



MIXING GROUP

**CATALOGUE OF
PRODUCTS AND SERVICES**

Pure Passion – HF MIXING GROUP

The HF MIXING GROUP has a passion for developing, producing and supplying equipment for mixers and mixing rooms. We are a reliable partner with a wide range of sector-specific knowledge in the polymer processing industry. Our machines and our equipment are used all over the world for tire applications, sealing profiles,

cables and friction pads, as well as for thermoplastic elastomers and special plastic compounds. Our commitment and the special reliability offered by our machines are highly appreciated. Furthermore, we have built up service centres all over the world in order to be able to help you whenever necessary.



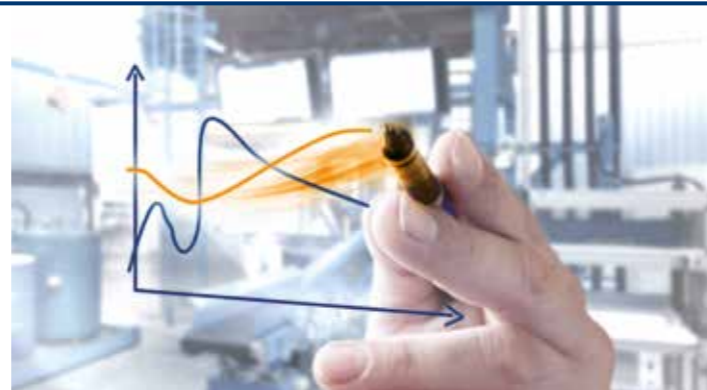
OUR EXPERTISE. Pure Passion – HF MIXING GROUP.

A company distinguishes itself through its specialities. For us these are: comprehensive expertise in technical and process engineering built up over more than 150 years;

a corporate philosophy based on longevity and sustainability; and a deliberate approach of close customer cooperation.



EXPERTISE THROUGH KNOW-HOW



Process ⁺

EXPERTISE IN OPTIMISING OUR CUSTOMERS PROCESSES

Working with you to develop and optimise your processes is important to us so we set up the industry's most modern Technical Center in Freudenberg. In its fully equipped mixing room you can test our products under real-life conditions and get expert advice from our process specialists.

Solution ⁺

COMPREHENSIVE EXPERTISE FOR CUSTOMISED SOLUTIONS

With more than 150 years of experience, the HF MIXING GROUP are the engineering experts for the polymer processing industry. Our experts are highly skilled in manufacturing and production processes and work with customers to develop the best individual solutions for them.

Comfort ⁺

PRAGMATIC SOLUTIONS

Our corporate values guide us however we are not tied to fixed principles. We solve customer problems in a pragmatic and methodical way.

Direct ⁺

EXPERIENCE OUR COMMITMENT

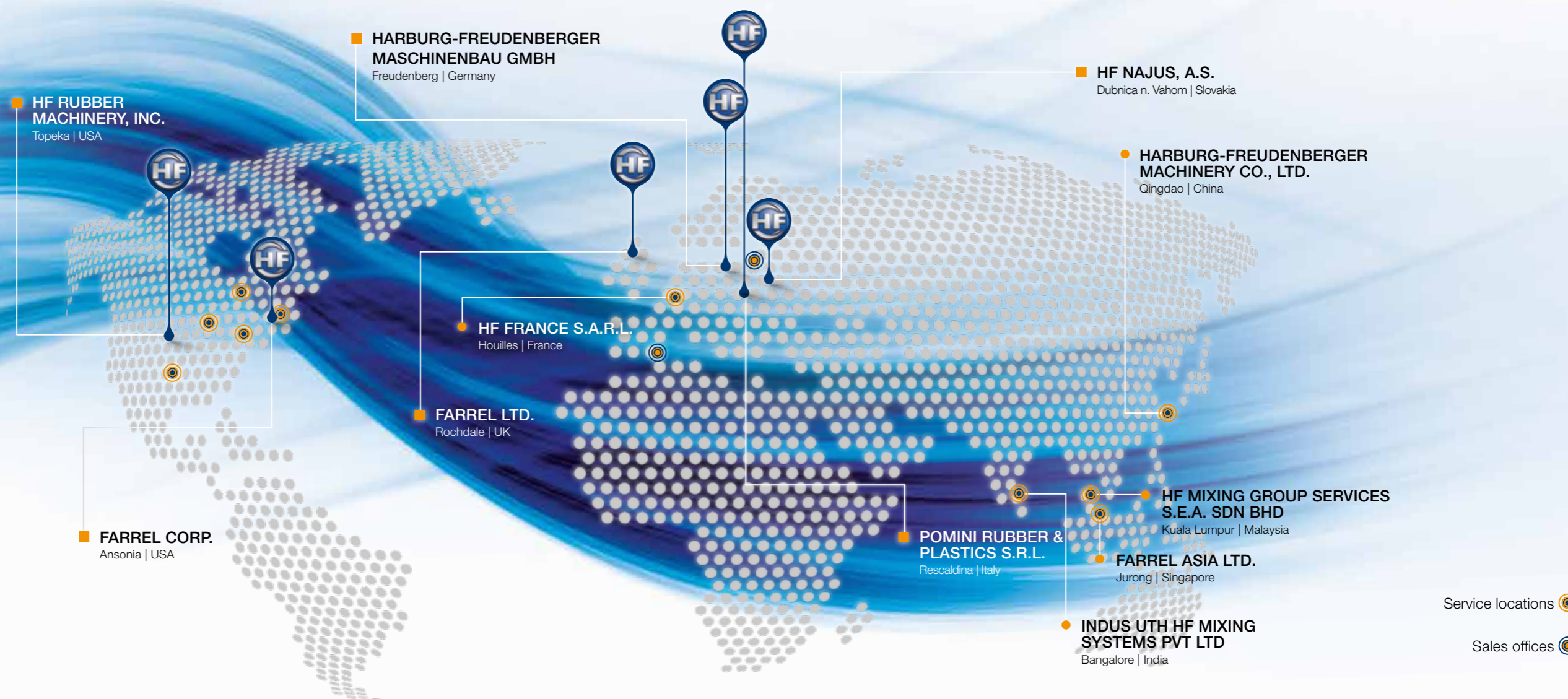
Direct contact between ourselves and our customers base is something of priority. Commitment, fast response times and availability are important pillars of the service we provide.

Safe ⁺

A SUSTAINABLE APPROACH FOR SAFE AND SECURE PERFORMANCE

Our approach to business is based on sustainability and the long term. This means being available to our customers at all times and providing lifetime servicing and replacement parts for our products.

OUR LOCATIONS



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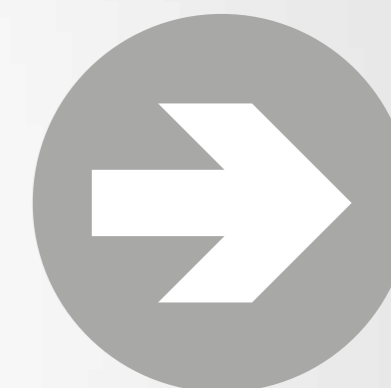
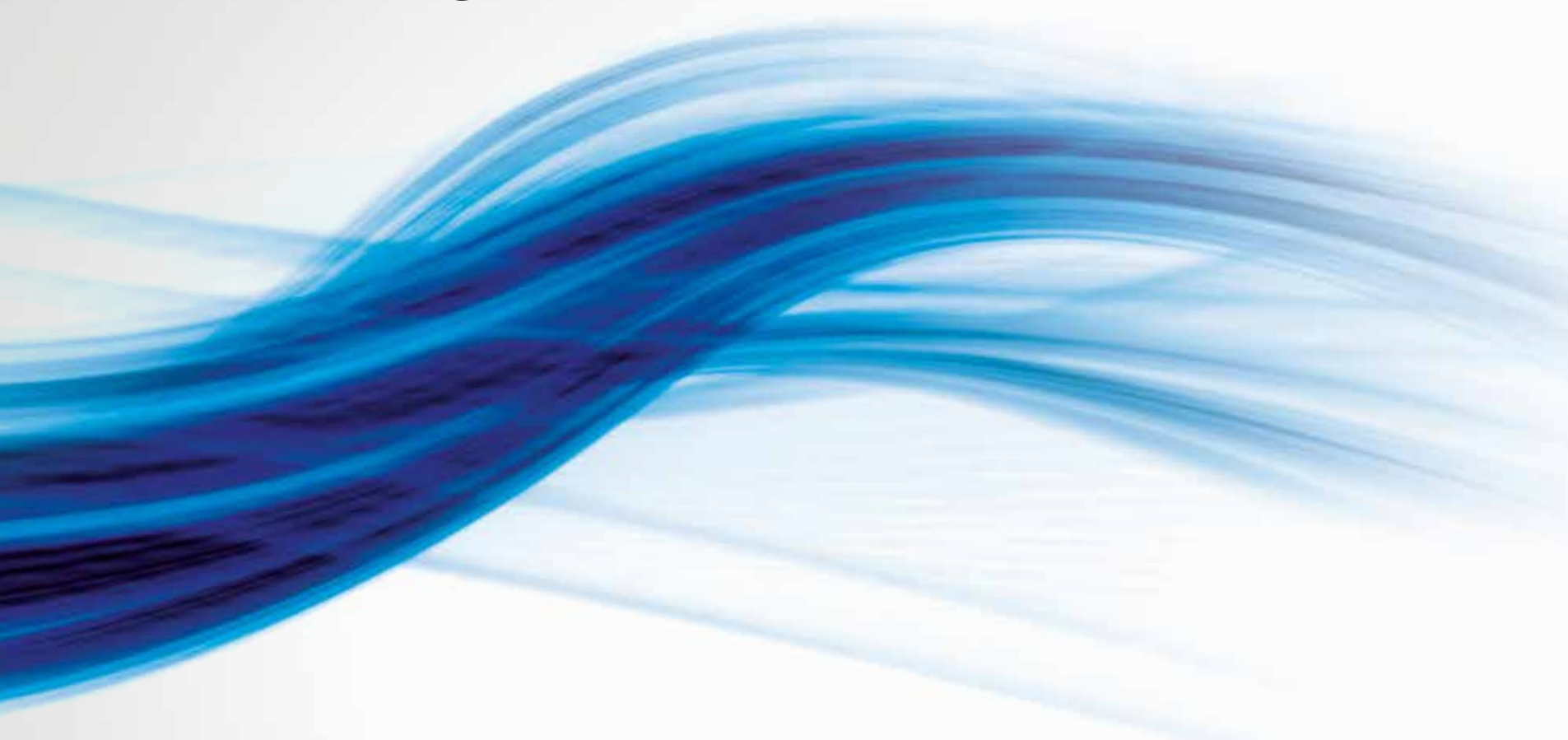
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MIXERS



BANBURY® SERIES

Tangential mixer

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Universal mixer

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Laboratory mixer

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BANBURY® SERIES TANGENTIAL MIXER

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 tire 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

BANBURY® SERIES – Technical data

	Unit	BM20N	BM50N	BM80N	BM120N	BM160N	GK255N	BM305N	GK420N	BM440N	BM700N
Chamber volume*	l, approx.	24	49	75	116	146	260	269	420	436	720
Useful volume at fill factor 0.75	l, approx.	18	37	56	87	110	195	202	315	327	540
Batch weight at specific gravity 1.15 kg/l	kg, approx.	20	42	64	100	126	224	232	378	376	621
Standard rotor speeds**	rpm	60	60	60	60	60	60	60	60	60	50
Related motor power	kW	120	275	385	600	800	1,500	1,500	2,300	2,300	3,000
Ram pressure on compound <small>(pneumatic or hydraulic ram)</small>	N/cm ² , approx.	50	50	50	50	50	50	50	50	50	50
Useful volume of the feeding hopper: up to the feed door shaft <small>(including mixing chamber throat)</small>	l, approx.	52	121	187	251	331	484	522	730	885	1,355
Useful volume of the feeding hopper: up to the feed opening <small>(including mixing chamber throat)</small>	l, approx.	60	130	187	251	331	498	555	915	890	1,420
Dimensions of feed hopper	Length in mm	390	511	610	670	700	800	889	1,000	950	1,200
	Width in mm	210	263	267	267	380	500	457	500	610	610
Dimensions of drop door <small>(discharge opening)</small>	Length in mm	390	511	610	670	700	800	889	1,100	950	1,200
	Width in mm	190	177	215	240	255	470	420	500	442	640
Space requirements for mixer and gearbox <small>(excluding motor)</small>	Length in mm, approx.	3,300	4,100	5,200	5,000	5,300	6,000	6,600	7,100	7,400	9,000
	Width in mm, approx.	2,000	1,800	2,400	2,600	3,400	4,200	3,500	4,600	3,700	4,600
	Height in mm, approx.	3,500	4,100	4,700	4,900	5,600	5,550	6,050	6,600	6,800	7,600
Weight of internal mixer <small>(excluding drive)</small>	kg, approx.	5,000	7,000	10,250	12,750	17,250	25,000	27,500	40,000	48,000	61,000

Batch capacities equals volume x specific gravity x fill factor. Fill factor is variable and dependent upon compound viscosity, speed, ram pressure and rotor type configuration.

BM series fitted with NST rotors, keel bottom ram with standard nominal ram lay back position.
GK series fitted with ZZ4 rotors, vee bottom ram with standard nominal ram lay back position.

Noise data – the effective A-weighted emission sound at the operating platform depends on the configuration of the mixing line.

* Chamber volume is the effective free volume of the mixing chamber with closed ram.

** In addition to the rotor speeds stated, higher or lower speeds can also be specified. The corresponding motor powers will in most cases be lower than the figures quoted, however for some compounds, depending on their composition, the ram pressure and the mixing method used, higher motor powers may be required.

INTERMIX® E SERIES INTERMESHING MIXER

The intermeshing machine technology of the INTERMIX® E is the clear top performer in the technical rubber goods industry and the tire 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 the machine components that come into contact with the

mixture to efficiently process heat-sensitive materials. Due to these characteristics, the INTERMIX® E is well-established in the technical rubber goods industry and has become accepted in the area of silica compounds for tires. In addition, the INTERMIX® E can also be an interesting solution for special kinds of compounds, such as fibre-filled compounds.



MORE FEATURES:

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

INTERMIX® E SERIES – Technical data

	Unit	IM20E	IM45E	IM90E	IM110E	IM135E	IM190E	IM250E	IM320E	IM550E
Chamber volume*	l, approx.	20	48	90	112	140	203	255	332	565
Useful volume at fill factor 0.7	l, approx.	14	34	63	78	98	142	179	232	396
Batch weight at specific gravity 1.2 kg/l	kg, approx.	17	40	76	94	118	171	218	279	475
Standard rotor speeds**	rpm	5–50	5–50	5–50	5–50	5–50	5–50	5–50	5–50	5–50
Related motor power	kW	9–90	22–220	39–390	48–480	60–600	87–870	110–1,100	140–1,400	255–2,550
Ram pressure on compound	N/cm ² , approx.	50	50	50	50	50	50	50	50	50
Useful volume of the feeding hopper: up to the feed door shaft (including mixing chamber throat)	l, approx.	50	110	173	205	286	481	550	730	1,184
Useful volume of the feeding hopper: up to the feed opening (including mixing chamber throat)	l, approx.	65	145	220	260	341	490	710	915	1,184
Dimensions of feed hopper	Length in mm	390	535	650	700	760	870	925	1,016	1,200
	Width in mm	210	280	340	360	380	480	480	500	610
Dimensions of drop door (discharge opening)	Length in mm	390	535	650	700	760	870	925	1,016	1,200
	Width in mm	210	280	340	360	380	440	480	520	610
Space requirements for mixer and gearbox (excluding motor)	Length in mm, approx.	3,280	3,910	4,600	5,000	5,200	5,950	6,100	6,600	6,200
	Width in mm, approx.	1,830	2,435	2,320	2,845	3,100	3,400	4,000	4,650	5,200
	Height in mm, approx.	3,300	3,750	4,000	4,200	5,275	5,600	6,100	6,500	7,000
Weight of internal mixer (excluding gearbox and motor)	kg, approx.	5,000	8,500	11,000	13,500	17,000	26,500	33,000	41,000	56,000

Batch capacities equals volume x specific gravity x fill factor. Fill factor is variable and dependent upon compound viscosity, speed, ram pressure and rotor type configuration.

Noise data – the effective A-weighted emission sound at the operating platform depends on the configuration of the mixing line.

* Chamber volume is the effective free volume of the mixing chamber with closed ram.

** In addition to the rotor speeds stated, higher or lower speeds can also be specified. The corresponding motor powers will in most cases be lower than the figures quoted,

however for some compounds, depending on their composition, the ram pressure and the mixing method used, higher motor powers may be required.

INTERMIX® VIC SERIES INTERMESHING MIXER

The INTERMIX® VIC is another excellent example of inter-meshing technology. This machine type provides a unique, additional processing parameter of special importance for the tire 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 superior sealing and easy maintenance



INTERMIX® VIC SERIES – Technical data

	Unit	IM110VIC	IM190VIC	IM320VIC
VIC® mixer		VIC95X	VIC165X	(VIC275X)
HF hopper		IM90E	IM135E	IM250E
Chamber volume*	l, approx.	104	191**	318**
Useful volume at fill factor 0.75	l, approx.	78	143	238
Batch weight at specific gravity 1.15 kg/l	kg	90	164	274
Standard rotor speeds***	rpm	60–70	60–70	60–70
Related motor power	kW	510	900	1,470
Ram pressure on compound <small>(pneumatic or hydraulic ram)**</small>	N/cm ² , approx.	50	50	50
Useful volume of the feeding hopper: up to the feed door shaft <small>(including mixing chamber throat)</small>	l, approx.	114	172	338
Useful volume of the feeding hopper: up to the feed opening <small>(including mixing chamber throat)</small>	l, approx.	277	410	753
Dimensions of feed hopper	Length in mm	650	760	925
	Width in mm	340	380	480
Dimensions of drop door <small>(discharge opening)</small>	Length in mm	720	850	1,000
	Width in mm	290	350	480
Space requirements for mixer and gearbox <small>(excluding motor)</small>	Length in mm, approx.	3,800	5,100	6,300
	Width in mm, approx.	2,700	3,300	3,600
	Height in mm, approx.	4,500	5,300	6,200
Weight of internal mixer <small>(excluding gearbox and motor)</small>	kg, approx.	13,000	20,500	37,000

Batch capacities equals volume x specific gravity x fill factor. Fill factor is variable and dependent upon compound viscosity, speed, ram pressure and rotor type configuration.

Noise data – the effective A-weighted emission sound at the operating platform depends on the configuration of the mixing line.

* Chamber volume is the effective free volume of the mixing chamber with closed ram.

** PESS rotors

*** In addition to the rotor speeds stated, higher or lower speeds can also be specified. The corresponding motor powers will in most cases be lower than the figures quoted, however for some compounds, depending on their composition, the ram pressure and the mixing method used, higher motor powers may be required.

TANDEM MIXER

The successful implementation of the tandem technology can be considered a quantum leap for the tire industry. It offers such high performance that it may well become the standard in other areas of the tire 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 master batch, 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



TANDEM MIXER – Technical data

	Unit	IM320E	IM550E	IM550ET	IM1000ET
Chamber volume*	l, approx.	332	565	620	980
Useful volume at fill factor 0.7	l, approx.	232	396	–	–
Batch weight at specific gravity 1.2 kg/l	kg, approx.	279	475	–	–
Standard rotor speeds**	rpm	5–50	5–50	5–50	5–50
Related motor power	kW	140–1,400	255–2,550	80–800	150–1,500
Ram pressure on compound <small>(pneumatic or hydraulic ram)***</small>	N/cm ² , approx.	50	50	–	–
Useful volume of the feeding hopper: up to the feed door shaft <small>(including mixing chamber throat)</small>	l, approx.	730	1,184	–	–
Useful volume of the feeding hopper: up to the feed door shaft <small>(including mixing chamber throat)</small>	l, approx.	915	1,184	–	–
Dimensions of feed hopper	Length in mm	1,016	1,200	1,200	1,350
	Width in mm	500	610	610	710
Dimensions of drop door <small>(discharge opening)</small>	Length in mm	1,016	1,200	1,200	1,350
	Width in mm	520	610	610	710
Space requirements for mixer and gearbox <small>(excluding motor)</small>	Length in mm	6,600	6,200	6,200	7,700
	Width in mm	4,650	5,200	5,200	5,200
	Height in mm, approx.	6,500	7,000	3,000	3,500
Weight of internal mixer <small>(excluding gearbox and motor)</small>	kg, approx.	41,000	56,000	42,000	61,000

Noise data – the effective A-weighted emission sound at the operating platform depends on the configuration of the mixing line.

* Chamber volume is the effective free volume of the mixing chamber with NST rotors, Keel Bottom™ ram with ram lay-back position (25 mm) as standard for BM series and with Z22 rotors, vee bottom ram with ram lay-back position (25 mm) as standard for GK series.

** In addition to the rotor speeds stated, higher or lower speeds can also be specified. The corresponding motor powers will in most cases be lower than the figures quoted, however for some compounds, depending on their composition, the ram pressure and the mixing method used, higher motor powers may be required.

*** The pneumatic ram pressure quoted relates to an available air supply pressure of 8 bar.

UMIX – UNIVERSAL MIXER FOR PRODUCTION AND LABORATORY

Historically universal mixers have proven to be reliable machines for the mixing and kneading of low- to high-viscosity products in many industries. Their working principle is based on two tangential counterrotating blades creating shear within the treated product in combination with the wall of the trough. Variation of the revs per minute, friction and position of the blades results in extremely effective mixing and kneading of the material. The versatility of the machine enables simultaneous processes within a mixing cycle like moistening, plasticising, dispersing, homogenising, melting, cooling, degassing, evaporation, dissolving and reacting.

MORE FEATURES:

- Two product lines for production and lab
- Product extraction by tilting, discharge screw or bottom valve – to be chosen*
- Multiple machine sizes from 0.25 to 4,300 l net volume
- Process control with temperature-adjustable troughs and blades*
- Blade geometry, material selection and drive design adapted to customer-specific process requirements*
- Profile extrusion via nozzle and pelletising possible for discharge screw versions*

* Depending on version and/or size.

TYPICAL PRODUCTS:

- Adhesives
- Silicone rubber
- Rubber solutions
- Putties
- Ceramic compounds
- Catalytic converter compounds
- Activated carbon
- Carbon electrodes
- Hot-melt and other adhesive types
- Insulating compounds
- Sealants
- Printing inks
- Pharmaceutical compounds
- Chocolate
- Chewing gum
- Chemical masterbatches

UMIX – Size and corresponding available extraction technology

Usable volume [l]	Total volume [l]	Removable trough	Tiltable trough	Discharge screw	Bottom discharge
0.25	0.40	■	–	–	–
0.75	1.10	■	–	–	–
1	1.50	–	■	–	–
2.50	3.75	–	■	■	–
5	7.50	–	■	–	–
8	12	–	■	–	–
20	30	–	■	–	–
80	120	–	■	■	–
200	260/300**	–	■	■	–
450	570*/675**	–	■	■	–
680	850*/1,020**	–	■	■	■
900	1,120*/1,350**	–	■	■	■
1,500	1,900*/2,250**	–	■	■	■
2,000	2,600*/3,000**	–	■	■	■
3,000	3,800*/4,500**	–	■	■	■
4,300	6,450	–	–	■	■

* Machines with tiltable trough or bottom discharge.

** Machines with discharge screw.



TECNOLAB® SERIES LABORATORY MIXER

Our laboratory mixers are the optimal research and development process and production support tool. The laboratory mixers are developed to make the optimisation of your compounds as efficient as possible and act as your reliable partner for optimising your products.

The characteristics of the laboratory mixers are in line with those of our production mixers and this similarity simplifies the process of scaling up mixing parameters for compounding applications in much larger machines.

MORE FEATURES:

- Ram position indicator
- Temperature control units with direct or indirect cooling for the mixing chambers
- Easy cleaning due to the horizontal splitted mixing chambers centre line
- Dosing and injection unit for process oils
- Option for control through system ADVISE® ES LAB
- Hard chrome plated machine parts for optimal protection from wear and corrosion

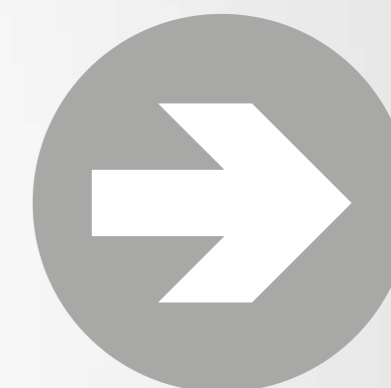


TECNOLAB® SERIES – Technical data

		IM0.3E	IM1.5E = KO	IM5E = K1	GK1.5E	GK5E	IM5.5VIC	BR1600	BR4000	GK4N	GK1.5N
Equipment	Mixing chamber, horizontal split	■	-	-	■	■	-	-	-	■	■
	Maintenance door in baseplate	-	-	-	□	□	-	-	-	□	□
	Swing drilled sides	-	-	-	-	-	-	■	■	-	-
	Tilt back hopper	-	■	■	-	-	-	-	-	-	-
Wear resistance	Hard steel plating	-	-	-	-	□	■	-	-	□	-
	Chromed	■	■	■	■	■	■	□	■	■	■
Drop door	Hydraulic-operated	Pneumatic	■	■	■	■	■	■	■	■	■
Dust sealing	Spring-loaded	■	■	■	■	■	■	■	■	■	■
	Hydraulic-driven	-	-	-	□	□	■	-	-	□	□
	Ring gap lubrication	-	-	-	□	□	■	-	-	□	□
Feeding unit	Ram pressure device	Pneumatic	Pneumatic	Pneumatic	Hydraulic	Hydraulic	Pneumatic	Pneumatic	Pneumatic	Hydraulic	Hydraulic
	Optional: hydraulic	-	■	■	-	-	-	■	■	-	-
	Ram pressure	0–50 N/cm ²	0–24 N/cm ²	0–24 N/cm ²	0–60 N/cm ²	0–60 N/cm ²	0–60 N/cm ²	0–42 N/cm ²	0–42 N/cm ²	0–60 N/cm ²	0–60 N/cm ²
Drive system	Reduction gear type	Semi unidrive	Unidrive	Unidrive	Unidrive	Unidrive	Unidrive	Unidrive	Unidrive	Unidrive	Unidrive
	Water-cooled engine	-	□	□	■	■	-	□	□	■	■
	Power: rubber Power: TPE (optional)	6.5 kW	24 kW 48 kW	60 kW 120 kW	24 kW 48 kW	60 kW 120 kW	60 kW 120 kW	22.5 kW	90 kW	50 kW 100 kW	24 kW 48 kW
	Speed: rubber Speed: TPE (optional)	135/135	100/100 200/200	100/100 200/200	100/100 200/200	100/100 200/200	100/100 200/200	225/225	150/150	111/100 222/200	111/100 222/200
	Slide ring lubrication, pump	-	■	■	■	■	■	■	■	■	■
	Optional: lubeless	■	■	■	-	-	-	■	■	-	-
Electrical equipment	Thermocouple end frame	■	■	■	■	■	■	■	■	■	■
	Thermocouple drop door	-	-	-	□	□	□	■	■	□	□
	Ram position measurement	■	■	■	■	■	■	■	■	■	■
	Drilling for oil injection valve	-	-	-	■	■	■	-	-	■	■
Safety equipment	Thermosensor for engine	□	□	□	□	□	□	□	□	□	□
	Safety switch for drop door, locking unit drop door, feeding door open/close, safety door closed	-	■	■	■	■	■	■	■	■	■
	Safety switch for horizontal split, dump bucket	■	■	■	■	■	■	■	■	■	■
	Thermocouple dust sealing	-	-	-	■	■	■	-	-	■	■

■ Standard □ Optional

DOWNSTREAM EQUIPMENT



CONVEX™ SERIES

Twin-screw discharge extruder ➔ Page 30–31

SINDEX®

Single-screw discharge extruder ➔ Page 32

MILLMIX®

Sheeting and mixing mill ➔ Page 33

TECNOLAB® SERIES

Laboratory mixing mill ➔ Page 34–35

CONVEX™ SERIES

TWIN-SCREW DISCHARGE EXTRUDER

The CONVEX™ is the new generation of twin-screw discharge extruders, developed to be best-of-best product. The CONVEX™ is mainly used in the tire industry and is today's standard for master batch lines. Its compact de-

sign with single drives, the cooled screws and its robustness make the CONVEX™ perfect as a piece of and reliable downstream equipment.

MORE FEATURES:

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



CONVEX™ SERIES – Overall dimensions

	L (mm)	W (mm)	H (mm)
CONVEX™ 1	2,600	3,200	1,670
CONVEX™ 3	3,300	3,300	2,300
CONVEX™ 7	3,800	3,450	2,100
CONVEX™ 10	3,800	3,450	2,100
CONVEX™ 12	4,300	3,800	2,650
CONVEX™ 18	3,300	3,800	2,650
CONVEX™ 21 (28)	5,600	4,100	3,000

CONVEX™ SERIES – Technical data

	Unit	1	3	7	10	12	18	21	28
Productivity*	T/h	1	3	7	10	13	18	21	28
Mixer size (approx.)	l	40–65	80–190**	130–300	190–300	260–500**	260–500**	450–1,000	450–1,000
Roll size (diameter x length)	mm	300 x 450	406 x 810	406 x 965	406 x 965	508 x 1,067 610 x 1,434	508 x 1,067 610 x 1,434	610 x 1,434	610 x 1,434 600 x 1,575
Working roll gap (min.–max.)	mm	2.5–12	3–12	3–12	3–12	3–12	3–12	3–12	3–12
Stock guide width (min.–max.)	mm	350–400	370–570	500–810	500–810	660–850 850–1,150	660–850 850–1,150	850–1,150	850–1,150 1,150–1,370
Extruder installed power	kW	1 x 15	1 x 51	2 x 51***	2 x 74***	2 x 74***	2 x 113	2 x 130	2 x 160
Screw speed	rpm	15	15	22	30	22	30	19	27
Roller head installed power	kW	1 x 15	2 x 30	2 x 51	2 x 51	2 x 51 2 x 74	2 x 74 2 x 113	2 x 130	2 x 130 2 x 160
Rolls speed	rpm	15	15	22	30	22	32 25	19	32

* Density = 1.2 kg/l
 ** Specific application to be evaluated
 *** Single drive configuration available

All data are nominal and may vary to suit a specific application.

SINDEX®

SINGLE-SCREW DISCHARGE EXTRUDER

The single-screw discharge extruder is a very flexible machine that can be used in many different areas of application and with which – depending on head technology – granules, sheets and strips can be produced. The integration of a material filter (strainer) is also possible. Our machines are characterised by the secure entry of the mixing bale from the mixer into the screw channel. Fluctuations in pressure in the extrusion tool are minimised thanks to the twin rotary pushing system. If the extruder is connected downstream of a collecting rolling mill, material feeding can also take place via a strip feed roll.

MORE FEATURES:

- Unique twin rotary pushing system for secure material feeding
- Customer-specific, individually designed geometry and length of the screw with optimised temperature control
- Inline strainer possible
- Compact design with water-cooled AC drives
- Easy to change materials with double-head technology



SINDEX® – Technical data

	EAE	150	200	250	300	400	500
Screw diameter	mm	150	200	250	300	400	500
Speed	rpm	5–60	5–50	5–40	5–30	5–25	5–20
Rated power* (L : D = 8.5 : 1)	kW	100	135	200	250	320	370

* Screw length and drive power depend on the technical requirements.

MILLMIX®

SHEETING AND MIXING MILL

Mills can achieve very high cooling performance thanks to their large roller surfaces. This characteristic makes them ideal for the processing of temperature-sensitive compounds, which is why they are often used in the technical rubber goods industry. Our mills stand out because of their very compact and robust construction, conformity to all relevant EU standards and universal potential for automation. In addition, the roller quality can be selected to suit the existing requirements. For special applications, the HF MIXING GROUP offers newly developed, wear protected rolls for the mills.

MORE FEATURES:

- Peripherally drilled roller-cooling channels
- Hydraulic roller slot adjustment
- Excess pressure release to protect rollers
- Compact individual drive solution
- Self-cleaning
- ASMA-Cool non-stick rollers



MILLMIX® – Technical data

	Unit	400 x 1,000	500 x 750	550 x 1,500	600 x 1,800	660 x 2,100	750 x 2,500	910 x 3,050
Roll diameter	mm	400	500	550	600	660	750	910
Roll length, total	mm	1,000	750	1,500	1,800	2,100	2,500	3,050
Roll length, usable	mm	880	620	1,380	1,680	1,980	2,380	3,000
Roll speed	rpm	24	19.1	17.5	16	14.5	12.7	10.5
Peripheral speed	m/min.	30	30	30	30	30	30	30
Drive power	kW	2 x 37	2 x 55	2 x 75	2 x 95	2 x 130	2 x 175	2 x 275
Individual drive for each roll friction area		Infinitely adjustable from 0.1 to 1.0, the friction can be adjusted independently from mill side, front to rear roll / rear to front roll						
Cooling water consumption		8	10	14	18	20	22	33
Weight	t approx.	11	16	21	31	35	45	90

TECNOLAB® SERIES LABORATORY MIXING MILL

Our laboratory mills are the optimal research and development process and production support tool. The laboratory mills are developed to make the optimisation of your compounds as efficient as possible and act as your reliable partner for optimising your products.

The characteristics of the laboratory mills are in line with those of our production mills and this similarity simplifies the process of scaling up mixing parameters for compounding applications in much larger machines.

An adjustable control panel is placed on the frame of the machine and contains the following elements:

- Switch with key and control pilot light for the main tension
- Potentiometer for speed selection
- Roll speed indication
- Pushbuttons and control pilot light of the drive motors
- Selector and pushbutton to reverse the sense of rotation of the rolls
- Selector with key for braking test
- 'Reset' button

	MM 150 x 330 FF*	MM 150 x 330 VF**	MM 160 x 400 VF**	MM 300 x 600 VF**
Construction as per	EC safety norms			
Roll diameter	150 mm	150 mm	160 mm	300 mm
Useful length	330 mm	330 mm	400 mm	600 mm
Roll speed up to	27.4 rpm high speed 20 rpm low speed	28.5 rpm	28.5 rpm	21 rpm
Friction ratio	1/1.37	Variable	Variable	Variable
Power	1 x AC built-in drive motor with inverter 5.5 kW	2 x AC drive motors with inverter 5.5 kW	2 x AC drive motors with inverter 5.5 kW	2 x AC drive motors with inverter 11 kW
Transmission to rolls	Rear – direct Front – spur pinions	Unidrive	Unidrive	Unidrive
Working height at the centre of the rolls	1,230 mm	1,230 mm	1,230 mm	1,250 mm
Colour	RAL 5022 midnight blue / RAL 9003 white			

* Fixed friction
** Variable friction



CUTTING EQUIPMENT



BALECUT®
Hydraulic bale cutter

➔ Page 38

STRIPCUT®
Strip cutting machine

➔ Page 39

BALECUT®

HYDRAULIC BALE CUTTER

The hydraulic bale cutter is designed for the cutting of natural and synthetic rubber bales. It allows exact and simple dosing of polymers when putting together formulas for mixes.

The machine comprises a bending-resistant framework with a stable double-pillar set-up for the blade carrier. The easily interchangeable cutting blade meets an exchangeable centre selvedge at its lowest position. Cutting takes place in dry conditions.

MORE FEATURES:

- Hydraulic blade drive
- Encased cutting device
- Two-handed operation

Optional:

- Polymer-holding clamp
- Adjustable cutting height
- Scissor-type cutting
- Collecting box



BALECUT® – Technical data

Cutting force	100 kN
Hydraulic operating pressure	210 bar
Motor of the hydraulic unit	7.5 kW
Cutting strokes per minute	7

BALECUT® – Overall dimensions

Horizontal clearance width	Approx. 650 mm
Vertical clearance width	Approx. 335 mm
Height of roller table	Approx. 900 mm
Height of machine	Approx. 2,270 mm
Width of machine	Approx. 1,080 mm
Depth of machine	Approx. 1,000 mm
Weight	Approx. 1,000 kg

STRIPCUT®

STRIP CUTTING MACHINE

The HF MIXING GROUP strip cutting machine is used if an existing sheet needs to be dosed on a belt weigher. Two belt conveyors, one above the other, feed the sheet in and bring it to the cutting tool. This comprises two cutting blades attached to a rotating cutting roller, which work against a stationary blade. The cutting blades are adjustable and can be resharpened where necessary. The conveyor belt drive is frequency-controlled for an exact, automated dosing. This allows the feeding of the rubber sheet to be increased (coarse flow) or reduced (fine flow) as required. The strip cutter is controlled via a control box with control panel, which is attached to the side of the machine. The machine comes from our factory completely pre-installed and extensively tested for you before delivery takes place.

MORE FEATURES:

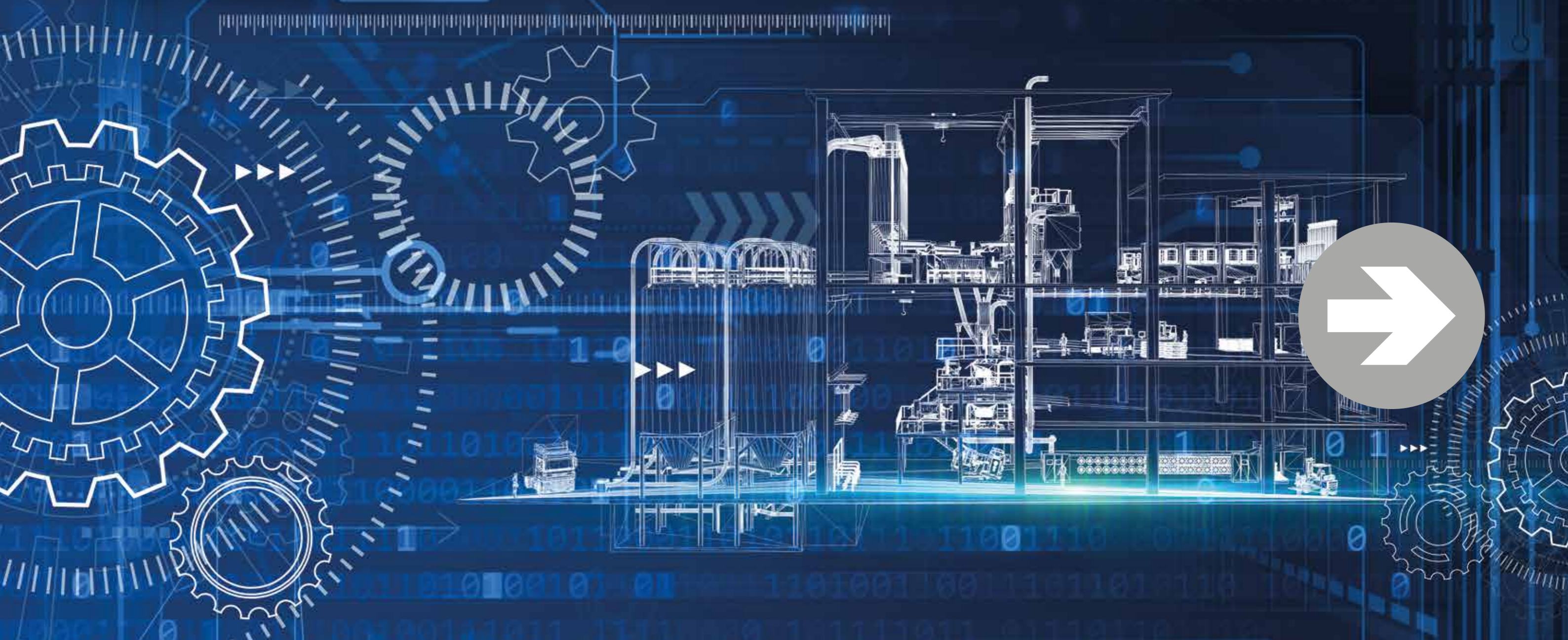
- Compact construction
- Easy installation
- Automatic rubber sheet dosing in the second mixing stage
- Longevity of blades and lower sensitivity to wear and tear

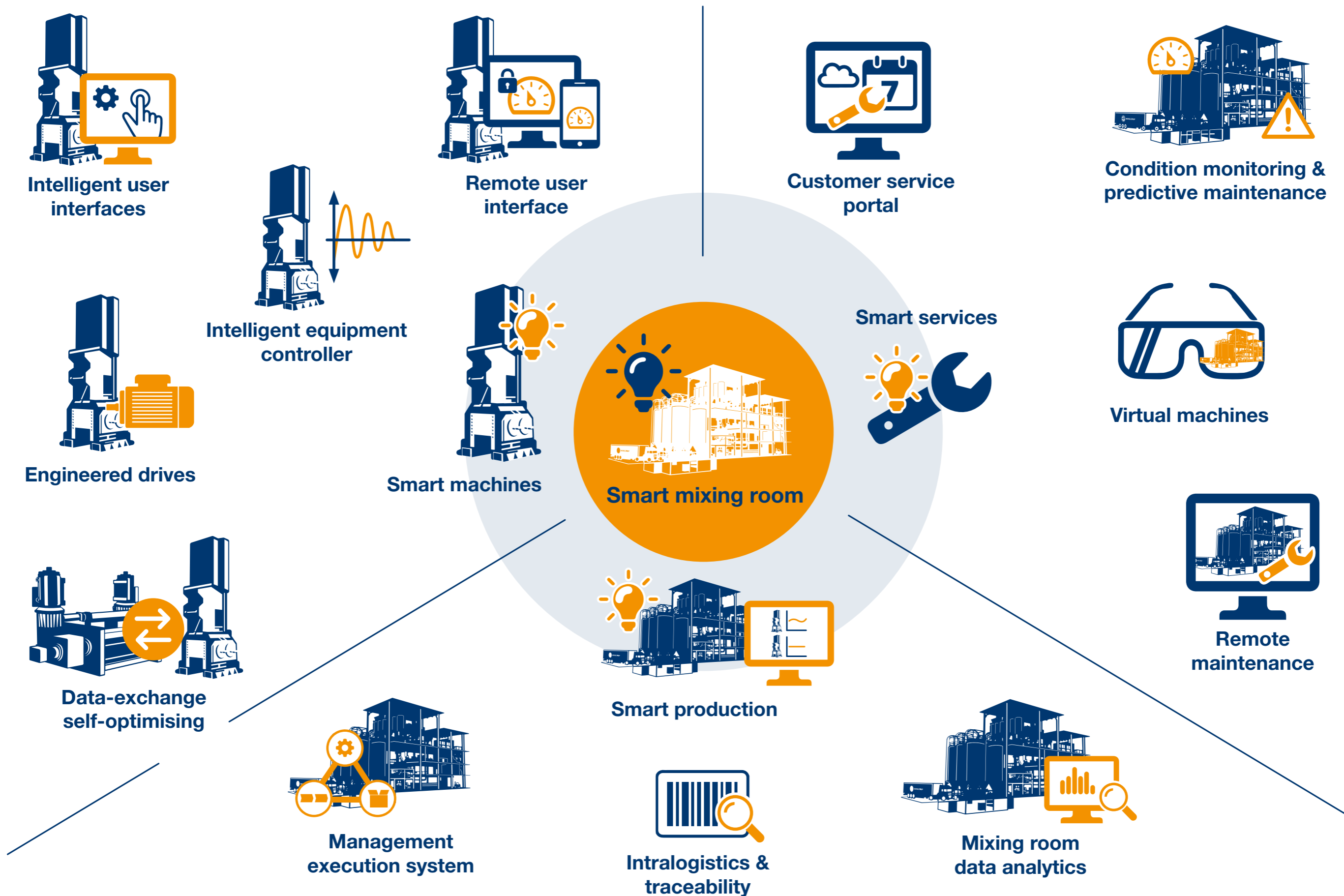


STRIPCUT® – Technical data

	Unit	SSM1000	SSM1200	SSM1400
Conveyor belt width	mm	1,000	1,200	1,400
Sheet width, max.	mm	800	1,000	1,200
Cutting thickness, max.	mm	24	24	24
Strip width, max.	mm	290	290	290
Strip width, min.	mm	60	60	60
Number of strips	Pieces/min	52	52	52
Drive power, transport device	kW	2.2	2.2	2.2
Drive power, cutting device	kW	9.5	9.5	9.5
Nominal throughput <small>(at max. sheet width and 24 mm sheet thickness and continuous feeding without pallet change)</small>	kg/h	20.000	25.000	30.000

AUTOMATION





MIXERS

DOWNSTREAM EQUIPMENT

CUTTING EQUIPMENT

AUTOMATION

MIXING ROOM SYSTEMS

CONTINUOUS COMPOUNDING SYSTEMS

SERVICES

ADVISE® MIXING ROOM AUTOMATION

ADVISE® is an automation system for the entire mixing room. It benefits from consistent use of the experience and expertise gained in over 150 years of tradition in the construction of machines and control systems for the polymer processing industry. ADVISE® can be adjusted to suit individual desires and requirements, without special solutions having to be developed. ADVISE® users value its intuitive system interface just as highly as its simple application of advanced technology.

It is an interesting option for use in small laboratory applications without any up- and downstream equipment, as it allows processes to be more precisely implemented and documented.

ADVISE® is the ideal solution for the constantly shift in requirements of the technical rubber goods industry or the tire industry thanks to its several mixing lines, high throughput and complete control of the material flow.





ADVISE® ES MIXING ROOM AUTOMATION

ADVISE® ES is a modular, scalable system for automating mixing rooms. All areas of the mixing room are included, starting with the inventory management of raw materials in the warehouse, going to the manual weighing of small chemicals, the fully automated weighing of bulk material, the mixing process, downstream equipment such as open mills and single- or twin-screw discharge extruders, and all the way to the compound storage room. Highly developed automation solutions are available for the individual areas and/or machines. Depending on requirements, individual applications can be selected and combined to create a comprehensive automation solution. Even higher-level ERP systems or laboratory equipment can be connected to the mixing room automation system via standard interfaces.

MORE FEATURES:

- Complete automation solutions from one single source
- High level of standardisation, low investment costs
- Continual further development for future mixing technologies
- Productivity and quality optimised with intelligent process technology
- High precision and repeatability of processes guaranteed
- Consistent documentation of processes and material flows

ADVISE® – Application range

Office and laboratory application		ADVISE® ES LAB	ADVISE® ES BASIC	ADVISE® ES
		LAB mixer	For single mixers without any automatic weighing	For single and multiple mixing lines with automatic weighing
Basic functions	User groups and user-related language translation	■	■	■
	Plant configuration for mixer set values and step parameters	■	■	■
	Plant configuration for weighing and feed system (scales, silos, dosingpath, ...)	-	-	■
	Plant configuration for downstream machines	-	□	■
	Material master data	■	■	■
	Recipe management	■	■	■
	Production order management	■	■	■
	Chart analyser for process data evaluation	■	■	■
	Reporting of production data	■	■	■
Extended basic functions	IMS inventory management	-	-	□
	PPS production planning	-	-	□
	PMS product management	-	-	□
Interfaces	ERP interfaces	□	□	□
	LAB interfaces	□	-	□

■ Standard □ Optional

ADVISE® – Application range

Online applications		ADVISE® ES LAB	ADVISE® ES BASIC	ADVISE® ES
		LAB mixer	For single mixers without any automatic weighing	For single and multiple mixing lines with automatic weighing
Mixer app	Full mixing process automation	■	■	■
	Automatic weighing process automation	-	-	■
	Intelligent temperature control	□	□	□
	Torque-related oil injection control	-	-	□
	Ram position profile control	□	□	□
Polymer app	Online manual weighing	-	■	■
	Barcode reader, for raw materials identification	-	□	□
SCW app	Offline manual weighing	■	■	■
	Barcode reader, for raw materials identification	□	□	□
	Label printer, for marking bags (intermediates)	□	□	□
ACW app	Offline automatic weighing	■	■	■
	Label printer, for marking bags (intermediates)	□	□	□
Mill app	Milling process automation	-	-	■
	Barcode reader, for raw materials identification	-	-	□
BOF app	Downstream process automation	-	-	■
Material tracking and tracing	Material receiving and material release	-	-	□
	Material disposition	-	-	□
	Silo filling application / big bag replacement control	-	-	□
	Batch / pallet weighing and labelling station	-	-	□

■ Standard □ Optional

MIXERS

DOWNSTREAM EQUIPMENT

CUTTING EQUIPMENT

AUTOMATION

MIXING ROOM SYSTEMS

CONTINUOUS COMPOUNDING SYSTEMS

SERVICES

ADVISE® CS MIXING ROOM AUTOMATION SYSTEM

The mixer is the central element of any mixing line. High-performance mixers and mixing room components require a control system that is intelligent and reliable in equal measure. ADVISE® CS is a control system that can be adapted for simple laboratory mixers, high-performance mixers and tandem systems, for example, in each case with or without material weighing and feeding.

ADVISE® CS operates as both a visualisation system and a diagnosis system, with intuitive handling and precise instructions in case malfunctions, which together ensure a high-level of system availability. The electrical engineering and design is always in line with international stan-

dards and relevant safety guidelines. The interconnection of process, hydraulic, drive and electronic technologies provides the basis for an efficient mixing room.

MORE FEATURES:

- High standard of technical production
- iRam – intelligent hydraulic control
- Reproducible results thanks to PID controllers



ADVISE® DS DRIVE SYSTEM

Rising energy costs and a growing awareness of environmental protection are creating new requirements for drive systems in the modern mixing centre. Electric drives are important components in this area, as they help to optimise the process while reducing investment costs, energy consumption and therefore also energy costs. High availability is combined with reduced maintenance costs thanks to the low-maintenance three-phase AC drive technology.

- Safe, highly dynamic drive control
- Innovative drive concept: 'modular gearbox'
- Exchange of DC for AC drive technology with financing concept
- Drive train engineering and implementation including after-sales support

MORE FEATURES:

- Drive train analyses to increase energy efficiency
- Application-specific drive train design
- Drive-size data collection based on Drive Data Warehouse
- Three-phase AC drive technology with minimal wear and tear and extremely high drive availability



ADVISE® IP INFORMATION PORTAL

ADVISE® IP has been designed for the mixing room decision makers. It helps with the recognition of interconnections and influences on production and process chains.

Typical questions such as 'How does last week's throughput compare to that of the previous year?', 'Are the differences in weighing precision dependent on the time of year?', 'How does system effectiveness change from shift to shift?' or 'Which supplier provided the raw materials in the compound xyz-1234?' can be answered in informed detail with ADVISE® IP.

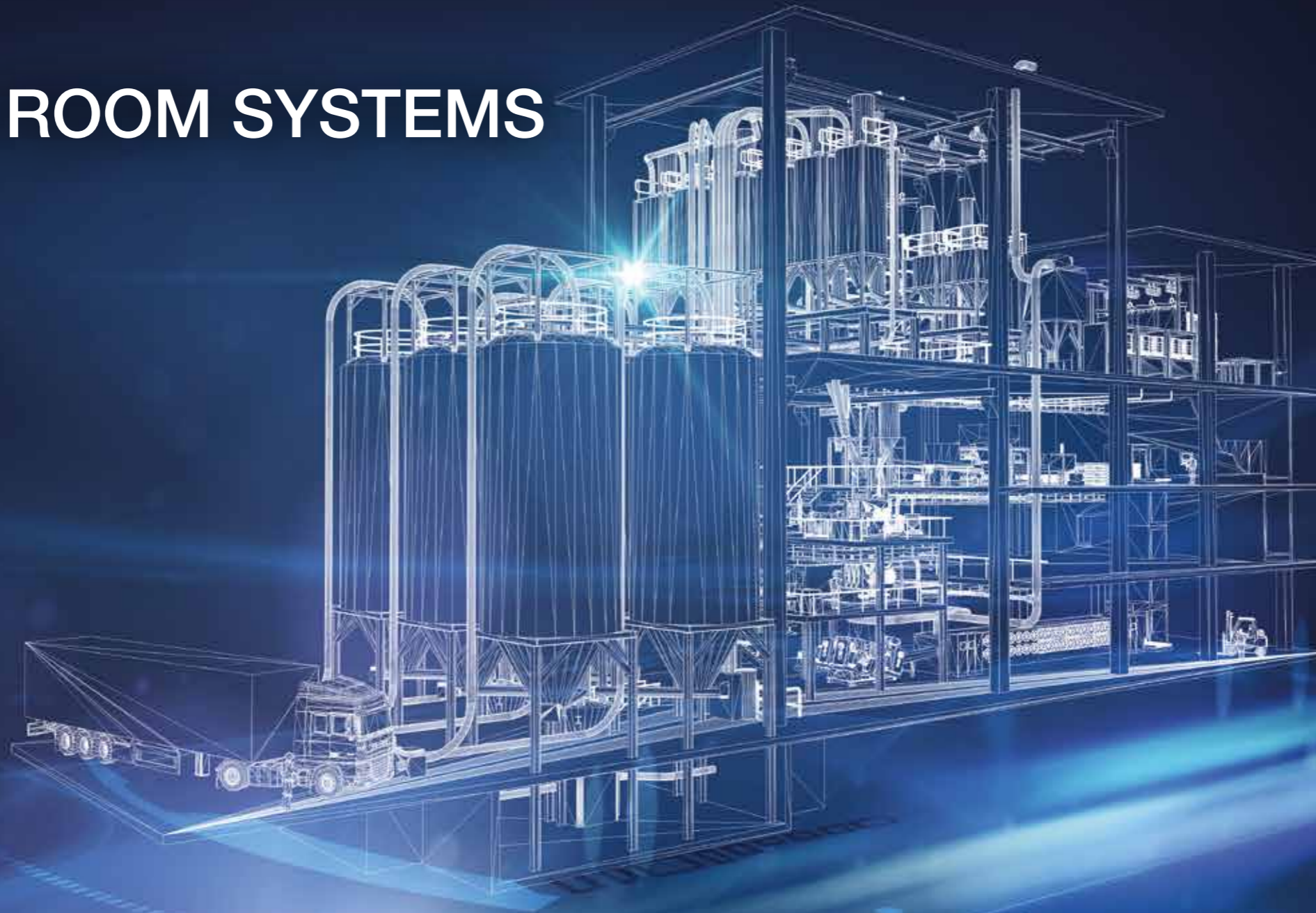
ADVISE® IP is also a tool that can provide the user with simple statistical and individually designable evaluations and representations.

MORE FEATURES:

- Improved product quality and efficiency
- Early recognition of growing variations
- Monitoring of mixing line effectiveness
- Statistical evaluation
- Long-term monitoring of machine, process and usage data



MIXING ROOM SYSTEMS

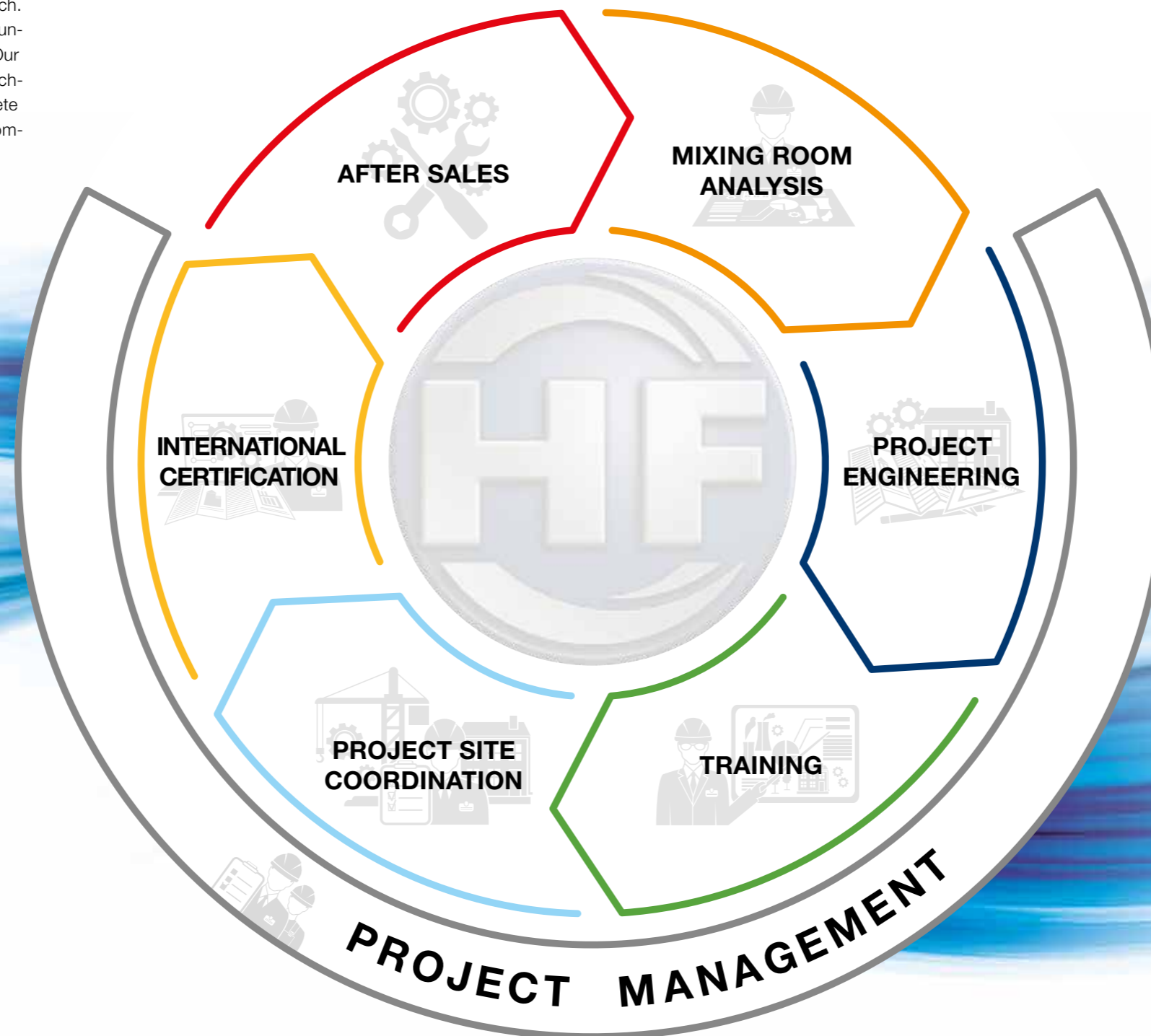


ENTIRE MIXING ROOM
SOLUTIONS FOR THE
POLYMER PROCESSING
INDUSTRY

➔ Page 54–55

A SYSTEM IS ONLY AS GOOD AS ITS DESIGN

Do you need a new mixing room or do your major components require replacement? If so, get in touch. You can focus on your routine business whilst we undertake full project management on your behalf. Our services range from the selection and design of technical equipment that best fits your needs, complete engineering services, training, site coordination, commissioning and certification.



Mixing room analysis:

- Analysis of mixing processes and mixing flows
- Carrying out of series testing in our HF Technical Center
- Mixing room design
- 3D mixing room scanning

Project management:

- Project management from the quotation phase through completion
- Supplier selection and coordination
- Scheduling and project controlling

Project engineering:

- Design and layout of mixing room material flows
- Interface definition and optimisation
- Factory Acceptance Testing (FAT) of soft- and hardware

Training:

- For operators
- For maintenance personnel
- For process supervisors

Project site coordination:

- Coordination of mechanical and electrical assembly as well as installation at the customer site
- Logistics management at the installation site
- Site Acceptance Testing (SAT) on behalf of the customer

International certification:

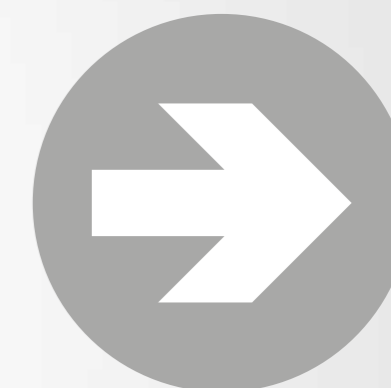
- State-of-the-art risk assessment
- Operating instructions
- Declaration of conformity

After sales:

- 24 h hotline service
- Global service network
- Replacement parts and on-site support services
- Permanent full-system support

CONTINUOUS COMPOUNDING SYSTEMS

EFFICIENCY



EFFICIENT SOLUTIONS – FARREL POMINI

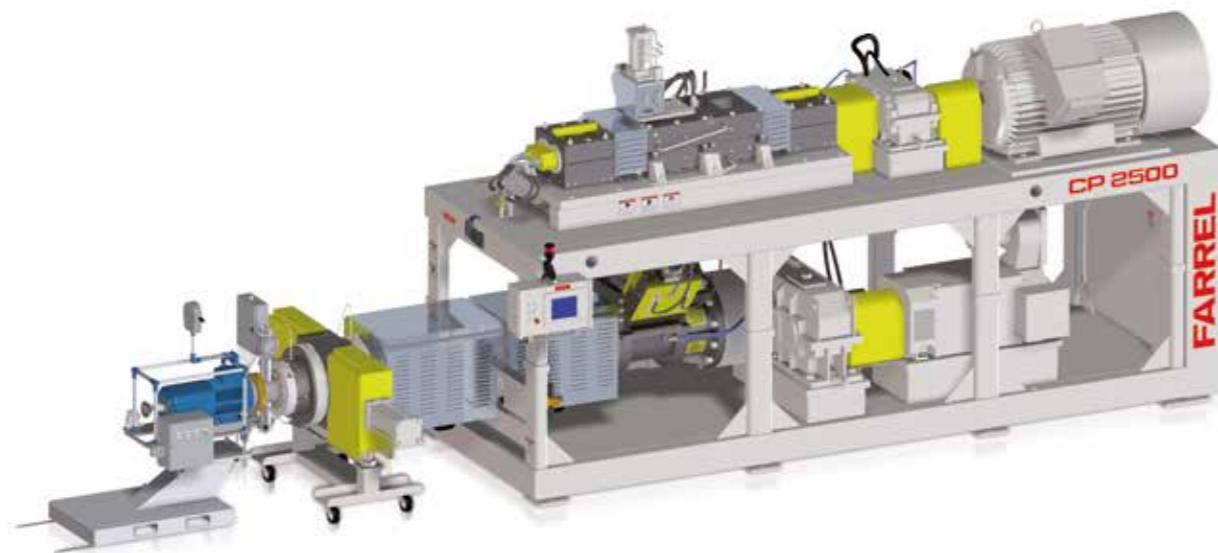
FARREL POMINI is the business unit of the HF MIXING GROUP dedicated to continuous mixing equipment. As the global leader in the research, design and manufacturing of compounding systems for the plastics industry, FARREL POMINI covers an extensive range of processing applications. The technology has proven its performance in processing polyolefin-based compounds with high levels of mineral fillers, as well as additives, colour masterbatches, polymer-elastomer blends and applications requiring high-intensity mixing while maintaining a low processing temperature.

Primary products include: CP Series II™ Compact Processor, FCM™ Continuous Mixer (including the UMSD Line), FMP™ Farrel Melt Pump, Underwater Pelletizer and Hot & Cold Extruders.

In addition to new equipment, FARREL POMINI offers remanufacturing and machinery upgrade services, spare parts, field service and technical support and start-up and commissioning services. Process and customer demonstration facilities are located in the United States and the United Kingdom. The research and development facility is in the United States.

Efficiency is the driving force of FARREL POMINI activities. This includes energy efficiency, processing efficiency and maintenance efficiency. These elements differentiate our equipment in the marketplace and, most importantly, help make compounder companies productive and profitable.

If you would like further information about FARREL POMINI products, please visit our website and do not hesitate to contact us: www.farrel-pomini.com



CP Series II™ Compact Processor

ENGINEERING:

- Compact Processors (CP)
- Continuous mixers
- Underwater pelletisers
- Melt pumps
- Hot-feed and reactor-fed extruders

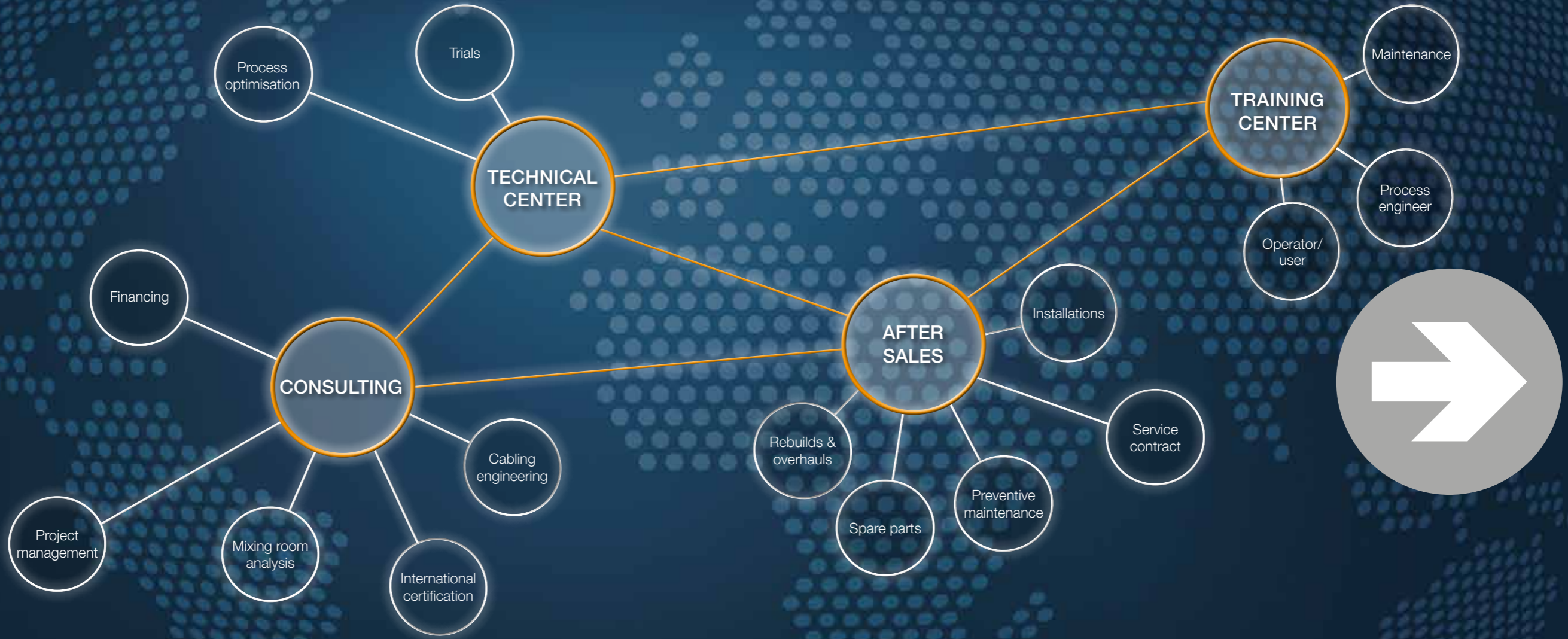
PRODUCTS:

- Polyolefin-based compounds
- Masterbatches with high levels of mineral fillers, additives and pigments
- Polymer-elastomer blends and applications requiring high-intensity mixing while maintaining a low processing temperature
- Temperature-sensitive materials such as PVC

SERVICE:

- Spare parts
- Remanufacturing and rebuilding
- Field service and technical support
- Process engineering services
- Project engineering
- Process laboratory and customer demonstration facilities

SERVICES



HF MIXING GROUP SERVICES

SERVICES AT FIRST-HAND

HF MIXING GROUP is a world leader in technology for the polymer processing industry, and our services lead the market as well, with a broad range of offerings to meet every need. Our wide geographic coverage means we are where you need us.

Our services are organised to provide short in-house communication paths. This lets us respond to you quickly and effectively.



CONSULTING:

- Mixing room analysis
- Project management
- Financing
- Cabling & piping engineering
- International certification



TECHNICAL CENTER:

- Trials
- Process optimisation

Service Hotline

For mechanical issues

- In North, Central and South America
00800 4212336
- Outside of North, Central and South America
00800-HFMIXING (00800 43649464)
or +49 2734 491-300

PLC & Automation worldwide

- 00800-HFMIXING (00800 43649464)
- or +49 2734 491-300

support@hf-mixinggroup.com



AFTER SALES SERVICE:

- Installations
- Preventive maintenance
- Spare parts service
- Service contracts
- Rebuilds & overhauls



TRAINING CENTER

- Trainings
 - Process engineer training
 - Operator/user training
 - Maintenance

www.hf-mixinggroup.com