

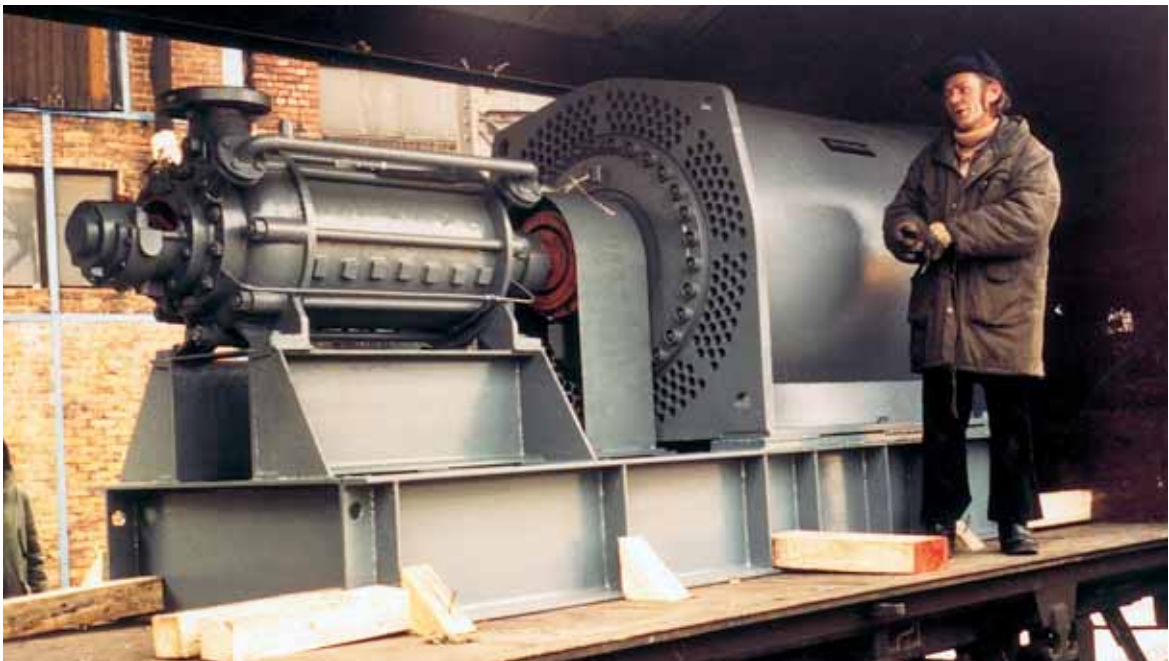
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Industry pump-aggregates

Industry aggregates



Diesel-driven centrifugal pump for crude-oil



Slurry pump 240 m³/h – 850 m w.s. with flame-proof motor 875 kW, 6000 Volt, 2975 1/min for mining

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For refinery

2



Steam-turbine-driven multistage centrifugal pump barrel-design acc. to API



Electrically-driven multistage centrifugal pump acc. to API 610

2

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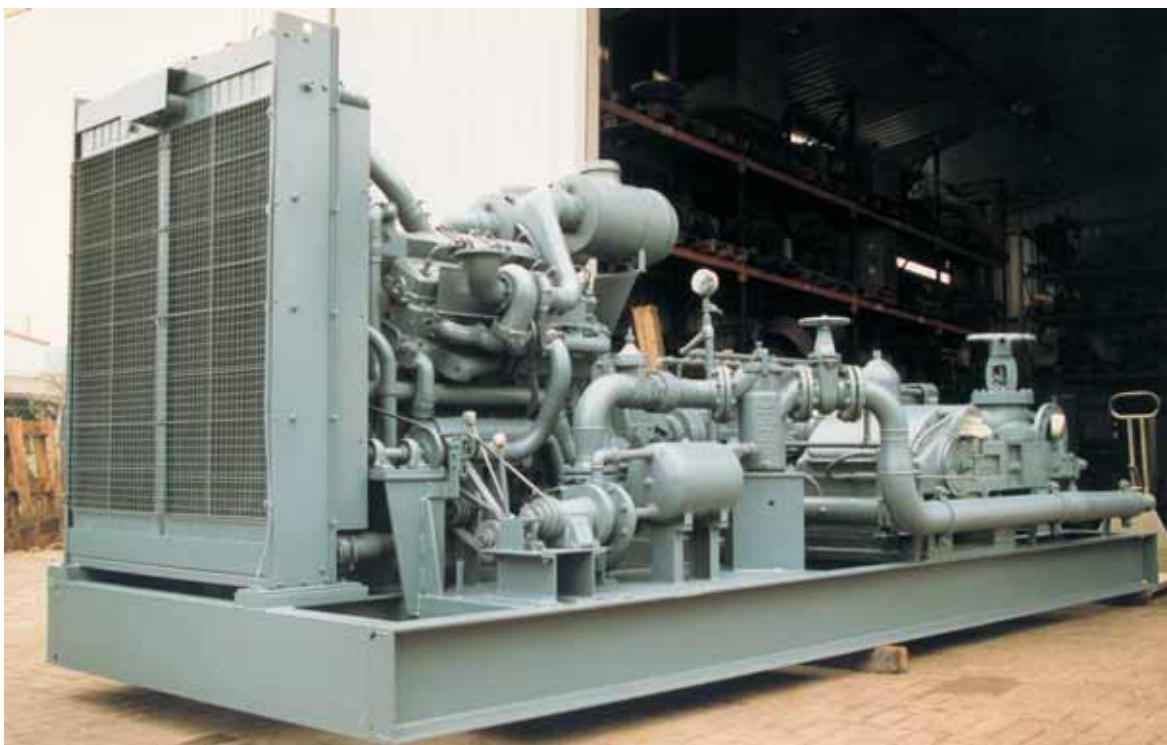
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For pipeline building



2

Oil-pipeline filling- and pressure test-pump, driven by diesel engine with gear-box and two PTO



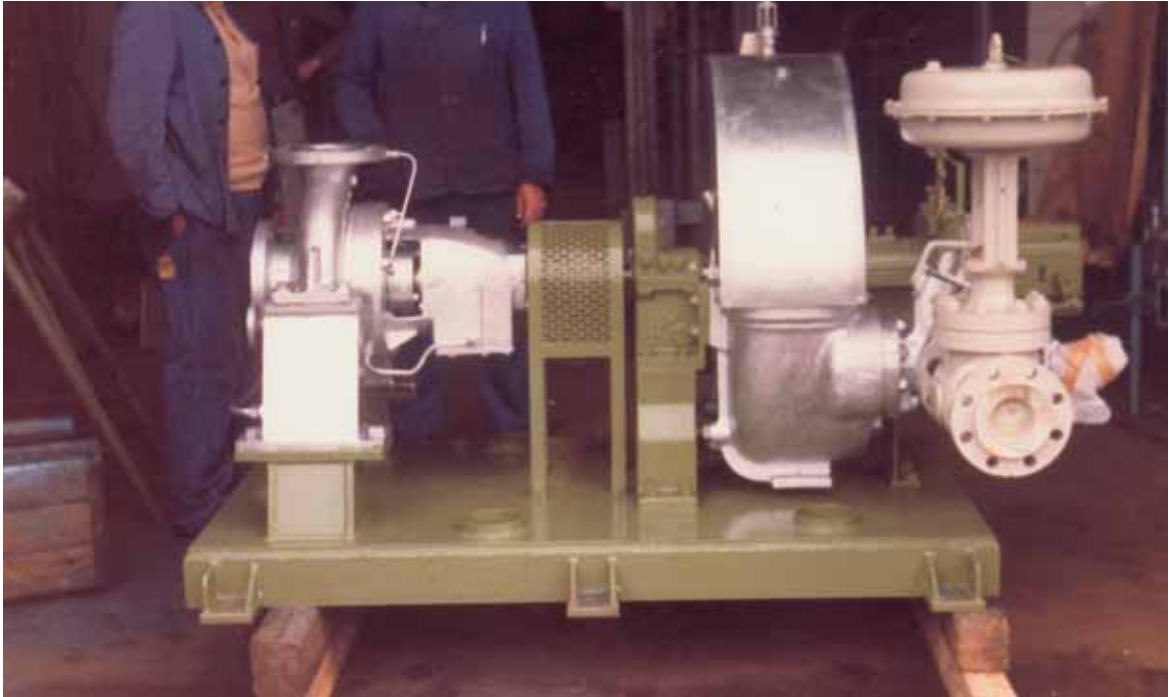
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For refinery

2



Steam turbine-driven single-stage, middle-axle-supported centrifugal pump acc. to API



Steam turbine-driven high-pressure centrifugal pump for butane, API-version

4

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Refilling station for diesel oil and gasoline with coalescer filter and volume counter



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Miscellaneous

2



Vertical centrifugal pump with additional evacuating unit



Vertical centrifugal pumps submerged 6500 mm

6

Miscellaneous



2



Mobile diesel-driven hydraulic power package for submersible drainage pumps

7

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Miscellaneous

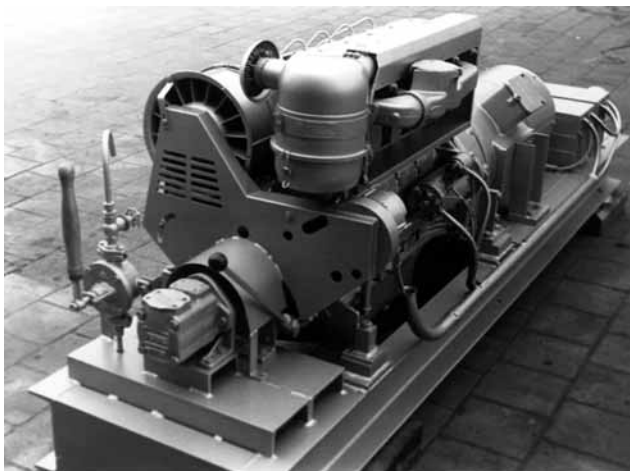
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Diesel driven axialally split centrifugal pump

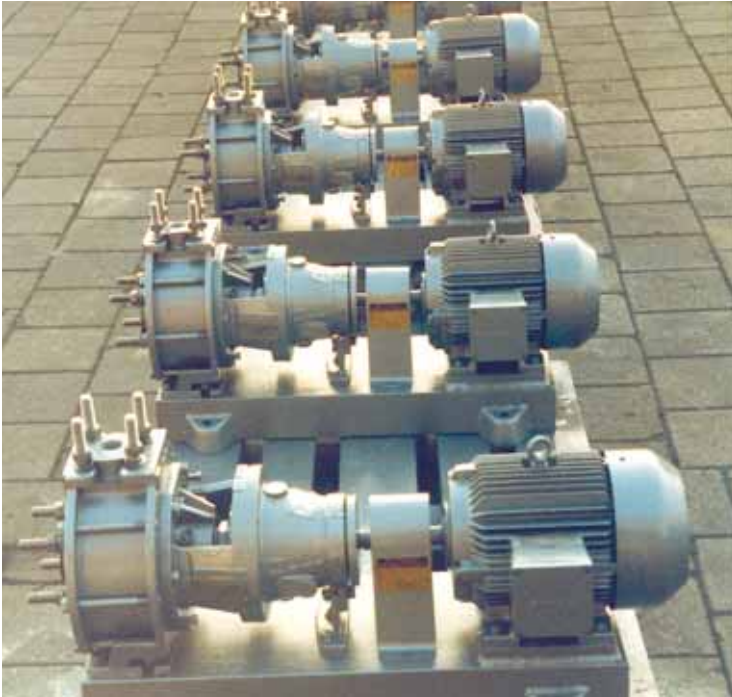


Diesel-driven single stage end suction non-selfpriming centrifugal pump

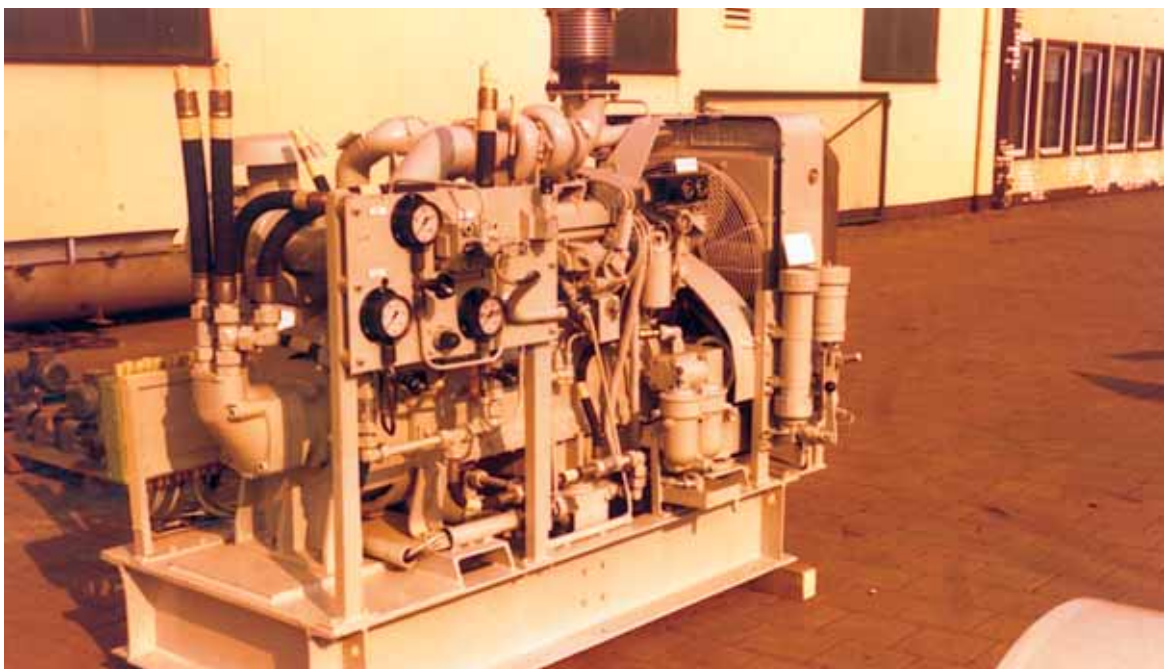


Diesel generator unit with centrifugal pump at PTO of the engine

Miscellaneous



Electrically driven acid pumps
material polyethylene



Hydraulic power package

Booster-pump-stations

Acc. to DIN 1988 booster-pump-stations must be constructed, designed and operated to grant continuous supply to consumers, without interfering with the public water supply or other consumer stations. Any change of drinking water quality must be out of the question.

2

Pressure range:

- min. pressure at tap connection 1,5 bar
- max. pressure at tap connection 6,0 bar

Total head of pump: consists of:

- geodetical height between pump and highest tap connection
- min. flow pressure at highest tap connection (1,5) bar
- friction

(if direct connection to main supply pipe minimal useable city water pressure can be reduced).



All booster pump stations can also be delivered as compact units.

Instead of pressure-dependent switching acc. to "DVGW Arbeitsblatt W 314" the booster pump station can be provided with:

Regulation in assistance of ridgeless speed-adjustment by means of frequency converter.

The stations can be delivered with 2, 3, 4, 5 or 6 pumps, the peak load pumps will be switched on and off free of pressure surge by means of electronic automatic cycle operation. The integrated frequency converter is switchboard served for speed regulated operation of base load pump (the base load pump will be switched off by a temperature limit switch if, during a long period of zero-capacity, a rise of the liquid temperature to more than 25 °C occurs).

Booster-pump stations for drinking water



2

Booster pump stations for drinking water conventional and as compact unit



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Feeder pumps for water work

2



Raw water pumps to the treatment station for use in public water works capacity 6000 m³/h



Feeder pumps as deep well turbine pumps with accessories for water works



Booster pump

For use in public water works
capacity 6000 m³/h 8 bar



Booster pump units as axially split
pumps with accessories and
switchboard for water works

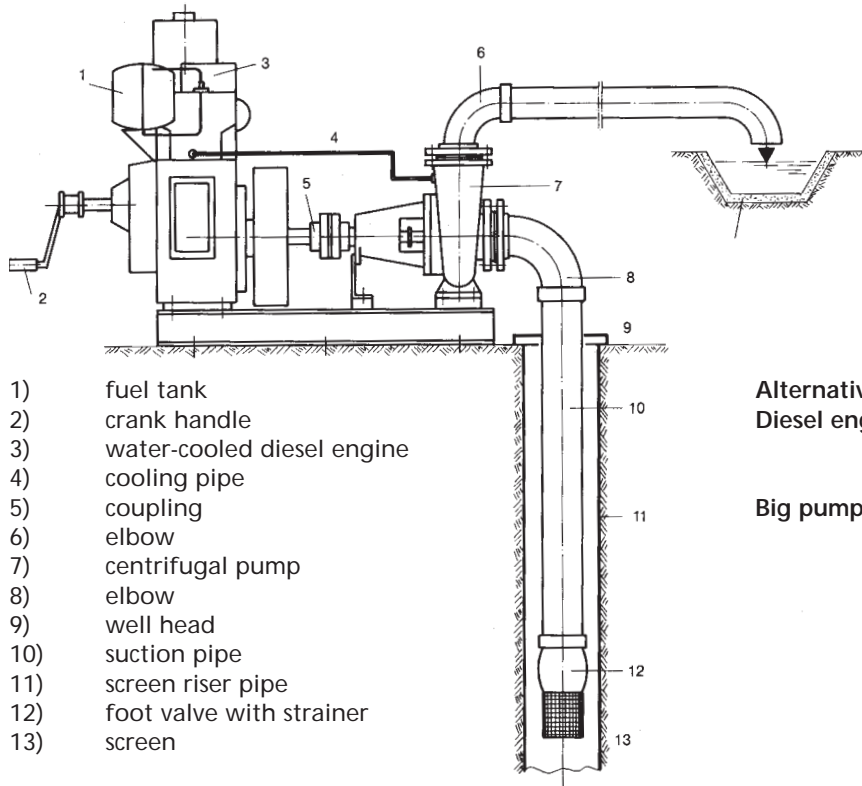


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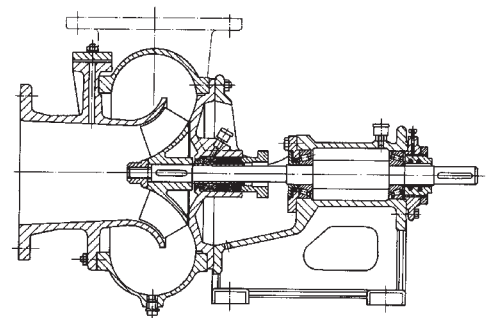
Irrigation with diesel driven centrifugal pump



Alternative:

Diesel engine: air cooled, with spring or electric start

Big pumps: with manual or automatic evacuating pump



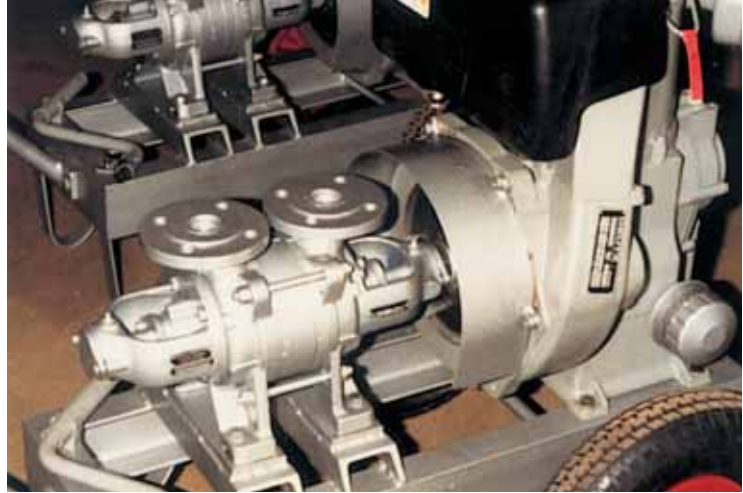
For big capacity (up to 6000 m³/h) of clean and dirty water (without solids) for drainage- and irrigation-stations we recommend the horizontal, single stage pump

Semi-axial centrifugal pump:

Very good suction height produced by small total height

Irrigation pumps

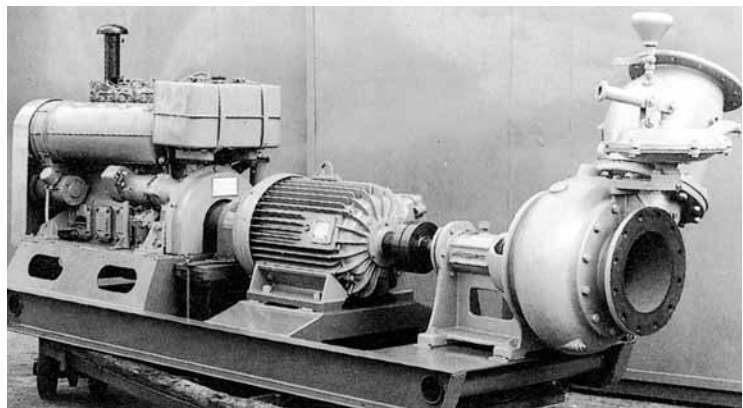
Small mobile selfpriming Irrigation pump diesel driven



Irrigation pump as deep well turbine pump. Picture shows pump-head with diesel engine



Combined diesel engine and electric motor driven semi-axial centrifugal pump for irrigation



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Irrigation pumps

2

Stationary irrigation units with Mercedes diesel engines



Stationary irrigation unit with self-priming centrifugal pump and diesel engine



Mobile irrigation unit with multi-stage centrifugal pump and diesel engine with manual pump for evacuating

Drainage pumps



Diesel driven centrifugal pump with automatic operating evacuation system



Selfpriming drainage pump for waste dump.
Diesel driven with automatic remote operation



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Drainage pumps

2



Electric and diesel driven selfpriming dewatering pumps for water containing sand and solids in suspension



Drainage pumps



With manual evacuating system

Mobile units diesel driven



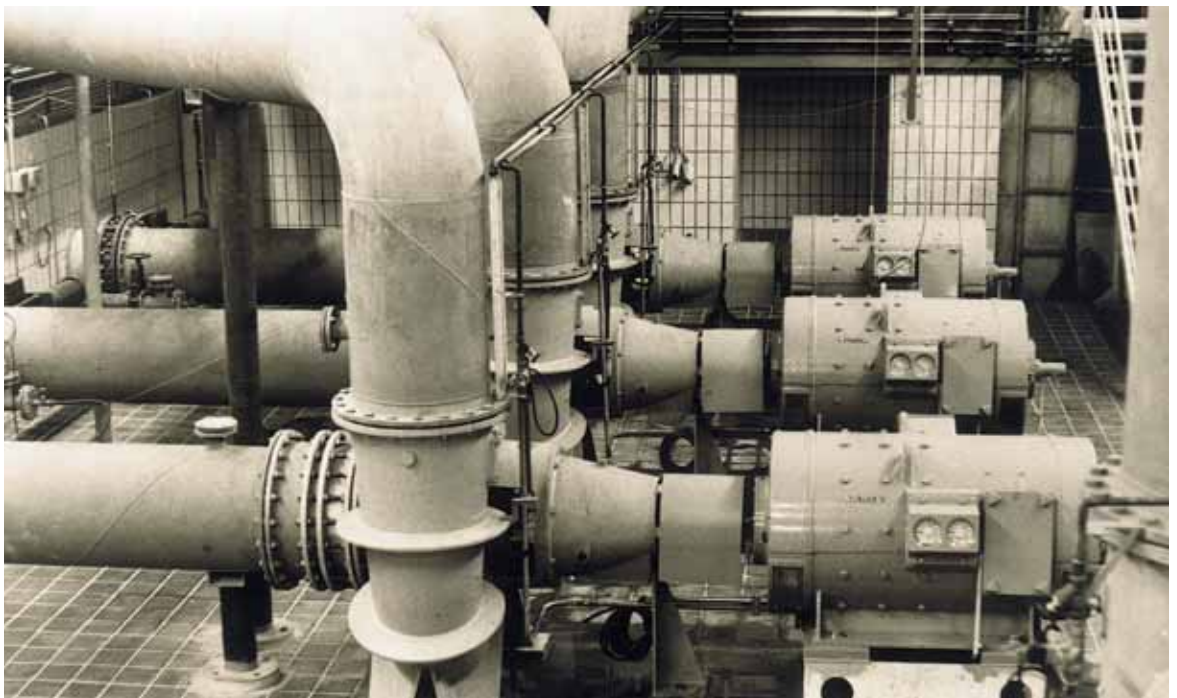
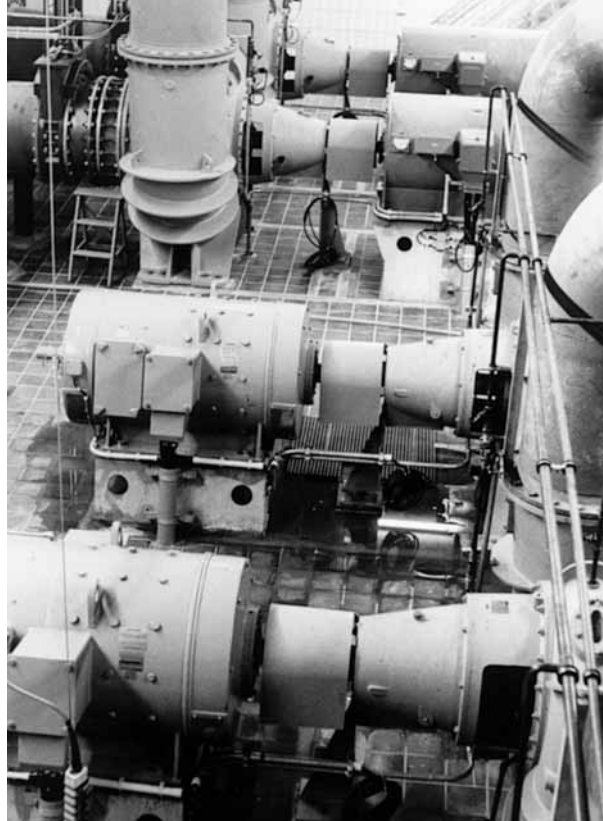
With selfpriming pump for water containing sand and solids in suspension

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Drainage pumping station
total 7000 m³/h with piping system DN 800

2



Dewatering pump station



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Dewatering pump as mixed flow pump $Q = 20.000 \text{ m}^3/\text{h}$
 $H = 20 \text{ m}$ speed 423 RPM, the power output of suitable motors 1600 KW



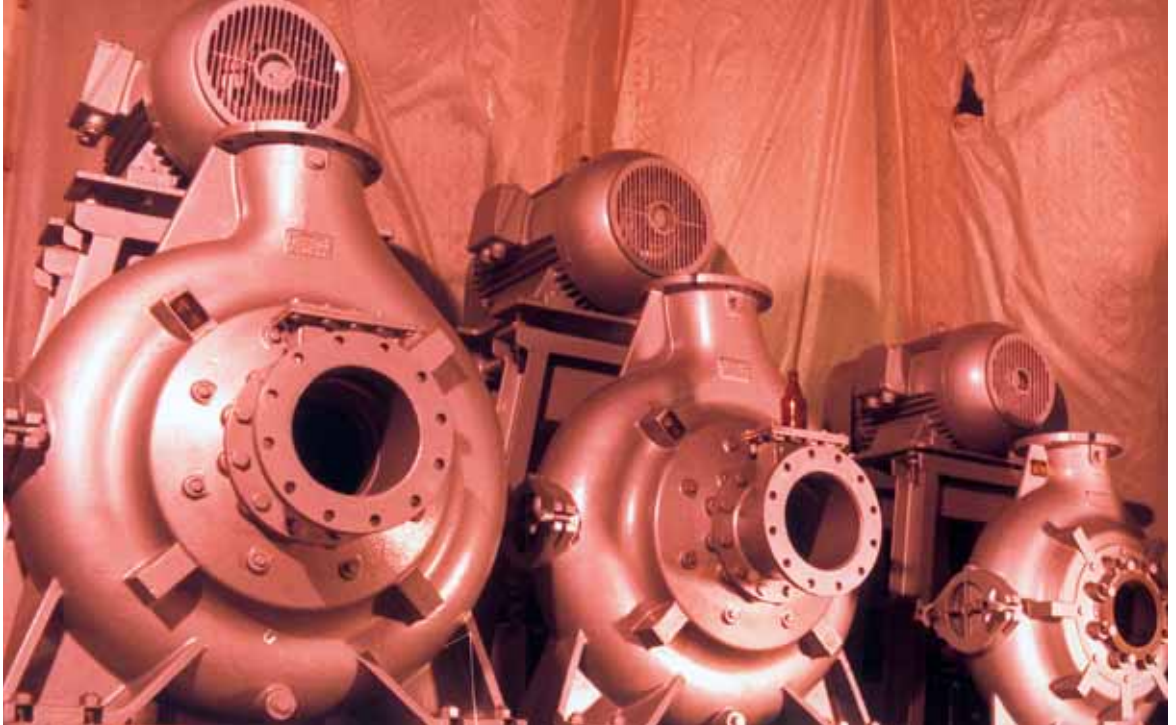
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Sewage pumps

2



Sewage pumps V-belt driven for better adjustment



Water treatment

We produce not only standard units. Production in accordance with our customers' specifications is also possible.

Containerized prefabricated machinery compact units for water treatment of raw river water to drinking water. Capacity 50 m³/h up to 250 m³/h consisting of the following main components:



2

- a) 2 low lift pumps for raw river water (1 in operation and 1 stand-by) as submersible pumps or selfpriming centrifugal pumps
- b) 2 aluminium sulphate dosing pumps (1 in operation and 1 stand-by) with 1 tank, 1 mixer, 2 dosing pumps, 2 ball valves, 1 injection unit, 1 pressure valve
- c) equipment for disinfection of the river water by means of chlorine gas with 2 or 4 cylinders, 2 vacuum regulators, 1 vacuum change-over device, 1 carbon filter, 1 dosing regulator, 1 injection with injection unit, sample water extraction, measuring water pump, compact measuring system, pH-electrode, buffer solution, Alcon compact photometer, 2 pH reagent with reagents set, dosing pump with accessories. Safety equipment as gas detected gas warning system, gas sensor, signal horn, flashlight, sprinkler system. Installation in separate chamber in the container (insulated with air-conditioning if the plant is to be used in a tropical area)
- d) 2 multistage non-selfpriming centrifugal pumps made of stainless steel (1 in operation and 1 standby) for water/chlorine dosing
- e) 2 high lift pumps (1 in operation and 1 stand-by) as booster centrifugal pumps
- f) 1 hydrophore tank, steel galvanized, with manhole, with safety valve, level indicator device, pressure switch, 2 float switches and compressed air stop valve
- g) 1 air-cooled compressor with all accessories
- h) 1 back wash air blower, complete with all accessories in closed cabinet
- i) 1 switchboard made of steel, free standing, with main switch, voltmeter, frequency meter, fuses, star-delta and d.o.l.-switches each with a selecting switch, operation and alarm lamp, hourmeter. For the big motors with ammeter, current transformer, time relay. (The switchboard is connected to the air-condition system if the plant is to be used in a tropical area).
- j) 1 combined machine and sea container. Outer dimensions according to ISO container standard including all fittings for handling. 2 doors, openings at the side walls, sun-roof, CSC-label

All components in the container mounted, piped and wired ready for operation (clarifier and sedimentation tank are produced locally because they are made of concrete)



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Water treatment

2



Booster pumps for water/ chlorine dosing



High lift pumps 240 m³/h 50m



Low lift pumps and blower



High lift pumps, pressure tank and compressor



Aluminium sulphate dosing equipment



Pressure tank and compressor

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Water treatment



High lift pumps 50 m³/h 80 m



Air condition



Switchboard



Pressure vessel 3800 liter 10 bar



Aluminium sulphate dosing pumps



Chlorine gas disinfection



Chlorine gas disinfection

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2

Condensate recovery unit

Application:

The automatic condensate recovery unit is mainly used to handle hot condensate, which is commonly returned for use as boiler feed water to supply a feed water tank. Other applications are air conditioning stations (humidifier), domestic heating (static pressure) and water supply for cooling circuits.

Sizing

Receiver size:

$\frac{1}{3}$ to $\frac{1}{2}$ of the average rate kg/h condensate returns to the receiver.
 condensate rate (kh/h) = $\frac{\text{Boiler capacity (kjoule)*}}{2100}$

*1 kcal approx. 4,2 kjoule / 1 kwh approx. 860 kcal or approx. 3.610 kjoule)

Pump capacity

2 to 3 times the rate of condensate returns to the receiver total pumping delivery head:

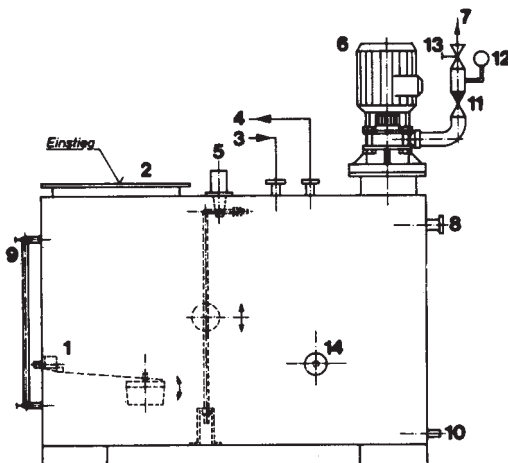
- a) **boiler feed pump:**
 static head between bottom of the receiver and average of controlled boiler-level (m)
 + friction loss in pipe and fittings (m)
 + max. boiler-pressure (m)
- b) **discharging to the feed water tank**
 static head between bottom of the receiver and max. level of feed water tank (m)
 + friction loss in pipe and fittings (m)
 + pressure in feed water tank



Condensate recovery for temperatures up to 95 °C
 vented rectangular receiver, standard specification: up to 2500 l welded construction of 4 mm steel sheet and from 3000 l to 5000 l of 5 mm steel sheet, with bolted manhole (inspection cover). strutting according to receiver volume and weight of the pump(s), special pump-counterflange(s) and welded UNP-supports.



Condensate recovery for temperatures up to 120 °C,
 operation pressure max. 4 bar with TÜV-Test. Execution acc. to "AD-leaflets". Receiver made of steel welded with manhole and 4 feet



- 1 float operated valve for treated water
- 2 manhole (inspection cover)
- 3 condensate inlet
- 4 vent
- 5 float operated magnetic level control
- 6 vertical pump(s)
- 7 pump discharge pipe(s)
- 8 overflow (to fit via an inverted syphon if necessary)
- 9 water level indicator
- 10 drain
- 11 nonreturn valve
- 12 pressure gauge with cock
- 13 gate valve
- 14 thermometer

Heat degasifying plant

Application:

Condensate specially in feedmixed freshwater of steam-generating plants normally contains gases, oxygen and carbon dioxide. To prevent corrosion in this respect on the whole system a heat- or chemical degasifier has to be installed. Because the chemical degasifying includes a loading of the condensate with salts and toxic materials, we recommend the heat degasifier.

Mode of operation:

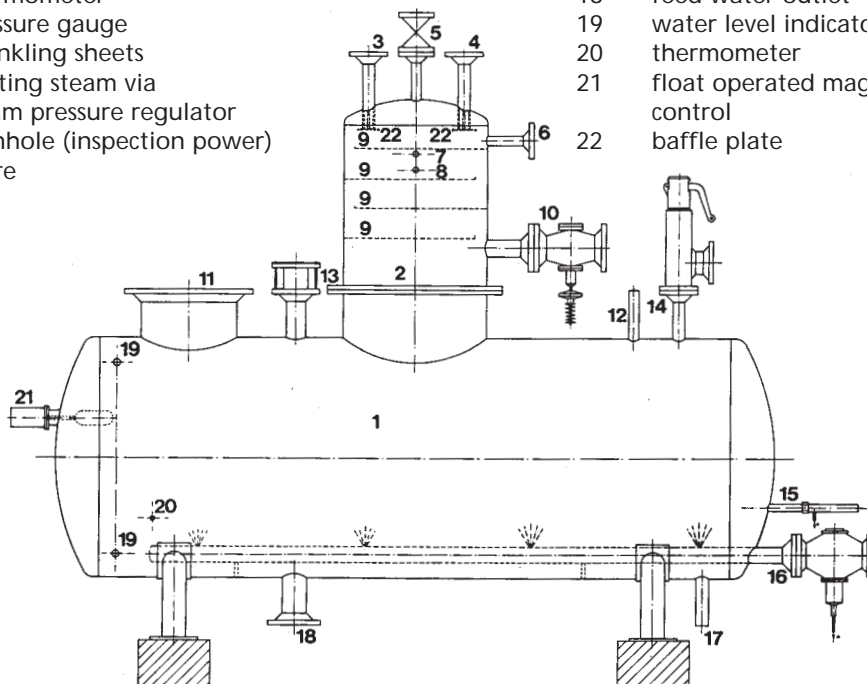
Mixture of condensate and freshwater is guided via sprinkling device as cascade sprinkling or filling body insets. The heating steam flows in counter direction into the degasifying unit to heat up the liquid to boiling temperature. Because solubility of oxygen and carbon dioxide is practically zero during boiling condition of condensate, these materials pass over into the heating steam and go out via degasifying dome and vapors outlet. In heat degasifying plants which work to an operation pressure of 0.3 bar following residual values available

oxygen < 0,1 mg/l

carbon dioxide > 1,0 mg/l

As a rule, subsequent treatment for these small residual values is not necessary. If these values are too high, very small quantities of hydrazine or sodium sulfide have to be injected.

- | | | | |
|----|--|----|---|
| 1 | feed water receiver | 13 | vacuum braker |
| 2 | degasification dome | 14 | safety valve |
| 3 | condensate inlet | 15 | temperature feeler |
| 4 | freshwater inlet | 16 | heating steam inlet via temperature regulator |
| 5 | vapors outlet with valve | 17 | drain |
| 6 | condensate inlet | 18 | feed water outlet |
| 7 | thermometer | 19 | water level indicator |
| 8 | pressure gauge | 20 | thermometer |
| 9 | sprinkling sheets | 21 | float operated magnetic level control |
| 10 | heating steam via steam pressure regulator | 22 | baffle plate |
| 11 | manhole (inspection power) | | |
| 12 | spare | | |



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Diesel – Generator – Units

For more than 25 years we have been supplying to our customers Marine Type Auxiliary and Emergency Power Generating Sets with an output ranging from 50 to 1000 KVA and a speed of 750 – 3000 rpm (50/60 Hz). Our generating sets are manufactured to have a compact design and to take up as little space as possible whilst retaining high reliability in performance and maintenance.

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The following points are a basis for selection and design concept of our Gen-Sets:

For most of our units we use marine type diesel engines and generators from manufactures with a world-wide service net.

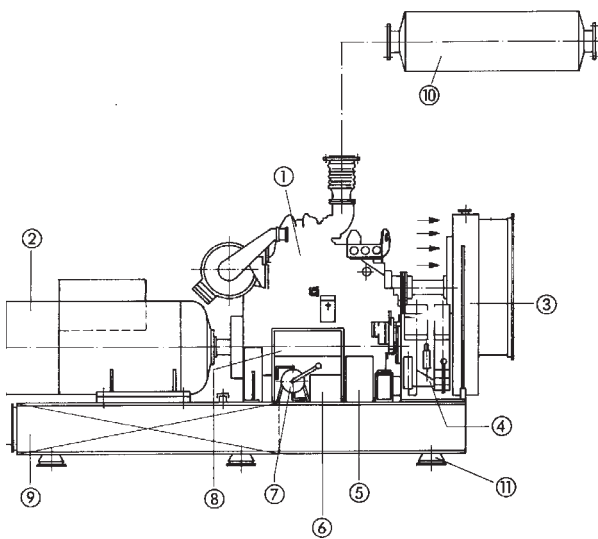
The generator set can be delivered with test and acceptance certificates from all Classification Societies and all our customers' special requirements will be considered.

Mirrlees Blackstone diesel engine with Ansaldo generator



Deutz diesel engine with Leroy Somer generator

Diesel – Generator – Units



- 1 Diesel engine
- 2 Generator
- 3 Radiator with fan
- 4 Emergency starting device
- 5 Battery, maintenance free
- 6 Battery charger
- 7 Hand pump
- 8 Supervision
- 9 Fuel tank 18 h
- 10 Exhaust silencer with spark arre-
stor
- 11 Flexible mounting



Caterpillar diesel engine with Siemens generator

Starters are offered acc. to Classification Societies Rules. We have the following starters:

- Electric
- Spring
- Compressed air
- Hydraulic

As a secondary starting device for emergency generator sets we provide:

- Hydraulic starter with high pressure hydraulic accumulator
- Hansa-Quick-Starter

If a second P.T.O. at the flywheel of the diesel engine is available, the following can be assembled:

- Compressed air starter
- Spring starter

Hydraulically actuated starter systems are more expensive, but they start more reliably and are easier to handle than Hansa-Quick-Starters.

Starting batteries are mounted at the base frame of the generator set to ensure a short cable distance between battery and starter. Apart from normal lead batteries we also supply Ni-Cd batteries and other maintenance-free special batteries.

We also supply all necessary instruments for monitoring, alarm and shut-down which conform to Classification Societies Rules whilst still meeting the individual needs of our customers and of the manufacturers of the diesel engines and generators. These instruments can either be supplied as a loose unit or installed at the generating set.

Diesel oil tanks can be incorporated within the base plate complete with level indicating gauges and alarm devices thus obtaining a compact generating set.

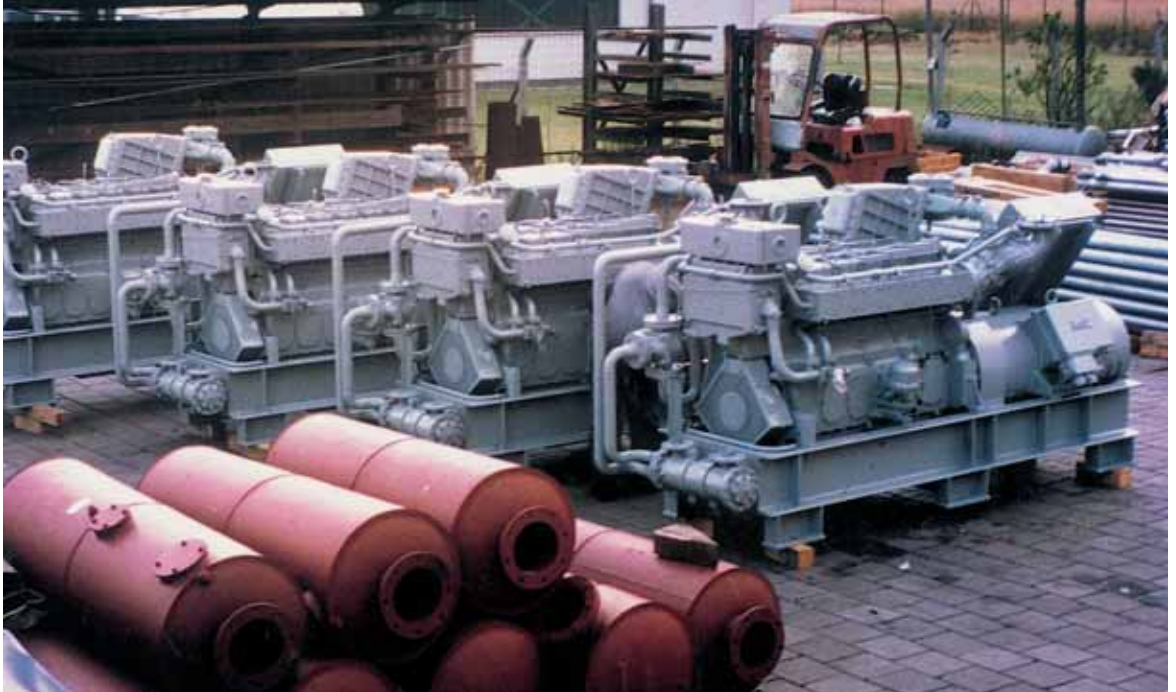
Important accessories such as antivibration mounting elements, flexible hoses, silencers/spark arrestors, expansion bellows are selected acc. to Classification Societies Rules.

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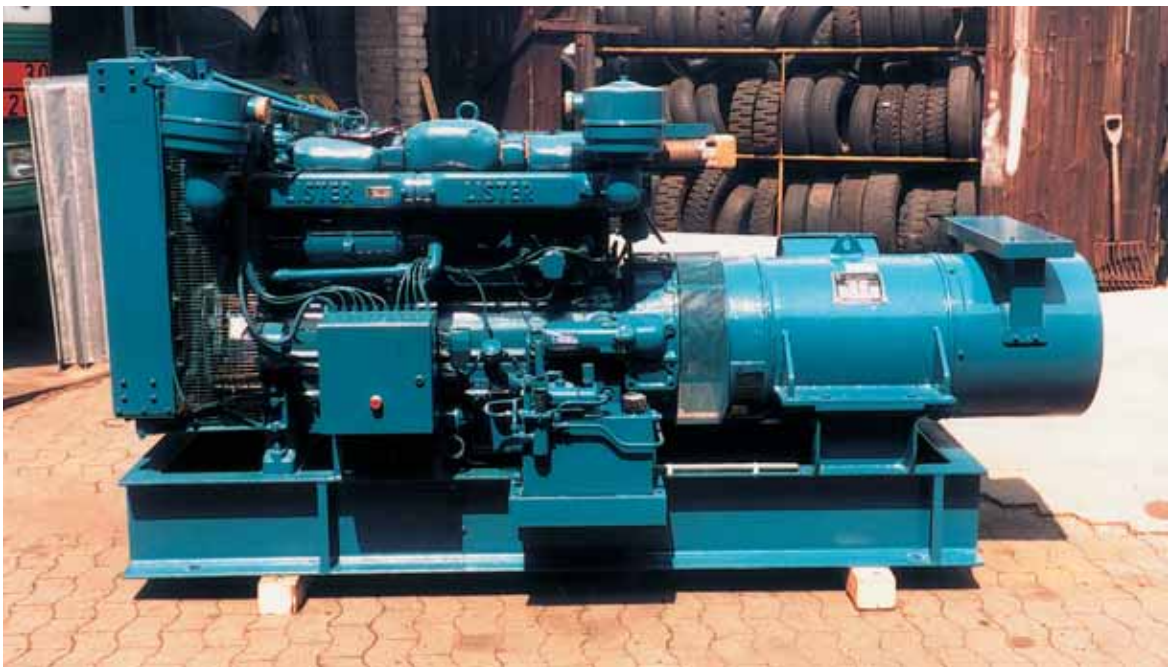
Industry pump-aggregates

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Diesel – Generator – Units

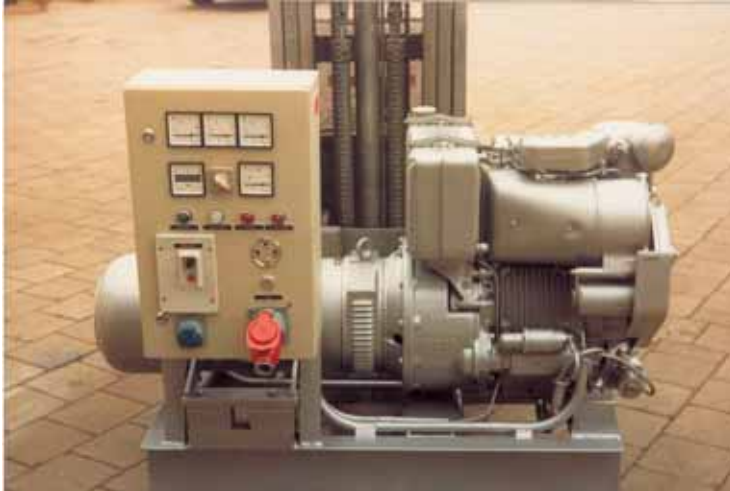


Auxiliary diesel gensets with Deutz engines and A. van Kaick generators



Emergency genset with certificate Det Norske Veritas

Diesel - Generator - Units



For land application



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Diesel – Generator – Units

2



Emergency genset

Converter for floating dock



Mobile diesel-driven welding sets