



CASE STUDY /

Solving Pharma and Life Science Design Challenges with Ansys CFD and Penguin Computing, Inc's HPC Cloud — CRB

“At CRB we use Ansys Mechanical and Ansys CFD to help us develop innovative designs for processes and equipment. As consultants, our workload varies throughout the year in ways that can be hard to predict. During peak seasons we can turn to our partner Penguin Computing, Inc. to process simulation jobs faster, or to handle additional jobs in parallel by expanding our in-house capacity. We have found that using Ansys Fluent in Penguin Computing, Inc.® On Demand™ (POD) HPC Cloud clusters is a winning combination to solve complex models quickly in a cost-effective manner. Having a cloud partner enables us to size our internal resources for our usual workload instead of peak seasons, reducing yearly costs by over 20%.”

Juan Pacio

LEED AP Simulation / Process Engineer CRB / San Diego, California, U.S.A.

With the biopharmaceuticals industry facing patent expirations and increasing competition, now more than ever processing equipment designs, such as mixing tanks, need to be developed quickly and efficiently, and work correctly the first time. Having the right software and hardware approach helps engineers complete designs faster in a cost-efficient manner.

/ Company Description

CRB is a leader in engineering, architecture and construction services, ranked #2 in 2017 by the ENR magazine. CRB's worldwide experience includes the design of facilities, equipment and processes for a variety of clients in the biopharmaceuticals, science and technology and food and beverage markets.

/ Challenges

When designing a mixing tank, it is important to know how its components interact to generate the desired hydrodynamic properties for adequate mixing. Sometimes the tank mixers have tight physical tolerances and rotate at high speeds. To model such mixers properly, a very fine mesh is required, resulting in models with greater than 14 million cells with sizes of 8 GB+. With multiple similar jobs it can be challenging to process them all on time during peak seasons. Having an external partner to complement internal resources allows us to deliver on time, while keeping costs down.

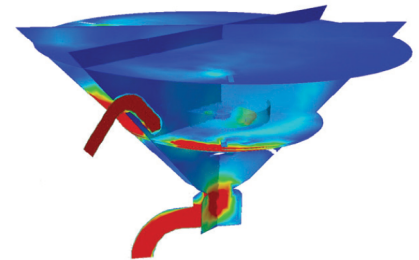
/ Technology Used

- Ansys® SpaceClaim®
- Ansys® DesignModeler™
- Ansys® Meshing™
- Ansys® Fluent®

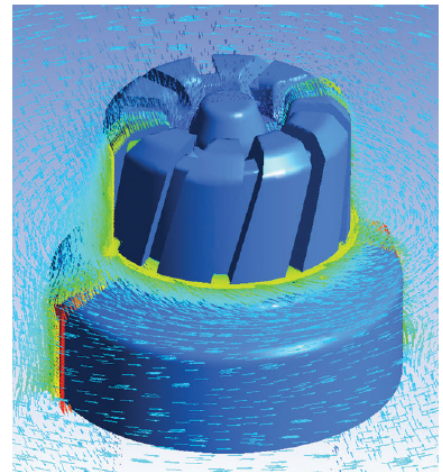
Note: all software listed above was used in local workstations. Fluent and CFD-Post were used in the local workstation and Penguin servers.

/ Engineering Solution

- We built the model geometry on in-house workstations.
- We completed model meshing for large models using Penguin Computing's Penguin Computing On Demand (POD) HPC cloud clusters.
- We solved the model using Fluent on Penguin Computing, Inc. On Demand (POD) clusters for faster completion time.
- We collaborated using the Penguin Computing, Inc. Scyld Cloud Workstation™ to visualize and analyze results, communicate findings and get input.
- We updated and reran the model if required directly on the cloud after sharing results.
- We performed post-processing and completed engineering design on in-house workstations.



CFD model of a recirculation tank showing multiple velocity gradient planes.



High shear mixer, rotating at high RPMs with velocity vectors.

/ Benefits

Having an external HPC cloud partner like Penguin Computing, Inc. has provided the following benefits:

- 100% on-time project completion by solving models during peak seasons on the Penguin Computing, Inc. On Demand (POD) clusters.
- 100% client satisfaction on delivery time and results provided.
- 10% reduction in project execution time, allowing more design time for engineers.
- Eliminated lost revenue due to computational resource limitations.
- Complete flexibility and customization: allocated storage capacity, processor type and speed, number of cores.
- 20% cost avoidance and cost savings compared to procuring or upgrading in-house equipment.
- Ease of use: quick adoption, minimal training needs.
- Good collaboration and communication tools: Penguin Computing's Scyld Cloud Workstation.

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