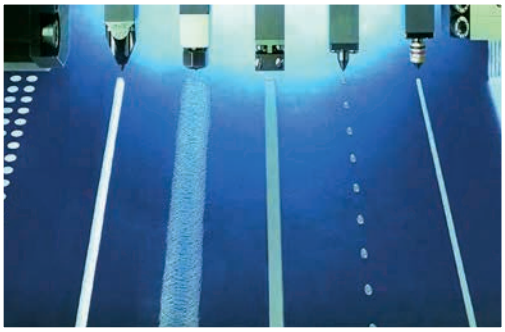


Cleaning Manual for PUR Hot Melt Adhesives









Powerful product solutions for effective flushing and cleaning

For many melters / applicator units

For many industrial applications

Flushing agents / Solid and liquid cleaners / Cold cleaners

Jowat Klebstoffe



Contents

1	**General information: PUR hot melt adhesives**		**3**
2	**Cleaning and flushing of melters**		**6**
	2.1	Tank melters	8
	2.2	Bag melters	10
	2.3	Drum / Hobbock melters	10
	2.4	Cartridge melters	11
	2.5	Adhesive reservoirs and glue pots	12
3	**Cleaning of applicator units**		**13**
	3.1	Roller applicators (applicator and metering roller)	14
	3.2	Nozzle applicators and (wide) slot nozzles	15
	3.3	Adhesive remnants on machine parts	15

Cleaning Manual for PUR Hot Melt Adhesives

Smoothly functioning **melters**, **conveying hoses** and **applicators** are a fundamental requirement for a homogenous and failure-free adhesive application.

Flushing and cleaning procedures mean:

- lost time in production
- higher adhesive consumption
- possible contamination due to remnants of flushing agent
- additional potential for flawed bonding

Therefore, the number of flushing and cleaning cycles should be reduced by taking measures that are aimed at lowering the thermal stress on the adhesive and at minimising the necessary cleaning processes:

- avoid standstills (i.e. with no adhesive application)
- reduce heat during longer breaks and interruptions (> 30 min.) by switching to the standby mode
- thoroughly clean all equipment at least 1-2 times per year

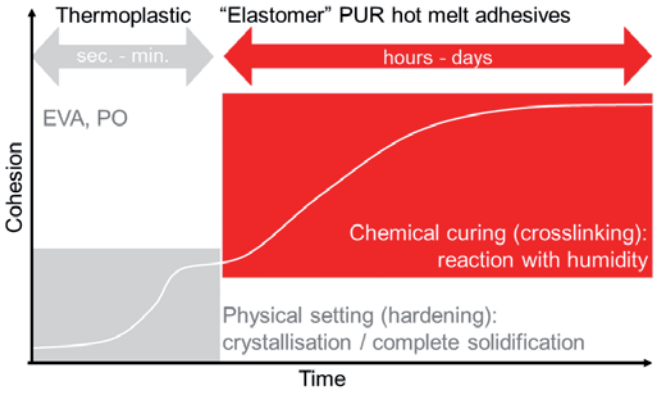
General rule: Flush and clean as little as possible and as often as necessary.

1. General information: PUR hot melt adhesives

Characteristics

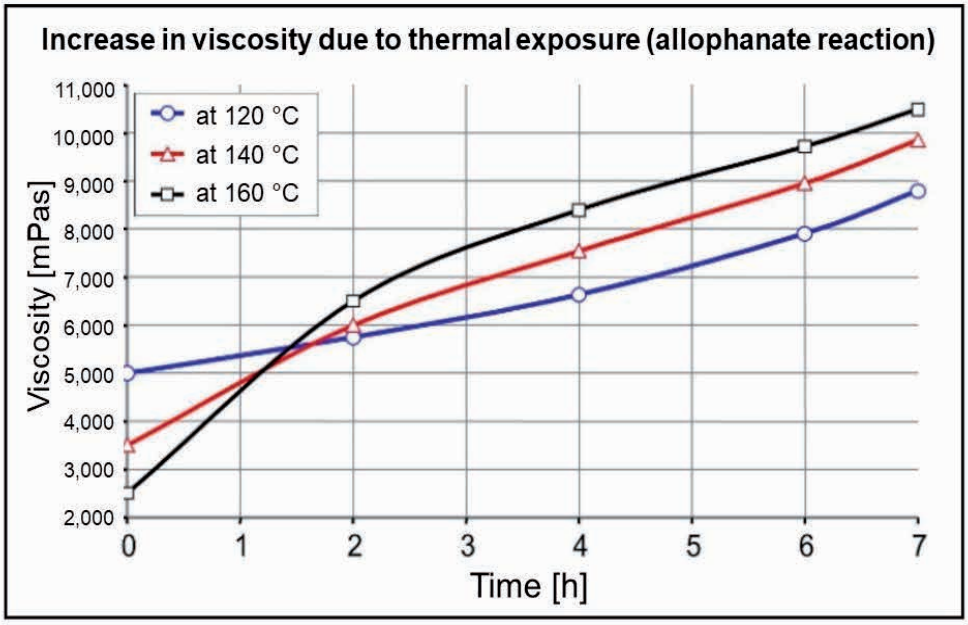
Polyurethane (PUR) hot melt adhesives of the Jowatherm-Reaktant® product range are characterised by the fact that after the purely physical setting when the material solidifies, a subsequent reaction with humidity occurs which triggers chemical crosslinking.

Applications / benefits:
- high requirements for water and heat resistance (> 120 °C)
- broad spectrum of adhesion
- low application and processing temperatures
- reduced application amount



The chemical reaction starts as soon as the adhesive comes into contact with humidity and/or material moisture from the substrate. PUR hot melt adhesives must therefore be protected from moisture during manufacturing, during storage as well as during processing to prevent a premature reaction.

During processing



In order to avoid unwanted secondary reactions, the melting and applicator units should be equipped with exact temperature controls to avoid local overheating.

If the adhesive is heated beyond the recommended processing temperature, or thermonally exposed over a longer period of time, the melt viscosity may increase due to a crosslinking reaction within the adhesive (allophanate reaction) - even if no moisture is present - just due to the influence of the high temperature.

Processing rules for PUR hot melt adhesives

- Observe recommended processing temperatures.
- Do not melt more adhesive than will be used up in 4 h.
- During extended standstills (e.g. breaks >30 minutes), reduce the temperature (depending on the adhesive, by 50 – 80 °C below the recommended processing temperature).
- To stop unwanted reactions between moisture and the reactive PUR hot melt adhesive, use inert gas, for instance nitrogen or dry air (observe quality grade).

2. Cleaning and flushing of melters

There are two different categories of products used for the maintenance and cleaning of **melters**, **conveying hoses** and **applicator units**: flushing agents and cleaners. Jowat supplies a wide range of flushing agents and cleaners for this purpose.

Jowat® flushing agents are used to squeeze out the adhesive from the melter and conveying hoses (purely physical) and inhibit the chemical crosslinking reaction.

Jowat® cleaners, on the other hand, are high-boiling solvents for PUR hot melt adhesives (solid at room temperature) and are used for cleaning applicator units before the crosslinking of the adhesive.

Objectives of using Jowat® flushing agents

- Even and reproducible adhesive application by ensuring melting and applicator units.
- A homogeneous melting between PUR hot melt adhesives and the Jowat® flushing agent in order to prevent clogging due to unwanted reactions.
- Extrude and drain adhesive remnants from the entire melting and adhesive-carrying system. PUR hot melts should be drained completely from the applicator system, otherwise an unsolvable mass may form.
- Inhibition of chemical reactions.





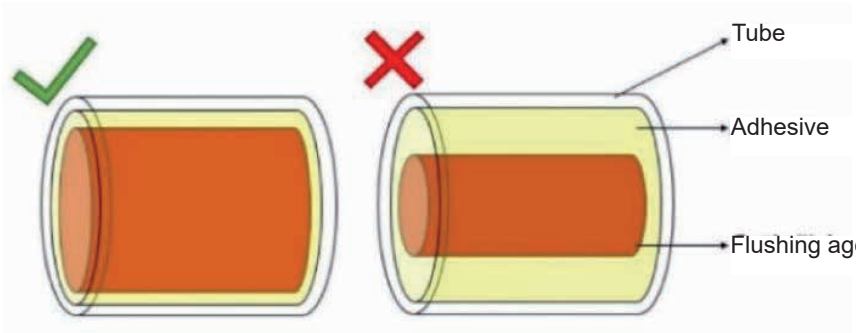
The cleaning effect is much better if the viscosity of the flushing agent is higher.
The viscosity of the flushing agent should be higher than the viscosity of the PUR hot melt adhesive.

The tasks of Jowat® flushing agents

The primary task of a flushing agent is to squeeze out and extrude the adhesive from tubes and from the application equipment. Due to the laminar flow properties of the flushing agent, the flow velocity is considerably lower near the walls compared to the centre of the tube.

To ensure a thorough cleaning, it is therefore necessary to use a sufficient amount of flushing agent. The unit should be emptied and flushed with Jowat® flushing agent until all the PUR hot melt adhesive has been squeezed out. Remnants of the flushing agent should remain in all adhesive-carrying parts. The shrinkage of the flushing agent when it cools will increase the cleaning effect.

Apart from flow velocity, the squeeze-out process is also influenced by viscosity. If the viscosity of the flushing agent is too low, it will only squeeze out the adhesive in the centre of the tube. It will not be possible to remove all the adhesive. To find out the viscosity of the flushing agent and of the hot melt adhesive, please refer to the corresponding Technical Data Sheets.



Flushing agent Jowat® 930.xx

	Jowat® 930.34	Jowat® 930.74	Jowat® 930.84	Jowat® 930.94
Processing temperature [° C]	approx. 120	approx. 120	approx. 100	approx. 140
Viscosity [mPas]	approx. 9,000	approx. 20,000	approx. 25,000	approx. 50,000
Softening range [Kofler bench]	80°C +/- 10°C			
at approx. viscosity of adhesive [mPas]	<15,000	15,000–40,000	10,000–50,000	35,000–100,000
Flushing effect	●●○	●●○	●●●*	●●○
Supply form / Container	cartridges / cans / granulate bag / hobbocks / drums			

* good detaching of adhesive remnants

2.1 Tank melters

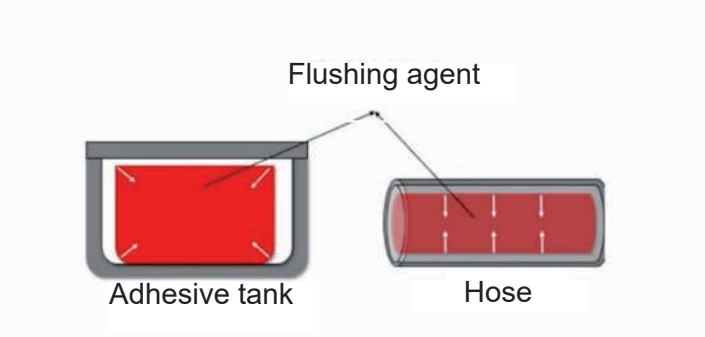
- **Used for: blocks (approx. 2kg) or Hobbocks (approx. 20kg)**
- **Entire container without inliner**
- **Equipped with heater body / walls**



Basically, tank units for reactive hot melt adhesives should be constantly blanketed with inert gas to avoid any reaction of the PUR hot melt adhesive with moisture. If the melting units are not emptied and flushed at the end of the day, continuous blanking with inert gas is imperative to avoid any contact of the cold adhesive mass with humidity.

If it cannot be ensured that the hot melt adhesive will not react with ambient humidity during longer standstills, the unit must be emptied and flushed with Jowat® flushing agent.





Soaking time for the flushing agent: at least 1 hour. (The cleaning effect can be increased further by letting the flushing agent cool and shrink.)

Flushing and cleaning process:

1. Close the applicator head and remove the hose
2. Completely empty the tank unit through the hose
3. Remove adhesive remnants from the tank unit mechanically with a spatula
4. Fill the tank unit* half way with flushing agent Jowat® 930.x4
5. Turn on the pump several times during the melting phase (for approx. 1 h, so that the flushing agent can produce its effect in the system)
6. Remove adhesive remnants adhering to the tank walls using a spatula
7. Extrude the completely molten flushing agent from the tank unit through the hose
8. Connect the hose to the applicator head
9. Fill ¼ of the tank unit with flushing agent, melt completely, and flush the applicator head
10. If **production** with the unit is started again directly after the cleaning process, completely empty the system and flush with adhesive until there is no more flushing agent in the system. In case of longer standstills (e.g. during holidays, etc.), leave flushing agent in the tank unit, hose and applicator head, and turn off the unit so that no moisture may enter the system
11. After the cleaning process is finished, it is recommended to replace the filters

* if possible, tilt the tank so that the flushing agent can be filled directly into the heater body below
Note: Observe the safety instructions of the manufacturer

Jowat® cleaner

	Jowat® 930.60
Applications	boiling of machine parts (e.g. nozzles, filters), cleaning of applicator rollers
Processing temperature [°C] / time	at approx. 180 °C for 60 - 180 minutes
Processing form	liquid
Special characteristics	Cleaning of heavily soiled materials, dissolves many plastics. Recommendation: Replace gaskets each time after cleaning.
Hazard labeling	hazard-free labeling

In case of units with bypass plates, clean bypass regularly (for instance weekly) by opening and internal circulation of the PUR through the bypass. If a filter is installed, examine filter for clogging at least once a week (depending on throughput) by removing it, and clean it mechanically or with the cleaner Jowat® 930.60. If necessary, replace it.

2.2 Bag melter



- **Used for: blocks (approx. 2kg) or Hobbocks (approx. 20kg)**
- **Cut a circle into the bottom of the adhesive slug and remove the foil**
- **Heater body at the bottom of the bag melter**
- **Melt-on-Demand Funktion**
- **Melting of required (adhesive) quantities**
- **Low thermal stress / changing of containers without disruption**

Bag melters are generally very airtight systems and are protected against the penetration of humidity and moisture. The following **flushing and cleaning process** helps for maintenance and cleaning:

1. Use up the adhesive
2. Remove adhesive container from the unit
3. Remove large adhesive remnants mechanically using a spatula
4. Close the applicator head and remove the hose
5. Drain adhesive remnants from the reservoir (if present, remove tube) through the hose. Remove large adhesive remnants in the reservoir and below the melting plate using a spatula
6. Fill in flushing agent (block or granulate), melt and allow to soak
7. Completely drain the flushing agent from the system through the hose
8. Fill reservoir ¼ with granulate and melt completely
9. Afterwards, connect the hose to the applicator head and flush
10. If **production** with the unit is started again directly after the cleaning process, completely empty the system and flush with adhesive until there is no more flushing agent in the system. In case of longer standstills (e.g. during holidays, etc.), leave flushing agent in the bag melter, hose and applicator head and turn off the unit so that no moisture may enter the system
11. After the cleaning process is finished, it is recommended to replace the filters

Note: Observe the safety instructions of the manufacturer

2.3 Drum / Hobbock melter



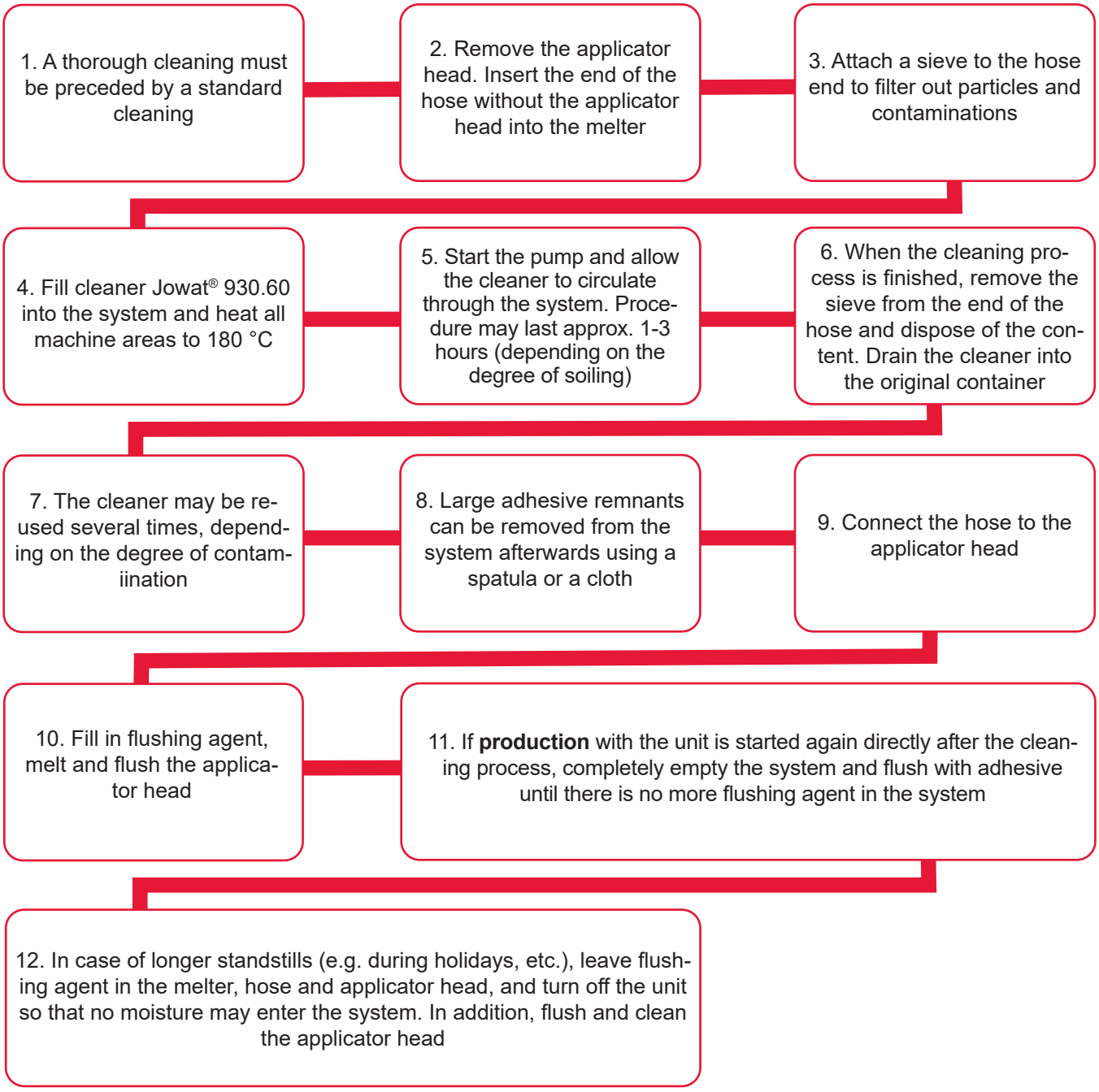
- **Uses a melting plate (smooth / grooved)**
- **Adhesive melted from the top**
- **Fold aluminium inliner over the edge**
- **High melting / melt conveyance performance**

The **cleaning** of drum and Hobbock melters is similar to the process for bag melters:

1. Remove the platen from the drum
2. Remove large adhesive remnants from the melting plate using a spatula
3. Lower the platen into the container with flushing agent
4. Close the applicator head and remove the hose
5. Melt the flushing agent from the top
6. Turn on the pump several times during the melting phase (for approx. 1 h, so that the flushing agent can produce its effect in the system)
7. Connect the hose to the applicator head and flush
8. If **production** with the unit is started again directly after the cleaning process, completely empty the system and flush with adhesive until there is no more flushing agent in the system. In case of longer standstills (e.g. during holidays, etc.), leave platen in the drum with flushing agent, as well as flushing agent in the hose and applicator head and turn off the unit so that no moisture may enter the system
9. After the cleaning process is finished, it is recommended to replace the filters

Note: Observe the safety instructions of the manufacturer

Thorough cleaning of tank units, bag and drum melters (1 - 2 times per year)



Note: Observe the safety instructions of the manufacturer

Avoid any contamination during drum changes. The heating plate is to be cleaned and remnants around the sealing ring are to be removed. Greasing the sealing rings with a suitable water-free and acid-free grease (e.g. roll bearing grease Petamo GY 193 supplied by Klueber Lubrication, Munich) facilitates easier cleaning and shortens the downtime during the drum change. The drum may not remain opened longer than necessary.

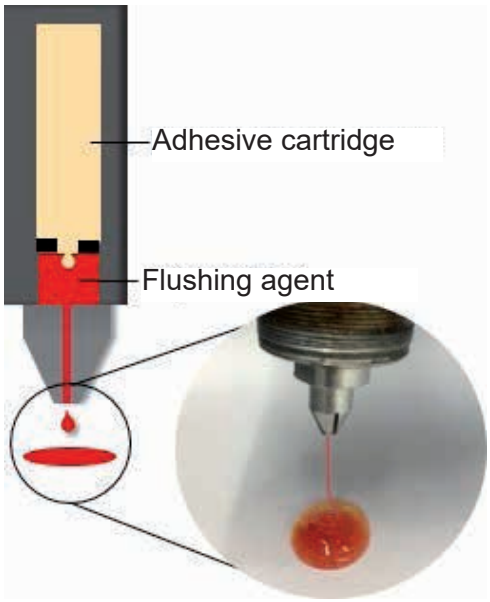
Bag melters are generally very airtight systems and protect against the penetration of humidity and moisture.





2.4 Cartridge melter

Adhesive cartridges are generally used in applications with small consumptions or for edgebanders. In case of longer downtimes, flush out the unit with one half cartridge or slug of Jowat® flushing agent. Turn off the unit and allow cooling. Heavily soiled nozzles can be boiled in cleaner Jowat® 930.60.
Jowat® flushing agents contain a reaction inhibitor that prevents the adhesive from crosslinking. When starting up again, remove the flushing agent container after heating, insert adhesive and make sure the PUR hot melt extrudes all remnants of the flushing agent. Repeat the procedure until there is no more red colour in the adhesive.

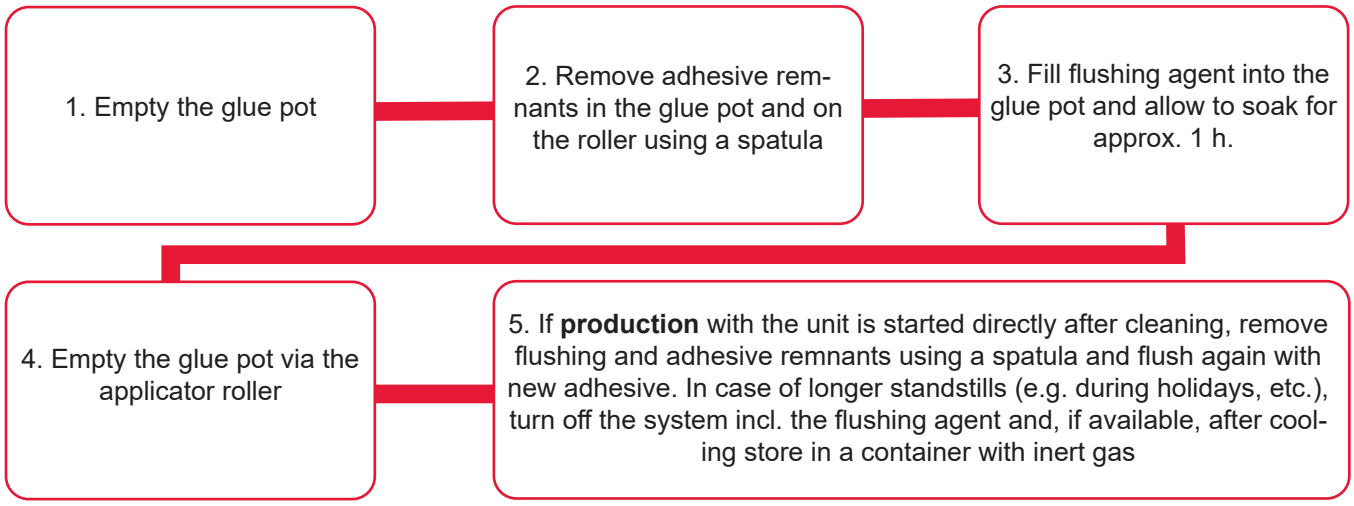


2.5 Adhesive reservoir and glue pots

The chemical crosslinking process of PUR hot melts for edgebanding is comparatively slow. In many cases, the PUR hot melt adhesive may therefore be left in the glue pot over night without any cleaning. However, this is a process advantage of individual PUR hot melts and is not universally applicable.

Glue pots are cleaned with suitable Jowat® flushing agents. Particularly advisable for the flushing of roller reservoirs in which a polyester based PUR hot melt has been processed. The short-chain reaction inhibitors have a very strong cleaning effect.

Flushing process for glue pots with an integrated applicator roller:



The flushing agent is coloured to allow the detection of contaminations in the new PUR hot melt adhesive.

3 Cleaning of applicator units

Apart from the cleaning of **melters** and **conveying hoses**, clean **applicator units** are imperative for a smooth and reproducible adhesive application.

Cleaning agents Jowat® 930.xx

	Jowat® 930.22	Jowat® 930.23	Jowat® 930.27	Jowat® 930.60
	Special	Premium	Asia/Pacific	Troubleshooter
Processing temperature [°C]	100–120	100–120	90–120	150–190
Soaking time [minutes]	30	20	60	60
Special characteristics	good price-performance ratio, no hazard labeling	best cleaning effect, short soaking time, no hazard labeling, also suitable for conv. HMs	good cleaning effect with reactive PUR and POR hot melt adhesives as well as with TP hot melt adhesives	Cleaning of heavily soiled Teflon and metal parts, has a dissolving effect on plastics
Softening range [Kofler bench]	approx. 50°C	approx. 55°C	50°C–55°C	liquid at RT
Cleaning effect	good	very good	good	very good
Hazard labeling	-	-	-	-
Appearance	white	white	white	colorless
Supply form	powder	powder	wax / powder	liquid

Cold cleaners Jowat® 40x.xx

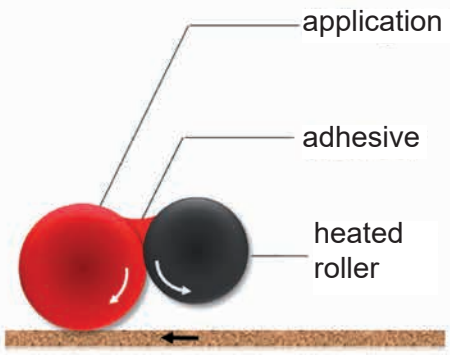
	Jowat® 402.40	Jowat® 401.50	Jowat® 402.60
	Biological cleaner	Universal	Hazard-free labeling
Viscosity / Supply form	liquid	liquid	liquid
Base	organic natural raw material	organic solvent	solvent
Special characteristics	universal biological cleaner for adhesive and lacquer residues, also suitable for conv. HMs	very good cleaning effect for all adhesive systems (conv. HMs, PUR HMs, POR HMs, prepolymers)	very good cleaning effect for different adhesive systems, can be sprayed (spray bottle)
Hazard labeling	GHS02 GHS07 GHS08 GHS09	GHS02 GHS07	-
Appearance	colorless	colorless	colorless

Observe: Before use, all products must be tested for suitability in the individual case.

3.1 Roller applicators (applicator / metering roller)

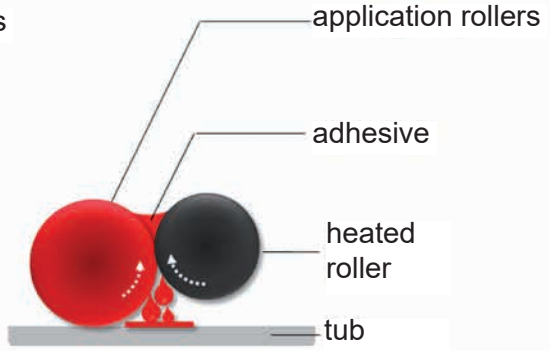
Generally, there are two different types of rollers: steel- and rubber-coated rollers (e.g. Viton, silicone).

Adhesive application



Synchronous rotation of the rollers.

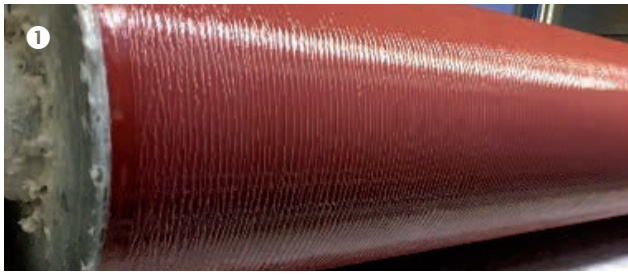
Flushing process



Reverse rotation of the rollers.

Before use, the cleaner should be tested for compatibility with the roller coating (coating may be permanently damaged). The cleaning and maintenance of metering rollers should be carried out following the process below:

1. Empty the unit
- roller applicator system in cleaning mode
- remove the adhesive from the unit
- collect adhesive remnants in a coated pan



2. Remove adhesive remnants
- stop the roller rotation
- remove large remnants using a wooden spatula

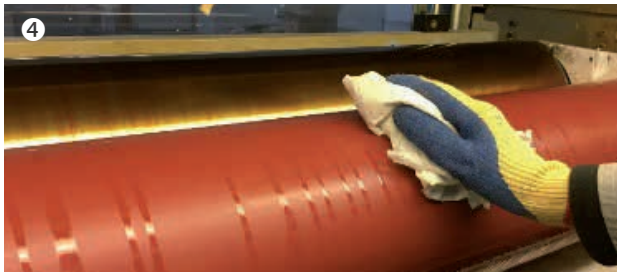


3. Cleaning process (solid)
- switch the roller applicator system to normal operating mode
- fill in and melt cleaner Jowat® 930.2x (ca. 1-2 kg) (approx. 1-2 kg)
- with the roller rotating, allow to soak for approx. 15 minutes and empty again (if necessary, repeat 1-3 times)
- switch the roller applicator system to normal operating mode
- remove residues with a lint-free cloth
- after cleaning, the roller should be dry



4. Cleaning process (liquid)

- Optionally in case of heavy soiling: Heat cleaner Jowat® 930.60 (approx. 1 litre) between the rollers and allow to soak for approx. 30 - 180 minutes in normal operating mode.
- Increase soaking time depending on the degree of soiling. Mechanical cleaning by rubbing with a cotton cloth is recommended.
- Afterwards, a spatula may be used to easily remove burned adhesive residues (on steel rollers only).
- Remove residues with a lint-free cloth.
- After cleaning, the roller should be dry.



Application rollers with metering blade can be cleaned using Jowat® flushing agent and cleaners. (Depending on machine and manufacturer).

3.2 Nozzle applicators and (wide) slot nozzles

Nozzle applicators and (wide) slot nozzles should also be cleaned. The nozzle head or slot nozzle may be protected overnight or on weekends with a paraffin oil or mineral grease free of water and acids, or with Jowat® flushing agent e.g. Jowat® 930.66, so that no moisture can penetrate into the system and cause an unwanted reaction.

After flushing the melting unit, take out the nozzle from the cleaning bath with water-free substance and wipe it with a lint-free cloth. Completely remove any potential remnants of the flushing agent by flushing with PUR hot melt adhesive during the heating phase of the melter unit.



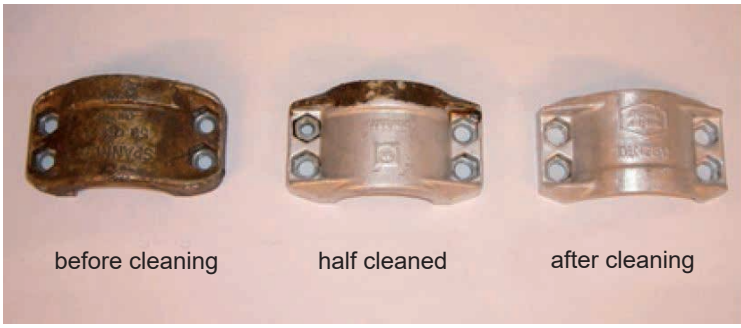
Use Jowat® flushing agent to protect nozzle tips against reaction with moisture.

Jowat® cleaner

	Jowat® 930.66
Applications	sealing liquid for soaking / sealing applicator systems (e.g. wide slot nozzles) containing reactive PUR hot melt adhesives.
Processing temperature [°C]	room temperature
Processing form	liquid
Special characteristics	reduces the exposure of the moisture-curing adhesive to humidity.
Hazard labeling	hazard-free labeling

3.3 Adhesive remnants on machine parts

Disassembled tools, nozzles, filters and other small parts made of metal may be cleaned in a heated bath with Jowat® Cleaner 930.60 at approx. 180 °C (e.g. an electrical deep fat fryer is suitable). Depending on the degree of contamination, the cleaning procedure takes about 60 to 120 minutes. The temperature of the cleaning bath should not exceed 190 °C. Remove parts from the bath, allow for cooling, rinse with water and dry completely.

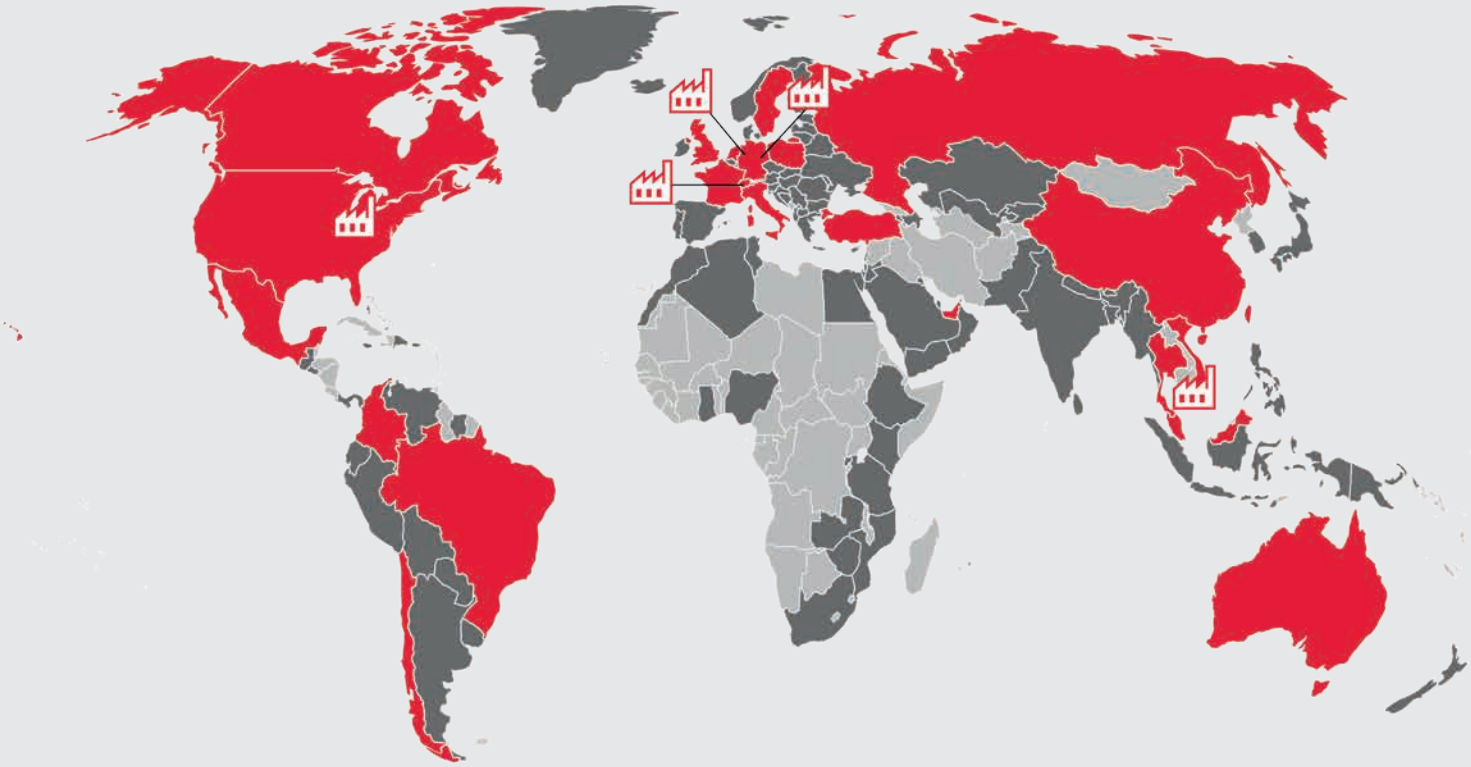


Observe! Seals and most plastic parts may be dissolved by Jowat® Cleaner 930.60 and must be replaced prior to assembly or installation.

Application table: Flushing agents and cleaners

		Flushing agent (solid)	Cleaner (solid)	Cleaner (liquid)	Cold cleaner (liquid)
Melting and conveyor technology (incl. hose system)	tank unit (2.20 litres)	•		•	
	drum/Hobbock (200 litres, 20 litres)	•			
	bags incl. reservoir (20 litres, 2 litres)	•		•	
	cartridge (310 ml)	•		•	
Melting and conveying-technology (one-in-all)	adhesive reservoir + roller applicator	•		•	
Application technology	applicator roller + metering roller		•	•	
	applicator roller + metering blade	•			
	wide slot nozzle	•		•	•
	different nozzles	•		•	•

Jowat | Unsere Versprechen halten
Jowat | Our Word is Our Bond



Manufacturing locations
Markets with Jowat Group companies
Markets with Jowat distribution partners







The information given in this leaflet is based on test results from our laboratories as well as on experience gained in the field, and does in no way constitute any guarantee of properties. Due to the wide range of different applications, substrates, and processing methods beyond our control, no liability may be derived from these indications nor from the information provided by our free technical advisory service. Before processing, please request the corresponding data sheet and observe the information in it! Customer trials under everyday conditions, testing for suitability at normal processing conditions, and appropriate fit-for-purpose testing are absolutely necessary. For the specifications as well as further information, please refer to the latest technical data sheets.

www.jowat.com

Jowat Klebstoffe

Australia Brasil Canada Chile 中国 Colombia Deutschland France Italia Malaysia Mexico Nederland Polska Россия
Sverige Suisse ประเทศไทย Türkiye United Kingdom United States of America دحتملا ةيبرعلا تاراملا Việt Nam