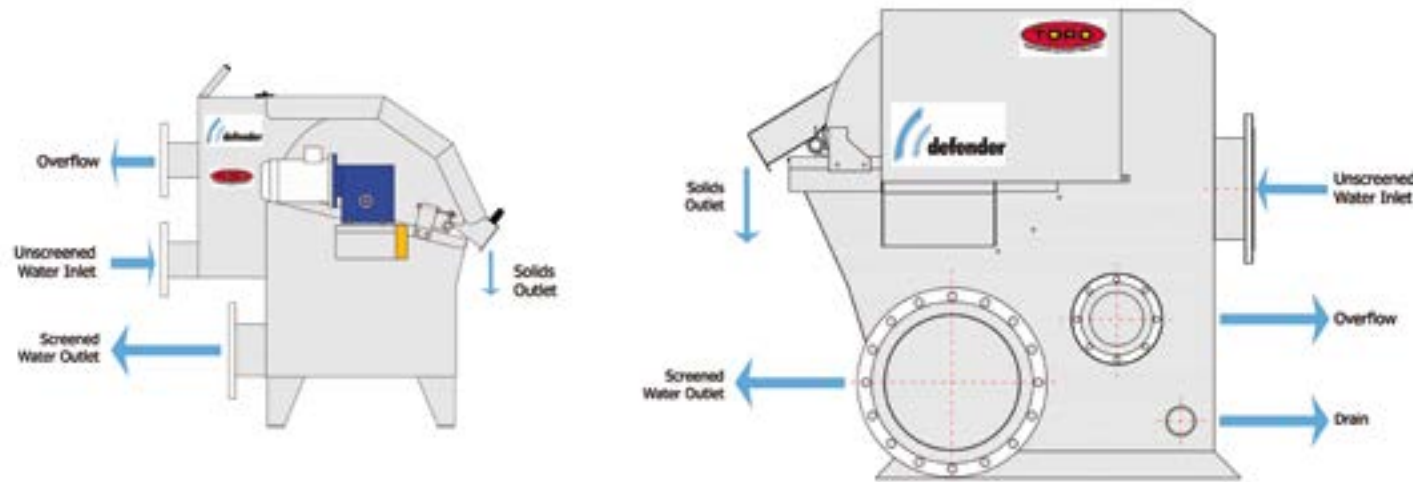


Defender® brand rotary screens: high performance filters for solid-liquid separation. Perfect for pretreatment of wastewater. Produced entirely by Toro Equipment SL.

TR Defender® 40 and 63 Ranges, with filtering capacity five times higher than a static screen.

TR Defender® HPS M and L Ranges, capable of handling four times more flow than conventional screens in its class.



Operation:

Defender® Rotary Screens are pre-treatment polishing equipment in the process of removing solid-liquid waste through a filter drum formed by a grating or perforated mesh of different apertures depending on the type and amount of solids being treated.

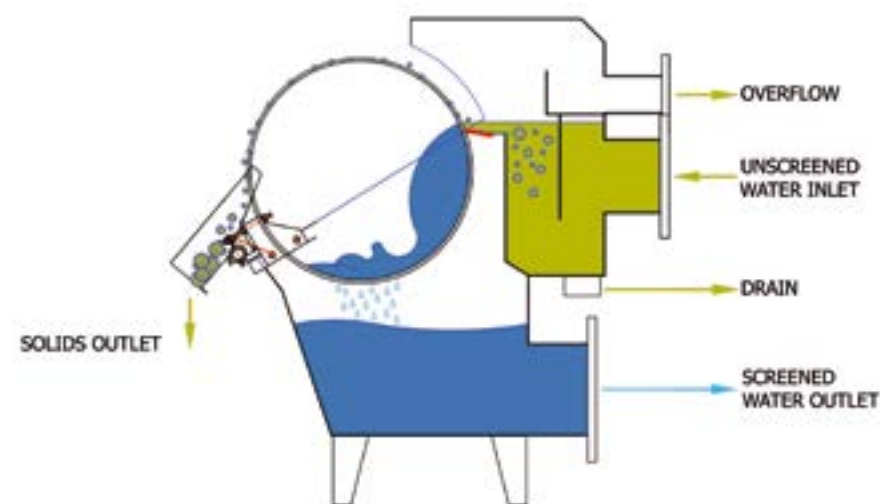
Their task is to remove the solids carried by the water in order to avoid obstructions and mechanical problems in the plant.

They are stand-alone units with self-cleaning systems and automatic drive operation.

In municipal water they frequently permit replacement of primary clarifiers, providing elimination of coarse sands and up to percentages of 30% of grease and effluent excess. The apertures used are from 0.50 to 0.15 mm.

Simple operation:

- The discharge to be treated enters through the flange located on the outside of the screen body, being uniformly distributed by the spillway and overflow over the drum filter.
- The solids are retained on the drum surface while it rotates, the discharge entering through the mesh performs a self-cleaning function as it passes again through the bottom of the drum.
- On passing through the external scraper, solids are detached from the mesh, and fall from the scraper thanks to gravity.



Equipment Parts:

FILTER DRUM, made of stainless steel by the spiral winding of a triangular section on longitudinal ribs grating mesh or a drum perforated with different diameters. The base of said triangular mesh grating or diameter coincides with the external surface of the drum. This strong, rigid assembly retains the solids on the outer surface of a size greater than the opening used and prevents the formation of clusters inside.

FILTER BODY, in which the drum filter is fixed at its front by bearings. At the rear it has an unscreened water receiving tank that distributes it in laminar flow.

CLEANING SCRAPER, which removes the solids deposited on the surface of the filter drum.

DRIVE UNIT consists of a reduction-gear motor coupled directly on the filter drum shaft providing this with a rotational movement.

SCREENED WATER RESERVOIR, is situated below the filter body and collects the filtrate which is extracted through a flanged pipe.

CLEANING SYSTEM, located inside the filter drum, fitted with jets that project water under pressure on the inner face of the cylinder to achieve complete cleaning.



Advantages and Applications:

- Made of stainless steel type 316 L.
- Includes safety and splash-suppression lid as a standard feature in the 40 Range.
- Emergency stop and solenoid valve for cleaning.
- Internal cleaning system with jets.
- External cleaning system with scraper.
- The equipment is guaranteed against defects in materials and workmanship under normal use and maintenance.
- Toro Equipment provides commissioning and after sales service, contact us.
- Applicable to any wastewater pre-treatment:
 - Trash collection.
 - Foodstuff manufacture.
 - Breweries and wine cellars.
 - Meat processing.
 - Canneries.
 - Dairies/Creameries.
 - Tanneries and textile industries.
 - Municipal wastewater.
 - Fish processing.
 - High oil content applications.
 - Washhouses.
 - Bio-diesel production.

Recommendations: ☺ Recommended ☹ Not Recommended ☹ Indifferent

GRATING MESH ▼▼	PERFORATED MESH Ø	SOLIDS
☹	☺	Scales - Gelatinous bodies
☹	☺	Film, plastic...
☺	☺	Long fibres - e.g. hair, bristles...
☺	☹	Grease *
☺	☺	MSS
☹	☺	Sands
☹	☺	Wool washing

* With pig waste clean mesh with water temperature <50°

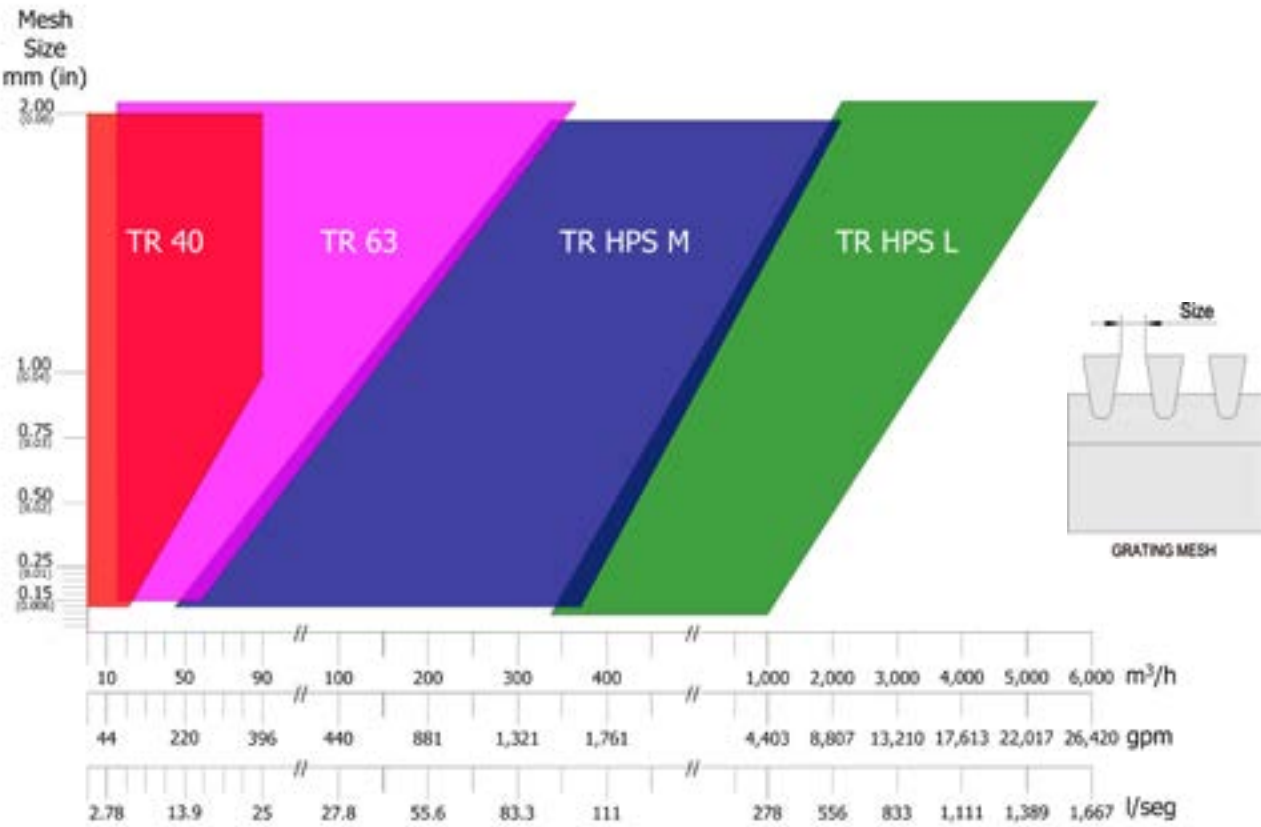


Grating Mesh

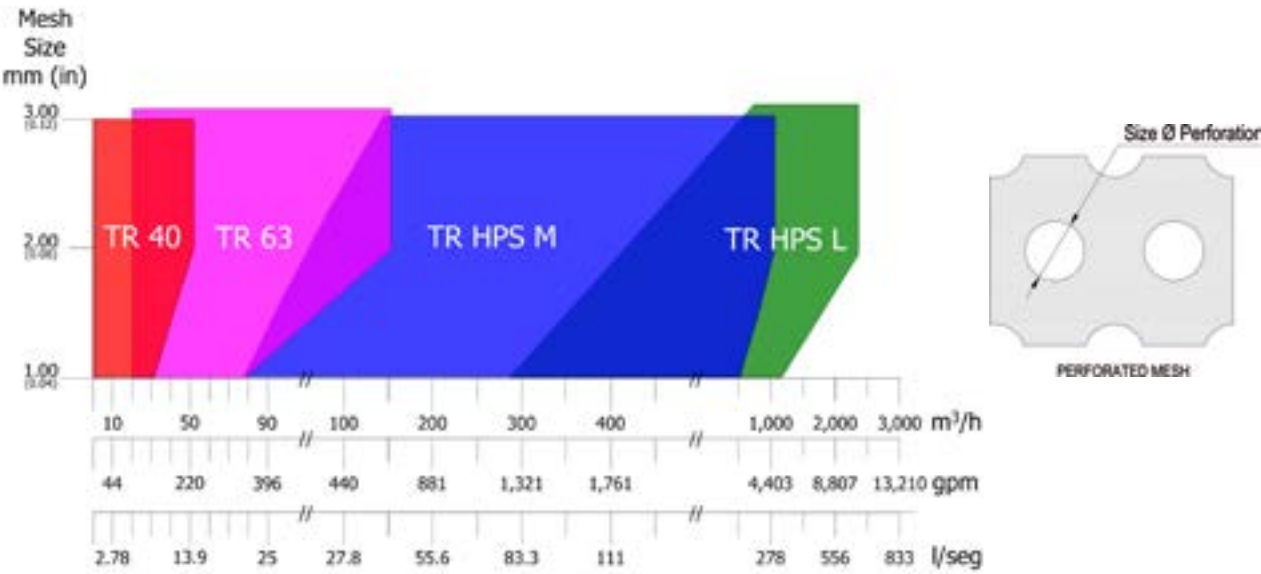


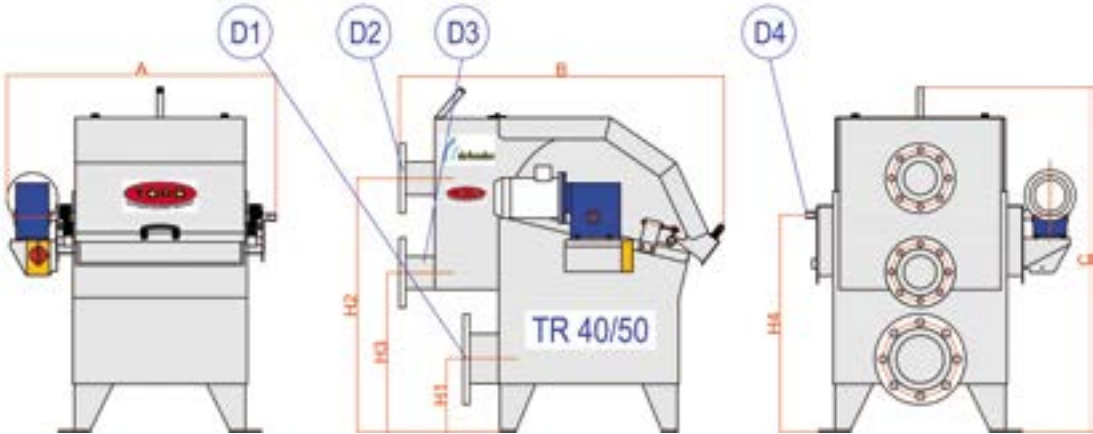
Perforated Mesh

Grating Mesh Screen:



Perforated Mesh Screen:





40 Range - Technical Specifications, mm (in)														
Model	Drum Diameter	Drum Length	Power Kw / HP	A	B	C	Outlet		Overflow		Inlet		Cleaning	
							D1	H1	D2	H2	D3	H3	D4	H4
TR 40/25	400 (15 3/4)	250 (9 7/8)	0.25 (0.33)	600 (23 5/8)	1,025 (40 3/8)	1,087 (42 3/4)	DN 100 ANSI 4"	209 (8 1/8)	DN 100 ANSI 4"	801 (31 1/2)	DN 100 ANSI 4"	507 (20)	1/2"	678 (26 3/4)
TR 40/50	400 (15 3/4)	500 (19 5/8)	0.25 (0.33)	850 (33 1/2)	1,025 (40 3/8)	1,087 (42 3/4)	DN 150 ANSI 6"	234 (9 1/8)	DN 100 ANSI 4"	801 (31 1/2)	DN 100 ANSI 4"	507 (20)	1/2"	678 (26 3/4)
TR 40/75	400 (15 3/4)	750 (29 1/2)	0.25 (0.33)	1,100 (43 1/4)	1,025 (40 3/8)	1,087 (42 3/4)	DN 200 ANSI 8"	Inferior	DN 100 ANSI 4"	801 (31 1/2)	DN 150 ANSI 6"	532 (21)	1/2"	678 (26 3/4)



40 Range - Clean Water Peak Flows, m³/h (US gpm)									
Mesh Size	Grating Mesh ▼, mm (in)						Perforated Mesh Ø, mm (in)		
	0.15 (0.006)	0.25 (0.01)	0.50 (0.02)	0.75 (0.03)	1.00 (0.04)	2.00 (0.08)	1.00 (0.04)	2.00 (0.08)	3.00 (0.12)
TR 40/25	7 (30)	11 (47)	19 (83)	25 (110)	30 (132)	30 (132)	9 (38)	17 (74)	17 (74)
TR 40/50	14 (61)	21 (94)	38 (165)	50 (220)	60 (264)	60 (264)	18 (78)	35 (153)	35 (153)
TR 40/75	21 (91)	32 (141)	56 (248)	75 (331)	90 (397)	90 (397)	27 (118)	52 (231)	52 (231)

HUELLAS / SUPPORTS

636 [2'-1.039"]
438 [1'-5.165"]
100 [3.937"]
100 [3.937"]
459 [1'-6.041"]
654 [2'-1.751"]
979 [3'-2.558"]

1024 [3'-4.298"]
233 [9.154"]
476 [1'-6.720"]
769 [2'-6.295"]
979 [3'-2.542"]

CONEXIONES / CONNECTIONS		MEZCLA / MEASURE	MARCA / MARK
DESCRIPCION / DESCRIPTION	RESORSE / OVERFLOW	DN 150ANSI 100	A
ENTRADA AGUA LIMPIEZA / AUTO-CLEANING WATER INLET		1/2"	B
ENTRADA DE AGUA / WATER INLET		DN 150ANSI 100	C
SAIDA DE AGUA / WATER OUTLET		DN 150ANSI 100	D

KIT DE LIMPIEZA (INCLUIDO) / CLEANING KIT (INCLUDED)

1/2" HEMBRA ROSCAR / 1/2" FEMALE-SCREW
1/2" HEMBRA-COLAR / 1/2" FEMALE-COLUE

500 [1'-7.686"]
960 [3'-1.811"]
654 [2'-1.751"]
R500 (R1'-7.686")

ZONA DE TRABAJO / WORKING ZONE

PESO EN VACIO / EMPTY WEIGHT : 115 Kg
PESO EN CARGA / FULL WEIGHT : 235 Kg

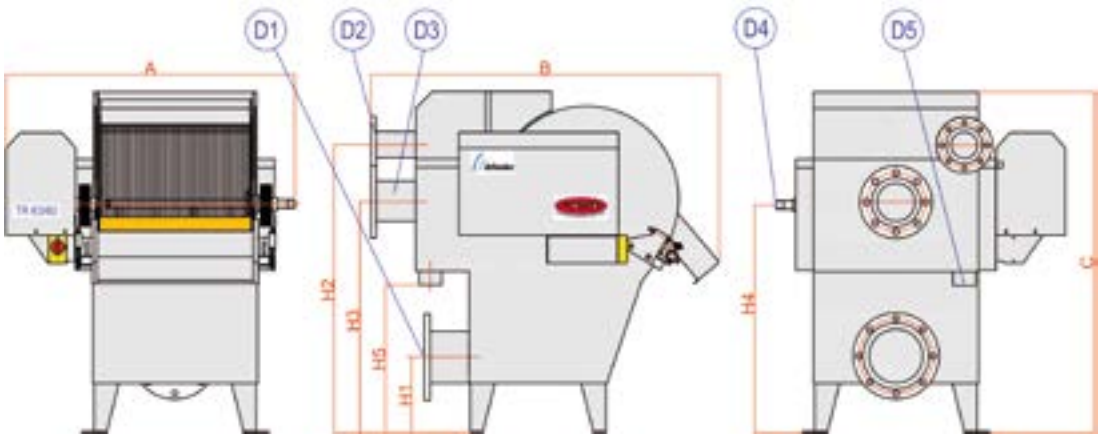
Medidas / Dimensions
(mm) (pulgadas)

TORO
Heavyweight Equipment Manufacturer

TORO EQUIPMENT, S.L.
C/da Nacional VP-3302 Km-11
47205 Villaverde
Villaverde (Spain)

NOTES:

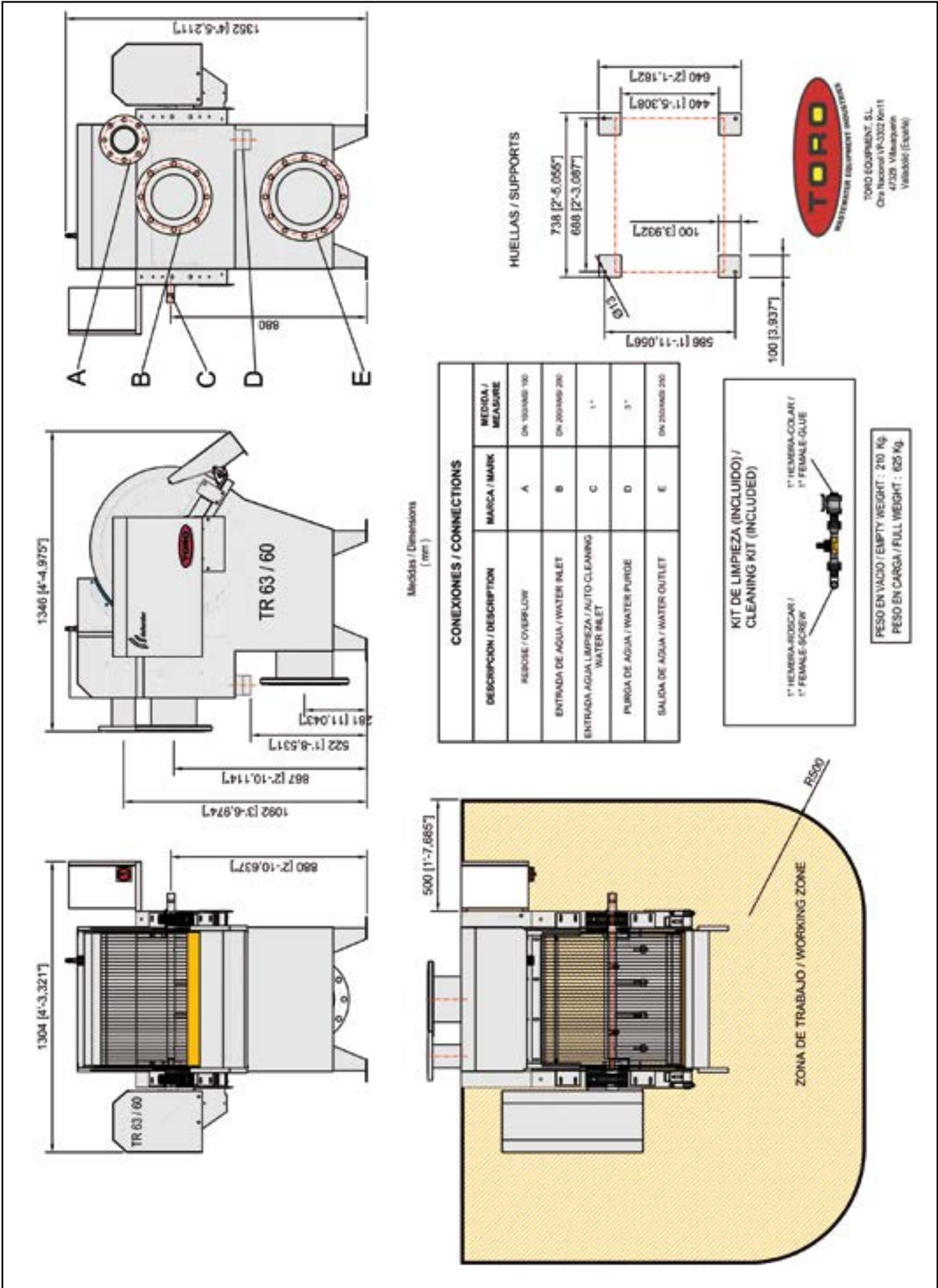
- Flows specified for clean water. A reduction should be applied according to the type and amount of solids removed. Consult our technical department.
- The dimensions and technical specifications may vary slightly due to normal product development by the engineering department of Toro Equipment, S.L.
- Request specifications sheet when ordering.
- You can find more specific figures in our website, www.toroequipment.com.



63 Range - Technical Specifications, mm (in)																
Model	Drum Diametre	Drum Length	Power Kw / HP	A	B	C	Outlet		Overflow		Inlet		Cleaning		Drain	
							D1	H1	D2	H2	D3	H3	D4	H4	D5	H5
TR 63/60	630 (24 3/4)	600 (23 5/8)	0.55 (0.75)	1,140 (44 7/8)	1,375 (54 1/8)	1,345 (53)	DN 250 ANSI 10"	322 (12 5/8)	DN 100 ANSI 4"	1,135 (44 5/8)	DN 200 ANSI 8"	910 (35 7/8)	1"	903 (35 1/2)	3"	580 (22 7/8)
TR 63/90	630 (24 3/4)	900 (35 3/8)	0.55 (0.75)	1,440 (56 3/4)	1,375 (54 1/8)	1,345 (53)	DN 250 ANSI 10"	322 (12 5/8)	DN 100 ANSI 4"	1,135 (44 5/8)	DN 200 ANSI 8"	910 (35 7/8)	1"	903 (35 1/2)	3"	580 (22 7/8)
TR 63/120	630 (24 3/4)	1.200 (47 2/8)	0.75 (1.00)	1,740 (68 1/2)	1,375 (54 1/8)	1,345 (53)	DN 300 ANSI 12"	347 (13 5/8)	DN 100 ANSI 4"	1,135 (44 5/8)	DN 250 ANSI 10"	910 (35 7/8)	1"	903 (35 1/2)	3"	580 (22 7/8)
TR 63/150	630 (24 3/4)	1.500 (59)	0.75 (1.00)	2,040 (80 3/8)	1,375 (54 1/8)	1,345 (53)	DN 350 ANSI 14"	372 (14 5/8)	DN 100 ANSI 4"	1,135 (44 5/8)	DN 300 ANSI 12"	910 (35 7/8)	1"	903 (35 1/2)	3"	580 (22 7/8)



63 Range - Clean Water Peak Flows, m³/h (US gpm)									
Mesh Size	Grating Mesh ▼, mm (in)						Perforated Mesh Ø, mm (in)		
	0.15 (0.006)	0.25 (0.01)	0.50 (0.02)	0.75 (0.03)	1.00 (0.04)	2.00 (0.08)	1.00 (0.04)	2.00 (0.08)	3.00 (0.12)
TR 63/60	23 (101)	36 (159)	63 (278)	84 (370)	101 (444)	144 (635)	29 (129)	57 (252)	57 (252)
TR 63/90	35 (152)	54 (239)	95 (419)	127 (558)	152 (670)	217 (957)	44 (194)	86 (380)	86 (380)
TR 63/120	46 (203)	72 (319)	127 (558)	169 (744)	203 (892)	290 (1,276)	59 (259)	115 (507)	115 (507)
TR 63/150	58 (254)	91 (400)	159 (699)	212 (932)	254 (1,118)	363 (1,598)	74 (324)	144 (635)	144 (635)

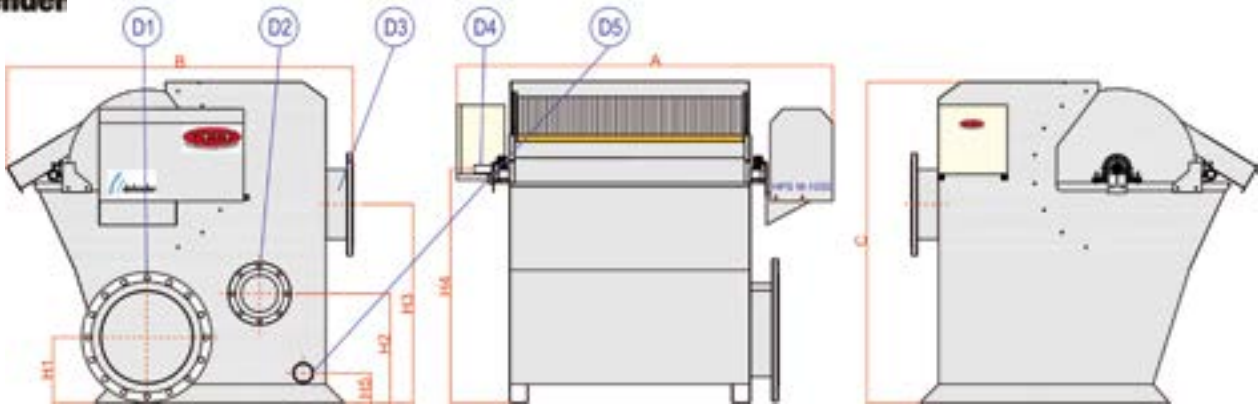


NOTES:

- Flows specified for clean water. A reduction should be applied according to the type and amount of solids removed. Consult our technical department.
- The dimensions and technical specifications may vary slightly due to normal product development by the engineering department of Toro Equipment, S.L.
- Request specifications sheet when ordering.
- You can find more specific figures in our website, www.toroequipment.com.

M/L Range TR HPS
Technical Specifications

Defender® TR HPS M-1000



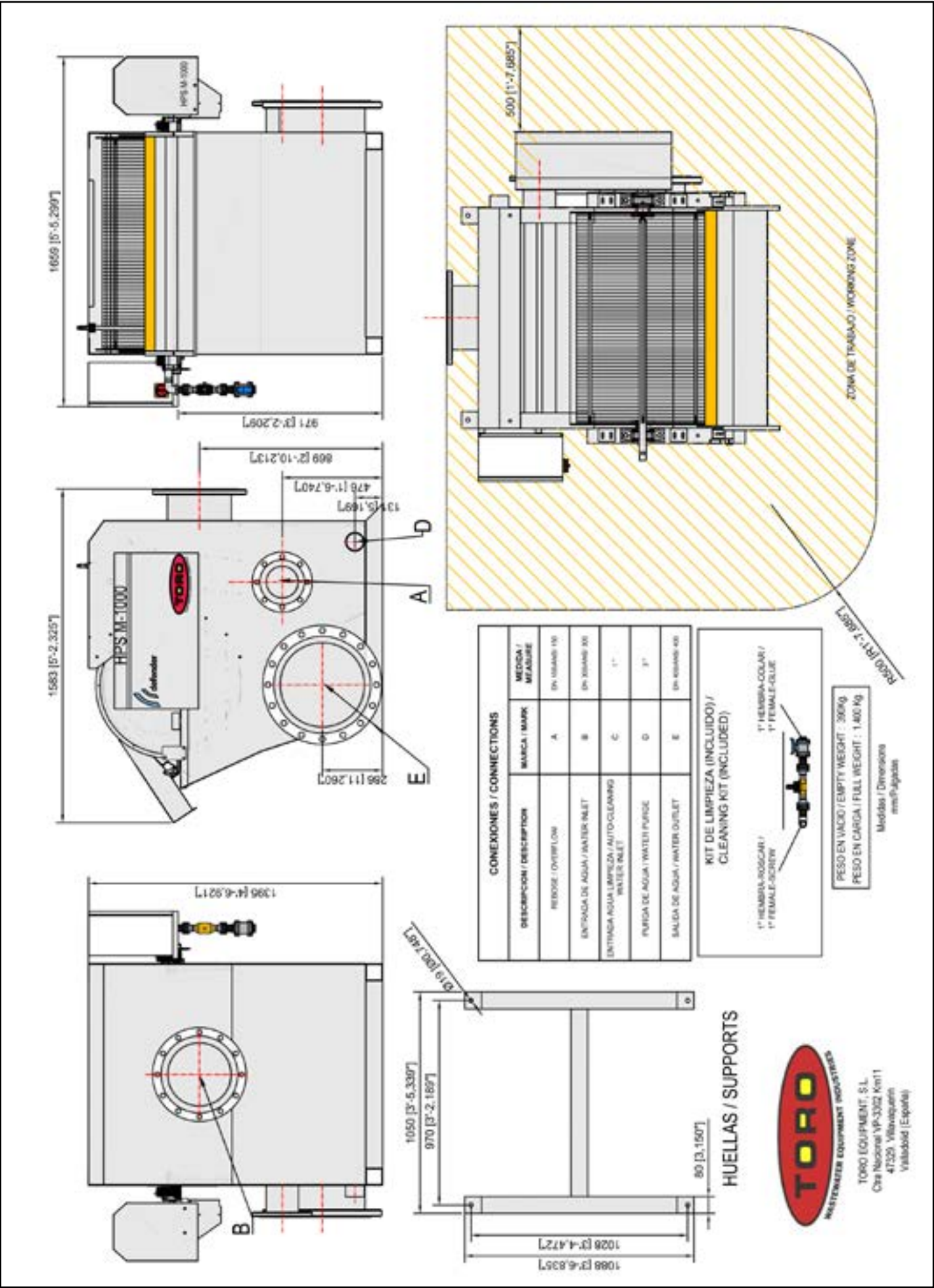
TR HPS - Technical Specifications, mm (in)

Model	Drum Diameter	Drum Length	Power Kw / HP	A	B	C	Outlet		Overflow		Inlet		Cleaning		Drain	
							D1	H1	D2	H2	D3	H3	D4	H4	D5	H5
M-500	630 (24 3/4)	500 (19 5/8)	0.55 (0.75)	1,140 (44 7/8)	1,540 (60 5/8)	1,395 (54 7/8)	DN 350 ANSI 14"	259 (10 1/4)	DN 150 ANSI 6"	474 (18 5/8)	DN 250 ANSI 10"	838 (32)	1"	1,015 (40)	3"	129 (5 1/8)
M-1000	630 (24 3/4)	1,000 (39 3/8)	0.55 (0.75)	1,640 (64 5/8)	1,540 (60 5/8)	1,395 (54 7/8)	DN 400 ANSI 16"	285 (11 1/4)	DN 150 ANSI 6"	474 (18 5/8)	DN 300 ANSI 12"	862 (33 7/8)	1"	1,015 (40)	3"	129 (5 1/8)
M-1500	630 (24 3/4)	1,500 (59)	0.75 (1.00)	2,140 (84 1/4)	1,540 (60 5/8)	1,395 (54 7/8)	2x DN 400 2x ANSI 16"	285 (11 1/4)	DN 150 ANSI 6"	474 (18 5/8)	2x DN 300 2x ANSI 12"	862 (33 7/8)	1"	1,015 (40)	3"	129 (5 1/8)
L-1500	914 (36)	1,500 (59)	0.75 (1.00)	2,150 (84 5/8)	2,420 (95 1/4)	1,996 (78 5/8)	2x DN 400 2x ANSI 16"	305 (12)	DN 200 ANSI 8"	680 (26 3/4)	2x DN 400 2x ANSI 16"	1,179 (46 3/8)	1"	1,452 (57 1/8)	3"	154 (6 1/4)
L-2000	914 (36)	2,000 (78 3/4)	0.75 (1.00)	2,650 (104 3/8)	2,420 (95 1/4)	1,996 (78 5/8)	2x DN 500 2x ANSI 20"	355 (14)	DN 300 ANSI 12"	680 (26 3/4)	2x DN 500 2x ANSI 20"	1,229 (48 1/4)	1"	1,452 (57 1/8)	3"	154 (6 1/4)



TR HPS - Clean Water Peak Flows, m³/h (US gpm)

Mesh Size	Grating Mesh ▼ ▼, mm (in)						Perforated Mesh Ø, mm (in)	
	0.15 (0.006)	0.25 (0.01)	0.50 (0.02)	0.75 (0.03)	1.00 (0.04)	2.00 (0.08)	2.00 (0.08)	3.00 (0.12)
M-500	133 (584)	208 (918)	365 (1,606)	486 (2,141)	584 (2,569)	834 (3,670)	332 (1,462)	467 (2,056)
M-1000	269 (1,185)	423 (1,861)	740 (3,258)	987 (4,343)	1,184 (5,212)	1,691 (7,446)	671 (2,955)	914 (4,024)
M-1500	405 (1,785)	637 (2,805)	1,115 (4,910)	1,487 (6,546)	1,784 (7,855)	2,549 (11,222)	1,011 (4,453)	1,423 (6,265)
L-1500	699 (3,079)	1,099 (4,838)	1,923 (8,466)	2,564 (11,288)	3,077 (13,546)	4,395 (19,351)	1,744 (7,679)	2,454 (10,804)
L-2000	934 (4,114)	1,468 (6,466)	2,570 (11,315)	3,426 (15,086)	4,112 (18,104)	5,874 (25,862)	2,331 (10,263)	3,280 (14,441)



- NOTES:
- Flows specified for clean water. A reduction should be applied according to the type and amount of solids removed. Consult our technical department.
 - MSS design concentration 1,000 mg/l.
 - The dimensions and technical specifications may vary slightly due to normal product development by the engineering department of Toro Equipment, S.L.
 - Request specifications sheet when ordering.
 - You can find more specific figures in our website, www.toroequipment.com.

Equipment:

Standard

Optional

BODY:	TR		TR HPS	
	40	63	M	L
Material AISI 316 L	<input checked="" type="checkbox"/>			
Material AISI 304	-	-	-	<input type="checkbox"/>
Connection flanges ISO/ANSI	<input checked="" type="checkbox"/>			
Screw couplings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
Protective cover	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
Protective lid clamping bracket	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
Side shields	<input checked="" type="checkbox"/>			
Double/triple inlet flange	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overflow chamber	<input checked="" type="checkbox"/>			
Drain in inlet chamber 2 "	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Motor housing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Flow entry baffle	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Solids scraper adjustment	<input checked="" type="checkbox"/>			
Lifting eyebolts	<input checked="" type="checkbox"/>			
Anchoring legs	<input checked="" type="checkbox"/>			
Blast finish 125-250 µm Microspheres B60	<input checked="" type="checkbox"/>			
CLEANING SYSTEM: <input checked="" type="checkbox"/>				
Solids scraper	<input checked="" type="checkbox"/>			
Cleaning Kit (Solenoid valve, cleaning jets, manual cut-off valve)	<input checked="" type="checkbox"/>			
DRUM FILTER: <input checked="" type="checkbox"/>				
Material AISI 316 L	<input checked="" type="checkbox"/>			
Material AISI 304	-	-	-	<input type="checkbox"/>
Grating mesh	<input checked="" type="checkbox"/> / <input type="checkbox"/>			
Perforated mesh	<input checked="" type="checkbox"/> / <input type="checkbox"/>			
DOCUMENTATION: <input checked="" type="checkbox"/>				
User manuals in specific language	<input checked="" type="checkbox"/>			
ISO standard documentation	<input type="checkbox"/>			

☒ Connection flanges ISO/ANSI



☒ Lifting eyebolts



☒ Anchoring legs



☒ Solids scraper adjustment



☒ Documentation



- To achieve high quality products and services, Toro Equipment has developed and implemented a Quality Management System in accordance with the UNE-EN-ISO 9001 standard, adapted to company needs and adopting continuous improvement methodology to attain business excellence.
- The system is based on continuous monitoring of all activities undertaken in the company:
 - Design
 - Manufacture
 - After sales service

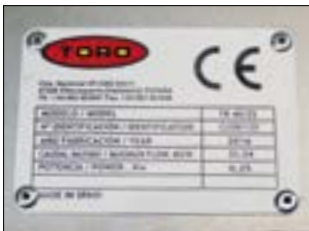
Equipment:

Standard

Optional

CERTIFICATES: <input checked="" type="checkbox"/>	TR		TR HPS	
	40	63	M	L
EC certificate	<input checked="" type="checkbox"/>			
Certificate of origin	<input type="checkbox"/>			
Factory test certificate	<input checked="" type="checkbox"/>			
Quality certificate	<input checked="" type="checkbox"/>			
Materials certificate	<input type="checkbox"/>			
Welding certificate	<input type="checkbox"/>			
Specific hydraulic certificate	<input type="checkbox"/>			
ELECTRIC PANEL: <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Incorporation of electrical panel	<input checked="" type="checkbox"/>			
Start/Stop	<input checked="" type="checkbox"/>			
Automatic programming of cleaning system	<input checked="" type="checkbox"/>			
Lid safety limit switch protection	<input checked="" type="checkbox"/>			
Protective lid clamping bracket	<input checked="" type="checkbox"/>			
Emergency Stop	<input checked="" type="checkbox"/>			
DRIVE SYSTEM: <input checked="" type="checkbox"/>				
Multi-voltage motor	<input checked="" type="checkbox"/>			
ATEX Motor	<input type="checkbox"/>			
Motor to NEMA standards, CSA, etc ...	<input type="checkbox"/>			
ADDITIONAL ITEMS:				
Automatic starting system (Start/Stop)	<input type="checkbox"/>			
Emergency Stop	<input checked="" type="checkbox"/>			
Packed in fumigated crate	<input type="checkbox"/>			
Shrink wrapping	<input checked="" type="checkbox"/>			
Containerisation	<input type="checkbox"/>			
Lifting structure	<input type="checkbox"/>			
Solids collection hopper AISI 316 L	<input type="checkbox"/>			
Solids collection hopper AISI-GRP	<input type="checkbox"/>			
Defender® Screw Compactor	<input type="checkbox"/>			
Defender® Sand Separator	<input type="checkbox"/>			

☒ Certificates



- The standard electric panel includes Start/Stop, limit switch to stop the drum when the protective lid is raised, securing support, emergency stop and automatic programming of the cleaning system.
- Start/Stop, start or stop the machine in the presence or absence of flow. Level sensing device that activates the machine when water for treatment is detected.

☐ Solids collection hopper GPR



☐ Solids collection hopper AISI



☐ Packed in fumigated crate



☐ Defender® Screw Compactor



NOTES:

- Optional equipment may carry an additional cost on the product. Consult our technical department.
- The standard and optional equipment may vary slightly due to normal product development by the engineering department of Toro Equipment SL
- When ordering ask about your equipment specifications.
- You can find more specific figures in our website, www.toroequipment.com

NOTES:

- Optional equipment may carry an additional cost on the product. Consult our technical department.
- The standard and optional equipment may vary slightly due to normal product development by the engineering department of Toro Equipment SL
- When ordering ask about your equipment specifications.
- You can find more specific figures in our website, www.toroequipment.com

Implementation:

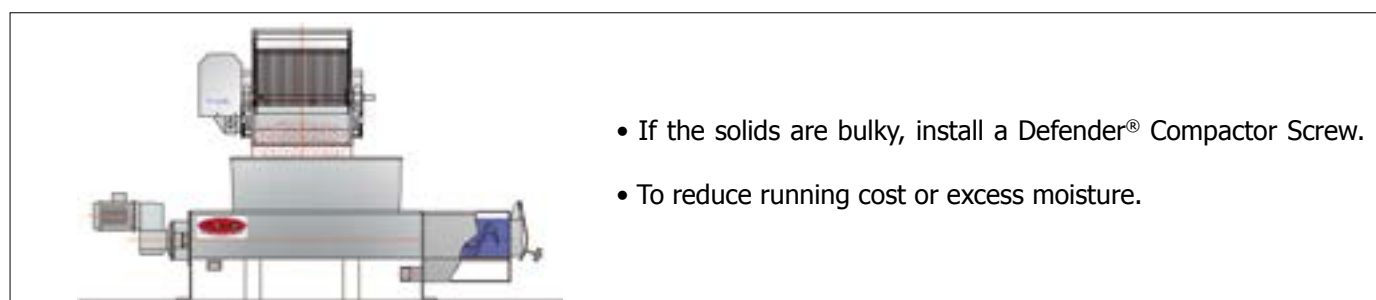
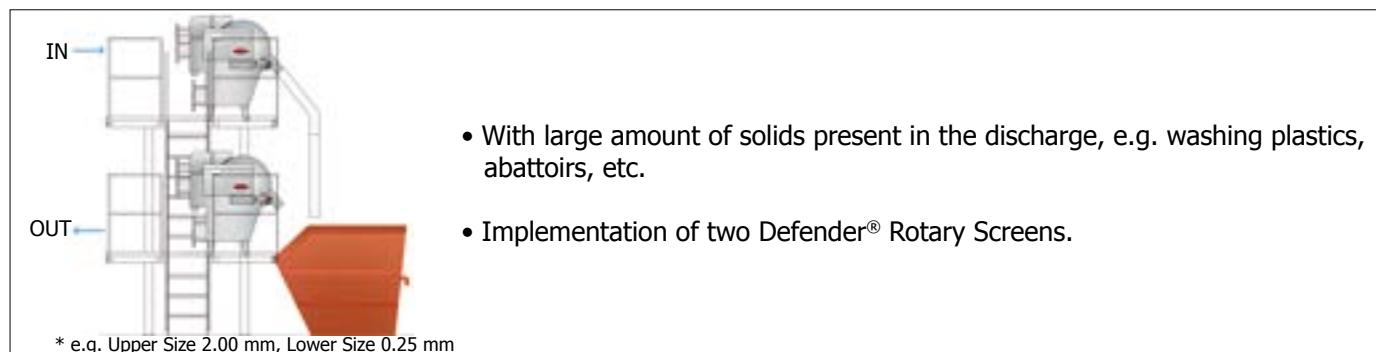
- HPS High Capacity Rotary Screens require a minimum flow for effective operation.
- Rotary Screens in the 40 and 63 Ranges work with any flow rate up to their maximum capacity.
- The screens deliver the solids by gravity through a hopper or compactor screw for which reason it is recommended to study the installation height of the equipment for discharge, collection and processing of such solids.



Series/Parallel Mounting



Mounting together with W-Tank settlement basin

**Compact and Pre-Assembled Plants:**

- On request, compact plants are containerised. Ask for information.
- Plants are also available pre-assembled on a structure.

**Test Pilot and Test Factory:**

- Our laboratory test the water to determinate mesh size.
- The equipments are pre-assembled and tested in our factory.

**Transport and Packaging:**

- On request:
 - Transportation of equipment in treated wooden crates.
 - Palletising and plastification of equipment.
 - Containerisation.



Worldwide References



Argentina
 Australia
 Austria
 Belgium
 Bolivia
 Brazil
 Bulgaria
 Canada
 Chile
 China
 Colombia
 Costa Rica
 Croatia
 Denmark
 Egypt
 Estonia
 Finland
 France
 Germany
 Greece
 Holland
 Hungary
 India
 Indonesia
 Ireland
 Israel
 Italy
 Japan
 Jordan
 Latvia
 Lebanon
 Lithuania
 Luxembourg
 Malaysia
 Mexico
 Moldova
 Morocco
 Pakistan
 Panama
 Peru
 Poland
 Portugal
 Romania
 Russia
 Saudi Arabia
 Seychelles
 Singapore
 South Africa
 Spain
 Switzerland
 Thailand
 Trinidad and Tobago
 Tunisia
 Turkey
 UAE
 UK
 Ukraine
 Uruguay
 US
 Venezuela

Factory Villavaquerín - Valladolid



Factory La Cistèrniga - Valladolid



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 toro@toroequipment.com
 www.toroequipment.com

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 471329, Villavaquerín
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 47193 La Cistèrniga
 Valladolid-Spain

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 DEFENDER® ROTARY SCREEN
 DEFENDER® ROTARY SCREEN HPS