



Low Noise Faucet Design

Noise is what the ear processes as unwanted sounds. These sounds are transmitted in several ways, but first let us examine the structure of noise.

Noise is not just a single frequency (tone) but many frequencies heard at the same time. They are created by vibrations from some source. With plumbing the source is varied. We have the sound created by the water as it moves through pipes; the sounds that are "air bound" because of the pipes vibrating; and the combination of both transmitted through a media such as a wall.

Sound is measured as a "bel," a unit of measurement, but this is a volume level too high for practical use. So we use one-tenth of this unit, a decibel. A straight pin hitting the floor in a quiet room is about 3 decibels (or dBs). The smallest change the human ear can hear is 3 dB. 10 dB would be about the level of a soft whisper.

Sound is transmitted down the water pipe in a wall, then it comes to a brace. The brace absorbs some sound, reflects some sound back to the source and some sound continues down the pipe. In modern homes the pipe must be braced, but the bracing now acts as a transmitter to the wall and on into the room. Now we have sound from the pipe, wall and air, all at different tones (frequencies) coming into the room as noise.

The way to control this sound is not at the pipe, in the wall, or through the air, but to reduce it at the source. GROHE does this in three ways:

- 1) by using a heavy casting to dampen the noise before it is transmitted to the pipe;
- 2) by engineering the cartridge so it does not vibrate;
- 3) by controlling the velocity of the water in the water ways and mixing chamber to slow the flow and reduce turbulence that causes vibration.

Why bother? Because vibrations cause damage to working parts of the faucet and to pipe joints (causing leaks)...and because the privacy law in Germany requires it.

German standards call for all faucets of Class I to operate at less than 20 dB (at 45 psi) measured in a quiet room where the source of the noise is a specific distance away and coming through a wall. This means that if there is a common wall between you and your neighbor, you should not be able to hear a faucet running in the next apartment or hotel room.