



CIP (Clean-In-Place)

CIP is a methodology of cleaning process pipelines, vessels, and equipment without disassembling of the components. CIP is typically used in food, beverage, pharmaceutical, and other applications where contamination can build up, propagate, or degrade a desired product. Historically these types of processes required complete disassembly between batches, formulas, or on set sanitation driven schedules to keep systems clean and operating. A properly operating CIP system accomplishes this without teardown and rebuild of valves or valve components.

CIP Systems Operations and Components

A CIP system typically consists of 4 separate operations:

1. Rinse: removes any existing product after lines in service
2. Caustic Wash: Cleans and sanitizes internal components
3. Acid Wash: Cleans, targeting scale build up and proteins
4. Final Rinse: Remove all cleaning chemicals used in this process.

A CIP system typically includes these major components:

1. Storage tanks: stores purified water, wastewater, and cleaning chemicals
2. Valves: to control flow of water/cleaning chemicals
3. Written procedure or process loop controller to operate CIP system in correct sequence

Materials and Types of Valve Assemblies in CIP Systems

Piping is typically made of 316SST or other higher alloys, which prevents corrosion from cleaning chemicals and corrosion from caustic washdowns. PTFE based material is preferred because of chemical compatibility with unfilled PTFE being optimum.

Operation of valves can be manual; however, quarter turn valve assemblies are common. The valve assemblies can be pneumatic or electric depending on customer need and if fail-safe valve position is required. Pneumatic fail-safe valve assemblies are cost effective and can include solenoids and limit switches to interact with process control logic.

Ball valve and butterfly valve assemblies are typically used for isolation because of their bubble-tight ratings. Control valves are typically used when an application requires precise flow of cleaning chemicals or water. Control valve assemblies take advantage of positioners when using a pneumatic actuator, or a control card when using an electric actuator to assist in regulating flow. Multiport valve assemblies are common and can take advantage of L and T ports options to direct or isolate fluids. When “pigging is used to “wipe” the pipeline clean, installation of pig bars may be required to prevent pigs from dropping into tanks or other equipment.

A-T Controls Materials Recommendations and Recommended Valves/Actuators

Please consult A-T Controls for material selection for your CIP application. These parameters are guidelines, and customers are responsible for material of construction and preparation of the valves for service being compatible with their CIP application:

Auxiliary Stem Seal: PTFE, TFM™-1600

Body: ASTM A351 Grade CF3M/CF8M

Seats: PTFE, TFM™-1600

Trim: 316LSST/316SST



A-T Products used in CIP Systems

Series 55 3-piece ball valve: [Literature Download & Content](#)

Series 77 Sanitary End 3-piece ball valve: [Literature Download & Content](#)

Series 88 High Performance 3-piece ball valve: [Literature Download & Content](#)

Series D9 Flanged Ball Valve: [Literature Download & Content](#)

Series 33/43/53 Multi-Port Ball Valve: [Literature Download & Content](#)

A-T Controls, Inc. Resilient Seated Butterfly Valves: [Literature Download & Content](#)

Series AS PFA Lined Split Body Butterfly Valve: [Literature Download & Content](#)

Series P1S High Performance Butterfly Valve: [Literature Download & Content](#)

Series LB PFA Lined Ball Valves: [Literature Download & Content](#)

3R Rack & Pinion Pneumatic Actuators: [Literature Download & Content](#)

Series S2 Stainless Steel Rack & Pinion Pneumatic Actuators: [Literature Download & Content](#)

Series WE/XE/XC Electric Actuators: [Literature Download & Content](#)

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