QUALITY

ECONOMY

SAFETY

VOLVO

CAR HANDBOOK

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It is very seldom that a person comes into a car showroom, points to one of the models exhibited and asks to buy it. In most cases the prospective customer is thinking about more than one make of car. When he finally decides which make he is going to buy, his decision is based on the subjective impression he has got of the car, on his own opinions and those of his friends as well as on the arguments used by the salesmen, the demonstrations and the capacity of the salesman to meet the viewpoints put forward by the customer.

In this handbook we are making a presentation of our company and our cars. We have tried to summarize the facts in the form of an argument which can help you in your sales work. The size of the book has been selected so that it is convenient for you to have with you all the time. The loose leaf system has been adopted so that replacement pages can easily be added.

Lively discussions are always going on in the technical press; sometimes these are of a general nature but sometimes they concern certain makes of car. Some of these discussions are of an expert nature while some are most definitely not. For this reason we have included some sections in this book which are of an informational character. The book also includes other useful matter which we hope will be of help to you in your daily sales work. We wish you all success.

AB VOLVO

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Replaces PE9-63

A = Europe
B = England
C = USA
D = Overseas

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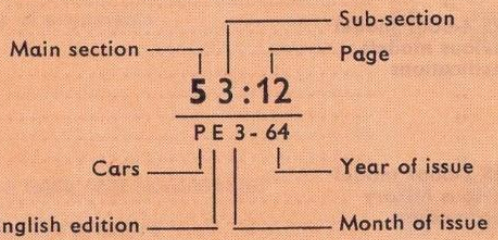

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This is VOLVO

How has it been possible for a company in Sweden — a country with a relatively small car market — to design and manufacture a family sports car which is today renowned all over the world for its quality, durability and performance?

How can VOLVO compete in price with the large American car manufacturers as well as other foreign manufacturers?

How has it been possible for VOLVO to attain such unique successes in speed contests, rallies and economy runs against keen competition from other cars produced all over the world?

The secret of VOLVO's success is by no means so astonishing, as this presentation will show.

The conditions for profitable car manufacture in Sweden were as follows:

A well-developed industrial country
Workers renowned for their skill
World-famed Swedish steel.

The product was to be a Swedish car built to stand up to very rough operating conditions since the network of Swedish roads was then far from being well developed.

Two men happened to have the same idea — businessman Assar Gabrielsson and technician Gustaf Larson — and together they started by building a series of ten test cars. The company was christened VOLVO — the Latin word meaning "I roll'.

On the night of April 14th 1927, the first VOLVO left the assembly line. The preliminary programme was soon found to be a little too optimistic but the result was in any case 297 cars during the first year, 900 during the second and 1,400 during the third year.

P4 — 1927

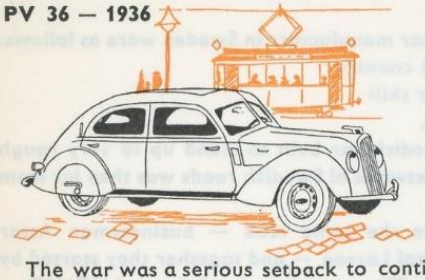
Open body. 4-cylinder engine, 118.3 cu ins. (1.94 litres), 28 h.p. at 2000 r.p.m. Wheelbase 112.3 ins.(285 cm), weight 2,090 lbs. (950 kg.) Max. speed approx. 37 mph (60 km.p.h.) Body of ash, red beech covered with leatherette. Leather upholstery, removable wheels with wooden spokes, 4,75—29 tyres, mechanical brakes on rear wheels.

The first car manufactured was an open touring car with a 28 h.p. four-cylinder engine. In 1927 the first saloon car was built. The following year saw the arrival of the first truck with a loading capacity of 1760 lbs. (800 kg).

In 1931 the company took over the share capital of Pentaverken, Skövde where the engine had been made from the very start. The share capital of VOLVO was increased from 4 to 13 million kronor and VOLVO shares were quoted on the stock market. The foundation was laid for the VOLVO Group of Companies as we know it today.

In 1936 the first stream-lined VOLVO was introduced into the market and the years up to the beginning of World War II were characterized by intensive developments, both technical and economic. The manufacturing programme in 1939 included 9,000 units, made up of 4,000 cars and 5,000 trucks and buses.

PV 36 — 1936



"Carioca". Streamlined 6-seater. 6-cylinder engine of 223.8 cu ins. (3.67 litres) with an output of 86 h. p. Wheelbase 116.2 ins. (295 cm), weight 3,660 lbs. (1660 kg). Max. speed 74 mph (120 km. p. h.) Steelbody, luggage compartment accessible from both inside and outside. Independent front wheel suspension, stabilizers, 6.50—16 tyres.

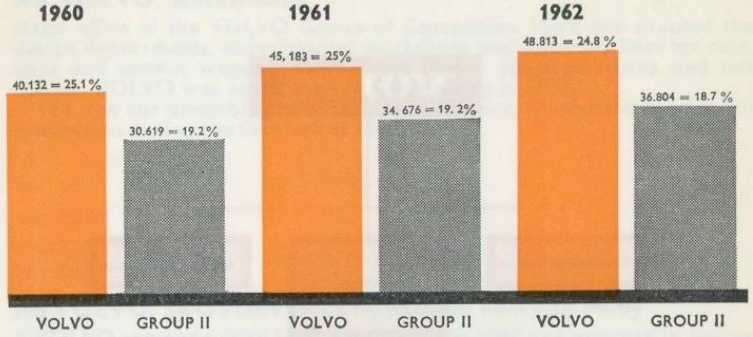
The war was a serious setback to continued developments in VOLVO. The manufacturing programme was concentrated on military vehicles, but towards the end of the war a new type of tractor was presented. Co-operation had started between VOLVO and Svenska Flygmotor AB (the Swedish Aero- Engine Factory) and in 1941 VOLVO bought up the majority of shares in this company. In 1943 Köpings Mekaniska Verkstads AB (Köping Engineering Workshop) was incorporated. This firm had manufactured gearboxes and rear axles for VOLVO since 1927.

Just before the end of World War II a new car was presented — the VOLVO 444, later to be world-renowned.

PV 444 — 1944

New 4-seater model. 4-cylinder o.h.v. engine, 85.4 cu. ins. (1.4 litres), 40 h.p. Wheelbase 102.4 ins. (260 cm), weight 2,200 lbs (1000 kg). Max. speed 77 mph (125 km.p.h.). Integral body without external running board, flush-fitted headlights, short-stroke engine, coil springs all round.

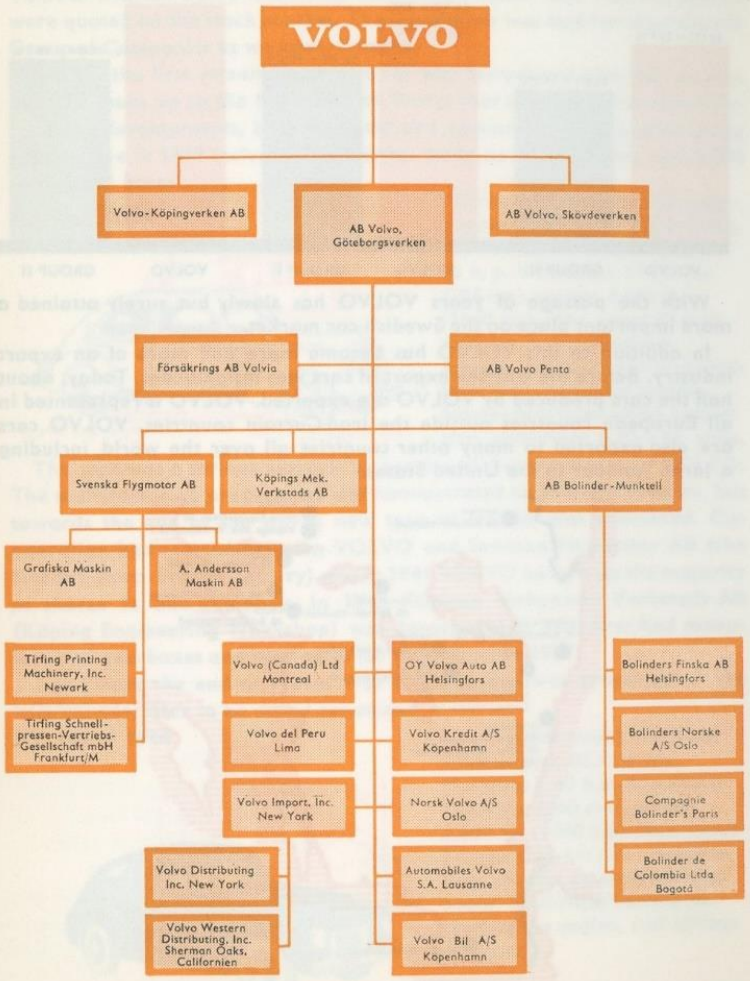
■ During subsequent development, Bolinder-Munktell of Eskilstuna was incorporated in the Company in 1950 and all manufacture of tractors was moved up there in order to provide more room in Gothenburg for cars and trucks.



With the passage of years VOLVO has slowly but surely attained a more important place on the Swedish car market.

In addition to this VOLVO has become more and more of an export industry. Before the war the export of cars was insignificant. Today, about half the cars produced by VOLVO are exported. VOLVO is represented in all European countries outside the Iron Curtain countries. VOLVO cars are also exported to many other countries all over the world, including a large number to the United States.

The VOLVO Group, 31 December 1962



AB VOLVO, Gothenburg

Head office of the VOLVO Group of Companies. Here are situated the design departments, experimental workshops and assembly lines for cars, vans and station wagons. Petrol- and diesel- powered trucks and bus chassis. VOLVO was established in Gothenburg in 1927.

The new car assembly plant, Torslanda Factory, is expected to be in full production during the first half of 1964.

VOLVO SKÖVDE-VERKEN

AB VOLVO, SKÖVDEVERKEN, Skövde, Flen and Floby

A VOLVO company since 1930. Established in 1868 and engaged in engine manufacture since 1907. The company has one of the most modern foundries and engine workshops in Europe for manufacturing petrol and diesel engines. Brake drums are made in the Floby factory.

The factory at Flen carries out engine reconditioning and other work.

VOLVO-KÖPING-VERKEN

VOLVO-KÖPINGVERKEN AB, Köping

VOLVO-Köpingverken make gearboxes, rear axles and tractor differentials and the outboard unit of VOLVO Penta Aquamatic marine engines. This company has an impressive array of more than 900 machine tools. The heat-treating shop with fully- and semi-automatic furnaces is one of the largest in Northern Europe.

The company was founded in 1958.

AB VOLVO PENTA, Gothenburg

Engines manufactured by AB VOLVO, Skövdeverken are converted to marine and industrial units at AB VOLVO PENTA. The same applies for engines manufactured by AB Bolinder-Munktell with effect from 1962. The production programme also includes the VOLVO PENTA Aquamatic, the inboard engine with outboard drive. The company was formed in 1935.

KÖPINGS MEKANISKA VERKSTADS AB, Köping

This company is a leading supplier of machine tools, particularly lathes and milling machines and specialized machinery, including machines for manufacturing VOLVO car components. The company was established in 1856 and became a VOLVO company in 1942.

AB BOLINDER-MUNKTELL, Eskilstuna, Arvika, Hallsberg, Skurup and Valla.

AB Bolinder-Munktell went to the VOLVO-group 1950.

The factories program in Eskilstuna contains agricultural- and industrial tractors, loading machines, road graders, diesel engines and front axle-details for Volvo-cars.

The factory was established in 1832.

The factories at Arvika, Hallsberg, Valla and Skurup were earlier named Arvika-Thermaenius Co.

This Company came to the Volvo-group 1960 and was amalgamated with Bolinder-Munktell 1962.

The Arvika-factories deliver moving-machines, culturators and traching-vehicles.

At Hallsberg only combine-harvester, at Skurup bitharvester and sowing machines and at Valla potatoe-diggers.

SVENSKA FLYGMOTOR AB, Trollhättan

The production of this company consists of the highly specialized precision manufacture of air-cooled, piston-type aero engines and jet engines. The share majority was taken over by AB VOLVO in 1941. The company was established in 1930.

GRAFISKA MASKIN AB, Trollhättan

Subsidiary company of Svenska Flygmotor AB. Established in 1944. The production programme comprises printing presses, including the well-known GMA Tirfing and Viking two-revolution letterpresses.

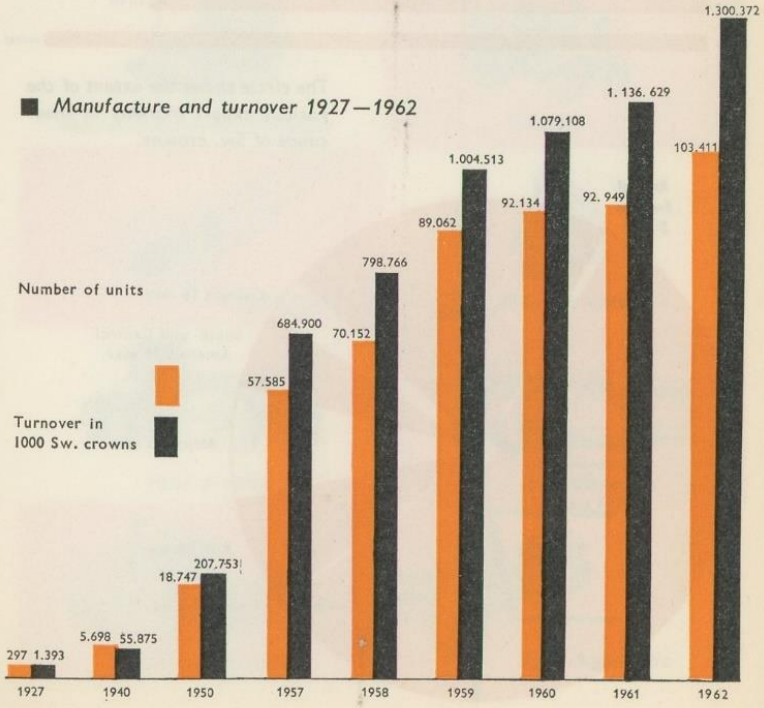
During 1962

■ **... more than 18,000 VOLVO employees in Sweden**

Company	*Employed in the VOLVO Group of Companies on 31 dec. 1962*
AB VOLVO, Göteborg, AB Volvo Penta, Göteborg	6550
AB VOLVO Skövdeverken, Skövde	2485
VOLVO-Köpingverken AB, Köping	1237
Köpings Mek. Verkstads AB, Köping	786
AB Bolinder-Munktell, Eskilstuna	4588
Svenska Flygmotor AB, Trollhättan	2311
	17957

It is estimated that about 1¼% of the population of Sweden, that is to say, about 100,000 people, are directly or indirectly supported by VOLVO.

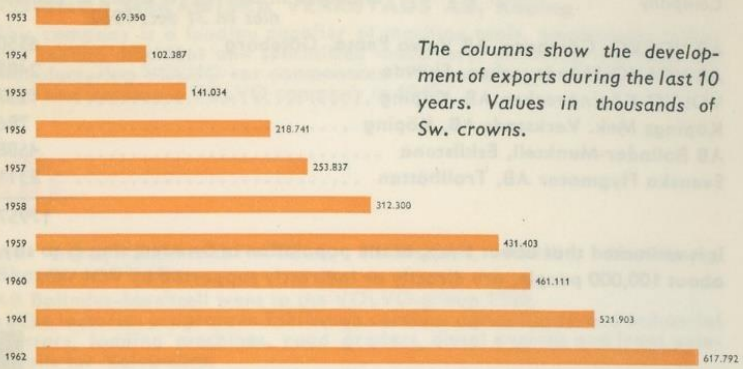
■ *Manufacture and turnover 1927—1962*



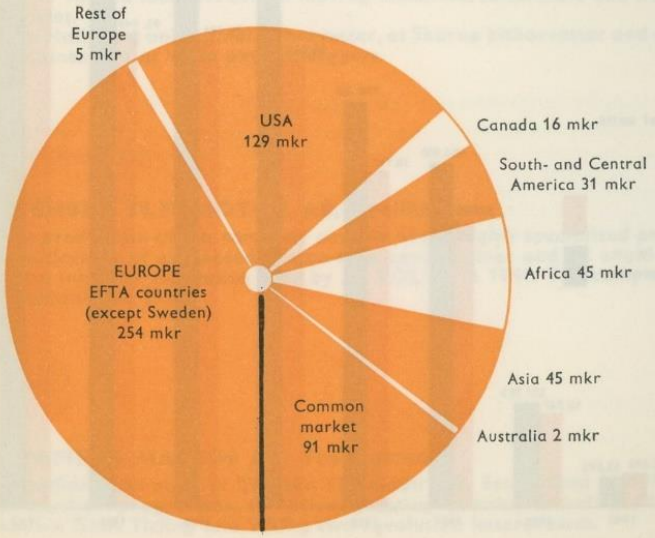
... ■ exports

During 1962 VOLVO exported 51,920 units.

The columns show the development of exports during the last 10 years. Values in thousands of Sw. crowns.



The circle shows the extent of the various export markets in thousands of Sw. crowns.

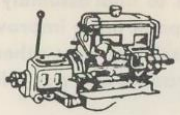


From the manufacturing programme


Sports cars


Cars


Trucks


Marine and industrial engines


Tractors

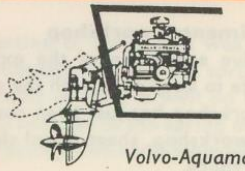

Jet engines


Machine tools

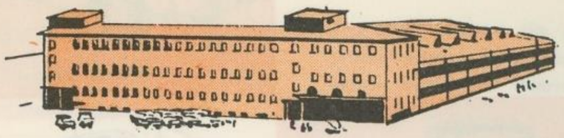

Road graders


Buses


Combined harvesters

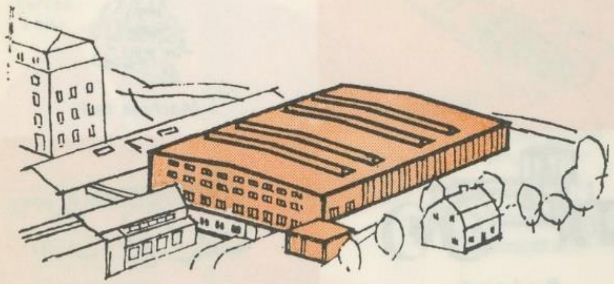

Volvo-Aquamatic

VOLVO is expanding



Z 2

is the name of the most recently finished factory building in Gothenburg. It has a total floor area of about 8,300 sq.yds. (7000 m²). For the time being it is used to extend car assembly. In addition to final assembly of all cars, the water test and roller test, adjusting and paint finish improvement are done here. The office part of the building is used amongst other things for the punched card department, printing department and pay office.



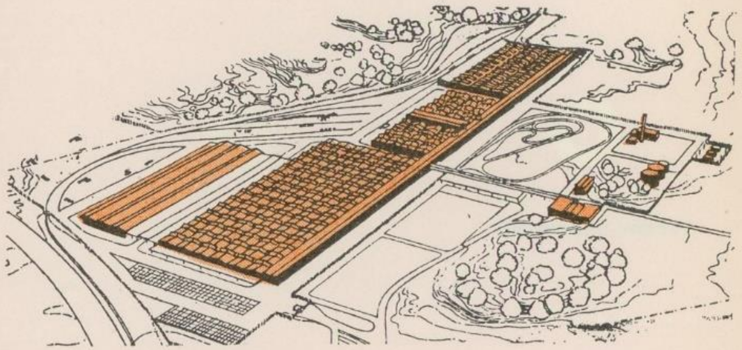
Experimental workshop

A successive expansion of the experimental and design department is being made to keep pace with the expansion of production. A new experimental workshop has just been completed. It contains the engine laboratory, car workshop, sheet metal shop, model carpentery shop and stores and office space.

VOLVO-Torslandaverken

VOLVO is striding ahead. Demand is greater than the manufacturing capacity of the existing factories. Preparatory work on a completely new car factory near Torslanda airport began in the autumn of 1959. According to plan this new factory should be ready in 1963 with a capacity of 150,000 cars a year and with good possibilities for further expansion.

Technical development keeps pace with the increase in manufacturing capacity. The laboratories are extended, the design department works continuously and the results of VOLVO's endeavours to build better and more economical cars are tested on the test tracks.



The main plant consists of three buildings. In the first of these to be completed, the shop for body assembly, production was started in the autumn of 1961. The rate of production was increased gradually during 1962 and now includes all VOLVO 121/122 models.

The shop for rust-proofing and painting of the bodies was completed during 1962 and will be taken into production during the spring of 1963. The third shop, intended for the assembly of cars, is well on the way to completion and is expected to be taken into use in the spring of 1964. The combined floor area of the Torslanda Factory when complete will be about 180,000 sq. metres (1,900,000 sq. ft.).

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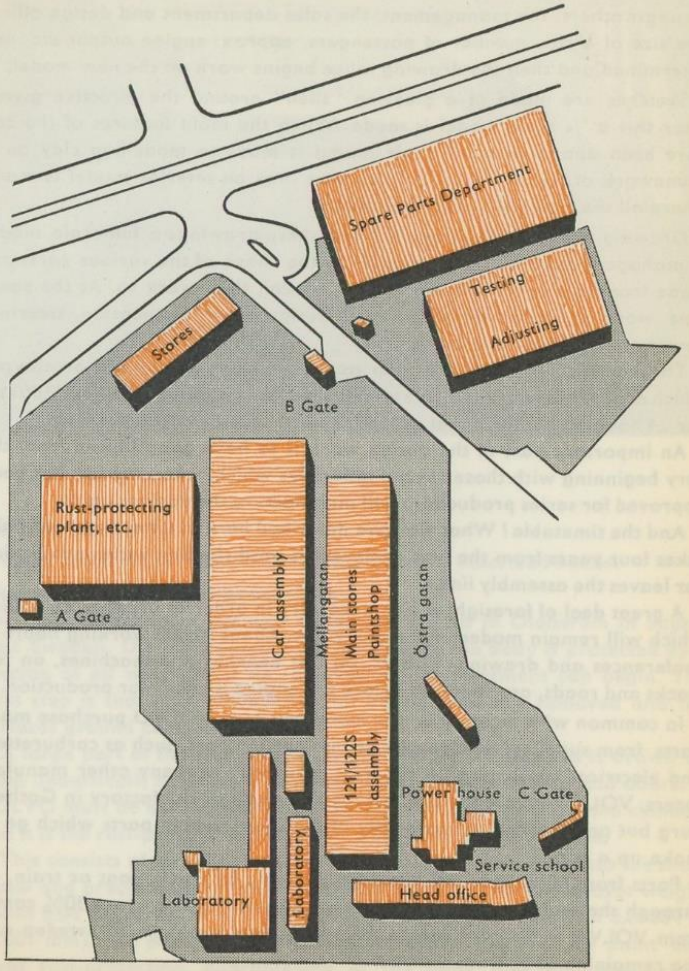
The VOLVO car factory



Impulses for new car models come from many different directions. The wishes of Swedish motorists are an important source. The men at VOLVO note these but also follow other trends and developments both at home and abroad.

The directive for a new car takes shape as a result of conferences with, amongst others, the management, the sales department and design office. The size of a car, number of passengers, approx. engine output etc. are determined and then the drawing office begins work on the new model.

Sketches are made of a pleasing "shell" around the directive given. After this a 1/4 scale model is made. When the main features of the car have been approved a full scale model is made in modelling clay on a framework of wooden ribs. At the same time an interior model is made where all the internal fittings are tested.

Drawing work can then begin. From these drawings a full-scale model in mahogany is built. Plastic moulds of the shape of the various parts are made from this which the manufacturers can then work to. At the same time work is carried on with engine design, wheel suspension, steering, power transmission and brakes.

The various elements are then assembled into handmade prototypes which are used for testing. These test cars are driven about 925 miles (1500 km) per 24 hours in 3 shifts under severe conditions and constant control.

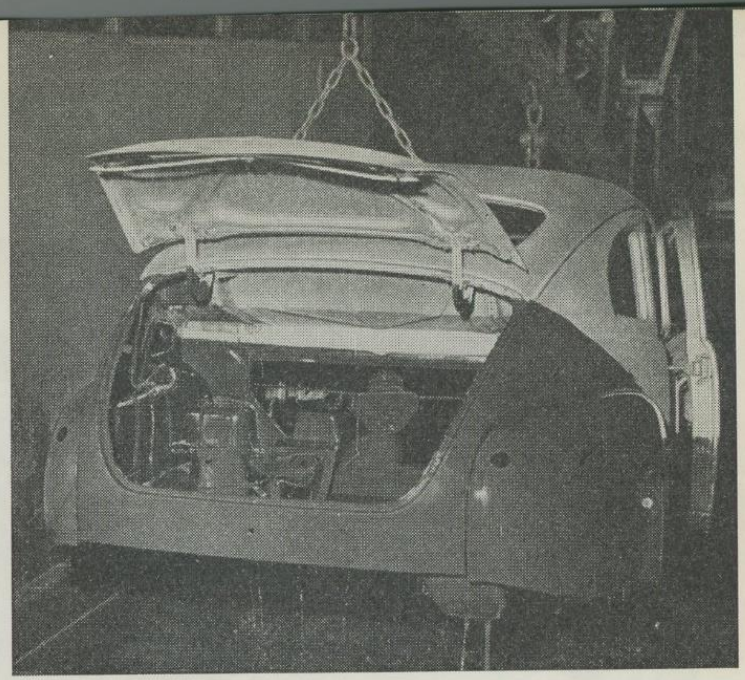
An important part of the design work is to have good liaison from the very beginning with those special industries which, when the car has been approved for series production, will manufacture the various parts.

And the timetable? What we have described here in a few lines normally takes four years from the first conferences until the first series production car leaves the assembly line.

A great deal of foresight is also necessary in order to produce an engine which will remain modern for many years. About 30.000 working hours at conferences and drawings boards, on test benches and machines, on test tracks and roads, are required before the engine is ready for production.

In common with most other car manufacturers, VOLVO purchase many parts from suppliers who specialize in a certain part, such as carburetters and electrical equipment. In contrast, however, to many other manufacturers, VOLVO does not manufacture any parts at the factory in Gothenburg but only carries out assembly of the thousands of parts which go to make up a car.

Parts from more than 800 suppliers arriving by truck, boat or train, go through the reception control. From a value standpoint about 30% comes from VOLVO subsidiary companies, 45% from suppliers in Sweden and the remaining 25% from abroad.



In the factory

Broadly speaking, a VOLVO car is assembled as described below.

Phosphating and rust-protecting.

The body comes from Svenska Stålpressnings AB in Olofström in South-East Sweden. During transport to Gothenburg the body is protected by a coating of oil which must be removed before treatment can begin. The next step is thorough adjustment, all unevenesses are removed and the surfaces ground completely smooth.

A large part of the dampness to which the car is subjected is drawn up from underneath or pressed down between window frames and doors. A VOLVO must be able to stand outside in all kinds of weather and climates and it is the rust-preventive treatment which makes this possible.

This consists of an acid zinc phosphate solution which eats into the sheet metal and precipitates crystals on the surface. The phosphate layer weighs about 0,06 oz./sq. yd. (2 g/m²) which is an average thickness of 0.00004 in (0.001 mm). The phosphate layer increases the adhesion of the paint and gives rust-protection, guaranteeing at the same time that the surface

Wagon 1600 S 3 4

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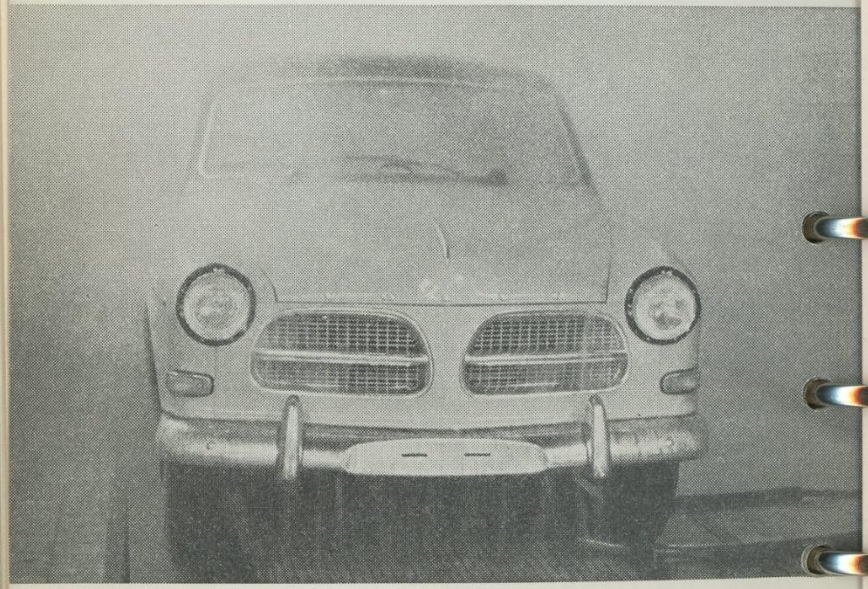
is free from grease. After drying, the underpart of the body is dipped in a synthetic primer which penetrates into all nooks and crannies.

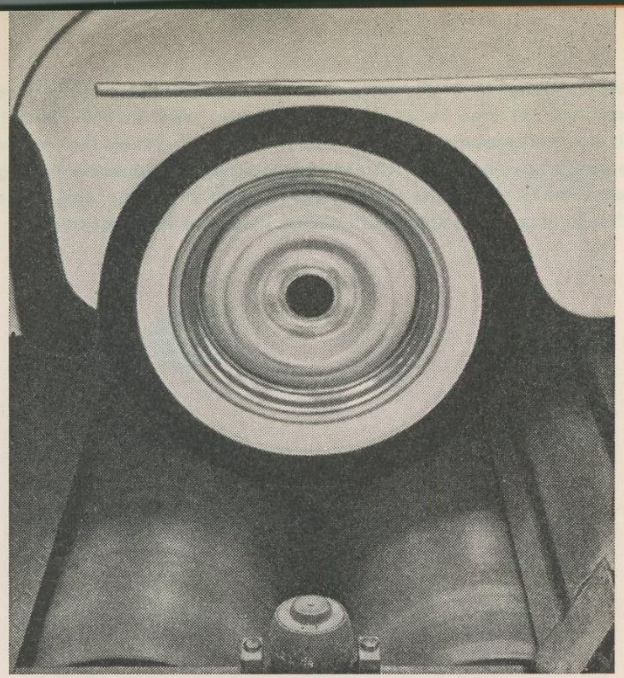
Painting

The bodies go to the painting plant through a tunnel and here they are sprayed with undercoating and secondary coatings before the surface enamel is applied. Between every type of enamel the bodies pass through stoving ovens and stations for grinding, sealing and, naturally, inspection. The enamel is synthetic. Each body receives about 24 lbs (11 kg) which corresponds to a thickness of 0.004 ins (90 my).

Assembling

All the parts are assembled on assembly lines which move steadily forward. The main assembly line is divided up into sections each of which is about the length of a car. Smaller units are assembled on feeder lines and when these are ready they run into the main assembly line where they are fitted both from the side, from above and from underneath. At frequent intervals along the line there are control stations where the operation which has just been carried out is checked.





Painstaking test

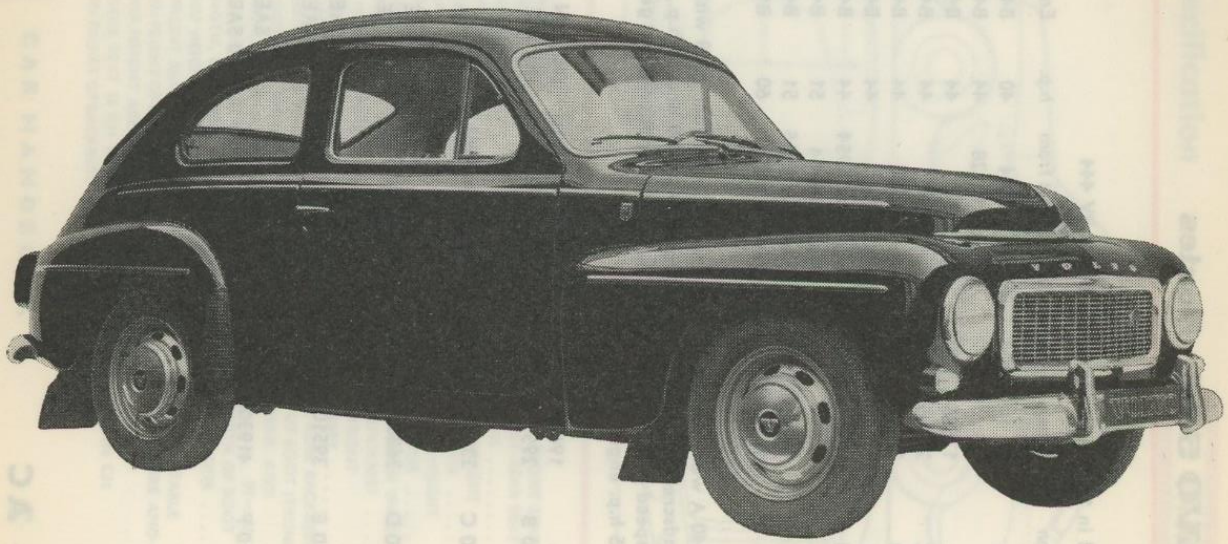
From the assembly hall the car rolls out to the new testing and adjusting hall.

The car is first subjected to the water test. No less than 175 Imp. galls. or 210 US galls. (800 litres of water per minute) for at least 3 minutes is sprayed at a pressure of 13 lbs. (6 kg) from all directions — even from underneath — onto the car. This quantity of water represents about 20 ins. (50 mm) of rain per minute, a downpour which would not be possible anywhere on earth. A violent tropical storm is not severer than 2 ins (5 mm) per minute. After the water test final assembly of the car takes place — it is easier to trace leaks before the interior fittings are in position — and it then goes to the roller test for indoor test-driving on a "rolling highway".

After checking wheel alignment and headlight adjustment, the necessary adjustments are then made which have been noted on the control card which has accompanied the car the whole time. When the mechanical adjustments have been carried out the paintwork is inspected in long light tunnels. Finally the car is coated with a layer of plastic, the purpose of which is to protect the paintwork during transport to the dealer.

1 This is Volvo
2 This is how Volvos are made
3 Data
4 Type specifications
5 Product information
6 Competitive makes
7 Racing and rally activities
8 Road tests as a basis for sales promotion
9 Sales arguments
10 Tables

EA



DIAGR. 3 7 | 121/122 S Station Wagon | 1800 S 3 4 | 121/122 S 2-door 3 3 | 121/122 S 4-door 3 2 | PV 544 3 1

VOLVO 544 – Series

Presented in 1944 under the designation PV 444

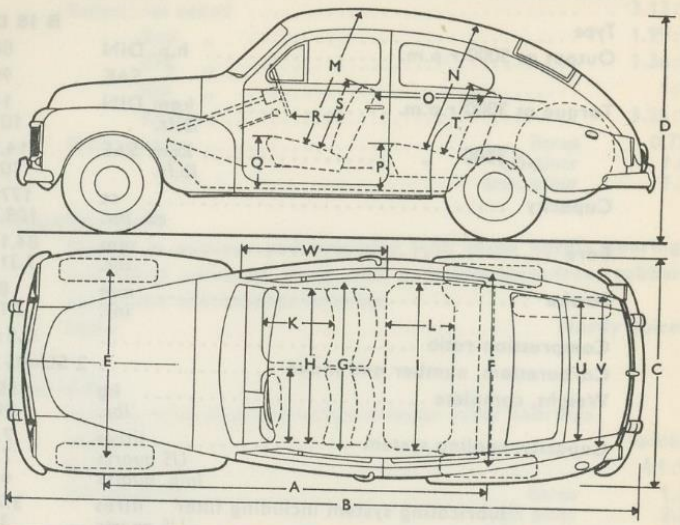
Designation	*Chassis numbers*	*With effect from*	*h.p.*	*Engine*
PV 444 A	1- 12504	August 1944	40	B4B
		Chassis 12128	44	B4B
PV 444 B	12505- 20004	April 1950	44	B4B
PV 444 C	20005- 28004	June 1951	44	B4B
PV 444 D	28005- 37004	August 1952	44	B4B
PV 444 E	37005- 68955	April 1953	44	B4B
PV 444 H	68956- 97999	December 1954	44	B4B
		Chassis 94154	51	B4B
PV 444 K	98000-131917	December 1955	51	B4B
PV 444 L	131918-196004	January 1957	60	B16A

The P 5440 A was introduced in August — September 1958 with one-piece windscreen, two alternative engine types, 60 and 85 h.p., three or four-speed gearbox for the 60 h.p. engine and four-speed gearbox for the 85 h.p. engine.

P 5440 A	196005-295499	September 1958	60 DIN B16A
P 544-110 B	295500-330099	August 1960	85 SAE B16B
P 544-110 C	330100-367999	September 1961	75 SAE B18A 90 SAE B18D
P 544-110 D	368000-395099	September 1962	75 SAE B18A 90 SAE B18D
P 544-110 E	395100-419299	August 1963	75 SAE B18A 90 SAE B18D
P 544-110 F	419300-	August 1964	75 SAE B18A 90 SAE B18D

Specification

544-series



A	WHEELBASE	260	102.4
B	OVERALL LENGTH	445	175.3
C	OVERALL WIDTH	159	62.6
D	OVERALL HEIGHT	156	61.5
E	TRACKWIDTH, FRONT	129	51.0
F	TRACKWIDTH, REAR	131	51.8
G	WIDTH OF FRONT SEAT SHOULDER HEIGHT	124	48.8
H	WIDTH, FRONT SEAT HEIGHT OF HIPS	125	49.2
I	WIDTH, REAR SEAT HEIGHT OF HIPS	132	52.0
	WIDTH, REAR SEAT SHOULDER HEIGHT	121	47.7
J	WIDTH, FRONT SEAT	54	21.3
K	LENGTH, FRONT SEAT	46	18.1
L	LENGTH, REAR SEAT	44	17.3
M	ROOF HEIGHT ABOVE, FRONT SEAT 15 CM (6″) IN FRONT OF BACKREST	96	37,8
N	ROOF HEIGHT ABOVE REAR SEAT 15 CM (6″) IN FRONT OF BACKREST	89	35.1
O	DISTANCE, FRONT SEAT BACKREST-REAR SEAT CUSHION	67	26.4
P	REAR SEAT HEIGHT OVER FLOOR	37	14.6
Q	FRONT SEAT HEIGHT OVER FLOOR	35	13.8
R	SPACE BETWEEN WHEEL AND BACKREST	35	14.0
S	HEIGHT FRONT BACKREST	51	20.1
T	HEIGHT, REAR BACKREST	57	22.5
U	WIDTH OF BOOT (TRUNK) LID (MAX. AND MIN.)	99—81	39.0—31.9
V	MAX. WIDTH OF BOOT	88	34.7
W	WIDTH OF DOOR	101	39.8

FRONT SEATS ADJUSTABLE ± 2.4 INS. (6 CM) FORE AND AFT

MEASUREMENTS IN CM AND INCHES

Engine

Front-mounted, four-cylinder, 4-stroke petrol engine with overhead valves, five-bearing crankshaft and in-line cylinders.

			B 18 D
Type			
Output at 5000 r.p.m.	h.p.	DIN	80
		SAE	90
Torque at 3000 r.p.m.	kgm	DIN	14
	lb.ft.		*101*
,, 3500 ,,	kgm	SAE	14.5
	lb.ft.		*105*
Capacity	cc		1778
	cu. ins.		*108.5*
Bore	mm		84.14
	ins.		*3.313*
Stroke	mm		80
	ins.		*3.15*
Compression ratio			8.5:1
Carburetters, number and make			2 SU-HS 6
Weight, complete	kg		155
	lbs.		*340*
Capacity, cooling system	litres		7.5
	US quarts		7.9
	Imp. quarts		6.6
lubricating system including filter	litres		3.75
	US quarts		3.7
	Imp. quarts		*3.1*
lubricating system excluding filter	litres		3.25
	US quarts		2.9
	Imp. quarts		2.4

Clutch

Single dry-disc clutch

Make		Borg & Beck
Clutch disc external diameter	mm	215.9
	ins.	*8.5*

Gearbox

Fully synchronized

		M 40
Type		
Ratios: 1st speed		3.13:1
2nd ,,		1.99:1
3rd ,,		1.36:1
4th ,,		1:1
Reverse		3.25:1
Oil capacity	litres	0.75
	US pints	*1.6*
	Imp. pints	*1.3*

Propeller shaft

Opens, in sections and provided with three needle bearing-journalled universal joints and a maintenance-free, rubber-suspended intermediate bearing.

Make ..... Hardy Spicer

Rear axle

Hypoid, drive shaft journalled in taper roller bearings.

Make		Spicer
Ratio		4.1:1
Oil capacity	litres	1.3
	US pints	2.7
	Imp. pints	2.3

Steering gear

Left-hand drive. Cam and roller.

Make		Gemmer
Number of steering wheel turns from lock to lock		3 1/4
Oil capacity of steering box	litres	0.25
	US pints	*.5*
	Imp. pints	*.4*
Turning circle	m	9.8
	feet	32.2

Front wheel suspension

Independent suspension with coil springs and control arms. Double-acting hydraulic telescopic shock absorbers. Stabilizer.

Rear wheel suspension

Rigid rear axle suspended in two oblique support arms, two torque rods, track rod. Coil springs and double-acting hydraulic telescopic shock absorbers.

Brakes

Footbrakes.

Self-centring hydraulic Duo-Servo brakes.

Make of brake system			Wagner Electric	
Diameter of brake drums, front and rear		mm	229	
		ins.	9	
Friction area front	cm²	451	*sq.ins.*	69.8
rear	,,	451	,,	69.8
total	,,	902	,,	139.6

Handbrake:

Mechanical, operating on rear wheels. Handbrake lever between front seats.

Wheels

Pressed steel wheels. All wheels balanced.

Rim size	4J × 15

White sidewall tires tubeless.

Size	6.00—15″

Body

All-welded, self-supporting steel body. Fully rust-protected.

Fuel tank

Placed at rear under luggage compartment.

Capacity	litres	35
	US gall.	9.2
	Imp.gall.	7.7

Electrical equipment

Voltage of system	V	12

Battery:

Voltage	V	12
Capacity	Amp.hr.	60

Dynamo:

Make		Bosch
Output	W	360

Starter motor:

Make		Bosch
Output	h.p.	1

Ignition switch

Starter contact in ignition switch which in addition is provided with extra "radio" position in which ignition coil is disconnected

Ignition coil

Connected with ignition switch by means of armoured, theft-proof cable.

Dipper switch

Foot operated. Blue warning lamp for full headlights on instrument panel.

Traffic indicators

Flashers front and rear. Visual and audible signals on instrument panel.

Interior lighting

Contact in left door and switch on lamp in roof.

Heater and fresh air

Control to left of steering wheel. Fan with two speeds.

Windshield wipers and washer

Double windshield wipers with automatic return and nozzles for windshield washer. Control for wipers or wipers plus washer.

Sun visors

Double, padded sun visors.

Instruments

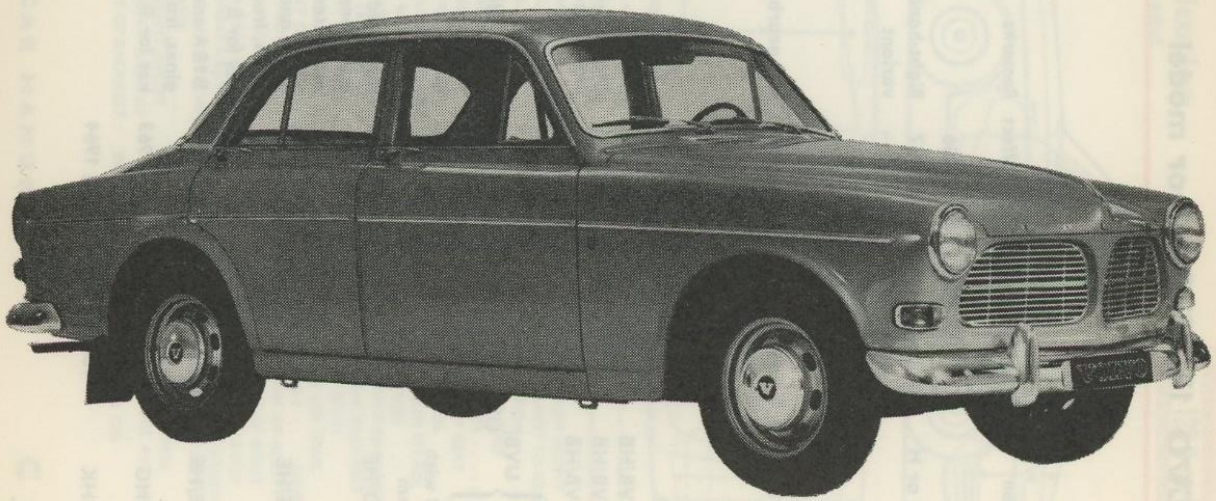
Padded instrument panel with combination instrument consisting of speedometer, mileometer, trip meter, fuel gauge and temperature gauge. Warning lamps for charging, oil pressure, traffic indicators and full headlights. Instrument lighting controllable.

Safety belts

Attachments for safety belts at front and rear seats.

Other equipment

Ashtrays in front and rear seat positions, set of tools, spare wheel, cigarette lighter.



DIAGR. 3 7

121/122 S Station Wagon

1800 S 3 4

121/122 S 2-door 3 3

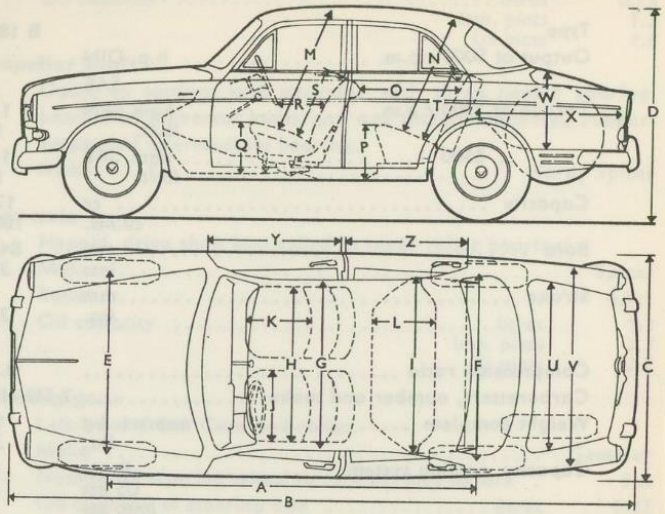
121/122 S 4-door 3 2

VOLVO 121/122 S 4-door model

Designation	*Chassis numbers*	*With effect from*	*Remarks*
P 1200	1- 249	Oct 1956	
P 1200 V or H	250- 4435 4447- 4636 4639- 5193 5214- 5215 5271- 5272	Apr 1957	Right-hand drive variant
P 1200 VB or HB	4436- 4446 4637- 4638 5192- 5213 5216- 5270 5273-12082	Febr 1958	M 4 gearbox
P 12204 VB/HB P 12206 VB/HB P 12104 VB/HB	12083 12170 -15000 12379	Sept 1958	B16B engine introduced
P 12104 P 12106 P 12204 P 12206 UVB/UHB	15001-54399	Nov 1958	Body undersealed
(P 12208 with effect from	21000)		
P 120 VD/HE	54400-84299	Aug 1960	Improved gearboxes and more comfortable interior fittings
P 120 VE/HE	84300-112799	Sept 1961	B18A and B18D engines, front disc brakes for B18D
P 120 VE/HE	112800-139999	Sept 1962	B18A and B18D engines, front disc brakes for B18D
120 VG/HG	140000-166399	Aug 1963	
120 VK/HK	166400-	Aug 1964	

Specification
4-door model

122 S-series



A	WHEELBASE	260	102.4	O	DISTANCE FROM FRONT SEAT BACKREST TO REAR SEAT CUSHION	75	29.5
B	OVERALL LENGTH	445	175.3	P	HEIGHT, REAR SEAT ABOVE FLOOR	35	13.8
C	OVERALL WIDTH	162	63.8	Q	HEIGHT, FRONT SEAT ABOVE FLOOR	31	12.2
D	OVERALL HEIGHT	150	59.3	R	DISTANCE FROM WHEEL TO BACKREST	35	13.8
E	TRACKWIDTH, FRONT	131	51.8	S	HEIGHT, FRONT BACKREST	54	21.3
F	TRACKWIDTH, REAR	131	51.8	T	HEIGHT, REAR BACKREST	56	22.1
G	WIDTH, FRONT SEAT, SHOULDER HEIGHT	128	50.4	U	WIDTH OF BOOT (TRUNK) LID (MAX. AND MIN.)	121-95	47.7-37.4
	WIDTH, REAR SEAT, SHOULDER HEIGHT	124	48.8	V	MAX. WIDTH OF BOOT	143	133.6
H	WIDTH, FRONT SEAT, HEIGHT OF HIPS	134	52.0	W	MAX. HEIGHT OF BOOT	55	51.4
I	WIDTH, REAR SEAT, HEIGHT OF HIPS	133	52.4	X	MAX. LENGTH OF BOOT	107	100.0
J	WIDTH, FRONT SEAT	54	21.3	Y	WIDTH OF FRONT DOORS	93	87.3
K	LENGTH, FRONT SEAT	46	18.1	Z	WIDTH OF REAR DOORS	84	78.5
L	LENGTH, REAR SEAT	43	16.9				
M	ROOF HEIGHT ABOVE FRONT SEAT 15 CM IN FRONT OF BACKREST	95	37.4				
N	ROOF HEIGHT ABOVE REAR SEAT 15 CM IN FRONT OF BACKREST	90	35.5				

FRONT SEATS ADJUSTABLE ± 3 INS. (7 CM) FORE AND AFT.

MEASUREMENTS IN CM AND INCHES

Engine

Front-mounted, four-cylinder, 4-stroke petrol engine with overhead valves, five main bearings and in-line cylinders.

Type		**B 18 D**
Output at 5000 r.p.m.	h.p. DIN	80
	SAE	90
Torque at 3000 r.p.m.	kgm DIN	14.0
	lb.ft.	*101*
,, 3500 ,,	kgm SAE	14.5
	lb.ft.	*105*
Capacity	cc	1778
	cu.ins.	108.5
Bore	mm	84.14
	ins.	*3.32*
Stroke	mm	80
	ins.	*3.15*
Compression ratio		8.5:1
Carburetters, number and make		2 SU-HS 6
Weight complete	approx. kg	155
	lbs.	*340*
Capacity, cooling system	litres	8.0
	US qts	*8.5*
	Imp. qts	*7.0*
Lubricating syst. including filter	litres	3.75
	US qts	*3.7*
	Imp. qts	*3.1*
Lubricating syst. excluding filter	litres	3.25
	US qts	*2.9*
	Imp. qts	*2.4*

Clutch

Single dry-disc clutch

Make		Borg & Beck
Clutch disc external diameter	mm	215.9
	ins.	*8.5*

Gearbox

Fully synchronized.

Type	**M 40**
Ratios: 1st speed	3.13:1
2nd ,,	1.99:1
3rd ,,	1.36:1
4th ,,	1:1
Reverse	3.25:1

Lubricant		Gear oil
viscosity	SAE	80
Oil capacity	litres	0.75
	Imp. pints	*1.3*
	US pints	*1.6*

Propeller shaft

Open, in sections and provided with three needle bearing-journalled universal joints and one maintenance-free rubber-suspended intermediate bearing.

Make ..... Hardy Spicer

Rear axle

Hypoid, drive shaft journalled in taper roller bearings

Make		Spicer
Ratio		4.1:1
Oil capacity	litres	1.3
	Imp. pints	*2.3*
	Us pints	*2.7*

Steering gear

Left-hand drive. Cam and roller.

Make		Gemmer
Number of steering wheel turns from lock to lock		3 1/4
Oil capacity of steering box	litres	0.25
	Imp. pints	*.4*
	US pints	*.5*
Turning circle	m	9.6
	ft.	*31.5*

Front wheel suspension

Independent suspension with coil springs and rubber-journalled control arms. Ball joints. Double-acting, hydraulic telescopic shock absorbers. Stabilizer.

Rear wheel suspension

Rigid rear axle mounted on two rubber-journalled support arms, torque rods, track rod. Coil springs and double-acting, hydraulic telescopic shock absorbers.

Brakes

Footbrakes:

Hydraulic, front: self-adjusting disc brakes, rear: drum brakes

Make of brake system		Girling
Diameter, brake disc, front	mm	276.5
	ins.	*10.88*

Diameter, brake drum, rear	mm	228.6
	ins.	*9.0*
Friction area, front, per wheel	cm^2	92.5
	sq.in.	*14.33*
,, ,, rear, per wheel	cm^2	210
	sq.in.	*32.55*

Handbrake:

Mechanical, operating on rear wheels. Handbrake lever between driving seat and door.

Wheels

Pressed steel wheels. All wheels balanced.

Rim size ..... 4J×15″

White sidewall tires, tubeless.

Size ..... 6.00—15″

Body

All-welded, self-supporting steel body. Completely rust-protected.

Fuel tank

Placed at rear under luggage compartment.

Capacity	litres	45
	US galls.	*12*
	Imp. galls.	*10*

Electrical equipment

System voltage	V	12
Battery:		
Voltage	V	12
Capacity	Amp.hr.	60
Dynamo:		
Make		Bosch
Output	W	360
Starter motor:		
Make		Bosch
Output	h.p.	1

Ignition switch

Starter contact in ignition switch which is, in addition, provided with an extra "radio" position in which the ignition coil is disengaged.

Ignition coil

Connected with ignition switch by means of an armoured tamper-proof cable.

Dipper switch

Foot operated. Blue warning lamp for full headlights on instrument panel.

Traffic indicators

Flashers front and rear. Visual and audible signals on instrument panel.

Interior lighting

Contact in both doors and switch on lamp in roof.

Heater and fresh air

Separate controls for heater, floor and defroster in the centre of the instrument panel. Warm air duct to rear seat. Fan with two speeds.

Windshield wipers and washer

Double electric windshield wipers with two speeds. Nozzles for windshield washer.

Sun visors

Double padded sun visors.

Instruments

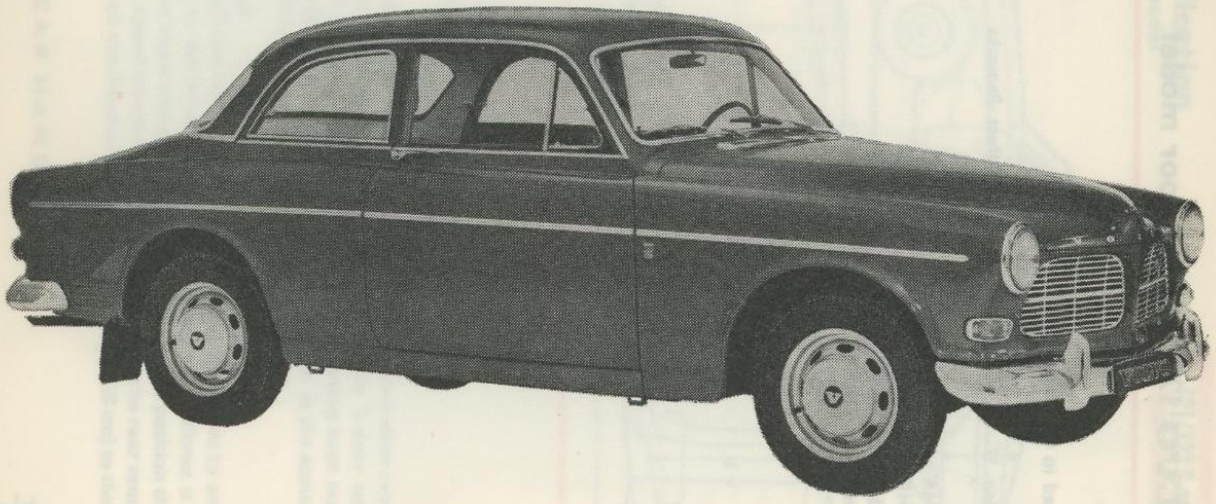
Padded instrument panel with combination instruments consisting of speedometer, mileometer, trip meter, fuel gauge and temperature gauge. Warning lamp for charging, oil pressure, traffic indicators and full headlights. Instrument lighting rheostat-controlled.

Safety belts

Attachments for safety belts at front and rear seats.

Other equipment

Ashtrays in instrument panel and both rear doors, set of tools. spare wheel, cigarette lighter.

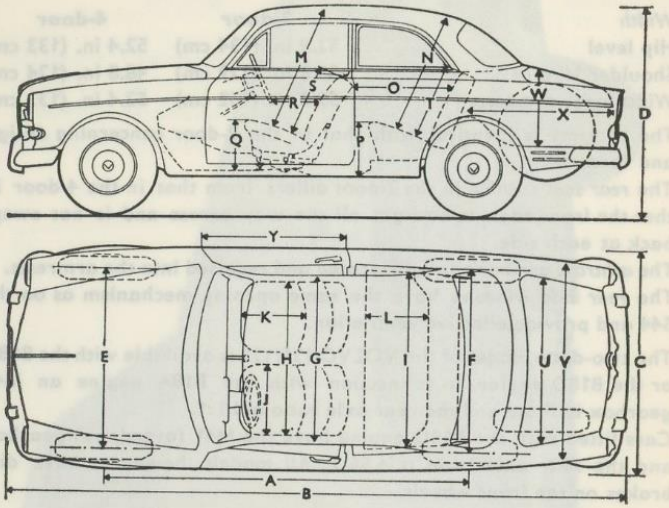


VOLVO 121/122 S, 2 door model

Introduced in October 1961.

Designation	*Chassis numbers*	*With effect from*	*Remarks*
130 VA/HA	1-10499	Oct 1961	
130 VB/HB	10499-39999	Sept 1962	
120 VD/HD	40000-84599	Aug 1963	
120 VE/HE	84600-	Aug 1964	

Specification
2-door model



Turn to page **3** 2:3 *for comparison with* **120.**

Doors

The entry opening is naturally larger than on the four-door model. The actual door opening is 39.4 in. (100 cm) on the 2-door compared with 33.7 in. (85 cm) on the 120, the door pillar having been moved 5.7 in. (14 cm) to the rear. The door opening angle is the same as that on the 120 but rather larger than that on the 544.

Front seats

The seat backrest can be moved to *three different positions* by one single movement. In the forward and rear positions the backrest is locked, this being an important safety feature. In the central position the backrest can be tipped forward for convenient entry to the rear seat.
The safety belt attachments have been moved 11 in. (28 cm) to the rear.

Rear seat

The rear seat is very roomy. Since the armrests are in the thickness of the side, the *width* is considerably greater on the 2-dooren than on the 4-door.

Width	2-door	4-door
Hip level	52.8 in. (134 cm)	52.4 in. (133 cm)
Shoulder level	50.8 in. (129 cm)	48.8 in. (124 cm)
Width over armrests	59.8 in. (152 cm)	52.4 in. (133 cm)

The *backrest* is identical with that in the 2-door concerning design and location.

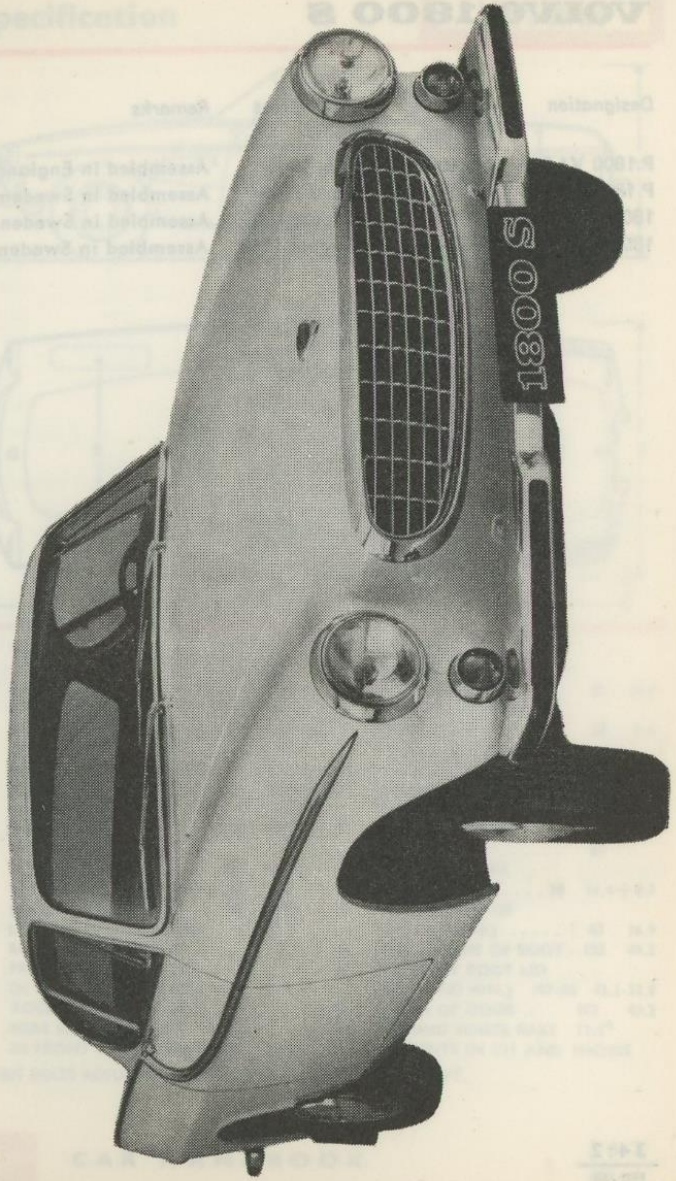
The *rear seat cushion* in the 2-door differs from that in the 4-door in that the front edge is straight all the way across and is not swept back at each side.

The *ashtrays* are horizontally located and recessed into the armrests.

The *rear side windows* have the same opening mechanism as on the 544 and provide effective ventilation.

The two-door model of the VOLVO 121/122 is available with the B18A or the B18D engine. In connection with the B18A engine an M40 gearbox is fitted and the rear axle ratio is 4.1:1.

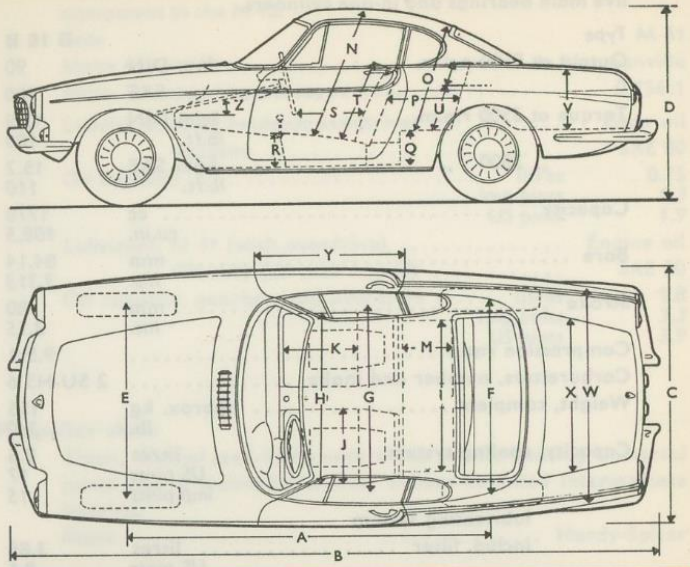
Cars fitted with the B18D engine have the M41 (overdrive) gearbox and the rear axle ratio is 4.56;1. All models, however, have disc brakes on the front wheels.



VOLVO 1800 S

Designation	Chassis number	With effect from	Remarks
P 1800 VA/HA	1—6000	May 1961	Assembled in England
P 1800 VB/HB	6000—8000	April 1963	Assembled in Sweden
1800 S VD/HD	8001—12499	August 1963	Assembled in Sweden
1800 S VE/HE	12500—	August 1963	Assembled in Sweden

Specification



A	WHEELBASE	245	96,5	P	DISTANCE FROM FRONT SEAT BACKREST TO REAR SEAT CUSHION	50	19.7
B	OVERALL LENGTH	440	173	Q	HEIGHT OF REAR SEAT ABOVE FLOOR	28	9.1
C	OVERALL WIDTH	170	66.9	R	HEIGHT OF FRONT SEAT ABOVE FLOOR	25	7.9
D	OVERALL HEIGHT	128	50.6	S	DISTANCE FROM WHEEL TO BACKREST	50	16.3
E	TRACKWIDTH, FRONT	131	51.8	T	HEIGHT OF FRONT BACKREST	57	
F	TRACKWIDTH, REAR	131	51.8	U	HEIGHT OF REAR BACKREST	38	11.4+8.7
G	WIDTH OF FRONT SEAT, SHOULDER HEIGHT	130	51.2	V	MAX. HEIGHT OF BOOT (TRUNK)	43	16.9
H	WIDTH, FRONT SEAT, HEIGHT OF HIPS	136	53.2	W	MAX. WIDTH OF BOOT	125	49.2
I	WIDTH, REAR SEAT, HEIGHT OF HIPS	131	50.7	X	WIDTH OF BOOT LID (MAX. AND MIN.)	107-86	42.1-33.9
J	WIDTH, FRONT SEAT	50	19.7	Y	WIDTH OF DOOR	102	40.2
K	LENGTH, FRONT SEAT	49	18.5	Z	STEERING WHEEL RAKE	11.5°	
M	LENGTH, REAR CUSHION	33	12.4		MEASUREMENTS IN CM AND INCHES		
N	ROOF HEIGHT ABOVE FRONT SEAT 15 CM (6″) IN FRONT OF BACKREST	93	36.6				
O	ROOF HEIGHT ABOVE REAR SEAT 15 CM (6″) IN FRONT OF BACKREST	72	28.4				

FRONT SEATS ADJUSTABLE ± 2.6 INS. (6 CM) FORE AND AFT.

Engine

Front-mounted, four-cylinder, four-stroke o.h.v. petrol engine, five main bearings and in-line cylinders.

		B 18 B
Type		
Output at 5500 r.p.m.	h.p. DIN	90
	,, SAE	100
Torque at 3500 r.p.m.	kgm DIN	13.8
	lb.ft.	*100*
,, 3800 ,,	kgm SAE	15.2
	lb.ft.	*110*
Capacity	cc	1778
	cu.in.	*108.5*
Bore	mm	84.14
	ins.	*3.313*
Stroke	mm	80
	ins.	*3.15*
Compression ratio		9.5:1
Carburetters, number and make		2 SU-HS 6
Weight, complete	approx. kg	155
	lb.	*340*
Capacity, cooling system	litres	8.5
	US pints	*17*
	Imp.pints	*15*
lubricating system		
includ. filter	litres	3.85
	US pints	*8.1*
	Imp.pints	*6.8*
exclud. filter	litres	3.3
	US pints	*7.0*
	Imp.pints	*5.8*

Clutch

Single dry disc

Make		Borg and Beck
Clutch disc, external diameter	mm	215.9
	ins.	*8.5*

Gearbox

Four-speed, fully synchronized with overdrive

	M 41
Type	
Laycock de Normanville	
Ratios 1st speed	3.13:1
2nd ,,	1.99:1
3rd ,,	1.36:1
4th ,,	1:1
reverse	3.25:1

Overdrive

An electrically-operated overdrive can be supplied as extra equipment to the M 40.

	M 41
Type	
Make of overdrive	Laycock de Normanville
Ratio, 4th speed overdrive	0.756:1
Lubricant, M 40 (without overdrive)	Gear oil
viscosity	SAE 80
Oil capacity litres	0.75
Imp.pints	*1.3*
US pints	*1.9*
Lubricant, M 41 (with overdrive)	Engine oil
viscosity (all year round)	SAE 30
Oil capacity, gearbox and overdrive litres	1.8
Imp.pints	*3.3*
US pints	*3.9*

Propeller shaft

Open, divided and fitted with three needle-bearing universal joints and a maintenance-free, rubber-mounted intermediate bearing.

Make ..... Hardy-Spicer

Rear axle

Hypoid, drive shafts carried in taper roller bearings.

Make	Spicer
Ratio, with M 40 gearbox	4.1:1
with M 41 gearbox (overdrive)	4.56:1
Lubricant	Hypoid oil
viscosity	SAE 80
Oil capacity litres	1.3
Imp.pints	*2.3*
US pints	*2.7*

Steering gear

Left-hand drive. Steering box type, "cam and roller"

Make	ZF
Number of steering wheel turns from lock to lock	3.3
Ratio	15.5:1

Lubricant		Hypoid oil
viscosity		SAE 80
Oil capacity	litres	approx 0.2
	US pint	,, .5
	Imp.pint	,, .4
Turning circle	m	,, 9.5
	ft.	,, *31*

Front wheel suspension

Independent front wheel suspension with coil springs and rubber-mounted control arms.

Steering knuckle carried in ball joints. Double-acting hydraulic, telescopic shock absorbers. Stabilizer.

Rear wheel suspension

Rigid rear axle carried on two rubber-mounted support arms, two torque arms and a track rod. Coil springs and double-acting hydraulic, telescopic shock absorbers.

Brakes

Footbrakes:

Hydraulic, front: self-adjusting disc brakes, rear: drum brakes.

Vacuum-servo

Make of brake system		Girling
Diameter, vacuum cylinder	mm	139.7
	ins.	*5.5*
,, brake disc, front	mm	276.5
	ins.	*10.88*
,, brake drum, rear	mm	228.6
	ins.	*9.0*
Friction surface, front, per wheel	cm^2	92.5
	sq.in.	*14.33*
,, ,, rear, per wheel	cm^2	210
	sq.in.	*32.55*

Handbrake:

Mechanical, operating on rear wheels. Handbrake lever between driving seat and door.

Wheels

Pressed steel wheels. All wheels balanced

Rim size	$4^1/_2$ J × 15 L
Tires	Braced-tread with tubes
Size	165—15
Tire pressure (cold tires), front kg/cm^2	1.8
lb/sq.in.	*26*
rear kg/cm^2	2.0
lb/sq.in.	*28*

Body

All-welded, integral body. Completely rust protected.

Fuel tank

Placed at rear under luggage compartment.

Capacity	litres	45
	Imp.galls.	*10*
	US galls.	*12*

Electrical equipment

Voltage of system	V	12

Negative earthed

Battery:

Voltage	V	12
Capacity	Ah	57

Dynamo:

Make		Bosch
Effect	W	360

Starter motor:

Make		Bosch
Output at —10°C (15°F)	h.p.	0.9
at 20°C (70°F)	,,	1.2

Ignition switch

Starter contact in ignition switch which is provided with an extra "radio" position in which the ignition coil is disconnected

Ignition coil

Connected with the ignition switch by means of an armoured, thief-proof cable.

Headlight dipper switch

Foot operated. Blue warning lamp for full headlights on instrument panel.

Directional indicators

Blinkers front and rear. Visual and audible signals on instrument panel.

Interior lighting

Switches in both doors and to the left under the instrument panel. Mapreading lamp with switch to the right under the instrument panel.

Heater and fresh air

Two openings for direct ventilation, one on the right and one on the left side. Controls on each side under the instrument panel.

Separate controls for heater, floor and demister under the centre of the instrument panel. Two-speed fan.

Windshield wipers and washers

Double electric windshield wipers with two speeds. Electrically operated windshield washers.

Sun visors

Double, padded sun visors.

Horns

Three horns, of which two function by pressing the knob in the centre of the steering wheel and the third, a loud-note horn, by means of the lever to the right under the steering wheel.

Instruments

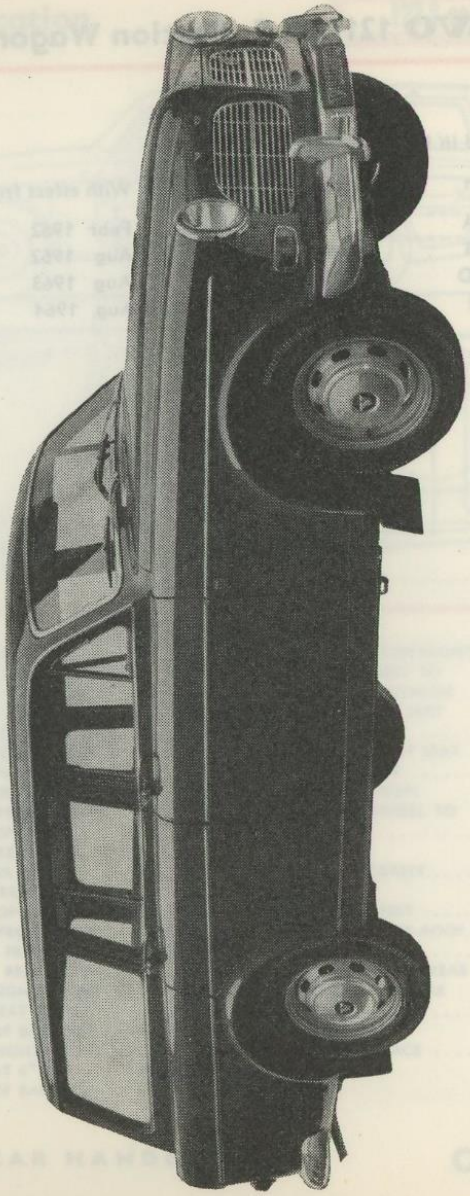
Padded instrument panel. Revolution counter. Thermometer type water and oil temperature gauges. Speedometer with mileometer, trip meter and warning lamp for charging, full headlights and directional signals. Clock. On cars with overdrives, a warning lamp which lights up when the overdrive is engaged. Adjustable-strength instrument lighting.

Safety belts

Three-point type safety belts for front seats.

Other equipment

Ashtray and cigarette lighter in instrument panel, compartments on both sides under the instrument panel, tool kit, spare wheel.

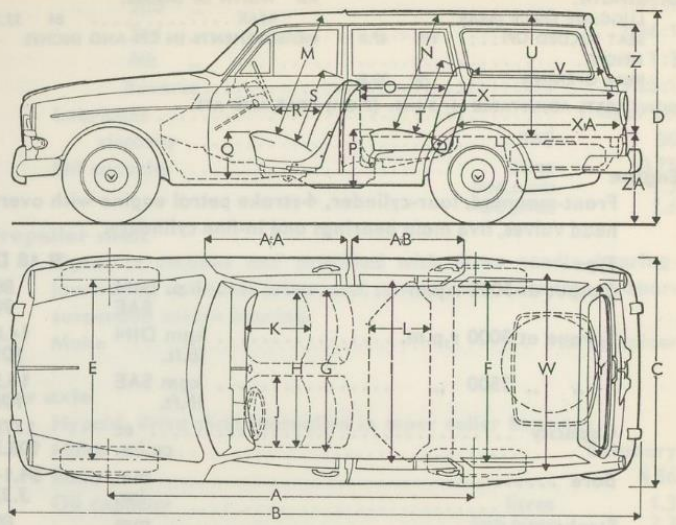


DIAGR. 37 121/122 S Station Wagon

VOLVO 121/122 S, Station Wagon

Introduced in February 1962

Designation	*Chassis numbers*	*With effect from*
220 VA/HA	1-1399	Febr 1962
220 VB/HB	1400-8274	Aug 1962
121 VD/HD	8275-17949	Aug 1963
121 VE/HE	17950-	Aug 1964



A	WHEELBASE	260	102.4	O	DISTANCE FROM FRONT SEAT BACKREST TO REAR SEAT CUSHION	60	23.5
B	OVERALL LENGTH	449	175.5				
C	OVERALL WIDTH	162	63.8				
D	OVERALL HEIGHT	153	60.5	P	HEIGHT, REAR SEAT ABOVE FLOOR	37	14.2
E	TRACKWIDTH, FRONT	131	51.8				
F	TRACKWIDTH, REAR	131	51.8	Q	HEIGHT, FRONT SEAT ABOVE FLOOR	33	13.5
G	WIDTH, FRONT SEAT, SHOULDER HEIGHT	128	50.4	R	DISTANCE FROM STEERING WHEEL TO BACKREST	35	13.8
H	WIDTH, FRONT SEAT, HEIGHT OF HIPS	134	52.0				
I	WIDTH, REAR SEAT, SHOULDER HEIGHT	125	50.0	S	HEIGHT, FRONT BACKREST	54	21.3
	WIDTH, REAR SEAT, HEIGHT OF HIPS	135	51.9	T	HEIGHT, REAR BACKREST	55	21.7
J	WIDTH, FRONT SEAT	53	21.2	U	HEIGHT, FLOOR-ROOF, LUGGAGE SPACE	86	34.4
K	LENGTH, FRONT SEAT	47	18.2				
L	LENGTH, REAR SEAT	45	18.1	V	DISTANCE FROM REAR BACKREST TO REAR OPENING	97	38.7
M	ROOF HEIGHT ABOVE FRONT SEAT 6″ IN FRONT OF BACKREST	98	38.9	W	WIDTH, LUGGAGE SPACE	126	50.2
N	ROOF HEIGHT ABOVE REAR SEAT 6″ IN FRONT OF BACKREST	91	35.6				

Cont.

X	LENGTH, LUGGAGE SPACE (REAR SEAT FOLDED DOWN)	183	72.0	ZA	LOADING HEIGHT ...	62	24.4
XA	LENGTH, LUGGAGE SPACE (REAR SEAT FOLDED UP)....	118	47.0	AA	WIDTH OF DOORS, FRONT.....	93	36.8
Z	HEIGHT, REAR OPENING.....	78	30.8	AB	WIDTH OF DOORS, REAR	84	33.2

MEASUREMENTS IN CM AND INCHES

FRONT SEATS ADJUSTABLE ± 3 INS. (7 CM) FORE AND AFT.

Engine

Front-mounted, four-cylinder, 4-stroke petrol engine with overhead valves, five main bearings and in-line cylinders.

Type		**B 18 D**
Output at 5000 r.p.m	h.p. DIN	80
	SAE	90
Torque at 3000 r.p.m.	kgm DIN	14.0
	lb.ft.	*101*
,, ,, 3500 ,,	kgm SAE	14.5
	lb.ft.	*105*
Capacity	cc	1778
	cu.ins.	*108.5*
Bore	mm	84.14
	ins.	*3.32*
Stroke	mm	80
	ins.	*3.15*
Compression ratio		8.5:1
Carburetters, number and make		2 SU-HS 6
Weight complete	approx. kg	155
	lbs.	*340*
Capacity, cooling system	litres	8.0
	US qts	*8.5*
	Imp.qts	*7.0*
Lubricating syst. including filter	litres	3.75
	US qts	*3.7*
	Imp.qts	*3.1*
Lubricating syst. excluding filter	litres	3.25
	US qts	*2.9*
	Imp.qts	*2.4*

Clutch

Single dry-disc clutch

Make		Borg & Beck
Clutch disc external diameter	mm	215.9
	ins.	*8.5*

Gearbox

Fully synchronized.

Type	**M 40**
Ratios: 1st speed	3.13:1
2nd ,,	1.99:1
3rd ,,	1.36:1
4th ,,	1:1
Reverse	3.25:1
Lubricant	Gear oil
viscosity ..... SAE	80
Oil capacity ..... litres	0.75
Imp.pints	*1.3*
US pints	*1.6*

Propeller shaft

Open, in sections and provided with three needle bearing-journalled universal joints and one maintenance-free rubber-suspended centre bearing.

Make ..... Hardy Spicer

Rear axle

Hypoid, drive shaft journalled in taper roller bearings

Make	Salisbury
Ratio	4.56
Oil capacity ..... litres	1.3
Imp.pints	*2.3*
US pints	*2.7*

Steering gear

Left-hand drive. Cam and roller.

Make	Gemmer
Number of steering wheel turns from lock to lock	3 1/4
Oil capacity of steering box ..... litres	0.25
Imp.pints	*0.4*
US pints	*0.5*
Turning circle ..... m	10.3
ft.	*33.7*

Front wheel suspension

Independent suspension with coil springs and rubber-journalled control arms. Ball joints. Double-acting, hydraulic telescopic shock absorbers. Stabilizers.

Rear wheel suspension

Rigid rear axle suspended on two rubber-mounted, longitudinal support arms and two similarly rubber-mounted longitudinal support rods, located to the body laterally by a rubber mounted track rod. Coil springs with rubber bush type auxiliary springs.

Brakes

Footbrakes:

Hydraulic, front; self-adjusting disc brakes, rear; drum brakes.

Make of brake system		Girling
Diameter, brake disc, front	mm	276.5
	in.	*10.88*
,, brake drum, rear	mm	228.6
	in.	*9.0*
Friction area, front, per wheel	cm^2	92.5
	sq.in.	*14.33*
,, ,, rear, per wheel	cm^2	210
	sq.in.	*32.55*

Handbrake:

Mechanical, operating on rear wheels. Handbrake lever between driving seat and door.

Wheels

Pressed steel wheels. All wheels balanced.

Rim size	$4^1/_2J \times 15$

White sidewall tyres, tubeless.

Size	6.40—15

Body

All-welded, self-supporting steel body. Galvanized sheet-metal in bottom rail and door angle. Completely rust-protected.

Fuel tank

Placed at rear under luggage compartment.

Capacity	litres	45
	US galls.	*12*
	Imp.galls.	*10*

Electrical equipment

System voltage	V	12

Battery:

Voltage	V	12
Capacity	Amp.hr.	60

Dynamo:

Make		Bosch
Output	W	360

Starter motor:

Make		Bosch
Output	h.p.	1

Ignition switch

Starter contact in ignition switch which is, in addition, provided with an extra "radio" position in which the ignition coil is disconnected.

Ignition coil

Connected with ignition switch by means of an armoured tamper-proof cable.

Dipper switch

Foot operated. Blue warning lamp for full headlights on instrument panel.

Traffic indicators

Flashers front and rear. Visual and audible signals on instrument panel.

Interior lighting

Contact in both doors and switch on lamp in roof.

Heater and fresh air

Separate controls for heater, floor and defroster in the centre of the instrument panel. Warm air duct to rear seat. Fan with two speeds.

Windscreen wipers and washer

Double electric windscreen wipers with two speeds. Nozzles for windscreen washer.

Sun visors

Double padded sun visors.

Instruments

Padded instrument panel with combination instruments consisting of speedometer, mileometer, trip meter, fuel gauge and temperature gauge. Warning lamp for charging, oil pressure, traffic indicators and full headlights. Instrument lighting rheostat- controlled.

Safety belts

Attachments for safety belts at front and rear seats.

Other equipment

Ashtrays in instrument panel and both rear doors, set of tools, spare wheel, cigarette lighter.

Output and torque curves

All of us once learnt that horsepower is the force necessary to lift 33.000 lbs one foot in one minute. (75 kg. 1 meter in one second). As far as cars are concerned, however, the designation of a horsepower in one country is not always the same as in another. As a rule one speaks of the engine horsepower when it is really the output at the driving wheels which should be measured, that is to say, consideration taken to power losses in the transmission, etc.

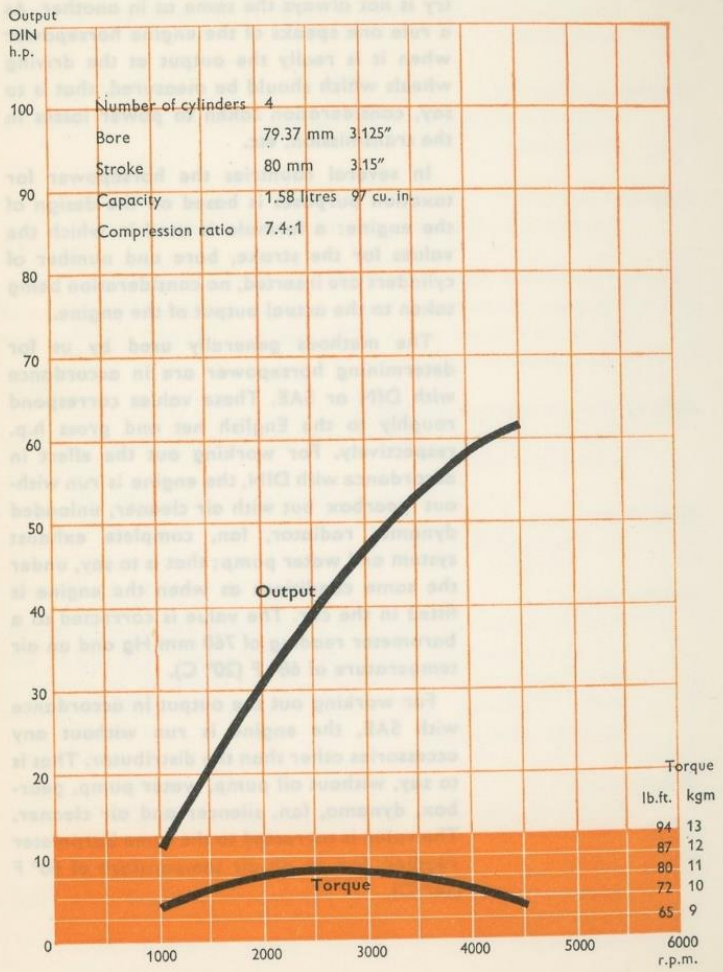
In several countries the horsepower for taxation purposes is based on the design of the engine: a formula is used in which the values for the stroke, bore and number of cylinders are inserted, no consideration being taken to the actual output of the engine.

The methods generally used by us for determining horsepower are in accordance with DIN or SAE. These values correspond roughly to the English net and gross h.p. respectively. For working out the effect in accordance with DIN, the engine is run without gearbox but with air cleaner, unloaded dynamo, radiator, fan, complete exhaust system and water pump; that is to say, under the same conditions as when the engine is fitted in the car. The value is corrected to a barometer reading of 760 mm Hg and an air temperature of 68° F (20° C).

For working out the output in accordance with SAE, the engine is run without any accessories other than the distributor. That is to say, without oil pump, water pump, gearbox, dynamo, fan, silencer and air cleaner. The value is corrected to the same barometer reading but to an air temperature of 60° F (16° C).

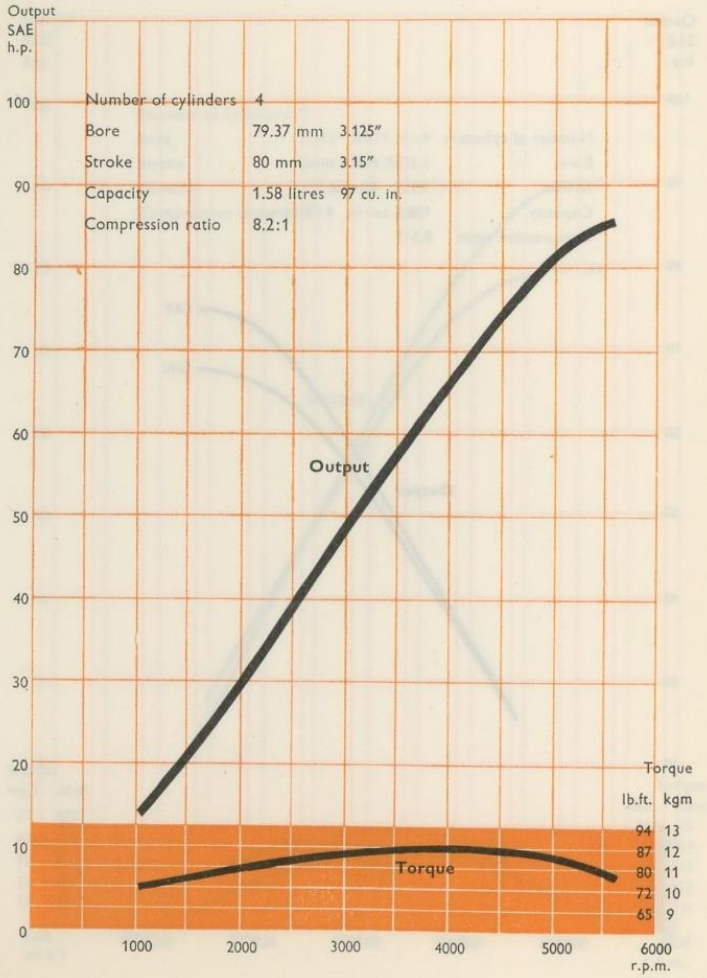
Engine

B 16 A



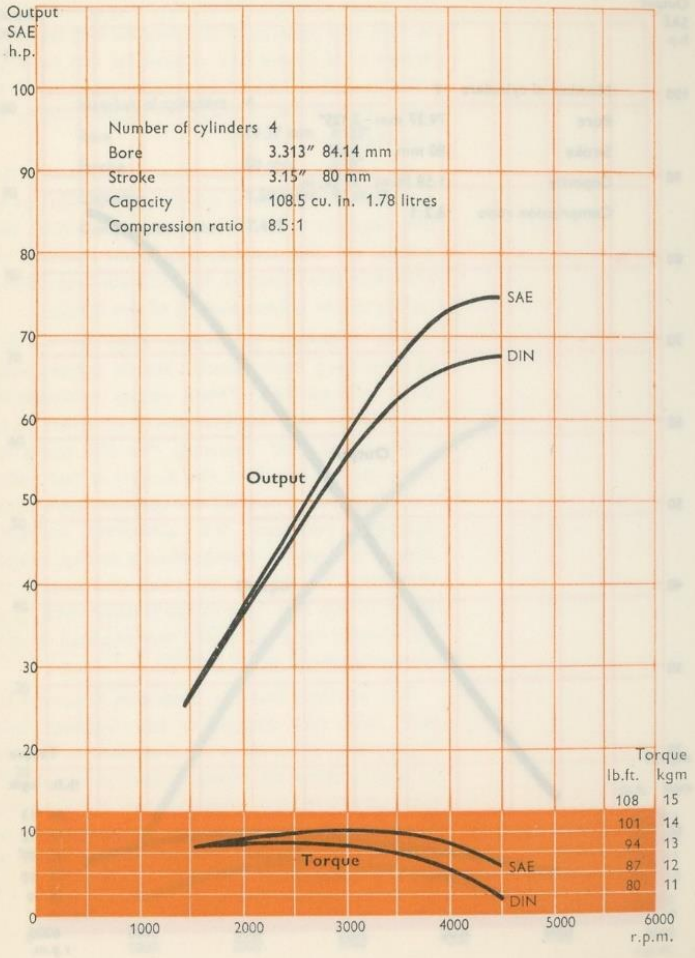
Engine

B 16 B



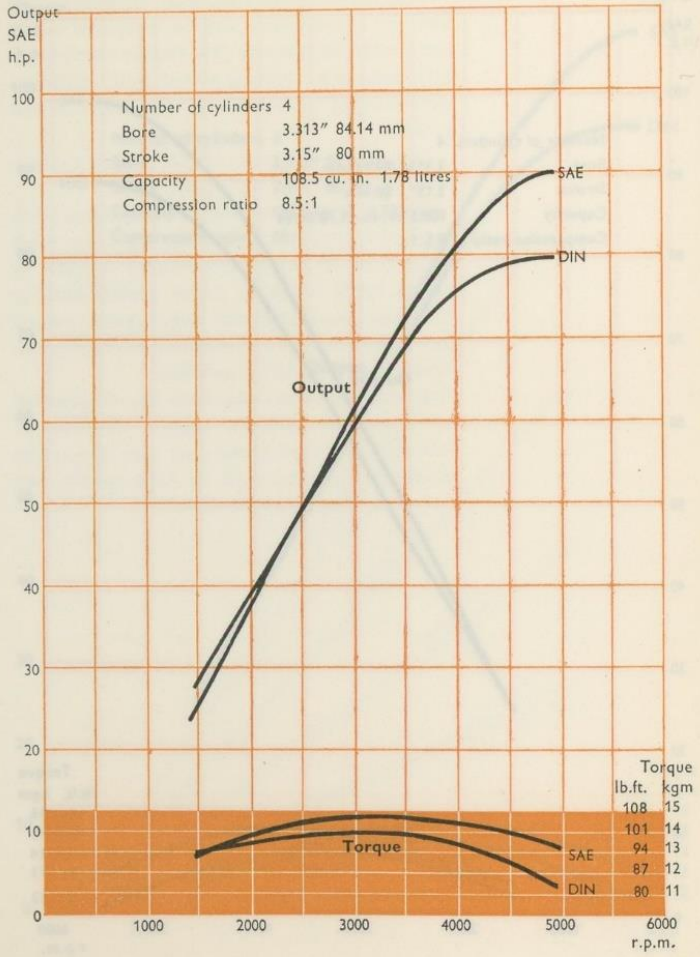
Engine

B 18 A



Engine

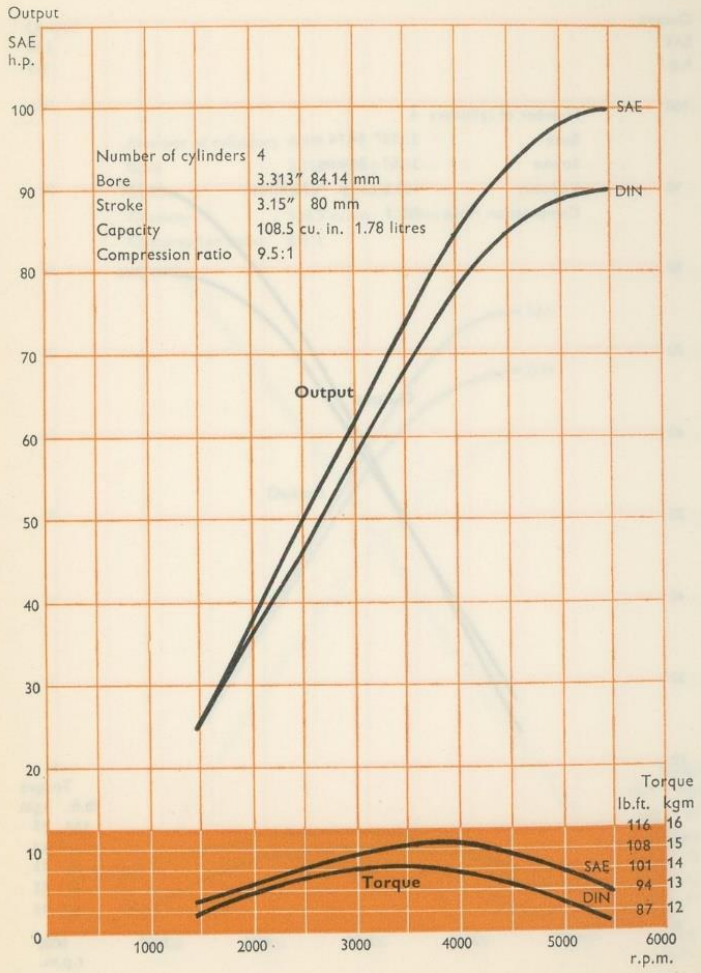
B 18 D



Engine

B 18 B

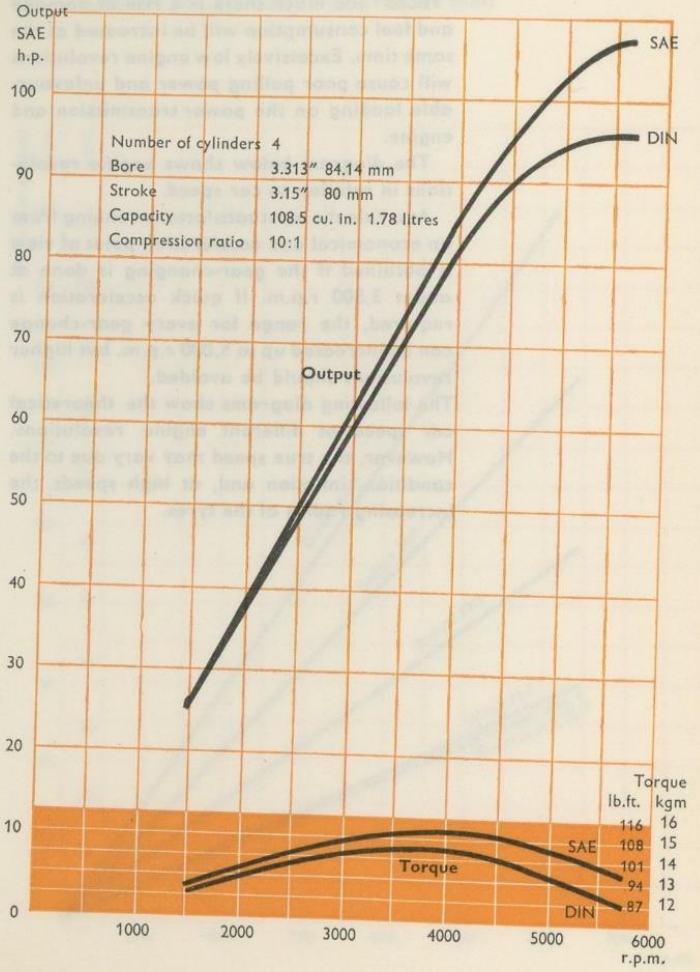
100 HP



Engine

B 18 B

108 HP



Speed diagrams
Engine revolutions
Gear-changing points

In order to drive the car in the best possible manner it is necessary to suit the gear positions with the speed of the car so that engine revolutions are kept within certain limits, neither too high nor too low. If the engine is "raced" too much there is a risk of damage and fuel consumption will be increased at the same time. Excessively low engine revolutions will cause poor pulling power and unfavourable loading on the power transmission and engine.

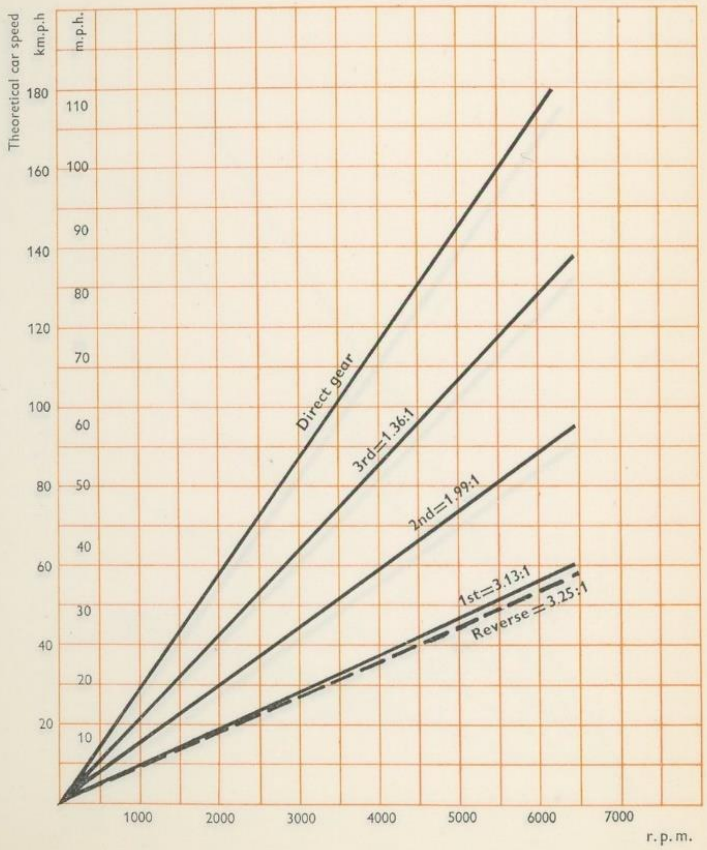
The diagram below shows engine revolutions in relation to car speed.

As a rule the most satisfactory running from an economical and acceleration point of view is obtained if the gear-changing is done at about 3,500 r.p.m. If quick acceleration is required, the range for every gear-change can be increased up to 5,000 r.p.m. but higher revolutions should be avoided.

The following diagrams show the theoretical car speed at different engine revolutions. However, the true speed may vary due to the condition, inflation and, at high speeds, the increasing radius of the tyres.

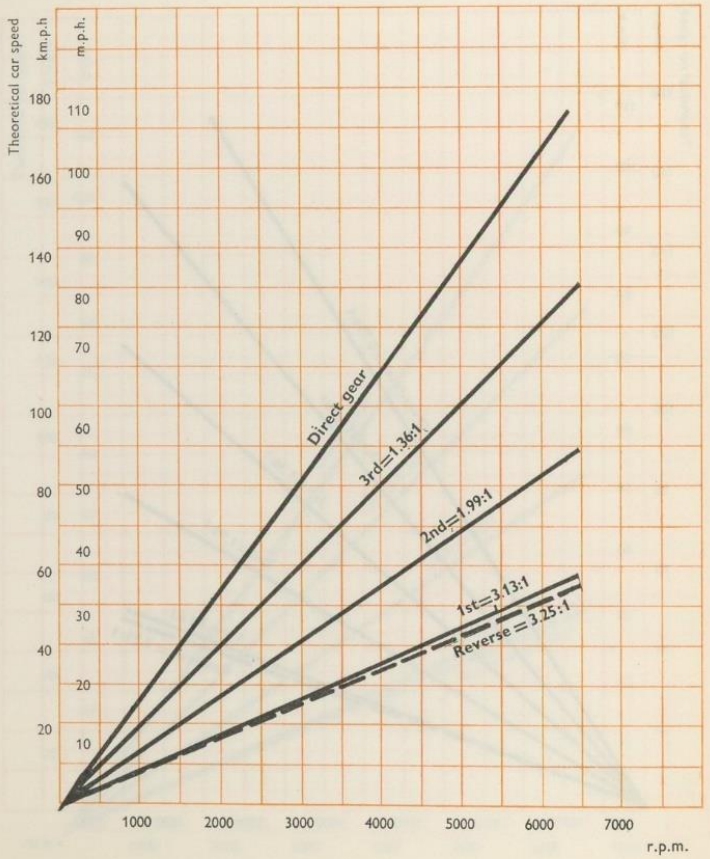
Speed diagram

Gearbox: M 40
Rear axle ratio: 4.1:1
Tyres: 6.00-15" rolling radius: 12 3/8" (315 mm)



Speed diagram

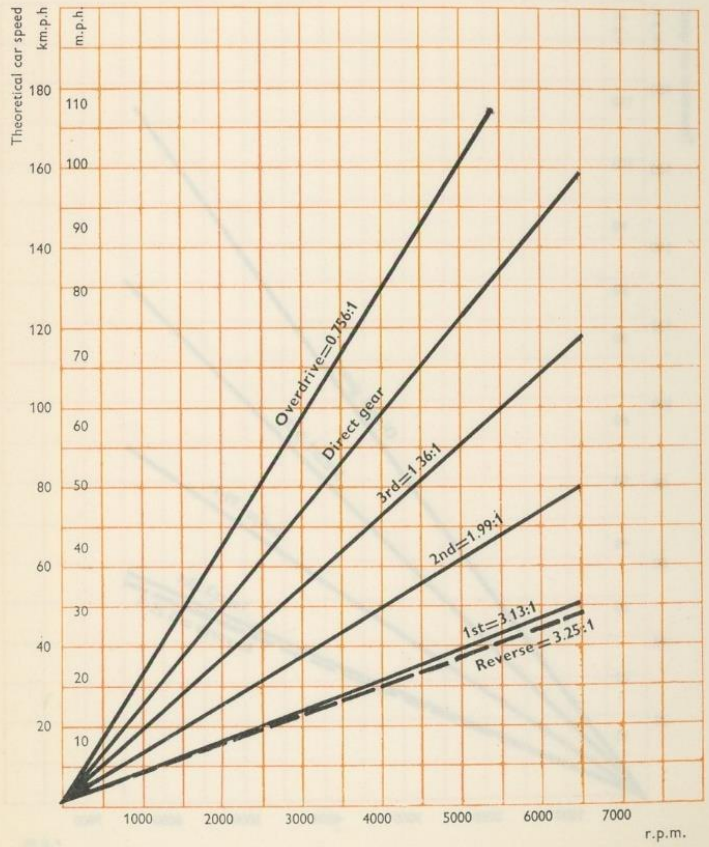
Gearbox: M 40
Rear axle ratio: 4.1:1
Tyres: 165-15, rolling radius: 11 3/4" (300 mm)



Speed diagram

1800 S

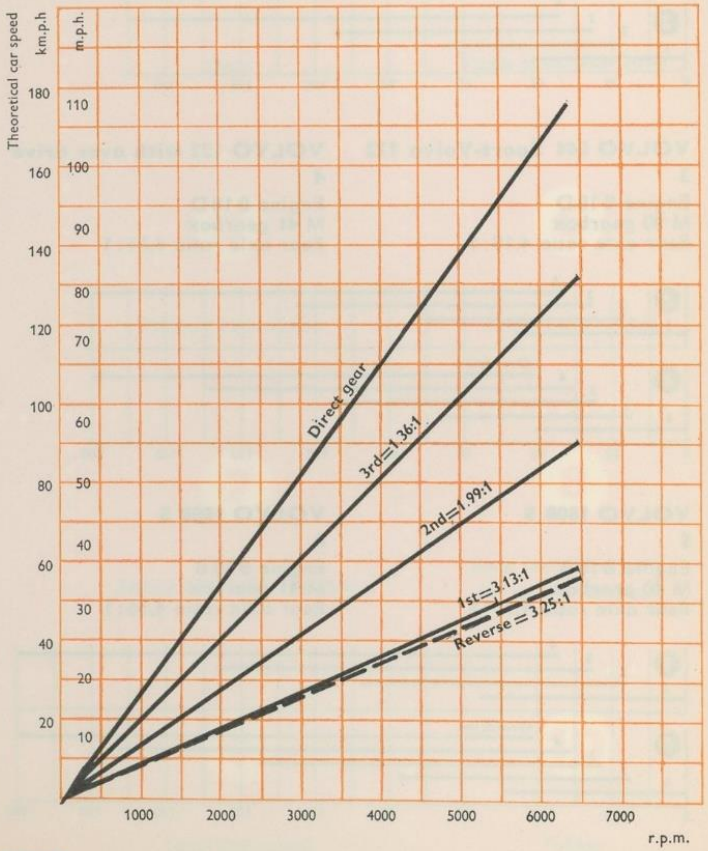
Gearbox: M 41
Rear axle ratio: 4.56:1
Tyres: 165-15, rolling radius: 11 3/4" (300 mm)



Speed diagram

210-series

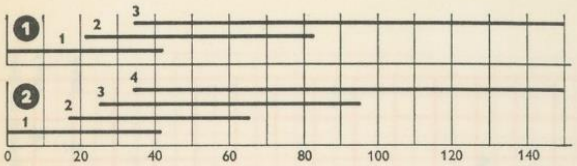
Gearbox: M 40
Rear axle ratio: 4.56:1
Tyres: 6.40-15, rolling radius: 13" (330 mm)



Gearing diagram
Speed km/h

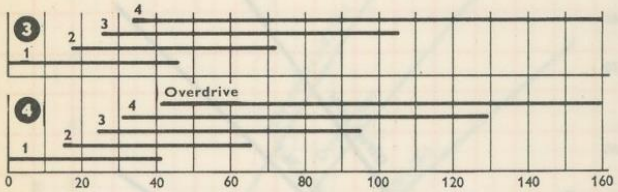
VOLVO 544
1
Engine B18A
M 30 gearbox
Rear axle ratio 4,10:1

VOLVO 544-121
2
Engine B18A
M 40 gearbox
Rear axle ratio 4,10:1



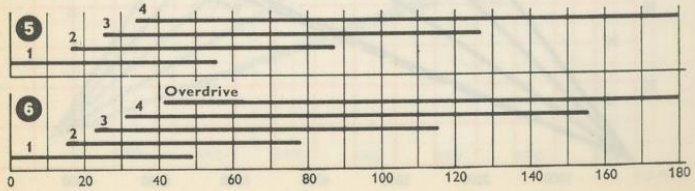
VOLVO 544 Sport-Volvo 122
3
Engine B18D
M 40 gearbox
Rear axle ratio 4,10:1

VOLVO 122 with over drive
4
Engine B18D
M 41 gearbox
Rear axle ratio 4,56:1



VOLVO 1800 S
5
Engine B18B
M 40 gearbox
Rear axle ratio 4,10:1

VOLVO 1800 S
6
Engine B18B
M 41 gearbox
Rear axle ratio 4,56:1



1 This is Volvo
2 This is how Volvos are made
3 Data
4 Type specifications
5 Product information
6 Competitive makes
7 Racing and rally activities
8 Road tests as a basis for sales promotion
9 Sales arguments
10 Tables

EA

Code key

12234

The type designations of our cars are explained in the code key below:

1st figure .....

1. Car
2. Station wagon

2nd figure .....

1. 544 and the related 210
2. 121/122 S, 4-doors and 121/122 S station wagon
3. 121/122 S, 2-doors
8. 1800 S

3rd figure .....

1. B 18 A, engine
2. B 18 D, engine
3. B 18 B engine

4th figure .....

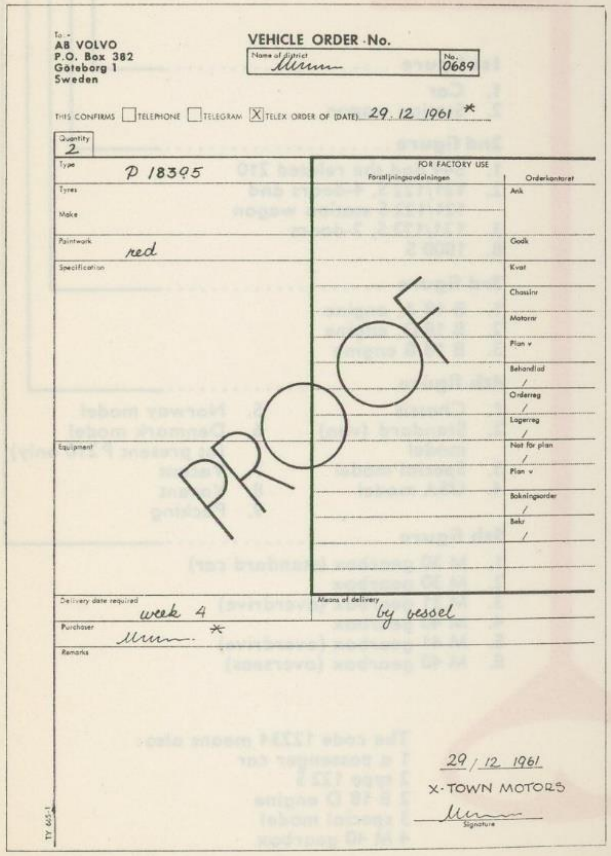
1. Chassis
2. Standard (van) model
3. Special model
4. USA model
5. Norway model
6. Denmark model (at present P 210 only)
7. Vacant
8. Vacant
9. Packing

5th figure .....

1. M 30 gearbox (standard car)
2. M 30 gearbox
3. M 31 gearbox (overdrive)
4. M 40 gearbox
5. M 41 gearbox (overdrive)
8. M 40 gearbox (overseas)

The code 12234 means also:
1 a passenger car
2 type 122 S
2 B 18 D engine
3 special model
4 M 40 gearbox

The following type designations apply to the passenger cars you are selling. These are intended for your information, but they do not necessarily apply to every car that VOLVO manufactures. Some cars may vary slightly from those you sell for purposes of marketing in other areas. Below the correct procedure to be followed in filling out the order forms is shown.



To:-
AB VOLVO
P.O. Box 382
Göteborg 1
Sweden

VEHICLE ORDER No.
Name of district: Mmm
No.: 0689

THIS CONFIRMS ☐ TELEPHONE ☐ TELEGRAM ☒ TELEX ORDER OF (DATE) 29. 12. 1961 *

Quantity: 2
Type: P 18395
Tyres:
Make:
Paintwork: red
Specification:
Equipment:
Delivery date required: week 4
Purchaser: Mmm. *
Remarks:

FOR FACTORY USE
Försäljningsavdelningen / Orderkontoret
Ank
Godk
Kvot
Chassinr
Motornr
Plan v
Behandlad /
Orderreg /
Lagerreg /
Not för plan /
Plan v
Bokningsorder /
Bekr /

Means of delivery: by vessel

PROOF

29/12. 1961
X-TOWN MOTORS
Mmm
Signature

TV 465-1

* Not necessary

Type designations

for ordering purposes

544-series

USA

With ■ or ☐ marked text below refers to headings in the vehicle order form.

		Please state in the order form:
■ **Type**	**VOLVO 544 Sport** USA model	11244
☐ **Tyres**	5 6.00—15 4-ply tyres with white side walls	
☐ **Painting**	Red	Red
	Blue	Blue
	Upholstery in grey plastic	
	Black	Black
	Grey	Grey
	White	White
	Upholstery in red plastic	
	Yellow	Yellow
	Upholstery in yellow plastic	
☐ **Specification**	B18D engine (**90** h.p. SAE)	
	4-speed transmission, M40	
	Rear axle ratio 4.1:1	
	Drum brakes	
	Air cleaner with paper element	
	Plastic headlining	
	Heater, defroster and fresh air intake	
	Speedometer in m.p.h.	
	English text	
	Bumpers with tubular arch	
	Safety belts, 2 front	

Type designations

for ordering purposes

121/122 S-series

USA

With ■ or □ marked text below refers to headings in the vehicle order form.

		Please state in the order form:
■ **Type**	**VOLVO 122 S,** 4-door USA model	12244
□ **Tyres**	5 6.00—15 4-ply tyres with white side walls.	
□ **Painting**	Black White Grey Upholstery in red plastic	Black White Grey
	Blue Red Upholstery in grey plastic	Blue Red
	Yellow Upholstery i yellow plastic	Yellow
□ **Specification**	B18D engine (**90** h.p. SAE) 4-speed transmission, M40 Rear axle ratio 4.1:1 Disc brakes at front Air cleaners with paper element Plastic headlining Heater, defroster and fresh air intake Speedometer in m.p.h. English text Front bumper with tubular arch Left hand drive Safety belts, 2 front	

Type designations

for ordering purposes

121/122 S-series

USA

With ■ or □ marked text below refers to headings in the vehicle order form.

		Please state in the order form:
■ **Type**	**VOLVO 122 S,** 2-door USA modell	13244
□ **Tyres**	5 6.00—15 4-ply tyres	
□ **Painting**	Red Blue Upholstery in grey plastic	Red Blue
	Black White Grey Upholstery in red plastic	Black White Grey
	Yellow Upholstery in yellow plastic	Yellow
□ **Specification**	B18B engine (**90** h.p. SAE) 4-speed transmission, M40 Rear axle ratio 4.1:1 Disc brakes at front Air cleaners with paper element Plastic headlining Heater, defroster and fresh air intake Speedometer in m.p.h. English text Front bumper with tubular arch Left hand drive Safety belts, 2 front	

Type designations

for ordering purposes

121/122 S-series

USA

With ■ or □ marked text below refers to heading in the vehicle order form.

Please state in the order form:

■ **Type**	**VOLVO 122 S,** Automatic 4-door USA model	**12246**
□ **Tyres**	5 6.00—15 4-ply tyres with white side walls.	
□ **Painting**	Black White Grey Upholstery in red plastic	Black White Grey
	Blue Red Upholstery in grey plastic	Blue Red
	Yellow Upholstery in yellow plastic	Yellow
□ **Specification**	B18D engine (**90** h.p. SAE) Automatic transmission Rear axle ratio 4.1:1 Disc brakes at front Air cleaners with paper element Plastic headlining Heater, defroster and fresh air intake Speedometer in m.p.h. English text Front bumber with tubular arch Left hand drive Safety belts, 2 front	

Type designations

for ordering purposes

544-series

USA

With ■ or □ marked text below refers to headings on the vehicle order form.

Please state on the order form:

■ **Type**	**VOLVO 544 SPORT** USA model	**11244**
□ **Tyres**	5 6.00—15, 4-ply tyres with white sidewalls	
□ **Painting and upholstery**	White Dark grey Black Upholstery in red cloth and red plastic	White Dark grey Black
	Red Upholstery in grey cloth and grey plastic	Red
	Light blue Dark blue Upholstery in blue cloth and blue plastic	Light blue Dark blue
□ **Engine**	B18D (**90** h.p. SAE)	
□ **Transmission**	4-speed, M 40	
□ **Rear axle**	Ratio 4.1:1	
□ **Miscellaneous**	Rear ventilator windows	

Type designations

for ordering purposes

121/122 S-series

USA

With ■ or □ marked text below refers to headings on the vehicle order form.

		Please state on the order form:
■ **Type**	**VOLVO 122 S,** 4-door USA model	**12244**
□ **Tyres**	5 6.00—15, 4-ply tyres with white sidewalls	
□ **Painting and upholstery**	White Dark grey Black Upholstery in red plastic	White Dark grey Black
	Red Light blue Upholstery in black plastic	Red Light blue
	Dark blue Upholstery in blue plastic	Dark blue
	Yellow Upholstery in leather-coloured plastic	Yellow
□ **Engine**	B 18D (**90** h.p. SAE)	
□ **Trans-mission**	4-speed, M 40	
□ **Rear axle**	Ratio 4.1 :1	

Type designations

for ordering purposes

121/122 S-series

USA

With ■ or □ marked text below refers to headings on the vehicle order form.

		Please state on the order form:
■ **Type**	**VOLVO 122 S,** 4-door USA model, Automatic	**12246**
□ **Tyres**	5 6.00—15, 4-ply with white sidewalls	
□ **Painting and upholstery**	White Dark grey Black Upholstery in red plastic	White Dark grey Black
	Red Light blue Upholstery in black plastic	Red Light blue
	Dark blue Upholstery in blue plastic	Dark blue
	Yellow Upholstery in leather-coloured plastic	Yellow
□ **Engine**	B18D (**90** h.p. SAE)	
□ **Trans-mission**	Automatic transmissio	
□ **Rear axle**	Ratio 4.1 :1	

Type designations

for ordering purposes

121/122 S-series

USA

With ■ or □ marked text below refers to headings on the vehicle order form.

		Please state on the order form:
■ **Type**	**VOLVO 122 S,** 2-door USA model	**13244**
□ **Tyres**	5 6.00—15, 4-ply tyres with white sidewalls	
□ **Painting and upholstery**	White Dark grey Black Upholstery in red plastic Red Light blue Upholstery in black plastic Dark blue Upholstery in blue plastic Yellow Upholstery in leather-coloured plastic	White Dark grey Black Red Light blue Dark blue Yellow
□ **Engine**	B18D (**90** h.p. SAE)	
□ **Trans-mission**	4-speed, M 40	
□ **Rear axle**	Ratio 4.1 :1	
□ **Miscel-laneous**	Rear ventilator windows	

Type designations

for ordering purposes

121/122 S-series

USA

With ■ or □ marked text below refers to headings on the vehicle order form.

		Please state on the order form:
■ **Type**	**VOLVO 122 S,** 2-door USA model	**13246**
□ **Tyres**	5 6.00—15, 4-ply tyres with white sidewalls	
□ **Painting and upholstery**	White Dark grey Black Upholstery in red plastic Red Light blue Upholstery in black plastic Dark blue Upholstery in blue plastic Yellow Upholstery in leather-coloured plastic	White Dark grey Black Red Light blue Dark blue Yellow
□ **Engine**	B18D (**90** h.p. SAE)	
□ **Trans-mission**	Automatic transmission	
□ **Rear axle**	Ratio 4.1 :1	
□ **Miscel-laneous**	Rear ventilator windows	

Type designations

for ordering purposes

121/122 S-series

USA

With ■ or □ marked text below refers to headings on the vehicle order form.

		Please state on the order form:
■ **Type**	**VOLVO 122 S** Station wagon USA model	**22244**
□ **Tyres**	5 6.40—15, 4-ply tyres with white sidewalls	
□ **Painting and upholstery**	White Dark grey Upholstery in red plastic Light blue Upholstery in black plastic Dark blue Upholstery in blue plastic	White Dark grey Light blue Dark blue
□ **Engine**	B18D (**90** h.p. SAE)	
□ **Gearbox**	4-speed, M 40	
□ **Rear axle**	Ratio 4.56:1	

Type designations

for ordering purposes

1800 S-series

USA

With ■ or □ marked text below refers to headings on the vehicle order form.

		Please state on the order form:
■ **Type**	**VOLVO 1800** USA model	**18345**
□ **Tyres**	5 165—15 braced tread tyres	
□ **Painting and upholstery**	Black Upholstery in red leather White Red Light blue Upholstery in black leather	Black White Red Light blue
□ **Engine**	B18D (**108** h.p. SAE)	
□ **Gearbox**	4-speed with overdrive, M 41	
□ **Rear axle**	Ratio 4.56:1	

Type designations

for ordering purposes

1800 S-series

USA

With ■ or □ marked text below refers to headings in the vehicle order form.

		Please state in the order form:
■ **Type**	**VOLVO 1800 S** 4-speed transmission, M40 Rear axle ratio 4.1:1	**18344**
	VOLVO 1800 S 4-speed transmission with overdrive, M41 Rear axle ratio 4.56:1	**18345**
□ **Tyres**	5 165—15 braced tread tyres with tubes	
□ **Painting**	Ivory	White
	Grey	Grey
	Black	Black
	Upholstery in red leather	
	Red	Red
	Upholstery in black leather	
□ **Specification**	B18B engine (**108** h.p. SAE) Vacuum servo disc brakes at front Safety belts, 2, not fitted Windshield washers Speedometer in m.p.h. English text Left hand drive	

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Type designations

for ordering purposes

121/122 S-series

USA

With ■ or □ marked text below refers to headings in the vehicle order form.

		Please state in the order form:
■ **Type**	**VOLVO 122 S** Station wagon	22244
□ **Tyres**	5 6.40—15 4-ply tyres with white side walls	
□ **Painting**	White Grey Upholstery in red plastic	White Grey
	Blue Upholstery in grey plastic	Blue
	Yellow Upholstery in yellow plastic	Yellow
□ **Specification**	B18D engine (90 h.p. SAE) 4-speed transmission M40 Rear axle ratio 4,56:1 Drum brakes Air cleaner with paper element Heater defroster and fresh air intake Plastic headlining Speedometer in m.p.h. Left hand drive Safety belts, 2 front	

1 *This is Volvo*
2 *This is how Volvos are made*
3 *Data*
4 *Type specifications*
5 **Product information**
6 *Competitive makes*
7 *Racing and rally activities*
8 *Road tests as a basis for sales promotion*
9 *Sales arguments*
10 *Tables*


5
1
ENGINE
2
Underbody
3
Body
4
Interior fittings and upholstery
5
Accessories
Engine
Underbody
Body
Int. fittings
Accessories
6
7
8
9
0

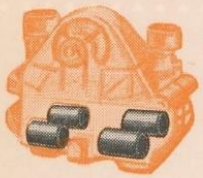
Different engine types

VOLVO

Three-cylinder, in-line engine

Four-cylinder, in-line engine

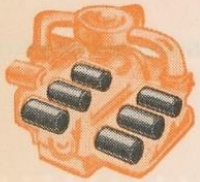
Four-cylinder, V-engine



Four-cylinder, opposed engine

Six-cylinder, in-line engine

Six-cylinder, V-engine

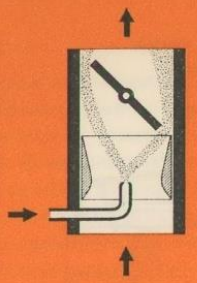


Six-cylinder, opposed engine

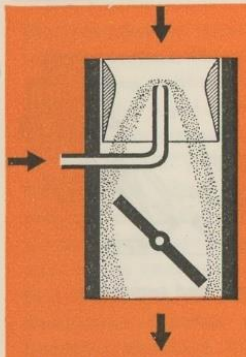
Eight-cylinder, in-line engine

Eight-cylinder, V-engine

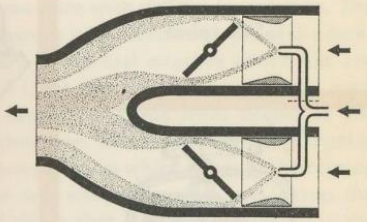
Different carburetter types



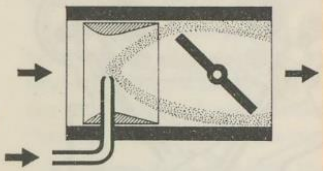
Updraught carburetter



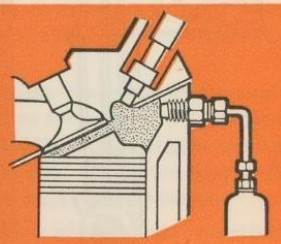
Down-draught carburetter



Twin-port carburetter

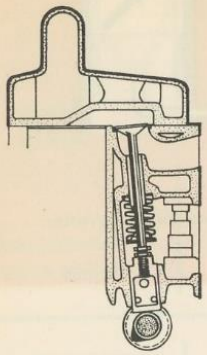


Horizontal carburetter

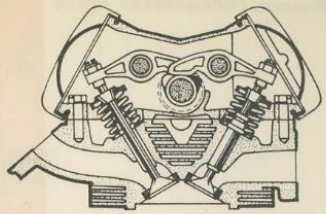


Direct injection

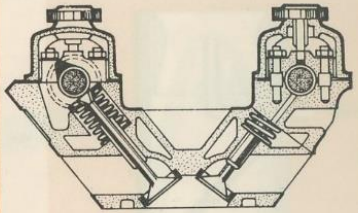
Different valve mechanisms



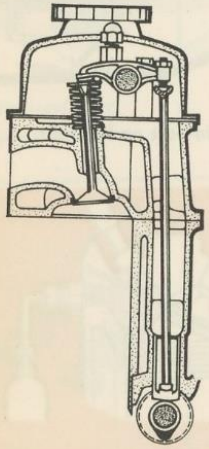
Side valves



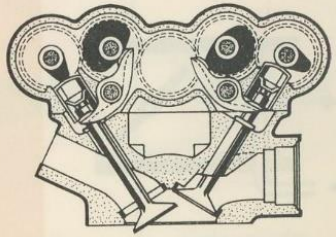
Overhead camshaft



Twin overhead camshafts



Push-rod operated overhead valves



Direct cam-operated valve system

■ Fuel

During normal combustion in an engine with electrical ignition, the fuel/air mixture is ignited by the sparking plug in the combustion chamber. The spark initiates the combustion process and the flame front spreads itself successively in all directions until all of the fuel mixture has been burnt up. The speed at which the flame front spreads itself is called the speed of combustion. During this process the pressure in the combustion chamber rises very rapidly. At the end of the compression stroke the compression pressure is in the region of 150 lb./sq. n. (10 kg/cm²). At the beginning of the expansion or working stroke while the fuel mixture is burning, the pressure rises to as much as 350—425 lb./sq.in. (25—30 kg/cm²).

If it should happen that the flame front moves too quickly through the fuel mixture (speed of combustion too great), too high pressure will be reached. The piston will not move down sufficiently quickly on the working stroke to keep an even pace with the rise in pressure. The result of this rapid increase in pressure is an abnormal rise of the compression temperature in that part of the fuel mixture which has not yet been burnt. Before the flame front has been able to spread itself through the whole mixture, a secondary flame front occurs in the remote parts of the combustion chamber. This secondary flame front is a result of the high compression temperature which arises in the remote part of the combustion chamber and which therefore self-ignites the fuel mixture there. The result of this is that all the fuel mixture in the combustion chamber burns virtually at once, giving rise to what is known as knocking. The rise in pressure during knocking is practically instantaneous and so high that a noticeable knocking noise can be heard in the cylinder. This knocking is assumed to come from the violent increase in pressure on the top of the piston resulting in stresses in the other parts of the engine.

Higher compression ratios increase the sensitivity of the engine to knocking. It causes higher pressure at the end of the compression stroke and at the beginning of the working stroke. Higher pressure at the beginning of combustion means that a pressure giving rise to "self-ignition", with knocking as a result, is reached earlier.

It follows from this that the knocking phenomenon in carburetter engines occurs towards the end of the combustion process in the combustion chamber and depends on the speed of combustion of the fuel mixture. For this reason the anti-knocking solutions which are added to petrol fuels are intended to bring down their speed of combustion. The most usual and one of the best solutions for this purpose is tetra-

ethyl lead or ethyl liquid. This medium is added to the petrol in very small quantities (max. .18 cu.ins. [3 cm³] per US gall or approx 0.07%), thus increasing the octane rating of the fuel from, for example, 70 to 80 (the lower the original octane rating of the fuel, the greater the increase of the octane rating will be).

■ Ignition

The ignition setting is of very great importance in a modern car engine. Reasons for this are higher compression ratios and engine speed. Another reason is that the octane rating of fuel (resistance to self-ignition) has been altered considerably.

The ignition system consists of ignition coil, condenser, distributor and sparking plugs.

The ignition coil generates high tension current and operates in two cycles, one charging and one discharging cycle which are controlled by the contact breakers in the distributor. The condenser prevents sparks forming between the contact breaker points and reinforces the high tension current. The distributor consists of breaker mechanism, rotor, centrifugal and vacuum governors.

The breaker mechanism controls the correct moment for beginning combustion and in this connection the basic setting of the distributor is very important. The setting is now done at 1500 r.p.m. with disengaged vacuum governor and is carried out with a special instrument. The basic setting has a decisive importance for fuel economy and output and setting values recommended by the factory should be followed.

The centrifugal governor varies the ignition setting in relation to engine speed. At higher speeds ignition occurs earlier.

The vacuum governor controls the ignition setting in relation to engine loading.

It is the sparking plug which finally produces the spark which starts combustion and this has an important function in the system. The sparking plug gap should be checked at regular intervals and the correct tightening torque should be observed when fitting. That the ignition system is free from faults is a condition for good fuel economy, output and function of the engine.

Remember that all faults in the ignition system always lead to higher fuel consumption.

■ Oils

There are several different types of motor oil with special properties and different ranges of use.

Engine oil
Gear oil
Shock absorbers oil
Rear axle oil (hypoid oil)
Brake fluid (brake oil)

Classifying lubricating oils

The rapid development of engine and engine oils during the last few years has meant that specifications have gradually had to be introduced to enable customers and people in the trade to select the correct type of oil for each requirement. Unfortunately these specifications have caused more confusion than anything else. We shall endeavour here to clarify this matter by explaining the most usual specifications and standards, what they imply and what value they have in judging different oils.

The SAE system

The SAE system is a classification of motor oils and is based exclusively on the viscosity of the oil (how thick it is). In other words, this takes no consideration whatever to the quality of the oil or to its behaviour under different working considerations. The system was worked out in USA and established in 1926 by the Society of Automotive Engineers (SAE). Since then it has been the subject of several revisions, the latest of which was done in October 1950.

Today the SAE system includes the following viscosity designations for motor oils:

SAE 5 W	SAE 10 W	SAE 20 W	
SAE 20	SAE 30	SAE 40	SAE 50

A lower number in the SAE series indicates that an oil is thinner and the letter W after the number indicates that the oil is suitable for winter use.

The old A.P.I. system

The SAE-system classifies oils only as regards viscosity. However, developments towards higher engine speeds and compression ratios together with the much increased use of diesel engines in motor vehicles has resulted in the production of completely new types of oil. It has therefore been necessary to devise other specifications as a complement to the SAE-system. It was decided to classify the oils having regard to the properties considered to be necessary for different types of engines and operating conditions. Such a classification was made by

the American Petroleum Institute (A.P.I.) and established in 1945 as follows:

"Regular" type	usually a pure mineral oil, mainly suitable for carburetter engines operated under favourable conditions.
"Premium" type	an oil with additives making it resistant to oxidization and active against bearing corrosion so that it is suitable for carburetter engines operating under more severe conditions than above.
"Heavy-Duty" type	an oil with additives giving it all the properties of a premium oil but in addition giving the oil a cleaning effect. This oil is thus suitable for both high-speed diesel engines and for carburetter engines operating under particularly unfavourable conditions.

The new A.P.I.-system

The original A.P.I. classification was replaced during the first half of 1952 with a new system. This does not attempt any description of different engine types. Instead it indicates six different kinds of operating conditions of which three apply to carburetter engines and three to diesel engines.

In specifying operating conditions consideration has in the first place been given to type of driving, engine design and fuel.

Classification of the different operating conditions or — as the Americans say — "different types of service", has been formed in the new A.P.I. system as follows:

Carburetter engines (maximum speed 4500—5500 r.p.m.: temperature of upper piston ring on A1 pistons 300—400° F [170—200° C]).

Service MS

Motor Severe — "typical for petrol and other engines with spark ignition of the fuel, operating under unfavourable and severe conditions and for which special demands are placed on the oil to inhibit sludge (oxidixation) and to prevent corrosion in cases where this is likely through operating conditions, engine design and fuel properties".

Two types of operating conditions belonging to this group are: Start-and-stop driving where an engine seldom reaches normal operating temperature which, for example, results in unburnt fuel finding its way into the sump, forming acids and causing the piston rings to stick through deposits.

Driving with the engine under heavy loading where the high operating temperature encourages oxidization of the oil causing deposits on piston rings, in the sump, in the oil filter, etc.

Service MM

Motor Moderate — "typical for petrol and other engines with spark ignition of the fuel operating under medium to severe conditions but relatively insensitive to deposits and corrosion arising when the sump oil temperature is high".

This type of operating condition includes all normal driving in the upper speed range or at high engine speed with relatively high engine loading.

Service ML

Motor Light — "typical for petrol and other engines with spark ignition of the fuel operating under easy and favourable conditions and where the engines do not make any special demands on lubrication and are insensitive to corrosion, deposits and other damage caused by impurities.

In this case the engine loading is moderate and engine speed and vehicle speed are maintained at a reasonable level".

Operating conditions for diesel engines have also been classified in the same way.

Additives for lubricating oils

In advertisements we meet with such expressions as "detergent oils, additives, inhibitors" etc. What do these really mean? Generally speaking it can be said that they concern such technical properties of the oils which the oil manufacturers are anxious to give them to enable them to fulfil all the demands which modern diesel and carburetter engines engaged on heavy-duty service demand.

Additives for oil

The majority of oils on the market today contain one or more of the following types of additives:

inhibitors (to prevent oxidization and bearing corrosion)
detergents, dispersants (cleaning — separating agents)
pour points depressants (agents for lowering the minimum fluidity temperature)
viscosity index improvers (agents for improving the viscosity index)
anti-foam agents (agents for preventing the formation of foam)
rust inhibitors (agents for counteracting rust)
oiliness or film strength agents (agents for improving lubricating capacity and strength of oil film).
dyes (colouring agents)

Much misunderstanding seems to exist concerning the purpose and function of these additives. In certain circles the idea has even arisen that the occurrence of additives in an oil is of greater importance for the lubricating properties than the oil itself.

It should therefore be stressed that the presence of additives in an oil is to improve and to bring out the quality of a well-refined, good mineral oil. Additives can never replace good original quality or thorough refining.

Gear oil differs from engine oil particularly as regards viscosity. VOLVO gearboxes use SAE 80. Oils with this thickness are of regular type. Some manufacturers have also begun to produce multigrade oils in this case. They cover a viscosity register of, for example, SAE 70 to 120.

Hypoid oil (rear axle oil) is an ordinary oil with an EP additive. The EP additive has the property of strengthening the oil film so that it can take up the pressure (rubbing) which arises in a hypoid system. VOLVO uses SAE 80.

Brake fluid is used in the hydraulic brake system and is now a synthetic product. Previously brake fluid was made of castor oil plus alcohol. Brake fluids are classified in medium and HD types. It is possible to mix HD fluids of different makes. VOLVO uses the HD type. A brake fluid should have the following properties. It must not have a detrimental effect on rubber seals or metals in the brake system. A slight disadvantage can arise with synthetic brake fluids in that they do not absorb condensation water occurring in the system so that in some cases rust can be formed. The manufacturers are now working to solve this problem.

Shock absorber oil is not a special oil and does not require any more detailed description since, as a rule, oil is not added to the shock absorbers, the complete unit being replaced if it does not function satisfactorily.

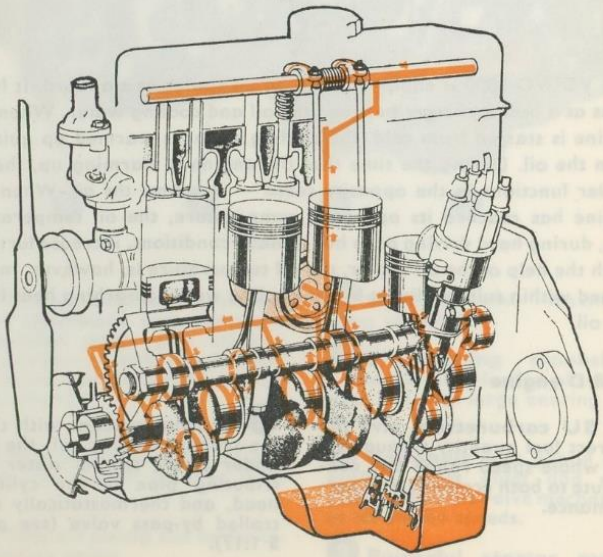
Always follow manufacturers' recommendations regarding viscosity.

We will now have a look at VOLVO engines.

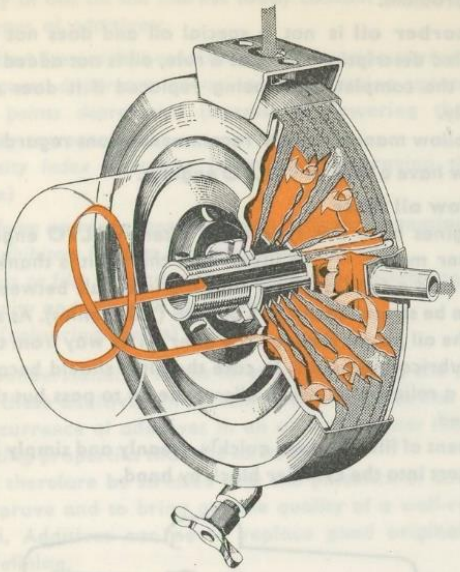
■ **Full-flow oil filter**

Not all engines have this type of oil filter. VOLVO engines — also several other makes — are fitted with this as it is thanks to the improved oils and a full-flow filter that the intervals between engine oil changes can be stretched out to 5,000 km (3,000 miles). As shown in the figure, *all* the oil passes through the filter on its way from the oil pump out to the lubricating points. In case the filter should become blocked up, there is a relief valve which allows the oil to pass but then without being cleaned.

Replacement of filter is done quickly, cleanly and simply by screwing the filter insert into the cylinder block by hand.



Oil cooler

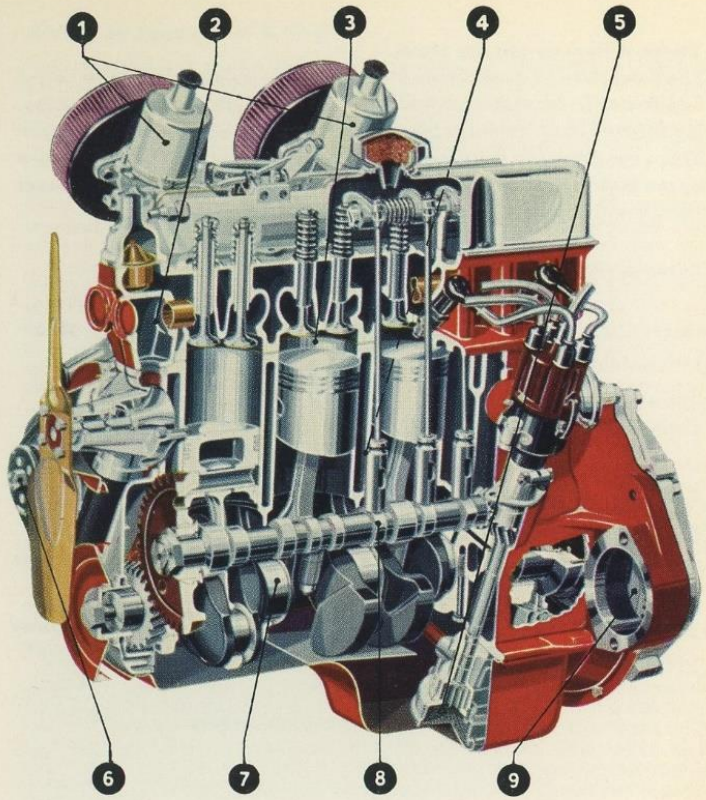


The VOLVO 1800 is equipped with an oil cooler as standard. It functions as a *heat exchanger* between the oil and cooling water. When the engine is started from cold, the cooling water is warmed up quicker than the oil. During the time that the engine is warming up, the oil cooler functions in the opposite sense — *it warms the oil*. When the engine has reached its operating temperature, the oil temperature can, during hard driving or in hot climatic conditions, increase further. With the help of the oil cooler, the oil temperature is, however, maintained within suitable limits by the cooling water absorbing heat from the oil.

B 18 D engine

1 SU carburetters give the correct fuel quantity throughout the whole speed range and contribute to both economy and performance.

2 Cooling system with thermo-syphon cooling of the cylinder block, special water distributing pipe in the cylinder head, and thermostatically controlled by-pass valve (see page 5 1:17).



3 Fully-machined combustion chambers and separate induction ports give uniform combustion in each cylinder and optimum conversion of energy from the fuel.

4 Full-flow filter (not visible) cleans all the oil pumped from

5 The oil pump out to the lubricating points.

6 Dynamo with maximum effect of 360 W.

7 Five-bearing crankshaft — robust, drop-forged of special steel and with large bearing surfaces.

8 Camshaft with gentle cam profiles gives quiet and even operation of the valve mechanism at all engine speeds.

9 Powerful starter motor

Three different engine types

The powerful and dependable B 18 engine has an outstanding technical design and is manufactured with an extremely high degree of precision. Some of the finer technical points are mentioned on the previous pages. These contribute to a very high degree of efficiency, this being shown by the high output and torque figures. This robust construction ensures vibration-free running, resistance to stress and a long life.

Three versions of the B 18 engine are available.

	B 18 A	B 18 D	B 18 B
Output SAE ..... (b.h.p./r.p.m.)	75/4500	90/5000	108/5800
Torque SAE (kgm(lb.ft.)/r.p.m.)	14(101) /2800	14.5(105) /3500	15.2(110) /4000
Compression ratio	8.5:1	8.5:1	10.0:1
Bearing shells: main bearings	white metal	white metal	lead-bronze
big-end bearings	lead-bronze	lead-bronze	lead-bronze
Carburetters	Zenith 36 VN (1)	SU HS-6* (2)	SU HS-6* (2)

* Different fuel needles.

B 18 A as opposed to B 18 D

The powerful and dependable B 18 engine has an outstanding technical design and is manufactured with the greatest precision. The B 18 engine is available in three models, the B 18 A (75 b.h.p SAE), the B 18 D (90 b.h.p SAE) and the B 18 B (100 b.h.p SAE) and the basic characteristics of the three engine types are the same: five-bearing crank shaft, fully machined combustion chambers, separate induction ports, cooling system with thermosiphon cooling and special cooling channels which keep the spark plugs and the exhaust valves at the correct working temperature. It is still, however, easy to differentiate between the characters of the various engine types. From a sales point of view, the important thing is to determine the right engine for the right customer. Earlier, primarily on the continent, the B 16 B (85 b.h.p. SAE) has been sold. The B model provides an excellent lead on markets where VOLVO is not known earlier. The purchasers have consisted to a large extent of sporting types and the name of VOLVO has quite naturally on many occasions been closely connected with competitions and outstanding performance. Today the potential customers cover a wider range and it is not always the most powerful type of engine that suits the customer best. Many details must be considered in this connection, for example the driving habits of the customer (sporting, normal, novice), long-distance driving or short stretches, city traffic or motor roads, several members of the family using the same car etc. As far as the VOLVO 1800 with the B 18 B engine is concerned, this attracts a particularly special section of the public which we shall not consider in this connection. But we believe that when the customer is selecting between a B 18 A engine and a B 18 D engine, the salesmen must find out the requirements of the customer and then clearly define the characteristics of the engines before advising the customer. The best publicity is satisfied customers. Both the B 18 A and the B 18 D are particulary competitive engines. What is the difference between these two engines?

The B 18 A is considered to be an exceptionally quiet-running engine, this depending to a great extent on the five-bearing crankshaft which makes the engine practically free from vibration. The B 18 D has also a five-bearing crankshaft but the B 18A engine is also fitted with an induction silencer combined with the air cleaner. This means that noise level is particularly low in a VOLVO 121. A quiet-running engine is often an excellent sales argument particularly when the car is to be used for family transportation.

The B 18 A is fitted with a single carburetter, a design which always implies maximum running reliability and a design which is very easy to service. Once the settings have been made, it is not necessary to alter them for long periods. (The carburetter contains a smaller number of moving parts than the two carburetters on the B 18 D engine) A two-carburetter system requires more complicated adjustment if it is to function well and makes greater demands on both the car owner and the mechanics. The extra price for the B 18 D engine is definitely regarded by many as being very small, particularly those who are primarily interested in extremely good performance. It is therefore our definite opinion that the majority of our customers only utilize this outstanding performance extremely rarely. The characteristics of the A engine are not such that the engine is subjected to the same stresses as a more sporting engine in the form of high engine speed, rapid increase in engine speed, etc. In city traffic, for example, the high output is not

required and the car is not accelerated at top engine speed. Fuel consumption under such conditions is naturally lower with the A engine than with the D engine and the rate of wear is also lower = good economy.

The lower price for the VOLVO 121 together with the particularly low noise level of the A engine and the greater reliability of its carburetter should be more attractive arguments for most customers. But do not forget that as far as acceleration, fuel consumption and top speed is concerned, the VOLVO 121 is better, or in point of fact very much better than most of its competitors. If one considers the old B 16 B engine (85 b.h.p. SAE) with its rapid acceleration rear axle (5.56:1), it only produced inconsiderably better values than the B 18 A engine at the cost of partially poorer fuel consumption for the B engine.

We should like to give you some good advice from our experience: sell the A engine and you will find out on a long-term policy that your number of satisfied customers will increase continually.

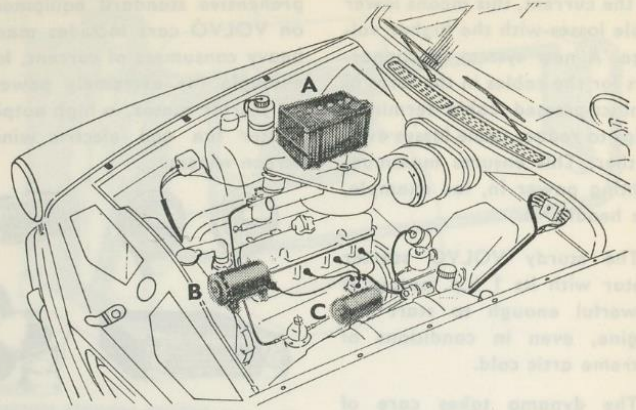
Here are some performance figures which, if used correctly, can be a great advantage in discussions with customers.

These are *average figures* and should be used with a certain amount of care since many factors such as the state of the road, wind resistance, the condition of the tyres, the weight of the vehicle, measuring accuracy and the skill of the driver always influence the test values.

VOLVO 121/122 S

PERFORMANCE:

	B 18 A	*B 18 D*
Rear axle ratio	4.10:1	4.10:1
Acceleration, seconds		
0— 80 km.p.h. (0—50 m.p.h.)	10.6	9.5
0—100 km.p.h. (0—62 m.p.h.)	18.0	15.5
0—120 km.p.h. (0—74 m.p.h.)	29.0	24.0
Maximum speed, approx.		
1000 r.p.m.		
Direct gear = km.p.h. (m.p.h.)	29.4 (18.3)	29.4 (18.3)

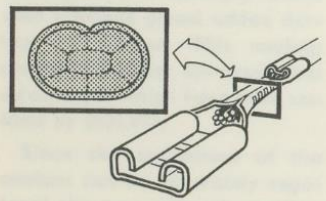


The battery, starter motor and dynamo in the new VOLVO are the most powerful on the market with respect to the engine size.

A) Thin plate battery, 12 V 60 amp. hour
B) Dynamo 360 W
C) Starter motor 1 h.p.

■ Do you have starting trouble during the winter?

During the winter, the electrical system in a car is always subjected to extra loading. The lighting units are used to a greater extent, the engine does not start so easily and has greater resistance due to the low temperature. In addition to this the capacity of the battery always goes down in cold weather — just when it is needed most.

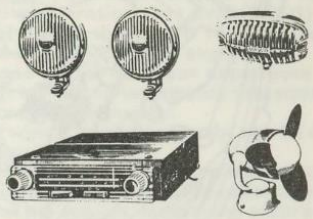


The electrical system in a VOLVO is dimensioned to stand up to all difficult winter conditions with a considerable margin. The VOLVO 12-volt battery is of the thin plate type with outstandingly good cold starting properties. The 12-volt system has also other advantages. The higher voltage means that with a certain consumption, the current in question is comparatively lower. Since the voltage drop in any cable is directly dependent

on the current, this means lower cable losses with the higher voltage. A new system of connectors for the cables in the form of contact-pressed cable terminals helps to reduce cable losses even further. This ensures maximum lighting power in, for example, the headlights.

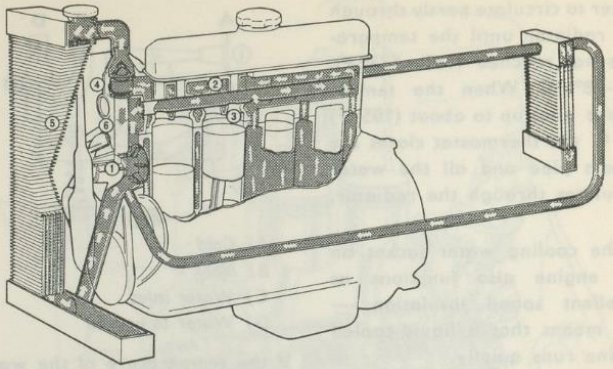
The sturdy VOLVO starter motor with its 1 h.p. output is powerful enough to start the engine, even in conditions of extreme artic cold.

The dynamo takes care of battery charging. The dynamo in the new VOLVO has an unusually high output — 360 W. The charging relay is temperature compensated and thus ensures more effective charging at low temperatures. The high output of the VOLVO dynamo and the advanced current control technique guarantee that the battery is kept well charged under all conditions. The comprehensive standard equipment on VOLVO cars includes many heavy consumers of current, for example the extremely powerful starter motor, a high output heater fan and electric windscreen wipers.



The VOLVO electrical system has sufficient capacity, however, for both standard equipment **and** *extensive extra equipment such as radio and extra lighting units.*

The VOLVO electrical system is, in common with the car, designed to stand up to very heavy demands concerning dependability under extremely demanding conditions — such as those encountered in the rigours of a Swedish winter.



Heater
Diagram showing cooling system on VOLVO B 18 engine, Bypass closed.

■ **Water cooling — an extra advantage during the winter**

All cars use air for cooling purposes — most, however, through the further medium of coolant. The stream of air through the radiator chills the coolant which, in its turn cools the engine. The cooling used is normally water with ethylene glycol added during the winter. This cooling system has many constructional advantages which have been utilized by VOLVO.

Since the circulation of the coolant can be accurately regulated, this means that the cooling of the engine can be effectively controlled. The cooling can also be made particularly effective at specially exposed points. VOLVO B 18 engines have also cooling channels which maintain the spark plugs and exhaust valves at their correct working temperature.

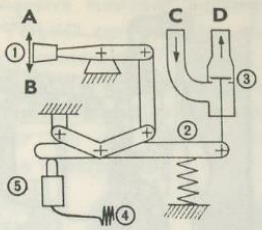
The water pump (1) ensures primarily that the cylinder head (2) is effectively cooled. The water then passes down into the engine block (3) where VOLVO utilizes the thermo-syphon effect for circulation, this ensuring that all the cylinders maintain the correct working temperature without variations and thereby minimizing cylinder wear. Below (167° F) 75° C the thermostat (4) keeps the passage to the radiator (5) closed and the water passes through the bypass pipe (6). The thermostat does not allow the

water to circulate partly through the radiator until the temperature has reached (167—173° F). 75—78° C When the temperature goes up to about (185° F) 85° C the thermostat closes the bypass pipe and all the water circulates through the radiator.

The cooling water jacket on the engine also functions as excellent sound insulation — this means that a liquid-cooled engine runs quietly.

VOLVO has also utilized water cooling to heat up the inside of the car quickly in cold weather. The VOLVO heater system ensures full heating a short time after the engine has been started and permits the quantity of warm air and its temperature to be regulated independently of each other. A special thermostat ensures that the set value is maintained.

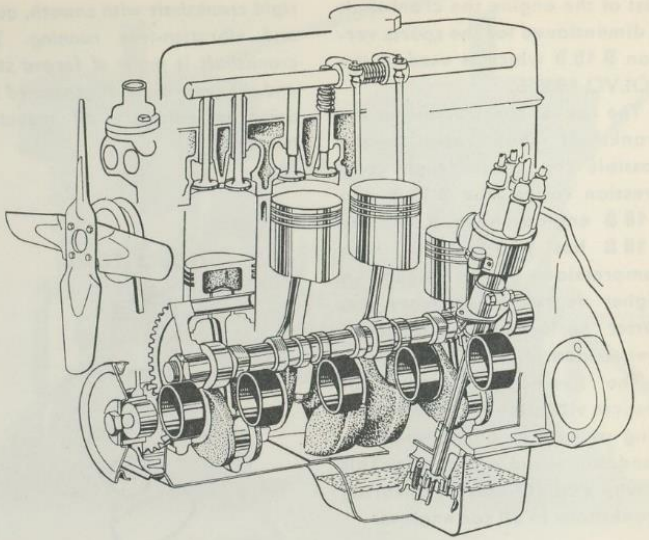
The heater thermostat (small illustration) functions as follows: When the control on the dashboard (1) is set to the required degree of heating, a lever (2) influences the warm water valve (3) which releases a certain amount of water to the heater.



A) Cold
B) Hot
C) Water inlet
D) Water to engine

If the temperature of the warm water should increase then the air warmed becomes even hotter. A sensitive head (4) is then influenced and this presses on the lever (2) through the expander (5). The result of this is that the valve (3) reduces the supply of water and the heater temperature remains constant. The sensitive head also functions in the opposite direction if the temperature of the water should go down. This means that the VOLVO heater always maintains the temperature that has been set.

The VOLVO cooling system has made possible a heater system of such high effectivity and capacity that its full output is needed only under conditions of extreme arctic cold.



■ **Why five bearings?**

The resistance to wear of a car engine depends to a great extent on how the moving parts are journalled. This is particularly important concerning the crankshaft which transfers all the work carried out by the engine to the power transmission.

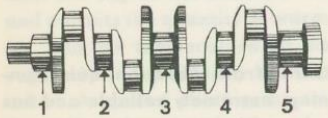
VOLVO has designed the B 18 engine with 5 main bearings. This means that, in addition to being supported at each end, the crankshaft is also journalled between each pair of cylinders. The advantages are increased rigidity and strength, this resulting in the fact that the B 18 engine is free from vibration, quiet running, extremely reliable and has a long lifetime.

The crankshaft in the B 18 engine is made of forged steel. Before machining is started, mass balancing is used to determine the centre of the forging and use this as a basis for machining. This avoids vibration during machining and facilitates the final dynamic balancing. Both the main bearing journals and the big-end bearing journals are induction hardened. The tolerance of the bearing journal diameters is only 0.013 mm (0.0005″). In common with the

rest of the engine the crankshaft is dimensioned for the sports version B 18 B which is used in the VOLVO 1800 S.

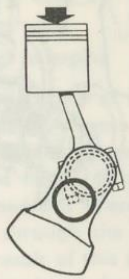
The robust construction of the crankshaft has also made possible the use of high compression ratios (the B 18 A and B 18 B engines have 8,5:1, the B 18 B has 10.0:1). The high compression ration means a higher degree of efficiency, i.e. better performance and better fuel economy.

The five-bearing crankshaft ensures vibration-free, quiet running as well as outstanding dependability and a long life. This is why VOLVO uses five-bearing crankshafts in all car engines.

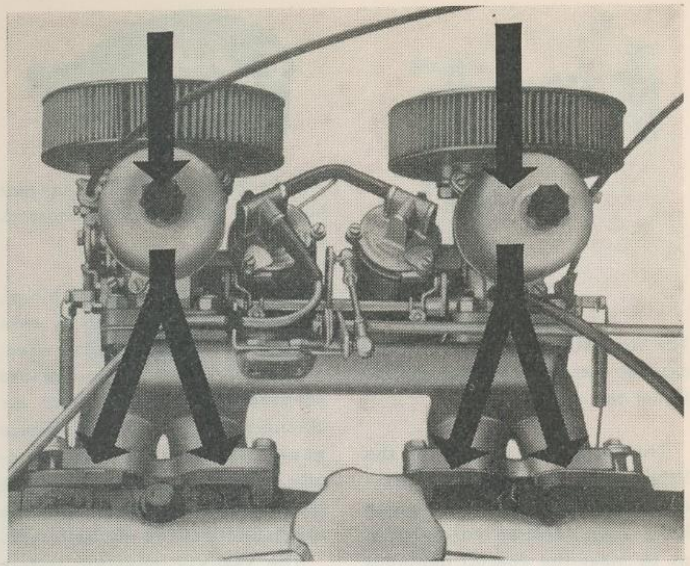


Five main bearings with a large diameter give the B 18 engine a rigid crankshaft with smooth, quiet and vibration-free running. The crankshaft is made of forged steel and the generously dimensioned bearing journals are all induction hardened.

ab. 3 tons



While combustion is taking place, the crankshaft bearings are subjected to a gaseous pressure of about 3 tons. The five-bearing crankshaft in the B 18 engine is dimensioned to stand up to large stresses with a wide margin of safety.

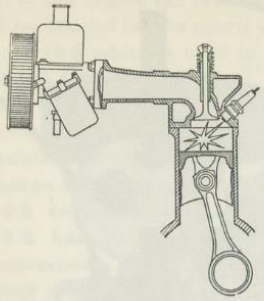


■ **Straight feed**

The performance of a carburetter engine depends to a considerable extent on the design of the induction system. A correctly designed system results in a low resistance to the flow of fuel/air mixture and an unvarying degree of thermal efficiency in all the cylinders, this also resulting in higher output and improved efficiency.

The VOLVO B 18 engine, various models of which are used in all VOLVO cars, has its induction pipes designed so as to result in the lowest possible resistance. Each cylinder has its own separate induction port which results in an extremely even degree of thermal efficiency in the cylinders and also low fuel consumption.

The combustion chambers in the B 18 engine are fully machined. This means that all the combustion chambers in an engine have exactly the same volume and form, this resulting in a more even compression pressure, smoother running and also better performance. This machining also means that all the surfaces are absolutely smooth and therefore provide poor adhesion for carbon deposits. This decreases the risk of carbon glow ignition and output decrease.

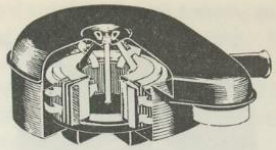


The straighter the induction pipes are, the less the resistance and the higher the output.

The induction system in the VOLVO engine has been combined with carburetters which have been selected carefully so as to meet the special demands made by the various models of the engine.

The standard engine B 18 A (75 b.h.p.) has one down-draught carburetter.

In the B 18 B model (108 b.h.p. this being used in the VOLVO



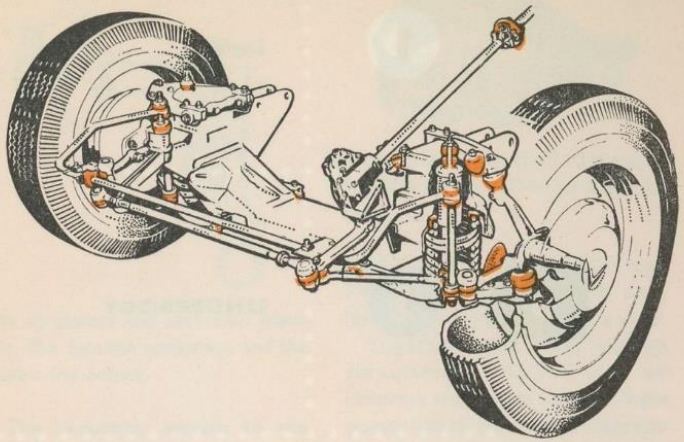
The air cleaner on the B 18 A engine has also a hyper-effective paper insert.

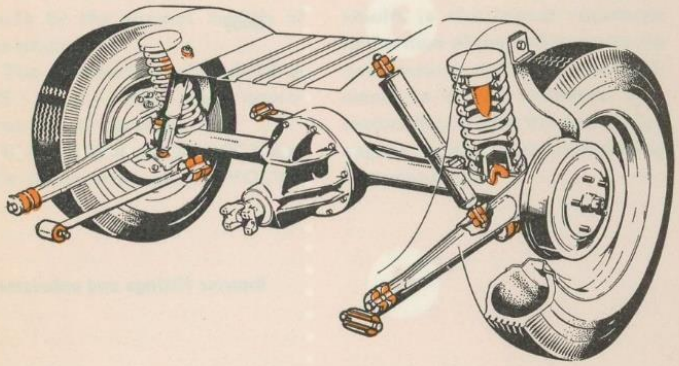
1800 S) and the B 18 D (90 b.h.p., PV 544 Sport and 122 S) twin horizontal carburetters are used.

Together with these various carburetters, VOLVO uses air cleaners with paper inserts. These paper filters have an exceptionally high cleaning effect and are more efficient than, for example air cleaners of the oil bath type.

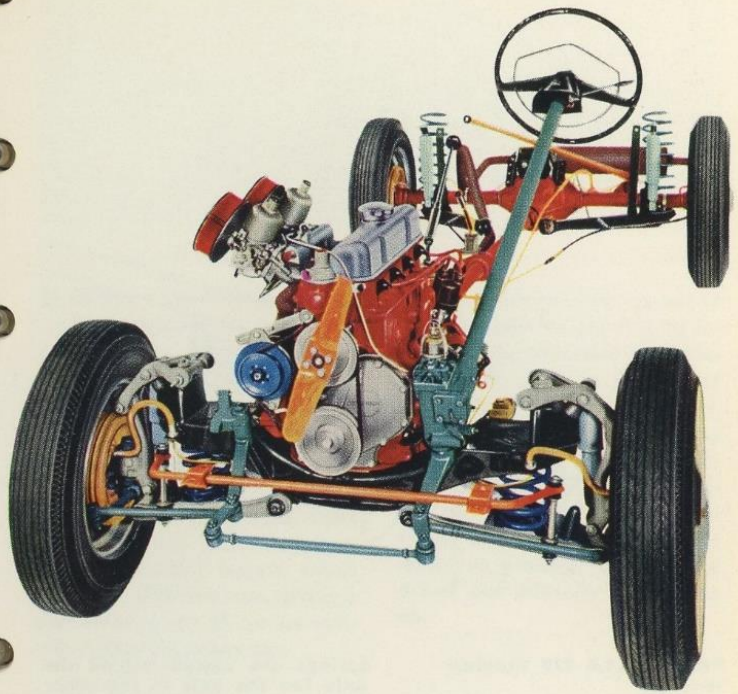
The VOLVO induction system results in the lowest resistance to the flow of the fuel/air mixture and ensures even thermal efficiency in all the cylinders. This means that a VOLVO has a high engine output and outstanding fuel economy.

1 Engine
5 2 UNDERBODY
3 Body
4 Interior fittings and upholstery
5 Accessories

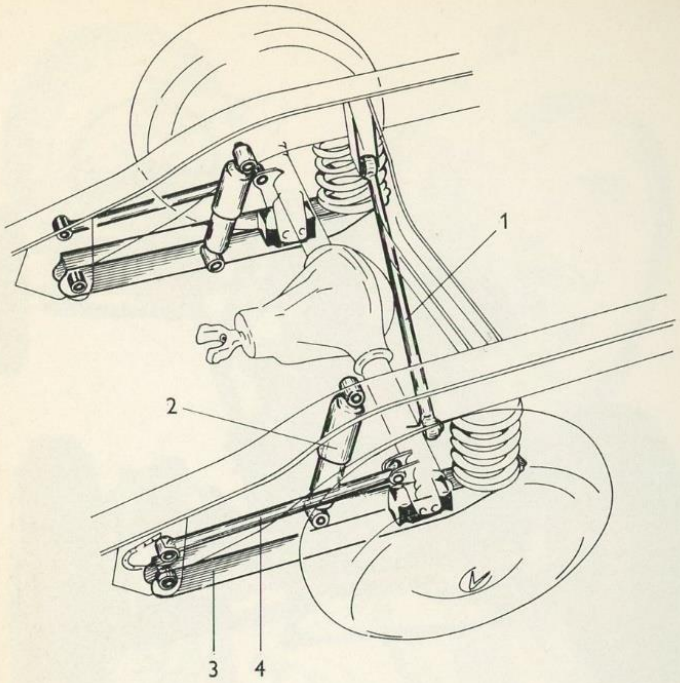




Maintenance-free, noise- and vibration-damping rubber parts on VOLVO 121 and 122. Also partly applies on VOLVO 1800 S.



Front and rear end of VOLVO 544 (with 18 D engine)



REAR AXLE 220 Station Wagon

The VOLVO 220 station wagon rear axle suspension consists of six components:

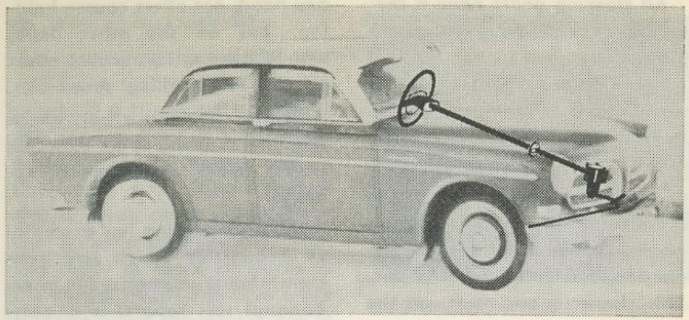
Two support rods locate the rear axle longitudinally.

Two support arms carry the springs and the axle torque is absorbed by rubber pads built into the support arms.

The track rod locates the axle laterally.

The system is suspended with *coil springs* and damping is obtained by *double-acting, hydraulic, telescopic shock absorbers*. The coil springs are placed behind the axle (on the axle in the other 1200 series), which means that the car has a *low loading height* approx. 62 cm (24.4″) and low overall height of about 153 cm (60.2″).

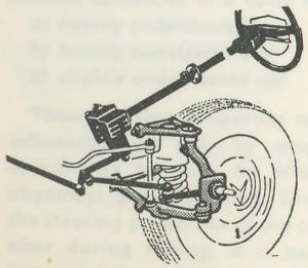
Auxiliary springs of the rubber bush type operate at high rear axle loading. This exclusive rear axle suspension is considerably superior to suspension with, for example, leaf springs (Opel, Ford Taunus) for the springs must *at the same time* perform a locating function. The VOLVO rear axle suspension has, therefore, outstanding road qualities.



Exact steering a safety requirement

A combination of many different factors gives the steering of a particular car its special properties. The main requirements are obvious: the steering must be exact, move quickly and easily and also be free from road shocks. There are, however, many secondary factors which vary with different cars, giving a particular make of car its individual steering properties.

In principle the steering can be made as easy as possible by increasing the reduction ratio between the steering wheel and front wheels. The result of this, however, is that the steering wheel has to be turned an abnormal number of times. This is not only inconvenient in town traffic but also means lack of safety on winding roads — the driver has difficulty in keeping up.



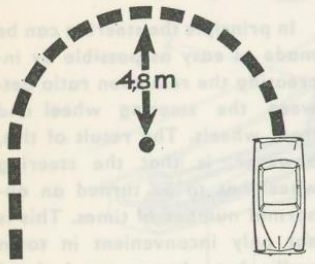
Another and more correct way of making the steering easier is to reduce the friction losses in the transmitting mechanism. VOLVO has chosen this method, producing a steering arrangement having particularly high mechanical efficiency. The low curb weight and moderate front axle loading of a VOLVO mean that steering is easy in spite of low ratio.

All steering gears have a certain amount off lexibility depending on the clearance in the ball joints. This must be kept within such limits as will not impair the steering precision.

The steering geometry, that is to say, the relationship between the turning of the right and left wheel, is influenced by the suspension and rolling of the car. This characteristic must, on the one hand, not affect course holding, but on the other hand, should have a favourable effect on the curve-taking properties.

Before choosing a car, check that the steering is as exact as traffic safety requirements demand.

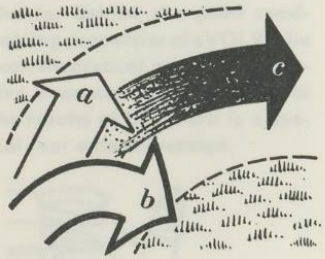
VOLVO steering has exemplary properties which are constantly being emphasized in international test report: it is easy, exact, has few steering wheel turns from lock to lock and is not sensitive to shocks. On the VOLVO 121/122 and 1800 the steering column consists of two sections which are joined by means of a noise- and vibration-damping coupling disc. In addition, the 121/122 has a very small turning circle — 31 ft. 6 in. (9.6 metres).



■ Why understeered?

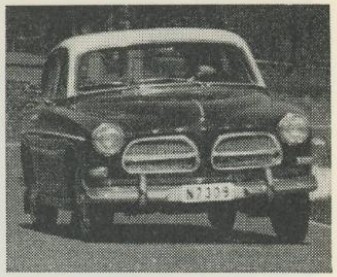
If a car is oversteered, the rear end has a tendency to slide outwards in a curve, particularly if the road surface is slippery or bumpy, which means that a dangerous and difficult-to-control skid can easily occur. If the car is understeered, the front end tends to move outwards in the curve, which requires more steering wheel movement but at the same time is easier to control.

On a straight road in a cross wind, an understeered car is more stable and requires considerably less effort to control than an oversteered car.



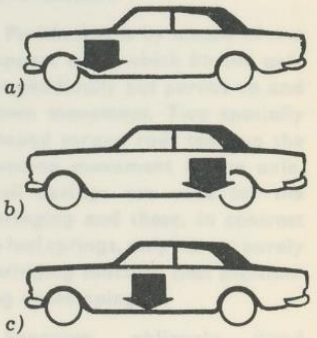
Steering tendencies in a curve for
a) heavily understeered
b) heavily oversteered and
c) slightly understeered car

These steering properties are influenced not only by weigh distribution but also by wheel alignment and stabilizing. Since the steering properties of the car alter during rolling, it is very important that stabilizing is correctly carried out.

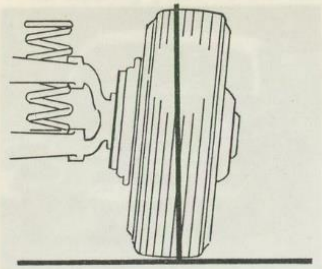


A basic rule is that larger camber (the angle of the wheel to the vertical) at the rear than at the front gives oversteering tendencies while more stabilizing at the front than at the rear gives understeering tendencies.

Weight distribution is essential for the steering properties of the car

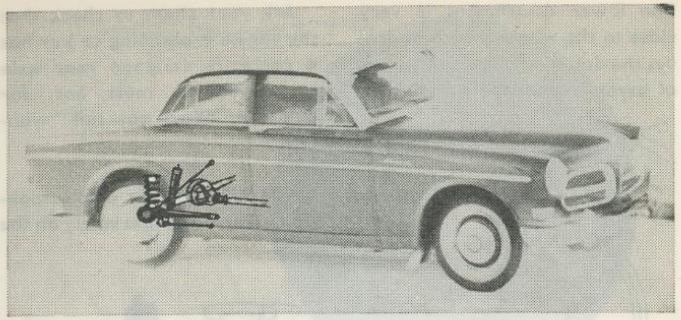


a) Tendency for understeering
b) Tendency for oversteering
c) Slightly understeered (VOLVO)



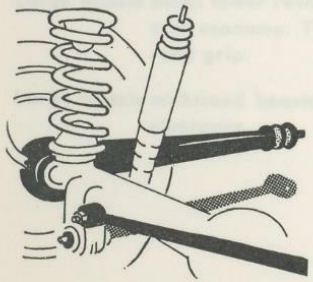
The camber angle — the inclination of the wheel to the vertical — also influences the steering properties.

VOLVO cars are slightly understeered. The position of the engine means that the centre of gravity lies slightly in front of the middle and the rear axle is integral. The rear wheels on VOLVO cars therefore always have the same camber. In practice this means that a VOLVO combines the driving stability of an understeered car with ease in steering. The steering properties of a VOLVO make the car safe, comfortable and easy to drive.



■ Rear axle suspension — important for road-holding

Good road-holding properties of a car are not obtained by chance. Behind the good road-holding properties of a VOLVO lie both theoretical work and intensive practical research. One of the results of this work is a special rear axle suspension.



Positioning the rear axle

A rear axle suspension must fulfil three different functions:

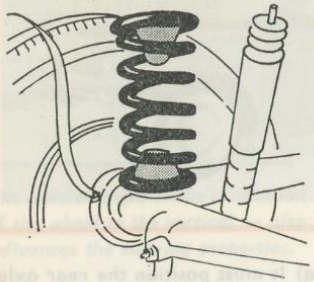
a) It must position the rear axle
b) "Off-load" the rear axle and
c) Damp the spring movement of the axle.

The correct relationship between these three functions contributes essentially to the good road-holding properties of a car. In order to obtain full control over this relationship, VOLVO cars have a separate unit for each function.

Positioning is by means of two support arms which fix the axle longitudinally but permit up and down movement. Two specially shaped torque rods take up the twisting movement of the axle. Coil springs are used for the springing and these, in contrast to leaf springs, only have a purely springing function (not positioning or damping).

Separate, obliquely fitted double-acting hydraulic shock absorbers are used for damping.

The lower attachment is very close to the wheel, which improves the damping effect in the case of asymmetrical springing.

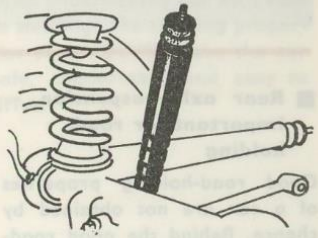


Damping

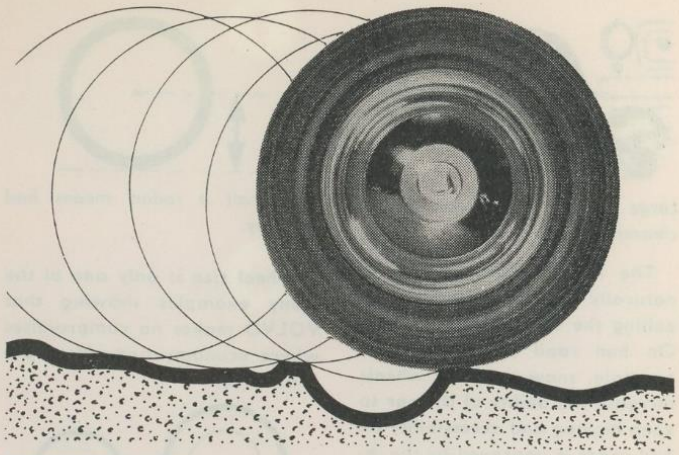
Both the spring constant and damping properties are also specially suitable for driving on bad road surfaces.

Ask your client to check that the car he is planning to buy has a correctly designed rear axle suspension. It must not, for example, allow any tail "wander".

The VOLVO rear axle suspension gives maximum safety on the road.



Suspension



■ LARGE WHEELS — WHY?

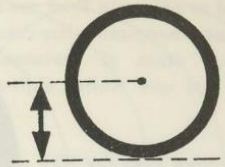
Large wheels mean greater safety since they make room for larger brakes with better cooling.

Large wheels mean fewer revolutions per mile and therefore greater tyre economy. The larger contact surface gives better road grip.

Large wheels withstand heavier loading and give increased ground clearance.

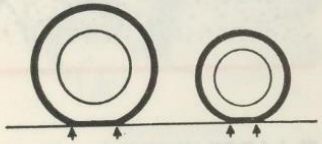
Large wheels give more ground clearance.

The large contact surface is naturally valuable both for propelling the car and for braking. On bad road surfaces — for example, snow — large wheels increase the ability of the car to keep moving and accessibility on bad roads is improved by the increased ground clearance given by the large wheels.

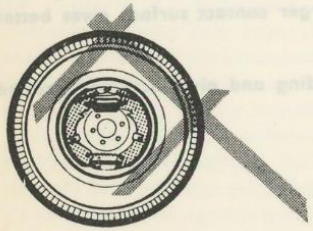


Too small a radius means bad economy.

Wheel size is only one of the many examples showing that VOLVO makes no compromises where economy and safety are concerned.



Large wheels give greater contact surface.



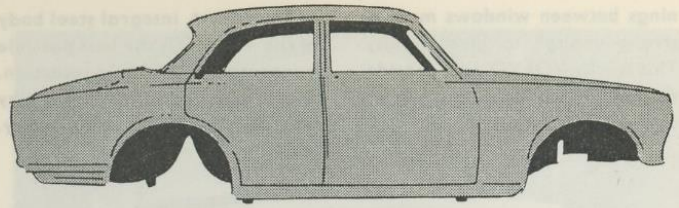
Large wheels make room for large brakes.

The arguments for and against are as follows: small wheels take up less room, weigh less and give a slightly lower centre of gravity.

Loading is a factor which is perhaps most overlooked in discussions concerning large and small wheels. There is in fact a noticeable difference in the "carrying capacity" of different sizes of tyres.

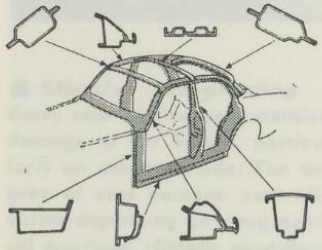
Before choosing, find out whether the car you are considering has tyre dimensions which will withstand full loading — overloading shortens the length of life of the tyres.

1 Engine
2 Underbody
5 3 BODY
4 Interior fittings and upholstery
5 Accessories



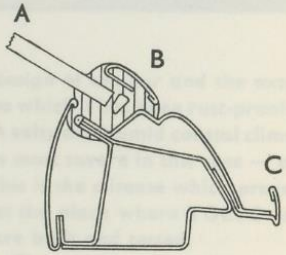
■ Rigid body for a safe car.

The strength of the body is one of the factors which decides whether a car is safe or not. A good body must be sufficiently strong to afford protection for the driver and passengers in difficult situations.



The various box-section members round the body openings give the VOLVO exceptional rigidity.

One of the demands placed on VOLVO cars is that they should be able to turn right over without becoming noticeably deformed. It is not only the rigidity of the roof that is decisive in this respect, but also the strength of the pillars supporting the roof and the members surrounding all the body openings. The windscreen pillars and body openings on a VOLVO are proportioned to give good all-round vision without impairing the strength of the body. Extra strong box-section members surround all body openings, a safety detail in which VOLVO leads the way.



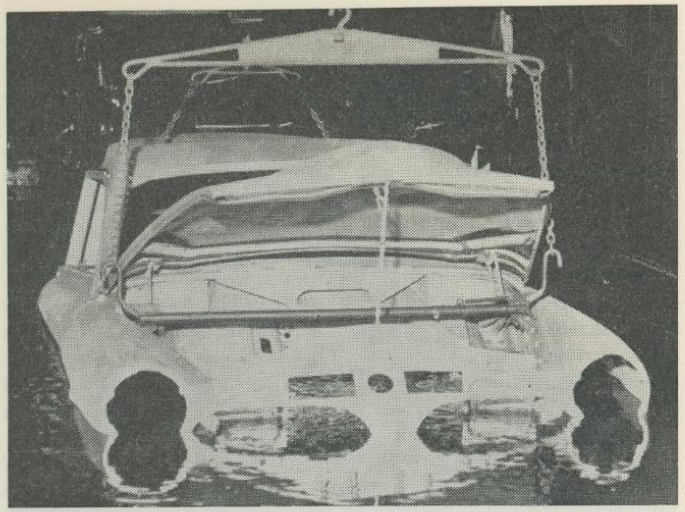
A) Windscreen
B) Rubber strip
C) Drip ledge

The well-dimensioned internal stiffening of the windscreen pillars ensures maximum passenger safety.

Some constructional details which give the body the desired rigidity sometimes lead to disadvantages from the purely aesthetic point of view. For example, the pillars supporting the ope-

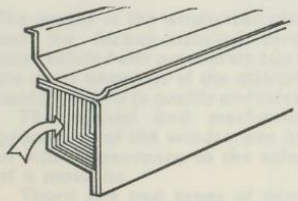
nings between windows must be strong enough to give rigidity. This is why VOLVO puts considerations of comfort and safety before everything else.

The robust, integral steel body of the VOLVO is the best possible guarantee for your protection. This is just one of the reasons why VOLVO means motoring safety.



■ **Effective rust-proofing**

Every year rust causes extensive damage to car bodies, particularly on the underside. The degree of rust damage naturally varies depending on geographical positions, climatic conditions and — by no means least — the design of the car and the extent to which it has been rust-proofed. A salty and humid coastal climate is most severe in this case — and this is the climate which prevails at the place where VOLVO cars are built and tested.



Volvo cars are rust-proofed even inside closed sections,

The first stage in VOLVO rust-proofing is when particularly exposed places on the body such as welding flanges and closed sections are coated with anti-rust paint before welding is even carried out.

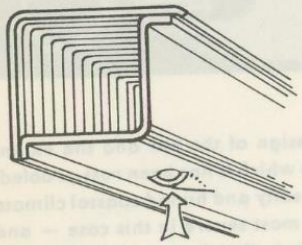
The basic condition for the effective rust-proofing of the body itself is that the surface of the metal is thoroughly clean. VOLVO bodies are first degreased in a weak aqueous alkaline

solution and are then rinsed twice. The clean bodies then pass through the zinc phosphating process. This deposits a thin layer of fine phosphate crystals on the surface of the metal, providing increased rust protection and better adhesion for the surface finish. The provision of special holes means that cleaning and phosphating also reach the inside of body members and cavities. After phosphating, the bodies are first rinsed with clean water and then with water containing chromic acid which improves the rust-proofing even further. After being dried in ovens, the bodies are then immersed in paint up to the level of the window openings. This paint also penetrates right into all the cavities (see the large picture).

The bodies are then ready for the application of the surface finish. After this has been done, extra rust-proofing operations are carried out. On 121/122 cars for example, particularly exposed cavities in the lower part of the body are mist-sprayed with anti-rust oil.

Closed sections which are exposed to moisture are drilled with ventilation holes. These keep the cavities dry and thereby decrease the risk of corrosion.

Effective rust-proofing is the secret behind the outstanding resistance of VOLVO cars to rusting — and also one of the reasons why Volvos have such an outstanding reputation for quality.



It is very important to ensure that all cavities exposed to moisture are well ventilated.

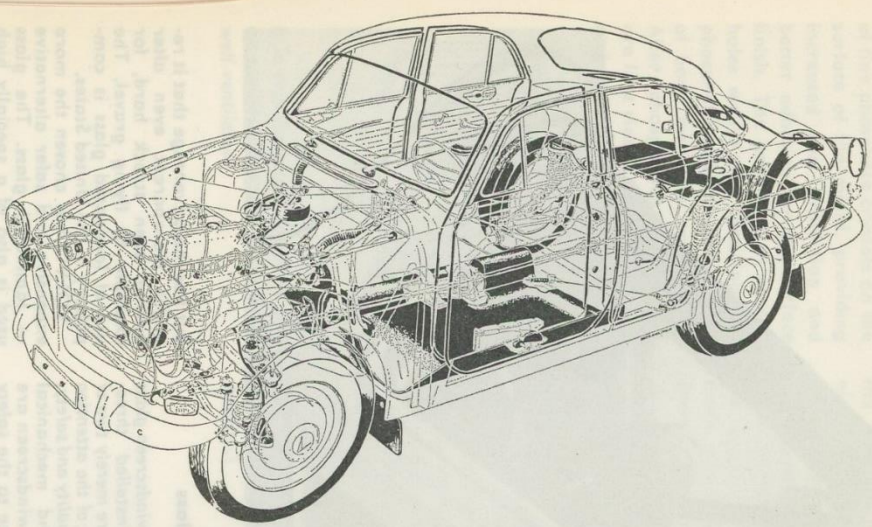
■ Laminated glass

The quality of the windscreen glass and the factory-installed three-point safety belts are merely two of the many examples of the attention paid by VOLVO to quality and safety.

The optical and mechanical properties of the windscreen are of vital importance to the safety of a motorist.

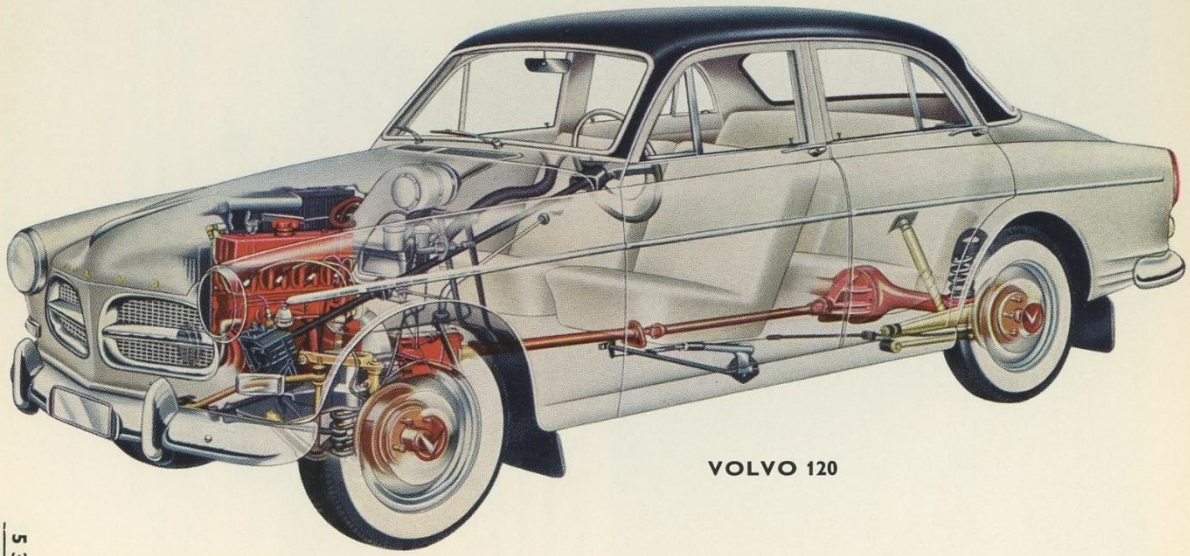
There are two types of windscreen glass: laminated glass and toughened glass. Laminated glass is considerably more expensive but has the advantage that it remains transparent even after having been struck hard, for example by flying gravel. The use of laminated glass is compulsory in the United States.

VOLVO has chosen the more expensive and safer alternative — laminated glass. The glass used is also of a specially high grade concerning surface texture. Laminated glass consists of two layers of glass with an intermediary sheet of plastic material.

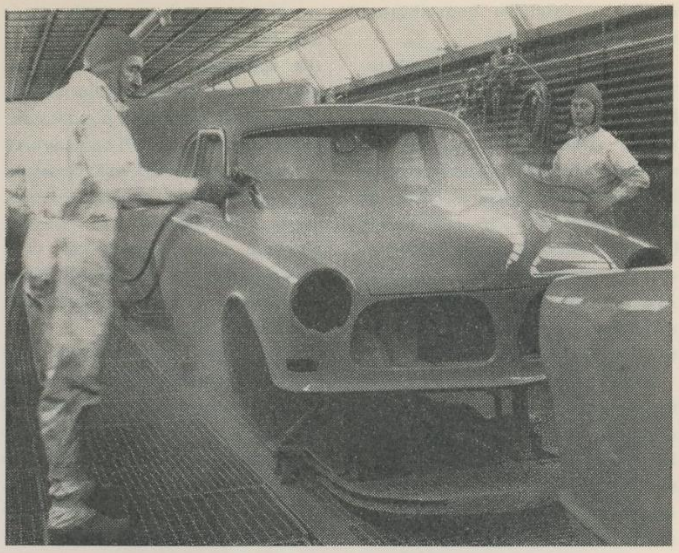


10% of the car consists of rubber

Rubber components are becoming increasingly important in the automotive industry and the amount used during recent years has increased to a great extent. The components can be sub-divided into four groups with respect to their function: 1. For reduction or insulation of vibration. 2. For sealing against air, fluids and dirt. 3. As electrical insulation. 4. As binding agent between frictional material, seals, gaskets, washers and dampers. This X-ray sketch of a VOLVO 121/122 shows most of the many rubber components included in a modern car.

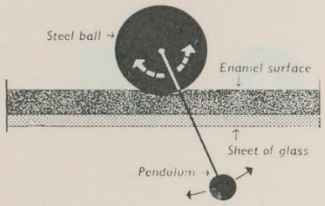


VOLVO 120

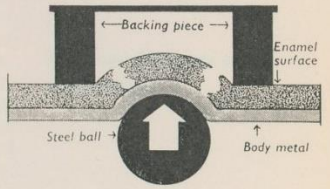


■ Surface finish — more than just enamel

The surface finish plays an important part in the appearance of a car. But it also has another function which is just as important and that is to protect the car body from corrosion. A good surface finsh makes the car easy to keep in perfect condition and also



The harder the enamel is, the more the movement of the pendulum is damped. Measurement of the damping provides a measure of the enamel hardness.



The size of the dent when the enamel starts to crack provides a measure of its elasticity.

makes a valuable contribution to its lasting quality.

The Volvo painting plant laboratory checks to ensure all deliveries of paint and all new paints used come up to the stringent VOLVO specifications: Is it durable? Does it keep its high gloss? Is it sufficiently flexible? Does it stand up to extreme temperature changes? Are the hardness, color fastness and other important characteristics up to standard?

When the enamel has been finally approved, it is sprayed onto the bodies which have first been phosphated and dipped into synthetic primer. The spraying booths used are maintained virtually dust-free by the use of water curtains and giant air-conditioning plant which changes the carefully filtered air in the spraying booths 700 times every hour. An undercoat is first sprayed on and then a tack coat followed by three full coats which are sprayed wet on wet. Between the application of the various coats, the bodies are stoved, ground and washed off very thoroughly. An extremely close inspection is also carried out after each operation.

Thorough rust-proofing and careful application of the surface finish of top quality enamel means that your VOLVO can stand up to outdoor parking in all weather — year after year. A further reason why VOLVOS have such an outstanding reputation for quality.

1 Engine
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■ AMAZON SEATING

Scarcely any other car upholstery is so soft and smooth as the new material Vinyl which, in combination with hard-wearing textile material, has an outstanding resilience. From the wear and tear point of view, Vinyl has an almost everlasting durability and is also extremely easy to keep clean; a damp rag with any type of synthetic detergent will remove most greasy spots, etc. — a point which will certainly be appreciated by families with small children and dogs, not to mention its importance concerning the second-hand value of the vehicle. Moreover, Vinyl gives the interior an exclusive smartness. Ask the customers to feel the material because Vinyl is in fact very comfortable to feel. The contact surfaces of the seating cushions and backrest are neatly pattern-

ed with quilted quality padding covered by perforated Vinyl which gives excellent ventilation and provides ideal seating comfort due to the elastically adaptable qualities of the upholstery.

The upholstery is available in 4 different colours;

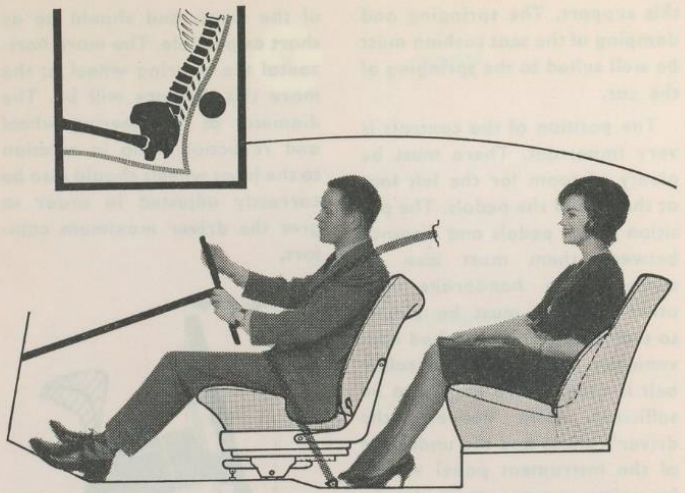
	black	light-blue	red	leather-coloured
which in combination with the various body colours is thus;	red+ light blue	dark-blue	white+ black+ dark-grey	yellow

The new seat design includes an altered backrest which takes the weight of the body higher up against the shoulders, thus greatly increasing the seating comfort. In order to increase safety for the passengers in the rear seat when, for example, abrupt braking takes place, there is a sprung steel band built into the upper section of the backrest. The padding in both the seating cushions and backrests has been built up and raised at the sides in order to give good lateral support: and thereby provides a thoroughly safe "saddle". The seating cushions are attached to the seat frame by means of snap fasteners which greatly facilitate removal when, for example, cleaning the cushions. A small knob located at the outer side of the seat regulates the inclination angles of the backrest — thus providing several possibilities for individual seating adjustment .The Spare Parts Department offers as accessories reclining seat fittings which with the new design can easily be fitted by the owner of the car. The full backwards/forwards travel of the seat is now 9 in. (225 mm), which ought to cover the ideal driving positions for most car-drivers. Moreover, the seat frame can be moved back 1 in. (25 mm), so that comfortable leg room can be provided for persons with particularly long legs. As previously, the seat can also be raised and lowered as well as the pitch of the seating cushion altered.

In order to increase seating comfort still more, VOLVO has introduced a new feature which must be unique; *the variable braced support for the small of the back*. It consists of two heavy gauge horizontal rubber straps attached to the section of the backrest which fits against the small of the back. The tension of the straps can be varied by means of the adjuster screws located at the sides of the backrest.

With a screwdriver one can, therefore, easily adjust the position of the braced support in the backrest in order to obtain a seating position which is anatomically correct and ideal for driving.

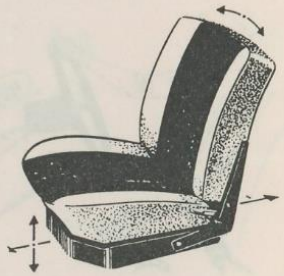
The purpose of VOLVO in designing these new seats, which were constructed in consultation with expert medical knowledge, has been to increase the safety and comfort of the passengers. With this unique, VOLVO feature the problem of the motorist's "backache" has probably been solved. We drive in cars more and more often and for longer periods, and seating comfort is, therefore, an important factor which must be taken into account — a comfortable driver is a safer driver who gets more pleasure and enjoyment out of a journey.



■ Do you sit correctly in the car?

The driving position in a car is more than a question of comfort. Sitting incorrectly means tiredness and irritation and this affects safety. VOLVO has therefore devoted much effort to creating a perfect driving position.

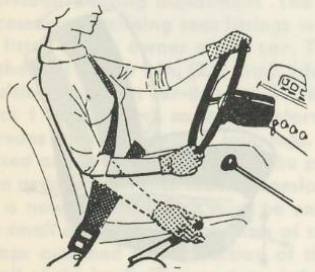
The shape of the driving seat is of fundamental importance. Since different drivers have different body measurements, the seat must be adjustable both as regards backrest inclination and distance from the pedals. The stuffing should be suitably hard and support the body in the right places.



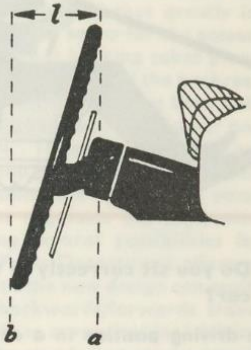
The seat cushion should be high enough and come sufficiently far forward to support the thighs. Both the seat cushion and backrest should be slightly concave so that the driver does not need to brace himself laterally to counteract centrifugal force when taking a curve. Only a separate driving seat offers

this support. The springing and damping of the seat cushion must be well suited to the springing of the car.

The position of the controls is very important. There must be plenty of room for the left foot at the side of the pedals. The position of the pedals and distance between them must also be correct. The handbrake and other controls must be placed so that they can be reached conveniently even when the safety belt is used. There must also be sufficient room between the driver's knees and the underside of the instrument panel which, for safety reasons, must also be free from obstructions.



The steering wheel in a car should be positioned as shown in the figure. The distance *(l)* between a vertical line *(a)* through the upper edge of the steering wheel and a corresponding line *(b)* through the lower edge represents the distance for the stretching and bending movements of the arms, and should be as short as possible. The more horizontal the steering wheel is, the more this distance will be. The diameter of the steering wheel and reduction ratio in relation to the front wheels should also be correctly adjusted in order to give the driver maximum comfort.



Before choosing a car, check that the stuffing in the seats is sufficiently hard and that the seats give good lateral support.

The separate front seats in a VOLVO are carefully shaped to give perfect comfort even during long journeys. The front seats in the 121/122 are adjustable both as regards backrest inclination and seat angle as well as height above floor. The pedals and other controls are correctly placed from a driving point of view. You drive both comfortably and safely in a VOLVO.

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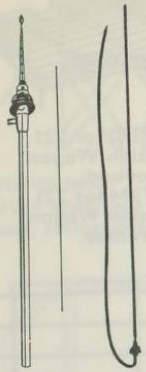
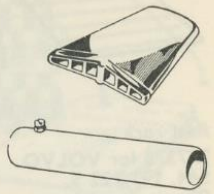
■ VOLVO

range of accessories

These provide the possibility for even more comfortable and convenient motoring for VOLVO owners. Anyone can fit their car with VOLVO accessories in accordance with their own personal requirements — accessories for increased safety, more convenient transportation, for keeping the car in good trim or for travelling comfort. VOLVO accessories have the same high quality and dependable function as VOLVO cars.



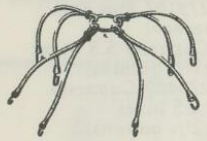
Aerials
279713 cowl-fitted aerial, four-part, telescopic.
279699 cowl-fitted. Glass fibre construction.



Tail pipes
279523 for VOLVO 544
277397 for VOLVO 544
279543 for 121/122 S
277178 for 121/122 S

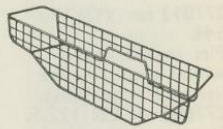
Rear view mirrors
277180 left
277181 right, for mudguard mounting. Springloaded.
279898 left
279899 right, for fitting on door.

Back-up lamp
279251

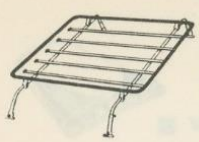


Luggage retainer
277007 8 elastic arms.

Luggage compartment lighting
279894 (no illustration).



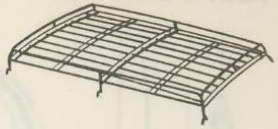
Parcel basket
277151 for VOLVO 544
277249 for 121/122 S (no illustration).



Roof rack

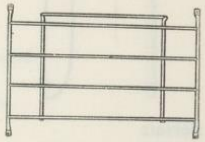
277278 for VOLVO 544, 121/122 S. Plastic-coated tubular steel.

277279 for VOLVO 544, 121/122 S. High gloss zinc with wooden slats.



277270 for 221 Station Wagon. Anodised.
277394 for 221 Station Wagon. Chromed.

277300 for 210 (flat).
79944 for 210 (convex, not illustrated).



277154 for 1800 S. High gloss chrome. Fitted over luggage compartment.

Fuel containers

277012 for VOLVO 544. Fits inside spare wheel Capacity 5.5 litres (1¼ gallons).
277002 for 121/122 S. Fits in spare wheel. Capacity 5.5 litres (1¼ gallons).

279107 Flat container. Capacity 5.5 litres (1¼ gallons).
279400 Capacity 10.5 litres (2¼ gallons).

Fuel tank cap

279716 for VOLVO 544. Five-sided, with lock.
277360 for 121/122 S. Five-sided with lock.
79082 for 121/122 S, PV 544. Round with lock.

Towing cable

277329 5 metres (16 ft.) long, load capacity 2 tons.

Fitted with warning flag. (Not illustrated).

Bedding set

79772 for VOLVO 544 (not illustrated).

Camping table

277153 With four stools, collapsible.

Blankets

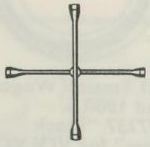
For front seats and rear seat. Volvo-marked, different colours.
Blue-checked
Brown-checked
Red
Blue-grey
Brown

Door table

277152 Collapsible. Easy to fit on car door.

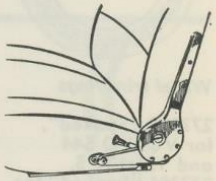
Fan for rear window

277177



Wheel wrench

79853 For speedier wheel changing.



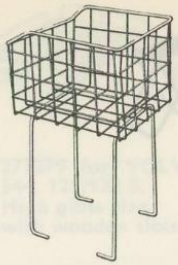
Front seat adjuster fittings

The backrest can be folded down in one simple movement.
277386 left
277387 right, for 121/122 S.

Paint

Enamel of original make. Both cellulose and synthetic. 30 g touching-up tin, tins containing 4 oz. and 1 kg (2¼ lb.).
Engine paint. Green and red. Tins of 4 oz. and 1 kg (2¼ lb.).

Baskets
For placing on propeller shaft tunnel behind gear lever.



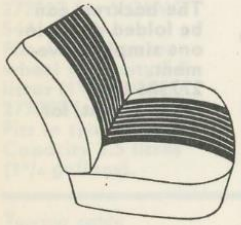
277173 for 121/122 S and 221 Station Wagon
279141 for VOLVO 544 and 210.

Wheel trim rings

277089 "Spoked", for VOLVO 544 and 121/122 S.
277396 "Spoked" for 221 Station Wagon and 1800 S.

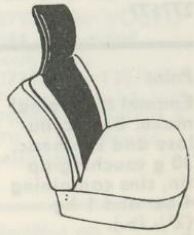
277237 "Black inset" for VOLVO 544 and 121/122 S.
277395 "Black inset" for 221 Station Wagon and 1800 S.

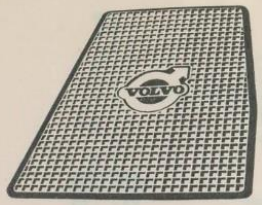
277236 "Black strips" for VOLVO 544 and 121/122 S.

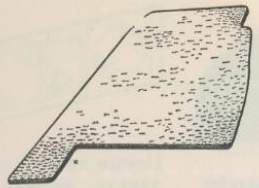


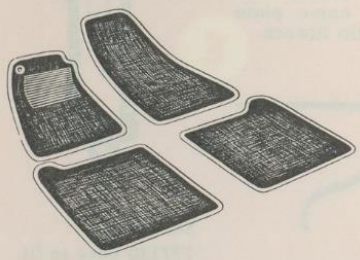
Upholstery
Shade-in-shade pattern for front and rear seats. Red, grey, nougat. For VOLVO 544 and two-door and four-door 121/122 S.

Head rest ▶
277163 For increased comfort and safety. Red, blue or grey.



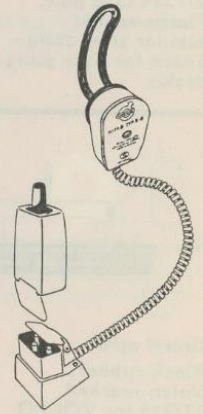






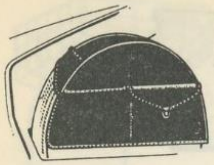
Mats
Rubber mats with Volvo emblem for all VOLVO cars. Different colours.
Coconut mats for all VOLVO cars except for 1800 S. Available in red or brown.
Sisal mats on latex base for VOLVO 544 and 121/122 S, red and grey.

Polish and wax
Tested for all Volvo surface finishes.
Polish
279140 tin 0.5 kg (1 lb.)
Wax
279245 tin 0.75 kg (1½ lb.).

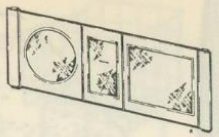


Backrest
277125 of plastic wire.
277150 of perlon.

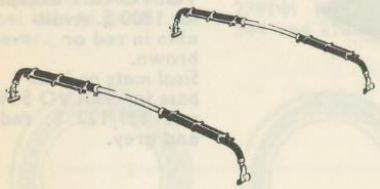
Engine heater
277165 For B 18 engines, 220 V.



Spare wheel protector
279731. Fabric-reinforced plastic. With tool bag.



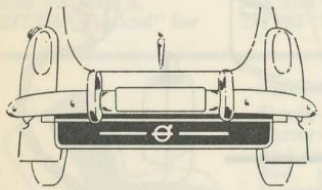
Licence holder
279136. Holder for licence, name plate and radio licence.



Ski holders
277234 One pair. Plastic-coated tubular steel design Space for four pairs of skis.

Snow links
277230 Easy to fit and remove.

Snow shovel
277380 (not illustrated).



Gravel apron
Black rubber. Volvo-marked.
277219 for VOLVO 544.
277428 for 121/122 S and 221 Station Wagon.
277332 for 210.

Safety belt for rear seat
Two-point safety belt.
279495 for VOLVO 544 and 121/122S.
277266 for 121/122 S Station Wagon.

1 This is Volvo
2 This is how Volvos are made
3 Data
4 Type specifications
5 Product information
6 **Competitive makes**
7 Racing and rally activities
8 Road tests as a basis for sales promotion
9 Sales arguments
10 Tables

The art of interpreting car specifications

It is most misleading to try to draw conclusions from a car brochure concerning the relative advantages and disadvantages of different makes. The non-technically-minded motorist often fastens on a certain detail and forgets that a car is the result of an infinite number of compromises. A comparison should therefore be made from as many viewpoints as possible since these all add up to the car as a complete unit.

On the following pages we give tabulated information concerning a number of cars which may come up for discussion during your conversation with the customer — the car buyer.

Wheelbase and trackwidth together with the external dimensions give an idea of the space required by the car and its manoeuvrability. Roadholding, on the other hand, cannot be judged from these measurements since this is dependent on the rigidity and suspension of the vehicle.

The luggage space is difficult to measure; certain values are gross and others net and in practice the shape plays an essential part.

Large tyres should last longer and grip well but the length of life is influenced by loading, rolling radius, air pressure and, not least, the manner of driving.

The number of kg per h.p. gives a direct comparison from a performance point of view between different cars without regard to their size. High weight and low horsepower will limit speed and acceleration reserves.

Bore, stroke and capacity are traditional comparison figures which are naturally included. Talk of a square engine has, as everyone knows, nothing to do with the shape of the cylinders or pistons — it means that the diameter of the piston is equal to or greater than the stroke and not considerably smaller as used to be the case. In several countries the long stroke of engines was due to technical motor tax reasons where such engines were favoured with a lower tax. The cylinder capacity indicates the sum of the piston displacement of each cylinder.

Large engines do not necessarily produce more output than small ones but they should give their output with less effort. Fuel consumption is related to the output made use of and manner of driving.

An engine which produces its output and maximum torque at low engine speed is flexible and so "tame" that it is not necessary to change gear frequently. The opposite applies to sports engines whose output and optimum torque lie near the upper part of the engine speed range. For the difference between DIN and SAE horsepower, see chapter 35.

Engine compressions have been increased during recent years. If an engine has a compression ratio of 7.5—8:1, it requires a premium fuel. As recompense it will have higher output and lower fuel consumption than with ordinary petrol. It is not economical to run a low-compression engine on high-octane fuel because of the price difference.

Now to the valves. Very few car engines nowadays have simple side valves. With overhead valves it is easier to give the combustion chamber a more economic shape in conjunction with higher output. It is more expensive and complicated to have one or two overhead camshafts operating directly on the valves and with considerably fewer moving parts than is the case with side valves and with push rods operated by a camshaft situated in the cylinder block.

It is not easy to have a high top gear and low bottom gear and to have only two speeds between these, without leaving a large gap somewhere in the range. Low-geared cars can be flexible in heavy traffic but tend to strain and be noisy on the open road where fuel consumption also increases rapidly. As far as the brakes are concerned, it is not possible to make a comprehensive estimation with only this information as a basis.

Too many other factors play a part: sensitivity of the linings to damp, fading, cooling and material in the drums and discs, pedal pressure and brake force distribution between the front and rear wheels.

The last columns should be interpreted with extra caution. Acceleration and maximum speed should also be regarded as relative. Apart from the fact that cars of the same make can differ in performance, test values are influenced by the weight of the vehicle (number of persons in the car) and degree of accuracy of the measurements.

At the bottom of each table there are some blank lines which can be used for private entries. New models will be on show, so there is always the possibility of making comparisons.

Data on VOLVO and other makes

SUBJECT TO ALTERATION

POS	MAKE	LENGTH × WIDTH × HEIGHT	WHEELBASE	NO OF PASSENGERS	S=SEPARATE SEATS H=BENCH FRONT SEAT	FRONT SEAT ROOF HEIGHT ABOVE	REAR SEAT ROOF HEIGHT ABOVE	REAR SEAT WIDTH HIP HEIGHT	REAR SEAT WIDTH SHOULDER HEIGHT	GROUND CLEARANCE	TURNING CIRCLE	TURNS OF STEERING WHEEL	NUMBER OF DOORS	FUEL TANK CAPACITY gallons Imp.	FUEL TANK CAPACITY gallons U.S.	CURB WEIGHT
I	544 SPECIAL	175.3 × 62.6 × 61.5	102.2	5	S	38.7	35.1	52.0	47.6	71.0	34.8	3 1/4	2	7.7	9.2	1010
II	544 SPORT	175.3 × 62.6 × 61.5	102.2	5	S	38.7	35.1	52.0	47.6	71.0	34.8	3 1/4	2	7.7	9.2	1010
III	VOLVO 121 2/4-DOOR	173.3 × 63.8 × 59.0	102.2	5	S	38.3	35.5	52.7	48.7	83.0	34.2	3 1/4	4	10.0	12.0	1060/1090
IV	VOLVO 122 S 2-DOOR	173.3 × 63.8 × 59.0	102.2	5	S	38.3	35.5	52.9	50.6	83.0	34.2	3 1/4	2	10.0	12.0	1080
1	ALFA ROMEO GIULIA 1600 T I	163.0 × 62.0 × 56.2	100.0	5	S	34.6	33.2	52.0	50.6	52.7	35.4	3 3/4	4	10.2	12.2	1040
2	AUSTIN 1600 SALOON	176.0 × 67.4 × 57.0	101.0	5	S	35.1	33.5	54.0	49.8	59.0	39.8	3	4	10.0	12.0	1120
3	BMW 1500 LIMOUSINE	183.2 × 70.6 × 57.2	101.2	5	S	35.5	33.9	54.2	52.0	69.0	35.4	3 3/4	4	11.8	14.4	1060
4	CHEVROLET CHEVY II NOVA	185.8 × 69.0 × 53.6	109.0	5	H	38.3	34.6	59.0	55.0	63.0	39.8	5	4	13.6	16.2	1250
5	CHRYSLER VALIANT V 200 SED.	190.8 × 70.6 × 57.8	105.8	5	H	35.9	33.5	57.1	54.9	63.0	41.5	5	4(2)	14.9	17.8	1350/1370
6	CITROËN DS 19	166.8 × 67.0 × 57.2	122.9	5	S	35.9	32.7	51.2	54.9	63.0	39.3	3	4	14.1	16.9	1250
7	DKW F 102	157.6 × 61.7 × 53.8	95.4	5	S	38.3	34.2	50.2	47.6	67.9	38.8	2 3/4	2	11.2	13.4	870
8	FIAT 1300/(1500) JUVENTUS	158.6 × 60.8 × 53.6	97.0	5	S	35.5	32.3	52.7	48.7	61.0	35.1	3	4	10.0	12.0	930
9	FIAT 1800/(2300) SCAND.	176.7 × 63.9 × 57.8	104.3	5	S	32.7	31.5	54.0	52.7	59.0	38.8	3 1/3	4	13.3	16.0	1270 (1290)
10	FORD ANGLIA DE LUXE	153.5 × 57.8 × 57.0	90.1	4	S	35.1	33.5	43.4	43.6	65.0	32.3	2 3/4	2	7.1	8.4	770
11	FORD CONSUL CORTINA (SUPER)	168.0 × 62.0 × 54.2	99.0	5	S	35.9	34.6	53.0	49.0	59.0	35.2	4 1/4	4(2)	7.9	9.3	820
12	FORD TAUNUS 12 M (TS) 1,5 L.	167.5 × 62.4 × 57.7	100.2	5	H(S)	35.1	33.9	51.8	48.6	63.0	39.5	4	2	8.2	9.8	870
13	FORD TAUNUS 17 M (TS) 1,7 L.	175.3 × 65.8 × 57.1	105.2	5	H(S)	35.1	34.3	53.0	53.0	65.0	38.5	3 1/2	2	10.0	12.0	940/950
14	FORD ZEPYR 6 MK III	180.3 × 69.0 × 57.7	105.4	5	H	37.5	34.7	58.2	56.1	67.0	38.9	4 1/2	4	12.2	14.6	1250
15	HILLMAN SUPER MINX MK II	165.0 × 63.7 × 57.8	101.7	5	H	37.9	35.1	51.8	48.6	65.0	35.2	3 1/2	4	10.3	12.4	1100
16	HUMBER SCEPTRE	165.4 × 63.0 × 57.0	101.7	5	S	37.1	35.5	60.3	57.8	65.0	35.5	3 2/3	4	10.4	12.5	1100
17	MERCEDES 190	186.3 × 70.8 × 58.6	106.4	5	S	39.2	35.1	61.2	55.0	75.0	39.2	3 1/2	4	11.3	13.7	1280
18	MERCEDES 220 S (SE)	191.7 × 70.8 × 59.5	108.3	5	S	39.2	35.1	61.2	55.0	75.0	39.8	3 1/2	4	14.1	16.9	1350 (1380)

F=Front B=Rear
V=Water-cooled L=Air-cooled
R=In-line V=V-engine
B=Flat opposed

S=Coil springs B=Leaf springs
TOR=Torsional springs TR=Transverse springs
HP=Hydro-pneumatic HL=Hydraulic
SO=Solex

SU=Skinner Union
WE=Weber
ZE=Zenith
ST=Stromberg

TYRES	DIN HP/TON	SAE HP/TON	ENGINE LOCATION COOLING NO. OF CYLINDERS ARRANGEMENT DRIVE	BORE	STROKE	CYLINDER CAPACITY	COMPRESSION RATIO	OUTPUT r.p.m./DIN	OUTPUT r.p.m./SAE	SPRINGING F	SPRINGING B	TORQUE DIN AT r.p.m.	TORQUE SAE AT r.p.m.	CARB. MAKE NO.	POS
6.00×15″	67.5	74.5	FV-4 RB	3.31	3.15	108.5	8.5	68/4500	75/4500	S	S	98/2600	101/2800	1 ZE	I
6.00×15″	79.5	89.5	FV-4 RB	3.31	3.15	108.5	8.5	90/5000	90/5000	S	S	101/3000	103/3500	2 SU	II
6.00×15″	64.2/62.3	70.7/68.8	FV-4 RB	3.31	3.15	108.5	8.5	75/4500	75/4500	S	S	98/2600	101/2800	1 ZE	III
6.00×15″	74.0	83.3	FV-4 RB	3.31	3.15	108.5	8.5	90/5000	90/5000	S	S	101/3000	103/3500	2 SU	IV
155×15″×	88.3	102.0	FV-4 RB	3.10	3.25	95.8	9.0	92/6000	106/6000	S	S	90/4000	101/4000	1 SU	1
5.90×14″	53.6	56.2	FV-4 RB	3.00	3.40	98.9	8.3	60/4500	63/4500	S	B	88/2000	90/2100	1 SU	2
6.00×14″	75.5	85.0	FV-4 RB	3.20	2.84	91.5	8.8	80/5700	90/5900	S	S	87/3000	90/3200	1 SU	3
6.50×13″		72.0 96.0	FV-4 RB FV-6 RB	(3.92 (3.54	3.21 3.21	153.7) 194.3)	8.5		90/4000 120/4400	S	B		151.8/2400 177.1/2400	1 RO	4
6.50×13″		74.2 105.7	FV-6 RB	(3.41 (3.41	3.15 4.08	170.7) 225.6)	8.2		100/4400 145/4000	S	B		154.7/2400 212.0/2800	1 Holley	5
165×400×	69.0	66.4	FV-4 RF	3.12	3.94	116.5	8.5	80/4500	83/4500	HP	HP	104/3250	104/3500	1 WE	6
6.00×13″	69.0		FV-3 RF	3.18	2.97	71.7	7.25	60/4500		Tor	Tor	78/2250		1 SO	7
5.60×13″	62.3 68.3	73.4 81.5	FV-4 RB	(2.82 (3.08	3.12 3.12	79.3) 90.3)	8.8	61/5400 67/5200	72/5800 80/5200	S	B	60.2/3200 81.7/3200	76/3400	1 WE	8
5.90×14″ 6.40×14″	63.7 79.1	76.2 90.7	FV-6 RB	(2.82 (3.10	2.87 3.12	109.8) 139.1)	8.8	81/5200 102/5400	97/5300 117/5300	Tor	B		102/3000	1 WE	9
5.20×13″	62.4	69.0	FV-4 RB	3.18	2.31	73.2	8.7	48/4800	53/4800	S	B	61/2700	67/2700	1 SO	10
5.60×13″	58.5	64.5	FV-4 RB	3.18	2.31	73.2	8.7	48/4800	53/4800	S	B	61/2700	67/2700	1 SO	11
5.60×13″	63.2		FV-4 VF	3.52	2.32	91.5	8.5	55/4500		TR	B	84/2300		1 SO	12
5.90×13″	69.2 79	76.6 87.4	FV-4 RB	(3.30 (3.32	3.01 3.01	103.7) 107.4)	8.4 8.6	65/4250 75/4500	72/4500 83/4700	S	B	103/2100 106/2300	105/2500 108/2700	1 SO	13
6.40×13″	74.5	84.0	FV-6 RB	3.17	3.14	155.7	8.3	93/4750	105/4750	S	B	123/2500	141/2000	1 ZE	14
6.00×13″	52.7	57.2	FV-4 RB	3.17	3.01	97.5	8.3	58/4400	63/4400	S	B	86/2800	87/2500	1 SO	15
6.00×13″	74.5	78.2	FV-4 RB	3.17	3.01	97.5	9.1	82/5200	86/5200	S	B	90/3500	89/3600	2 ZE	16
7.00×13″	62.5	70.3	FV-4 RB	3.32	3.26	115.8	8.7	80/5000	90/5200	S	S	103/2500	113/2700	1 SO	17
7.25×13″	81.5 87.0	91.8 97.2	FV-6 RB	3.15	2.82	134.2	8.7	110/5000 120/4800	124/5200 134/5000	S	S	130/3500	142/3700	2 SO B 1	18

OP=Opel
BI=Bosch injection
RO=Rochester

JI=Jikov
BW=Borg-Warner
DB=Daimbl-Benz

G=Floor gear lever
R=Steering column lever
I=Gear lever in dashboard
K=Selector lever

cont.

cont.

POS	MAKE	DYNAMO OUTPUT	ELEC. SYSTEM BATTERY CAP.	GEAR LEVER POS. NO. OF GEARS OVERDRIVE	REAR AXLE RATIO	ART. TRANS. MAKE	DISC. BRAKES = S DRUM BRAKES = T F	B	TOP SPEED	ACCELERATION 0—50	ACCELERATION 0—60	ACCELERATION 0—75	FUEL CONSUMPTION (30 m.p.h.) US gall	Imp gall
I	544 SPECIAL	360	12/60	G 4	4.10		T/ 9″	T/ 9″	90.1	10.4	15.9	27.8	31.8	37.9
II	544 SPORT	360	12/60	G 4	4.10		T/ 9″	T/ 9″	96.4	9.3	13.8	23.5	34.0	41.0
III	VOLVO 121 1/4-DOOR	360	12/60	G 4	4.10	BW	T/10″	T/ 9″	90.1	10.8	16.8	29.4	30.7	36.4
IV	VOLVO 122 S 2-DOOR	360	12/60	G 4+Ö	4.56		S/10⁷/₈″	T/ 9″	96.4	10.1	14.1	24.3	35.3	42.2
1	ALFA ROMEO GIULIA 1600 T I	200	12/40	R 5	5.13		T/10¹/₂″	T/10¹/₂″	102.5	9.5	13.2	22.8	31.6	37.7
2	AUSTIN 1600 SALOON	270	12/43	G 4	4.30	BW	T/ 9″	T/ 9″	83.9	15.5	22.5	40.1	29.0	34.6
3	BMW 1500 LIMOUSINE	300	6/77	G 4	4.38		S/10¹/₂″	T/10″	93.2	9.5	13.2	24.8	30.5	35.8
4	CHEVROLET CHEVY II NOVA	430	12/42	R 3	3.08	POWER-GLIDE	T/ 9″	T/ 9″	87.0 93.2	10.6	15.0	26.3	20.1	24.2
5	CHRYSLER VALIANT V 200 SED.	360	12/35	R 3	3.55	POWER-GLIDE	T/ 9″	T/ 9″	90.1	9.8	13.7	25.2	20.1	24.2
6	CITROËN DS 19	300	12/57	I 4	3.88		S/11¹/₂″	T/10″	93.2	12.8	17.8	32.4	29.7	35.2
7	DKW F 102	160	6/66	R 4	3.65		S/11″	T/ 9″	83.9	12.2	17.3		31.6	37.7
8	FIAT 1300/(1500) JUVENTUS	400	12/40	R 4	4.1		S/ 9¹/₃″	T/10″	87.0 93.2	12.7 10.1	18.0 14.1		29.7	35.2
9	FIAT 1800/(2300) SCAND.	400	12/40	R 4	4.3 4.1		S/10¹/₃″	S/10″	93.2 99.5	12.7 10.1	17.9 14.1	25.5 21.3	23.5	28.2
10	FORD ANGLIA DE LUXE	240	12/38	G 4	4.1		T/ 8″	T/ 8″	80.8	16.2	23.4		33.6	40.3
11	FORD CONSUL CORTINA (SUPER)	180	12/38	G 4	3.9		T/ 9″	T/ 9″	77.7		25.3		31.6	37.7
12	FORD TAUNUS 12 M (TS) 1,5 L.	180	6/78	R 4	3.56		T/ 9″	T/ 8″	87.0	11.2	16.8	30.3	28.0	34.0
13	FORD TAUNUS 17 M (TS) 1,7 L.	180	6/77	R 3/4	3.56		S	T	87.0 93.2	12.0 10.5	18.0 16.0		30.7	36.4
14	FORD ZEPHYR 6 MK III	300	12/80	R 4	3.55	BW	S/ 9³/₄″	T/ 9″	93.2	11.2	16.0		23.5	28.2
15	HILLMAN SUPER MINX MK II	230	12/51	G 4	3.89		S/10¹/₄″	T/ 9″	81.5	13.4	23.0	37.8	31.6	37.7
16	HUMBER SCEPTRE	300	12/38	G 4+Ö	4.22		S/ 9³/₄″	T/ 9″	88.5	12.2	17.8	32.4	29.7	35.2
17	MERCEDES 190	240	12/52	R 4	4.1		S	T	92.0	12.3	17.8	32.4	27.0	32.2
18	MERCEDES 220 S (SE)	240	12/60	R 4	4.1	DB	S/10″	T/9¹¹/₁₆″	102.5 107.0	9.1 8.1	14.0 13.0	23.3 21.7	26.1	31.3

Cont.

Data on VOLVO and other makes

SUBJECT TO ALTERATION

cont.

POS.	MAKE	LENGTH × WIDTH × HEIGHT	WHEELBASE	NO OF PASSENGERS	S = SEPARATE SEATS H = BENCH FRONT SEAT	FRONT SEAT ROOF HEIGHT ABOVE	REAR SEAT ROOF HEIGHT ABOVE	REAR SEAT WIDTH HIP HEIGHTH	REAR SEAT WIDTH SHOULDER HEIGHT	GROUND CLEARANCE	TURNING CIRCLE	TURNS OF STEERING WHEEL	NUMBER OF DOORS	FUEL TANK CAPACITY gallons Imp.	FUEL TANK CAPACITY gallons U.S.	CURB WEIGHT
I	544 SPECIAL	175,3 × 62,6 × 61,5	102,4	5	S	38,6	35.1	52.0	47.7	7.1	34.8	3 1/4	2	7.7	9.2	2220
II	544 SPORT	175,3 × 62.6 × 61.5	102.4	5	S	38.6	35.1	52.0	47.7	7.1	34.8	3 1/4	2	7.7	9.2	2220
III	VOLVO 121 2/4-DOOR	173.4 × 63.8 × 59.1	102.4	5	S	38.2	35.4	52.3/ 52.3	50.8/ 48.9	8.25	34.1	3 1/4	4	9.9	11.9	2335/ 2400
IV	VOLVO 122 S 2-DOOR	173.4 × 63.8 × 59.1	102.4	5	S	38.2	35.4	52.8	50.8	8.25	34.1	3 1/4	2	9.9	11.9	2380
19	MORRIS 1100 SALOON	144.5 × 60.3 × 52.8	93.0	5	S	37.0	34.7	51.6	49.7	5.9	37.1	3 1/3	4(2)	8.5	10.2	1850
20	OPEL REKORD 1,7 L	177.6 × 66.5 × 57.5	103.5	5	H	35.5	34.7	54.0	53.5	7.1	37.7	3 1/2	4(2)	9.9	11.9	2140
21	OPEL KAPITÄN STD	190.4 × 71.3 × 59.5	110.3	5	H	35.8	35.1	59.8	59.8	7.1	38.4	3 1/2	4	11.0	14.5	2950
22	OPEL KADETT	154.2 × 58.0 × 55.6	91.8	4	S	37.3	33.5	48.9	47.7	6.2	35.4	2 3/4	2	7.3	8.7	1520
23	PEUGEOT 404 SED	174.1 × 64.0 × 57.1	104.4	5	S	32.7	31.9	55.6	50.8	5.9	33.8	3 3/4	4	12.1	13.2	2400
24	RENAULT DAUPHINE GORDINI	155.0 × 59.9 × 56.7	89.4	4	S	35.4	33.5	50.4	46.4	6.0	31.8	4 1/2	4	7.0	8.5	1520
25	RENAULT R 8	157.0 × 58.7 × 55.5	89.4	5	S	33.1	32.7	52.8	50.8	5.7	33.8	3 3/4	4	6.8	8.2	1650
26	SAAB 96 SEDAN	158.0 × 61.8 × 57.9	97.7	5	S	41.4	34.3	49.7	47.3	7.5	38.1	2 1/4	2	8.8	10.5	1825
27	SIMCA 1000	149.2 × 58.3 × 52.4	87.5	4	S	35.4	34.3	49.7	46.1	6.5	33.5	2 3/4	4	7.9	9.5	1630
28	TRIUMPH HERALD, 1200 LIM.	153.0 × 59.9 × 52.0	91.3	4	S	33.9				6.2	27.6	3 3/4	2	7.0	8.5	1825
29	TRIUMPH VITESSE 6	152.7 × 59.9 × 52.8	91.3	4	S					6.2	27.9	3 3/4	2	8.8	10.5	2020
30	VAUXHALL VICTOR SUPER	173.3 × 63.8 × 55.5	100.0	5	H	35.4	35.1	54.0	48.9	5.4	35.7	3 3/4	4	9.9	11.9	2180
31	VAUXHALL VX 4/90	173.3 × 63.8 × 65.5	100.0	4	S	35.4	35.1	54.0	48.9	5.4	35.7	3 1/2	4	10.8	12.9	2270
32	VAUXHALL VELOX (CRESTA)	181.6 × 70.1 × 56.3	107.4	5	H	39.0	37.8	58.7	54.4	6.5	37.1	3 3/4	4	10.8	12.9	2700
33	VOLKSWAGEN 1200 LIM.	160.0 × 60.7 × 59.1	94.5	5	S	41.0	33.9	51.2	47.3	6.6	36.1	2 2/3	2	8.8	10.5	1690
34	VOLKSWAGEN 1500 LIM.	166.1 × 63.0 × 57.9	94.5	5	S	38.6	34.3	53.6	49.7	6.6	36.4	2 3/4	2	8.8	10.5	1960

F = Front B = Rear
V = Water-cooled L = Air-cooled
R = In-line engine V = V-engine
B = Flat opposed

S = Coilsprings B = Leaf springs
TOR = Torsional springs TR = Transverse springs
HP = Hydro-pneumatic HL = Hydraulic
SO = Solex

SU = Skinner Union
WE = Weber
ZE = Zenith
ST = Stromberg

TYRES	DIN HP/TON	SAE HP/TON	ENGINE LOCATION COOLING NO. OF CYLINDERS ARRANGEMENT DRIVE	BORE STROKE	CYLINDER CAPACITY	COMPRESSION RATIO	OUTPUT r.p.m./DIN	OUTPUT r.p.m./SAE	SPRINGING F	SPRINGING B	TORQUE DIN AT r.p.m.	TORQUE SAE AT r.p.m.	CARB. MAKE NO.	POS.
6.00×15"	67.5	74.5	FV-4 RB	3.31×3.15	108.5	8.5	68/4500	75/4500	S	S	98/2600	101/2800	1 ZE	I
6.00×15"	79.5	89.5	FV-4 RB	3.31×3.15	108.5	8.5	80/5000	90/5000	S	S	101/3000	105/3500	2 SU	II
6.00×15"	64.2/ 62.3	68.8 70.7/	FV-4 RB	3.31×3.15	108.5	8.5	68/4500	75/4500	S	S	98/2600	101/2800	1 ZE	III
6.00×15"	74.0	83.3	FV-4 RB	3.31×3.15	108.5	8.5	80/5000	90/5000	S	S	101/3000	105/3500	2 SU	IV
5.50×12"	57.2	59.5	FV-4 RF	2.55×3.30	67.0	8.5	48/5100	50/5100	HL	HL	59/2200	60/2500	1 SU	19
5.90×13"	62.0	69.1	FV-4 RB	3.35×2.91	102.5	7.25	60/4300	67/4400	S	B	88/1800	94/2400	1 OP	20
7.00×14"	67.0	74.6	FV-6 RB	3.35×3.02	163.0	7.8	90/4100	100/4300	S	B	138/1900	147/2200	1 OP	21
5.50×12"	58.0	66.8	FV-4 RB	2.84×2.40	60.6	7.8	40/5000	46/5200	S	B	52/2200	55/2600	1 OP	22
5.90×15"	59.6	66.0	FV-4 RB	3.31×2.88	98.5	7.4	65/5400	72/5400	S	S	94/2250	94/2250	1 SO	23
145 mm×15"	52.2	58.0	BV-4 RB	2.28×3.15	51.6	8.0	36/5000	40/5000	S	S	43/3300	48/3300	1 SO	24
145 mm×15"	53.5	64.0	BV-4 RB	2.56×2.84	58.4	8.5	40/5200	48/5200	S	S	51/2500	55/2500	1 SO	25
5.20×15"	45.8	50.6	FV-3 RF	2.76×2.88	51.3	7.3	38/4250	42/5000	S	S	59/3000	61/3000	1 SO	26
5.60×12"	52.8	41.2	BV-4 RB	2.68×2.56	57.6	8.2	39/5200	59/5200	B	S	47/3200	54/3400	1 SO	27
5.20×13"	47.0	51.9	FV-4 RB	2.73×2.99	70.0	8.0	39/4500	43/4500	S	TR	61/2250	65/2250	1 SO	28
5.60×13"	75.3	76.4	FV-6 RB	2.63×2.99	97.2	8.75	70/5000		S	B	92/2800		2 SO	29
5.60×13"	50.5	56.5	FV-4 RB	3.12×3.00	92.0	8.1	50/4600	56/4600	S	B	80/2000	85/2200	1 ZE	30
5.60×14"		78.5	FV-4 RB	3.12×3.00	92.0	9.3		82/5200	S	B		91/2800	2 ZE	31
5.90×14"	78.0	92.0	FV-6 RB	3.25×3.25	161.5	8.5	96/4600	113/4800	S	B		147/2400	1 ZE	32
5.60×15"	44.0	52.0	BL-4 BB	3.04×2.52	72.8	7.0	34/3600	40/3900	Tor	Tor	61/2000		1 SO	33
6.00×15"	50.5	59.5	BL-4 BB	3.27×2.52	91.0	7.8	45/3800	53/4000	Tor	Tor	78/2000	83/2000	1 SO	34

OP=Opel
BI=Bosch injection pump
RO=Rochester

JI=Jikov
BW=Borg-Warner
DB=Daimbl-Benz

G=Floor gear lever
R=Steering coluom lever
I=Gear lever in dashboard
K=Selector lever

Cont.

Cont.

POS.	MAKE	DYNAMO OUTPUT	ELEC. SYSTEM BATTERY CAP.	GEAR LEVER POS. NO OF GEARS OVERDRIVE	REAR AXLE RATIO	AUT. TRANS. MAKE	DISC. BRAKES = S DRUM BRAKES = T F	B	TOP SPEED	ACCELERATION 0—50	ACCELERATION 0—60	ACCELERATION 0—75	FUEL CONSUMPTION (50 m.p.h.) US gall	Imp gall
I	544 SPECIAL	360	12/60	G 4	4.10		T/ 9″	T/ 9″	90.1	10.4	15.9	27.8	31.8	37.9
II	544 SPORT	360	12/60	G 4	4.10		T/ 9″	T/ 9″	96.4	9.3	13.8	23.5	34.0	41.0
III	VOLVO 121 2/4-DOOR	360	12/60	K 3	4.10	BW	T/10″	T/ 9″	90.1	10.8	16.8	29.4	30.7	36.4
IV	VOLVO 122 S 2-DOOR	360	12/60	G 4+0	4.56		S/10⁷/₈″	T/ 9″	96.4	10.1	14.1	24.3	35.3	42.2
19	MORRIS 1100 SALOON	300	12/43	G 4	4.13		S/ 8″	T/ 8¹/₄″	78.3	15.4	26.0	53.2	37.4	45.0
20	OPEL REKORD 1,7 L	200	6/77	R 4(3)	3.89/ 3.55		T/ 8″	T/ 8″	86.0	12.2	20.0	32.6	27.7	32.9
21	OPEL KAPITÄN STD	200	6/77	R 3	3.90	HYDRA-MATIC	T/10″	T/10″	93.2	10.6	15.8	26.5	21.4	25.7
22	OPEL KADETT	200	6/66	G 4	3.90		T/ 8″	T/ 8″	74.6	15.0	27.0	93.0	39.2	47.0
23	PEUGEOT 404 SED	300	12/55	R 4	4.20		T/10″	T/10″	88.3	14.2	19.1	35.6	28.6	34.1
24	RENAULT DAUPHINE GORDINI	240	12/40	G 4	4.53		T/ 9″	T/ 9″	72.8	15.7	23.6		33.6	40.3
25	RENAULT R 8	260	12/40	G 4	4.37		S/10¹/₄″	S/10¹/₄″	82.7	12.7	23.0	42.4	37.4	45.0
26	SAAB 96 SEDAN	160	12/33	R 3/4	5.43		(S) T/ 9″	T/ 8″	76.0	17.3	30.6	91.0	37.4	45.0
27	SIMCA 1000	240	12/40	G 4	4.37		T/ 9¹/₈″	T/ 9¹/₈″	74.6	16.2	28.5		36.9	44.3
28	TRIUMPH HERALD, 1200 LIM.	264	12/43	G 4	4.87		T/ 8″	T/ 7″	77.6	15.4	26.0		33.6	40.3
29	TRIUMPH VITESSE 6	264	12/43	G 4	4.87		S/ 9″	T/ 8″	86.4	11.7	16.4	31.2	27.5	32.9
30	VAUXHALL VICTOR SUPER	264	12/38	G 4	4.13		T/ 8″	T/ 8″	72.5	19.3	33.6	68.0	27.9	33.3
31	VAUXHALL VX 4/90	264	12/38	G 4	3.90		S/10¹/₂″	T/ 8″	88.3	12.4	19.6	38.9	27.9	33.3
32	VAUXHALL VELOX (CRESTA)	297	12/57	R 3	3.70	HYDRA-MATIC	S/10¹/₂″	T/ 9″	93.0	10.4	14.2	25.6	21.4	25.7
33	VOLKSWAGEN 1200 LIM.	180	6/77	G 4	4.38		T/ 9″	T/ 9″	72.1	16.3	34.6		37.4	45.0
34	VOLKSWAGEN 1500 LIM.	200	6/77	G 4	4.13		T/ 9″	T/ 9″	81.4	12.7	23.8		32.9	39.2

Data on VOLVO 1800 S and other makes

SUBJECT TO ALTERATION

POS.	MAKE	LENGTH × WIDTH × HEIGHT	WHEELBASE	NO OF PASSENGERS	S = SEPARATE SEATS	FRONT SEAT ROOF HEIGHT ABOVE	GROUND CLEARANCE	TURNING CIRCLE	TURN OF STEARING WHEEL	FUEL TANK CAPACITY gallons Imp.	FUEL TANK CAPACITY gallons U.S.	TYRES	CURB WEIGHT	DIN HP/TON	SAE HP/TON
I	VOLVO 1800 S	173.2 × 69.0 × 49.4	96.5	2	S	36.6	63.0	32.9	3¼	10.0	12.0	165 × 15″	2510	84.2	94.7
1	ALFA ROMEO 1600 SPRINT	156.8 × 62.8 × 51.6	93.1	2	S	36.1	60.0	37.4	2½	11.6	14.0	155 × 15″	2200	92.0	106.0
2	,, ,, 2600 SPRINT	177.2 × 65.6 × 52.0	101.4	2	S		50.9	35.2	3	13.6	16.3	165 × 400	3080	103.5	117.8
3	ASTON MARTIN DB 4 GT	171.4 × 66.2 × 51.6	92.6	2	S		63.5	32.1	3	30.0	36.0	6.70 × 15″	3080	216.0	236.0
4	AUSTIN HEALY SPRITE 1100	135.7 × 53.6 × 49.1	79.6	2	S	32.9	50.9	32.2	2¼	6.0	7.2	5.20 × 13″	1518		79.7
5	,, ,, 3000 MK II	157.2 × 61.0 × 46.2	92.1	2	S	34.9	47.2	35.0	3	12.1	14.5	5.90 × 15″	2486	115.0	120.0
6	DKW 1000 SP ROADSTER	165.4 × 66.1 × 52.8	92.8	2	S		67.0	37.4	2¼	11.0	13.1	155 × 15″	2134	56.7	64.0
7	FERRARI 250 GT COUPÉ	185.0 × 68.0 × 53.3	102.2	4	S		57.0	40.6	3½	22.0	26.2	6.50 × 15″	3256		162.0
8	FIAT 2300 S COUPÉ	182.2 × 64.3 × 54.0	104.2	4	S	35.5	59.0	37.4	3⅓	15.5	18.5	165 × 15″	2904	110.0	113.5
9	KARMAN GHIA 1200	163.0 × 64.3 × 52.8	94.6	2	S		61.2	38.5	2⅔	8.8	10.6	5.60 × 15″	1804	48.7	41.5
10	,, ,, 1500 S	167.0 × 65.9 × 53.3	94.6	2	S		55.0	37.2	3	8.8	10.6	6.00 × 15″	1980	60.0	73.4
11	LOTUS ELITE SPEC SERIE II	144.0 × 57.9 × 46.2	88.6	2	S	33.2	71.0	31.2	2¾	13.8	16.5	4.80 × 15″	1490	111.5	123.5
12	MERCEDES 230 SL	169.8 × 69.8 × 51.5	99.0	2	S		71.0	33.2	3	14.3	17.3	185 × 14″	2860	130.5	115.5
13	MORGAN PLUS 4	143.8 × 56.0 × 52.6	96.0	2	S			35.2	2⅔	11.0	13.1	5.60 × 15″	1980	111.0	116.6
14	MGB 1800	153.5 × 60.0 × 49.2	91.0	2	S	35.5	54.8	31.2	3	10.2	12.3	5.70 × 14″	2112	99.0	
15	PEUGEOT 404 COUPÉ	176.8 × 64.8 × 53.1	104.2	2	S	36.8	59.0	32.4	3½	11.0	13.1	165 × 380	2420	72.6	77.7
16	PORSCHE 1600 S	158.0 × 65.9 × 52.0	82.8	2	S	36.8	59.0	35.7	2¼	12.3	14.9	5.60 × 15″	2057	80.2	94.0
17	,, 1600 SC	158.0 × 65.9 × 52.0	82.8	2	S	36.8	59.0	35.7	2¼	11.0	13.1	5.60 × 15″	2057	101.4	114.3
18	,, CARRERA 2000 GS	158.0 × 65.9 × 52.0	82.8	2	S	36.8	59.0	35.7	2½	11.0	13.1	5.90 × 15″	2260	126.3	
19	,, 901	162.6 × 63.0 × 51.8	87.2	2	S	36.8	59.0	35.7	2½	16.3	20.0	5.90 × 15″	2260	126.3	
20	RENAULT FLORIDE S CARAVELLE	168.0 × 62.0 × 51.6	89.6	2	S	36.8	57.3	33.3	3½	6.8	8.2	145 × 380	1760	55.0	63.9
21	SUNBEAM ALPINE GT III	155.0 × 60.9 × 51.4	86.0	2	S		50.9	35.2	3	11.2	13.3	5.60 × 13″	2310	77.2	82.0
22	TRIUMPH TR 4	156.0 × 58.1 × 50.6	89.2	2	S	38.1	60.0	34.3	2⅔	12.0	14.4	5.90 × 15″	2222	99.2	103.0
23	,, SPITFIRE	145.1 × 57.0 × 47.6	83.0	2	S	34.3	49.2	26.2	3¼	9.0	10.7	5.20 × 13″	1628	81.2	85.0
24	STUDEBAKER AVANTI	192.5 × 70.8 × 54.0	109.2	2	S	35.5	71.0	39.3	3½	7.6	20.6	6.70 × 15″	3080	171.5	196.5

See table 6:3 concerning abbreviations

ENGINE LOCATION COOLING NO. OF CYLINDERS ARRANGEMENT DRIVE	CYLINDER CAPACITY	BORE STOKE	COMPRESSION RATIO	OUTPUT r.p.m./DIN	OUTPUT r.p.m./SAE	SPRINGING F	SPRINGING B	TORQUE DIN AT r.p.m.	TORQUE SAE AT r.p.m	CARB. MAKE NO.	DYNAMO OUTPUT	ELEC. SYSTEM. BATTERY CAP.	GEARLEVER POS. NO. OF GEARS	REAR AXLE RATIO	POS.
FV-4 RB	108.5	3.31 × 3.15	10.0	96/5600	108/5800	S	S	102/3800	109/4000	2 SU	360	12/60	G 4+Ö	4.56	1
FV-4 RB	95.8	3.07 × 3.23	9.0	92.0/6000	106/6200	S	S	90/4000	93/4300	1 SO	200	12/50	G 5	5.13	1
FV-6 RB	157.7	3.27 × 3.14	9.0	145/5900	165/5900	S	S	140/4000	154/4000	2 SO	300	12/50	G 5	4.78	2
FV-6 RB	223.9	3.62 × 3.62	9.0	302/6000	331/6000	S	S	263/5000	280/5000	3 WE	264	12/51	G 4	4.09	3
FV-4 RB	67.0	2.48 × 3.30	8.9		55/5500	S	B	59/2500	62/2750	2 SU	256	12/43	G 4	4.22	4
FV-6 RB	177.6	3.28 × 3.50	9.0	130/4750	136/4750	S	B		114/3000	2 SU	337	12/53	G 4	3.54	5
FV-3 RF	61.8	2.51 × 2.99	8.0	55/4500	62/4500	S	B	65/3500	68/3500	1 SO	160	6/84	I 4	4.38	6
FV-12 VB	180.1	2.87 × 2.31	9.2		240/7000	S	B		194/5000	3 WE	300	12/65	G 5	4.57	7
FV-6 RB	137.0	3.07 × 3.13	9.5	136/5600	150/5300	S	B	134/4000	145/4000	2 WE	400	12/40	G 4	4.10	8
BL-4 BB	72.7	2.52 × 3.03	7.0	34/3900	40/3900	T	T	60/2000		1 SO	200	6/77	G 4	4.38	9
BL-4 BB	91.1	3.27 × 2.72	7.8	54/4200	66/4300	T	T	76/2400		2 SO	200	6/77	G 4	3.66	10
FV-4 RB	74.2	3.00 × 2.65	10.0	76/6100	84/6500	S	S	71/4400	73/4750	1 SU		12/56	G 4	4.55	11
FV-6 RB	140.7	3.23 × 2.86	9.3	150/5500	170/5600	S	S	142/4200	155/4500	B1	300	12/55	G 4	3.75	12
FV-4 RB	130.4	3.39 × 3.62	9.0	100/4600	105/4750	S	B	115/3000	117/3800	2 ST	240	12/54	G 4	3.73	13
FV-4 RB	109.8	3.16 × 3.50	8.8	95/5500		S	B	93/2600	100/2800	2 SU	295	12/53	G 4	3.9	14
FV-4 RB	98.7	3.31 × 2.87	8.8	80/5500	85/5500	S	S	90/3600	91/3700	B 1	300	12/55	R 4	4.52	15
BL-4 BB	96.5	3.25 × 2.91	8.5	75/5200	88/5200	T	T	90/4200		2 ZE	200	6/84	G 4	3.61	16
BL-4 BB	96.5	3.25 × 2.91	9.5	95/5800	107/5800	T	T	141/4600		2 SO	200	6/84	G 4	3.61	17
BL-4 BB	120.0	3.62 × 2.91	9.5	130/6200		T	T	141/4600		2 SO	300	12/50	G 4	4.43	18
BL-6 BB	121.5	3.15 × 2.60	9.0	130/6200		T	T			2 SO	300	12/50	G 4	4.43	19
BV-4 RB	58.3	2.56 × 2.84	9.5	44/5500	51/5500	S	S	51/3500	52/3500	1 SO	264	12/40	G 4	4.38	20
FV-4 RB	97.1	3.21 × 3.00	9.1	81/5000	86/5000	S	B		92/3800	2 ZE	230	12/51	G 4	3.89	21
FV-4 RB	132.4	3.39 × 3.62	9.0	100/4600	105/4750	S	B	142/3000	149/3350	2 ST	264	12/57	G 4	4.10	22
FV-4 RB	61.6	2.73 × 2.99	9.0	60/5600	63/5750	S	B	65/3300	66/3500	2 SU	264	12/43	G 4	4.10	23
FV-8 VB	269.0	3.62 × 3.56	9.0	240/4800	275/5200	S	B	305/3300	322/3300	1 ST	480	12/50	G 4	3.7	24

Cont.

Cont.

POS.	MAKE	DISC. BRAKES = S DRUM BRAKES = T F	B	TOP SPEED	ACCELERATION 0—50	ACCELERATION 0—60	ACCELERATION 0—75	FUEL CONSUMPTION m.p.g. 50 m.p.h. US	Imp.
1	VOLVO 1800 S	S/10⁷/₈"	T/ 9"	109	8.1	11.8	19.0	32.5	38.7
1	ALFA ROMEO 1600 SPRINT	T/10¹/₂"	T/10¹/₂"	109	10.1	12.8	21.5	32.5	38.7
2	.. .. 2000 SPRINT	S/	T/	124	8.1	11.8	16.8	19.6	23.5
3	AUSTIN MARTIN DB 4 GT	S/11¹/₄"	S/11¹/₈"	140	5.9	7.9	11.3	14.3	17.1
4	AUSTIN HEALEY SPRITE 1100	S/ 8¹/₄"	T/ 7"	87	11.2	16.3	26.5	31.7	37.7
5	.. .. 3000 MK II	S/11¹/₄"	T/11"	116	7.3	10.4	15.1	17.5	21.0
6	DKW 1000 SP ROADSTER	S/10¹/₂"	T/10"	90		22.4		29.7	35.2
7	FERRARI 250 GT COUPÉ	S/12³/₈"	S/11³/₄"	138	5.5	7.9	11.1		
8	FIAT 2300 S COUPÉ	S/10¹/₃"	S/10"	121	7.6	10.7	15.5	21.4	25.7
9	KARMAN GHIA 1200	T/ 9"	T/ 9"	78	16.2	35.0		37.4	45.0
10	.. .. 1500 S	T/ 9"	T/ 9"	90	12.0	18.6	32.8	35.2	42.3
11	LOTUS ELITE SPEC SERIE II	S/ 9¹/₂"	T/ 9¹/₂"	109	8.1	11.7	17.2	33.6	40.3
12	MERCEDES 230 SL	S/10"	T/ 9"	124	7.0	9.8	15.2	23.5	28.2
13	MORGAN PLUS 4	S/11"	T/9"	99	8.1	12.0	19.3	29.0	34.5
14	MGB 1800	S/10³/₄"	T/10"	98	8.6	12.0	19.3	31.7	37.7
15	PEUGEOT 404 COUPÉ	S/ 9¹/₂"	T/ 9¹/₂"	98	10.1	17.5	28.5	30.5	36.2
16	PORSCHE 1600 S	S/	S/	109	9.1	13.6	23.5	31.7	37.7
17	.. 1600 SC	S/	S/	115	8.1	12.7	18.2	30.5	36.2
18	.. CARRERA 2000 GS	S/11"	S/	124	6.9	9.2	14.0	27.9	33.3
19	.. 901	S/	S/	124	6.9	9.2	14.0	27.9	33.3
20	RENAULT FLORIDE S CARAVELLE	S/10¹/₄"	S/10¹/₄"	84	13.2	21.0	37.5	36.3	43.6
21	SUNBEAM ALPINE GT III	S/ 9¹/₂"	T/ 9"	93	10.1	17.0		32.1	38.2
22	TRIUMPH TR 4	S/11"	T/ 9"	108	7.9	10.7	17.8	31.7	37.7
23	.. SPITFIRE	S/ 9"	T/ 9"	88	11.1	17.0	31.0	34.7	41.6
24	STUDEBAKER AVANTI	S/11¹/₂"	T/11"	124	5.5	8.3	11.2	17.5	21.0

Data on VOLVO 210 and other makes

SUBJECT TO ALTERATION

POS.	STATIONWAGONS	LENGTH × WIDTH × HEIGHT	WHEELBASE	NO OF PASSENGERS	S = SEPARATE SEATS H = BENCH FRONT SEAT	ROOF HEIGHT, FRONT	ROOF HEIGHT, REAR	REAR SEAT WIDTH, HIP HEIGHT	REAR SEAT WIDHT, SHOULDER HEIGHT	CARGO SPACE WIDHT, MAX.	CARGO SPACE WIDTH, MIN.	CARGO SPACE LENGTH (REAR SEAT FOLDED DOWN)	CARGO SPACE HEIGHT (MAX.)	CARGO SPACE LENGTH (REAR SEAT UP)	CARGO SPACE HEIGHT (MIN.)
I	VOLVO 210	173.5 × 63.0 × 66.2	102.5	5	S	40.6	39.0	56.0	54.0	56.0	40.6	72.1	43.0	48.5	38.6
II	VOLVO 122	177.0 × 63.8 × 60.3	102.5	5	S	38.6	35.8	52.4	49.3	49.7	40.2	72.1	34.3	46.9	31.1
1	AUSTIN 1600 COUNTRYMAN	175.0 × 63.4 × 59.1	100.0	4	H	36.6	33.9			55.2	37.4	61.9	33.1	39.4	28.0
2	CHEVY II 435	183.0 × 70.9 × 56.7	110.5	5	H			50.8		57.2	43.0	108.8	32.7	78.0	
3	CHRYSLER VALIANT V 100	186.5 × 68.9 × 53.6	105.7	5	H	38.2	37.8	56.8	56.8	44.5	43.4	84.0	30.3	50.8	27.2
4	CITROËN I D 19 BREAK LUXE	196.5 × 70.5 × 60.3	123.0	5	H	36.7	37.1	48.1	54.8	63.1	38.2	69.4	48.0	47.2	37.4
5	FIAT 1800/2300 FAM.	177.0 × 63.8 × 58.7	104.5	5	S	32.8	31.5		54.0	48.9	34.7	70.2	33.1	39.4	29.9
6	FORD ANGLIA ESTATE	154.5 × 57.5 × 56.6	90.6	4	S	35.1	33.5	47.3	44.6	48.1	34.7	55.2	33.9	35.4	31.5
7	FORD CONSUL CORTINA COMBI	167.5 × 61.8 × 54.4	97.8	4	H	35.8	35.1			52.4	36.6	74.8	33.5	40.5	
8	FORD TAUNUS 12 M COMBI	167.5 × 62.7 × 57.6	98.1	4	H	35.1	33.9			51.2	37.0	71.8	35.9	40.5	
9	FORD TAUNUS 17 M TURNIER 510	177.5 × 65.8 × 58.3	100.0	5	H	34.3	33.5	54.4	53.2	53.6	39.4	69.0	32.7	46.0	31.5
10	FORD FAIRLANE 500	202.0 × 71.3 × 56.7	115.8	6	H			58.7	57.2	55.2	42.6	96.5	33.9	61.5	33.5
11	HILLMAN SUPER MINX	165.0 × 63.8 × 58.3	101.2	5	S	37.8	35.1			50.4	36.3	59.1	38.2	39.0	27.6
12	OPEL KADETT CARAVAN 1000	154.0 × 58.3 × 54.0	91.8	5	H	37.4	35.1	48.5	52.0	47.3	39.4	59.1	41.0	35.5	34.9
13	OPEL REKORD CARAVAN 1700	178.0 × 64.2 × 60.0	100.0	5	H	36.6	36.6	50.0		54.0	37.8	71.0	35.5	45.3	28.9
14	PEUGEOT 404 COMMERCIALE	181.0 × 64.2 × 56.3	111.8	5	S	38.2	35.1	55.6	47.3	55.6	39.8	84.0	35.5	51.2	33.1
15	PLYMOUTH SAVOY 6	218.0 × 80.0 × 55.6	116.2	6	H					48.9	46.5	94.6	30.7	56.7	27.6
16	RAMBLER CLASSIC 660	190.0 × 71.3 × 54.8	114.0	6	H					59.1	41.4	84.0	28.4	47.2	27.2
17	SAAB 95	162.0 × 61.8 × 57.9	98.0	5	S	41.4	34.3	49.6	47.3	47.3	36.7	64.6	47.3	43.3	28.8
18	SKODA OCTAVIA COMBI	160.0 × 63.1 × 57.2	94.5	5	S	37.8	36.3		53.2	37.0	37.0	57.5	31.5	38.2	28.4
19	TRIUMPH HERALD KOMBI	153.5 × 60.3 × 52.0	91.3	4	S	34.3	34.3	43.2	48.1	46.1	36.7	61.9	33.9	35.4	29.2
20	VAUXHALL VICTOR	173.5 × 64.2 × 55.6	100.0	5	H	35.1	35.1	49.7	54.4	53.2	41.0	65.0	32.7	43.7	
21	VOLKSWAGEN VARIANT 361	167.0 × 63.4 × 58.3	94.6	5	S	38.6	34.3	53.6	50.0	48.1	46.1	65.8	29.5	41.3	25.2

See table 6:3 concerning abbreviations

TOP WIDTH OF REAR OPENING	LOWER WIDTH OF REAR OPENING	REAR OPENING HEIGHT	CARGO FLOOR HEIGHT	CARGO SPACE VOLUME CM FT.	GROUND CLEARANCE	TURNING CIRCLE	NUMBER OF DOORS	TYRES	CURB WEIGHT	DIN HP/TON	SAE HP/TON	ENGINE LOCATION COORLING NO. OF CYLINDERS ARRANGEM. DRIVE	BORE STROKE	CYLINDER CAPACITY	COMPRESSION RATIO	OUTPUT r.p.m. DIN	OUTPUT r.p.m. SAE	POS.
41.4	44.9	36.6	25.6	101	8.7	35.1	2	6.40×15″	2485	60.0	66.2	FV-4 RB	3.31×3.15	108.5	8.5	68/4500	75/4500	I
38.2	41.8	30.7	24.4	65	8.7	34.5	4	6.40×15″	2620	57.5	63.5	FV-4 RB	3.31×3.15	108.5	8.5	68/4500	75/4500	II
38.6	41.3	27.9	20.5	51	5.9	39.4	4	5.90×14″	2620	50.4	53.0	FV-4 RB	3.00×3.51	99.0	8.3	62/4500	63/4500	1
46.9	47.6	28.3	24.4		6.0	39.4	4	6.50×13″	3000		66.0	FV-4 RB	3.89×3.26	153.0	8.5		90/4000	2
	43.7	30.3	29.1		5.5	41.0	4	6.50×13″	2950		74.5	FV-6 RB	3.39×3.11	170.0	8.2		100/4400	3
38.2	43.4	37.4	20.5			38.7	4	165×400	2970	49.0	52.0	FV-4 RF	3.07×3.94	116.4	7.5	66/4250	70/4500	4
38.6	42.9	31.4	25.6	71	5.9	37.7	4	6.40×S14″	2930		73.0 78.0	FV-4 RB	2.84×2.90 3.07×3.14	109.5 139.0	8.8		97/5300 117/5300	5
36.2	42.2	30.3	24.8	57	6.4	34.5	2	5.60×13″	1810		47.5	FV-4 RB	3.19×1.91	60.8	8.9		41/5000	6
42.1	47.2	30.7		35	5.9	36.0	2	5.60×13″	1875		64.5	FV-4 RB	3.19×2.29	73.0	8.7		53/4800	7
42.1	47.2	32.7			6.3	39.4	2	5.90×13″	2090		46.5	FV-4 VF	3.15×2.32	72.0	7.8	40/4500 50/4500	40/4500 60/4500	8
41.4	46.7	26.0	22.8		7.1	38.7	2	6.40×13″	2230	64.0	71.5	FV-4 RB	3.31×3.02	103.5	7.4	65/4250	72/4300	9
47.2	48.1	29.1	23.6		7.1	43.3	4	7.00×14″	3300		62.5	FV-6 RB	3.51×2.95	170.0	8.7		100/4400	10
51.2	49.2	28.3	25.6		7.1	38.7	2	6.00×13″	2530	53.9	57.4	FV-4 RB	3.21×3.00	97.3	8.3	62/4400	66/4400	11
39.4	42.6	31.4	22.8		6.7	36.0	2	6.00×12″	1585	55.5	65.0	FV-4 RB	2.84×2.41	60.7	7.8	40/5000	47/5200	12
31.9	44.1	31.1	25.2	71	6.7	39.4	2	6.40×13″	2270	58.2	60.0	FV-4 RB	3.35×2.92	102.5	7.25	60/4300	67/4400	13
36.6	42.6	31.4	19.7		6.0	37.7	4	5.90×15″	2580	56.0 62.1	56.4	FV-4 RB	3.15×2.88	89.5	7.5 7.4	60/5000	66/5200	14
	46.5	30.7	28.8		5.5	47.6	4	7.50×14″	3580		106	FV-6 RB	3.39×4.10	225.5	8.2		145/4000	15
43.3	50.4	24.4	26.0		6.9	37.7	4	6.50×15″	2970		94.0	FV-6 RB	3.11×4.26	195.3	8.7		127/4200	16
36.6	37.0	27.6	26.8		7.5	36.7	2	5.60×15″	1980	42.0	46.6	FV-3 RF	2.76×2.87	51.3	7.3	38/4250	42/5000	17
38.2	37.0	29.1		49	7.1	37.7	2	5.90×15″	2110	46.9	48.5	FV-4 RB	2.84×2.95	74.5	7.5	45/4600	47/4500	18
37.0	43.7	33.9	20.8	46	6.8	27.5	2	5.20×13″	1960	43.8	48.2	FV-4 RB	2.73×2.99	70.0	8.0	39/4500	43/4500	19
35.9	44.1	29.5	29.5	46	6.7	33.4	4	5.90×13″	2270		54.0	FV-4 RB	3.13×3.00	92.0	8.1		57/4600	20
37.0	42.1	27.6	27.6	42	5.8	36.2	2	6.00×15″	2050	48.5	57.0	BL-4 BB	3.27×2.72	91.0	7.8	45/3800	53/4000	21

Cont.

ELEC. SYSTEM BATTERY CAP.	GEAR LEVER POS. NO. OF GEARS	REAR AXLE RATIO	DISC. BRAKES = S DRUM BRAKES = T DIAM. OF DISCS AND DRUM RESPECTIVELY		TOP SPEED	ACCELERATION 0—50	FUEL CONSUMPTION m.p.g./50 m.p.h.		LOAD CAPACITY
12/60	G 4	4.56	T/ 9″	T/ 9″	86	18.0	31.7	37.7	1210
12/60	G 4	4.56	T/10″	T/ 9″	89	18.2	31.7	37.7	1100
12/43	G 4	4.3	T/ 9″	T/ 9″	81	25.0	29.7	35.2	1080
12/44	R 3	3.55	T/ 9″	T/ 9″	87				
12/38	R 3	3.23	T/ 9″	T/ 9″	90				1250
12/50	I 4	3.89	S/12″	T/10″	90	20.0	23.5	28.2	1430
12/48	R 4	4.3	S/10 1/3″	S/10″	90 96		20.5	24.6	1055
12/56	G 4	4.44	T/ 8″	T/ 8″	73	30.0	31.3	37.2	705
12/38	G 4	4.13	T/ 9″	T/ 8″	78		32.9	39.2	880
12/38	R 4	4.13 3.78	T/ 9″	T/ 8″	75 81	30.0 24.5	32.9	39.2	880
6/78	R 3/4	3.89	T/ 9 1/8″	T/ 9 1/8″	83	21.0	27.9	33.3	1120
12/56	R 3	3.50	T/10″	T/10″					
12/	G 4	4.22	T/ 9″	T/ 9″	78				835
6/66	G 4		T/	T/	75	30.0	36.3	43.6	780
6/77	R 4	3.89	T/	T/	76	25.0	29.0	34.5	1100
12/55	R 4	4.75	T/11″	T/11″	84	21.5	26.1	31.3	1100
12/60	R 3	3.55							
12/45	R 3	3.78	T/ 9″	T/ 9″	87				1320
12/33	R 4	4.56	T/ 9″	T/ 8″	75	32.0	34.7	41.6	
12/40	R 4	4.78	T/ 9″	T/ 9″	71				880
12/38	G 4	4.10	T/ 8″	T/ 7″	75	31.0			770
12/38	R(G) 3/4	4.63	T/ 8″	T/ 8″	78	30.3	27.9	33.3	1120
6/77	G 4	4.12	T/ 9 1/8″	T/ 9″	78	25.0	31.7	37.7	770

1 This is Volvo

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EA

SILVERSTONE. 2nd May, 1959
Volvo Class placings 1st, 2nd and 4th

Motor trial activities

Car trials are a form of competitive comparison and are run on certain laid-down international rules. There are, however, so many forms of trial that it is necessary to be familiar with each one of them in order to form an objective idea of an individual trial result today. It can, for example, be considerably more creditable for a make of car merely to complete a certain trial than to win an outright victory in another.

It is very seldom that a car competing in a trial starts with only standard equipment (this virtually only happens in economy runs), but on the other hand, the modifications which the trial rules permit are often quite small and easy to carry out for those who wish to do so. These include, for example, replacing sparking plugs, brake linings, tyres, shock absorbers, seats, etc. Engine tuning naturally also occurs in the same way as lightening the car, but all this is controlled by prevailing trial rules, which means that conditions for all participants are similar.

More and more car firms and car manufacturers have during recent years begun to take interest in car trials and so-called trial result advertisements appear ever more frequently. The reason for this interest is based on the hope of increased sales as a result of performance results but the value of car trials as a comparison should not be completely overlooked. During a motor trial the construction of a car is also subjected to considerably greater strain than during everyday driving and it is therefore possible to obtain a good picture of the safety margin of different car constructions by studying results from the test track.

■ Forms of trial

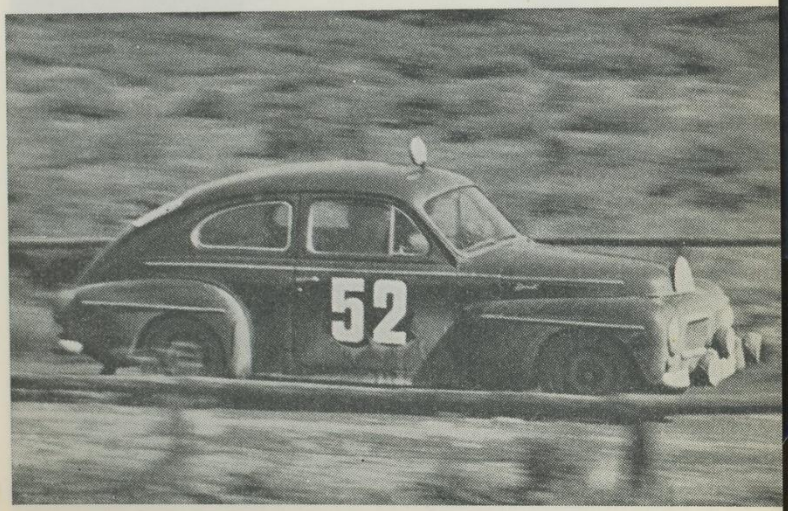
Motor trials can be divided into two main groups, one group including trials where the car and its design play a minor part in achieving results — for example, driving tests, clue-hunting, family rallies and orientation competitions.

The other group includes rallies, reliability trials, speed trials of a sporting or endurance character on a closed circuit or on the open road, and finally, economy runs. In addition to a good performance from the car, the trials demand the combination of a clever driver and co-driver, more or less exhaustive preparation of the car, a thorough study of the track and competitors and, last but not least, a good slice of luck.

When speaking about car trials, it is almost always the latter group which is concerned and it is possible here to pick out a few different types.

Economy runs are arranged by the various petrol companies around the world and are intended to demonstrate the possibilities there are available for lessening fuel consumption by adjustment in combination with an economical manner of driving. It is surprising how much the fuel consumption can be lessened first of all through an economical manner of driving but it should be borne in mind that the consumption figures attained under trial conditions are made at the expense of the comfort of the driver and that driving is very tiring and uncomfortable in the long run. Anyone could get down to corresponding consumption figures for a short time by means of a similar manner of driving. For everyday driving, however, a fuel consumption approx. 10—20% higher can be reckoned with under normal circumstances. High speed, town driving, unnecessary acceleration and braking and extra load lead to increased fuel consumption.

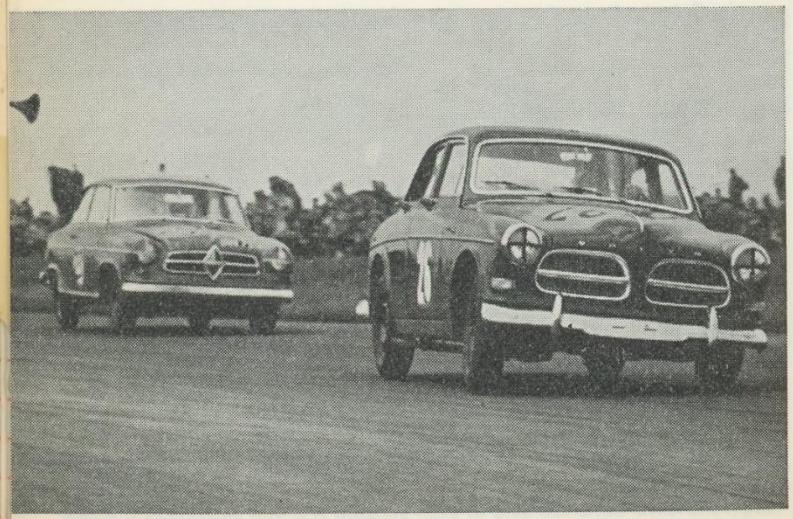
Rallies (reliability trials are a form of shorter rally) are usually run during the course of seven days on public highways at a medium average speed (50—60 km.p.h.) and have a number of special tests of a speed character arranged along the whole course. It is generally these special tests which decide placings in the trial and since rules for these special tests are as varying as they are numerous, a further knowledge of them is required to enable a certain performance to be judged correctly.



In connection with rallies there are also various class categories which can make results difficult to interpret. The number of classes in a rally varies from about 5 to 20 which explains the large number of "victory announcements" after certain trials. The outright winner is often decided by means of the shortest time principle from the special tests, but when the number of classes is very large, a form of handicap is, unfortunately, often used.

During rally competitions both the car and driver are subjected to strains which in certain respects are the same as those met with by the everyday motorist and for this reason this form of competition is very interesting. It is desirable that the number of classes should be as small as possible, that there should be no handicap, and that the results obtained should be fully comparable.

There are several forms of speed trial, hill-climbing, on race tracks or highway, but they are all similar in one respect, having a starting and finishing line on a common track, where all participants drive against the clock. From many points of view results achieved in a speed trial must be regarded as particularly fair and informative since they are obtained under the eye of the public and under similar conditions for all participants.



The greatest test value is naturally obtained from the longer trials of 12 to 24 hours on a closed circuit. Long-distance trials on public highways are also particularly interesting even though this type of competition is gradually disappearing because of the greatly increased traffic on the roads.

■ **What are the qualities tested on the trial course?**

It is acceleration and braking in combination with road-holding which constitute basic conditions for good results but the driver's capacity as well as the reliability of the car are at least as important.

The acceleration of the car is in direct proportion to the turning torque of the driving wheels and in inverse proportion to weight of the car. This means that the trial qualities of the car are closely bound up with the basic design, engine torque, reduction ratio in the gearbox and rear axle, kerb weight, suspension, shock absorbers and brakes.

■ General advice concerning tuning.

What can be done to tune a car for trial purposes?

1. Increase the engine output by raising the torque curve and/or engine speed.
2. Increase the acceleration of the car within certain speed ranges by choosing other reduction ratios in the gearbox and rear axle.
3. Increase the acceleration of the car by reducing its weight.
4. Increasing the max. speed of the car by a different rear axle ratio and decreasing wind resistance, friction losses.
5. Increase the road-holding properties of the car by lowering the centre of gravity and adjusting suspension and shock absorber effect to suit circumstances.
6. Increase braking effect.

■ Some advice

Many people object to anything connected with car trials. Be careful not to quote trial successes as a sales argument to all customers. If a customer should prove to be receptive to "racing talk", do not encourage him to feel like a racing driver with his new car. Motor trials should take place under organized supervision and not in everyday traffic.

1 This is Volvo
2 This is how Volvos are made
3 Data
4 Type specifications
5 Product information
6 Competitive makes
7 Racing and rally activities
8 **Road tests as a basis for sales promotion**
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Key to successful selling

■ **Know your goods** ■ **Develop your plan**

Regardless of what you are selling, it is absolutely essential that you inspire the customer with confidence by your attitude and that you have a plan to work to. This section is intended to help you to form a plan which you can then develop with your own personality in the way you think best.

But you must have a plan.

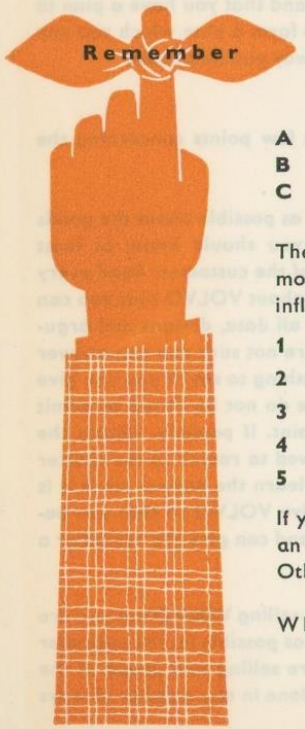
Before going any further, we follow with a few points concerning the goods and enthusiasm.

■ **Goods:** Obviously you must learn as much as possible about the goods you sell. Nobody can know everything but you should know at least enough for you always to keep a jump ahead of the customer. Read every piece of information and explanatory material about VOLVO that you can get hold of so that you will be conversant with all data, designs and arguments. If you are asked a question which you are not sure you can answer correctly, do not guess just for the sake of something to say. If you can give a logically correct answer, do so but otherwise do not be afraid to admit your lack of knowledge on that particular point. If possible, obtain the correct answer immediately or ask to be allowed to return to the matter later. Whatever happens, make sure that you learn the answer since it is likely that the question will crop up again. Drive VOLVO so that you become throughly conversant with its properties and can give the customer a perfect trial run.

■ **Enthusiasm:** *Remember* — You are not only selling VOLVO but you are also selling yourself and the Company. As soon as possible let the customer understand that you are proud of what you are selling and proud of the organisation to which you belong. This can be done in any number of ways during the sales conversation.

A sales plan is fundamental. No war has ever been won without strategy. Few cars are sold without planned sales work. Those which are sold without a plan are done so almost exclusively because the customer has already decided to buy the car and the salesman has only to arrange for payment and delivery. The following *plan* is intended to help you to win over VOLVO buyers from amongst those who are intending to obtain a small to medium-size car. In this plan you should avoid talking about price until the time is suitable. It is another matter if the customer has already decided to purchase when he comes in, if he only drops in to enquire about prices or if he is purely and simply just curious about VOLVO. In these cases the conversation, must, of course, be conducted in another way. Now... to a

SALES PLAN



Remember the following points during the whole of the conversation:

A Sell yourself
B Sell the company
C People do not buy specifications or advertised features.

These must be applied to the original purchasing motives of each individual. There are five factors influencing car buying:

1 **Economy, quality, and service**
2 **Comfort and suitability**
3 **Safety and protection**
4 **Easy driving and good performance**
5 **Social prestige**

If you can decide which of these motives apply in an individual case, then concentrate on this. Otherwise place equal stress on all motives.

WHEN YOU **KNOW** VOLVO —
THEN YOU **SELL** VOLVO

Know the customer's name
Introduce yourself as soon as you meet the customer. Give him your card if you have one. Remember the customer's name and write it down if it is a "difficult" one. Do not be afraid to do this since the customer will be only too glad to realise that you show a personal interest in him. Address him by his name during the whole of the conversation.

Find out his point of view
Weigh up the customer and decide how much he knows about VOLVO. If it is a married couple, try to find out who will be driving the car most. The customer's knowledge or lack of knowledge will tell you how you should begin. Judge the motive for purchasing. You can form a clear picture of the category to which he belongs by his appearance, manner of speaking, personality, present car, etc. Since a VOLVO is attractive to both a sporting driver and an ordinary family motorist, it is most important that you should decide at once and then concentrate all your arguments on the appropriate line.

Get him into the car
Get the customer into the rear seat at once by asking him to try out the comfort for himself. Sit in the front seat yourself and turn towards the customer. Now he cannot get out so easily. Discuss the quality, comfort and safety. Point out the solid quality behind every little part, the perfect fit of all joints and fittings, fitting of the headlining, "tailor-made" rubber floor mats, placing of the instruments, well-fitting ashtrays, etc. Remember that these are important points since there are cars in which these parts can cause

a lot of trouble, if not immediately, then after a short time. Explain that the upholstery is easy to clean, describe the way in which the seats are built, armrests, really serviceable plastic courtesy straps, safety belts at the front and safety belt attachments at the rear, clothes hangers.....

Show your knowledge of the car

Now ask the customer to sit behind the steering wheel and point out again the quality, comfort and safety that a VOLVO has to offer. You should now point out the integral body with strong roof construction, hard-wearing upholstery, conveniently located handbrake, padded upper side of instrument panel, padded sun visors, smooth underside of instrument panel permitting plenty of knee room, radiator blind chain now moved up, traffic indicator lever, electrical windscreen wipers, trip meter, curved windscreen without optical faults — made of laminated glass which does not become opaque in the event of stone damage but can easily be pushed outwards if struck with the head in a collision. (Do not frighten everybody by pointing this out). Before getting out of the car, summarize the points mentioned and ask the customer to consider what VOLVO has to offer in comparison with more expensive competitors.

Unlock the bonnet, get out of the car and walk slowly round it. While doing this, draw his attention to other features and while combining them with the previously mentioned interior fittings, see that the customer grasps the connection between these and his motives for buying. In this connection point out the thorough rust-protective treatment, the 7-coat synthetic enamel, tyres

with white sidewalls, all five wheels balanced, luggage compartment, robust bumpers, tool equipment, etc.

Show what there is under the bonnet

Lift up the bonnet and point out quickly the heater and air intake, carburetters, radiator blind. Do not go into technical details unless you are asked since this can be troublesome and the customer can easily be bored. If you do have to answer a technical question, make sure that the customer understands all the time. Stress economical reasons such as approximate fuel consumption for normal driving, service facilities, long driving intervals between oil changes, long tyre wear..... VOLVO strength and length of life guarantee high second-hand value.

Show him around

Show the customer where the spare parts and accessory departments are. Tell him about the people in charge of these. Tell him that there are workshops both within the country and abroad. If the opportunity is suitable you can inform him that Service Manuals can be bought by the general public, that spare parts prices are low, that technically trained mechanics are available, that good accessibility makes any necessary work cheaper. In other words, give the customer an idea of the size of the organization lying behind this car.

Take him for a trial run

It is now time to take the customer out for a demonstration run. If possible, do this in a car fitted with the gearbox in which he is interested, 3 or 4-speed, so that he can obtain the driving impression he is looking for. You drive first and the customer afterwards. Show him the gear positions and let him practise a few times as there is nothing more embarrassing than fumbled gear-changing in someone else's presence. Do not distract him with talk while he is driving but only answer any questions he may ask. Some of the performance details which the customer can test for himself are acceleration, easy gear-changing, the direct steering, small turning circle and the powerful brakes.

Tell him why he should buy

After coming back from the demonstration run summarize the reasons as to why a VOLVO can fulfil all demands he can place upon his car whatever his motives for purchasing may be. A VOLVO combines the qualities of both a family car and a fast sports car.

At this stage you should be able to decide whether the customer is willing to buy or not and in the latter case perhaps you can bring to mind what decisive factor you may have left out.

Ask for his order

Here are a few points of view to round off with:

1. Sell the payment plan.

2. When telling the customer what the car costs, explain the value he is getting for his money.

3. Frame your questions so that the customer cannot take charge of the conversation. Put questions demanding a clear yes or no in answer; the drift should be that he requires a car and that he will not have to wait too long for it, etc. Make him feel an immediate need for a VOLVO. The most important thing is that you gain your customer's confidence.

4. Keep to the point and avoid running down competitive makes or other car firms.

Above all, SELL.

Below is a list of arguments which can be used:

Economic argument

- Good second-hand value
- Rust-protective treatment of body gives long life (see chapter **5**:3)
- Full-flow filter, oil change every 5000 km
- All-round lubrication every 5000 km, 120-serie and 1800 S.
- Thief-proof
- 15″ wheels, increased life for tyres
- Cheap repairs
- Ready-equipped at purchase
- Good service facilities all over the world

Arguments concerning comfort and safety

- Good road-holding properties with 15″ wheels and tubeless tires, braced-tread tires on 1800 S
- Robustly dimensioned brakes
- All-welded body with sturdy roof construction
- Attachments for safety belts front and rear
- Laminated glass in windscreen which is easily dislodged by a blow from inside
- Padded instrument panel and sun visors
- Smooth underside of instrument panel
- "Child-proof" rear doors on 120-serie
- Large swept area, electric windscreen wipers; 120-serie and 1800 S, two speeds
- Adjustable seat height and backrest inclination on 120-serie
- "Swept-in" front seats
- Comfortable driving position, does not tire
- Easily-read instruments
- Rapid acceleration
- Safety steering wheel
- Direct steering
- Fuel tank at rear
- Good defroster
- Stabilizer

Arguments for service

- Specially trained technical personnel
- Spare parts available in the country concerned
- Good service. VOLVO represented all over the continent
- Service Manuals available for purchase by the public
- Good accessibility under the bonnet

Technical arguments

- A well-sealed car for cold climates
- Fresh air ventilation, opening rear quarter lights for warm climates
- Robust *5-bearing* induction-hardened crankshaft
- Efficient cooling system with both water pump and thermo-syphon cooling, thermostat
- Fuel thrifty
- Full-flow filter
- Oil cooler and oil temperature gauge on 1800 S
- Robust dynamo
- Robust starter motor
- Hydraulically operated clutch, 120-serie and 1800 S
- Fully-synchronised 4-speed gearbox
- Floor-type gear lever
- Powerful brakes, disc brakes at front on 120-serie and 1800 S
- Balanced wheels
- Robustly dimensioned steering gear
- Divided steering column, 120-serie and 1800 S, "breaks" if the body is compressed
- Rust-protected body
- Synthetic stove enamelling,
- Excellent heater
- Air intake placed high up, 120-serie and 1800 S
- Stabilizer
- Ball bearing type clutch release bearing

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Conversion Table

Temperature table

C°	F°
+100	+212
95	203
90	194
85	185
80	176
75	167
70	158
65	149
60	140
55	176
50	122
45	113
40	104
35	95
30	86
25	77
20	68
15	59
10	50
5	41
0	32
− 5	23
10	14
15	5
17,8	0
20	− 4
25	13
30	22
35	31
40	40
45	49
50	59

$$C = \frac{5}{9}(F-32)$$

$$F = \frac{9C}{5}+32$$

Fuel consumption

Litre per 10 km	Miles per US gall.	Miles per Imp.gall.
0,5	47,0	56,4
0,6	39,2	47,0
0,7	33,6	40,3
0,8	29,7	35,2
0,9	26,1	31,3
1,0	23,5	28,2
1,1	21,4	25,7
1,2	19,6	23,5
1,3	18,1	21,8
1,4	16,8	20,2
1,5	15,7	18,9
1,6	14,7	17,7
1,7	13,8	16,6
1,8	13,1	15,7
1,9	12,4	14,9
2,0	11,8	14,1
2,1	11,2	13,5
2,2	10,7	12,8
2,3	10,2	12,3
2,4	9,80	11,8
2,5	9,40	11,3
2,6	9,05	10,9
2,7	8,70	10,5
2,8	8,40	10,1
2,9	8,11	9,75

Conversion Table

Speed Table

Km.p.h.	M.p.h. Miles/tim.	M.p.h. Miles/tim.	Km.p.h. Km/tim.
1	0,62	1	1,61
5	3,11	5	8,05
10	6,21	10	16,1
15	9,32	15	24,1
20	14,2	20	32,2
25	15,5	25	40,2
30	18,6	30	48,3
35	21,7	35	56,3
40	24,9	40	64,4
45	28,0	45	72,4
50	31,1	50	80,5
55	34,2	55	88,5
60	37,3	60	96,6
65	40,4	65	105
70	43,5	70	113
75	46,6	75	121
80	49,7	80	129
85	52,8	85	137
90	55,9	90	145
95	59,0	95	153
100	62,1	100	161
105	65,2	105	169
110	68,4	110	177
115	71,5	115	185
120	74,6	120	193
125	77,7	125	201
130	80,8		
135	83,9		
140	87,0		
145	90,1		
150	93,2		
155	96,4		
160	99,5		
165	102,5		
170	105,6		
175	108,9		
180	112,0		
185	115,0		
190	118,1		
195	121,5		
200	124,5		

Weight table

kg	lbs.	kg	lbs.	kg	lbs.
10	22	**300**	662	1814	**4000**
20	44	**400**	882	**2000**	4409
23	**50**	454	**1000**	2041	**4500**
30	66	**500**	1103	2260	**5000**
40	88	**600**	1323	2495	**5500**
45	**100**	680	**1500**	**2500**	5513
50	110	**700**	1544	2722	**6000**
60	132	**800**	1764	2949	**6500**
70	154	**900**	1985	**3000**	6615
80	176	907	**2000**	3175	**7000**
90	198	**1000**	2205		
91	**200**	1134	**2500**		
100	221	1361	**3000**		
200	441	**1500**	3308		
227	**500**	1588	**3500**		

Tyre pressure

kg/cm²	lbs/sq in	kg/cm²	lbs/sq in
0,7	10	1,8	26
0,8	12	1,9	27
0,9	13	2,0	28
1,0	14	2,1	30
1,1	16	2,2	31
1,2	17	2,3	32
1,3	18	2,4	34
1,4	20	2,5	36
1,5	21	2,6	37
1,6	22	2,7	38
1,7	24	2,8	40

Conversion Table

mm — inches

mm	inches	feet	mm	inches	feet
5	3/16		**700**	27 1/2	
10	3/8		**750**	29 1/2	
20	13/16		762	**30**	2 1/2
25,4	**1**		**800**	31 1/2	
30	1 3/16		**850**	33 1/2	
40	1 9/16		**900**	35 1/2	
50	1 7/8		914	**36**	**3**
50,8	**2**		**950**	37 1/2	
60	2 3/8		**1000**	39 1/4	
70	2 3/4		1067	**42**	3 1/2
76,2	**3**		**1200**	47 1/4	
80	3 1/8		1219	**48**	**4**
90	3 1/2		**1228**	48 1/4	
100	3 15/16		**1240**	48 3/4	
102	**4**		1372	**54**	4 1/2
125	4 3/4		**1500**	59	
127	**5**		1520	**60**	**5**
150	6		1676	**66**	5 1/2
152	**6**		1829	**72**	**6**
175	6 3/4		1981	**78**	6 1/2
178	**7**		**2000**	78 1/4	
200	7 3/4		2134	**84**	**7**
203	**8**		2286	**90**	7 1/2
225	8 3/4		2438	**96**	**8**
229	**9**		**2500**	99 1/2	
250	9 2/4		2591	**102**	8 1/2
254	**10**		**2600**	102 1/4	
275	10 3/4		2743	**108**	**9**
279	**11**		2896	**114**	9 1/2
300	11 3/4		**3000**	118	
305	**12**	**1**	3048	**120**	**10**
350	13 3/4		3200	**126**	10 1/2
400	15 3/4		3353	**132**	**11**
450	17 3/4		**3400**	133 3/4	
457	**18**	1 1/2	**3500**	137 3/4	
500	19 3/4		3505	**138**	11 1/2
550	21 3/4		3658	**144**	**12**
600	23 1/2		**3800**	149 1/2	
610	**24**	**2**	3810	**150**	12 1/2
650	25 1/2		3962	**156**	**13**

mm	inches	feet	mm	inches	feet
4000	157 1/2		6858	**270**	22 1/2
4100	161 1/2		**7000**	275 1/2	
4115	**162**	13 1/2	7010	**276**	**23**
4267	**168**	**14**	7163	**282**	23 1/2
4400	173 1/4		7315	**288**	**24**
4420	**175**	4 1/2	7468	**294**	24 1/2
4500	177 1/4		**7500**	295 1/4	
4572	**180**	**15**	7620	**300**	**25**
4700	185		7772	**306**	25 1/2
4724	**186**	15 1/2	7925	**312**	**26**
4877	**192**	**16**	**8000**	315	
5000	196 3/4		8077	**318**	26 1/2
5029	**198**	16 1/2	8230	**324**	**27**
5100	200 3/4		8382	**330**	27 1/2
5182	**204**	**17**	**8500**	334 3/4	
5300	208 3/4		8534	**336**	**28**
5334	**210**	17 1/2	8687	**342**	28 1/2
5486	**216**	**18**	8839	**348**	**29**
5500	216 1/2		8992	**354**	29 1/2
5600	220 1/2		**9000**	354 1/4	
5639	**222**	18 1/2	9144	**360**	**30**
5791	**228**	**19**	9296	**366**	30 1/2
5944	**234**	19 1/2	9449	**372**	**31**
6000	236 1/4		9500	374	
6096	**240**	**20**	9601	**378**	31 1/2
6248	**246**	20 1/2	9754	**384**	**32**
6401	**252**	**21**	9906	**390**	32 1/2
6500	256		**10000**	393 3/4	
6553	**258**	21 1/2			
6706	**264**	**22**			

Converting

English measurements to metric and vice versa

	A	B	$\frac{A}{B}$
	F°	C°	$\frac{A}{0{,}56\ (A-32)}$
	C°	F°	$\frac{A}{1{,}8\ A+32}$
	inches	cm	2,540
	cm	inches	0,394
	foot	m	0,305
	m	foot	3,281
	yard	m	0,914
	m	yard	1,094
	Eng. mile	km	1,609
	km	Eng. mile	0,622
	Sq. in.	cm^2	6,452
	cm^2	Sq. in.	0,155
	sq. ft.	m^2	0,093
	m^2	sq. ft.	10,77
	sq. yd.	m^2	0,835
	m^2	sq. yd.	1,197
	cu in.	cm^3	16,39
	cm^3	cu. in.	0,061
	cu. ft.	litre	28,36
	litre	cu. ft.	0,035
	cu. yd.	m^3	0,763
	m^3	cu. yd.	1,311
	Imp.gall.	litre	4,547
	litre	Imp.gall.	0,220
	Imp. quart	litre	1,137
	litre	Imp. quart	0,880
	Imp. pint	litre	0,568
	litre	Imp. pint	1,762
	US gall.	litre	3,785
	litre	US gall.	0,264
	US quart	litre	0,946
	litre	US quart	1,057
	US pint	litre	0,473
	litre	US pint	2,114
	oz.	kg	0,028
	kg	oz.	35,25
	lb	kg	0,454
	kg	lb	2,203

	A	B	$\frac{A}{B}$
	lb./ft.	kgm	0,138
	kgm	lb./ft.	7,233
	lb./in.	kg/m	17,87
	kg/m	lb./in.	0,056
	lb./sq. in.	kg/cm^2	0,070
	kg/cm^2	lb./sq.in.	14,22
	lb./Imp.gall.	kg/litre	0,100
	kg/litre	lb./Imp.gall.	10,00
	lb./US gall.	kg/litre	0,120
	kg/litre	lb./US gall.	8,333
	lb./cu. ft.	kg/m^3	16,21
	kg/m^3	lb./cu. ft.	0,062
	cu.ft./lb.	m^3/kg	0,062
	m^3/kg	cu. ft./lb.	16,21

Conversion Table

Gradient

%		Degrees	%		Degrees
½	1:200	0,27	30	1:3,3	16,7
1	1:100	0,6	31	1:3,2	17,2
2	1:50	1,2	32	1:3,1	17,7
3	1:33,3	1,7	33	1:3	18,2
4	1:25	2,3	34	1:3	18,8
5	1:20	2,9	35	1:2,9	19,3
6	1:16,7	3,4	36	1:2,8	19,8
7	1:14,3	4	37	1:2,7	20,2
8	1:12,5	4,6	38	1:2,6	20,6
9	1:11,1	5,2	39	1:2,5	21,2
10	1:10	5,7	40	1:2,5	21,8
11	1:9,1	6,3	41	1:2,4	22,2
12	1:8,3	6,8	42	1:2,4	22,8
13	1:7,7	7,4	43	1:2,3	23,2
14	1:7,3	8	44	1:2,3	23,8
15	1:6,7	8,5	45	1:2,2	24,2
16	1:6,25	9,1	46	1:2,2	24,7
17	1:5,9	9,7	47	1:2,1	25,2
18	1:5,6	10,2	48	1:2,1	25,6
19	1:5,3	10,8	49	1:2	26,1
20	1:5	11,3	50	1:2	26,6
21	1:4,8	11,9	55	1:1,8	28,8
22	1:4,6	12,4	60	1:1,7	31
23	1:4,3	12,9	65	1:1,5	33
24	1:4,2	13,3	70	1:1,4	35
25	1:4	14	75	1:1,3	36,8
26	1:3,8	14,6	80	1:1,25	38,7
27	1:3,7	15,1	85	1:1,2	40,3
28	1:3,6	15,6	90	1:1,1	42
29	1:3,4	16,2	95	1:1,1	43,5
			100	1:1	45