarioAsept D Direct steam injection pasteurizer Dairy / Plant Based</p>	<p>Contiflow deaeration, blending and carbonization incl. add-on systems</p> <p>Modulfill VFS-M Hybrid Solutions (Mixer & Filler)</p>	<p>VarioClean CIP system</p> <p>UniPure Wine / Water Filtration</p>

Processing Units: In-house Production



Mech./electr. Engineering
Software description & PID
Krones Neutraubling



Software & SNAT
HMI & control cabinet / MCC
Krones Neutraubling



Pumps & valves
Krones Evoguard, Nittenau



Pipework (pipe bending
center) complete assembly &
FAT **Krones Neutraubling**



Tanks & vessels / incl. complete design
Krones Freising
or certified suppliers (design by Krones)

Krones Process Technology Center – Neutrabling, Germany

process-technology.center@krones.com



Possible procedures

- Product mixing
- Indirect heating HTST or UHT (tube)
- Direct heating steam-injection UHT
- Direct heating steam-infusion UHT
- Flash-cooler
- Homogenizing
- Deaeration
- Filling

Included services

- KickOff-Meeting (remote)
- Process engineer / Food technologist for running the pilot plant
- Carrying test production and filling
- As required: Rheology
- Final report

Optional services

- Provision of raw materials if these are not provided by the customer
- FlavorSpec Gas-Chromatograph
- Particle analysis
- Disposal of raw-materials or unused product
- Remote Services



The pilot plant facilities are used for the provision of technical product samples for analysis only.

Conservation Technology



Product Recovery

- Our Conservation Technology utilizes a Fluivac Air Module to deliver a high volume of air at low pressure to effectively **recover up to 99% of product from pipelines.**

Hybrid CIP

- The same air supply, combined with a low flow of water injected into the air stream, provides impingement cleaning to effectively rinse pipelines. This rinse can replace the CIP pre rinse and post rinse steps to achieve **up 85% reduction in CIP water usage.**

Benefits:

- Recovery of up to 99% of product from pipelines
- Purge thru pumps, valves, heat exchangers & instruments
- Increase product yield and plant efficiency
 - Reduces waste to drain
 - Pre-production line evacuation
 - Reduces spills at divert panels
 - Reduce COD (Chemical Oxygen Demand)
 - Reduce water usage
 - Drying pipelines after rinses
 - Eliminating interface loses



Automation



KRONES Group



Software

- **Programming**
 - PLC Programming
 - HMI Programming
 - Recipe-Based Blending Systems
- **Data Analysis**
 - Data Collection and Trending
 - Relational Database Systems
 - Reporting
 - Predictive Maintenance
- **IT/Networking**
 - Enterprise and Industrial Networks
 - Server Virtualization
- **Technology Upgrades**
 - Migrate and convert obsolete automation platforms
- **Custom Software Development**
 - Recipe, Batching, Lot Tracing, Reporting, RFID



Hardware

- **Electrical Design**
 - Network Architectures
 - Power Distribution
 - Control Panels
 - Motor Controls
 - Instrumentation Specification
- **Control Panels**
 - UL508A Control Panels
- **Field Electric**
 - Wiring terminations
 - Instrumentation configuration
 - Troubleshooting



Integration

- **Documentation**
 - Description of Operations
 - Functional Design Specifications
 - Operator Manuals
- **Validation**
 - Factory Acceptance Testing (FAT)
 - Site Acceptance Testing (SAT)
- **Commissioning**
 - I/O Check
 - Startup
 - Qualification
- **Training**
 - Classroom simulator-based training
 - Hands-on training for Operations and Maintenance
- **Support**
 - 24/7 Support

Installation



- Complete plant installation & integration
- Extensive large-scale process piping installation experience

All of our installations meet or exceed the highest regulations and sanitary standards.



Process Installation

- Process Piping
 - Orbital welding
 - Sanitary piping
 - Utility piping
- Structural Installation
 - Piping supports and hangers
 - Platforms, ladders and railing
 - Equipment delivery, rigging and setting
- Installation Management
 - Dedicated Installation Managers
 - Coordinating plant communications, installation activities, subcontractors, and schedule



Shop Fabrication

- Shop Fabrication
 - 50,000+ sq ft. of indoor facilities
 - High clearance ceilings with overhead cranes
 - Dock-high loading
 - Controlled environment allows for high quality and expedited project schedules



Quality & Documentation

- Quality
 - Qualified welders
 - Material certifications
- Documentation
 - Sanitary piping and fitting documentation
 - Borescope inspections
 - Validation support

Fabrication – Processing Tanks



Tank Manufacturing Capabilities

Heat Transfer Surfaces

- Multiple zone configurations
- Welded dimple heat transfer surfaces
- Steam rating: 15 PSI@250°F
- Cool rating: 50 PSI@100°F

Agitation

- All-welded CIP-able design
- Bottom and/or side sweeps
- Scraped surface with removable nylon blades
- Blending Turbines
- Nylon split-seal design

Standard Options

- Custom designs available, including 3A, PMO, ASME and UL
- Load cell plates
- Safety ladders and platforms
- Insulated
- Thermowell (recording or indication wells)
- Gasketed/non-gasketed manways



Balance Tank



Blend Tank and Platform



Mix Tank



Holding Tank



Cone Bottom Jacket
Process Tank



COP Tank

Fabrication – Processing Tanks

Tank Manufacturing Capabilities

Agitation

- All-welded CIP-able design
- Bottom and/or side sweeps
- Scraped surface with removable nylon blades
- Blending Turbines
- Nylon split-seal design
- Bottom-mounted agitators for high shear

Gear Box & Motors

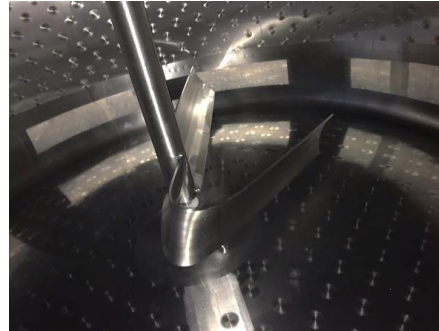
- Stainless steel for wash-down duty
- Painted if preferred
- Nord or vendor specified brand



Side Scraper



Mix Tank



Impeller



High Speed Blend Agitator



Side/Bottom Scraper



Helical Mixer



Fabrication – Platforms and Rails



Platform & Rail Capabilities

Stainless Steel Accessories for our Process Systems

- Custom designs available
- Safety ladders
- Stainless steel platforms
- Stairs and handrails
- Mezzanines and catwalks
- Designed to meet your specific requirements and OSHA specifications



Dairy Platform



CIP Platform



Brewhouse Platform – Top



Brewhouse Platform - Side



Stairs & Rails



Blend Tank & Platform

Brewing Systems

KPG Brewhouse Lines

Solutions for the North American Brewer

Brewers now have affordable options for every stage of growth in one trusted, quality brewing partner. Whether you're a small operation just starting out or a large, well established brewing operation, we have a brewhouse designed to meet your needs.

Don't need an entire brewhouse? We customize solutions and vessels to supplement your current Brewhouse:

- Yeast Handling
- Dry Hop Skids
- Cellar Tanks
- CIP Solutions



SPRINKMAN

Ideal for small to mid-size, growing breweries. For the entrepreneurial brewer, Sprinkman brewhouses allow you the flexibility to brew a wide range of innovative beer styles. The standard and customized layouts are available in 10 to 60 bbl batch sizes, comprised of two to six vessels. Sprinkman brewhouses are designed and built-in the USA for high efficiencies, productivity and durability. This translates to higher volumes of quality beer being produced, adding to your bottom line.

- Layout can be customized to maximize floor space
- Manual to full automation



STEINECKER

Ideal for large batch, production breweries. The gold standard of Krones offerings, Steinecker brewhouses are engineered, designed and manufactured in Germany to brew some of the finest beers possible.

Designed for large production breweries, these completely customizable, innovative systems can produce 60,000 bbl or more annually, with a focus on consistent quality and efficiency.

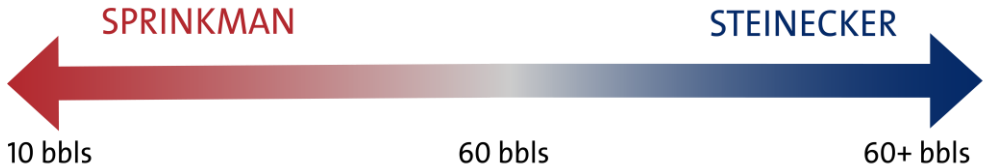
- Modular design and layout
- Options include the most energy saving technology available



Krones Brewing Systems



	SPRINKMAN	STEINECKER
Vessels	2+	3+
Batch Sizes (bbl)	10 to 60	60+
Perfect System for...	Small to large batch, innovation, likely production for retail	Large batch, production brewhouse
Annual Output (bbl)	Up to 100,000	+100,000
Platform/Vessel Configuration	Standard Custom	Custom
Level of Automation	Minimal (temp control) to Full	Full
Heating	Steam	Steam or Hot Water
CIP	Manual to Fully Automated	Automated
Energy Saving Technology	None to Minimal (Water)	Full

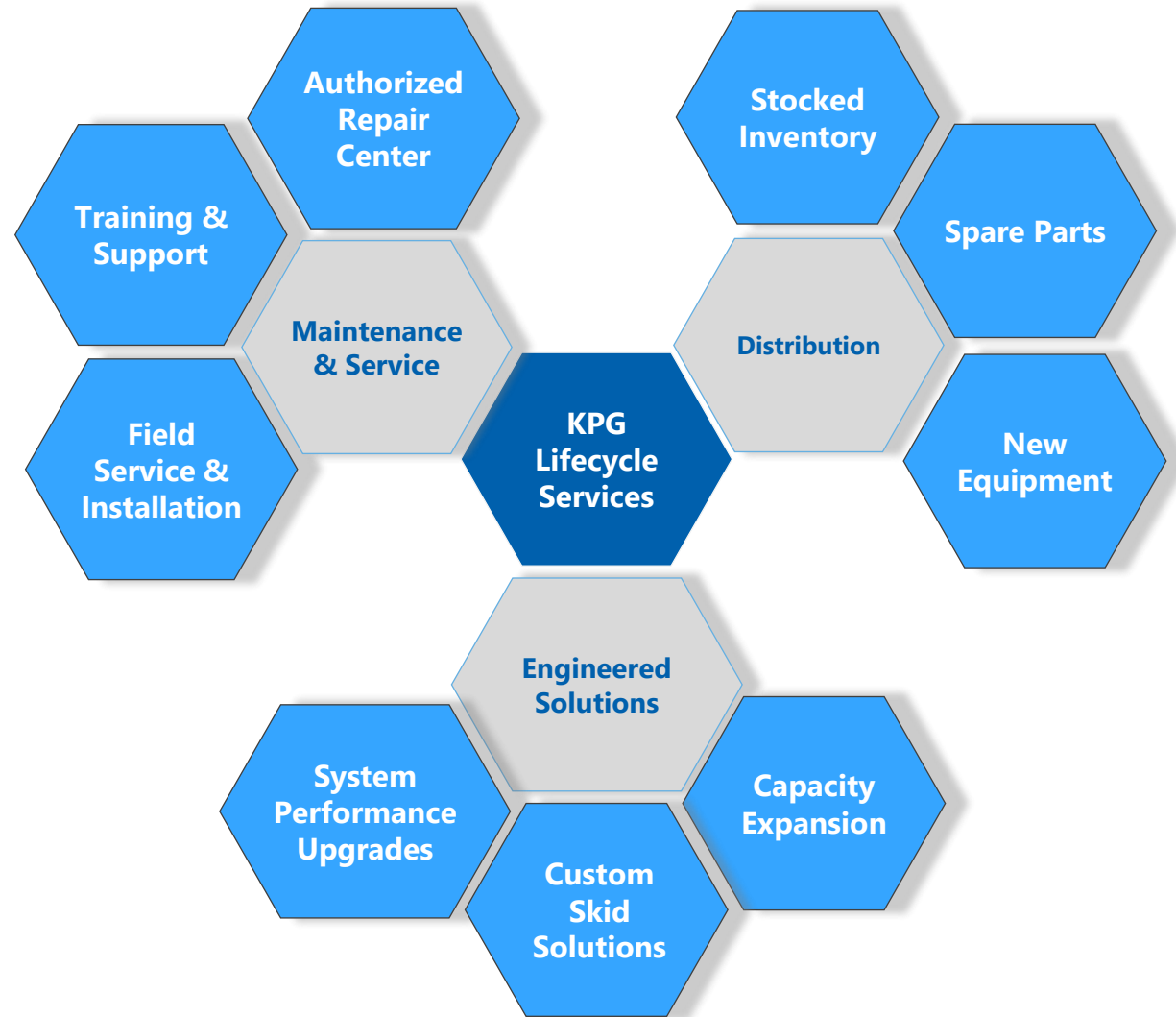


Lifecycle Services

Krones Process Group Lifecycle Services – a partnership beyond tomorrow

Three-Tiered Work Streams consisting of individual business units:

- ⇒ **Distribution**
- ⇒ **Maintenance & Service**
- ⇒ **Engineered Solutions**



Lifecycle Services – Distribution



As a stocking distributor for many top brands, we have relationships to source a complete inventory of dependable equipment and components.



Pumps

- Positive Displacement
- Centrifugal
- Diaphragm
- Twin Screw

Valves

- Mixproof
- Single Seat
- Diaphragm
- Manual

Heat Exchangers

- Tubular
- Plate
- Scrap Surface
- Brazed Plate

Homogenizers

- High Pressure
- Aseptic
- Laboratory
- Mono-Block

Drum/Tote Handling

- Drum Dumpers / Ice Crushers
- Tote Dumpers
- Drum Thawing
- Drum Filling
- Fluidor Equipment

Mixers

- Tank
- High Shear
- In-Line
- Colloid Mills

Controls

- Instrumentation
- Automation Hardware
- Controls Software
- Network Hardware

Materials

- Hoses
- Fittings
- Tubing
- Utility

Lifecycle Services – Maintenance, Service, and Support



Maintenance

Certified service and repair center

- Pumps
- Valves
- Homogenizers
- Heat Exchangers
- 1 Year Warranty on mechanical workmanship

Preventative Maintenance

- Develop Routine Maintenance plan for system equipment to avoid and limit costly downtime.

Accutest Plate Heat Exchanger Testing

- Highly Effective non-destructive Testing for plate and tubular heat exchangers



Service

Tank Inspections

- Shell
- Outlets and nozzles
- Ladders, legs and bracing
- Manways
- Motor Mounts
- Agitator
- Spray balls

Tank Repairs & Modifications

- Leaking jackets
- Hydrostatic blow-out of vacuum-damaged vessels
- Vacuum-damaged silo tops
- Fittings, manways and spray balls
- Agitators
- Minor cracks and fractures
- ASME pressure vessels
- Add or modify agitation (vertical, horizontal)
- Add heat transfer surface to existing tanks
- Add or remove ferrules



Support

- Documentation and literature
- Application consulting
- Troubleshooting
- Warranty management
- Automation Service Agreements
 - System Audits
- On-Site Training



Lifecycle Services – Engineered Solutions



System Performance Upgrades

Our engineers can analyze your system, identify bottlenecks or inefficiencies, and recommend and implement upgrades to improve productivity and reliability.



Capacity Expansion

Our team can provide storage vessels for increased capacity, along with implementation into your existing system.



Custom Skid Solutions

We specialize in designing and fabricating custom skid solutions, tailored to your unique needs. Our team works closely with you to create efficient, reliable, and cost-effective solutions.

We Know Process.



EXPERIENCE

With a depth of knowledge, **we provide process expertise developed from years of experience.** We maintain our resources in-house to offer consistent technical guidance from the people you know and trust.

SAFETY

KPG follows an in-depth Safety Program and is **ISNetworld A+ Rated**. We are committed to protecting the health and safety of our team members and our customer's facilities.

SUPPORT

When an issue arises, time is money, and we don't want you to lose any of it. Call our **dedicated support line**. After an on-call engineer is contacted, you will be able to deal directly with them, until your problem is solved.

QUALITY

Our Quality Assurance Program assures every aspect of a project meets specifications and your expectations. We rigorously control our processes to deliver dependable solutions.

CUSTOMER SERVICE

Our knowledgeable team members pride themselves on delivering outstanding customer service. We **focus on building relationships and providing you with exceptional service**, now and years down the road.

WARRANTY

We stand behind our work and provide a **1-year warranty on workmanship**. All material warranties are limited to manufacturer's warranty and replacement will be facilitated by KPG.



SOLUTIONS BEYOND TOMORROW

Krones Process Group NA