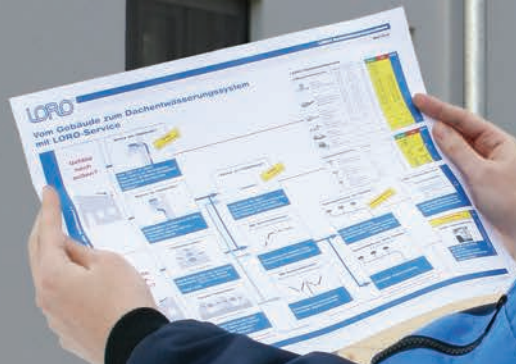


Online design at
www.loro.de

LORO[®]

From the building to the LORO-X roof drainage system

**ready for tendering, ready for fitting, with design
tables and LX data sheets for architects,
designers and planning installers**



Dear Customer,

Thank you very much for having decided in favour of original LORO-X roof drainage systems in your designs.

“From the building to the LORO-X roof drainage system”. In line with this motto, this LORO-X design booklet will help you choose the optimum roof drainage system. The examples of LORO-X applications and the summary tables on the following pages will guide you to the LX data sheets you need.

LORO-X data sheet service

A large number of standard drainage tasks can be solved simply with a prefabricated roof drainage system according to the LX data sheet. A LORO-X data sheet is the proof of performance for a prefabricated roof drainage system measured in our test fields. In this design booklet, we would like to offer you a selection of our prefabricated roof drainage systems for your design work.

LORO-X service team

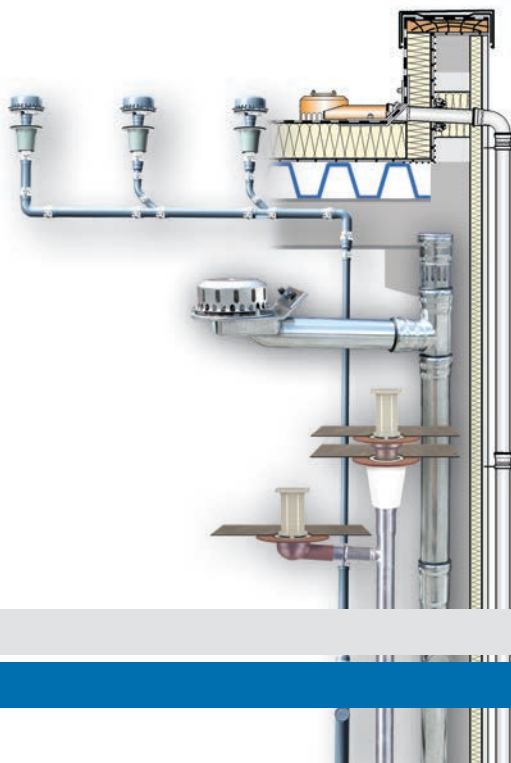
Optimum service and the highest quality have been day-to-day realities since 1954 at the LOROWERK factory. Our LORO-X service team of office-based and field workers will be pleased to help you prepare the LORO-X roof drainage system. Over the telephone, at your office or on your building site.

LORO-X special solutions can also be implemented promptly thanks to the flexibility of steel, since our LORO-X production team works hand-in-hand with our service team. We would be pleased to get your call on +49(0)5382-71-0. Or visit us at www.loro.de.

Yours faithfully,
the LORO-X service team



LOROWERK in Bad Gandersheim



**LOROWERK
K.H. Vahlbrauk GmbH&Co.KG**

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Roof drainage technology

Prefabricated roof drainage:
LORO-X roof drainage systems for
parapet roofs and flat roofs
LORO-X 1st principle
of roof drainage technology

by Dipl.-Ing. Wolfgang Vahlbrauk:

Prefabricated LORO-X roof drainage systems made at the LOROWERK factory, consisting of the drains, pipes and pipe fittings, provide optimum and reliable drainage for the roof of a building.

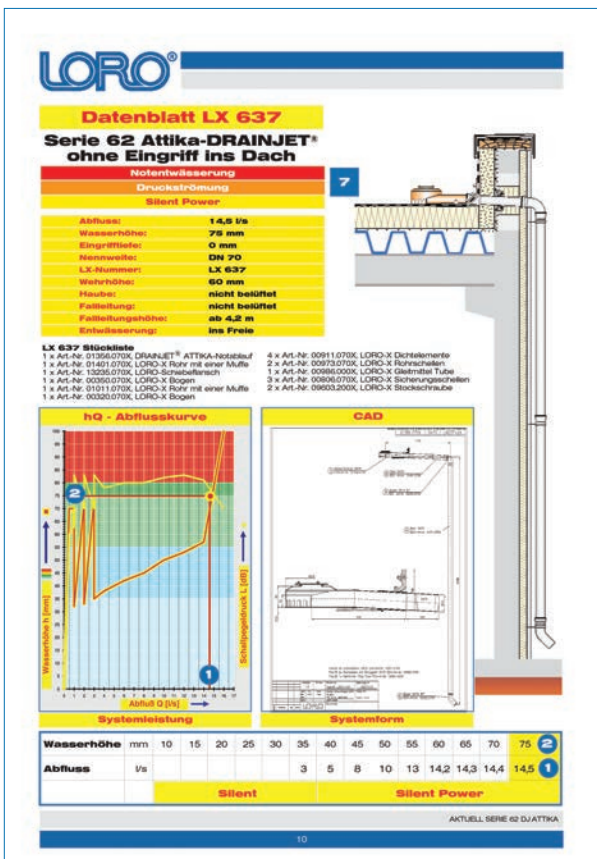
The reliability and speed of the roof drainage are achieved through prefabricated LORO-X roof drainage systems, with their trusted system performance, employing controlled water-air flow. The reliable LORO-X roof drainage system is designed and prefabricated as a whole.

LORO is responsible for the idea of prefabricating the entire roof drainage system for parapet roofs, comprising the drains, pipes and pipe fittings, as a whole in the LOROWERK factory in accordance with the data sheet, and installing the whole on-site in the building in accordance with the data sheet.

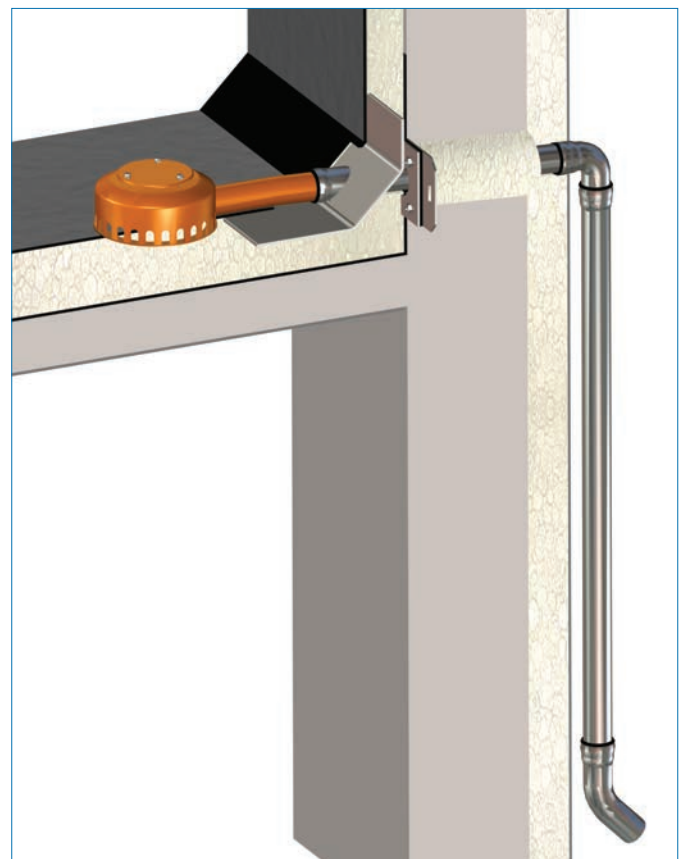
LORO offers the prefabricated LORO-X roof drainage systems from one source, so that any parapet roof or flat roof can be provided with optimum, reliable drainage.



Prefabricated LORO-X roof drainage system



LORO-X data sheet



Prefabricated LORO-X roof drainage systems

Roof drainage technology

LORO-X 2nd principle of roof drainage technology

by Dipl.-Ing. Wolfgang Vahlbrauk:

A roof drainage system provides reliable and optimum drainage with objective comparability, if it is designed and manufactured as a prefabricated LORO-X roof drainage system according to the LORO-X data sheet.

LORO-X data sheets include

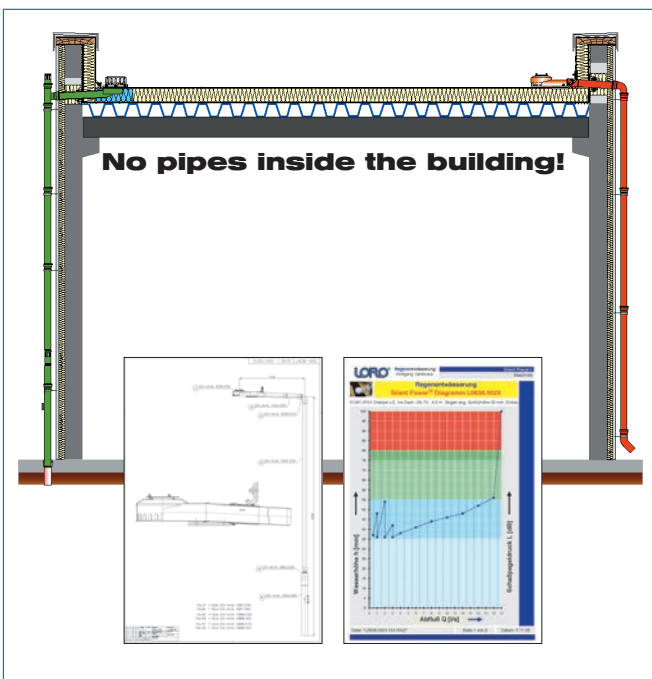
1. LORO-X properties list
2. LORO-X application diagram
3. LORO-X parts list
4. LORO-X drawing
5. LORO-X discharge curve (water level/outflow function)
6. LORO-X water level/outflow table
7. LORO-X calculation

LORO-X data sheets for the prefabricated LORO-X Roof drainage systems with drawing and discharge curve demonstrates that the roof drainage systems optimally and reliably drain the building roofs in every application.

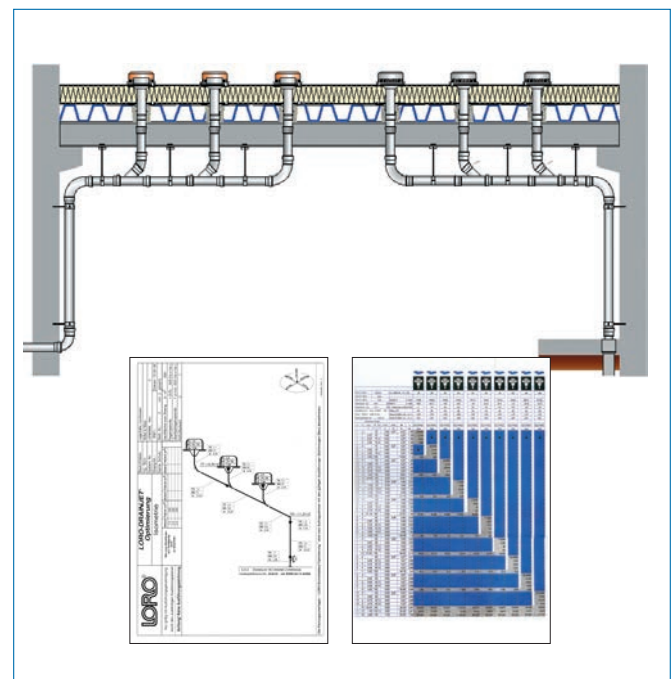
In this way, partners in the building industry solve all the roof drainage tasks for buildings with parapet and flat roofs using prefabricated LORO-X drainage systems working together with the LORO-X service team.



LORO-X service team



Prefabricated LORO-X roof drainage systems for parapet roofs with LORO-X data sheet



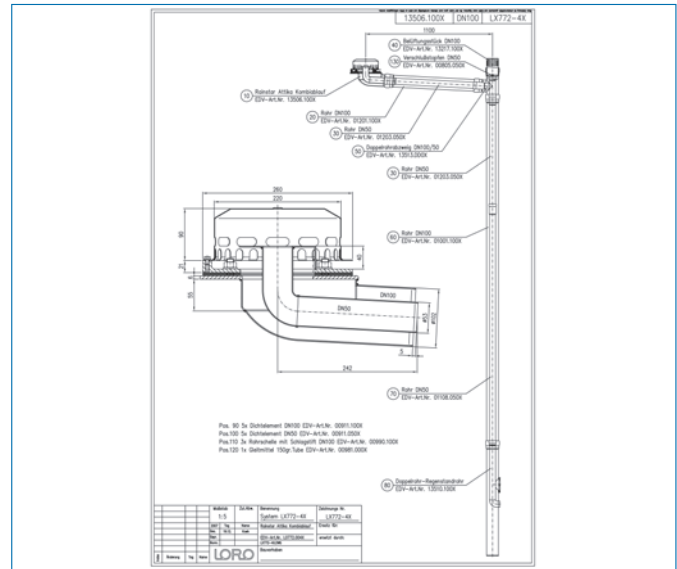
Prefabricated LORO-X roof drainage systems for flat roofs with LORO-X data sheet

Roof drainage technology

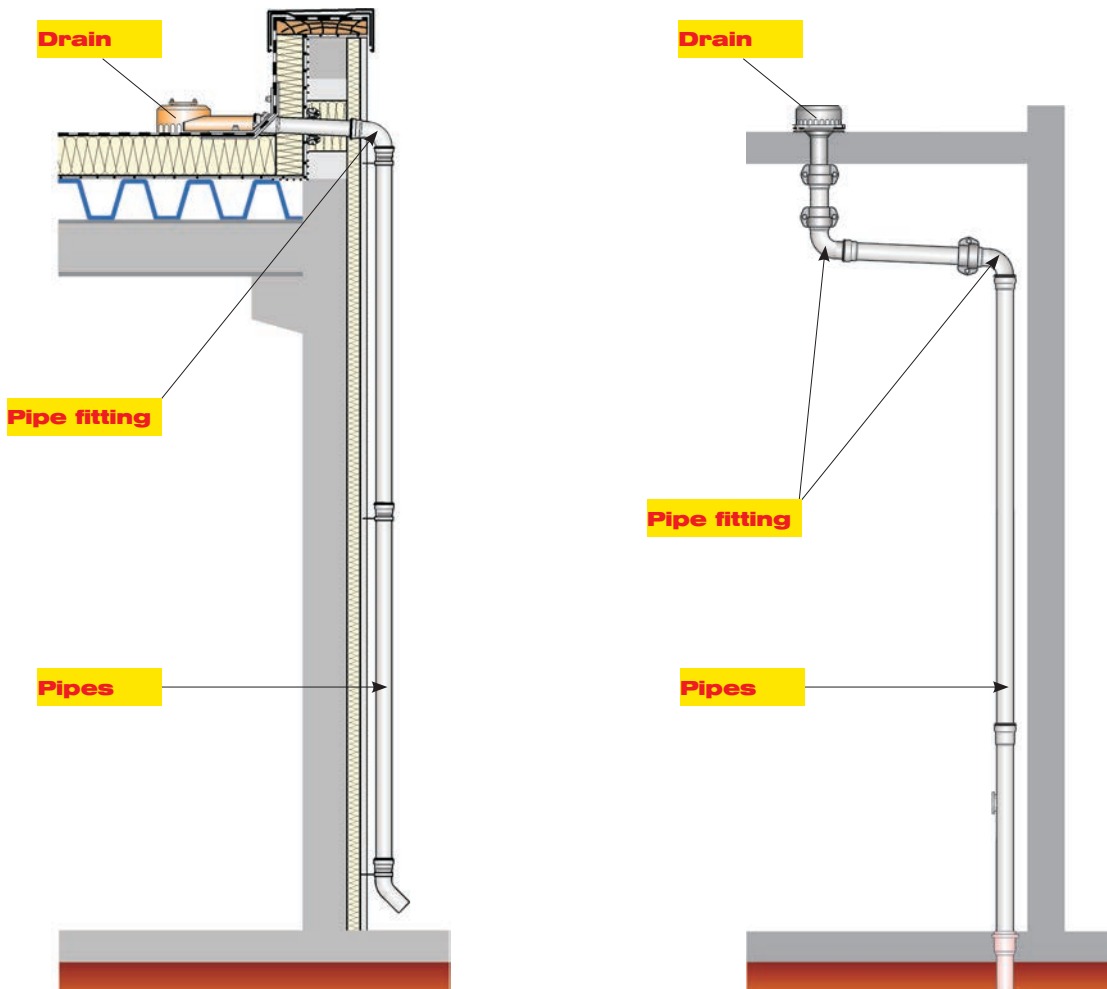
System design and LORO-X CAD drawing

A LORO-X roof drainage system as a flat roof drainage system, scupper drainage, balcony drainage or gutter drainage system consists of drains, pipes and pipe fittings. These primary system components of a roof drainage system together implement the system design.

Since the selection of system components has an effect on the performance of the roof drainage system, the selection of the system components is a particular importance. For that reason, no system part may be exchanged without being tested anywhere along the chain of design, sales and installation.



LORO-X CAD system drawing



System form of LORO-X scupper drainage systems and roof drainage systems

Roof drainage technology

System performance and LORO-X discharge curve

The discharge curve is the characteristic of a roof drainage system. The LORO-X discharge curve in the LORO-X data sheet demonstrates the performance of a LORO-X roof drainage system and supports design of the roof drainage.

The LORO-X discharge curve is measured by LORO in the LORO-X test fields, where the LORO-X roof drainage systems are installed with the system design in accordance with the standards.

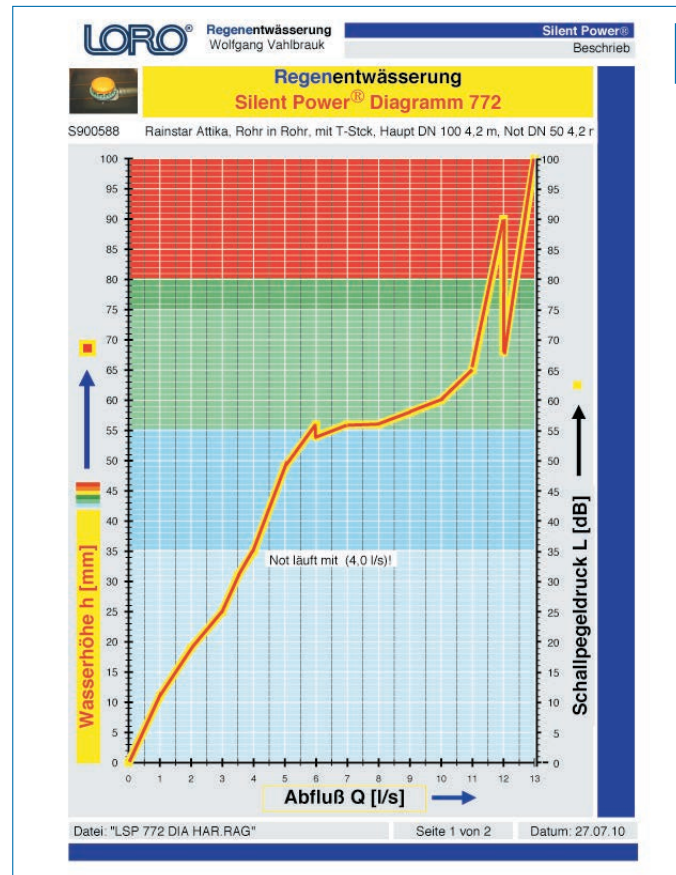
The **LORO-X discharge curve** shows the water level (red-yellow line) on the roof in relation to the discharge rate from the roof of the building in diagrammatic form. The values supporting the discharge curve are also given in tabular form. A water level of one millimetre corresponds to 1 kg of roof loading per square meter.

The diagram of the LORO-X discharge curve illustrates the range of figures for the water level corresponding to the limits given in the standard as coloured layers:

1. Gravity flow region (light blue):
water level up to 35 mm
2. Pressure flow region (dark blue):
water level up to 55 mm
3. Emergency drainage region (light green):
water level up to 75 mm

The LORO-X factory standard goes beyond the usual standard also in that it requires that a maximum water level of 75 mm on the roof is not exceeded even under emergency drainage, in order to permit safe design even on lightweight roofs without having to “convert” the weir heights. The weir under the hood invented and patented by LORO allows the full performance of pressure flow to be achieved with a water level of only 15 mm above the weir element. This means that even if the weir element is 60 mm high, the water level on the roof can remain at 75 mm.

The rate of outflow Q [l/s] measured for each water level is shown on the LORO-X discharge curve diagram along the horizontal axis.



LORO-X discharge curve as a diagram

Wasserhöhe	mm	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	
Abfluss	l/s	0,5	1,2	1,5	2,1	3	4	4,5	4,7	4,9	5,1	8	12,0	12,3	12,6	12,7	
		Silent						Silent Power									

LORO-X discharge curve as a table



LORO-X test field

External downpipe

Flat roofs with fall to the outside

are often drained using scupper drainage systems. "Parapet" means "roof edge upstand as a wall-like structure at the edge of the roof of the building together with the roof edge closure instead of a gutter". Scupper drainage, like gutter drainage, is a fully external drainage system for flat roofs.

LORO-X scupper drainage systems as a complete system, consisting of drains, pipes and pipe fittings for the main and emergency drainage, offer planners and installers a reliable proof of performance in the form of a defined system design (a modular standard system) and the reliable system performance that results from that in the form of a discharge curve. This applies both to scupper drainage systems with pressure flow and to systems with gravity flow.

The particular optimisations offered by the LORO-X scupper drainage systems offer, in nearly every application, the optimum external drainage system for your building.

Interior downpipe

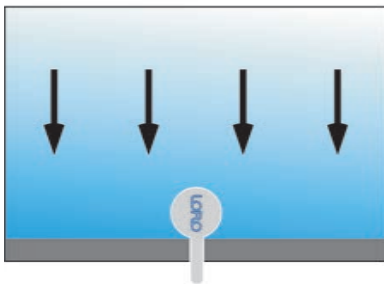
Flat roofs with fall to the inside

are usually drained using interior roof drainage systems. "Interior" refers to a roof drainage system in which a roof drain with a vertical connection to a pipe system is installed inside the building. This usually requires a core hole through which the roof drain is connected to the pipe system.

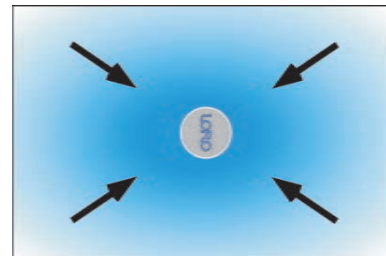
LORO-X roof drainage systems feature space-saving dimensions and a high discharge capacity with a narrow pipe diameter.

LORO offers the optimum roof drainage system for every roof structure. Thus each roof drainage system can be configured as a single-piece version (for cold roofs) or as a two-piece version (for roofs with thermal insulation). You may also select the system with additional thermal insulation at the drain or, in areas subject to heavy risk of frost, with trace heating. Simply use the online configurator to find your optimum system.

With scupper drainage:



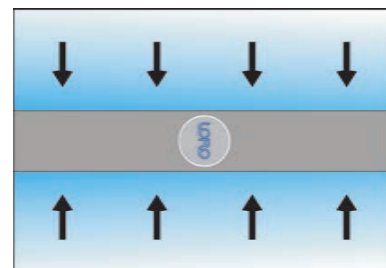
With roof drainage:



With box gutter drainage:

In this case a sealed joint is made between the roof drain and the box gutter, the drain passing vertically from the box gutter through the pipework system in the building.

LORO offers high-performance solutions for a variety of interior box gutter systems.



One drain per downpipe

Scupper and roof drainage systems with only one drain per downpipe can be designed for standard situations using the LX data sheet and modified to match the building. Our service team would be happy to receive your call for individual pipework design. Typical pipes and pipe fittings can be found starting from page 63.

Regardless of whether conventional gravity flow or modern pressure flow is used, the proof of performance with the precision of a CAD-designed system and a discharge curve accurate to the millimetre offers optimum proof of performance.

Please note our LX data sheets are available at www.loro.de!

Parapet:

LORO[®]
Datenblatt LX 479
Attikaentwässerung
Serien 79/88 RAINSTAR[®]

Hauptentwässerung
Freispiegelförderung
Silent Power[®]

Abfluss: 80/88
 Wasserhöhe: 38 mm
 Eingriffsbreite: 100 mm
 Normmaß: DN 100
 LX Nummer: LX 479
 Rohrmaterial: Ø mm
 Material: nicht bestückt
 Füllhöhe: bestückt
 Einbaueinrichtung: in Grundablage
 Flanschmaß: Ø mm

LX 479 Bezeichnungsliste

1 = Anflr. 0121100, LORO-Rohr mit einer Stufe	2 = Anflr. 0091100, LORO-Drainrohr
1 = Anflr. 0020100, LORO-Abfluss	1 = Anflr. 0030100, LORO-Drainrohr
1 = Anflr. 0010100, LORO-Rohr mit einer Stufe	1 = Anflr. 0040100, LORO-Drainrohr
1 = Anflr. 0030100, LORO-Drainrohr	2 = Anflr. 0050100, LORO-Drainrohr
1 = Anflr. 0040100, LORO-Drainrohr	2 = Anflr. 0060100, LORO-Drainrohr

HQ - Abflusskurve

GAD

Systemeinstellung

Wasserhöhe mm	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
Abfluss l/s	1,1	1,8	2,6	3,5	4,4	5,4	6,3	7,2	8,0	9,0	10,0	11,2	13,3		

Systemform

	Silent	Silent Power	Power
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Multiple drains per downpipe

A more extensive design calculation is required for roof drainage systems with multiple drains that are brought through a horizontal collecting pipe to one downpipe.

Collecting pipes for gravity flow always have an incline. Each partial section between the individual drains is separately dimensioned. The discharge capacity of each partial section depends largely on the incline and on the nominal diameters of the sections.

Gravity flow:

With incline and larger nominal diameters



Roof:

LORO[®] LORO-DRAINLET[®] Dachentwässerungssysteme

Datenblatt LX 873
Dachentwässerung
LORO-X DRAINLET[®]

Hauptentwässerung
Freispiegelförderung
Silent Power[®]

Abfluss: 63/63
 Wasserhöhe: 38 mm
 Eingriffsbreite: 100 mm
 Normmaß: DN 100
 LX Nummer: LX 873
 Rohrmaterial: Ø mm
 Material: nicht bestückt
 Füllhöhe: bestückt
 Einbaueinrichtung: in Grundablage

LX 873 Bezeichnungsliste

1 = Anflr. 0121100, LORO-DRAINLET [®] Drainrohr	1 = Anflr. 0100100, LORO-Rohr mit einer Stufe
1 = Anflr. 0020100, LORO-Abfluss	1 = Anflr. 0030100, LORO-Drainrohr
2 = Anflr. 0030100, LORO-Drainrohr	1 = Anflr. 0040100, LORO-Drainrohr
1 = Anflr. 0100100, LORO-Rohr mit einer Stufe	1 = Anflr. 0050100, LORO-Drainrohr
1 = Anflr. 0100100, LORO-Rohr mit einer Stufe	1 = Anflr. 0060100, LORO-Drainrohr

HQ - Abflusskurve

GAD

Systemeinstellung

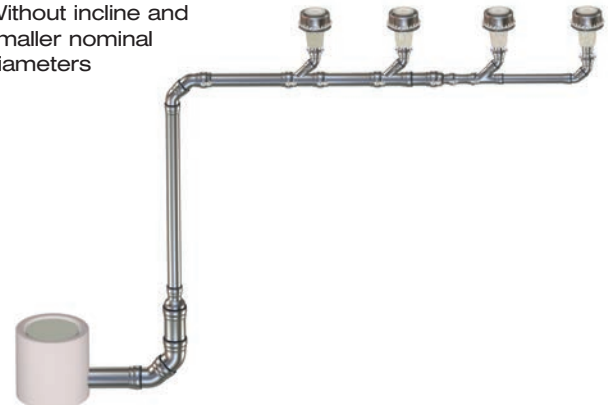
Wasserhöhe mm	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
Abfluss l/s	0,5	2,4	3,4	4,4	5,5	6,5	7,5	8,3	8,8	9,5	10,5	12	13,4	15,5	

Systemform

	Silent Power
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Pressure flow:

Without incline and smaller nominal diameters



Main drainage

At each low point on the roof it is the job of the LORO-X main drainage to pass the rainwater reliably and quickly from the roof into the sewer system. In order not to threaten the static strength of the building, it is important that the discharge capacity of the system is reached reliably even when the level of water on the roof is low.

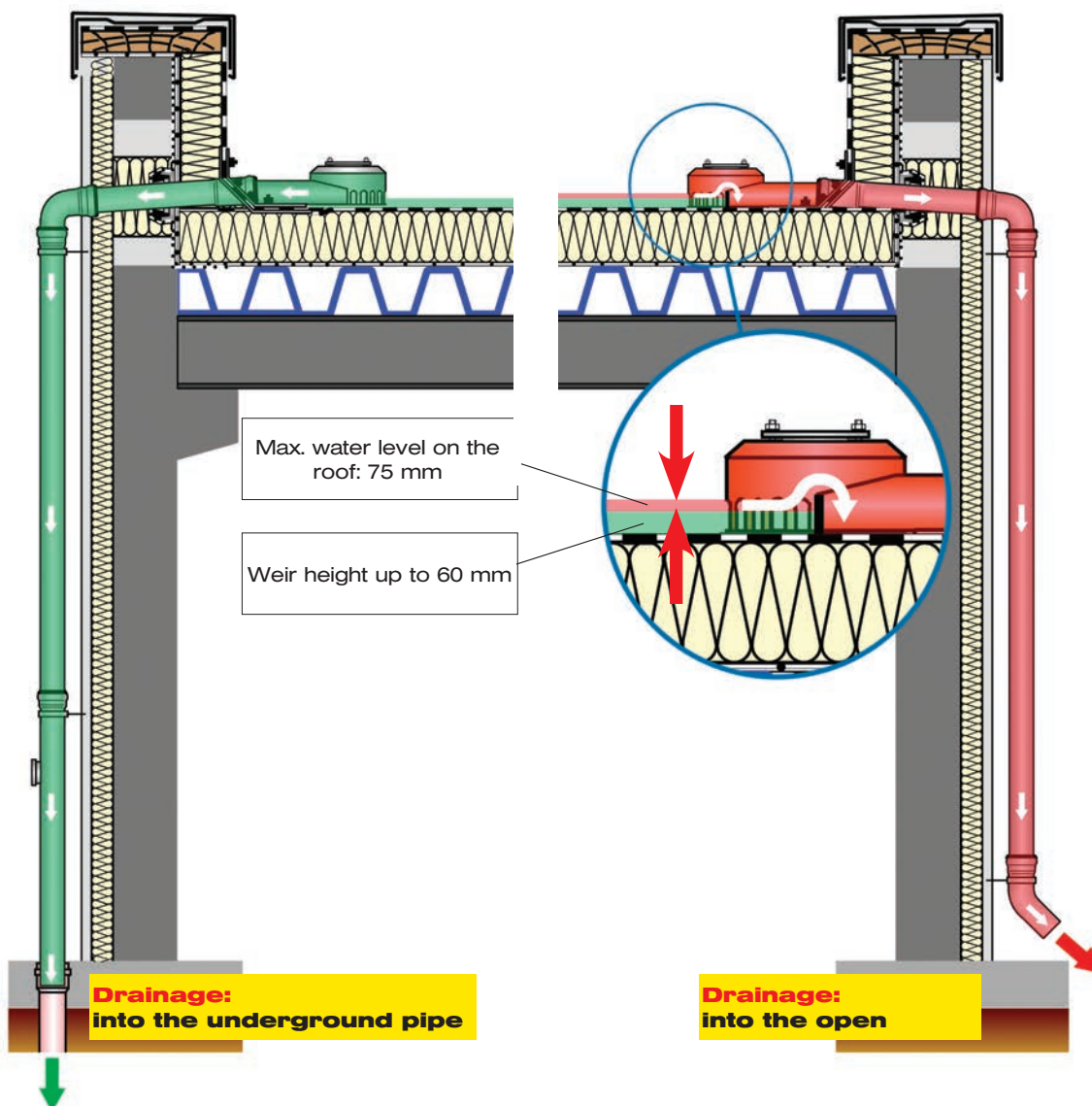
- **Drainage into the underground pipe**
- **Gravity flow:**
max. 35 mm water level
- **Pressure flow:**
max. 55 mm water level

Emergency drainage

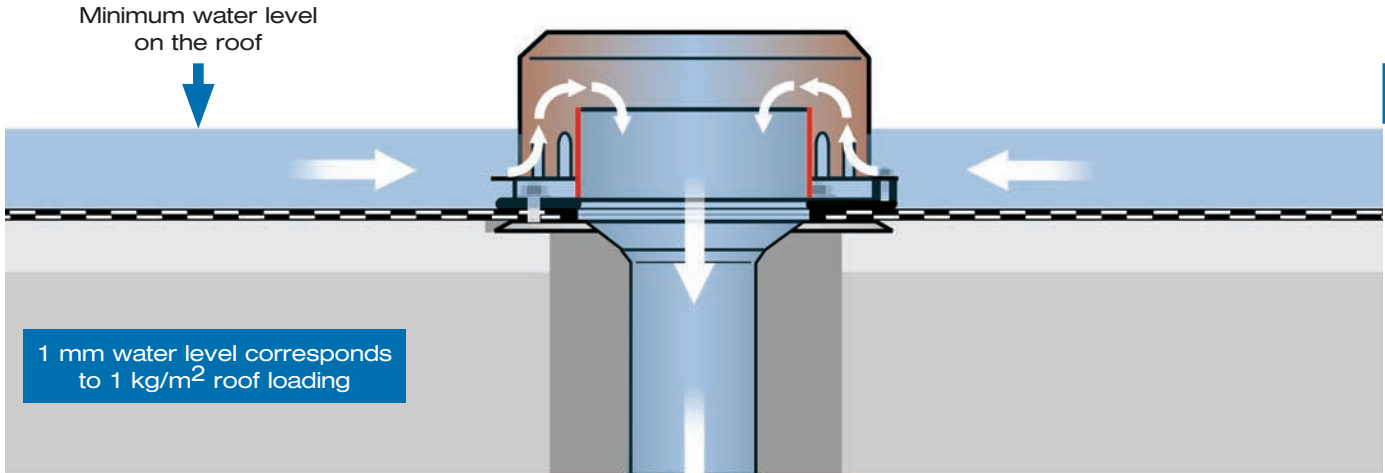
In accordance with DIN 1986-100 the LORO-X emergency drainage is to be included in the design in addition to the main drainage at every low point. It is the purpose of the emergency drainage to pass the rainwater to an area that can safely be flooded, and may not be connected to the outflow route of the main drainage. The emergency drainage system only operates in the event of a so-called once-in-a-hundred-year rain, or when the main drain – for instance due to overload of the underground pipe – is no longer able to operate, with the result that the water backs up onto the roof.

The rainwater is held back by the weir in the LORO-X emergency drain so that the emergency drainage does not normally operate. Only when the level of water on the roof is higher than the weir does safe drainage into the open commence.

- **Drainage into the open**
- **Max. 75 mm water level on the roof according to the LORO factory standard**
- **Weir heights between 35 mm and 60 mm**



LORO-X emergency weir under the hood

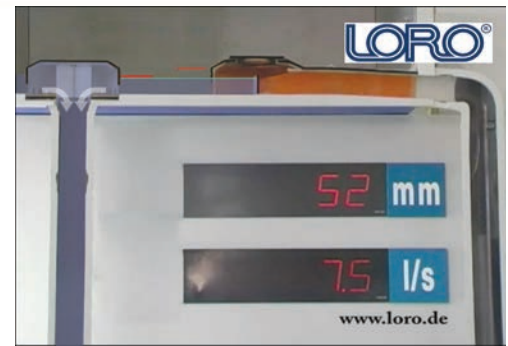


A minimum water level on the roof is particularly important for emergency drainage. With its outflow over the weir element, emergency drainage presents a particular challenge.

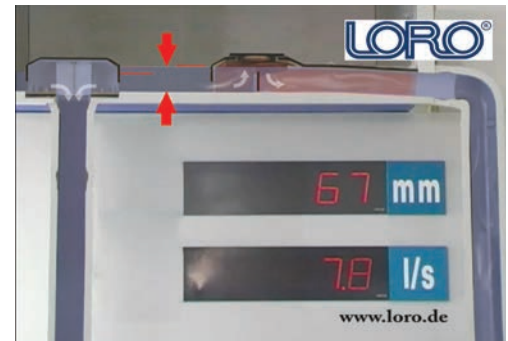
Often, the water level designed for on the roof for the main drainage is already between 35 mm and 55 mm. This is usually necessary, so that the discharge capacity of the main drainage system according to the design can be reached. The emergency drainage must therefore not operate until this water level is reached on the roof.

The height of the weir element for the emergency drainage results from the corresponding design water level for the main drainage, plus a safety clearance of about 5 mm to allow for waves and splashes.

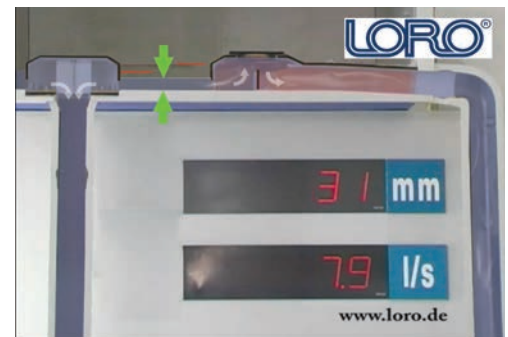
The “weir under the hood”, invented and patented by LORO, makes it possible to keep the level of water on the roof very low, being less than 75 mm throughout the whole of the discharge curve. When fully operating, this is lower than the height of the weir. (See photographs)



Stage 1: Emergency drainage not operating



Stage 2: Emergency drainage starts to work



Stage 3: Water level on the roof is lower than the water level in the drain

Gravity flow

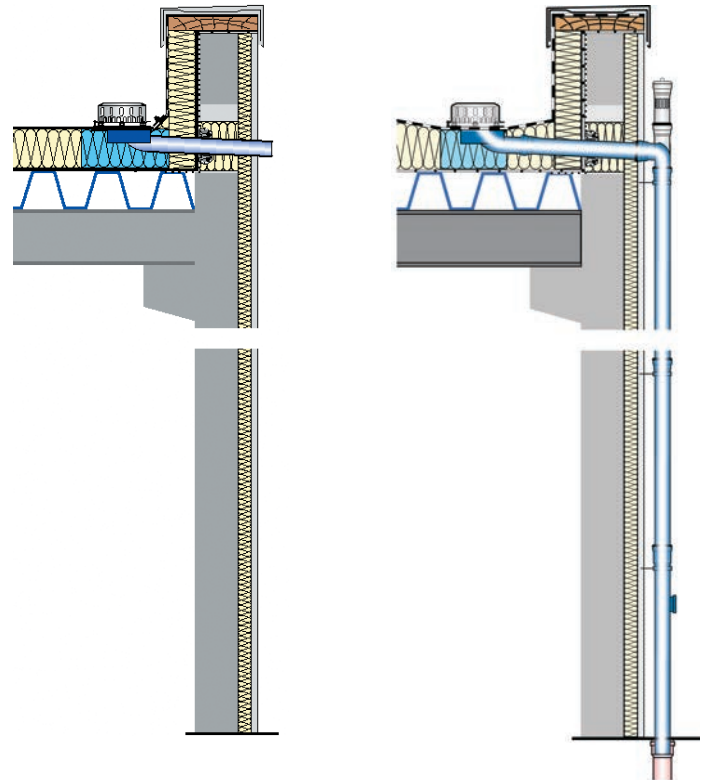
The limit value table for roof drainage according to the standard distinguishes between gravity flow and pressure flow, with limit figures in each case for the water level and the drain in relation to the nominal diameter of the pipe.

The mean flow rate for gravity flow lies between 0.3 m/s and 0.5 m/s. For pressure flow, the figures are between 1.9 m/s and 2.4 m/s (derived from Tables 1 and 2).

$$\text{Flow rate} = \frac{\text{discharge rate}}{\text{cross-sectional area of pipe}}$$

The rate at which the roof is drained is defined, according to Dipl. Ing. Wolfgang Vahlbrauk, as the ratio of the drain to the water level. The rate does not describe the rate of flow in the pipe, but is rather a measure for the discharge capacity of the system at a given water level on the roof. The higher the rate, the higher the discharge capacity that can be achieved even at a low water level.

$$\text{Rate} = \frac{\text{discharge rate}}{\text{water level}}$$



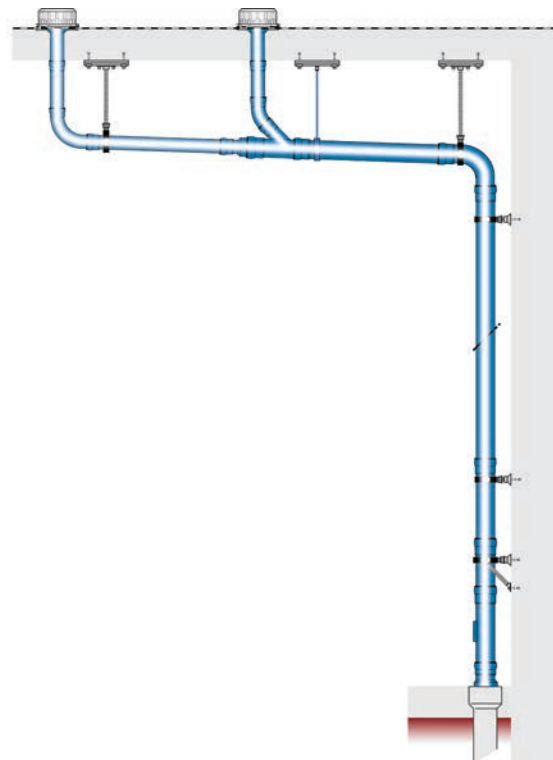
LORO-X scupper drainage with gravity flow

Gravity flow		
Nominal diameter of discharge pipe	Minimum discharge rate	Maximum permitted water level
-	l/s	mm
DN 40	-	-
DN 50	0.9	35
DN 70	1.7	35
DN 80	2.6	35
DN 100	4.5	35
DN 125	7.0	45
DN 150	8.1	45

Table 1:
Limit value table for roof drainage technology in accordance with EN 1253-1:2003 (D) and DIN 1986-100:2008-05

Pressure flow		
Nominal diameter of discharge pipe	Minimum discharge rate	Maximum permitted water level
-	l/s	mm
DN 40	3.0	55
DN 50	6.0	55
DN 70	12.0	55
DN 80	14.0	55
DN 100	22.0	55
DN 125	35.00	55
DN 150	50.00	55

Table 2:
Limit value table for roof drainage technology in accordance with EN 1253-1:2003 (D) and DIN 1986-100:2008-05
*Values printed in red are extensions from the LORO factory standard.



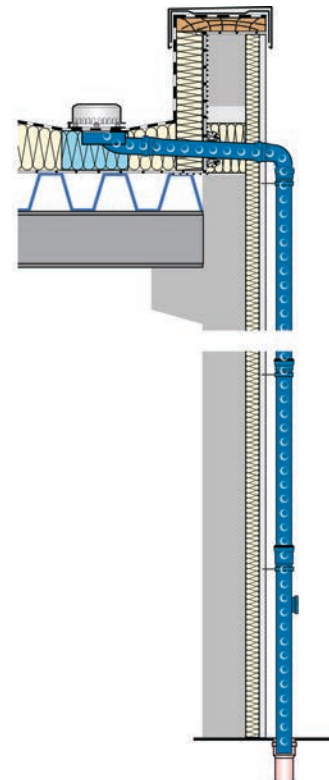
LORO-X roof drainage with gravity flow

Pressure flow

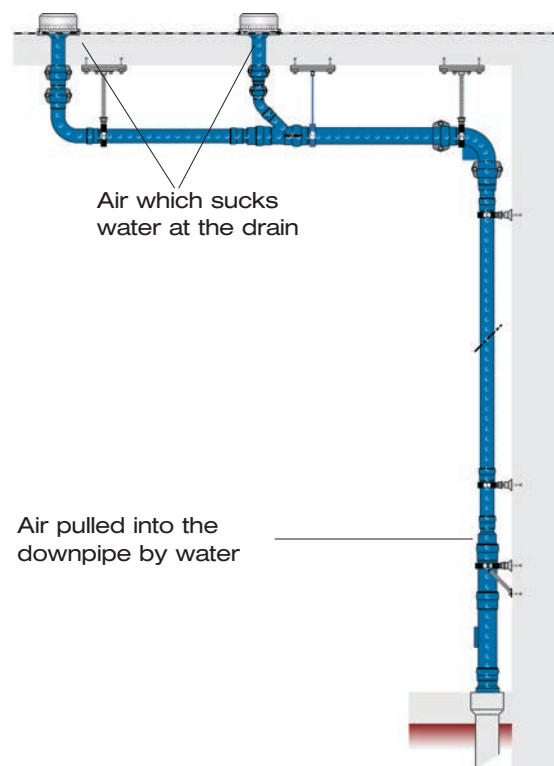
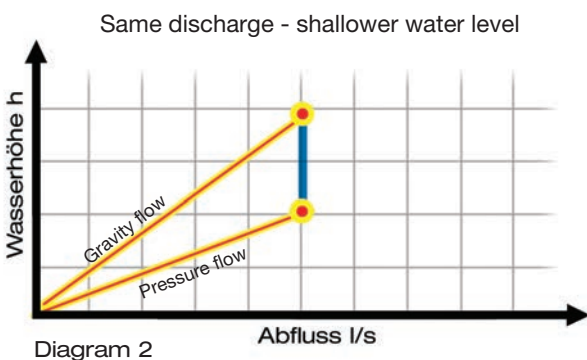
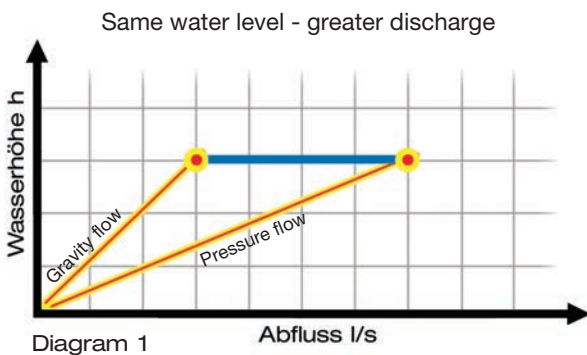
A roof drainage system with pressure flow discharges water at a greater flow rate than a roof drainage system with gravity flow; that is, with a greater discharge at a lower water level on the roof.

The LORO-X roof drainage systems including the LORO-patented system pipe fittings provide optimum discharge both for gravity flow and pressure flow. With pressure flow, the LORO-X scupper drains and roof drains suck water in a controlled way from the roof through air entrained in the LORO-X downpipe. The design of the system controls the flow of water and air throughout the roof drainage system, and so controls the system performance.

The greater speed of roof drainage using pressure flow makes possible either a greater discharge for a given water level (Diagram 1) or a shallower water level for the same flow rate (Diagram 2). Both diagrams illustrate the lower speed with gravity flow (steep curve) and the greater speed under pressure flow (flatter curve).



LORO-X scupper drainage with pressure flow



LORO-X roof drainage with pressure flow

Service team

LORO-X test fields

In addition to external tests, LORO-X roof drainage systems are subjected to our own strict testing in order to guarantee constant high quality and performance. For this reason, the LOROWERK factory in Bad Gandersheim has created a wide range of test fields, representing every application area and range of performance, used in the development and monitoring of LORO products.



e.g. **100 l drain tower**
Test field for roof drainage systems with high discharge performance

LX data sheets

Every LX data sheet has been prepared from measurements in one of the LORO-X test fields. The system structure, with the precision of CAD, and measurement of the water level that is accurate to the millimetre, together provide reliable demonstration of the discharge capacity. This proof of performance through the LORO-X discharge curve is unambiguous and in accordance with standards. It offers security to insurance companies and contractors, and is also a help for planners and planning installers.

Datenblatt LX 637

Serie 62 Attika-RAINJET® ohne Eingriff ins Dach

Notentwässerung	
Druckströmung	
Silent Power	
Abfluss:	14,6 l/s
Wasserhöhe:	75 mm
Eingrifftiefe:	0 mm
Nennweite:	DN 70
LX-Nummer:	LX 637
Wehrhöhe:	60 mm
Venture:	nicht belüftet
Fallleitung:	nicht belüftet
Fallleitungshöhe:	ab 4,2 m
Entwässerung:	ins Freie

LX 637 Stückliste

1 x Art-Nr. 01356.070X DRAINJET® ATTIKA-Notablauf	4 x Art-Nr. 00911.070X LORO-X Dichtelemente
1 x Art-Nr. 01401.070X LORO-X Rohr mit einer Muffe	2 x Art-Nr. 00973.070X LORO-X Flanschröhren
1 x Art-Nr. 13235.070X LORO-Schraubentisch	1 x Art-Nr. 00981.000X LORO-X Gleitmittel Tube
1 x Art-Nr. 00350.070X LORO-X Bogen	3 x Art-Nr. 00808.070X LORO-X Sicherungsschellen
1 x Art-Nr. 01011.070X LORO-X Rohr mit einer Muffe	2 x Art-Nr. 09603.200X LORO-X Stockschraube
1 x Art-Nr. 00320.070X LORO-X Bogen	

Systemleistung

Systemform

Wasserhöhe mm	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	
Abfluss l/s								3	5	8	10	13	14,2	14,3	14,4	14,5
	Silent											Silent Power				

AKTUELL SERIE 62 DJATTIKA

10

Online service

Calculation

Online Produktfinder | Online Berechnung | **Online Konfigurator** | Online Produktdatenbank | Online Ausschreibung

LORO-X Online Berechnung (für Flachdachentwässerung)

- Berechnen Sie die zu entwässernde Regenwassermenge Ihrer Dachfläche!
- Sie bekommen im nächsten Schritt eine Auswahl von LORO-X Attika-Dachentwässerungssystemen, mit der notwendigen Abflussleistung...
- Ausschreibungsfertig vom Ablauf bis zum Standrohr mit LORO-X Leistungsnachweis (LX-Datenblatt)

Dateneingabe der (Teil-) Dachflächen des Bauvorhabens**

Name / Ort Bauvorhaben:

Ihr Vor- / Nachname:

Ihre e-Mail Adresse:

Dachfläche in m²: m² (Pflichtfeld)

Dachaufbau (C):

Normal-Regenspende: (r5,5) in Liter/Second/10.000m²

Jahrhundert-Regenspende: (r5,100) in Liter/Second/10.000m²

Berechnen

- Dachgeometriemass muss Wasserzulauf zu den Abflüssen gewährleisten
- Fälligkeit bei Druckströmung mindestens 4 Meter
- Feiner Auslauf der Notentwässerung muss gegeben sein

Calculation of the discharge capacity

Unverbindliche LORO-X Online-Berechnung für

Sehr geehrte(r) Herr/Frau, Sie führten am 10.08.2011 eine Berechnung mit folgenden Werten durch:

Normal-Regenspende* (r5,5):	300 l/s/ha
Jahrhundert-Regenspende* (r5,100):	600 l/s/ha
Abflussbeiwert (C):	1
Fläche Gesamt:	500m ²

Aus den oben aufgeführten Angaben resultieren gemäß der Berechnungsformeln des Regenwasserabflusses nach DIN 1986-100 die folgenden Mindestabflusswerte für die o.g. Dachfläche (Tiefpunkt). Bitte vergewissern Sie sich, dass die Regenspenden zutreffen und dass die Dachkonstruktion so geplant wird, dass die entsprechende Regenwassermenge dem LORO-X Dachentwässerungssystem auch zugeführt werden kann. LORO übernimmt keine Gewähr für die Richtigkeit dieser Berechnung, im Zweifelsfall wenden Sie sich bitte an das LORO-X Infocenter.

Hauptentwässerung	Notentwässerung
15 l/s	15 l/s

Weiter zum Konfigurator

Configurator

Online Produktfinder | Online Berechnung | **Online Konfigurator** | Online Produktdatenbank | Online Ausschreibung

LORO-X Online Konfigurator

Konfigurieren Sie Ihr Dachentwässerungssystem gemäß der gewünschten Merkmale des Gebäudes. Haben Sie sich für ein Merkmal entschieden, verringert sich die Auswahl auf die noch möglichen alternativen Merkmalausprägungen. *Auswahl aufheben* macht eine Auswahl rückgängig.

Bitte die Online-Berechnung durchführen!
399
Systeme verfügbar
Bitte weiter eingrenzen

- 1. Entwässerung**
Attika, Dach, Dach-waagerechter Abgang
- 2. Entwässerungsart**
Hauptentwässerung, Notentwässerung, Haupt-Not-Kombi
- 3. Strömungsart**
Freispiegelströmung, Druckströmung
- 4. Nennweite**
DN 40, DN 50, DN 70, **DN 100**, DN 125, DN 150
- 5. Dachabdichtungsbahn/Flansch**
(Attika) Kunststoff 90° Klemmflansch, (Attika) Bitumen 45° Klemmflansch, (Attika) Bitumen 45° Klebeflansch, (Attika) Kunststoff/Bitumen Klemmflansch ohne Aufkantung, (Dach) einteilig ohne Wärmedämmung, (Dach) zweiteilig ohne Wärmedämmung, (Dach) einteilig mit Wärmedämmung, (Dach) zweiteilig mit Wärmedämmung, (Dach) einteilig mit WD+Heizung, (Dach) zweiteilig mit WD+Heizung
- 6. Maximale Eingriffstiefe (nur bei Attika)**
Maximal 106mm, Maximal 102mm, Maximal 92mm, Maximal 55mm, Maximal 0mm

Selection of the system

Foto	LX-Nummer und Beschreibung	Anzahl der Systeme basierend auf Online-Berechnung	
	LX479-2X 45° Klemmflansch Haupt/Main: 5.4 l/s	1	<input type="text" value="x"/> System auswählen und Daten in Produktdatenbank anzeigen
	LX487-2X 45° Klemmflansch Haupt/Main: 4.9 l/s	1	<input type="text" value="x"/> System auswählen und Daten in Produktdatenbank anzeigen
	LX488-2X 45° Klemmflansch Haupt/Main: 3.6 l/s	1	<input type="text" value="x"/> System auswählen und Daten in Produktdatenbank anzeigen

Online service

Product database

Online Produktfinder | Online Berechnung | Online Konfigurator | Online Produktdatenbank | Online Ausschreibung

Suche in LORO-X Produktdatenbank

Beispiele: "LX769" für LX-System
"57769.COC" für Art.Nr.
"Attikastr" für Stichwort

LX487

Für jeden LORO-X Artikel
- Fotos
- 2D und 3D CAD Dokumente als .dwg
- Maßzeichnungen als PDF

Für jedes LX-Komplettsystem
- 2D und 3D Komplettsysteme als .dwg
- LX-Datenblätter als PDF

LX-Komplettsysteme

LORO-X Dachentwässerungs-Komplett-System LX487
Mit 45° Klemmflansch

EDV Daten
LX487-2X
45° Klemmflansch

Bestehend aus:

- 1 x 01360.100X - LORO-RAINSTAR.ATTIKA ABL.F.FREISP.55 MM EINBAUT.F.BIT.DN 100
- 1 x 01211.100X - LORO-X ROHR 1 MUFFE 750 MM DN 100
- 1 x 00200.000X - LORO-X ABZWEIG 90° CRAD DN 100 / 100
- 1 x 01001.100X - LORO-X ROHR 1 MUFFE 3000 MM DN 100
- 1 x 05510.100X - LORO-X STANDLM.R-DECK.1000 MM DN 100
- 1 x 00911.100X - LORO-X DICHTLEMENT DN 100
- 1 x 00975.100X - LORO-X ROHRSCH.ANSCHLÜG-GERÄT DN 100
- 1 x 00986.000X - LORO-X CLEITMITTEL 250-C-TUBE
- 1 x 00805.100X - LORO-X ENDKAPPE M.SCHRAUBVERSCHL.DN 100
- 1 x 09604.200X - STOCKSCHRAUBE M10 x 200 MM
- 1 x 13235.100X - LORO-SCHIEBEFL.M.ANSCHLÜGEMANSCH.BP.BIT.DN 100

LX-Datenblatt 487
dwg System CAD 2D
dwg System CAD 3D
Maßzeichnung (PDF)

4 x System

Multimedia data

Tendering

Online Produktfinder | Online Berechnung | Online Konfigurator | Online Produktdatenbank | Online Ausschreibung

LORO-X Online Ausschreiben

Erstellen Sie ganz einfach fertige Ausschreibungen und Bestell-Listen für Ihre LORO-X Produkte und Systeme

incl. csv-Export für Excel
incl. GAEB-XML Export für AWA

LV-Identifikationscode
 LV-Passwort

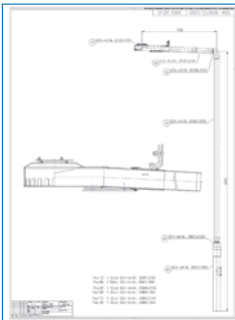
Leeres/Neues LV beginnen

Projektdaten:


Name und Ort des Bauvorhabens
 LORO Angebotsnummer
 Ansprechpartner (= Tel. oder eMail)

Wichtig: Korrekte Schreibweise der LORO-X Artikelnummern beachten: "00100.100X" immer mit führenden Nullen! Abweichungen führen zu einem unvollständigen LVI LORO übernimmt keine Gewähr. Zum "löschen" eines Artikels, bitte *0* als Menge eintragen.

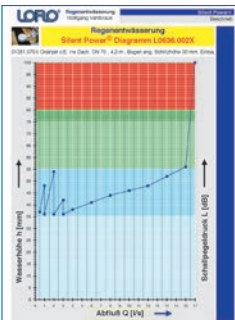
Pos.	Menge	LORO-X Artikelnummer	LORO-X Kurztext
1	4	01360.100X	LORO-RAINSTAR ATTIKA ABL.F.FREISP.55 MM
2	4	01211.100X	LORO-X ROHR 1 MUFFE 750 MM DN 100



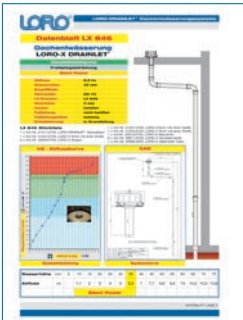
2D-CAD system
as .pdf and .dwg














3D-CAD system
as .dwg



2D-CAD system
as .pdf and .dwg



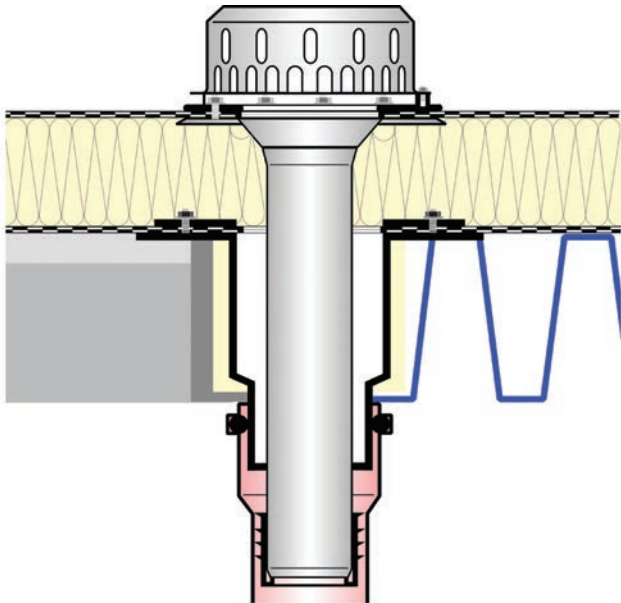
Proof of performance
in LX data sheet
as .pdf

Pos.	Menge	Artikel	Langtext	Einzelpreis	Preis	Gesamtpreis
Pos.1	4x	01360.100X	LORO - RAINSTAR Attikaablauf, für Freispiegelströmung, nach DIN EN 1223, mit Klemmflansch, als Löt- und Festflanschkonstruktion, für Einbauleiste 55 mm, für Stützen-Abdichtungsbahnen, aus Stahl, feuerverzinkt, innen zusätzlich beschichtet, mit Sockelbohr aus Edelstahl gefertigt, DN 100 ABM: 100			
Pos.2	4x	01211.100X	LORO-X Stahlrohrflusrohr nach DIN EN 1123, mit Steckmuffenverbindung (1 Muffe), aus Stahl, feuerverzinkt, Innenbeschichtung auf Basis 2K-Epoxyd-Kombination, Farbton: Rotbraun, 750 mm, DN 100 ABM: 100			
Pos.3	4x	00200.000X	LORO-X Abzweig nach DIN EN 1123, mit Steckmuffenverbindung, aus Stahl, feuerverzinkt, Innenbeschichtung auf Basis 2K-Epoxyd-Kombination, Farbton: Rotbraun, 87 Grad, DN 100 ABM: 100, ABM2: 100			
Pos.4	4x	01001.100X	LORO-X Stahlrohrflusrohr nach DIN EN 1123, mit Steckmuffenverbindung (1 Muffe), aus Stahl, feuerverzinkt, Innenbeschichtung auf Basis 2K-Epoxyd-Kombination, Farbton: Rotbraun, 3000 mm, DN 100 ABM: 100			
Pos.5	4x	05510.100X	LORO-X Regenständer, rund, mit Neigungsöffnung, nach DIN EN 1123, aus Stahl, feuerverzinkt, Innenbeschichtung auf Basis 2K-Epoxyd-Kombination, Farbton: Rotbraun, 1000 mm, DN 100 ABM: 100			
Pos.6	16x	00911.100X	LORO-X Dichtelement aus Elastomer, für GIBO-X Rohr-Steckmuffenverbindung, DN 100 ABM: 100			
Pos.7	12x	00975.100X	LORO-X Rohrbrille mit Anschlussgewinde M 10, aus Stahl, feuerverzinkt, ohne Schalldämmung, DN 100 ABM: 100			
Pos.8	4x	00986.000X	LORO-X Cleitmittel 250 Gramm			
Pos.9	4x	00805.100X	LORO-X Verschlussstopfen mit Schraubverschluss, mit Steckmuffenverbindung, aus Stahl, feuerverzinkt, Innenbeschichtung auf Basis 2K-Epoxyd-Kombination, Farbton: Rotbraun, DN 100 ABM: 100			
Pos.10	12x	09604.200X	LORO-X Stockschraube M 10, aus Stahl, verzinkt, 200 mm lang			
Pos.11	4x	13235.100X	LORO-Schiebeflansch mit Anschlussmanschete, aus Stahl, feuerverzinkt, für Dampfperle aus Gummi-Abdichtungsbahnen DN 100 ABM: 100			

Renovation

Application example I

Interior roof drainage



Recommended systems

Main drainage

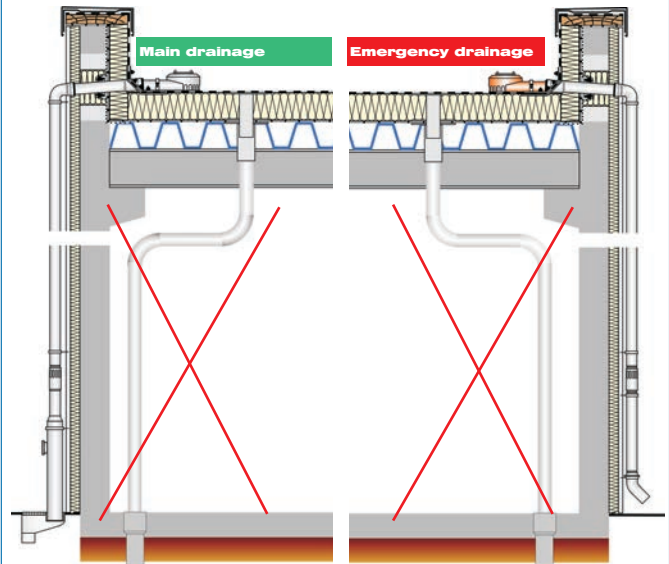
Gravity flow



LORO-DRAINLET®
flat roof renovation drain
DN 80 - DN 125
Item no. 21518X

Application example II

Exterior scupper drainage without interfering in the roof



Recommended systems

Main drainage

Pressure flow



LORO-DRAINJET®
scupper roof drainage system
DN 70

LX636

Emergency drainage

Pressure flow



LORO-DRAINJET®
emergency scupper drainage
system, DN 70

LX637

Special features:

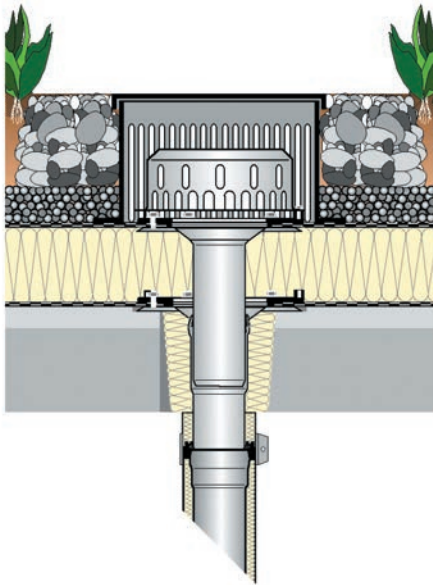
In the course of renovation, the existing drainage system is often exploited. Here the roof drain, and the connection to the new sealing sheet, are replaced. LORO offers special renovation drains for interior roof drainage for this purpose. As an alternative, unattractive cast iron or plastic pipes can be dismantled, and replaced by complete, high-performance LORO-X systems.

Without installing pipes in the building, the main drainage and the emergency pipes drainage (to be retrofitted) can be achieved, for example, through inclined insulation via the parapet. Interior pipes can then be dismantled or decommissioned.

Green roof

Application example I

Interior roof drainage



Recommended systems

Main drainage

Gravity flow



+



Inspection shaft
19973.000X

LORO-DRAINLET®
roof drainage system

LX873

Emergency drainage

Gravity flow



+



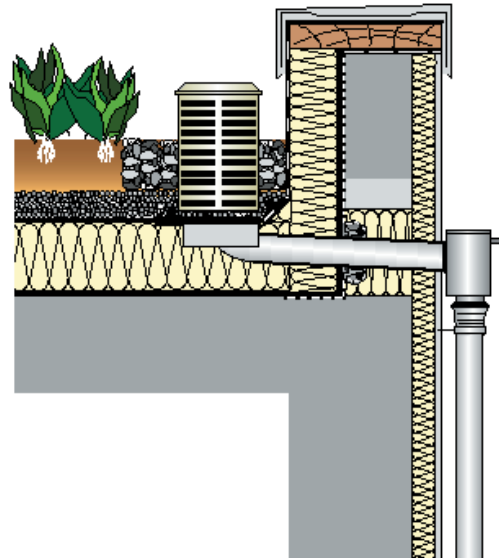
Inspection shaft
19973.000X

LORO-DRAINLET®
emergency drainage system

LX875

Application example II

Scupper drainage, exterior



Recommended systems

Main drainage

Gravity flow



LORO-RAINSTAR® roof drainage systems for green roofs
DN 100
consisting of:
LORO-RAINSTAR® scupper drain body,
Item no. 01376.100X
Loose flange
Item no. 01378.000X
LORO strainer unit for inverted roof,
Item no. 19494.000X

Special features:

The drainage of a green roof presents a particular challenge to the drainage system.

1. The delayed approach of the water to the drainage system must be taken into account.

Calculation coefficient C for dimensioning the roof area:

C = 0.5 for vegetation layers less than 10 cm

C = 0.3 for vegetation layers more than 10 cm

2. Soiling hazard

presented by soil and gravel requires the inclusion of an inspection shaft to protect from soiling and for servicing purposes. The servicing intervals in accordance with the standard must be maintained, and may need to be shortened.

Industrial roofs

Application example I

High-performance roof drainage, interior



Up to 3000 m² roof area at up to 100 l/s

Recommended systems

Main drainage
Pressure flow



LORO-DRAINJET®
roof drainage systems
DN 125 - DN 150

LX960

Emergency drainage
Pressure flow

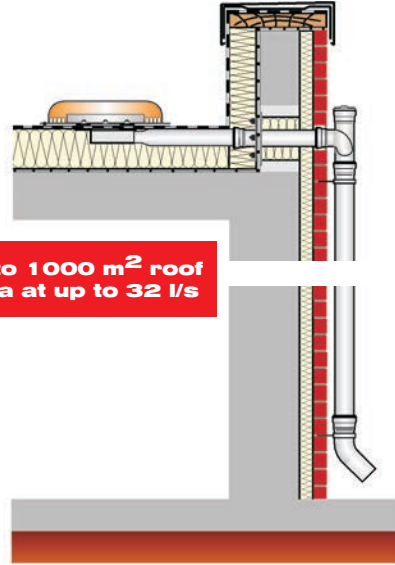


LORO-DRAINJET®
emergency drainage systems
DN 125 - DN 150

LX961

Application example II

High-performance scupper drainage, exterior



Up to 1000 m² roof area at up to 32 l/s

Recommended systems

Main drainage
Pressure flow



LORO-ATTIKASTAR®
roof drainage systems
DN 100

LX803

Emergency drainage
Pressure flow



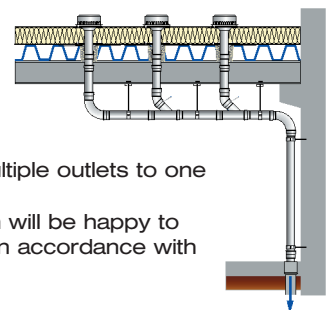
LORO-ATTIKASTAR®
emergency drainage systems
DN 100

LX766

Special features:

In order to facilitate the efficient and economical drainage of large roof areas, LORO-X high-performance systems permit the removal of up to 1000 m²/outlet for scupper drainage and the removal of up to 3000 m²/outlet in pipe systems with an interior location. The full LORO-X roof drainage system must be laid in accordance with the LX data sheet if this high performance figure is to be achieved. It is necessary to ensure at the planning stage that the pitch of the roof construction can feed water quickly enough to the appropriate low points / high-performance systems.

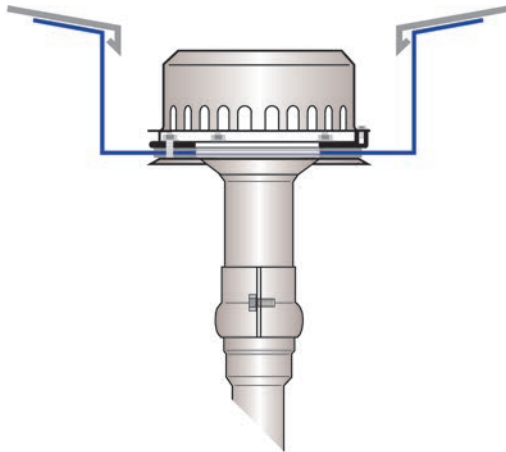
Alternatively:
Pressure flow systems with multiple outlets to one collecting pipe without fall.
The **LORO Service Team** will be happy to carry out this planning for you in accordance with your drawings.



Box gutter

Application example I

vertical in the box gutter



Recommended systems

Main drainage
Pressure flow



LORO-DRAINJET[®]
roof drainage systems,
DN 100

LX530

Emergency drainage
Pressure flow

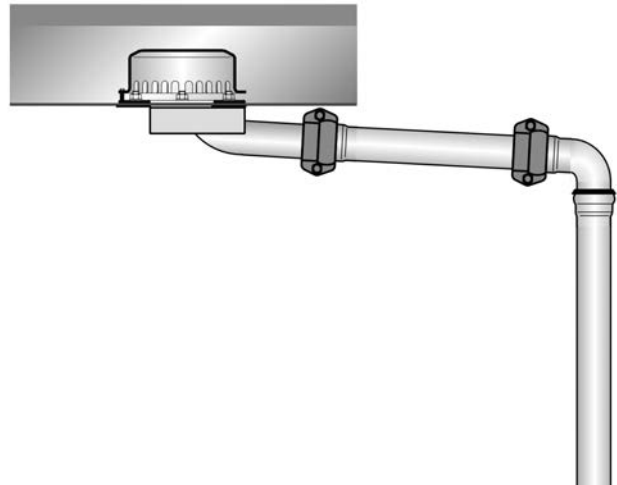


LORO-DRAINJET[®]
emergency drainage systems,
DN 100

LX842

Application example II

horizontal at the end of the box gutter



Recommended systems

Main drainage
Pressure flow



LORO-RAINSTAR[®]
scupper roof drainage
systems, **DN 100**

LX480

Emergency drainage
Pressure flow



LORO-RAINSTAR[®]
scupper roof drainage
systems, **DN 100**

LX482

Special features of the box gutter

Typically, a box gutter for two roof surfaces can be emptied at both ends, or at one end for a single roof surface. The box gutter can be located above a living room or other usable room, or may protrude freely from the edge of the roof.

Depending on local conditions, the pipe system may pass vertically downwards, or may have an offset.

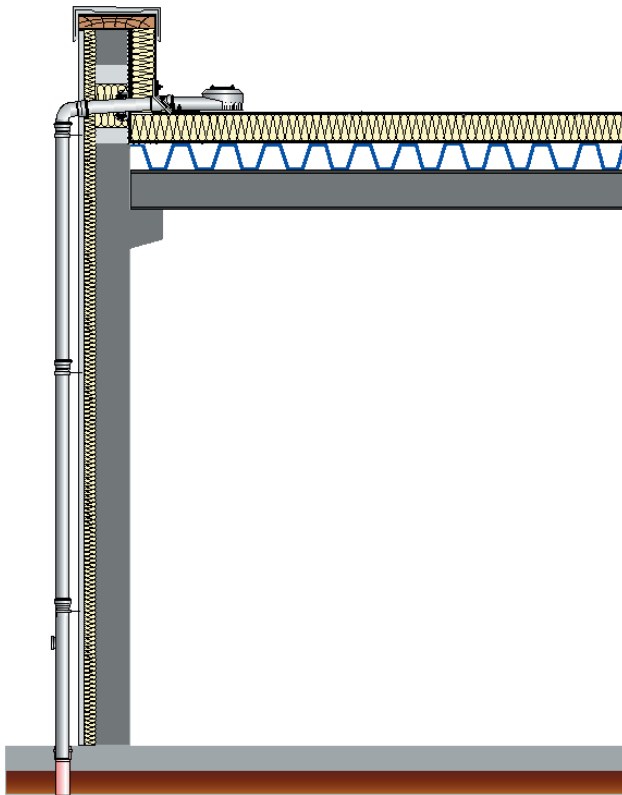
As a matter of principle, pressure flow or gravity flow can be employed with the box gutter.

The design and planning process will provide the dimensions for the box gutter. When dimensioning the width of the gutter, it must be remembered that there must be at least around 20 mm of clear space surrounding the outlet, so that the water can flow around it.

Low-energy roof without thermal bridges

Application example I

Scupper main drainage



Recommended systems

Main drainage
Pressure flow

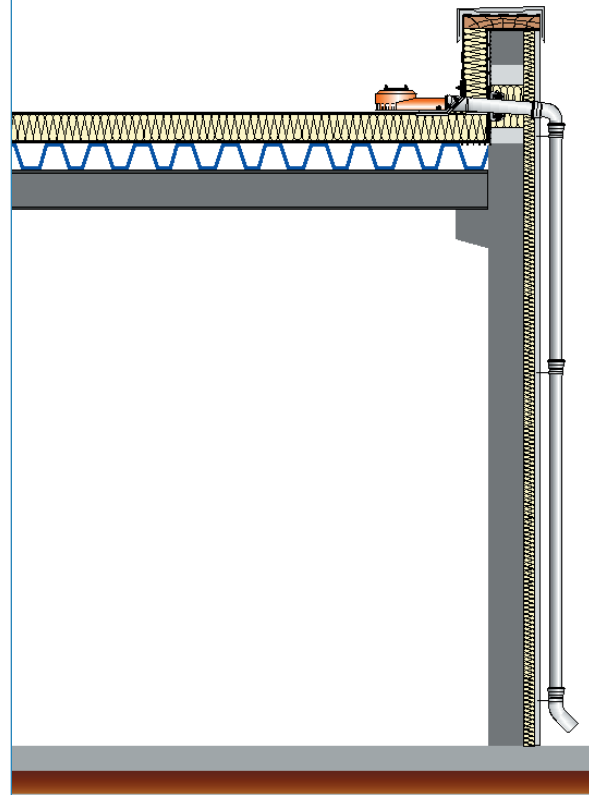


LORO-DRAINJET[®]
scupper roof drainage system,
DN 70

LX636

Application example II

Emergency scupper drainage



Recommended systems

Emergency drainage
Pressure flow



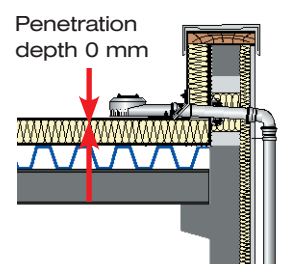
LORO-DRAINJET[®]
emergency scupper drainage
system, **DN 70**

LX637

Special features of the low-energy roof

Draining the roof of energy-saving buildings must not result in any unnecessary thermal bridges through the roof into the building. For this reason, all LORO-X scupper drainage systems have been designed to be fitted appropriately. In order to avoid thermal bridges into the thermal insulation as well, the LORO-X ATTIKA DRAINJET[®] systems, which do not intrude into the roof, can be used. These systems do not include a basin below the drainage level at the outlet, since they suck the water of the roof horizontally by means of

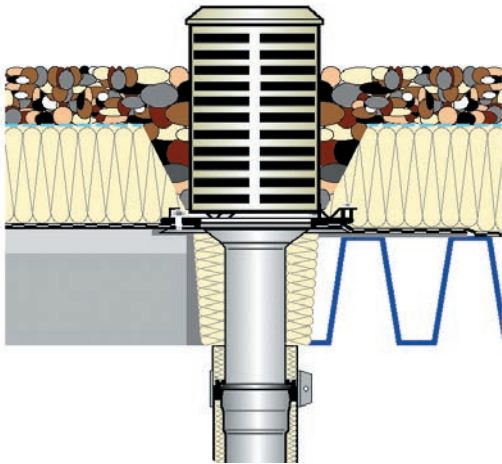
pressure flow.



Inverted roof

Application example I

Interior roof drainage



Recommended systems

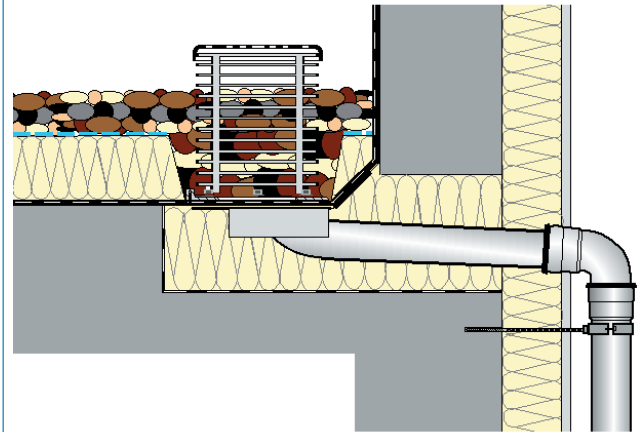
Main drainage
Gravity flow



LORO-DRAINLET® roof drainage systems for inverted roofs
DN 100
consisting of:
LORO-DRAINLET® roof drain base unit
Item no. 21902.100X
LORO-DRAINLET® strainer unit for inverted roofs
Item no. 19494.000X

Application example II

Scupper drainage, exterior



Recommended systems

Main drainage
Gravity flow



LORO-RAINSTAR® roof drainage systems for green roofs
DN 100
consisting of:
LORO-RAINSTAR® scupper drain body
Item no. 01376.100X
Loose flange
Item no. 01378.000X
LORO strainer unit for inverted roofs
Item no. 19494.000X

Special features:

Draining an inverted roof with thermal insulation above the roof sealing sheet presents particular challenges to the drainage system. Since a weighting layer of gravel or vegetation is often provided above the thermal insulation, it is necessary to observe the following:

Multiple drainage levels are possible:

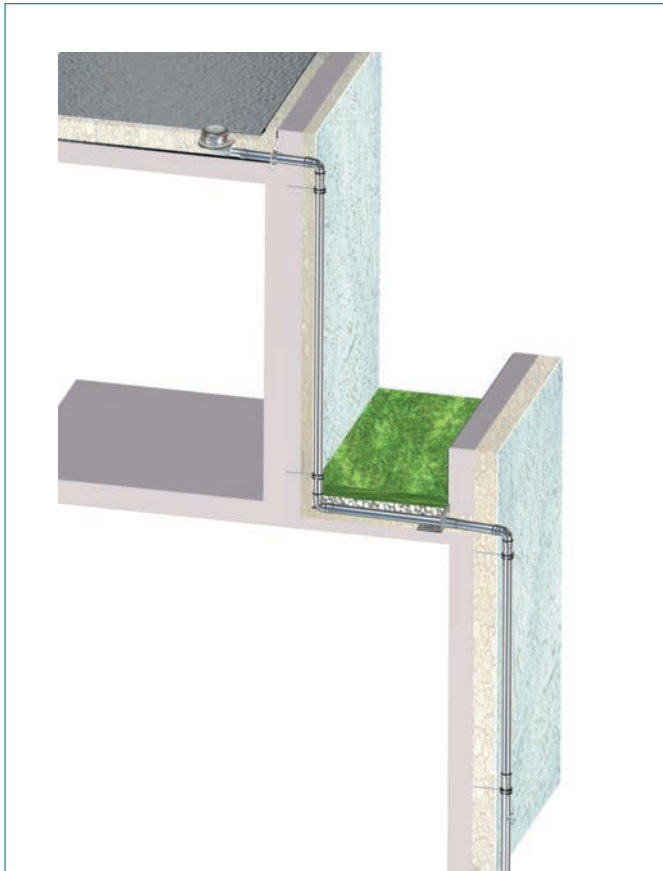
1. Level above the sealing sheet
2. Level above the thermal insulation
3. Level above the layer of gravel

If a **layer of gravel or vegetation** is present, the corresponding discharge coefficient must be included in the dimensioning calculation.

The **emergency drainage** must be arranged above the water level planned for the main drainage, and should be agreed with the LORO Service Team.

Set-back storey

Suggested solution I



Recommended systems

Main drainage

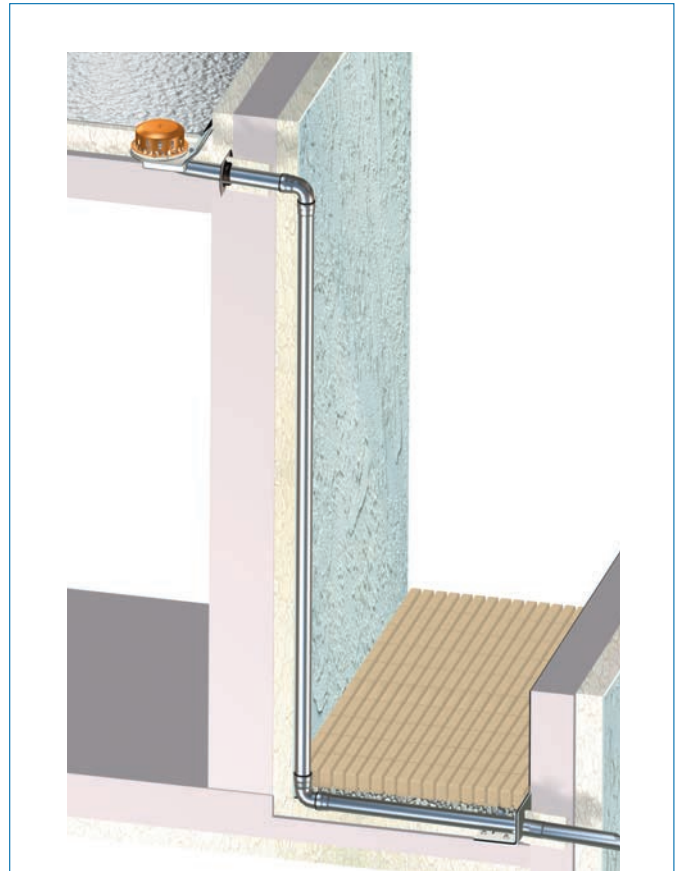
Gravity flow



LORO-RAINSTAR®
scupper Distant roof drainage
systems, **DN 70**

LX460

Suggested solution II



Recommended systems

Emergency drainage

Gravity flow



LORO-RAINSTAR®
emergency scupper drainage
systems, **DN 70**

LX465

Special features:

The drainage of set-back storeys presents particular challenges to the drainage system. In most cases, the rainwater from the roof must not be taken to balconies and terraces underneath, and the pipe can therefore only be continued underneath the surfacing. A pressure-resistant, back-flow-safe LORO-X pipe is particularly suitable for this. Sealing the pipe penetration in the vapour barrier or roof sealing sheet is achieved by using LORO-X sliding flanges and LORO-DRAINJET® scupper drain units. Please contact the LORO Service Team for other solutions for draining set-back storeys.

Recommended accessories:



LORO sliding flange
13235.070X

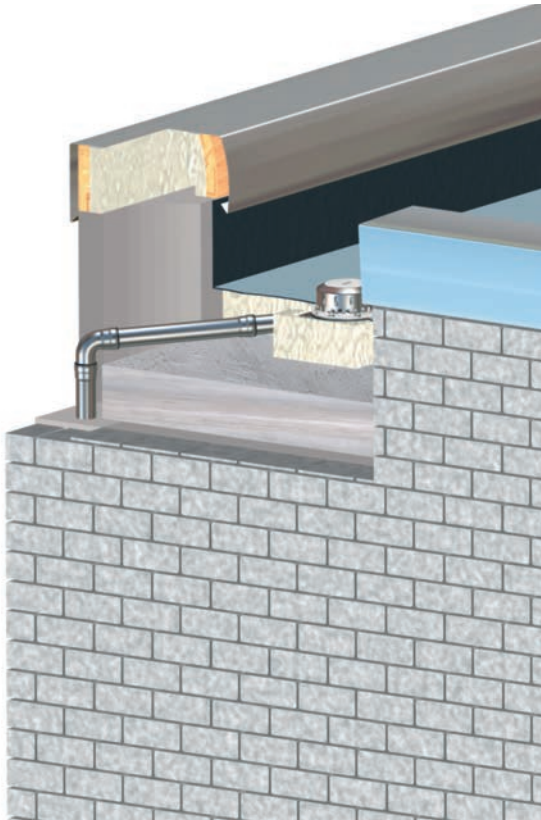
LORO-DRAINJET®
scupper drain unit
Flange form 45° item no. 13516.070X

Flange form 90° item no. 13511.070X

Scupper downpipe behind the facade

Application example I

Main drainage behind the facade



Recommended systems

Main drainage
Pressure flow



LORO-RAINSTAR®
scupper roof drainage systems

LX461 and LX492

Application example II

Emergency drainage behind the facade



Recommended systems

Emergency drainage
Pressure flow



LORO-RAINSTAR®
emergency scupper drainage
systems

LX466 and LX500

Special features of the downpipe behind the facade

The downpipe of a scupper drain is usually in front of the facade. For visual reasons, however, the downpipe is often positioned behind the facade, although this is not permitted with conventional downpipes. Backflow-safe, break-proof and pressure-resistant LORO-X steel discharge pipes come into their own here, as they can also be used in interior areas.

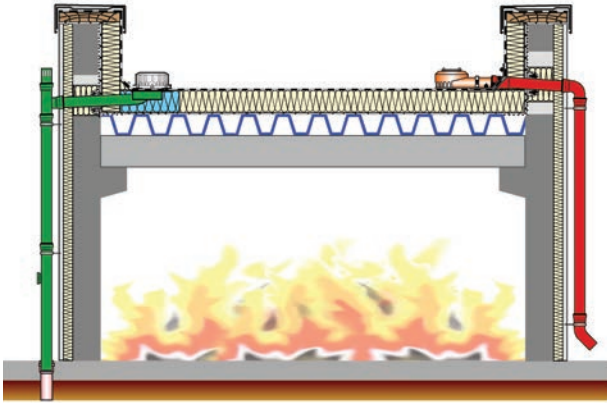
Having the scupper downpipe behind the facade combines the advantages of interior and exterior drainage:

no openings through the roof **and** no visible downpipe in front of the facade.

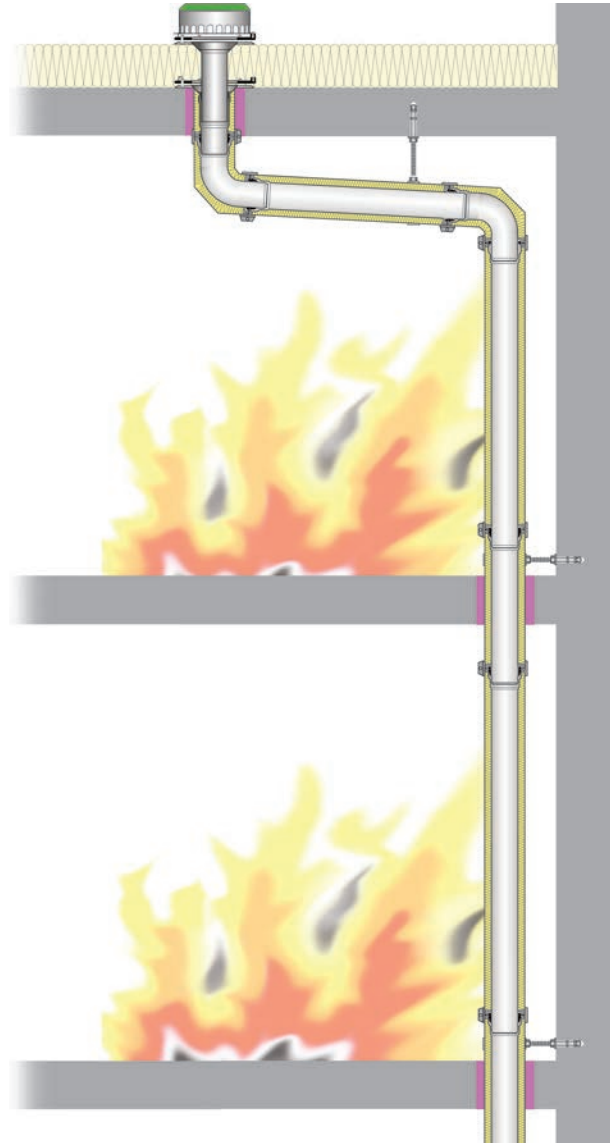
Systems with pressure flow, i.e. with high performance at small nominal diameters (DN 50 or DN 70) are optimum for these cases.

Fire protection

Application example I



Application example II



LORO-X fire protection roof drainage systems

with interior pipes are certified as a complete system as an R 90 fire protection solution, consisting of the LORO-X fire protection drains, LORO-X pipes and pipe fittings along with LORO-X fire protection clips.

If installed as a mixture with products from other manufacturers, there is no fire protection certification or guarantee beyond that of the non-flammable materials.

LORO-X scupper drainage systems with no openings into the fire protection area or into the interior of the building usually satisfy fire protection requirements automatically.

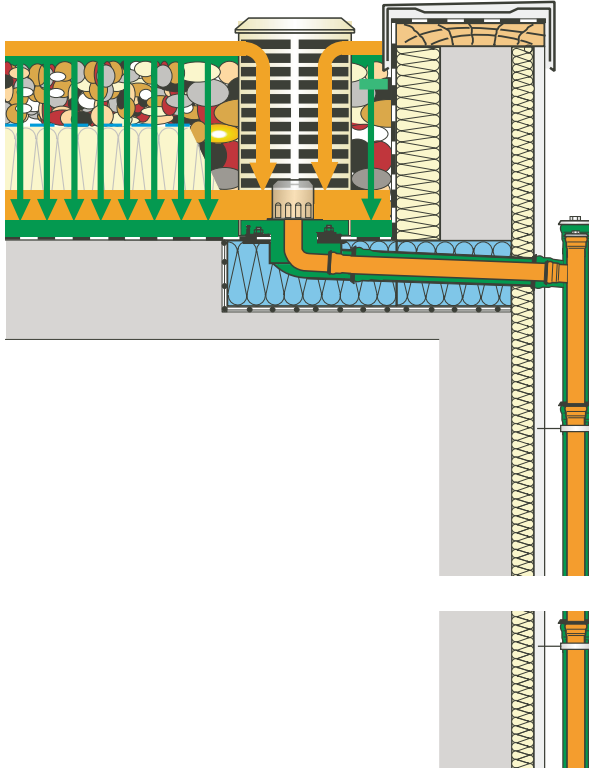
The drainage system of LORO-X scupper drains and LORO-X roof drains remains capable of full function even in the event of a fire.

Our LORO Service Team is available to help you on +49(0)5382-71-0.

Main-emergency combination

Inverted roof

Application example I for inverted roofs



Recommended systems

Main-emergency combination

Gravity flow

Pressure flow

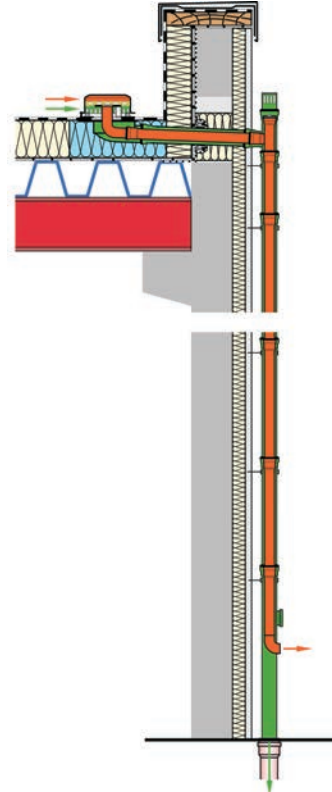


LORO-X
main-emergency
combination roof drainage
system for inverted roofs

by request

Warm roof

Application example II for warm roofs



Recommended systems

Main-emergency combination

Gravity flow

Pressure flow



LORO-X
main-emergency
combination roof drainage
system for warm roofs

LX772

Special features of the main / emergency combination

LORO offers interesting scupper main-emergency combination solutions for the increasing number of so-called "inverted roofs", in which the thermal insulation is positioned above the roof sealing sheet, as well as for conventional warm roofs.

The main drainage is implemented at the lower roof sealing level with silent gravity flow of up to 4.5 l/s. Emergency drainage can be implemented in the same system by means of LORO's patented pipe-in-pipe technique. The DN 50 pressure drainage is operated with an adjustable-height emergency drain which can be individually adjusted to match the height of the second drainage level of each building.

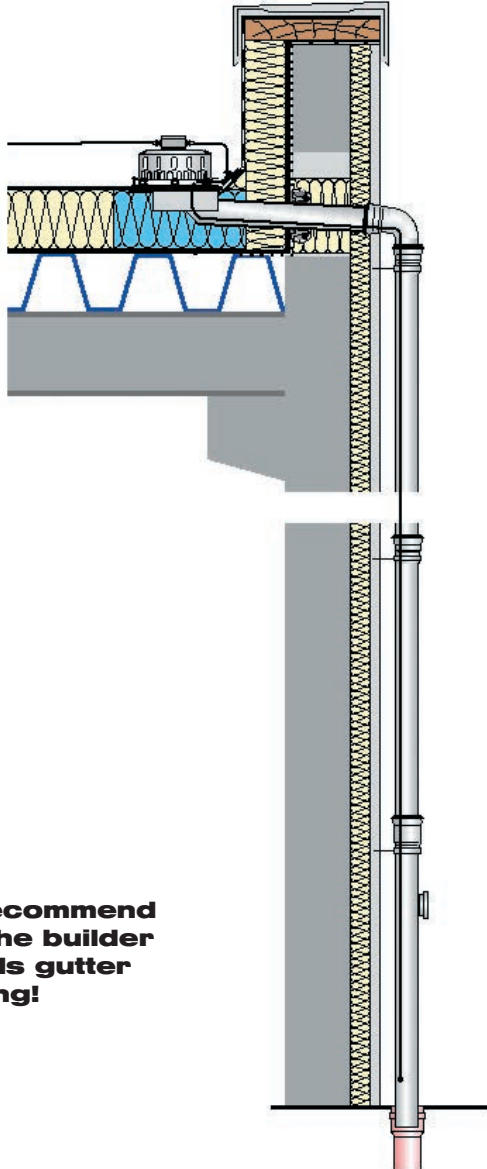
Recommended accessories:



LORO strainer unit for
inverted roofs
19494.000X

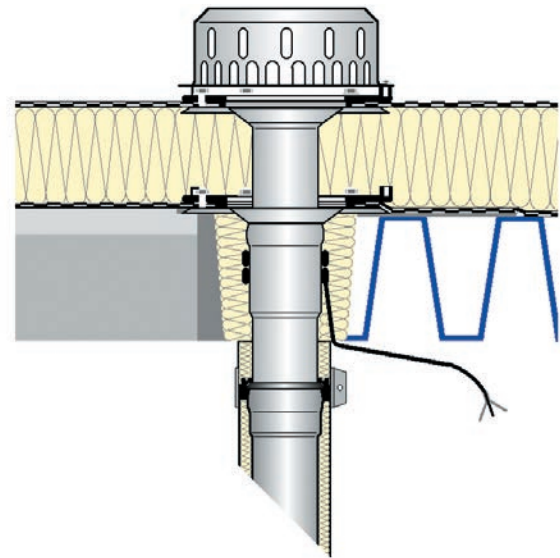
Trace heating

Application example I



We recommend that the builder installs gutter heating!

Application example II



According to Chapter 6.3.4 of the DIN 1986-100 standard, trace heating is recommended for regions subject to risk of frost (e.g. where the downpipe is in shadow, and in particular when cold wind flows around it) in order to prevent the drain or downpipe from freezing up.

Most often the problem occurs at the thaw after a frost, when meltwater freezes in the cold pipe system. Since meltwater does not get into emergency drainage systems with a weir element, trace heating is particularly relevant to the main drainage.

Our LORO Service Team is available to help you on +49(0)5382-71-0.

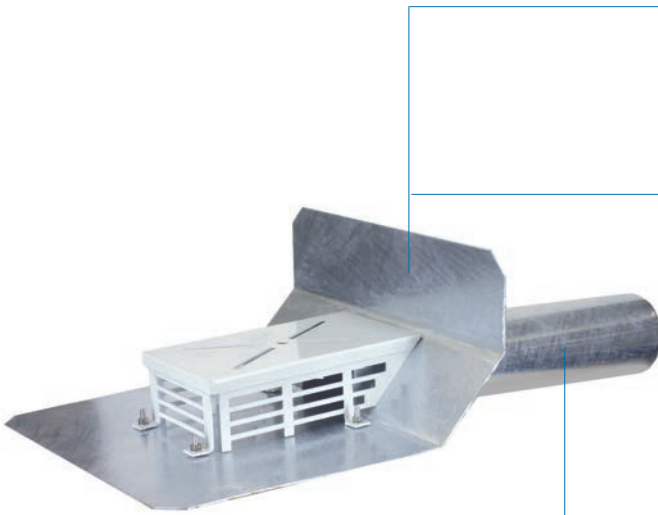
Recommended accessories:



Heating tape cable for LORO drains
19853.000X



LORO-X scupper direct



Application directly at the parapet

with 45° upstand for problem-free joining of the roofing sheet to the parapet

Bonding flange

with 45° upstand for bituminous roof sealing sheets

Made of galvanised steel

fabricated main body with gravel basket for high stability and UV resistance

Round pipe

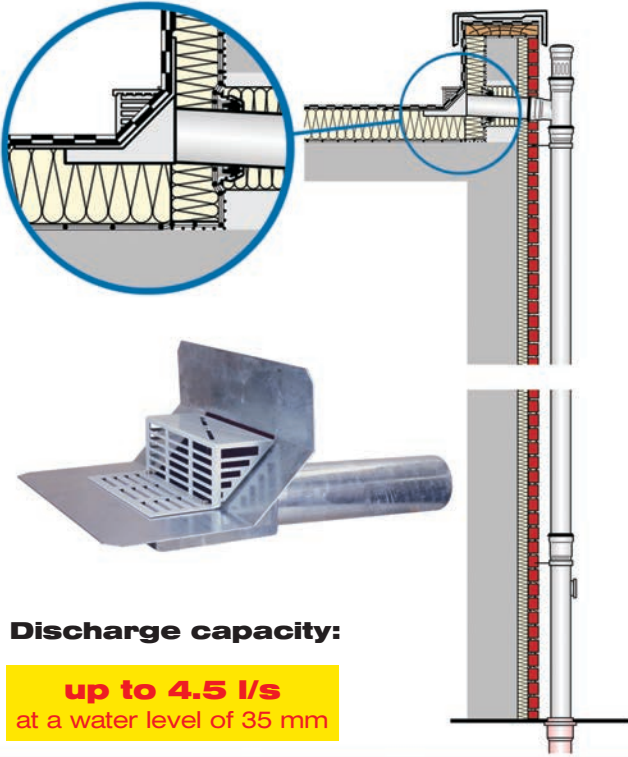
for the parapet opening, with no hidden costs such as for special transition pieces

You will find the **dimensions** of the LORO-X scupper direct drains at www.loro.de



LORO-X scupper direct

LORO-X scupper direct



Discharge capacity:

up to 4.5 l/s
at a water level of 35 mm

Advantages:

- Without penetration into the roof (0 mm) with bonding flange
- Without penetration into the roof (0 mm) with clamping flange
- Improved discharge capacity
- Discharge capacity 4.5 l/s conforms to standard
- Low penetration depth
- Discharge capacity 4.5 l/s conforms to standard
- Scupper main-emergency combination

Main drainage

Gravity flow

LX 620 **DN 70**



01316.070X

0.8 l/s at 35 mm*

LX 621 **DN 100**



01316.100X

1.2 l/s at 35 mm*

LX 1110 **DN 100**



01333.100X

1.7 l/s at 35 mm*

LX 650 **DN 70**



01330.070X

2.3 l/s at 35 mm*

LX 647 **DN 100**



01330.100X

3.0 l/s at 35 mm*

LX 653 **DN 100**



01320.100X

4.5 l/s at 35 mm*

LX 694 **DN 100**



01350.100X

4.5 l/s at 35 mm*

LX 727 **DN 100**

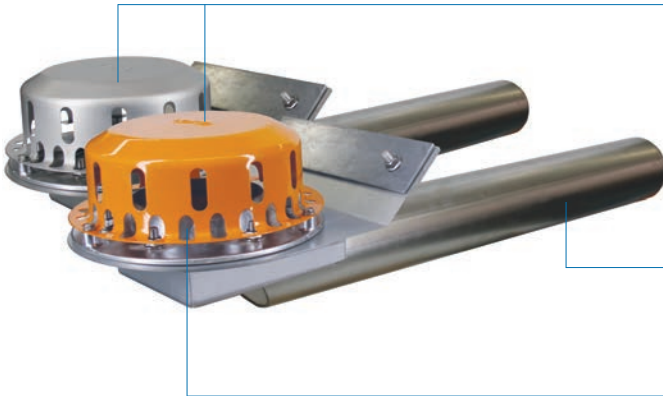


01324.100X

8.0 l/s at 75 mm*

* Water level on the roof

LORO-X RAINSTAR[®] gravity flow



High performance
of up to 9.0 l/s through patented, lowered pipe with 75 mm water level on the roof

Break-proof, impact-resistant and non-crushing
through UV-resistant cover of stainless steel

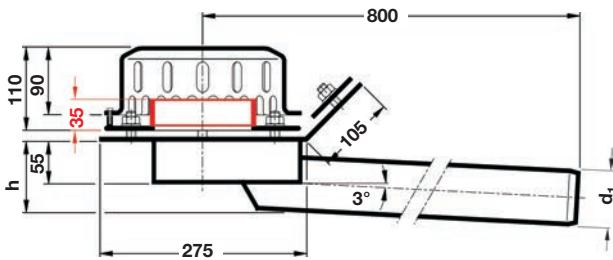
Only one sealing level
plus 45° or 90° upstand as assembly aid

Round pipe
optimum for the parapet opening, with no hidden costs such as for special transition pieces

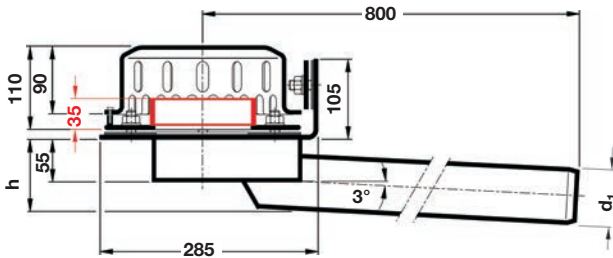
Integrated weir
under the hood (only for emergency drain). Main and emergency drain at one level.

Dimensions:

For bituminous roof sealing sheets:



For PVC roof sealing sheets:



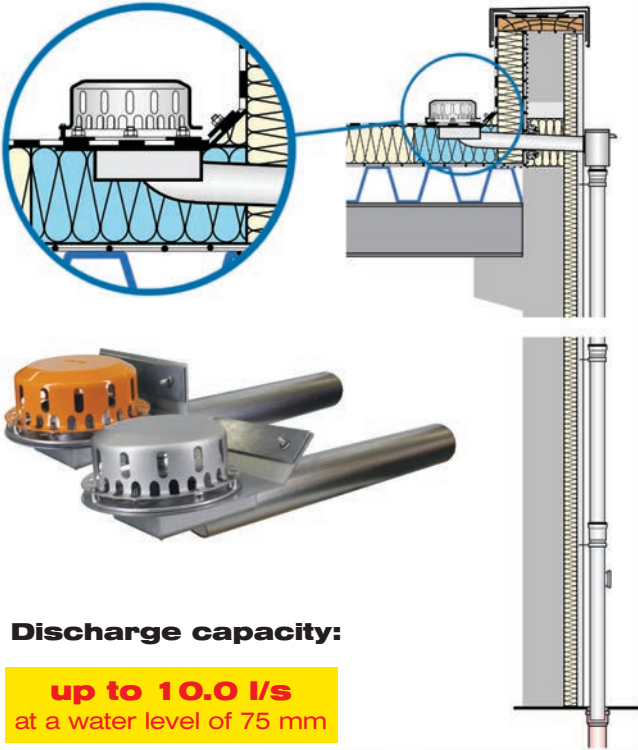
DN	d1	h
50	53	82
70	73	92
100	102	106

Application:



LORO-X RAINSTAR[®] gravity flow

LORO-X RAINSTAR[®]



Discharge capacity:

up to 10.0 l/s
at a water level of 75 mm

Main drainage

Gravity flow

LX 490

DN 50



Flange form 45° 01370.050X
Flange form 90° 01372.050X

5.1 l/s at a water level of 35 mm on the roof

LX 460

DN 70



Flange form 45° 01370.070X
Flange form 90° 01372.070X

5.2 l/s at a water level of 35 mm on the roof

LX 479

DN 100



Flange form 45° 01370.100X
Flange form 90° 01372.100X

5.4 l/s at a water level of 35 mm on the roof

Emergency drainage

Gravity flow

LX 494

DN 50



Flange form 45° 01371.050X
Flange form 90° 01373.050X

7.6 l/s at a water level of 75 mm on the roof

LX 465

DN 70



Flange form 45° 01371.070X
Flange form 90° 01373.070X

10.0 l/s at a water level of 75 mm on the roof

LX 481

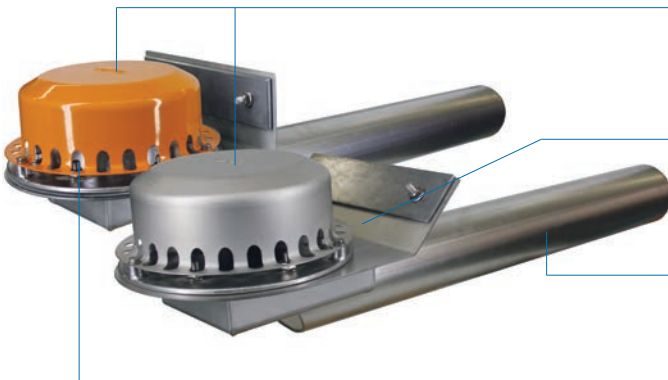
DN 100



Flange form 45° 01371.100X
Flange form 90° 01373.100X

9.0 l/s at a water level of 75 mm on the roof

LORO-X RAINSTAR[®] pressure flow



Very high capacity

of up to 21.7 l/s through patented, lowered pipe with 75 mm water level on the roof

Break-proof, impact-resistant and non-crushing

through UV-resistant cover of stainless steel.

Only one sealing level

plus 45° or 90° upstand as assembly aid.

Round pipe

optimum for the parapet opening, with no hidden costs such as for special transition pieces.

Integrated weir

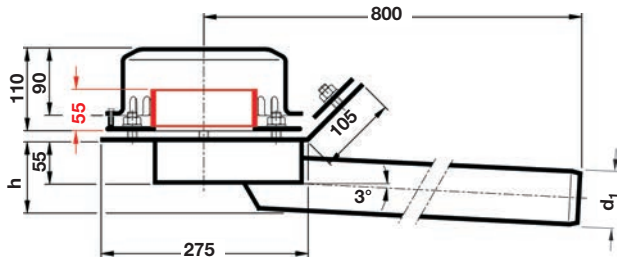
under the hood (only for emergency drain). Main and emergency drain at one level.

Space saving

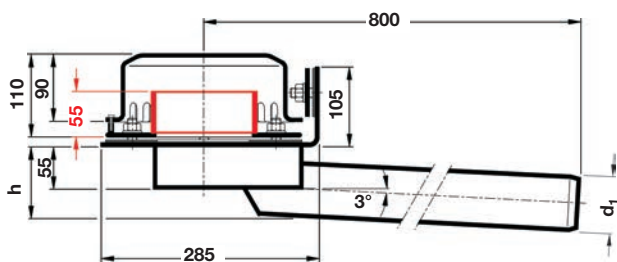
through non-inclined laying of the collecting pipes.

Dimensions:

For bituminous roof sealing sheets:



For PVC roof sealing sheets:



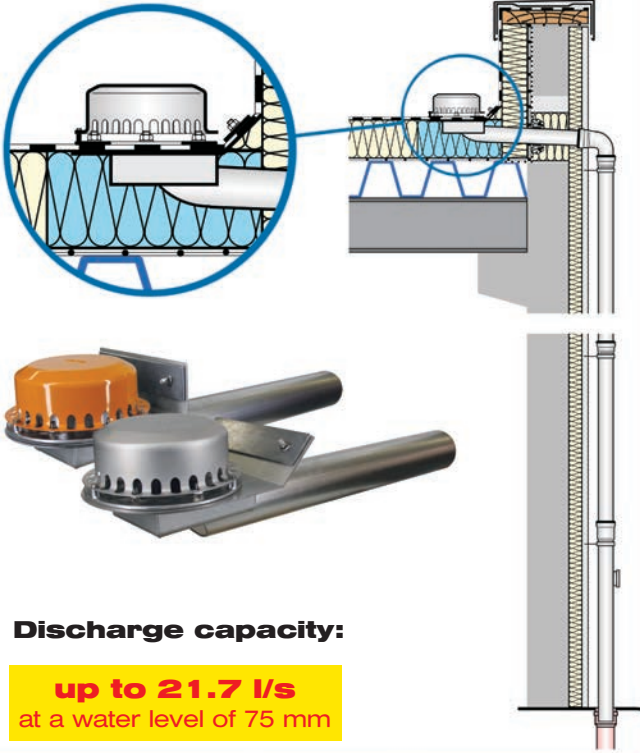
DN	d1	h
50	53	82
70	73	92
100	102	106

Application:



LORO-X RAINSTAR[®] pressure flow

LORO-X RAINSTAR[®]



Main drainage

Pressure flow

LX 492

DN 50



Flange form 45° 01380.050X
Flange form 90° 01382.050X

8.5 l/s at a water level of 55 mm on the roof

LX 461

DN 70



Flange form 45° 01380.070X
Flange form 90° 01382.070X

13.2 l/s at a water level of 55 mm on the roof

LX 480

DN 100



Flange form 45° 01380.100X
Flange form 90° 01382.100X

16.2 l/s at a water level of 55 mm on the roof

Emergency drainage

Pressure flow

LX 500

DN 50



Flange form 45° 01381.050X
Flange form 90° 01383.050X

8.6 l/s at a water level of 75 mm on the roof

LX 466

DN 70



Flange form 45° 01381.070X
Flange form 90° 01383.070X

17.6 l/s at a water level of 75 mm on the roof

LX 482

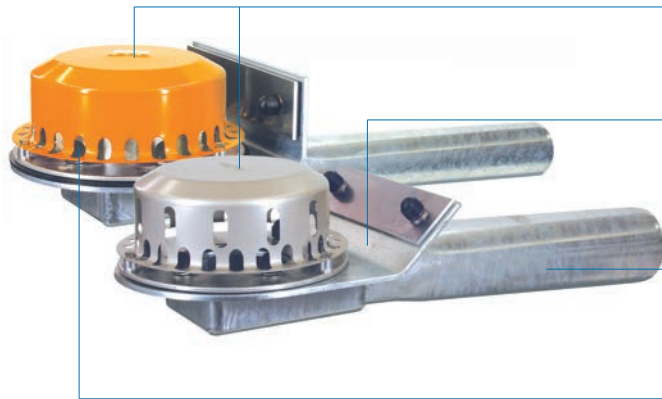
DN 100



Flange form 45° 01381.100X
Flange form 90° 01383.100X

21.7 l/s at a water level of 75 mm on the roof

LORO-X RAINSTAR[®] low penetration depth



Little penetration into the roof

through flat implementation with only 55 mm penetration depth

Break-proof, impact-resistant and non-crushing

through UV-resistant cover of stainless steel.

Only one sealing level

plus 45° or 90° upstand as assembly aid.

Round pipe

optimum for the parapet opening, with no hidden costs such as for special transition pieces.

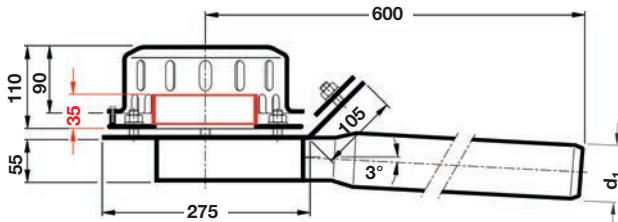
Integrated weir

under the hood (only for emergency drain). Main and emergency drain at one level.

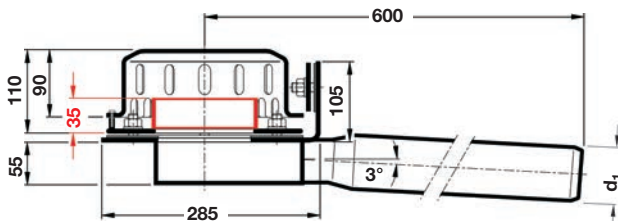
Dimensions:

Gravity flow

For bituminous roof sealing sheets:

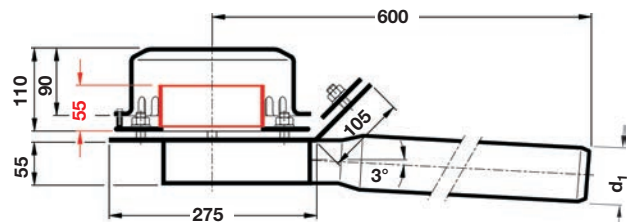


For PVC roof sealing sheets:

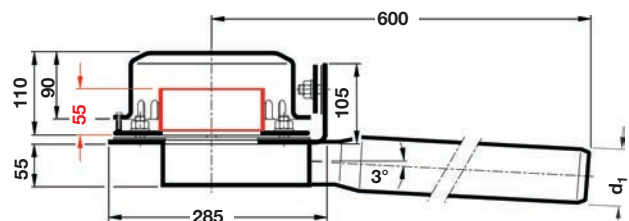


Pressure flow

For bituminous roof sealing sheets:



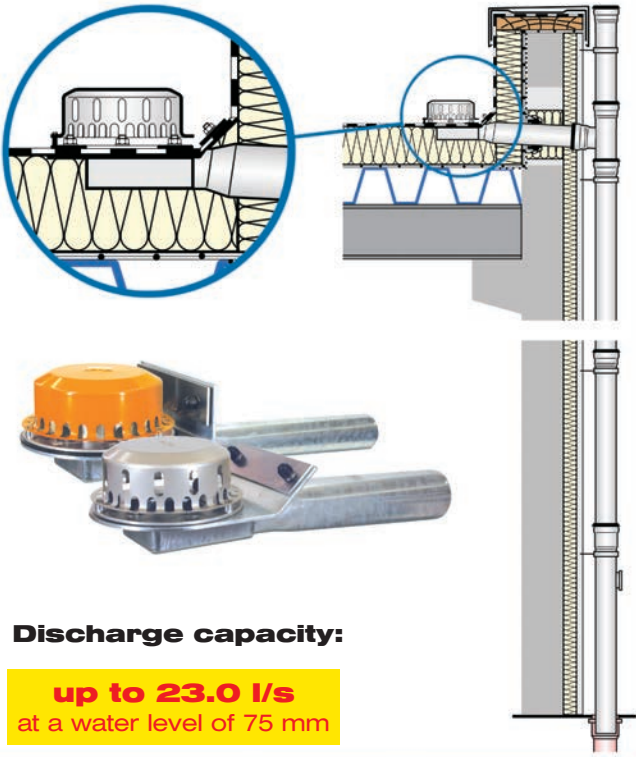
For PVC roof sealing sheets:



DN	d_1
70	73
100	102

LORO-X RAINSTAR[®] low penetration depth

LORO-X RAINSTAR[®]



Discharge capacity:

up to 23.0 l/s
at a water level of 75 mm

Main drainage

Gravity flow

LX 471

DN 70



Flange form 45° 01360.070X

Flange form 90° 01362.070X

5.0 l/s at a water level of 35 mm on the roof

LX 487

DN 100



Flange form 45° 01360.100X

Flange form 90° 01362.100X

4.9 l/s at a water level of 35 mm on the roof

Pressure flow

LX 473

DN 70



Flange form 45° 01364.070X

Flange form 90° 01366.070X

15.6 l/s at a water level of 55 mm on the roof

LX 665

DN 100



Flange form 45° 01364.100X

Flange form 90° 01366.100X

14.0 l/s at a water level of 55 mm on the roof

Emergency drainage

Gravity flow

LX 475

DN 70



Flange form 45° 01361.070X

Flange form 90° 01363.070X

8.2 l/s at a water level of 75 mm on the roof

LX 668

DN 100



Flange form 45° 01361.100X

Flange form 90° 01363.100X

8.0 l/s at a water level of 75 mm on the roof

Pressure flow

LX 798

DN 70



Flange form 45° 01365.070X

Flange form 90° 01367.070X

17.6 l/s at a water level of 75 mm on the roof

LX 666

DN 100

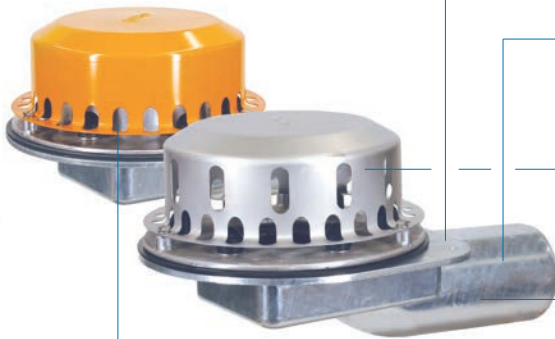


Flange form 45° 01365.100X

Flange form 90° 01367.100X

23.0 l/s at a water level of 75 mm on the roof

LORO-X RAINSTAR[®] scupper distant



Without upstand

allowing fitting at a distance from the upstand of the parapet

Very high capacity

of up to 9.0 l/s through patented, lowered pipe with 75 mm water level on the roof

Break-proof, impact-resistant and non-crushing

through UV-resistant cover of stainless steel

Round pipe

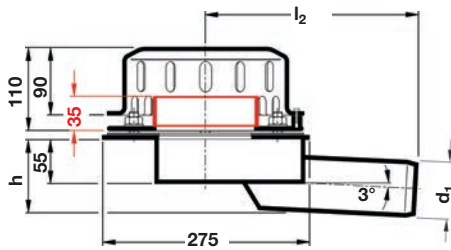
optimum for the parapet opening, with no hidden costs such as for special transition pieces

Integrated weir

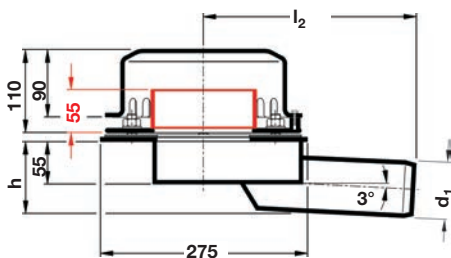
under the hood (only for emergency drain). Main and emergency drain at one level.

Dimensions:

Gravity flow



Pressure flow



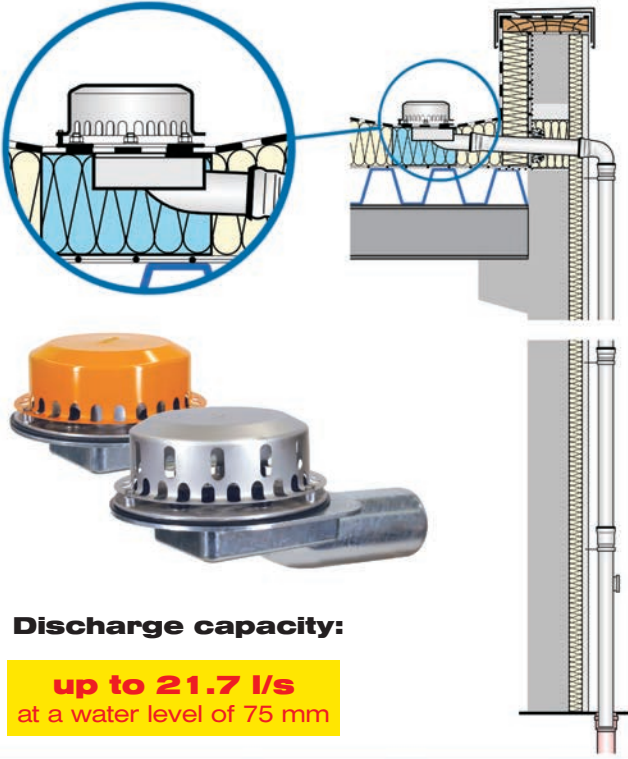
DN	d ₁	h	l ₂
50	53	82	260
70	73	92	260
100	102	106	290

Application:



LORO-X RAINSTAR[®] scupper distant

LORO-X RAINSTAR[®] scupper distant



Main drainage

Gravity flow

LX 490 DN 50



5.1 l/s at 35 mm*

LX 460 DN 70



5.2 l/s at 35 mm*

LX 479 DN 100



5.4 l/s at 35 mm*

Pressure flow

LX 492 DN 50



8.5 l/s at 55 mm*

LX 461 DN 70



13.2 l/s at 55 mm*

LX 480 DN 100



16.2 l/s at 55 mm*

Emergency drainage

Gravity flow

LX 494 DN 50



7.6 l/s at 75 mm*

LX 465 DN 70



10.0 l/s at 75 mm*

LX 481 DN 100



9.0 l/s at 75 mm*

Pressure flow

LX 500 DN 50



8.6 l/s at 75 mm*

LX 466 DN 70



17.6 l/s at 75 mm*

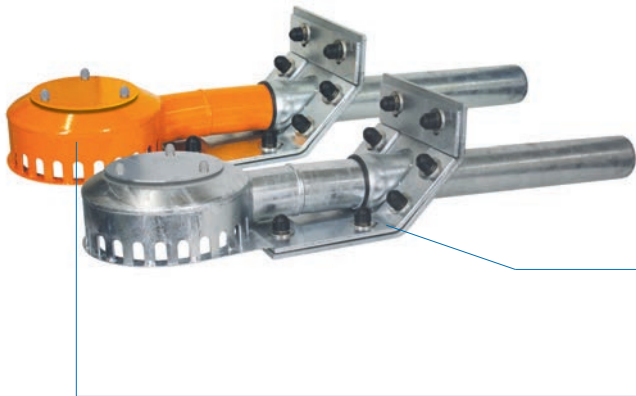
LX 482 DN 100



21.7 l/s at 75 mm*

* Water level on the roof

Application: LORO-DRAINJET[®] scupper pressure flow



No penetration into the roof

therefore ideally suited to low-energy roofs or to renovation

Very high capacity

of up to 16.0 l/s through patented, lowered pipe with 55 mm water level on the roof

Break-proof, impact-resistant and non-crushing

through UV-resistant construction of steel, galvanised

Only one sealing level

plus 45° upstand as assembly aid

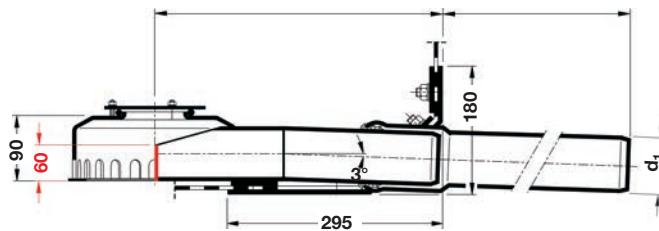
Integrated weir

under the hood (only for emergency drain). Main and emergency drain at one level.

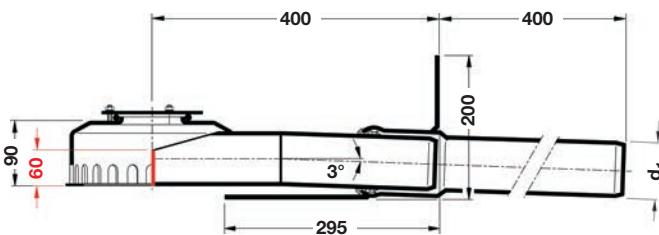
Dimensions:

Pressure flow

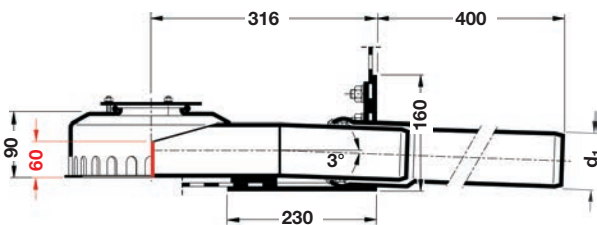
Clamping flange 45°, for bituminous sealing sheets:



Bonding flange 45°, for bituminous sealing sheets:



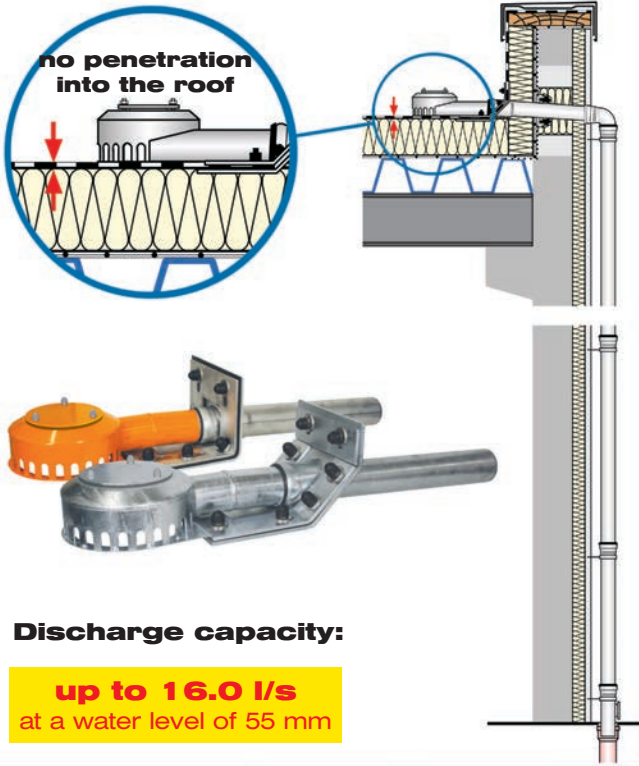
Clamping flange 90°, for PVC sealing sheets:



DN	d ₁
50	53
70	73

LORO-DRAINJET[®] scupper pressure flow

LORO-DRAINJET[®] scupper



Main drainage

Pressure flow

LX 789

DN 50



Clamping flange 45° 01351.050X
Clamping flange 90° 01353.050X
Bonding flange 45° 01347.050X

7.0 l/s at a water level of 55 mm on the roof

LX 636

DN 70



Clamping flange 45° 01351.070X
Clamping flange 90° 01353.070X
Bonding flange 45° 01347.070X

16.0 l/s at a water level of 55 mm on the roof

Emergency drainage

Pressure flow

LX 790

DN 50



Clamping flange 45° 01356.050X
Clamping flange 90° 01358.050X
Bonding flange 45° 01349.050X

9.0 l/s at a water level of 75 mm on the roof

LX 637

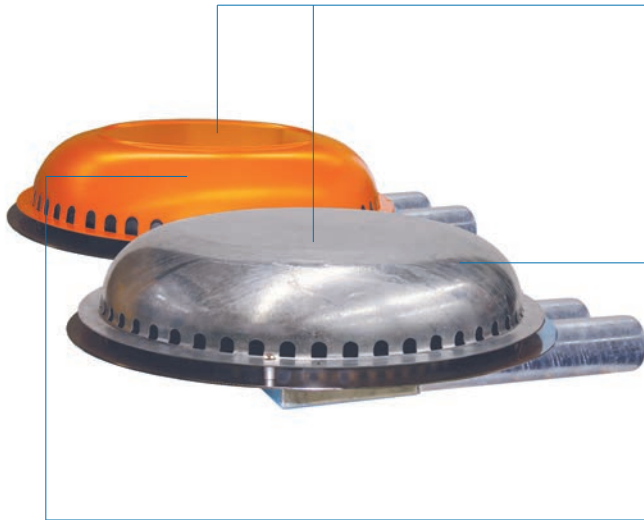
DN 70



Clamping flange 45° 01356.070X
Clamping flange 90° 01358.070X
Bonding flange 45° 01349.070X

14.5 l/s at a water level of 75 mm on the roof

Application: LORO-ATTIKASTAR[®] high-performance



Very high capacity

with up to 32 l/s at 55 mm water level on the roof due to power pressure flow

Unusually quiet running

through large hood

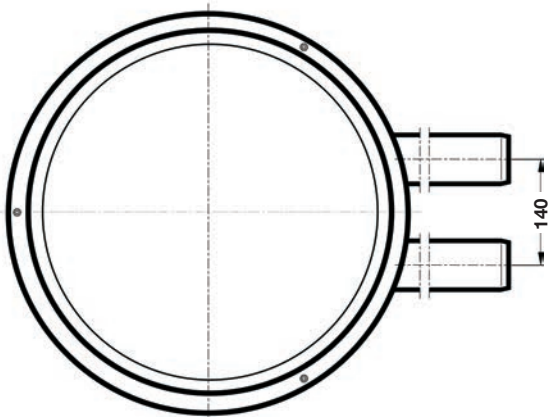
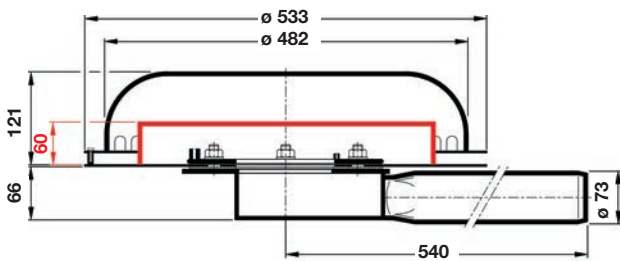
Break-proof, impact-resistant and non-crushing

through UV-resistant construction of steel, galvanised

Integrated weir

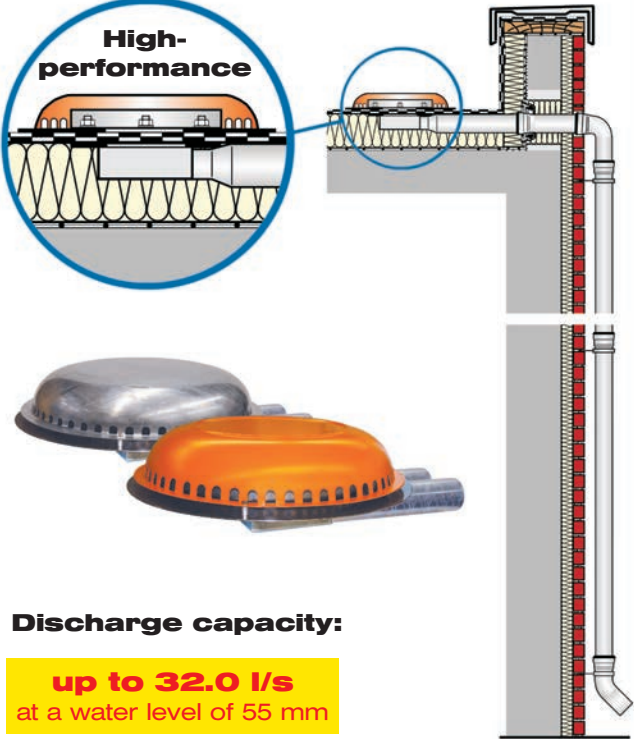
under the hood (only for emergency drain).
Main and emergency drain at one level.

Dimensions:



LORO-ATTIKASTAR[®] high-performance

LORO-ATTIKASTAR[®]



High-performance

Discharge capacity:

up to 32.0 l/s
at a water level of 55 mm

Main drainage Pressure flow

LX 803 **DN 100**



13779.CC0X

32.0 l/s at a water level of 55 mm on the roof

Emergency drainage Pressure flow

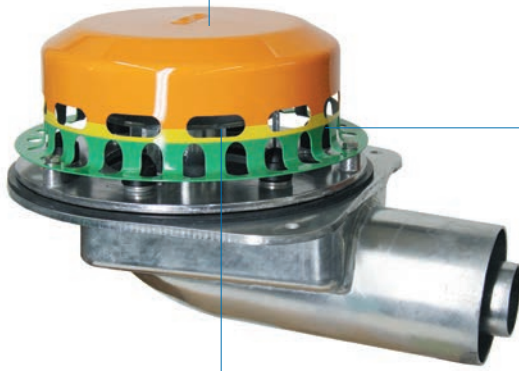
LX 766 **DN 100**



13766.CC0X

32.0 l/s at a water level of 75 mm on the roof

Application: LORO-X scupper main-emergency comb.



2 in 1

Main and emergency drainage in one system

Complete system

including all system components

Break-proof, impact-resistant and non-crushing

through UV-resistant construction of stainless steel and steel, galvanised

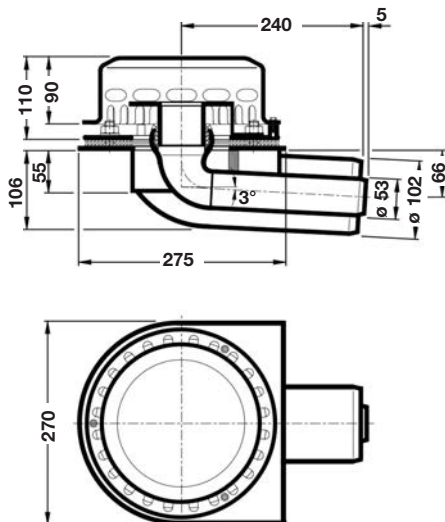
Only one opening

in the parapet for main and emergency drainage systems

Integrated weir

under the hood for interior emergency drain

Dimensions:

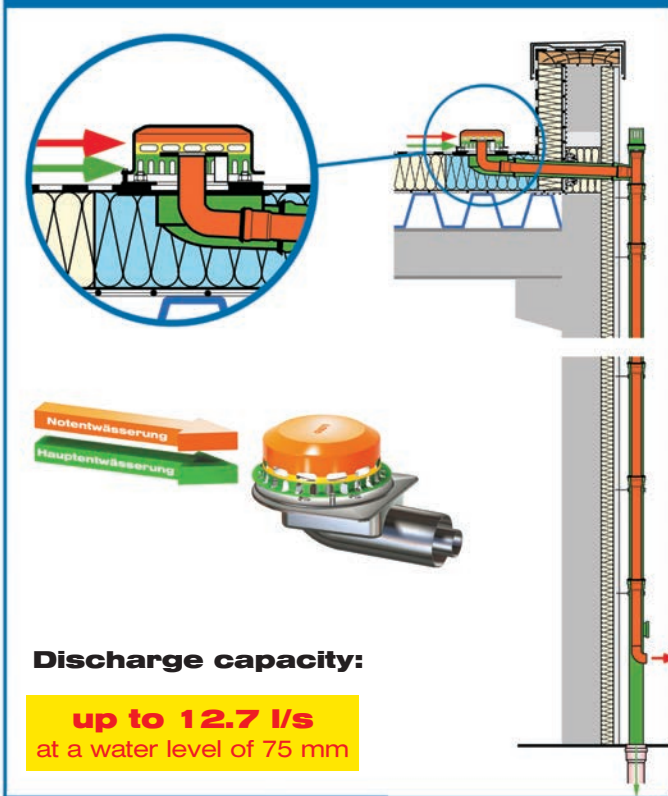


Application:



LORO-X scupper main-emergency combination

LORO-X main-emergency comb.



Main drainage

Emergency drainage

Gravity flow

Pressure flow

LX 772

DN 50/100

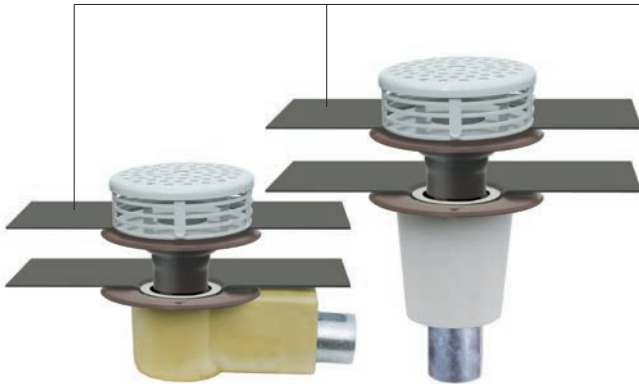


13506.100X

Main drainage DN 100: **4.5 l/s** at 35 mm*
Emergency drainage DN 50: **8.2 l/s** at 75 mm*

* Water level on the roof

Series O roof gravity flow, DN 70



Connecting sleeve

pre-fitted at the factory, made of bitumen/EPDM compound. Other qualities on inquiry.

One and two-piece versions

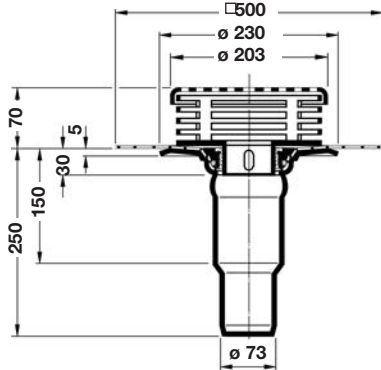
for roofs with and without thermal insulation

Corrosion protected through construction from galvanised steel, with additional coating

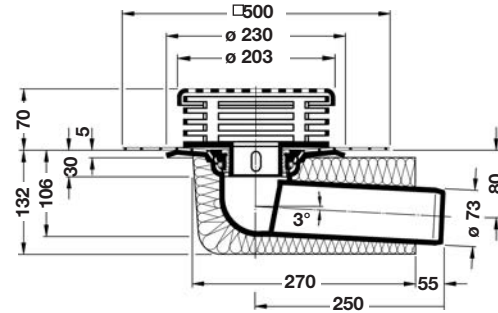
Drain vertical or 3°

Dimensions DN 70:

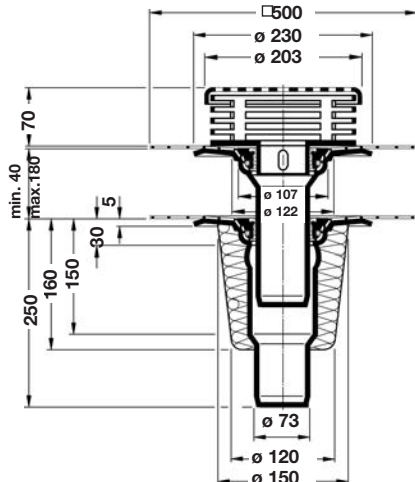
Vertical drain, one-piece:



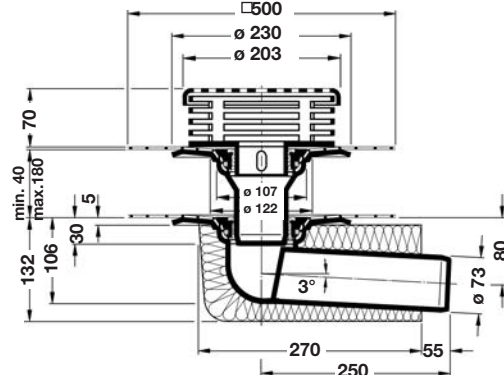
Drain 3°, one-piece:



Vertical drain, two-piece:

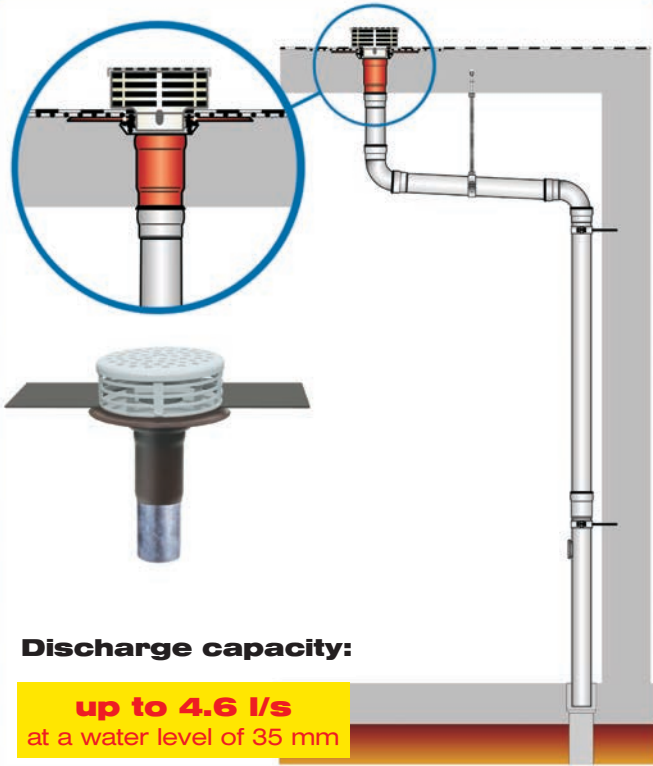


Drain 3°, two-piece:



Series O roof gravity flow, DN 70

LORO roof drainage[®] Series O



Main drainage

Gravity flow

Vertical drain:

LX 887



DN 70

	one-piece	two-piece
Vers. a	15275.070X	15285.070X
Vers. b	15375.070x	15385.070x

4.6 l/s at a water level of 35 mm on the roof

Side drain:

LX 886



DN 70

	one-piece	two-piece
Vers. a	15475.070X	15485.070X
Vers. b	15575.070x	15585.070x

4.2 l/s at a water level of 35 mm on the roof

Vers. a: without thermal insulation
 Vers. b: with thermal insulation

Serie O Dach-Freispiegelströmung, DN 100 - 125



Connecting sleeve

pre-fitted at the factory, made of bitumen/EPDM compound. Other qualities on inquiry.

One and two-piece versions

for roofs with and without thermal insulation

Corrosion protected

through fabrication in aluminium, plastic-coated

Optional trace heating

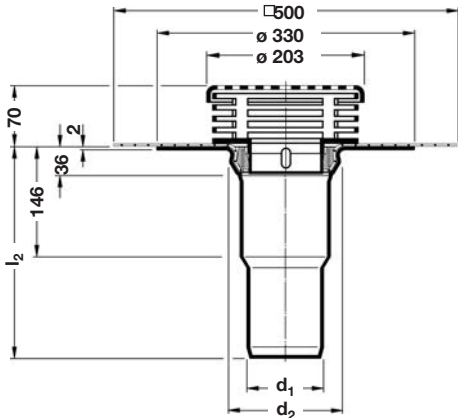
for areas with frost risk

Shapeable aluminium flange

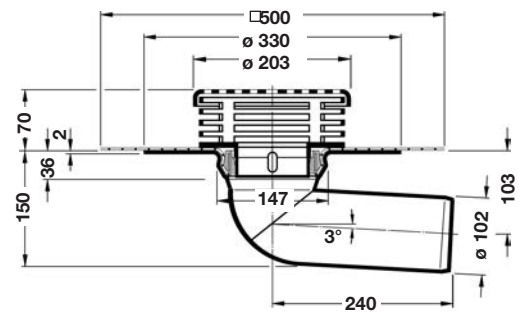
to compensate for uneven roofs

Dimensions:

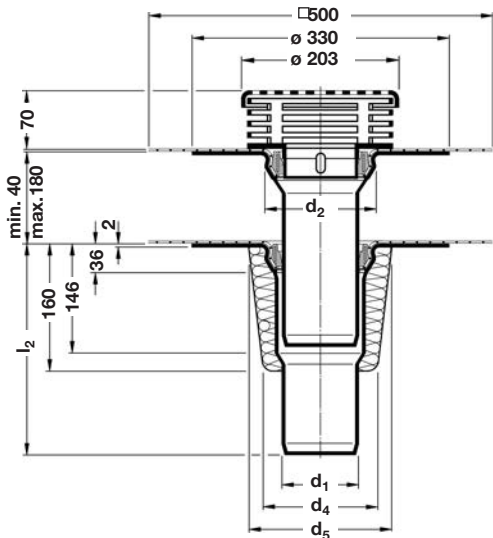
DN 100 - 125, vertical drain, one-piece:



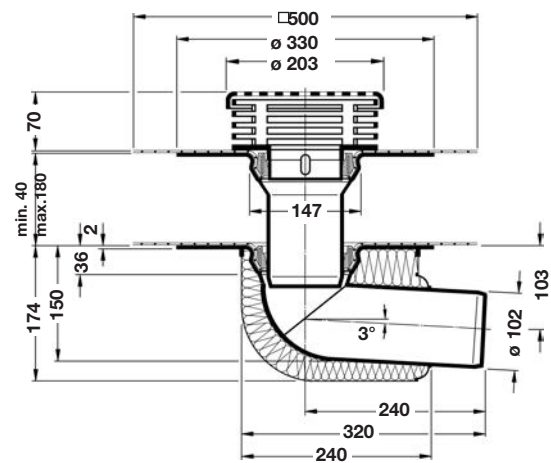
DN 100, drain 3°, one-piece:



DN 100 - 125, vertical drain, two-piece:



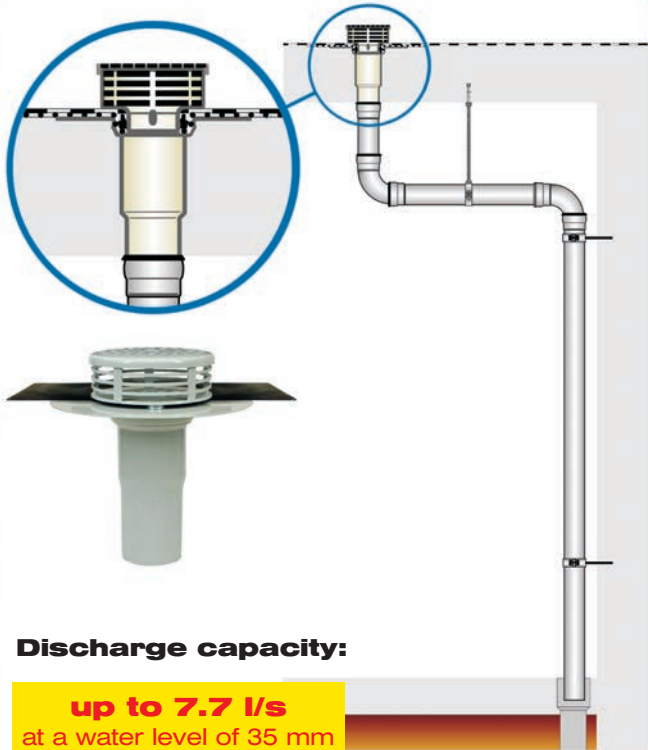
DN 100, drain 3°, two-piece:



DN	d ₁	d ₂	d ₄	d ₅	l ₂
100	102	147	160	190	270
125	133	178	190	220	280

Series O roof gravity flow, DN 100 - 125

LORO roof drainage[®] Series O



Main drainage

Gravity flow

Vertical drain:

LX 884



DN 100

	one-piece	two-piece
Vers. a	17110.100A	17120.100A
Vers. b	17141.100A	17142.100A
Vers. c	17143.100A	17144.100A

5.2 l/s at a water level of 35 mm on the roof

LX 852



DN 125

	one-piece	two-piece
Vers. a	17110.125A	17120.125A
Vers. b	17141.125A	17142.125A
Vers. c	17143.125A	17144.125A

7.7 l/s at a water level of 35 mm on the roof

Side drain:

LX 885



DN 100

	one-piece	two-piece
Vers. a	17131.100A	17132.100A
Vers. b	17145.100A	17146.100A
Vers. c	17147.100A	17148.100A

4.6 l/s at a water level of 35 mm on the roof

Vers. a: without thermal insulation
 Vers. b: with thermal insulation
 Vers. c: with thermal insulation, with heating

Application: LORO-DRAINLET® roof gravity flow



Discharge capacity conforms to standard
with 35 mm water level on the roof

One and two-piece versions
for roofs with and without thermal insulation

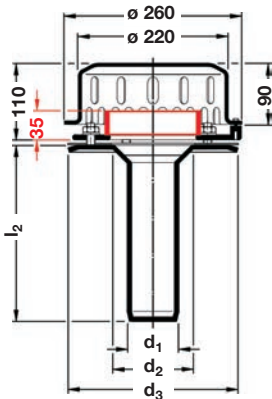
Break-proof, impact-resistant and non-crushing
through UV-resistant construction of steel, galvanised

Optional trace heating
for areas with frost risk

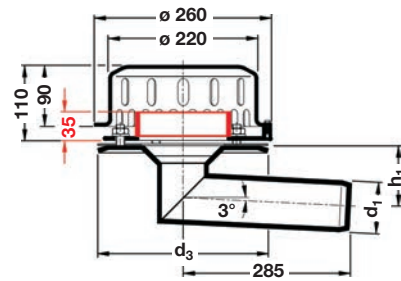
Integrated weir
under the hood (only for emergency drain).
Main and emergency drain at one level.

Dimensions:

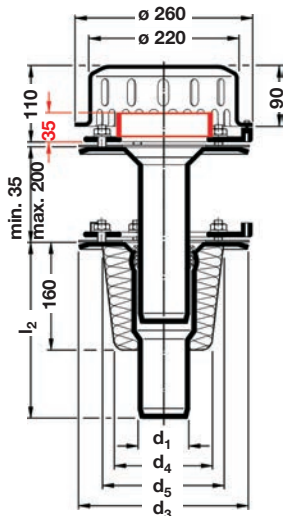
Vertical drain, one-piece:



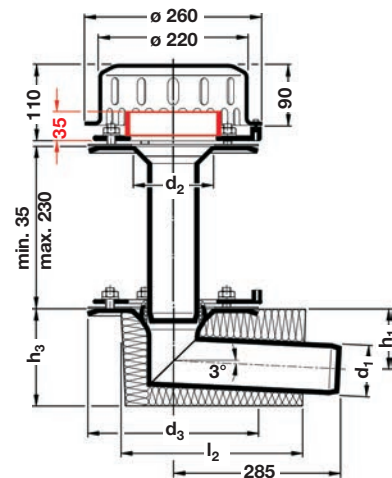
Drain 3°, one-piece:



Vertical drain, two-piece:

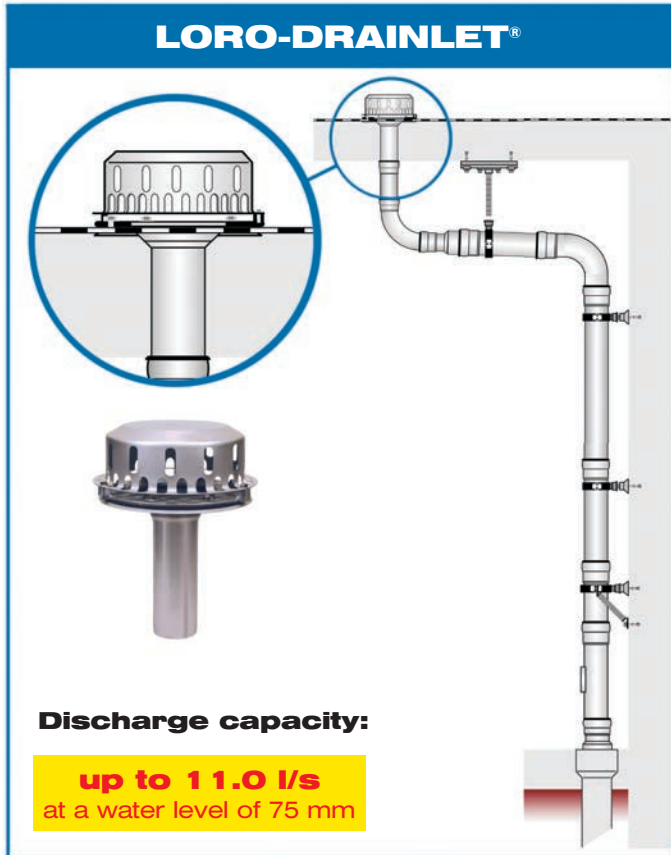


Drain 3°, two-piece:



DN	d ₁	d ₂	d ₃	d ₄	d ₅	h ₁	h ₃	l ₂
70	73	125	245	120	150	80	137	260
100	102	145	300	160	190	103	174	270
125	133	175	330	190	220	121	200	280

LORO-DRAINLET[®] roof gravity flow




Main drainage


Gravity flow


LX 846	one-piece		two-piece	DN 70
Vers. a	21511.070X		21521.070X	
Vers. b	21512.070X		21522.070X	
Vers. c	21513.070X		21523.070X	
6.3 l/s at a water level of 35 mm on the roof				

LX 873	one-piece		two-piece	DN 100
Vers. a	21511.100X		21521.100X	
Vers. b	21512.100X		21522.100X	
Vers. c	21513.100X		21523.100X	
6.5 l/s at a water level of 35 mm on the roof				

LX 874	one-piece		two-piece	DN 125
Ausf. a	21511.125X		21521.125X	
Ausf. b	21512.125X		21522.125X	
Ausf. c	21513.125X		21523.125X	
9.8 l/s at a water level of 35 mm on the roof				


LX 888	one-piece		two-piece	DN 70
Vers. a	21514.070X		21524.070X	
Vers. b	21515.070X		21525.070X	
Vers. c	21516.070X		21526.070X	
5.6 l/s at a water level of 35 mm on the roof				


LX 855	one-piece		two-piece	DN 100
Vers. a	21514.100X		21524.100X	
Vers. b	21515.100X		21525.100X	
Vers. c	21516.100X		21526.100X	
6.1 l/s at a water level of 35 mm on the roof				


LX 890	one-piece		two-piece	DN 125
Vers. a	21514.125X		21524.125X	
Vers. b	21515.125X		21525.125X	
Vers. c	21516.125X		21526.125X	
9.2 l/s at a water level of 35 mm on the roof				


Emergency drainage

Gravity flow

LX 848	one-piece		two-piece	DN 70
Vers. a	21711.070X		21721.070X	
Vers. b	21712.070X		21722.070X	
Vers. c	21713.070X		21723.070X	
9.0 l/s at a water level of 75 mm on the roof				

LX 875	one-piece		two-piece	DN 100
Vers. a	21711.100X		21721.100X	
Vers. b	21712.100X		21722.100X	
Vers. c	21713.100X		21723.100X	
9.0 l/s at a water level of 75 mm on the roof				

LX 889	one-piece		two-piece	DN 70
Vers. a	21714.070X		21734.070X	
Vers. b	21715.070X		21735.070X	
Vers. c	21716.070X		21736.070X	
10.0 l/s at a water level of 75 mm on the roof				

LX 854	one-piece		two-piece	DN 100
Ausf. a	21714.100X		21734.100X	
Ausf. b	21715.100X		21735.100X	
Ausf. c	21716.100X		21736.100X	
11.0 l/s at a water level of 75 mm on the roof				

Vers. a: without thermal insulation
 Vers. b: with thermal insulation
 Vers. c: with thermal insulation, with heating

Application: LORO-DRAINJET[®] roof pressure flow



Very high capacity

of up to 94.0 l/s through pressure flow with 75 mm water level on the roof

Space saving

through non-inclined laying of the collecting pipes.

Break-proof, impact-resistant and non-crushing

through UV-resistant cover of stainless steel.

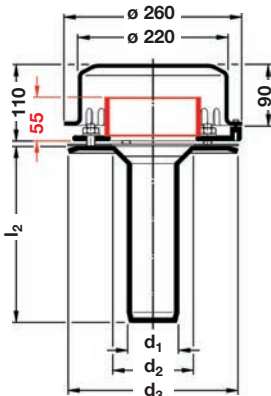
One and two-piece versions

for roofs with and without thermal insulation

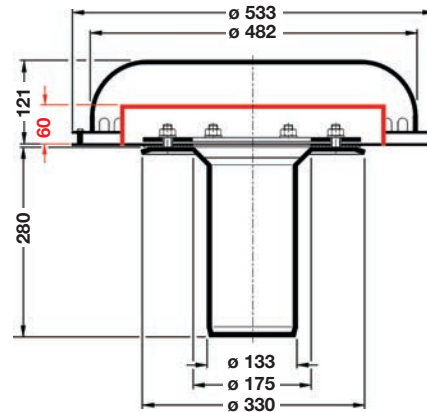
Integrated weir

under the hood (only for emergency drain).
Main and emergency drain at one level.

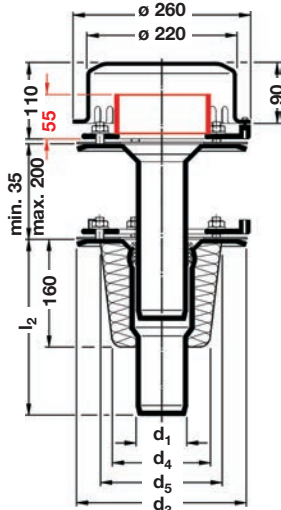
DN 70 - DN 100, one-piece:



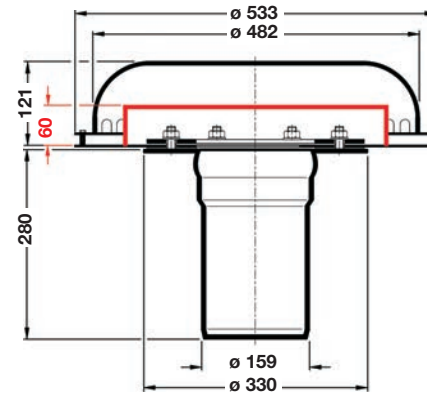
DN 125:



DN 70 - DN 100, two-piece:



DN 150:



DN	d ₁	d ₂	d ₃	d ₄	d ₅	l ₂
70	73	125	245	120	150	260
100	102	145	300	160	190	270

LORO-DRAINJET[®] roof pressure flow

LORO-DRAINJET[®]

Discharge capacity:

up to 94.0 l/s
at a water level of 75 mm

Main drainage

Pressure flow

LX 845  **DN 70**

	one-piece	two-piece
Vers. a	21111.070X	21121.070X
Vers. b	21112.070X	21122.070X
Vers. c	21113.070X	21123.070X

18.8 l/s at a water level of 55 mm on the roof

LX 530  **DN 100**

	one-piece	two-piece
Vers. a	21111.100X	21121.100X
Vers. b	21112.100X	21122.100X
Vers. c	21113.100X	21123.100X

27.0 l/s at a water level of 55 mm on the roof

LX 948  **DN 125**

21111.125X

50.0 l/s at a water level of 55 mm on the roof


LX 960  **DN 150**

21111.150X

50.0 l/s at a water level of 55 mm on the roof


Emergency drainage

Pressure flow

LX 847  **DN 70**

	one-piece	two-piece
Vers. a	21311.070X	21321.070X
Vers. b	21312.070X	21322.070X
Vers. c	21313.070X	21323.070X

19.4 l/s at a water level of 75 mm on the roof

LX 542  **DN 100**

	one-piece	two-piece
Vers. a	21311.100X	21321.100X
Vers. b	21312.100X	21322.100X
Vers. c	21313.100X	21323.100X

38.0 l/s at a water level of 75 mm on the roof

LX 947  **DN 125**

21311.125X

92.0 l/s at a water level of 75 mm on the roof

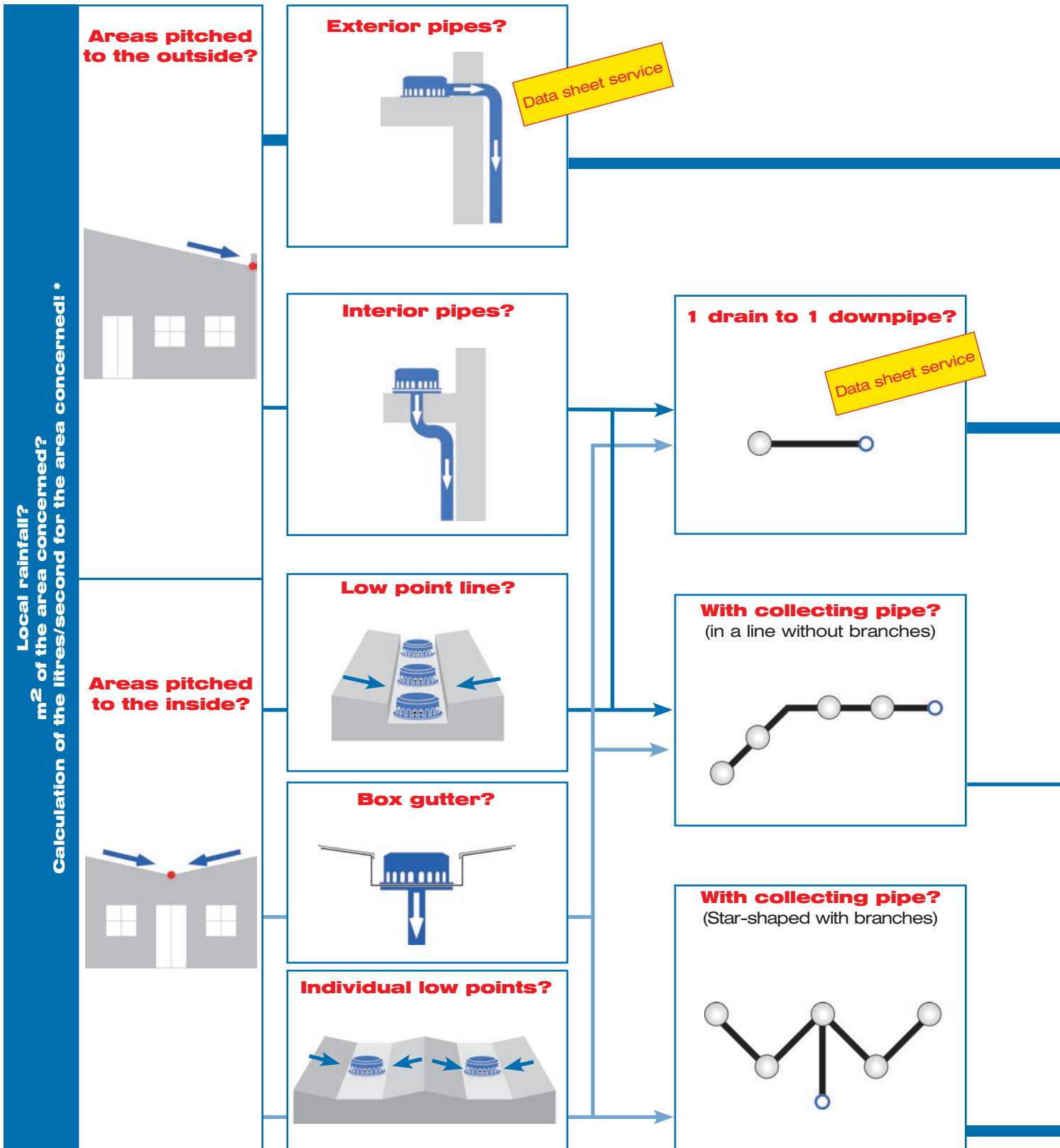
LX 961  **DN 150**

21311.150X

94.4 l/s at a water level of 75 mm on the roof







Vers. a: without thermal insulation
 Vers. b: with thermal insulation
 Vers. c: with thermal insulation, with heating




From the building to the LORO-X roof drainage system with LORO Service



* Main drainage: $1000 \text{ (A in m}^2) \times (300/10,000) \text{ l/s m}^2 \text{ (rainfall converted to l/s m}^2) \times 0.5 \text{ (C)} = 15 \text{ l/s}$
 Emergency drainage: $1000 \text{ (A in m}^2) \times ((600 - (300 \times 0.5 \text{ (C)}))/10,000) \text{ l/s m}^2 \text{ (rainfall converted to l/s m}^2) = 45 \text{ l/s}$
 Roof structure: smooth C = 1.0 gravelled C = 0.5 planted C = 0.3

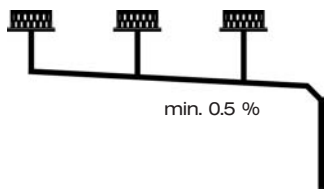
LORO-X data sheet service

Scupper drainage	Drain*	Penetration	DN	Main	Emergency
 Scupper direct series for roof and terrace	0.8 l/s	0 mm	70	LX 620	
	1.2 l/s	0 mm	100	LX 621	
	1.7 l/s	0 mm	100	LX 1110	
	3.0 l/s	52 mm	100	LX 647	
	4.5 l/s	52 mm	100	LX 653	
	4.5 l/s	103 mm	100	LX 694	
	8.0 l/s	103 mm	100	LX 727	LX 727
 Scupper RAINSTAR® series with patented second acceleration  Scupper RAINSTAR® series without upstand	5.1 l/s	82 mm	50	LX 490	LX 494
	5.2 l/s	92 mm	70	LX 460	LX 465
	5.4 l/s	106 mm	100	LX 479	LX 481
	8.5 l/s	82 mm	50	LX 492	LX 500
	13.2 l/s	92 mm	70	LX 461	LX 466
	16.2 l/s	106 mm	100	LX 480	LX 482
 Scupper RAINSTAR® series with low penetration depth	5.0 l/s	55 mm	70	LX 471	LX 475
	4.9 l/s	55 mm	100	LX 487	LX 668
	15.6 l/s	55 mm	70	LX 473	LX 798
 Scupper DRAINJET® series without penetration into the roof	7.0 l/s	0 mm	50	LX 789	LX 790
	16.0 l/s	0 mm	70	LX 636	LX 637
 ATTIKASTAR® series High-performance	32.0 l/s	55 mm	100	LX 803	LX 766
 Series Scupper main-emergency combination	12.7 l/s	106 mm	100/50	LX 772	LX 772

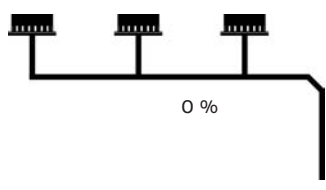
Roof drainage	Drain*		DN	Main	Emergency
 O series Roof drainage with connecting sleeve	4.6 l/s		70	LX 887	
	5.2 l/s		100	LX 884	
	7.7 l/s		125	LX 852	
 DL series LORO-DRAINLET® roof drainage with clamping flange	6.3 l/s		70	LX 846	LX848
	6.5 l/s		100	LX 873	LX875
	9.8 l/s		125	LX 874	
 DJ series LORO-DRAINJET® roof drainage with clamping flange	18.8 l/s		70	LX 845	LX 847
	27.0 l/s		100	LX 530	LX 542
	50.0 l/s		125	LX 948	LX 947
	50.0 l/s		150	LX 960	LX 961

*1/s = 30 m² with 350/700 rainfall and C=1

Collecting pipe with fall? (Gravity flow)



Collecting pipe without fall? (Pressure flow)



LORO-X service team



- Special solutions possible
- Very complex drainage tasks can be handled
- Fire protection systems

Phone: 0538271-0
E-mail: infocenter@lorowerk.de

Main-emergency comb.		Emergency drainage																					
		Gravity flow																					
Silent		Silent-Power		Silent			Silent Power																
HNK series		ATTIKASTAR® series			RAINSTAR® series			RAINSTAR® series		DISTANT series													
Main and emergency drain in one system		Spout emergency drain solution			High discharge capacity through lowered pipe			Low penetration depth		Without upstand													
DN	100 (main) 50 (emerg.)	100			50	70	100	70	100	50	70	100											
↓ mm	106	106			82	92	106	55	55	82	92	106											
Wh(mm)	35	75			75	75	75	75	75	75	75	75											
LX no.	LX772		LX859			LX494	LX493	LX465	LX469	LX481	LX485	LX475	LX476	LX668	LX667	LX494	LX493	LX465	LX469	LX481	LX485		
Discharge in l/s	4.5 l/s*	8.2 l/s*		9.1 l/s**			7.6 l/s*	2.6 l/s**	10.0 l/s*	4.2 l/s**	9.0 l/s*	6.8 l/s**	8.2 l/s*	as spout	8.0 l/s*	as spout	4.6 l/s**	7.6 l/s*	as spout	10.0 l/s*	4.2 l/s**	9.0 l/s*	6.8 l/s**

Main drainage																									
Gravity flow																									
Silent				Silent Power																					
DIRECT series				RAINSTAR® series			RAINSTAR® series			DISTANT series															
Fitted directly into the parapet				Drain through lowered pipe conforms with standard			Low penetration depth			Without upstand															
without penetration into the roof (without basin)																									
with basin																									
as double pipe drain																									
with basin and lowered pipe																									
as double pipe drain																									
without penetration into the roof with clamping flange only for PVC roofing sheets:																									
Part 01333X																									
DN	70	100			50	70	100	70	100	50	70	100													
↓ mm	0	52	0	52	52	103	103	0	82	92	106	55	55	82	92	106									
Wh(mm)	35	35	35	35	35	35/75	35	35	35	35	35	35	35	35	35	35									
LX no.	LX620	LX650	LX621	LX647	LX653	LX694	LX727	LX1110	LX490	LX489	LX460	LX467	LX479	LX471	LX472	LX487	LX488	LX490	LX489	LX460	LX467	LX479			
Discharge in l/s	0.8 l/s*	2.3 l/s*	1.2 l/s*	3.0 l/s*	4.5 l/s*	4.5 l/s*	4.0 l/s*	1.7 l/s*	8.0 l/s***	5.1 l/s*	as spout	5.2 l/s*	3.6 l/s**	5.4 l/s*	5.0 l/s*	as spout	2.7 l/s**	4.9 l/s*	3.6 l/s**	as spout	5.1 l/s*	as spout	5.2 l/s*	3.6 l/s**	5.4 l/s*

↓ = penetration depth into the roof * Discharge capacity measured in test assembly according to EN 1253, downpipe length 4.2 m
 Wh(mm) = water level on the roof *** Discharge capacity as main-emergency combination system with emergency overflow into collector

Emergency drainage

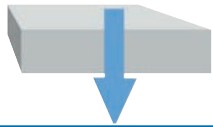
Pressure flow

Silent Power

	RAINSTAR® series				RAINSTAR® series		DISTANT series				DRAINJET® series		ATTIKASTAR® series
	High discharge capacity through lowered pipe				Low penetration depth		Without upstand				Without penetration into the roof		High-performance roof drainage
DN	40	50	70	100	70	100	40	50	70	100	50	70	100
↓ mm	76	82	92	106	55	55	76	82	92	106	0 mm	0 mm	55 mm
Wh(mm)	75	75	75	75	75	75	75	75	75	75	75	75	75
LX no.	LX682	LX500	LX466	LX482	LX798	LX666	LX682	LX500	LX466	LX482	LX790	LX637	LX766
Discharge in l/s	4.5	8.6	17.6	21.7	17.6	23.0	4.5	8.6	17.6	21.7	9.0	14.5	32.0

	RAINSTAR® series				RAINSTAR® series		Serie DISTANT			DRAINJET® series		ATTIKASTAR® series
	High discharge capacity through lowered pipe				Low penetration depth		Without upstand			Without penetration into the roof		High-performance roof drainage
DN	50	70	100	70	100	50	70	100	50	70	100	
↓ mm	82	92	106	55	55	82	92	106	0	0	55	
Wh(mm)	55	55	55	55	55	55	55	55	55	55	55	
LX no.	LX492	LX461	LX480	LX473	LX665	LX492	LX461	LX480	LX789	LX636	LX803	
Discharge in l/s	8.5	13.2	16.2	15.6	14.0	8.5	13.2	16.2	7.0	16.0	32.0	

** LORO measurement with fully ventilated downpipe, corresponds to spout capacity



LORO-X roof drainage systems for gravity flow

Main drainage

Emergency drainage

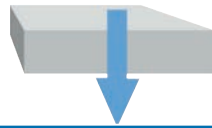
Gravity flow

Gravity flow

Silent Power

Series	O series with connecting sleeve			DL series with clamping flange			DL series with clamping flange								
	one-piece			one-piece			one-piece								
Uninsulated roof	<p>Vertical drain Vers. a: DN 70: 15275X DN 100/DN125: 17110A Vers. b: DN 70: 15375X DN 100/DN125: 17141A Vers. c: DN 100/DN125: 17143A</p> <p>Side drain Vers. a: DN 70: 15475X DN 100: 17131A Vers. b: DN 70: 15575X DN 100: 17145A Vers. c: DN 100: 17147A</p>			<p>Vertical drain Vers. a: 21511X Vers. b: 21512X Vers. c: 21513X Side drain Vers. a: 21514X Vers. b: 21515X Vers. c: 21516X</p>			<p>Vertical drain Vers. a: 21711X Vers. b: 21712X Vers. c: 21713X Side drain Vers. a: 21714X Vers. b: 21715X Vers. c: 21716X</p>								
Insulated roof	<p>Vertical drain Vers. a: DN 70: 15285X DN 100/DN125: 17120A Vers. b: DN 70: 15385X DN 100/DN125: 17142A Vers. c: DN 100/DN125: 17144A</p> <p>Side drain Vers. a: DN 70: 15485X DN 100: 17132A Vers. b: DN 70: 15585X DN 100: 17146A Vers. c: DN 100: 17148A</p>			<p>Vertical drain Vers. a: 21521X Vers. b: 21522X Vers. c: 21523X Side drain Vers. a: 21524X Vers. b: 21525X Vers. c: 21526X</p>			<p>Vertical drain Vers. a: 21721X Vers. b: 21722X Vers. c: 21723X Side drain Vers. a: 21734X Vers. b: 21735X Vers. c: 21736X</p>								
DN	70		100	125		70		100	125		70		100		
Wh (mm)	35		35	35		35		35	35		35		35		
LX no.	LX887	LX886	LX884	LX885	LX852	LX846	LX888	LX873	LX855	LX874	LX890	LX848	LX889	LX875	LX854
Discharge Q (l/s)	4.6 l/s*	4.2 l/s*	5.2 l/s*	4.6 l/s*	7.7 l/s*	6.3 l/s*	5.6 l/s*	6.5 l/s*	6.1 l/s*	9.8 l/s*	9.2 l/s*	9.0 l/s*	10.0 l/s*	9.0 l/s*	11.0 l/s*

Vers. a = without thermal insulation, vers. b = with thermal insulation, vers. c = with thermal insulation and heating
Wh(mm)= water level on the roof



LORO-X roof drainage systems for pressure flow

	Main drainage				Emergency drainage							
	Pressure flow				Pressure flow							
	Silent Power											
Series	DJ series with clamping flange				1 12 series with clamping flange				DJ series with clamping flange			
	one-piece								one-piece			
Uninsulated roof	<p>Vertical drain Vers. a: 21111X Vers. b: 21112X Vers. c: 21113X</p>				<p>LORO-X 100 litres per second high-capacity roof drainage system</p> <p>100 l/s</p>				<p>Vertical drain Vers. a: 21311X Vers. b: 21312X Vers. c: 21313X</p>			
Insulated roof	<p>Vertical drain Vers. a: 21121X Vers. b: 21122X Vers. c: 21123X</p>				<p>DN 150: 21114.150X</p>				<p>Vertical drain Vers. a: 21321X Vers. b: 21322X Vers. c: 21323X</p>			
DN	70	100	125	150	150	70	100	125	150			
Wh (mm)	55	55	55	55	55/60	75	75	75	75			
LX no.	LX845	LX530	LX948	LX960	LX836	LX847	LX542	LX947	LX961			
Discharge Q (l/s)	18.8 l/s*	27.0 l/s*	50.0 l/s*	50.0 l/s*	65 l/s*	19.4 l/s*	38.0 l/s*	92.0 l/s*	94.4 l/s*			
					100 l/s**							

* Discharge capacity measured in test assembly according to EN 1253, downpipe length 4.2 m
 ** At a backflow level of 60 mm

Online service

Product database

Data sheet

Online Productfinder | Online Calculation | Online Configurator | Online Productdatabase | Shopping Basket

Search in LORO-X Produktdatabase

Examples:
„LX786“ for LX-System
„13786CCO“ for Art.Nr.
„Drain“ for Keyword

For every LORO-X Article
- Pictures
- 2D and 3D CAD Documents as .dwg
- dimensioned drawing as PDF

For every LX-System
- 2D and 3D Systems as .dwg
- LX-Datasheets as PDF

LX-Complete Systems

LORO-X Roof-Drainage-System LX789
With 45° clamping flange

LORO-X Siphonic Scupper Roof-Drainage System without penetration of the roof including Siphonic Scupper Main Drain with 45 Degree clamping-flange, vertical warpage, bend with short radius, safety clamps, sliding flange, sealing elements and lubricant, ready to install. This siphonic roof drainage system has to be completed with LORO-X downpipes to get the mentioned discharge rate. Please ask your local dealer or LORO-contact person. Proof of performance can be downloaded as data-sheet LX789 on www.loro-x.com with 7,0l/s at 55mm water height, DN50

System contains these articles:

- 1 x 01351.050X -
- 1 x 01401.050X - LORO-X PIPE WITH 1 SOCKET 250 MM DN 50
- 1 x 00350.050X - LORO-X SHORT RADIUS BEND 87 DEGREE DN 50
- 1 x 01011.050X - LORO-X PIPE WITH 1 SOCKET 4000 MM DN 50
- 1 x 00550.050X - LORO-X PIPE WITH CLEANOUT DN 50 CLEAN-OUT OPENING
- 4 x 00911.050X - LORO-X SEALING ELEMENT NBR DN 50
- 3 x 00973.050X - LORO-X PIPE CLIP WITH CONNECTING THREAD M8 DN 50
- 1 x 00986.000X -
- 1 x 13232.050X -
- 3 x 09603.200X -
- 2 x 00806.050X - LORO-X ANCHOR CLIP DN 50

computerized Data

LX789-2X
45° clamping flange

LX-data sheet 789

1 x System CAD 2D
1 x System CAD 3D
1 x dimensioned drawing
1 x System
in shopping basket

Data sheet LX 789

Series 62 DRAINJET® siphonic scupper drainage systems without penetrating the roof

Main drainage

Siphonic flow

Silent Power

Discharge rate: 7,0 l/sec
Water height: 55 mm
Roof penetration: 0 mm
Diameter: DN 50
Weir height: 0 mm
Drain: not ventilated
Downpipe: not ventilated
Downpipe height: min 4,2 m
Drainage: in sewer

LX 789 Piece list

- 1 x Art-No. 01351.050X, DRAINJET® siphonic scupper drain
- 1 x Art-No. 01401.050X, LORO-X pipe with one socket
- 1 x Art-No. 13232.050X, LORO-sliding flange
- 1 x Art-No. 00350.050X, LORO-X bend
- 1 x Art-No. 01101.050X, LORO-X pipe with one socket
- 1 x Art-No. 00550.050X, LORO-X cleaning pipe
- 4 x Art-No. 00911.050X, LORO-X sealing element
- 3 x Art-No. 00973.050X, LORO-X pipe clamps
- 1 x Art-No. 00986.000X, LORO-X lubricant
- 2 x Art-No. 00806.050X, LORO-X anchor clips
- 3 x Art-No. 09603.200X, LORO-X threaded rods

hQ - Head-Discharge curve

CAD

Water height	mm	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
Discharge	l/sec					0,75	3	4,5	5,3	6	6,7	7,0	7,7	8		
		Silent						Silent Power								







AKTUELLE SERIE 62 DJ/ATTRA



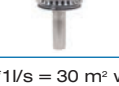
LX data sheet as .pdf

All Data sheets available on
www.loro-x.com

LORO-X data sheets

LORO-X data sheets (chronological)
LORO-X data sheet service

Scupper drainage		Drain*	Penetration	DN	Main	Emergency
 Scupper direct series for roof and terrace	0.8 l/s	0 mm	70	LX 620		
	1.2 l/s	0 mm	100	LX 621		
	1.7 l/s	0 mm	100	LX 1110		
	3.0 l/s	52 mm	100	LX 647		
	4.5 l/s	52 mm	100	LX 653		
	4.5 l/s	103 mm	100	LX 694		
	8.0 l/s	103 mm	100	LX 727		LX 727
 Scupper RAINSTAR® series with patented second acceleration Scupper RAINSTAR® series without upstand	5.1 l/s	82 mm	50	LX 490	LX 494	
	5.2 l/s	92 mm	70	LX 460	LX 465	
	5.4 l/s	106 mm	100	LX 479	LX 481	
	8.5 l/s	82 mm	50	LX 492	LX 500	
	13.2 l/s	92 mm	70	LX 461	LX 466	
	16.2 l/s	106 mm	100	LX 480	LX 482	
 Scupper RAINSTAR® series with low penetration depth	5.0 l/s	55 mm	70	LX 471	LX 475	
	4.9 l/s	55 mm	100	LX 487	LX 668	
	15.6 l/s	55 mm	70	LX 473	LX 798	
	14.0 l/s	55 mm	100	LX 665	LX 666	
 Scupper DRAINJET® series without penetration into the roof	7.0 l/s	0 mm	50	LX 789	LX 790	
	16.0 l/s	0 mm	70	LX 636	LX 637	
 ATTIKASTAR® series High-performance	32.0 l/s	55 mm	100	LX 803	LX 766	
 Series Scupper main-emergency combination	12.7 l/s	106 mm	100/50	LX 772	LX 772	

Roof drainage		Drain*		DN	Main	Emergency
 O series Roof drainage with connecting sleeve	4.6 l/s			70	LX 887	
	5.2 l/s			100	LX 884	
	7.7 l/s			125	LX 852	
 DL series LORO-DRAINLET® Roof drainage with clamping flange	6.3 l/s			70	LX 846	LX848
	6.5 l/s			100	LX 873	
	9.8 l/s			125	LX 874	
 DJ series LORO-DRAINJET® Roof drainage with clamping flange	18.8 l/s			70	LX 845	LX 847
	27.0 l/s			100	LX 530	LX 542
	50.0 l/s			125	LX 948	LX 947
	50.0 l/s			150	LX 960	LX 961

*1l/s = 30 m² with 350/700 rainfall and C=1

LORO-X pipes and pipe fittings to tailor your complete system



For interior roof drainage...

...and for exterior scupper drainage

Easy and time-saving to install

through LORO-X push-fit sockets in the complete system

Weather resistant

against frost, heat and UV radiation

Visually attractive

on any facade

Pressure-resistant, impact-resistant and dimensionally stable

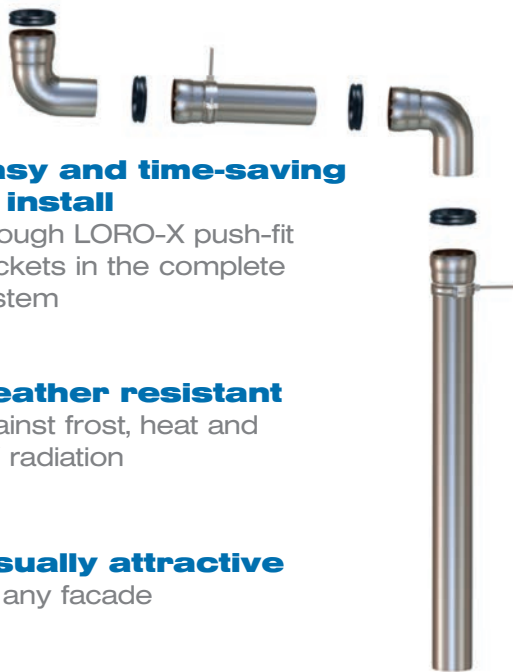
through galvanised steel pipe, both inside and outside

Backflow-safe

through LORO-X push-fit socket with LORO-X sealing element

Non-combustible

through galvanised steel pipes, building material class A1

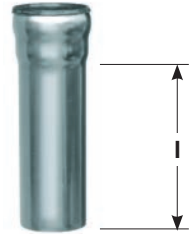


LORO-X steel discharge pipes, with push-fit socket (extract)

DN 40 - DN 200, hot-dip galvanised, with additional internal coating

Pipes with one socket

l (mm)		DN 40	DN 50	DN 70	DN 80	DN 100	DN 125	DN 150	DN 200
250	Item no.	01401.040X	01401.050X	01401.070X	01401.080X	01401.100X	01401.125X	01401.150X	01401.200X
		•	•	•	•	•	•	•	•
500	Item no.	01301.040X	01301.050X	01301.070X	01301.080X	01301.100X	01301.125X	01301.150X	01301.200X
		•	•	•	•	•	•	•	•
750	Item no.	01211.040X	01211.050X	01211.070X	01211.080X	01211.100X	01211.125X	01211.150X	01211.200X
		•	•	•	•	•	•	•	•
1000	Item no.	01201.040X	01201.050X	01201.070X	01201.080X	01201.100X	01201.125X	01201.150X	01201.200X
		•	•	•	•	•	•	•	•
1500	Item no.	01111.040X	01111.050X	01111.070X	01111.080X	01111.100X	01111.125X	01111.150X	01111.200X
		•	•	•	•	•	•	•	•
2000	Item no.	01101.040X	01101.050X	01101.070X	01101.080X	01101.100X	01101.125X	01101.150X	01101.200X
		•	•	•	•	•	•	•	•
2500	Item no.	01004.040X	01004.050X	01004.070X	01004.080X	01004.100X	01004.125X	01004.150X	01004.200X
		•	•	•	•	•	•	•	•
2500*	Item no.	-	01002.050X	01002.070X	-	01002.100X	-	-	-
		-	•	•	-	•	-	-	-
2750	Item no.	-	01005.050X	01005.070X	01005.080X	01005.100X	01005.125X	-	-
		-	•	•	•	•	•	-	-
2750*	Item no.	-	01003.050X	01003.070X	-	01003.100X	-	-	-
		-	•	•	-	•	-	-	-
3000	Item no.	01001.040X	01001.050X	01001.070X	01001.080X	01001.100X	01001.125X	01001.150X	01001.200X
		•	•	•	•	•	•	•	•
4000	Item no.	-	01011.050X	01011.070X	01011.080X	01011.100X	01011.125X	01011.150X	01011.200X
		-	•	•	•	•	•	•	•
5000	Item no.	-	-	01013.070X	01013.080X	01013.100X	01013.125X	01013.150X	-
		-	-	•	•	•	•	•	-
6000	Item no.	-	-	01014.070X	01014.080X	01014.100X	01014.125X	01014.150X	-
		-	-	•	•	•	•	•	-



* with long socket for balcony drainage

Branches

		DN 40	DN 50	DN 70	DN 80
87°	Item no.	00200.AA0X	00200.BB0X	00200.CC0X	00200.MM0X
		•	•	•	•
70°	Item no.	00210.AA0X	00210.BB0X	00210.CC0X	-
		•	•	•	-
45°	Item no.	00220.AA0X	00220.BB0X	00220.CC0X	00220.MM0X
		•	•	•	•

		DN 100	DN 125	DN 150	DN 200
87°	Item no.	00200.DD0X	00200.EE0X	00200.FF0X	00200.GG0X
		•	•	•	•
70°	Item no.	00210.DD0X	00210.EE0X	00210.FF0X	00210.GG0X
		•	•	•	•
45°	Item no.	00220.DD0X	00220.EE0X	00220.FF0X	00220.GG0X
		•	•	•	•



Bends

		DN 40	DN 50	DN 70	DN 80
87°	Item no.	00300.040X	00300.050X	00300.070X	00300.080X
		•	•	•	•
70°	Item no.	00310.040X	00310.050X	00310.070X	00310.080X
		•	•	•	•
45°	Item no.	00320.040X	00320.050X	00320.070X	00320.080X
		•	•	•	•
30°	Item no.	00330.040X	00330.050X	00330.070X	00330.080X
		•	•	•	•
15°	Item no.	00340.040X	00340.050X	00340.070X	00340.080X
		•	•	•	•



		DN 100	DN 125	DN 150	DN 200
87°	Item no.	00300.100X	00300.125X	00300.150X	00300.200X
		•	•	•	•
70°	Item no.	00310.100X	00310.125X	00310.150X	00310.200X
		•	•	•	•
45°	Item no.	00320.100X	00320.125X	00320.150X	00320.200X
		•	•	•	•
30°	Item no.	00330.100X	00330.125X	00330.150X	00330.200X
		•	•	•	•
15°	Item no.	00340.100X	00340.125X	00340.150X	00340.200X
		•	•	•	•

Bends with tight radius

		DN 40	DN 50	DN 70	DN 80
87°	Item no.	00350.040X	00350.050X	00350.070X	00350.080X
		•	•	•	•
45°	Item no.	00352.040X	00352.050X	00352.070X	-
		•	•	•	-


Transition pipes (concentric reducing pieces)

	DN 40/50	DN 40/70	DN 50/70	DN 50/100	DN 70/80
Item no.	00600.AB0X	00600.AC0X	00600.BC0X	00600.BD0X	00600.CM0X
	•	•	•	•	•



	DN 70/100	DN 70/125	DN 80/100	DN 100/125	DN 100/150
Item no.	00600.CD0X	00600.CE0X	00600.MD0X	00600.DE0X	00600.DF0X
	•	•	•	•	•

	DN100/200	DN 125/150	DN 125/200	DN 150/200
Item no.	00600.DG0X	00600.EF0X	00600.EG0X	00600.FG0X
	•	•	•	•

Please order the sealing elements separately.

Transition pipes (concentric reducers)

	DN 40/50	DN 40/70	DN 50/70	DN 50/100	DN 70/80
Item no.	00600.AB0X	00600.AC0X	00600.BC0X	00600.BD0X	00600.CM0X
	•	•	•	•	•

	DN 70/100	DN 70/125	DN 80/100	DN 100/125	DN 100/150
Item no.	00600.CD0X	00600.CE0X	00600.MD0X	00600.DE0X	00600.DF0X
	•	•	•	•	•

	DN100/200	DN 125/150	DN 125/200	DN 150/200
Item no.	00600.DG0X	00600.EF0X	00600.EG0X	00600.FG0X
	•	•	•	•


Transition pipes (eccentric reducers)

Form 1

	DN 40/50	DN 50/70	DN 70/80	DN 70/100	DN 80/100	DN 100/125	DN 125/150
Item no.	00601.AB0X	00601.BC0X	00601.CM0X	00601.CD0X	00601.MD0X	00601.DE0X	00601.EF0X
	•	•	•	•	•	•	•



Form 1

Form 2

	DN 50/100	DN 70/125	DN 100/150	DN 150/200
Item no.	00601.BD0X	00601.CE0X	00601.DF0X	00601.FG0X
	•	•	•	•



Form 2

Accessories
Anchor clips, steel, galvanised

(for socket joint, as additional security against axial thrust, and for pressure-proof assembly, including waste water pumping stations)

	DN 40	DN 50	DN 70	DN 80	DN 100	DN 125
Item no.	00806.040X	00806.050X	00806.070X	00806.080X	00806.100X	00806.125X
	•	•	•	•	•	•


Anchor clips, steel, galvanised

 as above, but **with notching** for pipe/branch connection

	DN 40	DN 50	DN 70	DN 80	DN 100	DN 125
Item no.	08061.040X	08061.050X	08061.070X	08061.080X	08061.100X	08061.125X
	•	•	•	•	•	•


Closing plugs with screw cap**

	DN 40	DN 50	DN 70	DN 80
Item no.	00805.040X	00805.050X	00805.070X	00805.080X
	•	•	•	•

	DN 100	DN 125	DN 150	DN 200
Item no.	00805.100X	00805.125X	00805.150X	-
	•	•	•	-



** Available by request in a special version for pressures above 0.5 bar

Please order the sealing elements separately.

Sealing elements for LORO-X pipe/LX socket

	DN 40	DN 50	DN 70	DN 80
Item no.	00911.040X	00911.050X	00911.070X	00911.080X
	•	•	•	•



	DN 100	DN 125	DN 150	DN 200
Item no.	00911.100X	00911.125X	00911.150X	00911.200X
	•	•	•	•

Pipe clips with connecting threaded socket, galvanised, without sound insulation,
for headless screw or hanger bolt

	DN 40	DN 50	DN 70	
M 8	Item no.	00973.040X	00973.050X	00973.070X
		•	•	•



	DN 80	DN 100	
M 10	Item no.	00975.080X	00975.100X
		•	•

	DN 125	DN 150	DN 168	DN 200	
M 12	Item no.	00977.125X	00977.150X	00977.168X	00977.200X
		•	•	•	•

Pipe clips with connecting threaded socket, galvanised, with sound insulation,
for headless screw or hanger bolt

	DN 40	DN 50	DN 70	
M 8	Item no.	00972.040X	00972.050X	00972.070X
		•	•	•



	DN 80	DN 100	
M 10	Item no.	00974.080X	00974.100X
		•	•

	DN 125	DN 150	DN 168	DN 200	
M 12	Item no.	00976.125X	00976.150X	00976.168X	00976.200X
		•	•	•	•

Hanger bolts*

	100 mm	120 mm	200 mm	
M 8	Item no.	09603.100X	09603.120X	09603.200X
		•	•	•
M 10	Item no.	09604.100X	09604.120X	09604.200X
		•	•	•
M 12	Item no.	09622.100X	09622.120X	09622.200X
		•	•	•

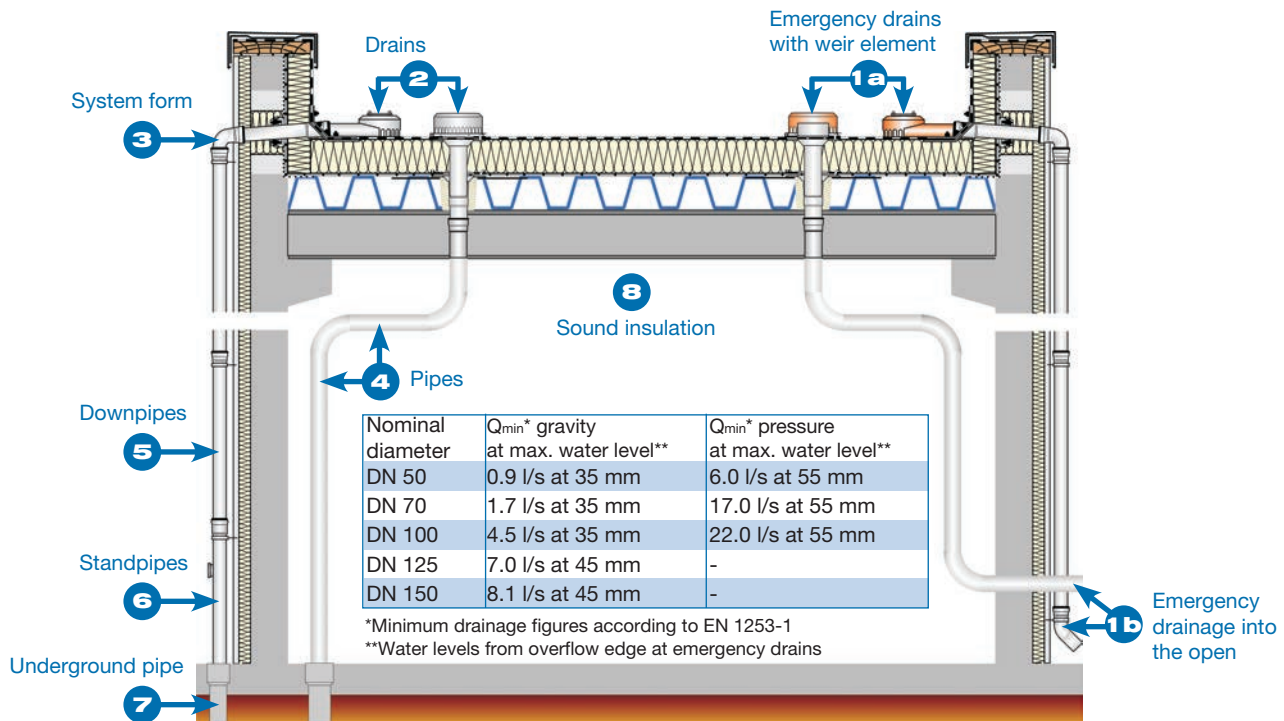


* Pack contents 25

Please order the sealing elements separately.

LORO-X roof drainage systems

References to recommended standards and guidelines with comments



Determining the necessary capacity for a roof drainage system

Every roof drainage system is considered as a whole, from the drainage through the pipes and pipe fittings down to the outlet. Its purpose is to drain the rainwater falling on the effective roof area, maintaining a low depth of water on the roof, safely away from the roof into the underground pipe or into the open onto a surface that can be flooded without harm.

- EN 12056-3 Chap. 4.3 and DIN 1986-100 Chap. 14.3.4 Determining the effective roof area A without the effect of wind

A in m² = horizontal projection of the roof area onto the floor plan

- EN 12056-3 Chap. 4.1 Calculating the necessary discharge rate Q with local rainfall (e.g. at www.loro.de)

Discharge rate Q in l/s = A x rainfall r x discharge coefficient C

C = 1.0 for smooth roof surfaces

C = 0.5 for gravelled roof surfaces and extensive (< 10 cm) green roof surfaces

C = 0.3 for intensive green roof areas and extensively green roof areas from 10 cm height upwards

Example of main drainage calculation:

1000 (A in m²) x (300/10,000) l/s m² (rainfall converted to l/s m²) x 0.5 (C) = 15 l/s

Example of emergency drainage calculation:

1000 (A in m²) x ((600-(300 x 0.5 (C)))/10,000) l/s m² (rainfall converted to l/s m²) = 45 l/s

- DIN 1986-100 Chap. 14.2.6 In order to calculate the emergency drainage, the difference between the once-in-a-hundred-year rain r(5,100) and the usual rainfall is inserted into the formula given above.

When calculating the emergency drainage, the coefficient, as shown in the example calculation, is to be calculated with normal rainfall. The emergency drainage for buildings requiring exceptional protection corresponds to the full once-in-a-hundred-year rain. Without subtracting the normal rainfall.

- DIN 1986-100 Chap. 14.2.5 The number of roof drainage systems required is found by dividing by the capacity of the system in litres.

1 Proof of performance for roof drainage systems

- DIN 1986-100 Chap. 5.4.1.3 A building-specific proof of performance for the roof drainage system must always be supplied (e.g. on the basis of the LX data sheet). Additional, comprehensive verifications on the structure of the roof and the boundary conditions must be supplied for roof areas of 800 m² and above.

- DIN 1986-100 Chap. 5.7.3.1 A discharge curve is to be provided by the manufacturer as a diagram or table (e.g. in the LX data sheet)

Secure emergency drainage systems

- DIN 1986-100 Chap. 5.8.2 + 5.9 An additional emergency drainage system is to be provided at every low point in order to provide secure drainage in the case of a once-in-a-hundred-year rain, or if the main drainage system fails e.g. through backflow resulting from the overloaded underground pipe. The only exception to this are concrete roofs designed to retain the rain. The absolute water level of 75 mm (75 kg/m²) is not to be exceeded on lightweight constructions.

1a Emergency drains with integrated weir element: The absolute water level on the roof is relevant to the static roof loading, not just the damming height above the weir element. Patented emergency drains from LORO achieve particularly low water levels with maximum discharge capacity here.

1b Free drainage: The emergency drainage must have an independent outlet into the open onto an area that can be flooded without harm, and must not open into the underground pipe.

The summary of standards provided here is simply a recommendation. Basically, all the standards and guidelines listed attempt to document the current state of the art under standardised conditions. In practice, not every roof drainage system can correspond to these standard conditions and assumptions, and it is therefore necessary to check whether the requirements of the standard can be applied meaningfully to the particular conditions. Innovative or patented products and special parts may in some cases permit better solutions.

2 Roof and scupper drains

- DIN 1986-100 Chap. 5.7.3.1: Roof drains for interior drainage should have at least 30 cm clearance from the outer edge of the flange to parts of the building that rise above it (e.g. parapet, light domes, pipe feedthroughs).
- DIN 1986-100 Chap. 5.7.3.1 and flat roof guideline: Scupper drains can be installed directly and without clearance at the parapet.
- EN 1253-1 Tables 3+4: Minimum discharge rates apply to roof drains, scupper drains and emergency drains.
- DIN 18195-9 Chap.7 and flat roof guideline Chap. 4.8: Drains must be joined in a waterproof way to the sealing sheet using bonding or clamping flanges. Roof drains must be installed in accordance with the installation instructions of the manufacturer.
- DIN 1986-100 Chap. 14.2.6 Due to the possible formation of "water fills" it is recommended that when zero-fall low-point lines are employed, distances of 20 m between any two main drains, and distances of 10 m between the main drain and the associated emergency drain are not exceeded. If the distances are greater, double the damming height should be assumed as the roof loading at the high point between the drains. Often it is possible to exceed this distance and to use higher capacity drainage systems if the static calculations for the planned low-point lines are designed appropriately. In that case, the number of drains required is less than usual.

3 Controlled discharge capacity through controlled ventilation of the complete system

- The entire configuration of the system, and control of the water-air mixture throughout the entire roof drainage system is crucial for secure discharge capacity. It is necessary to ensure that the system components provided for in the design are not exchanged in the marketing chain leading to the installer. A mixture of pipe fittings in conflict with the design at critical points can on the one hand lead to unwanted and uncontrolled pressure flow in a system designed for gravity flow or, on the other hand, can reduce the discharge capacity of the whole of a system designed for pressure flow. Mixed systems can often fail to withstand the forces that occur.
- DIN 1986-100 Chap. 6.4 System-specific manufacturer's specifications must be observed.

4 Pipes and pipe fittings

- DIN 1986-100 Chap. 6.1.3: The entire roof drainage system must be break-proof and backflow-safe with respect to pressure loading, vibrations resulting from flow and impacts. Anchor clips should be used upstream of deflection points to guard against axial thrust. A non-combustible, break-proof and backflow-safe pipe system (e.g. LORO-X) should, in particular, be used for interior and exterior roof drainage systems.
- DIN 1986-100 Chap. 6.1.5 Pipes may be concreted in if the pipe system is appropriate (e.g. LORO-X)
- Filling ratio of pipes horizontal through to 10° fall (e.g. collecting pipes)**
- EN 12056-3 Pipes for gravity flow (this also applies to the underground pipe) are generally designed for filling ratio up to 0.7 with at least 0.5% fall, and are dimensioned accordingly.
- EN 12056-3 Pipes for pressure flow systems are designed and dimensioned for a filling ratio up to 1.0 with pressure-resistant pipe systems and higher flow rates. These can also be designed to run horizontally without fall.

5 Filling ratio of pipes from 10° fall up to vertical (e.g. downpipes)

- EN 12056-3 Pipes for gravity flow are dimensioned for a filling ratio of between 0.2 and 0.33.
- EN 12056-3 Pipes for pressure flow are dimensioned for a filling ratio up to 1.0.
- DIN 1986-100 Chap. 6.1.8 Reductions in the nominal diameter in the direction of flow are only permitted in pressure flow systems.
- The requirements for interior pipe systems must be satisfied for downpipes located behind the facade (e.g. backflow-safe and pressure-resistant). LORO-X pipe systems with anchor clips are optimally suited to this. When installed in the insulation, it is referred to DIN 4108 'Thermal protection in building construction', and it is recommended that the use of trace heating is considered.

6 Rain standpipes

- DIN 1986-100 Chap. 6.1.4 and various regional regulations In order to protect against mechanical damage and vandalism, break-proof standpipes are to be used above ground level (e.g. LORO-X standpipes with clean-out opening 1-3 m).

7

- DIN 1986-100 Chap. 6.4 The downpipes of systems using pressure flow, and with gravity flow where the filling ratio is greater than 0.2, may need to be widened before the transfer into the underground pipe in accordance with the designed capacity, so that the entrance velocity into the underground pipe does not exceed 2.5 m/s. This widening is not necessary in emergency drainage systems, since these must not be connected to an underground pipe.

8 Sound insulation

- DIN 4109: Tighter requirements on the noise created by drainage when pipes are inside the building often apply to residential and commercial buildings and hospitals. Special pipe systems that reduce the noise are recommended here (e.g. LORO-X Silent compound pipes). Scupper drainage where there are no pipes inside the building usually satisfy these requirements automatically. The use of sound-damping fastening clips is recommended.

Frost protection

- DIN 1986-100 Chap. 6.3.4 In regions where there is a risk of frost, a building-specific assessment should be carried out to consider whether trace heating with a thermostat would be appropriate, bearing in mind the position of the roof drainage system.

Fire protection

- DIN 4102/MLAR (German Model Pipe System Guidelines): Roof openings and wall openings for roof drains or pipes between fire protection zones should preferably be made using special fire-safety solutions (e.g. LORO-X fire protection systems with Rockwool and BIS Walraven products). Scupper drainage systems usually satisfy fire protection regulations automatically, as there are no openings through the roof into fire protection zones.

Renovation

- DIN 1986-100 Chap. 5.8.4 The inspection and upgrading of the roof drainage system should be included in the renovation of a roof. The drainage capacity should particularly be checked in the light of actual rainfall, along with the condition of the system as a whole, the seals and, if relevant, the need to add emergency drainage.

Condensation

- In order to prevent condensation forming inside the building, the use of double-walled LORO-X compound pipes is recommended. As an alternative, normal LORO-X pipes can be insulated by the builder.

Inspection and servicing

- EN 1253-2 Figure 8 Test assembly for measuring the discharge capacity of drains (with consistent system structure)
- EN 1253-2 Figure 9 Test assembly for determining the pressure loss factor of drains
- DIN 1986-3 Tab. 1 recommends that drainage systems are serviced 1-2 times a year, or every 6 months, preferably in the autumn for cleaning and, for instance, removing leaves. Servicing contracts are recommended.

Designing roof drains for flat roofs

Determining the design rainfall intensity

$$Q_r = \frac{A \cdot (r_{5,5} \cdot C)}{10000}$$

- Q_r = design rainfall intensity
 A = effective roof surface or partial surface in m²
 $r_{5,5}$ = local 2-year rainfall (5 min. rainfall) according to DIN 1986-100 Table A1, page 82-85
 C = discharge coefficient according to DIN 1986-100 Table 6

Determining the volumetric overflow rate for emergency drains

$$Q_{not} = \frac{A \cdot (r_{5,100} - r_{5,5} \cdot C)}{10000}$$

- Q_{not} = volumetric overflow rate
 A = effective roof surface or partial surface in m²
 $r_{5,100}$ = local once-in-a-hundred-year rain (5 min. rainfall) according to DIN 1986-100 Table A1, page 82-85
 $r_{5,5}$ = local 2-year rainfall according to DIN 1986-100 Table A1, page 82-85
 C = discharge coefficient according to DIN 1986-100 Table 6

Determining the number of roof drains

(when evenly distributed around the roof area)

$$n_{DA} = \frac{Q_r}{Q_{DA}}$$

- n_{DA} = minimum number of roof drains
 Q_r = rain water discharge from an effective roof surface or partial surface
 Q_{DA} = discharge of roof drain at the planning stage in l/(s · ha) with a specified backflow level at the roof drain according to DIN 1986-100 Table 7

Required backflow level at the roof drain in order to achieve the minimum discharge according to EN 1253-1

Nominal diameter	Backflow level Δh mm	Discharge capacity l/s
DN 50	35	0.9
DN 70	35	1.7
DN 100	35	4.5
DN 125	45	7.0
DN 150	45	8.1

Designing roof drains for flat roofs

Calculation example*

- Hall roof with effective precipitation area of 500 m² (no partial areas) in the Cologne region
- Discharge coefficient $c = 1.0$
- Rainfall $r_{5,5} = 281 \text{ l/(s x ha)}$
- Backflow level 35 mm
- Rainfall $r_{5,100} = 648 \text{ l/(s x ha)}$
- Roof drains e.g. LORO-DRAINLET® DN 100 with discharge capacity 6.2 l/s
- Emergency drains e.g. LORO emergency scupper drain DN 70 with discharge capacity 7.8 l/s

* For connection of one drain to one downpipe

For main drainage:

$$Q_r = \frac{500 \cdot (281 \cdot 1.0)}{10000} \quad Q_r = 14.05 \text{ l/s}$$

$$n_{DA} = \frac{14.05}{6.2} \quad n_{DA} = 3 \text{ roof drains, DN 100}$$

For emergency drainage:

$$Q_{not} = \frac{500 \cdot (367 \cdot 1.0)}{10000} \quad Q_{not} = 18.35 \text{ l/s}$$

$$n_{not} = \frac{18.35}{7.8} \quad n_{not} = 3 \text{ emergency drains, DN 70}$$

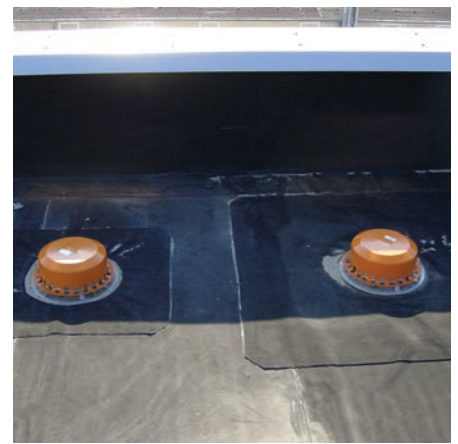
Discharge coefficients C according to DIN 1986-100 for determining the rainwater discharge

No.	Type of surfaces	Discharge coefficient C
1	Waterproof surfaces, e.g.	
	- Roof areas	1.0
	- Concrete surfaces	1.0
	- Ramps	1.0
	- Surfaces fastened in place with sealed joints	1.0
	- Blacktops (asphalt)	1.0
	- Paving with sealed joints	1.0
	- Gravel roofs	1.0
	- Green roof areas	0.5
	- For intensive green roofs	0.3
	- For extensive green roofs from 10 cm thickness	0.3
	- For extensive green roofs below 10 cm thickness	0.5

Please contact the technical LORO field service consultant if you have questions about the design of roof drains.



Thomas Phillips, Logistikzentrum Melle



Industriebau, DAIMLER-BENZ, Berlin Ludwigsfelde



Outletcenter 'An der B5', Wustermark



Meisterschule, Clausthal-Zellerfeld

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optimum drainage!**



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Improved value for trade work and design Safety for your roof

5 year manufacturer's guarantee

LORO-X design advantages:



LORO-X
Push-fit socket

Fast, easy assembly through the LORO-X push-fit socket

Worldwide online service:



- Online calculation
- Online configuration
- Online tendering




LORO-X
Special solutions

Special solutions are possible, even with small piece counts

- Individual planning assistance
- Professional building site support
- Training events

LORO-X
Safety through System

From one source: complete systems with proof of performance

Visually attractive on any facade



LORO-X
Architecture

LORO-X material advantages:



LORO-X

Break-proof



LORO-X

Impact-resistant



LORO-X

Pressure-resistant



LORO-X

Backflow-safe



LORO-X

A1
R90

Fireproof



LORO-X

UV-resistant

Loro-X Roof drainage systems



Loro-X mobile web-app
on the jobsite - for all mobile phone
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Calculate flow values in „litres per second“.

Online configurator:

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Access to more than 2500 products and
more than 400 complete systems including
description, weight, technical drawing (pdf) and
installation instructions.

<http://mobile.loro-x.com>



**3D-installation video clips can be
found on our YouTube-channel:
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Configurator



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