



SCALABLE CONTINUOUS FLOW ULTRACENTRIFUGATION

It is estimated **84% of the worldwide flu production** relies on units designed, built, and serviced by Alfa Wassermann Separation Technologies (AWST).

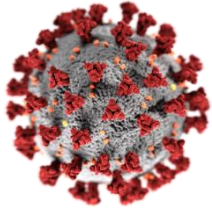
For **over 60 years**, AWST's continuous flow zonal ultracentrifuge has been a vital component in global production of the annual influenza vaccine.

These systems reliably operate year round yielding a product that results in **hundreds of millions of doses of vaccine**.

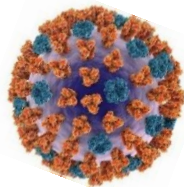
One of the great challenges to producing a SARS-CoV-2 vaccine is the need to produce hundreds of millions of doses. AWST ultracentrifuges address that challenge.



AWST KII Ultracentrifuge



SARS-CoV-2
Diameter = ~120 nm
Density = 1.18 g/mL



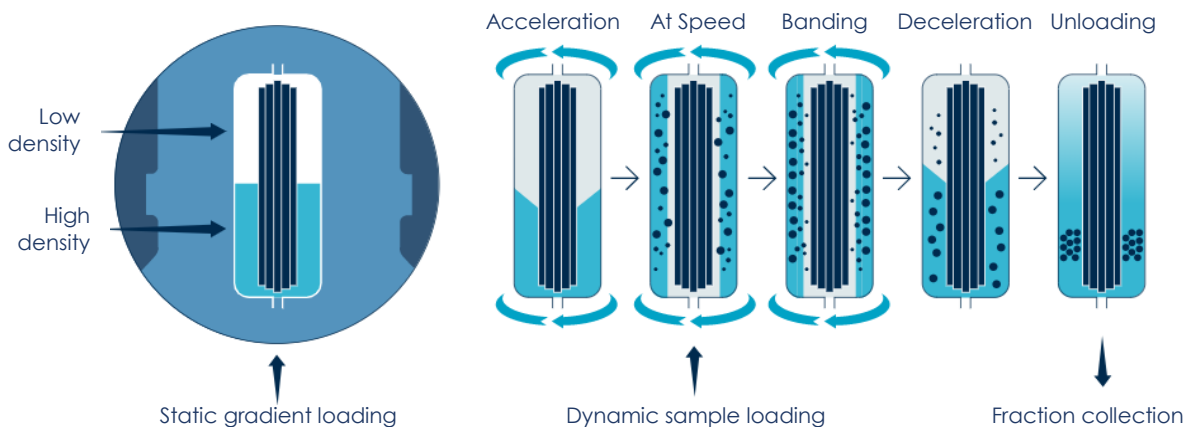
Influenza
Diameter = ~100 nm
Density = 1.19 g/mL

Both SARS-CoV-2, a coronavirus, and influenza are pleomorphic RNA viruses with similar sizes, shapes, densities, and surface proteins.

Viral vaccines generally require forming a suspension. **Ultracentrifugation is the standard** for purifying and concentrating suspensions.

Our unique ultracentrifugation technology bridges the gap between batch operation and large scale production featuring patented continuous flow operation. Scalability from vaccine development to large scale production is the hallmark of AWST's technology.

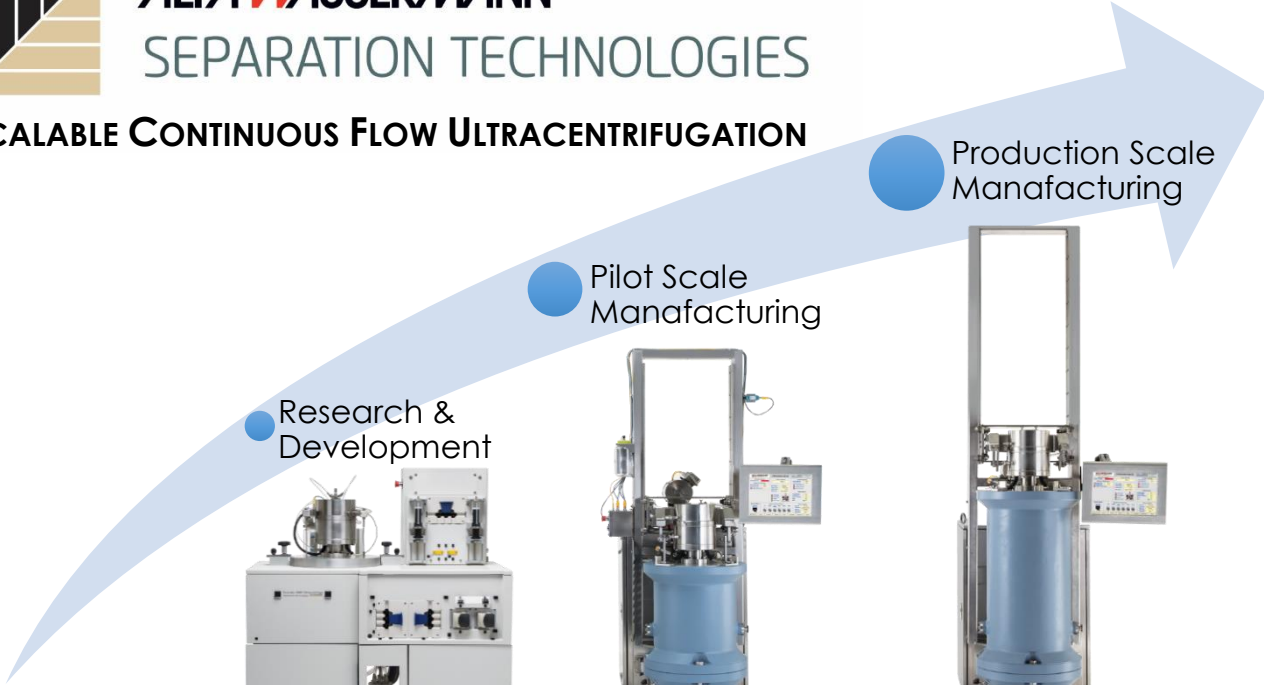
Scalability is rooted in our rotor design used in all AWST systems. During rotation, loaded sample particles separate radially utilizing the relatively simple physical phenomena of sedimentation, and once at rest they can be collected in fractions.





ALFA WASSERMANN SEPARATION TECHNOLOGIES

SCALABLE CONTINUOUS FLOW ULTRACENTRIFUGATION



Promatix 1000

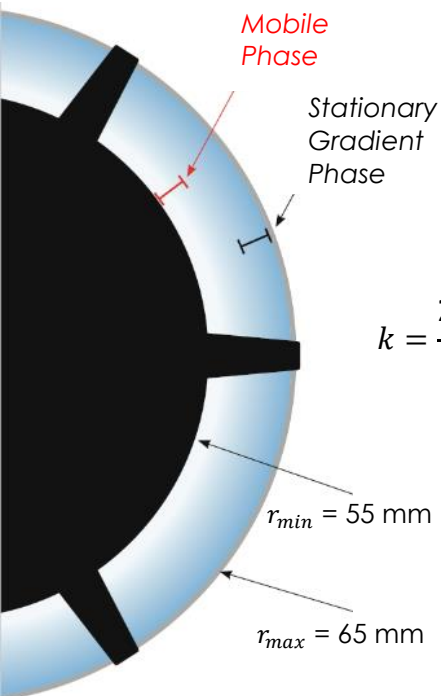


pKII



KII

Rotor Size	230 mL	400, 800, or 1600 mL	3200, or 8000 mL
Typical Flow	0.25 – 2 L/h	Up to 15 L/h	Up to 60 L/h
Max. Speed	35,000 rpm	40,500 rpm	40,500 rpm
G Forces	90,500	121,200	121,200

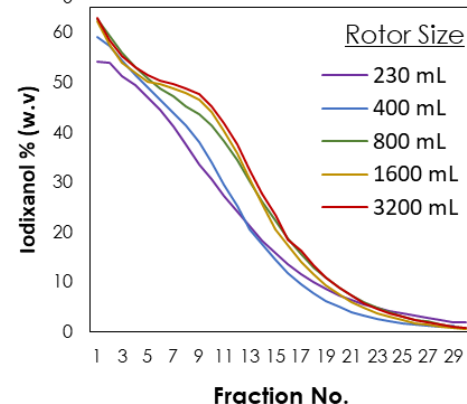
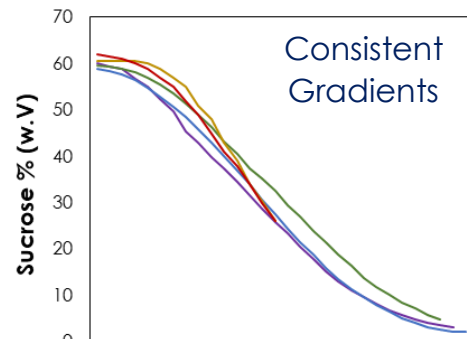


Multiple cores are available with dimensional equivalent forces, only the process volume changes.

Constant k -factors

$$k = \frac{2.53 \times 10^{11} \ln(r_{max}/r_{min})}{rpm^2}$$

Gradient formation and recovery is linearly scalable for a variety of materials (Sucrose, CsCl, and Iodixanol)





ALFA WASSERMANN

SEPARATION TECHNOLOGIES

SCALABLE CONTINUOUS FLOW ULTRACENTRIFUGATION

Why choose Alfa Wassermann for your vaccine development?



K11 Ultracentrifuge

- cGMP regulatory compliant 
- Continuous data collection 
- Improved Process Time 
- Reliable Performance 
- Dedicated Service 
- Process Support 
- Maximize Yield 



K11 Rotor and Core

Additionally, product recovery and process time can be improved with the AWST Automatic Fluid Handler that works in unison with the zonal ultracentrifuge.

-  Automate critical processes
-  Improve product yields
-  Extensibility with spare I/O
-  Continuous data collection
-  Standardize procedures
-  Mobile work station



Automated Fluid Handling System

Contact your AWST representative today at AWST.com