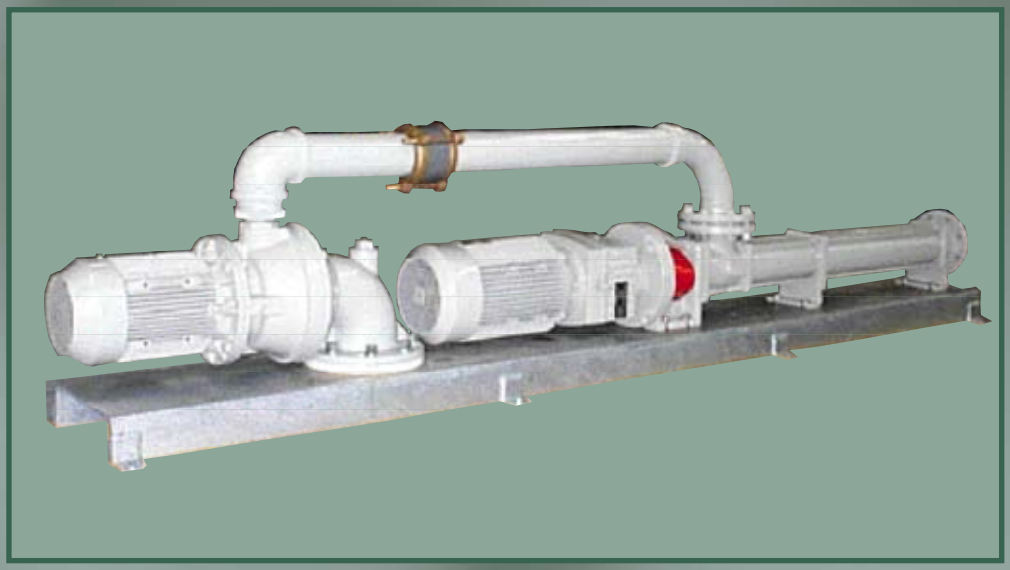
Mono®

National Oilwell Varco

Mutrator®
Sewage Pump Systems



Mono®

ıe Company, Unlimited Solutions

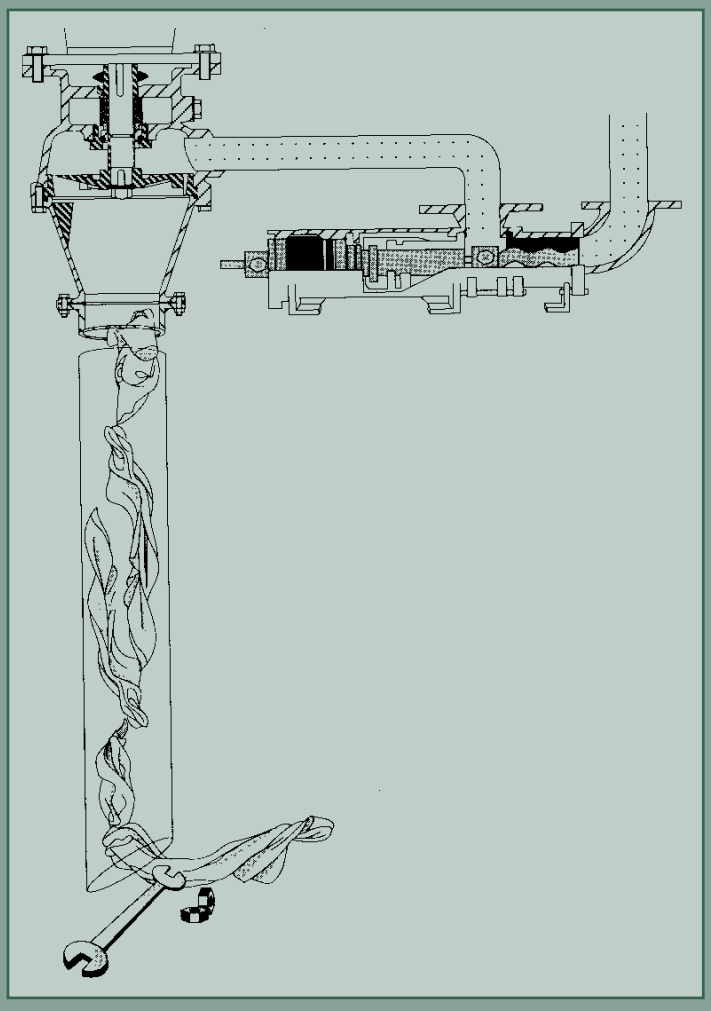
Mono® Mutrator - The

Introduction

Over 11,000 units in operation in EVERY possible type of drainage system.

The Mutrator consists of a Mono positive displacement pump with a centrifugal type macerator fitted in the suction line.

The Mono pumping principle is based on a hard helical metal rotor revolving within a resilient rubber stator. The rotor makes an interference fit with the stator, forming a cavity with a continuously forming seal line behind it, which progresses through the pump with the rotation. Particulate matter is contained within the cavity and is positively displaced to the discharge end. The pump is valveless, very simple to maintain, and very abrasion resistant.



Benefits

- **Positive Displacement Pumping**
  - Low retention times.
  - Constant flow with high heads.
  - High operating efficiency.
  - Easy flow control.
- **Above Ground Mounting**
  - Safe, easy servicing and removal.
  - No separate valve pit required.
  - Repair in situ.
- **Low Installation Costs**
  - Allows small bore piping.
  - Simple pit design.
  - No inlet screens required.
  - No separate valve pit required.

The Principle

The Mutrator is usually situated above the sump which collects the raw sewage. The positive displacement action of the pump lifts the sewage from the sump into the cutting chamber, where textile, fibrous matter, paper, etc. are held against the macerating impeller.

As the liquid content acts as an elutriation agent, large solid objects such as metal, glass, stones, etc. fall back out of suspension into the sump.

When the pumping cycle ends, macerated material falls back into the sump, clearing the suction pipe for the next duty run.

Being a positive displacement pump, head is independant of speed. This allows for slow pump speed selection, whilst maintaining high head capability. Slow speeds mean low wear rates, and on many high head pumping duties Mutrators can consume less than 50% of the energy of conventional submersible sewage pumps.

The System

The Mutrator isn't just a pump - it's a whole system principle - by finely macerating the sewage before pumping a whole host of positive benefits can be indirectly attained.

Small Bore Pumping
Small bore pumping offers many substantial economic and operational advantages over conventional large bore systems using traditional submersible sewage pumps.

Principle - The System

Lower Installation Costs
Small bore rising mains can usually be obtained in continuous reel lengths and installed by mole plough or slit trench methods, saving considerable sums over open trench excavations.

The flexibility of small bore pipes gives greater freedom of choice in routing layouts, and will easily follow ground contours.

Pump Housing
Pumps are housed in 'dry' above-sewage chambers or kiosks (chambers can be either above or below ground level). This makes for easier, cleaner and generally a more acceptable maintenance environment. Reduced level of 'sump entry' risks as entire pumping equipment is housed in a separate environment. This can also lead to savings on manpower and equipment utilization.

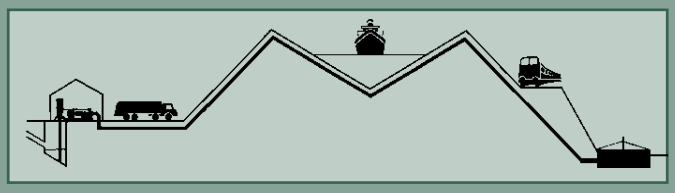
There is no need to have to haul pumps up out of festering sump bottoms and send them back to a factory or service depot for overhaul.

99.9% of all routine maintenance or repairs can be carried out 'in situ' and within a normal maximum downtime period of between 1 and 2 hours site time.

Shock Loading of Small Treatment Facilities
If the sewage is being pumped to a small rural or packaged treatment works the shock loads caused by periodic large flows of (sometimes septic) sewage from a large diameter rising main, may cause substantial detrimental effects on quality of final effluent discharge.

Positive displacement pumps can be set to give a flow pattern much closer to that of the original generation volumes and coupled with the use of small bore rising mains having lower retention times make for a significantly better feed system to a small plant. An added bonus to plant operation is that as the flow is finely macerated there is no need for inlet screens and the associated labour intensive cleaning and costly independant disposal of screenings often associated with small works practices.

Where it is critical that effluent quality is maintained at a high standard, variable speed pumps can be used. This stops the 'cyclic' action of conventional pump controls by feeding the plant more consistently (matching the biological capabilities of the plant) and makes for better quality effluent standards.

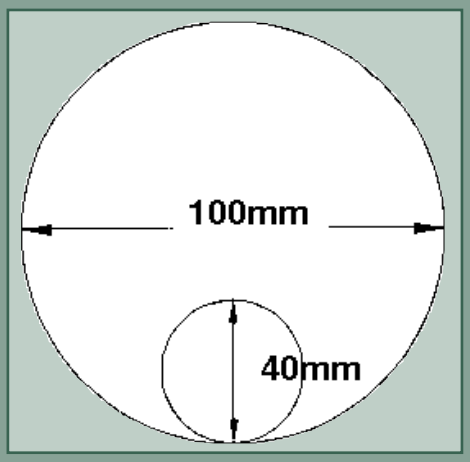


Lower Rising Main Material Costs

Typical unit/length pricing structure.

40mm MDPE: 1.0 cost unit
63mm MDPE: 2.4 cost units
100mm MPDE: 7.4 cost units

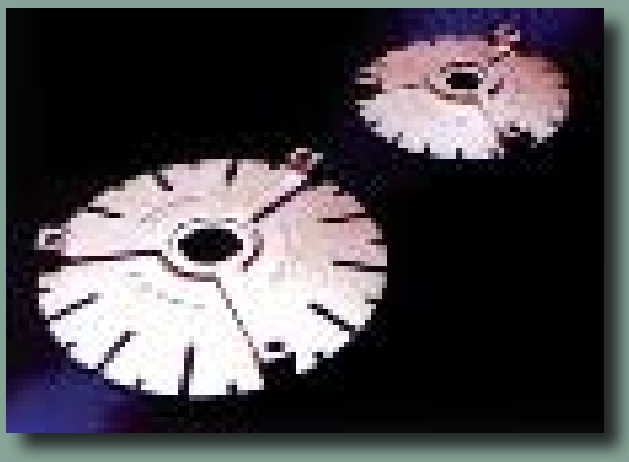
On many small development projects by using Mono Waste-Tec grinder pump systems it is often possible to use 63mm pipe instead of traditional 100mm effectively giving a typical saving of up to 70% on cost of rising main materials.



Rising Main Retention Periods
Small bores mean less volume per unit length of main. (Volume/unit length is 4 times less in a 50mm bore pipe than 100mm bore pipe). Sewage authority guidelines recommend a maximum of 4 hours retention time in a pump main. Septicity of sewage causes both a risk of H_2S attack to inspection chambers, gravity receiving sewers etc. and is undesirable at the sewage works particularly if it is a smaller or packaged treatment system. A cleaner 'fresher' sewage is far better for treatment processes, and is environmentally more pleasant and less odorous.

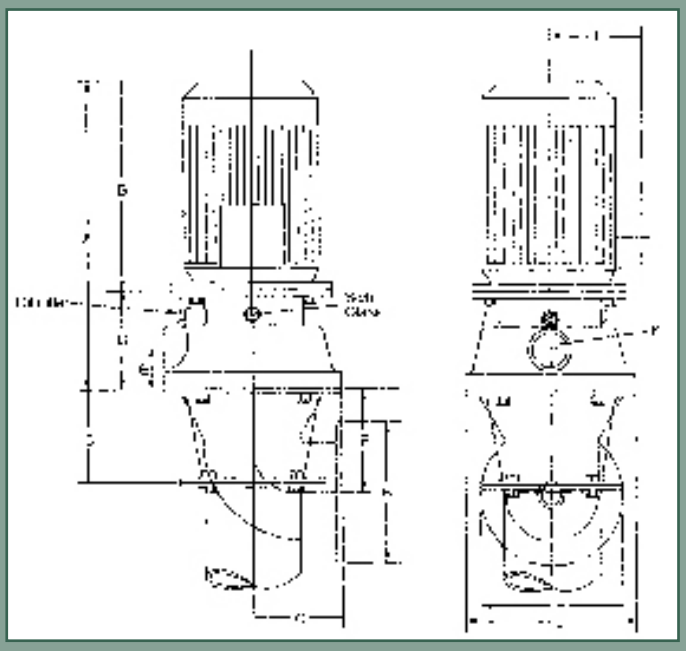
Tri-Hammer Macerators

Tri-Hammer Macerators are derived from a pedigree of over 11,000 installations worldwide our new Macerator range incorporates a number of design advances over our existing machines that give improvements in both maintenance and energy costs.



2 Model Range M12 and M18

Flow on Raw Sewage
M12 up to 5m³/Hr
M18 up to 20m³/Hr
(NB: For higher flows please refer to our Muncher range of grinders). Both models available with straight in or 90° inlet chambers.



Units can be mounted vertically or horizontally.
Dimensions shown are for guidance and planning purposes only. Please obtain certified drawings before proceeding with detail design work.

Model	Motor	Frame	A	B	C	D	E	F	G	H		J	K	L
M18	2.2kW	D100 LA	473.5	311	162.5	150	70.5	170	140	220	100 nb	275	2"	151
	3.0kW	D100 LB	473.5	311	162.5	150	70.5	170	140	250	1.25 n/b	275	2"	151
	4.0kW	D100 LK	473.5	311	162.5	150	70.5	170	140	280	1.50 n/b	275	2"	151
M12	0.55kW	D90S	398	264	134	100	45	150	90	190	80 n/b	200	1.5"	140
	0.75kW	D90L	423	289	134	100	45	150	90	190	80 n/b	200	1.5"	140

Pump Capacities

Mutrator Pump Nominal Capacities - Monobloc B Range Pumps

Model No.	Pump Speed	Motor Power	Macerator Model	Nominal Flow Rate	MAXIMUM Discharge Head
CB031	824rpm	1.1kw	M12B4N	2.5m³/hr	60 metres
	1450rpm	1.5kw	M12B4N	5m³/hr	60 metres
CB032	824rpm	1.5kw	M12B4N	2.5m3/hr	120 metres
	1450rpm	2.2kw	M12B4N	5.0m3/hr	120 metres
CB041	680rpm	3.0kw	M18E6N	7.5m3/hr	60 metres
	850rpm	3.0kw	M18E6N	10m3/hr	60 metres
CB042	680rpm	4.0kw	M18E6N	7.5m3/hr	120 metres
	850rpm	5.5kw	M18E6N	10m3/hr	120 metres
CB061	400rpm	5.5kw	M18E7N	15m3/hr	60 metres
CB062	400rpm	11.0kw	M18E7N	15m3/hr	120 metres

Models selected as reference only other pumps capable of higher flow and higher heads are available.

Mutrator Coding - Australia

	DESCRIPTION	BASIC CODES												FIELD VARns		
SYSTEM		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SYSTEM MACERATOR		M														
NOMINAL DIA	120 mm 180 mm		2 8													
INLET TYPE	80 dia straight thru 80 dia 90 bend 100 dia straight thr 150 dia straight thru 125 dia 90 bend			A B C D E												
MOTOR TYPE	0.75 kw 240/1/50 0.75 kw 415/3/50 2.2 kw 240/1/50 2.2 kw 415/3/50 4 kw 415/3/50 5.5 kw 415/3/50				2 4 5 6 7 8											
PUMP TYPE	CP800 CB03 CB04 CB06					C B B B	8 3 4 6									
PUMP STAGES	ONE TWO FOUR							1 2 4								
NOMINAL PUMP CAPACITY M3/hr	2.5 4 5 7.5 10 15 20								0 0 0 0 1 1 2	2 4 5 7 0 5 0						
GEARBOX (B Range only)	NONE LEROY SOMER SEW									0 1 2						
COUNTRY	AUSTRALIA										C					
FIELD VARns																
TYPICAL CODE		2	B	2	C	8	1	0	4	0	C					

Packaged Pump Station

The Mutrator range is also available as a 'Packaged Pump Station.'

The packaged compact Mutrator "pump in a box" principle allows a complete sewage pumping station to be transported, installed and operational on site in just a few hours.

The packaged Mutrator comprises of - holding well made of reinforced concrete of various diameters and depths to suit the requirements, complete with mass concrete ballast to prevent flotation.

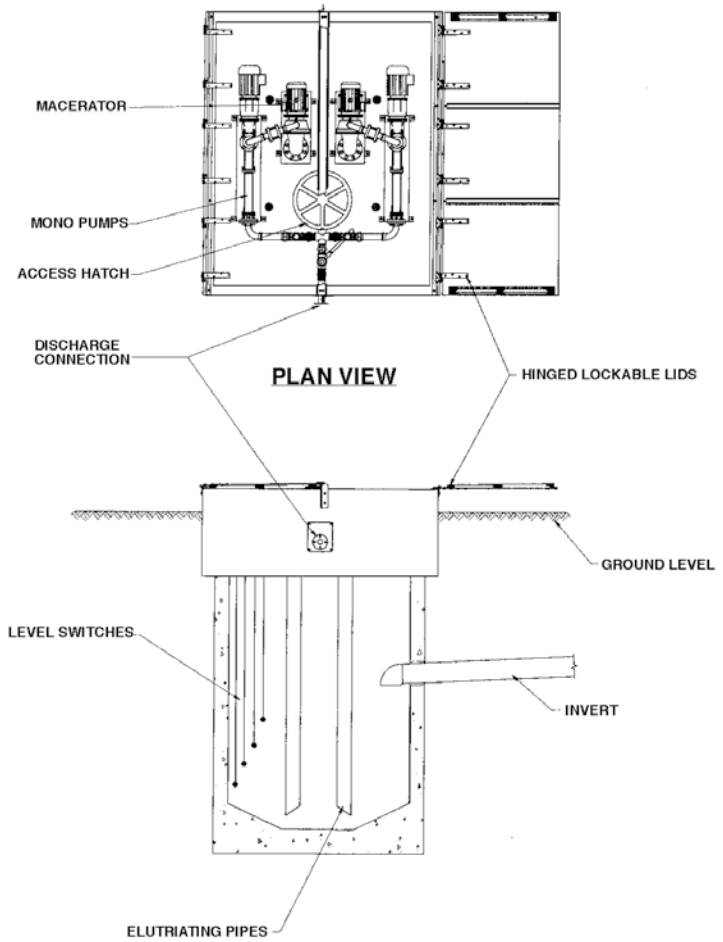
The dry well pump pit is made of reinforced concrete, into which are installed two (duty/standby) Mutrators. The pit base is the roof of the holding well, it comes complete with all discharge pipework and valves preassembled and includes a lockable metal checker plate lid.

The packaged Mutrator pump station is factory assembled and tested, an integral control panel can be included and the whole assembly can be supplied completely pre-plumbed, pre-wired and 'ready to run'. This ease of installation makes the packaged pump station system ideal for housing developments, caravan parks, factories, hotels, mining sites, any site where ease of installation is required and where maintenance must be kept to a minimum and where maintenance can be done on site.

With the packaged pump station mounted above the sewage level has the advantage that textiles and other matter cannot settle on pumps, pipework, lifting chain, pump cable, as they do with submersible pumps. Also pump maintenance is carried out at site in a dry non slimy environment.

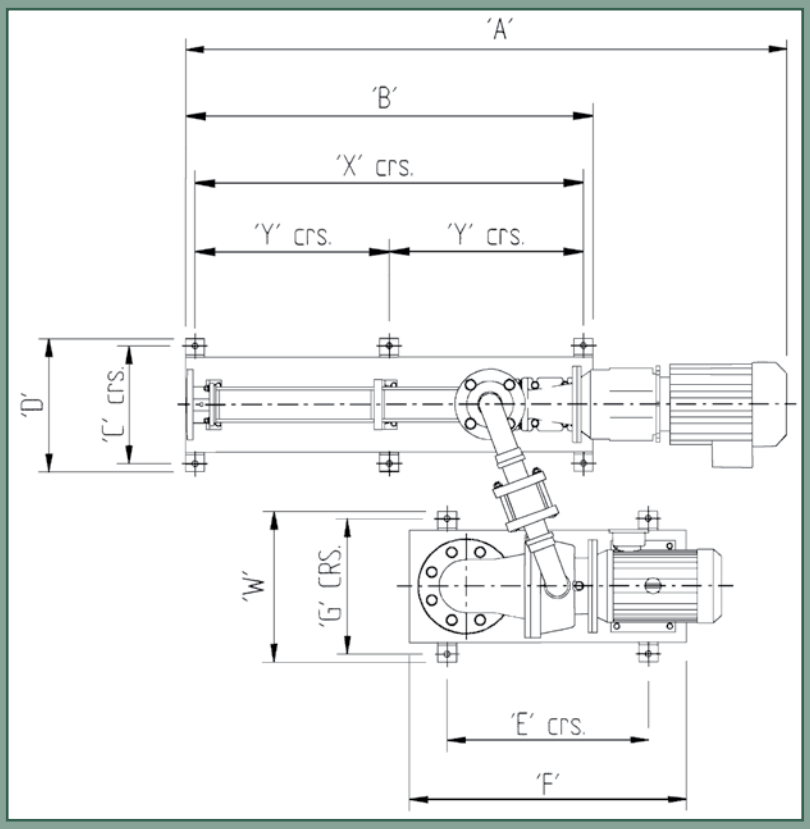
The high head capability of the pump makes the system ideal for difficult or remote sites where the controlled pumping rate provides the ideal feed to a controlled main carrier or packaged sewage treatment plant.

Packaged Pump Station (Typical Layout)

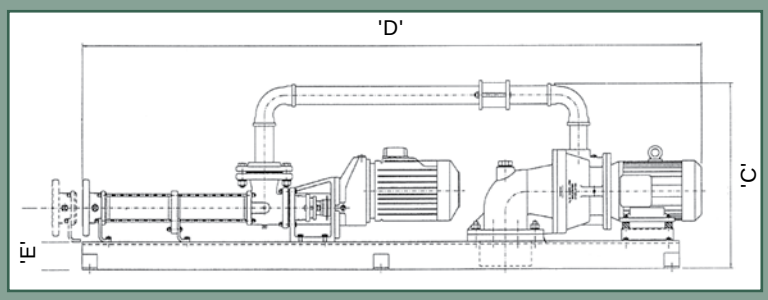


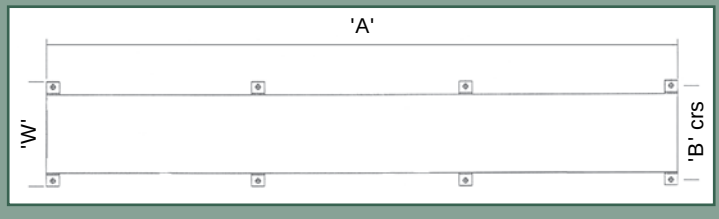
ELEVATION WITH HOLDING WELL CUTAWAY

Mutrator Pump Dimensions



SEPERATE BASE MUTRATOR WITH 90° MACERATOR INLET										
MODEL	A	B	C	D	E	F	G	W	X	Y
M2 B31	1309	775	310	350	450	600	310	350	725	-
M2 B32	1309	775	310	350	450	600	310	350	725	-
M8 B41	1362	775	310	350	550	740	360	400	725	-
M8 B42	1692	1075	310	350	550	740	360	400	1025	-
M8 B61	1764	1075	310	350	550	740	360	400	1025	-
M8 B62	2236	1420	360	400	550	740	360	400	1370	685





INLINE MUTRATOR						
MODEL	A	B	C	D	E	W
M2 B31	1960	360	546	1963	90	400
M2 B32	1960	360	571	1963	90	400
M8 B41	1960	360	610	2034	90	400
M8 B42	2400	360	633	2444	90	400
M8 B51	2400	360	646	2444	90	400
M8 B52	2650	360	695	2743	90	400

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