

# **CRL**

## **Central Research Laboratories**

a **DESTACO** company



## **A Rapid Transfer Port Tutorial**

*How the development of RTPs has helped optimize product transfer in pharmaceutical manufacturing*

*By Rob Weber*

# Introduction

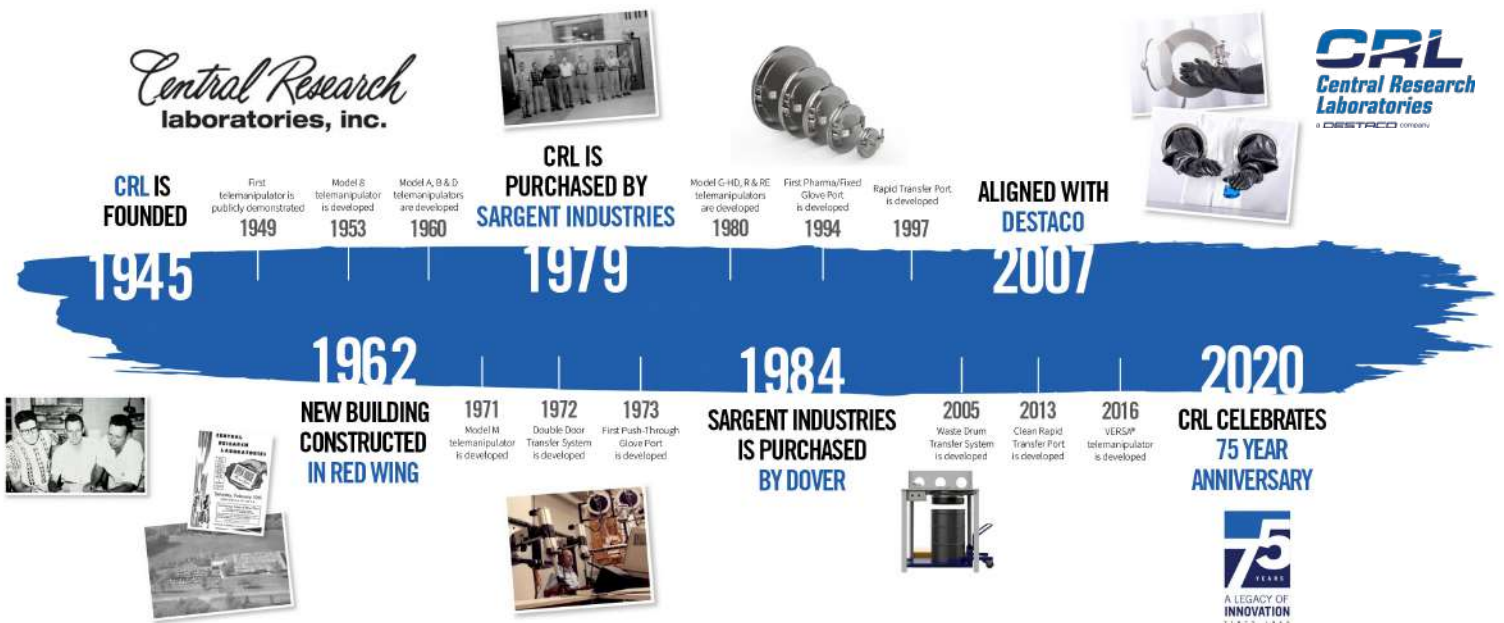
In the fall of 1945, as World War II was concluding, three recent graduates of the Massachusetts Institute of Technology – Frank G. Chesley, Demetrius Jelatis and Gordon M. Lee – put their resources together to create a company they named Central Research Laboratories®, Inc., (CRL) and headquartered in Red Wing, MN. Backed by their undergraduate experience as researchers for the U.S. War Department, their nascent company began life as one that designed radar-testing equipment for use by the various branches of the U.S. armed forces.



From that beginning, CRL slowly branched out into other areas of concentration and found success by developing safer methods of handling radioactive materials, which they supplied to the U.S. Atomic Energy Commission. Their success in this realm prompted CRL to begin concentrating on designing, engineering and manufacturing remote-handling technologies, with their first significant breakthrough being the Model 8 Telem manipulator, which was introduced to the market in 1953.

From that point, new Telem manipulator innovations were developed on a regular basis and CRL further expanded its product offering in the 1970s with the introduction of the Double-Door Transfer System and the first Push-Through Glove Port. All of this innovative remote-handling equipment served to burnish CRL's "Legacy of Innovation" moniker and made it a first-choice provider of remote-handling solutions for many of the major operators in the Life Sciences and Nuclear markets around the world, those whose operations demanded the safe, efficient and reliable handling of sterile and hazardous materials.

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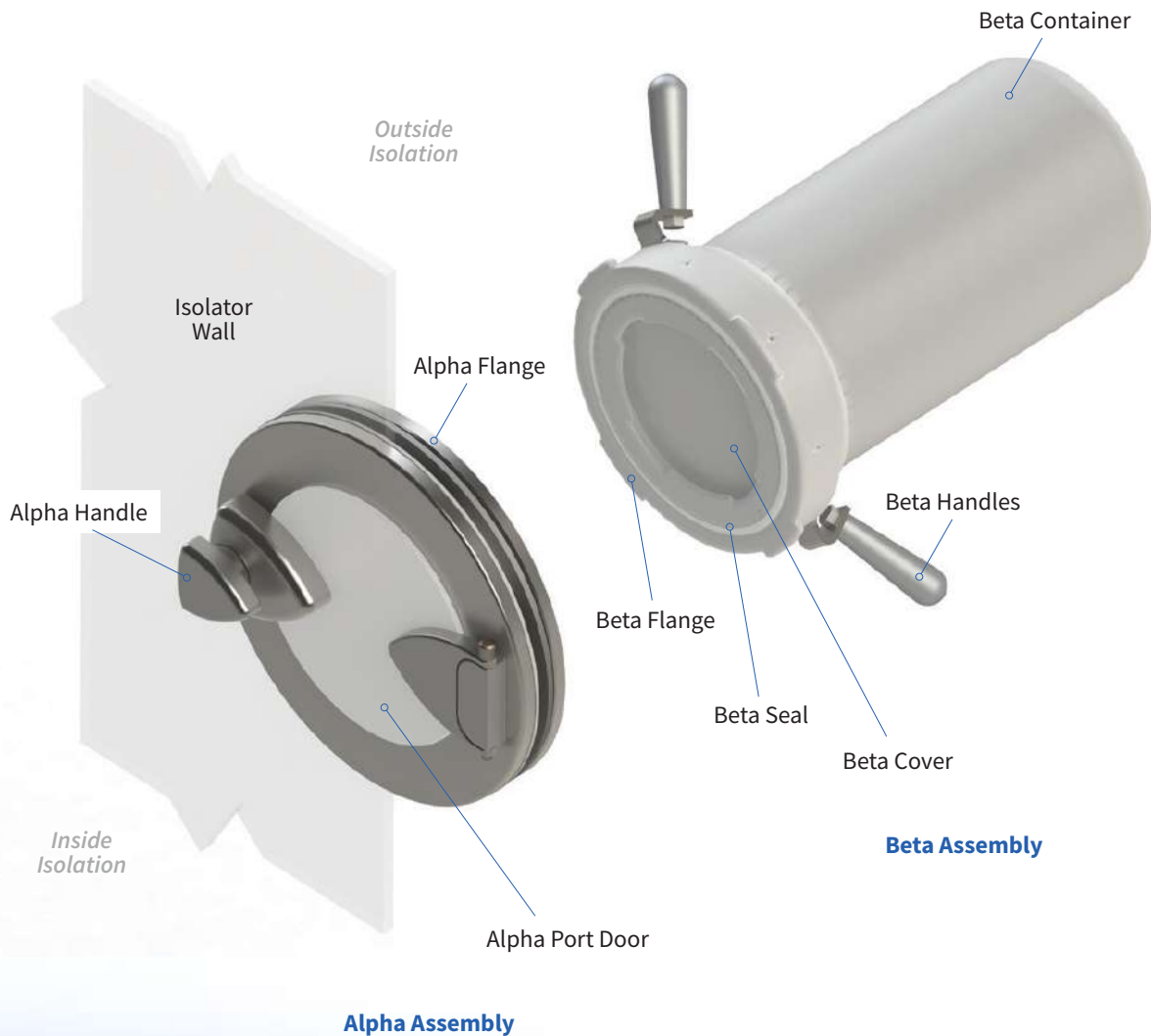


# It Was 25 Years Ago...

By 1997, 52 years after its founding, CRL had built a widely recognized reputation as a true standard-setter in the world of remote-handling solutions, but by no means was the company content to rest on its laurels. That creative commitment was manifested that year through the introduction of its latest product-handling technology: [the Rapid Transfer Port, or RTP](#), which was created to provide safe, contained transfer of sterile or hazardous materials and waste into and out of containment or isolation.

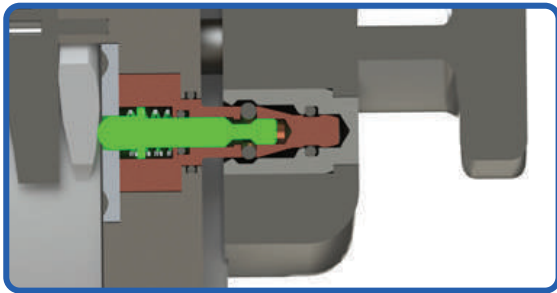


The design and operation of RTPs builds on the capabilities of the Double-Door Transfer System, which allows all types of materials to be rapidly transferred into and out of an isolation chamber, cleanroom or glovebox without breaking containment, which helps maintain safety for operators.

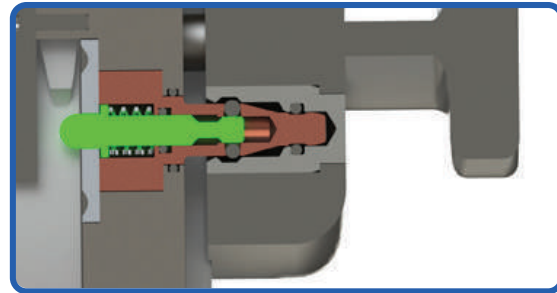


A product-transfer system featuring an RTP consists of two main components: the stationary Alpha port that is mounted to the wall of a contained environment, and the Beta assembly, which is mobile, that is attached to a container, bag or other process component. Both the Alpha flange and Beta assembly consist of a door (hence, the “double-door” designation), seal and interlock function.

### Interlock System



Port door interlock (shown in unlocked position), Beta assembly docked.



Port door interlock (shown in locked position), Beta assembly not docked.

The design of the RTP dictates that when the Alpha flange and Beta assembly are mated, the interlock helps protect against either of their doors accidentally opening. The doors will also not be allowed to open if the two assemblies are incorrectly docked. Specifically, the interlocks are incorporated into the flange on the Alpha assembly from where they interface with the door handle. This prevents the port door from being opened when a Beta assembly is not present; keeps the Beta assembly from being removed from the Alpha flange when the port door is open; and prevents the port-door handle from being rotated when the door is open.



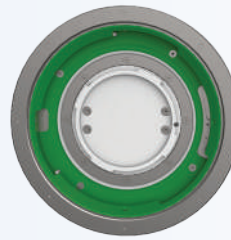
While the design of the RTP’s Alpha flange is pretty straightforward, though they can be customized to meet the needs of specific applications, there is more variability in the RTP’s Beta assemblies. The most common variation is the standard Beta container that is generally a canister available in multiple materials of construction (including stainless steel), sizes and lengths. Other variations include autoclavable Beta containers, which are used to sterilize tools and components, and the increasingly popular Single-Use Beta Bags. These disposable one-time-use product-transfer solutions have been developed to provide safe, efficient, contamination-free and cost-effective sterile-component transfer into and hazardous waste removal from aseptic-production processes.

# Digging Deeper

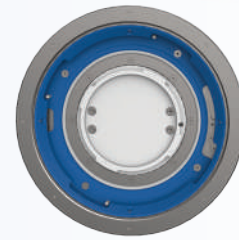
Like all CRL innovations, over the years the RTP has evolved through the work of a design and engineering team that is always searching for ways to improve product performance. Building off the capabilities of the legacy RTP, CRL has created two additional iterations: the **Clean Rapid Transfer Port (CRTP)** and the **Sterile Liquid Transfer Port (SLTP)**. Let's take a closer look at both:

**Clean Rapid Transfer Port (CRTP):** CRL designed the CRTP as a transfer solution for use in Life Science pharmaceutical-production applications where maintaining a high level of sterility, cleanability and cleanliness are critical. The CRTP features the Double-Door Transfer System, but offers additional features that give it more flexibility, including:

- A new handle design that utilizes minimal handle rotation to break the seal on the Beta container, which simplifies operation while still maintaining a high safety level
- A streamlined interlock system with interchangeable three-bayonet and four-bayonet Beta mount inserts that can be replaced without breaking containment



Three-Bayonet Beta Mount Insert



Four-Bayonet Beta Mount Insert

- Standard 316L stainless-steel body construction with three port-door options:



Stainless steel for use in strong chemical/radiation and some aseptic applications



Polypropylene for use in pharmaceutical, chemical and nuclear applications



Liquid-transfer for use in sterile filling-line and fluid-transfer applications

- The elimination of pinch points on the handle, which minimizes glove damage
- The elimination of exposed fasteners that creates a smoother surface that enables easier cleaning
- Compatibility with various Beta assembly options

**Sterile Liquid Transfer Port (SLTP):** The patent-pending SLTP, which builds off the proven CRTP technology and is a component within CRL's Sterile Liquid Transfer System, helps enable efficient, safe and contamination-free transfer of aseptic liquids from sterile product devices through a barrier wall and into a cleanroom or isolator during pharmaceutical manufacturing. This design helps the SLTP satisfy Ring of Concern challenges where the Alpha door and Beta assembly meet, which is an area that is constantly at risk of becoming contaminated.



The SLTP overcomes this challenge through its ability to allow the sealing surfaces to be heat sterilized. Other advanced features and benefits of the SLTP include:

- A standard Steam In Place (SIP) cleaning process with a dedicated docking plate that enables proper Beta flange placement during sterilization activities
- Polypropylene or stainless-steel protective collar at the Ring of Concern
- An Alpha flange equipped with mechanical interlocks that help prevent improper port operation
- A product connection tube with inner surfaces polished to 15 microns and sloped to aid in drainage
- An extended polypropylene or stainless-steel Alpha port door that accommodates longer product-connection tubes
- A single- or multi-connection Beta flange with a condensate-drain connection
- Alpha and Beta flange body construction of 316L stainless steel
- Silicone gasket seals
- Tri-clover fittings on product tubes for reusable, validateable and rapid aseptic-hose connection and disconnection
- Testing and approval for use at hydrostatic pressures up to 3.4 bar (50 psi)



CRL offers its RTPs in four sizes: 105-, 190-, 270- and 350-mm, with the measurement corresponding to the diameter of the Alpha/Beta assembly's opening. Those sizes are also compatible with the various ancillary components that are available, with the exception of Single-Use Beta Bags, which are currently only available in a 190-mm configuration. Additionally, CRL is able to customize its Beta Bags to meet the specific size requirements of the user.

## That's Not All, Folks

While CRL has an historically proven track record of setting new standards in remote-handling and product-transfer equipment and systems, being one of the best at what you do is not enough. Recognizing this, CRL has always put great effort into building a Customer Service Department that is easy to navigate and relies on personalized service.

This capability has grown in importance in recent years as global industrial markets have felt the sting of compromised supply chains. At the least, these ongoing supply-chain disruptions continue to result in longer delivery lead times, along with higher costs for material acquisition, production and delivery. As a company with a global footprint that features distribution partners in the United States, Canada, United Kingdom, France, Italy, India, Japan and South Korea, CRL has access to resources that can help limit the negative effects of the recent supply-chain situation.

Additionally, CRL's status as a smaller company within the world of remote handling and product transfer makes it nimbler than many of its competitors. This helps it use premier, personalized service to meet the needs of a global client base in a timely and cost-effective way with none of the "slipping through the cracks" or interminable telephone holds that can hamper larger companies.

## Conclusion

Driven by CRL's more than 75-year commitment to the remote-handling and product-transfer industries, its Rapid Transfer Systems have become a popular method of operation in the transfer of sterile and hazardous materials into and out of containment systems. As pharmaceutical development and manufacturing continues to evolve, aseptic processing will remain critical to the production and commercialization of new medical therapies. The use of RTPs can provide the flexibility needed for this critical work while helping maintain the sterile and contamination-free operation that are demanded in isolator and cleanroom environments.

### About The Author:

Rob Weber is the Manager of Products & Proposals for Central Research Laboratories® (CRL), Red Wing, MN, USA, which is a DESTACO company. He can be reached at [rweber@destaco.com](mailto:rweber@destaco.com). CRL possesses more than 75 years of innovation experience in the development of remote-handling systems, including Telemanipulators, Transfer Systems, Glove Ports and Waste Drum Transfer Systems. CRL's industry-leading technology helps its customers safely and efficiently handle hazardous and sterile materials in Nuclear and Life Science applications around the world.



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*DESTACO, a Dover company, is a global leader in the design and manufacture of high-performance automation, workholding and remote-handling solutions. The company serves customers in a variety of end markets, including the automotive, life science, consumer packaged goods, aerospace, industrial and nuclear sectors. DESTACO is based in Auburn Hills, Michigan, U.S.A. The company has more than 800 employees with 13 locations, in 9 countries, across the Americas, Europe and Asia.*

*More information is available at [crlsolutions.com](http://crlsolutions.com).*