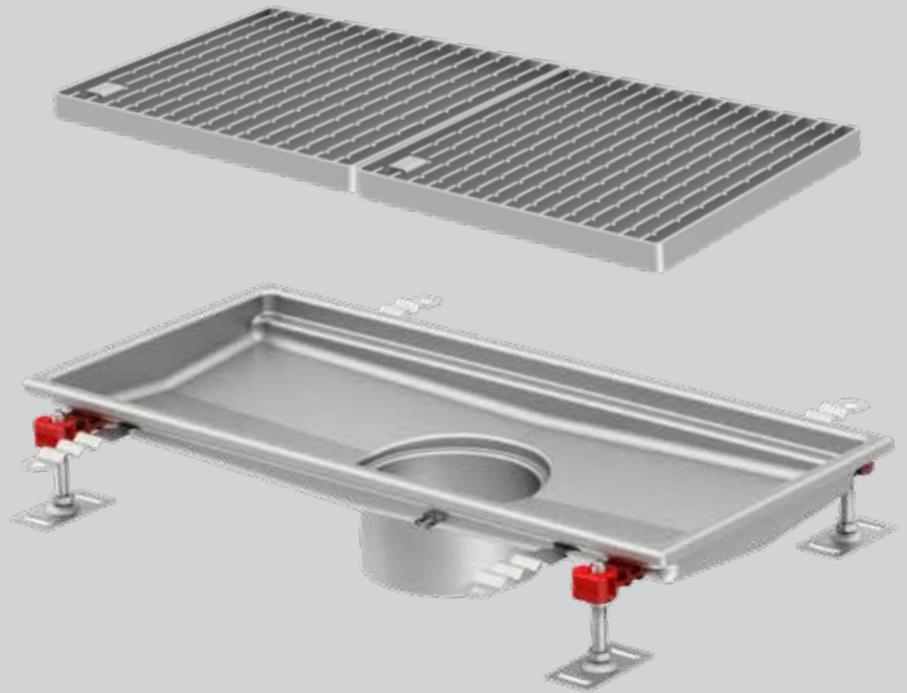
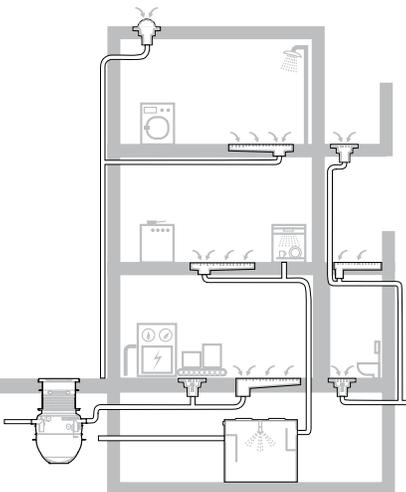


# ACO Building Drainage



## STAINLESS STEEL BOX DRAIN BROCHURE



## ACO Building Drainage

ACO offers drainage systems designed to protect your business and the environment. The stainless steel floor drainage products in the Building Drainage product line are designed for ultimate hygienic and corrosion resistant performance, ensuring health & safety of workers, customers and products while still allowing clean-in-place functionality.

### Product Portfolio

- **Stainless Steel Trench Drains**  
*versatile, modular stainless steel drainage*
- **Floor Drains**  
*stainless steel floor drains*
- **Hygienic Stainless Steel Box Drains**  
*stainless steel drainage for commercial kitchens or food applications*
- **Pipe**  
*gravity fed stainless steel push-fit pipe*
- **BuildLine**  
*green roof, facade and threshold drainage*
- **QuARTz ShowerDrain**  
*stainless steel bathroom drainage*



### ACO Hygienic Box Drain

ACO hygienic box drain products incorporate hygienic principles to ensure optimum performance. The hygienic box drain products are ideal for applications where high standards of hygiene are required as they are capable of handling large volumes of fluid.

Rounded internal corners prevent bacterial build-up and make cleaning quicker and more effective. Box drains are available in a wide range of widths from 7.87" (200 mm) to 31.50" (800 mm) and lengths from 12.99 (330 mm) to 158.66 (4030 mm) to suit a wide range of applications. A selection of stainless steel grates in a choice of styles and load classes complete the system.

### Typical Applications

- *Commercial kitchens/restaurants*
- *Food & beverage processing*
- *Wineries*
- *Breweries*
- *Hospitality*
- *Supermarkets*
- *Schools*
- *Hospitals*



### Hygiene Certifications



ACO has obtained NSF/ANSI 3A 14159-1-2014 certification for its products from NSF International. This standard refers to the hygienic requirements in food processing. All of ACO's hygienic floor drains, hygienic stainless steel box drains and hygienic cast and ladder grates for the hygienic floor drains now display the NSF certification mark.



Our box drain portfolio includes items which are fully compliant with maximum hygienic requirements. We design our products to drain processed wastewater hygienically and economically, exceeding the highest worldwide standards, such as those laid out in the European Hygienic Engineering and Design Group (EHEDG) and by NSF/3A/ANSI 3-A 14159-1-2014.

## Hygiene Applications

Effective drainage helps mitigate hazards from the external environment and is central to the safe and hygienic operation of food preparation and processing.

Hygienic design goes beyond the material; it encompasses every aspect of the drainage process, from initial design and installation to cleaning and maintenance.

## Food Safety Benefits

Products are designed not to harbor bacteria and to minimize the buildup of food particles and debris. Products are also designed to connect hygienically with the surrounding floors to minimize the risk of bacteria growth throughout the drainage system.

Hygiene**First**

## Cost Control Benefits

Systems are designed to be maintained easily. They minimize time spent on cleaning and the associated costs, thanks to their functional design and cleaning recommendations which have been developed from partnerships with premium cleaning agent suppliers.

## Health & Safety Benefits

ACO drainage systems deliver a number of important health and safety benefits. Many grates are slip resistant, improving safety in high risk areas such as food preparation stations and processing sectors which have heavy water usage. Each component of our drainage systems are easy to remove and clean, and there are no sharp edges optimizing employee safety.

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## Material Technology

### *Stainless steel*

Stainless steel is the name given to a range of steels that have greatly enhanced corrosion resistance over conventional mild steels.

In the building and construction industry, stainless steel is selected due to:

- Excellent strength and resistance to oxidation at high temperatures
- Durability and corrosion resistance in highly aggressive environments
- Hygienic and easily cleaned surfaces
- Aesthetically attractive surface finishes
- Non-magnetic properties

These features make stainless steel an obvious choice for demanding drainage applications.



There is a vast range of different stainless steels available. Austenitic stainless steels are the most widely used and encompass the generic 304 and 316L grades. These materials are ideal for applications found in the food processing, dairy, brewing, pharmaceutical, chemical and petrochemical industries.

Marine grade is often used in reference to grade 316L. Although correct, it is not the only grade available in this group. Other grades have different characteristics. If in doubt, contact ACO to assess the material suitability for the application.



Most stainless steel is manufactured from a minimum of 20% recycled material. Stainless steel is 100% recyclable.

## Performance

### *Corrosion and temperature resistance*

Some industrial applications present a challenging environment for drainage systems. All systems featured in this brochure are manufactured from stainless steel grade 304 or grade 316L. All products are pickled and passivated in order to ensure corrosion free joints.

In applications where highly aggressive liquids, or very alkaline cleaning agents are used drainage products should be durable and corrosion resistant. For these applications, ACO recommends stainless steel systems be manufactured in grade 316L.



## Pickling & Passivation

### *Ultimate finishing*

Bending, cutting, punching and welding during manufacturing results in damage of the stainless steel surface that can lead to corrosion. Pickling and passivation are chemical processes that restores physical properties of stainless steel.

- Improves corrosion resistance
- Smooth, uniform finish and appearance
- Ease of cleaning/maintenance
- Extended product life

## Hygiene

### *Food safety*

Medium and high risk zones within food processing environments often necessitate additional hygiene considerations.

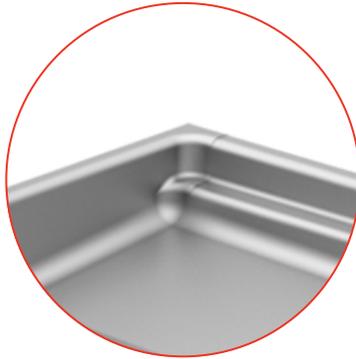
- Stainless steel is an excellent material for use in areas where hygiene performance is paramount
- In addition to the material properties of stainless trench, ACO manufactures its trench drains and floor drains incorporating hygienic design which allow easy cleaning and protection against microorganisms and bacteria
- We apply relevant hygienic design principles reserved for food contact surfaces or recommended by NSF/ANSI and EHEDG

Products shown with the  symbol in the catalog are recommended for hygienic applications.

**HygieneFirst**



## Features & Benefits

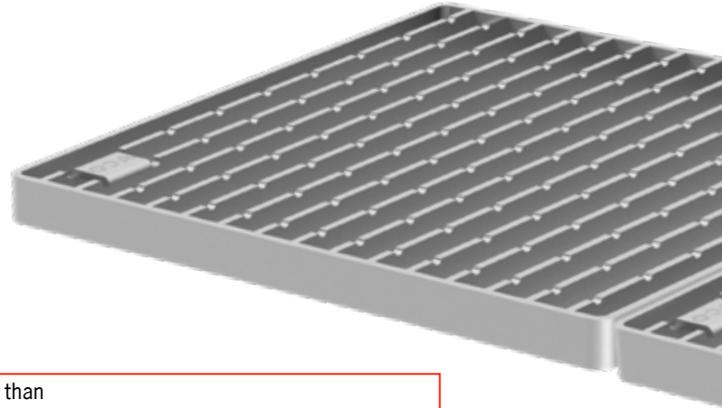
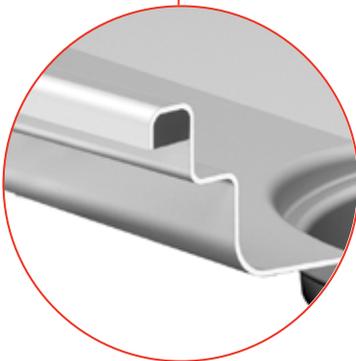


### Internal radii

All internal radii equal or larger than 1/8" (3 mm) which greatly increases cleaning effectiveness

### Edge in-fill

Ensures stable and durable connection between the floor drain and surrounding floor and helps to minimize risk of floor cracks which could harbor microorganisms



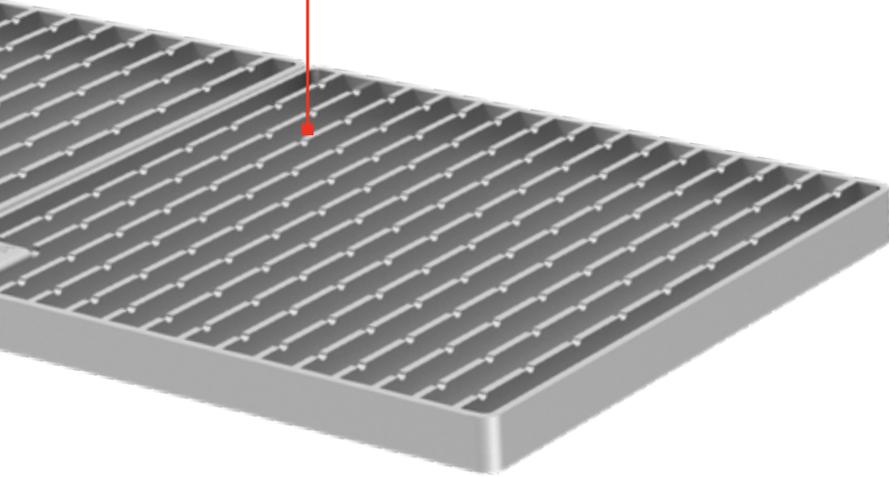
### Full drainability

Dry sump design, completely drainable - eliminating standing water, smells, microbial growth and potential chemical hazards

# ACO STAINLESS BOX DRAIN

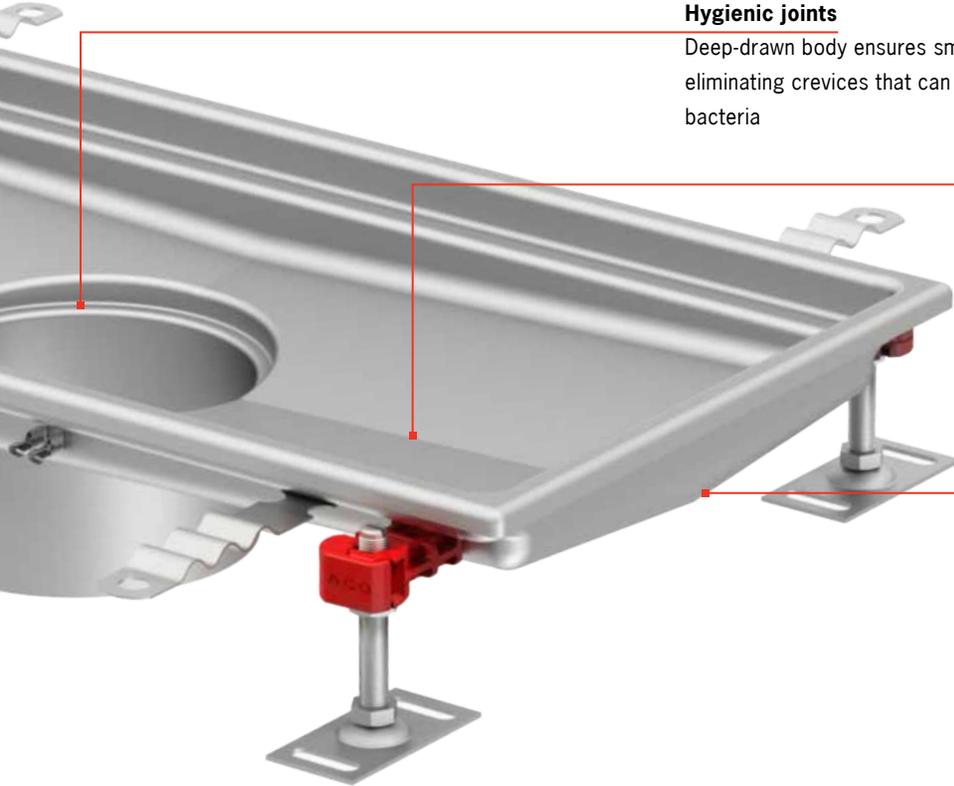
### Grates

A selection of stainless steel grates are available certified up to 25 tons. Unlocked grates make it easy to get access to the box drain for maintenance.



### Hygienic joints

Deep-drawn body ensures smooth contours eliminating crevices that can harbor dangerous bacteria

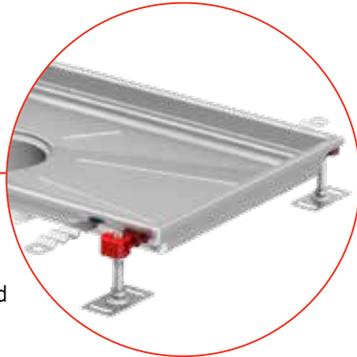


### Drain body

V-shape bottom for width less than 12" (300 mm)

### Drain body

Reinforced bottom for width 16" (400 mm) and greater



## Information about Removable Foul Air Trap

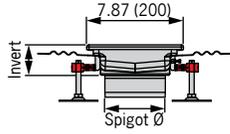
Building codes in North America do not encourage the use of removable foul air traps in Floor Drains. Generally a 'P' trap in the pipework directly below the floor drain acts as a foul air trap. There may be specific instances where a removable foul air trap is desired, such as restricted depth installations, client-specific requirements, marine (ships & boats) etc.

The ACO foul air trap is fully removable and is available as an optional accessory to floor drain bodies. It is available in grade 304 or 316L stainless steel. The foul air trap prevents foul air from the connected drain and sewer from entering the building. A standard foul air trap support must be ordered with the foul air trap.



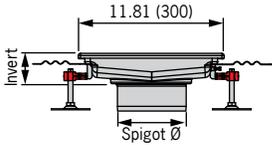
# Stainless Box Drains

## 7.87" (200 mm) box drain



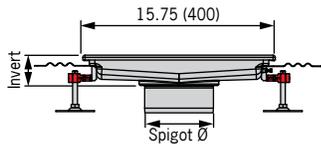
Overall Width in (mm)	Overall Length in (mm)	Invert Depth in (mm)	Overall Depth in (mm)	Spigot Ø in (mm)	Outlet options	Part #	
						AISI 304	AISI 316L
7.87" (200)	20.87 (530)	2.36 (60)	4.25 (108)	4.92 (125) <sup>1</sup>	125 mm pipe ACO Pipe catalog or Floor drain body Type 142 (8") with 4" outlet See page 14	416584	416602
	32.68 (830)					416585	416603
	40.55 (1030)					416586	416604
	48.43 (1230)					416587	416605
	60.24 (1530)					416588	416606
	79.92 (2030)					416589	416607
	20.87 (530)					416590	416608
	32.68 (830)					416591	416609
	40.55 (1030)					416592	416610
	48.43 (1230)					416593	416611
	60.24 (1530)	416594	416612				
	79.92 (2030)	416595	416613				

## 11.81" (300 mm) box drain



Overall Width in (mm)	Overall Length in (mm)	Invert Depth in (mm)	Overall Depth in (mm)	Spigot Ø in (mm)	Outlet options	Part #					
						AISI 304	AISI 316L				
11.81 (300)	12.99 (330)	2.17 (55)	4.52 (115)	5.59 (142) <sup>2</sup>	Floor drain body Type 157 (10") with 4" outlet See page 14	416614	416628				
	24.80 (630)					416615	416629				
	40.55 (1030)					2.36 (60)	4.72 (120)	416616	416630		
	60.24 (1530)							416617	416631		
	79.92 (2030)							416618	416632		
	119.29 (3030)					2.76 (70)	5.11 (130)	416619	416633		
	158.66 (4030)	3.15 (80)	5.51 (140)			416620	416634				
	12.99 (330)	2.17 (55)	4.52 (115)			7.87 (200) <sup>3</sup>	200 mm pipe ACO Pipe catalog or ACO P-trap ACO Pipe catalog or Floor drain body Type 218 (12") with 4"/6" outlet See page 14	416621	416635		
	24.80 (630)							416622	416636		
	40.55 (1030)							2.36 (60)	4.72 (120)	416623	416637
	60.24 (1530)									416624	416638
	79.92 (2030)									416625	416639
	119.29 (3030)			2.76 (70)	5.11 (130)			416626	416640		
	158.66 (4030)	3.15 (80)	5.51 (140)	416627	416641						

## 15.75" (400 mm) box drain



Overall Width in (mm)	Overall Length in (mm)	Invert Depth in (mm)	Overall Depth in (mm)	Spigot Ø in (mm)	Outlet options	Part #		
						AISI 304	AISI 316L	
15.75 (400)	16.93 (430)	2.36 (60)	4.84 (123)	5.59 (142) <sup>2</sup>	Floor drain body Type 157 (10") with 4" outlet See page 14	416642	416648	
	24.80 (630)					416643	416649	
	32.68 (830)					416644	416650	
	16.93 (430)	2.36 (60)	4.72 (120)		7.87 (200) <sup>3</sup>	200 mm pipe ACO Pipe catalog or ACO P-trap ACO Pipe catalog or Floor drain body Type 218 (12") with 4"/6" outlet See page 14	416645	416651
	24.80 (630)						416646	416652
	32.68 (830)						416647	416653

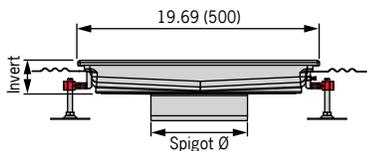
**Notes:**

Refer to page 14 for floor drain bodies.

1. Use 414339/414340 or 445232/445233 silt basket - see page 9
2. Use 408202/408212 or 445234/445235 silt basket - see page 9
3. Use 408222/408232 or 445236/445237 silt basket - see page 9

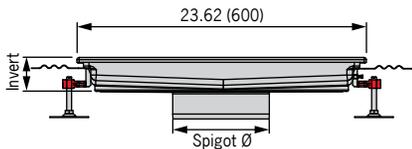
## Stainless Box Drains

### 19.69" (500 mm) box drain



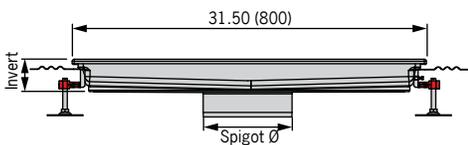
Overall Width in (mm)	Overall Length in (mm)	Invert Depth in (mm)	Overall Depth in (mm)	Spigot Ø in (mm)	Outlet options	Part #		
						AISI 304	AISI 316L	
19.69 (500)	20.87 (530)	2.56 (65)	5.00 (127)	5.59 (142) <sup>2</sup>	Floor drain body Type 157 (10') with 4" outlet <a href="#">See page 14</a>	416654	416660	
	32.68 (830)		4.84 (123)			416655	416661	
	40.55 (1030)		4.88 (124)			416656	416662	
	20.87 (530)		4.88 (124)	7.87 (200) <sup>3</sup>		200 mm pipe <i>ACO Pipe catalog</i> or ACO P-trap <i>ACO Pipe catalog</i> or Floor drain body Type 218 (12') with 4"/6" outlet <a href="#">See page 14</a>	416657	416663
	32.68 (830)					416658	416664	
	40.55 (1030)					416659	416665	

### 23.62" (600 mm) box drain



Overall Width in (mm)	Overall Length in (mm)	Invert Depth in (mm)	Overall Depth in (mm)	Spigot Ø in (mm)	Outlet options	Part #	
						AISI 304	AISI 316L
23.62 (600)	24.80 (630)	2.76 (70)	5.11 (130)	7.87 (200) <sup>3</sup>	200 mm pipe <i>ACO Pipe catalog</i> or ACO P-trap <i>ACO Pipe catalog</i> or Floor drain body Type 218 (12') with 4"/6" outlet <a href="#">See page 14</a>	416666	416669
	36.61 (930)		4.88 (124)		416667	416670	
	48.43 (1230)		4.92 (125)		416668	416671	

### 31.50" (800 mm) box drain



Overall Width in (mm)	Overall Length in (mm)	Invert Depth in (mm)	Overall Depth in (mm)	Spigot Ø in (mm)	Outlet options	Part #	
						AISI 304	AISI 316L
31.50 (800)	32.68 (830)	3.15 (80)	5.23 (133)	7.87 (200) <sup>3</sup>	200 mm pipe <i>ACO Pipe catalog</i> or ACO P-trap <i>ACO Pipe catalog</i> or Floor drain body Type 218 (12') with 4"/6" outlet <a href="#">See page 14</a>	416672	416673

### Silt Baskets



Depth in (mm)	For spigot Ø in (mm)	Part #	
		AISI 304	AISI 316L
1.77 (45)	4.92 (125)	414339	414340
3.94 (100)		445232	445233
1.97 (50)	5.59 (142)	408202	408212
3.94 (100)		445234	445235
1.97 (50)	7.87 (200)	408222	408232
5.31 (135)		445236	445237

### Portable Tundish



Depth in (mm)	Width in (mm)	Part #	
		AISI 304	AISI 316L
9.84 (250)	9.84 (250)	415821	n/a

#### Notes:

Refer to [page 14](#) for floor drain bodies.

1. Use 414339/414340 or 445232/445233 silt basket

2. Use 408202/408212 or 445234/445235 silt basket

3. Use 408222/408232 or 445236/445237 silt basket



# Stainless Box Drain Grates

## Relevant Load Standards

In the US the ASME: A112.6.3 - 2016 is the most relevant standard. However, it is designed primarily for floor drains and does not effectively address linear trench drains. ACO has independent certification for floor drains to ASME 112.6.3 and EN 1253, but all trench drains are tested to EN 1433 : 2002 Drainage channels for vehicular and pedestrian areas.

To assist with evaluating and comparing these standards to ACO products, a guide is provided below equating stresses (psi) from ASME : A112.6.3 - 2016 Load categories to the Load Class A - F categories from EN 1433. It is also broken down by internal channel widths. A comparison to EN 1253 : 2015 Gullies for Buildings is also provided. Load class certification for each product is available upon request.

ASME: A112.6.3 - 2016 Plumbing standard relating to internal floor drains.	EN 1433 Load class of similar rating:			EN 1253 Load class of similar rating:
	4<8" channel	8<12" channel	>12" channel	All channel widths
<b>Safe Live Load</b>				
<b>Light Duty (LD)</b> Less than 2,000lb	<b>A - B</b>	<b>A - B</b>	<b>A - C</b>	<b>L 15 - R 50</b>
<b>Medium Duty (MD)</b> Between 2,000lb and 4,999lb	<b>B - C</b>	<b>B - D</b>	<b>C - D</b>	<b>R 50 - M 125</b>
<b>Heavy Duty (HD)</b> Between 5,000lb and 7,499lb	<b>C - D</b>	<b>D</b>	<b>D - E</b>	<b>M 125 - N 250</b>
<b>Extra Heavy Duty (XHD)</b> Between 7,500lb and 9,999lb	<b>D - E</b>	<b>E</b>	<b>E - F</b>	<b>P400</b>
<b>Special Duty (SD)</b> Greater than 10,000lb	<b>E - F</b>	<b>E - F</b>	<b>F</b>	-

## Box Drain Grate Quantities

Box drains and grates come in a number of lengths, the table below assists in calculating what size and quantity of grates to use for each available box drain length. Not all grate styles come in all lengths so a number of options may be listed (example in chart below).

Overall Box Drain Length in (mm)	Internal Box Drain Length in (mm)	Example	
		Grate Length in (mm)	Grate Qty
12.99 (330)	11.81 (300)	11.73 (298)	1
16.93 (430)	15.75 (400)	15.67 (398)	1
20.87 (530)	19.69 (500)	19.65 (499)	1
24.80 (630) ①	23.62 (600)	23.54 (598)	1
32.68 (830)	31.50 (800)	15.67 (398)	2
36.61 (930)	35.43 (900)	11.73 (298)	3
40.55 (1030)	39.37 (1000)	19.65 (499)	2
48.43 (1230) ②	47.24 (1200)	23.54 (598)	2
60.24 (1530)	59.06 (1500)	19.65 (499)	3
79.92 (2030)	78.74 (2000)	19.65 (499)	4
119.29 (3030)	118.11 (3000)	19.65 (499)	6
158.66 (4030)	157.48 (4000)	19.65 (499)	8

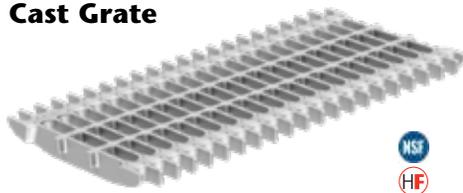
**Note**

① Could also use 2 qty 11.73" (298 mm) grates

② Could also use 3 qty 15.67" (398 mm) grates, or 4 qty 11.73" (298 mm) grates

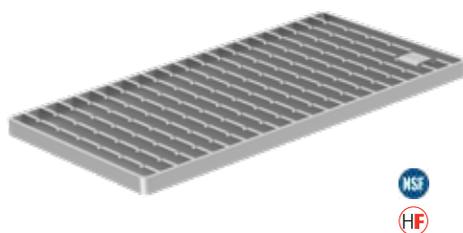
## Stainless Box Drain Grates

### Cast Grate



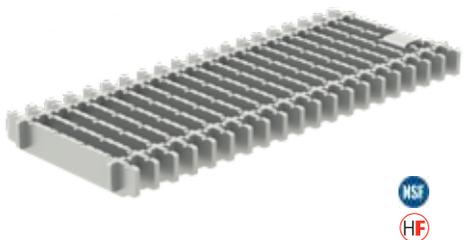
To suit Box Drain Width	Grate Length in (mm)	Load Class			Slip resistance	Open area sq in	Part #	
		EN 1433	ASME	EN 1253			AISI 304	AISI 316L
7.87 (200)	15.67 (398)	B125	HD	M125	✓	52.0	<b>416948</b>	-
	19.65 (499)					65.0	<b>416947</b>	-
11.81 (300)	11.73 (298)					62.5	<b>416946</b>	-
	19.65 (499)					118.4	<b>416945</b>	-

### Ladder Grate



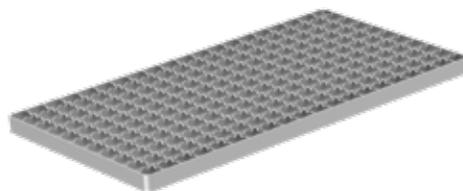
To suit Box Drain Width	Grate Length in (mm)	Load Class			Slip resistance	Open area sq in	Part #	
		EN 1433	ASME	EN 1253			AISI 304	AISI 316L
7.87 (200)	15.67 (398)	A15	LD	R50	✓	80.2	<b>416808</b>	<b>416809</b>
	19.65 (499)					101.0	<b>416802</b>	<b>416803</b>
	15.67 (398)	B125	MD	M125		76.7	<b>416810</b>	<b>416811</b>
	19.65 (499)					96.5	<b>416804</b>	<b>416805</b>
	15.67 (398)	C250	HD	N250		87.9	<b>416846</b>	<b>416847</b>
	19.65 (499)					92.3	<b>416844</b>	<b>416845</b>
11.81 (300)	11.73 (298)	A15	LD	R50	✓	98.0	<b>416812</b>	<b>416813</b>
	19.65 (499)					164.8	<b>416814</b>	<b>416815</b>
	11.73 (298)	B125	MD	M125		92.1	<b>416816</b>	<b>416817</b>
	19.65 (499)					156.7	<b>416818</b>	<b>416819</b>
	11.73 (298)	C250	HD	N250		87.7	<b>416850</b>	<b>416851</b>
	19.65 (499)					161.1	<b>416848</b>	<b>416849</b>
15.75 (400)	15.67 (398)	A15	LD	R50	✓	180.9	<b>416820</b>	<b>416821</b>
	23.54 (598)					274.6	<b>416822</b>	<b>416823</b>
	15.67 (398)	B125	MD	M125		172.6	<b>416824</b>	<b>416825</b>
	23.54 (598)					261.4	<b>416826</b>	<b>416827</b>
19.69 (500)	15.67 (398)	A15	LD	R50	✓	221.1	<b>416830</b>	<b>416831</b>
	19.65 (499)					279.0	<b>416828</b>	<b>416829</b>
	15.67 (398)	B125	MD	M125		214.6	<b>416834</b>	<b>416835</b>
	19.65 (499)					269.8	<b>416832</b>	<b>416833</b>
23.62 (600)	11.73 (298)	A15	LD	R50	✓	191.4	<b>416838</b>	<b>416839</b>
31.50 (800)	15.67 (398)	A15	LD	R50	✓	356.1	<b>416842</b>	<b>416843</b>

### Frameless Ladder Grate



To suit Box Drain Width	Grate Length in (mm)	Load Class			Slip resistance	Open area sq in	Part #	
		EN 1433	ASME	EN 1253			AISI 304	AISI 316L
7.87 (200)	15.67 (398)	A15	LD	R50	✓	76.2	<b>446250</b>	<b>446251</b>
	19.65 (499)					95.5	<b>446246</b>	<b>446247</b>
	15.67 (398)	B125	MD	M125		72.6	<b>446252</b>	<b>446253</b>
	19.65 (499)					90.7	<b>446248</b>	<b>446249</b>
11.81 (300)	11.73 (298)	A15	LD	R50	✓	94.7	<b>446258</b>	<b>446259</b>
	19.65 (499)					158.7	<b>446254</b>	<b>446255</b>
	11.73 (298)	B125	MD	M125		89.9	<b>446260</b>	<b>446261</b>
	19.65 (499)					150.7	<b>446256</b>	<b>446257</b>

### Mesh Grate

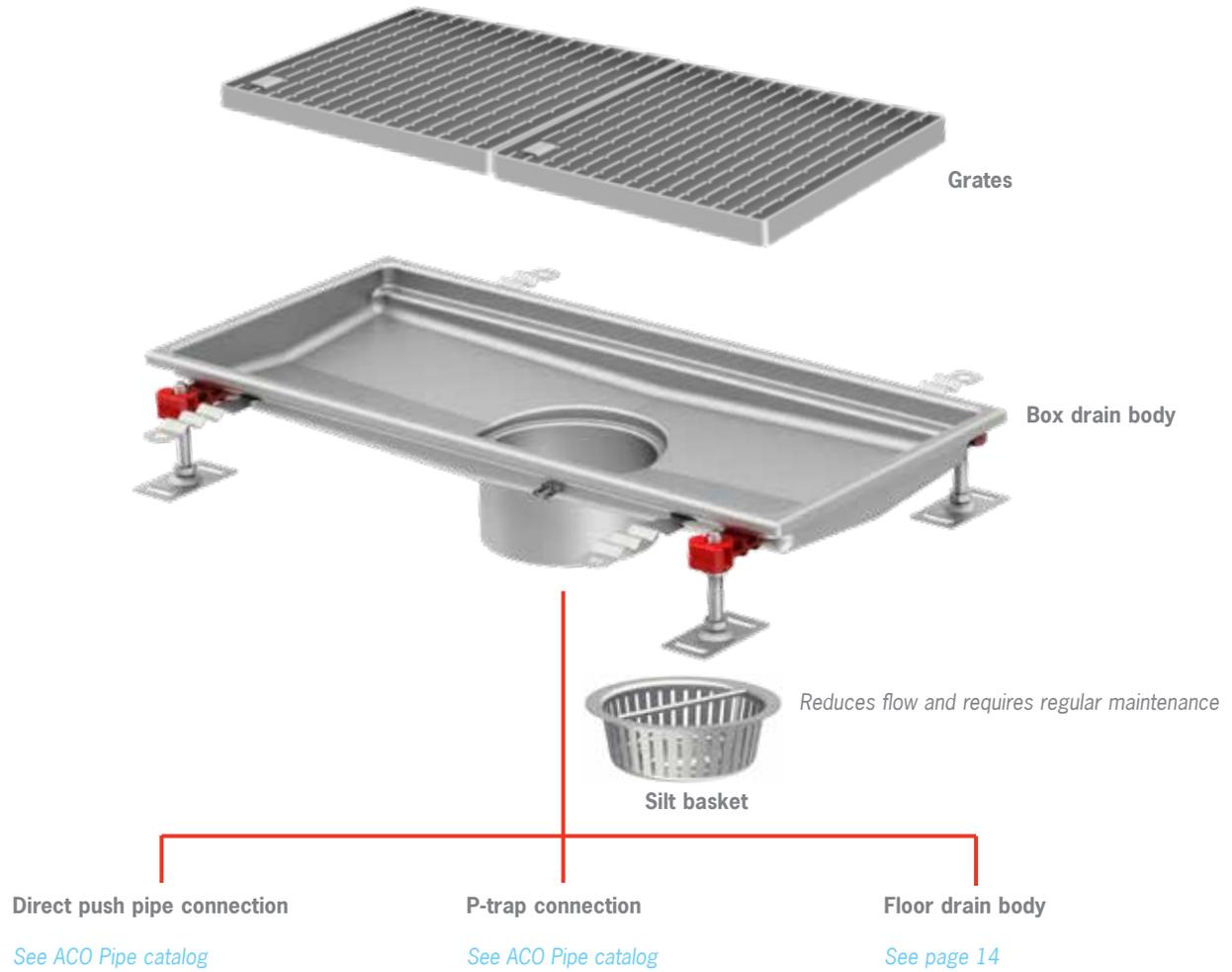


To suit Box Drain Width	Grate Length in (mm)	Load Class			Slip resistance	Open area sq in	Part #	
		EN 1433	ASME	EN 1253			AISI 304	AISI 316L
7.87 (200)	15.67 (398)	A15	LD	L15	✓	85.1	<b>416862</b>	<b>416863</b>
	19.65 (499)					106.7	<b>416860</b>	<b>416861</b>
11.81 (300)	11.73 (298)					101.8	<b>416864</b>	<b>416865</b>
	19.65 (499)					172.0	<b>416866</b>	<b>416867</b>
15.75 (400)	15.67 (398)					188.5	<b>416868</b>	<b>416869</b>
	23.54 (598)					284.3	<b>416870</b>	<b>416871</b>
19.69 (500)	15.67 (398)					240.4	<b>416874</b>	<b>416875</b>
	19.65 (499)					302.5	<b>416872</b>	<b>416873</b>
23.62 (600)	11.73 (298)					219.4	<b>416876</b>	<b>416877</b>
31.50 (800)	15.67 (398)					360.4	<b>416878</b>	<b>416879</b>

Tested and Certified by NSF International.

Grates feature a hygienic design.

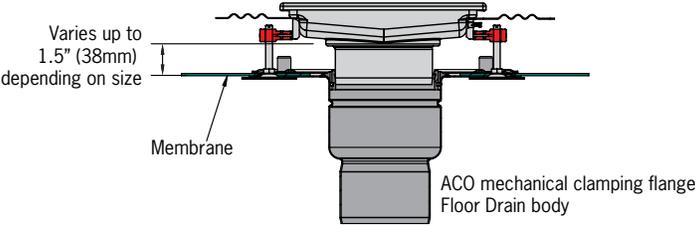
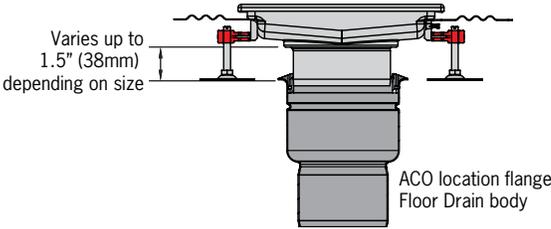
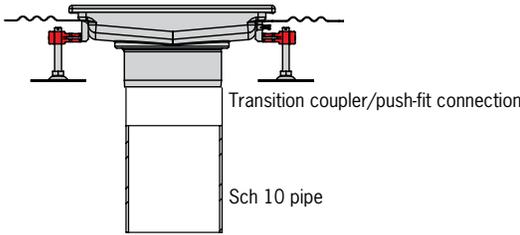
# Outlet Connections



## Outlet Options

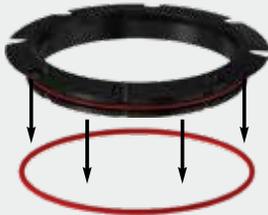
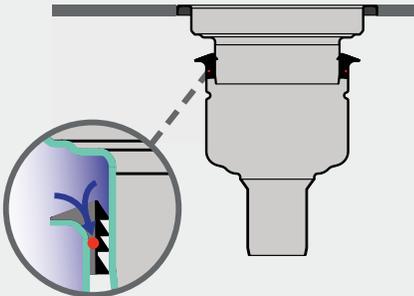
ACO stainless steel box drains can be connected to underground pipework in the following ways:

1. Vertical pipe spigot out of box drain bottom. Simplest method to connect pipework. The connection can be made with a no-hub connector, or ACO stainless steel push fit pipe system. This system usually requires drain and pipework to be set up prior to concrete/floor being poured.
2. Use of a floor drain body with location flange. The floor drain body can be cast into the slab at the first concrete pour. The box drain is then set to finished height. The vertical spigot on the underside of the stainless steel box drain will push-fit into the floor drain body. This gives variable height adjustment of approximately 1.5" (38 mm) vertically.
3. Use of a floor drain body with mechanical clamping flange. If the floor slab has a waterproof membrane, the membrane can be dressed into the floor drain body and the box drain installed afterwards. As with the location flange body, the vertical spigot on the underside of the stainless steel box drain will push-fit into the floor drain body. This gives variable height adjustment of approximately 1.5" (38 mm) vertically.

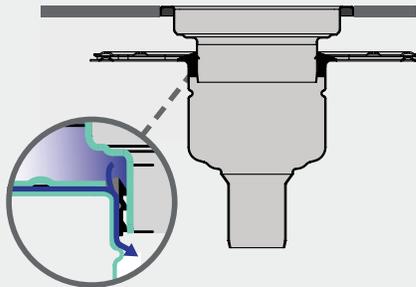


## Friction Ring

When using adjustable height floor drain with location flange, red sealing 'o' ring must be used to prevent water from entering body.



When using adjustable height floor drain with mechanical membrane clamping flange, red sealing 'o' ring *must* be removed to allow water to enter floor drain body through weep holes on friction ring.



## Parts Table: Floor Drain Bodies

### Location Flange Vertical Outlet



Body Size	Fits Spigot Ø in (mm)	Flange Type	Outlet Ø in (mm)	Part #	
				AISI 304	AISI 316L
<b>Type 142</b>	4.92 (125)	location	4.49 (114) - 4" Sch 10	<b>445252</b>	<b>445288</b>
<b>Type 157</b>	5.59 (142)		4.49 (114) - 4" Sch 10	<b>445129</b>	<b>445195</b>
<b>Type 218</b>	7.87 (200)		4.49 (114) - 4" Sch 10	<b>445135</b>	<b>445201</b>
			6.61 (168) - 6" Sch 10	<b>445141</b>	<b>445207</b>

### Location Flange Horizontal Outlet



Body Size	Fits Spigot Ø in (mm)	Flange Type	Outlet Ø in (mm)	Part #	
				AISI 304	AISI 316L
<b>Type 142</b>	4.92 (125)	location	4.49 (114) - 4" Sch 10	<b>445264</b>	<b>445300</b>
<b>Type 157</b>	5.59 (142)		4.49 (114) - 4" Sch 10	<b>445153</b>	<b>445219</b>
<b>Type 218</b>	7.87 (200)		4.49 (114) - 4" Sch 10	<b>445159</b>	<b>445225</b>

### Mechanical Membrane Clamp Vertical Outlet



Body Size	Fits Spigot Ø in (mm)	Flange Type	Outlet Ø in (mm)	Part #	
				AISI 304	AISI 316L
<b>Type 142</b>	4.92 (125)	mechanical membrane clamp	4.49 (114) - 4" Sch 10	<b>445256</b>	<b>445292</b>
<b>Type 157</b>	5.59 (142)		4.49 (114) - 4" Sch 10	<b>445133</b>	<b>445199</b>
<b>Type 218</b>	7.87 (200)		4.49 (114) - 4" Sch 10	<b>445139</b>	<b>445205</b>
			6.61 (168) - 6" Sch 10	<b>445145</b>	<b>445211</b>

### Mechanical Membrane Clamp Horizontal Outlet



Body Size	Fits Spigot Ø in (mm)	Flange Type	Outlet Ø in (mm)	Part #	
				AISI 304	AISI 316L
<b>Type 142</b>	4.92 (125)	mechanical membrane clamp	4.49 (114) - 4" Sch 10	<b>445268</b>	<b>445304</b>
<b>Type 157</b>	5.59 (142)		4.49 (114) - 4" Sch 10	<b>445157</b>	<b>445223</b>
<b>Type 218</b>	7.87 (200)		4.49 (114) - 4" Sch 10	<b>445163</b>	<b>445229</b>

**Note** - an automatic trap primer can be installed to the floor drain body to prevent the 'P' trap from drying out. Contact ACO for details.

### Optional Removable Foul Air Trap

Foul air trap support ring (required when ordering foul air trap)



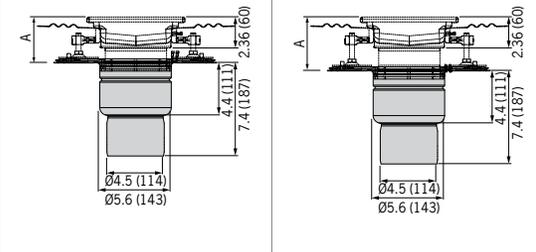
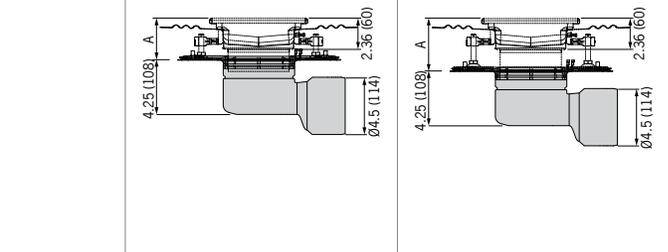
Foul air trap

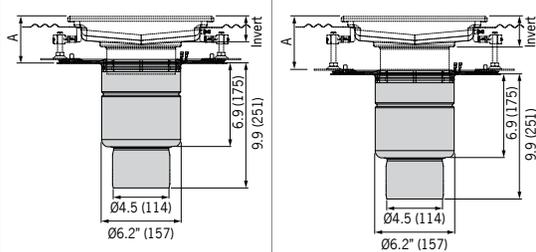
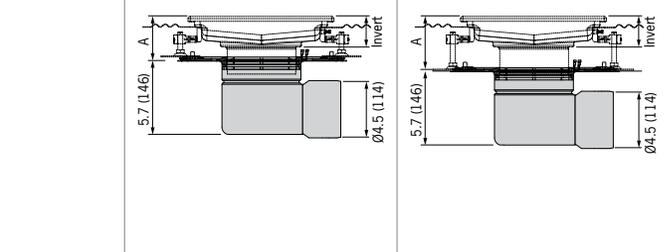


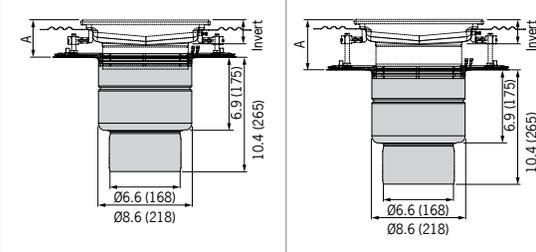
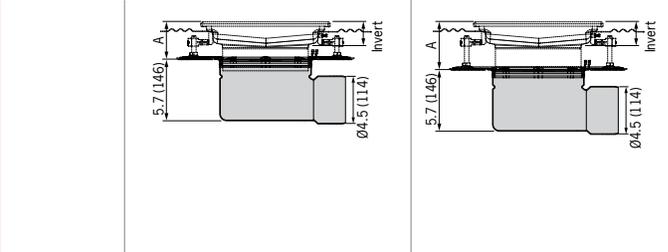
Part	Used with	Part #	
		AISI 304	AISI 316L
Foul air trap support ring	Type 142 Floor Drain Body	<b>(NBR) 414743</b>	
Foul air trap		<b>414741</b>	<b>414841</b>
Foul air trap support ring	Type 157 Floor Drain Body	<b>(NBR) 408201</b>	
Foul air trap		<b>408200</b>	<b>408210</b>
Foul air trap support ring	Type 218 Floor Drain Body	<b>(NBR) 408221</b>	
Foul air trap		<b>408220</b>	<b>408230</b>

Building codes in North America do not encourage the use of removable foul air traps in Floor Drains. However, a removable foul air trap may be required due to restricted depth installations, client-specific requirements, marine (ships & boats) and others.

**Flow Rates**

<b>Type 142 Floor Drain Body – for use under box drains with 4.92" (125 mm) spigot</b>					
<b>vertical outlet</b>			<b>horizontal outlet</b>		
					
<b>Outlet diameter</b>	<b>Flow rate GPM [l/s]*</b>		<b>Outlet diameter</b>	<b>Flow rate GPM [l/s]*</b>	
<b>ØD in [mm]</b>	<b>Min A = 2.83" (72 mm)</b>	<b>Max A = 6.77" (172 mm)</b>	<b>ØD in [mm]</b>	<b>Min A = 2.83" (72 mm)</b>	<b>Max A = 6.77" (172 mm)</b>
4" Sch 10 [Ø 114 mm]	148.1 [9.3]	179.5 [11.3]	4" Sch 10 [Ø 114 mm]	49.4 [3.1]	62.8 [4.0]

<b>Type 157 Floor Drain Body – for use under box drains with 5.59" (142 mm) spigot</b>					
<b>vertical outlet</b>			<b>horizontal outlet</b>		
					
<b>Outlet diameter</b>	<b>Flow rate GPM [l/s]*</b>		<b>Outlet diameter</b>	<b>Flow rate GPM [l/s]*</b>	
<b>ØD in [mm]</b>	<b>Min A = 3.74" (95 mm)</b>	<b>Max A = 8.07" (250 mm)</b>	<b>ØD in [mm]</b>	<b>Min A = 3.74" (95 mm)</b>	<b>Max A = 8.07" (250 mm)</b>
4" Sch 10 [Ø 114 mm]	179.5 [11.3]	224.4 [14.2]	4" Sch 10 [Ø 114 mm]	134.6 [8.5]	179.5 [11.3]

<b>Type 218 Floor Drain Body – for use under box drains with 7.87" (200 mm) spigot</b>					
<b>vertical outlet</b>			<b>horizontal outlet</b>		
					
<b>Outlet diameter</b>	<b>Flow rate GPM [l/s]*</b>		<b>Outlet diameter</b>	<b>Flow rate GPM [l/s]*</b>	
<b>ØD in [mm]</b>	<b>Min A = 3.94" (100 mm)</b>	<b>Max A = 8.46" (215 mm)</b>	<b>ØD in [mm]</b>	<b>Min A = 3.94" (100 mm)</b>	<b>Max A = 8.46" (215 mm)</b>
4" Sch 10 [Ø 114 mm]	186.6 [11.8]	222.2 [14.0]	4" Sch 10 [Ø 114 mm]	148.1 [9.3]	179.5 [11.3]
6" Sch 10 [Ø 168 mm]	403.9 [25.5]	480.2 [30.3]			

**Note:**

1. Silt basket and debris/solids, or foul air trap will reduce flow rates.
2. Flow rates are based on drowned orifice calculations.
3. Box drain inverters will impact the A min/max - min is based on shallowest invert and max is based on deepest invert

## Semi-Custom Options

ACO's box drains can be customized to fit specific configurations. Typical non-standard stainless steel drainage can include custom widths, special grates, and unique depth configurations. ACO has years of experience with these types of applications, and in instances where a standard or modified standard product cannot fulfil the project, please contact us.

Customers' individual project designs can be managed by our expert team with tailored services for specific projects, including complete technical support, CAD layout drawings and assembly instructions.

Contact our Sales/Technical department team to help find the best solution.

Customizations:

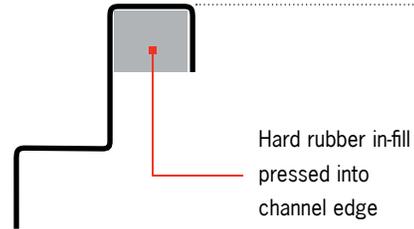
- Custom widths
- Custom depths
- Custom edge profile
- Built-in back splash upstand
- Custom invert depths
- Different gauge of material for box drain body
- Outlet position along box drain



## Channel Edge Options

All ACO Stainless Steel Trench Systems are available with different edge details to suit varying load requirements and the surrounding floor material.

### Standard Edge

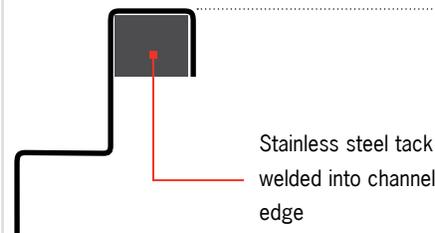


Hard rubber in-fill pressed into channel edge

Suitable for tiled, concrete and epoxy resin floors in pedestrian and light industrial applications. Drains without in-fill are susceptible to failure as concrete surround rarely fills that void. As edges compress, cavities create breeding grounds for pathogens and are impossible to clean. Edge in-fill in other materials - contact ACO for details.

### Semi-customization - Alternative Edge Options

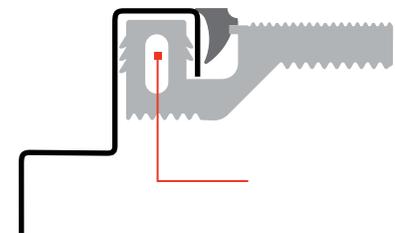
#### Solid Steel Edge In-fill - heavy duty



Stainless steel tack welded into channel edge

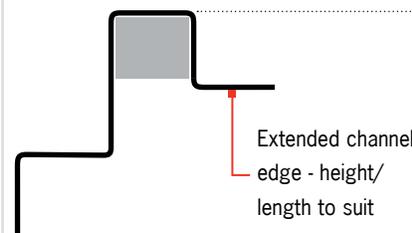
ACO recommends the use of a solid steel edge in-fill when using class E grates or where fork lift traffic is expected.

#### Vinyl Seal Edge - vinyl sheet floors



Fits standard channels - replaces standard edge insert and provides an anchoring point and seal between vinyl sheet flooring and trench edges. (Vinyl Seal # 49061, flexible seal # 49062 per meter)

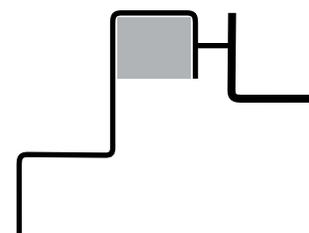
#### Extended Edge - tile floors



Extended channel edge - height/length to suit

Suitable for tiled floors in pedestrian and light industrial applications.

#### Floor Angle Edge - heavy duty resin floors



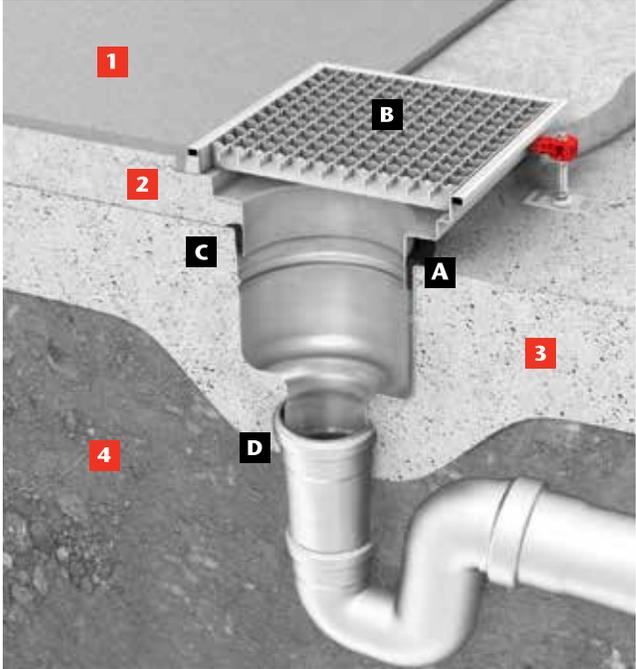
Suitable for heavy duty tiled, paver and resin floor applications, isolates channel from floor and provides gap for sealant. If deeper steel angle required contact ACO.

Stainless Steel Box Drain Installation Guide

Box drain connected to ACO Floor Drain Body with location flange (concrete floor)

- 1** Epoxy/resin floor
- 2** Screed
- 3** Solid concrete floor slab
- 4** Compacted soil

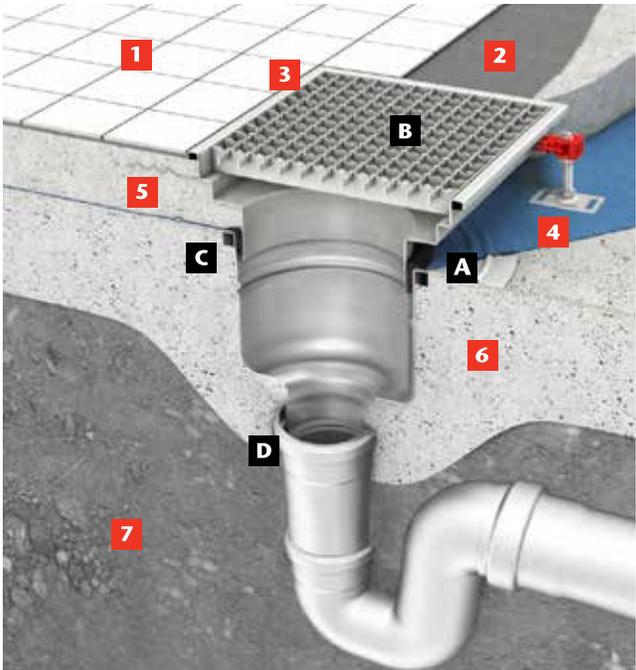
- A** Location flange floor drain body
- B** Grate
- C** Friction ring with red O-ring
- D** Outlet pipe connection



Box drain connected to ACO Floor Drain Body with membrane clamping flange (tiled floor)

- 1** Tile
- 2** Cement/tile adhesive
- 3** Flexible sealant
- 4** Waterproof membrane
- 5** Screed
- 6** Solid concrete floor slab
- 7** Compacted soil

- A** Mechanical flange floor drain body
- B** Grate
- C** Friction ring without red O-ring
- D** Outlet pipe connection



Post-Install Cleaning:

Remove all protective tape from the channel edge and clean the surface with a solvent if necessary to remove any adhesive residue. Wash and clean the channel (and floor drain if applicable), empty silt basket and refit grates.

## Slip Resistance

Slip resistance is critical for safety, particularly where wet surfaces are common.

Ideally the slip resistance of the grate should be similar to that of the surrounding floor finish to avoid both slip and trip hazards.

A number of test options are available;

- **Pendulum Test.** A pendulum is swung over a surface (usually wet) and the surface frictional properties are measured. Test results are given a BPN value - typically values in excess of 36 would be used, but this is not a set number.
- **Variable Angle Ramp Test.** Grate samples are mounted to a ramp which is gradually inclined, an operator walks up and down the ramp until the angle is such that they become unstable (slip). Test is repeated three times to create an average R value. The higher the R value the higher the slip resistance.

Finished floor slope, presence of surface contaminants, debris and etc. can also negatively affect slip and skid resistance and may require a higher slip resistance rating. Good maintenance practices should be applied to minimize contaminates.



Grate Style	Slip resistance	Pendulum Test Data BPN value	Wet Ramp Test Data R- value
Cast	✓	60	R13
Ladder	✓	45	R11
Frameless Ladder	✓	51	R12
Mesh	✓	62	R11

BPN value	Likelihood of a Slip*
36	1 in a million
34	1 in 100,000
29	1 in 10,000
27	1 in 200
24	1 in 20

BPN value	R-Value
11-18	R9
18-34	R10
34-51	R11
51-70	R12
70+	R13

\* Construction Industry Research and Information Association (CIRIA) Safer Surfaces to walk on (2006)

**Slopes** - ramps etc. create an increased risk of slips, even a 5 degree slope requires a higher slip resistance value to be used - minimum Pendulum Test Value (BPN) of 45, or minimum of R12, ideally R13 rating for any slopes.

**Flooring contaminants** - water, grease oils etc. will affect slip resistance and higher slip resistance values should be considered. Application specific test can be carried out as necessary.

To minimize the slip/trip hazard impact of a drainage grate, where possible, design the drainage system to be located out of the main area of traffic - close to equipment, walls etc. This may also allow a lower load rating to be used.



## Glossary

**Anti-slip grate** - grates certified to offer improved grip.

**Axle load** - load carried by each axle of vehicle.

**Channel** - one section of a modular trench drain system.

**Clamping flange** - metal plate with mechanical fixing (bolts) that allows a floor membrane to be dressed into floor drain.

**Electropolished** - electrolytic process producing a highly reflective luster which offers chemical and bacterial resistance.

**Flow rate** - quantity of liquid evacuated through outlet in a given time frame - gallons per minute (GPM).

**Foul air trap** - drain section designed to prevent odors traveling up from underground waste water system. ACO also offers an in-line option - See page 7

**Heelsafe** - per ASME A112.6 - maximum grate hole size in least dimension of 0.31", deemed safe for high-heeled shoes.

**Invert depth** - depth from top of grate to inside base of channel.

**Leveling feet** - fixed to base of channels to allow height and level adjustment.

**Linished** - brushed effect usually on channel edge surface.

**Load class** - ability of grate to resist load specified in a load standard.

**Pickled & passivated** - chemical descaling and coating of stainless steel part to restore corrosion and chemical resistance qualities.

**Point load** - load exerted through an area for specification and testing purposes.

**Rubber infill** - strip inserted to underside of channel edge, prevents concrete voids during installation and improves loading performance. Stainless steel infill available for heavy duty applications.

**Sieve** - perforated plate to prevent sediment/debris passing into pipework.

**Silt basket** - perforated basket to collect larger volumes of sediment/debris passing into pipework.

**Spigot** - section of pipe used for outlet connection, may require a coupler.

**Trench drain** - an assembly of channels that make up a linear drain.

**Wheel load** - load exerted through one wheel of vehicle/trolley.



## Other ACO products

### External drainage

#### ACO Drain

Modular trench drain systems for commercial, industrial and landscape applications.

#### ACO Sport

Surface drainage and building accessories for track & field.

#### ACO Infrastructure

Surface drainage products engineered for highways, urban roads and bridges.

#### Aquaduct

Custom design and manufacture of fiberglass trench drain systems.

#### ACO Duct

Linear ducting system with removable solid covers.

#### ACO Environment

Oil water separators and spill containment systems.

#### ACO Wildlife

Tunnel and fence system to guide amphibians and other small creatures safely across roads.

#### ACO StormBrixx

A unique and patented plastic geocellular storm water management system.

#### ACO Self

Simple drainage and building components for use around the home, garden and office.

### Building drainage

#### ACO Stainless

Stainless steel trench drains.

#### ACO Floor Drain

Stainless steel floor drains.

#### ACO BuildLine

Drainage products for thresholds, balconies, green roofs and building façades.

#### ACO Pipe

Stainless steel push-fit pipe system.

#### ACO ShowerDrain

Shower drainage.

#### QuARTz

Designer bathroom floor solutions.



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Re-order Part # BD016 v1.0

