Annoying Refrigerator Noises Become Less Mysterious
The acoustics behind the “popping” sounds of no-frost fridges
By Amber Williams  |  Feb 17, 2015

The buzzing. The whirring. The high-pitched ringing. Refrigerators could drive a person a bit mad, and they do: more than half of people who have a fridge are annoyed by its racket, according to a study by Korean engineers presented in 2006. One particularly irksome noise is unique to no-frost fridges: a popping sound that bursts into the room in spats when the home appliance’s compressor revs up. Researchers were uncertain as to the cause of these sounds, so mechanical engineers from MEF University and Istanbul Technical University, both in Turkey, launched a study to zero in on the audibles’ origins. First, they built their own stripped-down fridge as a testing rig. It contained only the necessary parts, including a compressor, fan, heater, evaporator and cooling pipes. With vibration sensors and microphones taped to the various parts, the team ran the components separately or in combination in different scenarios. They observed that the popping, or “cracking,” noises took place most frequently—and were loudest—when the heater was running, during the fridge’s defrost stage. No-frost fridges cycle between warming and cooling phases to prevent ice buildup. The team published its results in the March issue of *Applied Acoustics*.

More specifically, these bursts most likely occur during rapid temperature changes that cause contraction and expansion of metal and other materials in the heating panel that touch. It is called the “stick-slip” phenomenon, says David Bowen, director of the noise and vibration group at Acentech, an acoustics consulting firm in Cambridge, Mass. The ultimate culprit is friction: the parts “stick” to one another because of static friction but then suddenly “slip” by one another, which causes the panel to vibrate and radiate sound.

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The authors note that there are ways to reduce the popping, such as lowering the heating rate. Ultimately the bursts probably get past quality-assurance inspections because such sounds are difficult to quantify and qualify, Bowen says: “It’s a that-really-bothers-me type of noise.”

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