

Blower Doors: a Subsidized Success

Sales of blower doors to weatherization agencies are skyrocketing, while sales to private contractors are falling off sharply.

The blower door, essentially a fan that fits temporarily into a door frame, is a useful tool for locating and sealing air leaks in a house. (See "Blower Doors: Infiltration is Where the Action is," *EA&R*, Mar/Apr 1986 for a description of how they work). A year ago, prospects for the blower door industry appeared bright ("A Healthy Outlook for the Blower Door Industry," *EA&R* May/June '86). At that time, there were 11 firms in the U.S. and Canada manufacturing blower doors, and the number of doors in use had increased 30 percent compared to the previous year.

Today, the outlook is less rosy. Although estimated sales of blower doors increased from 390 in 1985 to 730 in 1986, the market has shaken down to six blower door manufacturers. The manufacturers realize that they are not in an industry that will see open-ended growth. Says David Saum of Infiltec, a blower door manufacturer, "The blower door industry is not a growth business. There's a lot of price competition, but it's a technology that never caught on, and I don't think it's going to. It's kind of a dead end."

A Shifting Market

The reason for this pessimism is the fact that blower doors remain largely a subsidized item, used primarily by government and utility weatherization programs and their contractors. The average price of blower door systems has decreased significantly during the past 18 months, and it is now possible to get a high-quality, calibrated blower door for slightly more than \$1,000. (Table 1 is a buyer's guide to the blower door industry. It lists specifications and prices for the available models.) However, sales have increased in just one sector: weatherization agencies serving low-income housing. The percentage of sales to private energy contracting firms has plummeted in the past year.

"In general it's a bad time to get into the energy conservation business," says Jeff Shlegel of the Wisconsin Energy Conservation Corporation.

"I haven't seen contractors in the upper-midwest flocking to buy blower doors."

Brendan Reid of Retrotec, Inc., a Canadian manufacturer, reports that last year about 75 percent of his company's blower door sales were to contractors and 25 percent to government or utility weatherization programs. Today, private contractors account for just 50 percent of his sales. Two trends are at work, says Reid. "First, the low-income weatherization and utility program managers are starting to wake up to the reality that blower doors are essential to getting good results. At the same time, sales to contractors are dropping off nationally."

David Saum of Infiltec reports a similar trend. A year ago, roughly 30 percent of his sales were to private contractors. Today that figure has dropped to just 10 percent while nearly half of his sales are to weatherization agencies. "What worries me," says Saum, "is that the private sector really hasn't made anything of the blower door business. I don't want to be in a business that is dependent on government money."

The most striking aspect of today's blower door market is the wide-scale adoption of blower doors by agencies that perform energy conservation work under the Department of Energy's Weatherization Assistance Program (WAP) for low-income homes. The capabilities of most blower doors in use today go beyond the mere ability to detect leaks. A weatherization crew, using a calibrated blower door, can measure the leakiness of a house to within 10 percent and identify specific leakage sites using a blower door and a smokestick; then, after caulking and sealing the leaks, they can take another blower door measurement to verify their success. *EA&R* surveyed the lead weatherization agencies in all 50 states. The results show how popular blower doors have become in weatherization work (see Table 2).

In some states, every single weatherization agency uses the blower door exclusively for infiltration control. In other states, the blower

Table 1. Blower door specifications. EA&R surveyed the manufacturers of blower doors to get information on model availability, technical specifications, and price (see EA&R, Mar/Apr '86 for the previous table of blower door manufacturers). These represent the range of blower doors commercially available in the U.S. and Canada. There are also at least two Swedish firms, not included in this table, that manufacture and distribute blower doors for air infiltration work.

Manufacturer	Model	Type P/T	Opening size (in.)	Weight (lbs.) All/fan	Flow Range (CFM)	Accuracy§	Motor type AC/DC	List Price	Warranty (months)	Computer
AQL Vista Industrial Park, Bldg. 5 Spokane, WA 99206 (509) 325-4281	CARE	T	29 x 78 - 37 x 86	87/39	0-7,400	5%	DC,R	\$3,400	12	software incl. computer extra \$265-2200.
AQL	Cap Door	T	29 x 78 - 37 x 86	51/39	0-7,400	5%	DC,R	\$1,495	12	same as above
Eder Energy 7535 Halstead Dr. Mound, MN 55364 (612) 446-1559	CA-2	P	24 x 72 - 37 x 84	41/32	3,500‡	5%	AC/R	\$1,349	36**	optional Sharp w/out printer \$200 with printer \$300
Eder	CA-3	P	24 x 72 - 37 x 84	45/36	4,500‡	5%	AC/R	\$1,495	36**	same as above
Eder	SA-1	NA	24 x 72 - 37 x 84	33/24	2,600‡	NA	AC	\$1,095	36**	same as above
Infiltec P.O. Box 1533 Falls Church, VA 22041 (703) 820-7696	R-1	P	28 x 78 - 36 x 88	74/39	545-4750	5%	var AC	\$3,250	12	optional CFM reading
Infiltec	E-2	NA	28 x 78 - 36 x 88	83/45	500-4,500	10%	AC,R	\$2,250	12	built in, ACH display
Minneapolis Blower Door 920 West 53rd St. Minneapolis, MN 55419 (612) 827-1117	Minneapolis	P	24 x 48 - 40 x 94	53/34	40-6,000	10%†	var AC,R	\$1,250	12	Sharp 1261 with printer \$350
Retrotec Energy Innovations, Ltd. P.O. Box 5632, Station F Ottawa, ONT Canada K2C-3M1 (613) 723-2453	710***	P	29.5 x 78 - 36 x 86	120/38	30-5,500	5%	DC,R	\$5,995	24*	Sharp 2500 with 5 programs
Retrotec	720	P	29.5 x 78 - 36 x 86	91/38	15-4,750	5%	AC,R	\$3,250	24*	same as above
Retrotec	730	P	29.5 x 78 - 36 x 86	92/38	15-4,750	5%	AC,R	\$3,995§§	24*	same as above
Your Energy Systems 2204 Elliston, Suite F Nashville, TN 37203 (615) 329-9747	Y.E.S.	P	25 x 74 - 42 x 98	60/53	0-6,800	non-calib.	AC,R	\$1,300	12	NA

Notes:

§ Accuracy ratings can be deceptive. The accuracies listed here are reported by each manufacturer and do not specify the range at which the accuracy applies. Fans and gauges can vary the effect of calibration by 4 to 5 percent.

§§ Special discounts are available for low-income weatherization agencies.

* Six month warranty on computer.

** Warranty on fan and motor assembly.

*** Can add a second fan to either the 710 or 720 for commercial and industrial uses.

† Custom calibrated for \$300.

‡ Fan flow at free air.

door is used as a training tool, for quality control, or to guide the infiltration work of weatherization teams on a crew by crew basis. Lead weatherization agencies in each state seem to be evaluating their options and purchasing blower doors.

"The agency crews tend to fight the idea of a blower door," says Mike Eder of Eder Energy, a Minnesota-based blower door manufacturer. "They are reluctant to adopt a new technology. I know one supervisor who finally decided to buy a blower door over his crew's objections. Now the biggest problem at his agency is deciding who gets to take the blower door home at night."

The State of Wisconsin's weatherization program exemplifies the incorporation of blower door technology into a state-wide program. Three years ago none of the weatherization crews had a blower door, and few of the supervisors had ever heard of one. Now various agencies in the state have begun adopting the blower door to set priorities for their weatherization work. One third of Wisconsin's agencies will be using blower doors by the end of this year.

The crews use the results of blower door tests to set a target for the amount of infiltration work that should be done on a house. Kathy Ghandehari, acting chief of the Energy Services Section of the Wisconsin Department of Health and Social Services, explains why the State is adopting blower doors.

"Blower doors are a useful tool for locating and sealing the most obvious air leakage sites in a house. In addition, for some houses, there is a point beyond which you shouldn't spend any money on infiltration work, because you can't get the house down to a level that's readable. I'm a strong believer in the blower door as a tool to locate houses where it's not cost-effective to do infiltration work."

Field tests are now being conducted in two Wisconsin counties to measure the fuel savings from the weatherization program. There are two separate crews: one performs pre- and post- blower door tests and infiltration work, and the other crew installs insulation and evaluates the heating system.

In Montana, there are generally two crews (as well as an inspector) that visit each house. The first performs the basic audit and educates the occupants about energy conservation. The second crew evaluates the heating system and performs infiltration work.

"We use the blower door to find major thermal bypasses and air leaks," says Charlie Poole of the Montana Department of Social and Rehabilitation Services. "Occasionally, the crews will perform blower door tests to quantify how tight we're

getting the houses." Poole cites four major assets of using blower doors in the weatherization program:

- They help the crews quickly find and seal the worst air leaks.
- They lend credibility to both the program and the auditor.
- They have great educational value for the homeowner.
- They raise the level of self esteem among crew members in the weatherization program.

New Applications

Two new uses for blower doors were introduced in 1986: tightening houses to reduce entry of radon gas, and airtightness testing of rooms in

Blower Door Training

In our Mar/Apr '86 issue we mentioned a procedure being developed by the Energy Business Association in Seattle, Washington to certify the operators of blower doors. In June of this year, 55 people took a two-day training course in Seattle. Most of participants were from community action agencies, and some were from private firms. The certification consisted of three steps: a written test covering infiltration theory and blower doors; a set up test, to show familiarity with blower door operation; and determination of change in the effective leakage area (ELA) in a house when an orifice of known size was introduced. Sixteen of the twenty-four of the participants who took the certification tests passed all three.

The next training and certification course will take place following the "Housing for the 90s" conference in early November in Seattle. For more information contact Don Stevens, Energy Business Association, 420 Maritime Building, 911 Western Ave., Seattle, WA 98104. Tel: (206) 622-7171.

Training in the use of blower doors is also available at the National Thermal Performance Institute in Denver, Colorado. According to Scott Spiegle, the three- and five-day courses cover heat loss, air leakage, blower doors testing, leak location, infrared cameras, combustion and appliance testing, moisture movement, sealants and gaskets, and sealing techniques for new and existing homes. The next training course will be in St. Louis, November 12-14. Upcoming courses will be held in Pennsylvania, South Carolina, Seattle, and Oregon. For more information contact Scott Spiegle, NTPI, 7088 E. Dartmouth, Denver, CO 80224. Tel: (303) 759-4958.

Table 2. Survey of blower door use in the U.S. Department of Energy's Weatherization Assistance Program. EA&R surveyed the lead weatherization agencies in the Department of Energy's Weatherization Assistance program (WAP) in order to determine the extent to which the states are incorporating the blower door in the weatherization of low-income housing. The survey was conducted in August 1987, and the data were supplied by the project manager of the lead agency in each state. Key to level of interest column: 0) - no interest; 1A) - one blower door for each agency; 1B) - one blower door for each crew at each agency; 2) blower door shared between agencies; 3) blower door used by state in training and quality control.

State	Number of sub-grantees	Number of blower doors	Year bought first blower door	Level of interest	Comments
Alabama	35	0	—	0	
Alaska	6	10	87	1A	
Arizona	7	1	86	2	
Arkansas	22	1	85	3	Buying one for training.
California	65	0	—	—	
Colorado	23	19	85	2	
Connecticut	14	2	85	—	Do not use them in W.A.P.
Delaware	2	0	—	—	Pilot project may use blower doors and IR scanners.
District of Columbia	2	1	80	0	Will buy one for training and weatherization.
Florida	40	0	—	0	Not being considered.
Georgia	25	0	—	0	Not planning on buying them.
Hawaii	4	0	—	—	No use for them.
Idaho	9	10	85	1A	One third of audits must use them.
Illinois	36	5	83	2	
Indiana	26	7+	83	1A	
Iowa	19	0	—	—	Want to get one for every crew eventually.
Kansas	12	0	—	—	May get one this year for training.
Kentucky	26	1	83	3	
Louisiana	46	0	—	—	
Maine	11	6	83	3	Considering requiring their use.
Maryland	17	1	87	—	Pilot test to determine effectiveness.
Massachusetts	26	1	85	3	Not planning on using them.
Michigan	35	12+	86	—	Lead agency strongly recommends their use.
Minnesota	14	7	81	2	
Mississippi	21	0	—	—	Not planning on buying them.
Missouri	19	4	87	—	Every agency buying one this year.
Montana	10	18	85	1B	Used on every home audit.
Nebraska	9	0	—	—	Will buy one for training and weatherization.
Nevada	6	1	86	2	Buying another in September.
New Hampshire	6	2	85	2	
New Jersey	25	1	86	—	Fewer than 5% of audits use them.
New Mexico	17	0	—	—	
New York	97	14	85	—	Ten subgrantees use them.
North Carolina	46	0	—	—	Do not foresee using them soon.
North Dakota	7	10	79	1	
Ohio	61	16	84	2	Considering buying one per agency.
Oklahoma	21	0	—	—	Discussing the option.
Oregon	18	19	86	1	Used on every home audit.
Pennsylvania	48	2	85	—	Buying them for all subgrantees.
Rhode Island	10	0	—	—	Testing their effectiveness.
South Carolina	16	8	87	2	
South Dakota	5	14	85	1A	Used prior to most weatherization work.
Tennessee	21	0	—	—	Not planning on using them.
Texas	56	1	—	—	No plan to buy more.
Utah	10	29	—	1A	
Vermont	5	11	85	1A	
Virginia	30	75	86	1B	Each agency has at least one.
Washington	26	5	—	2	
West Virginia	19	0	—	—	Planning to expand use.
Wisconsin	24	24+	84	1	Computerized audit includes blower doors.
Wyoming	7	1	—	—	Used on every home audit.
TOTALS	1162	339			

commercial buildings that have Halon® gas systems for extinguishing fires.¹

Radon is an odorless, colorless gas that enters the house from the soil underneath a foundation, basement, or crawlspace (see the article and interview in this issue). During the past decade researchers have discovered that radon levels in some houses can build up to extremely high levels and that long-term exposure to these levels can cause lung cancer. Companies that test for radon levels and perform radon mitigation work are proliferating across the country. The most effective techniques for mitigating radon levels seem to be sub-slab ventilation systems that reduce the flow of radon from the soil; however, there may be a role for the blower door. In some cases a blower door may be used to identify and seal off air leaks between the underside and the living area of a house.

"We are getting a lot more inquiries than ever before about using the blower door as part of a radon reduction kit," says Gary Anderson of Minneapolis Blower Doors, a blower door manufacturer. "People are looking to make a business diagnosing and taking care of radon problems."

Blower doors are also being used to check the airtightness of computer rooms or rooms with

expensive equipment susceptible to water damage. These rooms often have expensive fire-extinguishing systems that employ Halon gas. The room must be almost completely free of air leaks for the system to work. Ordinarily, small quantities of Halon gas are used to test the airtightness of the room; however, blower door testing offers a much less expensive means of performing this test.

Blower Doors in 1988

The price of blower doors has dropped and sales have increased during the past year. Nevertheless, the manufacturers see a disturbing trend: the sales to private energy conservation firms have stagnated. Business will continue to be brisk for those firms that have an assured market: low-income weatherization firms.

Until the general public resumes an interest in energy conservation, however, it is unlikely that the blower door industry will expand. Quipped Gary Anderson of Minneapolis Blower Doors, "We're all hoping for an oil embargo to get people thinking about energy conservation."

Footnote

1. David Saum, Infiltec, Inc. Personal communication.

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