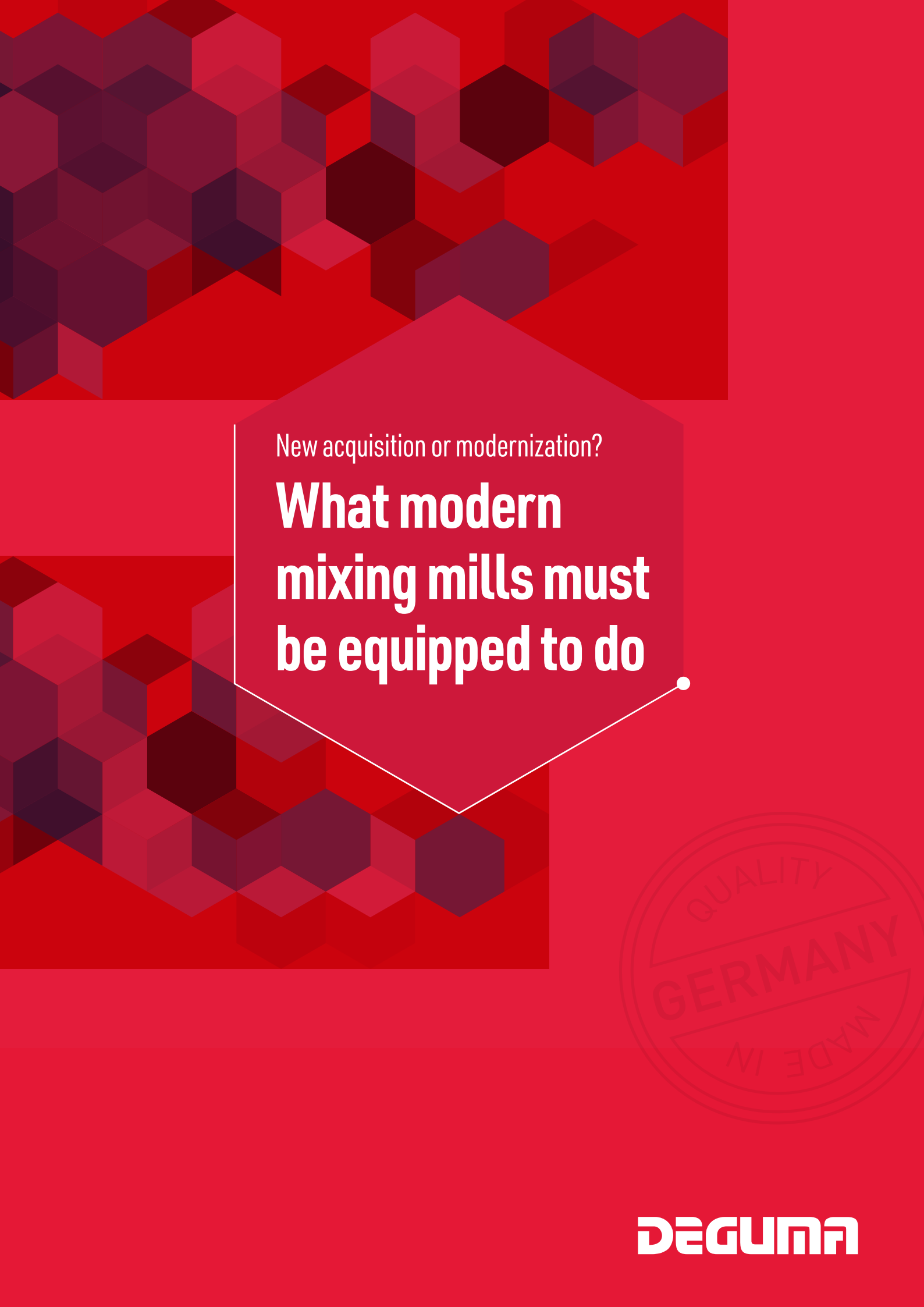




New acquisition or modernization?

**What modern
mixing mills must
be equipped to do**



DEGUMA

New acquisition or modernization?

What modern mixing mills must be equipped to do

Editorial	> 3
State-of-the-art drive, control and safety technology	> 4
Essential considerations for new acquisitions	> 5
Which mixing mill for which application?	> 6
Energy savings, maximum safety, reduced operating costs	> 7
Up to 40 years of extended service life - the advantages of modernizing mixing mills	> 8
DEGUMA at a glance	> 9
About DEGUMA-SCHÜTZ GmbH	> 10
Contact	> 10

› Mixing mills in times of sustainability and digitalization

Editorial

Mixing mills are indispensable when it comes to mixing rubber. This process has proven itself for decades and as a result, one point is often overlooked: Modern drive, safety and control technology can make production more sustainable and safer when a new machine is purchased or an existing one modernized. Users benefit from increased production efficiency with lower energy consumption. It is also important that modern mixing mills fulfill the necessary and intended safety aspects. Especially because the gap between the rollers, which rotate in opposite directions, pose a high risk for users. Accordingly, safety must be at the top of the specification sheet - no matter the machine design. Settings can be quickly adjusted or formulations easily managed with a modern machine control system. Older machines, however, can also be retrofitted and modernized with all these features.

Depending on the application and budget, various industrial mixing mills are available for mixing rubber or silicone. All systems - whether overhauled and modernized, completely new or with different equipment versions - have their place. It is important to find the right solution for the corresponding application to ensure the right process quality.

In this white paper, you will learn about the current state of the art in mixing mills, currently available equipment and what considerations

should be made before purchasing a mixing mill to make the right decision for long-term use. We provide you with a list of use cases to help make your decision in selecting your own solution.

If you have any questions, the DEGUMA team of experienced experts are happy to assist you at any time.

Enjoy reading!



Your Sebastian Bein
Key Account Manager

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It is important to find the right solution for the corresponding application to ensure the right process quality.



› State-of-the-art drive, control and safety technology

Modern mixing mills should include everything that corresponds to the latest (safety) technology. This is the only way to achieve the best result for the application.

Nowadays, technical possibilities include the following features:

- > Peripherally drilled rollers (surface hardness approx. 530-570 HV; chill depth approx. 10-15 mm; surface roughness $R_a < 0.4$) for constant and more precise temperature control at the roller surface
- > Spherical roller bearings
- > Hydraulic roller gap adjustment with roller breakage protection by pressure relief valve
- > Modern safety PLC based on Siemens S7 components in connection with a large, swiveling Siemens SIMATIC HMI comfort panel (visualization of operating parameters via the 15" touch panel; operation of the most important functions with user-friendly pushbuttons and switches)
- > Remote maintenance router

With regard to safety technology, it must be ensured that safety guidelines for mixing mills according to the currently valid version of EN 1417:2023 are met. These include brakes with brake angle monitoring, safety shift rods at the front and rear, and hydraulically operated gap adjustment (for quick opening of the gap in an emergency). In addition, the requirements for safe operation of work equipment and systems requiring monitoring (German Ordinance on Industrial Safety and Health - BetrSichV) must be complied with.

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Modern drive, safety and control technology can make production more sustainable and safer when a new machine is purchased or an existing one modernized.



» Essential considerations for new acquisitions

When purchasing a new mixing mill, various aspects must be taken into account to select the right model. This includes a detailed analysis of the overall process. To mix materials efficiently and uniformly, a number of factors must be considered and questions answered.

Essential considerations include the following:

- > What should a new mixing mill ideally feature or fulfill?
- > What materials do you want to mix and in what quantity?
- > Do you want to process only one mixture, and preferably as usual?
Or would you like to be able to mix different formulations in the future and optimize mixtures even further?
- > How can you produce more efficiently?
- > Should the mixing mill offer greater capacity than the previous one but remain the same size?
- > How much space do you have available? Would you like to save space in the future?
- > How important are the topics of energy efficiency and sustainability?
- > What about safety for operators and what role does noise emission play?
- > What are the investment costs for your company?
- > Which financing and funding possibilities exist?
- > And finally: What should you do with your old machine?

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Mixing mills must fit the customer's specific application as well as the individual conditions on site.



» Which mixing mill for which application?

Whether for the cable, construction or automotive industry, mixing mills must fit the customer's specific application as well as the individual conditions on site. This is because, depending on how the questions were answered in the analysis, a mixing mill with a certain set of equipment is more suitable than another.

That is why DEGUMA developed three different versions. The development of a new type of mixing mill focused on the needs and challenges of machine operators, companies and the future.

This resulted in mixing mills that are energy efficient, convenient and can be highly customized as needed.

Version	Use cases
DEGUMA neo basic robust entry-level model for simple applications. Compact design and easy installation.	Preheating rubber compounds, mixing in vulcanizing substances and other raw materials, mastication of rubber, reprocessing of production waste/residues.
DEGUMA neo plus basic model with optional extra equipment to suit your needs (e.g., stock blender, adjustable material stock guides, strip cutter)	Preheating of rubber compounds, mixing in vulcanizing substances and other raw materials, molding, homogenizing and cooling compounds produced in an internal mixer, mastication of rubber, production of mixing strips, drawing rubber sheets, reprocessing production waste/residues.
DEGUMA neo premium for all applications and mixtures. Highly flexible and with individual settings. State-of-the-art, high-quality components and distinct customization options. Outstanding energy efficiency due to torque motors.	Production of rubber compounds and mixture developments, molding, homogenizing and cooling compounds produced in an internal mixer, preheating rubber compounds, mixing in vulcanizing substances and other raw materials, mastication of rubber, reprocessing production waste/residues, production of mixing strips, drawing rubber sheets.



» Energy savings, maximum safety, reduced operating costs

How do users benefit from utilizing modern mixing mills in their production? What are the associated advantages?

What are the associated advantages? In addition to innovative and energy-efficient drives and IFA-approved CE certifications, which take a critical look at all technical details and include wear-free braking during emergency stops, energy savings of up to 30 percent make a strong case for DEGUMA neo mixing mills. The premium version with two highly efficient, permanently excited synchronous drives (torque motors „made in Germany“) combines the advantages of conventional hydraulic motors and three-phase AC motors without the disadvantages. A major advantage of these drives is the reuse of the regenerated drive power. The individual drives can be speed-controlled independently of each other via a frequency converter and the friction ratio is freely adjustable and variable.

This results in flexible production for users compared to conventional mixing mills with fixed friction. Thanks to the technical details that make daily work safer and more comfortable, DEGUMA neo mixing mills are particularly suitable for the operator. Accordingly, the fixed roller is located on the operator side. The adjustable roller faces away from the operator, which also moves up in an emergency. As a result, there is no crushing zone, significantly minimizing the risk of accidents.

The exact positioning of the strip cutter, which protects the rollers and knives during the cutting process, increases the service life. In addition, the machine is installed on a base frame at ground level, which means that no pits or other foundation work is required. This reduces costs for assembly and installation and offers greater flexibility, as there is no fixed connection between the machine and the factory floor. Decoupling from the building also guarantees minimized noise and vibrations.

DEGUMA neo premium mixing mills offer the following advantages:

- > Constant maximum torque from rotational speed 0 up to rated speed
- > High drive efficiency
- > Very low maintenance and servicing requirements
- > Both drives are installed next to each other on the same side
 - Low space requirement
 - Minimization of forces introduced into the machine frame
 - Increased stability
 - Long-term protection of mechanical components
- > Footprint of the largest mixing mill is only approx. 5.2 x 2.2 m. Mixing mills with smaller rollers are more compact.
- > State-of-the-art assemblies
 - Peripherally drilled rollers
 - Spherical roller bearings
 - Modern safety PLC based on latest Siemens S7 components
 - Hydraulic roller gap adjustment



› Up to 40 years of extended service life - the advantages of modernizing mixing mills

Sustainability is fundamental - for society, ecology and economy. But what is feasible? And above all, how? In order to increase the service life of older machines and significantly reduce their energy consumption, DEGUMA has developed a drive system with state-of-the-art technology as part of its DEGUMA efficiency concept, which allows older machines to be equipped with state-of-the-art technology, resulting in machines that are almost on a par with modern rolling mills from DEGUMA's neo range. This is not only sustainable, but it also increases the profitability of production in the medium term.

The major advantages of the DEGUMA efficiency concept:

- > CO₂ & resource savings due to reuse of existing components
- > Energy cost savings of up to approx. 30 percent (compared to conventional standard drives)
- > Amortization possible after only five years

The focus of the DEGUMA efficiency concept is the replacement of the old drive by a new drive train with two efficient torque motors, whose efficiency lies at 98 percent. As with the DEGUMA neo mixing mills, these drives provide maximum and constant torques even at the lowest speed, while at the same time offering maximum efficiency. Material that remains in the roll after production has stopped is processed

right from the start thanks to maximum power and does not have to be removed first. Significantly reduced power losses in the drive train and the reuse of regenerated drive power lower the overall energy requirement of the system and save up to 30 percent of the energy. This way, DEGUMA supports users in linking resource and cost efficiency.

Compared to conventional standard gearboxes, the planetary gearboxes used require only a fraction of the oil for the annual oil change. This reduces the consumption of environmentally harmful operating materials by up to ten times, which has a positive impact on operating costs. Overall, the maintenance effort for modernized mixing mills is reduced by up to 80 percent.

Thanks to the compact design and massive reduction of forces introduced into the machine frame (approx. 85 percent), mechanical stability is increased. At the same time, the components are protected from wear caused by fatigue.

Moreover, users increase the effectiveness of the mixing process: One DEGUMA efficiency mill can take over the task of several mixing mills due to its variability. With DEGUMA efficiency, power peaks are absorbed without over-dimensioning the motors from the outset. This saves costs in purchasing components. Significant savings in ongoing energy costs are also possible as a result.

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One DEGUMA efficiency mill can take over the task of several mixing mills due to its variability.



> DEGUMA at a glance



Company name:	DEGUMA-SCHÜTZ GmbH
Corporate Headquarters:	Industriestr. 4-8, 36419 Geisa / Germany
Management:	Viktoria Schütz (CEO) Daniela Dingfelder (COO)
Company structure:	Family business
Founded:	1990
Employees:	> 50
Distribution:	Worldwide
Industry focus:	> Technical rubber goods (gaskets, O-rings, couplings, damping elements, rubber-metal compounds, etc.) > Mixtures of rubber and silicone > Rubber profiles for the automotive and construction industries > PU molded parts > Conveyor belts and V-belts > Lightweight components for the automotive industry (composites) > Tires > Waste rubber/rubber recycling > Hoses and cables > Foils and floor coverings > Master batches
Range of services:	Service and maintenance, overhauls, Modernizations, safety training, Safety consultations, Manufacturing of mixing mills, Bale cutters, laboratory presses, extruders Overhauling and modernization of Mixing mills, extruders, calenders, mixers, Presses, cutting machines and laboratory machines

» **DEGUMA-SCHÜTZ GmbH & Contact**



A reliable partner with many years of experience in overhauling existing systems and manufacturing new production machines for the rubber and elastomer processing industry:

DEGUMA-SCHÜTZ GmbH was founded in 1990 and specializes in the construction and modernization of machines for rubber and plastics processing. The company's portfolio also includes services such as

safety consulting, retrofitting and training for operators on site, as well as the DEGUMA efficiency concept, which equips used machines with state-of-the-art drive, control and safety technology, thereby increasing their long-term sustainability and saving energy. In 2019, the company was passed on to the second generation and is now lead by CEO Viktoria Schütz and COO Daniela Dingfelder. Since then, the two women and their team have expanded the machine portfolio and service offering and are participating in various scientific projects on the topics of new work and digital twins.

Our expert team at DEGUMA is available to answer all of your questions. We look forward to helping you. Contact us!

DEGUMA-SCHÜTZ GmbH

Industriestr. 4-8

36419 Geisa / Germany

Phone: +49 (0)36967 761-0

www.deguma.com

