Düker

DRAINAGE TECHNOLOGY

# AQUAPERFECT

Siphonic Roof Drainage


Düker SML cast iron drainage pipe system

JET® flat roof drains made of stainless steel and cast iron

# Siphonic Roof Drainage


Source: Beuth Verlag

Damages as shown in the above picture can be avoided thanks to modern roof drainage systems and professional sizing.

Many flat roofs can nowadays be drained with a siphonic system. The precondition for optimum flow patterns is a complete filling of the rain water pipeline. The filling level of h/d = 1.0 is obtained primarily through special elements in the flat roof drains. They prevent the water from forming vortexes and sucking air into the drainage pipeline.

In order to obtain a full flow, the sizes of all drains and pipelines must be calculated separately on the basis of the local rain quantity as defined in DIN 1986-100. It is important to have a balance between the pressure loss resulting from friction loss and the resistance coefficients of fittings on one side and the pressure resulting from the height of the roof on the other side.

Thus the siphonic system guarantees a closed rain water flow without mixed-in air as well as an elevated flow velocity.

The advantages of the system are:

- smaller dimensions of pipelines, to be obtained at a lower cost
- laying of pipelines without slope below the roof requires less space
- higher flow velocities ensure thorough self-cleansing of pipes
- fewer down pipes save costs
- fewer pipe trenches
- shorter installation time

Düker and Aco Passavant offer you the adequate materials as well as the exact dimensioning of the siphonic system for your project:

- Aco Passavant JET® flat roof drains made of stainless steel or cast iron
- Düker SML cast iron drainage pipes, fittings and couplings

The advantages of this product combination are:

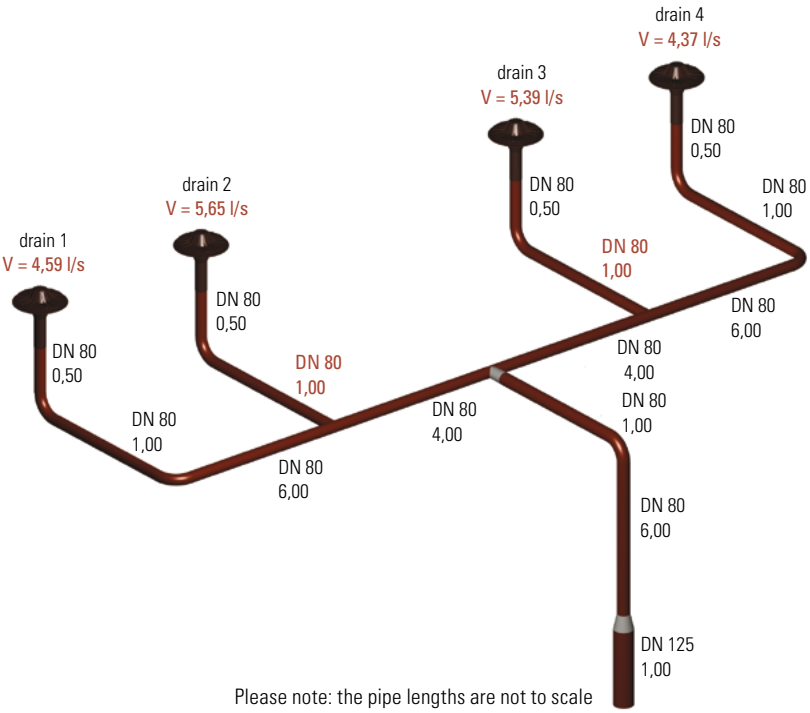
- choice of drains in cast iron or steel
- choice of cast iron pipe or steel pipe
- non-combustibility of all components
- stability due to high-quality materials, requires fewer fixings
- minor thermal expansion
- high levels of shape and vibration stability, reduced noise level

# Dimensioning of pipelines

## Incorrect

If the individual drains have very different drainage performances, this will cause the flow within the system to stall, causing unnecessary noise and vibrations.

- Incorrect dimensioning causes air to enter the pipe system
- This causes the flow to stall and reduces the drainage performance
- This increases the amount of water accumulating on the roof
- There is an increase in the static load which can damage the roof construction.

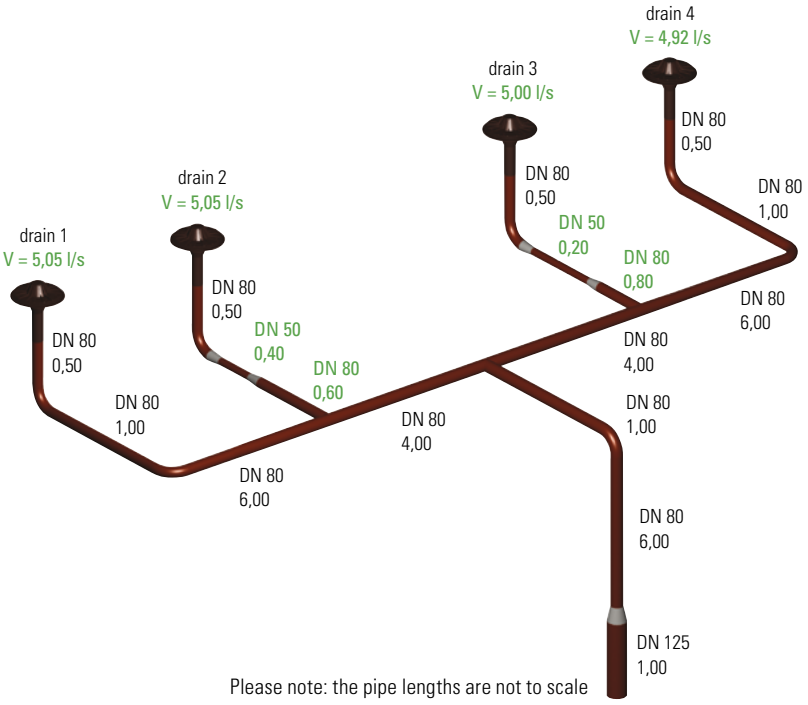



Please note: the pipe lengths are not to scale

## Correct

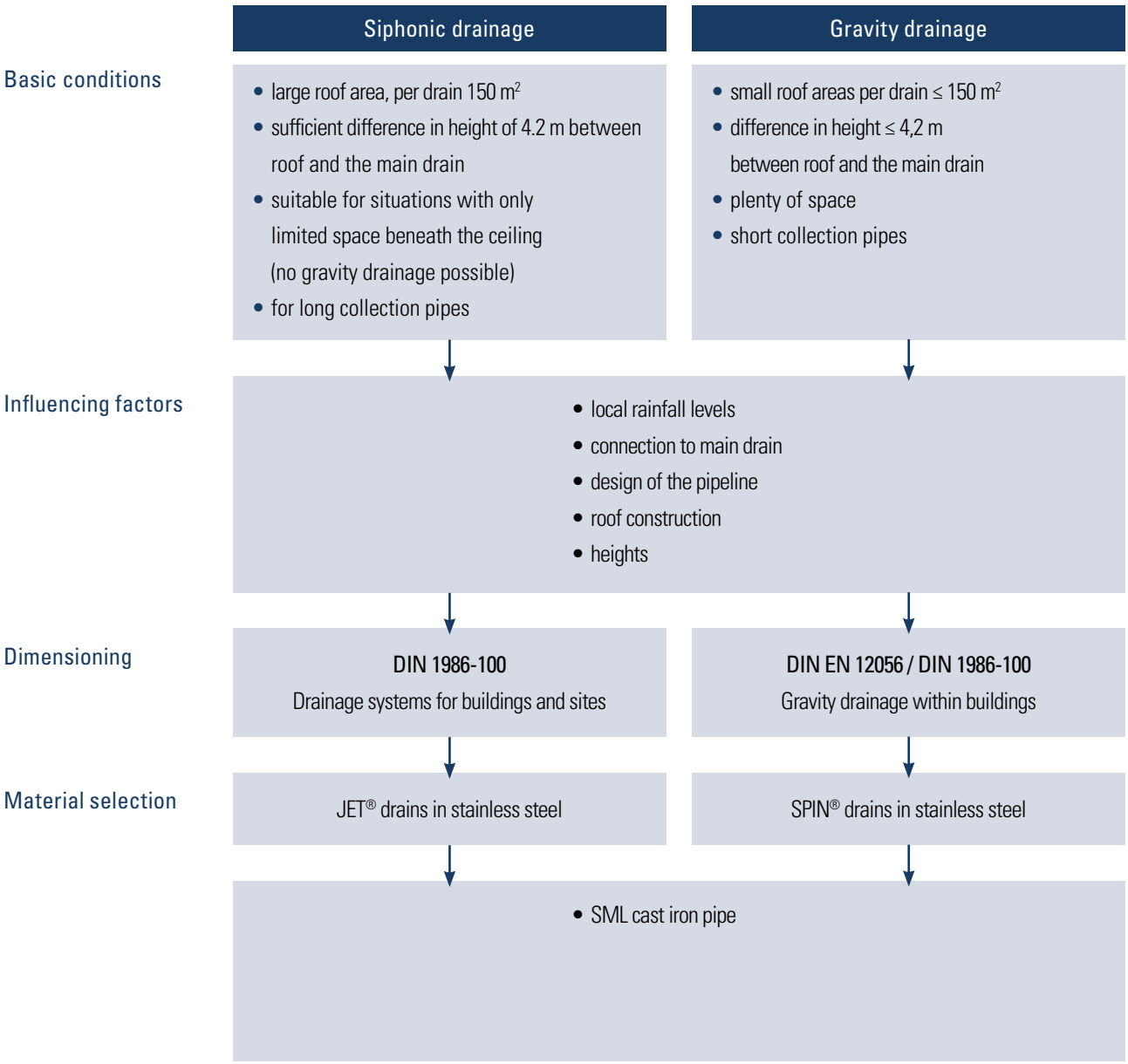
Precise calculation of the pipe diameters ensures that all of the drains have an almost identical drainage performance.

- At full flow, no air enters the pipeline
- The complete filling is achieved faster
- Optimal drainage conditions
- Lower noise emissions, which generally also occur at less frequent intervals.




Please note: the pipe lengths are not to scale

# Decision diagram




**DIN 1986-100 says:**

Emergency overflows are required for roof structures with internal channel drainage systems, and flat roofs built using the lightweight construction method (e.g. trapezoidal sheet roofs). The need to install emergency overflows must be checked on a case-to-case basis for all other roof structures taking into consideration the rainfall at the location, the roof structure, the roof geometry, the roof sealing, the roof statics and the sealing problems.

# JET® Flat roof drains

For roof drainage, ACO Passavant offer specially designed flat roof drains in cast iron and stainless steel. Depending on the situation, these may be combined with pipes in cast iron or galvanised steel.

### JET® Flat roof drains in cast iron

These drains are manufactured with vertical outlet spigot. The drains can also be combined with an additional upper part for applying a second sealing membrane.

| Nominal Diameter | Spigot Inclination | Performance demanded as per DIN | Actual performance as per DIN |
|---|---|---|---|
| DN 50 | 90° | 6 l/s | 9 l/s |
| DN 80 | 90° | 14 l/s | 17 l/s |

### Areas of application

- insulated or uninsulated concrete or trapezoidal roofs
- gravel roofs, green roofs and breversed roofs

### Accessories

- gratings and top sections
- green roof gully tops
- gravel traps
- upper part
- flat roof heating

### Product advantages

- above standard performance for increased safety of use
- choice of combining with gullytops up to class D400

### JET® Flat roof drains in stainless steel

These drains can be manufactured with vertical or horizontal outlet spigot. The vertical drains are also available in two-parts design for applying a second sealing membrane.

| Nominal Diameter | Spigot Inclination | Performance demanded as per DIN | Actual performance as per DIN |
|---|---|---|---|
| DN 40 | 0° | 3 l/s | 5.2 l/s |
| DN 50 | 0° | 6 l/s | 8.5 l/s |
| DN 70 | 90° | 12 l/s | 15 l/s |
| DN 70 | 0° | 12 l/s | 16 l/s |
| DN 100 | 90° | – | 39 l/s |

### Areas of application

- insulated or uninsulated concrete or trapezoidal roofs
- gravel roofs, green roofs and reversed roofs
- concrete ceilings with foam glass insulation glued with bitumen (0° spigot inclination)
- pipes and drains (0° spigot inclination) completely laid within the insulation

### Accessories

- flange seals
- trapezoidal steel supports
- collection ring for emergency overflow
- sliding flange
- stainless steel gravel trap
- isolator

### Product advantages

- above standard performance for increased safety of use
- optionally available with vertical or horizontal outlet

# SML pipe systems

## SML drainage pipe systems in grey cast iron

Düker SML drainage pipe systems are manufactured in accordance with EN 877. SML drainage pipes are treated on the outside with a red-brown primer in accordance with the relevant standards. The insides of the pipes are lined with a long-lasting fully cross-linked epoxy coating. The axial force resistance required is achieved by securing the couplings with grip collars.

### Areas of application

- for draining all commercial and domestic waste water
- rainwater drainage
- frost-risk zones (when using VML compound pipe system, optionally with heating)

### Accessories

- pipes
- bends
- branches
- reducers
- adapters
- couplings and grip collars

### Product advantages

- high wear resistance
- excellent corrosion resistance
- high sound damping capacity
- non-combustible
- non-problematic longitudinal expansion
- economic installation
- installation-friendly

TNT logistics centre in Niederaichbach with Düker SML cast iron drainage pipes.

The roof of the new TNT logistics centre in Niederaichbach/Bavaria is an impressive 16,500 m². Architect Gerhard Malfet from Dieburg/Germany was responsible for the planning, execution drawings and overall construction supervision of the roof drainage system. Gerhard Malfet specialises in the construction of largescale sheds and industrial buildings. The company responsible for installing the system was Henry Simanski from Plauen/Germany. They laid 678 metres of Düker cast iron piping for collection and down pipes, using 584 fixings and 33 drains. Henry Simanski was also responsible for the heating and sanitary installations. At times up to six plumbers were employed at the site because the work had to be finished within five weeks. In the words of Gerhard Malfet: "This is not the first time and will certainly not be the last time that we have used AQUAPERFECT."

| Reference projects with Düker SML pipe systems | |
|---|---|
| VW Hall 55, Wolfsburg | 40,000 m² |
| Exhibition centre, Cologne | 72,000 m² |
| Eastgate, Berlin | 30,000 m² |
| Nova Eventis, Dresden | 15,160 m² |
| Segmueller, Weiterstadt | 30,000 m² |
| Arcaden, Duesseldorf | 15,600 m² |
| Kremer, Elmshorn | 11,040 m² |
| Kaiserwiesen, Fulda | 11,850 m² |
| Prologis, Frankfurt | 190,050 m² |
| Bauhaus, Memmingen | 10,350 m² |
| Otto Versand, Haldensleben | 25,000 m² |

DRAINAGE TECHNOLOGY

JOBBING FOUNDRY

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