

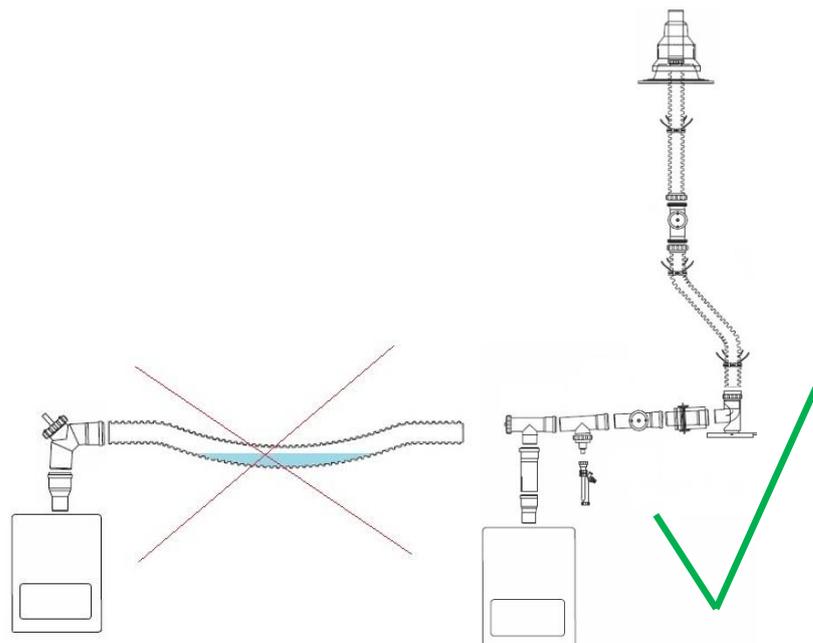
## Selected installation faults and shortcomings when implementing plastic flue exhaust systems



A variety of plastic flue exhaust systems have been used recently for condensing appliances. These are high quality and state-of-the-art systems and any doubts whether to use a stainless pressure-tight tube or a plastic tube for a condensing appliance may seem nowadays pointless. The ever increasing number of plastic flues clearly shows us

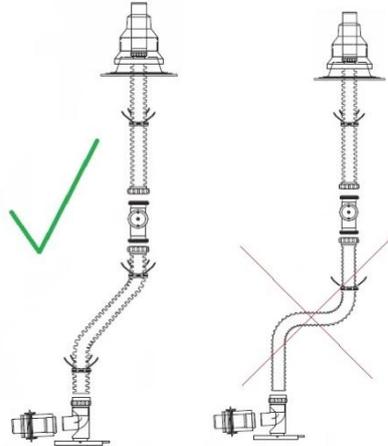
where the future of modern systems of flue gas exhaust is headed and which choice is the right one. PPH (polypropylene homopolymer) plastic systems well resist to ageing, they have great resistance to acids, they are physiologically harmless and resist to short term temperature of up to 150°C. Compared to stainless steel, plastic offers numerous advantages and due to its low price it is a very popular material. A plastic flue gas path may serve for a very long time provided that some basic principles are observed. Regarding manufacturers there are usually no problems - production technology is subject to stringent control, individual tubes and adapting pieces are exact, connections are perfectly tight and faultless in general. Issues may occur during the actual installation and these are usually caused by installation workers who do not have sufficient training, who fail to observe mounting procedures, who disregard manufacturer's instructions or respective standards. I present below some installation faults and shortcomings, which often cause problems. It is necessary to avoid such mistakes:

**1)** Flexible hoses are used only as vertical ducting for flue gas exhaust. **Reasoning:** Horizontal mounting of flexible hoses is strictly forbidden. Hoses are essentially soft and undulating, the waves may hold condensate and its weight may cause deflection of a hose between ceiling anchors. In some cases a horizontally mounted hose under a ceiling was flooded with condensate and eventually the whole flue gas path was blocked.

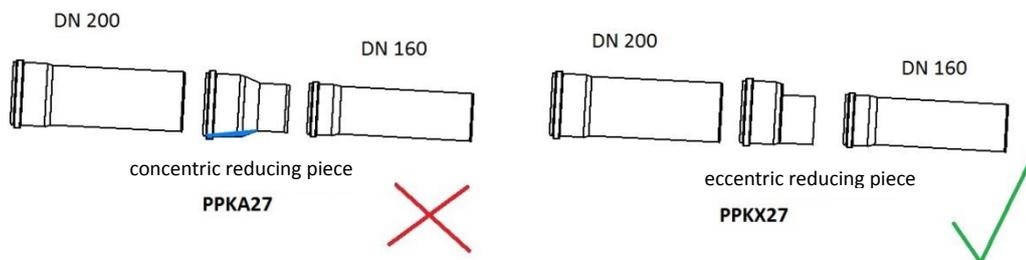


**2)** Flexible hoses may be bent maximally up to 45° from the axis of a chimney with a liner. **Reasoning:** If hoses are bent further, it creates excessive tension during operation at the external

edge of the bend and the hose may easily crack there. This happens most frequently at the transition from the chimney to the flue gas ducting. Therefore, it is always necessary to use an anchored elbow or inspection T piece with condensate drain at the transition from the vertical to the horizontal part and the following horizontal ducting is further implemented of fixed tubes. Deviations of up to 45° from the vertical axis in overpressure chimneys are also limited by ČSN EN 73 4201 (article 6.4.3)



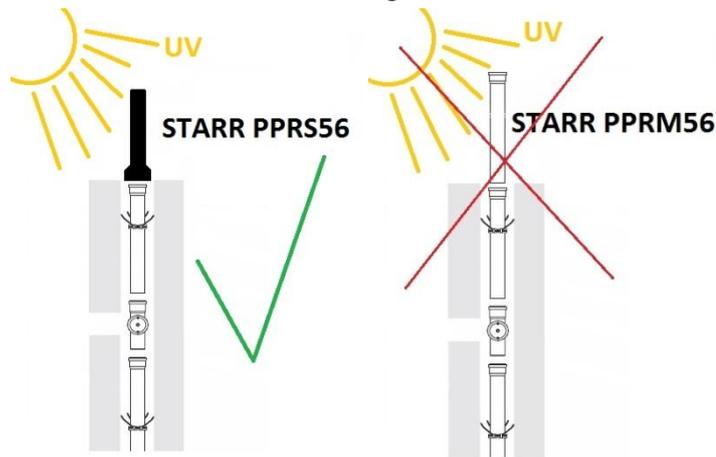
**3)** Eccentric reducing pieces need to be used at places where we wish to change diameter while preserving flow conditions for condensate in the piping. **Reasoning:** If an installation worker uses a common centric reducing piece at the anchored elbow at the place of a chimney flue (e.g. DN 160 cascade and DN 200 chimney i.e., we need to use a reducing piece) we have a problem. A blind trough is formed in the elbow where condensate is collected, which may eventually result in loss of tightness (depending on the seal quality). This also applies to cascades with variable diameters where the use of a common centric reducing piece means that condensate does not drain properly. However, these cascades are only seldom used with overpressure systems.



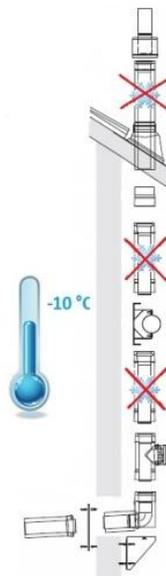
**4)** Plastic flue exhaust systems of PPH are not UV stable. Despite the fact that manufacturers in their technical manuals state advantages and disadvantages of PPH, installation workers often disregard this information. Then in practice we may come across uncovered plastic tubes mounted on facades of buildings, which is a serious error. **Reasoning:** PPH is not UV stable, therefore it may not be exposed to solar radiation. Plastic tubes are often protected by the following materials:

- a) Stainless protective tube (made of 1.4301 material), also used for supply of external air to type-C appliances (i.e. appliances which do not need air from the room where they are placed for combustion process).
- b) Special UV stable exterior self-adhesive films applied to tubes and creating sufficient protection against UV radiation. A nonstandard solution but in principle it is correct. An unprotected PPH tube exposed to UV radiation gradually deteriorates - the material acquires a yellowish shade, it becomes scaly, peels and eventually disintegrates. This does not happen immediately but

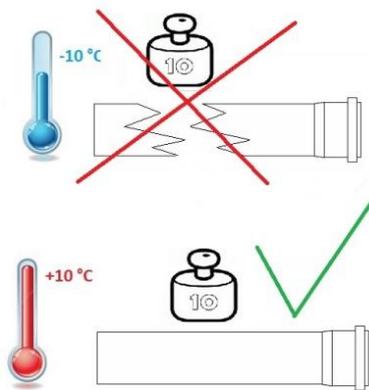
gradually and it depends on the quality of the used granulate. With some manufacturers it may be as early as after 6 months with others these changes do not occur until after 5 years.



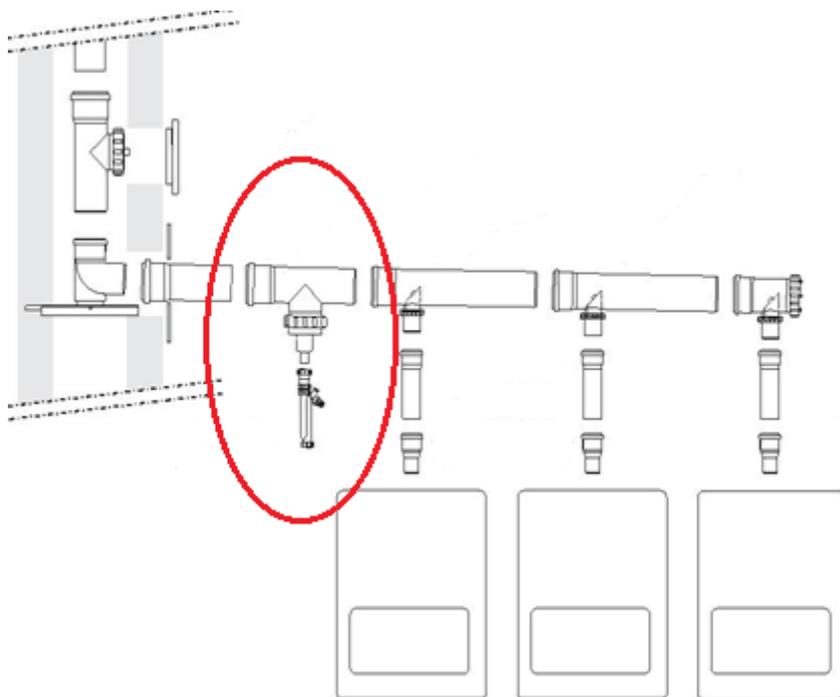
**5)** PPH flue gas exhaust systems do not freeze up. Despite the fact that litres of condensate flow through the ducting, plastic chimney liners have the exquisite characteristic of not freezing up when the temperature outside drops below zero. **Reasoning:** If the flue gas temperature drops below the dew point temperature of the inner surface of a plastic liner, the water steam contained in flue gas is condensed on the surface. This is manifested by formation of condensate drops on the piping inner surface. A drop may freeze but does not hold on the surface, it drops down where it melts again. This phenomenon is provided by the material structure. Therefore, it is not necessary to insulate these flues additionally - they only need to be protected against UV radiation as mentioned in article 4. Almeva facade flues do not need insulation, which has been verified in long-term practice. An example of that may be a number of flues installed in the extreme conditions of the Swiss Alps at altitudes of ca 2,500 m which have never frozen up.



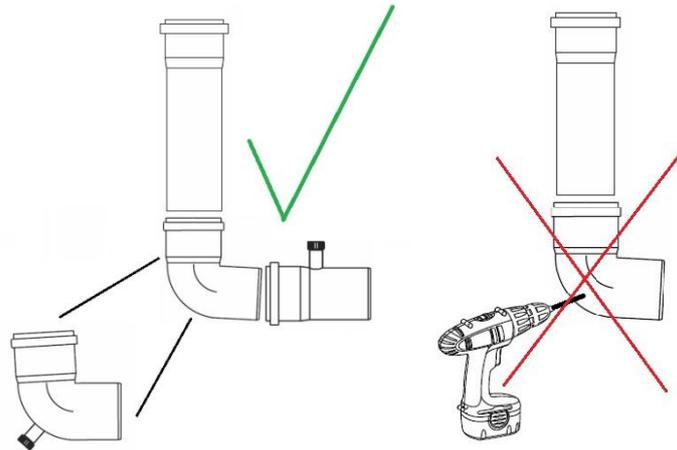
**6)** PPH has good surface hardness and impact strength. However, this does not apply at low temperatures, when the plastic becomes brittle and there is a risk of cracking. **Reasoning:** For example, if the temperature is above zero you may load the tube excessively, but you cannot do the same if the temperature drops below zero. The plastic tube cannot withstand the strain and it would crack. This characteristic needs to be taken into account particularly during installation when the temperature drops below zero. Even dropping of a part on a hard ground in winter may result in the loss of a costly component.



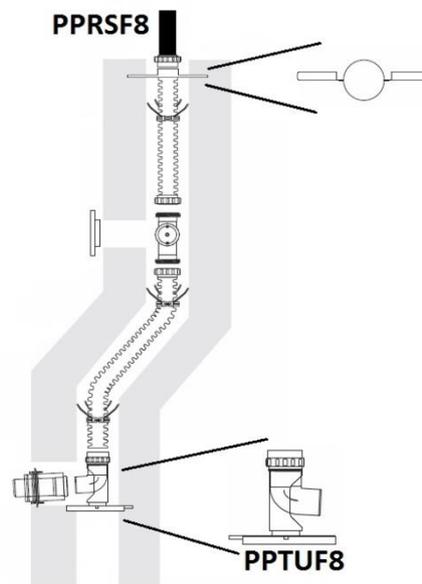
**Z)** Place condensate drains before boiler cascades (AXIAL type). The manufacturer of the Almeva flue gas exhaust system recommends an inspection T piece with a condensate drain be placed before AXIAL type cascades. AXIAL type cascade means a common collector situated directly above boilers on the axis of the flue gas vent orifice, where the condensate flows directly into the boiler. **Reasoning:** If you fail to place a T piece with a condensate drain before the cascade, the condensate produced by all boilers will drain into the first boiler in the cascade only. Thus the first boiler will have, e.g. 4 times the condensate flow for which it is designed and it may get damaged. We recommend that any unclear issues during installation be always consulted with the manufacturer or manufacturer's representative. In this way you may prevent unnecessary problems of the flue gas exhaust system in the future.



**8)** Measuring of overpressure flue gas paths must be done using system parts designed for the given purpose. **Reasoning:** In the case of underpressure flue gas paths it is possible to drill a measuring opening in the flue gas ducting subsequently covered with an aluminium tape. This is not allowed in the case of overpressure flue gas paths, as an overpressure gas path needs to be perfectly tight and measuring is implemented by system elements.



**9)** Flexible hoses must be anchored at the foot of the chimney and at the outlet as well. **Reasoning:** Due to the changing temperature, the flexible hose expands and it is necessary that the hose is provided with fixed anchoring at the foot of the chimney and its outlet. If the hose is not anchored at the chimney outlet as well, it may slide and even crack.



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