ENGINEER REPORT

Water Hammer Arresters

Sioux Chief

MANUFACTURING SINCE 1957

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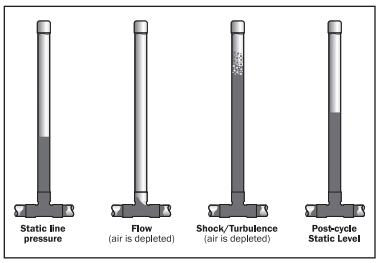
What is water hammer?

Although water hammer is a subject usually left up to plumbing engineers, the effects of water hammer must be dealt with every day by plumbing contractors everywhere. Water hammer is easily recognized by the banging or thumping noise that's heard when valves are shut off. Although this is an easy way to recognize the problem, water hammer doesn't always make these telltale noises.

Water hammer occurs when the flow of moving water is suddenly stopped by a closing valve. This sudden stop results in a tremendous spike of pressure behind the valve which acts like a tiny explosion inside the pipe. This pressure spike reverberates throughout the plumbing system, rattling and shaking pipes, until it is absorbed. Normally, a sufficient pocket of air will absorb such a pressure spike, but if no pocket of air is present, expensive fixtures and appliances within the plumbing system will be damaged as they are left to absorb this pressure spike.

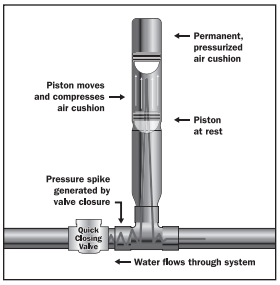
Why air chambers don't work

It used to be thought that an air chamber, or capped stand pipe, was an effective solution to controlling water hammer. However, within an air chamber, nothing separates the air from the water. It only takes a few short weeks before the air is absorbed into the water, leaving the air chamber waterlogged and completely ineffective. Laboratory tests confirm that the air is depleted by simple air permeation and by interaction between static pressure and flow pressure. In the diagram shown, (right) notice the difference in water level between "Static Line Pressure" and "Post-cycle Static Level."



Controlling water hammer

The most effective means of controlling water hammer is a measured, compressible cushion of air which is permanently separated from the water system. Sioux Chief arresters employ a pressurized cushion of air and a two o-ring piston, which permanently separates this air cushion from the water system. When the valve closes and the water flow is suddenly stopped, the pressure spike pushes the piston up the arrester chamber against the pressurized cushion of air. The air cushion in the arrester reacts instantly, absorbing the pressure spike that causes water hammer. Although arresters are typically tested to 10,000 cycles, Sioux Chief arresters have been independently lab tested to withstand 500,000 cycles without failure. All Sioux Chief arresters are guaranteed to control water hammer for the lifetime of the plumbing system.



National model codes

Both major National Model Codes require water hammer control in all residential and commercial water supply systems. Since 1997, both the Uniform Plumbing Code (UPC) sponsored by the International Association of Plumbing and Mechanical Officials (IAPMO) and the International Plumbing Code (IPC) sponsored by the International Code Council (ICC) have required water hammer control on all quick-closing valves. The AA arrester (Mini-Rester) is by far the most common approved device that satisfies these codes. Plain air chambers do NOT satisfy the requirements of either code. Many states across the country are now enforcing these arrester requirements, while many more are in the process of doing the same. With the Mini-Rester, code officials now realize proper water hammer control is permanent, affordable, and very feasible, even for residential applications.

Arrester testing and certification

The ANSI/ASSE 1010 test procedure has been developed to provide the industry with a standard method of rating arresters, and to estab-

lish a minimum standard for their design with respect to their function in the system. The testing methods simulate real-world conditions and provide reproducible results so that any engineered water hammer arrester can be tested for compliance with the standard. Seven categories have been established to cover the normal range of sizes required to protect the water distribution system of any plumbing system. Each arrester to be tested shall be installed in the test facility, and shall use the corresponding size test pipe. The table below lists each arrester size along with its corresponding test parameters under which each must qualify.

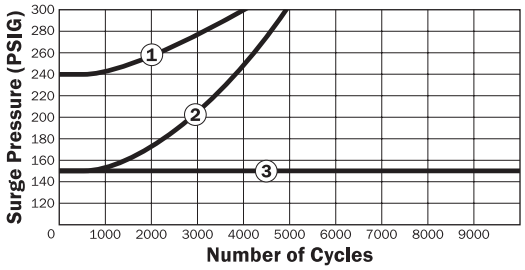
Arrester Size	Pipe Size	Pipe Length	Total Pressure without Arrester	Reduced Pressure with Arrester
AA	½"	50 ft	250 PSIG	150 PSIG
A	½"	50 ft	400 PSIG	150 PSIG
B	¾"	50 ft	400 PSIG	150 PSIG
C	1"	50 ft	400 PSIG	150 PSIG
D	1¼"	50 ft	400 PSIG	150 PSIG
E	1½"	50 ft	400 PSIG	150 PSIG
F	2"	50 ft	400 PSIG	150 PSIG

TEST PROCEDURE

As the testing procedure begins, the ball valve on the test rig is closed and the rig's pump fills the test system with water. The piping on the test rig is fully supported to avoid any uneven areas where air may be trapped in the pipe. Pressure gauges, valves and fittings are all purged of air. The arrester being tested is then filled with water in the inverted position and capped with a thin plate. Then with the plate held firmly in place, it is rotated upright and placed on the open end of the ball valve. The plate is slipped out from between the arrester and the ball valve, and the arrester is threaded securely into the ball valve.

The test rig's pump then begins to circulate water through the system. Using a pressure gauge attached to the test system, supply valves are adjusted to obtain the approximate flow rate required to generate a pressure spike of 340 PSIG and a flow pressure of 60 PSIG. Final adjustments are made to the water flow to obtain a total pressure of 400 PSIG (340 PSIG pressure spike with 60 PSIG flow). The ball valve is then open and the arrester is exposed to the test system pressure. The maximum total pressure is recorded for five cycles after the system temperature has stabilized. The average of these five readings is used for certification.

Endurance tests are done on one representative arrester from each of the categories that were performance tested, and must be of the same basic design and construction as those that were performance tested. Test arresters are installed in the same manner as described for the performance test. The test arrester shall be subjected to 5,000 cycles (pressure spikes) with water at ambient temperature. The same unit shall be subjected to an additional 5,000 cycles with water at 180°F minimum. The maximum total pressure shall be recorded after the 5,000th and 10,000th cycle. The average of these readings shall be used for certification.



Curve 1 represents a common air chamber, which is 24" long and one pipe size larger that the line served. Initially, it limited the pressure spike to approximately 240 PSIG before eventually failing.

Curve 2 represents a calculated air chamber, which initially limited the pressure spike to approximately 145 PSIG before eventually failing.

Curve 3 represents the performance of an engineered water hammer arrester which limited the pressure spike to 150 PSIG and maintained its control for 10,000 cycles of testing.

Although the duration of the above test was 10,000 cycles, some well designed arresters have endured testing under equal conditions through 500,000 cycles of shock, and continued to successfully control the pressure spike at 150 PSIG or less.

Arrester sizing and placement

Choosing the correct size arrester needed to effectively control water hammer can be a complicated and sometimes difficult task. In any system there are many variables that affect the amount of water hammer that is generated, and therefore needs controlling. Further, each arrester size has

a different capacity to control water hammer. The following symbols have been devised to denote the range in sizes for water hammer arresters.
Arrester Sizes: AA, A, B, C, D, E, F

DETERMINING SIZE BY FIXTURE UNIT

Fixture	Type of Supply Control	Fixture Units					
		Public			Private		
		Total	C.W.	H.W.	Total	C.W.	H.W.
Water Closet	Flush Valve	10	10	–	6	6	–
Water Closet	Flush Tank	5	5	–	3	3	–
Pedestal Urinal	Flush Valve	10	10	–	–	–	–
Stall or Wall Urinal	Flush Valve	5	5	–	–	–	–
Stall or Wall Urinal	Flush Tank	3	3	–	–	–	–
Lavatory	Faucet	2	1½	1½	1	1	1
Bathtub	Faucet	4	2	3	2	1½	1½
Shower Head	Mixing Valve	4	2	3	2	1	2
Bathroom Group	Flush Valve Closet	–	–	–	8	8	3
Bathroom Group	Flush Tank Closet	–	–	–	6	6	3
Separate Shower	Mixing Valve	–	–	–	2	1	2
Service Sink	Faucet	3	3	3	–	–	–
Laundry Tubs (1-3)	Faucet	–	–	–	3	3	3
Combination Fixture	Faucet	–	–	–	3	3	3

One method of sizing, based on "fixture-units" is a good way to choose the correct size arrester, because it is quick, accurate and well-known. The National Plumbing Code offers this definition of fixture unit: "A fixture-unit is a quantity in terms of which the load producing effects on the plumbing system of different kinds of plumbing fixtures are expressed on some arbitrarily chosen scale." The fixture unit values shown in the table below represent the standard ratings used by engineers to size water distribution systems as well as water hammer arresters.

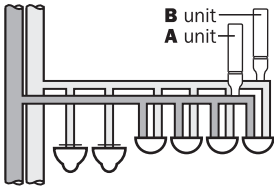
"Public" fixtures, as referred to in the table above, are fixtures found in public rest rooms, office buildings, and other places where each fixture is open and accessible for use at all times. "Private" fixtures are those in residential areas not freely accessible such as in private homes, residential apartments, hotel guest rooms and the like.

MULTIPLE FIXTURE BRANCH LINES

Arrester Size	AA	A	B	C	D	E	F
Fixture Units	1-4	5-11	12-32	33-60	61-113	114-154	155-330

On many types of applications, a single arrester must serve multiple fixtures. In these cases, the total fixture units should be determined for all the fixtures served by the branch line where the arrester is to be placed. Once the fixture units for the branch line have been totaled, choose the appropriate arrester by matching fixture units in the table (above) to the arrester size with the corresponding fixture unit capacity.

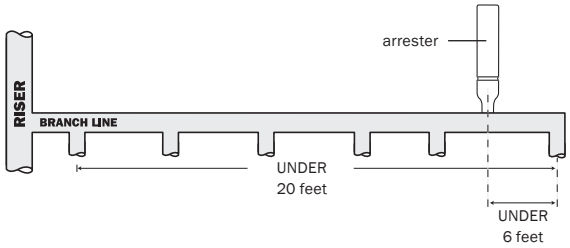
If the total number of fixture units has a fraction, it should be rounded to the next larger, whole number. In addition, if the flow pressure at the fixture exceeds 65 PSIG, the next larger size water hammer arrester should be used.



ARRESTER PLACEMENT ON MULTI-FIXTURE BRANCH LINES

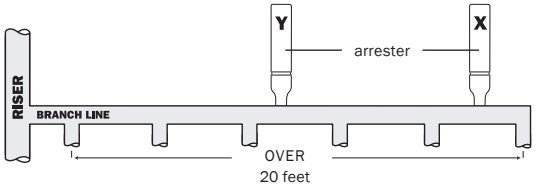
Once the correct size arrester has been determined, the final concern is the placement of the arrester within the system. The placement of the arrester depends on the length of the branch line it is to be installed on, which can be divided into two cases which are described below:

Branch Lines of 20 Feet or Less



Place arrester at the end of the branch line within six feet of the last fixture served, as illustrated above.

Branch Lines over 20 Feet



An additional arrester (Y) should be placed at the midpoint of the branch line. The sum of the fixture unit ratings of units X and Y combined, shall be equal to or greater than the demand of all branches.

Excerpts from articles written by:

Julius Ballanco, P.E., Plumbing Engineer

for *Plumbing & Mechanical* and *Plumbing Standards* magazines

Question: You constantly pick on air chambers in a water piping system, I have installed them for years, because the inspector makes me, and I don't seem to have any problems. Are you just blowing us a bunch of smoke, or is there really something to all of your comments?

Answer: I am not blowing smoke; air chambers do not work.

At last year's Plumbing Engineering Show, (ASPE '94) one of the water hammer arrester manufacturers had a demonstration showing the effectiveness of water hammer arresters. They had a ball valve to isolate the arrester. First, they would close off the water hammer arrester and throw the quick closing valve. The demonstration stand would bang so loud that you could hear it throughout the entire show. Then they repeated the demonstration with the water hammer arrester. You didn't hear a thing with the water hammer arrester in place.

I challenged the company to install an air chamber in the apparatus rather than the water hammer arrester. They took me up on the challenge. The air chamber did work in protecting the system. But only the first four times. By the fifth time, the quick closing valve was activated and the shock pressure exceeded 150 PSI–the established acceptable limit for a water hammer shock wave. As the water continued to fill the air chamber, the shock wave pressure continued to rise. All of this within a few minutes.[1]

It must be recognized by the plumbing profession that air chambers do not provide any level of control against water hammer. While many of the plumbing codes require air chambers, such requirements do not provide adequate water hammer control. Most plumbing codes, including every model plumbing code, permit water hammer to be controlled, using water hammer arresters. If water hammer control is necessary, the only available option is the use of water hammer arresters. AIR CHAMBERS DO NOT WORK.[2]

Size AA water hammer arresters have a ½" connection and are rated for pressure surges to 250 PSI. The size AA arrester can thus be used in plumbing systems piped in ½" and ¾" copper tubing. While most of the manufacturers list the arrester as being an individual fixture arrester, the size AA arrester can be located, similarly to other water hammer arresters, to serve more than one fixture.[2]

1 Reprinted with permission, *Plumbing & Mechanical*: Jan. 1996

2 Reprinted with permission, *Plumbing Standards*: Dec. 1995

Arrester sizing equation

The formula below was developed by Sioux Chief as an alternative to the Fixture Unit method of sizing arresters. Many water hammer applications do not involve the types of fixtures shown in the Fixture Unit table; and some involve flow pressures or pipe sizes that are outside the typical range. In these situations, the formula shown below can be used to select the correct size arrester for any given system.

$$C = \frac{1.5 \times L \times V^2}{D^2 \times (F + 14.7) \times Y}$$

L = Effective pipe length (in feet)
V = Change in Velocity (in gallons per minute)
D = I.D. of pipe (in inches)
F = Flow pressure (PSIG)
Y = A function of M/F (see graph, facing page)
M = Maximum allowable pressure (PSIG)
C = Required arrester capacity (in cubic inches)

EXAMPLE

Description of System

L *length of pipe* = 50 feet. This is the effective pipe length of the branch line serving the hammering valve. This is where the energy is. As the same flow goes through larger pipes such as the main trunk line, the energy calculates to be very low and inconsequential.

D *pipe size* = 1". Try to use the actual I.D. of the pipe if possible. The nominal size of the pipe will get you close to the right answer, but the actual I.D. size will be more accurate.

V *change in velocity* = 18 GPM. We can usually assume that our initial flow rate (18 GPM) is equal to the change in velocity because when we shut off a valve completely, the resultant velocity is always 0. Thus, 18 - 0 = 18. However, if the valve does not completely shut off, and the velocity changes from 20 GPM to 5 GPM, **V** would then equal 20 - 5 = 15 GPM. This is the most critical factor in the formula, and usually the most difficult to get on an existing installation.

F *flow pressure* = 60 PSIG. This variable is the gauge pressure at the valve when the valve is on. In the formula, we add 14.7 PSI (atmospheric pressure) to the gauge pressure to convert it to absolute or $\mathbf{F_A}$.

M *maximum allowable pressure* = 150 PSIG. This variable represents the pressure to which the sized arrester will limit the shock. It can vary depending on input from the plumber or yourself, but 150 PSIG is generally used because most plumbing equipment is rated at 150 PSIG. Also we have observed little or no water hammer noise at this level. In the formula, we add 14.7 PSI (atmospheric pressure) to the gauge pressure to convert it to absolute or $\mathbf{M_A}$.

FORMULA CALCULATIONS

First we should calculate for the Y Factor. This variable answers the question "What is the maximum allowable pressure in relationship to the flow pressure? Is it twice as much? To determine this you must divide the maximum allowable pressure (remember to add 14.7 to convert **M** to $\mathbf{M_A}$) by the flow pressure (remember to add 14.7 to convert **F** to $\mathbf{F_A}$).

$M_A / F_A = (150 + 14.7) / (60 + 14.7) = 2.2$
$M_A / F_A = 2.2$

Next, look at the graph (on facing page) and find the intersection of **2.2** and the **Y** curve. Follow that point straight down to the X axis to read **35**. In this example, **Y = 35**.

Now that you have all the variables, do the original calculation:

$$C = \frac{1.5 \times 50 \times 18^2}{1^2 \times (60 + 14.7) \times 35}$$

$$C = 9.29 \text{ in}^3$$

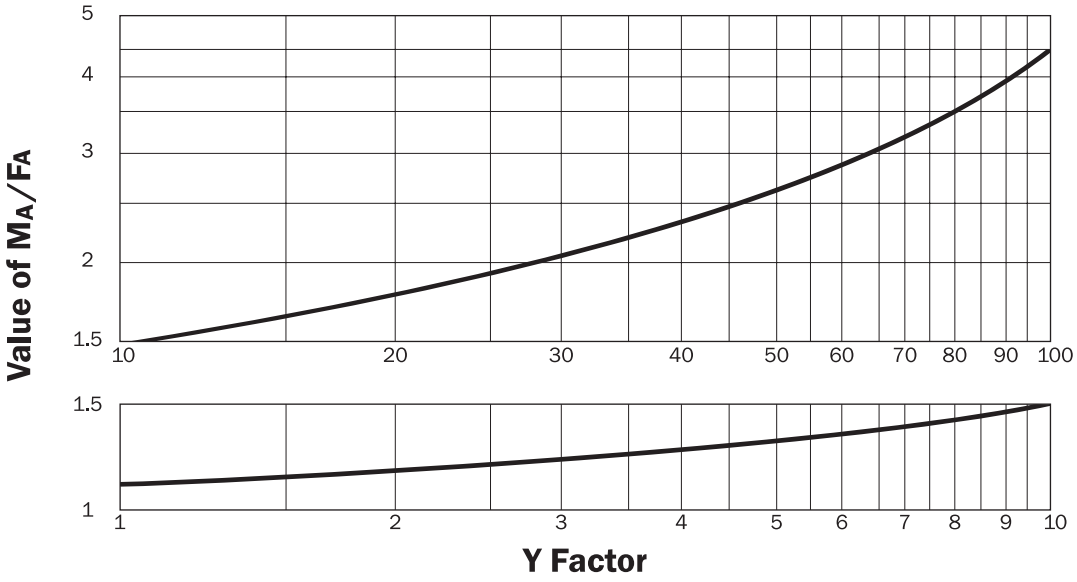
ARRESTER SIZING AND SELECTION

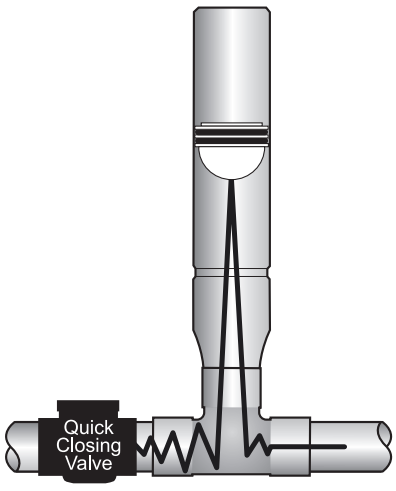
To choose an arrester that is as large or larger than the calculated volume required. Refer to the cubic inch volume chart of any Sioux Chief arrester brochure or catalog, or the specifications table on the Submittal Sheet (page 16). In this example, a Sioux Chief No. 654-C Hydra-Rester with an 11 cubic inch capacity would be the proper choice.

Arrester Sizing Equation

$$C = \frac{1.5 \times L \times V^2}{D^2 \times (F + 14.7) \times Y}$$

L = Effective pipe length (in feet)
V = Change in velocity (in gallons per minute)
D = I.D. of pipe (in inches)
F = Flow pressure (PSIG)
Y = A function of M/F (see graph, facing page)
M = Maximum allowable pressure (PSIG)
C = Required arrester capacity (in cubic inches)





American Society of Sanitary Engineering

FOR PLUMBING AND SANITARY RESEARCH

This certifies that **Sioux Chief Manufacturing Co.** is authorized to display the ASSE Seal on its

Product **Water Hammer Arrester**

Model **652A, 653B, 654C, 655D, 656E, 657F, 660SB, 660-T22**

Description

File # 800

in the manner and under the conditions stated herein and any supplemental description sheets, in accordance with

ASSE Standard Number **1010-1996(ANSI-1998)** Testing Laboratory **SGS US Testing**

This authorization is issued for one (1) year from date hereon and is renewable annually for a period of five (5) years.

The ASSE Seal (Conformity Assessment Mark) displayed on a product indicates that the product has been tested at an ASSE approved testing laboratory, and is found to be in compliance with an adopted ASSE standard that the manufacturers and this Society have found practical, workable and acceptable.

The American Society of Sanitary Engineering has created the Seal Control Program to encourage improvements in plumbing products and systems in the interests of greater protection of public health and safety.

ASSE

Date June 1, 2000 Chairman

ASSE Seal Control Board

American Society of Sanitary Engineering

SEAL AUTHORIZATION
CERTIFICATE OF RENEWAL

Prevention Rather Than Cure

AMERICAN SOCIETY OF SANITARY ENGINEERING
for Plumbing and Sanitary Research

This certifies that Sioux Chief is authorized to display the A.S.S.E. Seal on its

Product Water Hammer Arrester

Model 660-2

Description AA size

in the manner and under the conditions stated herein and any supplemental description sheets, in accordance with

A.S.S.E. Standard Number 1010-1996 Testing Laboratory SGS US Testing Company

This authorization is issued for one (1) year from date hereon and is renewable annually for a period of five (5) years.

The A.S.S.E. Seal displayed on a product indicates that the product has been tested at an A.S.S.E. approved testing lab and found to be in compliance with an adopted A.S.S.E. standard that the manufacturers and this Society have found practical, workable and acceptable.

The American Society of Sanitary Engineering has created the Seal Control Program to encourage improvements in plumbing products and systems in the interests of greater protection of public health and safety.

Date October 14, 1996 Chairman A.S.S.E. Seal Control Board

American Society of Sanitary Engineering

SEAL AUTHORIZATION
CERTIFICATE OF RENEWAL

Prevention Rather Than Cure

Sioux Chief Manufacturing
Technical Report #1097
Water Hammer Arresters

10 SUBJECT: HYDRA-RESTER & MINI-RESTER WATER HAMMER ARRESTER
NO ACCESS PANEL NEEDED

The American Society of Sanitary Engineering (ASSE) defines their standard 1010 as: "Engineered Water Hammer Arrester having a cushion of air or gas permanently sealed in the unit, and designed to provide continuous protection, without maintenance, against excessive surge pressure." More simply stated, an arrester that bears the ASSE seal must be totally maintenance free. This automatically excludes air chambers or any field rechargeable shock arrester. The ASSE tests are based on those of the Plumbing and Drainage Institute (PDI) and conducted on PDI testing equipment.

The Sioux Chief Hydra-Rester and Mini-Rester water hammer arresters have been tested and are found to be in compliance with the ANSI/ASSE-1010-1996 Revision.

On the average, a plumbing contractor will spend approximately thirty minutes on an access panel. Obviously, if access panels are not otherwise specified, most contractors will require an arrester approved by ASSE. Eliminating access panels saves the plumbing contractor time and cuts product and labor costs.

The Hydra-Rester and Mini-Rester are designed with cold-formed, spin-closed ends and have no welded seams for two basic reasons: (1) an air charge cannot be depleted through a seam which does not exist and, (2) labor costs are kept down with a much more efficient and cost effective manufacturing process. Many manufacturers still employ the welding or soldering process which is time consuming. These manufacturing costs are reflected in higher product prices to the plumbing contractor.

ASSE
1010

Sioux Chief Manufacturing
Technical Report #91097
Water Hammer Arresters

SUBJECT: HYDRA-RESTER WATER HAMMER ARRESTER
500,000 CYCLE ENDURANCE TEST

In order to establish a higher criteria for our water hammer arrester performance, and to address concerns posed by engineers and contractors regarding our o-ring performance, Sioux Chief Manufacturing Company conducted a 500,000 cycle endurance test. We chose to test our 654-C Hydra-Rester because it has the longest piston stroke of any Sioux Chief arrester, and therefore the wear and resistance on the o-ring is tested most stringently.

The endurance test was performed on a shock cycle tester which hydraulically plunged the piston simulating the maximum allowable system surge as outlined by the ANSI/ASSE 1010 standard. During the plunging process, each piston stroke travelled five inches up the arrester chamber and back. During the test, the piston was plunged thirty times per minute, twenty four hours a day, for twelve consecutive days.

At different intervals throughout the test, the arrester was removed from the shock cycle tester and subjected to the performance testing equipment consistent with the ANSI/ASSE 1010 standard for certifying water hammer arresters. The testing apparatus consisted of a 50 foot run of one inch galvanized pipe with a 60 PSIG flow pressure. The arrester was then subjected to a 400 PSIG pressure spike, and was required to keep the line pressure below 150 PSIG. The Sioux Chief Hydra-Rester kept the pressure spike below the specified 150 PSIG at each interval and at the completion of the 500,000 cycle test.

Hydra-Rester®

Commercial Water Hammer Arrester

Quality Assured

Certified by the American Society of Sanitary Engineering to the ANSI/ASSE 1010 Standard.

Lifetime cycle tested at U.S. Testing Laboratories in Fairfield, NJ, to withstand 10,000 shock cycles. Factory tested to withstand 500,000 cycles, without failure. (#654-C tested)

ASSE 1010

All Hydra-Resters® feature:

Compact Size
Allows for installation in a 2 × 4 wall cavity.

Installation Angle
Install upright, horizontally, or any angle in between.

Sealed Wall Installation
Approved for installation with no access panel required.

Item No.	Conn. Size	Unit Size	Dimensions		Fixture Unit Capacity	Volume (in^3)
			Length	Width		
MIP THREAD						
652-A	½"	A	6½"	1⅜"	1-11	5
653-B	¾"	B	8¾"	1⅜"	12-32	7
654-C	1"	C	11"	1⅜"	33-60	11
655-D	1"	D	10⅛"	2⅛"	61-113	20
656-E	1"	E	12⅝"	2⅛"	114-154	29
657-F	1"	F	15⅛"	2⅛"	155-330	36
MALE SWEAT						
652-AS	½"	A	8¼"	1⅜"	1-11	5
653-BS	¾"	B	10"	1⅜"	12-32	7
654-CS	1"	C	12½"	1⅜"	33-60	11
655-DS	1"	D	11"	2⅛"	61-113	20
656-ES	1"	E	13½"	2⅛"	114-154	29
657-FS	1"	F	16"	2⅛"	155-330	36

WATER HAMMER ARRESTERS

650/660 series

Item Number Submitted: _____

SPECIFICATION

Sioux Chief 650/660 Series piston-type water hammer arresters shall be required in piping systems. Water hammer arresters shall have sufficient volume of air to dissipate the calculated kinetic energy generated in the piping system. Arresters shall be effective when installed upright, horizontally or any angle in between. Arresters shall be approved for installation with no access panel required. Water hammer arresters shall be ANSI/ASSE 1010 2004 certified. Arresters shall be sized and placed per manufacturer's instructions.

MATERIALS

ARRESTER BODY: Type L copper tube
PISTON: Poly piston with two EPDM o-rings
MALE THREAD FITTING: Brass MIP thread
PISTON LUBRICATION: Dow-Corning, 111 FDA approved silicone compound.

WORKING LIMITS

MAX WORKING TEMPERATURE: 250°F
MAX WORKING PRESSURE: 350 PSIG
BURST TESTED TO: 2,900 PSIG

INSTALLATION

ANGLE: May be installed upright, horizontally or any angle in between.
ACCESS PANELS: No access panels required

SIZING & PLACEMENT

Refer to instructions on product package or in catalog.

DIMENSIONS

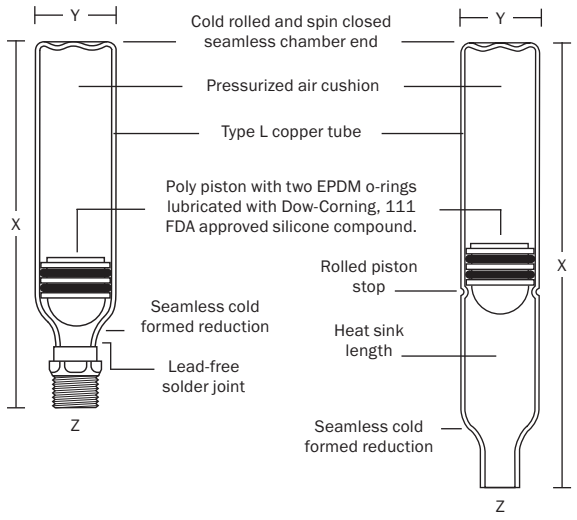
X: Overall height
Y: Chamber width
Z: Connection size
(See table below for dimensions)

CERTIFICATIONS/APPROVALS

650 series:
Certified by ASSE to the ANSI/ASSE 1010 standard
660 series:
Certified by ASSE to the ANSI/ASSE 1010 standard

ASSE 1010

Hydra-Rester® & Mini-Rester™



Create Item Number Below

Check the appropriate boxes to select connection style and arrester size. Then choose item number where chosen boxes intersect.
e.g. Size C arrester, male sweat connection = 654-CS
e.g. Size AA arrester, male thread connection = 660-2B

	☐ Size AA			☐ Size A			☐ Size B			☐ Size C			☐ Size D			☐ Size E			☐ Size F		
	1–4 fixtures (1.4 cubic inches)			4–11 fixtures (5 cubic inches)			12–32 fixtures (7 cubic inches)			33–60 fixtures (11 cubic inches)			61–113 fixtures (20 cubic inches)			114–154 fixtures (29 cubic inches)			155–330 fixtures (36 cubic inches)		
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
Male Thread	3⅜"	⅞"	½"	6½"	1⅜"	½"	8¾"	1⅜"	¾"	11"	1⅜"	1"	10⅛"	2⅛"	1"	12⅝"	2⅛"	1"	15⅛"	2⅛"	1"
	Item No: 660-2B			Item No: 652-A			Item No: 652-B			Item No: 652-C			Item No: 652-D			Item No: 652-E			Item No: 652-F		
Male Sweat	3⅜"	⅞"	½"	8¼"	⅞"	½"	10"	1⅜"	¾"	12½"	1⅜"	1"	11"	2½"	1"	13½"	2⅛"	1"	16"	2⅛"	1"
	Item No: 660-SB			Item No: 652-AS			Item No: 652-BS			Item No: 652-CS			Item No: 652-DS			Item No: 652-ES			Item No: 652-FS		

Mega-Rester™

Industrial Water Hammer Arrester

Industrial applications
Perfect for industrial equipment, commercial laundry equipment, food processing, irrigation and waste treatment systems.

Choice of tube wall material
Available in copper or stainless steel for any application.

Adjustable on-sight
Liquid-filled gauge and air filler valve for job site charging.

Customized for your application
Sized and charged in the factory by our computer to fit your specific job requirements.

Copper/Brass Arresters

Item No.	Connection Size & Type	Height (in)
150 CUBIC INCH VOLUME ARRESTERS		
658-1503	3" MIP (ANSI B2.1)	23.25
200 CUBIC INCH VOLUME ARRESTERS		
658-2002	2" MIP (ANSI B2.1)	29.25
658-2004	4" MIP (ANSI B2.1)	24.50
400 CUBIC INCH VOLUME ARRESTERS		
658-4004	4" MIP (ANSI B2.1)	40.50
658-4004F2	4" Class 150 Flange (ANSI B16.24)	39.75

Stainless Steel Arresters

Item No.	Connection Size & Type	Height (in)
200 CUBIC INCH VOLUME ARRESTERS		
658S2002	2" MIP (ANSI B2.1)	24.25
658S2004F2	4" Class 150 Flange (ANSI B16.24)	22.87
400 CUBIC INCH VOLUME ARRESTERS		
658S4004F2	4" Class 150 Flange (ANSI B16.24)	38.87

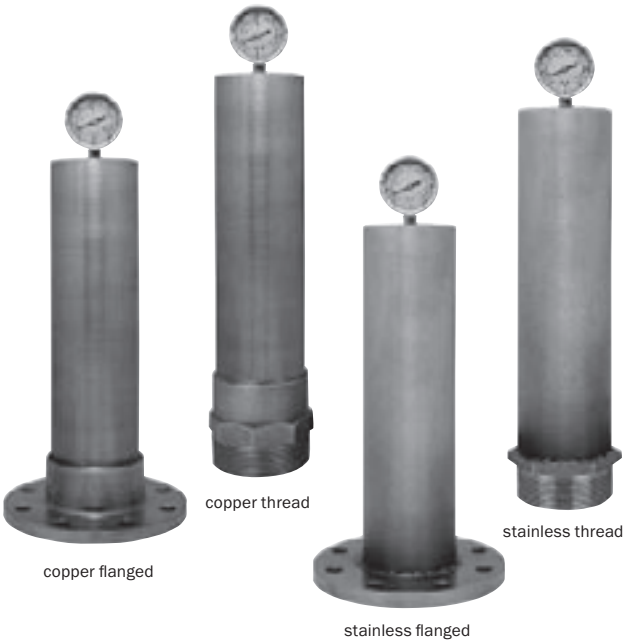
WATER HAMMER ARRESTERS

658 series

Item Number Submitted: **658-** _____

SPECIFICATION

Sioux Chief 658 Series piston-type water hammer arresters shall be installed where required in piping systems. Water hammer arresters shall have sufficient volume of air to dissipate the calculated kinetic energy generated in the piping system. Arresters shall have a permanently sealed tube body with factory air charge, and shall be available with male thread or flanged connection. Arresters shall be sized and placed per manufacturer's instructions.



MATERIALS

ARRESTER BODY – COPPER/BRASS MODEL: 4⅛" O.D. Type L copper tube

ARRESTER BODY – STAINLESS STEEL MODEL: 4¼" O.D. 316 stainless steel tube

MALE THREAD FITTING – COPPER/BRASS MODEL: Wrought copper fitting (ANSI B2.1) – lead free solder joint

MALE THREAD FITTING – STAINLESS STEEL MODEL: Stainless steel fitting (ANSI B2.1) – welded

FLANGE – COPPER/BRASS MODEL: Cast brass flange (ANSI B16.24) – lead free solder joint

FLANGE – STAINLESS STEEL MODEL: Stainless steel flange (ANSI B16.24) – welded

PISTON: Poly piston, dual EPDM o-rings lubricated with Dow 111, FDA-approved silicone compound.

GAUGE: 600 lb. liquid-filled

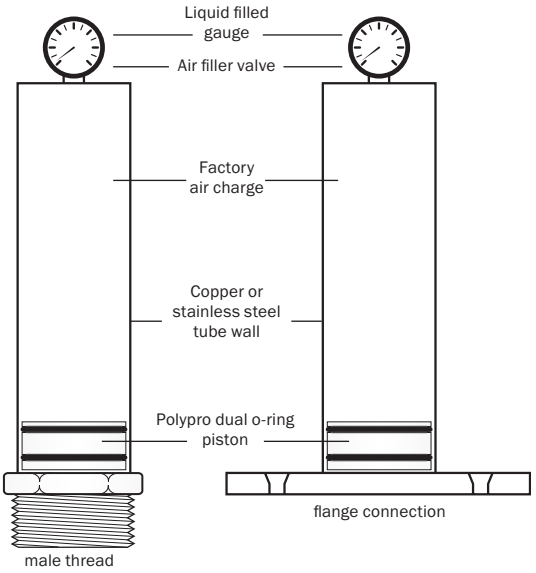
WORKING LIMITS

MAX WORKING TEMPERATURE: 250°F

MAX WORKING PRESSURE: 350 PSIG

OVERALL HEIGHT DIMENSIONS

Copper/brass	**150 IN²**	**200 IN²**	**400 IN²**
2" Male thread	—	29.25"	—
3" Male thread	23.25"	—	—
4" Male thread	—	24.50"	40.50"
4" Flanged	—	—	39.75"
Stainless steel			
2" Male thread	—	24.25"	—
4" Male thread	—	24.00"	40.00"



Create Item Number Below

658 *A* *B* *C*

e.g. 658-2004 = Copper/brass arrester with 200 in³ volume and 4" MIP connection

***A* Arrester material**

- ☐ **–** Copper/brass model
- ☐ **S** Stainless steel model

***B* Volume size**

- ☐ **150** 150 in³ volume
- ☐ **200** 200 in³ volume
- ☐ **400** 400 in³ volume

***C* Connection**

- ☐ **2**[1] 2" MIP connection
- ☐ **3**[1] 3" MIP connection
- ☐ **4** 4" MIP connection
- ☐ **4F2** 4" Class 150 flange

1 Not available on 400 in³ models

Residential & Light Commercial Water Hammer Control

AA-size piston-type arresters provide the solution to preventing water hammer in both residential and commercial applications.

Excerpt from April 2002 *PM Engineer* Magazine.

AA-size water hammer arresters are now sweeping the country as the permanent and affordable solution to that age-old problem of banging pipes and system damage caused by water hammer pressure surges, but this progress has been a long time in the making. Like many things in our industry, change doesn't happen overnight. Process and product innovation, industry education, along with new product standards and codes, have led the way.

In the 1980s, several arrester manufacturers offered a better alternative to plain air chambers when they introduced their single-fixture size arresters to the marketplace. At first, the use of these new arresters was somewhat limited due to the lack of official recognition at the codes and standards level. That all changed in 1996 when ASSE officially added the single-fixture AA-size category to the other six A through F arrester sizes in their ASSE 1010 Standard. Within 12 months, no less than three manufacturers had received ASSE certification on their compact and more affordable AA sizes, or double-A arresters, as they are now called.

…[A] large number of plumbing contractors report they are installing AA arresters even on applications where they are not required by code.

Since then, the installation of AA arresters to control water hammer has grown tremendously throughout the country. Code officials in many states see the AA arrester as a very simple, very feasible way to address this water hammer control issue they've been struggling with for years. And not surprisingly, a large number of plumbing contractors report they are installing AA arresters even on applications where they are not required by code. They say arresters add quality to their jobs and help reduce callbacks.

The AA size is considered a single-fixture arrester and it is designed for installation on a plumbing faucet or fixture at the point of use. In other words, one AA arrester should be placed on both the hot and cold lines as close as possible to each culprit valve or faucet that causes hammer.

The most common applications for AA arresters are on the water lines serving washing machines, dishwashers, and tub/shower valves. Historically, these areas have caused the most problems or have been the areas reported most often as having water hammer. At the very least, these three applications should always have AA arresters installed during new construction. Other possible applications on new construction or retrofit could be just about any other faucet or fixture in the plumbing system if water hammer is apparent, such as kitchen or lav faucets, water closets, and even ice maker valves.

A common myth is that one large arrester centrally located will control hammer throughout the piping system. In reality, this does little or nothing to control hammer. The arrester loses its effectiveness the farther away from the valve it is installed. Installation within six feet of the valve may work fine. However, when the arrester is installed 20 or 30 feet upstream, it has little effect. Arresters work like shock absorbers on a car. Your car has four wheels, so you need no less than four shocks, one placed at each wheel (point of use). Imagine the damage and abuse your car would take if it didn't have four properly placed shock absorbers. Your plumbing system is subject to the same type of abuse without proper arrester installation and placement.

Another question often asked is whether arresters are necessary on plastic tubing. Water hammer is a concern regardless of piping material, metal or plastic. It may be true that plastic tube does not seem to transmit as much noise as copper, but the energy from the flowing water is still there. It has to go somewhere. As a matter of fact, plastic tubing has a slightly smaller inner diameter compared to the same nominal size copper,

so the flowing water has a higher velocity, which means even more energy to be absorbed when the flow is stopped. Upon valve closure, plastic tubing expands minutely which does absorb a small amount of this energy, but water hammer can still occur at flow rates of three or four gallons per minute. Many contractors install arresters on plastic tubing systems to alleviate the tubing and joints of any undue stress and strain, rather than the plastic system taking the full brunt of the pressure surge all by itself.

Even though the AA size is often thought of as residential, it can certainly be specified for commercial projects as well. Its ASSE listing and fixture-unit rating of 4 makes it ideal for sizing and specification on projects such as hotels, motels, or multi-family. For example, a common mistake in hotel arrester sizing and placement is specifying one large multi-fixture arrester centrally located between several rooms. Worse yet, sometimes one arrester is specified to cover an entire floor. No matter how large the arrester is, the centrally located placement will not suffice. Large multi-fixture arresters work great on a commercial rest room with a bank of fixtures all on the same header; but when the branch lines go off in many directions, like in a hotel, smaller arresters placed at the point of use would be a better solution.

To insure proper water hammer control on this type of project, specify a pair of AA arresters at each tub/shower valve (a common water hammer culprit). For the typical hotel back-to-back bathroom configuration, one pair of AAs will suffice for both valves (see below) since the chance of simultaneous shut-off of both valves is almost nil.

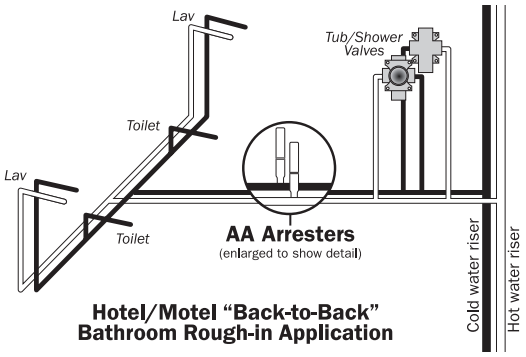
The product innovation of AA arresters has created dramatic effects at the code level as well. In the past five years, there have been major code revisions concerning water hammer control. In 1996, IAPMO published its UPC Installation Standard IS 20-96 for CPVC piping systems, which required arresters on all solenoid valves supplied with CPVC tubing. When this was first published, the UPC had yet to require arresters on other piping materials.

The common sized 12" plain air chambers do not satisfy the requirements of this code.

Then in 1997, IAPMO added Section 609.10 Water Hammer Control to the main body of the Uniform Plumbing Code, and then updated it in the UPC-2000 revision. This section calls out the requirement of either listed mechanical devices or air chambers on all quick closing valves in all potable water systems. It does not make exceptions for any piping material CPVC, copper, PEX or otherwise. Because of this new water hammer control requirement covering all piping systems, including CPVC, the secondary reference to water hammer control in the CPVC Installation Standard was deleted in 1998, evidently due to redundancy.

UPC's definition of listed mechanical devices can basically be interpreted as a UPC-listed AA arrester. UPC Table 6-6 calls out the air chamber requirements, which lists some very large-sized air chambers indeed. In addition, the section also requires each one of these air chambers to have their own means of drain down and air replenishment. The common sized 12" plain air chambers do not satisfy the requirements of this code. To my knowledge, the UPC-listed AA arresters are by far the contractors' choice to fulfill the requirements of this UPC water hammer control section.

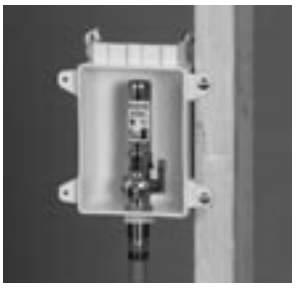
The International Plumbing Code (IPC-2000) also has a very similar requirement for water hammer control in its Section 604.9. AA arresters conforming to the ASSE 1010 Standard fulfill the product requirements of this code as well. IPC states that arresters should be installed per manufacturer's instructions. Therefore, if the arrester manufacturer states its arrester can be installed without access, then no access panels are required. Several states are already enforcing this section, and other states are planning to do so this year.



Hotel/Motel "Back-to-Back" Bathroom Rough-in Application

Mini-Rester™

Washing Machine Outlet Box
Quality rough-in box available with single lever shut off



Ice Maker Outlet Box
Rough-in wall outlet box with arrester & quarter-turn shut off

Stop Valve Connection
Unique fitting installs between ⅜" compression stop and supply tube, or between stub out and ⅝" compression stop

Washing Machine
Install between laundry supply valves and hoses

Tub & Shower Valve
Sweats directly into hot & cold supply of mixing valve.

Straight Compression
⅝" O.D. is perfect for ½" nom. air chamber replacement.

Full-Slip Sweat Tee
½" Full-slip tee easily sweats onto any copper system.

Male Sweat
Rough-in sweat anywhere in a system. ½" or ¾" male sweat.

½" Male Thread
New rough-in installations with ½" female thread fittings.

Ballcock Connection
Installs under tank between ballcock and supply tube

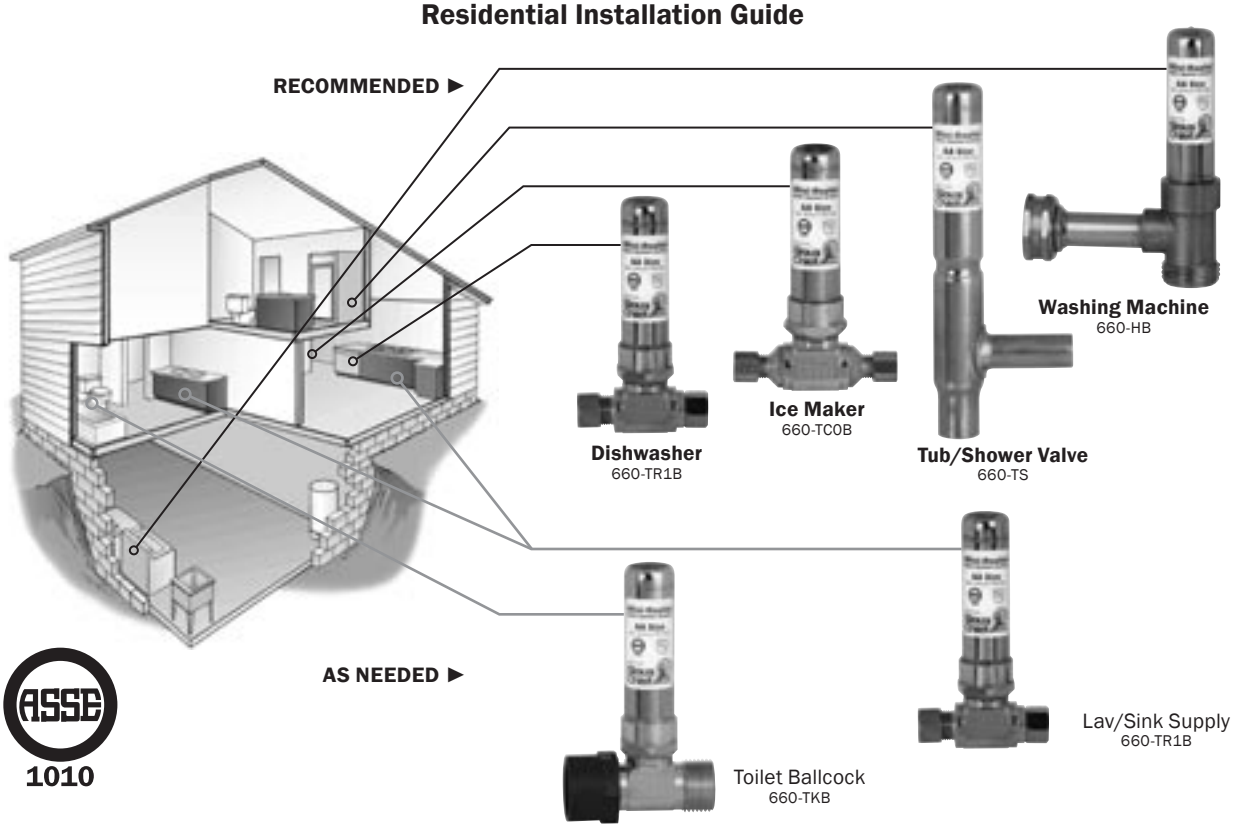
PEX Connection
Straight or tee pattern insert fitting for PEX systems

½" CPVC
Easy rough-in or retrofit installation in any CPVC system

Compression Tees
Compression tees for ¼" O.D., ⅜" O.D., ½" O.D., & ⅝" O.D.

ProPEX Tee
Barbed insert connection for ProPEX applications

Residential Installation Guide



In 1997, both IAPMO and ICC incorporated mandatory Water Hammer Control requirements into their national model codes, UPC and IPC/IRC. Since that time, many states have adopted these codes and are now fully enforcing the Water Hammer Control section for all segments of plumbing construction, especially residential. The AA size Mini-Rester was designed specifically for residential fixtures, and has made these code requirements feasible, affordable, easily inspected, and enforced. Sioux Chief recommends ASSE certified AA size arresters (Mini-Resters) installed at the very least on supply lines (both hot and cold) for washing machines, dishwashers, ice makers, and tub/shower valves to satisfy the minimum requirements of these codes. Arresters should be installed within six feet of the valve. All Sioux Chief Mini-Resters are AA size, regardless of connection size, and therefore are all equal in arrester capacity. Certain connection models may be intended for specific fixture applications, but other AA Mini-Rester models will control hammer on the same fixture just as well.

For High-Flow Garden Tub Valves and Multi-Head Shower Valves: Install 653-B Hydra-Resters on both hot and cold supply lines within six feet of the valve.

For Lawn Irrigation Zone Valves: On ¾" service line, install one 653-B Hydra-Rester within six feet of each valve or group of valves. On 1" service line: Install one 654-C Hydra-Rester within six feet of each valve or group of valves.

Recommended by the following codes

2006 Uniform Plumbing Code (UPC/IAPMO)

609.10 Water Hammer: All building water supply systems in which quick-acting valves are installed shall be provided with devices to absorb the hammer caused by high pressures resulting from the quick closing of these valves. These pressure-absorbing devices shall be approved mechanical devices. Water pressure-absorbing devices shall be installed as close as possible to quick-acting valves.

609.10.1 Mechanical Devices: When listed mechanical devices are used, the manufacturers' specifications as to location and method of installation shall be followed.

2006 International Plumbing Code (IPC)

604.9 Water hammer: The flow velocity of the water distribution system shall be controlled to reduce the possibility of water hammer. A water-hammer arrestor shall be installed where quick-closing valves are utilized. Water-hammer arrestors shall be installed in accordance with the manufacturer's specifications. Water-hammer arrestors shall conform to ASSE 1010.

IPC

Water Hammer Arrester
Competitive Comparison

Sioux Chief
Mini-Rester & Hydra-Rester

Josam
Absorbotron

J.R. Smith
Hydrotrol

PPP
MM Series & SC Series

Wade
Shokstop

Watts
05 Series & 15 Series

Wilkins
1250 Series

Zurn
Shocktrol

	Sioux Chief	Josam	J.R. Smith	PPP	Wade	Watts	Wilkins	Zurn
Trade Name	Hydra-Rester Mini-Rester	Absorbotron	Hydrotrol	MM500 Series SC500 Series	Shokstop	15 Series 05 Series	1250 Series	Shoktrol
Chamber Construction	Type L Copper	Stainless steel	Stainless steel	Type K Copper Brass cap	Stainless steel	Copper Brass cap	Type L Copper Stainless Steel Cap	Stainless steel
Permanent Gas Charge	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chamber Seams	0	1	1 to 3	1	1	2	1	1 to 3
Gas Charge Containment	Dual o-ring piston	Elastomer Bellows	Stainless steel bellows	Dual o-ring piston	Stainless steel bellows	Dual o-ring piston	Triple o-ring piston	Stainless steel bellows
ASSE 1010 Certified Sizes	AA – F	None	None	AA – F	None	AA – F	A – F	None

Cross Reference Guide

Manufacturer (Trade Name)	Arrester Size						
	AA	A	B	C	D	E	F
SIOUX CHIEF (Hydra-Rester)	660 series	652-A	653-B	654-C	655-D	656-E	657-F
JOSAM (Absorbotron)	N/A	75001	75002	75003	75004	75005	75006
J.R. SMITH (Hydrotrol)	N/A	5005	5010	5020	5030	5040	5050
PPP (MM Series, SC series)	MM-500 series	SC500	SC750	SC1000	SC1250	SC1500	SC2000
TYLER/WADE (Shokstop)	N/A	W-5	W-10	W-20	W-50	W-75	W-100
WATTS (AA = 05 series, A–F = 15 series)	05 series	15 – ½"	15 – ¾"	15 – 1"	15 – 1¼"	15 – 1½"	15 – 2"
ZURN (Shocktrol, Z-1700 series)	N/A	100	200	300	400	500	600

Hydra-Rester®

Engineer Status Report

Partial Listing

Company	Location		Engineer	Status
Adams Morgenthaler & Co.	Anchorage	AK	Vaughn Bradshaw	EQUALS
Adams Morgenthaler & Co.	Anchorage	AK	Patrick Rausch	APPROVED
Adams Morgenthaler & Co.	Anchorage	AK	Boyd Morgenthaler	APPROVED
Adams Morgenthaler & Co.	Anchorage	AK	David Crews	EQUALS
Miller & Weaver, Inc.	Birmingham	AL	Jerry Dumas	APPROVED
Engineering Resource Group	Birmingham	AL	Tom Thomason	APPROVED
West & Yonge	Mobile	AL	Matt Yonge	APPROVED
Pettit & Pettit Consulting Engineers	Little Rock	AR	Ken Baldridge	APPROVED
Pettit & Pettit Consulting Engineers	Little Rock	AR	Waymond Cox	APPROVED
H.W. Goodman	Little Rock	AR	Norman McElroy	APPROVED
Lewis Elliott & Struder	Little Rock	AR	Randy Ragsdale	APPROVED
Engineering Plus	North Little Rock	AR	Jay Yarboro	PRIME
Lescher & Mahony	Phoenix	AZ	Joe Labelle	PRIME
Lescher & Mahony	Phoenix	AZ	Zeid Abuwandi	APPROVED
Engineer Design Systems	Phoenix	AZ	Don Olea	APPROVED
Lowey Sorensen Willcoxson	Phoenix	AZ	Dick Nichols	PRIME
Pearson Engineering Associates Inc.	Phoenix	AZ	David Pearson	PRIME
Precision Mechanical	Phoenix	AZ	Jack	APPROVED
Robinet & Associates	Phoenix	AZ	Dennis Freitas	APPROVED
Sullivan Durand	Phoenix	AZ	Mike Tibben	APPROVED
R.J. Ghan Engineering	Tempe	AZ	Todd Raven	PRIME
Architecture One Limited	Tuscon	AZ	Jack De Pagter	APPROVED
F.T. Andrews, Inc.	Anaheim	CA	Scott Allen	EQUALS
Don Gillmore Engineers	Anaheim	CA	Mike Hutchens	APPROVED
California Engineering Design Group	Burbank	CA	Tod Reveles	PRIME
William Yang & Associates	Burbank	CA	Edick Abramian	APPROVED
Nibecker & Associates	Camarillo	CA	Robert Eubank	APPROVED
Donald Gregory	Costa Mesa	CA	Donald	APPROVED
Store Mataovich Wolfberg	El Monte	CA	Ted Musielowski	EQUALS
Nack & Sunderland	El Toro	CA	Gary Nielson	APPROVED
Paul S. Bennett	Encino	CA	Joe Incorvaia	EQUALS
Viradi Engineering	Encino	CA	Ivan Viradi	EQUALS
Don Lawrence & Associates	Fresno	CA	Dave Oustead	APPROVED
Schoenwald Oba Mogensen Pohil	Fresno	CA	Bill Allen	APPROVED
F.T. Andrews, Inc.	Fullerton	CA	Jim Belna	APPROVED
J.L. Hengstler & Associates	Glendale	CA	Bob Moser	EQUALS
Portillo Engineering	Glendale	CA	David Portillo	EQUALS
Oliveira Archs	Hanford	CA	M.J. Oliveira	APPROVED
The Austin Company	Irvine	CA	Oscar Alo	APPROVED
California Energy Design	La Canada	CA	Dick Gilbert	APPROVED
Nack & Sunderland	Lake Forest	CA	Gary Nielson	APPROVED
Nack & Sunderland	Lake Forest	CA	David Nack	PRIME
ACEA Inc.	Los Angeles	CA	Clem Hechanova	APPROVED
Ayres, Ezer, Lau	Los Angeles	CA	Rick Hines	PRIME
Cal Engineering	Los Angeles	CA	Hugo Serena	EQUALS
D.M.J.M.	Los Angeles	CA	Andy Hu	APPROVED
Fields & Devereaux	Los Angeles	CA		EQUALS
Haya Kawa Associates	Los Angeles	CA	John Mitsumori	EQUALS
Hellman & Lober	Los Angeles	CA	Al Hellman	PRIME
Hellman & Lober	Los Angeles	CA	Robert Koba	APPROVED
Hellman – Haloosim	Los Angeles	CA	Manuel David	EQUALS
Intek Engineering	Los Angeles	CA	Ann Min	PRIME
Intek Engineering	Los Angeles	CA	Yung Shin	PRIME
Ove Arup & Partners California	Los Angeles	CA	Dan Ursea	PRIME
Ove Arup & Partners California	Los Angeles	CA	Anait Manjikian	PRIME
Ove Arup & Partners California	Los Angeles	CA	Vivian Enriquez	PRIME
Rosenberg & Associates	Los Angeles	CA	Chuck Walker	PRIME
Syska & Hennessy	Los Angeles	CA	Keith Franklin	PRIME
Apex Engineering	Monrovia	CA	Matt Jessup	PRIME
List Engineering Company	Monterey	CA	Frank Souza	PRIME
Tower Engineers	Napa	CA	Jack Boureston	APPROVED

Hydra-Rester® Engineer Status Report
Partial Listing

Company	Location		Engineer	Status
Astra Industrial Service, Inc.	Newbury Park	CA	Larry Frahm	APPROVED
Boyle Engineering	Newport Beach	CA	Harry Saunders	APPROVED
Maroko & Associates	North Hollywood	CA	Eve Haarma	PRIME
Vickerman Zachery & Miller	Oakland	CA	Tim Belke	APPROVED
S.J. Engineers	Oakland	CA	Neil Joson	APPROVED
S.J. Engineers	Oakland	CA	Phil Orbegoso	APPROVED
TMAD	Ontario	CA	Noe Portilla	PRIME
Horiuchi & Associates	Pasadena	CA	Katz Horiuchi	EQUALS
Ralph M. Parsons Company	Pasadena	CA	Manuel Najera	EQUALS
Murray Company	Rancho Dom.	CA	Dave Geddes	APPROVED
Murray Company	Rancho Dom.	CA	Dick Drensske	APPROVED
Mathaudhu Engineering	Riverside	CA	Hanry Munoz	EQUALS
Sevier Engineers	San Diego	CA	Bill Mathews	APPROVED
Pacific Rim Mechanical	San Diego	CA	Ted Keenan	APPROVED
TMAD	San Diego	CA	Ron Jones	PRIME
Lecine & Seegel Associates	Santa Monica	CA	Mike Sapio	APPROVED
Stanford University Facilities Department	Stanford	CA	Wayne Paulsen	EQUAL
Jon Hammond Engineering	Tustin	CA	Richard Hunter	EQUALS
Archer, Spencer Engineering	Ventura	CA	Tim Moon	EQUALS
Archer, Spencer Engineering	Santa Barbara	CA	Bill Tziouvaras	EQUALS
Charles Mistretta & Associates	Santa Barbara	CA	John Grinsdale	APPROVED
Coast Village Engineering	Santa Barbara	CA	Lloyd Bush	EQUALS
Penfield & Smith Engineers	Santa Barbara	CA	Jerry Kovarik	EQUALS
Oliveira Architects	Hanford	CA	M.J. Oliveira	APPROVED
Tower Engineers	Napa	CA	Jack Boureston	APPROVED
Design Mechanical	Redwood City	CA	Al Simian	APPROVED
Yoshpe Engineers	Sacramento	CA	Dan Yoshpe	APPROVED
Capitol Engineering Consultants	Sacramento	CA	Bob Alessi	PRIME
Capitol Engineering Consultants	Sacramento	CA	John Lionakis	PRIME
Capitol Engineering Consultants	Sacramento	CA	Liem Huynh	APPROVED
Capitol Engineering Consultants	Sacramento	CA	Mike Minge	APPROVED
Airco Mechanical Inc.	Sacramento	CA	Steve Humason	APPROVED
Flack & Kurtz Consulting	San Francisco	CA	Alex Tanalski	APPROVED
Guttman & MacRitchie	San Francisco	CA		APPROVED
Hellmuth, Obata & Kassabaum	San Francisco	CA	Jaime “Himey” Carrion	APPROVED
Hellmuth, Obata & Kassabaum	San Francisco	CA	Yee Huey	APPROVED
Gayner Engineering	San Francisco	CA	John Yee	EQUALS
Gayner Engineering	San Francisco	CA	Silvan Peterhans	APPROVED
Gullmac & Associates	San Francisco	CA	Don Parrish	APPROVED
Marion, Cerbato & Tomasi Engineers	San Francisco	CA	Orville McArthur	APPROVED
A.S.C. Design	Walnut Creek	CA	Andrew S. Ciffer	PRIME
Mechanical Building Systems	West Hills	CA	Joe Tiesi	EQUALS
Aarons & Associates	Arvada	CO	Tom Aarons	PRIME
Merrick Engineers & Architects	Aurora	CO	Chris Buckley	PRIME
Merrick Engineers & Architects	Aurora	CO	Jim Given	PRIME
Farris Engineering	Colorado Springs	CO		PRIME
Systems Engineering	Colorado Springs	CO	Jeff Grebe	APPROVED
A.B.S. Consultants, Inc.	Denver	CO	Alex Valdez	APPROVED
A.B.S. Consultants, Inc.	Denver	CO	Stan Furhop	APPROVED
RNL, Inc.	Denver	CO	Rick Grout	APPROVED
Swanson – Rink	Denver	CO	Ron Tomlioni	PRIME
McFall, Konkel, Kimball	Denver	CO	Doug Sandridge	APPROVED
McFall, Konkel, Kimball	Denver	CO	Paula Fishert	APPROVED
Abeyta Engineering	Englewood	CO	Reggie Nelson	APPROVED
C & B Plumbing	Fort Collins	CO	Dennis	APPROVED
AE Associates, Inc.	Greeley	CO	Curtis Smith	APPROVED
AE Associates, Inc.	Greeley	CO	Fred Dunton	APPROVED
AE Associates, Inc.	Greeley	CO	John Helin	APPROVED
R.M.H. Group	Lakewood	CO	Jim Monteque	APPROVED
R.M.H. Group	Lakewood	CO	Mark Lepore	PRIME
Ballard Group	Lakewood	CO	Gene Gerken	PRIME
Ballard Group	Lakewood	CO	Tim Harris	PRIME

Hydra-Rester® Engineer Status Report
Partial Listing

Company	Location		Engineer	Status
Abrahamson Engineering	LaPorte	CO	Roger Abrahamson	PRIME
M.E. Engineers, Inc.	Wheatridge	CO	Paul Gomez	APPROVED
Burton VanHooten	Bloomfield	CT	Jerry Krysinski	PRIME
Hubbard, Lawless & Osborne	New Haven	CT	George Baxter	APPROVED
Helenski & Zimmerer, Inc.	Rocky Hill	CT	Robert W. Aube	APPROVED
Luchini, Milfort, Goodell & Associates	Wethersfield	CT	Ray Bjorkman	PRIME
Hellmuth, Obata & Kassabaum	Washington	DC	Chris Garcia	APPROVED
Leo A. Daly Company	Washington	DC	Phillip Evangelista	EQUALS
John Christie & Associates	Washington	DC	Elio Lopez	APPROVED
DMJM Architects & Engineers	Washington	DC	Frank Murphy	APPROVED
H.C. Yu & Associates	Washington	DC	Kitt Poon	EQUALS
Marriott Corp.	Washington	DC	Dave Clifford	APPROVED
Marriott Corp.	Washington	DC	Jim Mattocks	APPROVED
Marriott Corp.	Washington	DC	Terry Smith	APPROVED
Furlow Assoc.	Claymont	DE	Paul Silvestre	PRIME
KTA Engineers	Casselberry	FL	Ralph Kern	PRIME
KTA Engineers	Casselberry	FL	Edwin Gonzales	PRIME
Spillis Candela & Partners	Coral Gables	FL	George Chartrand	EQUALS
SDM	Coral Gables	FL	Eric Slay	APPROVED
Lewis Aguirre & Associates	Coral Gables	FL	Romarico Sanchez	APPROVED
Smith Seckman Reid	Ft. Lauderdale	FL	Carl Commissiong	EQUALS
Cadwallader and Assoc.	Gainesville	FL	Fred Danforth	APPROVED
Jack Neale Affliated Engineers	Gainesville	FL	Jack Neale	PRIME
Van Wagenen & Beavers Inc.	Jacksonville	FL	Edward Laabs	EQUALS
Langein & Bell Engineers, Inc.	Lakeland	FL	John Caramalis	APPROVED
G.R.G. Vanderwell Engineers	Maitland	FL	Ralph Kern	APPROVED
Briel Rhame Poynter Houser	Melbourne	FL	David DaSilva	APPROVED
Wolfberg, Alvarez & Associates	Miami	FL	Mario Murias	APPROVED
Smith Korach Hayet Haynie Partners	Maimi	FL	Benito Fernandez	APPROVED
The Duke's Plumbing, Inc.	Naples	FL	Duke Turner	APPROVED
Hansen, Lind, Meyer	Orlando	FL	Dave Anelli	PRIME
Hansen, Lind, Meyer	Orlando	FL	Dave McMullin	PRIME
Steven Feller P.E. Inc.	Oakland Park	FL	Mike Torrey	EQUALS
Architectural Engineering	Palm Harbor	FL	Tim Collins	EQUALS
Harper Mechanical	Sanford	FL	Larry Bruner	APPROVED
Harrison & Spencer	Tallahassee	FL	Crystal Schlappi	PRIME
Department of Corrections	Tallahasee	FL	Ralph Lemley	APPROVED
EMTEC	Tampa	FL	Jon Perucki	APPROVED
Reynolds, Smith and Hills Inc.	Tampa	FL	Roy A. West	PRIME
Burton & Rolley, Inc.	Tampa	FL	Robert H. Burton P.E.	PRIME
EG & G Engineers	Titusville	FL	Mosby West	PRIME
Johnson Levinson Slider Inc.	West Palm Beach	FL	Ron Bennett	APPROVED
Matern/H.C. Yu & Associates	Winter Park	FL	Doug Summers	APPROVED
Overstreet Consultants	Winter Park	FL	Amir Kazeminia	APPROVED
IMDC	Winter Park	FL	John Brocall	PRIME
Britt Alderman & Associates	Atlanta	GA	Lamar Lee	APPROVED
Jones Nall & David	Atlanta	GA	Van Johnson	PRIME
Southern Engineering	Atlanta	GA	Rudy Dialanzo	APPROVED
Rosser Fabrap International	Atlanta	GA	Billy Wells	PRIME
Rosser Fabrap International	Atlanta	GA	E.J. Nakis	APPROVED
Rosser Fabrap International	Atlanta	GA	John Burtrand	PRIME
Rosser Fabrap International	Atlanta	GA	Randy Fisher	APPROVED
Rosser Fabrap International	Atlanta	GA	Vernon Brannen	APPROVED
B & A Consulting Engineers	Atlanta	GA	Mike May	APPROVED
Kelly, Lundstrom, George	Atlanta	GA	Mike Sawyer	APPROVED
Newcomb & Boyd	Atlanta	GA	Al Singleton	PRIME
W. L. Thompson Associates	Atlanta	GA	Harry Schnirring	APPROVED
W. L. Thompson Associates	Atlanta	GA	Rick Finley	PRIME
Spurlok & Associates	Atlanta	GA	Barry Spurlok	PRIME
Spurlok & Associates	Atlanta	GA	Van Atkins	PRIME
Adams, Davis & Partners	Atlanta	GA	Ron Ellington	APPROVED
Armour Cape & Pond	Atlanta	GA	Garry Pelton	PRIME

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Company	Location		Engineer	Status
Bradley Anglin Engineering	Atlanta	GA	Harry Lockwood	PRIME
Bradley Anglin Engineering	Atlanta	GA	Mike May	APPROVED
Brady & Anglin	Atlanta	GA	Danny Landry	APPROVED
Brady & Anglin	Atlanta	GA	Harry Lockwood	APPROVED
David Lee Associates	Atlanta	GA	David Lee	APPROVED
Fidelity Mgmt & Investment Corp.	Atlanta	GA	Chuck Lowe	APPROVED
Coleman Pruett & Associates	Augusta	GA	Joe Powell	PRIME
Nottingham Brook & Pennington	Macon	GA	George Nottingham	PRIME
Technicon, CE	Macon	GA	Robert Carlton	PRIME
Andrews Hammock & Powell	Macon	GA	Al Andrews	PRIME
KVG Engineers	Marietta	GA	Gary Gabriel	PRIME
Dulohery Weeks & Gagliano	Savannah	GA	Benny Bacon	APPROVED
Rosser Fabrap International	Savannah	GA	Craig Shoemaker	APPROVED
Hudson Everett Simonson Millis	Tucker	GA	Dan Dahl	PRIME
W.A. Hirai & Associates	Hilo	HI	Michael Santiago	APPROVED
Mechanical Engineers of Hawaii	Honolulu	HI	Robert Ho	PRIME
Pacific Design Engineers	Honolulu	HI	George Honda	APPROVED
Ferris & Hamig Hawaii, Inc.	Honolulu	HI	Frank Lum	EQUALS
ECM Inc.	Wailuku	HI	Phill Walker	PRIME
Silversword Engineering	Wailuku	HI	Michael Conway	PRIME
Engineering, Inc.	Boise	ID	Ken Tewksbury	PRIME
Engineering, Inc.	Boise	ID	Mike Wisdom	PRIME
Engineering, Inc.	Boise	ID	Roger Albers	PRIME
Engineering Systems	Pocetello	ID	Charles Sudweeks	APPROVED
Design Engineers	Cedar Rapids	IA	John Bollinger	PRIME
Brooks Borg & Skiles	Des Moines	IA	Susan Oltrogge	APPROVED
Hansen, Lind, Meyer	Iowa City	IA	Mike Drahos	APPROVED
Hansen, Lind, Meyer	Iowa City	IA	Terry Hoffman	APPROVED
Hansen, Lind, Meyer	Iowa City	IA	Tim Fehr	APPROVED
Shaive Hatterly	West Des Moines	IA	Jim Lee	APPROVED
State Farm Insurance	Bloomington	IL	Brian Auer	PRIME
Environmental Systems Design	Chicago	IL	Mike Swanik	APPROVED
Environmental Systems Design	Chicago	IL	Raj Gupta	APPROVED
Wallace – Migdal & Associates	Chicago	IL	Otton Finiewicz	APPROVED
A. Epstein & Sons, Inc.	Chicago	IL	Dave Kikkebusch	PRIME
Chicago Design Consultants	Chicago	IL	Bill Strangeland	PRIME
Cosentini & Associates	Chicago	IL	Bob Thompson	APPROVED
Burkhardt and Associates	Chicago	IL	Jim Scholtz	APPROVED
Creative Engineering Company	Des Plaines	IL	William Scmowel	EQUALS
Woolpert Consultants	Fairview Heights	IL	Bret Paden	APPROVED
Beling Consultants	Moline	IL	Dave Pearson	APPROVED
MSKTD & Associates	Fort Wayne	IN	Mike Nichter	EQUALS
Barton Coe Vilamaa	Fort Wayne	IN	Don Stimpson	PRIME
Circle Design Group	Indianapolis	IN	Greg Champion	PRIME
Everett I. Brown Company	Indianapolis	IN	Ed Lucas	APPROVED
Everett I. Brown Company	Indianapolis	IN	Walter Strong	PRIME
Rotes Engineers	Indianapolis	IN	Naranji Patel	APPROVED
James Arch. & Engineers	Indianapolis	IN	Jim Wakelam	PRIME
Moore Engineers	Indianapolis	IN	Greg Plantenga	APPROVED
Fanning Howey Assoc Inc.	Indianapolis	IN	Ken Cook	PRIME
R.L. Millis	Munster	IN	Tom Bailey	APPROVED
Grigmore & Allen	El Dorado	KS	Mack Allen	APPROVED
Engineering Consortium	Leawood	KS	Larry Riggs	PRIME
Larson & Associates	Overland Park	KS	Phil Wittmeyer	APPROVED
Smith & Boucher	Overland Park	KS	Mike Thome	PRIME
Smith & Boucher	Overland Park	KS	Mike Wagner	PRIME
Feightner, Hall & Bartlett	Overland Park	KS	Dan Hall	EQUALS
Marrs Engineering	Salina	KS	Ken Marrs	APPROVED
Latimer, Sommers & Associates	Topeka	KS	Bill Basset	APPROVED
Brack & Associates	Topeka	KS	Bill Naeger	PRIME
Professional Engineers Consultants	Wichita	KS	Joy Martin	PRIME
G.R.W. Engineers	Lexington	KY	Doug Bowen	APPROVED

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Company	Location		Engineer	Status
C.M.W.	Lexington	KY	Jim Martin	PRIME
CMTA	Lexington	KY	Kevin Phelps	APPROVED
Kaiser Taulbee	Lexington	KY	Roger Cunningham	APPROVED
Staggs & Fisher	Lexington	KY	Daryl Hatton	APPROVED
Staggs & Fisher	Lexington	KY	Don Durham	APPROVED
Presnell Associates Inc.	Louisville	KY	Dan Leavitt	PRIME
Beaullieu & Associates	Lafayette	LA	Ted Beaullieu	APPROVED
Marrero Couvillion & Associates	Lafayette	LA	David Landry	APPROVED
Terry Gaudet & Associates	Lafayette	LA	Terry Gaudet	APPROVED
F.M. Alba & Associates	Metairie	LA	Mr. Alba	APPROVED
R.W. Sullivan	Boston	MA	Bob Thompson	APPROVED
R.W. Sullivan	Boston	MA	Mike McCeillacutti	APPROVED
Shooshanian Engineering Assoc.	Boston	MA	Joe Barbera	APPROVED
Thompson Consulting Inc.	Marion	MA	Bill Johnson	APPROVED
Thompson Consulting Inc.	Marion	MA	Chris Allbright	APPROVED
Henry Adams Inc.	Baltimore	MD	Dick Lippy	PRIME
James Posey Associates, Inc.	Baltimore	MD	Steve Hudson	PRIME
Engineering and Architectural Service	College Park	MD	William Shillig	PRIME
RHL Engineering Company Inc.	Frederick	MD	Richard Lawson	APPROVED
McNeil Baldwin	Glen Burnie	MD	Pyare Diwana	APPROVED
Donald, James, Johnson Inc.	Rockville	MD	Ken Wineberg	PRIME
Montgomery County Public Schools	Rockville	MD	Boots Peddicord	PRIME
Mendoza Rebas Farinas	Rockville	MD	Bernardo Soliz	APPROVED
Gipe Associates	Timonium	MD	Rob Weaver	PRIME
Gipe Associates	Timonium	MD	Steve Gizinski	PRIME
Gipe Associates	Timonium	MD	Mike Purtell	PRIME
Century Engineering	Towson	MD	Ron Menzel	APPROVED
PGPS Facilitys Department	Upper Marlboro	MD	Lee Bowan	APPROVED
PGPS Facilitys Department	Upper Marlboro	MD	Jim Wignall	APPROVED
D. Brooks Cross Consulting Engineers	Upper Marlboro	MD	David Bailey	APPROVED
Lisa & Whitney Engineers	Portland	ME	Tony Lisa	APPROVED
Hobbs & Black Associates	Ann Arbor	MI	Jim Paul	APPROVED
Universtiy of Michigan	Ann Arbor	MI	Tal Rabiah	EQUAL
Mancini Alkateeb & Assoc.	Bingham Farms	MI	Ralph Climey	APPROVED
Mancini Alkateeb & Assoc.	Bingham Farms	MI	Mike Scilacis	APPROVED
Hubell, Roth & Clark	Bloomfield Hills	MI	Joel Bowdan	PRIME
Hubell, Roth & Clark	Bloomfield Hills	MI	Pat Chouinard	PRIME
Albert Kahn Associates	Detroit	MI	Tom Boersna	PRIME
BEI Associates	Detroit	MI	Nick Purohit	APPROVED
Scales & Associates, Inc.	Detroit	MI	Marlvin Johnson	PRIME
Smith, Hinchman & Gryics Inc.	Detroit	MI	Jack Yorke	EQUAL
Wolf Wineman	Farmington Hills	MI	Michael DeHart	EQUAL
Greiner Engineering Inc.	Grand Rapids	MI	Bill English	APPROVED
Progressive Engineers	Grand Rapids	MI	Bob Todd	APPROVED
Kingscott Engineers & Architects	Kalamazoo	MI	Kent Phinney	APPROVED
Tower Pinkster Titus Associates	Kalamazoo	MI	Doug Dubois	APPROVED
Randers Engineering	Northville	MI	Paul Lipar	PRIME
Manyaw Associates, inc.	Saginaw	MI	Morgan M. Landon	PRIME
Guffels Consultants Inc.	Southfield	MI	Siraj Khan	PRIME
Harcey Ellington Design	Southfield	MI	Bob Pesta	PRIME
Wolf Wineman & Associates	Southfield	MI		PRIME
Giffels Associates, Inc.	Southfield	MI	David Galperin	PRIME
Giffels Associates, Inc.	Southfield	MI	Larry Slusher	APPROVED
S.W.S Engineering	Southfield	MI	Bob Carter	EQUAL
O.E.M. Associates	Sterling Hats	MI	Robert E. Oliveri	PRIME
Hydro Design Inc.	Sywan Lake	MI	Jim Wiest	PRIME
EAM. Engineers	Troy	MI	Bill Renke	EQUAL
Giffels Hoyen Basso, Inc.	Troy	MI	David DiCiuccio	EQUAL
Peter Basso Associates	Troy	MI	Robert Roop	APPROVED
SSOE Architects & Engineers	Troy	MI	Joseph Hernandaz	PRIME
SSOE Architects & Engineers	Troy	MI	Ron George	APPROVED
J.M.K. Associates	Warren	MI	David Park	EQUAL

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Company	Location		Engineer	Status
Haack Engineering	Bemidji	MN	Jim Haack	PRIME
Ellerbe Becket, Inc.	Minneapolis	MN	Ron Schneider	APPROVED
Ellerbe Becket, Inc.	Minneapolis	MN	Mike Jones	PRIME
Setter Leach & Lindstrom	Minneapolis	MN	Mike Anderson	APPROVED
Miller Hanson Westerbeck & Bell	Minneapolis	MN	Will Burger	APPROVED
Horty Elving & Associates	Minneapolis	MN	Larry Justin	PRIME
Ellerbe Becket, Inc.	Minneapolis	MN	George Dikson	APPROVED
Ellerbe Becket, Inc.	Minneapolis	MN	Rex Rundquist	PRIME
Michaud Cooley Erickson & Associates	Minneapolis	MN	Dan Acker	EQUALS
Michaud Cooley Erickson & Associates	Minneapolis	MN	Paul Deary	EQUALS
Wold Architects	St. Paul	MN	Craig Ading	PRIME
Ericksen, Ellison & Associates	St. Paul	MN	Mike Duggin	PRIME
Ericksen, Ellison & Associates	St. Paul	MN	Bruce Johnson	PRIME
Ericksen, Ellison & Associates	St. Paul	MN	Jim Art	PRIME
Ericksen, Ellison & Associates	St. Paul	MN	Larry Nemer	EQUALS
Ericksen, Ellison & Associates	St. Paul	MN	Reynold Warnsholz	PRIME
Thomas Berkley Consulting Engineers	Chesterfield	MO	Herb Schroer	APPROVED
W.L. Cassell & Associates	Kansas City	MO	Hubert Smith	PRIME
Massatlia Neystrom Bredson	Kansas City	MO	Harold Sallee	PRIME
Massatlia Neystrom Bredson	Kansas City	MO	Dick Daugherty	PRIME
Gibbens & Swinney	Raytown	MO	Larry Riggs	APPROVED
Malone Finkel & Associates	Springfield	MO	John Eckhard	APPROVED
Pellham, Phillips, Hagerman	Springfield	MO	Jeff Wells	PRIME
Pellham, Phillips, Hagerman	Springfield	MO	Larry Phillips	PRIME
Pellham, Phillips, Hagerman	Springfield	MO	Mr. Pellham	APPROVED
Warren & Gooden, Inc.	Springfield	MO	Walter Warren	APPROVED
Booker Associates Inc.	St. Louis	MO	Vince Amador	APPROVED
Hellmuth, Obata & Kassabaum	St. Louis	MO	Gene Klebanov	APPROVED
Hellmuth, Obata & Kassabaum	St. Louis	MO	Gus Zuniga	PRIME
Heideman & Associates	St. Louis	MO	David Heideman	PRIME
Robert E. Hawkins P.E.	Greenville	MS	Robert Hawkins	APPROVED
Engineering Resource Group	Jackson	MS	Dave Butler	APPROVED
Dees Eldridge Busby	Jackson	MS	Al Rucker	APPROVED
Design 3 Engineering	Billings	MT	Tom Scott	APPROVED
S.A. Olson & Associates	Billings	MT	Wade Johnson	APPROVED
C.T.A. Architects / Engineers	Billings	MT	Walter Heins	PRIME
Bronec & Associates Inc.	Bozeman	MT	Larry Bronec	APPROVED
Everson Cordeiro Engineering Design	Great Falls	MT	Bud Everson	EQUALS
Mecklenberg Facilities Department	Charlotte	NC	Ron Tuttle	PRIME
PMH Engineering	Moorestown	NJ	Peter M. Honeyford	EQUALS
Syska & Hennessy	Princeton	NJ	Carl Hansen	EQUALS
Dunham Associates	Las Vegas	NV	Frank Diliberato	APPROVED
Joseph R. Loring & Associates	New York	NY	Tom Gerrity	APPROVED
Edward Zuck	New York	NY	John Conway	PRIME
L. Robert Kimball & Associates	Ebensburg	PA	Dave Ciner	PRIME
Maida Engineering	Essington	PA	Michael L. Panco	EQUALS
Jaras Baum Bolls	New York	NY	Jack Kleinberger	APPROVED
Lehr Associates	New York	NY	Elizabeth Chronicka	APPROVED
Lehr Associates	New York	NY	Fred Barber	APPROVED
Perrillo Associates	Ossining	NY	Izzy Kokot	APPROVED
Carfarelli Associates	Valley Stream	NY	John McQuillin	APPROVED
Fraser & Fassler P.C. Engineers	Syracuse	NY	Bruce Dewey	APPROVED
B.J.L.J.	Mineola	NY	Frank Capuzzo	EQUALS
MRB Group PC	Rochester	NY	Bruno Krause	APPROVED
Hunt Engineers and Architects	Corning	NY	Tom Colewell	PRIME
GDP & Associates	Akron	OH	Rick Seifert	APPROVED
Fosdick & Hilmer	Cincinnati	OH	William Abell	APPROVED
Wilson & Associates, Inc.	Cincinnati	OH	David Hudson	APPROVED
Madison International	Cleveland	OH	John Davis	APPROVED
Madison International	Cleveland	OH	Alla Shulman	APPROVED
Osborn Architects & Engineers	Cleveland	OH	Ramon E. Campbell P.E.	APPROVED
Basic & Karpinsky	Cleveland	OH	Mark Stefanak	EQUALS

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Company	Location		Engineer	Status
Polytech	Cleveland	OH	Fred Ehrenbeit	APPROVED
Voinovich Company	Cleveland	OH	Dick Powell	APPROVED
Stecklow and Associates	Cleveland	OH	K. Dieter Hausmann, P.E.	APPROVED
Fanning/ Howey and Associates	Celina	OH	Jim Tolan	PRIME
Monks Engineering	Columbus	OH	Mike	PRIME
M-E Building Consultants	Columbus	OH	Mohsen Fahkar	PRIME
M-E Building Consultants	Columbus	OH	Mike Myers	APPROVED
MCC Engineering	Columbus	OH	Tony Moreno	APPROVED
Wolfgang Doerschlag Architects	Columbus	OH	John Sanders	EQUALS
H.A. Williams Associates	Columbus	OH	Kimm Burcham	EQUALS
Larson Engineering Inc.	Columbus	OH	Mark Rollins	PRIME
Heapy Engineering	Dayton	OH	Doug Gregory	APPROVED
Lorenz & Williams, Inc.	Dayton	OH	Jack Kolf	APPROVED
Lorenz & Williams, Inc.	Dayton	OH	Ron Bartley	APPROVED
Jeffery A. Jones and Associates	Worthington	OH	Mike Chaney	PRIME
C.E.C. Consultants, Inc.	Parma	OH	John Puskar	APPROVED
Henningson, Druham & Richardson	Oklahoma City	OK	John Stobart	EQUALS
Frankfurt Short Bruzo Associates	Oklahoma City	OK	Chuck Earnheart	APPROVED
Dames & Moore	Tulsa	OK	Nick Nichols	APPROVED
Consulting Engineers Inc.	Tulsa	OK	Art Shelton	PRIME
Manfull Curtis Inc.	Beaverton	OR	Al Cannon	APPROVED
Wood/Harbinger, Inc.	Bellevue	OR	Bob Axley	APPROVED
Endex Engineering	Corvallis	OR	Hal Spence	APPROVED
Endex Engineering	Corvallis	OR	Joe Forbes	APPROVED
Balzhiser Hubbard & Associates	Eugine	OR	Keith Hubbard	PRIME
Interface Engineering	Milwaukie	OR	John Gray	APPROVED
Interface Engineering	Milwaukie	OR	Rob Matteson	APPROVED
Carson Bekooy Gulick Kohn	Portland	OR	Ted Beckwith	APPROVED
Glumac & Associates	Portland	OR	Daniel Buck	PRIME
P.A.E. Consulting Engineers	Portland	OR	Gary Toole	APPROVED
MFIA Consulting Engineers	Portland	OR	John Van Bladeren	PRIME
Canzian/Johnson Associates	Arnold	PA	Harold Johnson	APPROVED
Canzian/Johnson Associates	Arnold	PA	Michael Shamey	APPROVED
Snyder Hoffman Associates	Bethleham	PA	George J. Gatanis	PRIME
Miyahara Associates	Bala Cynwyd	PA	David Smith	APPROVED
Miyahara Associates	Bala Cynwyd	PA	Steven Finkleman	APPROVED
Burt Hill & Associates	Butler	PA	James Marsili	APPROVED
Burt Hill & Associates	Butler	PA	Russell Sullivan	APPROVED
Meucci Engineering Inc.	Carnegie	PA	Mark Bronowski	EQUALS
Facilities Design Inc.	Columbia	PA	Michael P. Jones	EQUALS
Baker & Associates	Coraopolis	PA	Raymond Paff	EQUALS
Strunk-Albert Engineers	East Stroudsburg	PA	David Strunk	APPROVED
L. Robert Kimball & Associates	Ebensburg	PA	Dave Ciner	PRIME
Maida Engineering	Essington	PA	Michael L. Panco	EQUALS
ATA Engineers	Frackville	PA	Wade Romberger	PRIME
Waxman Lit Consulting Engineer	Glenside	PA	Ed Godorov	PRIME
J.S. Young Associates	Grove City	PA	David Thompson	APPROVED
Sturgeon Engineering	Grove City	PA	George Hagstrom	APPROVED
Brinjac Kambic & Associates	Harrisburg	PA	Brian Cunningham	APPROVED
Brinjac Kambic & Associates	Harrisburg	PA	Tom Coughlin	PRIME
Brinjac Kambic & Associates	Harrisburg	PA	Michael Brame	PRIME
MEG Engineering	Harrisburg	PA	Bill Klock	EQUALS
H.F. Lenz Company	Johnstown	PA	Greg Rummel	PRIME
H.F. Lenz Company	Johnstown	PA	Jim Simmons	PRIME
H.F. Lenz Company	Johnstown	PA	Larry Konchan	PRIME
Gumpf Engineering	New Brighton	PA	Frederick Gumpf	APPROVED
Pascoe Engineering	New Castle	PA	Chris Clark	APPROVED
Kling Lindquist Partnership	Philadelphia	PA	Charles Meyrick	APPROVED
Ballinger Company	Philadelphia	PA	David Orrell	PRIME
Ballinger Company	Philadelphia	PA	Gleb Slovinsky	PRIME
Paul H. Yeomans Inc.	Philadelphia	PA	Bruce Falkenstein	PRIME
The Vitetta Group	Philadelphia	PA	Jack Donahue	APPROVED

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Company	Location		Engineer	Status
Wick Fisher White	Philadelphia	PA	Jerry S. Olfazian	APPROVED
Loftus Division Eighleay Engineers	Pittsburgh	PA	Dave Crossey	APPROVED
Dodson Engineering	Pittsburgh	PA	Rudolph Svoboda	EQUALS
Art Schock & Associates	Pittsburgh	PA	Arthur Schock	APPROVED
Art Schock & Associates	Pittsburgh	PA	Donald Schock	APPROVED
Astorino Branch Engineers	Pittsburgh	PA	Raymnod Ballantine	APPROVED
Burt Hill & Associates	Pittsburgh	PA	John Johnson	APPROVED
Claitman Engineering	Pittsburgh	PA	Robert Rosenthal	APPROVED
SEI Engineering	Pittsburgh	PA	Mary Smith	APPROVED
P.L. Frank, Inc.	Pittsburgh	PA	Philip Frank	APPROVED
Gibson Engineering	Pittsburgh	PA	Ronald Pedatella	PRIME
Gibson Engineering	Pittsburgh	PA	Stephen Gipson	PRIME
Hunt Engineers and Architects	Pittsford	PA	Kevin Broadway	EQUALS
STV/Sanders & Thomas	Pottstown	PA	Al Kovach	EQUALS
STV/Sanders & Thomas	Pottstown	PA	Rich Snow	APPROVED
Beitman & Hupett Inc.	Reading	PA	Len Butzer	EQUALS
Gary Johnston & Associates	State College	PA	Jeffery Spackman	APPROVED
Parfitt/Ling	State College	PA	David Hile	APPROVED
Consolidated Engineer	West Lawn	PA	Richard Brownmiller	EQUALS
Borton-Lawson Engineering	Wilkes Barre	PA	Joseph J. Niznik Jr.	PRIME
JDB Engineering	York	PA	Greg Grvendler	PRIME
Basco Associates	York	PA	Harold Rupp	APPROVED
Foreman Bashford	Zelienople	PA	Bob Dorsch	APPROVED
Engineering Associates, Inc.	Charleston	SC	Brandt H. Williams	PRIME
Owens and Associates	Charleston	SC	Bill Coker	APPROVED
Beauford Goff	Columbia	SC	Bill Itter	APPROVED
Meca Mechanical	Columbia	SC	Bob Light	EQUALS
Odell Associates	Charlotte	NC	Pavan Bharteey	PRIME
Odell Associates	Charlotte	NC	John Best	APPROVED
Odell Associates	Charlotte	NC	Larry Guss	PRIME
McCracken & Lopez P.A.	Charlotte	NC	Richard McCracken	EQUALS
McCracken & Lopez P.A.	Charlotte	NC	Tony Brandon	APPROVED
Engineering Services	Charlotte	NC	Attila Horvath	APPROVED
McKnight Smith Engineers Inc.	Charlotte	NC	Mike Ward	APPROVED
Mechanical Engineers Inc.	Charlotte	NC	Keith Connors	APPROVED
Peterson & Associates	Charlotte	NC	Jeff Harris	APPROVED
Professional Engineering Associates	Charlotte	NC	Larry Rash	PRIME
Knott & Roberts	Durham	NC	John Rich	APPROVED
Bass, Nixon & Kennedy Inc.	Raleigh	NC	Bert Witford	PRIME
David Simms & Associates	Wilminton	NC	Bob English	APPROVED
Henning Metz & Hartford	Fargo	ND	Robert Metz	APPROVED
Henning Metz & Hartford	Fargo	ND	Gerald Hartford	PRIME
Davis Fenton Strange Darling	Lincoln	NE	Matt Morrissey	APPROVED
Henningson, Durham & Richardson	Lincoln	NE	John Albers	EQUALS
Dana Larson Roubal Associates	Omaha	NE	Tim Lang	PRIME
Dana Larson Roubal Associates	Omaha	NE	Terry Rushlau	EQUALS
Dana Larson Roubal Associates	Omaha	NE	Bob Berry	APPROVED
Henningson, Durham & Richardson	Omaha	NE	Bob Siepold	EQUALS
Henningson, Durham & Richardson	Omaha	NE	Chip	EQUALS
Henningson, Durham & Richardson	Omaha	NE	Jack Pagel	EQUALS
Hennisgson, Durham & Richardson	Omaha	NE	Paul O'Brien	EQUALS
Alvine & Associates Inc.	Omaha	NE	Larry Knotek	PRIME
Farris Engineering	Omaha	NE	Bob Martinmass	APPROVED
KFA Consulting Engineers Inc.	Teaneck	NJ	Thomas Liquori	EQUALS
DLB Associates	Wanamassa	NJ	John Cascone	APPROVED
Kelter & Gilligo	Princeton Junction	NJ	Chuck DiBona	PRIME
Metro-Tec Engineering	Albuquerque	NM	Merv Behal	APPROVED
Bridgers & Paxton Consultants	Albuquerque	NM	Bob Hopper	PRIME
JBA Consulting Engineers	Las Vegas	NV	Don Koch	APPROVED
JBA Consulting Engineers	Las Vegas	NV	Ed Butera	PRIME
JBA Consulting Engineers	Las Vegas	NV	Ralph Joeckel	PRIME
Dunham & Associates	Las Vegas	NV	Mike Brinkley	PRIME

Company	Location		Engineer	Status
Clark County School District	Las Vegas	NV	Ross Burnett	APPROVED
Harris Engineers	Las Vegas	NV	Bill Carman	APPROVED
Peterson & Associates	Reno	NV	Pete Peterson	PRIME
Peterson & Associates	Reno	NV	Tom Federici	APPROVED
Petty & Associates	Reno	NV	Dan Banner	PRIME
Dinter Engineering	Reno	NV	Denny Newton	PRIME
Dinter Engineering	Reno	NV	Ritch Golden	APPROVED
NYSDOGS Design & Construction Group	Albany	NY	Fred Samone	APPROVED
Babinsky Klein Engineering PC	Amherst	NY	Chris Sendker	APPROVED
Anthony Joy & Associates	Chautauqua	NY	Anthony Joy	APPROVED
Robson & Woese Inc.	East Syracuse	NY	George	APPROVED
Robson & Woese Inc.	East Syracuse	NY	Steve Howe	APPROVED
Henningson, Durham & Richardson	Flushing	NY	Alvin Dunaisky	APPROVED
Fred H. Thomas Associates PC	Ithaca	NY	Frank Heine	APPROVED
Elliott Hardy Associates	New York	NY	Tom Ribarich	PRIME
Seelye Stevenson Value Knecht	New York	NY	Garo Koumjian	APPROVED
Seelye Stevenson Value Kencht	New York	NY	Mr. Bonnano	EQUALS
M.A. Rubiano	New York	NY	Alberto Galarza	APPROVED
Kallen & Lemelson	New York	NY	Len Matlick	PRIME
Bryce Plumbing	Florence	SC	Jimmy Lee	APPROVED
Peritus Engineering	Greenville	SC	Ed Mathis	APPROVED
Peritus Engineering	Greenville	SC	Ray Putnam	EQUALS
Peritus Engineering	Greenville	SC	Tony Smith	APPROVED
Davis & Floyd Inc.	Greenwood	SC	Ron Kelly	PRIME
Lockwood Greene Engineers	Spartansburg	SC	Phil McLaughlin	EQUALS
Lockwood Greene Engineers	Spartansburg	SC	Keith Lowry	APPROVED
Associated Consulting Engineers	Sioux Falls	SD	John Dewitt	APPROVED
Associated Engineering Consultants	Johnson City	TN	Bruce Smith	APPROVED
Associated Engineering Consultants	Johnson City	TN	Edward M. Stanley P.E.	APPROVED
Engineering Services Group	Knoxville	TN	Ron Donahue	PRIME
Kelso-Reger	Knoxville	TN	Laura Beth Lawrence	PRIME
Barge, Wagner, Sumner & Cannon	Knoxville	TN	Don Quinley	EQUALS
Barge, Wagner, Sumner & Cannon	Knoxville	TN	Greg Knauss	PRIME
Ellers Oakley Chester & Rike	Memphis	TN	Scott Barry	APPROVED
Smith, Seckman, Reid	Nashville	TN	John Alford	APPROVED
Smith, Seckman, Reid	Nashville	TN	Kevin Rowan	APPROVED
Smith, Seckman, Reid	Nashville	TN	Larry Rains	PRIME
Smith, Seckman, Reid	Nashville	TN	Rocky Goodman	EQUALS
I.C. Thomason & Associates	Nashville	TN	Bob Coss	APPROVED
I.C. Thomason & Associates	Nashville	TN	Vernon Mullins	APPROVED
I.C. Thomason & Associates	Nashville	TN	Elton S. Chavers	PRIME
Entech Inc.	Nashville	TN	John Briely	APPROVED
Entech Inc.	Nashville	TN	Mitch Simpson	PRIME
Heningson, Durham, Richardson	Austin	TX	Art Meyer	EQUALS
O'Connel Robertson & Associates	Austin	TX	Larry Werner	APPROVED
Gerling Thomas Ward, Inc.	Austin	TX	Mike McCornack	APPROVED
Shriver-Megert & Associates	Amarillo	TX	John Abbott	APPROVED
Steve Dunn & Partners	Dallas	TX	Bob Castro	APPROVED
Turner Engineers	Dallas	TX	Frank Skipper	APPROVED
James Johnson & Associates	Dallas	TX	Scott Herrbold	APPROVED
Arjo Engineers Inc.	Dallas	TX	Bill Howse	APPROVED
Brandt Engineering	Dallas	TX	Robert Worth	EQUALS
Henningson, Durham & Richardson	Dallas	TX	Alan Watt	PRIME
Henningson, Durham & Richardson	Dallas	TX	Bud Miller	PRIME
Henningson, Durham & Richardson	Dallas	TX	Carol Rouw	PRIME
Henningson, Durham & Richardson	Dallas	TX	Jay Winslow	PRIME
Henningson, Durham & Richardson	Dallas	TX	Ken Gill	PRIME
Henningson, Durham & Richardson	Dallas	TX	Ming Lee	PRIME
Henningson, Durham & Richardson	Dallas	TX	Rich Lundstrom	PRIME
Henningson, Durham & Richardson	Dallas	TX	Steve Chandler	PRIME
Henningson, Durham & Richardson	Dallas	TX	Steve Sedlacek	PRIME
Blum Consulting Engineers	Dallas	TX	Paul Rutherford	APPROVED

Hydra-Rester® Engineer Status Report
Partial Listing

Company	Location		Engineer	Status
Blum Consulting Engineers	Dallas	TX	Tom Moore	APPROVED
Sam Toub & Associates	Dallas	TX	Sam Toub	APPROVED
Reed Wells Benson & Company	Dallas	TX	Byron Knight	PRIME
Latta Technical Services	Dallas	TX	Allen	APPROVED
AK & Associates	Dallas	TX	Abbas Kaka	EQUALS
Hunt Building Corporation	El Paso	TX	Steve Serda	APPROVED
Wells-Doak Engineers	Fort Worth	TX	Duran Doak	APPROVED
Yandell & Hiller, Inc.	Fort Worth	TX	Todd Beenders	PRIME
Burns DeLatte & McCoy	Houston	TX	Dave McCoy	PRIME
Burns DeLatte & McCoy	Houston	TX	Robert Gutierrez	PRIME
Brown & Root, Inc.	Houston	TX	Steven Chun	APPROVED
Steve Redding Consulting Engineers	Houston	TX	Steve Redding	APPROVED
Carter & Burgess, Inc.	Houston	TX	Bob Drouillard	APPROVED
Lockwood Andrews & Nunan	Houston	TX	Lynn Gibbs	APPROVED
DiStefano Santopetro Archs Inc.	Houston	TX	Bryan Horn	APPROVED
Willie E. Lewis, Inc.	Houston	TX	Bill Howell	PRIME
Day, Brown, Rice Inc.	Houston	TX	Johnnie Strong	APPROVED
June & Stanton	Houston	TX	George Stanton	APPROVED
Smith, Seckman, Reid	Houston	TX	Richard Morris	PRIME
R.H. George & Associates	Houston	TX	David Cropper	PRIME
Gruenwald Engineers	Houston	TX	Roger D. Lyall	PRIME
Agnew and Associates	Lubbock	TX	Dwayne Agnew	APPROVED
Hendrix & Meyers Consulting Engineers	Roundrock	TX	Buck Hendrix	APPROVED
Hendrix & Meyers Consulting Engineers	Roundrock	TX	Luciano Garcia	PRIME
Hendrix & Meyers Consulting Engineers	Roundrock	TX	Keith Mayes	EQUALS
Marmon Mock	San Antonio	TX	John Haggstrom	APPROVED
Marmon Mock	San Antonio	TX	Stve Huck	APPROVED
Silber & Associates	San Antonio	TX	Victor Olivares	APPROVED
Goetting & Associates, Inc.	San Antonio	TX	Butch Tarrilin	PRIME
Goetting & Associates, Inc.	San Antonio	TX	Gene Wisley	EQUALS
Bennion Associates	Murray	UT	Kenny Ekenstam	PRIME
Dale R. Wilde	Salt Lake City	UT	Ray Wilde	APPROVED
Heath Engineering	Salt Lake City	UT	Larry Viegle	APPROVED
J.R. Redd, Inc.	Salt Lake City	UT	Jack Reed	PRIME
Dale R. Wilde	Salt Lake City	UT	Brad Williams	APPROVED
Dale R. Wilde	Salt Lake City	UT	Dale R. Wilde Sr.	PRIME
Van Boreum, Frank & Associates	Salt Lake City	UT	Kathy Tilby	APPROVED
Henningson, Durham & Richardson	Alexandria	VA	Mr. Poage	EQUALS
Henningson, Durham & Richardson	Alexandria	VA	Steve Bailey	EQUALS
Henningson, Durham & Richardson	Alexandria	VA	Van Smith	EQUALS
S3E Engineers	Arlington	VA	Bruce McCullough	APPROVED
McDavid Engineering	Harrisonburg	VA	Fred McDavid	PRIME
William H. Pickeral	Lynchburg	VA	William H. Pickeral	EQUALS
Dewberry Davis	Marion	VA	Robert Epperson	EQUALS
ECI Engineers	Newport News	VA	Wesley Bonafe	PRIME
Koblos/Townsend	Reston	VA	Alison Dalgliesh	APPROVED
Basderville & Son	Richmond	VA	Carl Hudson	APPROVED
E.C.I. Engineers	Richmond	VA	Wayne Metheny	APPROVED
Simmons Rockecharlie & Prince	Richmond	VA	Tom Simmons	APPROVED
The Moseley Group	Richmond	VA	Kevin Sherlock	EQUALS
Lanna, Dunlap, & Spriggs	Richmond	VA	Clark	APPROVED
S.F.C.S.	Roanoke	VA	Tim Roseberry	APPROVED
Hayes Seay Mattern & Mattern	Roanoke	VA	Carlton Ryan	EQUALS
Hayes Seay Mattern & Mattern	Raonoke	VA	Mike Todd	APPROVED
Spectrum Engineers	Roanoke	VA	Granville Grant	PRIME
Glassman & Associates P.C.	Vienna	VA	Ronald L. Payne	EQUALS
Wood/Harbinger, Inc.	Bellevue	WA	Bob Axley	APPROVED
Consulting Design	Lynnwood	WA	Ray Richards	APPROVED
Consulting Design	Lynnwood	WA	John Della	PRIME
Abacus Consultants	Seattle	WA	Bill Mask	APPROVED
Abacus Consultants	Seattle	WA	Ron Quist	APPROVED
AEI Northwest	Seattle	WA	Scott Largent	PRIME

Hydra-Rester® Engineer Status Report
Partial Listing

Company	Location		Engineer	Status
Bouillon, Christoff, Schairer	Seattle	WA	Jim Jenkins	APPROVED
Bouillon, Christoff, Schairer	Seattle	WA	Larry Brown	PRIME
Bouillon, Christoff, Schairer	Seattle	WA	Ralph Meyer	PRIME
Coffman Engineers Inc.	Seattle	WA	Bill McDonald	PRIME
Coffman Engineers Inc.	Seattle	WA	Paul Largy	PRIME
Esmond Petska	Seattle	WA	Paul Petska	APPROVED
Esmond Petska	Seattle	WA	Peter Boileau	APPROVED
Hargis Engineers	Seattle	WA	Paul Johnson	APPROVED
Hargis Engineers	Seattle	WA	Tom Harrylock	APPROVED
John Graham & Associates	Seattle	WA	Erling Olson	APPROVED
McKinstry Company	Seattle	WA	Brent Guinn	APPROVED
Notkin & Associates	Seattle	WA	Larry Brown	PRIME
Notkin & Associates	Seattle	WA	Richard Senske	EQUALS
Halvorson Beach & Bower	Seattle	WA	Harry Bower	PRIME
Halvorson Beach & Bower	Seattle	WA	Vern Enns	PRIME
McKinstry Company	Seattle	WA	Brent Guinn	APPROVED
L & S Engineering Associates	Spokane	WA	Ron H. Burke	EQUALS
L & S Engineering Associates	Spokane	WA	Jim Stiller	APPROVED
Luhn Shafer Wanless Associates	Spokane	WA	Dale Shafer	PRIME
Tres West Engineers	Tacoma	WA	Fred Layton	APPROVED
Tres West Engineers	Tacoma	WA	George Conner	APPROVED
Tres West Engineers	Tacoma	WA	Dennis Grovenburg	APPROVED
ZMM Inc.	Charleston	WV	Scott Mason	APPROVED
ZMM Inc.	Charleston	WV	Bill Heavner	APPROVED
Clingenpeel/McBrayer Associates	Charleston	WV	Floyd Clingenpeel	APPROVED
Walt Hestickon & Associates	Altoona	WI	Ken Rudolphsen	PRIME
H.V.P. Design	Eau Claire	WI	Bob Novak	PRIME
Berners Schober Associates	Green Bay	WI	Lee Ducas	APPROVED
Somerville Associates	Green Bay	WI	Brian K. Tym	PRIME
Chris C. Olsen Owen Engineers	La Cross	WI	Ted A. Carlson	EQUALS
Chris C. Olsen Owen Engineers	La Cross	WI	Chris C. Olson	EQUALS
Affiliate Engineers Inc.	Madison	WI	Mike Haffler	PRIME
DILHR Safety and Buildings Division	Madison	WI	Michael Beckwit	APPROVED
Ring & DuChateau, Inc.	Milwaukee	WI	Don Bears	APPROVED
Ring & DuChateau, Inc.	Milwaukee	WI	Dave Rawls	APPROVED
PSG	Milwaukee	WI	Pat Geraghty	APPROVED
HNTB	Milwaukee	WI	David Sturges	EQUALS
Richards & Associates	New Berlin	WI	Bob Richards	PRIME
J. David Konkel Consulting Engineers	Sheridan	WY	David Konkel	PRIME
Keen Engineering Ltd. (Canada)	N. Vancouver	BC	Mark Swain	EQUALS
H.H. Angus & Associates (Canada)	Don Mills	ON	Bruce Kobald	APPROVED
Piafsky, L'Ecuyer (Canada)	Montreal	QC	Don Piafsky	APPROVED
Parsons Brinckerhoff Ltd.	Quarry Bay	China	Louis M.L. Wu	PRIME
Parsons Brinckerhoff Ltd.	Quarry Bay	China	Derek S.S. Tsoi	PRIME
Wong & Ouyang Ltd.	King's Road	China	Tang Siu Hung	PRIME
US Army Corps of Engineers	Seoul	Korea	Na, Pyong-Chol	PRIME
Jungwon Architects, Consultants & Engineers	Seoul	Korea	Y.M. Lee	PRIME

Key:
Approved: Sioux Chief complies with spec requirements, specifying engineer will approve upon submittal.
Equal: Sioux Chief listed as approved alternative to other manufacturer's arrester, which is listed in master spec
Prime: Sioux Chief is the arrester listed by name on the master spec.

Hydra-Rester®

Arrester Installation

Partial Listing

Location	Name of Job	Units
	Correctional Facilities	
Calipatria, CA	Northern Imperial County State Prison	54
Chowchilla, CA	Madera State Prison	1132
Coalinga, CA	Coalinga State Prison	480
Corcoran, CA	Corcoran Prison	188
Crescent City, CA	Del Norte California State Prison	813
Delano, CA	California State Prison	970
Oroville, CA	F.M. Booth Butte County Jail	44
San Mateo, CA	West County Detention Center	76
Santa Paula, CA	Ventura County Jail	415
Wasco, CA	State Prison	1012
Denver, CO	Women's Correction Facility	300
Niantic, CT	Womens Institution	500
Gainesville, FL	Alachua County Detention Center	160
Miami, FL	South Florida Reception/Correction Center	102
Orlando, FL	Central Florida Reception/Correction Center	98
Thomasville, GA	Thomas County Jail	138
Decatur, GA	DeKalb County Jail	465
Ina, IL	Rend Lake Correctional Center	750
Harrisburg, IL	Saline County Jail	160
Peoria, IL	Sheridan, Canton – Cell Houses	732
Kokomo, IN	Howard County Prison	322
Noblesville, IN	Hamilton County Juvenile Detention Center	15
El Dorado, KS	El Dorado Maximum Security Prison	160
Ellsworth, KS	Ellsworth Correctional Facility	161
Emporia, KS	Lyons County Law Enforcement Center	50
Lansing, KS	Kansas State Prison	118
Larned, KS	Larned State Correctional Facility Hospital	46
Wichita, KS	Sedgewick County Jail	526
Manchester, KY	Federal Correctional Institute	559
Warren, ME	Maine State Prison – Minimum Security	165
Baraga, MI	Baraga Correctional Facility	245
Greene County, MS	Southern Mississippi Correctional Facility	212
Monrovia, NY	New York State Maximum Security Facility	193
New York, NY	Metro Jefferson Correctional Facility	288
Portland, OR	Donald E. Long Juvenille Justice Center	128
Allenwood, PA	Allenwood Correction Center	340
Pittsburgh, PA	Allegheny County Jail	2000
Dauphin, PA	Dauphin County Prison	189
Waynesburg, PA	Green County Jail	665
Ridgeland, SC	Ridgeland Prison	126
Turbeville, SC	Turbeville Prison	208
Abilene, TX	French Robertson Unit-Texas Dept.	933
Amarillo, TX	Amarillo Prison	992
Childress, TX	Childress Prison	60
Diboll, TX	County Detention Center	83
Hondo, TX	Substance Abuse Treatment Facility	121
Lubbock, TX	TDCJ Brownfield Prison	149
Pampa, TX	Gray County Jail Addition	30
Texarkana, TX	Bowie County Jail	55
San Diego, TX	Substance Abuse Treatment Facility	103
Waco, TX	McLennan County Jail	76
Roanoke, VA	Roanoke City Jail	30
Portsmouth, VA	Deerfield Correction Center	34
Kenosha, WI	Racine Correctional Institute	35
Oshkosh, WI	Oshkosh Correctional Center	427
	Medical Facilities	
Tuscaloosa, AL	Druid City Hospital	235
Atascadero, CA	Atascadero State Hospital	100
Bakersfield, CA	Bakersfield Memorial Hospital	230
Fountain Valley, CA	Fountain Valley Care Center	344
Los Angeles, CA	Cedars Sinai Hospital	32
Los Angeles, CA	University Southern California Hospital	282
Palo Alto, CA	Palo Alto Medical Facility	800

Hydra-Rester® Arrester Installation
Partial Listing

Location	Name of Job	Units
Rancho Mirage, CA	Eisenhower Medical Center	55
Tustin, CA	Kaiser Hospital	124
Healdsburg, CA	Healdsburg General Hospital	20
Fresno, CA	Kaiser Hospital	477
Porterville, CA	Sierra View Hospital	90
New Britain, CT	New Britian Hospital	115
Orlando, FL	University Medical Center	50
Kissimmee, FL	Florida Hospital Addition	73
Hull, IA	Flyod Hospital	20
Coeur D'Alene, ID	Kootenai Medical Center	20
Coeur D'Alene, ID	New State Hospital	115
Bangor, ME	Eastern Maine Medical Center(MRI Bldg.)	19
Damariscotta, ME	Miles Hospital	43
Crow Agency, MT	Crow Agency Hospital	80
Greenville, NC	Pitt County Hospital	190
Winston-Salem, NC	Clinical Service Building	750
Rocky Mount, NC	Rocky Mount Hospital	48
Durham, NC	VA Medical Center	50
Raleigh, NC	UNC Women & Children's Hospital	582
Raleigh, NC	Wake Medical Center	150
Lincoln, NE	Bryan Memorial Hospital Outpatient Building	165
Albuquerque, NM	Loveless Multi-Practice Hospital	40
Tioga, NY	Tioga Hospital / Nursing Home	111
Utica, NY	Slocum Dickson Medical Clinic	200
Columbus, OH	Riverside Hospital	570
Columbus, OH	Correction Medical Center	88
Lawton, OK	VA Outpatient Center	92
Altoona, PA	Altoona Hospital	250
Pittsburgh, PA	West Penn Hospital	121
Greenwood, SC	Self Memorial Hospital	89
Bristol, TN	Bristol Regional Medical Center	240
Greenville, TN	Laughlin Hospital	200
Nashville, TN	Centennial Medical Center	285
Bonham, TX	VA Hospital	190
Lubbock, TX	Methodist Hospital	48
Houston, TX	Cypress Fair Womens Medical Center	76
Houston, TX	Kingwood Hospital	123
Tyler, TX	East Texas Medical Center	95
Suffolk, VA	Lakeview Medical Center	32
Norfolk, VA	Childrens Hospital	215
Fort Lewis, WA	Maddigan VA Hospital	398
Milwaukee, WI	Milwaukee City Medical Complex	32
Milwaukee, WI	Childrens Hospital of Wisconsin	350
Charleston, WV	CAMC Hospital	156
	Schools	
Pomona, CA	Pomona College	51
New Britain, CT	Central Connecticut State University	145
Palm Beach Garden, FL	Eissey Theatre, Palm Beach Comm. College	20
Atlanta, GA	Georgia Industrial Institute	146
Atlanta, GA	University Apartments (96 Olympics)	410
Iowa City, IA	Hillcrest Dormitory	96
Pekin, IL	CB Smith School	50
Bloomington, IL	Indiana University- Sports and Rec Building	48
Bloomington, IN	Monroe County High School	50
Indianapolis, IN	Center Grove High School	52
Indianapolis, IN	North Central High School	36
Indianapolis, IN	Indianapolis Public School 14, #269	61
Jasper, IN	Ireland Elementary	46
Muncee, IN	Burris School	50
Orono, ME	University of Maine Alfond Arena	40
Minneapolis, MN	Basic Science Research Facility	78
Maryville, MO	NW Missouri State University – Lamkin Gym	21
Springfield, MO	Southern Missouri University Cafeteria	30
Boone, NC	Appalacia State University	89
Carrboro, NC	Carrboro Middle School	59
Greensboro, NC	A&T State University (Dorm Renovation)	45

Hydra-Rester® Arrester Installation
Partial Listing

Location	Name of Job	Units
Las Vegas, NV	Cheyenne High School	34
Las Vegas, NV	Memorial High School	34
Greensboro, NC	NCAT University Dorm Renovation	105
Brooklyn, NY	Brooklyn Occupational Training Center	60
Brooklyn, NY	Public School IS# 171	25
Buffalo, NY	University of Buffalo Housing	360
Oxford, OH	University Commons	128
Guthrie, OK	Guthrie Elementary School	31
Norman, OK	Oklahoma University Energy Center	72
Altoona, PA	Blairsville, High School	30
Erie, PA	Erie County VOTEC	35
Landisville, PA	Hemsfield High School	94
Moscow, PA	Moscow Elementary School	40
Saint Matthews, SC	John Ford Middle School	68
Aiken, SC	Aiken High School Gym	43
Highland Park, TX	Highland Park Middle School	50
Houston, TX	Spring Branch Elementary School	100
College Station, TX	New Junior High School	43
Grapevine, TX	Grapevine/Colleyville ISD Elementary School	37
Lubbock, TX	Texas Tech. Univ. Health Sciences Building	96
Leesburg, VA	Lowden County Schools	78
Midlothian, VA	Bailey's Bridge High School	95
Sopkane, WA	Chase Middle School	48
Spokane, WA	Hamblen School	140
Antigo, WI	Antigo High School	25
Madison, WI	Beloit Memorial High School	32
	U.S. Military	
Fort Ord, CA	Military Housing	1142
Fresno, CA	Lemoore Naval Station	840
Twenty-Nine Palms, CA	U.S. Marine Corp Base	584
Denver, CO	Lowry AFB – Military Housing	368
Ft. Walton Beach, FL	Eglin AFB – Military Housing	505
Ft. Walton Beach, FL	Hurlburt Field – Military Housing	482
Mayport, FL	Rebault Bay Village Military Housing	1232
Panama City, FL	Coastal Dining Facility	40
Sorrento, FL	Patrick Air Force Base – Housing	250
Fort Benning, GA	Military Housing	456
St. Mary's, GA	King's Bay Submarine Base	164
Moanalua, HI	Military Base	1292
Pearl City, HI	Military Base	780
Schofield, HI	Military Housing	148
Glenview, IL	Glenview Naval Airbase	400
Fort Riley, KS	Military Housing	50
Bossier , LA	Barstow AFB – Military Housing	100
Camp Lejeune, NC	Bachelors Enlisted Quarters	426
Fort Bragg, NC	Military Housing	1156
Fort Bragg, NC	Military Housing (Barracks)	238
Fort Bragg, NC	Military Housing	528
Eatontown, NJ	Fort Monmouth Army Military Base	58
Clovis, NM	Cannon AFB Dorm	35
Holman, NM	Holman AFB – Enlisted Housing	740
Watertown, NY	Fort Drum – Military Housing	182
Altus, OK	Altus AFB – Military Housing	426
Fort Sill, OK	Military Housing	671
Fort Sill, OK	Barracks Renovation	264
Columbus, OH	DCSC Operation Center	272
Mechanicsburg, PA	Naval Control Parts Center	61
Newport, RI	Naval Education & Training Center	660
Box Elder, SD	Ellsworth AFB – Military Housing	1620
San Antonio, TX	Military Housing	284
Fort Hood, TX	Military Housing	176
Fort Hood, TX	Barracks Renovation	176
Shepherd, TX	Enlisted Dormitory	762
Fort Belvoir, VA	Army Military Housing	1328
Fort Belvoir, VA	Army Military Housing	79
Williamsburg, VA	Dormitory Training Facility, Camp Perry	61

Hydra-Rester® Arrester Installation
Partial Listing

Location	Name of Job	Units
Woodbridge, VA	Navy Apartments Village #1 and #3	706
McChord, WA	McChord AFB	300
Yakima, WA	Military Housing	400
	Federal/State Government	
Fairbanks, AK	HUD 40	80
Novato, CA	Fire Station	30
Redwood Valley, CA	Northern Circle Indian Housing Authority	50
Augusta, GA	Delta Homes (HUD)	250
Cartersville, GA	Cartersville Housing Authority (HUD)	150
Marietta, GA	Marietta Housing Authority (HUD)	130
Honolulu, HI	Helemano Government Housing Project	340
Wichita, KS	Kansas State Office Building	70
Landover, MD	Sommerfield Housing Project	2021
Bath, ME	West Bath District Court House	17
St. Louis, MO	Convention Center Addition	57
Box Eldr, MT	Indian Housing Authority	80
Sparks, NV	Pyramid Lake Indian Housing Authority	70
Pittsburgh, PA	Crowley Manor Housing Project (HUD)	330
Charleston, SC	Charleston Ship Yard (Public Works Facility)	35
Coyce, SC	U. S. Postal Office	55
Effingham, SC	Florence Civic Center	460
	Hotel/Motel	
Ocean Springs, AL	Sleep Inn Hotel	65
Boynton Beach, FL	Marriott Hotel	100
Ft. Lauderdal, FL	Comfort Suites Hotel	29
Kissimmee, FL	All-Star Resort	1296
Lake Buena Vista, FL	Magnolia Bend Disney Hotel	528
Orlando, FL	Clarion Hotel	338
Orlando, FL	Comfort Suites Hotel	120
Orlando, FL	Omni Rosen Hotel	236
Honolulu, HI	Hapuna Beach Hotel	45
Rockfork, IL	Econo-Lodge	100
Malden, MA	Gateway Hotel	336
Lansing, MI	Quality Inn Hotel	240
Traverse City, MI	Park Place Motel	80
Branson, MO	Holiday Inn	250
Branson, MO	Seven Gables Motel	40
Branson, MO	Green Mountain Inn	35
Branson, MO	Holiday Hill Resort	48
Branson, MO	Grand Victorian Inn	60
Osage Beach, MO	Marriott Tan Tara	40
Las Vegas, NV	MGM Grand Hotel	150
Durham, NC	Hilton Hotel	92
Corning, NY	Perri's Days Inn	64
Oklahoma City, OK	Marriott Hotel	191
Myrtle Beach, SC	Beach Cove Inn Motel/Hotel	520
Hilton Head, SC	Grande Ocean Resort	40
Chesepeake, VA	Marriott Hotel	33
Ayudhya, Thailand	Krung Sri Riverside Hotel	39
Bangkok, Thailand	Amarit Watergate Hotel	47
Bangkok, Thailand	Ayothaya Thani Hotel	633
Bangkok, Thailand	Bai Yok Tower II	22
Bangkok, Thailand	Century Hotel	40
Bangkok, Thailand	Chaopraya Park Hotel	96
Bangkok, Thailand	Lotus Tower Hotel	108
Bangkok, Thailand	Rambrandt Hotel & Plaza	459
	Apartments/Condos	
Coronado, CA	Coronado Apartments	220
San Diego, CA	Affinity Condos	300
Orlando, FL	The Renaissance (Condos)	142
Atlanta, GA	University Apartments	100
Honolulu, HI	Nuuanu Parkside (Condos)	644
Honolulu, HI	Queen Victoria Condos	740
Kahului-Maui, HI	Kahului Town Terrace	512
Maui, HI	The Palms, Phase II (Condos)	600
Maui, HI	The Villas (Condos)	222

Hydra-Rester® Arrester Installation
Partial Listing

Location	Name of Job	Units
Branson, MO	Foothills Condos	261
Kearney, NE	Regency Apartments	100
Hilton Head, SC	Cypress Village	130
Arlington, VA	Courthouse Commons Highrise	405
Everett, WA	Center House Apartments	10
Hong Kong, China	Old Peak Road Residential Development	24
Hong Kong, China	Redevelopment at Robinson Road	16
Bangkok, Thailand	Art View Service	20
Bangkok, Thailand	Baan Chaopraya	219
Bangkok, Thailand	Bangkok River Park	493
Bangkok, Thailand	Evergreen View Tower	274
Bangkok, Thailand	Fair View Tower	196
Bangkok, Thailand	Lake Green	71
Bangkok, Thailand	Muang Thong Thani	178
Bangkok, Thailand	Palm Court	110
Bangkok, Thailand	President Park – C-8	144
Bangkok, Thailand	President Park – D	230
Bangkok, Thailand	Prestige Tower	217
Nakhon Pathom, Thailand	The Royal Gems	112
Pathum Thani, Thailand	Thanya Thani	26
Liverpool, England	Bispham House	20
	Office Buildings	
Los Angeles, CA	26 Story Office Building, Wilshire Blvd.	164
Washington, DC	Pennsylvania Ave. N.W. Office Building	139
Linthicum Heights, MD	City Cresent Office Building	155
Omaha, NE	Two Pacific Place	36
Seattle, WA	Allstate Office Building	38
Hong Kong, China	South Horizon Development	96
Singapore, China	Lane Crawford Office Building	60
Bangkok, Thailand	Alpha Building	92
Bangkok, Thailand	Bangkapi Office Building	30
Bangkok, Thailand	Bisco Tower	62
Bangkok, Thailand	Boonpong S.N. Tower	56
Bangkok, Thailand	Esso Building	78
Bangkok, Thailand	Phya Tower	67
Bangkok, Thailand	Quality House	55
Bangkok, Thailand	Shiva Height Building	252
Bangkok, Thailand	Siam Commercial Bank Headquarters	280
Bangkok, Thailand	S.M. Office Tower	128
Bangkok, Thailand	Viboon Thani Building	76
Bangkok, Thailand	208 Wireless Road	46
Leatherhead, England	Esso Petroleum Building	12
London, England	Bishopsgate Office Building	8
Stevenage, England	Glaxo Pharmaceutical Factory	140
Stevenage, England	Glaxo R&D Complex	1000
	Miscellaneous	
Los Angeles, CA	LA Convention Center	144
Woodland Hills, CA	Warner Center Plaza #6	96
Chino, CA	Mission Laundry Service	108
Denver, CO	Coors Field	250
Boynton Beach, FL	Adult Care Complex	400
Lady Lake, FL	Orange Blossom Gardens	100
Maitland, FL	Brighten Gardens Adult Care Living Units	265
Orlando, FL	Orange County Convention Center	87
Orlando, FL	1st Presbytarian Church	65
Atlanta, GA	Olympic Field Hockey Arena (96 Olympics)	98
Peoria, IL	Cub Food Store	40
Newton, KS	Kansas Christian Home	50
Portland, ME	Barber Foods	19
Saco, ME	Sweetser's Childrens Home	31
Silver Springs, MD	Villa Cortez Retirement Community	208
Greensboro, NC	Retirement Care Facility	35
Bronx, NY	Webster Avenue Womens Shelter	125
Brooklyn, NY	Bishop Mugavero Geriatric Center	200
Dayton, OH	Country Club of the North	90
Midwest City, OK	Midwest City Womens Center	68

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