



Liquid Skimmers

(Skimmer*)

Separating Waste from Water

ACQUA International Group [“ACQUA”]

ACQUA are involved in the extraction of waste from water using proprietary technologies sold under the following brand names:

- *Vertical Gravity Separator (VGS*)*
- *Induced Cyclonic Separator (IC-SEP*)*
- *Cyclonic Falling Film Evaporator (CycloVap*)*
- *Inline Swirl Generator Hydrocyclone Head (ISG*)*
 - *Liquid/Liquid*
 - *Solid/Liquid*
- *Liquid Skimmer (Skimmer*)*

The ACQUA technologies are involved in the following market segments and applications:

- *Oil-water separation*
- *Fat, oil and grease recovery/removal*
- *Marine bilge water treatment and marina oil slicks clean-up*
- *Soil remediation*
- *Tertiary sewage treatment*
- *Recovery of backwash water*
- *Removal of suspended solids*
- *Treatment of wastewater from food and chemical manufacturing, pulp and fines recovery.*

* Indicates International Patents Pending

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1 LIQUID SKIMMERS (SKIMMER*)

ACQUA Liquid Skimmers (Skimmer*) are designed to ensure a balanced oil/water feed ratio for delivery into ACQUA separation systems. The Skimmer* works by removing the wastewater from a retention pit, and delivering it to a Hydrocarbon/Water (OWS) Vertical Gravity Separator (VGS*) or to a Fat, Oil and Grease (FOG) Vertical Gravity Separator (VGS*). Skimmer*s are available in 2 ranges and both improve overall system efficiency, while preventing the buildup of fat, grease and oil in the retention pit.

1.1 Fixed Skimmer*

The fixed Skimmer* is designed to operate in smaller retention tanks in conjunction with separation systems that deal with very little silts and solids, and are without high concentrations of fat, grease or oil.

1.2 Floating Skimmer*

The floating Skimmer* is designed to operate in larger retention tanks, in conjunction with separation systems that deal with higher levels of silts and solids, and have higher levels of fat, grease or oil.

1.3 Applications

Skimmer*s used in conjunction with an OWS or FOG VGS* can be used in the following applications:

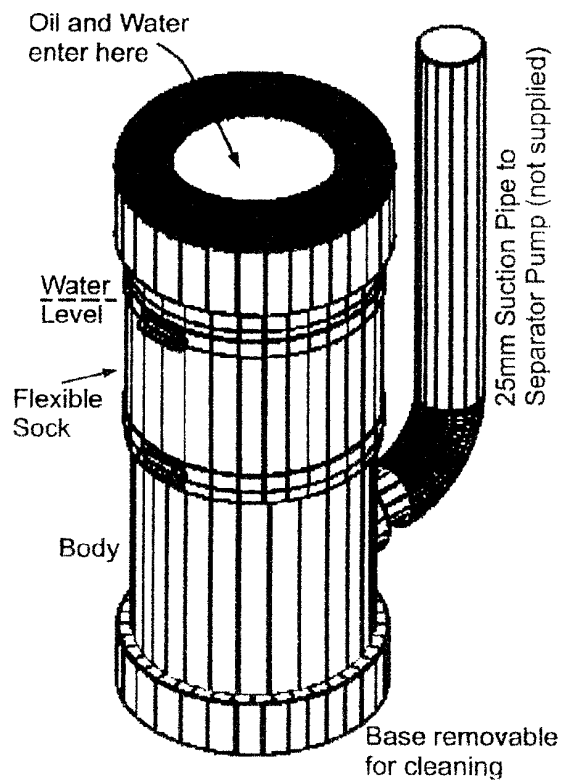
- Oil Refineries
- Mechanical Workshops
- Service Stations
- Metal Production and Recycling
- Power Stations
- Process Water Recycling
- Vehicle Dismantling and Repair
- Remediation Systems
- Waste Processing
- Restaurants and Food Outlets
- Shopping Centres
- Clubs and Hotels
- Sporting Stadiums
- Resorts
- Schools and Colleges
- Mining Sites
- Hospitals and Nursing Homes
- Factory Canteens
- Processing Plants
- Abattoirs

1.4 SK20 Skimmer*

The SK20 Skimmer* is a fixed body oil skimmer. It is fixed near the surface of the liquid, and via the clever use of a flexible sock, efficiently gathers free oil for delivery to the ACQUA VGS*.

1.4.1 Features

Skimmer	Trash Basket
<ul style="list-style-type: none"> • Lower cost 	<ul style="list-style-type: none"> • Emergency basket available
<ul style="list-style-type: none"> • Ideal for constant level interceptors ($\pm 25\text{mm}$) 	



1.4.2 Specifications

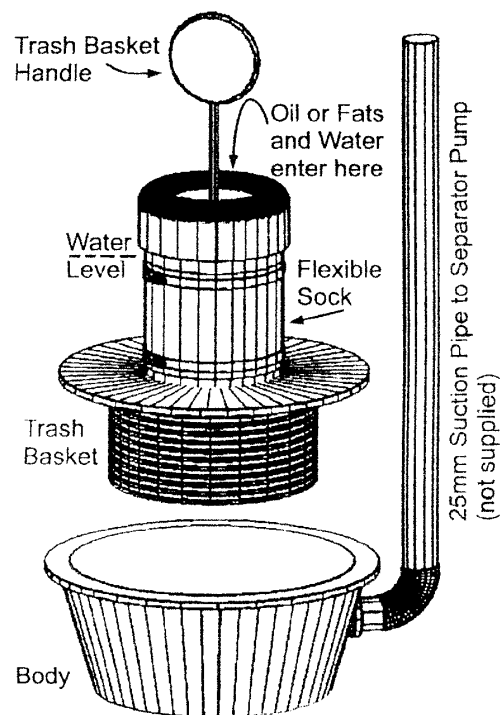
Flow Rate	600 - 3000 L/hr
Weight	1kg
Dimensions	140mm (diameter) x 200mm (height)
Minimal Operational Water Depth	250mm
Materials	Plastic and Steel
Pipe Construction	1" BSP Male

1.5 The SK21 Skimmer*

The SK21 Skimmer* is a fixed body oil or grease skimmer with an easily removable trash basket. It is fixed near the surface of the liquid, and via the clever use of a flexible sock, efficiently gathers free oil for delivery to the ACQUA VGS*.

1.5.1 Features

Skimmer	Trash Basket
<ul style="list-style-type: none"> • Lower cost 	<ul style="list-style-type: none"> • Flexible and resilient
<ul style="list-style-type: none"> • Ideal for constant level interceptors ($\pm 25\text{mm}$) 	<ul style="list-style-type: none"> • No screen required
	<ul style="list-style-type: none"> • Jumbo basket (optional)
	<ul style="list-style-type: none"> • Prevents blockage



1.5.2 Specifications

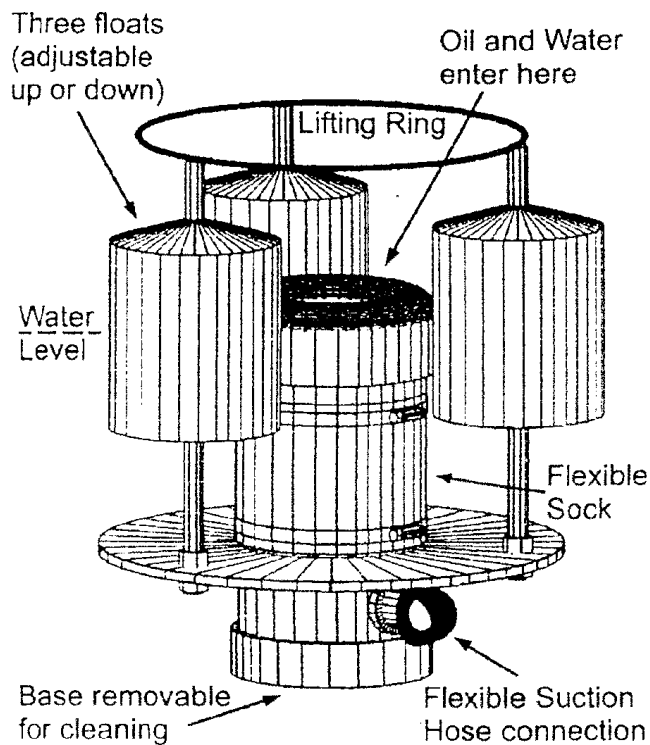
Flow Rate	600 - 3000 L/hr
Weight	5kg
Dimensions	300mm (diameter) x 400mm (height)
Minimal Operational Water Depth	300mm
Materials	PE Plastic and Steel
Pipe Construction	1" BSP Male

1.6 The SK31 Skimmer*

The SK31 Skimmer* is a compact oil/water skimmer with a small trash basket. It floats on the surface of the liquid, efficiently gathering free oil and water for delivery to the ACQUA VGS*.

1.6.1 Features

Skimmer	Trash Basket
<ul style="list-style-type: none"> • Lightweight and compact 	<ul style="list-style-type: none"> • Backup for emergencies
<ul style="list-style-type: none"> • Extra suction hose (optional) 	<ul style="list-style-type: none"> • Prevents blockage to the pump
<ul style="list-style-type: none"> • Small in diameter 	



1.6.2 Specifications

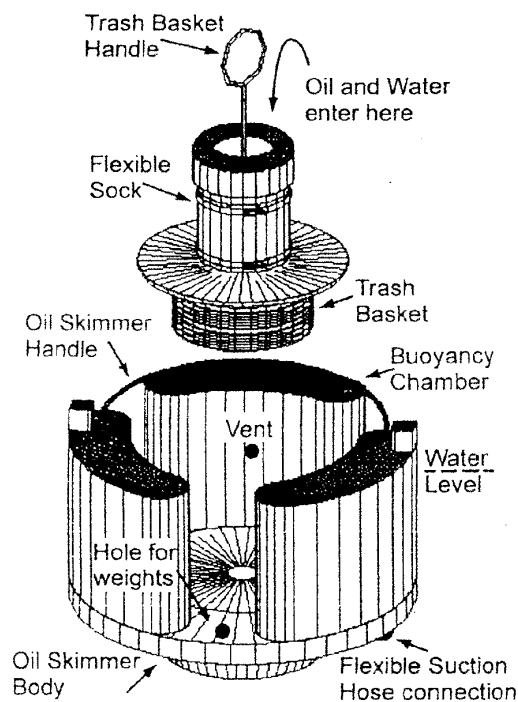
Flow Rate	600 - 3000 L/hr
Weight	4.6kg
Dimensions	360mm (diameter) x 350mm (height)
Minimal Operational Water Depth	300mm
Materials	Plastic and Steel
Flexible Suction Hose (as supplied)	1m x 1" BSP Female

1.7 The SK32 Skimmer*

The SK32 Skimmer* is a small and lightweight oil/water skimmer with an easily removable trash basket. It floats on the surface of the liquid, efficiently gathering free oil and water for delivery to the ACQUA VGS*.

1.7.1 Features

Skimmer	Trash Basket
• Lightweight and compact	• Flexible and resilient
• No adjustment required	• No screen required
• Durable	• Jumbo basket (optional)
• Extra suction hose (optional)	• Prevents blockage to the pump



1.7.2 Specifications

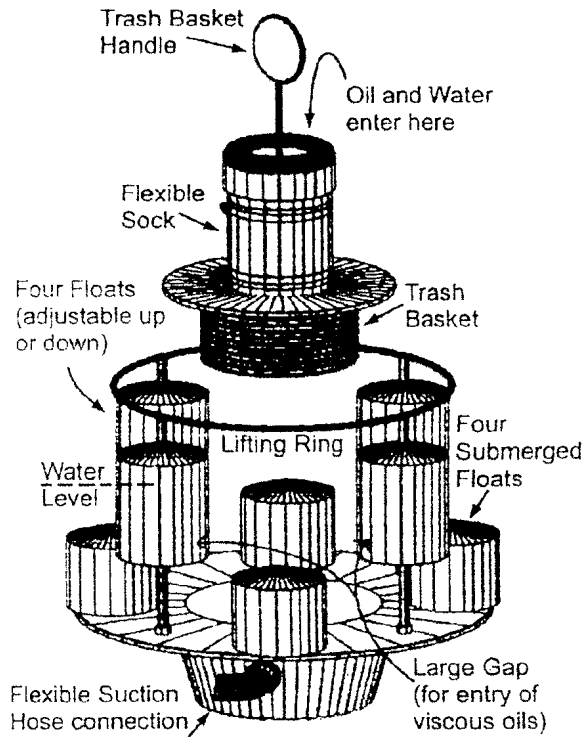
Flow Rate	600 - 3000 L/hr
Weight	7kg
Dimensions	450mm (diameter) x 400mm (height)
Minimal Operational Water Depth	300mm (Standard) 380mm (Jumbo)
Materials	PE Plastic and Steel
Flexible Suction Hose (as supplied)	1m x 1" BSP Female

1.8 The SK35 Skimmer*

The SK35 Skimmer* is a lightweight oil/water skimmer for use with viscous oils. It floats on the surface of the liquid, efficiently gathering free oil and water for delivery to the ACQUA VGS*.

1.8.1 Features

Skimmer	Trash Basket
<ul style="list-style-type: none"> • Suitable for viscous oils 	<ul style="list-style-type: none"> • Flexible and resilient
<ul style="list-style-type: none"> • No screen required 	<ul style="list-style-type: none"> • Jumbo basket (optional)
<ul style="list-style-type: none"> • Extra suction hose (optional) 	<ul style="list-style-type: none"> • Prevents blockage to the pump



1.8.2 Specifications

Flow Rate	600 - 3000 L/hr
Weight	10kg
Dimensions	520mm (diameter) x 400mm (height)
Minimal Operational Water Depth	300mm (Standard) 380mm (Jumbo)
Materials	Plastic and Steel
Flexible Suction Hose (as supplied)	1m x 1" BSP Female

1.9 The Combo Skimmer*

The Combo Skimmer* is a dual function oil skimmer and submerged intake screen. The Skimmer* collects the free surface oil for treatment by the ACQUA VGS*. The submerged screen prevents large solids from being drawn into the separator.

1.9.1 Features

Skimmer	Trash Basket	Sub Screen
<ul style="list-style-type: none"> • Lightweight 	<ul style="list-style-type: none"> • Easily cleaned 	<ul style="list-style-type: none"> • Ensures that no free oil is drawn into the separator
<ul style="list-style-type: none"> • Durable 	<ul style="list-style-type: none"> • Prevents pump blockage 	
<ul style="list-style-type: none"> • Extra suction hose (optional) 	<ul style="list-style-type: none"> • Jumbo basket (optional) 	



1.9.2 Specifications

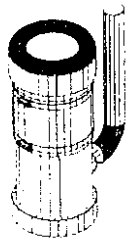
Flow Rate	600 - 3000 L/hr
Weight	10kg
Dimensions	450mm (diameter) x 480mm (height)
Minimal Operational Water Depth	400mm
Materials	PE Plastic and Steel
Flexible Suction Hose (as supplied)	1m x 1" BSP Female or 1m x 1.5" BSP Female
Screen Hole Size (mm)[client to specify]	4.8, 6.4, 8.0, 9.5, 12.7

2 SKIMMER PRODUCT SUMMARY

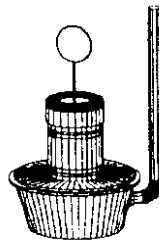
2.1 Model Chart

	SK20	SK21	SK31	SK32	SK35	Combo
Oil/Water	Yes	Yes	Yes	Yes	Yes	Yes
Grease/Water	No	Yes	No	No	Optional	No
Removable Trash Basket	No	Yes	No	Yes	Yes	Yes
Jumbo Trash Basket	No	Optional	No	Optional	Optional	Optional
Fluid Pre-screening	Yes	No	Yes	No	No	No
Body Diameter (mm)	140	300	360	450	520	450
Weight (kg)	1.0	5.0	4.6	7.0	10.0	10.0
Minimum Operational Water Depth (mm)	250	300	300	300	300	400
Maximum Flow Rate (L/hr)	3000	3000	3000	3000	3000	3000
Constant Level Interceptors	Fixed	Fixed	Floats	Floats	Floats	Floats
Floats at Oil/Water Interface	Fixed	Fixed	Yes	Yes	Yes	Yes
Submerged Intake Screen	No	No	No	No	No	Yes

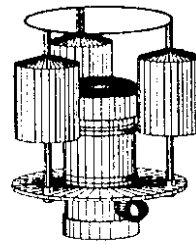
2.2 Diagrams



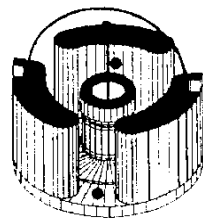
SK20



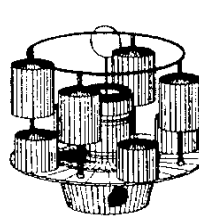
SK21



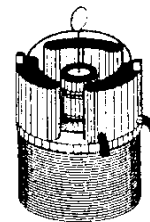
SK31



SK32



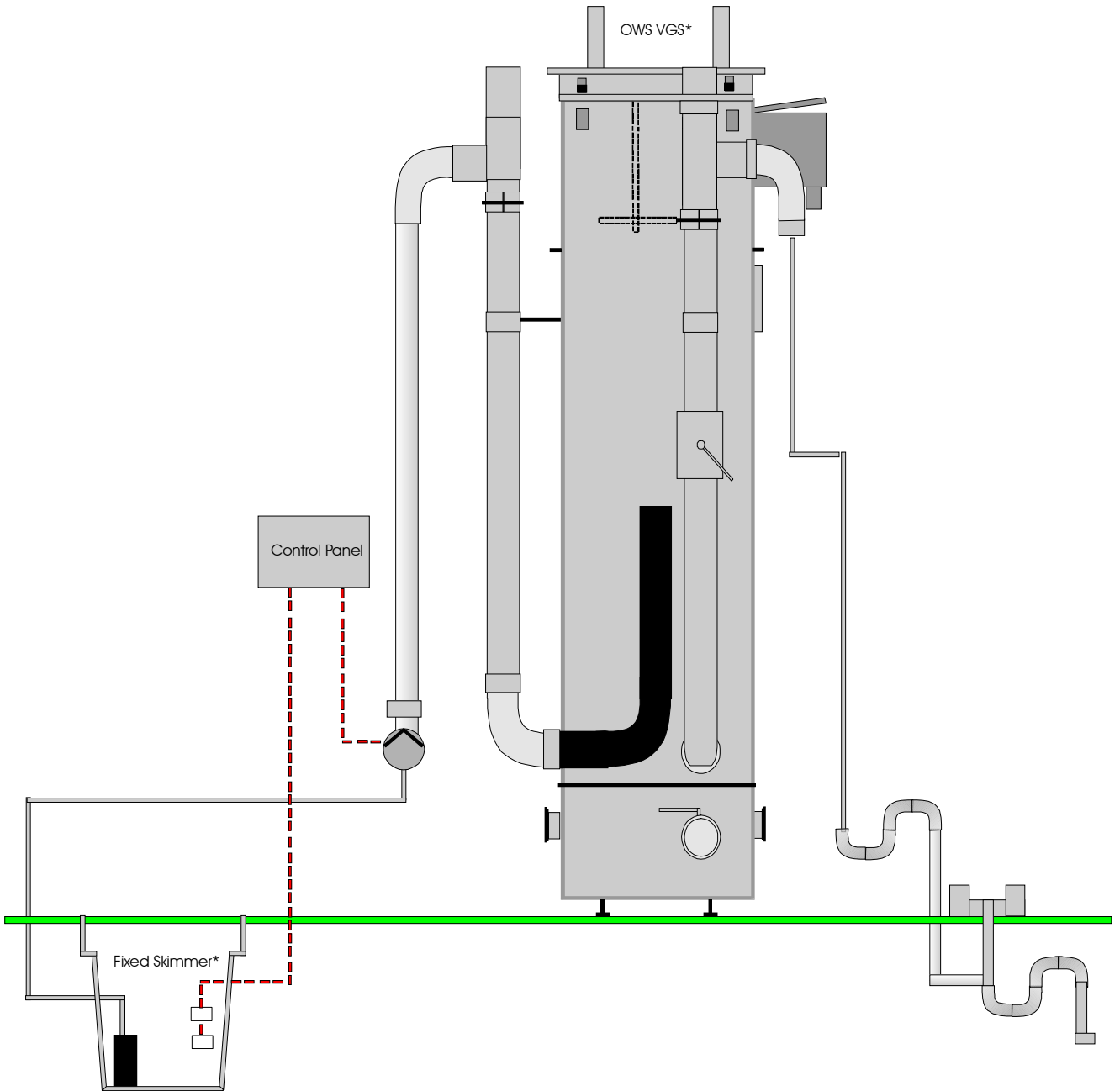
SK35



Combo

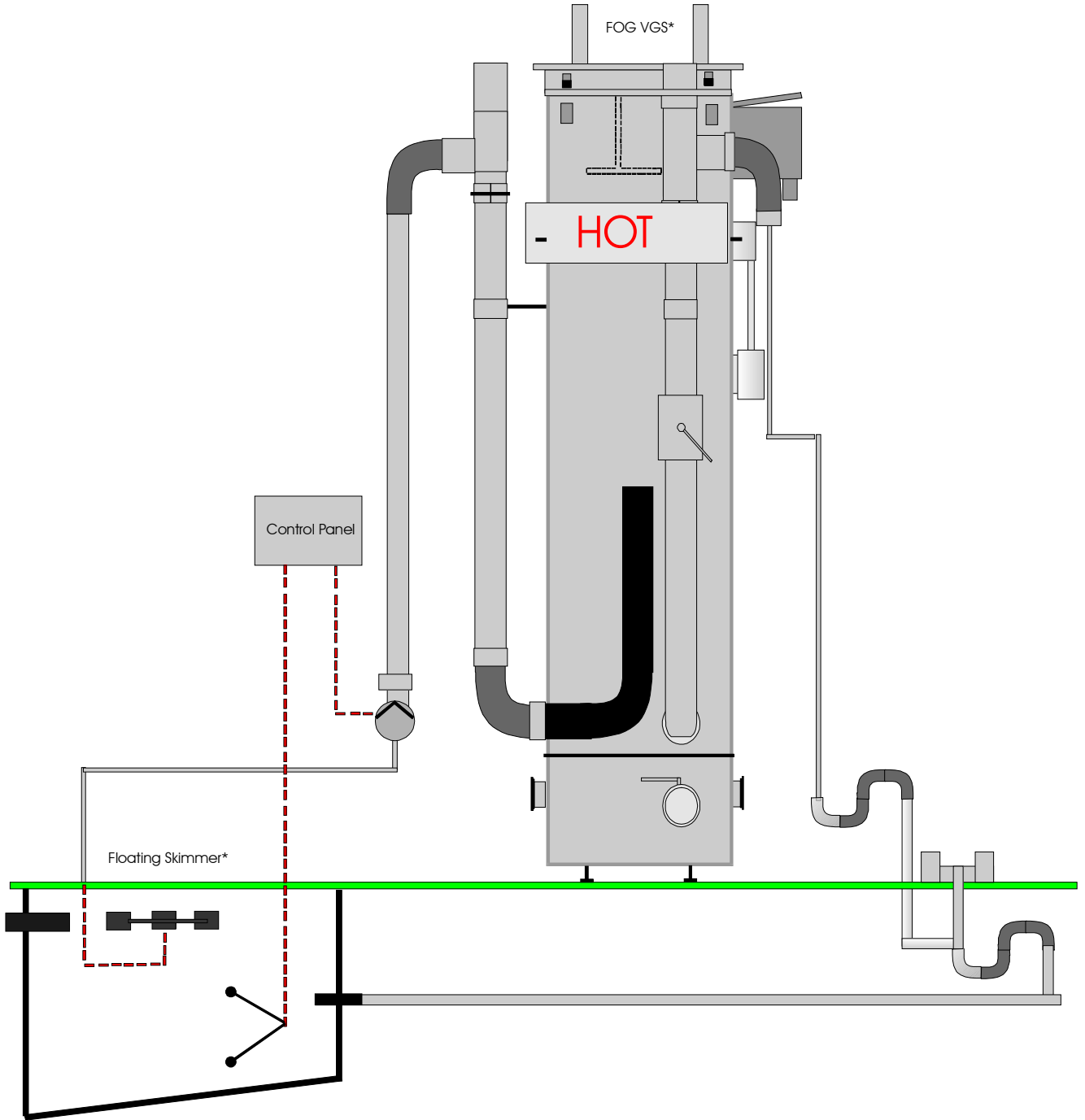
3 DIAGRAMS

3.1 Typical Skimmer* Installation (Fixed Skimmer*)



3.2

Typical Skimmer* Installation (Floating Skimmer*)



4 PROJECT SUMMARIES

Safeway

Prix Car Services

4.1 Safeway

Client	Safeway (Woolworths)
Location	Melbourne, Victoria, Australia
Product	Fat, Oil and Grease (FOG) Vertical Gravity Separator (VGS*)

Objective

To reduce pump out costs from grease traps at Safeway supermarkets and to reduce trade waste charges.

Background

Safeway grease traps were being pumped out monthly but were still not meeting Water Authority requirements for discharge to sewer. Safeway was incurring high pump out costs and trade waste charges and was under pressure from Water Authorities to comply with their requirements.



Solution

Initial trialling with the FOG VGS* showed a 90% reduction in BOD, 80% reduction in suspended solids as well as a significant reduction in total oil and grease. The removal of free oil and grease with the FOG VGS* is also extremely effective.

Safeway have now installed the system at 16 stores in Melbourne and plan to install them nationally as the payback on the installation cost is excellent. At Safeway stores with 2 or more grease traps a system of using only 1 FOG VGS* to handle 2 grease traps has been implemented.

4.2 Prix Car Services

Client	Prix Car Services
Location	Melbourne, Victoria, Australia
Product	Hydrocarbon/Water (OWS) Vertical Gravity Separator (VGS*)

Objective

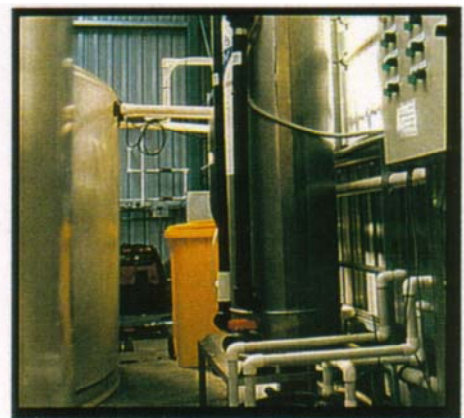
To remove BTEX hydrocarbons (Benzene, Toluene, Ethyl Benzene and Xylenes) from wash water to achieve Water Authority standards.

Background

Prix Car Services use a 10% kerosene and hot water mix high pressure sprayed onto imported cars to remove the protective wax coating. Whilst the free kerosene is relatively easily removed the remaining wash water is an emulsion of kerosene and wax.

Solution

ACQUA designed and installed a treatment plant for the removal of free kerosene and the separation of the emulsified kerosene and wax. An OWS VGS* separator skimming the surface of the wash down collection pit is used to separate the free kerosene, which is collected in tanks. The discharge from the OWS VGS* is an emulsion of kerosene and wax, which is dosed with a de-emulsifier, mixed and allowed to stand in a large tank. Air agitation is activated during the standing cycle and finally a skimming system removes the de-emulsified layer on the surface of the tank.



The water underneath is clean enough to allow 50% or greater recycling with the removing water discharged to sewer within the Water Authority's limits. The makeup water for the system is supplied from rainwater collection tanks so that no mains water is required for the washdown system of 18,000 L/day.

5 LIST OF SKIMMER* PROJECTS

Detailed below is a list of separation systems that utilise a Skimmer*, that have been installed by ACQUA.

Client	Country	Throughput (L/hr)	Application
Baileys on the Boulevard	Australia	2,000	FOG Wastewater
Bells Hotel and Brewery	Australia	3,000	FOG Wastewater
Don Small Goods	Australia	2,500	FOG Wastewater
Kraft Foods	Australia	3,000	FOG Wastewater
McCains	Australia	3,000	FOG Wastewater
Nestle	Australia	3,000	FOG Wastewater
Nestle	PNG	3,000	FOG Wastewater
Saizerya	Australia	3,000	FOG Wastewater
St Kilda Marina	Australia	3,000	FOG Wastewater
Aqua Block Plumbing Services	Australia	1,500	OWS Wastewater
Bib Stillwell Ford	Australia	1,500	OWS Wastewater
BJP Constructions	Australia	1,500	OWS Wastewater
Carrera Motors	Australia	1,000	OWS Wastewater
Cobram Toyota	Australia	1,500	OWS Wastewater
Dee Why Auto Wreckers	Australia	1,500	OWS Wastewater
Easons Car Centre	Australia	1,000	OWS Wastewater
Echuca Truck Sales	Australia	1,500	OWS Wastewater
Environmental Waste Services	Australia	1,000	OWS Wastewater
Hertz Car Rentals	Australia	1,000	OWS Wastewater
Kennards Hire	Australia	1,500	OWS Wastewater
Kennedy Plumbing	Australia	1,500	OWS Wastewater
M1 Detailing	Australia	1,000	OWS Wastewater
Mentone SAAB	Australia	1,500	OWS Wastewater
Morley Ford	Australia	1,500	OWS Wastewater
Oasis Truck Wash	Australia	3,000	OWS Wastewater
Preston Motors	Australia	1,000	OWS Wastewater
Quaker Chemicals	Australia	3,000	OWS Wastewater
South Melbourne Plumbing	Australia	1,500	OWS Wastewater
Star Track Express	Australia	2,000	OWS Wastewater
Strapp Ford	Australia	1,500	OWS Wastewater
Tradelink	Australia	1,000	OWS Wastewater
Vic Containers	Australia	1,500	OWS Wastewater

6 INDUSTRY INTEGRATION FLOWCHART

This industry integration flowchart illustrates the applications for ACQUA proprietary technologies.

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