

# Up Close

Behind the Scenes with the Industry's Leading Innovators



## 6 KEY FEATURES OF SMART, FLEXIBLE DUCT

The experts at JPL know what it takes to install efficient flex duct.

By Russ Klettke

**B**efore the early 1960s, ductwork was largely installed with rigid sheet metal and a laborious installation process. A Fresno, California-based HVAC distributor, **John P. Lamborn, Sr.**, knew a good opportunity when he saw it. Seven-foot-long insulated flexible ducts were first manufactured with helical, Slinky-like wires supporting a mere one inch of fiberglass insulation with no inner liner, a vinyl vapor barrier, and factory-installed male and female sheet metal collars. Lamborn tinkered with the design, eventually adding his own changes and improvements on an innovation that changed the HVAC industry.

Nearly 60 years later, the company, **JPL**, continues to manufacture high-quality flex duct known for its sound attenuation and sustainable attributes as well as its contribution to indoor air quality. JPL gives great attention to proper flex duct installations, ensuring the best use of the product by educating and communicating these six important characteristics of properly installed flex ducts.

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### The Scope

## 0-4%

Friction rate when flex duct is fully stretched compared to improperly extended flex duct's rate of 30%

## 3/8-in

oversize inner core for easier handling by installers

## 53%

JPL partners with Owens Corning, whose insulation is made with a minimum 53% recycled glass content

**1 Proper corners.** A fundamental principle of flexible duct installation is that the path and configuration supports easy, smooth airflow with minimal frictional impediments to air pressure. This formula makes that clear: The bend radius (center line) has to be equal to or greater than the duct diameter.

JPL Engineer **Jason Shelton** explains this is well understood with experienced installers, but not always adhered to by inexperienced, inattentive, or third party installers. The "Flexible Duct Performance & Installation Standards" handbook (5th Edition) published by the **Air Diffusion Council (ADC)** provides detailed instructions in the proper methods of a quality flex duct installation.

**2 No snaking or sagging.** The Flexible Duct Performance & Installation Standards handbook—or the ADC Green Book—provides detailed warnings against snaking and sagging. Both add friction to airflow, reduce overall energy efficiency, and hurt cooling and heating efficacy and operating costs.

Snaking occurs when there are unnecessary directional changes in any plane that results in a pressure drop. This often happens due to improper duct layout, where the flexible duct is made to circumvent barriers or where installers fail to cut the product to the minimum length required.

Sagging is a deviation of distance in the flex duct (measured in inches per lineal foot) over a horizontal or inclined plane. It occurs due to an improper estimate of duct length relative to support hanger or saddle material. At a maximum, the sag should be half-inch per running foot between supports. If the duct run is particularly long and if it takes sharp (90 degree or greater) bends, additional supports can eliminate sag.

**3 Avoid compression.** Shelton says there is no excuse for compression of flexible ducts, nor is it acceptable. "When there is over-compression of outer insulation—when the saddle straps are too tight—it can compress the insulation and reduce the R-value of the flexible duct."

There's a second version of this problem known as longitudinal compression. The round, helical configuration of the flexible duct inner core allows

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it the flexibility that makes it easier and less costly to install, but it's possible to insufficiently stretch the flexible duct, which then increases the friction rate (slows the air flow). When the flex duct is fully (properly) stretched, the friction rate is 0-4%; improperly extended (compressed) and that friction rate can increase by up to 30%. Compression in this circumstance is easily fixed by taking the time to measure and cut the flex duct to the proper length.

### 4 Calculate materials and labor to understand true costs.

A good reason to consider flex duct is that it's less expensive than rigid sheet metal ductwork. The first cost savings of flexible duct allows contractors and their installers plenty of time to install flexible duct correctly.

As with all components of construction, materials and labor costs need to be considered. JPL's 3/8-inch oversize inner core enables easier handling by installers. JPL's insulation, inner core, and vapor barriers are manufactured to remain flush when dispensed from packaging; some brands separate and have to be realigned for proper installation.

One important step in installation, Shelton says, that shouldn't be shortchanged is a ductwork inspection before the drywall goes up. "A responsible contractor should do a walk-through to verify that the flex duct has been installed per industry standards."

### 5 Certify it has been tested for low VOCs.

The EPA estimates 90% of our time is spent indoors, and indoor air quality affects our health

and wellbeing. The agency warns how indoor air pollutants can be two to five times higher than outdoors. Pollutants may be from the building materials themselves, many of which contain VOCs. **GREENGUARD**, an independent third-party testing organization, tests for VOCs in building materials. JPL flexible ducts received the **GREENGUARD Gold Certification**, the highest achievable classification for improving indoor air quality. The standard looks for total VOC emissions and total chemical emissions (including from formaldehyde), using the same standards required by California's stringent Section 01350 from the state's Department of Public Health.

### 6 Certified proof of thermal resistance.

The minimum R-value for insulated ducts is R-4.2, according to ADC standards established in the early 1990s. JPL offers R-4.2, R-6, and R-8 levels of insulation on all of its insulated products. It also offers R-4.2 and R-8 thermal values on the JPL Manufactured Housing Flex Duct, a category many manufacturers don't address. An ADC seal of thermal performance certification is provided on the vapor barrier of insulated flex duct to indicate the thermal resistance of the product's insulation.

JPL partners with **Owens Corning**, a global leader of fiberglass insulation and related products in addition to providing excellent thermal performance (R-4.2, R-6, and R-8). OC flex duct media insulation is made with a minimum of 53% recycled glass content (31% pre- and 22% post-consumer). OC flex duct media is also made with a minimum of 99% by weight, natural materials consisting of minerals and plant-based compounds. ●

Flex duct from JPL is known for its sound attenuation and improved indoor air quality.

HOW TO GET IT

Find out more at [jplflex.com](http://jplflex.com).