MANUFACTURING
TECHNOLOGY INSIGHTS

APRIL - 2020

MANUFACTURINGTECHINSIGHTS.COM

LIST
Kneading - Mixing - Drying

TOP
RUBBER AND
TIRE TECH
SOLUTION PROVIDERS
IN EUROPE
2020

Awarded By
MANUFACTURING
TECHNOLOGY INSIGHTS

COMPANY
OF THE YEAR

LIST
Kneading - Mixing - Drying

TOP
RUBBER AND
TIRE TECH
SOLUTION PROVIDERS
IN EUROPE
2020

Awarded By
MANUFACTURING
TECHNOLOGY INSIGHTS

The annual listing of 10 companies that are at the forefront of providing
Rubber and Tire Tech solutions and transforming businesses in Europe

COMPANY OF THE YEAR

MANUFACTURING
TECHNOLOGY INSIGHTS
TOP 10

RUBBER AND TIRE TECH
SOLUTION PROVIDERS IN EUROPE - 2020

LIST 🇨🇭
Kneading - Mixing - Drying

Pioneers in Dry Processing Technology

The continuous stirred-tank reactor has long been the standard equipment for producing polymers along with the extruder that is used for compounding and devolatilisation. However, these processors rely on high shear mixing, which causes mechanical stress leading to product degradation. In order to develop a more sustainable processing method, Heinz List, a gifted inventor, found an alternative to conventional processing methods. List's first design was a single-screw machine combining oscillation and rotation, which ultimately evolved into today's commercially-successful Co-Kneader. Subsequently, he developed the twin-shaft All Phases processor, the first machine that was capable of reliably and safely processing highly viscous, pasty, and crust-forming products. Through these innovations, Heinz recognised that the future of processing technology would depend on machines that can efficiently handle large volumes, are self-cleaning, offer a wide range of residence times, and exhibit excellent mixing and kneading performance. In the pursuit of achieving this vision, LIST Technology AG was established in 1966. Since then, LIST has specialised in solving process engineering challenges and designing the corresponding kneading reactors. Today, LIST's KneaderReactors are leveraged by organisations in the polymer, chemical, fiber, petrochemical, and food industry sectors.

Disrupting the Rubber Industry with the KneaderReactor

LIST's KneaderReactor technology brings key processing advantages to polymer manufacturers. "The benefits include improved product quality, lower capital and operating costs, increased safety, and more compact, efficient, and environmentally-friendly plants," says Karsten Güdemann, CEO and managing director of operations at LIST. In contrast to traditional processors, LIST's KneaderReactors provide a gentle kneading action that ensures excellent mixing and wall heat transfer while minimising shear during the processing of highly viscous materials. The KneaderReactors reduce and eliminate the use of solvents from the reaction step and replace emulsion or suspension polymerisation by bulk processes. This simplifies processes, reduces raw material costs, and saves energy, which is instrumental in reducing the environmental pollution. The company's KneaderReactors also enable the recovery and transformation of volatile—often hazardous—

Karsten Güdemann,
CEO of LIST Technology A.G

distillation residues into valuable side-products. Above all, unlike traditional equipment, LIST's KneaderReactor technology allows manufacturers to work with multiple grades of rubber and seamlessly scale their operations.

These competencies make LIST's KneaderReactors a cut above the other equipment available in the market. Evidently, every client that collaborates with LIST ends up becoming their long-term partner, owing to the unmatched benefits of its KneaderReactor technology.

Delivering a Portfolio that Ensures Superior Quality

The process experts at LIST have several years of experience designing thermal and mechanical processes that occur within the KneaderReactors. In addition to the guidance of its experts, the LIST Test Centre allows clients to evaluate and confirm process feasibility while identifying and addressing potential challenges. Located near Basel, Switzerland, the facility is fully-equipped with a large number of LIST KneaderReactors, various feeding and discharging equipment, condensation units, and data logging systems. The state-of-the-art facility operates in compliance with the latest standards for environmental protection, health, and safety. During trials, small batch testing of a client's product or process proves concept feasibility, which is followed by continuous

mode testing to demonstrate its viability. "Using sophisticated test equipment and our expertise in scaling up, we can also help our customers minimise their time to market," says Güdemann.

Complementary Services Geared to Deliver Value

From project initiation with a feasibility test to industrial project execution, delivery, and operation, LIST offers end-to-end support to its clients. The company's services suite comprises offerings geared towards enhancing installation, commissioning, training, maintenance, and other processes. To help its clients reduce the time to deploy LIST's products, the company assists and supervises the installation of its system, coordinates with sub-suppliers, reviews system interfaces and utilities, and verifies the deployed equipment against the client's specifications. Concurrently, the company tests if their system is mechanically functional and other critical aspects of the KneaderReactor's operations to enable timely and optimised commissioning. LIST also provides training programs to help clients gain an in-depth understanding of every one of their deployments, thereby aiding them in making the most of their investment.

Moreover, LIST's Life Cycle Management (LCM) program ensures optimal performance during the process. LCM aims to achieve zero downtime through a combination of preventive maintenance, continuous optimisation, and training services for the client's in-house teams. LCM helps prolong the lifetime of equipment while maximising performance and minimising the risk of untimely failures.

All-Round Expertise, Singular Focus

According to Güdemann, his company's long-running track record of testing a myriad of rubber devolatisation and polymer synthesis processes has enhanced the team's ability to tackle prevalent challenges and develop innovative solutions to overcome them. Further enhancing

LIST Technology Twin-Shaft KneaderReactor

the flexibility of LIST's offerings is its team of highly competent and passionate professionals from a myriad of industrial backgrounds. Discussing the competencies of its chemical development personnel, Güdemann elaborates, "We ensure that our team of chemical experts are always on top of their game as our offerings often take shape in a chemical lab before scaling up worldwide."

> ❝
> **Using sophisticated test equipment and our expertise in scaling up, we can also help our customers minimise their time to market**
> ❞

As a company, LIST has the flexibility to work with small-scale clients with limited production demands as well as multinational corporations with world-scale manufacturing needs. At the same time, owing to LIST's honest and transparent client engagement approach, the team ensures that clients are informed of other solutions that are more cost-effective than LIST's products to minimise clients' spending.

A Worldwide Footprint of Operational Excellence

LIST's Tech Centers are strategically located worldwide and equipped to support customers with responsive and efficient

services. In addition to the U.S., China, India, and South Korea, LIST also has employees in Singapore and Germany, which enables the company to support customers directly on site. Currently, LIST is well-positioned to expand its geographic reach and enter the South American, Russian, and South-East Asian markets. In parallel, the company intends to broaden the application of its KneaderReactors with a focus on the textile industry and oil refinery business.

Since its inception in 1966, LIST has been committed to improving the technologies that drive today's industrial processing and helping customers meet surging market demands. More recently, the company has gained the capability to offer a fully integrated solution—from development to production and commissioning of Swiss engineered, designed and manufactured industrial equipment—with its acquisition of Swiss manufacturing company, Heinz Halbich AG. Having manufacturing know-how and capabilities within the group gives LIST's clients added safety and comfort in all aspects, from strategic purchasing to quality control and innovation, all with the highest Swiss Quality standards.

Moving ahead, LIST will continue to empower its customers with the most efficient technologies for future chemical processes, and by doing so, create long-term value through better energy efficiency and greater sustainability, which contributes towards a safer environment. **MT**