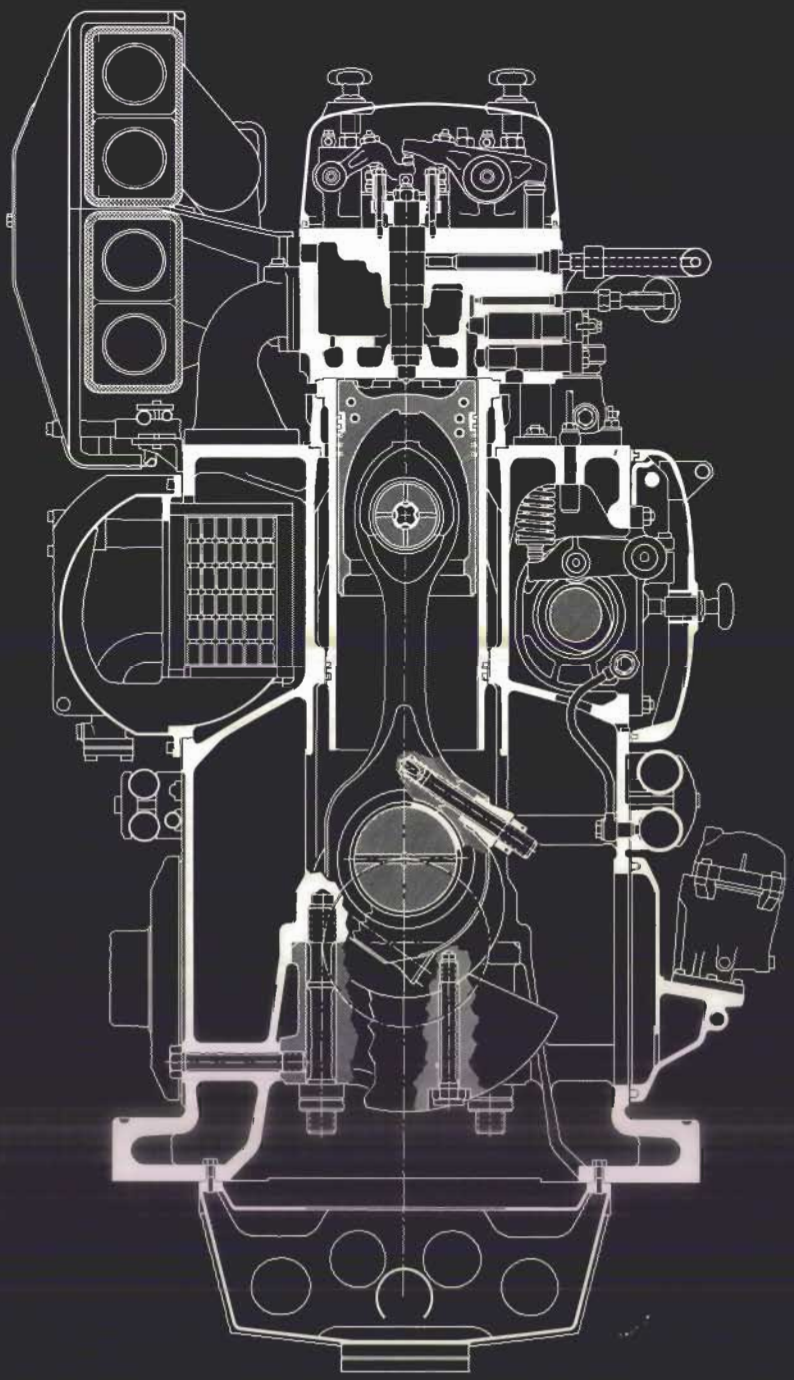
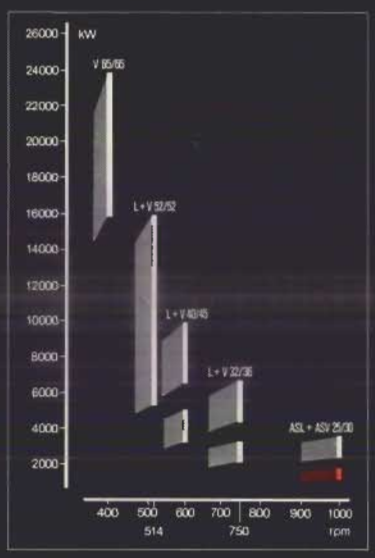
Brief Specification
Status: June 1977

M·A·N

Four-stroke Diesel engine ASL 25/30
200 kW/cylinder 1000 rpm





ASL 25/30

(M.A.N.-SULZER design)

Working cycle:	Four-stroke
Combustion process:	Direct fuel injection
Number of cylinders:	6, 8 and 9
Cylinder bore:	250 mm
Piston stroke:	300 mm
Swept volume per cylinder:	14.73 dm^3
Cylinder output:	200 kW 270 hp
Specific weight:	8.9-9.6 kg/kW 6.6-7.1 kg/hp
Coolant:	Water
Starting:	by compressed air
Specific fuel consumption at full load: (Tolerance 5%)	217 g/kWh 160 g/hp h

Performance

Speed	rpm		1000
Mean piston speed	m/s		10.0
Mean effective pressure	bar		16.3
		kW	hp
6 ASL 25/30	6 cyl.	1200	1620
8 ASL 25/30	8 cyl.	1600	2160
9 ASL 25/30	9 cyl.	1800	2430

General definition of diesel engine ratings (to ISO 3046/I)

Cont. rating 10% overload capacity for 1 hour's service within 12

Reference conditions:	
Air temperature	300 K (27°C)
Air pressure	1 bar
Cooling water temp. bef. charge-air cooler	300 K (27°C)

Engine power ranges of marine propulsion engines

MCR = Maximum Continuous Rating (fuel stop power)

I = operating range for continuous service

II = operating range temporarily admissible, e. g. during acceleration, manoeuvring (torque limit)

FP = design range for fixed-pitch propeller (Fig. 1)

VP = design range for controllable-pitch propeller with combinator (Fig. 2)

Reference conditions:	
Air temperature	318 K (45°C)
Air pressure	1 bar
Cooling water temp. bef. charge-air cooler	305 K (32°C)

Applications

The ASL 25/30 model is a single-acting four-stroke Diesel engine of trunk piston design, used as a marine main engine, a marine auxiliary engine and for stationary duties.

Engine casing

The engine casing is a one-piece casting. It houses the crankshaft bearings. Large openings at the sides afford easy access to the running gear and bearings. Some of the crankcase covers are fitted with safety valves which open automatically when pressure in the crankcase rises.

Oil sump

The oil sump is of fabricated design and bolted to the engine crankcase. It serves to close off the bottom of the crankcase and its capacity is approximately 0.3 kg of lubricating oil per kW. Where long oil-change or topping-up intervals or heavy fuel service are involved, a service tank must be installed.

Crankshaft bearings

The bearings are underslung. The steel bearing shells are lined with lead-bronze and coated with a galvanized running layer. Each bearing cover is held firmly in place by two hydraulically pre-tensioned bolts. Horizontal bolts between bearing cover and crankcase provide additional stiffnes. The crankshaft is located by rings arranged on each side of the bearing between camshaft drive and first cylinder.

Cylinder liner

The cylinder liner is made of wear-resistant cast iron and is introduced into the crankcase from the top. It abuts against a cooling water jacket. The liner is enveloped by cooling water up to the collar which is subjected to high thermal loads. This ensures efficient cooling and optimum heat distribution. In its bottom guide portion the liner is sealed by two O-rings.

Cylinder head

The individual cylinder heads are made from nodular cast-iron and forced upon the cylinder liners by four studs in the crankcase. The studs are hydraulically preloaded and, due to the stiff cylinder head, load is distributed very uniformly over the seating. Each cylinder head houses two inlet valves, two exhaust valves, one starting-air valve, and the fuel injection valve. In marine engines it also contains a safety valve. The lateral arrangement of the delivery fitting relative to the injection valve prevents ingress of fuel into the lubricating oil system.

The cooling water spaces in the cylinder head are shaped and arranged in such a way that the temperature is evenly distributed over the underface, a fact which is decisive for the life of this component.

Crankshaft

The sturdy crankshaft is a chromium-nickel-steel forging. To achieve good balancing of masses, the crankwebs are fitted with counterweights. Lubricating oil is fed from the crankshaft bearings through bores to the connecting rod bearings. The two-part gearwheel for the camshaft drive is mounted at the coupling end on two flanges facing the crankpin. If required, a shaft extension can be fitted to the "free" end of the engine for power take-off.

Vibration damper

An M.A.N. sleeve-spring vibration damper is fitted to the "free" end of the crankshaft. This type of damper has been selected since it ensures long times between overhauls at constant efficiency. Maintenance is very little.

Connecting rod

The angled split connecting rod, serrated at the parting line, is a drop forging. The bolts for the connecting rod bearing covers are made of a high-strength material. Like the cylinder head studs they are tightened and slackened by hydraulic means that facilitate very precise preloading. The two thin-walled connecting-rod bearing shells are lead-bronze lined and coated with a thin galvanized running layer. A bore in the connecting rod shaft conveys the oil to the piston pin bearing and cooling coil or cooling chamber of the piston.

Pistons

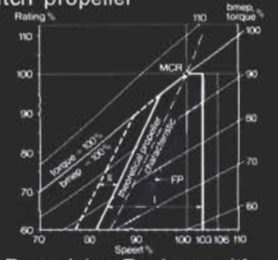
A cast aluminium piston with cooling coil and double ring carrier is used for diesel fuel operation; for heavy fuel operation a two-part piston is used. It comprises a steel crown and a light-metal skirt connected by bolts. Cooling oil admission is from the crankshaft via the rifle-drilled connecting rod and piston pin.

Camshaft

The camshaft comprises several identical sections each having the

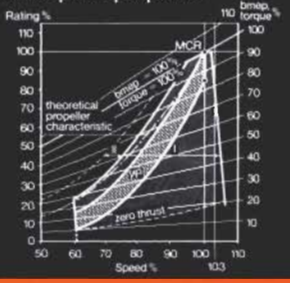
Marine Propulsion Engines with fixed-pitch propeller

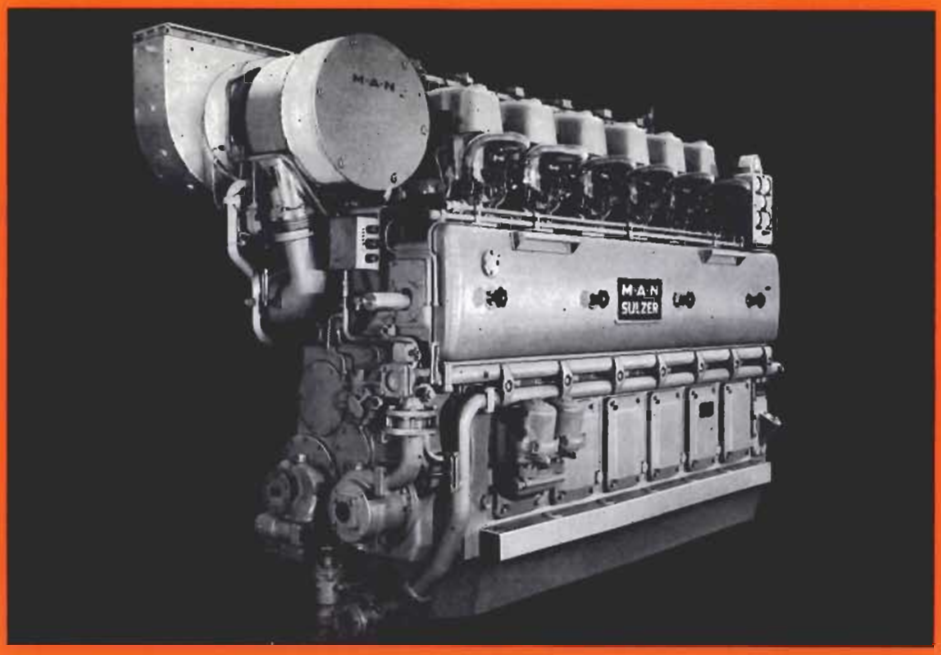
Fig. 1



Marine Propulsion Engines with controllable-pitch propeller

Fig. 2





length of one cylinder spacing. Each section has one inlet, one exhaust and one fuel cam and the sections are connected without special centring by fitted bolts so that they can be readily exchanged. The camshaft is supported in brackets on interchangeable bushes bolted to the side of the crankcase. At the coupling end the camshaft drives the starting air distributor; an electric speed transmitter can be fitted at the "free" end.

Valves

The inlet and exhaust valves have two springs each. The valve stems are hard-chrome-plated, the seats being hard-faced. The valve seat rings, which are fitted undercooled into the cylinder head, are special hard castings with great resistance to wear.
The combination of materials selected for the valve seat ensures a long service life. In heavy fuel service, the exhaust valves are rotated by rotocaps.

Fuel system

A fuel feed pump (engine-mounted for diesel fuel operation, detached for heavy fuel service) draws the fuel from the day tanks and delivers it to the injection pumps via a filter (engine-mounted in diesel fuel operation, detached for heavy fuel operation). Each cylinder is fitted with an injection pump with single-acting plunger and helical edge control. The various pumps form a unit with their drive and can be easily fitted and removed. The fuel injection valve fitted in the cylinder head is cooled by oil from the lubricating system. The fuel delivery pipes can be jacketed.

Lubrication system

The lubricating oil flows through an separately mounted filter of approx 30µ mesh width. In Diesel fuel service, purification of the lubricating oil in bypass is by two engine-mounted free-jet centrifuges, in heavy fuel service by an separately mounted separator. The oil drips from the lubrication points collect in the oil sump. The running faces of the piston are lubricated by the swirled oil dripping off the bearings. The bearings of the entire timing gear such as valve drive on the cylinder head, camshaft with rollers, and gear train, are connected to the lubrication circuit. By means of a valve, oil pressure in the circuit is kept constant.

Cooling system

Cylinder liners and heads are cooled by fresh water. The cooling water pump needed for this — a gear-driven centrifugal pump — can be fitted to the engine. Provision has also been made for a sea water centrifugal pump to be fitted for the recooling system.

Starting system

The engine is started by compressed air at a pressure of 10-30 bar. The starting valves are pneumatically opened by a control air distributor driven by the camshaft and closed again by springs. The fitted main starting valve can be brought into operation by hand or by an automatic electro-pneumatic system.

Control

The amount of fuel fed by the fuel injection pumps to the injection nozzles is regulated as a function of engine load or desired speed. As a rule, the engines are fitted with the tried and tested Woodward UG8 governor. For marine propulsion engines, particularly those in twin-engined geared drives, a Woodward PG governor may become necessary. The engine is protected from running at inadmissible overspeed by a mechanical overspeed governor.

Monitoring and operation

The underlying design concept of the engine provides for pressure and temperature monitoring of fuel, water and lubricating oil. The engine is thus protected against any damage which might be caused by failure of the lubrication or cooling system. The engine is equipped with an exhaust temperature measuring system for checking the exhaust temperature of the various cylinders. Additional instrumentation can also be fitted for temporarily unmanned operation. Wiring on the engine for the electrical instruments fitted is brought together at an easy-to-reach engine-mounted terminal box. The engine is designed for both direct manual operation and for connection to remote control equipment.

Turbocharging

The thermal energy of the exhaust gases is utilized by one highly efficient engine-mounted M.A.N. turbocharger to compress the air for combustion. This charge air is recooled in a ribbed tubular cooler fitted to the engine and fed with water, or in a separately mounted cooler through which air is passed.

M·A·N

DIESEL ENGINES

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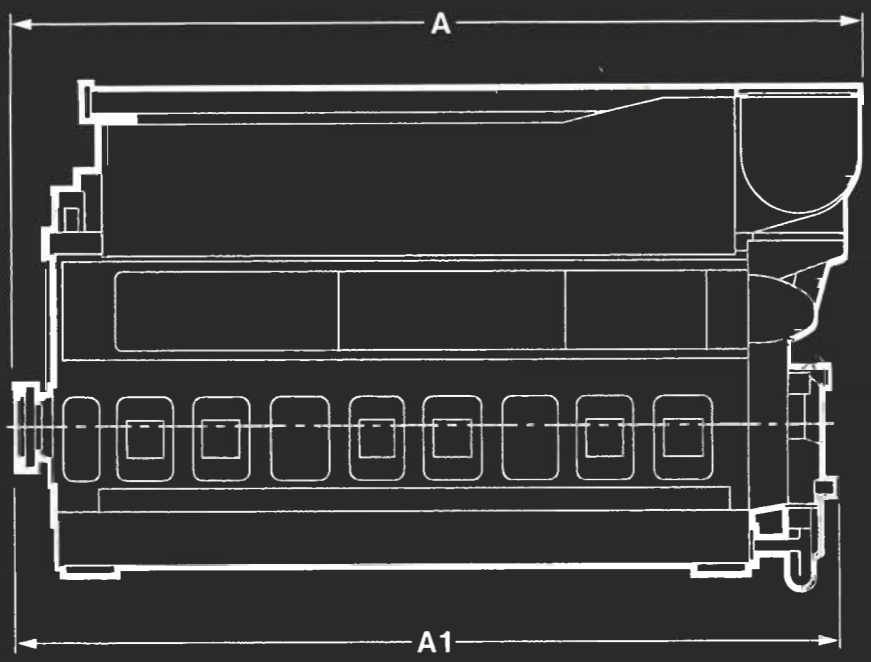

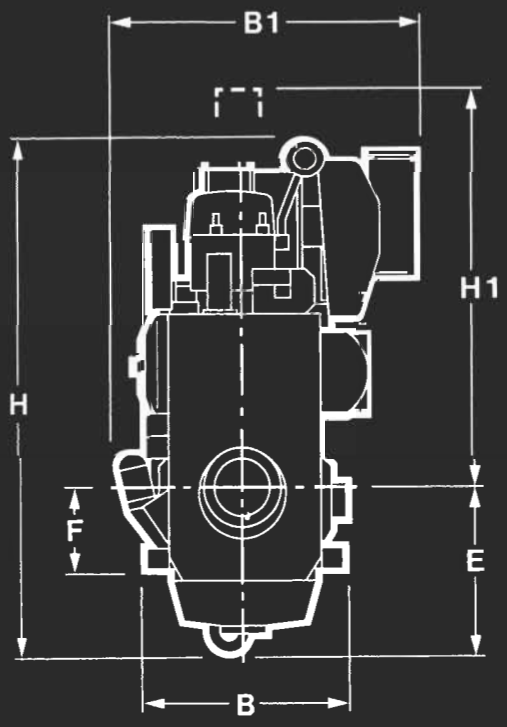

Engine	No.of cyls.	A mm	A 1 mm	B mm	B 1 mm	H mm	E mm	F mm	H_1 mm	Weight t
6 ASL 25/30	6	3450	3320	1040	1450	2450	765	420	2030	11.5
8 ASL 25/30	8	4300	4100	1040	1450	2450	765	420	2030	14.5
9 ASL 25/30	9	4650	4490	1040	1450	2450	765	420	2030	16.0

H_1 = Height required for removing cylinder liner and piston

General

Our Technical Branch Offices, Agencies and the Augsburg Works of M.A.N. will be glad to advise you on further details. All engine particulars given in this pamphlet are correct at the time of going to press but subject to change without notice.