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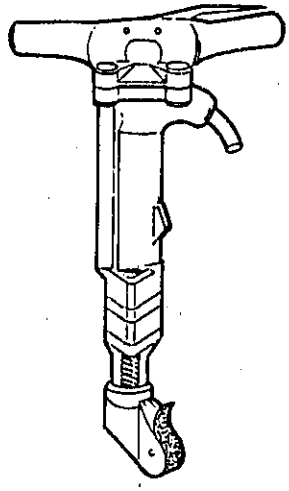
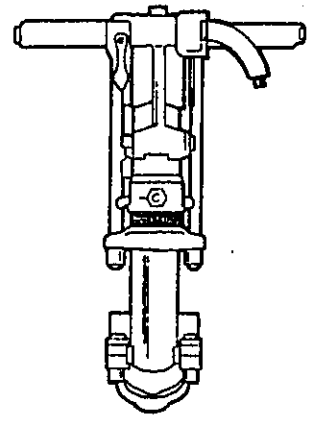
Buy Quiet

PRODUCT INFORMATION SUPPLEMENT No. 4
PRODUCT NOISE INFORMATION SERIES
JUNE, 1980

INFORMATION ON NOISE LEVELS, NOISE MEASUREMENT METHODS AND "BUY QUIET" EXPERIENCES ASSOCIATED WITH PAVEMENT BREAKERS AND ROCK DRILLS



PORTABLE PAVEMENT BREAKER



PORTABLE ROCK DRILL

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 Pavement Breakers and Rock Drills. It is a companion document to the Guide to Purchasing Quieter Products and Services[1] 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.

CONTENTS

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 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.

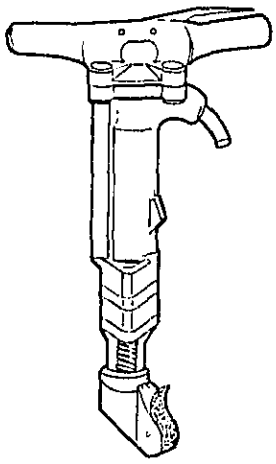
Section 1. DESCRIPTION OF THE PRODUCT

A pavement breaker is defined as any power driven portable or mounted impacting (percussive) mechanism that is fitted with an accessory tool to break up or otherwise demolish concrete (see pictures-Figure 1.)

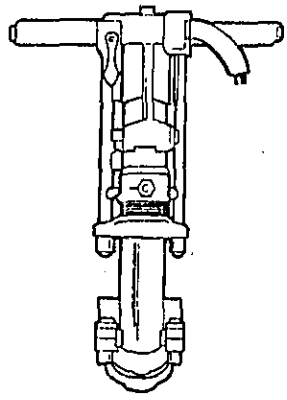
A rock drill is defined as any power driven portable or mounted impacting (percussive) mechanism containing an integral or independent drill rod rotating mechanism that is fitted with a drill rod and bit to create a hole in a hard brittle material (rock)(see pictures-Figure 1.)

Pavement breakers and impact rock drills are similiar in construction. The major difference between the two is that the rock drill rotates its bit while impacting and pavement breakers do not.

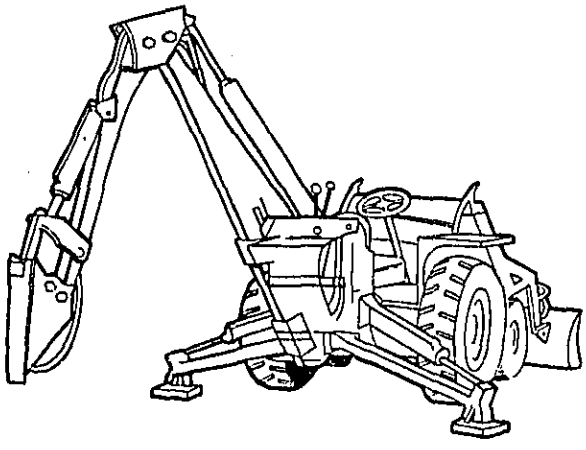
Pavement breakers and rock drills may be classified according to their mounts: portable or mounted. Further categorization is employed using the weight of the tool (e.g., light, medium, and heavy), the type of accessory attached to the tool, and the power source. These categorizations are indicated in Tables 1 and 2.



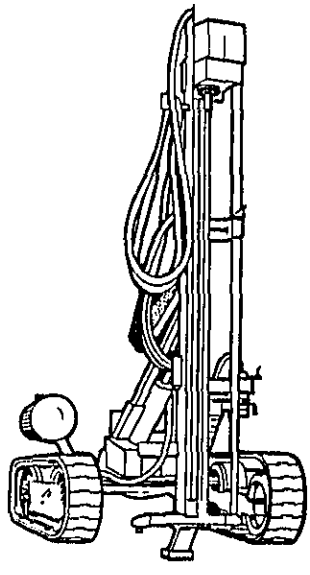
PORTABLE PAVEMENT BREAKER



PORTABLE ROCK DRILL



MOUNTED PAVEMENT BREAKER ON A WHEEL TRACTOR



MOUNTED ROCK DRILL

Figure 1. Pavement Breakers and Rock Drills

TABLE 1
PAVING BREAKER USES BY CATEGORIES

1. PORTABLE	
A. LIGHT	Trimming and close quarter work; floors, light paving, masonry breakage.
B. MEDIUM	Light concrete, frozen ground or gravel, average pavement work.
C. HEAVY	Concrete paving, foundations, trenching in hard ground, boulder breakage.
2. MOUNTED	Heavy duty splitting, demolition, and excavation.

TABLE 2
ROCK DRILL USES BY CATEGORIES

1. PORTABLE	
A. SINKERS (portable rock drill designed primarily to drill holes vertically downward)	Hitch cutting, drilling anchor holes, rock excavation, low volume blastholes.
B. FREED LEG DRILLS (same rock drill as sinker but fitted with a support shaft)	Horizontal deep hole drilling where mounted drills are inaccessible.
C. STOPPERS (rock drill fitted with a feed leg to drill up into a rock ceiling)	Steep angle drilling, roof bolting.
2. MOUNTED	Trenching, foundation preparation, general excavation, general blasthole drilling.

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.

dBA: 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 method[1] 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.

4) the table does not distinguish the sound levels of muffled breakers and drills from those of un-muffled breakers and drills. The sound levels of certain standard models may be significantly reduced, at the discretion of the user, by attaching an optional muffler designed by the manufacturer.

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 3. PAVEMENT BREAKERS/ROCK DRILLS

NOISE DATA SUMMARY

CATEGORY	APPROXIMATE RANGE OF NOISE LEVELS[1] (AT 7 METERS)	APPROXIMATE PERCENTAGE OF MODELS BELOW A GIVEN SOUND LEVEL							NOISE MEASUREMENT METHODS
		10%	30%	40%	50% (Median)	60%	70%	90%	
1) Portable Pneumatic Pavement Breakers	80 dBA - 95 dBA	83 dBa	85 dBA	86 dBA	87 dBA	88 dBA	89 dBA	92 dBA	CAGI - PNEUROP test code for the measurement of sound from pneumatic equipment
2) Mounted Pavement Breakers	85 dBA - 105 dBA	90 dBA	92 dBA	92 dBA	92 dBA	93 dBA	93 dBA	96 dBA	
3) Portable Rock Drills	80 dBA - 105 dBA	86 dBA	93 dBA	95 dBA	96 dBA	96 dBA	98 dBA	103 dBA	
4) Mounted Rock Drills	90 dBA - 105 dBA	96 dBA	100 dBA	101 dBA	102 dBA	102 dBA	103 dBA	105 dBA	

1. At 7 meters using CAGI - PNEUROP test. Levels at operator's ear would be much higher. As noted previously, the table does not distinguish the sound levels of muffled breakers and drills from those of un-muffled breakers and drills.

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 reference 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 Specifications-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 pavement breaker or rock drill might say:

> NOISE LEVEL: Noise level shall not exceed __ decibels (A Scale) when measured in accordance with the CAGI-PNEUROP test code for the measurement of sound from pneumatic equipment.

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.

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 decibel[1] 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:

$EBP = P - Y\% (P_{AV}) (N_N N)$ 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) con't.

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

(D) 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

MANUFACTURERS OF ROCK DRILLS AND PAVEMENT BREAKERS

Abema, Inc.
129 Glover Avenue
Norwalk, Conn. 06954

Allied Steel & Tractor
19200 Cranwood Parkway
Cleveland, Ohio 44128

American Jenbach Corp.
Box 817
1523 Bowman Avenue
Burlington, N.C.

American Pneumatic Tool Co.
120 S. 190 Street
Gardena, CA 90247

Atlas Copco, Inc.
70 Demarest Drive
Wayne, N.J. 07470

Black & Decker
701 E. Joppa Road
Towson, MD 21204

Robert Bosch Corp.
2800 South 25th Avenue
Broad View, Ill. 60153

Chicago-Pneumatic Tool Co.
Orchard & Howard Streets
Franklin, Pa. 16323

Construction Technology, Inc.
90 Madison Street
Denver, Colo. 80201

Fairmont Hydraulics
Div. of Fairmont Railway
1260 Virginia Drive
Fort Washington, Pa. 19304

Guest Industries
215 Route 10
Dover, N.J. 07801

Hughes Tool Co.
5425 Polk Street
Houston, TX 77001

Ingersoll-Rand Co.
Phillipsburg, N.J.
08865

Jaeger Machine Co.
550 W. Spring Street
Columbus, Ohio 43216

Joy Manufacturing Co.
River Road
Claremont, N.H. 03743

Kent Air Tool Co.
711 Lake Street
Kent, Ohio 44240

LeRoi Division
Dresser Industries,
Inc.
N. Main & Russell Road
Sidney, Ohio 45363

MacDonald Air Tool Co.
60 Worth Street
Hackensack, N.J.

Milwaukee Electric Tool
Corp.
13135 W. Lisbon Road
Brookfield, Wis. 53005

New England Carbide Tool
Co., Inc.
Industrial Park
Peabody, Mass. 01960

Rockwell International
Power Tool Division
400 N. Lexington Ave.
Pittsburgh, Pa. 15208

Schramm, Inc.
800 E. Virginia Ave.
West Chester, Pa. 19380

Skil Corporation
5033 N. Elston Ave.
Chicago, Ill. 60630

Gordon Smith & Co., Inc.
Box 1240
Bowling Green, Ky. 42101

Stanley Hydraulic Tools
Div. of Stanley Works
13770 S.E. Ambler Road
Clackamas, OR 97015

Sullair Corp.
3700 E. Michigan Blvd.
Michigan City, Ind. 46360

Thor Power Tool Co.
175 N. State Street
Aurora, Ill. 60507

Tramac Corp.
40 Old Camplain Road
Somerville, N.J. 08876

Wacker Corp.
3808 W. Elm Street
PO Box 09402
Milwaukee, Wis. 53209

Widder Corp.
No. 1 Depot Plaza S
Mamaroneck, N.Y.

MANUFACTURERS OF ROCK DRILLS AND PAVEMENT BREAKERS (CONTINUED)

Gardner-Denver Co.
PO Box 1020
Denver, Colo. 80201

Racine Construction Tool Co.
2200 South Street
Racine, Wis. 53404

Quincy Compressor Div.
217 Main Street
Quincy, Ill. 62301

Worthington Compressors, Inc.
37 Appleton Street
Box 431
Holyoke, Mass. 01040

Grimmer-Schmidt Corp.
Box 342
Franklin, Ind. 46131

June 1980

APPENDIX B

Governments Known to Have Had Buy Quiet
Experiences Associated With
Pavement Breakers and Rock Drills

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.