

**HOT MELT
IS OUR
PASSION**

Since more than 90 years



PORTFOLIO



„We go to great lengths to show dedication to what our customers want“
› Bert Gausepohl

„It is our ultimate goal to really understand the needs of our customers and to transform them into solutions“
› Helmut Hannemann

„Hot-melt adhesives have always had a promising future: they're valuable in many industries. We're extremely knowledgeable in this area“
› Frank-Thomas Wiebe

„I'm proud of the comprehensive benefits that our range offers our customers.“
› Hanno Pünjer

„Laborious, soul-destroying work - not with BÜHNEN“
› Joachim Rudolph

„Every day throws up new challenges, which we overcome together“
› Claudia Voigt

A key technology for today and tomorrow – hot melt is our passion!

Hot melt adhesives, tools and services from one source.

Adhesion has always been key to technical advancement. Ötzi, the famous Stone Age hunter, even used adhesives to make his arrows extra strong over 5300 years ago. He attached the flint point to the shaft with plant fibres but also used a special mixture made from heating birch bark – birch bark pitch, the first adhesive known to man.

These days, countless materials can be bonded using a variety of adhesion techniques. But the richer and more diverse the range of available materials, the greater the challenge to find the ideal adhesive.

But no challenge is too great for BÜHNEN! As an owner-operated family business with a history stretching back 90 years, we passionately specialise in modern hot melt adhesive compounds. We are constantly developing new and exciting solutions in our laboratory, which are tailored to meet specific customer requirements. Thanks to these continuous optimisation and our service, today we are a world-leading provider of manual application tools for hot melt adhesives.

Our comprehensive range of adhesives, application technology and accessories is now being used in over 100 different industrial sectors. As well as with our own companies in Germany, Austria, Poland and the Netherlands, BÜHNEN co-operates with trading partners around the world to satisfy the fast-growing international demand for reliable and innovative new hot-melt adhesives and the corresponding applicators.

We have always lived by the principle: consultation first, then selling! Because, for us, customer focus means pledging our expertise and personal dedication entirely to the quest for customised solutions to satisfy your individual needs. This is what inspires us afresh every single day.

Hot melt is our passion!

Every time you see our laboratory expert, you'll discover little tips about our tools, hot-melt adhesives or on the general subject of adhesion.



You can always rely on:

- ▶ Established consultation expertise
- ▶ Consistent alignment with your wishes
- ▶ Fair prices
- ▶ Environmentally-friendly solutions
- ▶ Reliability for over 90 years

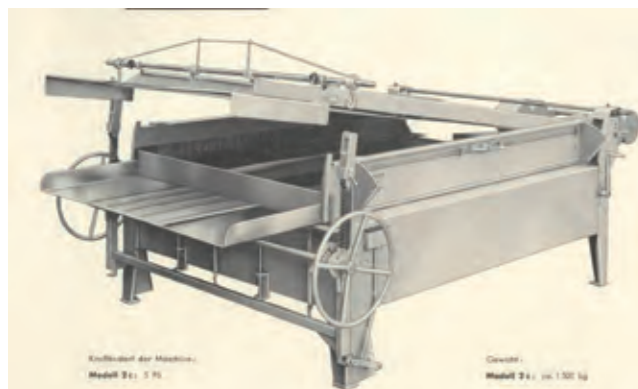
With a gifted inventor all began

More than years BÜHNEN GmbH & Co. KG

Every problem has its own solution. Guided by this principle, our employees' passionate dedication to the special requirements of our customers goes back to our roots. After all, Heinrich Bühnen, who founded our company more than 90 years ago, already took the utmost pleasure in solving tricky problems and impressing his customers with innovative new solutions. At that time, however, the path to becoming the leading provider of complete hot melt adhesive technology solutions was not yet quite laid, as our brief look-back shows.

The history of BÜHNEN GmbH & Co begins on 3 August 1922. This is the day that skilled locksmith Heinrich Bühnen fulfils his dream of setting up his own machinery repair shop in Bremen. The Rhineland native born in 1887 ended up in the Hanseatic City on the Weser River after the First World War because he found work in an aircraft plant there.

At first it is mainly coffee roasters who bring their machinery to Heinrich Bühnen for repair. But word soon gets around: Heinrich Bühnen is a gifted inventor, a specialist in particularly tricky and complicated technical challenges. Gradually more and more companies from other sectors become aware of his skilled workshop. His small workshop soon becomes a factory specialising in the manufacture and repair of upholstery machines.



When Heinrich Bühnen dies in 1953 his son Heinz (also a skilled machine fitter) takes over the business. Like his father he is always looking for new and improved manufacturing methods. So he is fascinated when, at a trade fair in Switzerland, he hears about a new, unbeatably fast way of bonding materials: stapling. He immediately contacts the leading manufacturer of this pneumatic attachment system in the USA and agrees an exclusive partnership.

By integrating the new technique in operations, Heinz Bühnen gives his company a competitive edge on the German market. The customer base grows rapidly from this point, especially since BÜHNEN is one of the first providers of staplers for the upholstery industry. Although up to this point BÜHNEN had predominantly supplied the furniture industry, it now begins to serve the carpentry business, house construction and interior design, as well as various other sectors.

At the same time the staple marks BÜHNEN's entry into connection technology. The company has acquired broad expertise that forms the basis for the next quantum leap in this industry: adhesion.

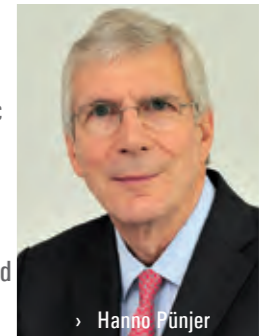
The company makes the move towards adhesion with hot melt adhesives and the development of corresponding applicators in the mid-1970s. This new business field receives more and more attention, is continuously expanded and new service components are added until it ultimately becomes the core business area. After all, adhesion with hot melt adhesives is continuously paving the way for new applications. Sectors such as the automotive, construction, floristry, electronics and packaging industries are soon lining up to buy a whole range of hot melt adhesives and equipment.

Close to international customers

Technical innovations and customer-focused thinking allows the company to expand. Heinz Bühnen establishes new distribution organisations to be as close as possible to international customers. This starts with the founding of HEINZ BÜHNEN GmbH & Co. KG in Vienna in 1965. Independent companies in the neighbouring countries of Hungary, Czech Republic, Slovakia and Slovenia soon follow.

In 1969 the BÜHNEN Group in partnership with the US company SENCO, based in Cincinnati, Ohio, establishes DEUTSCHE SENCO in Bremen – a highly industrialised production plant that supplies trade and industry with nails, staples and the associated tools. The leap into the US market comes in 1981 with the founding of subsidiary PAM Fastening Technology, Inc. in Charlotte, North Carolina. Ten years later HEINRICH BÜHNEN Ltd. opens its doors in Basingstoke, England. In 1993 the BÜHNEN Group acquires HELFER & Co. KG, a long-standing supplier of the company and global leader in auto-feed screwdriver technology.

The present managing director, Hanno Pünjer, joins the company in 2003 as a minority shareholder. The Hamburg businessman with Hanseatic roots directs the group's focus solely towards the core business with hot-melt adhesive systems. Ever since, BÜHNEN has clearly positioned itself as a provider of hot melt adhesives and tools from one source with excellent consultancy expertise. In 2005/06 all company activities are consolidated in Bremen. At the same time BÜHNEN targets the international market more strongly and begins expansion into Poland, Belgium, Netherlands, Czech Republic and Slovakia in 2008.



> Hanno Pünjer

Granddaughter of company founder Heinrich Bühnen, Constanze Wriedt, joins the family company as majority shareholder in 2011. Now into its third generation and over 90 years later, BÜHNEN GmbH & Co. KG has today developed into an international full-service company and a leading provider of manual hot melt adhesive applicators. Equipped with a both broad and ultra-modern range of products and with multi-faceted sector expertise, the ever-growing family company with its current 70 employees, develops reliable adhesive solutions for a very diverse range of customer requirements. Expert advice and 24-hour delivery service mean everything is taken care of.

Just like company founder Heinrich Bühnen, the company constantly strives always to offer the best solutions at competitive prices. The in-house laboratory is always testing new hot melt adhesives and developing new adhesive materials. In doing so the BÜHNEN Group is aware of its responsibility and always keeps environmental and human needs at the forefront.



„The key to our success is constantly thinking about what our customers want.“

> Heinrich Bühnen

„We represent solutions. Selling versatility, innovation and service across borders.“

> Heinz Bühnen



„I want to steer my father's company towards a successful future based on family tradition. BÜHNEN will continue to focus on offering comprehensive benefits to customers in the future, too.“

> Constanze Wriedt



BÜHNEN





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„Fun at work assured – with new challenges every day at BÜHNEN!“

› Joachim Rudolph

Hot Melt Adhesives

HOT MELT ADHESIVES

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From the stone axe to the Space Shuttle Adhesives conquer the world

Adhesive bonding is one of the oldest and most important cultural practices of mankind. Early adhesives such as birch pitch allowed our ancestors to manufacture weapons and tools in order to survive in a hostile environment. The great cultures of antiquity, whether Sumerians, Greeks or Romans, had their own bonding techniques. Glues were continuously developed over time, and today adhesives are more relevant than ever. Technical achievements like the space shuttle are only possible thanks to adhesives.



In the mid-60s, archaeologists from the University of Halle-Wittenberg doing research in a brown-coal mining area near Halle uncover the remains of mammoths and reindeer

and red deer, and some stone tools. Their main find, however: two inconspicuous **black lumps**. The supposed resin lumps are actually lumps of pitch from birch trees, about 40,000 years old. This early glue was used to stick together tools and weapons made of stone and wood. Since the pitch does not occur naturally but must be systematically prepared, the discovery clearly shows that adhesives were already playing an important role by the Middle Stone Age.

Oetzi had arrowheads with birch pitch

Birch pitch was used as an adhesive for many thousands of years. The iceman Oetzi, who died around 3400 BC, was carrying in his backpack arrowheads glued onto the shafts with pitch from birch trees. Some 600 years earlier, an alternative to birch pitch had been discovered by the Sumerians, who used glue from cooked animal skins, known as "glutin glue".



To make boats watertight and for construction, natural asphalt was also used in Mesopotamia, the region around the present-day Iraq, where it was abundant. Animal glue also began to be used among the Egyptians from around 1500 BC at the latest.

Extracted from bones, the glue was used mostly for artistic inlay work. Its immense cultural significance is revealed in a wall painting from the grave of Rekhmire, Vizier of Upper Egypt and Mayor of Thebes. The elaborate picture depicts in detail the various aspects of veneer work, including the use of glue made from gelatin.



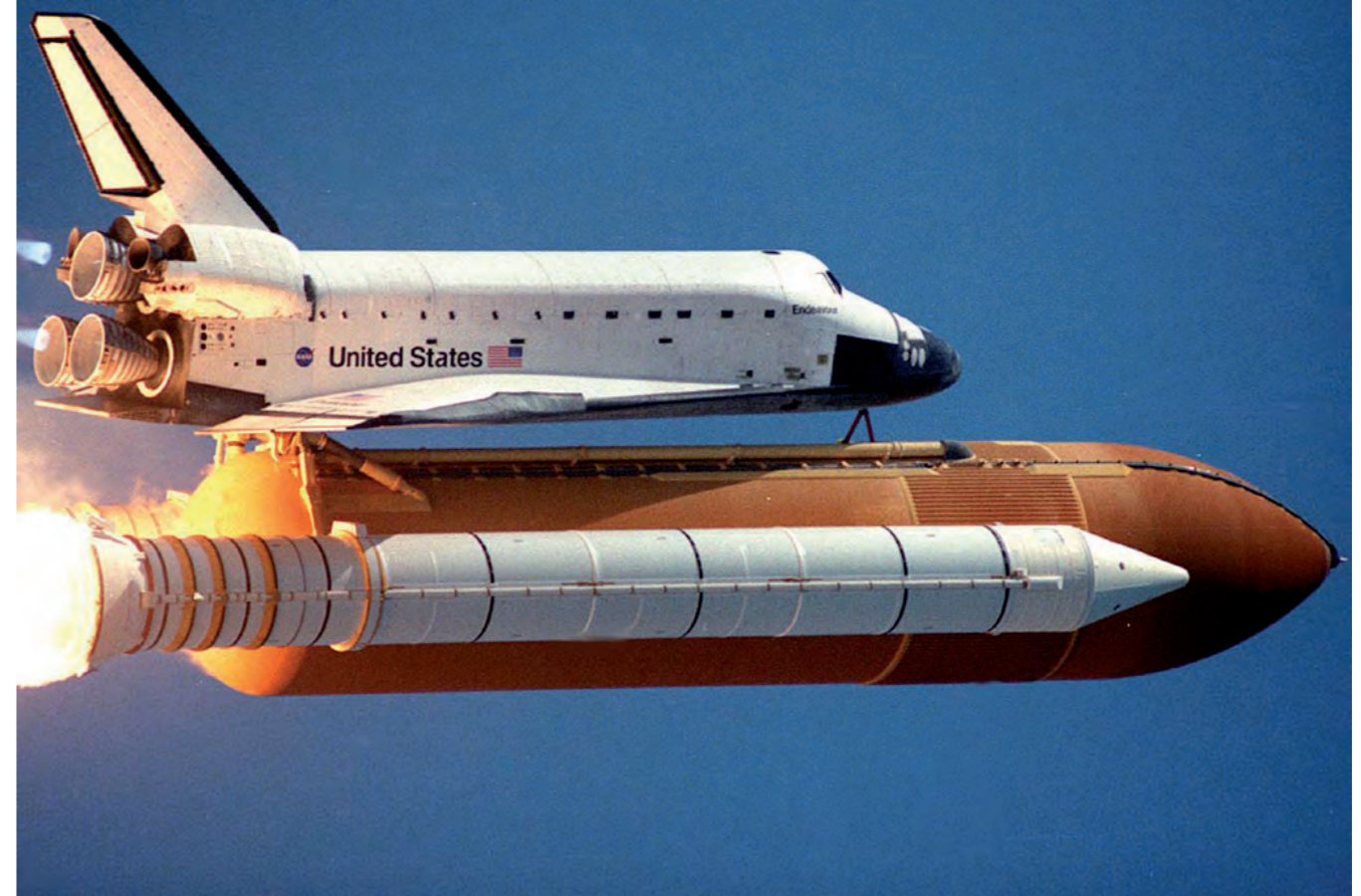
The Greeks use isinglass

The art of boiling glue was enhanced by the ancient Greeks, who came up with an especially effective fish glue. "In carpentry work the glue is best for joining fir, because of its porous and straight timber," the philosopher Theophrastus (371-286 BC) wrote in his "History of Plants". "The wood will rip sooner than the glued joint". The first independent profession of glue boilers was also formed in Greece, where those glue experts of antiquity were known as „Kellopsos“.

After this high-water mark, no significant innovations in the development of adhesives are known of for many centuries. During the 14th century, the Aztecs were the first to use animal blood to increase the bonding strength of cement. Numerous well-preserved temple structures confirm the obvious quality of this binding agent even today.

In the Late Middle Ages, the centre of the development of glue shifted back to Europe. After Gutenberg had invented the movable-type printing press in Mainz, new and reliable glues were suddenly needed to bind books.

Carpenters, needed more effective wood glues for the increased use of veneer techniques as well. In 1690 this evolution saw the world's first glue factory established in the young nation of the Netherlands. It should not have been the only one, as glue-boilers began to set up production facilities across Europe through the 17th century. Well into the 20th century their products were still being used, and they are still used today for restoring antique furniture. The first patent for an adhesive - a fish glue - was finally granted in 1754 in England.

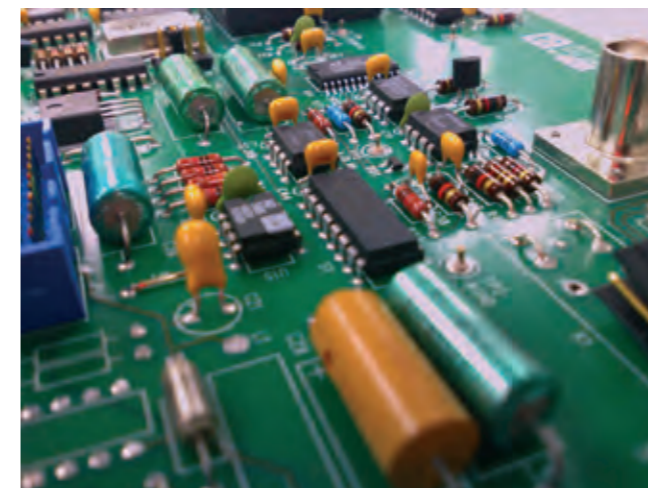


The innovative century

In the 20th century, innovations came hard and fast. In 1909 a patented process for phenolic resin-curing ushered in the age of modern adhesives based on synthetic raw materials. Only three years later, Rollet and Klatte were granted the patent on polyvinyl acetate, a plastic that is still one of the most common ingredients of wood glue and other adhesives.



In the U.S.A., Richard Gurley Drew developed transparent tape in 1930. In 1932, August-Fischer, a pharmacist in Buhl (Germany), succeeded in creating the first resin-based off-the-shelf adhesive. In 1953 the American



college professor Vernon Krieble invented a synthetic resin that hardened in the absence of oxygen, and in 1969 the first glue stick in the world premiered in Düsseldorf.

Adhesives are also of incalculable importance in the high-tech sector: in mobile phones glued connections are more and more replacing classic screws and soldering. Thanks to advanced adhesive technology, vehicles today are being built of lighter composite materials, something that was unthinkable just a few years ago. Since the last 60,000 years bonding technology clearly has lost nothing of its immense importance in all areas of human existence. On the contrary, today it is more important than ever – a key technology.



Text:
Industrieverband
Klebstoffe e.V. (IVK)



Hot Melt Adhesives / Basics

Hot melt adhesives are solvent-free, physically setting adhesives, which are composed of 100% solid material at room temperature. They are melted in order to allow the substrate surface to be coated with adhesive. This is done using a special application technology developed for this purpose. The liquid hot melt adhesive passes from the heated tank through the heated hoses and heated application heads and is then applied to the substrate with or without direct contact. The adhesive's viscosity is controlled via the processing temperature to ensure that the surface can be sufficiently covered with adhesive.

The molten mass can be applied to either to the surface of the component to be joined or to the surface of both substrates. Once on the surface, the hot melt adhesive begins cooling immediately and its viscosity increases. The two parts must then be joined within a certain time frame (the so-called open time); in general, a small amount of pressure is sufficient to ensure that the adhesive is also coated to the second substrate. A permanent bond between the substrates is created as the adhesive cools to the solidification temperature.

The adhesive can also be pre-applied to a substrate and reactivated with heat shortly before joining the two parts.

The working principle behind hot melt adhesives is therefore a two-fold change in the aggregate state of the adhesive that is not connected to a chemical reaction within the adhesive. The setting time passes very quickly, since only heat is needed and no other material (such

Applying hot melt adhesives

The **strength of hot melt adhesive bonds** is, as with other adhesives, based on the **adhesive bond** between the adhesive and the surface and on the **cohesive strength** of the adhesive. The bond between the two parts is created when the fluid adhesive coats the surface of the object. In order for this to take place, the adhesive must be applied to the surface as a molten liquid. This allows for a smooth coating of the surface. The second part is then brought into position while the adhesive is still in its liquid state. This part must also be coated in order to take hold. The adhesive can also be placed between the two



parts in solid form as a film or powder and then be melted with heat. The adhesive must reharder after coating both parts. The adhesive solidifies due to a physical setting process. Heat dissipation causes it to go from liquid to solid form. At first the viscosity of the adhesive increases, then the adhesive becomes increasingly strength.

The bonds between the hot melt adhesive and the surface of the objects are, in general, **adhesive bonds**. Mechanical anchorage may occur when the hot melt adhesive is applied as a very thin liquid to porous material. For ensuring a good coating and thereby a strong bond the adhesive molecules must be movable enough for getting so close to the atoms and molecules of the surface of the part to be glued that an interaction and thus a

bond between them can be created. The adhesive molecules are only able to maneuver in this manner when the adhesive is in liquid form. Naturally, the adhesive must also be in liquid form to coat the object. It is, however, also necessary to apply pressure to the adhesive to ensure a proper coating.

The **cooling process** takes place relatively quickly, which is why hot melt adhesives have a much shorter setting time than other adhesives. Setting temperatures vary from one adhesive to the other. The cooling process begins immediately after the adhesive exits the nozzle and continues as the adhesive is applied to the first part. This means that there is only a small amount of time available to join the two parts, as the adhesive must still be fluid enough to coat the second piece. Usually hot melt adhesives show a short processing and a short setting time.

Cooling begins as soon as the molten adhesive exits the application nozzle.

Cooling takes place via:

- Heat dissipation to surrounding area,
- Heat conduction to the parts and
- Convection (Fig. 1)

The adhesive also cools down by radiating heat into the surrounding area.

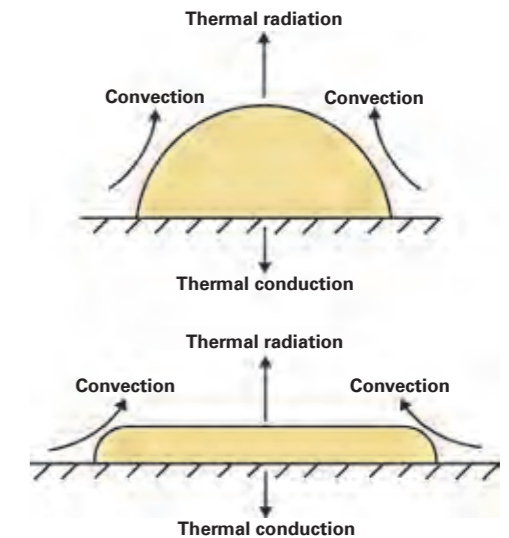
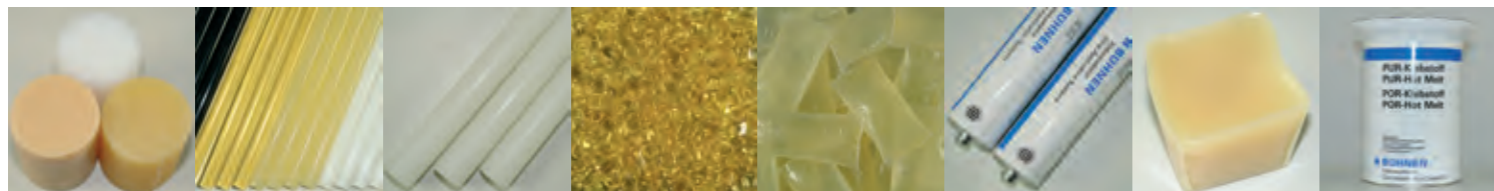


Fig. 1: Aspects influencing the cooling process of a hot melt adhesive bead. The larger the surface, the faster the hot melt adhesive cools.



Tip
If you like you can also have a look at our glossary. Here we have compiled short explanations of the technical terms used.

as water, solvents) must be removed from the glue joint. The fast-setting characteristic of hot melt adhesives allows for their use in automated, economical methods of production and is the driving force behind the stronger growth in hot melt adhesives than in other joining processes and adhesives.

Thermal conduction to the parts being bonded also leads to a further loss of heat. The parts must be bonded while the adhesive is still hot enough to warm the boundary surface of the second piece to the melting temperature.

If the adhesive cools beyond this point, the second piece will only receive a poor coating, which will result in a weaker hold. If too much time is allowed to pass between applying the adhesive and bonding the parts, the adhesive can cool to such a degree that the second piece can no longer be sufficiently coated at all. When working with hot melt adhesives two particular time windows are of importance: the maximal open time and the setting time. The maximal open time refers to the time between the application of the adhesive and the bonding of the parts. Both of these time windows are influenced by a number of factors.

The **cooling rate** of a hot melt adhesive upon application and its maximal open time are influenced by:

- the thermal capacity of the applied adhesive
- thermal dissipation to the parts being bonded
- thermal dissipation to the surrounding air

The adhesive can begin to cool as it exits the application nozzle before it even reaches the surface of the part. This fact must be taken into consideration especially when the adhesive is applied as a spray and small drops are exposed to cold air (Fig. 2). Pre-heating the air used to spray the adhesive can reduce such cooling.

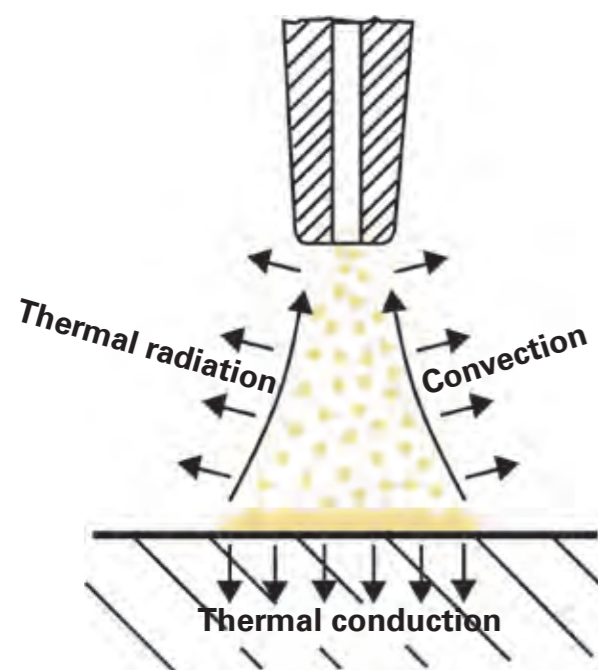


Fig. 2:
Aspects influencing the cooling process of a hot melt adhesive after spraying

In looking at these parameters it becomes clear that the processing time of hot melt adhesives depends not only on the adhesive itself, but is also strongly influenced by the two parts that are to be bonded. Thus it is nearly impossible to determine a standard processing and setting time for hot melt adhesives. This is one aspect that distinguishes hot melt adhesives from other adhesives. As a general it can be said that the open and setting time of a hot melt adhesive increase as the application temperature increases.

The following aspects can lead to a quicker cooling of the adhesive layer and thereby a reduction in processing time:

- using materials with high thermal conductivity
- the parts to be bonded are cold
- thin application of the adhesive
- adhesive with low temperature
- low specific thermal capacity in adhesive
- low environmental temperature
- strong air movements
- spray application

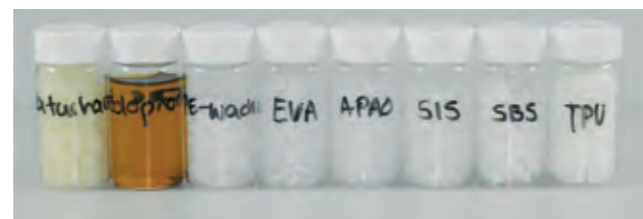
This should be taken into consideration especially when bonding metal parts, as metals are good thermal conductors, which promotes a faster cooling of the adhesive. Considering the aspects mentioned above, it logically follows that the adhesive should be applied at the maximum possible and allowed processing temperature when a very strong bond is desired.

Thermal stability of hot melt adhesive bonds

The physical setting process of hot melt adhesives is reversible. In other words, sufficient re-heating causes the adhesive to re-melt. Before the adhesive melts, however, the strength of the bond decreases significantly. This leads to a low thermal capacity of hot melt adhesives, which is particularly important when working with products with low melting points. If the thermal capacity of such products is not sufficient, adhesives with higher melting ranges can be used alternatively. Reactive hot melt adhesives, which set both physically and chemically, present one option in such cases. These adhesives applied at a lower temperature crosslink at a later point and thus have a greater thermal and mechanical capacity.

Composition of hot melt adhesives

Thermoplastic polymers are the basis of all hot melt adhesives. The so-called base polymer ensures the internal strength of the adhesive (cohesion), but also influences the film-forming properties of the adhesive, such as dilation and elasticity. The other working properties are created using other formulations with thermoplastic components.



In order to improve adhesion, adhesive resins with good coating properties are added. Resins cause a reduction in viscosity of the adhesive and ensure a good surface coating with their very low molecular weight. The adhesion spectrum can be strongly influenced through the selection of additive resins.

The viscosity and, in particular, setting properties of hot melt adhesives can be strongly influenced through the use of waxes and oils. If, for example, a hot melt adhesive with fast-acting setting properties is desired, waxes are needed to increase the crystalline content of the formulation. Once the hardening point of a wax in a hot melt adhesive formulation is reached during the cooling phase, the entire hot melt adhesive begins to harden and sets within a very short period of time. In this sense, wax influences both the open time and setting time of the hot melt adhesive. If a product with a longer open time is desired, oil is used in place of wax.

Base polymers

Hot melt adhesives are, in general, classified based on their base polymer. The following polymers are usually used as base polymers for hot melt adhesives:

- Ethylene Vinyl Acetate co-polymers (EVA)
- Polyolefins (PO)
- Amorphous Poly- α -olefins (APAO)
- Synthetic Rubber (SBS/SIS)
- Polyamide (PA)
- Polyester (PET)
- Thermoplastic Polyurethane (TPU)



With some polymers, the desired properties for a hot melt adhesive are engineered during production through the co-polymerisation of various monomers (EVA, SIS, SBS). In general, however, formulations are used to achieve the desired properties.

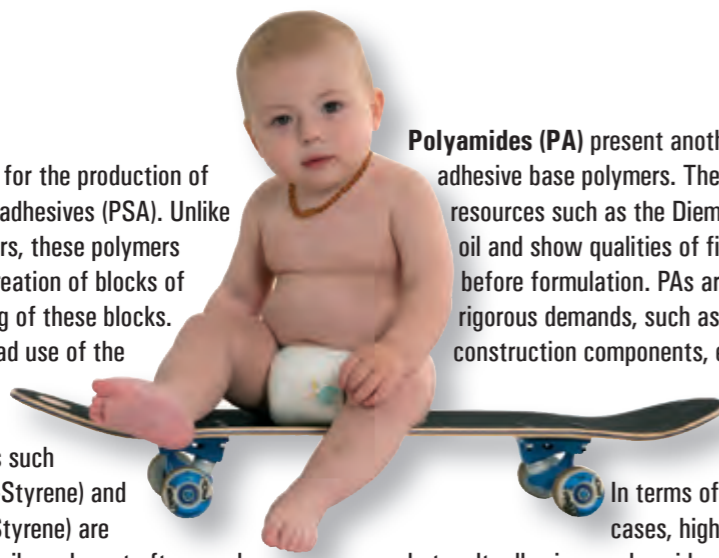
The most commonly used hot melt adhesives world-wide are based on **ethylene vinyl acetate co-polymers (EVA)**. More than a half of all hot melt adhesives are based on this polymer type due to its favourable price-benefit ratio. Their nearly inert structure gives EVA hot melt adhesives good thermal stability. Acetic acid can only split from the polymer chain at temperatures of 210°C or higher. In this sense, the highest application temperature should not exceed 200 °C.

Polyolefins (PO) are recently found their use as base polymer for hot melt adhesives. PO are co- and terpolymers which are especially produced using metallocene technology containing ethylene, propylene and butene-1. Hot melt adhesives based on metallocene polyolefins generally indicate an overall higher power spectrum than generic EVA adhesives, in particular with regards to thermal stability, allowing for longer standing times in the hot melt adhesive devices without a change in their viscosity, which ensures that their processing properties remain consistent. Other improvements with regards to suitability for use at deep-freeze temperatures and the thermal stability of adhesive bonds can also be achieved in combination with other high-quality raw materials.

Hot melt adhesives based on **amorphous poly- α -olefins (APAO)** have not found such a wide-ranging use as EVA based hot melt adhesives. Still, they have been able to find their place on the market thanks to their special affinity to polyolefin synthetics (PE; PP) and their characteristic delayed setting. Amorphous poly- α -olefins are atactic α -co-polymers and terpolymers, which are targeted for production from ethylene, propylene and butene-1 in a Ziegler low-pressure polymerisation process.

Thermoplastic rubbers

are used almost exclusively for the production of pressure sensitive hot melt adhesives (PSA). Unlike with EVA and APAO polymers, these polymers are produced through the creation of blocks of comonomers and the binding of these blocks. This leads to the wide-spread use of the term 'block copolymer' in reference to this class of polymers. Block copolymers such as SBS (Styrene-Butadiene-Styrene) and SIS (Styrene-Isopropylene-Styrene) are formulated with resins and oils and most often used in the production of hygiene products (like baby diapers), tapes, self-adhesive labels, pallet protection for boxes and bags, as well as in the installation of technical construction components.



Polyamides (PA) present another interesting class of hot melt adhesive base polymers. These are produced from renewable resources such as the Diemer fatty acid found in rapeseed oil and show qualities of fine hot melt adhesives even before formulation. PAs are often used in areas with very rigorous demands, such as the installation of technical construction components, electrical installations, automobile manufacturing and shoemaking.

In terms of their viscosity, which is, in most cases, higher than the viscosity of other hot melt adhesives, polyamides have a very high heat resistance (up to 180°C) while showing excellent flexibility at deep-freeze temperatures. Specially developed polyamides have passed tests in the automobile industry at temperatures ranging from

Polyesters are most often used plastics. There are, however, new derivatives of high-molecular polyesters, which can be used as hot melt adhesives. Polyesters are distinguished particularly by their high chemical and, in part, by their high heat resistance. Depending on their molecular structure, the viscosity may range between medium and high. The setting time of amorphous polyesters ranges from fast to medium fast. When dealing with crystalline polyesters the setting time can be very fast. Polyester based hot melt adhesives are used in textile linings, for example, as their bonds are wash and cleaning-agent resistant.



–35 to +135°C. Special polyamides are even resistant to chemicals used in chemical cleaning and therefore suitable for use in textiles. The flame-resistant properties of polyamides can also be taken advantage of in cases when other hot melt adhesives would have to be treated in complicated processes to attain such flame-resistant properties.

Certain conditions must, however, be taken into account when working with polyamides: The use of an application device with gear pump is recommended to ensure an exact application due to the high viscosity of the polyamides. Since polyamides can absorb water (0.1-2% within 24 hours), they should be stored in a moisture-free environment. This is also why polyamides are delivered in a special moisture-proof package. Any remaining quantity should be stored in a moisture-free container after opening. Should this requirement for storage not be observed, foaming may occur upon melting when the water evaporates at 100°C.



Tip
Always store PA hot-melt adhesives in a dry place!



Reactive hot melt adhesives are growing in importance. They are composed of various prepolymers, which set physically very quickly following application and then change to high-molecular polymers through a chemical reaction with the humidity in the air or from the substrate. Over the past ten years, systems have been developed allowing for very firm bonds with reactive **polyurethane (PUR) hot melt adhesives**. In this case these are NCO-end group prepolymers produced from di-hydroxy compounds (such as polyols) and an excess of di-isocyanate.

The principle behind this moisture-curable adhesive is a two-step setting mechanism. After the hot melt adhesive has been applied, a physical setting mechanism causes the bond to harden to a degree that allows for further processing or transport. A chemical cross-linking takes place within a time period ranging from hours to days, depending on the amount of moisture present and the amount of access the adhesive has to the moisture; this causes the molecular weight to increase.

Bonding takes place before the hot melt adhesive has completely reacted, as it can better coat the surface with a low molecular weight. The chemical cross-linking causes the adhesive to lose its thermoplastic properties and become thermoset plastic. Polyurethanes' extraordinarily good adhesive quality, combined with their firm hold, high heat resistance, good flexibility at cold temperatures and resistance to solvents once the adhesive film has set allow for the production of previously "un-glue-able" products with the help of this adhesive technology.

The **reactive PUR hot melt adhesives** can be used in the following areas: automobile manufacturing, woodwork and furniture making, production of catalogs and books, shoe production, installation of technical construction components. The highest level of adhesion of all hot melt adhesives can be reached with PUR hot melt adhesives, provided the necessary safety and processing rules are followed.

Reactive hot melt adhesives can also be formulated by combining them with silane end groups. Silane end groups also react with moisture and turn to high-polymer synthetics. **Silane-terminated hot melt adhesives** must also be stored in moisture-free containers and applied with a device safeguarding them from moisture. Silane-terminated hot melt adhesives distinguish themselves from polyurethane hot melt adhesives through their better adhesion to untreated, non-polar substrates, such as polyethylene and polypropylene.

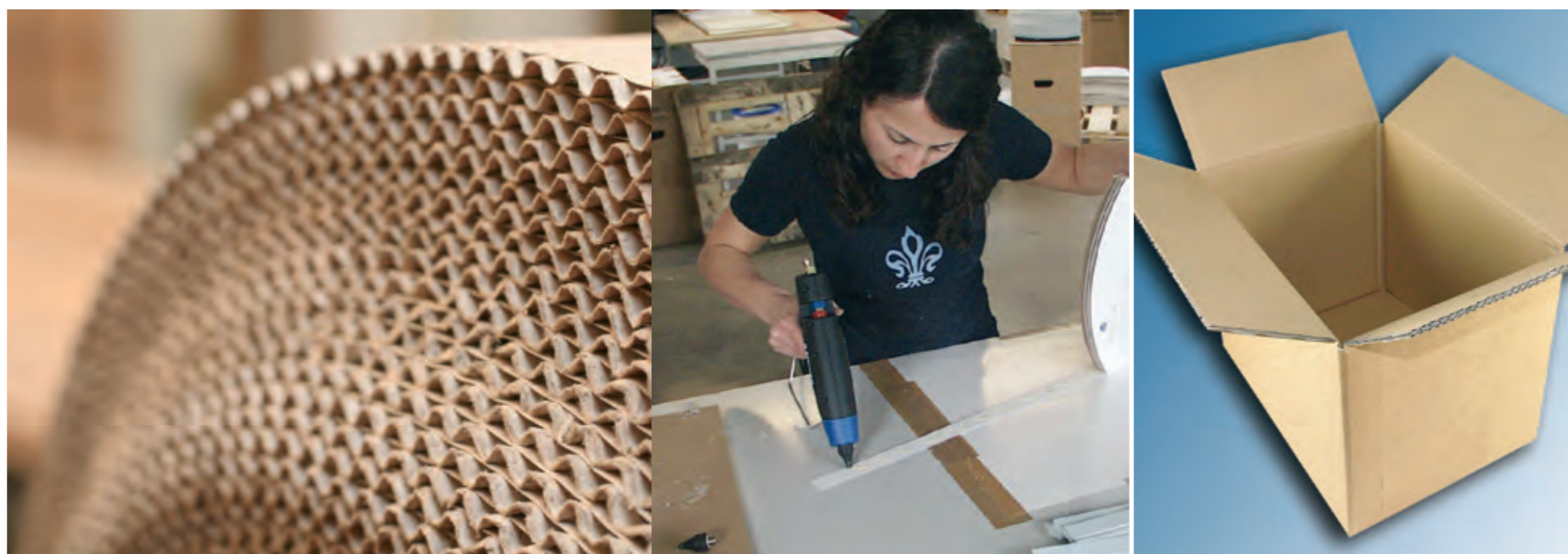
We thank Prof. Rasche, FH Hannover for his support

His "Forum of Adhesive Technology" („Klebetchnisches Forum") at the University of Applied Sciences (FH) in Hanover offers an excellent basic course for anyone with interest.



Hot Melt Adhesives for the Packaging Industry

Our product solutions for a variety of uses in the packaging industry. From fast-setting adhesives for automatic processing to products with long open time for display bonding. Our products are also suitable for bonding trays, cartons and folding boxes and for creating displays.



Short description		For difficult surfaces	Short setting time	Universal	Universal	For hot filling	Very short open-/ setting time	Universal	For deep frozen packaging	For heat sensitive materials	Good heat resistance	Removable	Universal for fixation and montage	Easy removable	Self-adhesive
Fields of application	Folding box		++	++	++		+++	++		++					
	Erector/Trays/Crates/Outer Package/Closure		++		+++	++	++	+++	+++	+++					
	Deep frozen packages		+	++					++						
	Warm filling					+++									
	Painted surfaces	+++	+++						+++						
	Self-adhesive finishing												++		+++
	Detachable											++		+++	
	Displays	+++									+++				
	Anti-Slip											++		+++	
Type	1325.1	0364.1	1289	1024.2	1129	1537.1	1543	1602	1637	1063.1	1585	1586¹⁾	1645	1628.1¹⁾	
Product Data	Adhesive basis ²⁾	A	A	A	A	A	A	A	A	A	B	D	D	D	D
	Viscosity in mPas at 150°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Viscosity in mPas at 160°C	-	-	-	1.200	-	1.700	1.200	1.300	350	-	-	16.000	-	-
	Viscosity in mPas at 170°C	-	-	-	-	-	-	-	-	-	-	1.200	-	1.500	-
	Viscosity in mPas at 180°C	3.000	4.000	10.000	-	500	-	-	-	-	4.300	-	-	-	5.000
	Colour / Appearance	yellow	yellow	white/trans.	yellow	yellow	yellow	yellow	yellow	light yellow	beige	water/clear	yellowish	white/clear	yellow
	Softening point in °C by ring and ball method	100	105	85	110	120	115	110	110	70	145	85	95	90	80
	Heat resistance in °C acc. WPS 68, shearload 100g/cm ² bonded surface	65	65	65	60	65	65	60	55	45	85	40	55	50	40
	Working temperature in °C	160-200	170-190	170-190	150-170	160-180	150-180	150-170	150-180	130-150	180-200	140-180	150-180	140-180	160-180
	Open time in seconds ³⁾	40	25	20	15	20	10	15	20	25	90	slightly permanently sticky	permanently sticky	slightly permanently sticky	permanently sticky
Setting time in seconds ³⁾	20	7	20	5	7	3	5	10	10	50	-	-	-	-	
Sprayable	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	
Delivery form ⁴⁾	1, 2, 3, 4	1, 2, 3	2, 3	4	4	4	4	4	4	1, 4	4	5	4	4	

Use:
 +++ very good,
 ++ good,
 + technically possible.

1) not FDA 175.105
 Adhesive basis:
 A = Ethylene vinyl acetate (EVA)
 B = Polyolefin (PO)
 D = Thermoplastic rubber (PSA)

2) The values listed here are information according to internal BÜHNEN tests. Content is not legally binding and subject to changes without notice.

3) Delivery form:
 1 = Slugs – approx 42 mm diameter, length 50 mm
 2 = Sticks – approx 12 mm diameter, 200 mm long
 3 = Sticks – approx 18,3 mm diameter, 300 mm long
 4 = Granulate/Pillows, loosely shaken
 5 = Blocks from approx 500 g – 4 kg

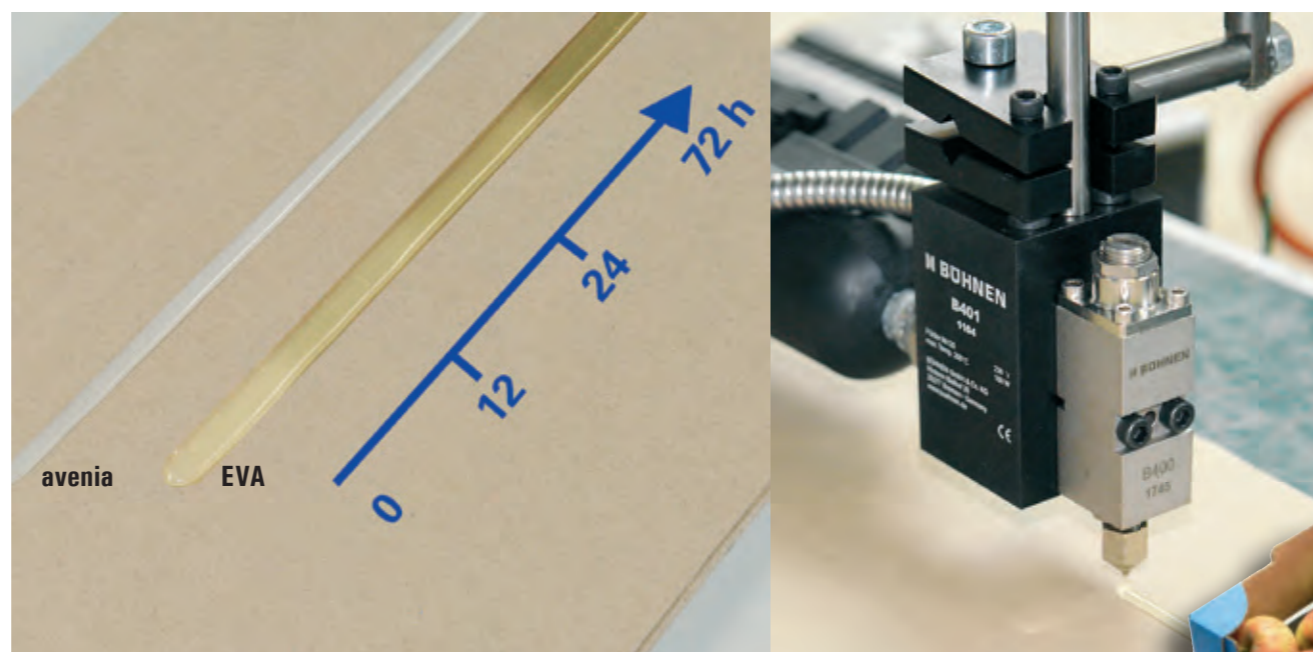


Tip
 We strongly recommend that you test our products under your own specific conditions.

avenia oxidation-resistant hot melt adhesives for packaging

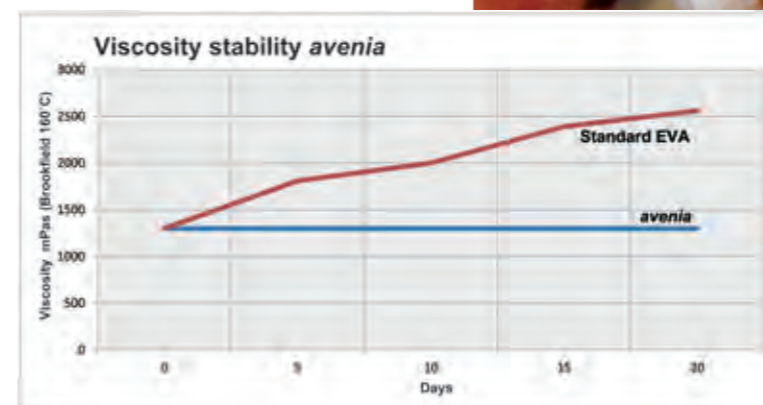
Benefits of using avenia products:

- › Adhesive costs are cut, as far less adhesive is consumed
- › Excellent colour fastness and oxidation stability, no cracking: Fewer maintenance costs, as application technology is subject to less wear
- › High degree of process reliability thanks to enduring viscosity stability
- › Outstanding adhesion even on tough substrates
- › High flexibility at cold temperatures down to -20°C
- › High thermal distortion resistance up to 65°C
- › User-friendly handling, as all *avenia* products are odourless
- › Suitable for use in the food industry (FDA 175.105)



Hot Melt Adhesives

Short description		Universal, for difficult surfaces	Universal	For very fast packaging machines	For stringing critical application systems	Particularly for warm fill applications	Universal	Long open time very short setting time
Fields of application	Folding box	+++	++	+++	+++	+	+++	
	Erector/Trays/Crates/Outer Package/Closure	+++	+++	+++	++	+++	+++	+++
	Deep frozen packages	+++						+++
	Warm filling					+++		
	Painted surfaces	+++	++		++	+		
	Type	1472.1	1577.2	1844	1943	2042.1	2381	2507
Product Data	Adhesive basis ¹⁾	B	B	B	B	B	B	B
	Viscosity in mPas at 150°C	-	-	-	-	-	-	-
	Viscosity in mPas at 160°C	1.300	1.200	650	950	2.350	-	900
	Viscosity in mPas at 170°C	-	-	-	-	-	900	-
	Viscosity in mPas at 180°C	-	-	-	-	-	-	-
	Density in g/cm ³	0,90	0,90	0,90	0,90	0,90	0,90	0,90
	Colour / Appearance	white	white	white	white	whitish	white	white
	Softening point in °C by ring and ball method	105	105	105	103	110	105	95
	Heat resistance in °C acc. WPS 68, shearload 100g/cm ² bonded surface	55	50	65	50	70	65	65
	Working temperature in °C	140-170	140-170	140-170	140-160	140-180	150-170	150-175
	Open time in seconds ²⁾	20	15	10	25	20	15	35
	Setting time in seconds ²⁾	5	3	3	3	3	3	3
	Sprayable	No	No	No	No	No	No	No
Delivery form ³⁾	4	4	4	4	4	4	4	



Use:
+++ very good, ++ good, + technically possible

- 1) Adhesive basis:
B = Polyolefin (PO)
- 2) The values listed here are information according to internal BÜHNER tests. Content is not legally binding and subject to changes without notice.
- 3) Delivery form
4 = Granulate/Pillows, loosely shaken

Tip
We strongly recommend that you test our products under your own specific conditions.

Label adhesive for the food and beverage industry

With the **vesima** product line BÜHNEN completes its range of water-based adhesives for the food and beverage industry.

Product range:

- › Hot melt adhesives
- › Casein adhesives
- › Hybrid adhesives
- › Synthetic adhesives
- › Starch adhesives

Product features:

- › Condensation resistant
- › Ice water resistant
- › Strong wet-tack
- › Lower consumption
- › Good washability
- › Clean machine running

Our strengths:

- › Tailor-made solutions
- › Extensive range
- › Expert consultation
- › Customer proximity
- › Reliability



Tip

We strongly recommend that you test our products under your own specific conditions.

Application:

- +++ Very good
- ++ Good
- + Technically possible

- 1) Adhesive basis:
A = Ethylene vinyl acetate (EVA)
D = Thermo-plastic rubber (PSA)
- 2) The values indicated represent data according to internal BÜHNEN measurement methods.
- 3) Delivery form:
4 = small Pillows

Hot melt adhesives

Description	Tin label	Hot fill	Universal	Low Temperature	For all beverages containing CO ₂	PET-Cycle
Paper labels on glass, PVC, PE, PET, metal and other substrates	+	++	+	+	+	
Paper labels on glass, PVC, PE and other substrates	+	++	++	+	+	
Paper and PP labels on PVC, PP-, PE or PET bottles and metal cans	+++	+++	+	+	+	+++
Paper and PP labels on PVC, PP or PET bottles (carbonated)			+	+	+++	
Type	1535	2100	2779	2811	2815	2101
Adhesive base ¹⁾	A	D	D	D	D	D
Viscosity in mPas at 160°C	1250	650	850	420	400	485
Colour / Appearance	yellowish	transparent	yellowish	yellowish	transparent	yellow-transparent
Softening point in°C by Ring and ball method	73	87	70	70	76	65
Thermal resistance in °C	35	45	35	35	35	40
Working temperature in °C	160	160	130-140	140-160	140-160	130-140
Open time in seconds ²⁾	300	permanently sticky	permanently sticky	permanently sticky	permanently sticky	permanently sticky
Setting time in seconds ²⁾	light permanently sticky	-	-	-	-	-
Sprayable	Yes	Yes	Yes	Yes	Yes	Yes
Delivery form ³⁾	4	4	4	4	4	4

vesima-water-based adhesives

Description	Excellent condensation and ice water resistance	Cold and dry metal containers	Predominantly hot fill	Very broad material range	Very broad range	Suitable for PET bottles
Paper labels on glass (reusable)	+++		+++	+++	+++	++
Paper labels on glass (disposable)	+++		+++	+++	+++	++
Paper labels on PET/PVC (disposable)						+++
Paper labels on metal	++	+++	++	++	++	++
Type	W92821	W92822	W92823	W92824	W92825	W92831
Adhesive base	Casein	Starch	Starch	Semi-synthetic	Synthetic	Synthetic
Viscosity in mPas (Brookfield)	60.000 - 120.000	4.500 - 6.500	35.000-60.000	65.000 - 110.000	55.000 - 120.000	60.000 - 100.000
pH value	7,5-8,5	6,0-8,0	6,0-7,5	7,5-8,5	7,5-8,5	7,5-8,5
Solids content	ca. 45 %	ca. 30 %	ca. 50 %	ca. 37 %	ca. 42 %	ca. 50 %
Working temperature	28-32 °C	No data	24-28 °C	25-30 °C	25-30 °C	22-30 °C
Speeds	Unlimited	Moderate	Moderate	Unlimited	Unlimited	Unlimited
Use	Fountains, Breweries, Sparkling wine, Soft drinks, Spirits, Wine	Tin labelling	Fountains, Hot fills, Juice	Fountains, Breweries, Sparkling wine, Soft drinks, Spirits, Wine	Fountains, Sparkling wine, Soft drinks, Spirits, Wine	Fountains, Breweries, Soft drinks



“The trend towards wrap-around labels has resulted in the increased use of hot melt adhesives in the labelling industry. In this area BÜHNEN offers a range of hot melt adhesives tailored to a wide range of surfaces.”

› Joachim Rudolph

Hot Melt Adhesives for the Construction Industry

Our product solutions for the construction industry are used, among other things, to produce self-adhesive insulation materials and offer protection against abrasion in the roofing tile industry.



Hot Melt Adhesives

Description		White, very flexible at low temperatures	Very long open time	High softening point	Very good heat resistance	Flexible, short open time, high hardness	Short open and setting time	Low viscosity, very short setting time	Very good sprayability	Universal for fixing and mounting	Self adhesive material	Good UV resistance	Strong beginning tack	Low viscosity, good flowability	High beginning tack
Fields of application	Roofing tile industry					+	+++								
	Roof tile industry					+++									
	Paving slabs / tiles						++	+++							
	Insulation of roller shutter boxes		+++						++						
	Lamination of insulating boards								+++	++		+++	+++	+	+++
	Construction panels / Angle elements	++													
	Ceiling edge formwork	+		++	+++										
	Self-adhesive insulating strips										+++		++	+++	
	Vapour and moisture barrier											+++			
Type	1545	1052	1135.1	1730	1404	1429.2	1701.2	1544.1	1586	1628.1	1631	1887	1894	2604	
Product Data	Adhesive base ¹⁾	A	B	B	B	C	C	C	D	D	D	D	D	D	D
	Viscosity in mPas at 140°C	-	-	-	-	-	-	-	-	-	-	-	-	-	11.000
	Viscosity in mPas at 160°C	5.700	-	-	-	2.500	1.500	-	-	16.000	-	-	-	700	-
	Viscosity in mPas at 170°C	-	-	-	-	-	-	-	-	-	-	6.500	-	-	-
	Viscosity in mPas at 180°C	-	3.000	8.600	8.000	-	-	600	1.700	-	5.000	-	5.000	-	-
	Colour / Appearance	white	yellow	light brown	brown	yellow	yellow	yellowish	yellowish/clear	yellowish	yellow	light yellow	yellowish	yellowish	dark yellow
	Softening point in °C by ring and ball method	80	130	160	155	130	110	155	87	95	80	95	80	75	90
	Heat resistance in °C acc. WPS 68, shearload 100g/cm ² bonded surface	60	60	90	110	100	105	100	50	55	40	50	45	40	50
	Working temperature in °C	140-180	160-180	180-200	180-200	160-200	150-200	180-200	120-180	150-180	160-180	160-180	140-180	120-170	130-160
	Open time in seconds ²⁾	20	1.500	70	45	10	10	5	permanent sticky	permanent sticky	permanent sticky	permanent sticky	permanent sticky	permanent sticky	permanent sticky
Setting time in seconds ²⁾	20	240	35	30	10	5	2	-	-	-	-	-	-	-	
Sprayable	No	Yes	No	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Delivery form ³⁾	4	1, 4	2, 4	4	4	4	4	4	5	4	4	5	4	5	

Use:
 +++ Very good
 ++ Good
 + Technically possible

1) Adhesive basis:
 A = Ethylene vinyl acetate (EVA)
 B = Polyolefin (PO)
 C = Polyamide (PA)
 D = Thermo-plastic rubber (PSA)

2) The values listed here are information according to internal BÜHNEN tests. Content is not legally binding and subject to changes without notice.

3) Delivery form:
 1 = Slugs – approx 42 mm, diameter, length 50 mm
 4 = Granulate/Pillows, loosely shaken
 5 = Blocks from approx 500 g – 4 kg

Tip
 We strongly recommend that you test our products under your own specific conditions.

Hot Melt Adhesives for the Concrete Industry

Product solutions for the concrete industry are offered for use with both conventional and water-based release agents.

Use:
 +++ Very good,
 ++ Good,
 + Technically possible

- 1) Adhesive basis:
 A = Ethylene vinyl acetate (EVA)
 B = Polyolefin (PO)
- 2) The values listed here are information according to internal BÜHNEN tests. Content is not legally binding and subject to changes without notice.
- 3) Delivery form:
 1 = Slugs – approx 42 mm, diameter, length 50 mm
 4 = Granulate/Pillows, bulk packed
 5 = Blocks from approx 500 g – 4 kg

Tip
 We strongly recommend that you test our products under your own specific conditions.



Hot Melt Adhesives

Features	Type of release agents	Hot melts for solvent-based release agents					Hot melts for water-based release agents			
		For conventional, solvent-based release agents: universal, excellent adhesion to metal formwork, rather in warmer environment, shorter open time		For conventional, solvent-based release agents: very good for spraying, sound heat resistance, for warm environment		For conventional, solvent-based release agents: long open time, very well for spraying, good cold flexibility, rather to be used in cold environments		Especially to be applied with water based release agents with antifreezing and anticorrosion compounds: very good for spraying, well removable from metal formwork	Especially to be applied with water based release agents with antifreezing and anticorrosion compounds: very good for spraying, well removable from metal formwork	Works particularly with standard water-based release agents: excellent adhesion properties, well removable from formwork, good cold flexibility
	Type	0090.2	2127	0715	2216	0524	2413	2097	2635	1694
Product Data	Adhesive base ¹⁾	B	B	B	B	B	B	B	B	A
	Viscosity in mPas at 160°C	2.600	4.100	-	3.200	-	-	6.000	3.800	2.300
	Viscosity in mPas at 180°C	-	-	2.500	-	4.500	5.600	-	-	-
	Density in g/cm ³	0,98	0,98	0,98	0,98	0,98	0,98	0,98	0,98	0,98
	Colour / Appearance	yellowish	yellowish	light brown	yellowish	light brown	beige	yellow	yellow	whitish
	Softening point in °C by ring and ball method	110	118	135	110	100	94	115	80	85
	Heat resistance in °C acc. WPS 68, shearload 100g/cm ² bonded surface	60	70	70	75	60	50	55	55	50
	Cold flexibility in °C	1	5	-5	1	-30	-5	-5	5	-20
	Working temperature in °C	160-180	160-180	180-190	160-180	160-180	160-180	160-180	150-180	150-170
	Open time in seconds ²⁾	90	90	120	120	480	720	150	550	60
	Setting time in seconds ²⁾	90	45	90	60	600	180	60	130	60
	Hardness shore A	45	63	50	50	43	36	30	8	35
Sprayable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Delivery form ³⁾	4	4	1, 4	4	1, 5	4	5	4	4	



Hot Melt Adhesives for the Automotive and Electronics Industry

In the automotive industry, our product solutions are used for a variety of purposes, including, for example, coating insulation materials, securing electronic components and manufacturing car seats. In addition, the adhesives are also used for applications in the filter industry and for bonding textile materials.



Use:
+++ very good, ++ good, + technically possible.

- Adhesive basis:
A = Ethylene vinyl acetate (EVA)
B = Polyolefin (PO)
C = Polyamide (PA)
D = Thermo-plastic rubber (PSA)
E = reaktive Polyurethane (PUR)
- The values listed here are information according to internal BÜHNEN tests. Content is not legally binding and subject to changes without notice.

- Delivery form:
1 = Slugs – approx 42 mm diameter, length 50 mm
2 = Sticks – approx 12 mm diameter, length 200 mm
4 = Granulate/Pillows, loosely shaken
5 = Blocks from approx 500 g – 4 kg
7 = Cartridge – 47 mm, length 215 mm
9 = Container
- As delivered

Tip
We strongly recommend that you test our products under your own specific conditions.

Description	Good heat resistance	Very high heat resistance	Reactive polyolefin for PP hands	Reactive polyolefin, good sprayability	Very good heat resistance	Good plasticizer resistance	Application temperature -40 °C to -125 °C	Very good adhesion to inorganic materials	Very good heat resistance	Universal for fixing and mounting	Long open time	Rapid uptake of restoring forces	Low viscosity, excellent flow properties
Electronics industry													
Potting (plugs)							+++						
Component fixation						+++	+						
Component protection against vibration						+++	+						
Embedding of electronic components							+++						
Battery cells bonding to batteries													+++
Automotive industry													
Car seat heater						+++							
Seats and foam	+++								+++		+++		
Emblems			+								+++		+++
Carpet and insulating nonwoven	+++						+++		+++	+++			
Lamination				+++									
Air Filter		+++											
Sandwich construction					+								
Fixing clips and holders				+++							+++	+++	+++
Plastic parts PP/EPDM (pretreated)		++			+++						+++		
Electric and cable fixation plugs grouting						+++	+++						
Plastic parts made of PP	++	++	+++	+++									
Edgefolding							+++					+++	
Sand core								+++					
Type	1063.1	1145.1	1452.1	1539	1730	0460	0874	1669	1341	1586	0931.1	1075.1	1387
Adhesive base¹⁾	B	B	B	B	B	C	C	C	D	D	E	E	E
Viscosity in mPas at 150°C	-	-	-	-	-	-	-	-	-	-	13.000/120°C	20.000/120°C	-
Viscosity in mPas at 160°C	-	-	-	-	-	-	-	-	-	16.000	-	-	2.000/130°C
Viscosity in mPas at 180°C	4.300	12.000	5.200	3.500	8.000	3.500/190°C	3.500/200°C	130/210°C	10.000/190°C	-	-	-	-
Colour / Appearance	beige	dark beige	light brown	water clear	brown	yellow	yellow / black	yellow	yellow	yellowish	white/opaque	white	white
Softening point in °C by ring and ball method	145	155	130 ⁴⁾	125 ⁴⁾	155	140	155	175	135	95	65 ⁴⁾	72 ⁴⁾	74 ⁴⁾
Heat resistance in °C acc. WPS 68, shearload 100g/cm ² bonded surface	85	105	175	180	110	110	135	110	75	55	150	150	150
Working temperature in °C	180-200	180-210	180	180	180-200	180-210	180-210	195-210	160-190	150-180	120-140	120-140	120-140
Open time in seconds ²⁾	90	30	90	240	45	40	15	8	permanent sticky	permanent sticky	240	120	90
Setting time in seconds ²⁾	50	25	60	120	30	20	10	3	-	-	210	50	180
Sprayable	Yes	No	No	Yes	No	No	No	No	Yes	Yes	Yes	No	Yes
Delivery form ³⁾	1, 4	5	7, 9	7, 9	4	2, 4	2, 4	4	5	5	7, 9	7, 9	7, 9
Flammability class UL 94	-	-	-	-	-	V-0	V-2	-	-	-	-	-	-

Hot Melt Adhesives for the Textiles-, Foam-, Woodwork -, Furniture- and Filter Industry

From EVA-based hot melt adhesives and polyolefin adhesives through to contact adhesives for self-adhesive applications, a variety of product solutions for various industries can be found here. In particular, the products are used for the surface bonding/laminating of technical films and in the area of mattress manufacture.



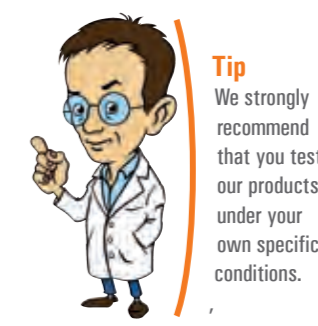
“These areas particularly make use of the advantages of hot melt adhesive, for example in mattress manufacture, they are solvent-free and boast an Eco passport, the fast setting behaviour when repairing wooden boards (filling knotholes) and in air filter production.”

> Katrin Janocha

Hot Melt Adhesives

Description		short setting and open time	universal	white, very flexible at low temperatures	good flow behavior	good adhesion spectrum, low odor	very long open time	large bonding	sanded	for self-adhesive equipment	easy removable	long open time	white flexible	
Fields of application	Textiles-/Foam industry													
	Foam mattress bonding						+++	+++						
	Spring core pockets for mattresses					+++		+						
	Foam for upholstered furniture						+++	+++						
	Edge sealing for technical textiles											++		
	Self-adhesive textile/foam equipment									+++				
	Woodwork- and Furniture industry													
	Knothole fill material								+++					
	Edge guard for furniture													
	Mounting aid when working with white glues		+++								+++			
Filter industry														
Filter frames made of plastic					+							+++		
Filter frame made of paper / nonwoven				++				+++						
Air filter	+++													
Type		2549	1301	1545	1602	1947	1052	1596	0339.2	1628.1	1645	0931.1	2055	
Product Data	Adhesive base ¹⁾	A	A	A	A	A	B	B	C	D	D	E	B	
	Viscosity in mPas at 150°C	-	-	-	-	-	-	-	-	-	-	13.000/120°C	-	
	Viscosity in mPas at 160°C	8.500	-	5.700	1.300	-	-	2.900	-	-	-	-	-	
	Viscosity in mPas at 170°C	-	-	-	-	1.100	-	-	-	-	1.500	-	-	
	Viscosity in mPas at 180°C	-	6.000/200°C	-	-	-	3.000	-	250/200°C	5.000	-	-	2.700/190°C	
	Colour / Appearance	white	yellow	white	yellow	light yellow	yellow	yellow	yellow	amber	yellow	white/clear	white/opaque	white
	Softening point in °C by ring and ball method	110	90	80	110	95	130	90	180	80	90	65 ⁴⁾	124	
	Heat resistance in °C acc. WPS 68, shearload 100g/cm ² bonded surface	55	55	60	55	60	60	55	120	40	50	150	55	
	Working temperature in °C	160-180	160-200	140-180	150-180	150-170	160-180	150-180	230	160-180	140-180	120-140	170-190	
	Open time in seconds ²⁾	20	50	20	20	25	1.500	600	10	permanent tacky	slightly perm.tacky	240	30	
Setting time in seconds ²⁾	10	45	20	10	5	240	120	3	-	-	210	20		
Sprayable	No	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	No		
Delivery form ³⁾	4	1, 4	4	4	4	1, 4	4, 5	4	4	4	7, 9	4		

- Use:**
 +++ very good,
 ++ good,
 + technically possible.
- 1) Adhesive basis:
 A = Ethylene vinyl acetate (EVA)
 B = Polyolefin (PO)
 C = Polyamide (PA)
 D = Thermo-plastic rubber (PSA)
 E = reactive Polyurethane (PUR)
 G = Polyester (PET)
 - 2) The values listed here are information according to internal BÜHNEN tests. Content is not legally binding and subject to changes without notice.
 - 3) Delivery form:
 1 = Slugs – approx 42 mm diameter, length 50 mm
 2 = Sticks – approx 12 mm diameter, length 200 mm
 3 = Sticks – approx 18,3 mm diameter, length 300 mm
 4 = Granulate/Pillows, loosely shaken
 5 = Blocks from approx 500 g – 4 kg
 7 = Cartridge – 47 mm diameter, length 215 mm
 9 = Container
 - 4) As delivered



Tip
 We strongly recommend that you test our products under your own specific conditions.



„95% of our customers do recommend us to others!“
 › Hermann Kruse

Mechanical
Glue Stick Applicators

MECHANICAL GLUE STICK APPLICATORS

- › HB 181
- › HB 185 / HB185 LT / HB190
- › HB 195 / HB 220
- › HB 230 E / HB 325

- p. 36
- p. 37
- p. 38
- p. 39

Mechanical Glue Stick Applicators



- Areas of application**
- › Packaging
 - › Display manufacture
 - › Automotive
 - › Floristry
 - › Textile industry
 - › Foam
 - › Furniture industry

Our hand glue guns are indispensable aids for many areas of application, be it in the automotive industry, the packaging industry, the carpentry trade, the toy industry, trade fair and shop fittings, among others – the range of applications is virtually endless. They provide perfect adhesion for wood, plastics, rubber, fabrics, leather, paper, cardboard, earthenware and metal. What is more, BÜHNEN offers various matching hot-melt adhesives that are accurately customised to your specific applications.

HB 181

- 190 °C
- 12 mm
- 80 W



- Advantages and features**
- › optimized grip and trigger form
 - › small and handy
 - › low operating force
 - › universal stand, varied space
 - › fixed nozzle (diameter 2.5 mm)
 - › available in a cardboard

Technical Data	HB 181
Dimensions	215 x 180 x 38 mm
Weight	270 g
Operating Voltage	220-240 V, 50 Hz
Power consumption	80 W
Operating temperature	190 °C
Hot melt sticks	length 200 mm / 300 mm, Ø 12 mm
Melting capacity*	0,3–0,6 kg/h

* depends on temperature and glue viscosity

- ▶ **Suitable adhesives**, see page 18, 20, 26, 30, 32
- ▶ **Accessories**, see page 68



HB 185 / 185 LT

- 190 °C
- LT 120 °C
- 12 mm
- 80 W



- Advantages and features**
- › Very good haptics, fatigue-proof work (slim, easy-hold handle, trigger close to grip)
 - › Small and handy
 - › Low weight
 - › Very high dispensing capacity
 - › Fixed nozzle (diameter 2.5 mm)
 - › Available in blister pack

Special benefits and features of HB 185 LT

- › Low-temperature hand gun (max. 120 °C)
- › Gentle on fingers and material
- › Minimises burning
- › Low energy consumption

Technical Data	HB 185 / HB 185 LT
Dimensions	225 x 195 x 35 mm
Weight	300 g
Operating Voltage	220-240 V, 50 Hz
Power consumption	80 W
Operating temperature	190 °C / LT-version 120 °C
Hot melt sticks	length 200 mm / 300 mm, Ø 12 mm
Melting capacity*	0,3–0,6 kg/h

* depends on temperature and glue viscosity

- ▶ **Suitable adhesives**, see page 18, 20, 26, 30, 32
- ▶ **Accessories**, see page 68



Tip
The HB 185 LT is ideal for any handicraft work and is also a very reliable tool for florists. The low-temperature glue gun is ideal for heat-sensitive materials or in applications where the hot melt adhesive must be reshaped using fingers.

HB 190

- 190 °C
- 12 mm
- 100 W



- Advantages and features**
- › Very good haptics, fatigue-proof work (slim rubberized handle, trigger close to grip)
 - › Small and handy
 - › Low weight
 - › Very high dispensing capacity
 - › Removable nozzle (standard diameter 3.0 mm)
 - › Available in blister pack or case

Technical Data	HB 190
Dimensions	230 x 195 x 35 mm
Weight	300 g
Operating Voltage	220-240 V, 50 Hz
Power consumption	100 W
Operating temperature	190 °C
Hot melt sticks	length 200 mm / 300 mm, Ø 12 mm
Melting capacity*	0,4–0,7 kg/h

* depends on temperature and glue viscosity

- ▶ **Suitable adhesives**, see page 18, 20, 26, 30, 32
- ▶ **Accessories**, see page Seite 68

HB 195

190 °C

12 mm

120 W



Advantages and features

- › Fatigue-proof work with long trigger
- › Very high dispensing capacity
- › Integrated on/off switch
- › Removable nozzle (standard diameter 3.0 mm)
- › Available in blister pack or case

Technical Data	HB 195
Dimensions	240 x 205 x 45 mm
Weight	470 g
Operating Voltage	220-240 V, 50 Hz
Power consumption	120 W
Operating temperature	190 °C
Hot melt sticks	length 200 mm / 300 mm, Ø 12 mm
Melting capacity*	0,5–0,8 kg/h

* depends on temperature and glue viscosity

- ▶ **Suitable adhesives**, see page 18, 20, 26, 30, 32
- ▶ **Accessories**, see page 68

HB 220

140-230 °C

12 mm

220 W



Advantages and features

- › Fatigue-proof work with long trigger
- › Stroke limiter allows exactly the same quantity of glue to be applied repeatedly (distance of trigger to grip can be adjusted to fit to all hand sizes)
- › Very high dispensing capacity
- › Integrated on/off switch
- › Removable nozzle (standard diameter 3.0 mm)
- › Available in carton or case
- › Separate stand available

Technical Data	HB 220
Dimensions	225 x 195 x 35 mm
Weight	600 g
Operating Voltage	220-240 V, 50 Hz
Power consumption	220 W
Operating temperature	140-220 °C
Hot melt sticks	length 200 mm / 300 mm, Ø 12 mm
Melting capacity*	0,7–1,2 kg/h

* depends on temperature and glue viscosity

- ▶ **Suitable adhesives**, see page 18, 20, 26, 30, 32
- ▶ **Accessories**, see page 68



HB 230 E

40-230 °C

12 mm

300 W



Digital display
built into handle



Separate stand



Tip

Especially well-suited for PA hot-melt adhesive sticks

Advantages and features

- › Microprocessor controlled, continuously adjustable temperature control +/- 1 °C
- › Particularly suited to use with polyamide glue sticks
- › Digital display built into handgrip
- › Temperature locking
- › Fatigue-proof work with long trigger
- › Stroke limiter allows exactly the same quantity of glue to be applied repeatedly (distance of trigger to grip can be adjusted to fit to all hand sizes)
- › Very high dispensing capacity
- › Removable nozzle (standard diameter 3.0 mm)
- › Available in case
- › Separate stand available

Technical Data	HB 230 E
Dimensions	290 x 230 x 70 mm
Weight	625 g
Operating Voltage	220-240 V, 50 Hz
Power consumption	300 W
Operating temperature	40-230 °C
Hot melt sticks	length 200 mm / 300 mm, Ø 12 mm
Melting capacity*	1,2–1,5 kg/h

* depends on temperature and glue viscosity

- ▶ **Suitable adhesives**, see page 18, 20, 26, 30, 32
- ▶ **Accessories**, see page 68

HB 325

140-230 °C

18 mm

600 W



For larger
hot melt
adhesive
consumption

Advantages and features

- › For use with 18 mm sticks
- › Large glue reserve
- › Fatigue-proof work with long trigger
- › Stroke limiter allows exactly the same quantity of glue to be applied repeatedly (distance of trigger to grip can be adjusted to fit to all hand sizes)
- › Very high melting capacity
- › Removable nozzle (standard diameter 3.0 mm)
- › Available in case

Technical Data	HB 325
Dimensions	300 x 240 x 80 mm
Weight	980 g
Operating Voltage	220-240 V, 50 Hz
Power consumption	600 W
Operating temperature	140-230 °C
Hot melt sticks	length 300 mm, Ø 18 mm
Melting capacity*	1,5–2,0 kg/h

* depends on temperature and glue viscosity

- ▶ **Suitable adhesives**, see page 18, 20, 32
- ▶ **Accessories**, see page 68



„No-one disappears into anonymity here; everyone knows each other.“
 › Friedrich Schwarting

Pneumatic Glue Applicators

PNEUMATIC GLUE APPLICATORS

- › HB 710 Bead / HB 710 HT Bead
- › HB 710 Spray
- › HB 700 KD Bead / HB 700 K Spray

p. 43
 p. 44
 p. 45

Pneumatic Glue Applicators



Areas of application

- › Packaging
- › Display manufacture
- › Automotive
- › Textile industry
- › Foam
- › Furniture industry

The HB 700 series of applicators sets new standards in design and ease of use. The experience of 35 years and more than 25,000 pneumatic hand applicators supplied have gone into developing a unit in which glue is melted in a tank and applied using compressed air.



Temperature regulation

A clear, easy-to-read display marks the temperature regulation of the HB 700 series. Setting the temperature precisely to within a degree preserves the adhesive and reduces burned glue residues. Automatic lowering of the temperature during longer periods of inactivity further preserves the glue. For process reliability it is possible to lock the temperature so that it cannot be adjusted by workers using the device.

Melting capacity

The 700 series of applicators are optimised for high melting capacities. Three heating cartridges with a total power of 600 watts provide rapid and even heating of the tank, nozzle and closure.

Ergonomics

The shape, weight and ergonomics have been designed for fatigue-proof working. The applicator unit is balanced by the positioning of the tank and temperature regulator, making the unit easy to handle.



HB 710 dot and bead application

This model can handle hot melt glue in the form of 43-mm diameter cartridges or as granulate.



HB 710 HT high temperature

In this high-temperature version, all plastic parts and seals are designed for working with adhesives at temperatures up to 250 °C.



Temperature area to 250 °C

Advantages and features

The HB 700 series brings process reliability to your assembly with:

- › Microprocessor-controlled, continuously adjustable temperature regulation +/- 1 °C
- › One-hand bayonet closure for maximum operator comfort
- › High melting capacity
- › Ergonomically shaped handle for fatigue-proof work
- › Automatic lowering of temperature to save energy consumption and preserve the adhesive

- › Temperature regulation with digital display built into handle
- › Low weight
- › Rapid response time (between operation of trigger and availability of glue at nozzle)

Accessories

Tool stand, workstation, control timer, nozzles, balancer

Technical Data	HB 710 bead	HB 710 HT
Dimensions	308 x 270 x 109 mm	308 x 270 x 109 mm
Weight	1,350 g	1,400 g
Operating Voltage	220-240 V, 50 Hz	220-240 V, 50 Hz
Power consumption	600 W	600 W
Operating temperature	40-210 °C	40-250 °C
Temperature control	electronic	electronic
Temperature constancy	± 1 °C	± 1 °C
Temperature display	digital LED-display	digital LED-display
Automatic Temperature Reduction (ACE)	40 °C temperature reduction after an operating break of 30 min. / or individually adjustable by customer	
Melting tank capacity	200 ml	200 ml
Melting capacity*	3,2 kg/h with slugs, 1,3 kg/h with granulate	3,2 kg/h with slugs, 1,3 kg/h granulate
Delivery system	compressed air	compressed air
Operating pressure	2,0 to 6 bar	2,0 to 6 bar
Nozzles (Standard)	conical nozzle Ø 1,5 mm	conical nozzle Ø 1,5 mm

Rights reserved to make technical changes / ** Product dependent: figures obtained with a viscosity of approx. 2000 mPas / 175 °C

▶ **Suitable adhesives**, see page 18-33

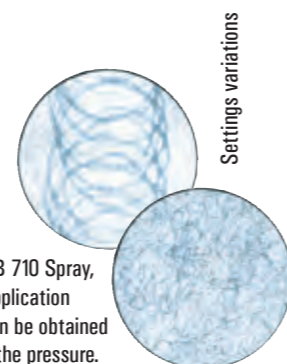
▶ **Accessories**, see page 72, 73

HB 710 spray

This model offers spray application of adhesive in 43 mm diameter slugs or from granulate/pillows. Where very high melting capacities and rapid heating are required, use of slugs is preferable. By interrupting the spray air inlet, the HB 710 Spray can also apply glue in beads.



Tip
Hot melt adhesive cartridges are preferable if high melting rates and short heating times are required.



With the HB 710 Spray, different application patterns can be obtained by varying the pressure.

Advantages and features

The HB 710 Spray goes beyond the HB 710 Bead by also offering:

- › a wafer-thin spray film and thus reduced glue consumption
- › an easily adjustable, steady spray pattern resulting from the pre-heated spray air
- › optimal fixing of heat-sensitive materials
- › wide application area

Accessories

Tool stand, workstation, timer control, nozzles, balancer



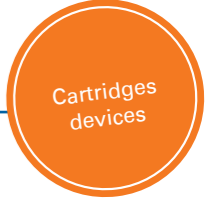
Technical Data	HB 710 Spray
Dimensions	292 x 270 x 109 mm
Weight	1,500 g
Operating Voltage	220-240 V, 50 Hz
Power consumption	600 W
Operating temperature	40-210 °C
Temperature control	electronic
Temperature constancy	± 1 °C
Temperature display	digital LED-dispaly
Automatic Temperature Reduction (ACE)	40 °C temperature reduction after an operating break of 30 min. / or individually adjustable by customer
Melting tank capacity	200 ml
Melting capacity*	3,2 kg/h with slugs, 1,3 kg/h with granulate
Delivery system	compressed air
Operating pressure	2,0 to 6 bar
Nozzles (Standard)	Spray nozzle Ø 1,5 mm

Rights reserved to make technical changes / * Product dependent: figures obtained with a viscosity of approx. 2000 mPas / 175 °C

- ▶ Suitable adhesives, see page 18-33
- ▶ Accessories, see page 72, 73

HB 700 cartridges devices

These two models offer capability with reactive adhesives such as polyurethane (PUR) or polyolefins (POR) in aluminium cartridges. This allows the guns to be operated horizontally or overhead. For continuous use of cartridges, a cartridge pre-heater is recommended.



With the HB 700 K Spray, different application patterns can be obtained by varying the pressure.

HB 700 KD dot and bead application

Advantages and features

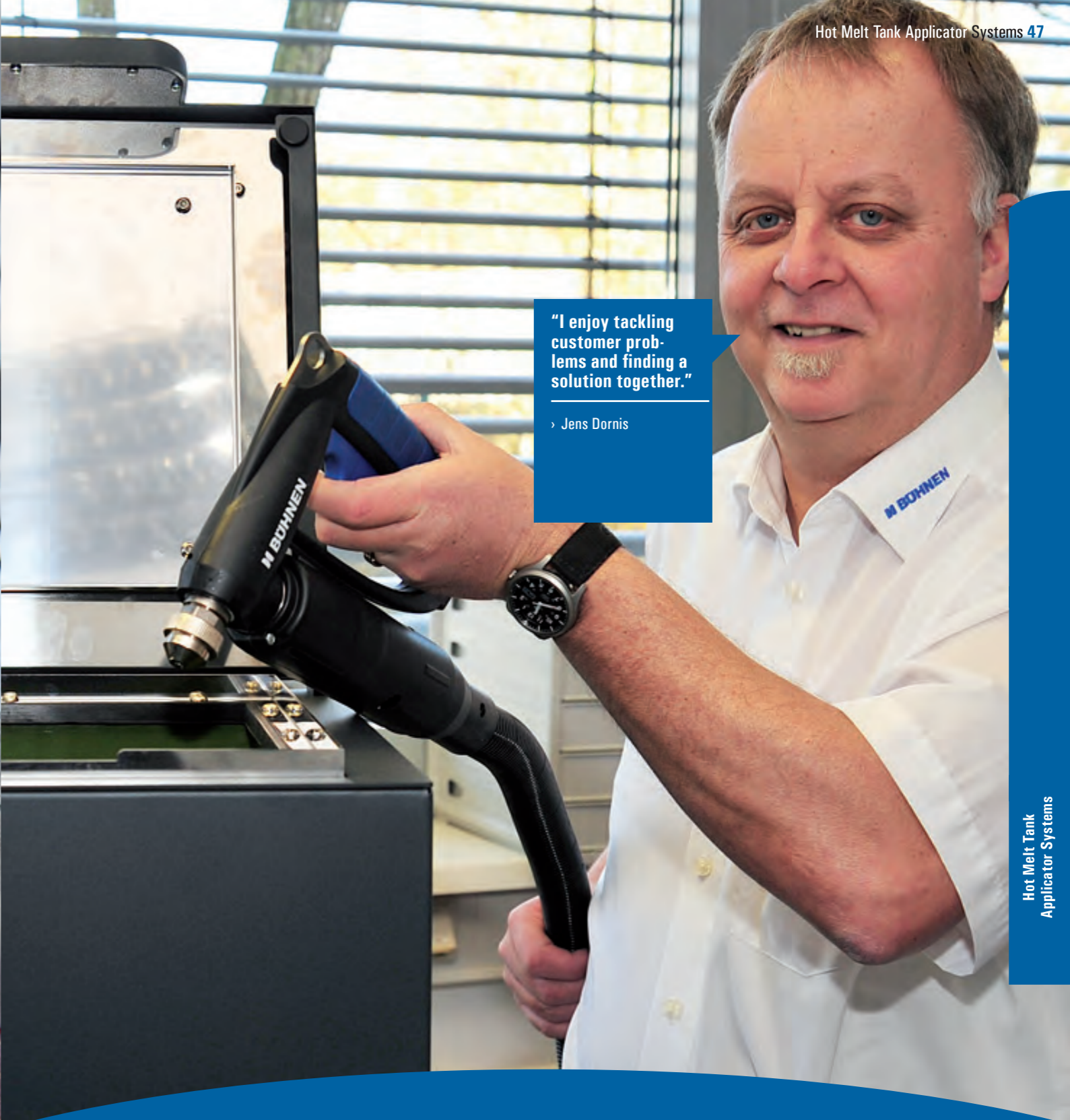
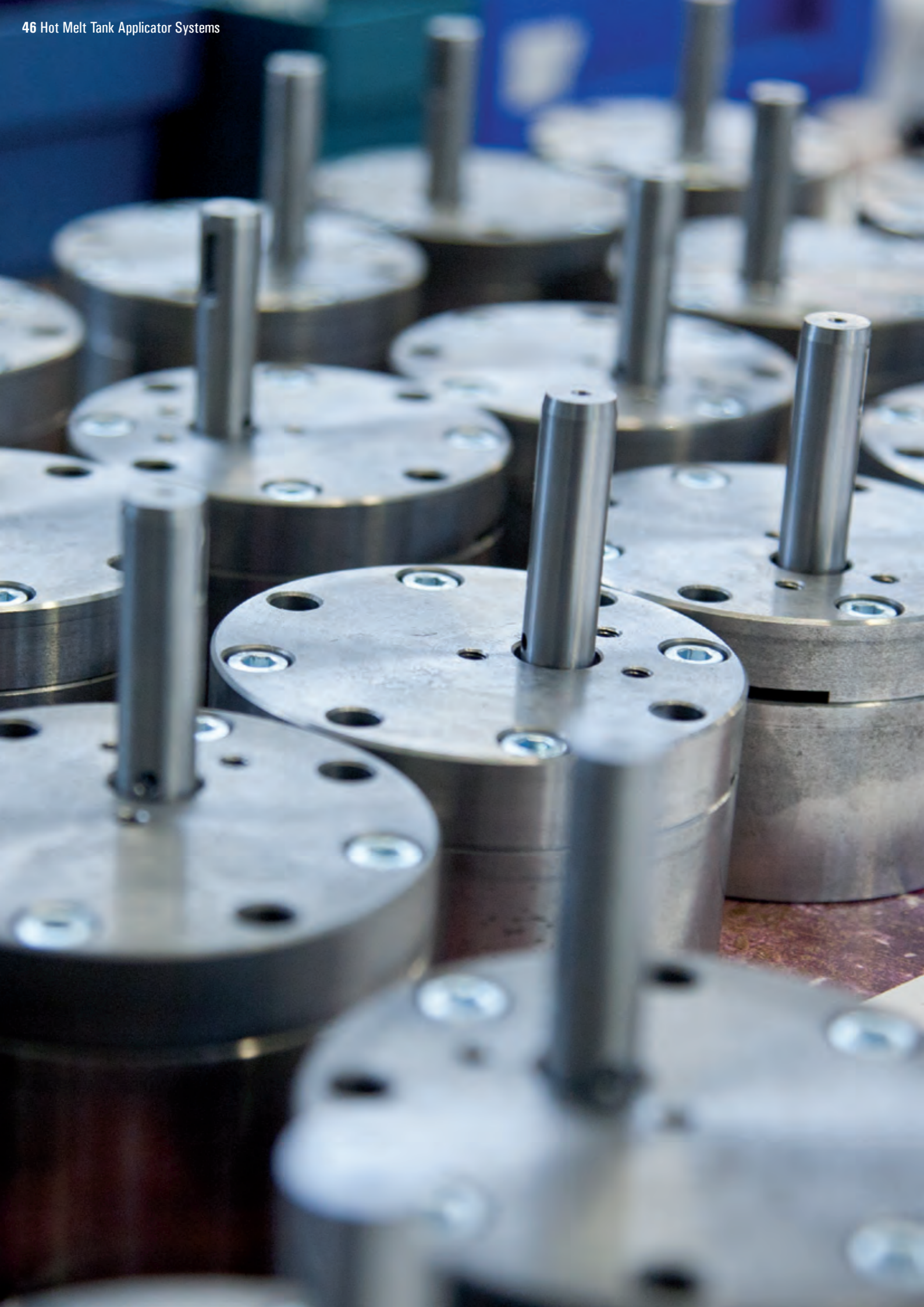
These cartridge applicator devices from BÜHNEN offer greater economic efficiency in professional applications. They have been developed especially for use with PUR and POR adhesives.

PUR/POR adhesives are used in assembly and construction applications that are subjected to extreme temperatures.

Technical Data	HB 700 KD	HB 700 K Spray
Dimensions	352 x 270 x 109 mm	335 x 270 x 109 mm
Weight	1,500 g	1,700 g
Operating Voltage	220-240 V, 50 Hz	220-240 V, 50 Hz
Power consumption	600 W	600 W
Operating temperature	40-210 °C	40-210 °C
Temperature control	electronic	electronic
Temperature constancy	± 1 °C	± 1 °C
Temperature display	digital LED-dispaly	digital LED-dispaly
Automatic Temperature Reduction (ACE)	40 °C temperature reduction after an operating break of 30 min. / or individually adjustable by customer	40 °C temperature reduction after an operating break of 30 min. / or individually adjustable by customer
Melting tank capacity	310 ml (cartridge)	310 ml (cartridge)
Melting capacity*	0.7-1.2 kg/h without cartridge pre-heater, 1.3-2.0 kg/h with cartridge pre-heater	
Delivery system	compressed air	compressed air
Operating pressure	2,0 to 6 bar	2,0 to 6 bar
Nozzles (Standard)	Standard nozzle Ø 1,5 mm	Spray nozzle Ø 1,5 mm

Rights reserved to make technical changes / * Product dependent: figures obtained with a viscosity of approx. 2000 mPas / 175 °C

- ▶ Suitable adhesives, see page 18, 30, 31, 33
- ▶ Accessories, see page 72, 73



"I enjoy tackling customer problems and finding a solution together."
 › Jens Dornis

Hot Melt Tank
 Applicator Systems

HOT MELT TANK APPLICATOR SYSTEMS

- › Basics / Piston pumps / Gear pumps p. 48
- › HB 5000 series p. 52
- › HB 6000 series p. 54
- › HB 4000 series p. 56
- › HB 4000 series / Bag melter p. 62
- › HB 4000 series / Bulk melter p. 64

Basics / Piston pumps / Gear pumps

The main components of every hot melt glue applicator are a heated tank, a temperature control and a pumping system for the molten adhesive.



Tank

Aluminium is the most commonly used material for adhesive tank systems. The metal has the dual advantage of being both lightweight and a good heat conductor. To facilitate cleaning, tanks are coated on the inside with PTFE. A large surface area for heat transfer from the tank to the adhesive is of crucial importance for a high melting capacity. As a result, the inner surfaces are not smooth, but ribbed for surface area enlargement. The set temperature

is only maintained at base level; the temperature falls in relation to the proximity to the tank cover. In this way, adhesive residue is prevented from adhering too quickly and the adhesive can be pre-dried, which is important e.g. with polyamide.



Tip

Multi-stage heating of the adhesive should be programmed to reduce energy consumption and to protect the adhesive!

Temperature control

All components such as the tank, filter block, hoses and applicators have to be heated. In this respect, a temperature control, heating cartridges, over-temperature safety devices and temperature sensors are required. The temperature is controlled via independently operating heater circuits with temperature sensors. BÜHNEN uses PT 100 sensors as standard, but equipment may be fitted with alternative temperature sensors if required. Both heating and cooling are relatively slow processes and demand a lot of time. The heating process is hindered by the insulation effect of the adhesive. Hence, the set temperature may be long achieved before the adhesive is fully melted. For this reason, there is usually a programmed waiting period to prevent the pump from starting too soon. Frequently the adhesive heating process is programmed at multi-levels; e.g. tank 160 °C, hose 165 °C and application head 170 °C. In this way, the adhesive is treated with as much care as possible and energy consumption is reduced. Conventional temperature controls are accurate to approximately ± 1 K. However, the set temperature is only maintained in the area close to the temperature sensor; the further you are from this point, the lower the temperature. For application heads or manual applicators with long nozzles, this means that the nozzle temperature can no longer be maintained and needs to be controlled.

Individual controllers

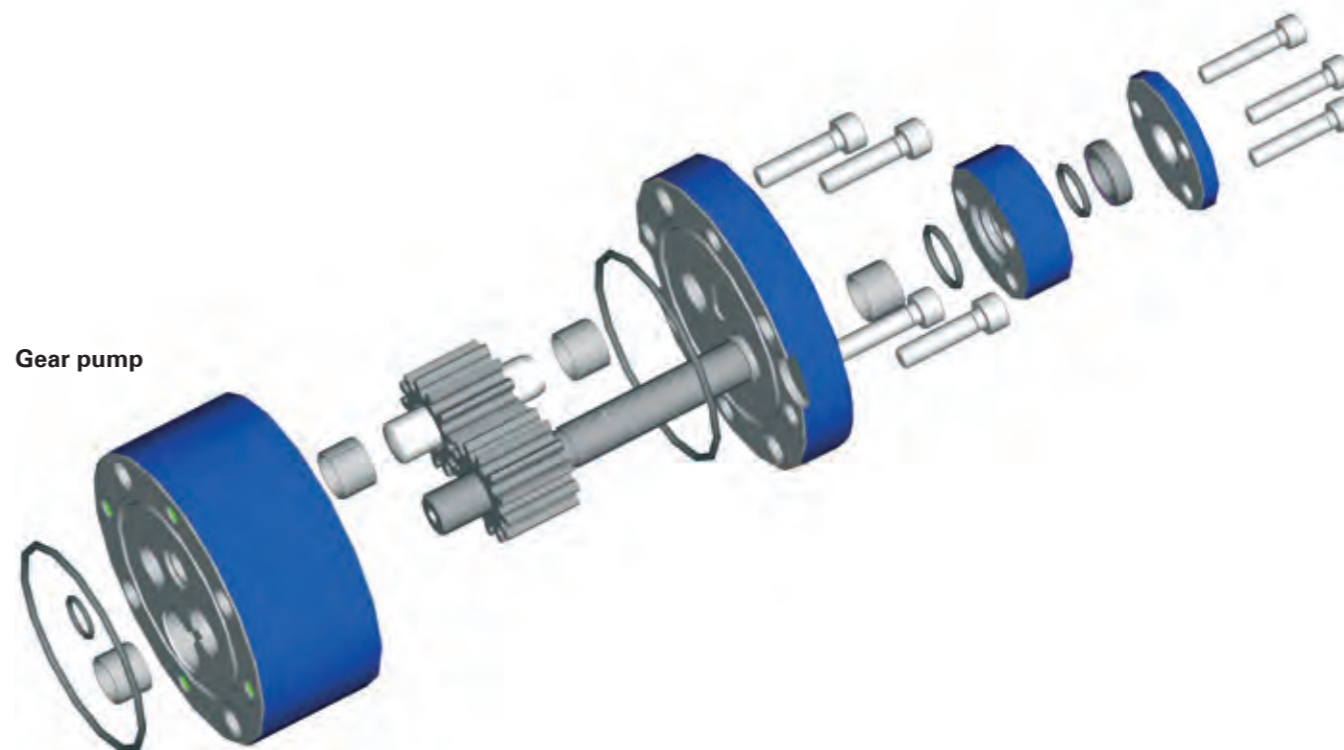
Individual temperature controllers are usually used for custom-built systems. A separate controller is present for each heater circuit. For each heater circuit, both the set and actual temperatures can be seen at all times. They have the advantages of being relatively economical, easy to adapt to specific customer requirements and easy to programme. In the event of damage or loss, they can be replaced without prior experience.

Multi-channel controllers

Multi-channel temperature controllers are predominantly used in standard systems. As well as controlling the temperature, they often fulfil other functions such as providing a weekly timer, alarm signals, and entry and exit points for master control systems (e.g. the PLC of a packing machine). Customer specific adaptations are virtually impossible.



Gear pump



Pumping systems

Two systems with different features have been established for transporting the molten hot melt adhesive and producing the necessary application pressure.

Gear pump operated by an electric motor

A pumping system with gear pump and electric motor delivers a constant volume flow rate. The delivery volume is determined by the size of the pump and the rotational speed of the motor. The substance to be pumped is transported to the spaces between the sprockets and housing. Due to its simple construction, the pump is robust and relatively inexpensive.

The rotational speed of the motor can be regulated through the use of a frequency converter, which also controls the delivery volume. Since the amount of applied adhesive is smaller than the discharge flow volume, the gear pump must be equipped with a bypass regulator which allows the surplus adhesive to flow back into the tank. The pressure produced is determined by the clearance of the gearwheels in the housing and the viscosity of the adhesive. For standard applications, the pressure must be reduced. This is once again effected by the bypass, which acts as a kind of safety valve and limits the pump pressure. Pressures of between 10 and 60 bar are common. If the application amount has to be administered precisely with several application heads, then tank systems with 2 to 4 motors and pumps are used. Precise application amounts can be set for each application head by adjusting the rotational speed control of the motors.

Advantages:

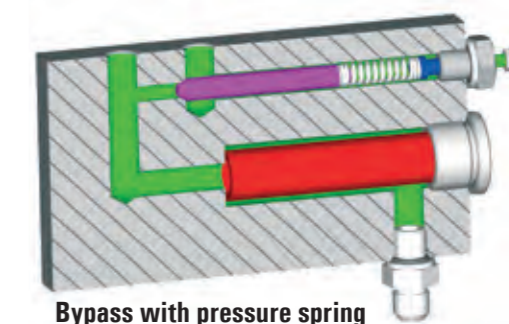
- Constant flow rate; advantageous for spray applications
- Flow rate can be adjusted via the speed control; advantageous if only a small amount of adhesive is to be applied
- 8% less pressure fluctuations
- Higher temperatures possible, as there are hardly any gaskets (used with polyamide)
- Viscosity up to 70,000 mPas
- An electrical connection is all that is needed (for bead application)

Disadvantages:

- Some of the adhesive is unnecessarily circulated via the bypass
- The system cannot be adapted to varying quantities

Bypass with pressure spring

A bypass regulator is needed for pressure adjustment and pressure limitation.

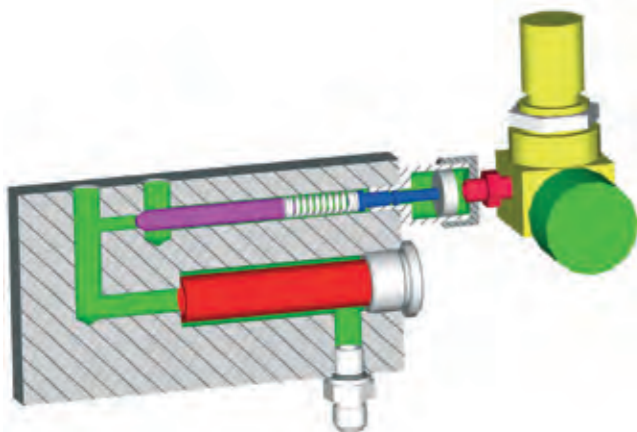


Basics / Piston pumps / Gear pumps

Standard tank systems have a pressure spring-operated bypass. The pressure produced by the gear pump is applied to a piston, which presses against a hub by means of a spring. The preliminary tension of the pressure spring can be altered by an adjusting screw, thereby altering the adhesive pressure. Surplus adhesive flows back into the tank.

Pneumatic bypass

For special applications, there is the option of using a bypass in which the spring is replaced by a pneumatic cylinder and pneumatic pressure regulator. This means that the pump pres-



sure can also be regulated during application, e.g. a little pump pressure at the beginning and higher pump pressure at the end of an application. Systems of this type are used in moulding technology amongst other areas.

Pneumatic piston pump

Dual-acting piston pumps operated by a pneumatic cylinder are most commonly used in packaging machines. However, they also offer potential advantages for application with manual devices. An oscillating pneumatic cylinder drives a piston which draws in the molten adhesive.

The piston pump serves as a kind of processor, raising the cylinder air pressure to the required adhesive pump pressure. Due to the considerably larger diameter of the pneumatic cylinder, ratios of 1:8 to 1:20 can be realised, e.g. with a ratio of 1:8, 1 bar air pressure would correspond to 8 bar adhesive pressure. The pump pressure is easily adjusted via a pressure regulator. The flow rate is automatically adjusted via the frictional resistance up to the nozzle and the viscosity of the adhesive. If - when using an application head - a second application head is opened, the system resistance drops and more adhesive is automatically pumped. A bypass is not required, since pumping only takes place if there is a drop in the amount of adhesive.

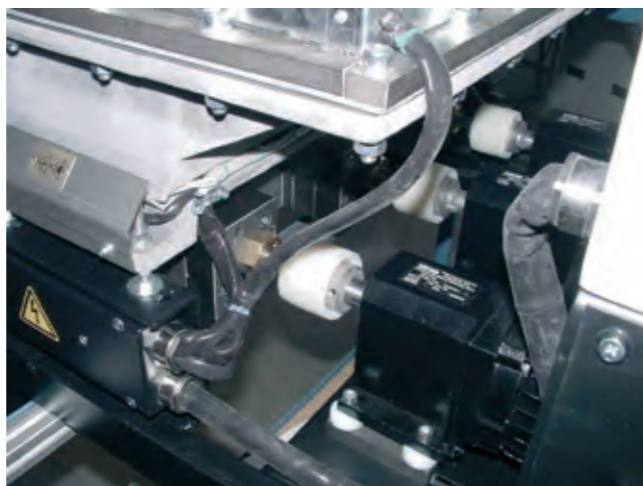
A dual-acting piston pump works like a two-stroke engine. Pumping takes place upon both forward and return strokes. At the first stroke, the substance to be pumped is drawn in through the inlet valve. At the return stroke, the enclosed adhesive is driven into the second space. At the next stroke, new substance is drawn in and the first amount is simultaneously driven in the direction of the outlet.

Advantages:

- Flow rate is automatically adapted to meet the requirement
- Adhesive pressure can easily be adjusted via air pressure
- No unnecessary circulation of the adhesive
- Max. viscosity 50,000 mPas.

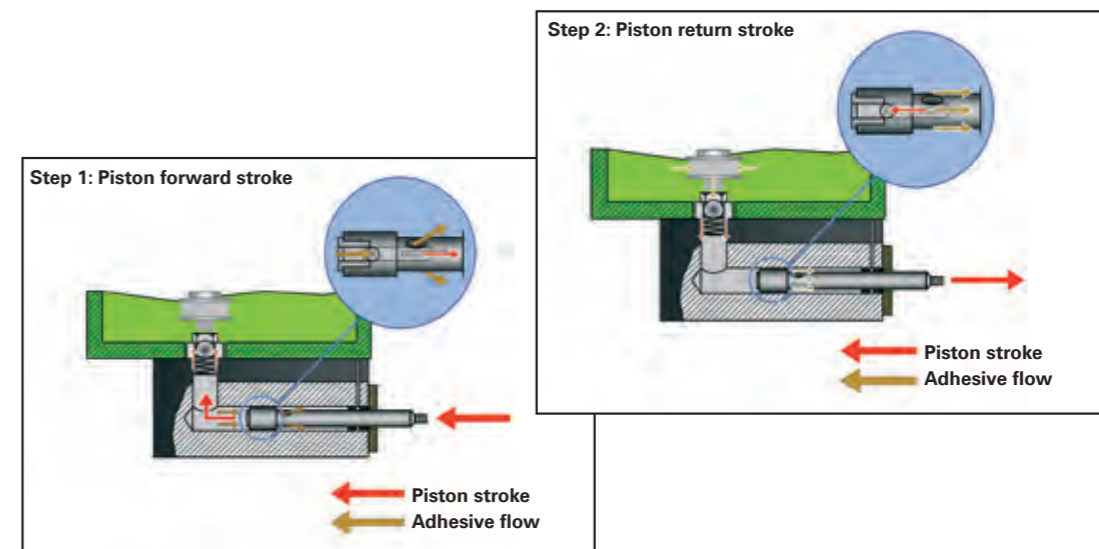
Disadvantages:

- Both, electricity and compressed air are required
- Temperature is usually limited to around 200 °C (cannot be used with polyamide hot melt adhesive)



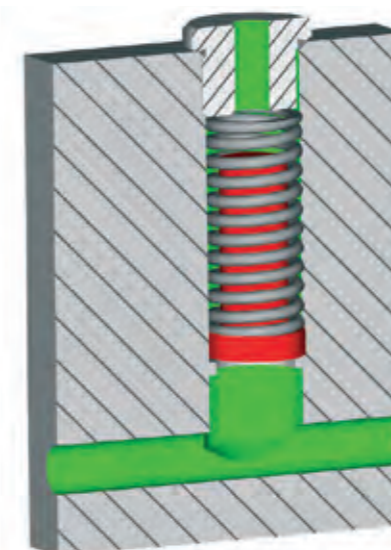
"A piston pump can be beneficial particularly for shifting output and with low viscosity adhesives."

> Hermann Kruse



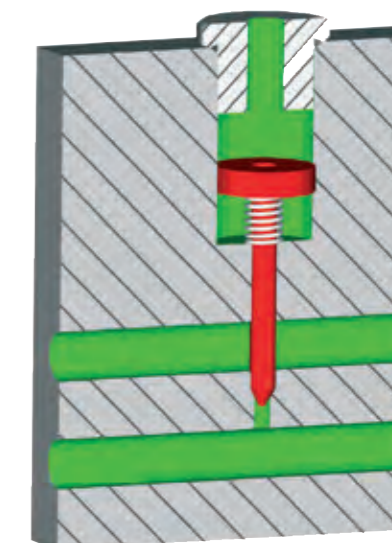
Pressure compensation

There are compensation valves to compensate for the pressure drop at the terminal points of the piston pump. These are located between the piston pump and the connections for the heated hoses. The pressure produced by the piston pump harnesses a pressure spring by means of a piston. This pressure accumulator largely compensates for the pressure drop at the changeover points.



Pressure release

Upon shutdown, many tank systems with piston pumps trigger an automatic pressure release of the heated hose. A valve opens and allows the pressurised adhesive to flow back into the tank. This has the advantage of allowing the adhesive to stretch upon re-heating and prevents increased pressure in the hose. This is also advantageous for safety reasons. There is no pressure when replacing a heated hose and the transfer can be made safely.



Filters

All hot melt adhesive systems are equipped with filters. A primary filter located inside the tank serves to prevent contaminants from entering the pump, as these could cause it to malfunction. An additional filter with finer mesh is located behind the pump to trap contaminants that could obstruct the nozzle bores. These filters require regular inspection and maintenance. Maintenance intervals of approximately 500 hours are usual.



HB 5000 series (gear pump)



Areas of application

- › Packaging
- › Display manufactures
- › Construction supplying
- › Upholstery industry
- › Mattress manufacturers

The hot melt adhesive applicator **HB 5010** is a tank system with a gear pump in a modern plastic housing. Its main application areas are found in the packaging industry, in display production, in the construction supply industry and in upholstered furniture and mattress production.

All relevant applications with EVA, polyolefins, polyamides or thermoplastic rubber are possible. A maximum of 2 heated hoses can be connected. The device control has an easily readable display with clear assignment of functions. The temperature control includes a weekly timer, manual or programmable temperature reduction, and switchover to NI 120 temperature sensors.

Used with a applicator system manual hand gun, HB 910 is optimally designed for manual applications involving high performance outputs. The gear pump ensures an even delivery volume for spray applications. Used with application heads, it enables the automation of simple tasks.

Used with a applicator system manual hand gun, HB 910 is optimally designed for manual applications involving high performance outputs. The gear pump ensures an even delivery volume for spray applications. Used with application heads, it enables the automation of simple tasks.

HB 5010 for EVA-, PO-, PSA



Advantages and features

- › Available as a device for bead or spray application
- › Intuitive user interface with integrated timer
- › Lightweight plastic housing
- › Connections for 2 hoses
- › Coated aluminium tank
- › Tank capacity 4.5 litres
- › High melting capacity 4.5 kg/h
- › Can be switched to Ni 120 temperature sensors
- › Easy to service, modular design
- › Easy cleaning
- › Bead and/or spray application
- › Integrated filter



Technical Data	HB 5010 dot and bead	HB 5010 spray
Dimensions:	720 x 360 x 360 mm	720 x 360 x 360 mm
Weight:	35 kg	35 kg
Operating Voltage:	220-240 V, 50 Hz alternative 110-120 V, 60 Hz	220-240 V, 50 Hz alternative 110-120 V, 60 Hz
Hose connections:	2	2
Approx. melting capacity*:	4,5 kg/h	4,5 kg/h
Drive:	Gear motor	Gear motor
Number of gear pumps:	1	1
Delivery rate of gear pumps:	26 kg/h	26 kg/h
Tank capacity:	4,5 litres	4,5 litres
Max. noise emission:	72 dBA	72 dBA
Practicularly designed for:	EVA, PO, PSA	EVA, PO, PSA

Rights reserved to make technical changes / ** Product dependent: figures obtained with a viscosity of approx. 2000 mPas / 180 °C

- ▶ **Suitable adhesives**, see page 18-33
- ▶ **Accessories**, see page 74-89



Tip
The HB 5010 is particularly well-suited to manual work with high performance.

HB 6000 series (piston pump)



The new generation of the award-winning Micron series is based on years of experience and continuous development by our partner Meler Glueing Solutions. As a result of this partnership, BÜHNEN offers these tools as the **HB 6000** series: a solution that is always focused on efficiency. Meeting the highest demands in efficiency, technology and design is at the heart of what we do.

The hot melt adhesive applicators with piston pumps in the **HB 6000** series are characterised by high output, simple handling and extensive standard equipment. Thanks to various options they meet all requirements for integration in modern packaging plants. But they are also extremely well-suited to individual solutions. With tank sizes of 5/10/20/35 litres and up to 6 hose connections, the systems can be adapted to different requirements. Heatable hoses, application heads and handguns of other manufacturers can be connected to the applicators. Thanks to compact dimensions and excellent tank accessibility, **HB 6000** can effortlessly replace existing systems.

Temperature control

The temperature controller of the **HB 6000** features a clear language-independent display. The operation is intuitive and user-friendly. Integrated week timer and temperature reduction to protect the adhesive.

Piston pump

Good pump heating is guaranteed through the horizontal installation of the double-acting piston pump directly on the tank base. The adhesive pressure can be adjusted from 7-82 bar on the applicator (ratio 1:14).

Pressure compensation

Thanks to the unique compensation valve, the pressure drop at the switching point of the piston pump is significantly reduced and does not lead to irregularities in application.

Automatic pressure relief

If the compressed air supply is interrupted (system shut-down or emergency stop) the adhesive in the hose is automatically returned to the tank. This protects the heatable hose and increases safety when changing the hose or application head.

Filter cartridges

To avoid impurities in the application heads, the hot melt adhesive is prefiltered in the tank and purified by a filter cartridge (100 mesh) in the distribution unit. A drain valve and easy access to the pump filter highlights the easy maintenance.

Tank

Excellent accessibility to the tank combined with a large opening allows the processing of many adhesives. Low operating costs with a high melting rate ensures the innovative insulation of all heated elements. Burned adhesive residues can be removed easily thanks to the PTFE coating on the tank interior.

Control cabinet door and housing

Access to all components of the **HB 6000** in just a few steps. The innovative drawer system and wide-opening front door provides excellent accessibility to the control cabinet and pneumatic unit. The removable side cladding of the "Cool Touch" housing provides easy access for all service and installation operations.

HB 6050 / HB 6100 / HB 6200 / HB 6350 for EVA-, PO-, PSA

Excellent heating of the double-acting piston pump thanks to horizontal installation



Advantages and features

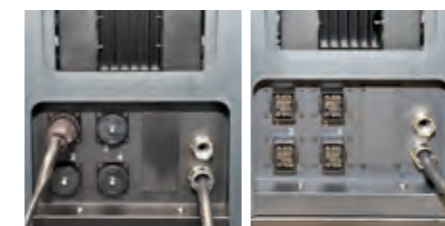
- › Very high melting rate of 9 – 30 kg/h
- › Highly efficient insulation and "Cool-Touch" housing
- › Excellent accessibility to components through innovative drawer system
- › Easy installation and operation
- › Extensive standard equipment
- › Nordson compatible
- › Compact dimensions
- › Intuitive operation of the temperature controller
- › Connection of up to 6 heating hoses possible
- › Optional Ni120 or PT 100 sensor
- › Individual control of piston pump output



Technical Data	HB 6050-2 / -4 / -6	HB 6100-2 / -4 / -6	HB 6200-2 / -4 / -6	HB 6350-2 / -4 / -6
Dimensions B x T x H:	587 x 341 x 481 mm	671 x 341 x 481 mm	671 x 382 x 524	738x 435 x 673 mm
Weight:	37,5 kg	45,7 kg	60,2 kg	90,1 kg
Operating Voltage:	1 / N / PE 230 V 3 / N / PE 400 V	3 / N / PE 400 V	3 / N / PE 400 V	3 / N / PE 400 V
Hose connections:	1-2 / 1-4 / 1-6	1-2 / 1-4 / 1-6	1-2 / 1-4 / 1-6	1-2 / 1-4 / 1-6
Approx. melting capacity*:	9 kg/h	13,5 kg/h	19 kg/h	30 kg/h
Drive:	Piston pump	Piston pump	Piston pump	Piston pump
Number of piston pumps:	1	1	1	1
Delivery rate of piston pump:	30 kg/h	30 kg/h	66 kg/h	66 kg/h
Tank capacity:	5 Liter	10 Liter	20 Liter	37 Liter
Max. noise emission:	60 dBA	60 dBA	60 dBA	60 dBA
Practicularly designed for:	EVA, PO, PSA	EVA, PO, PSA	EVA, PO, PSA	EVA, PO, PSA

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- ▶ **Suitable adhesives** see pages 18-33
- ▶ **Accessories** see pages 72-89

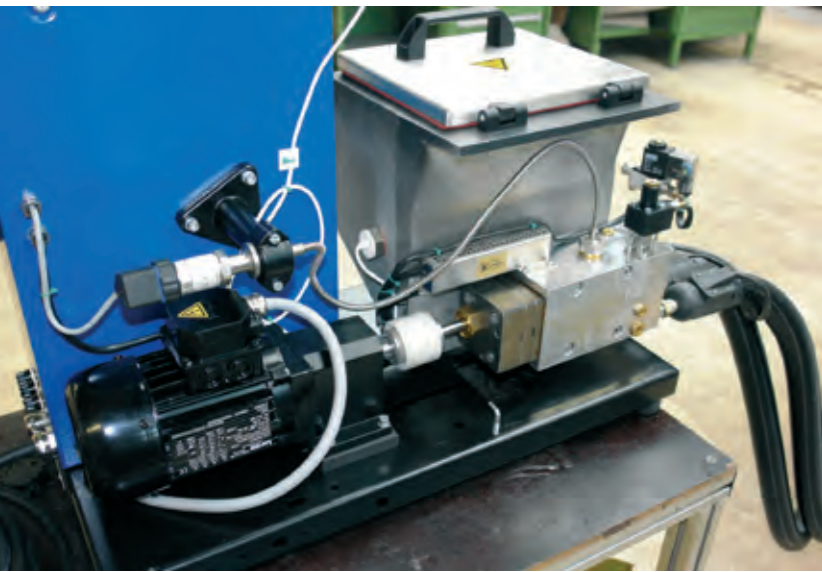


Up to 6 connections for PT 100 or NI 120 Temperature sensors



Automatic pressure release
Pressure compensation

HB 4000 series (gear pump)



Areas of application

- › Packaging
- › Display manufacturers
- › Automotive
- › Construction supplying
- › Electronic industry
- › Upholstery industry
- › Mattress manufacturers



The 4000 series is flexible to the very last detail

The hot melt adhesive application technology of the 4000 tank system series is precisely tailored to the individual requirements of different applications. Our customers always receives a user solution that is custom-made. Our success lies in our maximum efficiency and cost effectiveness. Amongst other things, this involves the use of reliable, time-tested industrial electronics by companies like Siemens, Klöckner Möller, Elotech, Wika, Lenze and Weidmüller in our temperature and motor controls.

The temperature control is the heart of every tank system. Because of this, we offer a wide range of different temperature controllers. Amongst others, PID „plug-in“ temperature controllers of modular construction, or different multi-channel controllers with up to 20 heater circuits can be used.

Thanks to the integrated microprocessor, the PID „plug-in“ temperature controllers of modular construction offers high reliability with optimal accuracy to approximately +/-1 K. For complex applications, Siemens PLC control systems are used as a standard. With the S7-300 control, there is the choice of an OP or colour touch panel user interface. Of course, the connection of a profibus or MPI bus segment can also be integrated into the motherboard.

The infinitely variable three-phase motor ensures continuous rotational speed of the gear pump, thereby providing a perfectly even hot melt adhesive application. Due to the wide range of sizes offered, the delivery volume of the gear pumps can be tailored to customer needs.

Tip

The plug-in temperature controller allows a quick and easy exchange in the event of outage



HB 4100 / HB 4200 for EVA-, PO-, PSA

Advantages and features

- › Gear pump
- › Non-stick coated melting tank
- › Temperature sensors PT100, FeCuNi, Ni120, NTC
- › Bypass valve
- › Filter cartridges
- › Three-phase motor with frequency converter
- › Speed control of the gear pump via external master voltage
- › Protection against excessive heat and cold
- › Insufficient temperature lock
- › External tank system and motor control centre
- › Gear pump sizes of 5-80 kg/h flow rate

Optional equipment components

- › Granulate feeder
- › Level monitoring via signal lights and / or signal alarm or as a potential-free contact
- › Pneumatic bypass valve
- › Electronic hot melt adhesive pressure measurement
- › Hot melt adhesive pressure start-up control
- › Hot melt adhesive flow measurement
- › Electronic filter control
- › Weekly timer
- › Temperature reduction or brand component with lowering response
- › Screw spindle pump or dual pump fine grain testing
- › Interfaces via Harting connectors
- › High temperature version up to 250°C available
- › Lockable cover for control elements
- › Spray air attachment kit
- › Heating of upper part of tank



Technical Data	HB 4100	HB 4200
Dimensions:	700 x 395 x 420 mm	735 x 445 x 705 mm
Weight:	50 kg	70 kg
Operating Voltage:	3 / N / PE 400 V 50 Hz	3 / N / PE 400 V 50 Hz
Hose connections:	1-4	1-4
Approx. melting capacity*:	12 kg/h	16 kg/h
Drive:	Three-phase motor	Three-phase motor
Max. number of gear pumps:	1	2
Delivery rate of gear pump:	10 / 20 / 40 kg/h	10 / 20 / 40 / 80 kg/h
Tank capacity:	9 litres	18 litres
Max. noise emission:	60 dBA	60 dBA
Particular designed for:	EVA, PO, PSA	EVA, PO, PSA

Rights reserved to make technical changes / *) Product dependent: figures obtained with a viscosity of approx. 2000 mPas / 180 °C

▶ **Suitable adhesives** see pages 18-33

▶ **Accessories** see pages 74-91

HB 4450 / HB 4650 / HB 4800 / HB 4130 for EVA-, PO-, PSA-, PA

Advantages and features

- › Gear pump
- › Non-stick coated melting tank
- › Temperature sensors PT100, FeCuNi, Ni120, NTC
- › Bypass valve
- › Filter cartridges
- › Three-phase motor with frequency converter
- › Speed control of the gear pump via external master voltage
- › Protection against excessive heat and cold
- › Insufficient temperature lock
- › External tank system and motor control centre
- › Gear pump sizes of 5-320 kg/h flow rate

Optional equipment components

- › Granulate feeder
- › Level monitoring via signal lights and / or signal alarm or as a potential-free contact
- › Pneumatic bypass valve
- › Electronic hot melt adhesive pressure measurement
- › Hot melt adhesive pressure start-up control
- › Hot melt adhesive flow measurement
- › Electronic filter control
- › Weekly timer
- › Temperature reduction or brand component with lowering response
- › Screw spindle pump or dual pump fine grain testing
- › Interfaces via Harting connectors
- › High temperature version up to 250°C available
- › Lockable cover for control elements
- › Spray air attachment kit
- › Heating of upper part of tank



Technical Data	HB 4450	HB 4650	HB 4800	HB 4130
Dimensions:	840 x 680 x 1150 mm	840 x 680 x 1350 mm	1175 x 717 x 825 mm	990 x 610 x 1460 mm
Weight:	100 kg	110 kg	120 kg	130 kg
Operating Voltage:	3 / N / PE 400 V 50 Hz	3 / N / PE 400 V 50 Hz	3 / N / PE 400 V 50 Hz	3 / N / PE 400 V 50 Hz
Hose connections:	1-4	1-4	1-4	1-4
Approx. melting capacity*:	35 kg/h	50 kg/h	60 kg/h	70 kg/h
Drive:	Three-phase motor	Three-phase motor	Three-phase motor	Three-phase motor
Max. number of gear pumps:	4	4	4	4
Delivery rate of gear pump:	10 / 20 / 40 / 80 / 160 kg/h	10 / 20 / 40 / 80 / 160 kg/h	10 / 20 / 40 / 80 / 160 / 320 kg/h	10 / 20 / 40 / 80 / 160 / 320 kg/h
Tank capacity:	45 litres	65 litres	80 litres	130 litres
Max. noise emission:	60 dBA	60 dBA	60 dBA	60 dBA
Particularly designed for:	EVA, PO, PSA, PA	EVA, PO, PSA, PA	EVA, PO, PSA, PA	EVA, PO, PSA, PA

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- ▶ Suitable adhesives see pages 18-33
- ▶ Accessories see pages 72-89

HB 4070 / HB 4150 / HB 4250 for PA

Advantages and features

- › Gear pump
- › Non-stick coated melting tank
- › Temperature sensors PT100, FeCuNi, Ni120, NTC
- › Bypass valve
- › Filter cartridges
- › Three-phase motor with frequency converter
- › Speed control of the gear pump via external master voltage
- › Protection against excessive heat and cold
- › Insufficient temperature lock
- › External tank system and motor control centre
- › Gear pump sizes of 5-160 kg/h flow rate

Optional equipment components

- › Granulate feeder
- › Level monitoring via signal lights and / or signal alarm or as a potential-free contact
- › Pneumatic bypass valve
- › Electronic hot melt adhesive pressure measurement
- › Hot melt adhesive pressure start-up control
- › Hot melt adhesive flow measurement
- › Electronic filter control
- › Weekly timer
- › Temperature reduction or brand component with lowering response
- › Screw spindle pump or dual pump fine grain testing
- › Interfaces via Harting connectors
- › High temperature version up to 250°C available
- › Lockable cover for control elements
- › Spray air attachment kit
- › Heating of upper part of tank



Tip

The polyamide hot-melt adhesive is protected against thermal stress through the use of two different tank materials with different heat conductivity.



Technical Data	HB 4070	HB 4150	HB 4250
Dimensions:	700 x 390 x 420 mm	700 x 390 x 420 mm	800 x 445 x 770 mm
Weight:	50 kg	60 kg	80 kg
Operating Voltage:	3 / N / PE 400 V 50 Hz	3 / N / PE 400 V 50 Hz	3 / N / PE 400 V 50 Hz
Hose connections:	1-4	1-4	1-4
Approx. melting capacity*:	4 kg/h	12 kg/h	20 kg/h
Drive:	Three-phase motor	Three-phase motor	Three-phase motor
Max. number of gear pumps:	1	2	2
Delivery rate of gear pump:	10 / 20 / 40 kg/h	10 / 20 / 40 / 80 kg/h	10 / 20 / 40 / 80 kg/h
Tank capacity:	7 litres	15 litres	25 litres
Max. noise emission:	60 dBA	60 dBA	60 dBA
Particularly designed for:	PA	PA	PA

Rights reserved to make technical changes / * Product dependent: figures obtained with a viscosity of approx. 2000 mPas / 180 °C

- ▶ Suitable adhesives see pages 18, 26, 30-33
- ▶ Accessories see pages 72-89

HB 4000 series (gear pump)



Areas of application

- › Packaging
- › Display manufacturers
- › Automotive
- › Construction supplying
- › Elektronik industry
- › Upholstery industry
- › Mattress manufacturers

The PUR hot melt adhesive tank system of the **HB 4000 series** combines innovative technology with a high degree of reliability; advantages which lead to considerably lower operating costs, higher durability and an increase in the reliability of serial production processes.

PUR tank systems are equipped with a compressed air dryer as standard. In this way, the moisture-curing, reactive **PUR** or **POR** hot melt adhesive is protected against a premature chemical reaction. Cleaning requirements are also significantly reduced.

Re-filling with **PUR/POR hot melt adhesive** is possible without interrupting the production, as the tank systems have a progressive melting range. A homogeneous amount of molten hot melt adhesive is always available. Depending on the design of the tank system, they are able to process all standard container types of 2.0 to 18.0 kg.

As a matter of course, the systems comprise all features of the HB 4000 tank system series.

Tip

The compressed air dryer installed as standard only requires compressed air from the compressed air system. No nitrogen is required.



HB 4004 / HB 4008 / HB 4022 for PUR/POR adhesives

Advantages and features

- › Gear pump
- › Non-stick coated melting tank
- › Airtight sealable tank cover
- › Temperature sensors PT100, FeCuNi, Ni120, NTC
- › Bypass valve
- › Three-phase motor with frequency converter
- › Speed control of the gear pump via external master voltage
- › Protection against excessive heat and cold
- › Insufficient temperature lock
- › External tank system and motor control centre
- › Gear pump sizes of 5-80 kg/h flow rate
- › Integrated compressed air dryer
- › Connection for inert shielding gas admission (nitrogen)

Optional equipment components

- › Level monitoring via signal lights and / or signal alarm or as a potential-free contact
- › Pneumatic bypass valve
- › Electronic hot melt adhesive pressure measurement
- › Hot melt adhesive pressure start-up control
- › Hot melt adhesive flow measurement
- › Electronic filter control
- › Weekly timer
- › Temperature reduction or brand component with lowering response
- › Interfaces via Harting connectors
- › Lockable cover for control elements
- › Spray air attachment kit



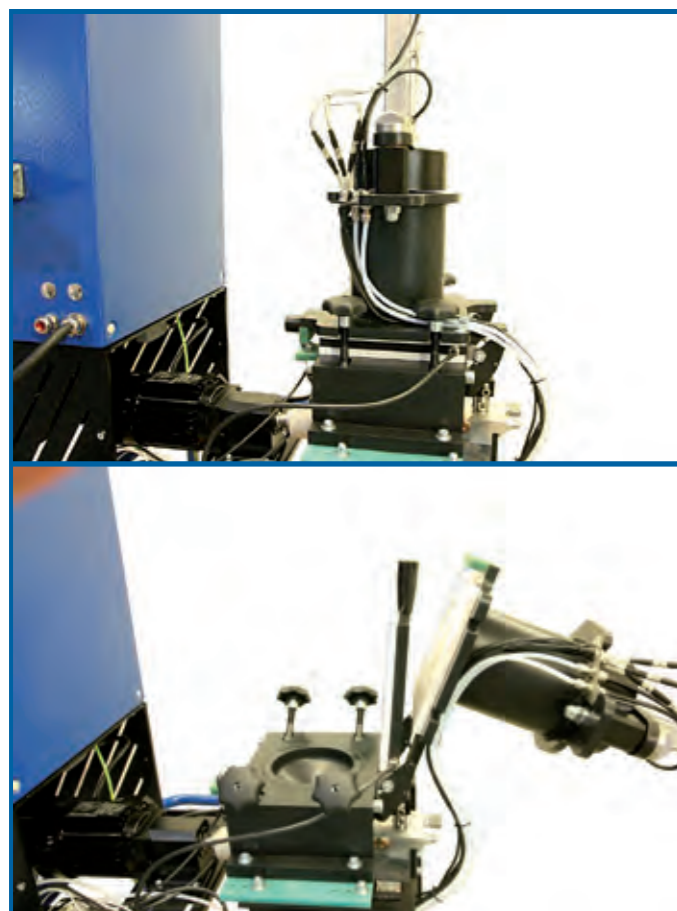
Technical Data	HB 4004	HB 4008	HB 4022
Dimensions:	720 x 360 x 510 mm	755 x 360 x 705 mm	940 x 480 x 1220 mm
Weight:	50 kg	75 kg	130 kg
Operating Voltage:	3 / N / PE 400 V 50 Hz	3 / N / PE 400 V 50 Hz	3 / N / PE 400 V 50 Hz
Hose connections:	1-4	1-4	1-4
Approx. melting capacity*:	2 kg/h	4 kg/h	16 kg/h
Drive:	Three-phase motor	Three-phase motor	Three-phase motor
Max. number of gear pumps:	1	2	2
Delivery rate of gear pump:	10 / 20 / 40 kg/h	10 / 20 / 40 kg/h	10 / 20 / 40 / 80 kg/h
Tank capacity::	4 litres	8 litres	22 litres
Usable tank volume:	Ø 158 x 167 mm high	Ø 158 x 270 mm high	Ø 282 x 445 mm high
Max. noise emission:	60 dBA	60 dBA	60 dBA
Particularly designed for:	PUR, POR	PUR, POR	PUR, POR

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▶ **Suitable adhesives** see pages 18, 31, 33

▶ **Accessories** see pages 72-89

HB 4000 Bag Melter series (gear pump)



Areas of application

- › Packaging
- › Display manufacturers
- › Automotive
- › Construction supplying
- › Elektronik industry
- › Upholstery industry
- › Mattress manufacturers



The BÜHNEN melting system for bags is an easy to maintain, adhesive-friendly melting device that combines the advantages of a drum melter with a tank system. The melting stock is converted straight from the bag, there-by minimising contamination of the device. The bag melter works without production downtime. For „melting on demand“, the melting stock is melted in two stages. The adhesive cartridge is compressed through a melting grid by means of a piston; the hot melt adhesive then flows into a reservoir. When the reservoir is full, the melting grid is automatically shut down. This creates constant viscosity in the reservoir and ensures continued production quality.

There is no residual hot melt adhesive in the bag; the full amount is melted.

Performance features:

- › Gear pumps of 5-80 kg / h capacity
- › Easy to maintain
- › High durability
- › Simple operation
- › Low operating costs
- › High process reliability
- › Extensive range of series-related equipment
- › No residual adhesive in the bag
- › Low waste volume from the compressed bag
- › No unnecessary thermal stress of melting stock
- › No vapours when replacing adhesive
- › Constant melting stock viscosity in the reservoir
- › Melting stock does not make contact with ambient air
- › No compressed air dryer required
- › Ease of access

HB 4020 BS / HB 4180 BS for PUR/POR adhesives

Advantages and features

- › Gear pump
- › Bayonet filter
- › Filter rinse function
- › Replaceable heating cartridges
- › Temperature reduction
- › Temperature sensors PT100, FeCuNi, Ni120, NTC
- › Pneumatic bypass valve
- › Three-phase motor with frequency converter
- › Speed control of the gear pump via external master voltage
- › Gear pumps with 5-80 kg/h flow rate
- › Protection against excessive heat and cold
- › Insufficient temperature lock
- › External bag melter and motor control centre
- › Non-stick coated reservoir and melting grid

Optional equipment components

- › Level monitoring via signal lights and / or signal alarm or as a potential-free contact
- › Electronic hot melt adhesive pressure measurement
- › Medium temperature sensors
- › Hot melt adhesive pressure start-up control
- › Hot melt adhesive flow measurement
- › Electronic filter control
- › Weekly timer
- › Interfaces via Harting connectors
- › Lockable cover for control elements
- › Spray air attachment kit



Technical Data	HB 4020 BS	HB 4180 BS
Dimensions:	930 x 490 x 930 mm	1367 x 500 x 2182 mm
Weight:	68 kg	250 kg
Operating Voltage:	3 / N / PE 400 V 50 Hz	3 / N / PE 400 V 50 Hz
Hose connections:	1-2	1-4
Approx. melting capacity*:	0,5-4 kg/h	1-30 kg/h
Drive:	Three-phase motor	Three-phase motor
Max. number of gear pumps:	1	2
Delivery rate of gear pump:	10 / 20 / 40 kg/h	10 / 20 / 40 / 80 kg/h
Container size:	2 kg and 2,5 kg bags, Ø ca.125 x 270 mm high	18 kg bags, Ø ca. 280 x 370 mm high
Reservoir capacity:	approx. 0,2 litres	approx. 1,1 litres
Particularly designed for:	PUR, POR	PUR, POR

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- ▶ Suitable adhesives see pages 18, 31, 33
- ▶ Accessories see pages 72-89

HB 4000 Bulk melter series (gear pump)



Fine rib melt plate

- › Fine rib melt plate with very large surface area for very high melting capacity
- › Very good heat distribution
- › A continuous ring gasket
- › Melting capacity at HB 4020 FS approx. 20 kg/h
- › Melting capacity at HB 4200 FS approx. 20-200 kg/h

Axial rib melt plate

- › Axial rib melt plate with large surface area for high melting capacity
- › Very good heat distribution
- › A continuous ring gasket
- › Melting capacity at HB 4020 FS approx. 12 kg/h
- › Melting capacity at HB 4200 FS approx. 10-60 kg/h

Smooth melt plate

- › Smooth melt plate with smooth surface area for low melting capacity
- › Very good heat distribution
- › A continuous ring gasket
- › Melting capacity at HB 4020 FS approx. 5 kg/h
- › Melting capacity at HB 4200 FS approx. 5-20 kg/h
- › Low residual adhesive in the bulk

Areas of application

- › Packaging
- › Display manufacturers
- › Automotive
- › Construction supplying
- › Elektronik industry
- › Upholstery industry
- › Mattress manufacturers



The drum melter is an ideal delivery form for converting large amounts of **PUR** or **POR** hot melt adhesive, as well as traditional hot melt adhesives or even sealants and butylene. BÜHNEN drum melter systems have been specially designed for gentle and tailored converting straight from the drum.

With BÜHNEN drum melter systems, only the contact surface of the needed amount of adhesive is melted. A variety of melt plates are used, depending on the required melting capacity and the heat conductivity of the melting stock. With various melt plate geometries, melting capacities of 5-200 kg/h are achieved.

Ventilation of the drum occurs automatically by means of a sensing device. Robust three-phase motors with gear pump sizes of 5-320 kg/h flow rate ensure precise application of the adhesive. The pressure of the adhesive is regulated via a pneumatic bypass valve. Our melt plate ring gasket has been developed as an additional extra for robust use with various melting materials and drums.

Dual drum melters can be used for applications requiring continual output. The transfer from an empty to a full drum occurs automatically via a distribution block. Another option would be to

pour the melting stock from a drum melter into a buffer device. Depending on the design, systems are able to convert all standard container types of 20 kg and 200 kg.

As a matter of course, the systems comprise all features of the **HB 4000 tank system series**.

Advantages:

- › Gear pump
- › Simple and convenient bulk replacement within a few minutes
- › High durability
- › Easy to operate
- › Low operating costs
- › Heightened process reliability
- › Extensive range of standard equipment
- › Low residual adhesive in the bulk
- › An area ring gasket on the melt plate
- › Easily replaceable surface heating systems in the melt plate
- › Simple cleaning of melt plate due to different geometries
- › Ease of access
- › Two-handed operation for starting up and shutting down the drum

HB 4020 FS / HB 4200 FS for PUR/POR adhesives

Advantages and features

- › Gear pump
- › Non-stick coated melt plate
- › Bulk replacement drawer
- › Individual drum-dependent base plate
- › Temperature sensors PT100, FeCuNi, Ni120, NTC
- › Pneumatic bypass valve
- › Pneumatic ventilation module
- › Three-phase motor with frequency converter
- › Speed control of the gear pump via external master voltage
- › Protection against excessive heat and cold
- › Insufficient temperature lock
- › External drum melter system and motor control centre
- › Various gear pump sizes of 5-320 kg/h flow rate

Optional equipment components

- › Uncoated melt plate
- › 2-fold ring gasket on the melt plate
- › Level monitoring via signal lights and / or signal alarm or as a potential-free contact
- › Drum clamp for bulk positioning
- › Electronic hot melt adhesive pressure measurement
- › Medium temperature sensor
- › Hot melt adhesive pressure start-up control
- › Hot melt adhesive flow measurement
- › Electronic filter control
- › Weekly timer
- › Temperature reduction or brand component with lowering response
- › Interfaces via Harting connectors
- › Lockable cover for control elements
- › Spray air attachment kit
- › Scoop piston pump, screw spindle pump or eccentric pump
- › Bulk sleeve
- › Heated filter cartridges
- › Stainless steel design

Tip

The barrel drawer supplied as standard prevents molten hot melt adhesive from dripping onto the empty barrel during barrel changes. So always use it!



Technical Data	HB 4020 FS	HB 4200 FS
Dimensions:	1300 x 520 x 1650 mm	1820 x 710 x 2750 mm
Weight:	240 kg	580 kg
Operating Voltage:	3 / N / PE 400 V 50 Hz	3 / N / PE 400 V 50 Hz
Hose connections:	1-4	1-4
Approx. melting capacity*:	5-20 kg/h	5-200 kg/h
Drive:	Three-phase motor	Three-phase motor
Anzahl der Zahnradpumpen max.:	1	2
Max. number of gear pumps:	10 / 20 / 40 kg/h	10 / 20 / 40 / 80 / 160 / 320 kg/h
Input power of melt plate:	5 KW	22 KW
Bulk lifting device:	pneumatic	pneumatic
Container size:	20 l, Ø 275 x 366 mm high	200 l, Ø 571 x 875 mm high
Particular designed for:	PUR, POR	PUR, POR

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▶ **Suitable adhesives** see pages 18, 31, 33

▶ **Accessories** see pages 72-89



“Keeping the customer in mind is the key to success.”

› Frank-Thomas Wiebe

ACCESSORIES

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Accessories mechanical glue stick applicators



Standard nozzle
1,5 mm / 2,5 mm / 3,0 mm
L = 38 mm
Thread: UNF 7/16



Pipe nozzle, long, squeezed
L = 40 x 5 mm
Thread: UNF 7/16



Standard nozzle
3,0 mm
L = 45 mm
Thread: UNF 7/16



Fine nozzle
1,0 mm
L = 29 mm
Thread: UNF 7/16



Standard nozzle
2,5 mm
L = 27 mm
Thread: UNF 7/16



Point nozzle, long
1,8 mm
L = 32 mm
Thread: UNF 7/16



Pipe nozzle
3 mm
L = 32 mm
Thread: UNF 7/16



Nozzle adapter UNF 7/16 to UNF 3/8
L = 10 mm
for use with applicator head nozzles
(see page 90, 91)



Pipe nozzle
1,8 mm, brass
L = 32 mm
Thread: UNF 7/16



5-hole nozzle 5 x 1,2 mm
Thread: UNF 3/8
B = 20 mm
Use with UNF 7/16 to 3/8 nozzle adapter



Pipe nozzle
3,2 mm, oblique
L = 40 mm
Thread: UNF 7/16



Nozzle adapter UNF 7/16 to UNF 1/2
for use with pneumatic hand gun nozzles
(see page 73)



Stand
for HB 220 / HB 230 E



Balancer
for HB 325 / HB 350 for greater ease of use
at the workstation



Accessories pneumatic glue guns



Tool holder for HB 700 series
Holds the following applicator models
HB 700/710, HB 700/710 Spray,
HB 700 HT, HB 700 KD, HB 700 K Spray,
incl. air service unit



Cartridge pre-heater K 96 R
for 2 cartridges, 230 Volt, 500 Watt,
adjustable in range 40-140 °C



Workstation for HB 700 series
For use of the following applicator models
in stationary applications
HB 700/710, HB 700/710 Spray,
HB 700 HT, HB 700 KD, HB 700 K Spray,
tool stand with air service unit, release
and foot valve



Double-T section for granulates



Workstation conversion kit
Workstation conversion kit for stationary
use of applicator models
HB 700/710, HB 700/710 Spray,
HB 700 HT, HB 700 KD, HB 700 K Spray,
incl. release and foot valve



Balancer
for HB 700 / HB 710 for greater ease
of use at the workstation



Nozzles pneumatic glue guns



HB 700 / 710 bead		Cone nozzle, standard Ø 0,8 mm / 1,0 mm / 1,5 mm / 2,0 mm Thread: UNF 1/2		Flat nozzle 70 mm (8-hole 1,5 mm) Thread: UNF 1/2	HB 700 / 710 bead
		Cone nozzle with capillary Ø 0,35 mm / 0,63 mm Thread: UNF 1/2		Wide-slot nozzle Width 0,2 x 16 mm 0,2 x 30 mm Thread: UNF 1/2	
		Round pipe nozzle Ø 1,0 mm / 1,5 mm / 3,0 mm Thread: UNF 1/2		Film nozzle Path 10 mm (1x1 mm) Path 15 mm (1x1 mm) Thread: UNF 1/2	
		Flat pipe nozzle, 33 mm long Width 7 mm Thread: UNF 1/2		Nozzle Adapter with UNF 7/16 thread	
		Flat nozzle 10 mm 2-hole 3,1 mm 13 mm 4-hole 1 mm Thread: UNF 1/2		Nozzle Adapter UNF 1/2 to UNF 7/16 for use with nozzles on glue stick guns (see page 70)	
		Spray nozzle kit consisting of swirl nozzle and air flap Ø 1,5 mm		Bead application nozzle for spray applicators Ø 1,2 mm	
HB 700 / 710 spray		Swirl nozzle Ø 1,0 mm / 1,5 mm / 2,0 mm		Spray to bead nozzle adapter for use with bead nozzles (HB 710 Raupe)	HB 700 / 710 spray
		Cone nozzle 3,0 mm L = 45 mm			

HB 700 KD

HB 700 KD

Accessories hot melt tank applicator systems

In order to maximise the tank system options, BÜHNEN offers a range of accessories tailored to the needs of the customer.

Applicator head controller

To ensure that the hot melt adhesive is applied according to requirements, the application heads rely on signals for their activation and deactivation. These signals often come from master control systems, e.g. in a packaging machine. BÜHNEN also offers driver level control systems.

Time controller

A time control is often sufficient for simple applications and slow production line speeds. By means of a contact (foot valve, switch, light barrier), the solenoid valve is activated via the time control and the adhesive can be applied. After a predefined period, the time control switches off the signal and closes the solenoid valve. In doing so, the adhesive application ceases. Using this control system, a maximum of one application per work piece is possible.

External linear path control system in separate housing

The BÜHNEN linear path control system enables a time- or path-dependent application of the hot melt adhesive. An intuitive menu navigation provides customers with a programming option that is easy to operate. A maximum of 8 application heads can



be connected to 4 channels. The hot melt adhesive is precisely applied at a maximum machine speed of up to 400 m/min. The linear path control is optimally suited to today's market needs and, therefore, can be trusted to meet your operational requirements.



Tip

Using the external linear control system uses less adhesive because the hot melt adhesive can be applied in small dots instead of a long bead.

Upon changing machine speeds, a fully automated adaptation of the solenoid valve to the application head occurs by means of an encoder, resulting in precise positioning of the adhesive application. This ensures consistent and reliable production.

Advantages:

- › Easily readable display
- › Programming possible in up to 10 languages (currently German, English, Dutch, French, Spanish, Italian and Portuguese)
- › Compensation for the response time (start/stop)
- › Choice of light barrier channel
- › Cycle lock to prevent error readings by the photoelectric cell
- › Separate start/stop control programmable per channel
- › Programming access guaranteed with password
- › Production data display (machine speed, production per minute, total output)
- › For universal application with all BÜHNEN tank systems and those produced by all other manufacturers
- › Choice of time or path-controlled (encoder) operation

Technical Data and features

Power supply:	230 Volt AC / 50 Hz
Channel output:	24 V DC
Power output per channel:	35 W
Number of programmable channels:	4
Number of application heads per channel:	2
Activations per channel:	4
Deactivations per channel:	4
Input for encoders:	1
Input for photoelectric cells:	2
Glue programme storage spaces:	20
Tolerance of hot melt adhesive application:	+/- 1 mm or 1 ms
Maximum machine speed:	400 m/min
Hot melt adhesive application length:	2 – 9.999 mm (encoder operation)
Hot melt adhesive application time:	2 – 9.999 ms (time operation)
Drive prevention:	speed < 2 m/min

Granulate feeder

A granulate conveyor ensures consistent quality of adhesive bondings by reducing temperature fluctuations in the melt and avoiding adhesive cracking and production stoppage time.

„AUTOFILL“ (automatic adhesive filling) ensures that granulate material is conveyed directly to the melting tank, thereby eliminating the need for manual refilling. The system is optimally designed for all HB 6000 types, but can also be adapted to suit any tank system. With its own PLC, it remains independent from the tank system control. A capacitive sensor measures the amount of adhesive in the tank and sends a signal to the control system when the amount of adhesive falls below an adjustable level. The signal activates the conveying system, and with the aid of compressed air, the adhesive is conveyed from the container into the tank. Upon reaching the maximum amount, the capacitive sensor sends out another signal and the control system shuts down the conveyor unit. If the tank fails to fill within a predefined period, the system sounds an alarm.

Advantages:

- › Reduces operating time
- › Helps to reduce temperature fluctuations in the melt
- › Reduces adhesive cracking
- › Prevents downtime caused by an empty tank
- › As a closed system, it reduces contamination of the adhesive
- › Reduces risk of injury through hot tanks
- › Overfill protection of the tank



Technical Data

Type of adhesive:	Granulate or pillows up to 10 mm
Adhesive flow rate:	400 kg/h*
Max. conveyor distance:	25 m*
Max. conveyor height:	8 m*
Compressed air supply:	5 - 6 bar, hose, min 10/8 mm
Air consumption:	360 l/min when filling
Power supply:	230 V
Optional:	Granulate containers with a capacity of 120 litres

* dependent on shape, size and weight of adhesive granulate material

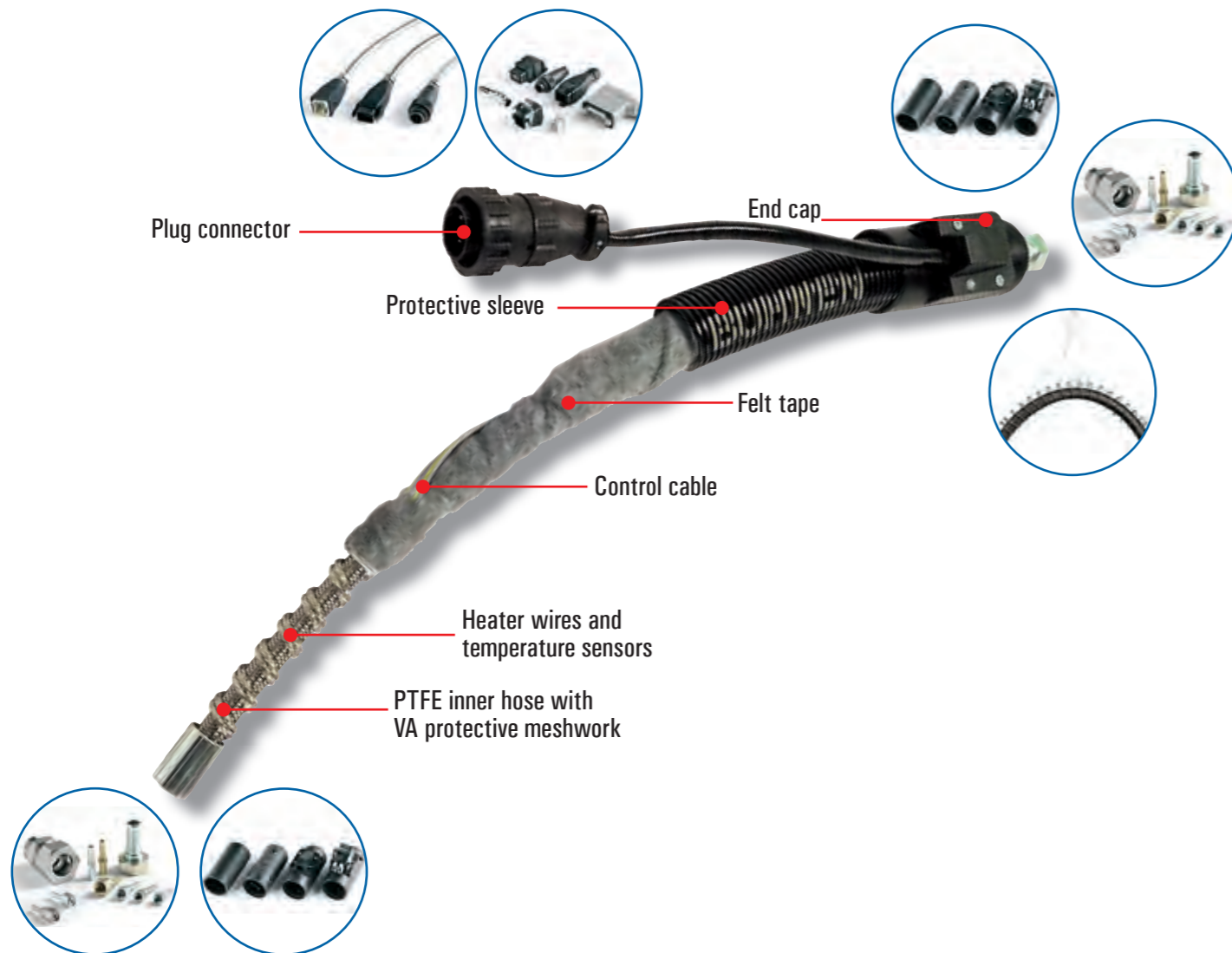


Balancing device

If a manual device is in permanent use at the workstation, then the use of a balancing device may be practical. The applicator stays in the correct position for the machine operator and is safely prevented from toppling over or falling from the table.



Heated hoses / Basics



Heatable hoses

BÜHNEN heatable hoses are manufactured from the highest quality materials and thus set standards in long service life and high operational reliability with precise temperature control. Heating the hot melt adhesive in the hose guarantees a constant temperature and ensures accurate processing.

Areas of use

Heatable hoses are heated and flexible transport routes for hot melt adhesives, from a tank unit to the application head. They are also used in areas where moving system parts are connected and where heated hot melt adhesive is applied by robot or manual hand movements.

Construction

We use a PTFE inner hose for our heatable hoses to cope with high temperatures. This is sheathed in VA protective braiding, so it can also withstand corresponding high pressures.

The heating wires and temperature sensor are wound round in the next stage. Heat-resistant felt insulation tape is attached for further protection. Then control wires and more felt insulation tape is applied.

A thermoplastic elastomer (TPE) corrugated tube protects the thermal insulation. The heatable hose assembly is completed with high quality end caps, robust plug connectors and electrical connections.

BÜHNEN hoses fit like a glove – every time! Every hot melt adhesive applicator system requires correct hoses of various lengths and nominal diameters (= diameter of the inner tube).

Hoses also differ in terms of the various temperature sensors (PT 100, Ni120, FeCuNi, NTC), the range of connector plugs and widely varying screw connections.

BÜHNEN hoses are not exclusively designed for BÜHNEN applicator systems. We are also able to provide compatible heated hoses for Nordson, Meltex, Robatech and ITW Dynatec systems.

Available lengths: 0,6 m to 12,0 m

Standard lengths: 1,2 m, 1,5 m, 1,8 m, 2,0 m, 2,4 m, 2,5 m, 3,0 m, 3,6 m, 4,0 m, 4,2 m, 4,5 m, 4,8 m, 5,0 m, 6,0 m
Additional lengths available upon request.

Standard diameters: NW06 (= 6 mm), NW08 (= 8 mm), NW13 (= 13 mm)
Additional diameters available upon request.



More protection required? Do your environmental conditions dictate special heated hose protection requirements? **Once again, BÜHNEN has the solution!**



Standard: Thermoplastic elastomer (TPE) for NW06 and NW08
Splash protection: A special (IP65-certified) protection ideal for use in the beverage industry for instance
Braided sheath: Polyamide braiding and heat-resistant silicone foam from NW10
VA sheath: For particularly extreme strain on the outer sheath

Hoses can also be tailored to different hot melt adhesive types.

High temperature: Up to 250°C for processing hot melt adhesives (e.g. PA)

PUR version: Ideal for processing PUR hot melt adhesives
Replaceable inner core: As an individual component, the inner core can itself be replaced – the remaining hose is preserved



“When installing heating hoses in complex systems, we recommend that you install the heating hoses in energy chains.”

> Jens Dornis



Heated hoses / technical data



KS heated hoses for application heads



HP heated hoses for manual guns

Technical data		
Supply voltage	230 V AC / 50-60 Hz special voltage possible upon request	230 V AC / 50-60 Hz special voltage possible upon request
Power consumption per metre	dependent on lengths and diameters (see table below)	dependent on lengths and diameters (see table below)
Temperature sensors	PT100, Ni120, NTC, FeCuNi or by request	PT100, Ni120, NTC, FeCuNi or by request
Operating temperature	200°C standard, 250°C high temperature	200°C standard, 250°C high temperature
Nominal diameter of inner tube (DN)	DN 6, 8, 10, 12, 16, 20, 25 or by request	DN 6, 8 oder 10
Length	0,5 m to 10,0 m or by request	1,2 m to 7,2 m or by request
Outer protective meshwork	Polyamide meshwork or corrugated hose or metal	Polyamide meshwork or corrugated hose
Thermal insulation	Heat-resistant, closed-cell silicone foam hose or felt (temperature-dependent)	Heat-resistant, closed-cell silicone foam hose or felt (temperature-dependent)
Pressure hose	PTFE tube with protective metal meshwork	PTFE tube with protective metal meshwork
Operating pressure	80-240 bar, dependent on nominal diameter of inner tube and the pressure class (T1, T2 or T3)	175-240 bar, dependent on nominal diameter of inner tube (only pressure class T1) Max. 40 bar permitted for use with BÜHNEN manual guns
Connection fittings	Various UNF threads depending on nominal diameter or customised fittings	UNF 9/16-18 thread
Bending radius	75 - 250 mm dependent on nominal diameter	75 - 120 mm dependent on nominal diameter
Integrated spray air duct	Available option for spray application heads	Spray available for application with manual guns
Heated hose end caps with cable strain relief	Silicone rubber cap or hard cap with cable strain relief	Silicone rubber cap or hard cap
Electrical plug and head connections	14-pin circular plug and socket, 12-pin plug (Nordson compatible) and socket, all Harting plugs and sockets; others by request	14-pin circular plug and socket, 12 pin plug (Nordson compatible) and socket, all Harting plugs and sockets; others by request

Elektrical data for standard heated hoses – heat output at 230 V AC – per metre (tolerances + 5% / -10%)												
Temperature range	DN	4	6	8	10	12	16	20	25	32	40	50
max. 100 °C		70 W	90 W	110 W	130 W	150 W	180 W	240 W	300 W	350 W	400 W	500 W
max. 200 °C / 250 °C		80 W	110 W	130 W	150 W	180 W	240 W	300 W	350 W	400 W	500 W	600 W
max. 350 °C		--	--	210 W	240 W	270 W	300 W	380 W	430 W	550 W	600 W	800 W

Accessories heated hoses



Coil hose hangers for heated hoses
BÜHNEN provides hangers with stainless steel coil springs and retaining clips, facilitating the most varied bends and curves.



Connector systems
We offer a wide range of different connector systems.



End and connector caps
We offer a wide range of end and connector caps.



Fittings
The choice of hose connection fittings depends on the nominal diameter and compressive strength of the hose. We also offer many kinds of special fittings (flange, milk pipe, etc.)



Spray air attachment kit
Applications using a manual spray gun require a spray air attachment kit for optimal calibration of the spray air. The spray air attachment kit is for optional use with the spray application head.



Insulating sleeves
An insulating sleeve is used to prevent thermal bridges between the hose fitting and the application head or tank system.

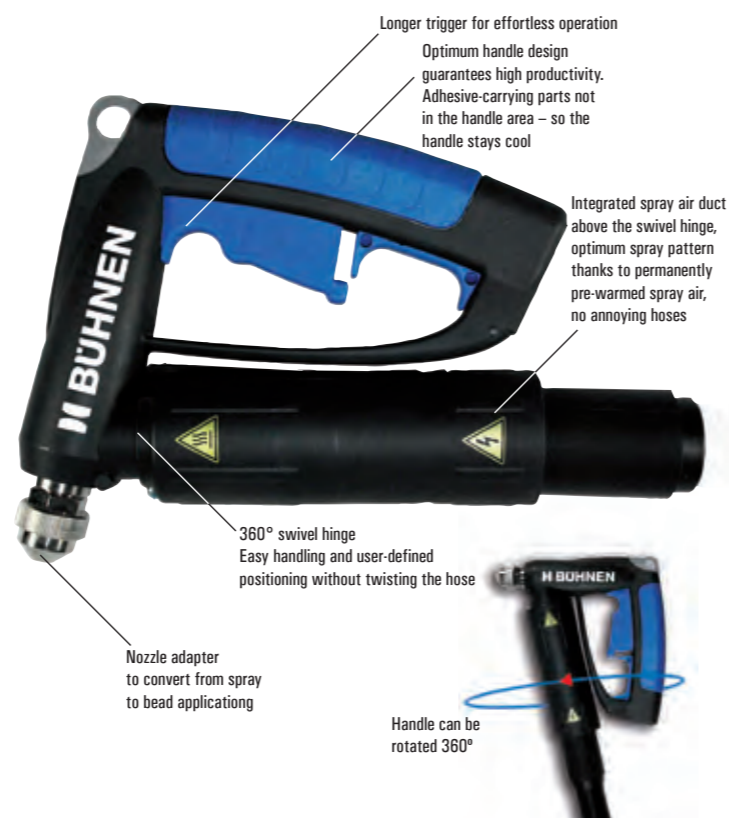


Hose protectors
The hose protector provides the polyamide corrugated protective hose with additional protection against shock and abrasion.

Hand guns HB 910 for hot melt tank applicator systems

Advantages

- › Weighs just 760 g (bead) and/or 870 g (spray)
- › Even long applications can be performed effortlessly
- › 360° mobility
- › Remote switch to start the pump motor (with HB 5010)
- › No disturbing cable during operation
- › Hose connected at the bottom
- › For maximum working comfort
- › Robust and protected hose connection to the hand gun with bend support
- › Standard temperature sensor PT 100, NI 120 or FeCuNi available
- › Integrated air valve in the spray version to regulate pre- and post-ventilation during spraying. So nozzles always stay clean
- › Adjustable spray application, pressure regulator on spray air attachment kit and various nozzle diameters



Technical data	HB 910 hand gun bead application	HB 910 hand gun spray application
Weight:	760 g	870 g
Operating voltage:	230 V AC / 50-60 Hz	230 V AC / 50-60 Hz
Heat output:	120 Watt	120 Watt
Max. operating temperature:	210 °C, optional 250 °C	210 °C
Heated hoses:	1,2-6,0 m*	1,2-6,0 m*
Nozzles:	Nozzle, long, UNF 3/8 "	Spray nozzle kit
Nozzle diameter, selective:	0,8 / 1,0 / 1,2 / 1,5 / 2,0 / 2,5 / 3,0 mm	0,8 / 1,0 / 1,2 / 1,5 / 2,0 mm
Optional:	special nozzles	Nozzle adapter for bead application

*other lengths upon request

Tip

An optimum spray pattern can be achieved by pressing the handle trigger at variable rates.



BÜHNEN

Hand gun HB 950 for hot melt tank applicator systems

Advantages

- › No bending of the arm due to turning the hand gun (gentle on muscles and tendons)
- › Handling couldn't be easier thanks to suspension
- › Easy-to-operate pneumatic trigger
- › One-hand operation (no need to hold and guide the hose)
- › Suitable for all hot-melt adhesives (EVA, PO, PA, PE, PSA, POR/PUR) and all application methods (bead, spray application).
- › Exchangeable modules, nozzles
- › Available with optional, mobile table and suspension, universal use
- › Effortless working (less downtime)
- › No burn hazard thanks to handles manufactured from special plastic
- › Safe adhesive application when required from above
- › Hand gun cannot fall due to suspension
- › Less wear on hose
- › One-hand operation (no need to hold and guide the hose)



Technical data	HB 950 hand gun bead application	HB 950 hand gun spray application
Weight:	1.500 g	1.500 g
Operating voltage:	230 V AC / 50-60 Hz	230 V AC / 50-60 Hz
Heat output:	200 Watt	300 Watt
Max. operating temperature:	200 °C	200 °C
Temperature sensor:	PT 100 or Ni 120	PT 100 or Ni 120
Heated hoses:	3,0-6,0 m*	3,0-6,0 m*
Nozzles:	Nozzle, long, UNF 3/8 "	Spray nozzle kit
Nozzle diameter, selective:	0,8 / 1,0 / 1,2 / 1,5 / 2,0 / 2,5 / 3,0 mm	0,2 / 1,0 / 1,2 / 1,5 / 2,0 mm

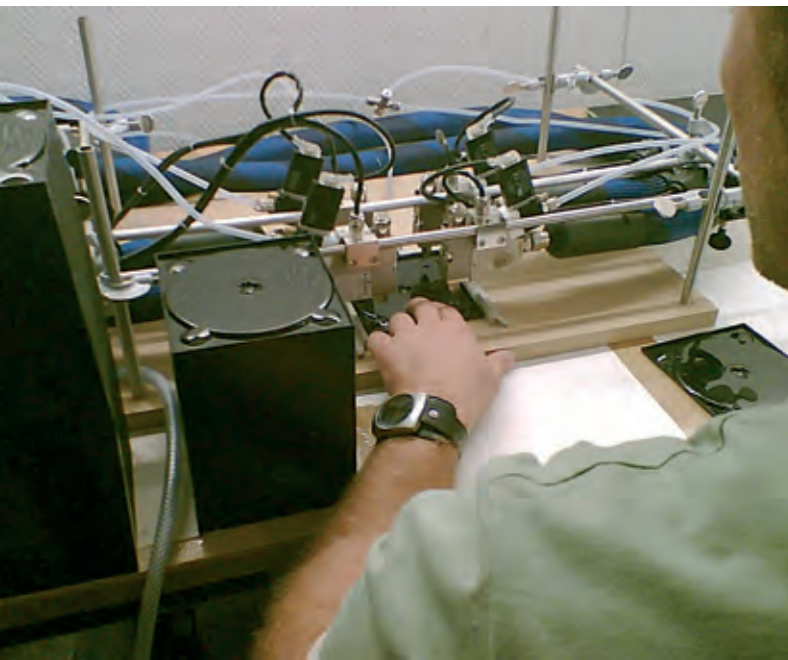
*other lengths upon request



Table and suspension optional

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Application heads for hot melt tank applicator systems / basics



An application head is made up of several components: a basic body, a module and a solenoid valve.

Basic body

The base body provides a connection for the heated hose and can be attached to a base frame. The heating system is located in the base plate, along with the heating cartridges and temperature sensors. Passing directly through the basic body are drillings for conducting the adhesive and compressed air. Many types also contain a fine mesh filter.

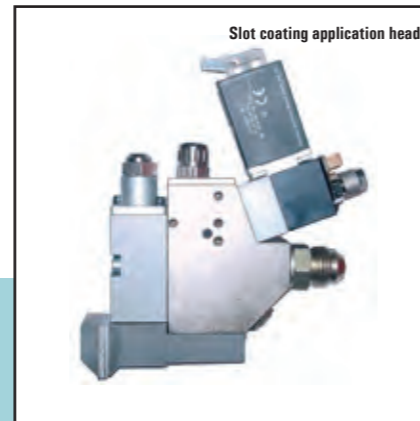
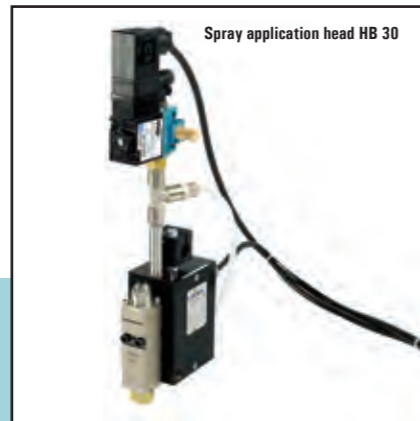
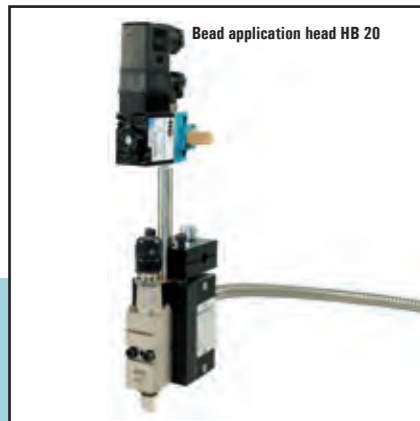
Module

As a rule, the module is screwed to the front of the base plate. This element has the function of regulating the adhesive inflow. Inside there is a piston with a nozzle needle, which can open or close the adhesive inflow. Differentiation is made between air opening/spring shutting and air opening/air shutting. In the first type, the module is opened via compressed air and shuts automatically by means of a pressure spring once the compressed air has been shut down. In the second type, the compressed air has to be switched over to shut down.



Solenoid valve

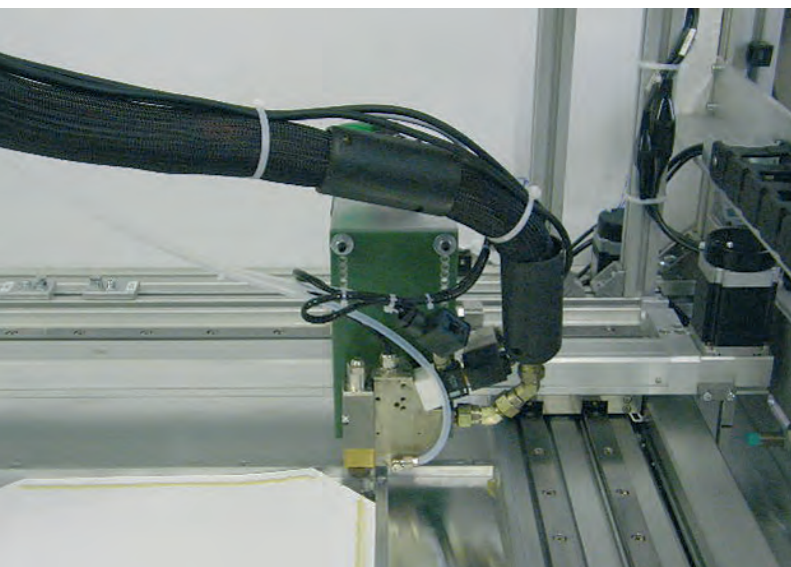
Solenoid valves can transfer an electric control system signal and release, lock or purge compressed air. The solenoid valve must be chosen according to the type of module; whether air opening/spring shutting or air opening/air shutting. For the first type, a 3/2-way solenoid valve is sufficient. For the second type, a 4/2-way or 5/2-way valve has to be used. 24 V or 230 V solenoid valves are the norm.



Tip

The larger the electrical output of the solenoid valves, the faster they switch. So even the tiniest dots of hot melt adhesive can be applied.

Bead application heads



General

Application heads are used for automated operations. If material costs need to be reduced for larger quantities, the precision of a manual gun application is insufficient, available space do not allow for manual application, or the adhesive application has to be monitored, different types of application heads are used. In these cases they are component parts (e.g. of a packaging machine) and are integrated into the master PLC control system. In the majority of cases, the application heads are integral and the work piece is positioned underneath them. Linear beads or dots are applied according to the configuration of the application heads. One or several application heads may be used, depending on the task. A number of application heads can be combined into one block with several modules or individually be arranged. In the process, the hot melt adhesive can also be applied horizontally or, in certain cases, upside down.

Applications

The type of application head used is dictated by the requirements of the application. Different application heads are used depending on the type of drive, the desired application pattern, the cycle time, the flow-rate, the temperature, the adhesive, the nozzle and the space available.

As a rule, application heads are driven via a 24 V solenoid valve. In individual cases, the drive may be achieved with a 230 V solenoid valve or pneumatically.

The desired application pattern determines the system and application head. If the application pattern cannot be achieved as a continuous process, then an individual application head can be used at an XY-table or robotically.

The intended application speed in relation to the cycle time and application amount, determines the size of the application head. For quick cycle times, application heads with small modules and an air opening/air shutting solenoid valve are used.

Standard application heads are limited to approximately 200 °C by the Viton seals used. For HT (high temperature) constructions with high-quality seals, temperatures of up to 250 °C are possible. HT application heads are especially used with polyamide hot melt adhesives.

When applying PUR or POR hot melt adhesives, application heads can be used with front-closing nozzles. PUR and POR hot melt adhesives react with the atmospheric moisture and harden. Reliable operation is achieved through the seal gasket in the nozzle. Standard application heads have a UNF 3/8 thread for nozzle attachment. In certain cases, nozzle attachment by means of a flange is advantageous, especially if an angle nozzle has to be secured against rotation.

Micro application head HB 11



"We recommend the use of in-line filters for application heads without integrated filters."

> Torsten Grütznier



Bead application head HB 20



Bead application head DK 1/30 HT



Bead application head B 402-84 V



Slot coating application head FK 1/30

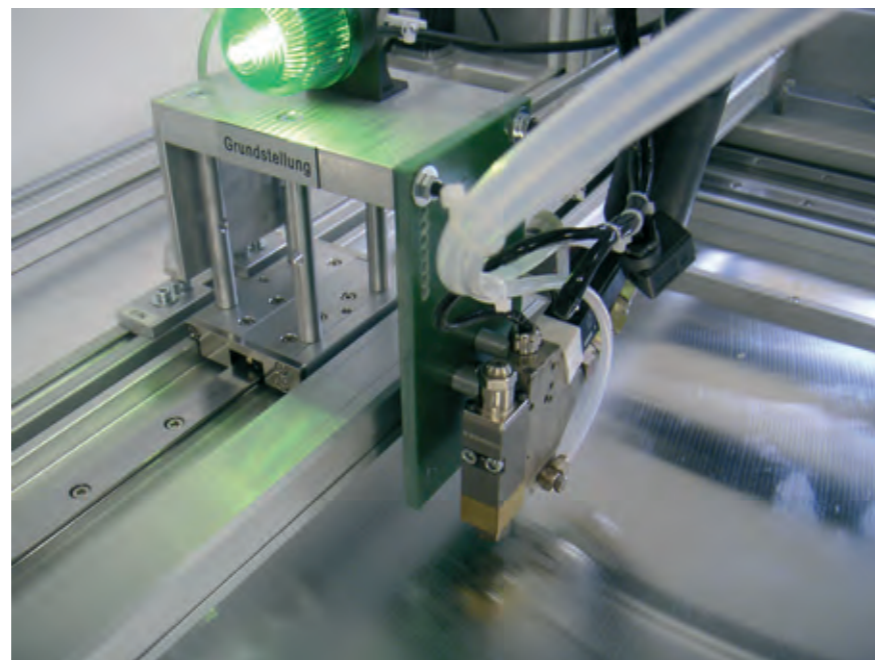


Bead application head B 404/104-22-38-22



Technical data:	HB 11	HB 20	DK 1/30 HT	FK1/30	B 402-84 V	B 404/104
Heating capacity W:	160	180	175	175	180	400
Temperature range °C:	200	200	50-250	50-190	190	190
max. press. range bar:	100	100	120	120	100	100
Dimensions mm:	150 x 18 x 98	256 x 44 x 80	85 x 30 x 130	115 x 45 x 156	44 x 172 x 93	104 x 172 x 105
Nozzle thread:	3/8"UNF	3/8-24"UNF	3/8"UNF	flange	3/8"UNF	3/8"UNF
Comments:				Nozzle front closing	with 2 modules	with 4 modules

Spray application heads



General

Spray application heads are used for gluing large surface areas. Spray application heads are also advantageous if only a small amount is required. The process involves a thin line of adhesive being laterally deflected through an air vortex, picked up and applied to the work piece in a circular fashion. The relative motion between application head and work piece can produce a laminar application pattern. Rather than the entire surface being coated with adhesive, lines of adhesive are produced and dots at the intersection point of the circles. This kind of application is predominantly used for bonding foam and paper or cardboard. Fields of application are limited by the type of adhesive. Only certain adhesives can be used, depending on their viscosity, open time and flexibility.

Adhesives with viscosities above 15.000 mPas are difficult or impossible to apply as spray applications. The high viscosity means that a thinner line of adhesive is unable to be produced and picked up by an air vortex. Likewise, adhesives with short open times are unsuitable. Although they can potentially be applied without difficulty, they dissipate heat so markedly that they lose their adhesion. This effect can be minimised by preheating the spray air. Due to its short open times, polyamide cannot be used as a spray application unless use as a kind of spacer is all that is required rather than adhesion to the substrate.

The flexibility of the adhesive also influences the application behaviour of the spray. Thermoplastic rubber often responds well to spraying, although the viscosity is very high. One or several

application heads may be used, depending on the task. With several application heads, these can be combined into a block with several modules or be individually arranged. In the process, the hot melt adhesive can also be applied horizontally or, in certain cases, upside down.

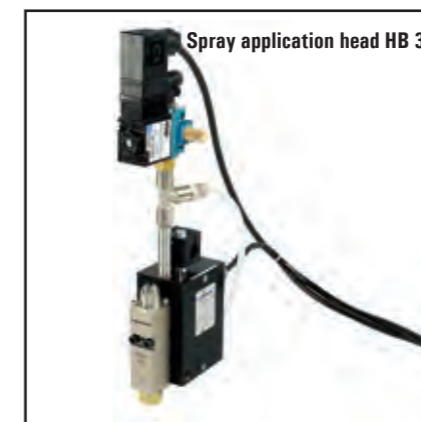
The type of application head is dictated by the requirements of the application. Cycle times are considerably longer compared to bead application heads. Establishing the spray pattern requires a certain amount of time.

The desired application pattern determines the machine and application head. If the application pattern cannot be achieved as a continuous process, then an individual application head can be used at an XY-table or robotically.



Tip

Using a spray application head with air heater significantly enlarges the spray application, whilst increasing the cure time of the hot melt adhesive.



Spray application head with air preheater



Spray application head B 34 S



Technical data:	HB 30	Spray appl. head with air preheater	B 34 S
Heating capacity W:	180	480	200
Temperature range °C:	50-200	50-200	50-195
Max. press. range bar:	100	120	100
Dimensions mm:	269 x 44 x 95	259 x 44 x 113	30 x 192 x 214
Spray width mm:	10-50	10-300	10-30
Comments:	standard	for large spray widths (depending on the hot melt adhesive)	for small spray widths (depending on the hot melt adhesive)

Slot coating application heads



General

Slot coating application heads are a special type of bead application head. Instead of a nozzle, an adhesive spreader is flange-mounted for full surface application of the adhesive at a certain width and as a very thin layer. Whereas bead or spray application heads are always at a certain distance from the work piece, a slot coating application head makes contact with the substrate. Because the substrate grinds at the application head, the lip of the application head is made of steel rather than brass or aluminium and is partially cured. Slot coating application heads by BÜHNEN offer excellent tear quality and precise application and are designed for intermittent and continuous application.

Applications

- › **Non-woven**
Hygiene products like disposable nappies or surgical tape
- › **Edge gluing and postforming**
Counter tops for the furniture industry
- › **Profile wrapping**
Plastic profiles or derived timber products with membrane or inlay
- › **Book spine gluing**

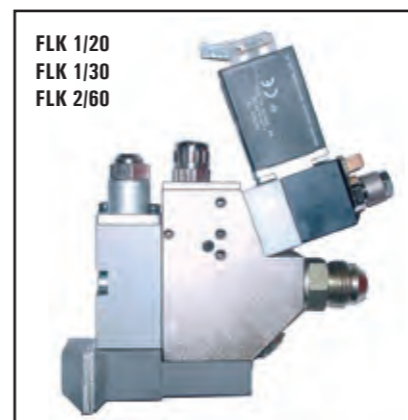


With slot coating application heads, widths of between 50-500 mm can be thinly coated with adhesive. Application amounts of up to 20-200 g/m² are customary. To ensure a constant application amount, slot coating application heads are used exclusively in combination with tank systems with gear pump and rotational speed control. Smaller slot coating application heads up to 60 mm are standard. The adhesive is conveyed via a heated hose and distributed through 1-2 modules by means of bores. The coating width can be adjusted by an insert plate.

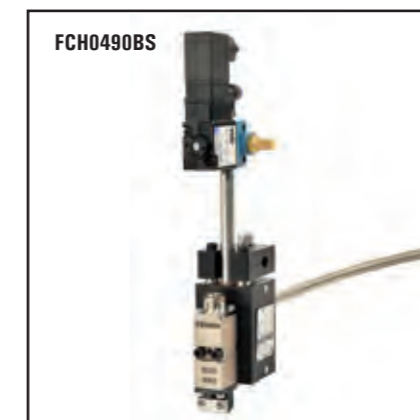
Larger slot coating application heads can be considerably more expensive and are constructed and manufactured according to customer requirements. Often several heated hoses and many modules are needed to achieve the desired adhesive distribution. Tank systems with several pumps are used for an even distribution. Individual modules can be disconnected or connected in order to alter the coating width. It is also possible to regulate the coating width via slide valves, which are operated manually or by servomotors.

"A width-adjustable application head can also be used with a wide range of substrates."

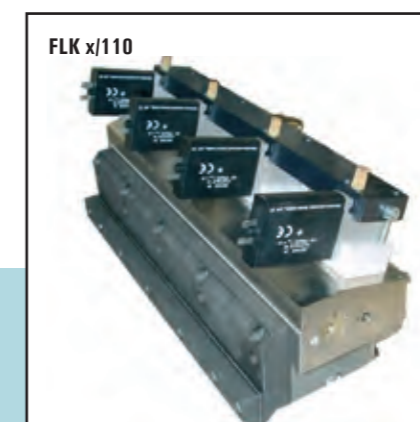
› Helmut Hannemann



FLK 1/20
FLK 1/30
FLK 2/60



FCH0490BS



FLK x/110



Special FLK

Technical data:	FLK1/20	FLK1/30	FLK2/60	FCH0490BS	FLKx/110
Heating capacity W:	175	175	350	180	525
Temperature range °C:	50-190	50-190	50-190	bis 200	50-190
Dimensions L x W x H mm:	130 x 25 x 143	130 x 35 x 143	130 x 65 x 143	80 x 44 x 256	130 x 115 x 143
Max. application width:	0,5-20 mm	0,5-30 mm	0,5-60 mm	15-20 mm	0,5-110 mm
Number of modules:	1	1	2	1	variable

Nozzles for application heads / hand guns

Nozzles for dot/bead application:

BÜHNEN high-precision nozzles for dot/bead application set new standards for the most diverse applications. Our nozzles are produced with very low tolerance parameters, which ensures exact bead placement and an uniform application of hot melt adhesives.

The nozzles are ideally suited for their specified use and ensure a controlled flow of hot melt adhesives, as well as a uniform bead size and ideal tear behavior.

Standard nozzle:

- Nickel-plated brass
- No capillary
- Precision application
- Standard orifice diameter 0.3 mm to 3.0 mm
- 3/8" UNF thread

Compatible with BÜHNEN (RK1/22, DK1/30)

Nordson (H200 / H400 / SolidBlue / MiniBlue)

Robatech (AX100 / SX 100)

ITW-Dynatec (Micro)



Brass Capillary Nozzle MS-VA:

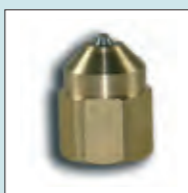
- Stainless steel capillary
- Capillary length matched to orifice diameter
- Precision application
- Standard orifice diameter 0.20 mm to 1.20 mm
- 3/8" UNF thread

Compatible with BÜHNEN (RK1/22, DK1/30)

Nordson (H200 / H400 / SolidBlue / MiniBlue)

Robatech (AX100 / SX 100)

ITW-Dynatec (Micro)



Flange-pointed Nozzle for FK:

- Single orifice
- Standard orifice hole diameter 0.6 mm to 2.00 mm
- Flange 15 mm / 30 mm

Compatible with BÜHNEN (RK1/22 V, FK1/30)



Stainless Steel Nozzle VA-LL:

- No capillary
- Precision application
- Standard orifice diameter 0.20 mm to 2.00 mm
- 3/8" UNF thread

Compatible with BÜHNEN (RK1/22, DK1/30),

Nordson (H200 / H400 / SolidBlue / MiniBlue).

Robatech (AX100 / SX 100)

ITW-Dynatec (Micro)



90° 1B Angular Nozzle:

- Single orifice
- Stainless steel capillary
- Rotatable angle piece
- Variable applications
- Standard orifice diameter 0.20 mm to 1.00 mm
- 3/8" UNF thread

Compatible with BÜHNEN (RK1/22, DK1/30)

Nordson (H200 / H400 / SolidBlue / MiniBlue)

Robatech (AX100 / SX 100)

ITW-Dynatec (Micro)



90° XB Angular Nozzle:

- Regularly available for delivery with 2, 3 and 4 orifice
- No capillary
- Available standard with orifice distances of 15°, 30°, 45° and 60°
- Rotatable angle piece
- Various applications
- Standard orifice diameter 0.30 mm to 0.70 mm
- 3/8" UNF thread

Compatible with BÜHNEN (RK1/22, DK1/30)

Nordson (H200 / H400 / SolidBlue / MiniBlue)

Robatech (AX100 / SX 100)

ITW-Dynatec (Micro)



Standard Brass Nozzle:

- No capillary
- Precision application
- Standard orifice diameter 0.20 mm to 1.20 mm
- 3/8" UNF thread

Compatible with BÜHNEN (RK1/22, DK1/30)

Nordson (H200 / H400 / SolidBlue / MiniBlue)

Robatech (AX100 / SX 100)

ITW-Dynatec (Micro)



ZC Nozzle: (front-closing)

- Single orifice
- Standard orifice diameter 0.20 mm to 1.00 mm
- 3/8" UNF thread

Compatible with BÜHNEN

(RK1/22, DK1/30)



Multiple orifice Nozzle XB:

- Stainless steel multiple orifice nozzle incl. cap nut
- Regularly available for delivery with 2, 3 and 4 orifice
- Available standard with orifice distances of 15°, 30°, 45° and 60°
- Standard orifice diameter 0.20 mm to 0.70 mm
- 3/8" UNF thread

Compatible with BÜHNEN (RK1/22, DK1/30),

Nordson (H200 / H400 / SolidBlue / MiniBlue)

Robatech (AX100 / SX 100)

ITW-Dynatec (Micro)



Spray Nozzles:

There are numerous aspects involved when it comes to achieving the perfect spray result. Which hot melt adhesive should be used? Which application head? Which module? Which nozzle? The wide-ranging selection of BÜHNEN spray nozzles is suitable for any job, whether it's a narrow 5 mm or as wide as 400 mm, everything is possible.

We are happy to produce samples (under realistic production conditions) to synchronize all components for you

Brass Spray Nozzle MS:

- Single-piece model (no capnut necessary)
- Self-sealing (no O-ring necessary)
- Various spray angles available for delivery
- 60° spray angle (model with 7 air orifice)
- 90° spray angle (model with 12 air orifice)
- Standard orifice diameter 0.20 mm to 2.00 mm
- UNF 1/2x20 thread

Compatible with BÜHNEN (SK 1/22)

Nordson (H200CF)



Material Nozzle B34S:

- Stainless steel base nozzle
- Standard orifice diameter 0.60 mm
- Air nozzle for swirling of hot melt adhesive
- Cap nut
- Very clean bead application possible even when only using base nozzle
- M10 x 1 thread

Compatible with Nordson / Meltex (EP24)



Tip
The smaller the nozzle diameter, the better the removal properties of the hot melt adhesive

Nozzles for Surface Application:

BÜHNEN slot coating application nozzles allow for a sharp-edge surface application from 5mm to 500 mm.

20 mm slot coat. Nozzle:

- Maximal width of application 20 mm
- Distance plates available separately (available for delivery for thicknesses of 0.10 mm and for widths up to 20 mm)

Compatible with BÜHNEN (RK1/22, DK1/30)



30 mm slot coat. Nozzle:

- Maximal width of application 30 mm
- Distance plates available separately (available for delivery for thicknesses of 0.10 mm and for widths up to 30 mm)

Compatible with BÜHNEN (RK1/22, DK1/30)



60 mm slot coat. Nozzle:

- Maximal width of application 60 mm
- Distance plates available separately (available for delivery for thicknesses of 0.10 mm and for widths up to 60 mm)

Compatible with BÜHNEN (RK1/22, DK1/30)



500 mm slot coat. Nozzle:

- Maximal width of application 500 mm
- Distance plates available separately (available for delivery for thicknesses of 0.10 mm and for widths up to 500 mm)

Compatible with BÜHNEN (RK1/22, DK1/30)



Wide slot nozzle BS10:

- Maximal width of application 20 mm
- Distance plates available separately (available for delivery for thicknesses of 0.10 mm and for widths up to 20 mm)
- Suitable for dot/bead application modules with a 3/8" UNF thread

Compatible with BÜHNEN (RK1/22, DK1/30)

Nordson (H200 / H400 / SolidBlue / MiniBlue)

Robatech (AX100 / SX 100)

ITW-Dynatec (Micro)



Nozzles for Hand Guns:

BÜHNEN nozzles for hand guns are ideally suited for use with the HB 900 hand gun for hot melt tank applicator systems.

Bead:

- Steel-burnished standard nozzle
- Precision application
- Standard orifice diameter 0.6 mm to 3.0 mm
- 3/8" UNF thread

Compatible with BÜHNEN (WCH1147)



Spray:

- Max. width of application 50 mm depending on adhesive
- Three components; twist nozzle, air cap, cap nut
- M10 x 0.75 thread

Compatible with BÜHNEN (WCH1148)





“We work closely with our customers and can thus offer ideal complete solutions from one source”

› Torsten Grützner

MADE
IN
GERMANY

one 4 all Compatible to Nordson, Robatech and ITW-Dynatec

- › Dot and bead application heads p. 92
- › Spray and slot coating application heads p. 93
- › Modules for dot, bead, spray and slot coating application p. 94
- › Nozzles for bead and spray application p. 95
- › Extensive spare parts and accessories range, heated hoses p. 96
- › Piston and gear pumps, cleaning, repair and maintenance p. 97

one4all



With our **one4all** product line we offer a wide range of compatible replacement parts produced in-house for hot melt adhesive applicators by Nordson, Robatech and ITW-Dynatec.

Whatever your industry – construction or cars, food, electronics or the furniture industry – and whatever your applications – displays or packaging, polymer foams or textiles: you can count on us to provide the best possible product- and market-driven solution.

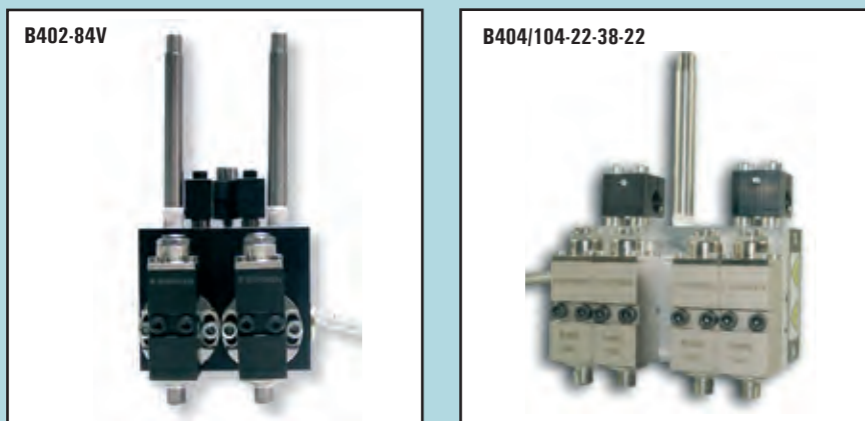
one4all Application heads for dot and bead application

Application heads are used in automated processes. These can be, for example, components of a packaging machine and integrated into the primary PLC control system or controlled via a separate linear control system.

duction type and the application heads can be equipped with the desired number of modules.

B400 series heads compatible with Nordson, Robatech and ITW-Dynatec are available*.

Various dot and bead applications are possible with the B400 series. Module intervals and various overall widths are possible so the optimum module interval can be selected for every pro-



Looking for an application head for particularly quick applications? Have a look at our HB 11 high-speed micro-head on page 83

Technical data:	B401/44	B401/28-F	B402/44-22	B402-84 V	B404/104-22-38-22
Heating capacity W:	180	200	180	300	400
Max. temperature °C:	200	200	200	200	200
Max. pressure bar:	100	100	100	100	100
Dimensions mm (W x H x D):	44 x 172 x 105	28 x 116,5 x 171	44 x 92 x 171	84 x 105 x 171	104 x 172 x 105
Nozzle thread:	3/8"UNF	3/8"UNF	3/8"UNF	3/8"UNF	3/8"UNF
Comment:	incl. 1 module B400	incl. 1 module B400, with integrated filter	incl. 2 modules B400	incl. 2 modules B400 Control via two solenoid valves	incl. 4 modules B400

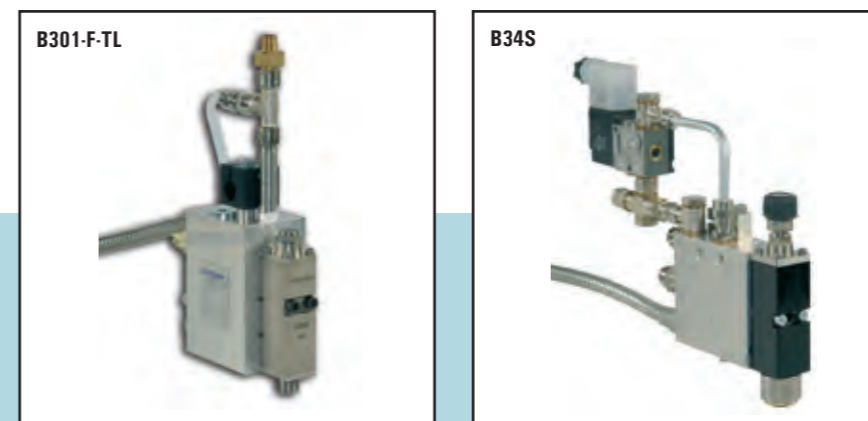
*The items are not original parts from the manufacturer



one4all Application heads for spray application

Spray application heads are ideal for work pieces that need to be bonded over a wide area. Spray application heads are beneficial, even when low consumption of hot-melt adhesive is required.

Various application patterns and spray widths can be achieved with the B300 and B34S series, regardless of the selected hot melt adhesive and the machine settings.



B300 and B34S series heads compatible with Nordson, Robatech and ITW-Dynatec are available*.



Matching nozzle found on page 89, 95

Technische Daten:	B301-F-TL	B34S
Heizleistung W:	360	200
Max. temperature °C:	200	200
Max. pressure bar:	100	100
Dimensions mm (W x H x D):	44 x 200 x 113	30 x 192 x 214
Spray width mm:	10-40	10-40
Nozzle type:	Spin spray	Spin spray
Comment:	Nozzle separately	Incl. nozzle 0,60 mm

one4all Application heads for coating

Coating heads apply a thin layer of hot melt adhesive across a certain width. A coating head always maintains direct contact with the substrate: both intermittent and continuous application is possible.

Various application widths and application thicknesses can be achieved by using different spacer plates.

Coating heads compatible with Nordson, Robatech and ITW-Dynatec are available*.



Technical data:	B45-70	B401/44 with nozzle BS10	B401/44 with module BS20
Heating capacity W:	400	180	180
Max. temperature °C:	200	200	200
Max. pressure bar:	100	100	100
Dimensions mm (W x H x D):	95 x 79,5 x 235	44 x 172 x 105	44 x 172 x 105
Application width:	max. 68 mm	max. 10 mm	max. 20 mm
Comment:	incl. 1 ex. control B45 / incl. solenoid valve	incl. 1 module B400 / nozzle separately	incl. 1 module BS 20

*The items are not original parts from the manufacturer

one4all Nozzles for bead application



Suitable cleaning needles are listed on page 96

Nozzles for dot/bead application:

BÜHNEN high-precision nozzles for dot/bead application set new standards for the most diverse applications. Our nozzles are produced with very low tolerance parameters, which ensures exact bead placement and a uniform application of hot melt adhesives.

The nozzles are ideally suited for their specified use and ensure a controlled flow of hot melt adhesives, as well as a uniform bead size and ideal tear behavior.

Brass Capillary Nozzle MS-VA:

- Stainless steel capillary
- Capillary length matched to orifice diameter
- Precision application
- Standard orifice diameter 0.20 mm to 1.20 mm
- 3/8" UNF thread

Compatible with BÜHNEN (RK1/22, DK1/30)
Nordson (H200 / H400 / SolidBlue / MiniBlue)
Robatech (AX100 / SX 100)
ITW-Dynatec (Micro)



Stainless Steel Nozzle VA-LL:

- No capillary
- Precision application
- Standard orifice diameter 0.20 mm to 2.00 mm
- 3/8" UNF thread

Compatible with BÜHNEN (RK1/22, DK1/30),
Nordson (H200 / H400 / SolidBlue / MiniBlue),
Robatech (AX100 / SX 100)
ITW-Dynatec (Micro)



90° 1B Angular Nozzle:

- Single orifice
- Stainless steel capillary
- Rotatable angle piece
- Variable applications
- Standard orifice diameter 0.20 mm to 1.00 mm
- 3/8" UNF thread

Compatible with BÜHNEN (RK1/22, DK1/30)
Nordson (H200 / H400 / SolidBlue / MiniBlue)
Robatech (AX100 / SX 100)
ITW-Dynatec (Micro)



90° XB Angular Nozzle:

- Regularly available for delivery with 2, 3 and 4 orifice
- No capillary
- Available standard with orifice distances of 15°, 30°, 45° and 60°
- Rotatable angle piece
- Various applications
- Standard orifice diameter 0.30 mm to 0.70 mm
- 3/8" UNF thread

Compatible with BÜHNEN (RK1/22, DK1/30)
Nordson (H200 / H400 / SolidBlue / MiniBlue)
Robatech (AX100 / SX 100)
ITW-Dynatec (Micro)



Multiple orifice Nozzle XB:

- Stainless steel multiple orifice nozzle incl. cap nut
- Regularly available for delivery with 2, 3 and 4 orifice
- Available standard with orifice distances of 15°, 30°, 45° and 60°
- Standard orifice diameter 0.20 mm to 0.70 mm
- 3/8" UNF thread

Compatible with BÜHNEN (RK1/22, DK1/30),
Nordson (H200 / H400 / SolidBlue / MiniBlue)
Robatech (AX100 / SX 100)
ITW-Dynatec (Micro)



one4all Nozzles for spray application

Additional nozzles are listed on page 89

Spray Nozzles:

There are numerous aspects involved when it comes to achieving the perfect spray result. Which hot melt adhesive should be used? Which application head? Which module? Which nozzle? The wide-ranging selection of BÜHNEN spray nozzles is suitable for any job, whether it's a narrow 5 mm or as wide as 400 mm, everything is possible.

We are happy to produce samples (under realistic production conditions) to synchronize all components for you.

Brass Spray Nozzle MS:

- Single-piece model (no capnut necessary)
- Self-sealing (no O-ring necessary)
- Various spray angles available for delivery
- 60° spray angle (model with 7 air orifice)
- 90° spray angle (model with 12 air orifice)
- Standard orifice diameter 0.20 mm to 2.00 mm
- UNF 1/2x20 thread

Compatible with BÜHNEN (SK 1/22)
Nordson (H200CF)



Material Nozzle B34S:

- Stainless steel base nozzle
- Standard orifice diameter 0.60 mm
- Air nozzle for swirling of hot melt adhesive
- Cap nut
- Very clean bead application possible even when only using base nozzle
- M10 x 1 thread

Compatible with Nordson / Meltex (EP24)



one4all Extensive range of replacement parts and accessories

Our range of compatible replacement parts includes various filters and screens produced in-house, suitable for tank systems and application heads by manufacturers Nordson, Robatech and ITW-Dynatec. The screens are available in a wide range of mesh sizes.

Solenoid valves: Different models, various wattages, etc. Whether for dot and bead application or spray application, we offer you a wide range of solenoid valve designs.

Our extensive range of replacement parts also includes adapters, sensors, heating cartridges, cordsets, etc.

 Tank filter cartridges	 Tank filter screens	 In-line filters	 In-line filter screens		
 Insulation sleeves	 O-rings and gaskets	 Solenoid valves	 Air nipples and mufflers		 Cordsets
 Heating cartridges and sensors	 Adapters and screw joints	 Nozzle cleaning needles	...and much more		

one4all Heatable hoses



Hose Series NS30
High-flex design
NW08 standard diameter
40 mm outer cap diameter
Robust plug connectors
High-quality temperature sensor (NI120)
Pressure resistant up to 160 bar at 200°C
Temperature resistant up to 210°C
Compatible to Nordson Series 2300 / 3000 / ProBlue

Hose Series MT
High-flex design
NW08 and NW13 standard diameter
Robust plug connectors
High-quality temperature sensor (PT100 and FeCuNi)
Pressure resistant up to 210°C
Temperature resistant up to 210°C
Compatible to Nordson / Meltex

Hose Series RB
High-flex design
NW08 standard diameter
40mm outer cap diameter
Robust plug connectors
Harting plug (rectangular) HTS-8-pin.
High-quality temperature sensor (NTC)
Pressure resistant up to 160 bar at 200°C
Temperature resistant up to 210°C
Compatible to Robatech Concept series

Hose Series DY (EU)
Hose Series DY(AM)
High-flex design
NW 06(EU) NW08(AM) standard diameter
Approx. 45mm cap outer diameter
Robust plug connectors
Euchner or Amphenol plug
High-quality temperature sensor (PT100)
Pressure resistant up to 160 bar at 200°C
Temperature resistant up to 210°C
Compatible to ITW-Dynatec

*The items are not original parts from the manufacturer

one4all piston and gear pumps



Info:
Often, pumps can be repaired economically
Give us a try!



Piston pump NS30 14:1
Ratio 14:1
Pneumatic switch-over
Operating pressure 0,5 to 6 bar
Pneumatic- and hydraulic part can be separated
Special seals to handle high-viscose mediums
compatible to Nordson Serie 3000

Piston pump NS-PB 14:1
Ratio 14:1
Pneumatic switch-over
Operating pressure 0,5 to 6 bar
Pneumatic- and hydraulic part can be separated
compatible to Nordson Serie ProBlue 4/7

Piston pump RB 12:1
Ratio 12:1
Pneumatic switch-over
Operating pressure 0,5 to 6 bar
compatible to Robatech Concept A+B

Gear pump NS PR
different versions
compatible to Nordson / Meltex

Piston pump NS23 14:1
compatible to Nordson Serie 2300
Specification as piston pump NS30 14:1

one4all Cleaning, repair and maintenance



BÜHNEN Cleaner for hot melt adhesive applicators
› Various cleaning products are available depending on the hot melt adhesive used.
› We would be happy to offer further recommendations.

Repair service for hot melt adhesive application systems from other manufacturers
› Professional and quick cleaning measures
› Guaranteed supply of replacement parts
› After inspection you will receive a no-obligation quotation
› Range of services also available for applicator heads and other third-party accessories

Maintenance service for other manufacturers' hot melt adhesive application systems at a fixed price
› Inspection and cleaning of your hot melt adhesive application system
› Replacement of tank filter screen incl. O-ring
› Inspection and cleaning of system hoses and applicator heads

*The items are not original parts from the manufacturer

GLOSSARY

AC motor: Drives the gear pump at 220-240 V. The speed of the AC motor is usually not adjustable.

Adhesion: Bonding one substance to another.

Adhesion failure: Adhesive separates from the bonded part.

Adhesive: A non-metallic substance that can join two components together by surface bonding (adhesion) and internal strength (cohesion) (according to DIN EN 923).

Application head: Device for automatic application of adhesive controlled by a pneumatic or electric signal. Usually consists of main body, module and solenoid valve. Different applicator heads are used for dot, bead, surface or spray applications. Mainly built-in, but can also be used on robots.

Blister: Sales packaging in transparent plastic

Bond strength: Adhesive and cohesive strengths which hold the bond together.

Bonding surface: Surface area required for bonding two components with the help of an adhesive.

Bypass valve: The pressure of the hot melt adhesive is regulated via the bypass valve. The bypass valve ensures constant system pressure.

Coating weight: The weight of the hot melt adhesive on the work-piece. The weight is specified in g/m for dot or bead applications. For spray or surface application it is specified in g/m².

Cohesion: The internal cohesion, the internal strength of an adhesive.

Cohesion failure: Failure of the bond in the adhesive itself.

Contact pressure: Pressure applied to the parts to be joined for better wetting.

Cracking: Breaking up of macro molecules due to excessive heating. In hot melt adhesives, these will often appear as dark/black discolorations.

EVA: Ethyl vinyl acetate (basic polymer e.g. for EVA hot melt adhesive)

Flow rate: The amount of hot melt adhesive which the pump delivers. The output volume is specified in kg/h and refers to the unrestricted output of the pump.

Fracture of bonded parts: Here the adhesive strength is higher than the inherent strength of the bonded part.

Fracture pattern: Error image of a failed bond (see adhesion/cohesion fracture)

Gear pump: The gear pump is used for volumetric distribution of hot melt adhesive. Depending on the hot melt adhesive application system, gear pumps with an output of 5-300kg/h are used.

Handgun: A hand gun has a mechanical trigger which is actuated manually. Hand guns that dispense beads, dots or spray are usually used.

Heating cartridge: A heating element of varying diameter and length and electrical output. The heating cartridge can usually be replaced.

Heated hoses: Heated hoses connect the tank system with the application head or handgun. Length and diameter can be customised.

High viscosity: The higher the viscosity, the thicker the liquid (e.g. honey = high viscosity; water = low viscosity).

Hot tack: Measurement of the strength of a bond during the solidification phase of the hot melt adhesive. A high 'hot tack' is also important for a quick absorption of restoring forces shortly after bonding (e.g. in the packaging industry).

Hot melt adhesive: solvent-free, physically bonding adhesives, which are solid at room temperature, but melt if the temperature rises (adhesive application and wetting) and become rigid once more when cooled (development of cohesion).

Initiator: Electronic transmitter which sends a pulse to a primary control unit as soon as a substrate is detected. Possible alternatives are light barriers, reflection sensors, proximity switches.

Initial strength: Strength of the bond immediately after joining.

Inert gas: To prevent reactive hot melt adhesives from coming into contact with oxygen or moisture, an inert gas is used. Usually nitrogen or dry air.

Intermittent hot melt application: The hot melt is applied intermittently and not continuously. This type of application saves hot melt adhesive. Applicator heads are used for applying the adhesive.

Isocyanate: Main constituent of the curing component in polyurethane adhesives. As isocyanates are sensitive to moisture, polyurethane adhesives must be protected from humidity.

Joining: Bonding two materials together. Bonding is a method of joining, such as welding, soldering and riveting.

Low-temperature flexibility: The temperature range where the hot melt adhesive remains flexible and does not harden/become brittle.

Low-viscosity: The lower the viscosity, the thinner the liquid (i.e. honey = high viscosity; water = low viscosity).

Melting capacity: maximum possible output of the glue gun or the tank system achievable at optimum conditions.

Multi-channel controller: A number of heating circuits can be connected to this temperature regulator, depending on the type and version.

Ni 120: Nickel-based resistance temperature sensor. The resistance changes depending on the temperature. The resistance is 120 Ohm at 0 °C.

Non-stick coating: PTFE coating of the melting tank, to prevent carbonization of hot melt adhesive on the tank surfaces.

Nozzle: The nozzle is mounted on the applicator head or the hand gun. Nozzles differ in terms of number and diameter of drill holes, length or shape. The nozzle determines the volume and shape of the hot melt adhesive application.

Open time: The period of time following the application of the adhesive, when the adhesive is still sufficiently wet, so that the components can be joined together within this time.

Over-temperature protection: Most applicator devices are disconnected at all poles if a temperature of 260 °C would be reached.

PA: Polyamide (basic polymer e.g. for PA hot melt adhesive).

Packaging options: BÜHNEN hot melt adhesives are available as follows:

1=slug: Ø approx. 42 mm, length approx. 50 mm, approx. 60 g
2=stick: Ø approx. 12 mm, length approx. 200 mm, approx. 20 g
3=stick: Ø approx. 18.3 mm, length approx. 300 mm, approx. 80 g
4=granules/pillows: bulk packed
5=blocks: from approx. 500 g to 4 kg
7=cartridge: Ø approx. 47 mm, length approx. 215 mm, 310 ml
9=drums, bags and other containers: from 2 kg to 200 kg

Parent machine: Higher-level machine in which the hot melt adhesive system is integrated. Many components of the tank system can optionally be controlled from the parent machine.

PID controller: Temperature controller where the dynamic behaviour can be adapted to the part to be heated. The temperature accuracy of this type of controller is +/- 1 °C (K).

PO: Polyolefin (basic polymer e.g. for P/POR hot melt adhesive)

POR: reactive polyolefin (complete curing via silane groups)

PSA: Pressure sensitive adhesive, permanently tacky; adhesive with infinitely long open time = see also TPE (thermoplastic elastomer)

PT 100: Platinum-based resistance temperature sensor (Pt). The resistance changes depending on the temperature. The resistance is 100 Ohm at 0 °C. This is the standard sensor used in BÜHNEN tank systems.

PUR: reactive polyurethane (complete curing via isocyanate groups)

PLC: Programmable logic controller. This is usually used to perform internal control sequences in bag melters and drum melters.

Plasticisers: Substances which are added to plastics, paints, varnishes, rubber and adhesives to make them softer, more flexible and elastic.

Piston pump: Pumping system for adhesive. A pneumatic cylinder drives a second smaller cylinder which draws in and dispenses the adhesive. Piston pumps are always double-acting, i.e. they pump in both forward and reverse strokes. The adhesive pressure can easily be adjusted via the air pressure. The flow rate adjusts automatically depending on the adhesive pressure and the number of users.

Power consumption P max: This is equivalent to the maximum electric power (W) which the device (motor, heating and components inside the control cabinet) and the connected accessories (heated hoses, application heads and handguns) can accommodate.

Reactive hot melt adhesive: Polyurethane or polyolefin-based hot melt adhesive, which reaches its final strength by chemical cross-linking.

Return module: The return module is controlled by a solenoid valve. This allows the prepressure of the hot melt adhesive to be set via a spring preload setting. Furthermore, the required process pressure is set using compressed air in a ratio of 1:10.

Rotary encoder: Device for measuring length and speed. The rotary encoder is required when a linear path system is used and the hot melt adhesive is to be applied regardless of the machine speed. The application length of the hot melt adhesive is specified in mm.

Safety valve: The safety valve is integrated in the bypass and prevents hot melt adhesive from building up to much pressure.

Setting time: The time it takes from the start of the bond until the approximate final strength is reached, so that pressure may be applied to the glue joint once the setting time has passed.

Shore hardness: Named after US citizen Albert Shore; it describes the hardness of a solid body. A spike is driven into the solid body and the degree of hardness is determined, based on the penetration depth of the spike. The higher the value, the higher the hardness.

Softening point: Temperature at which the hot melt adhesive changes from a solid state to a soft/liquid state (standard test method: ring & ball).

Solenoid valve: Solenoid valves can be components of a piston pump or application head. The electro-magnetic coils are available in 24 V DC or 230 V AC.

Surface treatment: Pretreatment of the components in order to optimise the bond of the adhesive (e.g. grinding, flame treatment).

Surface tension: A force acting on a surface which is trying to reduce the surface area. The greater the surface tension, the better the wettability (and hence also the bond quality) of the surface.

Substrate: In bonding technology, this means the product or material on which the adhesive is applied.

Supply voltage: Voltage at which the device is operated. Depending on the electric power, voltage 1 / N / PE 230 V AC 50 Hz or 3 / N / PE 400 V AC 50 Hz is used.

Temperature controller: Micro-processor-controlled temperature regulator for application devices, heated hoses and application heads/hand guns, in modular design or as a multi-channel controller.

Temperature lock: To prevent unauthorised alteration of the set temperature.

Temperature reduction (also called ACE - Anti Char Electronic): Option of using the controller to reduce the temperature during production stops, in order to preserve the adhesive.

Thermal endurance: Measurement of the temperature endurance of a bond under defined shear stress

Three-Phase AC motor: Drives the gear pump. A three-phase motor can be regulated. This allows the flow rate of the gear pump to be variable.

TPE: Thermoplastic elastomer (permanently tacky = see also PSA)

Viscosity: Measurement of the internal friction of a gas, liquid or solid. When friction/resistance is high, the material has a high viscosity (viscous). The following applies to hot melt adhesives: the higher the melting temperature, the less viscous the material becomes.

Wetting: The ability of a liquid to spread evenly on the substrate.



**HOT MELT
IS OUR
PASSION**

Since more than 90 years



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ADHESIVE SYSTEMS

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