

# Clean-in-Place Systems

For Improved Cleanability



- Single Use Systems
- Multi Use Systems
- Portable Systems
- Neutralization Systems
- Custom Designed CIP
- Factory Tested
- Manual or Automated Systems



**TURN-KEY**  
MODULAR SYSTEMS

At Turn-Key Modular Systems Inc. we manufacture some of the most advanced CIP Systems produced today, all designed to meet the diverse demands of our clients.

These systems are available in various designs, including Single Use to Drain, Single & Multi Use Recovery and Portable Units. Standard configurations can be easily modified to suit your specific application. All systems are manufactured and configured in our facility including the piping & control automation, where Factory Acceptance Testing provides you the comfort of operating the equipment prior to accepting delivery. Whether you have a simple application or more complex cleaning requirements, we offer total integration solutions..... for improved Cleanability.



## A Flexible Approach to CIP

Clean-In-Place is an essential production tool used to reduce manufacturing operating costs & improve product quality. By using a central CIP in your facility, you can automate the method of cleaning for both equipment & piping systems, with little or no dismantling of piping required. Driven by the requirements of the U.S. Food & Drug Administration, both the Biotech & Pharma industries have successfully adapted CIP Systems along with the use of a fully validatable process for the cleaning of production equipment. We offer the latest CIP designs and are sensitive to industry standards & the compliance requirements of our clients.

### Advantages of Clean-In-Place:

- Superior to other methods of manual cleaning based on repeatability
- Provides Lower Facility Operating Costs (Labor Requirements)
- There is minimal dismantling of Equipment & Piping
- Reduced turnaround time for cleaning
- WFI or High Purity water requirements for cleaning is significantly reduced
- Exposure to hazardous activities or entry into equipment such as tanks, is eliminated



## Basic Design Concepts

- Permanently installed supply & return piping is preferred & should be separate from the facility piping
- Positive breaks between the CIP piping network & the Process System is adapted using transfer panels or valving arrangements
- Size of the equipment to be washed & the holdup volume in the lines determines the CIP tank size
- CIP Return Options:
  - a) Regardless of the type, the return CIP pump must be located close to each point of use
  - b) An Eductor Style is suitable for most applications but it is sensitive to high temperature
- Chemical Feed is by peristaltic, piston or diaphragm pump & selected on the basis of flow, pressure, reliability, ease of adjustment & cost
- All systems are drainable & contain no pockets for entrapment of soils. Dead legs & branches are kept to a minimum
- The use of hoses is minimized
- Instrumentation used is considered CIP'able
- Effective Cleaning Criteria Factors include:
  - Cleaning Cycle Time
  - Cleaning Agent & Temperature
  - Concentration & Chemistry of the Cleaning Agent within the circuit
  - Degree of Turbulence obtained in the piping system by the Cleaning Solution
  - Characteristics of the Surface Being Cleaned
  - Spray Device selection (Static or Dynamic)
  - Length of the piping system that is being cleaned & the overall diameter

### System Types

### System Applications

Single Tank Portable	Portable use throughout the Facility with Minimal Capital Costs
Double Tank Portable	Multi Purpose Portable Cleaning throughout the facility
Single Use Once Through	Eliminates Cross Contamination Between Cleaning Circuits
Single Tank Solution Recovery	Reduces Water, Chemical & Heat Requirements
Multiple Tank Solution Recovery	Reduces Water, Chemical & Heating requirements & uses storage tank for rinse solutions
Twin Multiple Tank Solution Recovery	Allows for Cleaning Flexibility & Prevents Cross Contamination of Cleaning Systems Utilizing a Single Set of Water Feed Tanks, Reducing the Capital Cost of the System
Neutralization - Single Tank	Provides Neutralization of Spent CIP Solution Prior to Drain
Neutralization - Single Tank with Cooling	Provides Neutralization & Temperature of Control Spent CIP Solution Prior to Drain



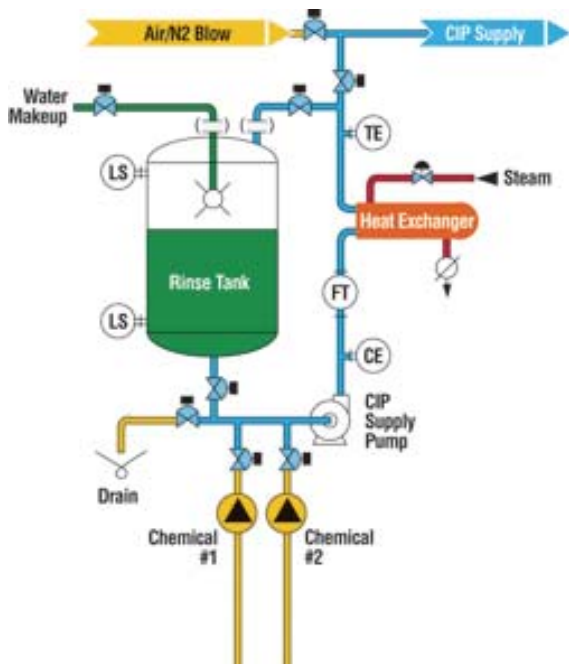
# Types of CIP Systems

## Single Use Once Through To Drain

Is capable of cleaning tanks & piping systems which require solution flow once through, then to drain. The single tank version eliminates cross contamination during the cleaning procedures. Chemical addition can be added to the system as well as heating of the solution. In most applications, larger CIP tanks are required to meet the demands of the CIP Supply.

### Other Types of Systems Available:

- Single Use Eductor Assisted
- Single Use Solution Recovery
- Portable Systems - Single & Two Tank Designs

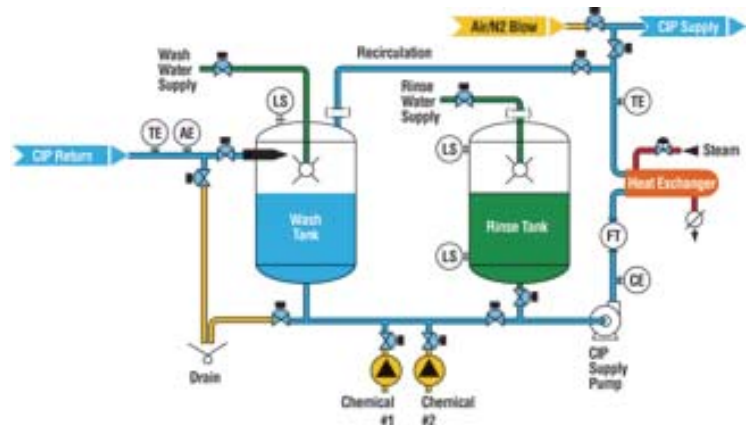


## Single Use Recirculation System

Used when longer cycle times are required, & when the conservation of water & chemical use is critical. During the cleaning cycle, smaller wash tanks are used to recirculate the solution.

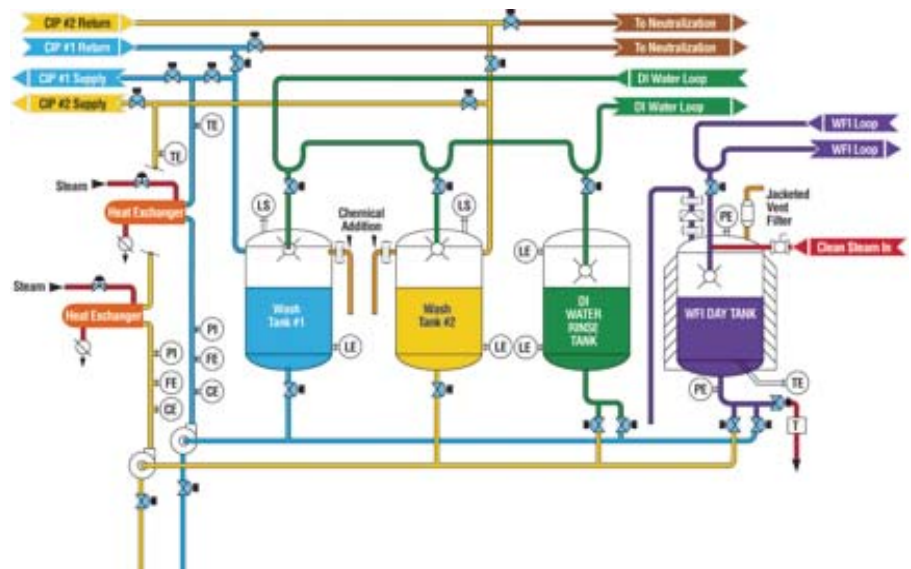
This design offers the following benefits:

- Reduced chemical & water requirements (small footprint)
- Minimal Wash Solution each cycle
- Fresh solutions are used for each circuit cleaned



## Multi Purpose Recirculation System

Often employing standard CIP design principles, the cleaning equipment & controls are configured to allow for the cleaning of several circuits at once. The system can also be configured to allow for cleaning of a Storage Tank & a Piping Transfer line simultaneously. This is accomplished by using two sets of CIP pumps, using separate wash tanks & sharing a common set of water storage vessels containing DI water, or WFI. The integrity of the system design is maintained using special valving arrangements & proper piping design.



## Portable CIP Systems

Our Portable CIP Systems provide flexible & effective cleaning application solutions which can significantly reduce the capital investment required for a central CIP System.

### Modified to meet your unique process requirements:

- Single or double tank capacities
- Flexibility to clean stand alone equipment in a Pilot Plant, or in a small Production Facility
- Controls can be manual or automatic, dependant upon the sophistication of the cleaning requirements
- Environmentally sound Neutralization Systems
- Heating with direct clean steam injection or with an inline heat exchanger. We offer electric heating as an alternate to steam heating

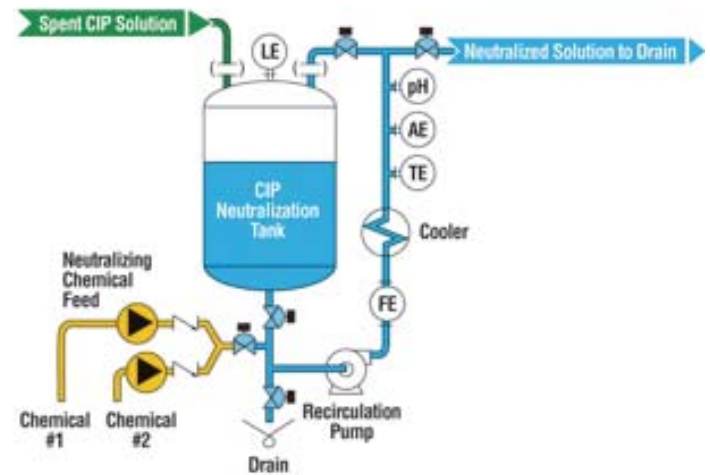


## Neutralization Systems

In many facilities, spent CIP Solution must be discharged below specific temperatures while maintaining a certain pH range. In order to address associated environmental issues we offer a standard Neutralization System. The Neutralization Tank will range in size dependant upon the amount of CIP Solution being discharged.

### We offer the following with our Neutralization systems:

- Acid or Caustic Addition
- Inline Recirculation & Cooling prior to discharge
- Stainless Steel Neutralization Tank



All equipment provided by TKMS meets or exceeds the stringent demands of regulatory compliance. Full documentation is provided to support a validation protocol.

# Custom Cleaning Solutions

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Pharmaceutical  
Cosmeceutical  
Food

Modular System Design  
Valves, Pumps, Fittings  
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CIP Systems  
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Bioreactor & Fermenter Systems



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