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Editorial contribution
CONTENT PAINT special issue: Stirring and mixing – expertise

Infoline for reader and journalists
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Mixing done right – a "how to" guide

Efficient and reliable mixing is the ideal basis for processing plaster and fillers

The importance of correctly mixing powdered materials is often underestimated. Philipp Stahl, master painter and application engineer at Festool, describes why this process in particular is so crucial. In particular, the combination of stirrer and stirring rod plays an important role in mixing and stirring, and should be individually tailored to the relevant material.

Painters encounter a multitude of different materials in their everyday working life: Various types of plaster, filler, paint, wallpaper paste, clear coat, reinforcement adhesive, varnish and two-component coating systems. As a rule, these materials each require a different choice of stirring rod. In everyday work, users often use the same stirrer rod for different materials. The result is that the materials are often mixed incorrectly. This could lead to the need for rework, additional costs or even to structural damage. What is particularly aggravating is that the material manufacturer's warranty could also be rendered void due to incorrect application. For the painter, this usually ends in substantial follow-up costs and potential compensation demands from the end customer. This risk can be easily avoided by simply using the correct stirrer, stirring rod and settings in accordance with the material manufacturer's specifications.

Of paramount importance: Surface preparation

In demanding work processes – such as laying floor coatings using epoxy resin or PUR – the material is made up of two components. During mixing, it is especially important to ensure that the quantities and proportion of components A and B are carefully and accurately balanced, that the timings specified by the manufacturer are complied with, and that the components are mixed properly. If this is not the case, damaged areas may form on the coating, and adhesion issues with the underlying surface may crop up. During mixing, we recommend referring to the component manufacturer's specifications on the designated data sheets and keeping exactly to the specified quantity proportions and mixing speed. "If the components are mixed at too high a speed, the mixture heats up faster. This means that the material sets too quickly, impairing adhesion with the underlying surface and reducing the processing time," explains master painter Stahl. He continues: "When using liquid resins, we recommend a so-called whisk, which ensures that the two components are mixed in the ideal way."

Firm fillers and plaster for walls

"To mix heavy and viscous materials such as mortar and plaster, we recommend a stirrer rod that is spiralled to the right with three spirals. It generates high shear forces, which means that the material is perfectly mixed from the bottom to the top. This ensures that all of the material is mixed evenly," describes Stahl.

For low-viscosity materials

To stir clear coats, dispersion adhesives, wallpaper paste as well as low-viscosity materials and pains, the application engineer recommends using a stirrer rod that is spiralled to the left and that mixes the material from top to bottom while simultaneously preventing the material from spurting out. The round stirrer is equally well suited for liquid materials.

Self-levelling fillers

Painters are increasingly using self-levelling filler when it comes to flooring, in order to create an even underlying surface for the decorative floor coverings, laminate or prefabricated parquet which are to be added later. Mixing self-levelling filler incorrectly could cause it to form lumps. This results in a residue of dry material – usually at the bottom of the bucket. Using a classic stirrer rod that is spiralled to the right could also introduce an excessive amount of air into the material. This would result in the material not mixing into a homogeneous mass, even after long periods of stirring. This leads to damaged areas with some material remaining in powder form or air bubbles on the surface, which appear when too much air has been introduced to the mixture. "For this reason, we recommend using a suitable stirrer rod and ensuring that the speed and stirring duration remain in accordance with the manufacturer's specifications. For this particular job, we recommend using the whisk, since its special design lets hardly any air into the material and reliably forms a homogeneous mixture," explains Philipp Stahl.

It's all down to the perfect stirrer

For the majority of mixing materials – both in liquid and solid form – Festool recommends a stirrer with at least 1200 W power and two-gear transmission with variable speed settings for mixing lightweight and medium materials. "In addition to the speed regulation, thanks to the patented ErgoFix height adjustment feature, our stirrers can be individually and easily adapted to the height of the operator. This makes a natural, upright and effortless working position possible. At the same time, the ErgoFix adapter, with its classic M14 tool reception, makes it possible to quickly change stirrer rods (FastFix function) without the need for tools," Stahl adds. Heavy, compact materials should be stirred in first gear since the high torque means that the maximum stirring force is readily available. Meanwhile, liquid materials should be stirred in second gear at the appropriate speed (see manufacturer specifications). If the wattage of the available stirrer is too low, it requires a lot more effort to mix the material perfectly since the missing power often has to be compensated for with physical input. It can be concluded that

correct mixing enables painters to achieve the desired working result as well as avoid unnecessary hassle and the consequent expensive rework.

Dust-free work starts with stirring and mixing

Festool has included an MX dust extractor in the scope of delivery for every stirrer. This means that you can stir and mix any material – with no dust. The MX dust extractor is simply clipped onto the edge of the mixing bucket. When the extractor is switched on, the dust disappears into the extractor when the mixing material is poured. This means that you no longer have to battle with clouds of dust while stirring. This protects the lungs of the user and leaves behind a clean working environment – all without any additional cleaning work.

Author: Silvia Pirro – in cooperation with Philipp Stahl (master painter and application engineer at Festool)

Top tips

… Before acquiring a professional mixing system, think about what requirements you encounter in your work and which materials you generally need to mix

… Match the suitable stirring rod to each application/material

… Observe the manufacturer's specifications

… Adapt the speed as required and keep to specified mixing times

More information can be found at: www.festool.co.uk

Total approx. 6538 characters (including spaces)

Technical data	MX 1000	MX 1200	MX 1200/2	MX 1600/2	MX 1600/2 DUO
Power consumption (watt)	1.020	1.200	1.200	1.500	1.500
Gears	1	1	2	2	2
Idling speed, 1st gear/2nd gear (RPM)	360 – 630/–	360 – 630/–	150 – 360/320 – 780	150 – 300/320 – 650	100 – 250/130 – 350
Tool holder	M14/ErgoFix	M14/ErgoFix	M14/ErgoFix	M14/ErgoFix	FastFix
Collar dia. (mm)	57	57	57	57	57
Max. mixer container diameter (mm)	120	140	140	160	140
Mix quantity (l)	40	60	70	90	90
Weight (kg)	4,6	4,6	6,3	6,7	8,1

Image preview

Image: Festool-stirring-mixing-01.jpg
Dust-free work begins with stirring – the best way to stir and mix.

Image: Festool-stirring-mixing-02.jpg
Philipp Stahl – master painter and application engineer at Festool – provides tips and tricks for stirring and mixing all kinds of materials.

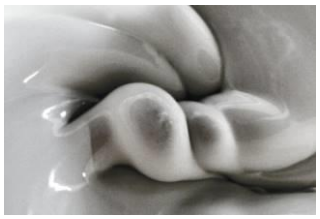


Image: Festool-stirring-mixing-03.jpg
Starting basis: Liquid Mixing result: Liquid – recommended with the RS round stirrer or the HS3L helical stirrer with three spirals on the left or the whisk for epoxy resins

Image: Festool-stirring-mixing-04.jpg
Starting basis: Powdered/viscous
Mixing result: Fluid – recommended with the CS whisk or HS2 stirring rod

Image: Festool-stirring-mixing-05.jpg
Starting basis: Powdered/viscous
Mixing result: Compact – recommended with the HS2 or HS3 R stirrer rod

Image: Festool-stirring-mixing-06.jpg
Using the right equipment to mix different materials can save painters a lot of time and money.

Image: Festool-stirring-mixing-07.jpg
Thick clouds of dust while stirring are a thing of the past: The MX stirrers, including MX extractor on the edge of the bucket, enable you to stir and mix any material with no dust. A welcome breath of fresh air not only for your lungs – but for your back, too.

Image: Festool-stirring-mixing-08.jpg
The variable speed adjustment means that you can mix all types of materials. When using this, we always recommend that you pay close attention to the manufacturer's specifications to ensure that you always stir and mix at the right speed.

Image: Festool-stirring-mixing-09.jpg
The combination of their powerful motors and robust gear units mean that these machines offer maximum power and a long service lift.

Image: Festool-stirring-mixing-10.jpg
With the patented ErgoFix height adjustment, the Festool stirrers can be easily and quickly adapted to the user's height.

Image: Festool-stirring-mixing-11.jpg
Mix ergonomically and upright with the ErgoFix height adjustment – and if, at any point, you lose power, the SYS-PowerStation is the perfect way to bring the electrical outlet module with you.

Image: Festool-stirring-mixing-12.jpg
Mix ergonomically and upright: The ErgoFix height adjustment means that you can work in an upright, natural position, and therefore guarantees relaxed and effortless mixing and stirring.

Image: Festool-stirring-mixing-13.jpg
With the patented ErgoFix height adjustment, the Festool stirrers can be easily and quickly adapted to the user's height.

Image: Festool-stirring-mixing-14.jpg
Bad for the lungs and the work environment: This is what it looks like when powdered materials are poured in without extraction.

Image: Festool-stirring-mixing-15.jpg
Effective extraction as soon as material is poured in: No exposure to dust when filling and mixing powdered materials – the MX dust extractor is simply clipped onto the edge of the bucket and ensures that the dust ends up in the extractor and not in your lungs. For a clean working environment with no rework required.

Image: Festool-stirring-mixing-16.jpg
RS round stirrer: For low-viscosity mixtures; wall and emulsion paints, paste, glue, casting compounds, lacquer, bitumen, slurry-type seal coating

Image: Festool-stirring-mixing-17.jpg
HS3L spiral stirrer spiralled to the left: Mixing from top to bottom. In this way, settled material is mixed in well and the mixture does not spray – for thin materials such as gypsum plaster, emulsion paint, clear coats, wall paint, casting compounds

Image: Festool-stirring-mixing-18.jpg
CS whisk: For filling mixtures and smoothing cement, sealants, epoxy resin coatings, adhesives – for stirring without trapping air (no air bubbles) and for liquid materials.

Image: Festool-stirring-mixing-19.jpg
HS2 spiral stirrer spiralled to the right: For viscous materials; tile cement, filling compounds, flooring mixtures, ready-mix plasters, screed, smoothing cement, filling mixtures

Image: Festool-stirring-mixing-20.jpg
HS3R spiral stirrer spiralled to the right: Mixing from bottom to top – "screws" itself into the material. For heavy materials with high viscosity: Mortar, concrete, cement and lime plaster, mounting binder, screed, quartz-filled epoxy resin, bitumen, thick coatings.

Image: Festool-stirring-mixing-21.jpg
The two-speed DUO stirrer with 1500 W power for thorough mixing, even of viscous and multi-component material up to 90 l.

Image: Festool-stirring-mixing-22.jpg
Work more easily: Working with the DUO saves even more energy. The stirrer rods working in opposite directions cancel out the torque. You guide the tool through the material with virtually no torque.

Image: Festool-stirring-mixing-23.jpg
HS 3 COMBI stirrer rod: For liquid and viscous materials, the lower part of the stirrer cage raises the material from the bottom of the container upwards. The upper part of the stirrer cage pushes the material downwards – material quantity of 30–60 kg.

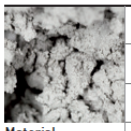
Image: Festool-stirring-mixing-24.jpg
HS 3 DOUBLE stirrer rod: For heavy, high-viscosity materials, two stirrer rods, each with three helixes, counter-rotate. The material is kneaded with a combing effect – material quantity of 30–60 kg.

Image source: Festool GmbH

Overview of the materials – optimal stirrer rods





		RS Round stirrer	HS3L Helical stirrer with 3 anticlockwise spirals	CS Whisk	HS2 Helical stirrer with 2 spirals	HS3R Helical stirrer with 3 clockwise spirals
 Material consistency liquid Mixing result liquid	Paints	●	●			
	Emulsion paint	○	●			
	Wallpaper paste	●	○			
	Clear coat, varnish	●	○			
	Epoxy resin	○	○	●		
 Material consistency powdery/viscous Mixing result free-flowing	Filler			●	●	○
	Bonding mortar			○	●	○
	Levelling compound			●	○	
	Waterproofing filler			●	●	○
	Bitumen			○		○
 Material consistency powdery/viscous Mixing result compact	Ready-mix plaster				○	○
	Plaster		○		●	●
	Tile cement				●	○
	Joint mortar				●	●
	Mortar				●	●
	Quartz-filled epoxy resin				○	●
	Concrete, screed				○	●

272 FESTOOL

Extremely appropriate ●
Appropriate ○
Vibration and emissions values can be found in the operating manual at www.festool.com/vibration