



LIST Company Presentation

Author:
Date:
Presenter:
Customer:

LIST Technology | Brad Yun
10 October 2025
Brad Yun | Managing Director | LIST Technology Korea Ltd.
JX Metals Corporation



Kneading - Mixing - Drying



Content

- Company Introduction
- LIST Kneader Technology
- LIST Applications
- LIST Technology Centers
- LIST Manufacturing
- LIST Assembly and Service



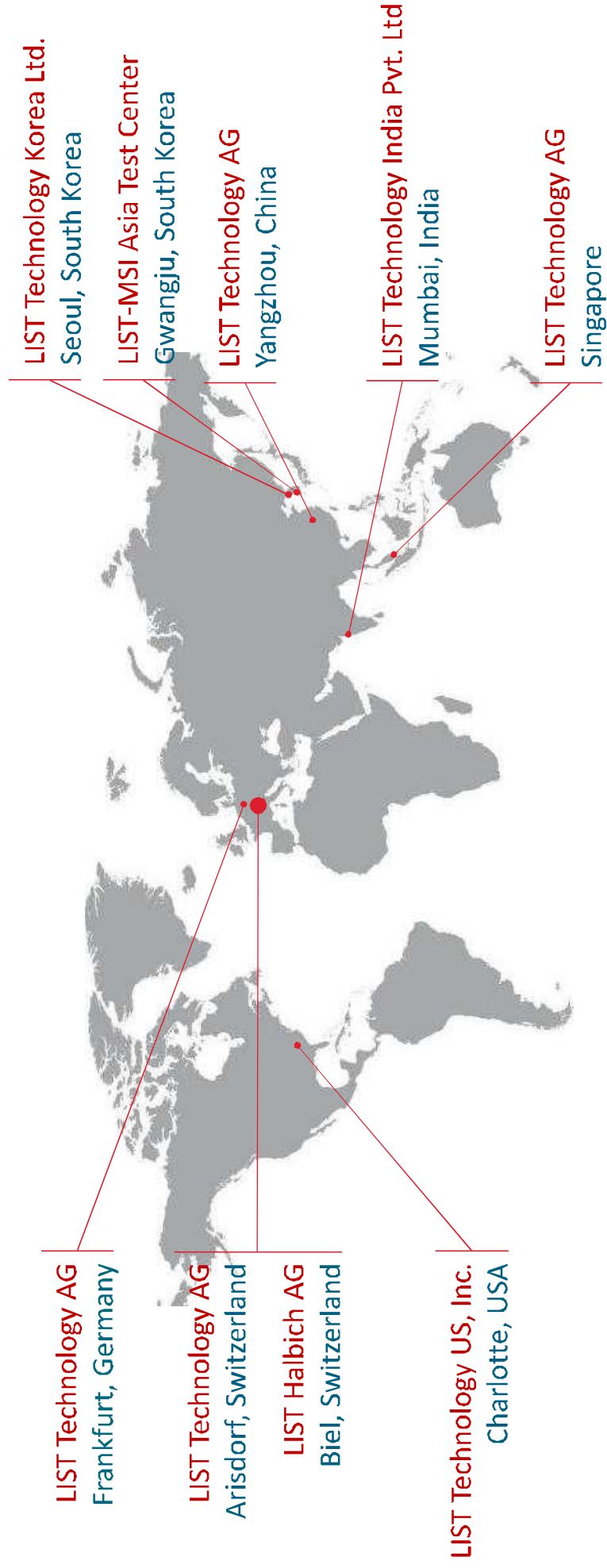
LIST Technology



Introduction

- Founded in 1966
- Specialist in
 - KneaderReactor technology
 - High viscosity processing
 - Process development
 - Peripheral equipment design
- Fully equipped Technology Centers in Switzerland and South Korea
- KneaderReactors engineered and manufactured in Switzerland







LIST Technology

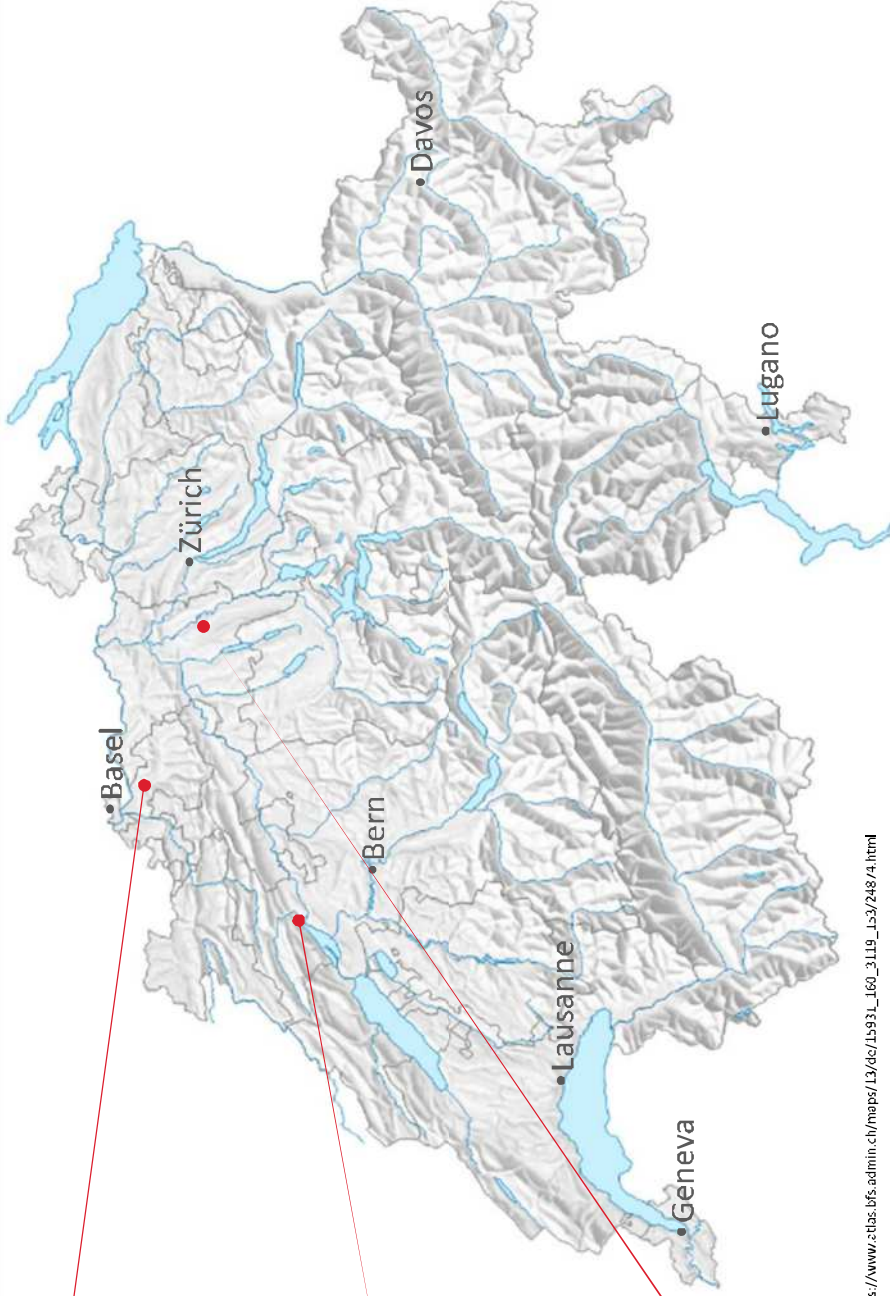


LIST in Switzerland

LIST Technology AG
Headquarter
Arisdorf, Switzerland

LIST Technology AG
LIST Halbach AG
Arisdorf, Switzerland
Manufacturing
LIST Halbach AG
Biel, Switzerland

BBA Innova*
Strengelbach,
Switzerland
*** LIST's daughter company**



https://www.ctbas.bfs.admin.ch/maps/13/dcs/15931_160_3119_153/248/4.html

Corporate Structure Jakob Müller Holding AG since 31 Jan 2025



Product Portfolio of Jakob Müller Family

Textile Solutions



Jakob Müller Group



Jakob Müller AG

Narrow textile production machines

Benninger Group



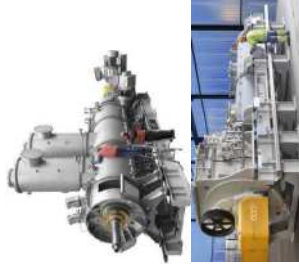
Benninger AG

Textile finishing, Tire Cord treating lines

Process Solutions



LIST Technology Group



List Technology AG

High Viscosity KneaderReactor

BUSS Group



Buss AG

Co-Kneader (Oscillating single-screw for compounding)

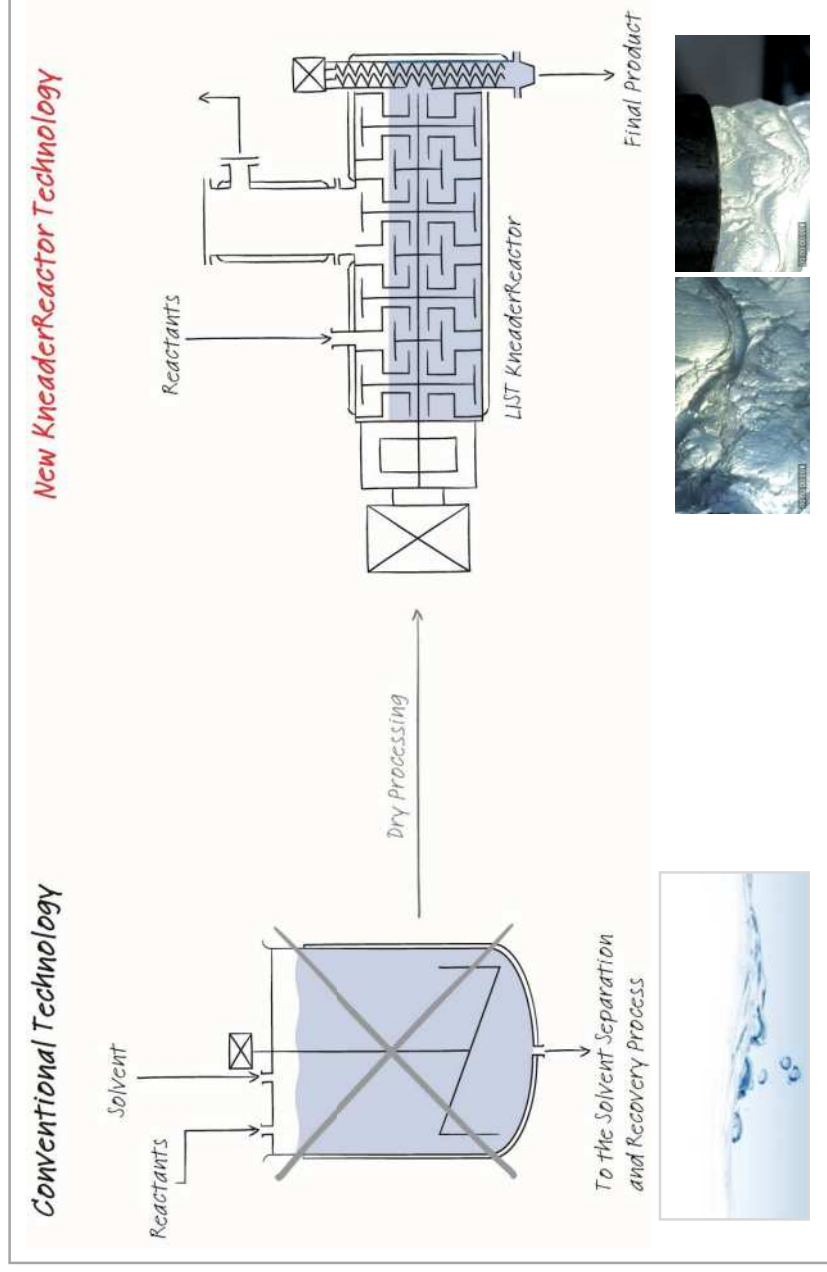
BBA Innova



BBA Innova AG

Industrial coolers for flaking & solidifying

Vision



Heinz List (1912 – 1988)
Founder of LIST, in 1966

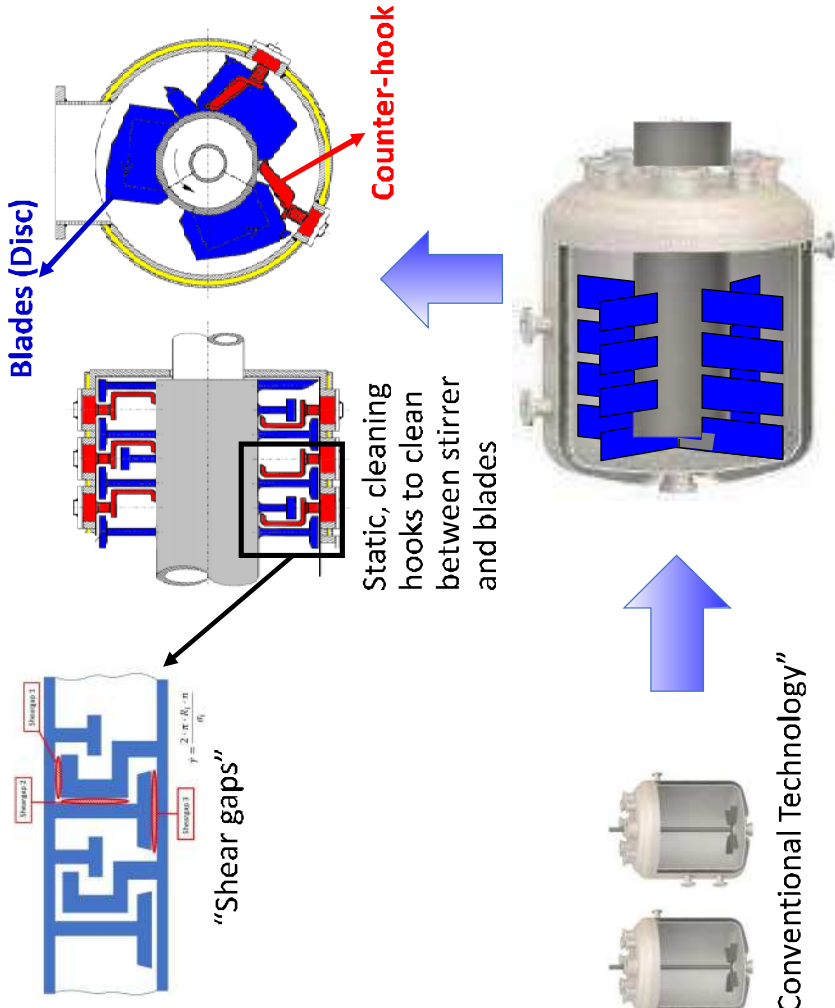
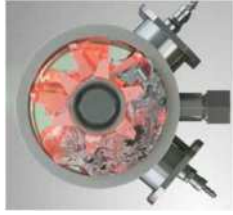
Inventor of the Buss Co-Kneader (1945), LIST Kneader (1965)

Polymer Processing Hall of Fame - University of Akron

Gallery of Celebrities - Stuttgart University

How Stirred Reactors became a KneaderReactor - Evolution to KneaderReactor

- Interaction of static and rotating mixing elements
- Effective mixing / kneading in all product phases
- Self-cleaned agitator-housing geometry
- Large heat exchange surfaces



Stirred Tank Reactors = “Conventional Technology”

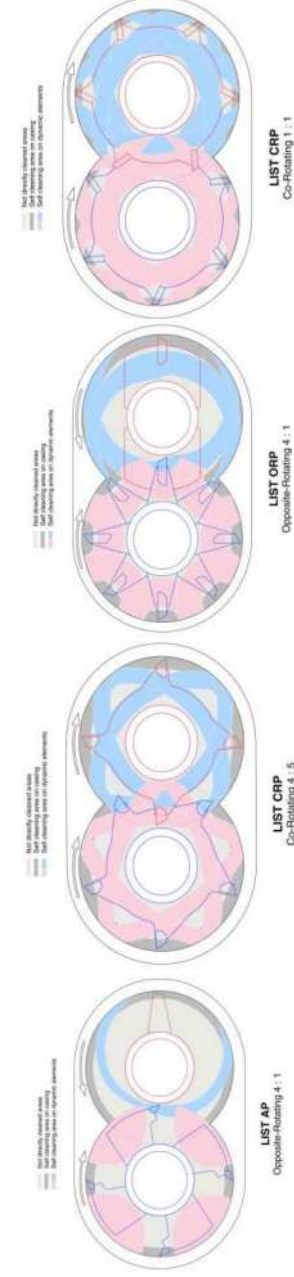
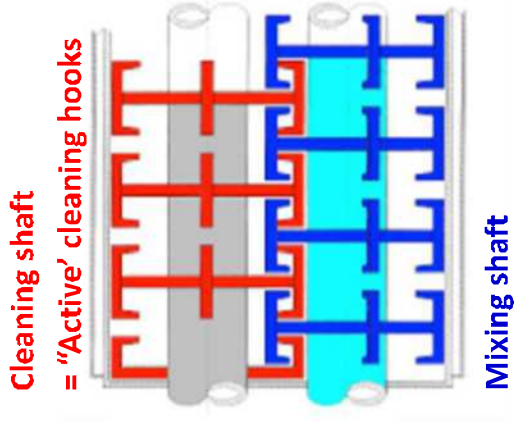
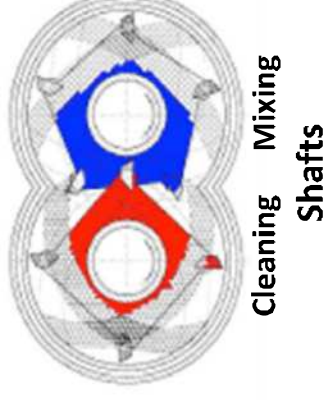


LIST Technology

Evolution to a Twin Shaft KneaderReactor - Twin Shaft KneaderReactor



- Excellent renewal of phase boundary layers
 - Large heat exchange surfaces
 - Very effective self-cleaning
 - Large working volumes
 - Smooth running behavior
- ... at highest torque load with heavy duty applications





Tank Reactors

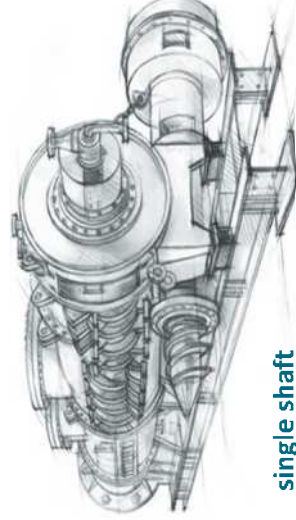


Liquid
0.001 Pas

Low viscous
2 – 10 Pas



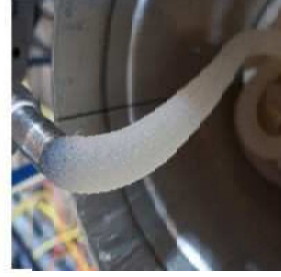
LIST KneaderReactors



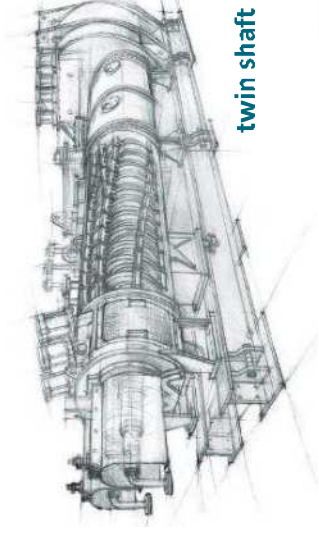
single shaft



Pasty
250 Pas



High viscous
50'000 Pas

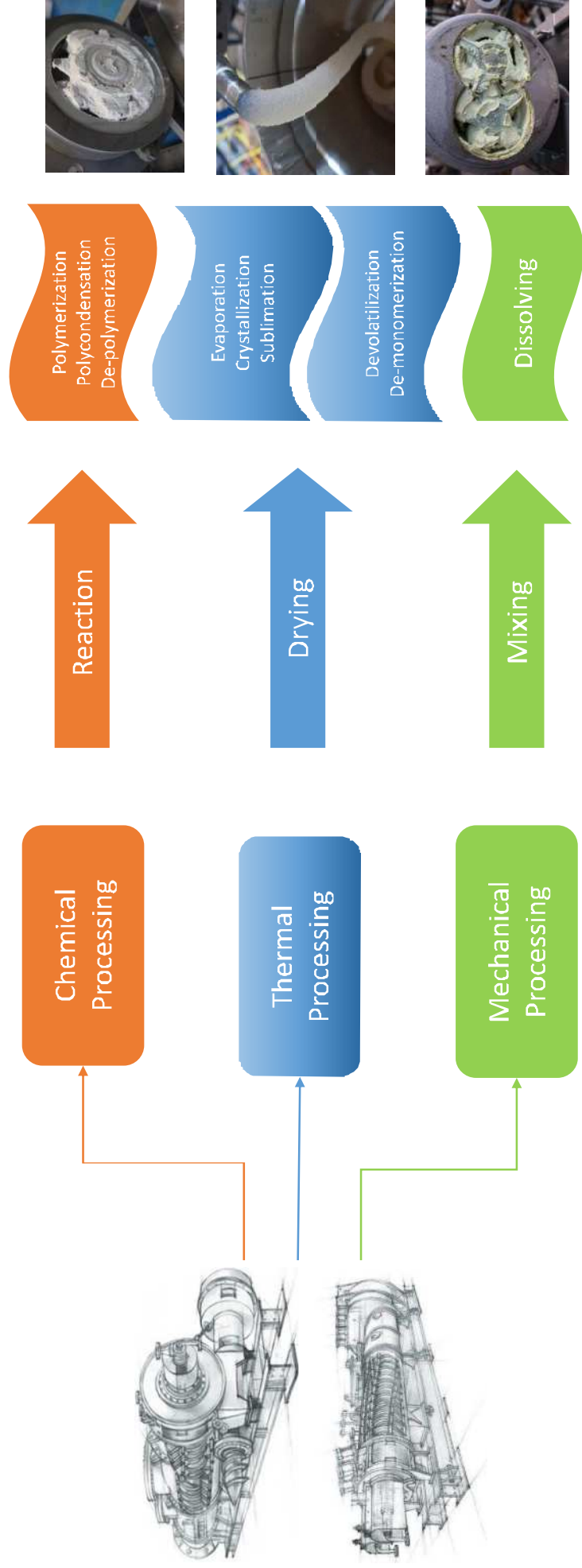


twin shaft



Solids

LIST KneaderReactor – Process Technology





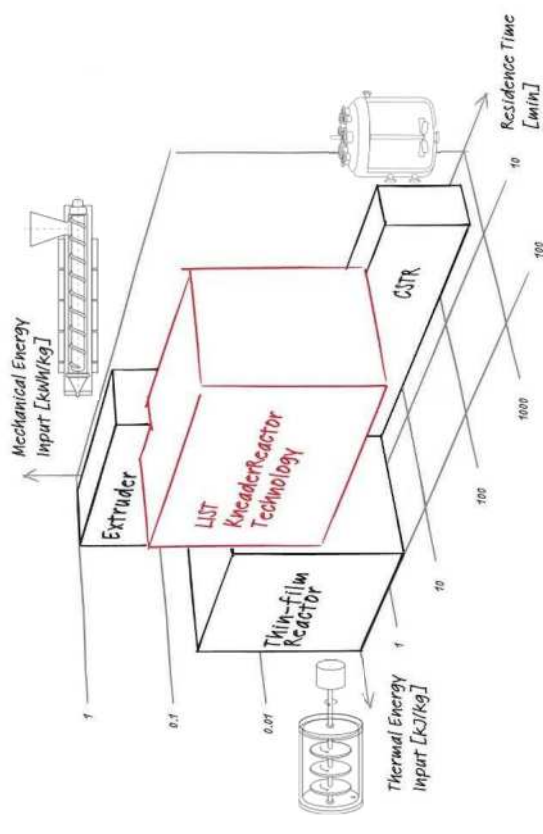
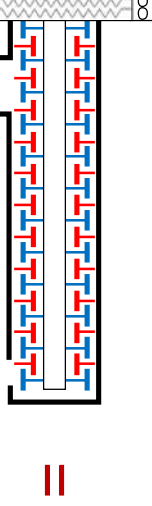
LIST KneaderReactor - Advantages in Processing

LIST KneaderReactor technology fills the gap between

- Thin film reactor
- Extrusion
- Conventional drying technologies

It combines

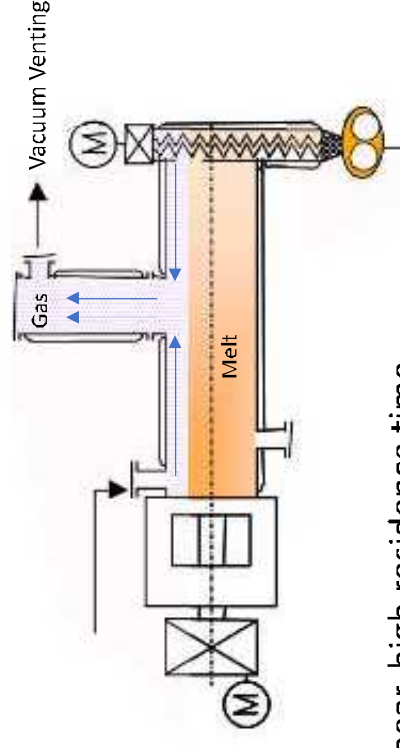
- the mechanical strength of heavy duty extruders
- the large heat exchange surface of thin film equipment
- The large working volume of rotary disc dryers



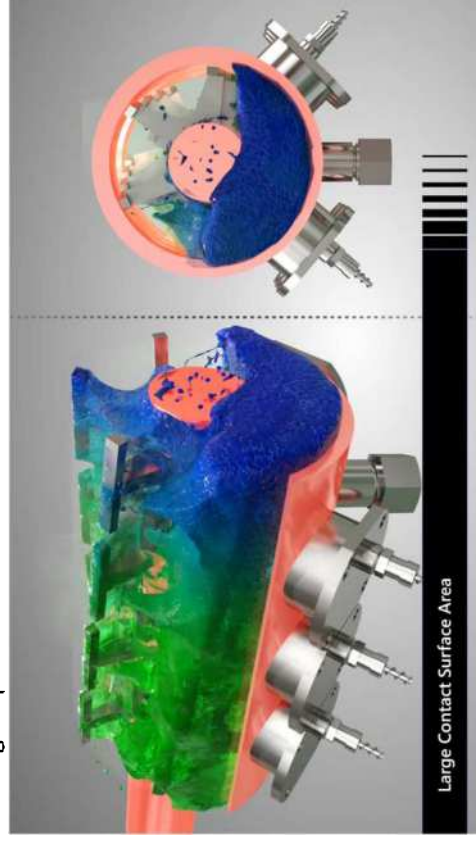
Characteristics

- **Fill Level**
 - Always partly filled (typically 50-70%)
- **Surfaces**
 - Large volumes > 14m³ Conti / 50m³ Batch
 - Large heat transfer surfaces
 - Large cross sections
 - Low gas speed
- **Shaft speed**
 - N = 10-100 rpm, typically 15-60 rpm
 - Residence time is independent of shaft speed
 - Radial mixing is independent on conveying

LIST-KneaderReactor



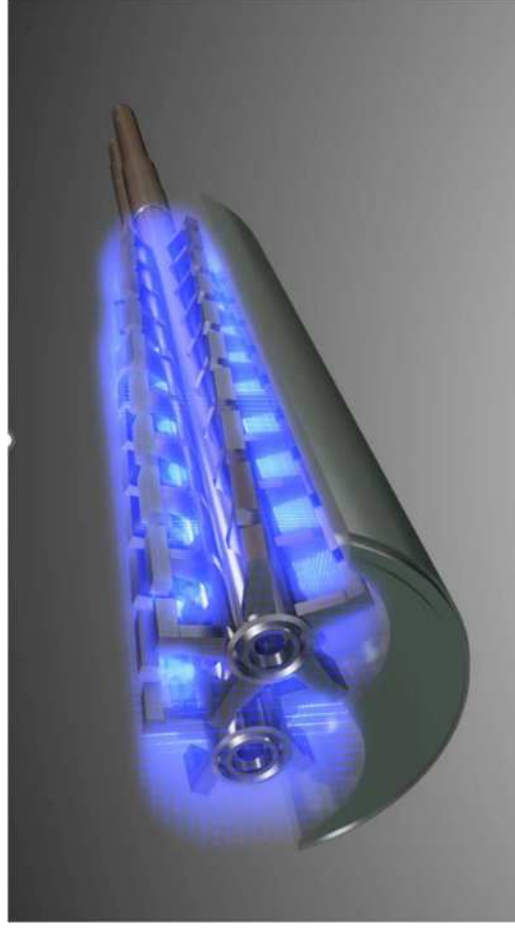
- Low shear, high residence time
- Combination of dissipation and contact heat
- Tolerant to solids
- Phase changes to free-flowing material possible
- Rigid, long-lasting design for years of 24/7 operation



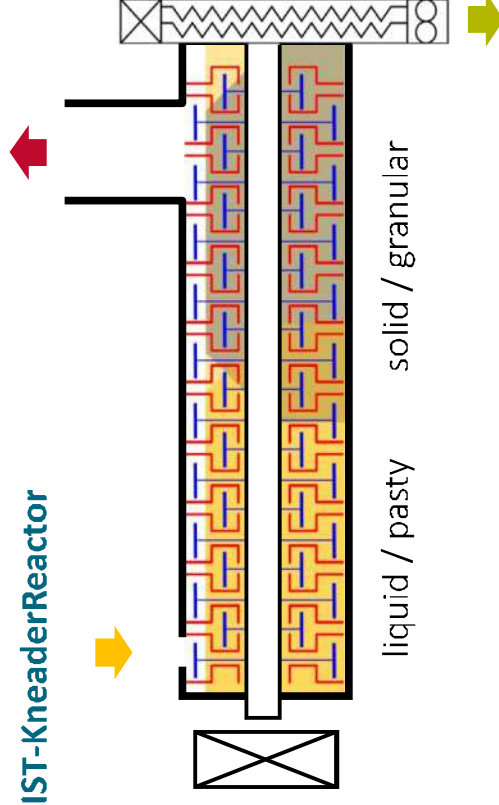


Characteristics

LIST Twin shaft Co-rotating



LIST-KneaderReactor



- Conti-Mixing-Kneading
- Co-rotating or counter-rotating
- Drying & Self-cleaning
- Discharge by screw or weir plate
- Phase changes liquid to solid



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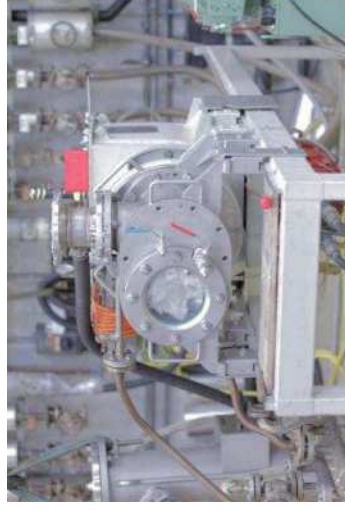
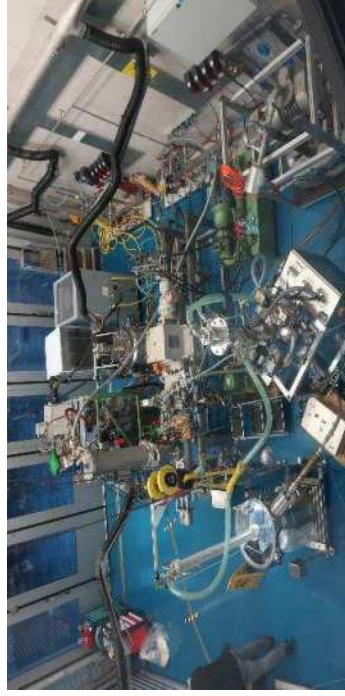
Kneading - Mixing - Drying

Your Industry with LIST Technology Solutions





- Team**
- 5 Engineers
 - 1 Trainee

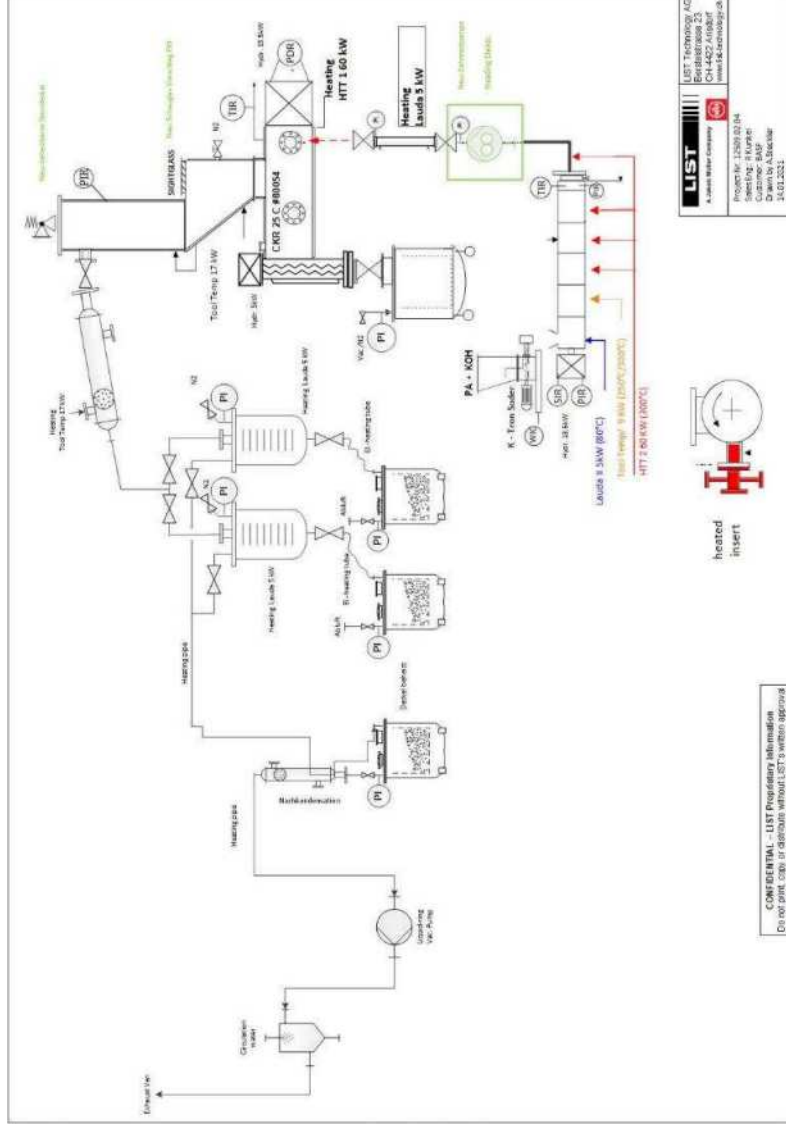


Equipment

- 4 separate test bays
- Suitable for *EX Zone II Tx*
- Kneading Reactors from 1 – 160 liter process volume
- Data recording systems
- Dosing systems such as
 - Pumps
 - Powderfeeder (Feeding into vacuum)
 - Gravimetric feeder
 - Feedextruders
- Heating systems
- Condensation skids
- Vacuum pumps
- Exhaust air scrubber
- Heating and cooling chambers
- Laboratory for simple analysis

Tasks

- Creating of risk-analysis
- Set-up of test equipment
- Conducting customer trials
- Commissioning of customer`s test lines
- Commissioning support
- Operator training

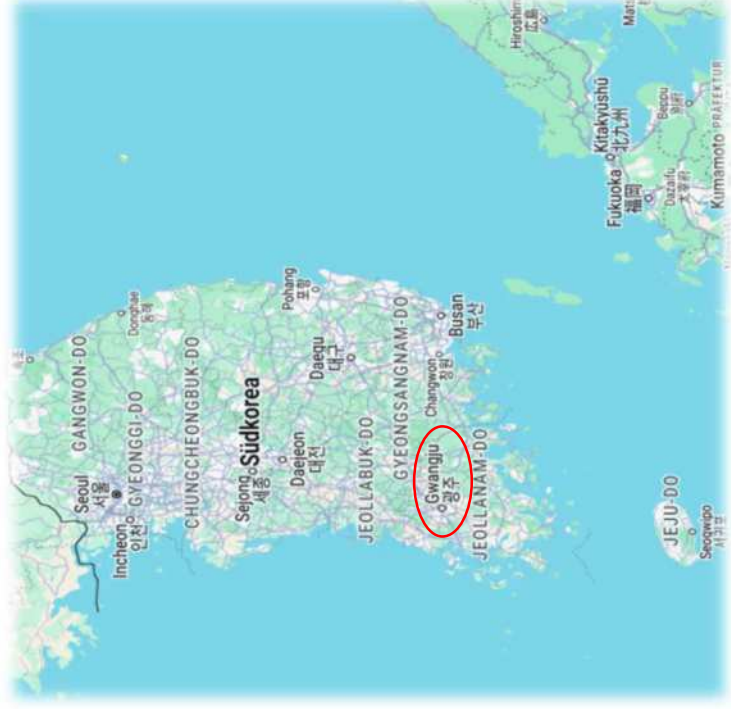


Technology Center

Gwangju, South Korea



- Team**
- Director
 - 3 Test Engineers
 - 1 Administration
- +
- Partner MiraeSI
 - Control System
 - Commissioning
 - Support for tests



LIST Korea Team



Technology Center Gwangju, South Korea

Facilities and Equipment

- 3 x Twin Shaft
 - CRP 2.5
 - CRP 10B/25C
 - CKR 10B/25C
- 1 x Single shaft
 - DTB 6B/12C



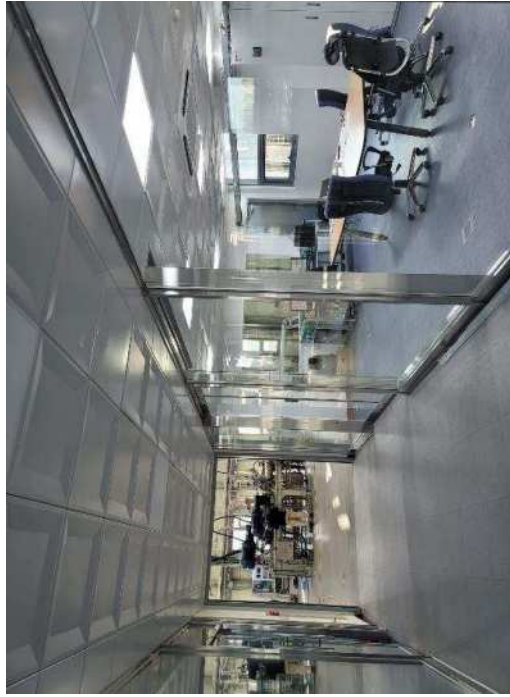
- Facilities**
- 2 Stage Devol line lab
 - 1 x CME single shaft 6 liter
 - 1 x Finisher single shaft 4 liter
 - 1 x Finisher twin shaft 6 liter
- and**
- Equipment**
- BBA Inova Drum cooler





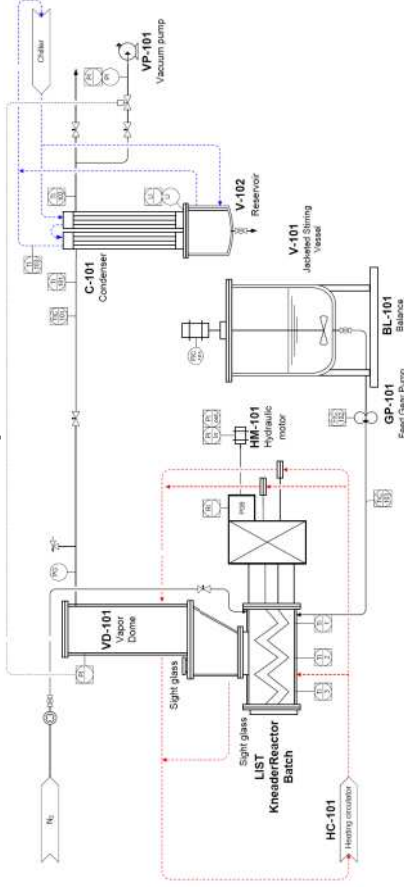
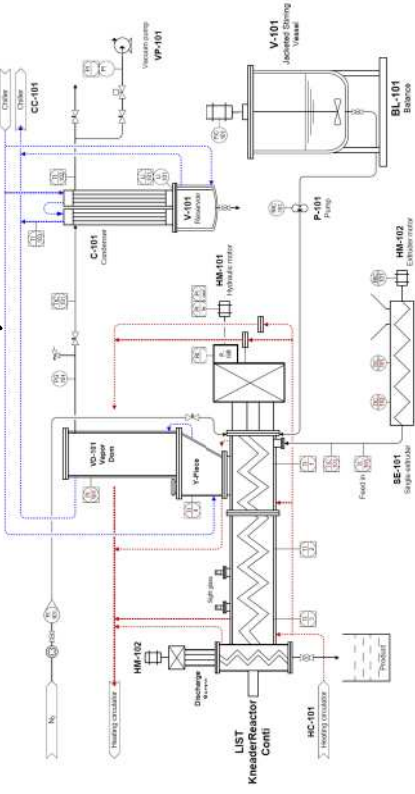
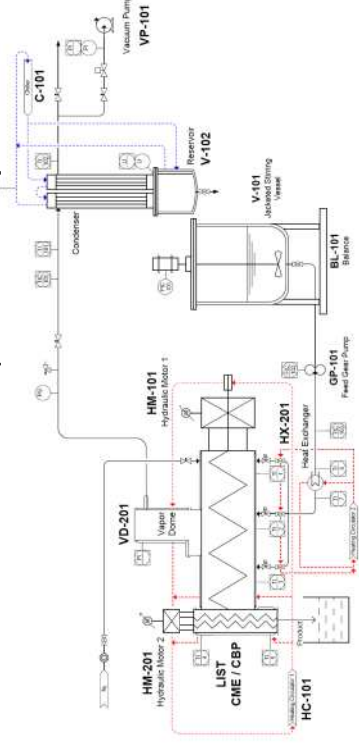
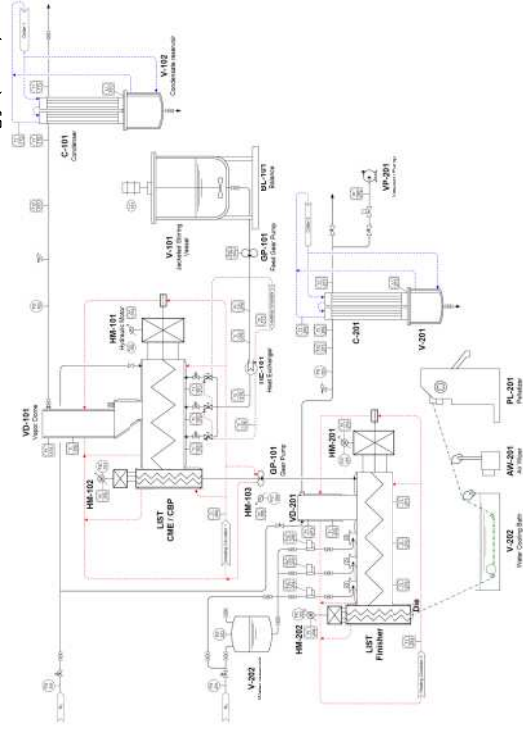
Facilities
and
Equipment


Control room/ Meeting rooms/ offices



- 2 Stage Devol line Pilot
- 1 x CME single shaft 40 liter
- 1 x Finisher 30 liter



Case 1: Batch Feasibility Test

Case 2: Continuous Feasibility Test

Case 3: Continuous Main Evaporation / Bulk Polymerization

Case 4: LIST Direct Devolatilization Technology (DDT)


 Technology Center
Gwangju, South Korea



LMATC and the entire team will be happy to welcome you!

LIST Manufacturing



- Qualified and authorized specialists for
 - Machining of individual parts for welded constructions
 - Welding of the highest quality
 - Non-destructive testing
- Fully equipped machining, welding and assembly workshop in Biel, Switzerland
- Founded in 1981





SGS Certificate
 Site certificate of main certificate Reg. no. H44886
 The SGS herewith attests that the organisation named below has a management system that meets the requirements of the normative basis mentioned.

LIST Kneading - Mixing - Drying
LIST Halbach AG
 Lengnaustrasse 8
 2504 Biel/Bienne
 Switzerland

Scope:
 Welding technology and plant engineering

Normative basis:
 Quality Management System
 Environmental Management System

ISO 9001:2015
 ISO 14001:2015

Reg. no. 580221
 Validity: 26.09.2021 - 25.09.2024
 Note: 26.09.2021

A. Givara, President SGS
 F. Müller, CEO SGS

Partner of IQNET
 Swiss Association for Quality and Management Systems (SQS)
 Bernstrasse 101, 3052 Zollikofen, Switzerland

- Management System for Welding Technology and Plant Engineering

- ISO 9001:2015
- ISO 14001:15

- Certified Manufacturer of Pressure Equipment acc. 2014/68/EU

- AD 2000 HP 0
- SVTI 501
- EN 13445-4
- EN 13480-4

- Quality requirements for Fusion Welding

- EN ISO 3834-2



CERTIFICATE
 Manufacturer accreditation
 Certificate number: Z-COS.VZ.6200348

Manufacturer: LIST Halbach AG
 Road/Street: CH-2504 Biel/Bienne

Production site(s): Lengnaustrasse 8
 CH-Postcode Biel/Bienne

Verified in accordance with:
 AD 2000-HP 0 / SVTI 501 / EN 13445-4 / EN 13480-4
 and
 Comprehensive quality requirements for fusion welding of metallic materials
 in accordance/in conjunction with: (Please select as applicable)
 EN ISO 3834-2

The company fulfils the requirements for producing pressure equipment as laid down by the Pressure Equipment Directive 2014/68/EU while also taking account of the aforementioned rules and standards.
 Details of the responsible supervisory and testing personnel can be found in the report accompanying the certificate, along with the specific requirements of the aforementioned rules and standards.

Report number: P-COS.VZ.6200348
 Valid until: 06.12.2025

Wädswiler, 25.11.2022
 Swiss Safety Center AG is a subsidiary assessment body (notified body) for the Pressure Equipment Directive 2014/68/EU.

SGS
 Competency assessment body for production equipment
 Swiss Safety Center AG
 Industriestrasse 1
 4102 Birmensdorf
 Switzerland
 CE 1253



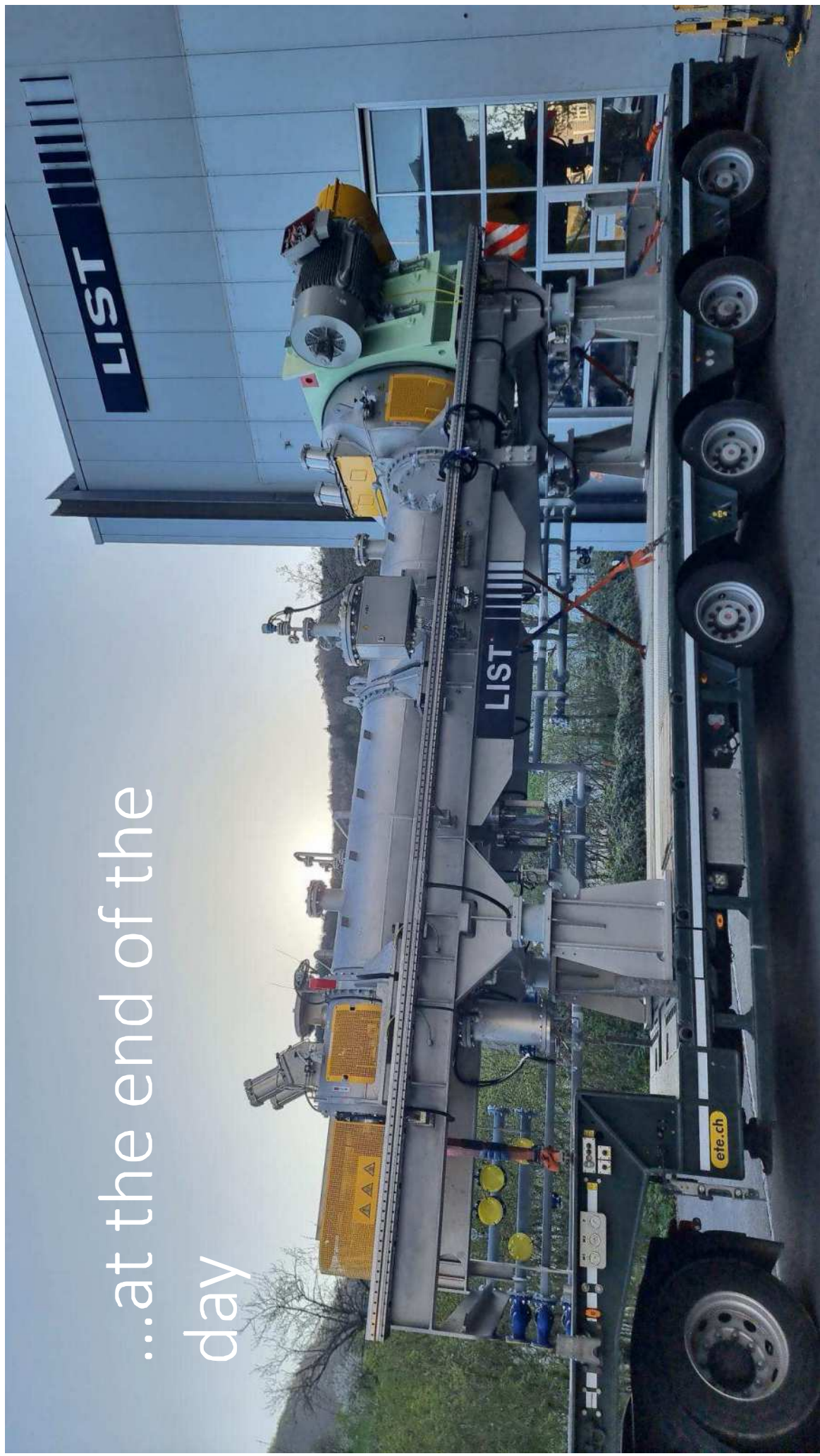
Impressions – Industrial units



- New assembly hall since September 2023
- Footprint 510m²
- 3 assembly stations
- 2 Cranes with lifting load of totally 64 tons



...at the end of the
day



Service

- **Service Center**
 - 4 Person in Switzerland
 - 1 Person in China
 - 1 Person in India
 - 1 Person in USA
 - Partner MiraeSI in Korea
- **Tasks**
 - Customer Service for Spare-parts
 - Commissioning
 - Revision work
 - Complaint processing
 - LSS - proactive customer care



