DRAINAGE SYSTEMS

ARCHITECTURAL **SOLUTIONS**

ULMA

INDEX

WHO **WE ARE**

ULMA ARCHITECTURAL SOLUTIONS IS A MEMBER OF THE ULMA GROUP, A LEADING INDUSTRY GROUP IN THE BASQUE COUNTRY, AND ALSO PART OF THE INDUSTRIAL DIVISION OF THE MONDRAGON CORPORATION, ONE OF THE LARGEST BUSINESS CORPORATIONS IN SPAIN AND THE LARGEST COOPERATIVE GROUP IN THE WORLD.

Currently, **it has an important network of subsidiaries extending to countries on all of the continents.** It has a staff of more than **4.500 people**, achieving revenues of close to **700 million Euros.**

ULMA Group takes part of the Industrial Division of the MONDRAGON Corporation, one of the largest business corporations in Spain and the largest Cooperative Group in the world.

Our expertise and experience in **prefabricated systems** for construction has led us to develop a wide range of products aimed at four market segments:

EXTERNAL WALL SYSTEM | DRAINAGE SYSTEMS | VENTILATED FACADES | ARCHITECTURAL PRECAST

ARCHITECTURAL PRECAST

ULMA has an extensive line, focused on satisfying generic or specific project needs. Among its standard solutions it offers window sills, coping, jambs, etc. at highly competitive prices.
Additionaly ULMA puts a special emphasis on adapting its parts to the functional, technical and aesthetical demands of our clients.

DRAINAGE SYSTEMS

ULMA offers a range of solutions for the channelling of fluids, as well as ducting for facilities and services. This product line is shown in the present catalogue.

VENTILATED FACADES

It is a building covering system, a cladding for exterior walls, which joins considerable aesthetic characteristics with efficient advantages in terms of insulation and, as a result, savings. In addition to aesthetically pleasing, they are practical and take into account all of the environmental sustainability requirements.

EXTERNAL WALL SYSTEM

This multi-layer self-supporting facade enclosure system serves as the complete building envelope, providing the required thermal and acoustic insulation. Based on a light construction system, it is dry-mounted, which enables different finishing layers to be used.

In a continuous commitment to innovation in constructive alternatives, ULMA presents solutions based on improvement and process efficiency. It has important project references, in addition to the recognition of the leading architectural and engineering firms.

ADVANTAGES WHICH SET **US APART**

- **Personalised service and advice.**
- **Close relationship with the client.** Vast geographic coverage via Commercial Delegates and Distributors.
- **Widest range on the market** of trench drains, gratings and accessories: a complete drainage system.
- Product developed and certified in accordance with the **EN-1433 Standard.**
- Constant **innovation in product R&D.**

We provide our clients with a complete Technical Brochure, serving as the ideal back-up for engineers and specifiers as a whole. It contains technical descriptions, drawings in CAD and product images.

This info is available on our website:
ulmaarchitectural**.com**

RESISTANCE TO COMPRESSION

The Polymer Concrete applied to the prefabricated systems supports up to 14 223 psi compared to 3 556 psi that traditional concrete supports before breaking or crumbling.

FLUID REMOVAL

This material, thanks to its entirely smooth mirror-like surface, facilitates the quick evacuation of fluids. Furthermore offering a near zero water absorption index, compared with the 5-10% of traditional concrete.

RESISTANCE TO CHEMICAL PRODUCTS

Polymer Concrete is one of the most resistant materials against any kind of chemical product, as its components do not react to contact, avoiding the disintegration or deformity of the product.

RESISTANCE TO FREEZE

This material, the opposite to traditional ones, is not affected by the freezingthawing cycles, avoiding the appearance of cracks or crevices, and maintaining intact all of the physical properties.

ABRASIVE WEATHERING

Polymer concrete, as being a combined material, guarantees the perfect conservation of surfaces without any perception of weathering due to use or the passing of time.

SHOCK RESISTANT

The properties of this material, combined with its excellent prefabricated design, manage to withstand and absorb the force of shock, guaranteeing the great resistance against impacts.

POLYMER CONCRETE by ULMA

Polymer concrete is a high-quality material comprising a selected combination of silica and quartz aggregates, bound by stable polyester resins. Worthy of special mention is **its exceptional mechanical resistance** (**up to 4 times more resistant to compression than traditional concrete**) allowing the production of light elements with reduced dimensions.

OUR EXPERIENCE BACKS US UP

Our material is unique:

- For our Know How.
- With more than 20 years experience, using it and improving it.
- For our specific R&D.
- For the specific intrinsic attributes of our material.
- For our infrastructure, plant over 12,000m^2 and 180 professionals.
- For our international presence in over 20 countries.
- For our adaptability to our customers' needs.
- For our service and close relationship with the client.
- For our quality backed up by Prestigious entities:

  TECNALIA

  EDUARDO TORROJA CONSTRUCTION SCIENCES INSTITUTE.

Because we are ULMA.

labein tecnalia Applus CSIC

POLYMER CONCRETE PROPERTY TESTS

POLYMER CONCRETE **TRADITIONAL CONCRETE**

Resistance to Compression
STANDARD UNE 22 194
14 223 psi
3 556 psi

Bend resistance in tile
STANDARD UNE 127 006
3 556 psi
825 psi

Shock Resistant (height)
STANDARD UNE 127 007
37.40 in [95 cm]
21.65 in [55 cm]

Water absorption by capillarity (Weight Increase) RILEM C.P.C. 11.2
0%
7,3%

Water absorption
STANDARD UNE 22 191
0,22%
8,10%

Abrasive Weathering
STANDARD UNE 127 005/1
0.02 in [0,53 mm]
0.20 in [5,03 mm]

Resistance to chemical products
No visible effects
Considerable damage

Resistance to freeze
STANDARD UNE 127 004
Unchangeable
Fissuration loss of mass

Coefficient of expansion
11,9 x 10^{-6} In/In/F
6,5 x 10^{-6} In/In/F

LINEAR DRAINAGE

Here at **ULMA** we offer more than trench drains and gratings. We provide solutions through a complete drainage system which includes:

- 39.37 inches (1LM) modular trench drain.
- 19.69 inches (1/2LM) linear and siphonic sump units

Gratings:

· Made of various materials: ductile iron, galvanized steel, stainless steel, composite, polymer concrete,...

· With different designs: slotted, mesh, perforated, single-slot, solid...

· Endowed with type of load up to F900 in accordance with Standard EN 1433.

- **Various accessories** such as end caps, locking bars, screws etc.

LINEAR DRAINAGE ADVANTAGES

Point Drainage Linear Drainage

- **Easier installation** of slabs and floorings.
- It is hydraulically **much more efficient** than point drainage.
- **Prevents** waterlogging in specific areas.
- **Registrable** at any point, making cleaning and system maintenance easier.
- **Absorbs minimum slopes** of the site without any need for complicated implementations at the works site.
- It is **much more feasible** in terms of the final cost of the drainage system.

STANDARD EN-1433

The products set out in this Technical Brochure are designed according to the premises of EN 1433 STANDARD "Drainage trench drains for the circulation areas used by pedestrians and vehicles. Classification, design and testing requirements, marking and evaluation of compliance" This Standard specifies the definitions, classes, design and testing requirements, marking and quality control for drainage trench drains.

Guarulhos airport, Brazil.

Ikea Bergen, Norway.

Barcelona FC, Spain

Design Centre. Barcelona, Spain.

Krakow Arena, Poland

Massena square, France.

Main Square, Mexico.

LOAD CLASSIFICATION

CLASS A15
-3,372 lbs
Areas which can only be used by pedestrians and pedal cyclists.

CLASS B125
-28,100 lbs
Footways, pedestrian areas and comparable areas, private car parks or car parking decks.

CLASS C250
- 56,200 lbs
Kerb sides and non-trafficked areas of hard shoulders and similar.

CLASS D400
- 89,920 lbs
Carriageways of roads (including pedestrian streets), hard shoulders and parking areas, for all types of road vehicles.

CLASS E600
- 134,800 lbs
Areas subjected to high wheel loads, e. g. ports and dock sides such as forcklift trucks.

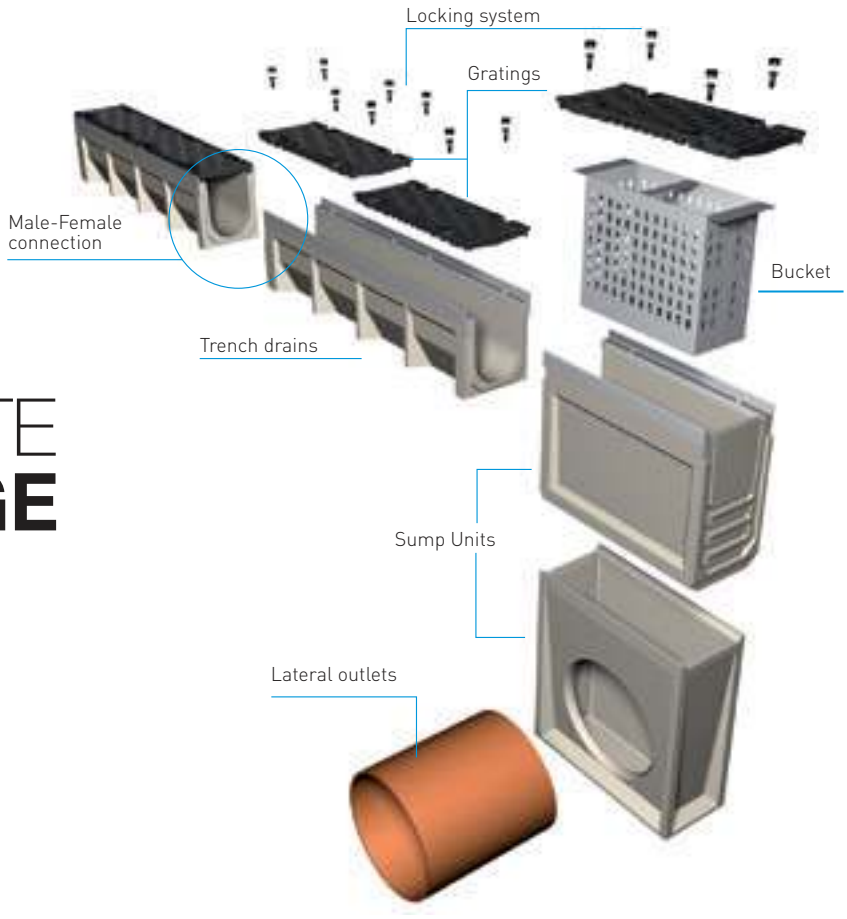
CLASS F900
- 202,320 lbs
Areas subjected to especially high wheel loads e. g. aircraft pavements.

UK
SYSTEM

MULTI**V+**
SYSTEM

F
SYSTEM

SPORT
SYSTEM



COMPLETE **DRAINAGE** SYSTEM

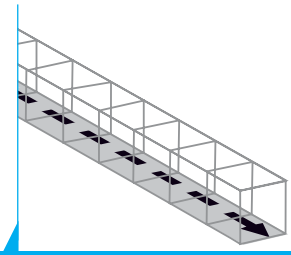
OPTIMAL DRAIN by ULMA

ULMA Architectural Solutions Hydraulic Calculation software

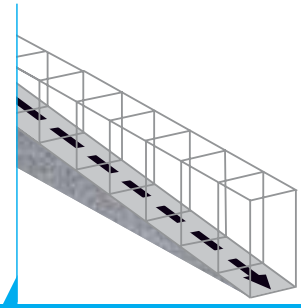
To ensure drainage systems with optimal evacuation capacity and cost, ULMA Architectural Solutions has developed a multi-platform software solution offering the possibility of performing a hydraulic study for each project and precisely defining the most suitable trench drain.

- **Simplicity:** It only requires a few project parameters, such as line lengths, catchment areas, slopes and run-off coefficients of each surface, to accurately reflect the current situation and the subsequent study.
- **Precision:** To calculate the water's behaviour in the trench drains a mathematical model is used that takes the Spatially Varied Flow with Increasing Flow for Open trench drains as the base, which describes the water's behaviour more accurately than other commonly used models and formulas.
- **Multiple Functionalities:** You can enter different rainfall data for any geographic area worldwide, calculate different trench drains lines in the same project and find the right trench drain among hundreds of references in ULMA's extensive catalogue, based on their Heights, Widths, Sections, Load Classes or other characteristics.
- **Cost Reduction:** The software optimises the cost of trench drain lines by selecting the most appropriate trench drain for the application, the exact location of intermediate outlets or the exact distribution of trench drains in cascade slope.
- **Detailed Report:** As a result we obtain a report with references and dimensions of the necessary trench drains sheet of water, filling percentages, water flows and speeds in each of the project lines. All the necessary data for the validation of the drainage system.

SLOPE **CONFIGURATIONS**

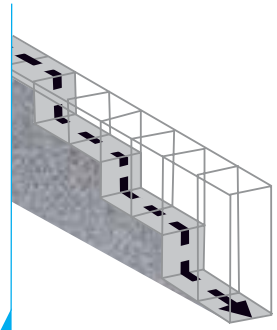


WITHOUT SLOPE
All of the trench drains are placed at the same height.
ADVANTAGES: Very simple from an execution point of view. It has a hydraulic capacity sufficient for short stretches of drainage.

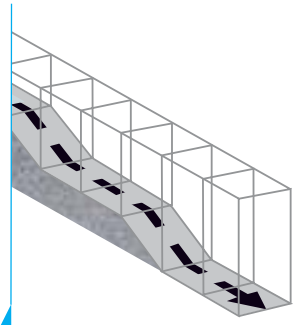


PRESLOPED*
Trench drains of variable height with a built-in slope of 0.5% and 2.5%, according to the model.
ADVANTAGES: Very appropriate for areas where the ground has no natural slope.

ULMA Architectural Solutions offers the only trench drain on the market with a built-in slope of 2.5%



CASCADE SLOPE
A combination of straight trench drains of various heights that are joined using step connectors.
ADVANTAGES: Simple and economic onsite execution when slopes need to be included.



MIXED SLOPE
A combination of the previous systems.
ADVANTAGES: Very appropriate to drain long-length stretches. It allows for the optimization of hydraulic capacity to the utmost.

GRATING TYPES

ULMA offers a complete line of gratings in various materials and designs:

MATERIALS	DESIGNS
Nodular Ductile Cast Iron	Slotted (Heelproof Slotted)
Galvanized steel	Mesh
Stainless steel	Perforated
Composite	Single Slot, Double Slot
Polymer Concrete	Solid
Cast Stainless Steel	

In addition to gratings for pedestrian usage (for both outside and inside use), and for vehicles, ULMA has the widest range of gratings for heavy load areas, such as ports, docks and airports.

STANDARD EN-1433

ULMA's grating is designed according to the European Standard EN1433, which regulates covering devices, and closure devices for circulation areas used by pedestrians and vehicles, and classifies the grating into six categories based on the place of their installation.

SLOTTED. Nodular Ductile cast iron

SLOTTED. Galvanized steel / Stainless steel

SOLID.Nodular Ductile cast iron

MESH. Galvanized steel/ Stainless steel

PERFORATED. Galvanized steel/ Stainless steel

SINGLE SLOT. Galvanized steel/ Stainless steel

HEELPROOF SLOTTED Composite.

SINGLE SLOT. Galvanized steel/ Stainless steel

MESH. Composite

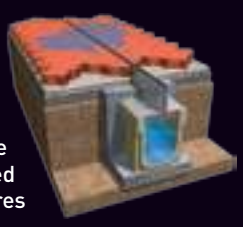
SINGLE SLOT. Polymer Concrete.

DOUBLE SLOT. Galvanized steel/ Stainless steel

SLOTTED GRATINGS

Inverted T-shape gratings made of galvanized steel with hydraulic connection area in the form of a 0.59 inches (15mm) wide single or double groove and up to load class D-400.

Endowed with a discreet appearance, it is the perfect solution for paved areas or printed concrete pavements in pedestrian streets, squares etc.



CLOSED GRATINGS

Especially designed for wiring conduits.

ADA & PEDESTRIAN SAFETY

ADA GRATES

The Americans with Disabilities Act of 1990: Section 4.5.4

" Where grates are used within walking surfaces, the open slots should be no greater than 0.5 inches [12,7 mm] wide in one direction. Where the length of the slot is greater than 0.5 inches, the opening should run perpendicular to the main direction of traffic."

HEEL RESISTANT GRATES

ASME A112.6.3: Section 7.12 Heel Resistant Strainers and Grates

" A grate designed to resist entry of high-heeled shoes, in which the maximum grate hole size in least dimension shall be 5/16 in. [8 mm]

BICYCLE SAFE GRATES

Australian Standard AS 3996 - 2006 Clause 3.3.6

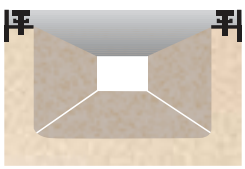
Defines maximum slot dimensions for "Bicycle Tire Penetration Resistant" grates.

LOCKING SYSTEMS

BOLTLESS LOCKING SYSTEM

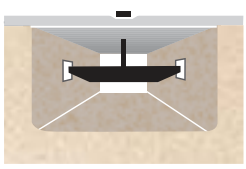
- Trench drains with profile
- Up to load class E600
- 8 fixing points per 39.37 inches.

rapidlock®



8 BOLTS PER GRATING

- Trench drains with galvanized or cast iron edges.
- Load classes from D400 up to F900.
- 8 screws per 39.37 inches.



LOCKING BAR AND SCREW

- Trench drains with and without edge-on.
- Up to load class C250.
- Two locking bars and two screws per 39.37 inches.

UK URBAN

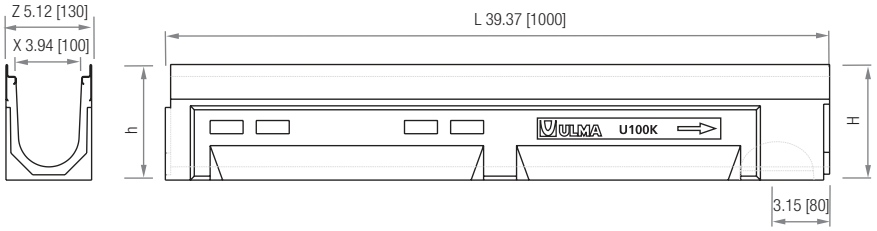
SQUARES, HOUSING ESTATES,
CAR PARKS FOR LIGHT VEHICLES

U100K

LOAD CLASS
UP TO C250
EN-1433 STANDARD

ULMA Linear Trench Drain type U100K: External width 5.12 inches [130 mm]; Internal width 3.94 inches [100 mm]; Available with overall heights between 5.91 and 9.84 inches [150 mm and 250 mm] for 0,5% presloped trench drains and between 5.91 and 11.81 inches [150 and 300 mm] for cascaded slope, to collect rainwater in 39.37 inches [1 LM] long units; Integrated galvanized steel* edges for lateral protection. Locking system consists of CS100 locking bar and screws.

*Also available with stainless steel edge protection.



Trench Drain Code	L (in/mm)	Height (in/mm)		Width (in/mm)		Ø Outlet*(in/mm)		Hydraul. Section (in²/cm²)
		h	H	Z	X	Vert.	Horiz.	
U100K00R	39.37 [1000]	5.91 [150]	5.91 [150]	5.12 [130]	3.94 [100]	4 [110]	-	15.04 [97]
U100K01	39.37 [1000]	5.91 [150]	6.10 [155]	5.12 [130]	3.94 [100]	-	-	15.04 [97]
U100K02	39.37 [1000]	6.10 [155]	6.30 [160]	5.12 [130]	3.94 [100]	-	-	15.66 [101]
U100K03	39.37 [1000]	6.30 [160]	6.49 [165]	5.12 [130]	3.94 [100]	-	-	16.43 [106]
U100K04	39.37 [1000]	6.49 [165]	6.69 [170]	5.12 [130]	3.94 [100]	-	-	17.21 [111]
U100K05	39.37 [1000]	6.69 [170]	6.89 [175]	5.12 [130]	3.94 [100]	-	-	17.98 [116]
U100K05R	39.37 [1000]	6.89 [175]	6.89 [175]	5.12 [130]	3.94 [100]	4 [110]	-	18.6 [120]
U100K06	39.37 [1000]	6.89 [175]	7.09 [180]	5.12 [130]	3.94 [100]	-	-	18.6 [120]
U100K07	39.37 [1000]	7.09 [180]	7.28 [185]	5.12 [130]	3.94 [100]	-	-	19.38 [125]
U100K08	39.37 [1000]	7.28 [185]	7.48 [190]	5.12 [130]	3.94 [100]	-	-	20.15 [130]
U100K09	39.37 [1000]	7.48 [190]	7.68 [195]	5.12 [130]	3.94 [100]	-	-	20.93 [135]
U100K10	39.37 [1000]	7.68 [195]	7.87 [200]	5.12 [130]	3.94 [100]	-	-	21.7 [140]
U100K10R	39.37 [1000]	7.87 [200]	7.87 [200]	5.12 [130]	3.94 [100]	4 [110]	4 [110]	22.48 [145]
U100K11	39.37 [1000]	7.87 [200]	8.07 [205]	5.12 [130]	3.94 [100]	-	-	22.48 [145]
U100K12	39.37 [1000]	8.07 [205]	8.27 [210]	5.12 [130]	3.94 [100]	-	-	23.25 [150]
U100K13	39.37 [1000]	8.27 [210]	8.46 [215]	5.12 [130]	3.94 [100]	-	-	24.03 [155]
U100K14	39.37 [1000]	8.46 [215]	8.66 [220]	5.12 [130]	3.94 [100]	-	-	24.65 [159]
U100K15	39.37 [1000]	8.66 [220]	8.86 [225]	5.12 [130]	3.94 [100]	-	-	25.42 [164]
U100K15R	39.37 [1000]	8.86 [225]	8.86 [225]	5.12 [130]	3.94 [100]	4 [110]	4 [110]	26.2 [169]
U100K16	39.37 [1000]	8.86 [225]	9.06 [230]	5.12 [130]	3.94 [100]	-	-	26.2 [169]
U100K17	39.37 [1000]	9.06 [230]	9.25 [235]	5.12 [130]	3.94 [100]	-	-	26.97 [174]
U100K18	39.37 [1000]	9.25 [235]	9.45 [240]	5.12 [130]	3.94 [100]	-	-	27.59 [178]
U100K19	39.37 [1000]	9.45 [240]	9.65 [245]	5.12 [130]	3.94 [100]	-	-	28.37 [183]
U100K20	39.37 [1000]	9.65 [245]	9.84 [250]	5.12 [130]	3.94 [100]	-	-	29.14 [188]
U100K20R	39.37 [1000]	9.84 [250]	9.84 [250]	5.12 [130]	3.94 [100]	4 [110]	4 [110]	29.92 [193]
U100K25R	39.37 [1000]	10.83 [275]	10.83 [275]	5.12 [130]	3.94 [100]	4 [110]	4 [110]	37.2 [240]
U100K30R	39.37 [1000]	11.81 [300]	11.81 [300]	5.12 [130]	3.94 [100]	4 [110]	4 [110]	44.64 [288]

*Vert. and horiz. outlets on order.

LOCKING SYSTEM

LOCKING BAR.
Two locking bars and two screws per 39.37 inches.

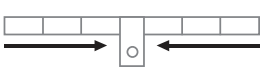
SUMP UNITS AND ACCESSORIES TABLE

AK100

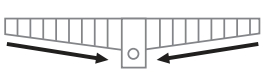
Code	L (in/mm)	H (in/mm)	Width (in/mm)	Ø Outlet (in/mm)		Sump Units	Bucket
				Lateral	Front		
AK100	19.69 [500]	22.05 [560]	5.12 [130]	4 /6 [110/160]	3 1/2 [90]	1	CU100

*Suitable up to height 20R.

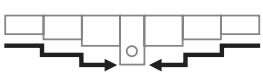
SLOPE DESIGNS



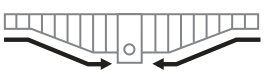
WITHOUT SLOPE



0,5% PRESLOPED



CASCADED SLOPE



MIXED SLOPE

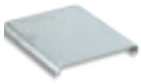
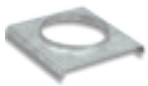
GRATINGS

Material	Design	Load	Code	L (in/mm)	Width (in/mm)	Opening (in/mm)	Norm
DUCTILE IRON	SLOTTED	C250 // 56,200 lbs	FNX100KCCM	19.69 [500]	4.84 [123]	0.55 [14]	
	HEELPROOF SLOTTED	C250 // 56,200 lbs	FNHX100KCCM	19.69 [500]	4.84 [123]	0.19 [5]	
GALVANIZED STEEL	PERFORATED	A15 // 3,372 lbs	GP100KCA	39.37 [1000]	4.84 [123]	0.24 [6]	
	SLOTTED	A15 // 3,372 lbs	GN100KCA	39.37 [1000]	4.84 [123]	0.35 [9]	
	HEELPROOF MESH	B125 // 28,100 lbs	GEHX100KCB	39.37 [1000]	4.84 [123]	1.18 x 0.39 [30 x 10]	
STAINLESS STEEL	SLOTTED	A15 // 3,372 lbs	IN100KCA	39.37 [1000]	4.84 [123]	0.28 [7]	
	PERFORATED	A15 // 3,372 lbs	IP100KCA	39.37 [1000]	4.84 [123]	0.24 [6]	
	MESH	B125 // 28,100 lbs	IEX100KCB	39.37 [1000]	4.84 [123]	1.18 x 0.79 [30 x 20]	
COMPOSITE	HEELPROOF SLOTTED	A15 // 3,372 lbs	PNH100KCAM-GRIS (1)	19.69 [500]	4.84 [123]	0.19 [5]	
	MESH	B125 // 28,100 lbs	PE100KCBM	19.69 [500]	4.84 [123]	0.55 x 0.49 [14 x 12,5]	

(1) Available in several colors.

END CAPS

Design	Material	Code	Trench drain	Type	Outlet (in / mm)
 Closed	GALVANIZED STEEL	TUNIU100KGC	U100K00R	CLOSED	-
			U100K05R		
			U100K10R		
			U100K15R		
			U100K20R		
			U100K25R		
			U100K30R		
 Open		TUNIU100KGA	U100K00R	OPEN	4 [110]
			U100K05R		
			U100K10R		
			U100K15R		
			U100K20R		
			U100K25R		
			U100K30R		

Design	Material	Code	Trench Drain	Type	Outlet (in / mm)
 Closed	GALVANIZED STEEL	T100K00C	U100K00R	CLOSED	-
		T100K00A		OPEN	4 [110]
		T100K05C	U100K05R	CLOSED	-
		T100K05A		OPEN	4 [110]
		T100K10C	U100K10R	CLOSED	-
		T100K10A		OPEN	4 [110]
		T100K15C	U100K15R	CLOSED	-
		T100K15A		OPEN	4 [110]
 Open		T100K20C	U100K20R	CLOSED	-
		T100K20A		OPEN	4 [110]
		T100K25C	U100K25R	CLOSED	-
		T100K25A		OPEN	4 [110]
		T100K30C	U100K30R	CLOSED	-
		T100K30A		OPEN	4 [110]

STEP UNITS
Code
CEU100

GALVANIZED STEEL BUCKET
Code
CU100

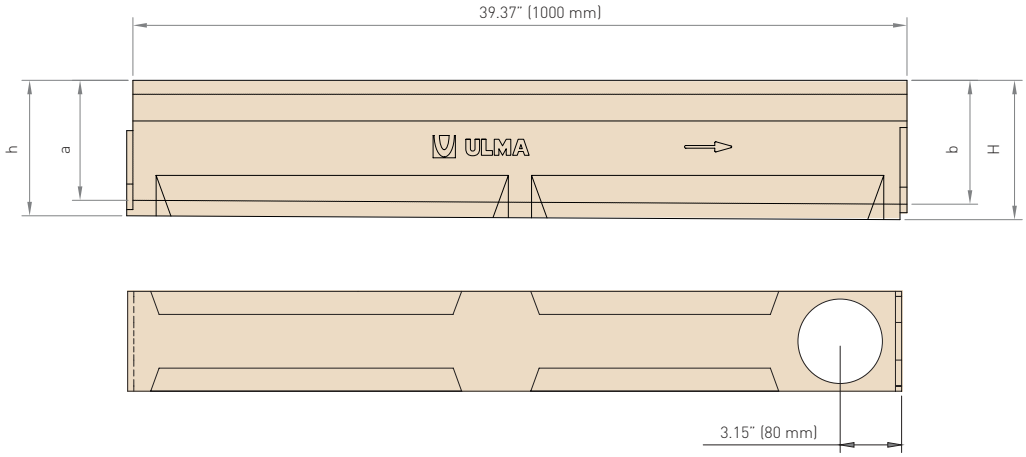
INSTALLATION DEVICE
Code
ID100

FLOW RATES UK

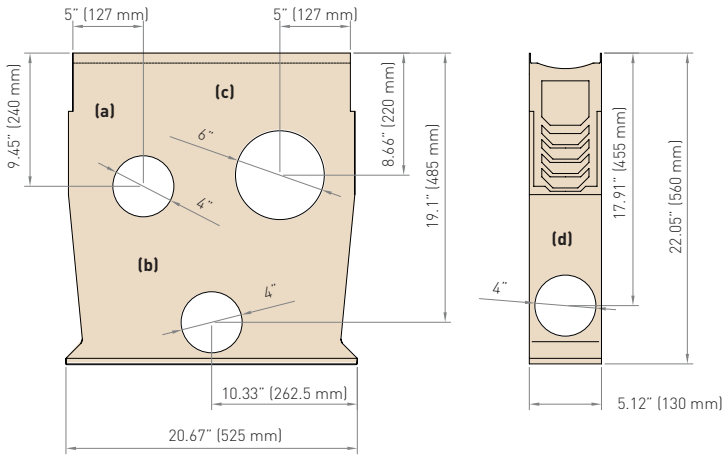
Outlet flow rates help to select the correct size trench drain based on the requirements of the project.

Outlet flow rates

Trench drain	Outlet (in)	Q (m^3/s)	GPM	CFS
U100K00R	4	0,0098	154,89	0,34
U100K05R	4	0,0106	167,30	0,37
U100K10R	4	0,0113	178,85	0,39
U100K15R	4	0,0120	189,70	0,42
U100K20R	4	0,0126	199,96	0,44
U100K25R	4	0,0132	209,72	0,46
U100K30R	4	0,0114	181,03	0,40



Sump Units	Outlet (in)	Q (m^3/s)	GPM	CFS
AK100 (a)	4	0,0124	195,9203	0,4310
AK100 (b)	4	0,0176	278,5124	0,6127
AK100 (c)	6	0,0250	396,8621	0,8731
AK100 (d)	4	0,0170	269,7612	0,5935



MULTIV+

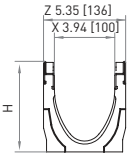
PEDESTRIAN AND SHOPPING AREAS,
CAR PARKS FOR ALL TYPE OF VEHICLES

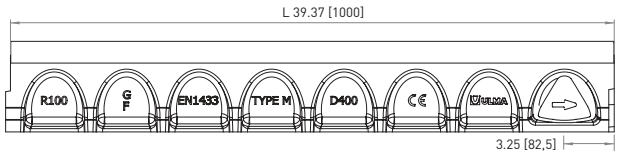
MULTIV+100

LOAD CLASS
UP TO E600 *
EN-1433 STANDARD

ULMA Linear Trench Drain, type **MULTIV+®** R100; External width 5.35 inches [136 mm], Internal width 3.94 inches [100 mm] , with overall heights between 3.15 and 11.81 inches [80 and 300 mm] ; With overall hights between 3.94 inches and 9.84 inches for 0,5% presloped channels and between 3.15 and 11.81' for constant depth trench drains.; sections 39.37 inches [1 LM] in length; optimized V-shape with self-cleaning effect; especially designed for trench drain runs with no longitudinal slope; galvanized steel edges for lateral protection; **Rapidlock®** boltless system.

OPTIMIZED V-SHAPE





Also available with stainless steel edge rails.

TRENCH DRAINS

19.69 in trench drains

Trench Drain Code		L (in/mm)	H (in/mm)		Width (in/mm)		Ø Outlet* (in/mm)		Hydraul. Section (in²/cm²)
Galvanized edge	Ductile iron edge		Initial	Final	Z	X	Vert.	Hor.	
R100GH8**	-	39.37 [1000]	3.15 [80]	3.15 [80]	5.35 [136]	3.94 [100]	4 [110]	-	6.2 [40]
R100G00R	R100MFG00R	39.37 [1000]	3.94 [100]	3.94 [100]	5.35 [136]	3.94 [100]	4 [110]	-	8.68 [56]
R100G01	R100MFG01	39.37 [1000]	3.94 [100]	4.13 [105]	5.35 [136]	3.94 [100]	4 [110]	-	9.44 [60,9]
R100G02	R100MFG02	39.37 [1000]	4.13 [105]	4.33 [110]	5.35 [136]	3.94 [100]	4 [110]	-	9.97 [64,3]
R100G03	R100MFG03	39.37 [1000]	4.33 [110]	4.53 [115]	5.35 [136]	3.94 [100]	4 [110]	-	10.49 [67,7]
R100G04	R100MFG04	39.37 [1000]	4.53 [115]	4.72 [120]	5.35 [136]	3.94 [100]	4 [110]	-	11.02 [71,1]
R100G05	R100MFG05	39.37 [1000]	4.72 [120]	4.92 [125]	5.35 [136]	3.94 [100]	4 [110]	-	11.55 [74,5]
R100G06	R100MFG06	39.37 [1000]	4.92 [125]	5.12 [130]	5.35 [136]	3.94 [100]	4 [110]	-	12.07 [77,9]
R100G07	R100MFG07	39.37 [1000]	5.12 [130]	5.31 [135]	5.35 [136]	3.94 [100]	4 [110]	-	12.6 [81,3]
R100G08	R100MFG08	39.37 [1000]	5.31 [135]	5.51 [140]	5.35 [136]	3.94 [100]	4 [110]	-	13.13 [84,7]
R100G09	R100MFG09	39.37 [1000]	5.51 [140]	5.71 [145]	5.35 [136]	3.94 [100]	4 [110]	-	13.66 [88,1]
R100G10	R100MFG10	39.37 [1000]	5.71 [145]	5.91 [150]	5.35 [136]	3.94 [100]	4 [110]	-	14.18 [91,5]
R100G10R	R100MFG10R	39.37 [1000]	5.91 [150]	5.91 [150]	5.35 [136]	3.94 [100]	4 [110]	-	14.18 [91,5]
R100G11	R100MFG11	39.37 [1000]	5.91 [150]	6.10 [155]	5.35 [136]	3.94 [100]	4 [110]	-	14.96 [96,5]
R100G12	R100MFG12	39.37 [1000]	6.10 [155]	6.30 [160]	5.35 [136]	3.94 [100]	4 [110]	-	15.59 [100,6]
R100G13	R100MFG13	39.37 [1000]	6.30 [160]	6.49 [165]	5.35 [136]	3.94 [100]	4 [110]	-	16.21 [104,6]
R100G14	R100MFG14	39.37 [1000]	6.49 [165]	6.69 [170]	5.35 [136]	3.94 [100]	4 [110]	-	16.85 [108,7]
R100G15	R100MFG15	39.37 [1000]	6.69 [170]	6.89 [175]	5.35 [136]	3.94 [100]	4 [110]	-	17.47 [112,7]
R100G16	R100MFG16	39.37 [1000]	6.89 [175]	7.09 [180]	5.35 [136]	3.94 [100]	4 [110]	-	18.11 [116,8]
R100G17	R100MFG17	39.37 [1000]	7.09 [180]	7.28 [185]	5.35 [136]	3.94 [100]	4 [110]	-	18.72 [120,8]
R100G18	R100MFG18	39.37 [1000]	7.28 [185]	7.48 [190]	5.35 [136]	3.94 [100]	4 [110]	-	19.69 [124,9]
R100G19	R100MFG19	39.37 [1000]	7.48 [190]	7.68 [195]	5.35 [136]	3.94 [100]	4 [110]	-	19.98 [128,9]
R100G20	R100MFG20	39.37 [1000]	7.68 [195]	7.87 [200]	5.35 [136]	3.94 [100]	4 [110]	-	20.62 [133]
R100G20R	R100MFG20R	39.37 [1000]	7.87 [200]	7.87 [200]	5.35 [136]	3.94 [100]	4 [110]	-	20.62 [133]
R100G21	R100MFG21	39.37 [1000]	7.87 [200]	8.07 [205]	5.35 [136]	3.94 [100]	4 [110]	-	21.28 [137,3]
R100G22	R100MFG22	39.37 [1000]	8.07 [205]	8.27 [210]	5.35 [136]	3.94 [100]	4 [110]	-	21.95 [141,6]
R100G23	R100MFG23	39.37 [1000]	8.27 [210]	8.46 [215]	5.35 [136]	3.94 [100]	4 [110]	-	22.61 [145,9]
R100G24	R100MFG24	39.37 [1000]	8.46 [215]	8.66 [220]	5.35 [136]	3.94 [100]	4 [110]	-	23.28 [150,2]
R100G25	R100MFG25	39.37 [1000]	8.66 [220]	8.86 [225]	5.35 [136]	3.94 [100]	4 [110]	-	23.95 [154,5]
R100G26	R100MFG26	39.37 [1000]	8.86 [225]	9.06 [230]	5.35 [136]	3.94 [100]	4 [110]	-	24.61 [158,8]
R100G27	R100MFG27	39.37 [1000]	9.06 [230]	9.25 [235]	5.35 [136]	3.94 [100]	4 [110]	-	25.28 [163,1]
R100G28	R100MFG28	39.37 [1000]	9.25 [235]	9.45 [240]	5.35 [136]	3.94 [100]	4 [110]	-	25.95 [167,4]
R100G29	R100MFG29	39.37 [1000]	9.45 [240]	9.65 [245]	5.35 [136]	3.94 [100]	4 [110]	-	26.61 [171,7]
R100G30	R100MFG30	39.37 [1000]	9.65 [245]	9.84 [250]	5.35 [136]	3.94 [100]	4 [110]	-	27.28 [176]
R100G30R	R100MFG30R	39.37 [1000]	9.84 [250]	9.84 [250]	5.35 [136]	3.94 [100]	4 [110]	-	27.28 [176]
R100G40R	R100MFG40R	39.37 [1000]	11.81 [300]	11.81 [300]	5.35 [136]	3.94 [100]	4 [110]	-	34.1 [220]
19.69 IN TRENCH DRAINS									
R100G10RM	R100MFG10RM	19.69 [500]	5.91 [150]	5.91 [150]	5.35 [136]	3.94 [100]	3 1/2 [90]	3 [75]	14.18 [91,5]
R100G20RM	R100MFG20RM	19.69 [500]	7.87 [200]	7.87 [200]	5.35 [136]	3.94 [100]	3 1/2 [90]	4 [110]	20.62 [133]

*Vert. outlets on order.
**U shaped section.

LOCKING SYSTEM

FAST, BOLTLESS SAFETY LOCKING 8 fastening points per trench drain.

rapidlock

SUMP UNITS AND ACCESSORIES TABLE

AR300G100

AR100G

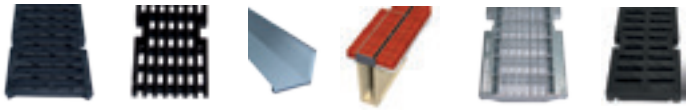
Code		L (in/mm)	H (in/mm)	Width (in/mm)	Ø Lateral Outlet (in/mm)	Ø Frontal Outlet (in/mm)	Sump Units
Galvanized edge	Ductile iron edge						
AR100G	AR100MFG	19.69 [500]	19.29 [490]	5.35 [136]	4 / 6 [110/160]	3 [90]	1
AR300G100	AR300MFG100	19.69 [500]	15.36 [390]	14.26 [362]	4 /6 /8 [110/160/200]	-	1
AR300G100S + AR300G100B	AR300MFG100S + AR300MFG100B	19.69 [500]	28.78 [730]	14.26 [362]	4 /6 /8 [110/160/200]	-	1

SLOPE DESIGNS

WITHOUT SLOPE | 0,5% PRESLOPED | CASCADED SLOPE | MIXED SLOPE

*For cross-drainage in heavy traffic areas, we recommend our KOMPAQDRAIN® system.

Slotted Normal & Heelproof | Longitudinal Slotted | Single Slot | Single Slot Access Unit | Heelproof Mesh | Composite

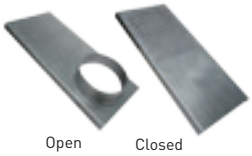


GRATINGS

Material	Design	Load	Code	L (in/mm)	Width (in/mm)	Slot Size (in/mm)	Norm
DUCTILE IRON	HEELPROOF SLOTTED	B125 // 28,100 lbs	FNHX100RGBM	19.69 [500]	5 [127]	0.31 [8]	
	HEELPROOF SLOTTED	C250 // 56,200 lbs	FNHX100RGCM	19.69 [500]	5 [127]	0.31 [8]	
	SLOTTED	D400 // 89,920 lbs	FNX100RGDM	19.69 [500]	5 [127]	0.55 [14]	
	HEELPROOF SLOTTED	D400 // 89,920 lbs	FNHX100RGDM	19.69 [500]	5 [127]	0.31 [8]	
	LONGITUDINAL SLOTTED	D400 // 89,920 lbs	FNLHX100RGDM	19.69 [500]	5 [127]	0.31 [8]	
	LONGITUDINAL HEELPROOF SLOTTED	E600 // 134,800 lbs	FNLHX100RGEM	19.69 [500]	5 [127]	0.29 [7,36]	
GALVANIZED STEEL	LONGITUDINAL HEELPROOF SLOTTED	A15 // 3,372 lbs	GNLHX100RGA	39.37 [1000]	5 [127]	0.29 [7,36]	
	LONGITUDINAL HEELPROOF SLOTTED	C250 // 56,200 lbs	GNLHX100RGC	39.37 [1000]	5 [127]	0.29 [7,36]	
	HEELPROOF MESH	C250 // 56,200 lbs	GEHX100RGC	39.37 [1000]	5 [127]	1.18 x 0.3 [30 x10]	
	SINGLE SLOT (1)	D400 // 89,920 lbs	GRL100ROD	39.37 [1000]	5.16 [131]	0.39 / H4.13 [9,8 / H105]	
	ACCESS UNIT (1)	D400 // 89,920 lbs	GRL100RODMA	19.69 [500]	5.04 [128]	0.39 / H4.13 [9,8 / H105]	
	SINGLE SLOT (1)	D400 // 89,920 lbs	GRL100RODH150	39.37 [1000]	5.16 [131]	0.39 / H5.91 [9,8 / H150]	
	ACCESS UNIT (1)	D400 // 89,920 lbs	GRL100RODMAH150	19.69 [500]	5.04 [128]	0.39 / H5.91 [9,8 / H150]	
	HEELPROOF MESH	D400 // 89,920 lbs	GEHX100RGD	39.37 [1000]	5 [127]	1.18 x 0.3 [30 x10]	
COMPOSITE	LONGITUDINAL HEELPROOF SLOTTED	A15 // 3,372 lbs	PNLH100RGAM	19.69 [500]	5 [127]	0.29 [7,36]	
STAINLESS STEEL	LONGITUDINAL HEELPROOF SLOTTED	A15 // 3,372 lbs	INLHX100RGA	39.37 [1000]	5 [127]	0.29 [7,36]	
	LONGITUDINAL HEELPROOF SLOTTED	C250 // 56,200 lbs	INLHX100RGC	39.37 [1000]	5 [127]	0.29 [7,36]	

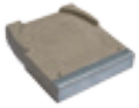
(1) Available Range in Stainless Steel.

END CAPS

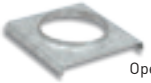


Open Closed

Material	Code	Trench drains	Type	Outlet (in/mm)
Composite	TUNIR100	R100G00R	CLOSED	-
		R100G10R	CLOSED	-
			OPEN	4 [110]
		R100G20R	CLOSED	-
			OPEN	4 [110]
		R100G30R	CLOSED	-
			OPEN	4 [110]
		R100G40R	CLOSED	-
			OPEN	4 [110]
Galvanized steel	TUNIR100GC	R100GH8	CLOSED	-
		R100G00R		
		R100G10R		
		R100G20R		
		R100G30R		
		R100G40R		
	TUNIR100GA	R100G10R	OPEN	4 [110]
		R100G20R		
		R100G30R		
		R100G40R		



Closed



Open

Trench drains		Material	Code	Type	Edge*	Accessory	Outlet (in/mm)
Galvanized edge	Ductile iron edge						
R100GH8	-	Galvanized steel	TR100H8	CLOSED	-	-	-
		Polymer concrete	THPR100GH8C	CLOSED	Galvanized	-	-
R100G00R	R100MFG00R	Galvanized steel	TR10000C	CLOSED	-	-	-
		Polymer concrete	THPR100G00C	CLOSED	Galvanized	-	-
		Polymer concrete	THPR100MF00C	CLOSED	Ductile Iron	-	-
R100G10R	R100MFG10R	Galvanized steel	TR10010C	CLOSED	-	-	-
		Polymer concrete	THPR100G10C	CLOSED	Galvanized	-	-
		Polymer concrete	THPR100MF10C	CLOSED	Ductile Iron	-	-
		Polymer concrete	THPR100G10AJ	OPEN	Galvanized	Joint	4 [110]
		Polymer concrete	THPR100MF10AJ	OPEN	Ductile Iron	Joint	4 [110]
		Polymer concrete	THPR100G10AT	OPEN	Galvanized	Pipe	4 [110]
		Polymer concrete	THPR100MF10AT	OPEN	Ductile Iron	Pipe	4 [110]
R100G20R	R100MFG20R	Galvanized steel	TR10020C	CLOSED	-	-	-
		Polymer concrete	THPR100G20C	CLOSED	Galvanized	-	-
		Polymer concrete	THPR100MF20C	CLOSED	Ductile Iron	-	-
		Polymer concrete	THPR100G20AJ	OPEN	Galvanized	Joint	4 [110]
		Polymer concrete	THPR100MF20AJ	OPEN	Ductile Iron	Joint	4 [110]
		Polymer concrete	THPR100G20AT	OPEN	Galvanized	Pipe	4 [110]
		Polymer concrete	THPR100MF20AT	OPEN	Ductile Iron	Pipe	4 [110]
R100G30R	R100MFG30R	Galvanized steel	TR10030C	CLOSED	-	-	-
		Polymer concrete	THPR100G30C	CLOSED	Galvanized	-	-
		Polymer concrete	THPR100MF30C	CLOSED	Ductile Iron	-	-
		Polymer concrete	THPR100G30AJ	OPEN	Galvanized	Joint	4 [110]
		Polymer concrete	THPR100MF30AJ	OPEN	Ductile Iron	Joint	4 [110]
		Polymer concrete	THPR100G30AT	OPEN	Galvanized	Pipe	4 [110]
		Polymer concrete	THPR100MF30AT	OPEN	Ductile Iron	Pipe	4 [110]
R100G40R	R100MFG40R	Galvanized steel	TR10040C	CLOSED	-	-	-
		Polymer concrete	THPR100G40C	CLOSED	Galvanized	-	-
		Polymer concrete	THPR100MF40C	CLOSED	Ductile Iron	-	-
		Polymer concrete	THPR100G40AJ	OPEN	Galvanized	Joint	4 [110]
		Polymer concrete	THPR100MF40AJ	OPEN	Ductile Iron	Joint	4 [110]
		Polymer concrete	THPR100G40AT	OPEN	Galvanized	Pipe	4 [110]
		Polymer concrete	THPR100MF40AT	OPEN	Ductile Iron	Pipe	4 [110]

BUCKET
Code
CR100

STEP UNITS
Code
CER100

INSTALLATION DEVICE
Code
ID100

CONNECTORS	
Trench drains	Code
R100G10R	TCR100G10FFA
R100G20R	TCR100G20FFA
R100G30R	TCR100G30FFA
R100G40R	TCR100G40FFA

* Available with cast iron and stainless steel edge.

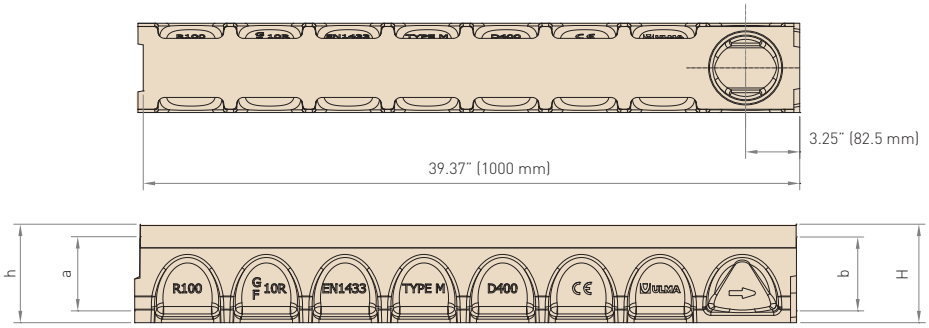
FLOW RATES MULTIV+100

Outlet flow rates help to select the correct size trench drain based on the requirements of the project.

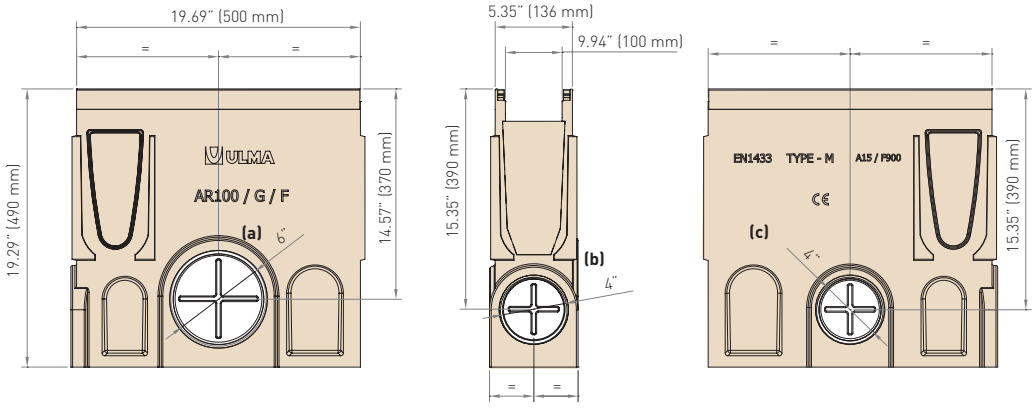
Outlet flow rates

Trench drain	Outlet (in)	Q (m^3/s)	GPM	CFS
R100GH8	4	0,0071	113,1146	0,2489
R100G00R	4	0,0080	126,4660	0,2782
R100G01	4	0,0082	129,5891	0,2851
R100G02	4	0,0084	132,6386	0,2918
R100G03	4	0,0086	135,6197	0,2984
R100G04	4	0,0087	138,5365	0,3048
R100G05	4	0,0089	141,3933	0,3111
R100G06	4	0,0091	144,1934	0,3172
R100G07	4	0,0093	146,9402	0,3233
R100G08	4	0,0094	149,6366	0,3292
R100G09	4	0,0096	152,2852	0,3350
R100G10	4	0,0098	154,8886	0,3408
R100G10R	4	0,0098	154,8886	0,3408
R100G11	4	0,0099	157,4489	0,3464
R100G12	4	0,0101	159,9682	0,3519
R100G13	4	0,0102	162,4485	0,3574
R100G14	4	0,0104	164,8915	0,3628
R100G15	4	0,0106	167,2988	0,3681

Trench drain	Outlet (in)	Q (m^3/s)	GPM	CFS
R100G16	4	0,0107	169,6719	0,3733
R100G17	4	0,0109	172,0123	0,3784
R100G18	4	0,0110	174,3213	0,3835
R100G19	4	0,0111	176,6001	0,3885
R100G20	4	0,0113	178,8499	0,3935
R100G20R	4	0,0113	178,8499	0,3935
R100G21	4	0,0114	181,0717	0,3984
R100G22	4	0,0116	183,2666	0,4032
R100G23	4	0,0117	185,4355	0,4080
R100G24	4	0,0118	187,5794	0,4127
R100G25	4	0,0120	189,6990	0,4173
R100G26	4	0,0121	191,7952	0,4219
R100G27	4	0,0122	193,8687	0,4265
R100G28	4	0,0124	195,9203	0,4310
R100G29	4	0,0125	197,9506	0,4355
R100G30	4	0,0126	199,9603	0,4399
R100G30R	4	0,0126	199,9603	0,4399
R100G40R	4	0,0138	219,0455	0,4819



Sump Units	Outlet (in)	Q (m^3/s)	GPM	CFS
AR100 (a)	6	0,0325	514,670	1,1323
AR100 (b)	4	0,0158	249,750	0,5495
AR100 (c)	4	0,0158	249,750	0,5495

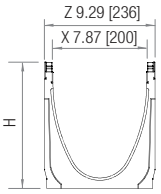


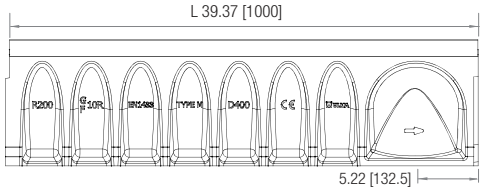
MULTIV+200

LOAD CLASS
UP TO E600 *
EN-1433 STANDARD

ULMA Linear Trench Drain, type **MULTIV+®** R200; External width 9.29 inches [236 mm], Internal width 7.87 inches [200 mm] , with overall heights between 3.15 and 14.57 inches [80 and 370 mm] ; With overall hights between 3.94 inches and 9.84 inches for 0,5% presloped channels and between 3.15 and 11.81' for constant depth trench drains.; sections 39.37 inches [1 LM] in length; optimized V-shape with self-cleaning effect; especially designed for trench drains runs with no longitudinal slope; galvanized steel edges for lateral protection; **Rapidlock®** boltless system.

OPTIMIZED V-SHAPE





TRENCH DRAINS

19.69 in trench drains

Trench Drain Code		L (in/mm)	H (in/mm)		Width (in/mm)		Ø Outlet* (in/mm)		Hydraul. Section (in²/cm²)
Galvanized edge	Ductile iron edge		Initial	Final	Z	X	Vert.	Hor.	
R200GH8**	R200FH8**	39.37 [1000]	3.15 [80]	3.15 [80]	9.29 [236]	7.87 [200]	6 [160]	-	12.25 [79]
R200GH12**	R200FH12**	39.37 [1000]	4.72 [120]	4.72 [120]	9.29 [236]	7.87 [200]	6 [160]	-	24.65 [159]
R200G000R	R200MFG000R	39.37 [1000]	6.69 [170]	6.69 [170]	9.29 [236]	7.87 [200]	8 [200]	-	31.62 [204]
R200G00R	R200MFG00R	39.37 [1000]	8.66 [220]	8.66 [220]	9.29 [236]	7.87 [200]	8 [200]	-	44.02 [284]
R200G01	R200MFG01	39.37 [1000]	8.66 [220]	8.86 [225]	9.29 [236]	7.87 [200]	6 [160]	-	45.66 [294,6]
R200G02	R200MFG02	39.37 [1000]	8.86 [225]	9.06 [230]	9.29 [236]	7.87 [200]	6 [160]	-	46.92 [302,7]
R200G03	R200MFG03	39.37 [1000]	9.06 [230]	9.25 [235]	9.29 [236]	7.87 [200]	6 [160]	-	48.19 [310,9]
R200G04	R200MFG04	39.37 [1000]	9.25 [235]	9.45 [240]	9.29 [236]	7.87 [200]	6 [160]	-	49.45 [319]
R200G05	R200MFG05	39.37 [1000]	9.45 [240]	9.65 [245]	9.29 [236]	7.87 [200]	6 [160]	-	50.72 [327,2]
R200G06	R200MFG06	39.37 [1000]	9.65 [245]	9.84 [250]	9.29 [236]	7.87 [200]	6 [160]	-	51.97 [335,3]
R200G07	R200MFG07	39.37 [1000]	9.84 [250]	10.04 [255]	9.29 [236]	7.87 [200]	6 [160]	-	53.24 [343,5]
R200G08	R200MFG08	39.37 [1000]	10.04 [255]	10.24 [260]	9.29 [236]	7.87 [200]	6 [160]	-	54.5 [351,6]
R200G09	R200MFG09	39.37 [1000]	10.24 [260]	10.44 [265]	9.29 [236]	7.87 [200]	6 [160]	-	55.77 [359,8]
R200G10	R200MFG10	39.37 [1000]	10.44 [265]	10.63 [270]	9.29 [236]	7.87 [200]	6 [160]	-	57.04 [368]
R200G10R	R200MFG10R	39.37 [1000]	10.63 [270]	10.63 [270]	9.29 [236]	7.87 [200]	8 [200]	-	57.04 [368]
R200G11	R200MFG11	39.37 [1000]	10.63 [270]	10.83 [275]	9.29 [236]	7.87 [200]	6 [160]	-	60.2 [388,4]
R200G12	R200MFG12	39.37 [1000]	10.83 [275]	11.02 [280]	9.29 [236]	7.87 [200]	6 [160]	-	61.4 [396,1]
R200G13	R200MFG13	39.37 [1000]	11.02 [280]	11.22 [285]	9.29 [236]	7.87 [200]	6 [160]	-	62.59 [403,8]
R200G14	R200MFG14	39.37 [1000]	11.22 [285]	11.42 [290]	9.29 [236]	7.87 [200]	6 [160]	-	63.8 [411,6]
R200G15	R200MFG15	39.37 [1000]	11.42 [290]	11.61 [295]	9.29 [236]	7.87 [200]	6 [160]	-	64.99 [419,3]
R200G16	R200MFG16	39.37 [1000]	11.61 [295]	11.81 [300]	9.29 [236]	7.87 [200]	6 [160]	-	66.19 [427]
R200G17	R200MFG17	39.37 [1000]	11.81 [300]	12.01 [305]	9.29 [236]	7.87 [200]	6 [160]	-	67.39 [434,8]
R200G18	R200MFG18	39.37 [1000]	12.01 [305]	12.20 [310]	9.29 [236]	7.87 [200]	6 [160]	-	68.59 [442,5]
R200G19	R200MFG19	39.37 [1000]	12.20 [310]	12.40 [315]	9.29 [236]	7.87 [200]	6 [160]	-	69.78 [450,2]
R200G20	R200MFG20	39.37 [1000]	12.40 [315]	12.60 [320]	9.29 [236]	7.87 [200]	6 [160]	-	70.99 [458]
R200G20R	R200MFG20R	39.37 [1000]	12.60 [320]	12.60 [320]	9.29 [236]	7.87 [200]	8 [200]	-	70.99 [458]
R200G30R	R200MFG30R	39.37 [1000]	14.57 [370]	14.57 [370]	9.29 [236]	7.87 [200]	8 [200]	-	84.01 [542]
19.69 IN TRENCH DRAINS									
R200G00RM	R200MFG00RM	19.69 [500]	6.69 [170]	6.69 [170]	7.32 [186]	5.90 [150]	4 [110]	3 1/2 [90]	24.18 [156]
R200G10RM	R200MFG10RM	19.69 [500]	8.66 [220]	8.66 [220]	7.32 [186]	5.90 [150]	4 [110]	5 [125]	33.79 [218]

*Vert. outlets on order.
**U shaped section.

LOCKING SYSTEM

FAST, BOLTLESS SAFETY LOCKING 8 fastening points per trench drain.

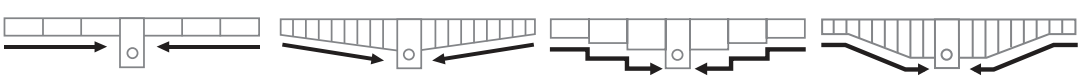
rapidlock®

SUMP UNITS AND ACCESSORIES TABLE

AR200G

Code		L (in/mm)	H (in/mm)	Width (in/mm)	Ø Lateral Outlet (in/mm)	Ø Frontal Outlet (in/mm)	Sump Units
Galvanized edge	Ductile iron edge						
AR200G	AR200MFG	19.69 [500]	21.65 [550]	9.29 [236]	6 /8 [160/200]	4 [110]	1

SLOPE DESIGNS



WITHOUT SLOPE | 0,5% PRESLOPED | CASCADED SLOPE | MIXED SLOPE

*For cross-drainage in heavy traffic areas, we recommend our KOMPAQDRAIN® system.

GRATINGS

Slotted Normal & Heelproof

Single Slot

Single Slot Access Unit

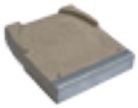
Helproof Mesh

Material	Design	Load	Code	L (mm)	Width (in/mm)	Slot Size (in/mm)	Norm
DUCTILE IRON	HEELPROOF SLOTTED	C250 // 56,200 lbs	FNHX200RGCM	19.69 [500]	8.94 [227]	0.31 [8]	
	SLOTTED	D400 // 89,920 lbs	FNX200RGDM	19.69 [500]	8.94 [227]	0.55 [14]	
	HEELPROOF SLOTTED	D400 // 89,920 lbs	FNHX200RGDM	19.69 [500]	8.94 [227]	0.31 [8]	
	LONGITUDINAL HEELPROOF SLOTTED	E600 //134,800 lbs	FNLHX200RGD/EM	19.69 [500]	5 [127]	0.29 [7,36]	
	SLOTTED	E600 //134,800 lbs	FNX200RGEM	19.69 [500]	8.94 [227]	0.55 [14]	
GALVANIZED STEEL	SINGLE SLOT (1)	D400 // 89,920 lbs	GRL200ROD	39.37 [1000]	9.09 [231]	0.39 / H4.13 [9,8 / H105]	
	ACCESS UNIT (1)	D400 // 89,920 lbs	GRL200RODMA	19.69 [500]	8.98 [228]	0.39 / H4.13 [9,8 / H105]	
	SINGLE SLOT (1)	D400 // 89,920 lbs	GRL200RODH150	39.37 [1000]	9.09 [231]	0.39 / H5.91 (9.8 / H150]	
	ACCESS UNIT (1)	D400 // 89,920 lbs	GRL200RODMAH150	19.69 [500]	8.98 [228]	0.39 / H5.91 (9.8 / H150]	
	HEELPROOF MESH	C250 // 56,200 lbs	GEHX200RGC	39.37 [1000]	8.94 [227]	1.18 x 0.39 [30 x10]	

(1) Available Range in Stainless Steel.

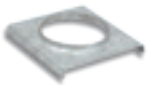
END CAPS

Material	Code	Trench drains	Type	Outlet (in / mm)
COMPOSITE	TUNIR200	R200G000R	CLOSED	-
			OPEN	4 [110]
		R200G00R	CLOSED	-
			OPEN	6 [160]
		R200G10R	CLOSED	-
			OPEN	6 [160]
		R200G20R	CLOSED	-
			OPEN	6 [160]
		R200G30R	CLOSED	-
			OPEN	6 [160]



Closed

Open



Trench Drain		Material	Code	Type	Edge*	Accessory	Outlet (in/mm)
Galvanized Edge	Ductile Iron Edge						
R200GH8	-	Galvanized Steel	TR200H8	CLOSED	-	-	-
		Polymer concrete	THPR200GH8C	CLOSED	Galvanized	-	-
R200G00R	R200MFG00R	Galvanized Steel	TR20000C	CLOSED	-	-	-
		Polymer concrete	THPR200G00C	CLOSED	Galvanized	-	-
		Polymer concrete	THPR200MF00C	CLOSED	Ductile Iron	-	-
R200G10R	R200MFG10R	Galvanized Steel	TR20010C	CLOSED	-	-	-
		Polymer concrete	THPR200G10C	CLOSED	Galvanized	-	-
		Polymer concrete	THPR200MF10C	CLOSED	Ductile Iron	-	-
		Polymer concrete	THPR200G10AJ	OPEN	Galvanized	Joint	4 [110]
		Polymer concrete	THPR200MF10AJ	OPEN	Ductile Iron	Joint	4 [110]
		Polymer concrete	THPR200G10AT	OPEN	Galvanized	Pipe	4 [110]
		Polymer concrete	THPR200MF10AT	OPEN	Ductile Iron	Pipe	4 [110]
R200G20R	R200MFG20R	Galvanized Steel	TR20020C	CLOSED	-	-	-
		Polymer concrete	THPR200G20C	CLOSED	Galvanized	-	-
		Polymer concrete	THPR200MF20C	CLOSED	Ductile Iron	-	-
		Polymer concrete	THPR200G20AJ	OPEN	Galvanized	Joint	4 [110]
		Polymer concrete	THPR200MF20AJ	OPEN	Ductile Iron	Joint	4 [110]
		Polymer concrete	THPR200G20AT	OPEN	Galvanized	Pipe	4 [110]
		Polymer concrete	THPR200MF20AT	OPEN	Ductile Iron	Pipe	4 [110]
R200G30R	R200MFG30R	Galvanized Steel	TR20030C	CLOSED	-	-	-
		Polymer concrete	THPR200G30C	CLOSED	Galvanized	-	-
		Polymer concrete	THPR200MF30C	CLOSED	Ductile Iron	-	-
		Polymer concrete	THPR200G30AJ	OPEN	Galvanized	Joint	4 [110]
		Polymer concrete	THPR200MF30AJ	OPEN	Ductile Iron	Joint	4 [110]
		Polymer concrete	THPR200G30AT	OPEN	Galvanized	Pipe	4 [110]
		Polymer concrete	THPR200MF30AT	OPEN	Ductile Iron	Pipe	4 [110]
R200G40R	R200MFG40R	Galvanized Steel	TR20040C	CLOSED	-	-	-
		Polymer concrete	THPR200G40C	CLOSED	Galvanized	-	-
		Polymer concrete	THPR200MF40C	CLOSED	Ductile Iron	-	-
		Polymer concrete	THPR200G40AJ	OPEN	Galvanized	Joint	4 [110]
		Polymer concrete	THPR200MF40AJ	OPEN	Ductile Iron	Joint	4 [110]
		Polymer concrete	THPR200G40AT	OPEN	Galvanized	Pipe	4 [110]
		Polymer concrete	THPR200MF40AT	OPEN	Ductile Iron	Pipe	4 [110]

BUCKET
Code
CR200

STEP UNITS
Code
CER200

INSTALLATION DEVICE
Code
ID200

CONNECTORS	
Trench drains	Code
R200G000R	TCR200G000FFA
R200G00R	TCR200G00FFA
R200G10R	TCR200G10FFA
R200G20R	TCR200G20FFA
R200G30R	TCR200G30FFA

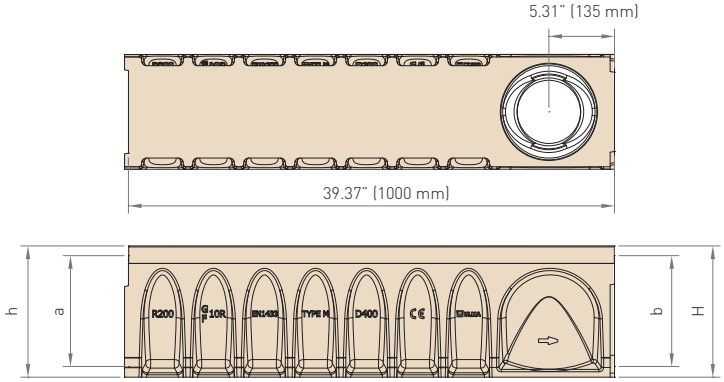
FLOW RATES MULTIV+200

Outlet flow rates help to select the correct size trench drain based on the requirements of the project.

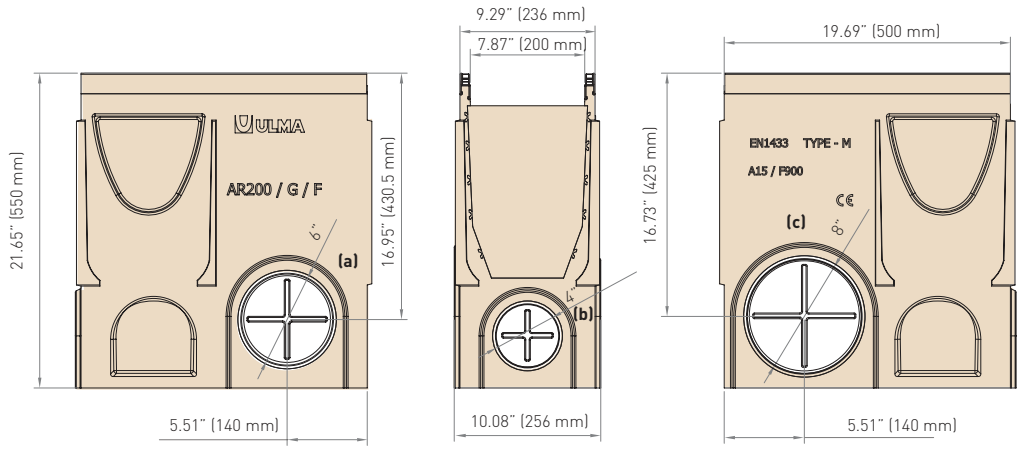
Outlet flow rates

Trench drain	Outlet (in)	Q (m^3/s)	GPM	CFS
R200GH8	8	0,0236	373,9327	0,8227
R200GH12	8	0,0289	457,9721	1,0075
R200G000R	8	0,0344	545,0958	1,1992
R200G00R	8	0,0391	620,0972	1,3642
R200G01	8	0,0396	627,1041	1,3796
R200G02	8	0,0400	634,0337	1,3949
R200G03	8	0,0404	640,8883	1,4100
R200G04	8	0,0409	647,6704	1,4249
R200G05	8	0,0413	654,3822	1,4396
R200G06	8	0,0417	661,0258	1,4543
R200G07	8	0,0421	667,6033	1,4687
R200G08	8	0,0425	674,1167	1,4831
R200G09	8	0,0429	680,5677	1,4972
R200G11	8	0,0437	693,2897	1,5252

Trench drain	Outlet (in)	Q (m^3/s)	GPM	CFS
R200G10	8	0,0433	686,9582	1,5113
R200G10R	8	0,0433	686,9582	1,5113
R200G12	8	0,0441	699,5640	1,5390
R200G13	8	0,0445	705,7824	1,5527
R200G14	8	0,0449	711,9466	1,5663
R200G15	8	0,0453	718,0578	1,5797
R200G16	8	0,0457	724,1175	1,5931
R200G17	8	0,0461	730,1269	1,6063
R200G18	8	0,0464	736,0872	1,6194
R200G19	8	0,0468	741,9996	1,6324
R200G20	8	0,0472	747,8653	1,6453
R200G20R	8	0,0472	747,8653	1,6453
R200G30R	8	0,0507	804,1726	1,7692



Sump Units	Outlet (in)	Q (m^3/s)	GPM	CFS
AR200G (a)	6	0,0350	555,156	1,221
AR200G (b)	4	0,0171	270,944	0,596
AR200G (c)	8	0,0544	861,872	1,896



F HEAVY DUTY

AIRPORTS, INDUSTRIAL AREAS,
CAR PARKS FOR HEAVY VEHICLES.

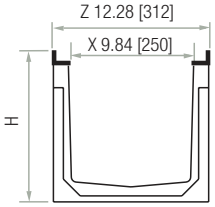
F250K

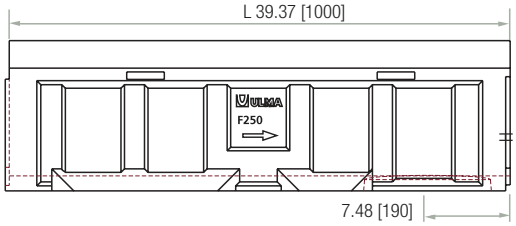
SLOPE **2,5%**

LOAD CLASS
UP TO F900
EN-1433 STANDARD

ULMA Linear Trench Drain type F250K: External width 12.28 inches [312 mm]; Internal width 9.84 inches [250 mm]; Available with overall heights between 5.91 and 25.59 inches [150 mm and 650 mm]. Suitable also with 2,5% presloped, cascaded or mixed slope, to collect rainwater in 39.37 inches [1 LM] long units. Safe locking system consists of eight bolts per 39.37 inches (1LM); Integrated galvanized steel* edges for lateral protection.

*Also available with cast iron edges.



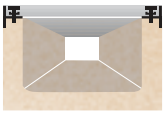


Trench Drain Code	L (in/mm)	Height (in/mm)		Width (in/mm)		Ø Outlet*(in/mm)		Hydraul. Section (in²/cm²)	Slope
		h	H	Z	X	Vert.	Horiz.		
F250B01RM	19.69 [500]	5.91 [150]	5.91 [150]	12.44 [316]	9.84 [250]	-	-	34,1 [220]	-
F250K01	39.37 [1000]	5.91 [150]	6.89 [175]	12.44 [316]	9.84 [250]	-	-	43,4 [280]	2,5%
F250K02	39.37 [1000]	6.89 [175]	7.87 [200]	12.28 [312]	9.84 [250]	-	-	52,7 [340]	2,5%
F250K03	39.37 [1000]	7.87 [200]	8.86 [225]	12.28 [312]	9.84 [250]	-	-	62 [400]	2,5%
F250K04	39.37 [1000]	8.86 [225]	9.84 [250]	12.28 [312]	9.84 [250]	-	-	71,3 [460]	2,5%
F250K05	39.37 [1000]	9.84 [250]	10.83 [275]	12.28 [312]	9.84 [250]	-	-	80,6 [520]	2,5%
F250K06	39.37 [1000]	10.83 [275]	11.81 [300]	12.28 [312]	9.84 [250]	-	-	89,9 [580]	2,5%
F250K00R	39.37 [1000]	11.81 [300]	11.81 [300]	12.28 [312]	9.84 [250]	10 [250]	-	89,9 [580]	-
F250K07	39.37 [1000]	11.81 [300]	12.79 [325]	12.28 [312]	9.84 [250]	-	-	99,2 [640]	2,5%
F250K08	39.37 [1000]	12.79 [325]	13.78 [350]	12.28 [312]	9.84 [250]	-	-	108,5 [700]	2,5%
F250K10R	39.37 [1000]	13.78 [350]	13.78 [350]	12.28 [312]	9.84 [250]	10 [250]	-	108,5 [700]	-
F250K09	39.37 [1000]	13.78 [350]	14.76 [375]	12.28 [312]	9.84 [250]	-	-	117,8 [760]	2,5%
F250K10	39.37 [1000]	14.76 [375]	15.75 [400]	12.28 [312]	9.84 [250]	-	-	127,1 [820]	2,5%
F250K20R	39.37 [1000]	15.75 [400]	15.75 [400]	12.28 [312]	9.84 [250]	10 [250]	-	127,1 [820]	-
F250K11	39.37 [1000]	15.75 [400]	16.73 [425]	12.28 [312]	9.84 [250]	-	-	134,85 [870]	2,5%
F250K12	39.37 [1000]	16.73 [425]	17.72 [450]	12.28 [312]	9.84 [250]	-	-	144,15 [930]	2,5%
F250K30R	39.37 [1000]	17.72 [450]	17.72 [450]	12.28 [312]	9.84 [250]	-	-	144,93 [935]	-
F250K13	39.37 [1000]	17.72 [450]	18.70 [475]	12.28 [312]	9.84 [250]	-	-	152,68 [985]	2,5%
F250K14	39.37 [1000]	18.70 [475]	19.69 [500]	12.28 [312]	9.84 [250]	-	-	161,98 [1045]	2,5%
F250K15	39.37 [1000]	19.69 [500]	20.67 [525]	12.28 [312]	9.84 [250]	-	-	170,5 [1100]	2,5%
F250K16	39.37 [1000]	20.67 [525]	21.65 [550]	12.28 [312]	9.84 [250]	-	-	179,8 [1160]	2,5%
F250K17	39.37 [1000]	21.65 [550]	22.64 [575]	12.28 [312]	9.84 [250]	-	-	188,33 [1215]	2,5%
F250K18	39.37 [1000]	22.64 [575]	23.62 [600]	12.28 [312]	9.84 [250]	-	-	196,85 [1270]	2,5%
F250K19	39.37 [1000]	23.62 [600]	24.61 [625]	12.28 [312]	9.84 [250]	-	-	204,6 [1320]	2,5%
F250K20	39.37 [1000]	24.61 [625]	25.59 [650]	12.28 [312]	9.84 [250]	-	-	213,9 [1380]	2,5%

*Vert. and horiz. outlets on order.

LOCKING SYSTEM

8 BOLT LOCKING SYSTEM.
8 screws with protection cap, per 39.37 inches.



SUMP UNITS AND ACCESSORIES TABLE

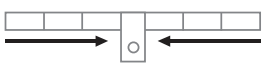
AF250

AF250S + A250B

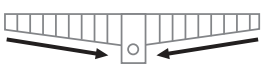
Code	L (in/mm)	H (in/mm)	Width (in/mm)	Ø Lateral Outlet (in/mm)	Ø Frontal Outlet (in/mm)	Sump Units
AF250	19.69 [500]	15.75 [400]	12.44 [316]	6 / 8 [160/200]	-	1
AB250	19.69 [500]	15.75 [400]	12.44 [316]	6 / 8 [160/200]	-	1
AF250S-65	19.69 [500]	26.77 [680]	12.28 [312]	16 [415]	-	1
AB250S-65	19.69 [500]	26.77 [680]	12.28 [312]	16 [415]	-	1
AF250S+A250B	19.69 [500]	29.53 [750]*	12.44 [316]	6 / 8 [160/200]	-	2
AB250S+A250B	19.69 [500]	29.53 [750]*	12.44 [316]	6 / 8 [160/200]	-	2
AF250S + A250B415	19.69 [500]	36.06 [916]*	12.44 [316]	16 [415]	8 [200]	2
AB250S+A250B415	19.69 [500]	36.06 [916]*	12.44 [316]	16[415]	8 [200]	2

* The sump unit can be higher incorporating an intermediate unit.

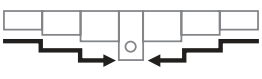
SLOPE DESIGNS



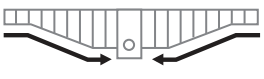
WITHOUT SLOPE



0,5% PRESLOPED



CASCADED SLOPE



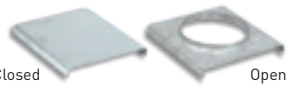
MIXED SLOPE

GRATINGS

Material	Design	Load	Code	L (in/mm)	Width (in/mm)	Opening (in/mm)	Norm
DUCTILE IRON	SLOTTED	C250 // 56,200 lbs	FNX250FTCM	19.69 [500]	11.85 [301]	0.54 [13,75]	
	SLOTTED	D400 // 89,920 lbs	FNX250FTDM	19.69 [500]	11.85 [301]	0.54 [13,75]	
	SLOTTED	F900 // 202,320 lbs	FNX250FTFM	19.69 [500]	11.85 [301]	0.75 [19]	
	SOLID	F900 // 202,320 lbs	FC250FTFM	19.69 [500]	11.85 [301]	-	
GALVANIZED STEEL	SINGLE SLOT	D400 // 89,920 lbs	GRL250FOD (1)	39.37 [1000]	11.85 [301]	0.71 / H5.91 [18 / H150]	

(1) Without screws.

END CAPS



Trench drain	Code	Type	Ø (in/mm)
F250K00R	T250K00C	CLOSED	-
	T250K00A	OPEN	8 [200]
F250K10R	T250K10C	CLOSED	-
	T250K10A	OPEN	8[200]
F250K20R	T250K20C	CLOSED	-
	T250K20A	OPEN	8[200]
F250K30R	T250K30C	CLOSED	-
	T250K30A	OPEN	8 [200]

STEP UNITS

Code
CE250

BUCKET*

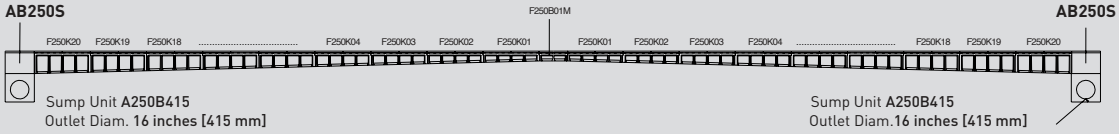
Code
C250

*Only applicable if 2 sump units are installed.

INSTALLATION DEVICE

Code
ID300

CONTINUOUS PRESLOPED OF 2,5%



FIRST POLYMER CONCRETE TRENCH DRAIN WITH PRESLOPED OF 2,5% ON THE MARKET

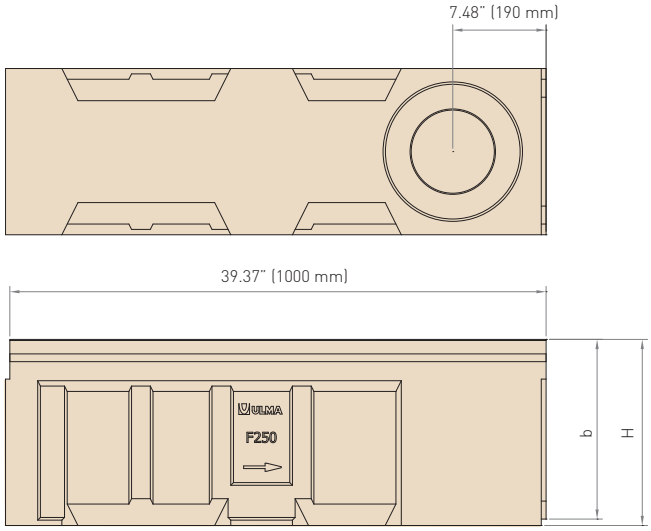
High hydraulic capacity.
Self-cleaning effect.
Minimum maintenance.

FLOW RATES F250K

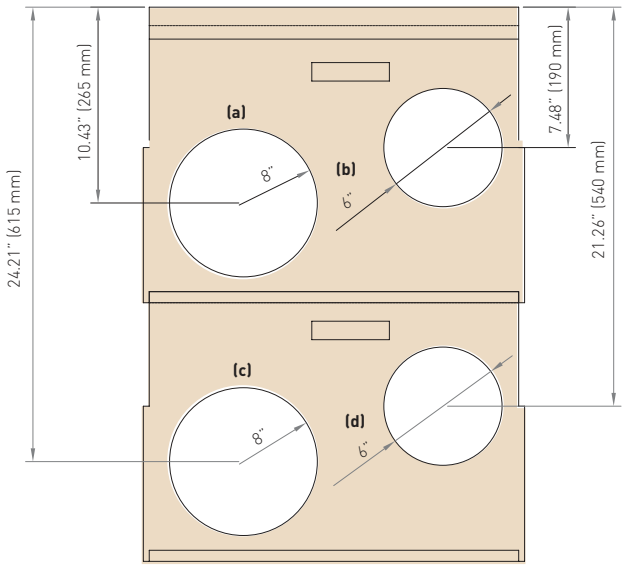
Outlet flow rates help to select the correct size trench drain based on the requirements of the project.

Outlet flow rates

Trench drain	Outlet (in)	Q (m^3/s)	GPM	CFS
F250K00R	10	0,0714	1131,433	2,4892
F250K10R	10	0,0771	1222,088	2,6886
F250K20R	10	0,0824	1306,467	2,8742



Sump Units	Outlet (in)	Q (m^3/s)	GPM	CFS
AF250 (a)	8	0,0429	680,568	1,497
AF250 (b)	6	0,0233	368,812	0,811
AF250+A250B (c)	8	0,0654	1036,778	2,281
AF250+A250B (d)	6	0,0392	621,763	1,368

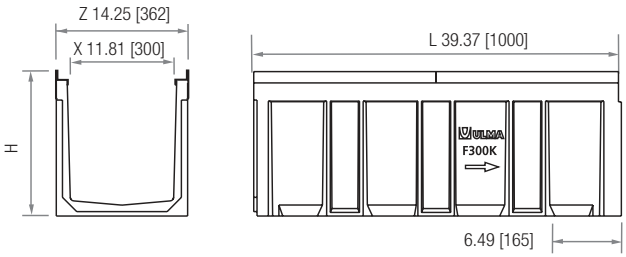


F300K

LOAD CLASS
UP TO F900
EN-1433 STANDARD

ULMA Linear Trench Drain type F300K: External width 14.25 inches [362 mm]; Internal width 11.81 [300 mm]; Available with overall heights between 11.81 and 23.62 inches [300 mm and 600 mm]. Suitable for cascaded type slope to collect rainwater in 39.37 inches long [1 LM] units. Safe locking system consists of eight bolts per 39.37 inches (1LM); Integrated galvanized steel* edges for lateral protection.

*Also available with cast iron edges.

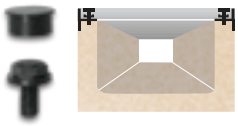


Trench drain	L (in/mm)	H (in/mm)	Width (in/mm)		Ø Outlet* (in/mm)		Hydraul. Section (in²/cm²)
			Z	X	Vert.	Hor.	
F300K000R	39.37 [1000]	11.81 [300]	14.25 [362]	11.81 [300]	10 [250]	-	112.38 [725]
F300K00R	39.37 [1000]	15.35 [390]	14.25 [362]	11.81 [300]	8 [200]	-	151.13 [975]
F300K10R	39.37 [1000]	17.32 [440]	14.25 [362]	11.81 [300]	8 [200]	-	172.05 [1110]
F300K20R	39.37 [1000]	19.29 [490]	14.25 [362]	11.81 [300]	8 [200]	-	194.53 [1255]
F300K60R	39.37 [1000]	23.62 [600]	14.25 [362]	11.81 [300]	-	-	236.36 [1525]

*Vert. outlets on order.

LOCKING SYSTEM

8 BOLT LOCKING SYSTEM.
8 screws with protection cap, per 39.37 inches.



SUMP UNITS AND ACCESSORIES TABLE

AF300

AF300S+A300B

Code	L (in/mm)	H (in/mm)	Width (in/mm)	Ø Outlet (in/mm)		Sump Units	Bucket
				Lateral	Front		
AF300	19.69 [500]	15.35 [390]	14.25 [362]	8 [200]	-	1	-
AF300S + A300B	19.69 [500]	28.74 [730]*	14.25 [362]	8 [200]	-	2	C300

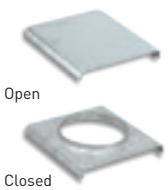
* The sump unit can be higher incorporating an intermediate unit

GRATINGS

Slotted Solid Single Slot

Material	Design	Load	Code	L (in/mm)	Width (in/mm)	Opening (in/mm)	Norm
DUCTILE IRON	SLOTTED	C250 // 56,200 lbs	FNX300FTCM	19.69 [500]	13.82 [351]	0.54 [13,75]	
	SLOTTED	D400 // 89,920 lbs	FNX300FTDM	19.69 [500]	13.82 [351]	0.54 [13,75]	
	SLOTTED	F900 // 202,320 lbs	FNX300FTFM	19.69 [500]	13.82 [351]	0.55 [14]	
	SOLID	F900 // 202,320 lbs	FC300FTFM	19.69 [500]	13.82 [351]	-	
GALVANIZED STEEL	SINGLE SLOT	D400 // 89,920 lbs	GRL300FOD (1)	39.37 [1000]	13.82 [351]	0.71 / H5.91 [18 / H150]	

(1) Without screws.



END CAPS

Trench drain	Code	Type	Ø (in /mm)
F300K00R	T300K00C	CLOSED	-
	T300K00A	OPEN	12 [300]
F300K10R	T300K10C	CLOSED	-
	T300K10A	OPEN	12 [300]
F300K20R	T300K20C	CLOSED	-
	T300K20A	OPEN	12 [300]

STEP UNITS

Code
CE300

GALVANIZED STEEL BUCKET*

Code
C300

*Only applicable if 2 sump units are installed.

INSTALLATION DEVICE

Code
ID300

SLOPE DESIGNS

WITHOUT SLOPE

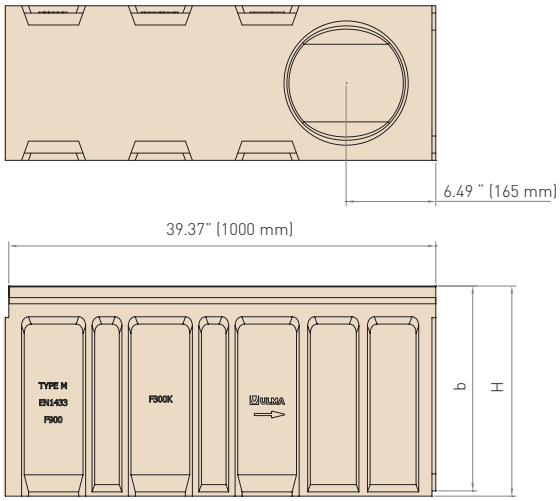
CASCADED SLOPE

FLOW RATES F300K

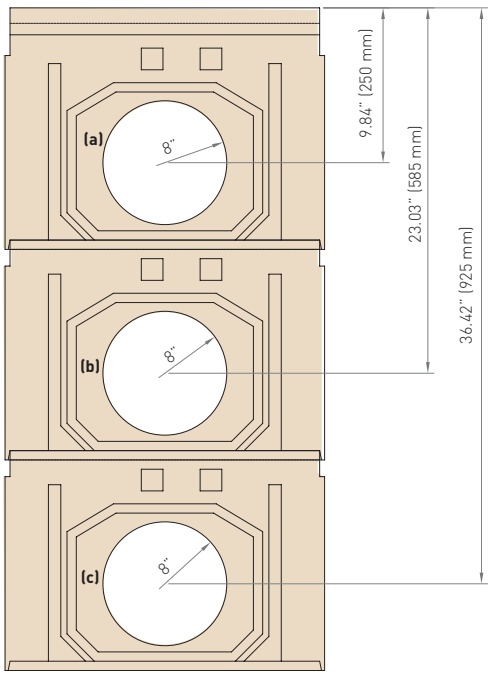
Outlet flow rates help to select the correct size trench drain based on the requirements of the project.

Outlet flow rates

Trench drain	Outlet (in)	Q (m^3/s)	GPM	CFS
F300K000R	10	0,0714	1131,43	2,4892
F300K00R	10	0,0521	825,62	1,8164
F300K10R	10	0,0553	876,95	1,9293
F300K20R	10	0,0584	925,44	2,0360



Sump Units	Outlet (in)	Q (m^3/s)	GPM	CFS
AF300 (a)	6	0,0417	661,0257	1,45
AF300+A300B (b)	6	0,0638	1.011,1749	2,22
AF300S+A300I+A300B (c)	6	0,0802	1.271,5083	2,80



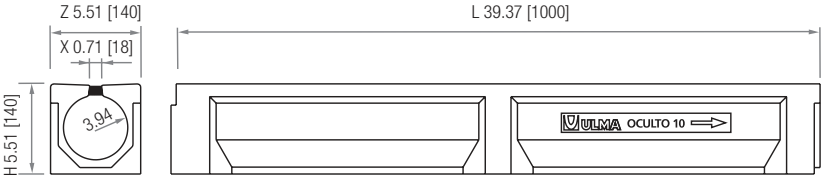
SPORT

SPORT FACILITIES, SOCCER PITCHES,
INDOOR AREAS

OCULTO10

LOAD CLASS
UP TO A15
EN-1433 STANDARD

ULMA Linear Trench Drain type OCULTO10: External width 5.51 inches [140 mm], inside diameter 3.94 inches [100 mm] and overall height 5.51 inches [140 mm] to collect rainwater in 39.37 inches [1 LM] long units.



Trench drain	L (in/mm)	H (in/mm)	Width (in/mm)		Ø Outlet* (in/mm)		Hydraul. Section (in²/cm²)
			Z	X	Vert.	Hor.	
OCULTO10	39.37 [1000]	5.51 [140]	5.51 [140]	3.94 [100]	4 [110]	4 [110]	12,17 [78,5]

*Vert. and horiz. outlets on order.

AOCULTO100S + AU100

AOCULTO100S + AEURO100

SUMP UNITS AND ACCESSORIES TABLE

Code	L (in/mm)	H (in/mm)	Width (in/mm)	Ø Outlet (in/mm)		Sump Units	Bucket
				Lateral	Front		
AOCULTO100S + AU100	19.69 [500]	26.57 [675]	5.51 [140]	4 /6 [110/160]	4 [110]	2	CU100
AOCULTO100S + AEURO100	19.69 [500]	17.24 [438]	5.51 [140]	3 1/2 /4 [90/110]	3 1/2 [90]	2	CEURO100

HPR100KCAM polymer concrete grating is locked on the AOCULTO 100S sump unit and OCULTO 100RM maintenance element using a locking bar.

ACCESS UNIT

Code	L (in/mm)	H (in/mm)	Width (in/mm)
OCULTO100RM	19.69 [500]	5.51 [140]	5.51 [140]

OCULTO 100RM

GALVANIZED STEEL BUCKET *
Code
COCULTO100

*Only applicable if 2 sump units are installed.

GRATINGS

The trench drain does not have grating. Trench drain of one piece only.

HPR100KCAM

ACCESS UNIT GRATING

Material	Design	Load	Code	L (in/mm)	Width (in/mm)	Thickness (in/mm)	Units (x 39.37in)
POLYMER C.	SINGLE SLOT	A15 // 3, 372 lbs	HPR100KCAM	19.69 [500]	4 [110]	1.18 [30]	2

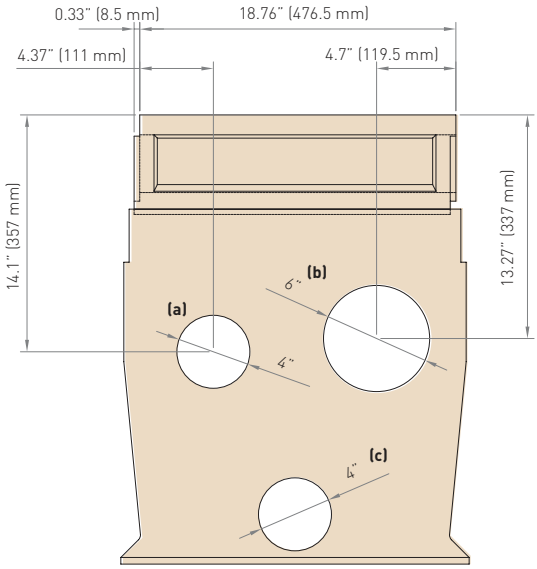
FLOW RATES **OCULTO**10

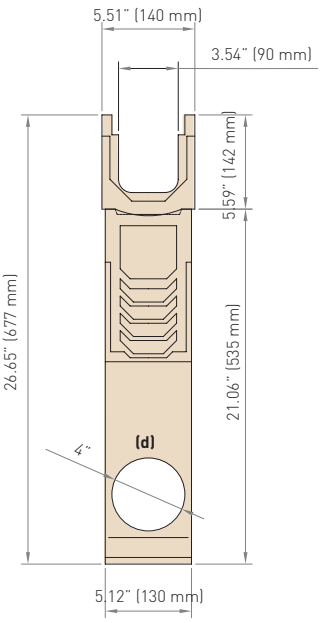
Outlet flow rates help to select the correct size trench drain based on the requirements of the project.

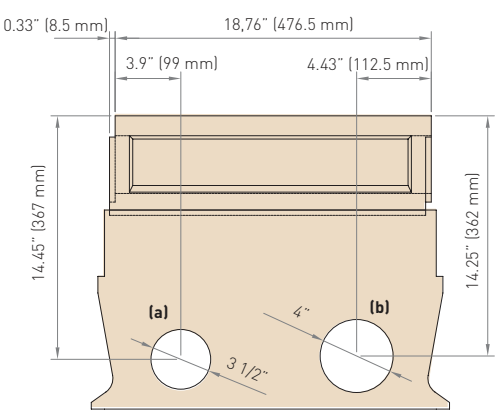
Outlet flow rates

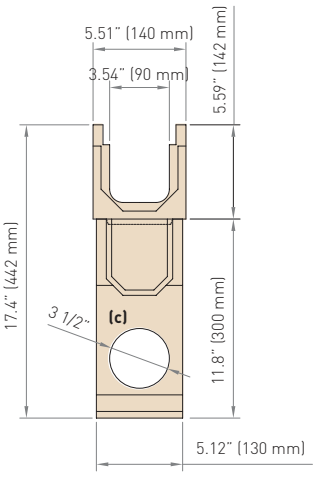
Channel	Outlet (in)	Q (m^3/s)	GPM	CFS
OCULTO10	4	0,0094	149,6366	0,3292

Sump Unit	Outlet (in)	Q (m^3/s)	GPM	CFS
AOCULTO100S+AU100 (a)	4	0,0151	238,95	0,53
AOCULTO100S+AU100 (b)	6	0,0310	491,18	1,08
AOCULTO100S+AU100 (c)	4	0,0196	310,29	0,68
AOCULTO100S+AU100 (d)	4	0,0191	302,46	0,67
AOCULTO100S+AEURO100 (a)	3 1/2	0,0102	162,18	0,36
AOCULTO100S+AEURO100 (b)	4	0,0152	240,62	0,53
AOCULTO100S+AEURO100 (c)	3 1/2	0,0100	158,83	0,35

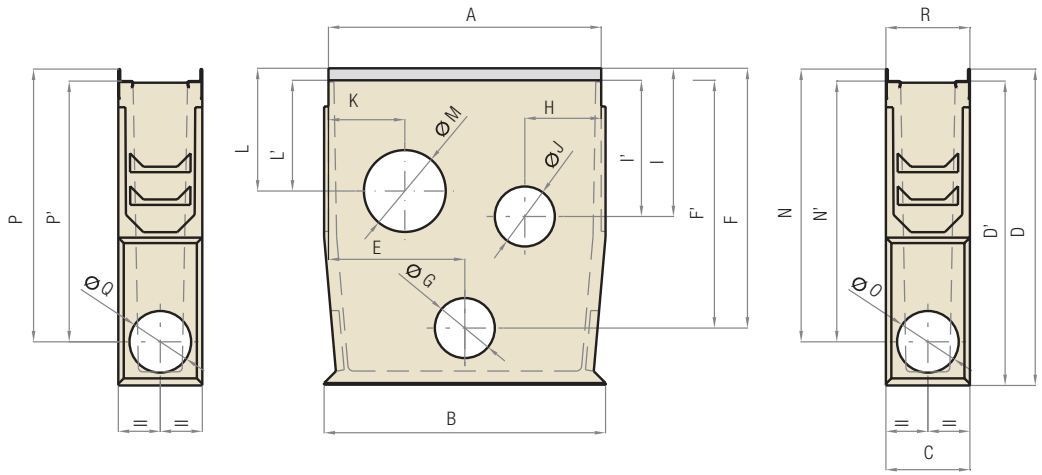






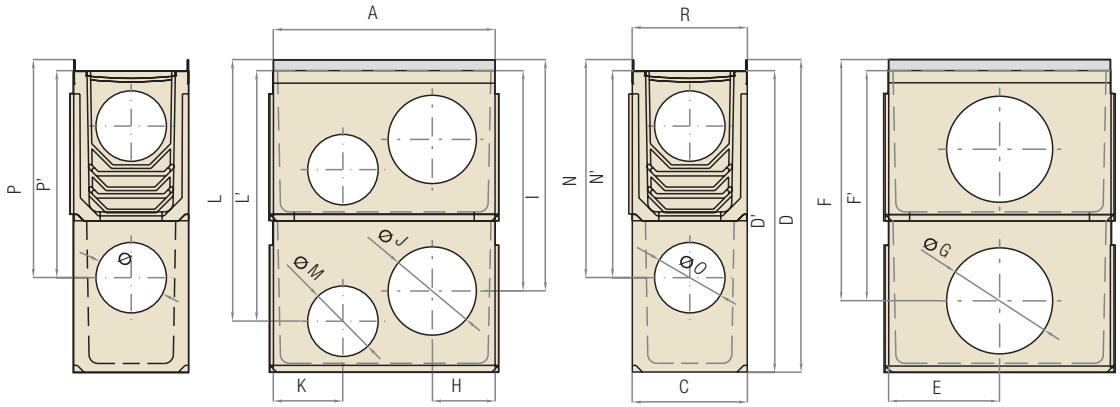


GENERAL DIMENSIONS OF INDIVIDUAL **SUMP UNITS**



	A	B	C	D	D'	E	F	F'	G	H	I	I'	J	K	L	L'	M	N	N'	O	P	P'	Q	R
AK100	19.69 [500]	20.31 [516]	5.12 [130]	22.05 [560]	-	9.84 [250]	18.50 [470]	-	4 [110]	5.51 [140]	8.66 [220]	-	6 [160]	5.51 [140]	8.66 [245]	-	4 [110]	18.50 [470]	-	3 1/2 [90]	18.50 [470]	-	3 1/2 [90]	5.12 [130]
AR100G	19.69 [500]	19.69 [500]	5.35 [136]	19.29 [490]	-	9.84 [250]	15.35 [390]	-	4 [110]	9.84 [250]	370	-	6 [160]	-	-	-	-	15.35 [390]	-	4 [110]	-	-	-	-
AR200G	19.69 [500]	19.69 [500]	9.29 [236]	21.65 [550]	-	5.51 [140]	16.69 [424]	-	8 [200]	5.51 [140]	16.93 [430]	-	6 [160]	-	-	-	-	18.07 [459]	-	4 [110]	-	-	-	-
AR300G100	19.69 [500]	20.31 [516]	14.17 [360]	15.35 [390]	-	7.36 [187]	9.45 [240]	-	8 [200]	4.02 [102]	10.43 [265]	-	6 [160]	8.66 [220]	292	-	4 [110]	-	-	-	-	-	-	14.17 [360]
AF250	19.69 [500]	20.31 [516]	12.20 [310]	15.75 [400]	-	-	-	-	-	6 [160]	9.65 [245]	-	6 [160]	5.91 [150]	8.07 [205	-	8 [200]	-	-	-	-	-	-	12.20 [310]
AF300	19.69 [500]	20.31 [516]	14.17 [360]	15.35 [390]	-	9.84 [250]	9.84 [250]	-	8 [200]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.17 [360]

GENERAL DIMENSIONS OF DOUBLE **SUMP UNITS**



	A	B	C	D	D'	E	F	F'	G	H	I	I'	J	K	L	L'	M	N	N'	O	P	P'	Q	R
AF250S+A250B	19.69 [500]	20.31 [516]	12.20 [310]	29.53 [750]	-	-	-	-	-	6 [160]	23.43 [595]	-	6.30 [160]	5.91 [150]	21.85 [555]	-	8 [200]	-	-	-	-	17.72 [450]	-	12.44 [316]
AF250S+ A250B415	19.69 [500]	19.69 [500]	12.20 [310]	36.06 [916]	-	9.84 [250]	26.10 [663]	-	16 [415]	-	-	-	-	-	-	-	-	30.43 [773]	-	8 [200]	-	-	-	12.44 [316]
AB250S+A250B	19.69 [500]	20.31 [516]	12.20 [310]	29.53 [750]	-	-	-	-	-	6 [160]	23.43 [595]	-	6 [160]	5.91 [150]	21.85 [555]	-	8 [200]	-	-	-	-	-	-	12.44 [316]
AB250S+ A250B415	19.69 [500]	19.69 [500]	12.20 [310]	36.06 [916]	-	9.84 [250]	26.10 [663]	-	16 [415]	-	-	-	-	-	-	-	-	30.43 [773]	-	8 [200]	-	16.14 [410]	-	12.44 [316]
AF300S+A300B	19.69 [500]	20.31 [516]	14.17 [360]	28.74 [730]	-	9.84 [250]	9.84 [250]	-	8 [200]	-	-	-	-	-	-	-	-	-	-	-	-	3.74 [95]	-	14.41 [366]
AR300G100S + AR300G100B	19.69 [500]	20.31 [516]	14.17 [360]	28.74 [730]	-	7.36 [187]	22.72 [577]	-	8 [200]	4.02 [102]	23.70 [602]	-	6 [160]	8.66 [220]	24.80 [630]	-	-	-	-	-	-	-	-	14.41 [366]
AOCULTO100S +AU100	19.69 [500]	20.31 [516]	5.12 [130]	-	26.93 [684]	10.16 [258]	-	23.39 [594]	4 [110]	5.51 [140]	-	13.54 [344]	6 [160]	5.51 [140]	-	14.53 [369]	4 [110]	-	23.39 [594]	3 1/2 [90]	-	-	23.39 [594]	5.51 [140]
AOCULTO100S+ AEURO100	19.69 [500]	19.69 [500]	5.12 [130]		17.40 [442]	-	-	-	-	4.53 [115]		14.45 [367	3.54 [90]	4.53 [115]	-	14.06 [357]	4 [110]	-	13.86 [352]	3 1/2 [90]	-	-	13.86 [352]	5.51 [140]

POLYMER CONCRETE TRENCH DRAIN **CHEMICAL RESISTANCE**

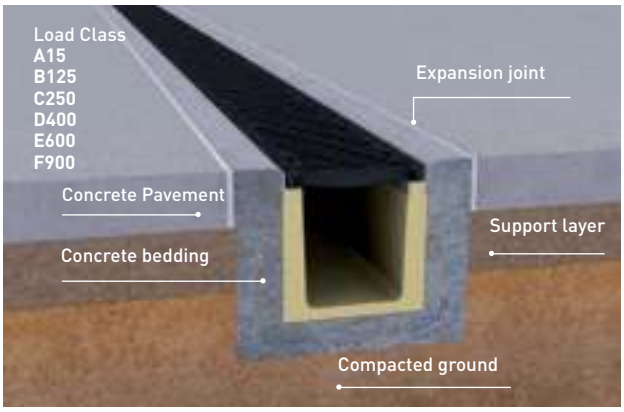
Chemical	Concentration	Long Term exposure	Short Term Exposure 24 hours
Acetaldehyde	100%	NR	NR
Acetic Acid	30%	NR	R
Acetone	10%	NR	R
Ammonia	10%	NR	R
Aniline	100%	NR	R
Benzene	100%	NR	R
Boric Acid	100%	R	R
Butyric Acid	25%	R	R
Butyl Alcohol	100%	R	R
Calcium Chloride	100%	R	R
Calcium Hydroxide	100%	NR	R
Caster Oil	100%	R	R
Chloric Acid	5%	NR	R
Chromic Acid	5%	R	R
Citric Acid	100%	R	R
Diesel Fuel	100%	R	R
Ethanol	100%	NR	R
Ethlendiamine	100%	R	R
Ethyl Acetate	100%	NR	R
Ferrous Sulfate	30%	R	R
Fluorallic Acid	10%	R	R
Formaldehyde	35%	R	R
Formic Acid	10%	NR	R
Fuel Oil	100%	R	R
Gasoline	100%	R	R
n-Heptane	100%	R	R
n-Hexane	100%	R	R
Hydraulic Oil	100%	R	R
Hydrochloric Acid	10%	R	R
Hydrofluoric Acid	5%	NR	R
Lactic Acid	10%	R	R
Methanol	5%	NR	NR

Chemical	Concentration	Long Term exposure	Short Term Exposure 24 hours
Methyl Amine	100%	NR	R
Methyl Ethyl Ketone	100%	NR	R
Mineral oil	100%	R	R
Monochlor Benzene	0.05%	NR	NR
Monochloroacetic Acid	10%	R	R
Nitric Acid	10%	NR	R
n-Nonane	100%	R	R
Iso-Octane	100%	NR	R
Petrol	100%	R	R
Phenol	100%	NR	R
Phosphoric Acid	10%	R	R
Potassium Hydroxide	10%	NR	NR
Sodium Acetate	100%	NR	R
Sodium Carbonate	20%	R	R
Sodium Chloride	100%	R	R
Sodium Hydroxide	15%	NR	R
Sodium Hypochlorite	5%	R	R
Sulfuric Acid	40%	R	R
Tetrafluoroborsaure	20%	NR	R
Toluene	100%	NR	R
Trichloroethylene	100%	NR	NR
Triethylamine	100%	R	R
Water (Deionised)	100%	R	R
Water (Demineralised)	100%	R	R
Xylene	100%	NR	R

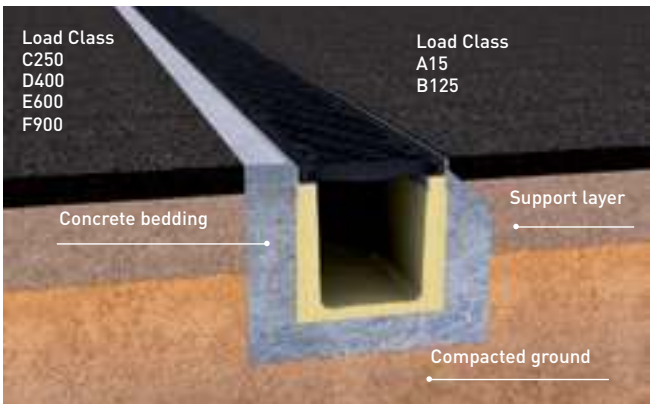
NR: Not recommended
R: Resistant

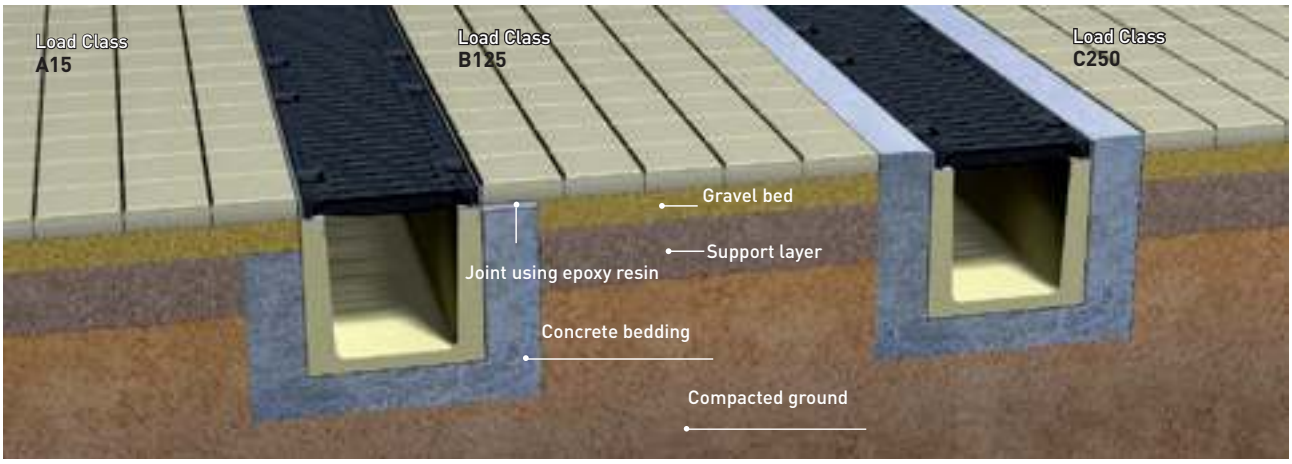
The maximum recommended temperature is 75C / 167F
These recommendations are given for guidance use only.
In applications exposed to corrosive and agressive media, especially if the medium is not listed, please contact the ULMA Technical Department (+34 943 780 600) to check the suitability of the grating, screw, bucket, edge and locking system.

CONCRETE PAVEMENT



ASPHALTE PAVEMENT





PAVING

GENERAL CONDITIONS

GENERAL ON-SITE LAYOUT CONDITIONS

The ULMA Architectural Solutions drainage system has been designed and tested under the strictest premises of the EN1433 STANDARD, following the constructive details illustrated on the following pages.

The design of the road surface adjacent to the concrete trench drain / concrete bedding (concrete, asphalt or paving) must include the dilation and contraction joints necessary to prevent any tangential or perpendicular force on the concrete trench drain / concrete bedding. Depending on the constructive details of the road surface, the size of said joints shall be the responsibility of the Professional Management or designer.

The following illustrations show what the suitable section to be installed for each type of road surface and load is, along with the recommended constructive details.

TYPES OF **INSTALLATION**

INDICATIONS COMMON TO THE DIFFERENT TYPES OF INSTALLATION

The ditch must have the necessary depth and width to comply with the concrete bedding dimensions recommended in table 1 in accordance with the required load type.

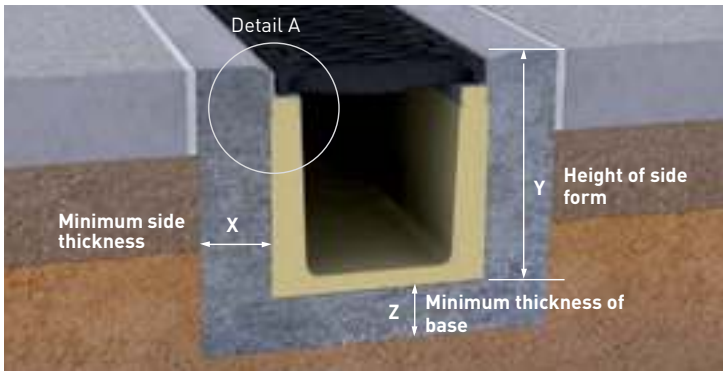
Special care must be taken in the installation of an unprofiled trench drain; the thickness of the grating must be taken into account so that, when the installation is finished, the grating is situated below the level of the road surface as recommended in Detail B.

In the event of a compaction process being required in the proximity of the trench drain (e.g. class A15 and B 125 asphalt surface), special care must be taken not to damage the edge and walls of the trench drain.

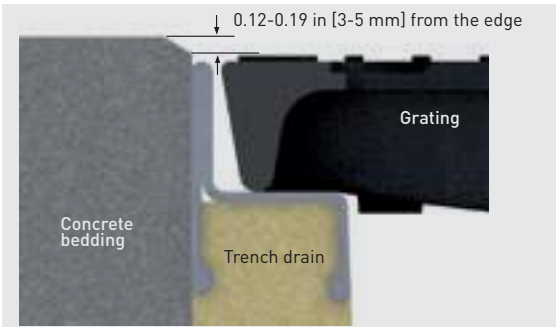
The surrounding road surface and concrete bedding must remain on a plane of between 0.12 and 0.19 inches (3-5mm) above the plane of the upper edge of the trench drain.

TABLE 1: THICKNESS OF CONCRETE BEDDING

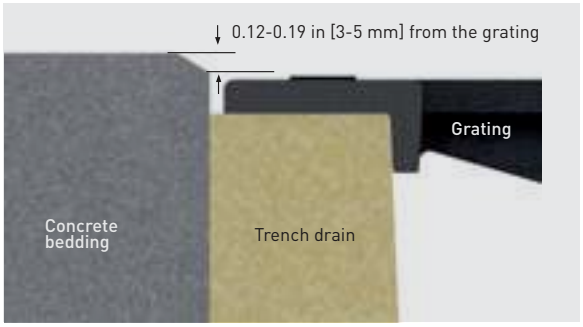
LOAD ACCORDING TO STANDAR **EN-1433**	X MINIMUM SIDE THICKNESS **(in/mm)**	Z MINIMUM THICKNESS OF BASE **(in/mm)**	Y HEIGHT OF SIDE FORM **(in/mm)**	RECOMMENDED WIRE MESH **(in x in x in)**	TYPE OF CONCRETE **(psi)**
A15	3.94 [100]	3.94 [100]	At least at a point located at 1.57 in (40 mm) below the level of the pavement.		2 133.5
B125	3.94 [100]	3.94 [100]			3 556
C250	5.91 [150]	5.91 [150]	Up to the level of the wire mesh and the adjoining pavement.		3 556
D400	5.91 [150]	5.91 [150]		5.9 X 5.9 X 0.24	3 556
E600	5.91 [150]	5.91 [150]		5.9 X 5.9 X 0.40	3 556
F900	7.87 [200]	7.87 [200]		7.87 X 7.87 X 0.47	3 556

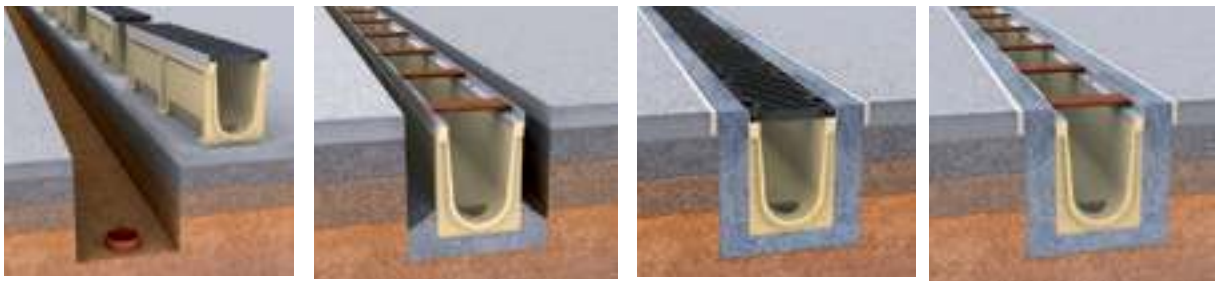


Detail A Trench drain with edge



Detail B Trench drain without edge

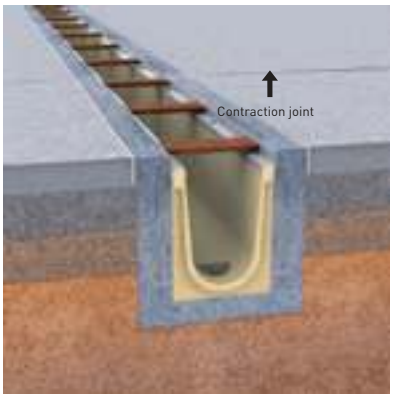




The installation of the trench drains shall be started at the evacuation point or at the deepest point.

In the event of any of the layers adjacent to the concrete bedding also being made of concrete, a dilation joint must always be placed between the concrete bedding and said concrete layer.

Before tipping out the concrete for the concrete bedding place wooden battens or the gratings themselves protected with plastic, in order to prevent deformations which might impede the placement of the gratings.

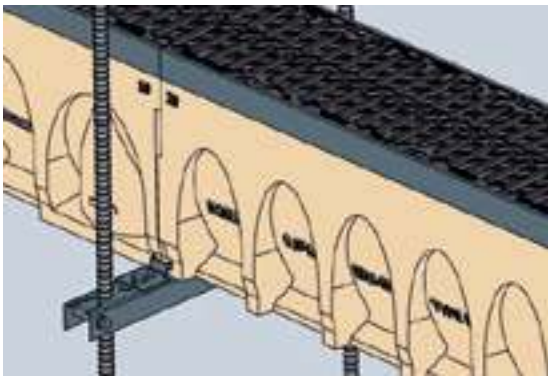


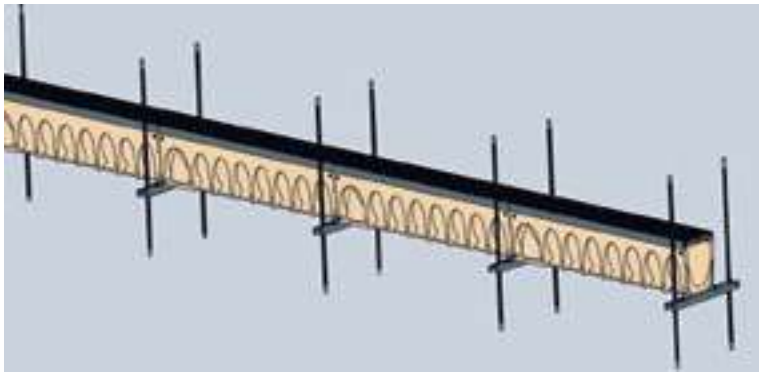
When it comes to opening the pre-marked outlets (vertical or horizontal), it is recommended to mark the perimeter every 1.97 to 2.36 inches (5 to 6 cm) with a drill or rotaflex, in order then to carefully open the pre-marked outlet with a hammer and chisel.

It is advisable for the contraction joint perpendicular to the trench drain to be placed every 236.22 to 275.60 inches (6 to 7 metres) and to be made to coincide with the union between trench drains.

TRENCH DRAIN INSTALLATION USING **ULMA**'S INSTALLATION DEVICE.

Devices are attached to the dimples at the bottom of the trench drain what enables the alignment of the trench drains. One device required for every joint.





Rebars allow the adjustment of the required height

ULMA

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