Regulator inspection checklist

Here are a few checks that everyone is capable of doing.
Items 1, 2, and 3 are just routine inspections that should only take a few minutes.
Items 4, 5, 6, and 8 should be performed before every dive and should only take a few minutes once you establish a routine.

1. Inspect for external corrosion or physical damage to any parts including hoses. Pay particular attention to the hose to fitting interface for any signs of damage.

2. Inspect the first stage inlet filter for discoloration, particulate matter or any other signs of water intrusion.

3. Check each hose connection to see that it is at least hand tight. It is an essential check after service or reassembly and a good check to make occasionally after that.

4. Next, watertight checks are also very easy to perform and check the integrity of the second stage housing. Connect the regulator to a tank and without turning on the air (or if you have a good tight dust cap you can use that instead) draw a breath on the second stage and hold it for a few seconds. Do not draw too hard as it will collapse the exhaust valves and cause a leak. Does the regulator hold vacuum? If so, then it is probably watertight. If the regulator fails this vacuum check you probably have a leak in the exhaust valve, the diaphragm or in one of the o-rings sealing the case or through a crack in the case itself.

5. Pressurize the regulator. Depress the purge slightly. If you have to depress it more than a very slight amount before airflow starts, the lever may be improperly adjusted, reducing the working range of the valve and the flow rate of the reg.

6. Check for air leaks by putting regulator on a tank and with the pressure on, first listen to any leaks, then turn the tank valve off but do not purge the reg. Note the SPG pressure and leaving it undisturbed come back in 5 or 10 minutes. The SPG pressure should be close to the original value. A drop of 200-400 psi is no big deal, but a large drop in pressure indicates something is leaking beyond the normal limits. If the leak is so fast you can see the needle drop just looking at it, the leak is probably large enough to warrant fixing before you dive.

7. To locate a leak, the definite answer comes by submerging all parts of the regulator in a water tub or similar container. Check the first stage, the second stages, the pressure gauge, and all the hoses with special attention to all the fittings. Check around any hose connections as well as all around the first stage and out the mouthpiece of all second stages for small bubbles.

8. Leave the regulator sit in a pressurized condition for a few minutes. If the second stage begins to free flowing slightly immediately after you stop inhaling from it, it is most likely in need of adjustment or annual service due to improper second stage orifice adjustment or excessive LP seat wear.

If the primary or octopus begins free flowing slightly a few seconds to a few minutes after you last breathed off it, it indicates IP creep - most commonly caused by a leaking HP seat or damaged first stage orifice.

9. Intermediate pressure check. Get a scuba regulator intermediate pressure gauge:
Tech Diver IP Gauge - Universal Inflator
Intermediate Pressure Gauge Plugs Into The BCD Quick Disconnect Hose
You can also put one together or your LDS may have one for sale.

Find out what the IP range should be for your regulator (most are ~ 135 +/- 10 psi.) Connect your regulator to a tank and open the tank valve. Connect the IP gauge to the LP inflator hose, and lightly press the purge a few times to "cycle" the regulator.

The intermediate pressure should dip whenever the air is flowing, and immediately return to the acceptable range and remain steady. If it tends to climb (creep) that indicates there is a problem with the first stage that must be corrected. It's not a bad idea to leave the regulator pressurized with the IP gauge connected for several minutes to check for slow IP creep.

It should be noted that the IP of balanced and non- balanced first stages react differently to changing tank pressures. Balanced first stages should keep a relatively constant IP over the entire range of tank pressure. Any significant changes in the IP indicate a first stage problem. The IP of non-balanced regs will vary up or down by several PSI as tank pressure varies, the amount and direction of the change varies with regulator design.

(Thank you Herman for the above; the important thing to keep in mind is the IP should not creep after lock up and be within the manufactures parameters.)

10. Another check is the cracking pressure of each second stage. Partially fill your kitchen sink and immerse the pressurized regulator with the mouthpiece up. Air should begin to flow before the regulator gets more than 1 1/2 inches deep. If the mouthpiece is submerged before the regulator starts to flow, the cracking pressure is probably too high.

11. A tiny bit more advanced, remove second stage diaphragm cover to inspect for any corrosion, damage, sand or any other contaminants. Clean sand and contaminants as necessary. On some regulators it is very easy to open and inspect second stages, but not all. It is a good idea to learn how to open your second stage to clean it. Note: If you do not feel comfortable opening up your second stage, this step can be omitted.

These simple checks can be done by anyone. They should be done prior to any dive trip, not to mention when new out of the box or after shop service.

Check early, check often.

Some very good sources of information:
Vance Harlow's (Oxyhacker on Scuba Board and elsewhere) "SCUBA Regulator Maintenance Repair."
SCUBA REGULATOR MAINTENANCE AND REPAIR by Vance Harlow
The Scuba Tools book, "Regulator Savvy" Scuba Tools