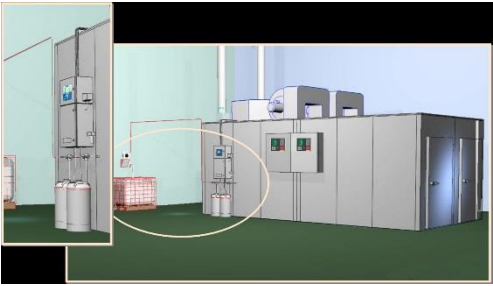
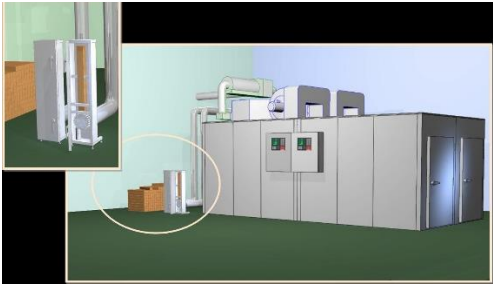





CleanSmoke vs. Friction Smoke

| CleanSmoke | Friction Smoke | |
|--|---|---|
| Purified smoke generated on the basis of purified primary products (smoke condensates) | Smoke generated from wooden blocks. A wooden block is pressed onto a fast-rotating steel friction wheel. At the friction surface smoke is generated by the increased temperature. | |
| <i>Installation examples</i> | | |
| <p>CleanSmoke</p>  | <p>Friction smoke</p>  | |
| Facts | | |
| | CleanSmoke | Friction Smoke |
| <i>Temperature</i> | Ambient temperature | 300-400°C |
| <i>Smoking times</i> | Short | long |
| <i>Smoke taste and colour</i> | Adjustable as per request | mild / weak |
| Limitation for application | None | for large industrial smoking chambers where strong smoke flavour is required (traditional products) |
| Handling and work safety | No heavy lifting necessary, clean work environment, no tar and no ashes | Combustions gases, noise, working with wooden block, tar and ash |
| Safety | No danger of fire and explosion | Danger of fire and explosion, special protection measures must be taken |
| Health | <ul style="list-style-type: none"> - PAH largely eliminated - 3-MCPD not present - Formaldehyde largely reduced | Reduced level on PAH, 3-MCPD and Formaldehyde |

| Environmental impact | | |
|--------------------------------|---|---|
| | CleanSmoke | Friction Smoke |
| Emissions to air | No emission is being produced | Emissions such as NO _x , CO, TVOC are being produced CO: 88,00 mg / Nm ³ NO_x: 23,00 mg / Nm ³ TVOC: 3,40 mg / Nm ³ |
| Air treatment | Unnecessary | Necessary |
| Tar deposits ¹ | No deposits | 4 kg tar is being produced per 1 ton of smoked products |
| Ash deposits ¹ | No deposits | 7,8 kg ash is being produced per 1 ton of smoked products |
| Water consumption for cleaning | 0,036 m ³ per 1 ton of smoked products ² | 0,060 m ³ per 1 ton of smoked products ² |
| Waste water pollution | COD: 620.178,73 g per 1 ton ¹ BOD: 277.876,80 g per 1 ton ¹ Total N: 2174,69 g per 1 ton ¹ PAH: 0,48 mg per 1 ton ² HC-Index: 0,19 g per 1 ton ² Phenols: 0,35 g per 1 ton ² | COD: 3.896.181,30 g per 1 ton ¹ BOD: 744.573,20 g per 1 ton ¹ Total N: 11.344,28 g per 1 ton ¹ PAH: 1,70 mg per 1 ton ² HC-Index: 0,15 g per 1 ton ² Phenols: 2,16 g per 1 ton ² |
| Cleaning detergent | 0,34 litres per FU ^{2,3} | 0,37 litres per FU ^{2,3} |
| |  |   |

¹ FDM_BREF_Fragebogen-MeatProcessing_Glocken-Beune_v2.xlsm

² Final report on life cycle assessment of meat products smoked by the use of purified primary smoke products in comparison to conventional smoking, Deutsches Institut für Lebensmitteltechnik e.V. (DIL)

³ Functional unit (FU): 1 ton of smoked sausages



Reference companies

| | <i>CleanSmoke</i> | <i>Friction Smoke</i> |
|--------------------|---|---------------------------------------|
| For the comparison | Glocken-Beune GmbH, Borgholzhausen | Glocken-Beune GmbH, Borgholzhausen |
| Further companies | <ul style="list-style-type: none"> • Heinrich Bille GmbH & Co. KG • Kleinemas Fleischwaren GmbH & Co. KG • Die H. & E. Reinert Westfälische Privat-Fleischerei GmbH - Vörden | |