

**PRINCE**  
PIPING SYSTEMS

# Skolan safe®

PREMIUM  
POLYPROPYLENE SILENT  
DRAINAGE SYSTEM



**MADE IN  
GERMANY**

**Ostendorf**  
Kunststoffe

# **Skolan** GERMANY'S NO 1 POLYPROPYLENE DRAINAGE SYSTEM

## **safe**®

**12 dB (A)\***

P-BA 221/2016  
as per DIN 4109, along with EN 14366

Approval with  
# Z-42.1-217 of DIBT (German  
Inst of Construction  
Technology, Berlin)

**25-year  
Warranty**

**Made in  
Germany**



# Skolan SAFE®

## QUALITY, TECHNOLOGY, AND INNOVATION



### Excellent sound proofing performance

Sound rated at 12 dB (A) at 2 lps, certified by Fraunhofer, Germany; produced as per requirements of DIN 4109, along with EN 14366



### Patented joints/ lip seals

New patented 3-way seal for faster processing, secure sealing under adverse conditions



### World-class design and quality

Approval No. Z-42.1-217 of DIBT (German Institute of Construction Technology, Berlin)



### PP with mineral fillers

Provides excellent acoustic and mechanical properties, superior ring stiffness & impact resistance, essential for drainage and sewerage piping systems. Material density is 1.6gms/cubic cms



### High impact resistance

External & internal layers have excellent impact strength & abrasion resistance; also at very harsh temperatures as low as -20°C (-4°F)



### Fire protection

A normally combustible construction material listed as B2 as per DIN 4102-11, in nominal diameters DN 56 to DN 200



### Sound insulation that guarantees noise reduction

Maximum sound insulation by the use of clamps with rubber lining, certification by Fraunhofer Institute



### Sustainable from the get-go

Environment-friendly material, 100% recyclable, aligned to EMS for ISO 14001 Standard



### For stress-free projects

25-year warranty with implementation advice & technical guidance from experts

# Material properties Skolan Safe® Soundproof pipe system

**Commercial Name**  
Ostendorf Skolan Safe®

**Material**  
mineral-reinforced polypropylene (PP)  
▪ normal inflammability as per DIN 4102 B2

**DIBt-approval Z-42.1-217**  
tested on the basis of **ÖNORM EN 1451-1**

**Application**  
Soundproof pipe system  
Drainage until the transfer chamber as  
▪ waste water pipe  
▪ rain water pipe  
▪ ventilation pipe (see also areas of application DIN 1986-4)

**Nominal diameters (DN/OD)**  
58 / 78 / 90 / 110 / 135 / 160 / 200

**Installation**  
DIN EN 12056, DIN 1986-100, DIN 4109, VDI 4100

**Colour**  
Light grey RAL 7035

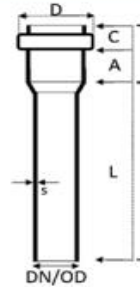
**Seal**  
Patented 3 lip seal, factory inlaid SBR lip seal acc. to DIN 681

**Chemical Resistance**  
Discharge of aggressive media in the range pH2-pH12  
(see also [www.ostendorf-kunststoffe.com](http://www.ostendorf-kunststoffe.com))

**Marking Pipes and Fittings**  
Permanent marking with manufacturer label, Skolan Safe, nominal diameter, approval No. Z-42.1-217, date of manufacture, material, building material class (fire behaviour)  
▪ Fittings additionally bear information about the nominal angle

**Sound insulation**  
Measured value 17 dB (A)  
Sound insulation test according to DIN EN 14366 (Fraunhofer Institute)  
Noise emission at 4 litres volume flow to measurement with Bismat 1000 (P-BA 221/2016)

**Central vacuum cleaning system**  
Test certificate of the State Material Testing Institute Darmstadt

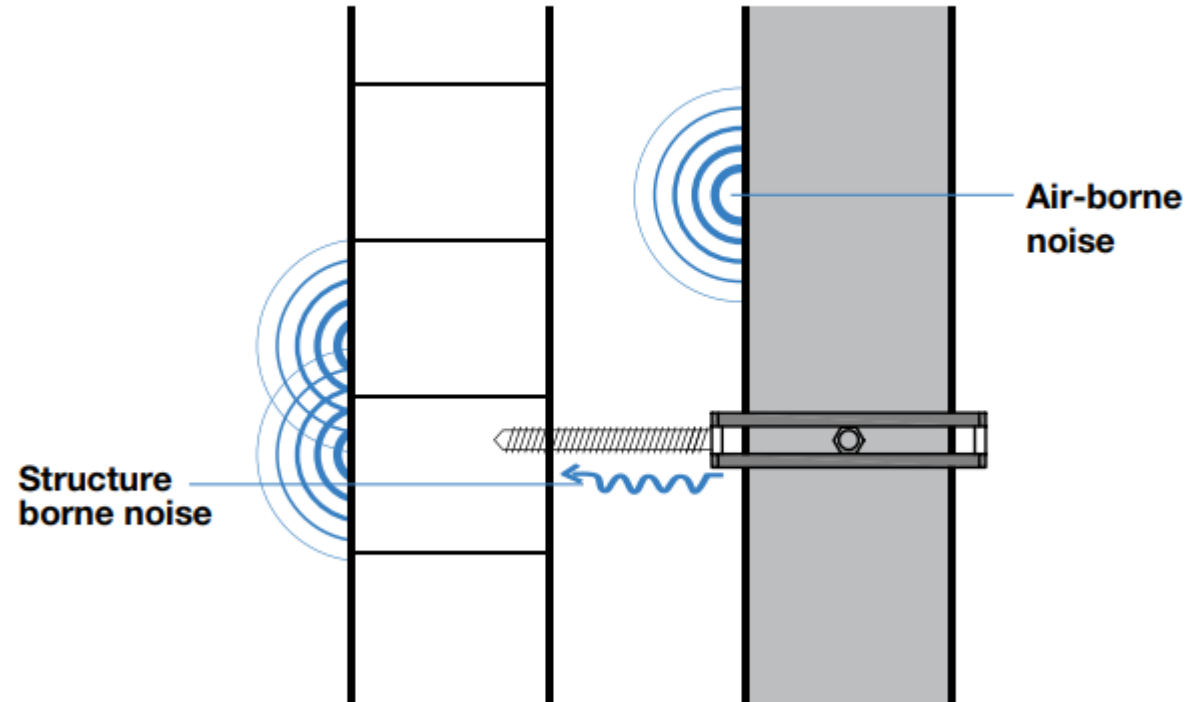


| DN/OD | s (mm) | D (mm) | A+C (mm) | L (mm)     |
|-------|--------|--------|----------|------------|
| 58    | 4,0    | 78     | 60       | 150 – 3000 |
| 78    | 4,5    | 98     | 57       | 150 – 3000 |
| 90    | 4,5    | 111    | 57       | 150 – 3000 |
| 110   | 5,3    | 135    | 74       | 150 – 3000 |
| 135   | 5,3    | 161    | 70       | 150 – 3000 |
| 160   | 5,3    | 193    | 91       | 150 – 3000 |
| 200   | 6,2    | 239    | 112      | 150 – 3000 |

*You may find the technical data sheets regarding our products on our website: [www.ostendorf-kunststoffe.com](http://www.ostendorf-kunststoffe.com)*

## Origin of noise in sewer piping

- The fluid flowing inside sewer piping can reach a relatively high speed.
- Air column resonance occurs especially in places like bends, branches, and vertical collecting pipes.
- The noise created by air column resonance penetrates the pipe wall and is transmitted to the building structure.
- The noise created by the pipe wall vibration has a similar propensity as well.



## Skolan Safe- experience true silence

- Skolan Safe with its high density and special molecular structure effectively:
  - Absorbs noise right at the point of its origin – inside the pipes
  - Prevents noise transmission through the pipe wall
- Due to the near silent environment, it becomes possible to achieve noise values approaching the noise perception threshold.
- Under testing, dramatically lower sound data were reached as required as per DIN 4109



## SOUND INSULATION REQUIREMENTS AS PER VDI GERMANY

12 dB(A)\*



30 dB(A)

Sound insulation level I\*  $\leq$   
30 dB (A) **FAMILY HOMES**



27 dB(A)

Sound insulation level II\*  $\leq$   
27 dB (A) **APARTMENT BUILDINGS**



24 dB(A)

Sound insulation level III\*  $\leq$   
24 dB (A) **HOTELS, HOSPITALS,  
RESIDENTIAL COMPLEXES**

\* Sound emission at 4 ltr/sec flow rate discharge according to measurements with Bismat 1000 (P-BA 221/2016). As per VDI sound insulation in buildings.

 **Skolan** Acoustic Performance  
**SAFE**®



Fraunhofer IBP | POB 80 04 69 | 70504 Stuttgart, Germany

Gebr. Ostendorf Kunststoffe GmbH  
Rudolf-Diesel-Str. 6-8  
49377 Vechta  
Germany

Fraunhofer Institute for Building Physics IBP

Directors  
Prof. Dr. Philip Leistner  
Prof. Dr. Klaus Peter Sedlbauer

Nobelstr. 12  
70569 Stuttgart

Dipl.-Ing. (FH) Joachim Mohr  
Building Acoustics  
Phone +49 711 970-3348 | Fax -970-3406  
joachim.mohr@ibp.fraunhofer.de  
www.ibp.fraunhofer.de

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Stuttgart, January 25, 2018

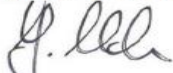
**Determination of the Acoustic Performance of a Wastewater Installation System in the Laboratory according to EN 14366 and following DIN 4109. Extract from test report P-BA 221/2016**

On October 25, 2016 the determination of the acoustic performance of a wastewater installation system was performed in the technical centre of the Fraunhofer Institute for Building Physics on a plastic wastewater installation system "**Skolan Safe, SKEM DN/OD 110 x 5.3, PP**" (manufacturer **Ostendorf**) with pipe clamps "**BISMAT 1000**" (manufacturer **Walraven**). Below measurement results are stated in extracts. Precise information about test object, test set-up and test method as well as detailed measurement results can be found in the test report P-BA 221/2016.

**Result:**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |     |     |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----|-----|-----|
| <b>Test specimen:</b> Plastic wastewater installation system "Skolan Safe, SKEM DN/OD 110 x 5.3, PP" (manufacturer Ostendorf) with pipe clamps "BISMAT 1000" (manufacturer Walraven). In each storey (EG and UG) two pipe clamps were mounted. At the upper wall area of the installation wall one "Bismat 1000" loose clamp was installed (supporting clamp SL, DN 100). At the lower wall area of the installation wall one "Bismat 1000" double clamp consisting of supporting clamp (SL, DN 100) and fixing clamp (SX, DN 100) was installed. To prevent contact to the pipe, the loose clamps and the supporting clamps were equipped with two spacers (2 x 7.5 mm, black) on each side. | Flow rate [l/s] |     |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0,5             | 1,0 | 2,0 | 4,0 |
| <b>Installation sound level <math>L_{A,eq,n}</math> [dB(A)] following DIN 4109 in the basement test-room</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | UG rear         |     |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <10             | <10 | 12  | 17  |

Fraunhofer Institute for Building Physics IBP

  
(Dipl.-Ing.(FH) J. Mohr)

Fraunhofer-Institut für Bauphysik  
Postfach 80 04 69 · D-70504 Stuttgart  
Nobelstraße 12 · D-70569 Stuttgart





**Sound insulation level I\***  
≤ 30 dB (A) Family homes

## Residential Buildings

Due to its excellent sound insulating properties, which considerably reduce drain noise, Skolan Safe is an ideal choice for all kinds of residential buildings and brings a sense of great calm and comfort to living spaces.



**Sound insulation level II\***  
≤ 27 dB (A) Apartment buildings

## Large Commercial Buildings

Skolan Safe can be installed in buildings that require great sound insulation, such as hotels, office buildings, hospitals, restaurants, libraries, educational institutions, etc.



**Sound insulation level III\***  
≤ 24 dB (A) Hotels, Hospitals, Residential Complexes

## Commercial Kitchens

Due to its high temperature resistance, Skolan Safe is a great choice for commercial kitchens where wastewater with a high temperature is drained.



## Industrial Applications

Skolan Safe is resistant to a wide variety of chemicals and can be used for the drainage of harsh chemicals, making it a great fit for the industrial building segment.

# *Skolan* A NOTCH ABOVE THE REST

## SAFE®



### Patented 3 lip-seal with special design of the ring:

- Guarantees secure sealing even in most adverse conditions
- Result of years of meticulous R&D

#### 1. Tensioning lip and retaining lip

- Prevents dirt from collecting between the pipe wall and the seal
- Retaining lip causes tensioning lip to be pressed against the foremost edge of the bead – which stops sealing ring from being pressed out or rolling

#### 2. Wiping lip

- Serves to keep back any dirt on the pipe

#### 3. Sealing lip

- Assures permanently tight pipe connection
- Leakage test done as per DIN EN 1610 with air and water from 0.05 to 0.5 bar, & under vacuum (System test 3.0 bar MPA Darmstadt)



**PRINCE**  
PIPING SYSTEMS

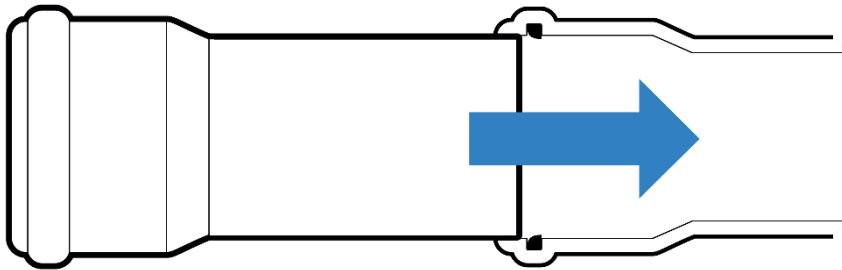
# Skolan

## Usage **SAFE**®



- Sound proof pipe system
- Waste water system
- Discharge within the building structure up to the transfer shaft
- Internal rain water drainage
- Fall pipe
- Collection pipe
- Ventilation duct (for drainage systems)
- Suction pipes for central vacuum cleaner systems
- Grease/fat drainage for large kitchens in combination with NBR seals

## Ease of installation, efficient application



Skolan Safe Pipe installation should ensure zero tension at all points and changes in length are not hindered.

Stepwise Installation as follows:

1. Proper cutting tools to be used for cutting to length.(manual or mechanical). Bevel the cut pipe end with an angle of approximately 15° with a bevel length of about 5 mm.
2. Remove chips, shavings, and sawdust before installing.
3. Check the position and integrity of the lip seal in the socket gasket slot. Clean the seal and the socket,and apply a thin layer of lubricant around the plain pipe end.
4. Fittings should be inserted to maximum socket depth, whereas pipes, after being pushed completely into the socket, have to be pulled back approximately 10 mm.
5. For anchoring Skolan Safe to walls and ceilings, use steel brackets with rubber inserts, approved for acoustic insulation systems.
6. As a general rule, straight lengths of pipe must be anchored by means of fixed brackets (FB) under each socket, while the rest of the pipework and the fittings will be supported by sliding brackets (SB).
7. The distance between the pipe clamps in the case of horizontal piping is approximately 10 times the exterior pipe diameter.
8. In the case of vertical installation, the distance between clamps should be 1 to 2 metres, not exceeding 2 metres.
9. A fixed clamp and a loose clamp per pipe length (storey height of more than 2.50 m) are recommended for drop pipelines.

# Arrangement of brackets and clamps

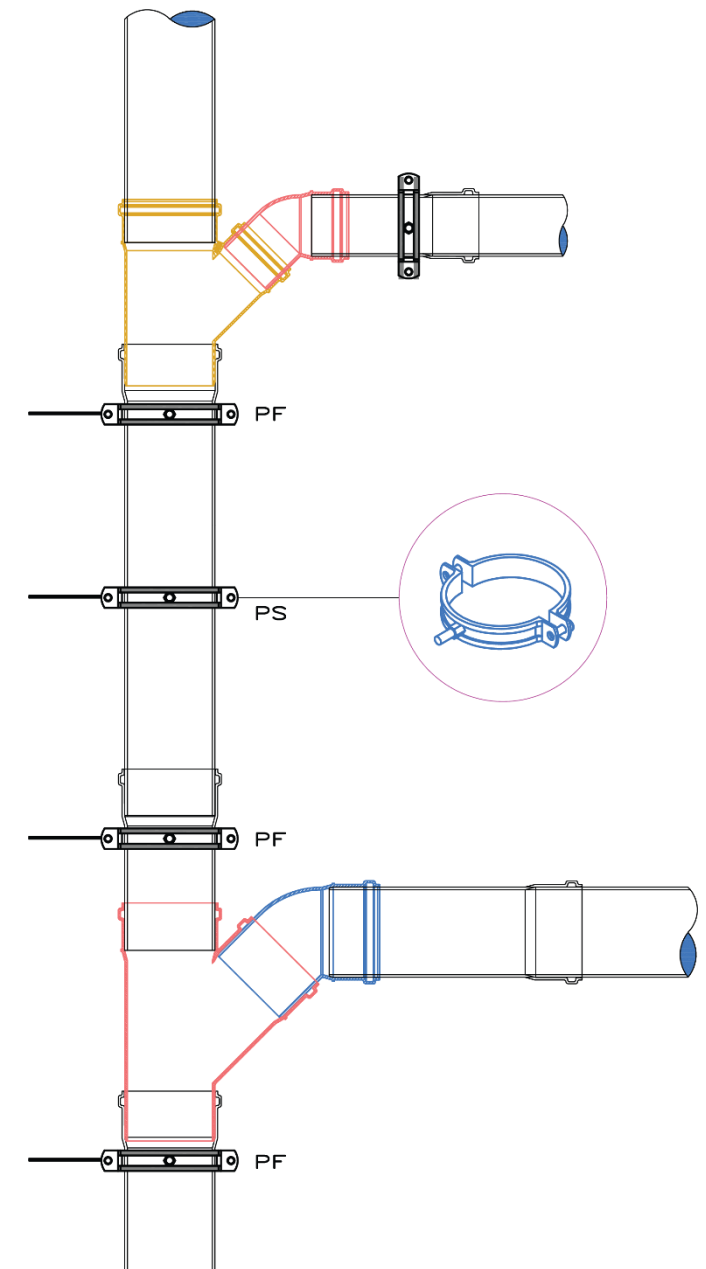
- The sound dampening brackets reduce structure-borne noise transmission by decoupling the vibrations within the drainage line from the wall.
- The quick and easy push-fit installation guarantees hydraulic tightness and allows the normal movements of the pipe, including those caused by thermal expansion.
- It also repeats the performance of the sound dampening effect by centralizing the pipe securely and applying the exact fastening force.
- By combining these sound insulation techniques into one system, Skolan Safe is able to fulfil the best acoustic requirements and mechanical performance targets, making it the ideal solution for all types of large modern buildings.

| Nominal outer diameter DN/OD | Max distance between brackets |          |
|------------------------------|-------------------------------|----------|
|                              | Horizontal                    | Vertical |
| 58                           | 750                           | 1250     |
| 78                           | 1125                          | 1875     |
| 90                           | 1350                          | 2000     |
| 110                          | 1500                          | 2000     |
| 135                          | 1625                          | 2000     |
| 160                          | 2000                          | 2000     |
| 200                          | 2150                          | 2000     |

\*Spacing of brackets based on diameters of pipes.

## Positioning of brackets and clamps

- Mechanical stress must be taken into account during design and assembly, so as not to affect the integrity of the system.
- Pipes must be fastened using brackets, placed under the socket, in order to prevent it from slipping.
- Pipes to be installed with free lateral allowance for temperature compensation.
- All fittings that involve a change in the direction of the system must be properly clamped to prevent the socket from slipping in the event of accidental excess pressure.
- For pipe systems in which inner pressures can arise, the joints have to be secured to prevent them from sliding apart and deviating from the central structure.
- **Fixed Bracket** - A fixed point (fixed bracket) that blocks that part of the system must be installed under the socket of each pipe, leaving the rest of the system free to expand. With fixed brackets, no longitudinal movement is possible and the pipe/fitting is firmly secured and cannot be moved.
- **Sliding Bracket** - Sliding brackets allow longitudinal movement. Post installation, the pipe can be moved through the bracket, even when the clamp and screws are tightened.



# Skolan Safe®:

*Plan calm with us for a quiet solution...*

**Skolan**  
safe®

**NEW**

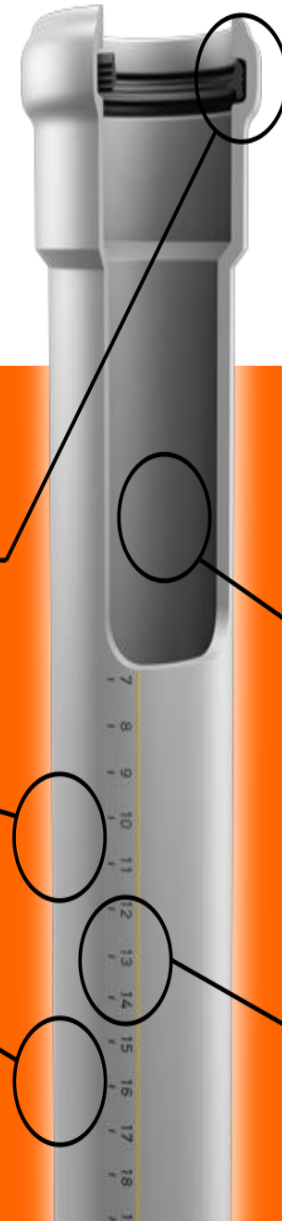
Patented 3 lip seal  
Simple and secure  
installation

**NEW**

Smoother outside  
surface  
With anti-smearing  
properties

**NEW**

Color  
Lightgrey RAL 7035



Hydraulically  
smooth inner  
surface

**NEW**

Increased level of  
sound insulation  
through a frictionless  
water flow

Proven centimeter  
marking:  
For simple and quick  
installation







**THANKS**