



MIXING GROUP

TYRES





IDEAS THAT STICK.
Pure Passion – HF MIXING GROUP.

The HF MIXING GROUP develops and builds equipment for compounding facilities with passion. Our broad spectrum of industry-specific knowledge makes us a reliable partner for the tyre industry, where our machines are used for passenger cars, trucks, OTR and buses as well as retreaded tyres. We use our expertise to create tailored solutions in order to achieve the highest benefit for the customer. We are able to promise reliable and dependable future-oriented solutions thanks to our engineering know-how and our many years of experience in the business. Our customers value our commitment and the high degree of process reliability that can be achieved using our excellent solutions. Yet we have even more to offer our customers than just our product range: we also provide an impressive, reliable service that is tailored to each customer.



EXPERTISE BUILT ON EXPERIENCE. Pure Passion – HF MIXING GROUP.

Since early 2010, the companies Harburg-Freudenberger, Farrel and Pomini Rubber & Plastics have operated together as HF MIXING GROUP. Each company offers both a long tradition and special strengths in building machines for the plastics and rubber industry, all of which have been consolidated and integrated to your advantage. Thanks to the collective skills and experience of the group and a focus on core products at each site, the ability of HF MIXING GROUP to develop solutions grows stronger all the time. As a result, market needs can be met faster and better.

It is our promise to you to create products and services in line with our values of reliability, ambition and sustainability with passion. That is how things began 150 years ago, and it is the same today.



- 1 Upstream equipment**
material feeding system – fillers, plasticisers, rubber
- 2 Mixer**
- 3 Mixing room automation system**
- 4 Drive chain**
- 5 Downstream equipment**
single-screw or twin-screw discharge extruder, mill(s) and batch-off unit



MIX IT SYSTEMATICALLY.
Pure Passion – HF MIXING GROUP.

The HF MIXING GROUP uses its technical expertise to develop compounding facilities and systems while taking into account increasingly stringent safety and efficiency requirements. It is therefore also particularly important for us to optimise mixing line procedures by working on improved coordination between individual line components and the control system. We believe that integrating machines and control systems will continue to gain importance in future, just as we have seen with the development of the automobile. We have therefore set ourselves the goal to optimise the availability of mixing lines, enabling you to plan for unavoidable standstills.

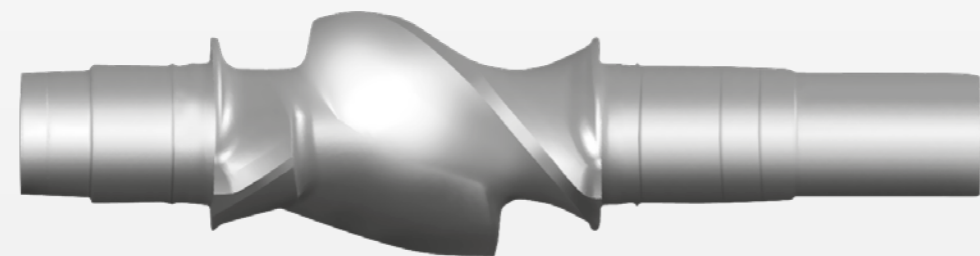
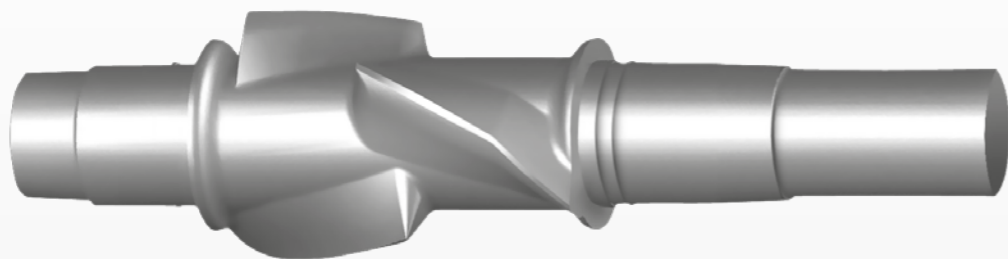
BANBURY® SERIES

Farrel brought the BANBURY® mixer to the HF MIXING GROUP. We have optimised it within our group, assimilating the best features of the previous models from HF, Farrel and Pomini. The BANBURY® mixer still remains the first choice for diverse applications in the tyre industry because it is ideally suited to the specific requirements of multi-step mixing applications. Criteria such as good intake and discharge behaviour, excellent dispersion and distribution quality, and optimal cooling behaviour guarantee efficient and profitable masterbatch, remilling and final mixing processes.

MORE FEATURES:

- Increased volumes for tangential mixers
- Full hydraulic hopper with iRam function
- Greater batch size with Keel Bottom™ Weight
- Optimised HCD dust seal system and new single-point lubrication system
- Wide variety of hard surfacing systems to meet individual demands





TANGENTIAL ROTORS

The HF MIXING GROUP offers the widest possible choice of tangential rotors to meet the specific requirements of the tyre industry. You can select from the entire range of developments from HF, Farrel and Pomini in our BANBURY® series of mixers. Our product portfolio includes aggressive masterbatch mixing rotors with extremely high specific energy output and all-purpose products such as rotors that are tailored to the requirements of the final mix. Out of our entire product range of rotors, the balanced mixing characteristics of the NST™ rotor have made it a trusted performer in the tyre industry. Please contact us for detailed information about our diverse rotors. We will be happy to advise you.

MORE FEATURES:

- **New rotor geometries for tangential mixers**
- **Advanced Super Cooled® rotors for excellent temperature control**
- **Sturdy rotor design that has been tried and tested**
- **Optimised rotor alignment to eliminate dead zones**
- **Customised hard surfacing for individual needs**

INTERMIX® E SERIES

The intermeshing machine technology of the INTERMIX® E is the clear top performer in the technical rubber goods industry and the tyre industry. The PES5 rotors feature unique intermeshing wing technology that ensures the homogenous distribution of all mixture components and the highest possible degree of dispersion. The rotor design and optimised cooling behaviour also enable all of machine components that come into contact with the mixture to efficiently process heat-sensitive materials. As a result of these characteristics, the INTERMIX® E

has also found use in the tyre industry for reactive mixtures such those containing silica. In addition to this, the INTERMIX® E can be an interesting alternative to other mixtures.

MORE FEATURES:

- **Highly effective cooling (Super Cooled®)**
- **Crack-free special hard surfacing**
- **Innovative ram pressure control**
- **Optimised dust seal system**



INTERMIX® VIC SERIES

The INTERMIX® VIC is another excellent example of intermeshing technology. This machine type provides a unique, additional processing parameter of special importance for the tyre industry – it allows the gap between rotors to be adjusted during the mixing process. A large gap allows very fast intake of raw materials into the mixing chamber, while a narrow gap increases the quality of dispersion. Thanks to the gap adjustment option, the machine can be used in a very efficient and versatile way. Like the INTERMIX® E, the VIC also delivers high specific energy into the compound in the shortest time with optimal temperature control thanks to a favourable ratio between cooling surfaces and batch volume: a key factor for temperature-sensitive compounds such as silica.

MORE FEATURES:

- **Variable distance between rotors for optimal mixing process steps**
- **Fast intake and adjustable shear level**
- **Flexibility for different process applications (mastication, remilling master batches and final production)**
- **Durable crack-free hard facing for an extended lifetime**
- **Hydraulic ram with highly accurate pressure control**
- **Hydraulic dust seals with multiple cylinder concept (HCD) for a superior seal and easy maintenance**

TANDEM MIXER

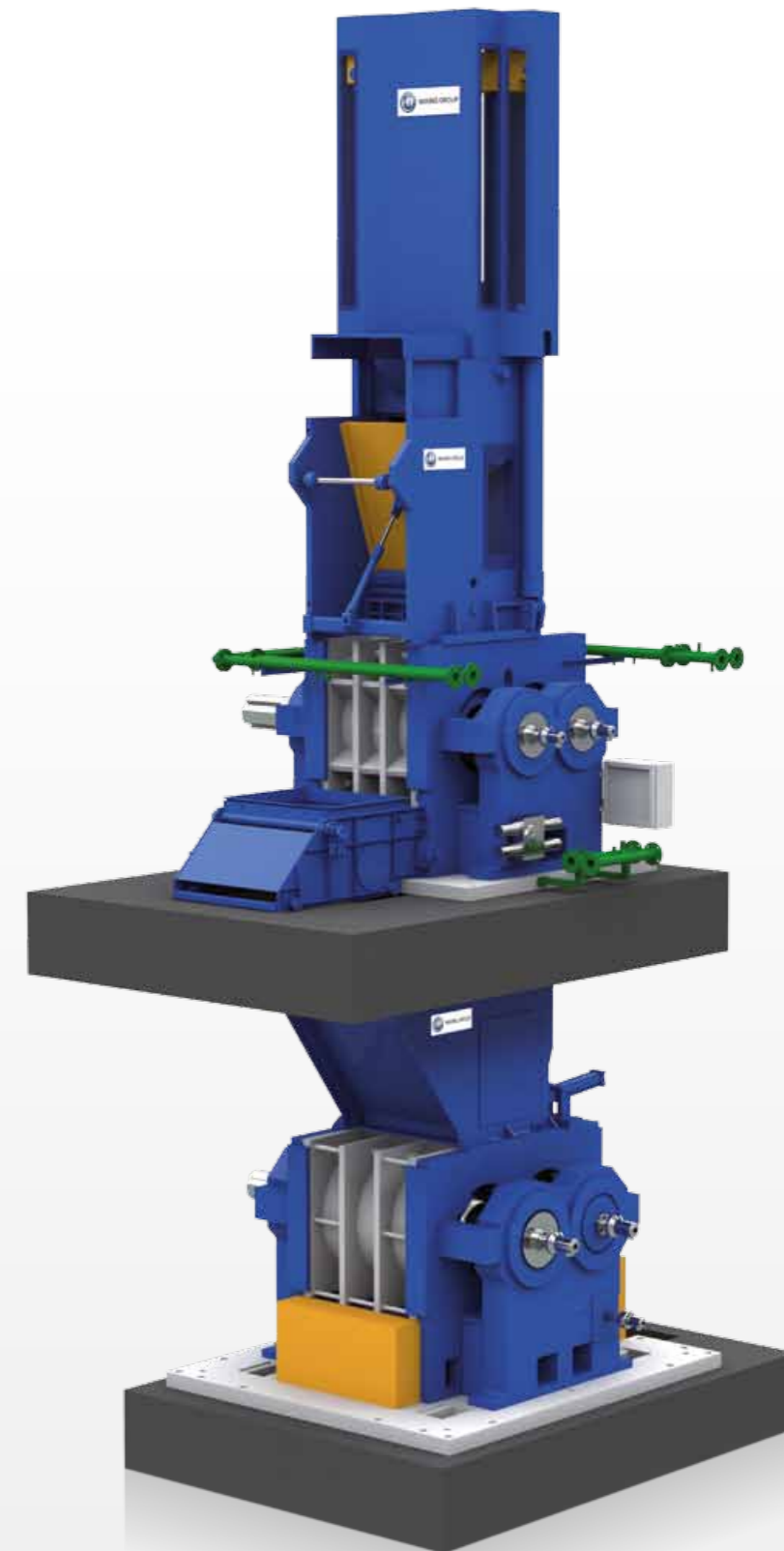
The successful implementation of the TANDEM MIXER technology can be considered a quantum leap for the tyre industry. It offers such high performance that it may well become the standard in other areas of the tyre industry in the future. This technology provides considerable potential for improving the quality and efficiency of practically every process in mixing facilities. The ability to distribute the mixing process over two machines is at the core of the tandem procedure.

The top machine can take care of producing the masterbatch, for instance, and is thus responsible for the quality of dispersion. It generates a high level of specific energy for mixing in order to achieve a good dispersion of fillers. If the ram is effectively applied, the mixture can be more efficiently fed into the area between the

rotors and thus subjected to a high shear force. The bottom machine is much larger and can distribute the mixture components, for example. This method offers many benefits. In the case of reactive mixtures, it can be used to separate the dispersion from the reaction so that they practically run in parallel. Additionally, mixing times can be shortened further for final mixes, and entire mixing steps can even sometimes be skipped for multi-step mixtures.

MORE FEATURES:

- **Tandem rotors with optimised intake behaviour**
- **Very good degassing ability**
- **Lubricant-free dust seals on the bottom machine**
- **Proven sturdy construction**



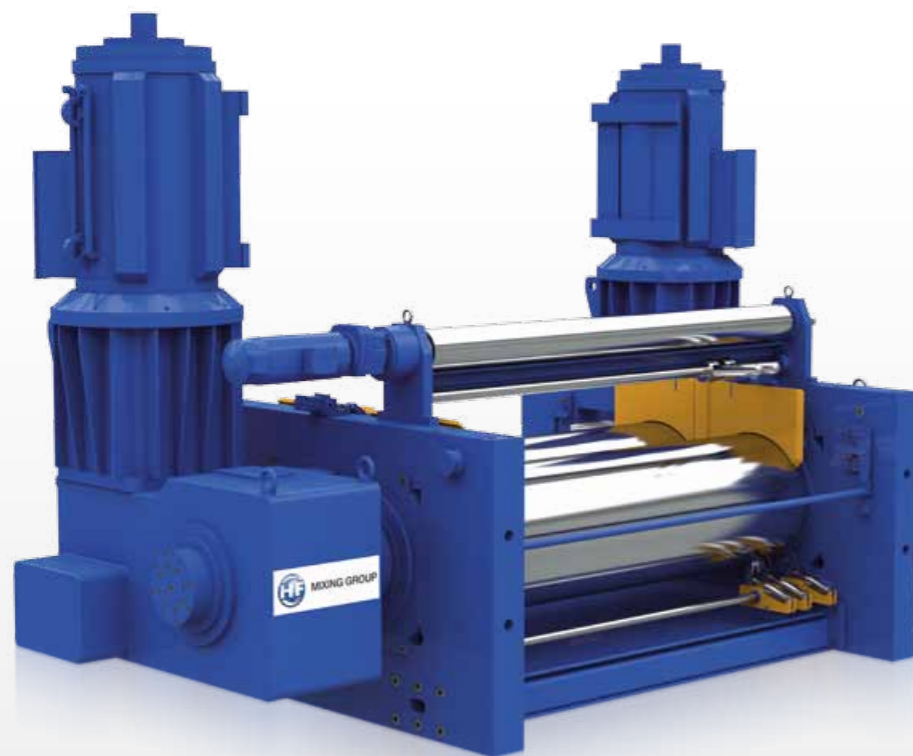
CONVEX™ SERIES

The HF MIXING GROUP developed the new generation of twin-screw discharge extruder following an extensive period of analysis and development work. Its energy-efficient screws, compact and sturdy construction and newly designed fully hydraulic calender make it a reliable machine for a wide range of applications. These characteristics give it an impressively high throughput performance as well as optimised temperature control without material contamination. The unique features of CONVEX™ guarantee superior quality and mixing line performance. As a result, CONVEX™ is already the standard downstream equipment in the tyre industry for master batch lines as well as modern

final mixing lines. In addition, the HF MIXING GROUP offers newly developed hard surfaced rolls for processing silica compounds in order to minimise sticking effects and increase the service life of the rolls.

MORE FEATURES:

- Fully automatic sheeting process
- High efficiency and throughput
- Compact layout
- Intrinsically safe process
- Effective compound temperature control
- Good self-cleaning capability



SHEETING AND MIXING MILL

Mills can achieve very high cooling performance due to their large roller surface. This characteristic makes such equipment ideal for mould temperature-sensitive mixtures, which is why mills are very often used in the tyre industry for moulding in final mix lines. Our mills stand out due to their very compact and sturdy construction, compliance with the current EU standards, and their fully integrated capability of automation. The roller quality can be selected according to requirements. The HF MIXING GROUP also supplies the newly developed plated rollers for special applications for mills.

MORE FEATURES:

- Peripherally drilled cooling channels
- Hydraulic mill gap adjustment
- Overpressure relief valve to protect the mills
- Compact single-drive solution

ADVISE® MIXING ROOM AUTOMATION

We have consolidated our globally established automation solutions in the ADVISE® product line to offer you 'the best of the best'. With multiple mixer lines, high throughput and complete control of the material flow thanks to a flexible, modular design that can be fully scaled, it is the optimal solution for the tyre industry. It is very easy to configure ADVISE® to your specific needs and preferences without having to create special solutions – a feature that you will value just as highly as the intuitive operation and the straightforward application of sophisticated technology.

The key to the success of the ADVISE® system lies in its networking capability, which optimally links all machines and workstations in the mixing facility. Our team of experts is constantly working to develop solutions with long-term benefits for you. With the ADVISE® system, we cover the full automation of an entire mixing facility, from raw material storage, automated weighing of small components, and automatic weighing of fillers and softeners to the mixing process itself, open mills, single-screw and conical twin-screw discharge extruders, and other downstream components and mixture storage.

MORE FEATURES:

- A coherent, durable and reliable mixing room control system
- Use of latest web-based programming language
- Modular system design with individual configuration
- Full mixing room visualisation for easy maintenance
- Specific closed-loop process controller for improved mixing efficiency
- Full process data acquisition and visualisation
- Strong development team with 'real life' testing capabilities in our technical centre
- Certified, long-term development partners
- Standardised communication interfaces to ERP and LAB systems
- Very flexible step-by-step control
- Complete material tracking system





STATE-OF-THE-ART TECHNOLOGY. Pure Passion – HF MIXING GROUP.

The former technical centre for discontinuous mixers has been centralised and expanded in the new HF MIXING GROUP technical centre in Freudenberg (Siegerland, North Rhine-Westphalia). Here we have installed the latest technology to test our machines and automation solutions. Training courses and technical consultations can also be held on the premises. It is the most modern testing and development centre for rubber mixing technology – a place that is meant to inspire a passion for new mixing technology methods and experimentation. Technical elements from every company in the HF MIXING GROUP are brought together under one roof in the technical centre.

Find out more – we look forward to hearing from you.



Pure Passion – HF MIXING GROUP.

www.hf-mixinggroup.com

Those who are passionate about their work and devote themselves entirely to a project are winners in every respect – because passion is a powerful quality. It enables unimagined possibilities and potential to be achieved. That is why passion is our key to long-term customer satisfaction and the creation of added business value.

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