

salarollpump[®]

THE SUPER SUCTION PUMP

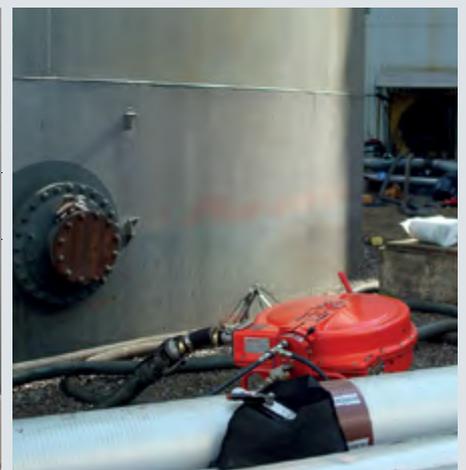


HIGH VISCOUS AND DEBRIS LADEN LIQUID HANDLING



SPILL RESPONSE

Desludging and Oil Recovery



Suction Drainage via Tank Valve



TANK CLEANING

Salarollpump clean up system for oil and chemicals is a unique patented system designed for recovery and clean up of oil spills and other high viscous and polluted liquids. The extremely strong suction (vacuum) and the debris tolerance of 37mm, (1 1/2") solids make it suitable for pumping debris laden viscous oil. The extremely high discharge pressure makes it possible for liquids to flow through a long distance of hose. The combination of handling weight and portability enables the user to deploy the system in remote areas.

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- **THE POWER PACK**
- **WATER INJECTION**

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FUNCTIONAL DESCRIPTION



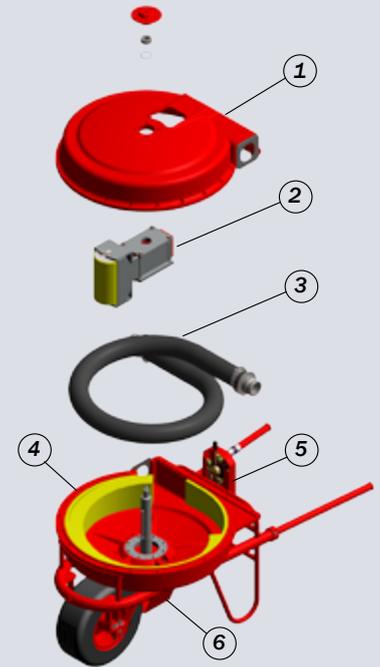
THE PUMP UNIT

The salarollpump delivers "super suction" performance thanks to a unique patented design feature.

The system is a peristaltic type of suction and pressure pump that delivers a flow rate of 9 m³/h, (39 gpm) or 14 m³/h, (61 gpm) depending on the size of the pump.

The heart of the system is a special manufactured hose compressed by a wheel mounted on a crank shaft. The suction is created when the hose by its own force returns to its round shape.

Discharge pressure is created by the force of the wheel moving the media. The high vacuum and the low speed of the pump enable it to pump most high viscous, polluted liquids and debris over 40mm, (1 1/2") solid. Both the pressure wheel and the inside of the pump housing have a lining of soft material that prevents a solid particle from damaging the pump hose.



- | | |
|-----------------------|--------------------------|
| 1 Pump housing | 4 Hose support |
| 2 Crank arm | 5 Hydraulic valve |
| 3 Pump hose | 6 Hydraulic motor |

THE POWER PACK



The power pack for the salarollpump is available with a gasoline/diesel engine or electric motor which drives a hydraulic pump. This powers the hydraulic motor mounted on the salarollpump.

Pumping high viscous media is made easier by reducing the speed of the pump. The pump speed can be regulated by adjusting the hydraulic oil flow to three different output speeds,

15, 30 and 45 rpm. The power pack has two levers and a position label that are used to set the hydraulic oil flow to one of three different values.

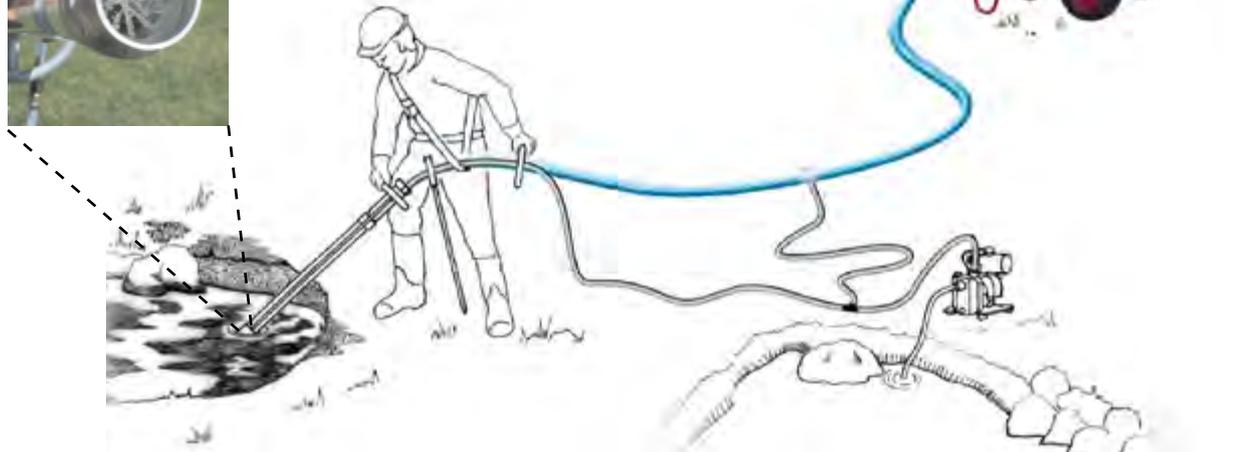
The discharge pressure is not affected because the motor or engine is at full power. Additional fine adjustments to the pump speed can be accomplished by setting the throttle on the gas/diesel engine.

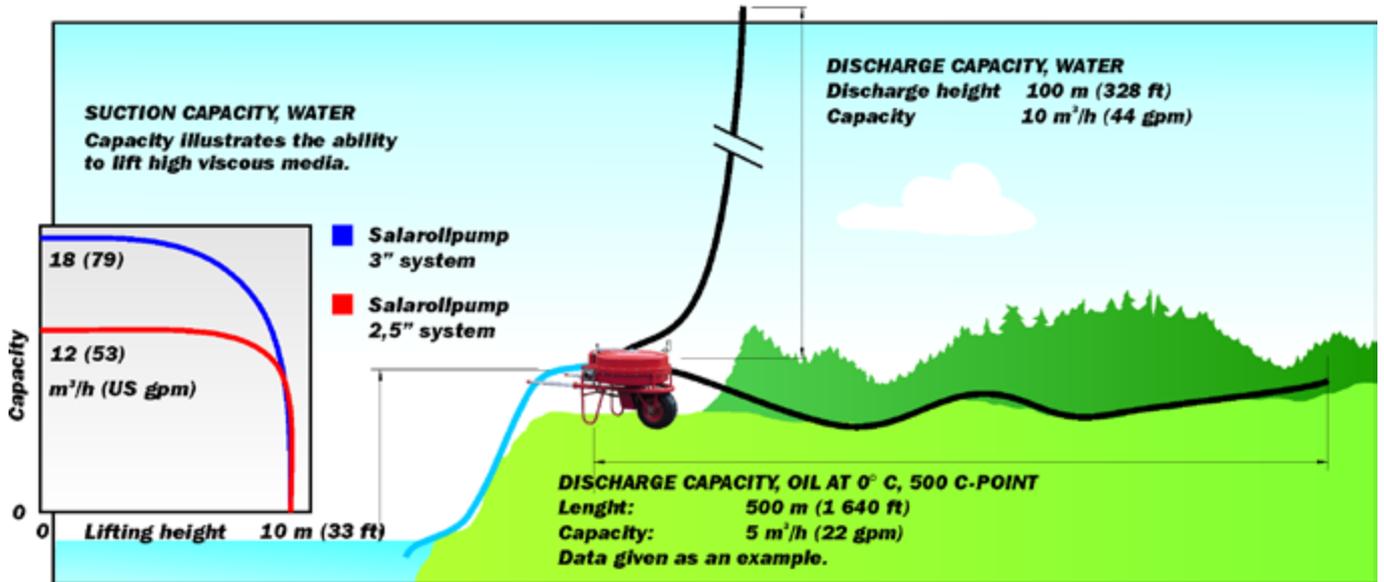
WATER INJECTION

Pumping extremely high viscous media is made easier by injecting water into the suction nozzle.



The water reduces the friction between the oil and hose. A small centrifugal pump mounted to a backpack is offered as an accessory.





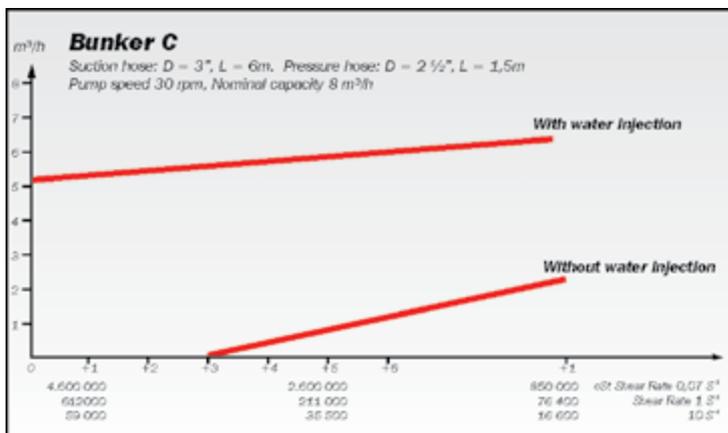
A series of pump tests were conducted to measure the suction capability of the Salarollpump with high viscous oil.

The suction nozzle was placed into approximately 1m³ (264 gallons) of bunker C oil.

The suction lift was 0.6 m (2 ft) and a 6 m (20ft) length of 3" suction hose was used. The discharge hose was 2 1/2" and 1.5m (5 ft) in length. The pump speed can be set at 15, 30 or 45 rpm. The medium speed of 30 rpm was selected which gives a nominal capacity of 8 m³/hr (35 gpm).

Tests were conducted at three different temperatures; 1, 5 and 10°C (33.8, 41 and 50°F). The viscosity in cSt is shown in the diagram at three different shear rates. The pour point of the oil was 18°C (64.4°F).

The tests were carried out with and without water injection in the suction nozzle. The results indicate that the limit without water injection was approximately 3,500,000 cSt at shear rate 0.07 S⁻¹. With water injection the capacity was increased to approximately 65% of the nominal capacity at a viscosity around 4,500,000 cSt with the same shear rate of 0.07 S⁻¹. Preliminary tests not illustrated below were also conducted with diesel oil injected into the suction nozzle instead of water. The preliminary test results indicate an improved capacity but not as much as with water.



TRANSPORT



The ease of transporting the system is further enhanced by handles that attach to both the pump and power pack for lifting in difficult terrain or by wheeling it as a wheel barrow. An all terrain vehicle or band driven vehicle attached to a trailer is available to transport the pump and power pack to the impacted area. The trailer can also be used for transporting smaller amounts of oil in sacks or barrels to the collecting area.

CUSTOMIZED TRAILERS



The trailer is customized for loading both the ATV and trailer carrying the Salarollpump system.

The trailer can be pulled by both an ATV or the tow bar can be dismantled and the wheels moved further back for pulling by a band driven vehicle.

AMPHIBIAN TOOL CARRIER



The combination of Salarollpump and Truxor amphibian tool carrier is ideal for work on water or land in difficult to reach marsh land. The Salarollpump can be used independently with a suction nozzle or in combination with a skimmer attached to the tool carrier as well as for dredging with a low content of water.



SHORE LINE CLEANING

The following article is an unbiased view point from Teknisk Ukeblad following

Oil Spill disaster in Norway:

Referencedate: By Elisabeth B. Kjönö.

Published 21.8.2009 at 08:35

<http://www.tu.no/natur/article219596.ece>



"The Full City"

The "Swedish Pump" is the most efficient:

During the clean up operation after the oil spill in Langesund the Salarollpump was used to suck up larger puddles of oil and oil emulsions.

KRAGERÖ: The island Jomfruland in Kragerö community has a shore line of round stones as far as the eye can see, this was unfortunately hit by thick bunker oil when "Full City" run aground on the 31st of July.

This is the first time I have operated this equipment. It is genius. We have pumped with one of these pumps for three days now and recovered around 1300 liter on an area of 30 times 30 meter, says Trond Holten from the North Norwegian response centre. He was in charge of the clean up operation on Jomfruland for the first few days, and directed around 30 soldiers, volunteers from WWF and the local community.



Private Sven Olsen (to the right) and sergeant Kåre-Gunnar Bergstöl operates the "Swedish Pump" that sucked up several tonnes of oil. Photo: Elisabeth Kjönö

Remote area

A remote area like this can neither be reached by car nor boat. The work to take up several tonnes of oil from this (area from high to low tide) has so far been done by hand. When the little newly baptised "Swedish Pump" was used, as it soon was to be called, the volunteers don't have to stand in oil up to their ankles and put oil in buckets.

There is a hose put as a loop inside the pump housing. A wheel rotates and compresses the hose so that a negative pressure is created.

The vacuum that occur makes the suction possible. It can pump up stones and soil without any problem, Holten explains. As a matter of fact, the pump can suck up stones up to 35 mm without getting hiccup, and it can easily lap up the thickly floating and nasty smelling bunker oil which is floating in puddles.



Rescued by the Swedes

As the nick name suggests, it is the Swedes that have invented a nice little assistant which can assist in difficult beach clean up operations. The pump is hydraulic, but can be connected to an ordinary petrol, diesel or electric motor.

In Norway Elba AS is selling or renting out the pump. They are one of many suppliers of equipment that enters the track when an accident of this magnitude occurs. We are renting out the pumps for this operation, and this is the first time they have been used in Norway says Ronny Thoresen at Elba.

Challenge

Holten is in any case very satisfied with the job that the pump does. But in the future the difficult part remains to reach the oil in between all the stones, and to wash the beach clean. No operation is like the other. In Fedje in 2007 it was a different challenge and different coast line. It is during operations one really can learn, says Holten.



SHORE LINE CLEANING



Tjörn oil spill - The worst Swedish west coast spill in 20 years.

Ten Salarollpump Systems deployed.

900 tons of heavy oil have been cleaned up after coming ashore on the west coast of Sweden following a spill farther out to sea.

The Swedish Civil Contingencies Agency and the Swedish Coast Guard were both involved in the operation.

At the start of the clean-up operation 600 tons of the thick oil were picked out of the water using vessels with crane and grab. Approximately 300 tons hit the shore line. Approximately 150 tons could be accessed and were cleaned up using large vacuum trucks. The remaining 150 tons were inaccessible to all but compact, light weight equipment.

Thus 10 units of the Salarollpump system for clean-up of heavy and polluted oil in remote areas was used for the remaining 150 tons which were inaccessible for bigger equipment.

These Salarollpump units were used for two weeks, during which the bad weather made it impossible to work on some days.

The Salarollpump and a 1 m³ container (IBC) were loaded onto a barge to reach the polluted shallow water areas.

Once the container was full, it was transported to a larger vessel and lifted on board with a crane.

Oil was pumped up from the beach or from very shallow water areas.

Some water was pumped with the oil and the water was separated using the IBC bottom valve. The low pump speed ensures that the oil and water does not mix and separation of water is easy.

In areas where there was a lot of oil, pumping was pretty well continuous. An IBC was filled with oil in 30 minutes.

After processing of the 900 tons of the recovered spill, 500 tons of clean oil was recovered, i.e. the water content of the emulsion was approx. 45 %.



FIRST STEP SEPARATION

The slow movement of the pump prevents oil and water to mix and separates instantly after it has been pumped to a container. Water can be let out from a valve at the bottom of the container. Alternatively the discharge hose can be pushed down to the bottom of the container and by reversing the pump water can be pumped out and disposed.



A slippery and messy environment.

When there were large quantities of heavy oil and little water, the water injection applied on the suction side increased the capacity. This is a separate accessory which can be supplied with the Salarollpump.



A range of different oiled areas were encountered.

SKIMMER OFFLOADING

The salarollpump skimmer is manufactured in aluminium and used in shore line areas.

When the oil layer to be removed is thin optimum pump capacity is achieved when the pump is operated at low speed. Alternatively, if the oil layer is thick, the pump shall operate at a higher speed.

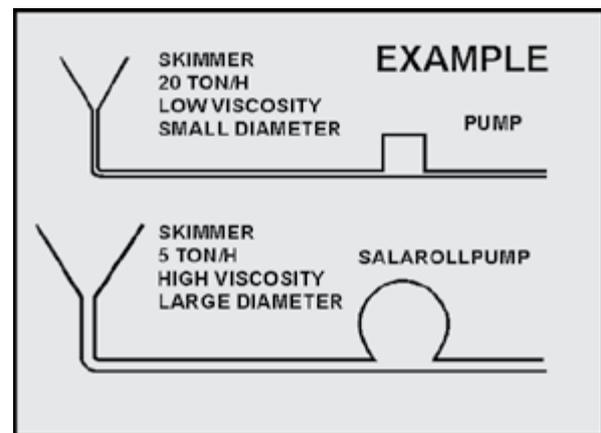


As the example shows the salarollpump can off load a skimmer designed for a high volume of low viscosity oil when skimming a very thick product. This is due to the high suction and low speed of the salarollpump.



The ability to pump high viscosity oil is improved if the salarollpump offloads a skimmer rated at a much higher capacity than the capacity of the pump.

This combination gives the best match for optimum performance.



SUBMERGED OIL RECOVERY



Submerged heavy oil can be pumped from the bottom of the sea. During the test shown in the picture the depth was approx. 4 m.

The slow rotation of the pump makes it easier to separate water from the sunken oil.

OIL IN ICE



The ability to handle solid particles and to reverse in case of a blockage as well as the ability to work in low temperatures makes the system well fitted for suction and pumping of oil in ice.

The picture is taken when the Alaska North Slope Spill Response Team conducted the Course - Advanced Oil Spill Response in Ice Training - at Cold Region Research and Engineering Laboratory in the USA.

Slurry removal from tanks has always been difficult and time consuming. The salarollpump with its exceptional suction and discharge pressure makes it possible to remove high viscous slurry from the bottom of a tank.

The pump is hydraulically driven and the powerpack equipped with diesel, electric or gasoline engines.

Solid debris up to 37 mm, (1 ½”) can pass through without damaging the system. The unique design allows for self-priming and enables the pump to safely run with a completely dry suction, without depending on a by-pass or other easily blocked devices.



Suction Drainage via Tank Valve

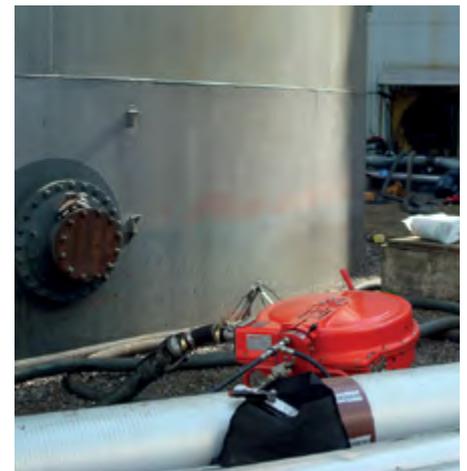
The high vacuum of the pump improves efficiency of suction from a valve at the bottom of a wide variety of tanks such as slop tanks. This simple method of connection will give easy, quicker clean out with little preparation required and fewer access issues.

The risk for sparks due to static electricity is low due to the low rotating speed of the pump and the ability to place the power pack outside the hazardous area.

The low rotating speed of the pump also ensures that the high viscous oil being pumped stays binded together rather than creating a hole from the intense vacuum where it separates from the rest of the oil and can no longer pull in oil, only air.



Desludging and Oil Recovery



Sludge nozzles

The nozzle is provided with a handle and a swivel. When pushing the nozzle the hose will follow. With the help of the swivel the nozzle can be reversed. Different nozzles are available for this arrangement. As shown on the picture, the nozzle can be equipped with rotating hydraulically driven blade or a lower inlet for clean up of the last remaining thin layer of the pumped product.

Gantry System

The suction hose is suspended above the sludge with metal tripods and horizontal rails holding the hose in place. This will allow the hose to move freely.



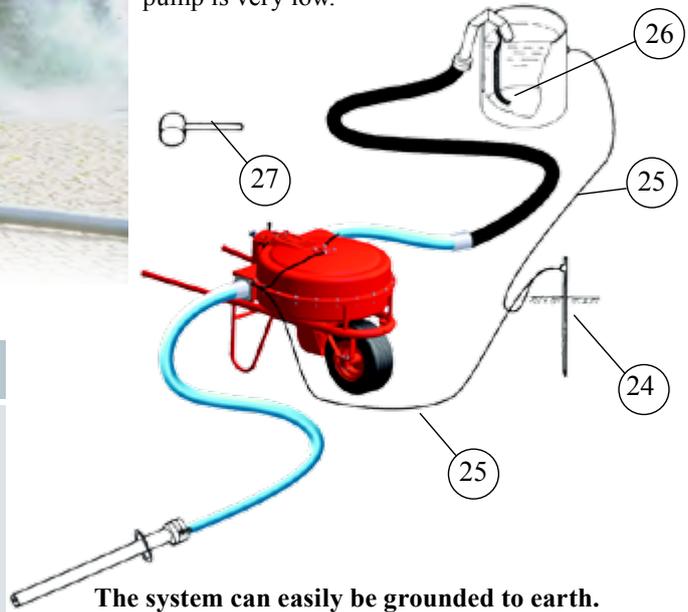
The sludge shown in the picture can be very dry at times, but when agitated with the sludge feed nozzle it becomes more pumpable.



An entering kit makes it easy to go in and out of the tank without spreading oil outside the man hole.



The standard inner lining of the pump hose is made of nitrile for long term pumping of oil but the material can also handle short term operations of a number of aggressive chemicals. The risk for sparks due to static electricity is very small as the power pack can be placed outside the hazardous area and the rotating speed of the pump is very low.



Chemicals which have been tested

Type of chemical	Formula	Concentration	Pumping time hours	Exposure hours
Nitric acid	HNO3	56 %	12	18
Caustic soda	NaOH	45 %	12	18
Toluene	C6H5CH3	-	10	15
Hydrochloric acid	HCL	30 %	12	18
Phosphoric acid	H3PO4	52 %	13	18
Sulphuric acid (warm)	H2SO4	95 %	12	18
Hydrogen peroxide	H2O2	35 %	12	18
Trichlorethylene	C2HCl3	99 %	13,5	18
Hydrofluosilic acid	H2SiF6	20 %	12	18
Liquid ammonia	NH3	100 %	4,5	5,5

Contact salarollpump for detailed information.

The system can easily be grounded to earth.

The components below are used when pumping flammable products:

- 24 Equipment for ground connection, length 0,5 m 1
- 25 Copper cable, length 10 m 2
- 26 Copper plate, length 1 m 1
- 27 Plastic hammer 1

For long term use of specific chemicals, the following inner linings are available.

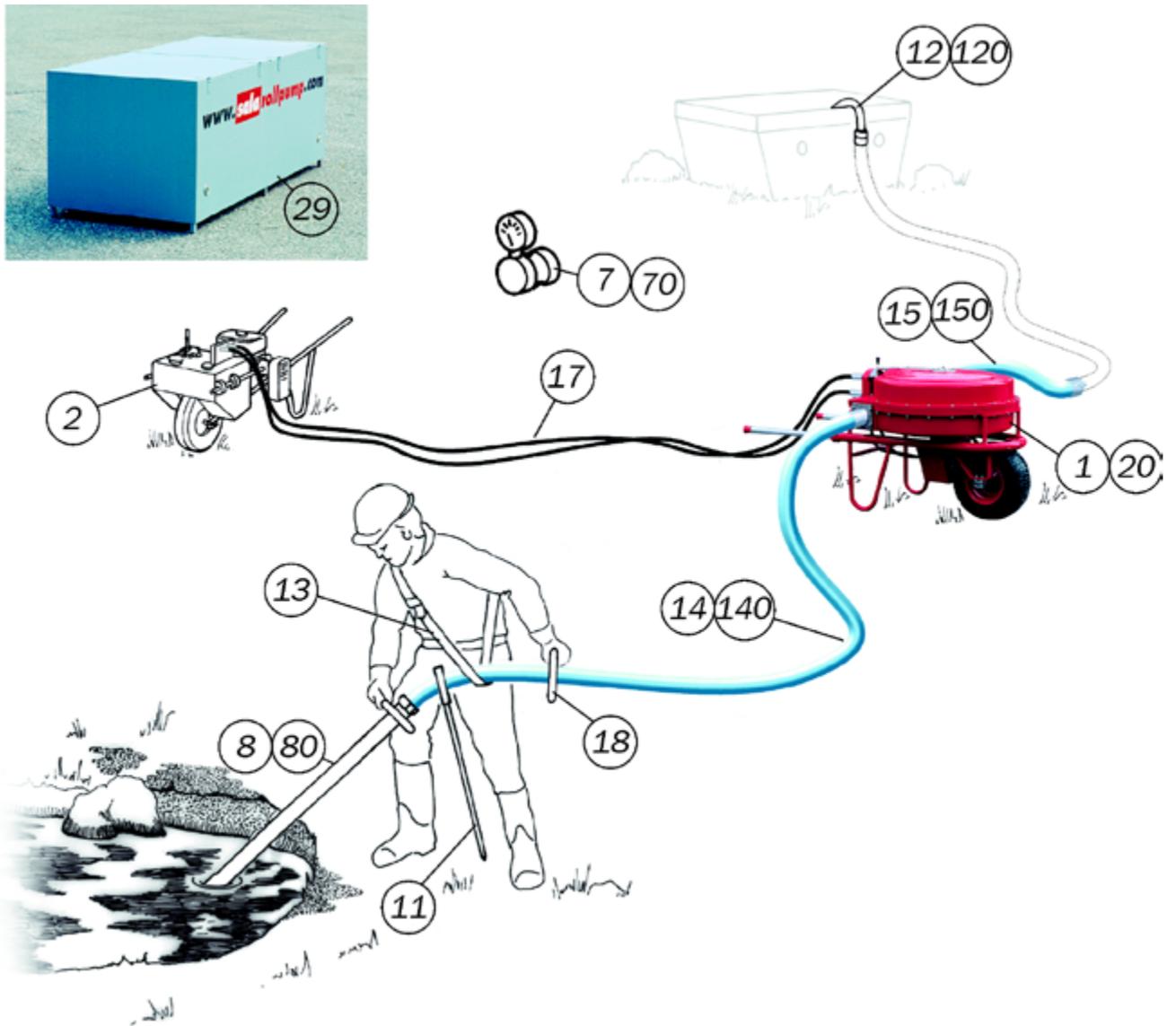
- | | | | | | |
|---------------|---------------------|-------------------------|-------|---------------|-----------------------------------|
| •NITRILE, NBR | •NATURAL RUBBER, NR | •CHLOROPRENE RUBBER, CR | •EPDM | •HYPALON, CSM | <u>AT ADDITIONAL COST:</u> |
| | | | | | •VITON, FPM |

Nozzle for flat floor



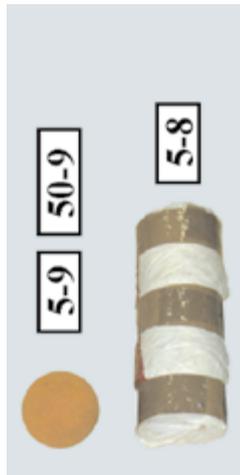
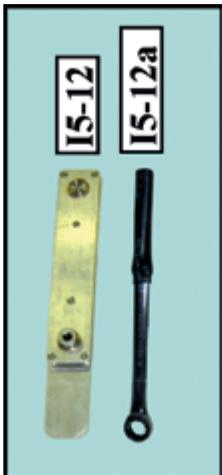
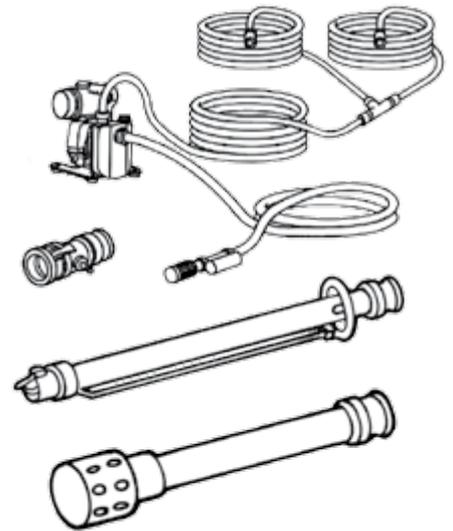
The nozzle makes it possible to collect light fluid liquid spills from a flat asphalt or concrete floor.

OIL AND CHEMICAL RESPONSE SYSTEM



Size 2½"	3"	Name	Number	Size 2½"	3"	Name	Number
Item				Item			
1	20	Salarollpump	1	14	140	Suction hose incl. CAM-couplings	
2		Power pack	1			2 pcs length=3 m/118 in, 1 pcs length=6 m/236 in	
7	70	Vacuum gauge	1	15	150	Adaptor for pressure hose incl. 1 CAM-coupling, length = 1,5 m/59 in	1
8	80	Suction nozzle (aluminium alt.stainless steel)	1	17		Hydraulic hose, length = 10 m/394 in	2
11		Support for suction hose. .(- " -)	1	18		Handle	1
12	120	Filling pipe (aluminium alt.stainless steel)	1	29		Transport and storage box	1
13		Harness	1				

OIL AND CHEMICAL RESPONSE SYSTEM



Size	2½"	3"	Name	Number	Size	2½"	3"	Name	Number
Item					Item				
1	20		Salarollpump	1	14	140		Suction hose incl. CAM-couplings	
2			Power pack	1				2 pcs length=3 m/118 in, 1 pcs length=6 m/236 in	
7	70		Vacuum gauge	1	15	150		Adaptor for pressure hose incl. 1 CAM-coupling, length = 1,5 m/59 in	1
8	80		Suction nozzle (aluminium alt.stainless steel)	1					
11			Support for suction hose. (- " -)	1		17		Hydraulic hose, length = 10 m/394 in	2
12	120		Filling pipe (aluminium alt.stainless steel)	1		18		Handle	1
13			Harness	1		29		Transport and storage box	1

PULP AND PAPER INDUSTRY



In industry sediments or sludge often have to be pumped out from trenches or sludge have to be cleaned out from other difficult to reach areas. The example is taken from Pulp and Paper industry where a black liquor and sulphate soap mixture was returned to a spare tank and could be used in the production again instead of being wasted.

Pumped media: Black liquor and sulphate soap mixture
Pumped volume: 244 m³ (65 000 gallons)
Working time: 32 hours

CHEMICAL INDUSTRY



Waste from chemical industry collected in pits and trenches can be pumped out with a low water content

MANUFACTURING INDUSTRY



Machine tool waste

Waste after turning and grinding of components in mechanical industry sometimes has to be cleaned out and can easily be pumped by mixing with a volume of approx. 50% water.

ALGAE BLOM



The slow rotation speed of the pump prevents that large amounts of water is pumped. By placing the nozzle in the sludge and the discharge hose on the sandy beach the algae was moved from the water and dried before collection.

DREDGING

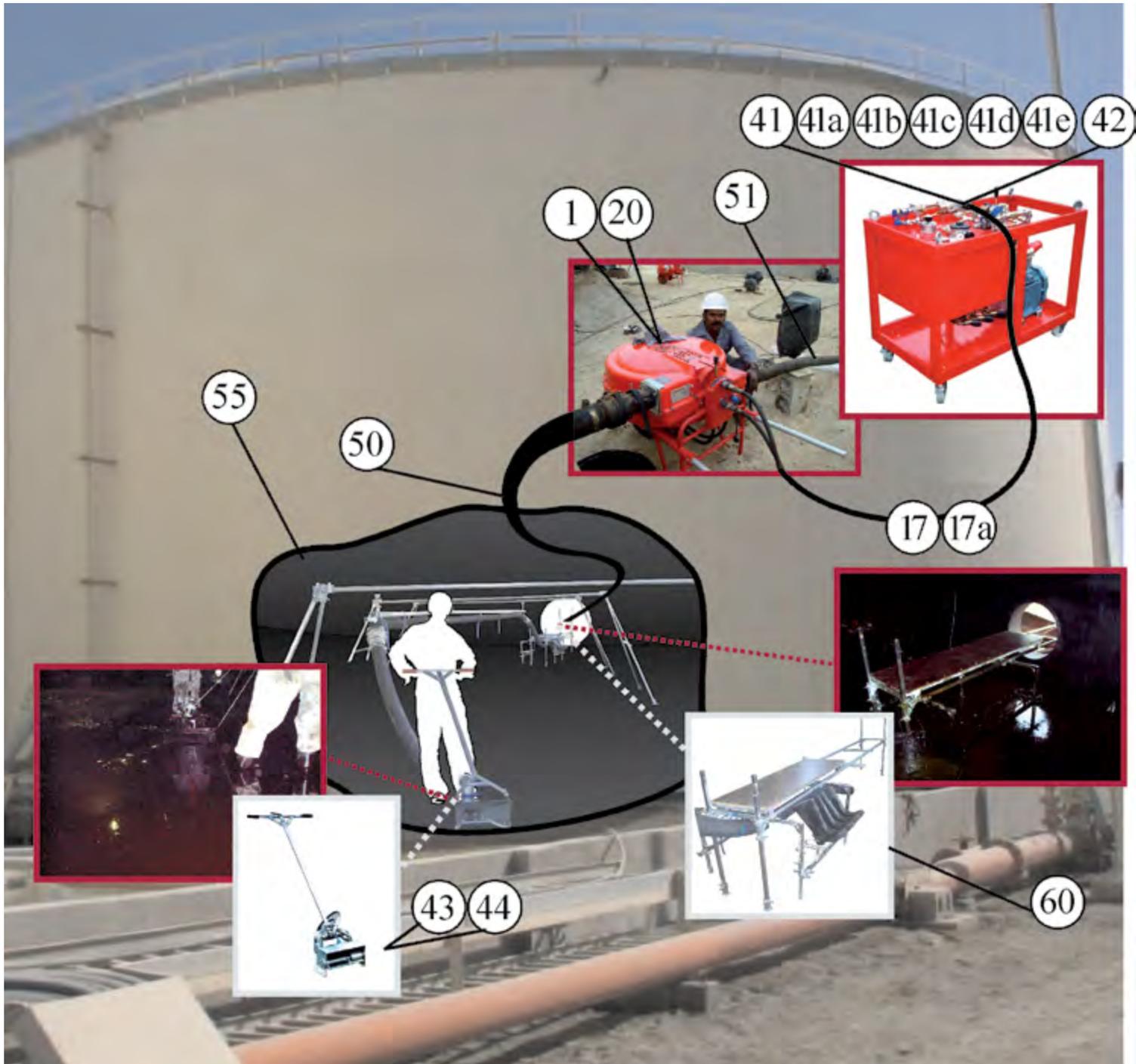


Dredging is made possible due to the resistance to abrasive material and the slow rotation resulting in low mixing of the sediment and water.

This is important in case toxic material exists in the sediment.

The Salarollpump can pump sediment with a low volume of water.

TANK CLEANING SYSTEM



Item	Size		Name	Number	Item	Size		Name	Number
	2½"	3"				2½"	3"		
1	20		Salarollpump	1	42			Power pack, diesel drive, hand start 10 kW	1
17			Hydraulic hose 2 x 10 m	1	43			Sludge feed nozzle,	1
17a			Hydraulic hose 2 x 20 m	1	44			Sludge nozzle-low	1
41			Power pack, gasoline drive, 6,0 kW	1	50			Suction hose, 1 pcs 3" x 3 m	
41a			Power pack, gasoline drive, 8,2 kW	1				6 pcs 4" x 4 m	1
41b			Power pack, diesel drive, hand start 7,4 kW	1	51			Discharge hose, 5 pcs 4" x 4 m	<<
41c			Power pack, diesel drive, electric start 7,4 kW	1				1 pcs 3" x 3 m	1
41d			Power pack, electric drive, 50 Hz, 7,5 kW	1	55			Lifting equipment for suction hose	1
41e			Power pack, electric drive, 60 Hz, 8,6 kW	1	60			Equipment for entering man hole	1

PUMP

POWER PACK / RESPONSE



2½" model = 2½" couplings - **Item 1**
 3" model = 3" couplings - **Item 20**

Weight: 2½"	120 kg	264 lb
3"	130 kg	285 lb
Length:	1 020 mm	40 in
incl. handles*	1 560 mm	61 in
Width:	792 mm	31 in
Height: 2½"	776 mm	30 in
3"	820 mm	32 in
Pump hose:		
inside diam. 2½"	51 mm	2 in
3"	63 mm	2½ in
inside material	nitril	nitril
Capacity†: 2½"	12 m3/hour	53 US gal/min
(water) 3"	18 m3/hour	79 US gal/min
(fat 45 rpm)		
Max suction:	-1 Bar	- 14.5 PSI
Max discharge-pressure:	6(10) Bar	(87)145 PSI

*Handles can be inserted.



GASOLINE DRIVE

Standard - Item 2

Weight:	110 kg	242 lb
Power:	6,0 kW	6,0 kW

High power - Item 2a

Weight:	116 kg	255 lb
Power:	8,2 kW	8,2 kW

DIESEL DRIVE

Hand start - Item 2b

Weight:	139 kg	306 lb
Power:	7,4 kW	7,4 kW

Electric start - Item 2c

Weight:	152 kg	334 lb
Power:	7,4 kW	7,4 kW



The example shows alt. with electric start

Length:	1 250 mm	49 in
incl. handles*	1 850 mm	73 in
Width:	620 mm	24 in
Height:	750 mm	30 in
incl. handles*	860 mm	34 in

*Handles can be inserted.



POWER PACK / INDUSTRIAL



GASOLINE DRIVE

Standard- Item 41

Weight:	172 kg	378 lb
Power:	6,0 kW	6,0 kW

High power - Item 41a

Weight:	178 kg	392 lb
Power:	8,2 kW	8,2 kW

DIESEL DRIVE

Hand start - Item 41b

Weight:	201 kg	442 lb
Power:	7,4 kW	7,4 kW

Hand start - Item 42

Weight:	250 kg	550 lb
Power:	10 kW	10 kW

Weight incl. 50 l hydraulic oil



Electric start - Item 41c

Weight:	214 kg	471 lb
Power:	7,4 kW	7,4 kW

ELECTRIC DRIVE

50 hz - Item 41d

Weight:	198 kg	435 lb
Power:	7,5 kW	7,5 kW

60 hz - Item 41e

Weight:	198 kg	435 lb
Power:	8,6 kW	8,6 kW

Length:	1 100 mm	43 in
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Width:	600 mm	24 in
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Height:	1 000 mm	39 in
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GASOLINE DRIVE

Standard - Item 2

Weight:	110 kg	242 lb
Power:	6,0 kW	6,0 kW

High power - Item 2a

Weight:	116 kg	255 lb
Power:	8,2 kW	8,2 kW

DIESEL DRIVE

Hand start - Item 2b

Weight:	139 kg	306 lb
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Weight:	152 kg	334 lb
Power:	7,4 kW	7,4 kW

ELECTRIC DRIVE

50 hz - Item 2d

Weight:	136 kg	306 lb
Power:	7,5 kW	7,5 kW

60 hz - Item 2e

Weight:	136 kg	306 lb
Power:	8,6 kW	8,6 kW

Length:	1 250 mm	49 in
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incl. handles*	1 850 mm	73 in
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Width:	620 mm	24 in
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Height:	750 mm	30 in
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incl. handles*	860 mm	34 in
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*Handles can be inserted.

TECHNICAL SPECIFICATIONS



TRANSPORT AND STORAGE BOX



Item 29

Weight:	165 kg	363 lb
Length:	2 470 mm	97 in
Width:	1 090 mm	43 in
Height:	1 010 mm	40 in
Weight*: 2½"	440 kg	968 lb
3"	465 kg	1.025 lb

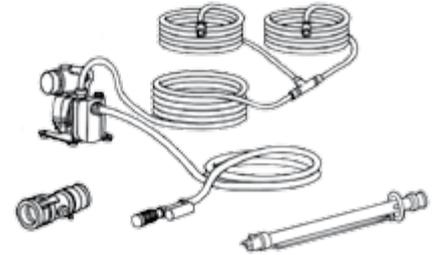
SKIMMER



2½" model - Item 4
3" model - Item 40

Weight:	34 kg	75 lb
Length:	980 mm	39 in
Width:	1 090 mm	43 in
Height:	740 mm	29 in

WATER INJECTION



2½" model - Item 3
3" model - Item 300

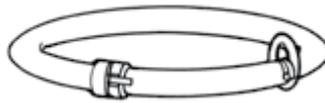
Weight:	13kg	28lb
Length:		
Suction hose	3 m	118 in
Pressure hose	10 m	394 in

Pump: Centrifugal

Motor: Gasoline 4-stroke

*Including complete standard system(see page 8).

SUCTION HOSES



Weight with:		length 3 m/118 in		length 6 m/236 in	
aluminium couplings:	2½" - Item 14a 3" - Item 140a	6 kg 8 kg	13 lb 18 lb	14b 140b	11 kg 14 kg 24 lb 31 lb
stainless steel couplings:	2½" - Item 14a 3" - Item 140a	7 kg 10 kg	15.5 lb 22 lb	14b 140b	12 kg 16 kg 26.5 lb 35 lb

DISCHARGE HOSES

FIRE HOSE ANTISTATIC



Length:	12,5/25 m	492/984 in
Weight: 2½"	8,5/17 kg	19/38 lb
3" - Item 160a/160b	11/22 kg	25/50 lb

HYDRAULIC HOSE



Item x

Length:	10 m	394 in
Weight:	9 kg	20 lb
Dimension:	½"	½ in

FILLING PIPE



Weight:			
aluminium	Item 12	1,5 kg	3.3 lb
stainless steel:	Item 12 Item 120	2,5 kg 4 kg	5.5 lb 9 lb

RECOMMENDED SPARE PARTS



Pump hose set incl. grease

Weight: 2½"	Item x	18 kg	40 lb
3"	Item x	22 kg	50 lb
Length:		2 500 mm	98 in
Package dimensions		2,6 x 0,2 x 0,2 [m]	102 x 8 x 8 [in]

PUMP STATIONARY FRAME



Weight:	2½"	130 kg	286 lb
	3"	140 kg	308 lb
Length:		1 200 mm	74 in
Width:		850 mm	34 in
Height:		770 mm	30 in

PUMP DISCONNECTABLE FRAME



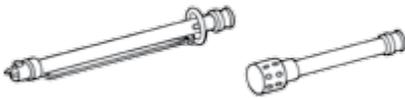
Weight:	2½"	110 kg	242 lb
	3"	120 kg	264 lb
Length:		1 200 mm	74 in
Width:		850 mm	34 in
Height:		770 mm	30 in

PUMP 2-WHEEL FRAME



Weight:	2½"	120 kg	264 lb
	3"	130 kg	286 lb
Length:		1 200 mm	74 in
Width:		850 mm	34 in
Height:		770 mm	30 in

SUCTION NOZZLES



	standard		with bottom filter	
	Weight:			
aluminium:	2,5 kg	5.5 lb	1,5 kg	3.3 lb
stainless steel: 2½"	4 kg	8.8 lb	3 kg	6.5 lb
3"	7 kg	15 lb	5 kg	11 lb

TRAILER FOR TERRAIN SCOOTER



Weight:	220 kg	484 lb
Size of wagon bridge:	1 240 x 2 540 mm	49 x 100 in
Total length:	3 390 mm	133 in
Height:	1 460 mm	57 in

CRAWLER TYPE VEHICLE



Weight:	330 kg	726 lb
Length:	1 750 mm	69 in
Length:	3 150 mm	124 in
Width:	1 150 mm	45 in
Height:	980 mm	39 in
Motor:	5,5 hp	5,5 hp
Ground pressure:	0,15 kg/cm ² (at 500 kg load)	2.1 lb/in ² (at 1.100 lb load)
Speed:	6 km/h	3 ¾ miles/h

* The operating handle can be lifted.

ADAPTORS 3" - 4"



Weight:	4 kg	9 lb
Length:	330 mm	13 in
Width:	130 mm	5 in



Weight:	1 kg	2 lb
Length:	200 mm	8 in
Width:	200 mm	8 in

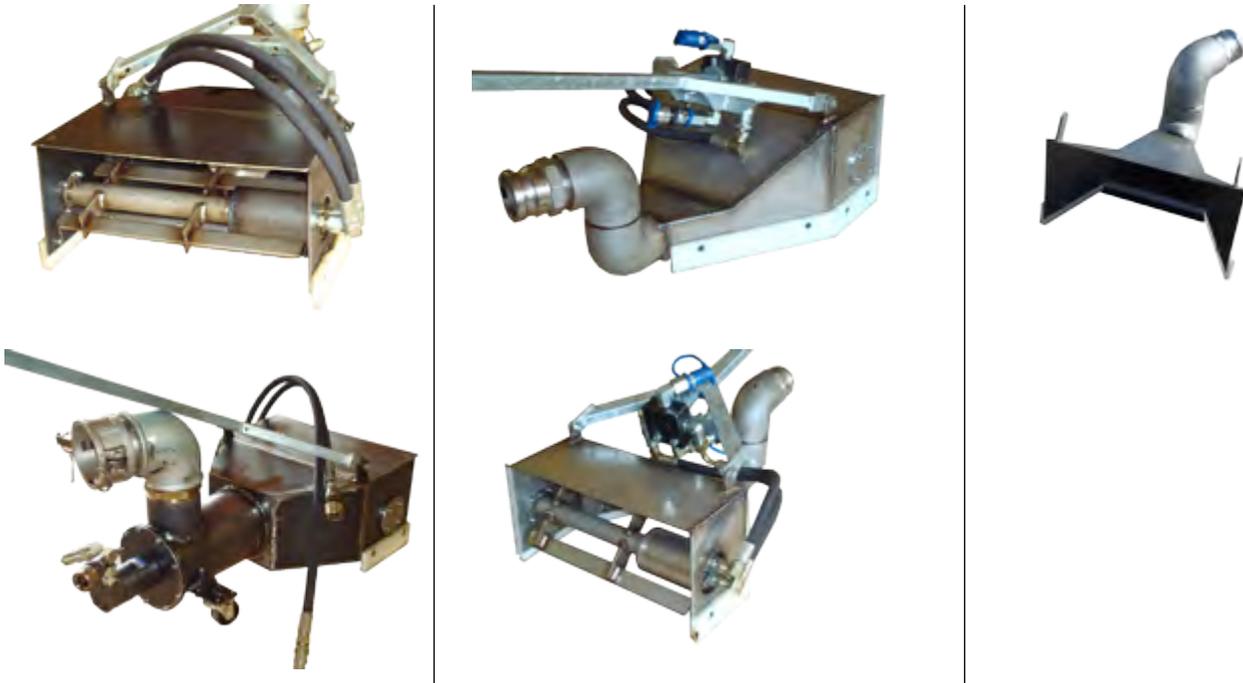
SLUDGE FEED NOZZLE



Item 29
hydraulic drive for small entrance

Weight:	16 kg	35 lb
Length:	650 mm	26 in
Width:	300 mm	12 in

SLUDGE FEED NOZZLES



hydraulic drive for flat floor				finish for flat floor				
high power		low power						
Weight:	34 kg	75 lb	26 kg	57 lb	10 kg	22 lb	10 kg	22 lb
Length:	800 mm	31 in	650 mm	26 in	400 mm	16 in	400 mm	16 in
Width:	480 mm	19 in	500 mm	20 in	600 mm	24 in	400 mm	16 in
Height:	400 mm	16 in	400 mm	16 in	100 mm	4 in	300 mm	12 in

STONE TRAP



Weight:	145 kg	320 lb
Length:	1250 mm	49 in
Width:	900 mm	35 in
Height:	1150 mm	45 in

BOOSTER PUMP



Weight:	54 kg	119 lb
Length:	650 mm	26 in
Width:	650 mm	26 in
Height:	370 mm	15 in

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THE SUPER SUCTION PUMP



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