

CONDITIONING OF POLYAMIDE PLASTICS (PA)

CONDITIONING OF POLYAMIDE (PA)

The processing of Polyamide (PA) needs dry raw materials to ensure that the manufactured parts leave the moulds completely dry. However, when exposed to humid environment or water, these parts absorb humidity relatively fast. Therefore, to ensure that some physical properties are gained and improved, these parts need to be exposed to a humid environment. This process is called conditioning.

In the literature, there are 4 described processes to achieve absorption of humidity:

1. Storage in warm water,
2. Storage by exposure to warm and humid climate,
3. Exposure to saturated steam up to 105°C, and
4. **Utilisation of an industrial vacuum – pressure conditioning machine (autoclave) and exposure to saturated steam.**

VACUUM – SATURATED STEAM CONDITIONING

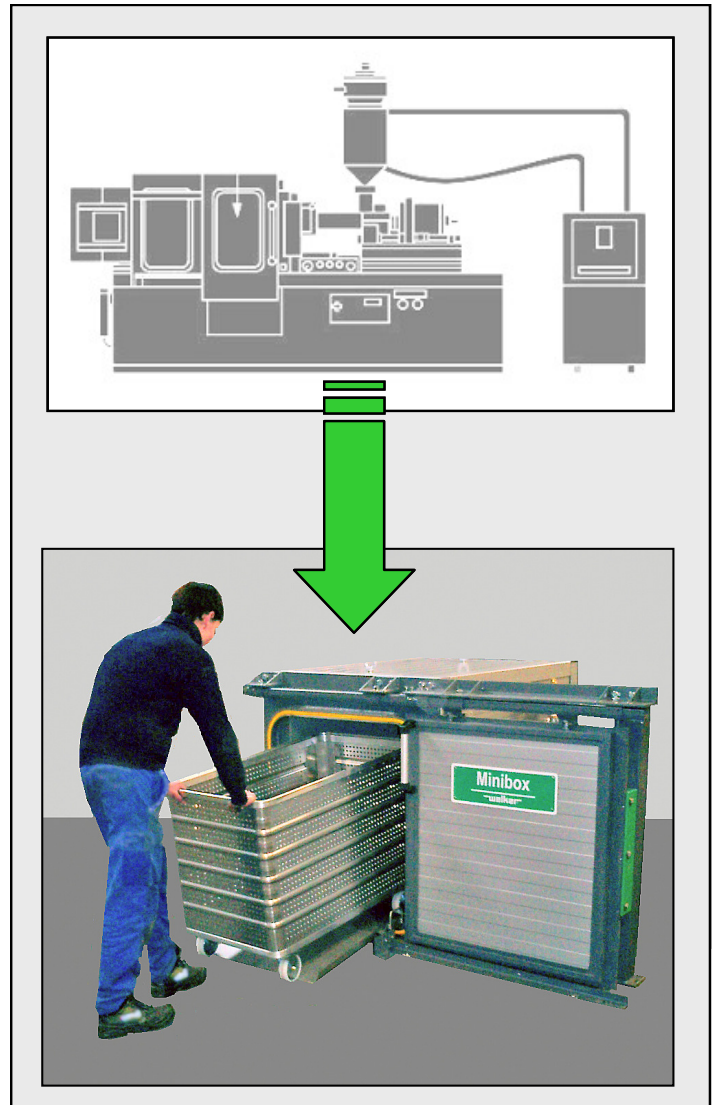
The processes 1. - 3. indicated above are well known to the market and have the disadvantages that the exposure times are long, often for days, and the penetration of moisture inside the parts is not achieved throughout the material inside. Migration from the outer layers into the inner ones is quite difficult. The higher the parts thicknesses, the more difficult is the penetration of moisture (see available literature).

In a vacuum – saturated steam conditioner, using vacuum of up to 95% and various saturated steam cycles, these 2 significant criteria are improved substantially. The change of the ambient pressure by vacuum accelerates the moisture absorption inside the parts molecules thus increasing penetration and reducing process times to less than 60 minutes.

TECHNOLOGY ELEMENTS

WELKER conditioners are equipped with a full range of elements to satisfy all possible production demands:

- High vacuum pumps up to 95%,
- Own electric steam generation,
- Cylindrical and rectangular design,
- All possible dimensions,
- One or 2 doors,
- Transport automation,
- Digital process control with documentation and data transfer.



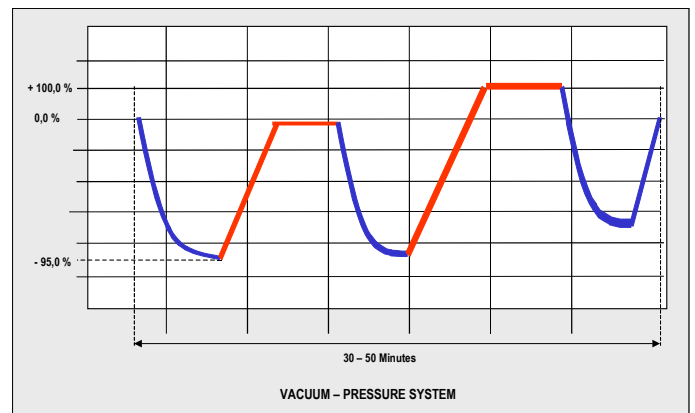
CONDITIONING OF POLYAMIDE PLASTICS (PA)



WELKER CONDITIONERS

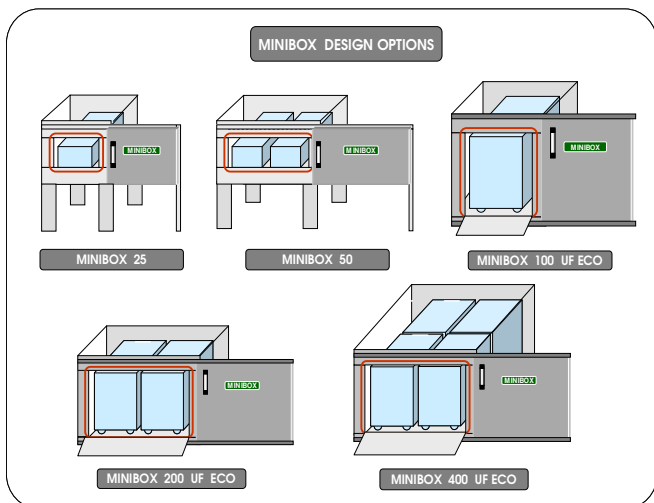
WELKER conditioners are available in various designs and sizes from laboratory application up to large production units. Machines are designed as per customer demand.

WELKER machines are entirely manufactured in GERMANY, engineered and welded under supervision of the German authorities and are products made out of high standard steel out of German steel plants.



VACUUM- SATURATED STEAM PROCESS

The fully controlled and monitored process is characterised by sequences of vacuum and saturated steam. The application of vacuum is core element to achieve gradually deep penetration inside the plastic parts.



EXAMPLE: TRIAL WITH DUPONT ZYTEL

- Vacuum 95%
- Heating up to 100°C, 10 Minutes
- Vacuum 95%
- Heating up to 100°C, 10 Minutes
- Vacuum 95%
- Heating up to 120°C, 20 minutes
- Final cooling vacuum 65%

- **Conditioning Effect :** + 4,0 Moisture
- **Total process time:** 52 Minutes