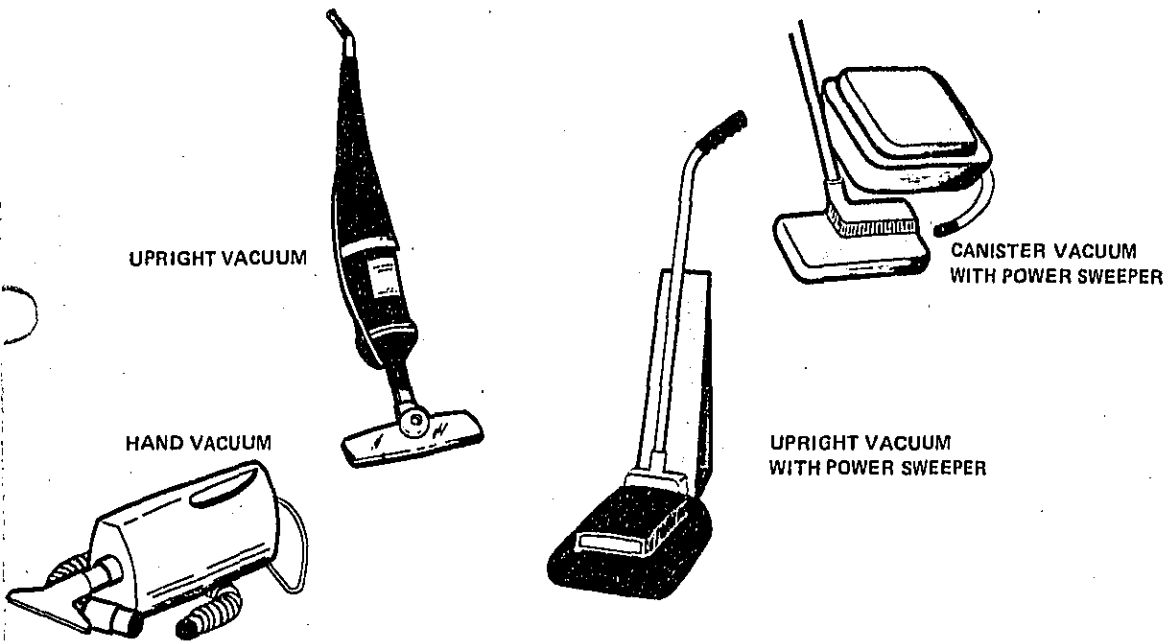


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PRODUCT INFORMATION SUPPLEMENT No.6
PRODUCT NOISE INFORMATION SERIES
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INFORMATION ON NOISE LEVELS, NOISE MEASUREMENT METHODS AND "BUY QUIET" EXPERIENCES ASSOCIATED WITH VACUUM CLEANERS



AN INFORMATION SUPPLEMENT FOR GOVERNMENTAL PURCHASING AGENTS IN DEVELOPING "BUY QUIET" PROGRAMS

THE NATIONAL INSTITUTE
OF
GOVERNMENTAL PURCHASING
1001 CONNECTICUT AVE. N.W.
WASHINGTON, D.C. 20036

Preface

This packet contains information for the use of government purchasing officers and other officials in purchasing quieter Vacuum Cleaners. It is a companion document to the Guide to Purchasing Quieter Products and Services¹ which describes in general terms how noise considerations can be incorporated into purchasing decisions. Together, these documents and others available through the Quiet Product Data Bank maintained by the National Institute of Governmental Purchasing (NIGP) can help you develop a "Buy Quiet" Program for your government.

1. Issued by NIGP, May 1980.

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INTRODUCTION

The "Buy Quiet" Program is a new concept in which governments cooperate with each other to buy quiet models of equipment. It is being extended with the help of the National Institute of Governmental Purchasing, the National League of Cities, other national organizations and various local and state agencies. This type of local noise control:

- . costs very little;
- . requires little additional effort;
- . begins the community quieting process;
- . establishes market pressures.

Surveys have shown that noise is the most frequently identified undesirable neighborhood condition in urban areas. Scientists and the medical profession now tell us that noise is no longer a mere irritant, but that in fact it has a very adverse impact on our health and well being. You as a purchasing officer can reduce noise in your community by the purchase of quieter products. State and local governments and large private organizations spend billions of dollars each year on equipment such as compactors, chain saws, typewriters, lawnmowers, trucks, motorcycles, pneumatic drills, and buses. If these governments can become more selective so as to purchase quieter products, cities and neighborhoods will be quieter.

Section 1. DESCRIPTION OF THE PRODUCT

The majority of vacuum cleaners can be classified as either canister or upright.

Canister vacuum cleaners consist of a tank (either horizontal or vertical) that provide suction, a connecting hose, and appropriate nozzles. Some recently manufactured canister units also have powered rotating brush attachments for cleaning carpets.

In addition to a motor-blower assembly, upright vacuum cleaners have a mechanism (either vibrating agitators or rolling brushes) that beats the carpet to bring dirt to the surface where it is sucked away.

Section 2. NOISE LEVEL OUTPUT INFORMATION

Definitions of Terms

NOISE: Any undesired sound.

SOUND LEVEL METER: An instrument, consisting of a microphone, an amplifier, an output meter, and frequency-weighted networks, that is used for the measurement of sound levels in a specified manner.

DECIBEL: The intensity of a sound often abbreviated dB. The decibel scale was devised to measure the smallest difference in sound which is detectable by the human ear. Its graduations move up not in a simple arithmetic progression but in a multiple progression based on logarithmic calculations. This means that each increase of one decibel represents a much larger change of intensity than might be expected. Because of the logarithmic progression of the decibel scale, an increase of ten decibels, for example, reflects a ten-fold increase in sound energy, but is perceived as being approximately twice as loud. Thus a sound which is measured at 80 dB contains ten times the sound output and is perceived as being twice as loud as a sound that is measured at 70 dB.

dB(A): An expression of sound level taking into account the response of the human ear to sound.

Noise Level Output Information - continued

Noise level information is given in Table 1. When using it, please note:

- 1) the noise level range given for commercially available models of the product is for use as a guide only. It is not a definitive statement of noise measurements taken on all models currently available. Lower noise levels, for some models, are likely to be found.
- 2) when making comparisons among the noise levels of different products, it is very important that a single noise measurement method¹ is used. If this is not adhered to, very different noise levels will result and comparisons which are made may not be meaningful. Thus, in the chart the range of noise levels is expressed using one method from the known ones that are listed, to insure consistency when comparing noise level information. Selection of that particular method in no way constitutes NIGP endorsement of that method.
- 3) the table implies nothing in terms of product pricing. A quieter product does not necessarily cost more; in many cases, it may be less.

Measurement Procedures

Sound level measurement procedures generally prescribe instrumentation (e.g., the type of sound level meter to be used, other devices required), a description of the test site and measurement zone, a description of equipment operation (e.g. traveling on stationary mode, rpm setting), how measurements are to be made (e.g., setting of sound level meter, height and location of microphones), and general requirements (e.g., such as who should select testing equipment and conduct the tests).

1. See discussion in Section 3.

TABLE 1. VACUUM CLEANER NOISE DATA SUMMARY

Category	Approximate Range of Noise Levels	Noise Measurement Methods
1) Canister Model	62 - 85 dBA ¹	Although no "final" method has been yet developed, the following may be used:
2) Upright Model	62 - 85 dBA ¹	The <u>International Electrotechnical Commission Draft Proposal for determination of airborne acoustical noise emitted by electrical appliances for household and similar purposes, Part 5: Test code for Noise Measurements on Vacuum Cleaners. (Technical Committee No. 59: Performance of Household Electrical Appliances, Working Group No. 2: Acoustical Noises).</u>

¹ Measured uniformly at operator's position but not using a standard noise measurement methodology such as the one listed at the right.

Section 3. PREPARATION OF THE PRODUCT SPECIFICATION

A good specification for any product will identify minimum performance and design requirements; list the reproducible test methods that may be used to determine compliance with these requirements; allow competitive bidding; permit an equitable contract award at the lowest possible evaluated price.

Therefore, a government seeking to purchase a quieter product should be sure that its specification describes a product that can be bid at a reasonable price by at least two, and preferably, three or more suppliers.

Noise Level Specification

The noise level portion of the product specification should contain the following three elements.

1. A maximum noise level referenced to a single measurement methodology.
2. A verification requirement, and
3. An incentive for offering products quieter than the maximum level established.

Maximum Noise Level

The maximum level should be low enough to disqualify the noisiest models on the market but high enough to insure competition among 2 or more suppliers.

In the absence of a recommended level from NIGP, a buyer should feel comfortable in using a level roughly midpoint in the range of noise levels presented in Table 1.

Section 3. Preparation of the Product Specification - Continued

Including Sound Level Measurement Procedures in the Specifications

A buyer must reference a reproducible sound level measurement procedure whenever it specifies a noise level requirement or any other performance requirement. For example, the noise level requirement in a specification for a quieter vacuum cleaner might say:

NOISE LEVEL: Noise level shall not exceed __ decibels (A Scale) when measured in accordance with the International Electrotechnical Commission Draft Proposal for determination of airborne acoustical noise emitted by electrical appliances and similar purposes, Part 5: TEST code for noise measurements on vacuum cleaners.

A copy of the complete specification will be available in the near future from NIGP.

Verifying Compliance With Specifications

There are at least two ways that governments can assure themselves that they have been offered or sold products which conform to specified requirements. One involves laboratory and field testing. The other involves vendor submission of "certified" test data.

In some instances, it may be necessary for the government or its agent (e.g., a commercial laboratory) to actually test items when they are submitted for evaluation or when received after purchase. In most instances, however, it is more practical for the government to ask a vendor to submit, with his bid, an approved third-party's written certification that the vendor's product conforms with a specified requirement. There are hundreds of private sector laboratories which could be approved to perform testing and certification services for manufacturers.

If a buyer must actually test the noise levels of product models offered in response to a "noise-conscious" invitation for bids, he or she should contact the Buy Quiet Program director at the NIGP national office for assistance, who may be able to arrange for essential testing through various cooperative programs.

INCENTIVES FOR QUIETER PRODUCTS

Section 4. A SUGGESTED METHOD OF CONTRACT AWARD

NIGP has developed an optimal method of contract award which allows a buyer to encourage a bidder to offer a product that is even quieter than required by the specification. In effect, it tells the bidder: "For each decibel¹ that your product is quieter than the loudest product bid (in conformance with the specification), we will subtract a fixed percentage of the average actual bid price from your actual bid price. The difference will be your evaluated bid price."

Evaluated bid prices, rather than actual bid prices, are compared in the selection of the contract recipient. As in Life Cycle Costing, the bidder with the lowest actual bid price may not necessarily be the bidder with the lowest "evaluated" bid price.

To insure against paying an excessive premium for increased quietness, buyers using this optimal method of contract award can state:

The purchaser will not pay a contract price more than X% in total above the average of the actual bid prices.² This amount represents the maximum additional amount that the government is willing to pay above the average actual bid price, for each quieter product.

1. Usually (but not always) A scale. A few product methodologies may use the C scale.
2. Not to be confused with the per decibel incentive in the formula.

Formula For Determining
Evaluated Bid Price

The formula for determining the Evaluated Bid Price (EBP) is:

$$EBP = P - Y\% (P_{AV}) (N_N - N) \text{ where:}$$

EBP = Evaluated Bid Price

P = Actual Bid Price

Y% = The percentage weight designated by the purchasing activity to "reward" the bidder for each decibel that his model is quieter than the noisier model bids.

P_{AV} = Average (actual) bid price of all models bid in response to the IFB

N_N = The noise level (in decibels) of the noisiest model bid in response to the IFB

N = The noise level (in decibels) of the model whose EBP is being determined

Sample Bid Tabulations

In order to illustrate the working of the formula the bid tabulations for a purchase of quieter product X might look like this:

BIDDERS:

Bidder	Actual Bid Price	Noise Level (dBA)	(EBP)	Evaluated Bid Price:
(A) Smith Co.	\$145.00	76		\$145.00
(B) Robert Co.	\$154.00	75		\$151.02
(C) Jones Co.	\$147.00	72		\$135.08
(D) Watkins Co.	\$150.00	71		\$135.10

Calculation of Evaluated Bid Price (EBP)

Assuming that the Purchasing Activity used a 2% "reward" factor for each decibel of increased quietness, the EBP for each bidder would be determined as follows:

(A) Smith Co.
 $EBP = \$145. - .02 (\$149) (76-76)$
 $= \$145. - \$2.98 (0)$
 $= \$145.$

(B) Roberts Co.
 $EBP = \$154. - .02 (\$149) (76-75)$
 $= \$154. - \$2.98 (1)$
 $= \$151.02$

Calculation of Evaluated Bid Price (EBP) continued.

(C) Jones Co.
EBP = \$147. - .02 (\$149) (76-72)
= \$147. - \$2.98 (4)
= \$147. - \$11.92
= \$135.08

(B) Watkins Co.
EBP = \$150. - .02 (\$149) (76-71)
= \$150. - \$2.98 (5)
= \$150. - \$14.90
= \$135.10

Contract Award

Based on an evaluated bid price (EBP) of \$135.08, the contract should be awarded to Jones Co. (bidder "C") at its actual bid price of \$147 per unit for furnishing quieter product X with a (maximum) noise level of 72 decibels (A Scale).

Appendix A

Vacuum Cleaner Manufacturers

Air-Way Sanitizor, Inc.
Toledo, Ohio 43601

Allegretti & Co.
Chatsworth, California 91311

American Hardware Supply Co.
Butler, Pennsylvania 16001

Arkay Electromatic Corporation
Bronx, New York 10401

Bissel Incorporated
Grand Rapids, Michigan 49501

Black and Decker Mfg. Co.
Towson, Maryland 21204

Bon-Aire, Division of Lear Seigler Inc.
Compton, California 90223

Central Quality Industries, Inc.
Polo, Illinois 61064

Certified Chemical and Equipment Co.
Cleveland, Ohio 44101

Clarke Division, Clarke-Gravelly Corp.
Muskegon, Michigan 49401

Dayton Electric Mfg. Co.
Chicago, Illinois 60601

Decker Mfg. Co.
Keokua, Iowa 52632

Desco Appliance Inc.
Brooklyn, New York 11201

Douglas Division
The Scott and Fetzer Corp.
Bronson, Michigan 49028

Electrolux Division
Consolidated Foods Corporation
51 Forest Avenue
Old Greenwich, Connecticut 06870

Eureka Company
Division of National Union Electric Co.
Bloomington, Illinois 61701

Farnam Coys, Inc.
Phoenix, Arizona 85001

Federal Vacuum Co., Inc.
Ridgewood, New Jersey 07401

Fighton Inc.
Rochester, New York 14601

Filtex, Division Nater Mfg. Corp.
Temple City, California 91780

Fingerhut Mfg. Co.
Minnetonka, Minnesota 55343

The Firestone Tire & Rubber Co.
Akron, Ohio 44301

Flicker Vacuum Mfg., Inc.
Linden, New Jersey 07036

GCL Mercantile Corp.
Division of Chaptex International
Hawthorne, New Jersey 07501

Glenburn Corporation
Little Ferry, New Jersey 07643

Hardware Wholesales, Inc.
Fort Wayne, Indiana 46801

Health-Mor, Inc.
203 North Wabash Avenue
Chicago, Illinois 6060

The Hoover Company
101 East Maple
North Canton, Ohio 44720

Household Research Institute
San Leandro, California 94577

Interstate Engineering
Division of A-T-O, Inc.
Anaheim, California 92801

Jet Line Products, Inc.
Mathews, North Carolina 28105

Kirby Company Division
The Scott & Fetzer Company
1920 West 114 Street
Cleveland, Ohio 44102

Maxi-Vac Manufacturing Company
PO Bos 482
Palantine, Illinois 60067

McCraw Edition Co.
Bersted Mfg. Division
Broomville, Missouri 55919

Metropolitan Vacuum Cleaner Co., Inc.
Suffren, New York 10901

Miller Falls Co.
Greenfield, California 93927

Nobles Industries, Inc.
St. Paul, Minnesota 55101

Oreck Corporation
Stamford, Connecticut 06901

Pacific Floor Machine Mfg. Co.
South San Francisco, California 94080

Premier Electric Company
1734 Ivanhoe Road
Cleveland, Ohio 44110

Pullman Vacuum Cleaners
Division of Purex Corportation, Ltd.
Malden, California

Ranger Die Casting Co.
Lynwood, California 90262

The Regina Company
313 Regina Avenue
Rahway, New Jersey 07065

Rexair Inc.
Cadillac, Michigan 49601

Royal Appliance Manufacturing Co.
650 Alpha Drive
Highland Heights, Ohio 44143

Sanyo Electric Company
Compton, California 90233

Shelton Products, Inc.
Shelton, Connecticut 06484

Shop-Vac Corp.
Williamsport, Pennsylvania 17701

The Singer Company
PO Box 1110
Anderson, South Carolina 29621

Southwest Manufacturers and Distributors, Inc.
Fort Worth, Texas 76101

Star for Parts Inc.
Denver, Colorado 80201

Sunbeam Appliances Co.
Division of Sunbeam Corp.
Chicago, Illinois 60601

Tevis Campbell Corp.
South Pasadena, California 91030

Thompson & Sons, Inc.
Lyons, Illinois 60534

The Triangle Corporation
127 West Taylor
Grant Park, Illinois 60940

Universal Corps., Inc.
Alliance, Ohio 44601

Vac-U-Way, Inc.
Toledo, Ohio 43601

Versa Tool Mfg. Co., Inc.
Racine, Wisconsin 53401

Walton Products, Inc.
Atlantic, Iowa 50022

Whirlpool Corporation
PO Box 3380
St. Paul, Minnesota 55164

White Store Inc.
Witchita Falls, Texas 76301

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APPENDIX B

Governments Known to Have Had Buy Quiet
Experiences Associated With Vacuum Cleaners

The Buy Quiet concept is new and the program is just starting. It should not be surprising, therefore, that the NIGP Data Bank, as yet, has no experiences to report for these products. When experiences become known to us, the governments will be listed in this section.

June 1980

APPENDIX C

Sources of Additional Information

Information on any aspect of the Buy Quiet Program is available from:

Director
Buy Quiet Program
National Institute of
Governmental Purchasing, Inc.
1001 Connecticut Avenue, N.W.
Suite 922
Washington, DC 20036
Tel: 202/331-1357

For additional information on technical and programmatic matters relating to product noise, you may wish to contact your local or State noise control official.