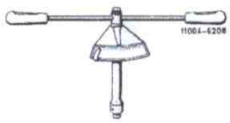
Test values

Engine	Injection nozzles Bosch designation	Opening pressure in bar gauge pressure[1]) (atü) new injection nozzles	used injection nozzles min
Standard version			
National version (AUS) (E) (J) (S) up to 1978, (USA) up to 1977, (ZA)			
615.912/941 616, 617	DNO SD 220	115–123 1668 - 1784 psi psi	100
	DNO SD 240[3])		
615.913/940	DNO SD 1510		
National version (S) starting 1979, (USA) starting 1978			
616 617	DNO SD 240[2])	115–123	100

[1]) The difference in opening pressure of injection nozzle within one engine should not exceed 5 bar gauge pressure (atü). 73 psi
[2]) Starting 1979 with rod-type filter.
[3]) Engine 616, 617 starting from power increase.

Tightening torques	Nm	(kpm)
Injection nozzles top and bottom	70–80	(7–8)

Special tools

Torque wrench 1/2" square, 40–130 Nm (4–13 kpm)		000 589 22 21 00
Socket 27 mm, 1/2" square for injection nozzle		001 589 65 09 00
Cleaning kit		000 589 00 68 00

Conventional tools

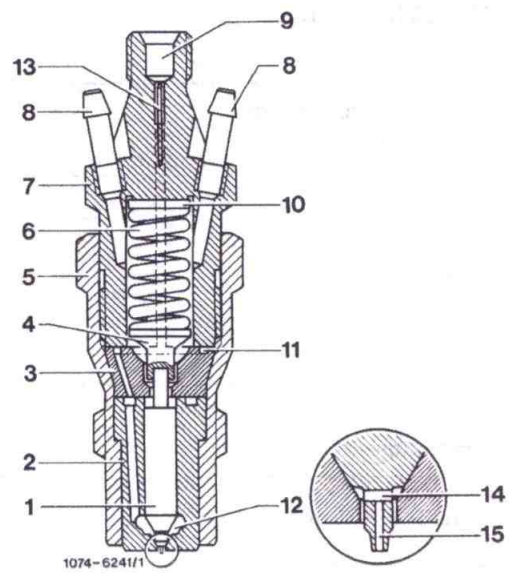
Tester EFEP 60 H	e.g. made by Bosch, D-7000 Stuttgart Order no. 0 681 200 502
Cleaning needle	e.g. made by Bosch, D-7000 Stuttgart Order no. KDEP 2900/3

Use only clean testing oil or filtered diesel fuel for testing. When testing a nozzle, **never move hand into jet of a nozzle.** Jet will deeply enter flesh and will destroy the tissue. Fuel entering into blood may cause blood poisoning.

Attention!
The shutoff valve of pressure gauge should remain closed during jet and buzzing test, since otherwise the pressure gauge may be damaged by wide deflection of needle.

The injection nozzle with Bosch designation DNO SD 240 is a perforated pintle nozzle. This nozzle differs from the pintle nozzle by a crosswise and lengthwise bore (14 and 15) in throttle pintle. In addition, a maintenance-free rod-type filter (13) is pressed into top of injection nozzle holder (7).

The advantage of a perforated pintle nozzle is better injection at reduced quantity and lower load, as well as a reduction of coking at ring gap.



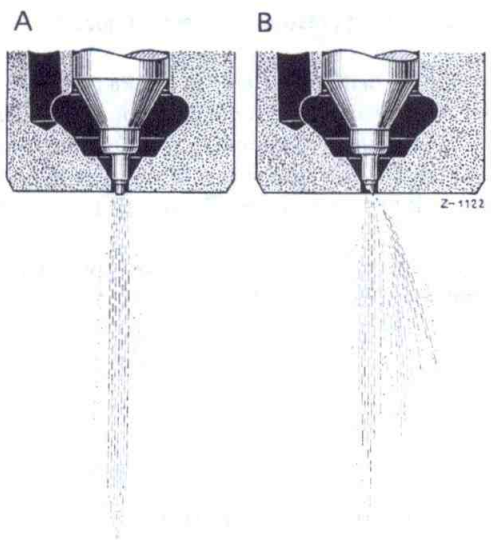
1 Nozzle needle
2 Nozzle body
3 Nozzle holder element
4 Pressure pin
5 Injection nozzle holder bottom
6 Compression spring
7 Injection nozzle holder top
8 Leak oil connection
9 Fuel feed
10 Steel washer
11 Ring groove and feed bores
12 Pressure chamber in nozzle body
13 Rod-type filter
14 Crosswise bore
15 Lengthwise bore

Testing

1 Remove injection nozzles (07.1–230).

2 Connect removed injection nozzle to tester. With pressure gauge **switched off**, plunge down energetically several times (approx. 6–8 downward movements/sec.). With a perfectly moving nozzle needle nozzle should buzz together with a high whistling sound.

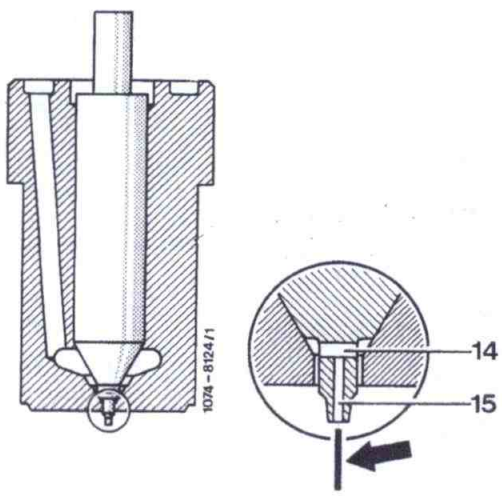
3 Jet test with shutoff valve closed. Insert injection nozzle into tester. At short, fast partial strokes (approx. 2 strokes per second) the jet should be rather concentrated and should break well. Individual drops, diagonal or diagonally broken jets, slightly wide jets are of no significance for combustion in engine.



A Good injection nozzle
Jet concentrated and well atomized
B Damaged injection nozzle
Jet too wide, streaky and not concentrated

4 Test longitudinal bore (15) in throttle pintle. At slow, uniform downward movement of hand lever (approx. 4–6 seconds per stroke) a distinct, vertical cord-like jet (arrow) should come out of longitudinal bore (15). If no cord-like jet comes out, check longitudinal bore with cleaning needle 0.13 mm dia for unobstructed passage. If the longitudinal bore is clear, the injection nozzle can be used again.

Note: Test procedure also applies to new injection nozzles.



14 Crosswise bore
15 Lengthwise bore

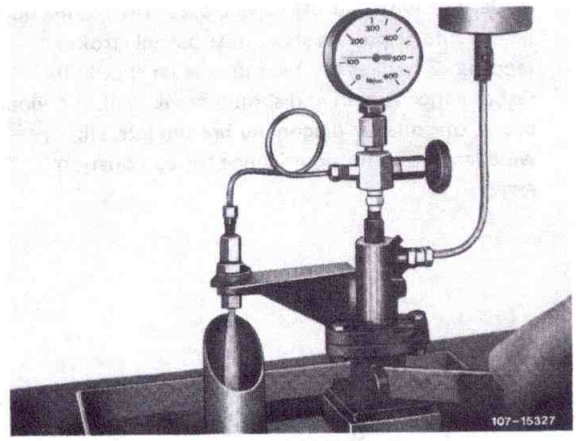
5 Buzzing test. Push hand lever **slowly** fully down **(approx. 1 stroke per second);** a damped buzzing of injection nozzle should be heard.

If the jet or the jet test are not in order, flush injection nozzle by means of several short, fast full strokes (2–3 strokes per second). The jet should be concentrated and emerge with a clearly heard, high whistling sound. Replace injection nozzle if required.

6 Test opening pressure of injection nozzle.

Slowly push hand lever down (1 stroke per second) with shutoff valve open. When ejection begins, read ejection pressure; injection nozzle should buzz distinctively. Set injection nozzle to specified ejection pressure (opening pressure), if required (07–137).

When removing injection nozzle, close shutoff valve, so that pressure gauge is not damaged.



7 Check injection nozzle for leaks.

With shutoff valve open, slowly push pump lever down up to ejection pressure. Release pump lever, ejection pressure should remain constant. In the event of leaks, disassemble injection nozzle, clean, assemble and adjust (07.1–137).