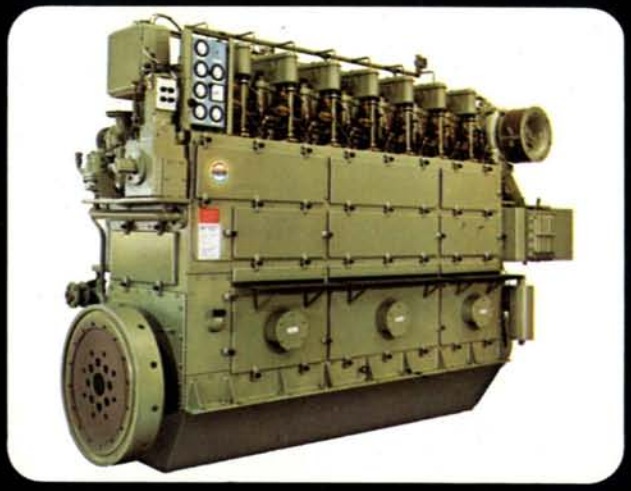
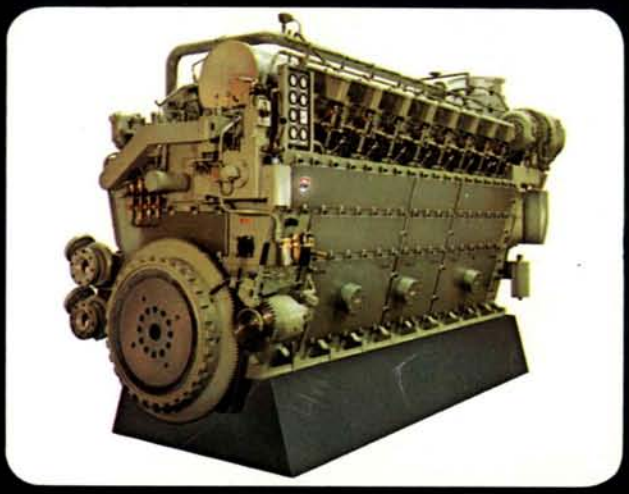
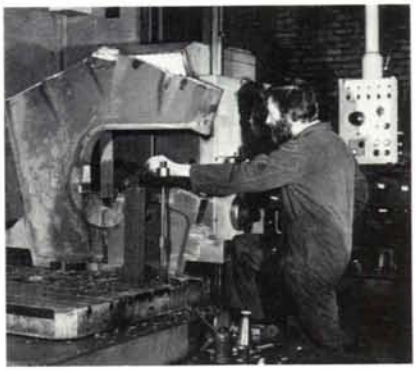


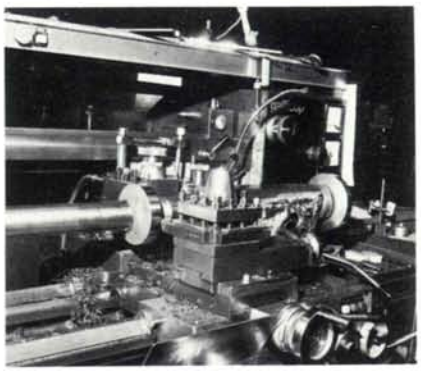
diesel engines with crosshead-scavenge piston

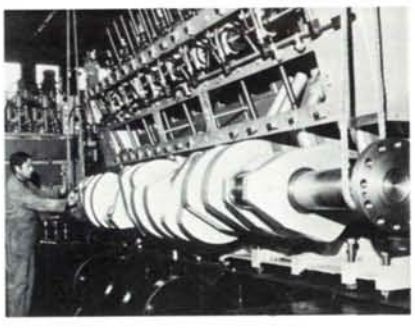


BOLNES

Bolnes Motorenfabriek BV is one of the leading manufacturers of two-stroke crosshead diesel engines. Manufacture of this equipment in the medium-speed range assures Bolnes of a unique position.
The firm's offices and production facilities are located at Krimpen aan de Lek, a town situated to the east of the international port of Rotterdam. Bolnes have been manufacturing both in-line and V-type diesel engines since 1920.



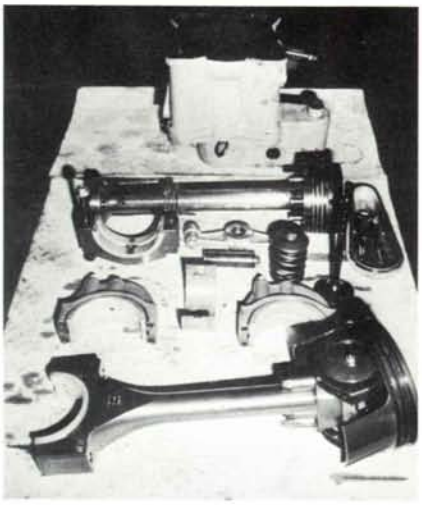


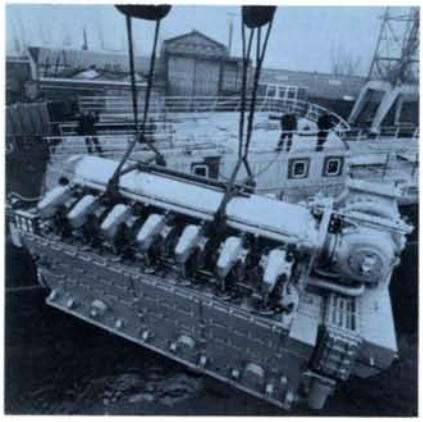


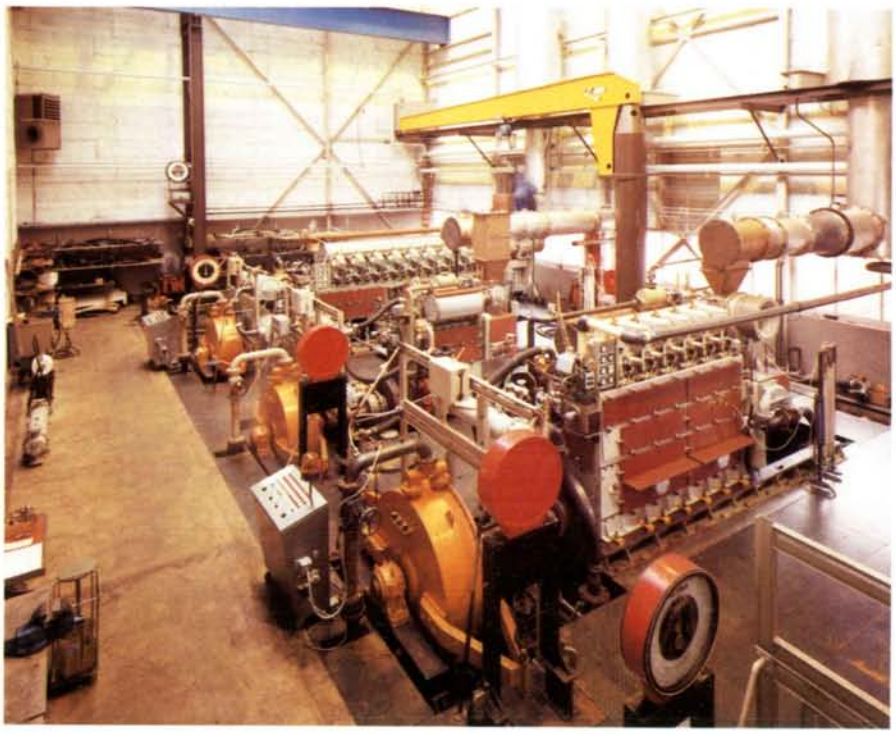
The following design philosophy applies to today's engines:

- construction of a simple, robust, heavy-duty engine whose moderate loading ensures exceptional reliability and ability to burn inferior fuel if necessary
- series production of parts, in which interchangeability of components between in-line and V-engines is very important
- most maintenance and service can be carried out on board by the ship's own trained engine room personnel, thus minimizing times and costs.

BOLNES



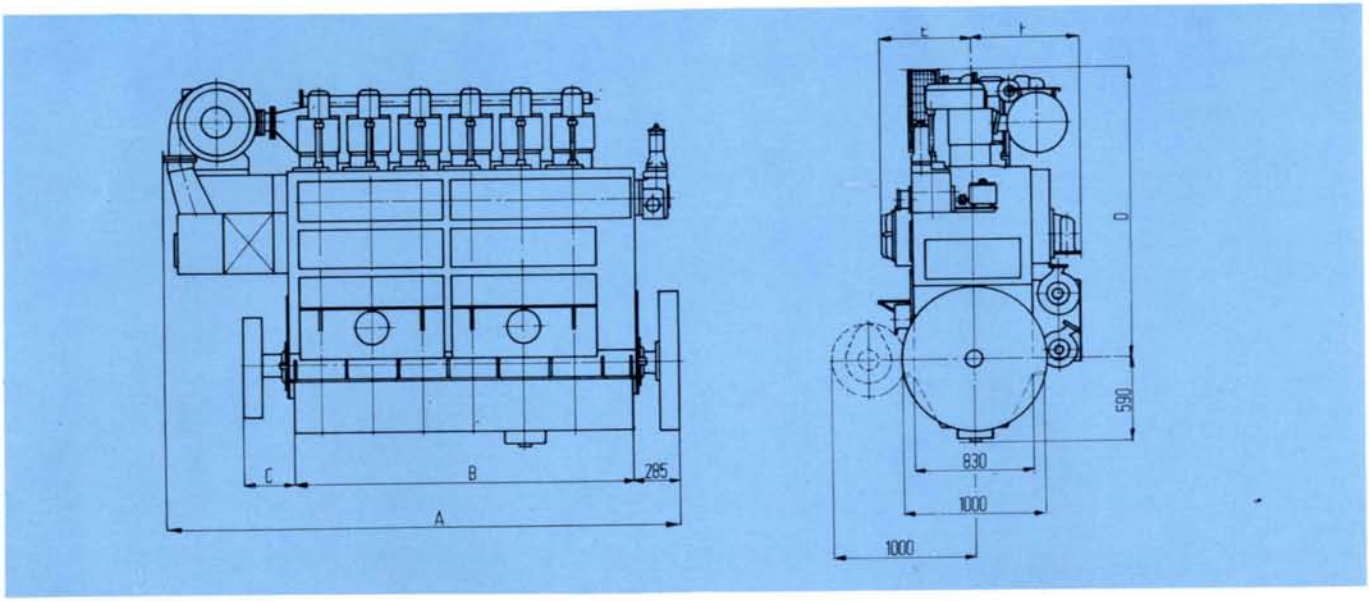




The fact that Bolnes has succeeded in its intention is clear from the large number of in-line and V-engines that have found their way to customers both in the Netherlands and abroad. The diesel engine is used for propulsion resp. to drive generators and pumps for fishing boats, inland vessels, oceangoing ships, coasters, offshore installations and shore-based facilities.

TECHNICAL DATA FOR
DNL 150/600
Engine design
Bolnes Motorenfabriek BV,
Krimpen aan de Lek, Netherlands

	Type	DNL 150/600
	Cylinder bore	190 mm
	Piston stroke	350 mm
	Scavenge pump bore	260 mm
	Max. continuous output rating per cylinder (to ISO 3046/1, 1st. edition 1975)	110 kW/cyl. 150 bhp/cyl.
	Overloading	10%
	Speed	600 rev/min
	Average piston speed	7.00 m/s
	Compression ratio (geometric)	14.5
	Compression pressure	46 bar 47 kgf/cm²
	Mean effective pressure	11.08 bar 11.34 kgf/cm²
	Max. combustion pressure	110-118 bar 112-120 kgf/cm²
Air supply	Principle	Uniflow scavenging
	Scavenge air pressure	1.77 bar 1.80 kgf/cm²
	Scavenge air consumption (full load)	10.9 kg/kWh 8.0 kg/bhph
Lubricating oil system	Number of lubrication points per cylinder	2
	Cylinder lubricating oil consumption to be metered at	0.72 g/kWh (0.53 g/bhph)
	Lubricating oil consumption - system lubrication	0.1369 g/kWh (0.100 g/bhph)
	Lubricating oil pressure	3.24 bar 3.30 kg/cm²
	Inlet/outlet temperature	43/57°C
Cooling water system	Fresh water pressure	1.27 bar 1.30 kgf/cm²
	Inlet/outlet temperature	56/63°C



POWER RATINGS, WEIGHTS AND DIMENSIONS
DNL 150/600, Bore 190 mm, Stroke 350 mm, Non-reversible

Number of cylinders		3	5	6	7	8	9	10
	A	2475	3320	3670	4040	4400	4760	5120
	B	1405	2125	2485	2840	3200	3565	3925
	C	280	300	315	305	305	310	325
	D	1950	1950	1950	2030	2030	2030	2030
	E	650	700	700	700	840	850	850
	F	770	770	770	770	950	965	965
Weight less oil and water in tonnes		6.9	9.1	10.1	11.3	12.3	13.2	15
Number of superchargers		VTR	VTR	VTR	VTR	VTR	VTR	VTR
	BBC	160	200	201	201	250	251	251
Raw cooling water pump	2 bar vk	30	30	45	45	45	45	45
Fresh cooling water pump	2 bar vk	15	15	24	30	30	40	40
Lubricating oil pump	5 bar vk	12	12	12	20	20	20	20
*Output	bhp	450	750	900	1050	1200	1350	1500
	kW	330	550	660	770	880	990	1100

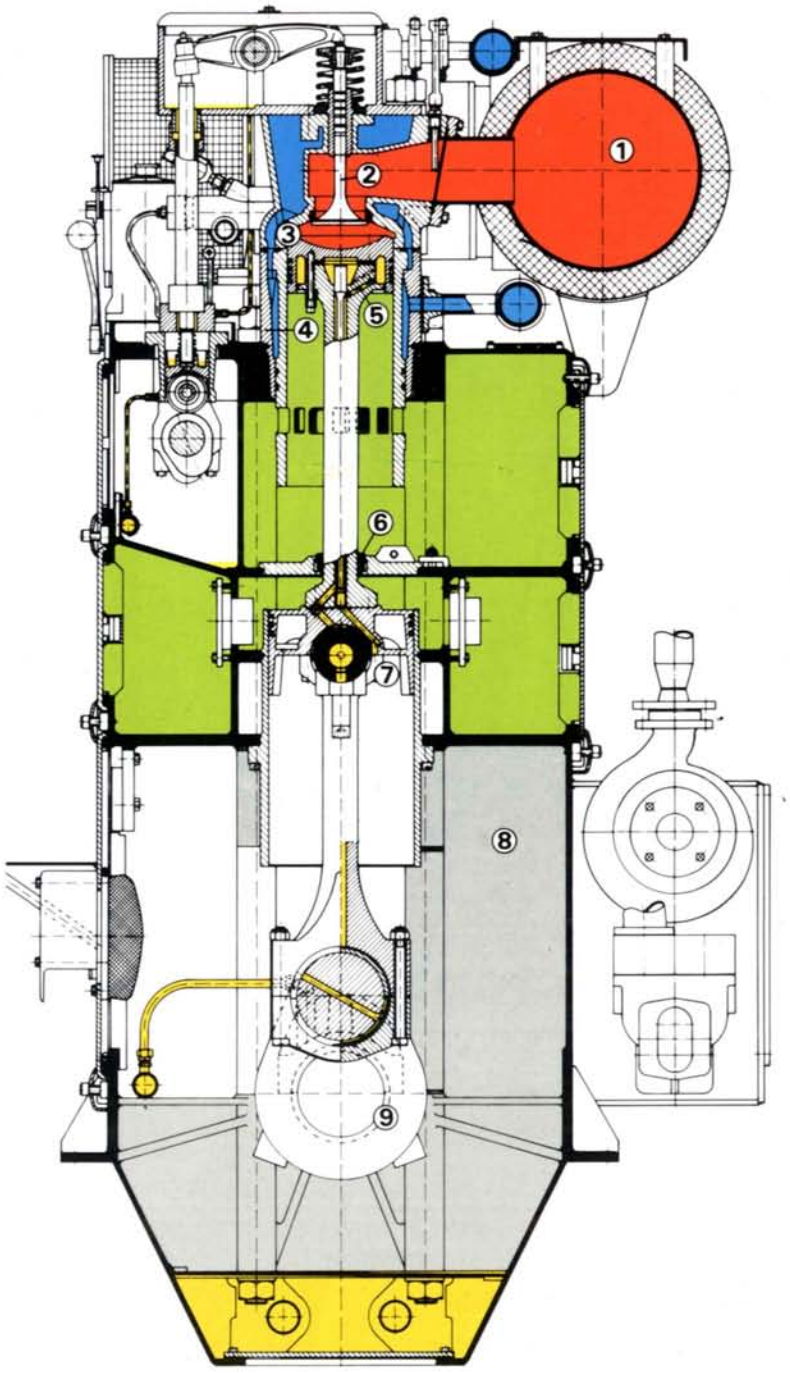
*Continuous output in temperate climate to ISO 3046/1 in bhp, measured on outgoing flange.
Minimum distance between centres of two DNL 150/600 engines: 2000 mm (twin installation).

All dimensions in mm and not final.

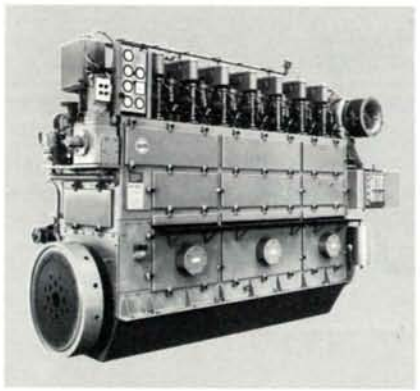
BOLNES

BOLNES IN-LINE ENGINE TYPE DNL 150/160

Range of ratings: 330 - 1100 kW (450 - 1500 bhp) at 600 rev/min.



1 Exhaust with expansion bellows
2 Uniflow scavenging with a single central exhaust valve
3 Single-hole nozzle's clogging impossible
4 Loose, interchangeable cooling water jacket and cylinder liner
5 Oil-cooled piston
6 Seal around piston rod; no pollution of sump oil
7 Crosshead doubles as scavenge piston - no lateral pressure on main piston
8 Frame of welded steel sheet structure
9 Crankshaft; removable laterally

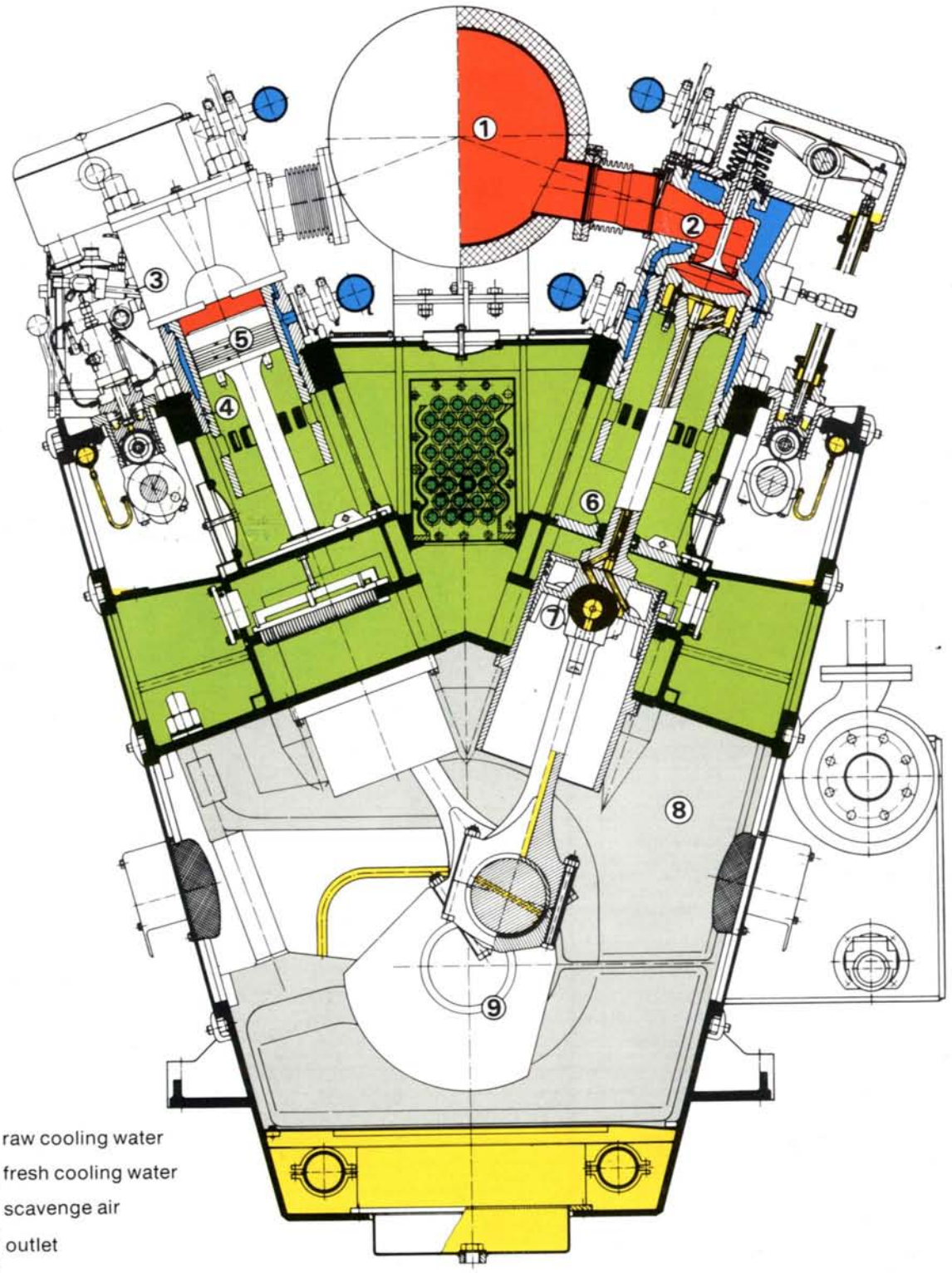


BOLNES V ENGINE
TYPE V-DNL 150/160

Range of ratings: 1100 - 2200 kW (1500 - 3000 bhp). at 600 rev/min

1 Exhaust with expansion bellows
2 Uniflow scavenging with a single central exhaust valve
3 Single hole nozzle; clogging impossible
4 Loose, interchangeable water jacket and cylinder liner
5 Oil-cooled piston
6 Seal around piston rod - no pollution of sump oil
7 Crosshead doubles as scavenge piston - no lateral pressure on main piston
8 Frame of welded steel sheet construction
9 Crankshaft - removable laterally

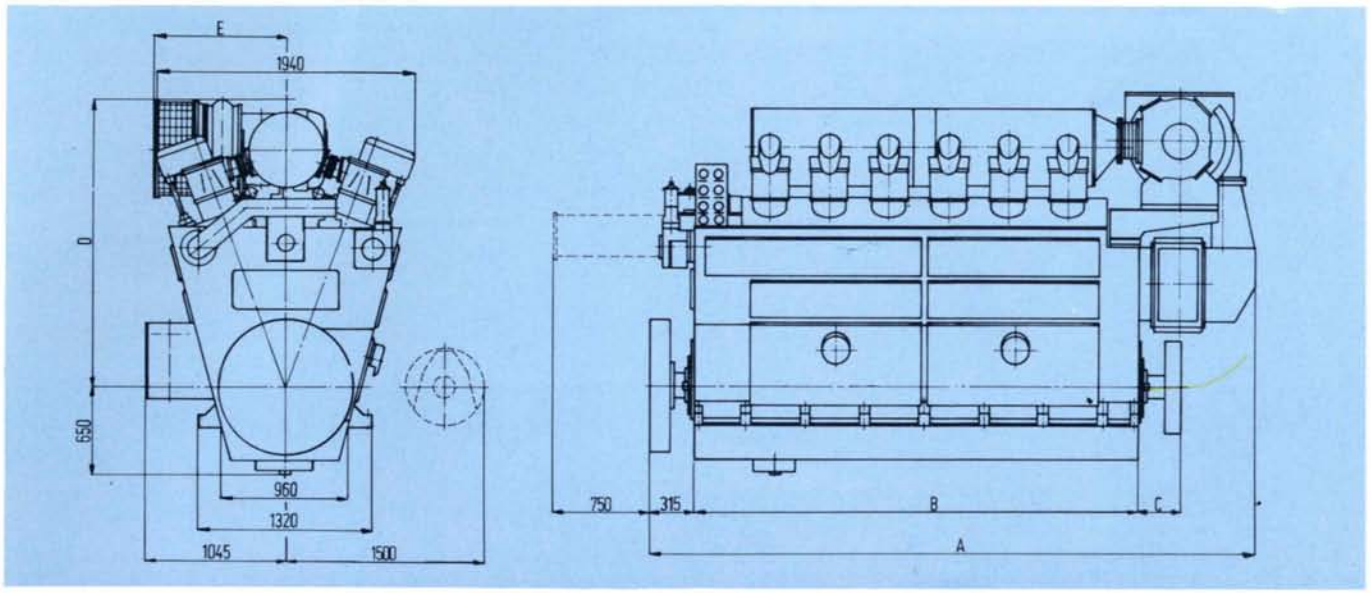
BOLNES



TECHNICAL DATA FOR V-DNL 150/600

Engine design
Bolnes Motorenfabriek BV,
Krimpen aan de Lek, Netherlands

	Type	V-DNL 150/600
	Cylinder bore	190 mm
	Piston stroke	350 mm
	Scavenge pump bore	260 mm
	Max. continuous power rating per cylinder (to ISO 3046/1, 1st edition 1975)	110 kW/cyl. (150 bhp/cyl.)
	Overloading in	10%
	Speed	600 rev/min
	Average piston speed	7.00 m/s
	Compression ratio (geometric)	14.5
	Compression pressure	46 bar (47 kgf/cm²)
	Mean effective pressure	11.08 bar (11.34 kgf/cm²)
	Max. combustion pressure	110-118 bar (112-120 kgf/cm²)
Air supply	Principle	Uniflow scavenging
	Scavenge air pressure	1.77 bar (1.80 kgf/cm²)
	Scavenge air consumption (full load)	10.9 kg/kWh (8.0 kg/bhph)
Lubricating oil system	Number of lubrication points per cylinder	2
	Cylinder lubricating oil consumption to be metered at	0.72 g/kWh (0.53 g/bhph)
	Lubricating oil consumption-system lubricatination	0.1369 g/kWh (0.100 g/bhph)
	Lubricating oil pressure	3.24 bar (3.30 kg/cm²)
	Inlet/outlet temperature	43/57°C
Cooling water system	Fresh water pressure	1.27 bar (1.30 kgf/cm²)
	Inlet/outlet temperature	56/63°C



A*
* Continuous output in temperate climate, to ISO 3046/1 in bhp, measured on outgoing flange

B*
Raw water cooling pump capacities must be doubled in the tropics (except 10 and 12 V-DNL).
Minimum distance between centres of two V-DNL 150/600 engines: 2500 mm (twin installation).

All dimensions in mm and not final.

POWER RATINGS, WEIGHTS AND DIMENSIONS

V-DNL 150/600, Bore 190 mm, Stroke 350 mm, Non-reversible

Number of cylinders		10	12	14	16	18	20
	A	4075	4485	4935	5420	5870	6510
	B	2935	3385	3835	4285	4735	5185
	C	300	300	300	300	300	387
	D	2090	2163	2163	2219	2219	2090
	E	895	993	993	1129	1129	1034
Weight less water and oil in tonnes		15.5	18	21	24	28	32
Number of superchargers		VTR	VTR	VTR	VTR	VTR	2x VTR
BBC		251	320	320	321	321	251
Raw cooling water pump	2 bar	60	60	80	80	80	80
Fresh cooling water pump	2 bar	40	60	60	60	80	80
Lubricating oil pump	5 bar	34	40	40	40	40	40
*Output	bhp	1500	1800	2100	2400	2700	3000
	kW	1100	1320	1540	1760	1980	2200

Photo KLM Aerocarto

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