



Monoclonal Antibodies (mAbs)  
2000 L 5 g/L Platform  
Accelerator<sup>SM</sup> Integrated Solutions

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Illustrations and recommendations are based upon a typical process and may be subject to change based upon your individual process requirements.

# 1. Cell Seeding

Cells taken from the working cell bank are typically cultured in a number of bioreactors with ever-increasing volumes before being transferred to the target volume production bioreactor. A well-optimized and intensified seed train can accelerate this process and increase productivity. A series of well-characterized (N-1 / N-2) bioreactors facilitate this process and are as critical to the overall productivity as the final production bioreactor.

## Equipment

### Allegro™ STR Single-Use Stirred Tank Bioreactors

The Allegro STR bioreactor family combines Pall's bioprocess engineering expertise, cell culture know-how and our drive for quality into a series of single-use bioreactors that deliver consistent and scalable cell culture performance across the range.

Part Numbers (PN): STR50-230W-R-SU, STR200-230W

[Discover more](#)



#### Input

Allegro® 2D Standard Systems  
PN: 7190-1397N, 7190-1397P,  
7190-1397S

Allegro 3D Standard Systems  
PN: 7190-1374W, 7190-1376R

Allegro Bioprocessing Workstations  
PN: LGRTBDC, LGRTSDC, LGRTDCPE,  
LGRTPPE20L, LGRTLPE20L, LGRTRDC

Allegro Plastic Totes  
PN: LGRPTTE50L, LGRTTBSC,  
LGRPTTE200L, LGRPTTL200L,  
LGRPTTEL200L

Allegro XRS 25 Bioreactor System  
PN: XXRS25BRS, XRS25FAT,  
XRS25IVOV, 609-40A

Transfer Sets  
PN: 7292-1516N, 7292-1381X,  
7292-1380Y

#### Output

Transfer Sets  
PN: 7292-1380Y, 7292-1381X



#### Supporting

Allegro STR Bioreactor Biocontainer Bags  
PN: 6412-0726H, 6412-0473Q

mPath™ Benchtop Bioreactor Control Towers  
PN: MPATHLINK-LT

Temperature Control Unit  
PN: TCU-V2000A-NRTL

## 2. Cell Culture

Additional resources 

Higher culture titers and intensified processes mean that an increasing number of products can be produced at the desired quantities using 2000 L bioreactors. These working volumes are within the capability of single-use and enable manufacturers to access the benefits of single-use at a commercial scale.

### Equipment

#### Allegro STR Single-Use Stirred Tank Bioreactor

The family of Allegro STR bioreactors maintain ease-of-use across all scales making the final production bioreactor as simple to install and operate as the rest of the seed train.

PN: STR2000-230W

[Discover more](#)



#### Input

Allegro 3D Standard Systems  
PN: 7190-1377B, 7190-1376V,  
7190-1374W, 7190-1374Y

Allegro Plastic Totes  
PN: LGRPTTE50L, LGRTTBSC,  
LGRTE1500L, LGRPTTE200L,  
LGRPTTL200L, LGRPTTEL200L,  
LGRPTTE1000L, LGRTRLPT1000L,  
LGRPTTEL1000L

Transfer Sets  
PN: 7292-1381X, 7292-1380Y

#### Supporting

Allegro STR Bioreactor Biocontainer Bags  
PN: 609-110U

Temperature Control Unit  
PN: TCU-V10000W-NRTL



When viewing on desktop roll over product name to view more

# 3. Clarification

Additional resources 

The removal of cells, cell debris, and other insoluble impurities during harvest is critical to protect downstream processes and reduce biological burden as much as possible. Depth filtration is an economic, flexible and scalable technology to clarify the harvested cell culture fluid. Low yields can be a challenge in this step and this is especially true as cell densities increase. A carefully selected filtration train can deliver robust performance as a platform choice, or can be optimized for a single process. Our experienced technical team can help you achieve high throughput and yield by optimizing protocols and parameters for this step, in addition to selecting the best filter materials and size.

## Equipment

### Stax™ mAx Clarification Modules

The Stax mAx clarification platform is a single-use, robust, depth filtration solution for the economic clarification of monoclonal antibody cell cultures without the need for centrifugation or process additives.

PN: 7008442

[Discover more](#)



#### Input

Allegro 3D Stainless Steel Totes  
PN: LGR3000BASE, LGR3000EXT,  
LGR3000HOIST, LGR3000STAND

Allegro 3D Standard Systems  
PN: 7190-1374U

Allegro Connect Buffer  
Management System  
PN: ACBMSEUPLC, ACBMSWS,  
ACBMSFSK, ACBMSFT, 6431-1457D

Transfer Sets  
PN: 7292-1380Y, 7292-1381X,  
7292-1381A, 7292-1381M, 7291-1380V



#### Supporting

Allegro MVP Single-Use System  
PN: 9430-1413S, 9430-1416M, 9430-1419Y,  
LGRMVPAPE

Stax mAx Clarification Chassis  
PN: SXPSC10W, 7008225, 7008224

#### Output

Magnetic Mixer  
PN: LM3000JCTA-B4N, MMG403,  
7404-1443D

Transfer Sets  
PN: 7292-1381D

Supor® EAV Membrane in  
Kleenpak™ Capsules  
PN: 7090-1401N

Transfer Sets  
PN: 7291-1381B

# 4. Affinity Chromatography

Affinity chromatography separates the target antibodies on the basis of a reversible interaction with a specific ligand bound to a base matrix. The selection of the optimal resin is key and, when managed by a suitable automated chromatography system, can deliver consistently high purity and yield.

## Equipment

### ÄKTA ready<sup>†</sup> XL

ÄKTA ready XL adapts single-use chromatography to manufacturing scale. To meet the capacity demands from single-use upstream processes (2000 L high-titer feeds), ÄKTA ready XL operates large-scale columns (up to 1200 mm), using the two flow kit sizes that cover a broad range of flow rates from 45 to 3500 L/h.



#### Input

Allegro 3D Standard Systems  
PN: 7190-1374Y, 7190-1376R

Allegro Connect Buffer  
Management System  
PN: ACBMSEUPLC, ACBMSWS,  
ACBMSFSK, ACBMSFT, 6431-1457D

Allegro Plastic Totes  
PN: LGRPTTE200L, LGRPTRL200L,  
LGRPTTEL200L

Magnetic Mixer  
PN: MMG403, 7404-1443D,  
LM3000JCTA-B4N

Transfer Sets  
PN: 7292-1381M, 7291-1381B,  
7292-1381A, 7291-1380V

#### Output

Magnetic Mixer  
PN: MMG403, 7404-1444L,  
LM1000NCMA-B4N

Transfer Sets  
PN: 7292-1381L, 7292-1399Y, 7291-1381E



#### Supporting

Transfer Sets  
PN: 7291-1399Y

ÄKTA ready XL ¾ flow kit

UNICORN<sup>†</sup> Workstation License

# 5. Virus Inactivation

The control of potential viral contaminants is critical to ensuring the safety of mAb therapeutics. Low pH-based inactivation methods are commonly applied downstream of affinity chromatography, taking advantage of the low pH elution conditions of affinity chromatography. There are several factors that can impact the robustness of this step, including exposure time, pH range, protein concentration and temperature, and careful flow control is required to deliver the expected virus reduction.

## Equipment

### Supor EKV Sterilizing-Grade Filter Cartridges

Validated sterilizing grade membranes for the most cost-effective filtration of a wide range of liquids such as buffers, tissue culture media, and others.

PN: 7090-1437U

[Discover more](#)



#### Input

Allegro 3D Standard Systems  
PN: 7190-1374Y

Allegro Connect Buffer Management System  
PN: ACBMSEUPLC, ACBMSWS, ACBMSFSK, ACBMSFT, 6431-1457D

Allegro Plastic Totes  
PN: LGRPTRL200L, LGRPTE200L, LGRPTEL200L

Magnetic Mixer  
PN: MMG403, 7404-1444L, LM1000NCMA-B4N

Transfer Sets  
PN: 7292-1381M, 7292-1381X



#### Output

Magnetic Mixer  
PN: MMG403, 7404-1443D, LM3000JCTA-B4N

Transfer Sets  
PN: 7292-1381X



#### Supporting

Allegro MVP Single-Use System  
PN: LGRMVPAPE

Transfer Sets  
PN: 9430-1413G, 9430-1413Q

# 6. CEX Chromatography

Cation exchange (CEX) chromatography further purifies the process intermediate achieving separation from process contaminants based upon charge differences. These operations can be performed in bind-elute or flow-through modes and are best managed using an automated chromatography system to achieve consistent performance.

## Equipment

### ÄKTA ready XL

ÄKTA ready XL provides high flow capacity, making the system well suited for purification of high-titer entities or for products produced in large-volume bioreactor cultures. The small system footprint enables an efficient facility use. Single-use sensors with high accuracy allows for reliable monitoring and control of the purification process.



#### Input

Allegro 3D Standard Systems  
PN: 7190-1376T, 7190-1374Y,  
7190-1374W, 7292-1381A

Allegro Bioprocessing Workstations  
PN: LGRTTBS

Allegro Connect Buffer  
Management System  
PN: ACBMSEUPLC, ACBMSWS,  
ACBMSFSK, ACBMSFT, 6431-1457D

Allegro Plastic Totes  
PN: LGRPTTE200L, LGRPTRL200L,  
LGRPTEL200L, LGRPTTE500L,  
LGRPTRL500L, LGRPTEL500L,  
LGRPTTE50L

Magnetic Mixer  
PN: MMG403, 7404-1443D,  
LM3000JCTA-B4N

Transfer Sets  
PN: 7292-1381M, 7291-1381B,  
7291-1380V

#### Output

Magnetic Mixer  
PN: MMG403, LM650NCMA-B4N,  
7404-1452E

Transfer Sets  
PN: 7292-1381L, 7291-1381E



#### Supporting

Transfer Sets  
PN: 7291-1399Y

Gradient Section, ÄKTA ready XL Flow Kits

ÄKTA ready XL Flow Kits

UNICORN Workstation License



# 7. AEX Chromatography

Anion exchange (AEX) using membrane chromatography may be incorporated to help remove residual host cell protein (HCP) and DNA, and assist with virus clearance to achieve a highly purified process intermediate.

## Equipment

### ÄKTA ready Single-Use System

ÄKTA ready is a single-use liquid chromatography system built for process scale-up and manufacturing. The system uses disposable flow paths and pre-packed columns that enable flexibility and speed in bioprocessing.



#### Input

Allegro 3D Standard Systems  
PN: 7190-1376R, 7190-1374W

Allegro Connect Buffer  
Management System  
PN: ACBMSEUPLC, ACBMSWS,  
ACBMSFSK, ACBMSFT, 6431-1457D

Allegro Plastic Totes  
PN: LGRPTTE200L, LGRPTTL200L,  
LGRPTTEL200L, LGRTTBSC,  
LGRPTTE50L

Magnetic Mixer  
PN: MMG403, LM650NCMA-B4N,  
7404-1452E

Supor EKV Sterilizing-Grade  
Filter Cartridges  
PN: 7090-1438D

Transfer Sets  
PN: 7292-1381X, 7292-1469E,  
7292-1381L, 7292-1381M, 7291-1381E,  
7292-1381A, 7291-1380V



#### Supporting

Transfer Sets  
PN: 7291-1399Y

ÄKTA ready Low Flow Kit

UNICORN Workstation License

#### Output

Magnetic Mixer  
PN: MMG403, LM650NCMA-B4N,  
7404-1452E

Transfer Sets  
PN: 7292-1381L, 7291-1381E

# 8. Virus Filtration

Orthogonal to virus inactivation and reductions achieved during chromatographic processes, virus filtration provides a robust, size-based reduction of virus and typically adds >4 log of virus clearance to control product safety.

## Equipment

### Pall Filter Cartridges and Kleenpak Nova Capsules with Pegasus™ Protect Virus Prefilter Membrane or Pegasus Prime Virus Removal Filter Membrane

Pegasus Protect virus prefiltration combines with Pegasus Prime virus filtration to deliver the first gamma-sterilized pre-filter and virus filter combination. Together, these simplify process development, validation and operations while saving time and delivering improved process economy.

[Discover more](#)



#### Input

Allegro Connect Buffer Management System  
PN: ACBMSEUPLC, ACBMSWS, ACBMSFSK, ACBMSFT, 6431-1457D

Magnetic Mixer  
PN: MMG403, LM650NCMA-B4N, 7404-1452E, 7404-1360B

Supor EKV Sterilizing-Grade Filter Cartridges  
PN: 7090-1438D

Transfer Sets  
PN: 7292-1381X, 7292-1469E, 7292-1381M



#### Supporting

Allegro MVP Single-Use System  
PN: LGRMVAPE, 9430-1413C, 9461-1369H, 9430-1413Q

Palltronic® Flowstar V Filter Integrity Test Instrument  
PN: FFS05

#### Output

Magnetic Mixer  
PN: LM1000NCMA-B4N, MMG403, 7404-1444L

Transfer Sets  
PN: 7292-1381X

# 9. Concentration

Additional resources 

Concentration and diafiltration using ultrafiltration (UF) membranes further concentrates the target molecule and exchanges buffers ready for final formulation. Achieving high yield is a common challenge, but our technical experts can work with you to optimize this unit operation.

## Equipment

### ÄKTA readyflux<sup>†</sup> XL Filtration System

ÄKTA readyflux XL is an automated single-use tangential flow filtration system for large-scale manufacturing. The system's broad flow-rate range, low hold-up volume and multiple filtration-control features provide versatility.



#### Input

Allegro 3D Standard Systems  
PN: 7190-1374W, 7190-1376V

Allegro Connect Buffer Management System  
PN: ACBMSEUPLC, ACBMSWS, ACBMSFSK, ACBMSFT, 6431-1457D

Allegro Plastic Totes  
PN: LGRPTTE1000L, LGRTRLPT1000L, LGRPTTEL1000L, LGRTTBSC, LGRPTTE50L

LevMixer<sup>®</sup> System  
PN: LMG403, LM200NCMA-B4N, 7403-1352K

Magnetic Mixer  
PN: MMG403, LM1000NCMA-B4N, 7404-1444L

Transfer Sets  
PN: 7292-1381A, 7291-1380V, 7292-1381M



#### Supporting

Cadence<sup>®</sup> Single-Use Tangential Flow Filtration (TFF) Modules  
PN: CSUM010T250, 7443-1437P

Transfer Sets  
7292-1381A

#### Output

LevMixer System  
PN: LM50NCMA-B4N, LMG403, 7403-1350S

Transfer Sets  
PN: 7291-1380V, 7090-1388D, 7292-1381X

ÄKTA readyflux XL Flow Kit TriClamp

C10 Manifold with TriClamp ready for ÄKTA readyflux TL

UNICORN Workstation License

# 10. Bulk Filtration

Additional resources 

The final stage of manufacture demands the highest levels of process security to safeguard valuable, highly purified drug substance. Sterilizing grade (0.2 µm) filtration, coupled with pre-sterilized fluid handling solutions eliminate bioburden prior to storage, freezing and shipment to fill finish operations.

## Equipment

### Palltronic Flowstar V Filter Integrity Test Instrument

The Palltronic Flowstar V integrity test instrument ensures accurate filter integrity testing with a further reduction in test time, full compliance with 21 CFR Part 11, advanced automation capabilities, and simplified network integration saving the user time while improving process efficiency.

PN: FFS05

[Discover more](#)



#### Input

Allegro Connect Buffer Management System  
PN: ACBMSEUPLC, ACBMSWS, ACBMSFSK, ACBMSFT, 6431-1457D

LevMixer System  
PN: LM50NCMA-B4N, LMG403, 7403-1350S

Transfer Sets  
PN: 7292-1381X, 7292-1381M



#### Supporting

Allegro MVP Single-Use System  
PN: LGRBULKFILL, 9494-1446H, 9494-1446K, 9494-1446L, 9494-1446M, 9494-1446N

Supor EKV Sterilizing-Grade Filter Cartridges  
PN: 7090-1437Y

#### Output

Allegro 2D Standard Systems  
PN: 7190-1397P, 7190-1454N

Allegro 3D Standard Systems  
PN: 7190-1374W

Allegro Bioprocessing Workstations  
PN: LGRTBDC, LGRTEDC

Allegro Plastic Totes  
PN: LGRTEW200L, LGRPTTE50L, LGRTTBSC

Emflon® II Membrane in Kleenpak Capsules  
PN: 7090-1388M

Transfer Sets  
PN: 7292-1381X

Pall® Freeze & Go Solutions Protected by RoSS® technology  
PN: LGRFREEZE5L

## Additional Resources

| Process Description       | Format           | Title  | Link              |
|---------------------------|------------------|--|-------------------|
| <b>Cell Culture</b>       | Poster           | Engineering Characterization of the Allegro Stirred Tank Reactors For Successful Cell Culture Scale-Up   | <a href="#">▶</a> |
| <b>Cell Culture</b>       | Application Note | Scalability Between the Allegro STR 50 and STR 500 Bioreactors in a CHO-S Fed-Batch Process  | <a href="#">▶</a> |
| <b>Cell Culture</b>       | Application Note | Cultivation of CHO Cells in Allegro STR 200 Single-Use Stirred Tank Bioreactor System  | <a href="#">▶</a> |
| <b>Clarification</b>      | Guide            | Cell Harvesting Guide  | <a href="#">▶</a> |
| <b>AEX Chromatography</b> | Application Note | Contaminant Removal by Mustang® Q Membrane Chromatography from a Protein A Purified Monoclonal Antibody  | <a href="#">▶</a> |
| <b>AEX Chromatography</b> | Application Note | Implementation of Mustang Q Membrane Chromatography as a Polishing Step (Residual DNA Removal) in Monoclonal IgG1 Production from CHO Cell Culture | <a href="#">▶</a> |
| <b>Virus Filtration</b>   | Application Note | Filterability Testing and Virus Challenge of Pall Minidisc Capsules with Pegasus SV4 Virus Removal Filter Membrane                                 | <a href="#">▶</a> |
| <b>Virus Filtration</b>   | Application Note | Validating Pegasus Prime Filters: What Virus Spike Should I Use?   | <a href="#">▶</a> |
| <b>Concentration</b>      | Application Note | Volume Reduction and Process Optimization with Cadence Inline Concentrator   | <a href="#">▶</a> |
| <b>Concentration</b>      | White Paper      | Understanding Single-Pass Tangential Flow Filtration and the New Era of Bioprocessing  | <a href="#">▶</a> |

# Equipment List

| Step No. | Process Description | Product  | Part Number   | Link              |
|----------|---------------------|--|---|-------------------|
| 1        | Cell Seeding        | Allegro 2D Standard Systems                        | 7190-1397N, 7190-1397P,<br>7190-1397S   | <a href="#">▶</a> |
| 1        | Cell Seeding        | Allegro 3D Standard Systems                        | 7190-1374W, 7190-1376R  | <a href="#">▶</a> |
| 1        | Cell Seeding        | Allegro STR Bioreactor Biocontainer Bags           | 6412-0726H, 6412-0473Q  | <a href="#">▶</a> |
| 1        | Cell Seeding        | Allegro Bioprocessing Workstations                 | LGRTBDC, LGRTSDC,<br>LGRTRDCPE, LGRTPPE20L,<br>LGRTRPE20L, LGRTRDC  | <a href="#">▶</a> |
| 1        | Cell Seeding        | Allegro Plastic Totes                              | LGRPTTE50L, LGRTTBSC,<br>LGRPTTE200L, LGRPTTL200L,<br>LGRPTTEL200L  | <a href="#">▶</a> |
| 1        | Cell Seeding        | Allegro STR Single-Use Stirred<br>Tank Bioreactors | STR50-230W-R-SU,<br>STR200-230W   | <a href="#">▶</a> |
| 1        | Cell Seeding        | Allegro XRS 25 Bioreactor System                   | XRS25BRS, XRS25FAT,<br>XRS25IVOV, 609-40A   | <a href="#">▶</a> |
| 1        | Cell Seeding        | mPath Benchtop Bioreactor Control Tower            | MPATHLINK-LT  | <a href="#">▶</a> |
| 1        | Cell Seeding        | Temperature Control Unit                           | TCU-V2000A-NRTL   |                   |
| 1        | Cell Seeding        | Transfer Sets                                      | 7292-1516N, 7292-1381X,<br>7292-1380Y   |                   |
| 2        | Cell Culture        | Allegro Plastic Totes                              | LGRPTTE50L, LGRTTBSC,<br>LGRTEI500L, LGRPTTE200L,<br>LGRPTTL200L, LGRPTTEL200L,<br>LGRPTTE1000L,<br>LGRTRLPT1000L,<br>LGRPTTEL1000L | <a href="#">▶</a> |
| 2        | Cell Culture        | Allegro 3D Standard Systems                        | 7190-1377B, 7190-1376V,<br>7190-1374W, 7190-1374Y   | <a href="#">▶</a> |
| 2        | Cell Culture        | Transfer Sets                                      | 7292-1381X, 7292-1380Y  |                   |
| 2        | Cell Culture        | Allegro STR Single-Use Stirred<br>Tank Bioreactor  | STR2000-230W  | <a href="#">▶</a> |
| 2        | Cell Culture        | Allegro STR Bioreactor Biocontainer Bags           | 609-110U  | <a href="#">▶</a> |
| 2        | Cell Culture        | Temperature Control Unit                           | TCU-V10000W-NRTL  |                   |
| 3        | Clarification       | Allegro 3D Stainless Steel Totes                   | LGR3000BASE, LGR3000EXT,<br>LGR3000HOIST, LGR3000STAND  | <a href="#">▶</a> |
| 3        | Clarification       | Allegro 3D Standard Systems                        | 7190-1374U  | <a href="#">▶</a> |
| 3        | Clarification       | Allegro Connect Buffer Management System           | ACBMSEUPLC, ACBMSWS,<br>ACBMSFSK, ACBMSFT,<br>6431-1457D  | <a href="#">▶</a> |
| 3        | Clarification       | Allegro MVP Single-Use System                      | 9430-1413S, 9430-1416M,<br>9430-1419Y, LGRMVPAPE  | <a href="#">▶</a> |
| 3        | Clarification       | Magnetic Mixer                                     | LM3000JCTA-B4N, MMG403,<br>7404-1443D   | <a href="#">▶</a> |
| 3        | Clarification       | Stax mAx Clarification Chassis                     | SXPSC10W  | <a href="#">▶</a> |
| 3        | Clarification       | Stax mAx Clarification Plate                       | 7008225, 7008224  | <a href="#">▶</a> |
| 3        | Clarification       | Stax mAx Clarification Module                      | 7008442   | <a href="#">▶</a> |
| 3        | Clarification       | Supor EAV Membrane in<br>Kleenpak Capsules         | 7090-1401N  | <a href="#">▶</a> |

# Equipment List

| Step No. | Process Description     | Product                                       | Part Number   | Link              |
|----------|-------------------------|---|---|-------------------|
| 3        | Clarification           | Transfer Sets                                 | 7292-1380Y, 7292-1381X,<br>7292-1381A, 7292-1381M,<br>7291-1380V, 7292-1381D,<br>7291-1381B             |                   |
| 4        | Affinity Chromatography | UNICORN Workstation License                   | 29128116  |                   |
| 4        | Affinity Chromatography | Allegro 3D Standard Systems                   | 7190-1374Y, 7190-1376R  | <a href="#">▶</a> |
| 4        | Affinity Chromatography | Allegro Connect Buffer Management System      | ACBMSEUPLC, ACBMSWS,<br>ACBMSFSK, ACBMSFT,<br>6431-1457D  | <a href="#">▶</a> |
| 4        | Affinity Chromatography | Allegro Plastic Totes                         | LGRPTTE200L, LGRPTTL200L,<br>LGRPTTEL200L   | <a href="#">▶</a> |
| 4        | Affinity Chromatography | Magnetic Mixer                                | MMG403, 7404-1443D,<br>LM3000JCTA-B4N, 7404-1444L,<br>LM1000NCMA-B4N                                    | <a href="#">▶</a> |
| 4        | Affinity Chromatography | Transfer Sets                                 | 7292-1381M, 7291-1381B,<br>7292-1381A, 7291-1380V,<br>7292-1381L, 7292-1399Y,<br>7291-1381E, 7291-1399Y |                   |
| 4        | Affinity Chromatography | ÄKTA ready XL ¾ flow kit                      | 29482435  |                   |
| 4        | Affinity Chromatography | ÄKTA ready XL                                 | 29609264  |                   |
| 5        | Virus Inactivation      | Allegro 3D Standard Systems                   | 7190-1374Y  | <a href="#">▶</a> |
| 5        | Virus Inactivation      | Allegro Connect Buffer Management System      | ACBMSEUPLC, ACBMSWS,<br>ACBMSFSK, ACBMSFT,<br>6431-1457D  | <a href="#">▶</a> |
| 5        | Virus Inactivation      | Allegro MVP Single-Use System                 | LGRMVPAPE   | <a href="#">▶</a> |
| 5        | Virus Inactivation      | Allegro Plastic Totes                         | LGRPTTL200L, LGRPTTE200L,<br>LGRPTTEL200L   | <a href="#">▶</a> |
| 5        | Virus Inactivation      | Magnetic Mixer                                | MMG403, 7404-1444L,<br>LM1000NCMA-B4N, 7404-1443D,<br>LM3000JCTA-B4N                                    | <a href="#">▶</a> |
| 5        | Virus Inactivation      | Supor EKV Sterilizing-Grade Filter Cartridges | 7090-1437U  | <a href="#">▶</a> |
| 5        | Virus Inactivation      | Transfer Sets                                 | 7292-1381M, 7292-1381X,<br>9430-1413G, 9430-1413Q   |                   |
| 6        | CEX Chromatography      | ÄKTA ready XL                                 | 29609264  |                   |
| 6        | CEX Chromatography      | ÄKTA ready XL Flow Kit                        | 29482435  |                   |
| 6        | CEX Chromatography      | Gradient Section, ÄKTA ready XL Flow Kits     | 29279665  |                   |
| 6        | CEX Chromatography      | Allegro 3D Standard Systems                   | 7190-1376T, 7190-1374Y,<br>7190-1374W, 7292-1381A   | <a href="#">▶</a> |
| 6        | CEX Chromatography      | Allegro Bioprocessing Workstations            | LGRTTBSC  | <a href="#">▶</a> |
| 6        | CEX Chromatography      | Allegro Connect Buffer Management System      | ACBMSEUPLC, ACBMSWS,<br>ACBMSFSK, ACBMSFT,<br>6431-1457D  | <a href="#">▶</a> |
| 6        | CEX Chromatography      | Allegro Plastic Totes                         | LGRPTTE200L, LGRPTTL200L,<br>LGRPTTE500L, LGRPTTL500L,<br>LGRPTTEL500L, LGRPTTE50L                      | <a href="#">▶</a> |

# Equipment List

| Step No. | Process Description | Product  | Part Number   | Link              |
|----------|---------------------|--|---|-------------------|
| 6        | CEX Chromatography  | Magnetic Mixer   | MMG403, 7404-1443D,<br>LM3000JCTA-B4N,<br>LM650NCMA-B4N, 7404-1452E                                     | <a href="#">▶</a> |
| 6        | CEX Chromatography  | Transfer Sets  | 7292-1381M, 7291-1381B,<br>7291-1380V, 7292-1381L,<br>7291-1381E, 7291-1399Y                            |                   |
| 6        | CEX Chromatography  | UNICORN Workstation License  | 29128116  |                   |
| 7        | AEX Chromatography  | ÄKTA ready Low Flow Kit  | 28930182  |                   |
| 7        | AEX Chromatography  | ÄKTA ready Single-Use System   | 29032038 (gradient system)<br>28906261  |                   |
| 7        | AEX Chromatography  | Allegro 3D Standard Systems  | 7190-1376R, 7190-1374W  | <a href="#">▶</a> |
| 7        | AEX Chromatography  | Allegro Connect Buffer Management System   | ACBMSEUPLC, ACBMSWS,<br>ACBMSFSK, ACBMSFT,<br>6431-1457D  | <a href="#">▶</a> |
| 7        | AEX Chromatography  | Allegro Plastic Totes  | LGRPTTE200L, LGRPTRL200L,<br>LGRPTTEL200L, LGRTTBSC,<br>LGRPTTE50L                                      | <a href="#">▶</a> |
| 7        | AEX Chromatography  | Magnetic Mixer   | MMG403, LM650NCMA-B4N,<br>7404-1452E  | <a href="#">▶</a> |
| 7        | AEX Chromatography  | Supor EKV Sterilizing-Grade Filter Cartridges  | 7090-1438D  | <a href="#">▶</a> |
| 7        | AEX Chromatography  | Transfer Sets  | 7292-1381X, 7292-1469E,<br>7292-1381L, 7292-1381M,<br>7291-1381E, 7292-1381A,<br>7291-1380V, 7291-1399Y |                   |
| 7        | AEX Chromatography  | UNICORN Workstation License  | 29128116  |                   |
| 8        | Virus Filtration    | Allegro Connect Buffer Management System   | ACBMSEUPLC, ACBMSWS,<br>ACBMSFSK, ACBMSFT,<br>6431-1457D  | <a href="#">▶</a> |
| 8        | Virus Filtration    | Allegro MVP Single-Use System  | LGRMVPAD, 9430-1413C,<br>9461-1369H, 9430-1413Q   | <a href="#">▶</a> |
| 8        | Virus Filtration    | Magnetic Mixer   | MMG403, LM650NCMA-B4N,<br>7404-1452E, 7404-1360B,<br>LM1000NCMA-B4N, 7404-1444L                         | <a href="#">▶</a> |
| 8        | Virus Filtration    | Pall Filter Cartridges and Kleenpak Nova Capsules with Pegasus Protect Virus Prefilter Membrane or Pegasus Prime Virus Removal Filter Membrane |   | <a href="#">▶</a> |
| 8        | Virus Filtration    | Palltronic Flowstar V Filter Integrity Test Instrument   | FFS05   | <a href="#">▶</a> |
| 8        | Virus Filtration    | Supor EKV Sterilizing-Grade Filter Cartridges  | 7090-1438D  | <a href="#">▶</a> |
| 8        | Virus Filtration    | Transfer Sets  | 7292-1381X, 7292-1469E,<br>7292-1381M   |                   |
| 9        | Concentration       | ÄKTA readyflux XL Flow Kit TriClamp  | 29403627  |                   |
| 9        | Concentration       | ÄKTA readyflux XL Filtration System  | 29609298  |                   |
| 9        | Concentration       | Allegro 3D Standard Systems  | 7190-1374W, 7190-1376V  | <a href="#">▶</a> |

# Equipment List

| Step No. | Process Description | Product   | Part Number   | Link              |
|----------|---------------------|---|---|-------------------|
| 9        | Concentration       | Allegro Connect Buffer Management System                    | ACBMSEUPLC, ACBMSWS, ACBMSFSK, ACBMSFT, 6431-1457D                      | <a href="#">▶</a> |
| 9        | Concentration       | Allegro Plastic Totes                                       | LGRPTTE1000L, LGRTRLPT1000L, LGRPTTELI000L, LGRTTBSC, LGRPTTE50L        | <a href="#">▶</a> |
| 9        | Concentration       | C10 Manifold with TriClamp ready for ÄKTA readyflux XL      | 7445-1418W  |                   |
| 9        | Concentration       | Cadence Single-Use Tangential Flow Filtration (TFF) Modules | CSUM010T250, 7443-1437P   | <a href="#">▶</a> |
| 9        | Concentration       | LevMixer System   | LM50NCMA-B4N, LMG403, 7403-1350S, LM200NCMA-B4N, 7403-1352K             | <a href="#">▶</a> |
| 9        | Concentration       | Magnetic Mixer  | MMG403, LM1000NCMA-B4N, 7404-1444L                                      | <a href="#">▶</a> |
| 9        | Concentration       | Transfer Sets   | 7292-1381A, 7291-1380V, 7292-1381M, 7291-1380V, 7090-1388D, 7292-1381X  |                   |
| 9        | Concentration       | UNICORN Workstation License                                 | 29128116  |                   |
| 10       | Bulk Filtration     | Allegro 2D Standard Systems                                 | 7190-1397P, 7190-1454N  | <a href="#">▶</a> |
| 10       | Bulk Filtration     | Allegro 3D Standard Systems                                 | 7190-1374W  | <a href="#">▶</a> |
| 10       | Bulk Filtration     | Allegro Bioprocessing Workstations                          | LGRTBDC, LGRTEDC,   | <a href="#">▶</a> |
| 10       | Bulk Filtration     | Allegro Connect Buffer Management System                    | ACBMSEUPLC, ACBMSWS, ACBMSFSK, ACBMSFT, 6431-1457D                      | <a href="#">▶</a> |
| 10       | Bulk Filtration     | Allegro MVP Single-Use System                               | LGRBULKFILL, 9494-1446H, 9494-1446K, 9494-1446L, 9494-1446M, 9494-1446N | <a href="#">▶</a> |
| 10       | Bulk Filtration     | Allegro Plastic Totes                                       | LGRTTEW200L, LGRPTTE50L, LGRTTBSC                                       | <a href="#">▶</a> |
| 10       | Bulk Filtration     | Emflon II Membrane in Kleenpak Capsules                     | 7090-1388M  | <a href="#">▶</a> |
| 10       | Bulk Filtration     | LevMixer System   | LM50NCMA-B4N, LMG403, 7403-1350S  | <a href="#">▶</a> |
| 10       | Bulk Filtration     | Pall Freeze & Go Solutions Protected by RoSS technology     | LGRFREEZE5L   | <a href="#">▶</a> |
| 10       | Bulk Filtration     | Palltronic Flowstar V Filter Integrity Test Instrument      | FFS05   | <a href="#">▶</a> |
| 10       | Bulk Filtration     | Supor EKV Sterilizing-Grade Filter Cartridges               | 7090-1437Y  | <a href="#">▶</a> |
| 10       | Bulk Filtration     | Transfer Sets   | 7292-1381X, 7292-1381M  |                   |

## Scientific and Laboratory Services

The scientific and regulatory knowledge that supports the selection, adoption, and ongoing use of critical process technology, coupled with analytical, imaging and measurement capabilities, creates a versatile and practical resource ready to respond to an ever-changing industry. Pall maintains these laboratories across the globe and leverages their collective knowledge to deliver practical scientific and regulatory support to all process technologies – to keep you moving forward.

## Technical Services

The accessibility of local technical support networks minimizes delays in your journey at all points. From the early stage of process development to on-site support for mature processes, Pall's technical support groups are there to help remove barriers to progress and to make your journey as rapid and stress free as possible. Our knowledge of the technology and the process can be applied to everything from training to troubleshooting and consultancy. Our global team of technology experts are on hand to respond to your changing needs.

## Advanced Separation Systems

Operating within the defined design space demands the monitoring and control of critical process parameters to assure product quality. Systems that control critical unit operations and that communicate with your existing process components can control process risks and maximize productivity by reducing operator involvement for many processes, Pall applies strong engineering and regulatory understanding to deliver compliant and qualified systems that safeguard and simplify your journey.

## Process Development Services

Prior knowledge is a rare and valuable commodity, especially when preparing to take a new direction or when under pressure to deliver to a tight deadline. Take advantage of Pall's experience, process knowledge and technical know-how to help you achieve your goals. From the optimization of an end-to-end continuous process to establishing the right parameters for a single unit operation, our teams of scientists are ready to work with you and to generate the data you need to make the critical decisions necessary for success.

## Validation Services

Arriving at your destination counts for nothing without the necessary paperwork to proceed to the next stage. Pall's Validation Services are committed to delivering the supporting data packages and analysis required to quantify process risk and to support regulatory submission. Our strengths include critical filtration technologies such as the performance validation of sterilizing grade filtration, and we are at the forefront of the evolving needs in the area of extractables and leachables for all product contact components. We combine the generation of data with interpretation and consultancy to deliver data packages that are ready for regulatory scrutiny and to ensure there are no barriers to progress.

## Servicing and Maintenance

Our range of service packages keeps your equipment protected and well maintained, and includes itemized pay-as-you-go services, start-up care and training packages and a variety of post-warranty service plans that include priority response times, discounts for emergency repairs and flexible payment options. Pall service plans provide total peace of mind and worry-free support throughout the coverage period.



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