

Curriculum Vitae – February 2019

Bo Frederiksen

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General: B.Sc. Mechanical, 49 years old, male, Danish citizen

Current Work: Various types of consultancy projects (Minor and middle size projects, Engineering & Sales Partner work) within food ingredients-, pharmaceutical- and chemical industry.

Previous Work experience:

<u>Company</u>	<u>Responsibilities / Results</u>
<p>Mech- ApS 2008- current <u>Founder & owner</u></p> <p><u>Reference persons:</u> Bob Menzies VP, Director of R&D</p> <p><u>Reference persons:</u> Peter Sommer Former Production Manager</p>	<p>1. Consultancy within the Food Ingredients-, Pharmaceutical and Chemical industries - Complete project history:</p> <p>GUSMER ENTERPRISES, Inc. (Biotechnology Company, California)</p> <ul style="list-style-type: none"> Accomplished and carried through (in a project partnership) CD+BD in developing a complete “green field” food & beverage process- and production-line, incl. mechanical engineering, automation preparations, tender process, plant design, building-preparations, ect. Successfully cross-functional and cross-cultural team work over sea <p>XELLIA PHARMACEUTICAL APS (Pharmaceutical Company, Denmark)</p> <ul style="list-style-type: none"> “New stirrers for F14 & F16” – Project management of considerable re-build of two 36 m³ existing fermenters including enforcement (preparation for larger motors/gears), designing rebuild, procurement for new 75 kW motors, FAT, supervision of installation, running-in, commissioning, qualification, etc. Steam reduction project – Design and installation of semi-automated steam traps on 32 m³ existing fermenter in order to obtain a significant reduction in steam consumption and thereby a large saving on steam. Payback time < 2 years.

<u>Company</u>	<u>Responsibilities / Results</u>
<p><u>Reference persons:</u> Jakob Smed Project Manager</p>	<p>LEO PHARMA A/S (Pharmaceutical Company, Denmark)</p> <ul style="list-style-type: none"> • Complete renewing, re-design and re-build of sterile condensate sealing water system for pre-fermenters • Development, construction and implementation of an odour reduction system for fermenters during the sterilisation process • Preparation, procurement and FAT of 4 new gear-motors for 4 existing 40 m³ fermenters. The scope was to renew and shift-over from hydraulic to electrical driven gear-motors (drives) • Moving and updating existing HPLC column incl. control system. Re-commissioning, start-up and running-in
<p><u>Reference person:</u> Poul Brunsgaard Managing Director</p>	<p>ALLERGON AB (Thermo Fisher Scientific owned company in Sweden)</p> <ul style="list-style-type: none"> • Design and rebuild of dog/cat hair extraction line • Consulting / support to spray dryer-project (trouble-shooting, CIP-update /rebuild and validation) for a research and manufacturing of allergen source materials company in Southern Sweden • Design and install new PHE's at several existing Spray Drying equipment's • Design and installation of a CIP in existing spray drying cyclones
<p><u>Reference person:</u> Magnus Andrén Sales Manager</p>	<p>AAF Engineering (Large Swedish Engineering company)</p> <ul style="list-style-type: none"> • Pre-project for a large Dutch company globally leading within Health, Nutrition and Materials. The scope of the pre-project was to deliver a basic design package for 'high-end' pharmaceutical purification equipment (EBA) for contract manufacturing use • Overall project manager for a 10M € project involving both equipment installation and construction work / building erection (new spray dryer incl. surrounding equipment and new warehouse for raws). The project had a length of approx. 1 y and took place in the southern part of Sweden
<p><u>Reference person:</u> Allan Lihme CEO (Now Lihmes Protein Solutions)</p>	<p>UPFRONT CHROMATOGRAPHY A/S (UFC) (Smaller EBA chromatography development company, Denmark)</p> <ul style="list-style-type: none"> • Various types of equipment related consultancy projects within Expanded Bed Absorption (EBA) for UFC's internal development purpose or for their customers

<u>Company</u>	<u>Responsibilities / Results</u>
<p data-bbox="148 170 424 320">Chr. Hansen A/S 2000-08 (Employee) <u>Project Manager,</u> <u>Global Engineering</u></p> <p data-bbox="148 663 424 768"><u>Reference person:</u> Thomas Düring Engineering Director</p>	<p data-bbox="603 170 997 197"><i>Enzyme purification projects:</i></p> <ul data-bbox="651 241 1445 551" style="list-style-type: none"> ● Development of new downstream process for purification of <i>animal rennet</i> from extracted calf wells – based on Autolysis & Expanded Bed Chromatography (EBA) ● Rebuilding of batch Chromatography plant for Purification of animal rennet (Chymosin/Pepsin) ● Development of new downstream process for purification of <i>fermented Chymosin</i> based on Expanded Bed Chromatography (EBA) <p data-bbox="603 645 826 678"><i>Culture projects:</i></p> <ul data-bbox="651 723 1445 1458" style="list-style-type: none"> ● Package owner and responsible for sterile fermentation tanks and surrounding equipment at a <i>new fermentation plant</i>. This project included CIP/SIP of the fermentation equipment. The plant was a “Green Field” project started September 2006 with first product through 15 April 2008 ● Freeze Dry packaging lines: Specifying (URS), prepare tender documents, negotiate contracts / procure equipment, FAT/SAT, install, run-in two complete packing lines for freeze-dried products. One packing line automated with ‘pick- & pack’ robot and one packing line with more manual operations ● Construct and implement hygienic designed anti-foam equipment for fermentation system, handling of exhaust from process and rebuilding of air supply for an aerobic process (fermentation) ● Build a pilot plant REED unit (“Reverse Electro-Enhanced Dialysis”) –The REED process is a membrane filtration technology that allows continuous removal of lactate from an ongoing fermentation <p data-bbox="603 1529 802 1563"><i>Color projects:</i></p> <p data-bbox="603 1597 1455 1659">Complete line of semi-pilot /production scale equipment for color production including;</p> <ul data-bbox="651 1671 1361 2045" style="list-style-type: none"> ● Blending tanks ● Semi-automated filling machine ● Homogenizer ● Small temperature regulated mobile tanks ● Re-build of existing Pasteur ● Rebuild of a Beta-Carotene plant – The plant was automated (mixing & CIP), a high-shear mixer was installed and a special pipe emptying system were designed and implemented

<p>Lundbeck A/S 1996-00 <u>As consultant through</u> <u>Teknikon A/S</u></p>	<p><i>Powder mixing & tablet projects:</i></p> <ul style="list-style-type: none"> • Finalizing, running-in and validation of a 25 kg pharmaceutical Pilot Plant containing; Fluid-bed, coater, several mixing units, incubator, tablet machine and utilities. • Re-building and optimizing at reactors (SFS – Single-Fluid-System). <p><i>Utility projects:</i></p> <ul style="list-style-type: none"> • Preparing User Requirement Specifications, project engineering and construction / implementation of following utilities; <ul style="list-style-type: none"> • Purified Water System (PW), WFI (Water for Injection), Nitrogen and Air (compressed) supply • Installation of new air compressors, adsorption dryers and sterile filters.
<p>Novo Nordisk A/S 1996-00 <u>As consultant through</u> <u>Teknikon A/S</u></p>	

Core competences:

- Experience area: Food Ingredients and Pharma industry
- Senior Project Management (experience with up to 10M € projects)
- Sanitary design and specification of equipment/plants
- Sterile techniques, hygienic design and SIP
- Process optimization
- CIP dosing systems
- Spray Drying techniques
- Separation-/Centrifugation techniques
- Blending & Mixing techniques
- Building utility systems within following areas:
 - Purified Water System (PW),
 - WFI (Water for Injection),
 - Nitrogen
 - Steam / Clean steam
 - Compressed Air
 - pH adjustment systems

Mech-E ApS - Reference list

(Engineering customers)

- LEO Pharma A/S
- Novo Nordisk A/S
- Xellia ApS
- Upfront Chromatography A/S
- Biora AB / Straumann AG
- Chr. Hansen GmbH (Nienburg)
- Unilever AB
- GE HealthCare Bio-Sciences AB
- Barry Callebaut Sweden AB
- DSM Biologics
- Allergon AB
- AAF A/S
- Gusmer Enterprises, Inc.

(Equipment/sensor sale customers, not complete list)

- Centec GmbH (*Mech-E is exclusive Sales Partner for Centec in Denmark*)
- SOFRASER – (*Mech-E is exclusive Distributor for Sofraser in Denmark*)
- Metsä Board AB (Husum)
- AstraZeneca AB
- Zetterströms AB
- Haldor Topsoe A/S
- Royal UniBrew A/S (brewery)
- Vestfyn (brewery)
- Alfa Laval A/S
- Gollane ApS