

# HIGH CONTAINMENT REACTOR CHARGING

The Problem

The ChargePoint Solution

Bulk Powder Addition

Seed Charging

Buffer Prep



## THE REACTOR CHARGING PROCESS

During Pharma, Biopharma and Chemical manufacturing, the process of transferring material from a container directly to the reactor vessel encompasses a variety of applications each with their own set of unique challenges:

- Buffer / Media preparation
- Seed charging (catalyst addition)
- Bulk powder addition

This powder transfer process has historically involved utilising a rigid container or bag to manually transfer batches of pre-weighed powder, granular or semi-solid products to the vessel in an open, non-contained manner. When handling potent compounds, this would mean isolating the process from the operator using cumbersome PPE, air suits, or air flow controlled areas.

In response to the performance, operational and cleaning issues associated with these methods of operator protection, the use of Split butterfly valve technology has since become a common solution to containing previously non-contained transfer processes. The trend of increasingly potent and sensitive products further necessitates the use of this containment technology.

The key requirements for split butterfly valves to meet the demands of modern manufacturing:

- Ensure maximum flow and yield from each transfer.
- Encompass the ability to dry or wet purge.
- Containment of high OEL potent products.
- Equipment must be designed for CIP and SIP.
- Protect sensitive products and maintain process sterility.

## THE PROBLEM

One of the main issues facing the use of split valves as a method of contained reactor charging is the presence of a pressure or vacuum condition within the process, either during or after the product transfer has taken place.

For running a process under pressure or charging / dispensing under pressure, a split butterfly valve requires a pressure rated characteristic in order to provide the required level of pressure and ultimately, containment. In order to achieve these pressure and containment levels many split valves rely on the disc as the pressure seal.

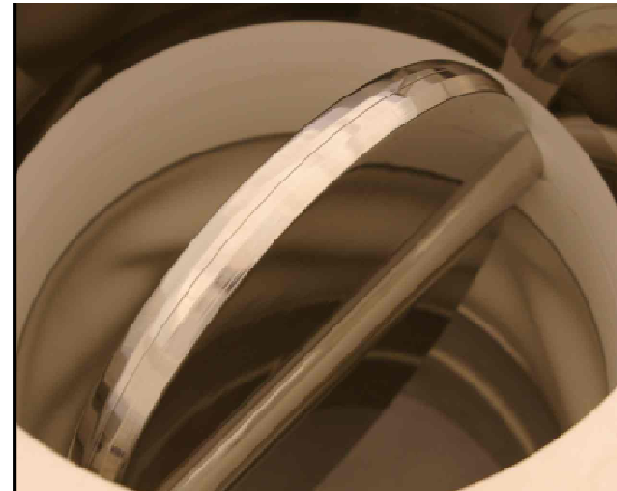
There are three problems with this method:

1. The design can only be used for sealing the process under pressure and not for charging / dispensing i.e. opening the valve under pressure.
2. With this method discs are thicker when compared to non-pressure rated valves. The larger disc cross section impedes product flow during a powder transfer.
3. With larger valves the thicker discs increase friction on the sealing surface making manual operation difficult and increasing costs for necessary actuation.

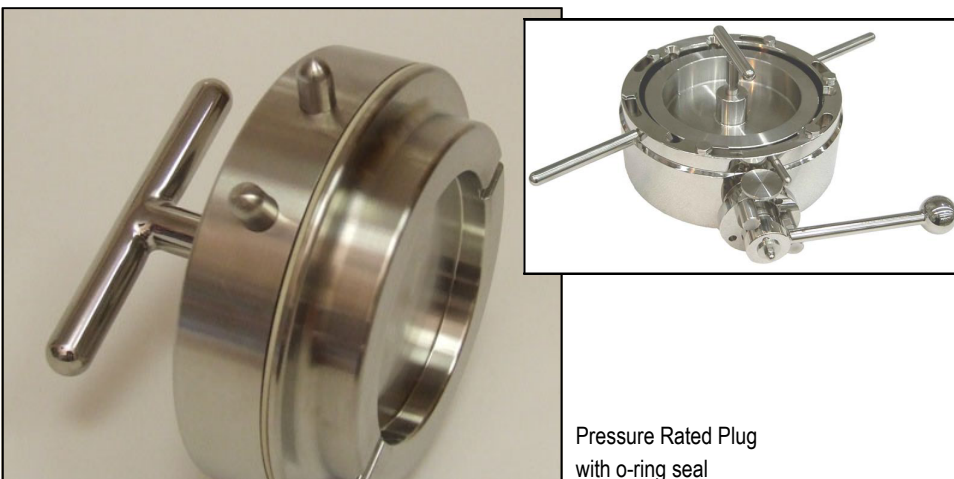
## THE CHARGEPOINT SOLUTION

The Pressure Rated ChargePoint does not rely on the disc to achieve a pressure rating.

- For running the process under pressure the ChargePoint utilises a plug with o-ring seal to maintain pressure and containment.
- The valve can be operated under pressure in charging and dispensing applications. This is achieved by an o-ring seal on the Passive to maintain pressure and containment. The disc profile is not thicker than the standard ChargePoint resulting in the same level of good powder flow. There are also therefore no increases in sealing friction making manual operation easy.
- Eliminates requirement for actuation therefore saves cost and space.



ChargePoint Disc profile



Pressure Rated Plug  
with o-ring seal

The unique design of the ChargePoint split valve means it can be adapted for other process operations:

### **Wet or dry purging**

Because a ChargePoint can be opened to pressures of up to 6Bar or full vacuum, it is safe to use a wet or dry purge to assist the charge of product through the valve. ChargePoint can also supply pressure rated containers with a purge connection.

### **SIP (Steam In Place)**

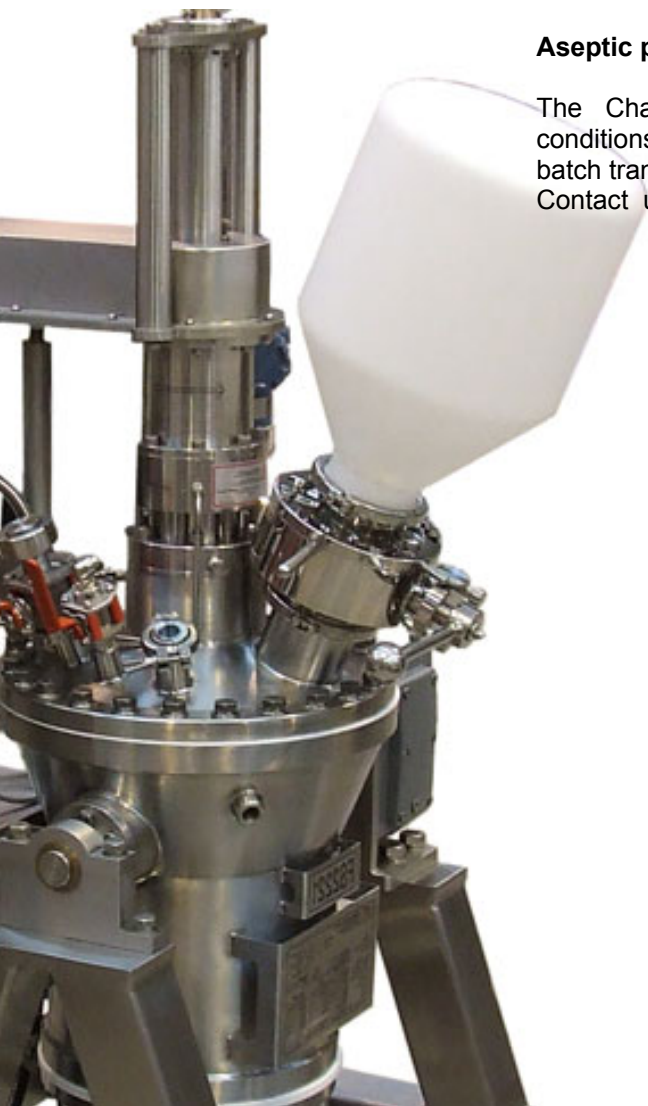
It is possible to SIP the valve connected to the process prior to Charging product by attaching an SIP Passive. Steam is introduced via a connection on the top of the SIP Passive body. This connection can also serve as a vent, where steam is being introduced from within the process. An O-Ring seal fitted to the perimeter of the component body, guarantees a pressure tight seal during the SIP procedure. The part is manufactured with a hollow interior which enables the Active disc to be opened, allowing the product contact faces and sealing edges to be sterilised during the SIP procedure.

### **Sightglass**

A ChargePoint valve can be installed and used for both product charging and as a viewing port once the charge has been completed. This has a benefit in cases where there is no spare reactor nozzle. A pressure rated sightglass offers visibility using the existing ChargePoint installation.

### **Aseptic processing**

The ChargePoint range has been developed to accommodate aseptic conditions when required. These solutions allow for both single and multiple batch transfers in both charging and discharging applications. Contact us to learn more about our solutions for aseptic processing.



ChargePoint with Sightglass

## BULK POWDER ADDITION

The ChargePoint range of containment valves incorporates an extensive choice of specification options and accessories to deliver optimal operational performance in any reactor charging application. The two fundamental factors that affect the selection of the appropriate ChargePoint solution are 1) process scale; and 2) product potency.

### Small scale

- Valve sizes 100mm, 150mm
- Simple, manual operation
- ChargeBottle™ 25L - increase or decrease number of additions to suit batch process
- Assist flow of cohesive products with a Vibratory Collar on a ChargeBottle. Alternatively an operator can physically manipulate a ChargeBag to improve yield.

### Large scale

- Valve sizes 150mm, 200mm, 250mm, 300mm
- Fully automated operation
- PowerDock™ automated raise and lower docking system.
- Stainless steel IBC's and integrated lifting hoists.

### High potency

- Active ingredients (API)
- Containment to  $<1\mu\text{g}/\text{m}^3$
- ChargePoint EXCEL
- ChargePoint + Extraction Ring System

### Low potency

- Intermediate materials
- Containment to  $<10\mu\text{g}/\text{m}^3$
- ChargePoint or ChargePoint DL

## BUFFER PREP

Direct additions of alkaline/acid without breaking the containment of the reactor

- Small-scale valves 50mm to 100mm
- Simple manual operation
- Containment performance to  $<1\mu\text{g}/\text{m}^3$

Contact us to find out more about our specifically designed Contained Dosage System

## SEED CHARGING

Small scale, simple manual additions with valve sizes 50mm (2") to 100mm (4").

- Containment of low toxicity products from  $<10\mu\text{g}/\text{m}^3$  or with use of Extraction Ring system for  $<1\mu\text{g}/\text{m}^3$
- High yield recovery of low bulk density and sticky products with the assistance of positive pressure purge.
- Integral sightglass allows visibility of complete product charge.

Contact us to find out more about our Contained Seed Charging Solutions.



## ABOUT CHARGEPOINT TECHNOLOGY

---

ChargePoint Technology are market leaders in the supply of containment valves and integrated material handling equipment for the Pharmaceutical, Chemical, Food and other process based industries.

Our most important goals are to create lasting partnerships by providing high quality and reliable products, coupled with outstanding customer service.

As a pioneer of split valve technology our consultative approach will provide the right technological solution, as well as delivering the lowest cost of ownership benefits by maximising yield, reliability, productivity and flexibility.

### International

80 Venture Point West, Evans Road  
Liverpool, L24 9PB  
United Kingdom  
T: +44 (0)151 728 4500  
F: +44 (0)151 728 4501  
E: [sales@thechargepoint.com](mailto:sales@thechargepoint.com)

### North America

ChargePoint Technology USA  
211 Potters Drive  
Bayville, NJ 08721  
T: +1 732 269-0606  
F: +1 732 269-0406  
E: [sales@thechargepoint.com](mailto:sales@thechargepoint.com)

Find your local representative online:  
[www.thechargepoint.com](http://www.thechargepoint.com)

**ChargePoint**  
TECHNOLOGY