

# Service Manual

## Repairs and maintenance

Section 2(21)

Reconditioning  
engine

D20, D24

1979-19 . . .

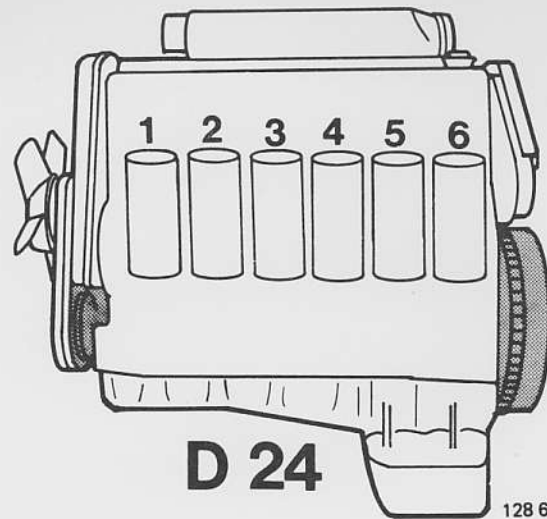
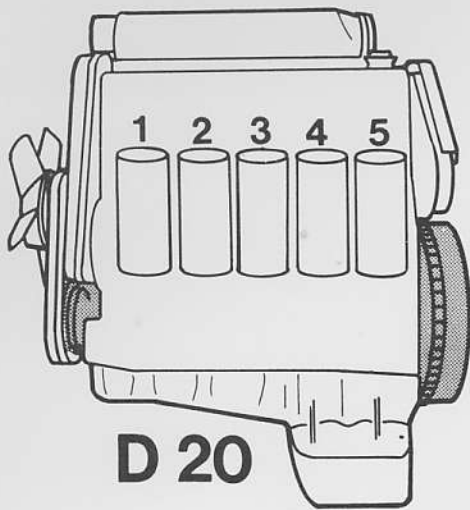
# VOLVO

## D 20, D 24

Both the D 20 and D 24 Diesel engines are dealt with in this manual.

The D 20 has five cylinders and the D 24 six. Otherwise the engines are similar in principle.

**Note!** Different flywheels and vibration dampers are fitted to the different engine types.



128 642

Volvos are sold in versions adapted for different markets. These adaptations depend on many factors including legal, taxation and market requirements.

This manual may therefore show illustrations and text which do not apply to cars in your country.

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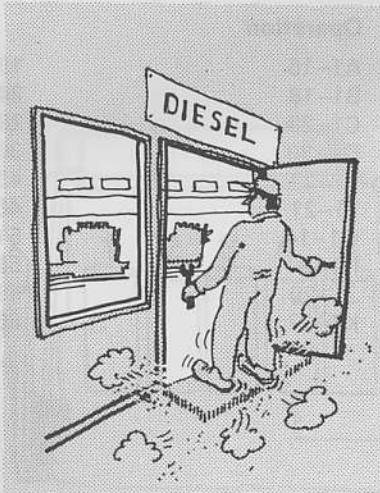
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This manual deals exclusively with the overhaul of the engine. For work carried out on the engine when fitted in the car, and for engine removal and installation, please refer to the service manual Section 2(20-22) and Section 2(23-29).

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We reserve the right to make alterations

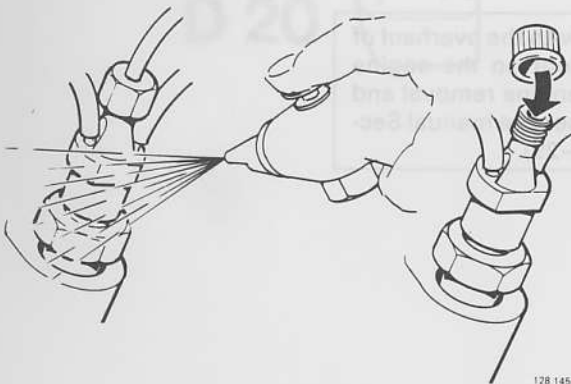
## Important information



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### CLEANLINESS

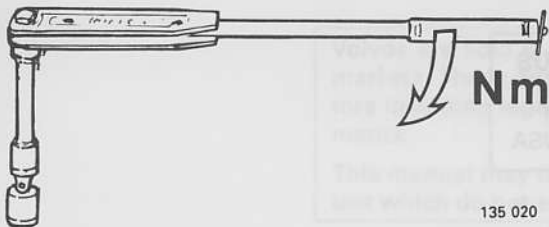
Diesel injection systems are extremely sensitive to dirt and foreign matter. A special workplace should therefore be used for inspection of components.



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### PLUGS

Clean fuel line connections thoroughly before disconnecting them. Plug ends of fuel lines etc as each component is removed. Do not remove these plugs until the component is reconnected.



135 020

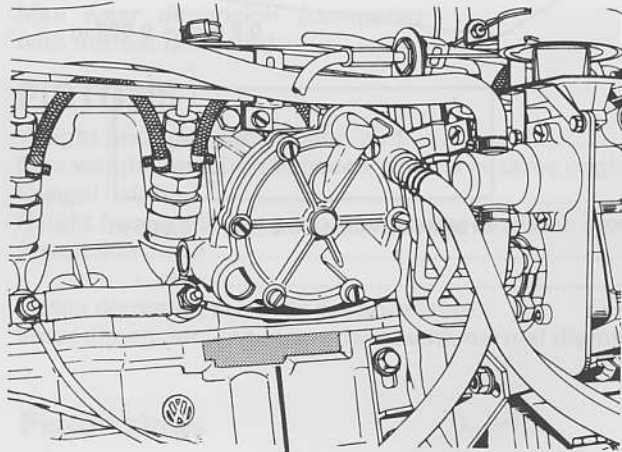
### Tightening torques

Two kinds of tightening torques will be found in this manual

1. Tighten to **40 Nm** (30 ft lbs) indicates that a torque wrench must be used for tightening.
2. Tightening torque 40 Nm (30 ft lbs) indicates a guide value. Tightening need not be done with a torque wrench.

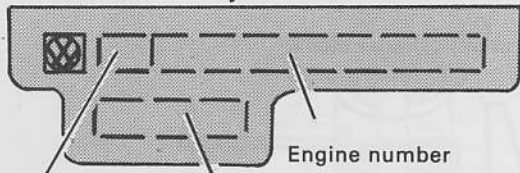
# Specifications

## Group 20 General



### Engine type designation and serial number

Stamped in left side of cylinder block beneath vacuum pump.



VOLVO type designation

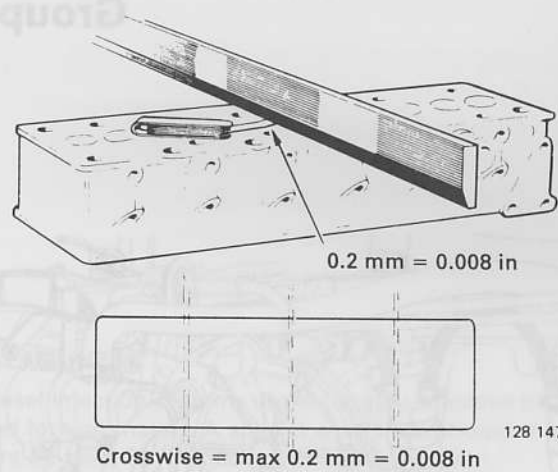
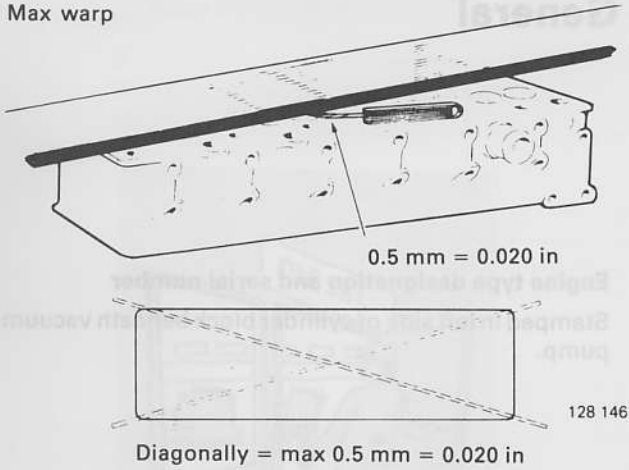
VW type designation

133 757

## Group 21 Engine block

### CYLINDER HEAD

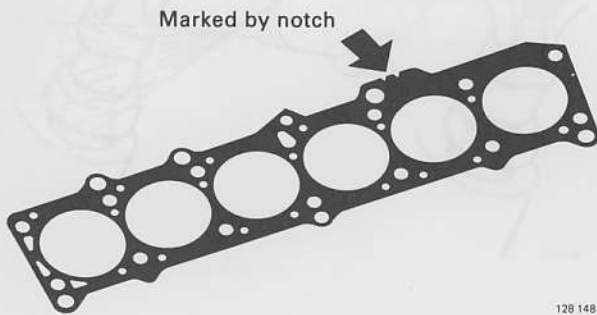
Max warp



Cylinder head may not be machined. It must be replaced if warp exceeds maximum.

### Cylinder head gasket

Three alternative gaskets are used depending on height of piston above cylinder block.



| Height of piston above cylinder block |             | notches | Gasket thickness |       |
|---------------------------------------|-------------|---------|------------------|-------|
| mm                                    | in          |         | mm               | in    |
| 0.67-0.80                             | 0.026-0.031 | 1       | 1.4              | 0.055 |
| 0.81-0.90                             | 0.032-0.035 | 2       | 1.5              | 0.059 |
| 0.91-1.02                             | 0.036-0.040 | 3       | 1.6              | 0.063 |

**Note!** Piston height in same engine must not extend over more than two classes. Piston height is measured at front and back of piston (along gudgeon/piston pin).

## CYLINDER BLOCK

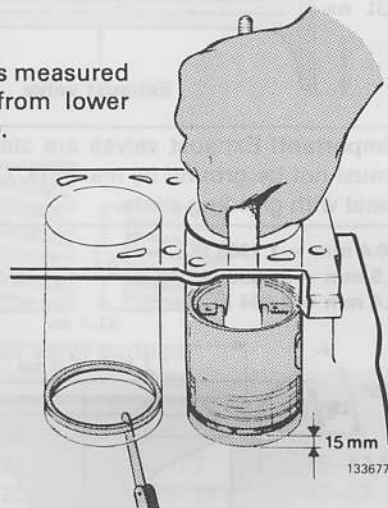
| Bore   | Marking              | Piston diameter |        | Cylinder bore |          |        |
|--|----------------------|-----------------|--------|---------------|----------|--------|
|  |                      | mm              | in     | mm            | in       |        |
| <b>Standard</b> .....                              | 651                  | 76.48           | 3.0110 | 76.51         | 3.0122   |        |
|  | 652                  | 76.49           | 3.0114 | 76.52         | 3.0125   |        |
|  | 653                  | 76.50           | 3.0118 | 76.53         | 3.0130   |        |
| <b>Oversize 1</b> .....                            | 676                  | 76.73           | 3.0209 | 76.76         | 3.0220   |        |
|  | (0.25 mm = 0.010 in) | 677             | 76.74  | 3.0212        | 76.77    | 3.0224 |
|  | 678                  | 76.75           | 3.0217 | 76.78         | 3.0228   |        |
| <b>Oversize 2</b> .....                            | 701                  | 76.98           | 3.0307 | 77.01         | 3.0318   |        |
|  | (0.50 mm = 0.020 in) | 702             | 76.99  | 3.0311        | 77.02    | 3.0322 |
|  | 703                  | 77.00           | 3.0315 | 77.03         | 3.0326   |        |
| <b>Oversize 3</b> .....                            | 751                  | 77.48           | 3.0504 | 77.51         | 3.0515   |        |
|  | (1.00 mm = 0.040 in) | 752             | 77.49  | 3.0508        | 77.52    | 3.0519 |
|  | 753                  | 77.50           | 3.0512 | 77.53         | 3.0523   |        |
| Max wear dimension (compared with normal diameter) |                      |                 |        | 0.04 mm       | 0.016 in |        |

## PISTONS

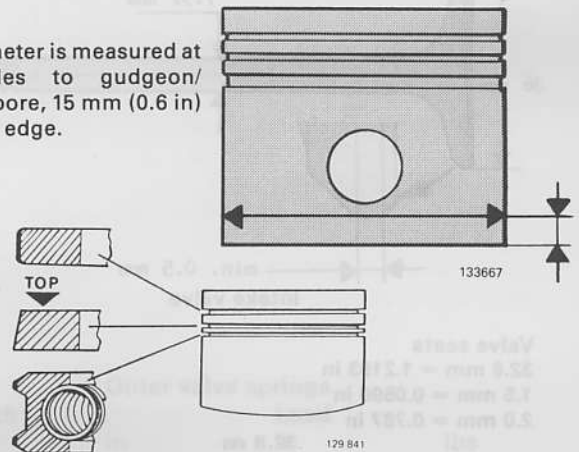
|   |                   |
|---|-------------------|
| Weight (incl. gudgeon/piston pin) .....                     | 455–465 grammes   |
| Max weight deviation between pistons in same engine .....   | 12 grammes        |
| Overall height .....  | 71.7 mm 2.8228 in |
| Height from gudgeon/piston pin center to piston crown ..... | 41.7 mm 1.6417 in |
| Piston float, new .....                                     | 0.03–0.05 mm      |
|   | max .....         |
| Piston diameter, see cylinder bore table                    |                   |
| Wear dimension, max (compared with normal diameter) .....   | 0.04 mm 0.0016 in |

## Piston rings

Piston ring gap is measured 15 mm (0.6 in from lower edge of cylinder).



Piston diameter is measured at right angles to gudgeon/piston pin bore, 15 mm (0.6 in) from lower edge.



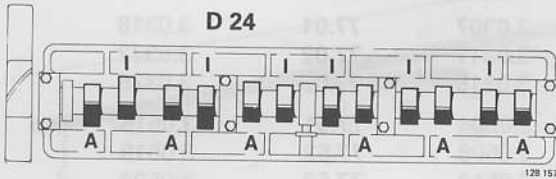
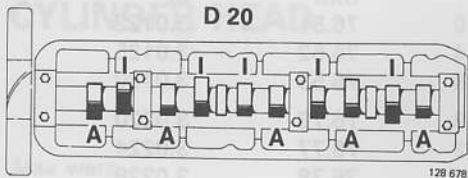
|  | Upper compression ring | Lower compression ring | Oil scraper ring |
|--|------------------------|------------------------|------------------|
| Ring thickness .....                                     | mm 1.730               | 1.980–1.990            | 2.975–2.990      |
|  | in 0.0681–0.0685       | 0.0780–0.0783          | 0.1171–0.1177    |
| Side clearance (measured with ring on piston), new ..... | mm 0.06–0.09           | 0.05–0.08              | 0.03–0.06        |
|  | in 0.0024–0.0035       | 0.0020–0.0031          | 0.0012–0.0024    |
|  | max .....              | mm 0.2                 | 0.15             |
|  | in 0.0079              | 0.0079                 | 0.0059           |
| Ring gap (measured in cylinder, see fig.), new .....     | mm 0.3–0.5             | 0.3–0.5                | 0.25–0.40        |
|  | in 0.012–0.020         | 0.012–0.020            | 0.0098–0.0157    |
|  | max .....              | mm 1.0                 | 1.0              |
|  | in 0.040               | 0.040                  | 0.040            |

## Gudgeon/piston pins

|                              |  |
|------------------------------|--|
| Fit, in connecting rod ..... | Light thumb pressure (close running fit) |
| in piston .....              | Thumb pressure (push fit)                |

## VALVE SYSTEM

### Valve clearances



Cold engine = engine at room temperature

I = intake valves  
 A = exhaust valves

Check/adjust valves in following order:

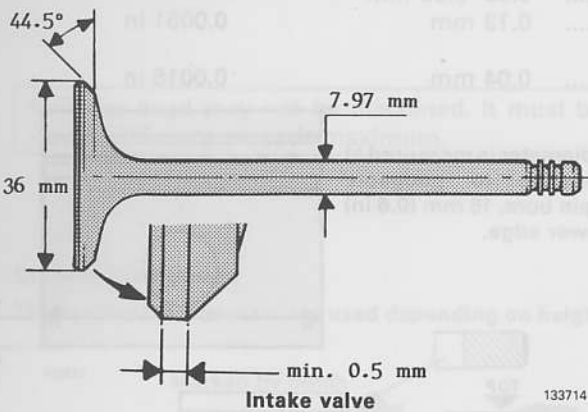
D 20 = 1-2-4-5-3  
 D 24 = 1-5-3-6-2-4

|                                  |   |             |      |       |
|----------------------------------|---|-------------|------|-------|
| Intake valve, warm engine .....  | 0.20-0.30   | 0.008-0.012 | 0.25 | 0.010 |
| cold engine .....                | 0.15-0.25   | 0.006-0.010 | 0.20 | 0.008 |
| Exhaust valve, warm engine ..... | 0.40-0.50   | 0.016-0.020 | 0.45 | 0.018 |
| cold engine .....                | 0.35-0.45   | 0.014-0.018 | 0.40 | 0.016 |
| Shims, thickness .....           | 3.00-4.25 at increments of 0.05 mm<br>0.012-0.167 at increments of 0.002 in |             |      |       |

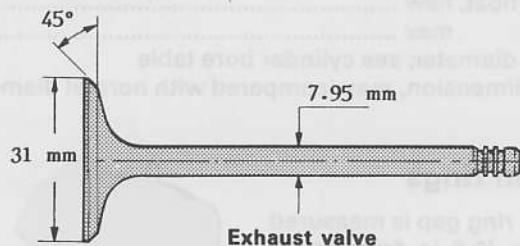
| Checking  |             | Setting |       |
|---|-------------|---------|-------|
| mm  | in          | mm      | in    |
| 0.20-0.30   | 0.008-0.012 | 0.25    | 0.010 |
| 0.15-0.25   | 0.006-0.010 | 0.20    | 0.008 |
| 0.40-0.50   | 0.016-0.020 | 0.45    | 0.018 |
| 0.35-0.45   | 0.014-0.018 | 0.40    | 0.016 |
| 3.00-4.25 at increments of 0.05 mm<br>0.012-0.167 at increments of 0.002 in |             |         |       |

#### Valves

7.97 mm = 0.3137 in  
 36 mm = 1.417 in 0.5 mm = 0.020 in



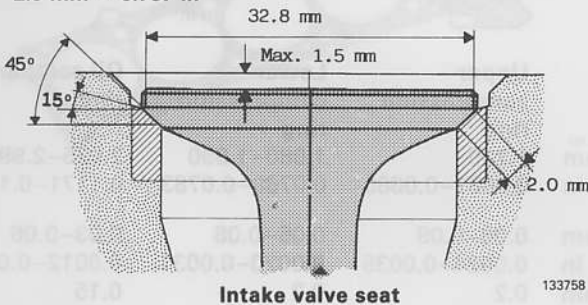
7.95 mm = 0.3129 in  
 31 mm = 1.22 in



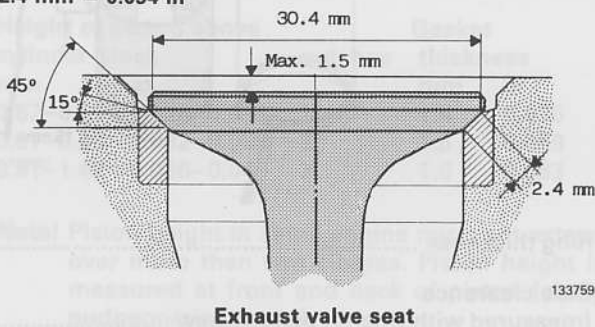
**Important!** Exhaust valves are stellite coated and must not be ground by machine. Grind-in valve on seat with grinding paste.

#### Valve seats

32.8 mm = 1.293 in  
 1.5 mm = 0.0590 in  
 2.0 mm = 0.787 in



30.4 mm = 1.1968 in  
 1.5 mm = 0.0590 in  
 2.4 mm = 0.094 in



|                                     | Intake           | Exhaust       |
|-------------------------------------|------------------|---------------|
| Valve seat diameter, standard ..... | mm 37.090-37.105 | 33.090-33.105 |
| in 1.4602-1.4608                    |                  | 1.3027-1.3033 |
| oversize 1 .....                    | mm 37.290-37.305 | 33.290-33.305 |
| in 1.4681-1.4687                    |                  | 1.3106-1.3112 |
| Seat width in cylinder head:        |                  |               |
| diameter, standard .....            | mm 37.000-37.016 | 33.000-33.016 |
| in 1.4566-1.4573                    |                  | 1.2992-1.2998 |
| oversize 1 .....                    | mm 37.200-37.216 | 33.200-33.216 |
| in 1.4645-1.4651                    |                  | 1.3070-1.3077 |