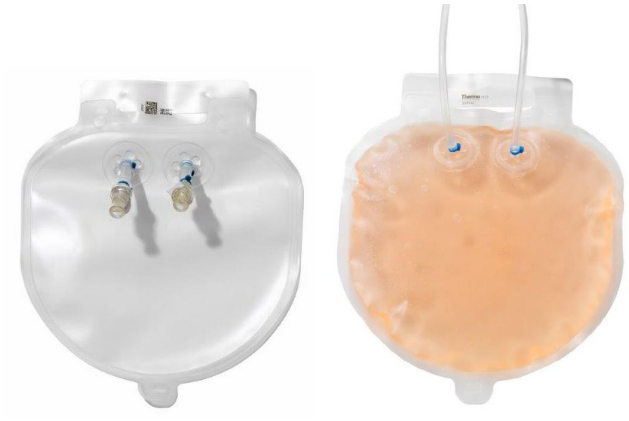
Smart Notes

How can single-use technology BioProcess Container answer the requirement for cGMP guideline compliance in centrifugation GMP application?

When performing a GMP application, one needs to comply to *Good Manufacturing Practice Guideline for Pharmaceutical Products, Main Principles*
First Edition, 2014

Chapter Two - Sanitation and Hygiene
A high level of sanitation and hygiene should be practiced in every aspect of the manufacture of pharmaceutical products. The scope of sanitation and hygiene covers personnel, premises, equipment and apparatus, production materials and containers, products for cleaning and disinfection, and anything that could become a source of contamination to the product. Potential sources of contamination should be eliminated through an integrated comprehensive program of sanitation and hygiene.

Chapter Four - Equipment
Production equipment should not present any hazard to the products. The parts of the production equipment that come into contact with the product must not be reactive, additive or absorptive to such an extent that it will affect the quality of the product and thus present any hazard.



Thermo Scientific™ CentriPAK™ BPC Single

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To answer GMP compliant production, the biotherapeutic market has been rapidly adopting single-use BioProcess Container (BPC) technologies to reduce risk and improve operational efficiencies. For more than 20 years, Thermo Fisher Scientific has pioneered single-use technologies for this industry. Our products have been proven to be robust and scalable from lab scale-up to cGMP production applications.

To help ensure that BPC systems conform to the quality standards expected in the bioprocess industry, BPC systems are subject to rigorous quality control in compliance with ISO 13485:2016 from the receipt of components to the release of final product.

Our production control processes help ensure complete lot traceability for each batch. The process control document becomes the stepwise manufacturing record that physically accompanies the lot through every step of the manufacturing process. At the end of the process, the production record is reviewed by the quality assurance team for completeness, and correctness prior to the release of the lot and issuance of the certificate of analysis (CoA).

The Thermo Scientific™ CentriPAK™ BioProcess Container is a next generation centrifuge container prodiving a single-use, sterilized, closed system for cell culture separations.

The CentriPAK BioProcess Container is a sterilized closed system that reduces cross-contamination risks while separating cell cultures. It is designed for centrifugation that enables gentle, high-throughput and high-efficiency separation. It is also single-use, that eliminates post-use cleaning steps required with reusable containers.

Perform centrifugation cell culture separation GMP applications with single-use, sterilized, closed system products

The CentriPAK BioProcess Container complies to the following standards: It is made with CX3-9 film BPC produced in a cGMP facility. The outer layer is a polyester elastomer coextruded product contact layer. CX3-9 film is manufactured using animal origin-free components.

Table 3. CX3-9 film

Property	Test Protocol	Average Values
Physical data (post–gamma irradiation, 25 - 40 kGy)		
Tensile strength	ASTM D882	4,996 psi 34.4 MPa
Elongation	ASTM D882	1,026%
Yield strength	ASTM D882	820 psi 5.7 MPa
2 % secant modulus	ASTM D882	11,459 psi 79 MPa
Tensile toughness	ASTM D882	439 lbf-in. 5.0 kN-cm
Puncture resistance	ASTM F1306	28 lbf 125 N
Seam strength	ASTM F88	18 lbf/in. 31.5 N/cm
O2 transmission rate	ASTM D3985, 0% relative humidity (RH) outside, 90% RH inside, 23°C	93.4 cc/100 in.2/day 1,448 cc/m²/day
CO2 transmission rate	MOCON method, 0% RH outside, 100% RH inside, 23°C	450 cc/100 in.2/day 6,968 cc/m2/day
Water vapor transmission rate	ASTM F1249, 0% RH outside, 100% RH inside, 23°C	0.061 g/100 in.2/day 0.95 g/m2/day
Haze	ASTM D1003 (outside dry/inside dry)	63%
Glass transition temperature	ASTM E1640	–17°F –27°C
Film gauge	–	9 mil 0.229 mm
Film contact material	–	Polyethylene
Temperature range*	–	–112°F to 140°F –80°C to 60°C
10^{-6} sterility assurance level	ANSI/AAMI/ISO 11137:2006	2.5–4.0 Mrad 25–40kGy
Biocompatibility data (post-gamma irradiation, > 50KGy)		
USP Class VI	USP <88>	Pass
Cytotoxicity	USP <87>	Pass
Bacterial endotoxin	USP <85>	0.006 EU/mL
Heavy metals	USP <661>	<1 ppm
Buffering capacity	USP <661>	<1 mL
Nonvolatile residue	USP <661>	<1 mg
Residue on ignition	USP <661>	<1 mg
Hemolysis	ISO 10993-4	Pass
Appearance	EP <3.2.2.1>	Pass
Acidity and alkalinity	EP <3.2.2.1>	Pass
Absorbance	EP <3.2.2.1>	0.0055 units
Reducing substances	EP <3.2.2.1>	<1 mL
Transparency	EP <3.2.2.1>	Pass

All tests are run post-gamma irradiation unless otherwise noted.

*Subzero conditions require proper support and handling.

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Additional components are attached to the CentriPAK BioProcess Container in an ISO 7 clean room. Then it is packaged and sealed in two independent outer dust-cover polyethylene bags while still in the ISO 7-certified area before gamma-irradiation in their outer packaging.

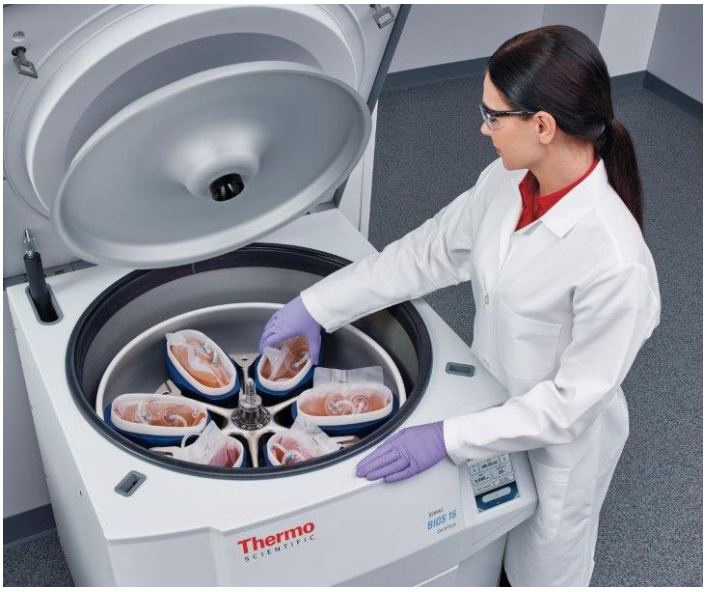
In-process inspections and testing taking place during the manufacturing process is to ensure that each production run of the Centri BioProcess Container is being manufactured to the approved specifications. Each product is delivered with its Certificate of Analysis.

Summary

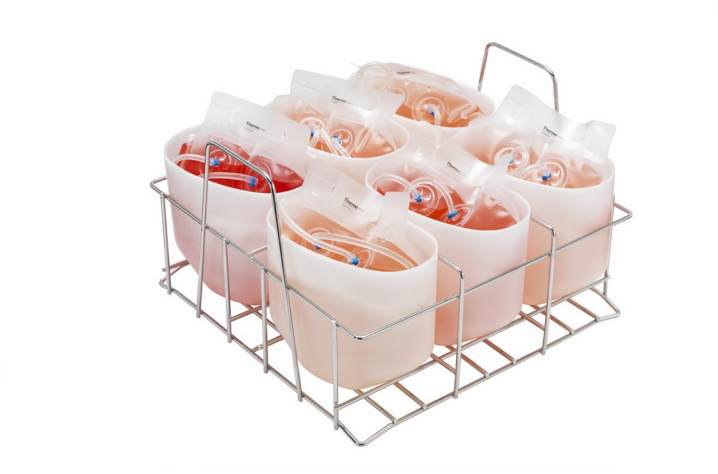
Thermo Scientific CentriPAK with Thermo Scientific™ Sorvall™ BIOS 16 Centrifuge is a solution for our customer's cell culture separations in GMP application. It provides them with a single-use, sterilized, closed system BioProcess Container product, designed by Thermo Fisher Scientific and manufactured in compliance with ISO 13485:2016 from the receipt of components to the release of final product.

Table 4. Testing

Test	Specification	Frequency
Irradiation dose	25 - 40 kGy	Each unit
100% visual inspection	Per build specification	Each unit
Endotoxin	USP <85>. Aqueous extracts contained <= 0.25 EU/mL as determinaed by the Limulus Amebocyte Lysate Test (LAL)	Routinely
Particulate	Particulate Matter in Injections Light Obscuration Particulate Count Test (USP <788>)	Routinely
Sterility	ANSI/AAMI/ISO 11137 guidelines provides a minimum Sterility Assurance Level (SAL) of 10^{-6}	Routinely
EP Testing	EP <3.2.2.1>	Each unit



Thermo Scientific™ Sorvall™ BIOS 16 Centrifuge with CentriPAK™ BPC



Thermo Scientific™ CentriPAK™ BPC with adapter and rack

Find out more at **thermofisher.com/centriPAK**

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