

## Minimum Standard 3.02: Principal Spillways

### High Density Polyethylene (Plastic) Trash Racks

#### Definition

Trash Racks are cage like attachments used on stormwater impoundment riser or outlet structures. High density polyethylene (plastic) trash racks are made from structural plastic consisting of a cellular core surrounded by integral skins forming a totally integrated structure. Structural molded parts are made from 100% virgin High Density Polyethylene (HDPE) and fiberglass.

#### Purpose

Trash racks are used to prevent floating and particulate debris from clogging outlet control structures. The goal is to trap material on the outside of the structure where it can be easily removed. Once debris enters a riser structure it can get lodged inside the riser and/or outlet barrel. Low flow trash racks are designed to keep sediment and other small debris from entering and clogging the low flow pipe. Riser trash racks are larger with a spacing that allows small debris to pass through while keeping large debris such as tree limbs, lumber, and other large materials out of the structure.

#### Conditions Where Practice Applies

Trash racks are required on most stormwater management impoundment structures with a riser or barrel (or combination). In addition, an anti-vortex device may be required if the design high water of the facility exceeds the weir flow capacity of the principal spillway. **(Refer to the complete text of Minimum Standard 3.02).**

#### Planning Considerations

Most basins will collect a certain amount of trash and debris from incoming flows. Floating debris such as grass clippings, tree limbs, leaves, trash, construction debris, and sediment

bed load from upstream watersheds are common. Therefore, all control structures, including detention, extended-detention and retention basin low-flow weirs and orifices should have a trash rack or debris control device. A trash rack will collect this debris in plain sight which will encourage maintenance as needed (as opposed to debris collecting unseen inside a structure with no apparent problem until the structure becomes completely clogged). Failure to keep a riser structure clean can greatly diminish the flow capacity possibly resulting in overtopping of the embankment.

In an effort to reduce the required frequency of maintenance, the Virginia Stormwater Management Handbook requires principal spillway structure trash racks to be designed as non-clogging. At a minimum this requires a sloped or vertical trash rack surface, or a bird-cage type design with vertical spacing between the top of the horizontal trash rack and the riser top. (Refer to the following figures as examples of acceptable trash rack designs.)

### Design Criteria

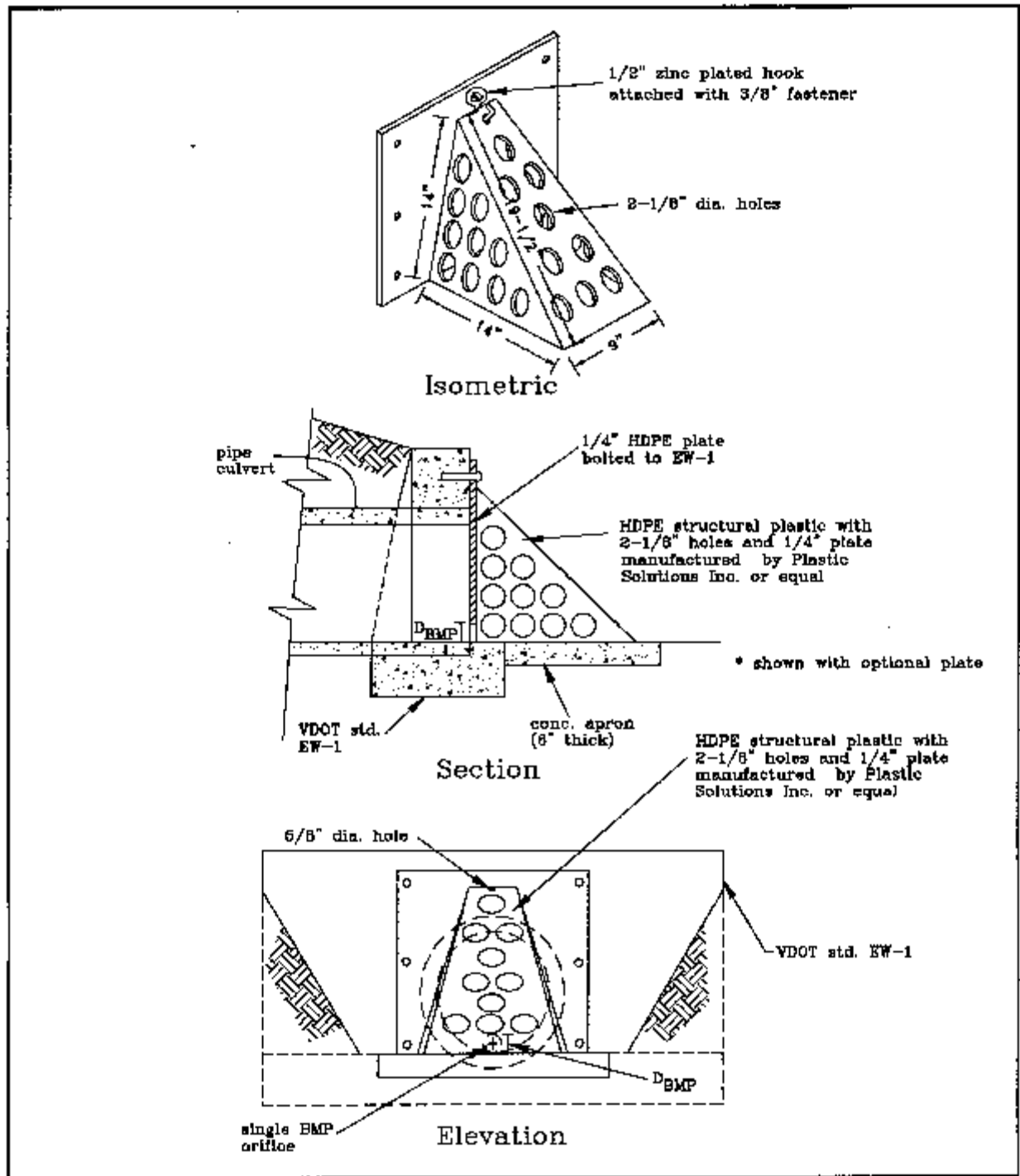
Plastic Solutions, Inc. has developed and field-tested trash racks made from structural plastic. A full line of trash racks and debris cages has been manufactured to accommodate almost any storm water management basin or pond structure. Plastic Solutions, Inc. offers a full line of standard sizes, but can customize to specific requirements. Racks are designed to fit concrete, metal and plastic pipe.



Plastic racks have many advantages to the conventional steel racks. They are much lighter and can be installed without the use of heavy equipment. Plastic racks are chemical resistant and will not rust or corrode. After installation, they are maintenance free.

The Virginia Department of Transportation has approved the Plastic Solutions pyramid style racks as an alternative to the DI-7 cover and the plastic debris rack as an alternative to the metal fabricated rack.

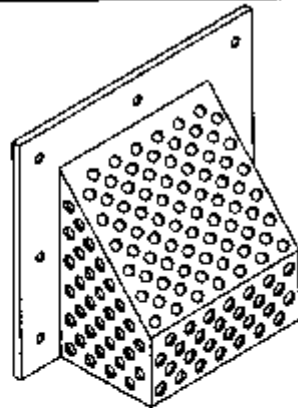
The reader is encouraged to visit the manufacturers web site at [www.plastic-solution.com](http://www.plastic-solution.com) for additional information.



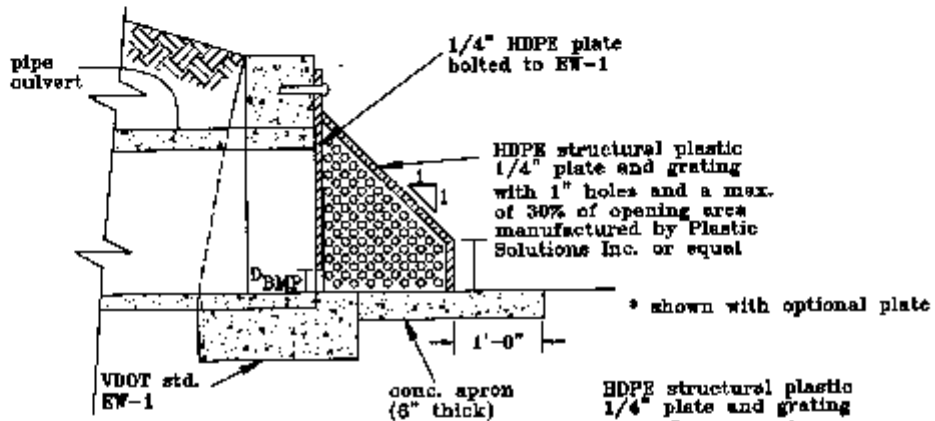
**BMP DEBRIS CAGE**



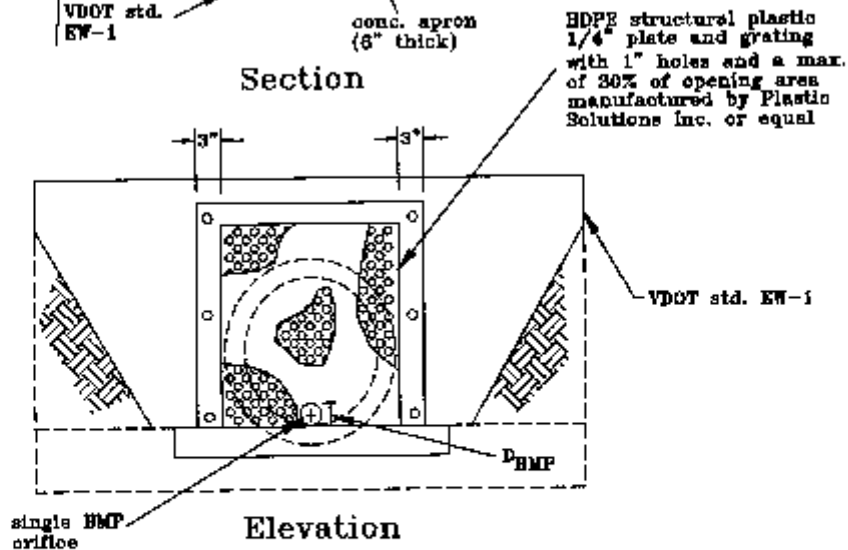
240 McGhee Road  
 P.O. Box 4386  
 Winchester VA 22304  
 540-722-4804  
[www.plastic-solution.com](http://www.plastic-solution.com)



Isometric



Section

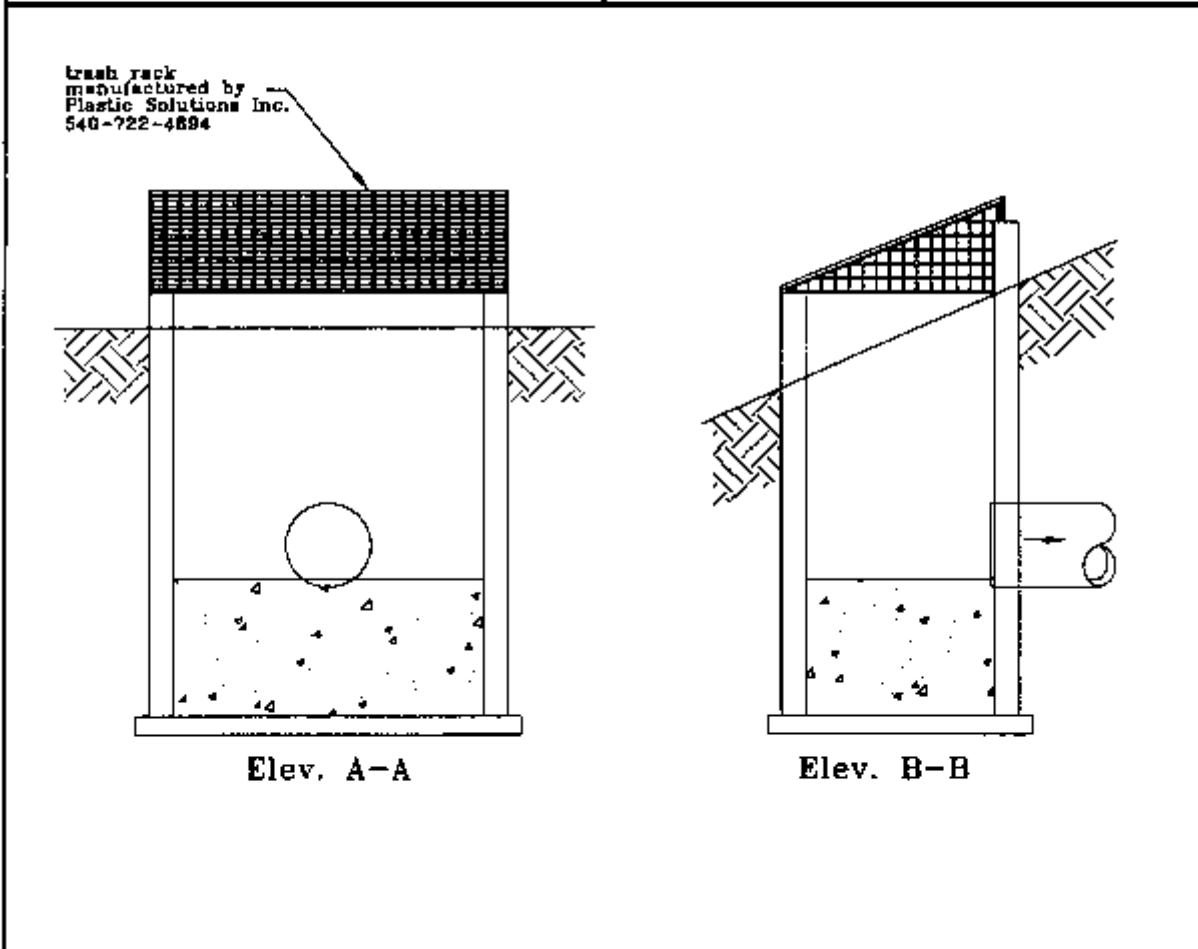
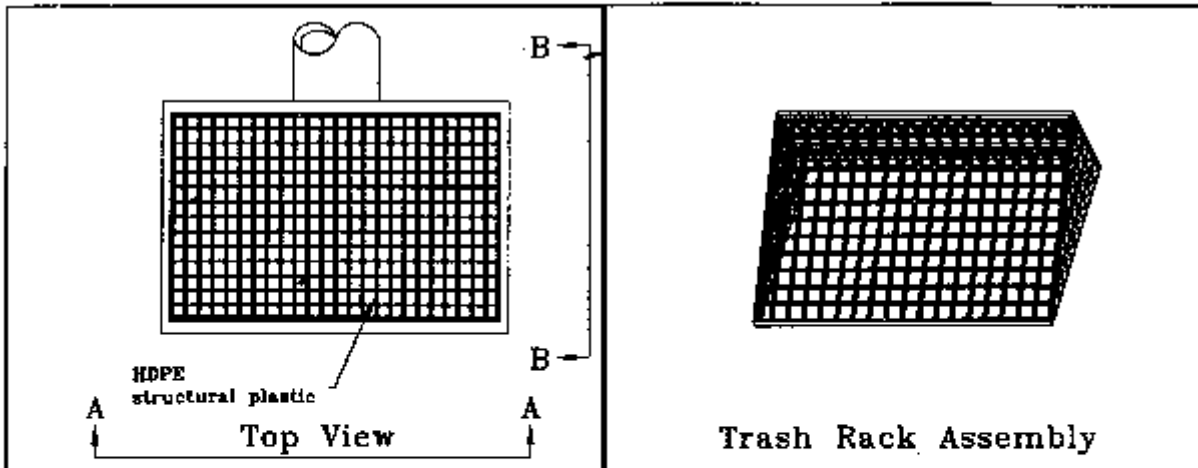


Elevation

**BMP DEBRIS PLATE & CAGE**



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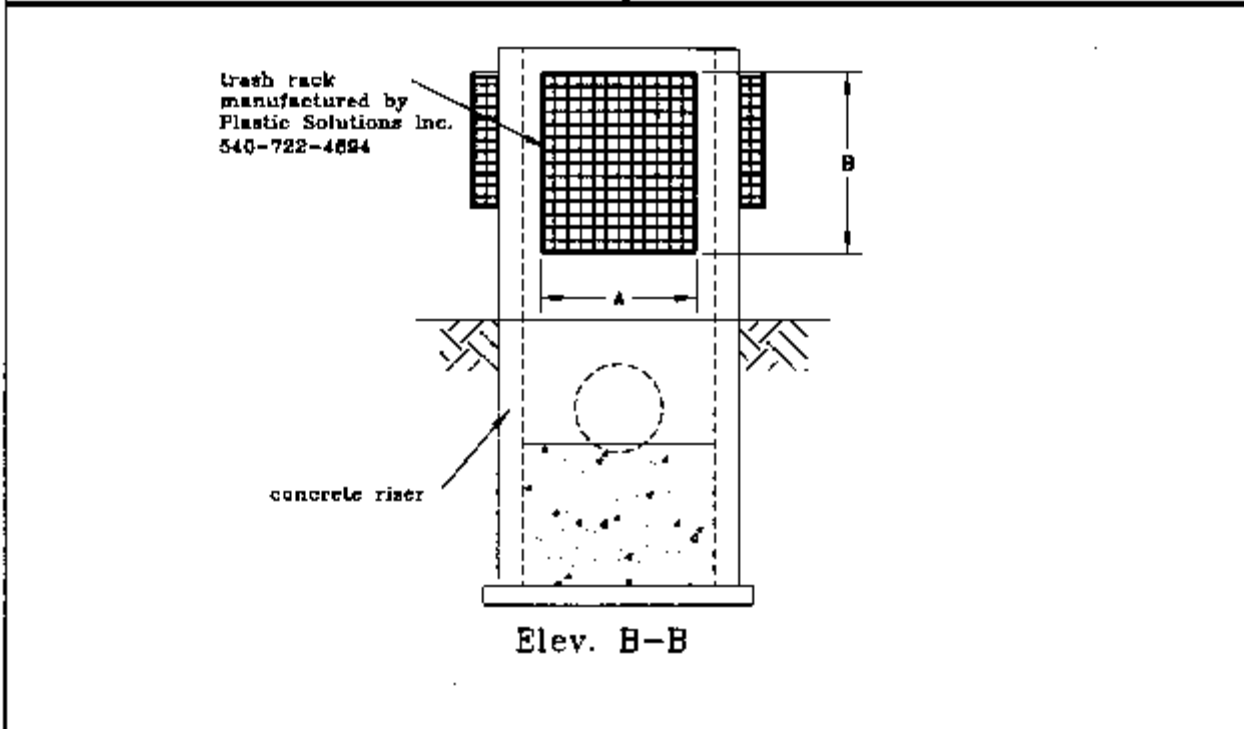
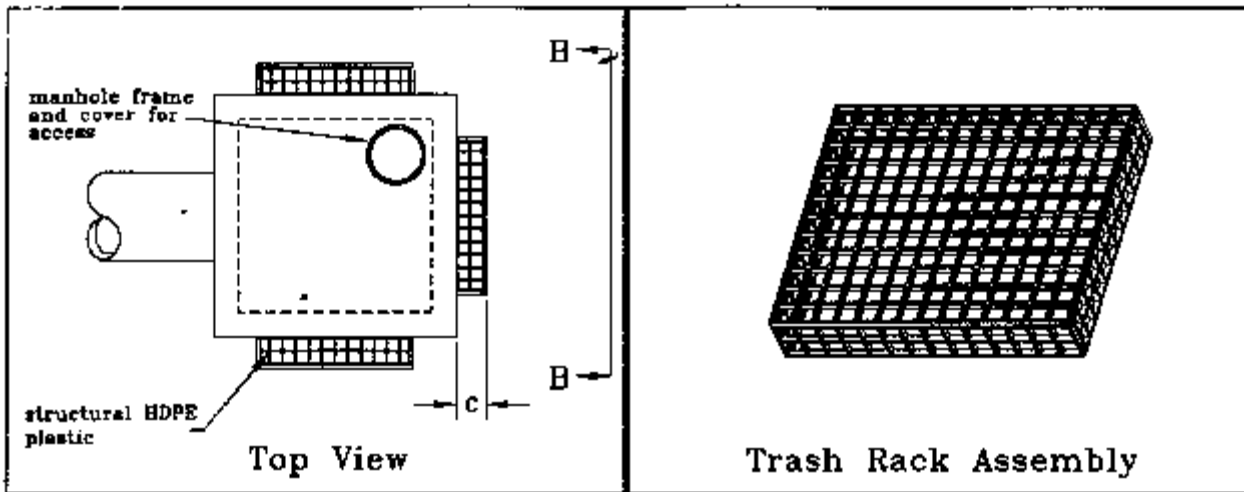


SLOPE RACK



PLASTIC SOLUTIONS INC.

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A	11 3/8	16 3/4	22 1/8	27 1/8	33 7/8	38 1/4	43 5/8	48	54 3/8	59 3/4	65 1/8	71 1/8	76 1/2	81 7/8	87 1/4
width code	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
B	11 3/8	16 3/4	22 1/8	27 1/8	33 7/8	38 1/4	43 5/8	48	54 3/8	59 3/4	65 1/8	70 1/2	76 7/8	81 7/8	87 1/4
length code	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16

C	7 1/2	12 7/8
height code	01	02

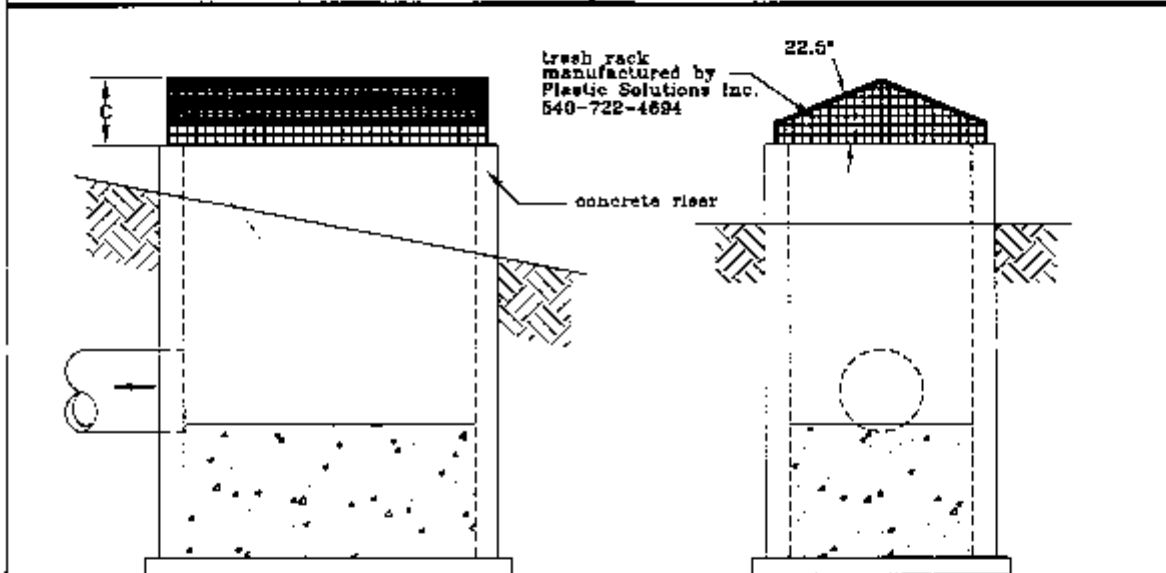
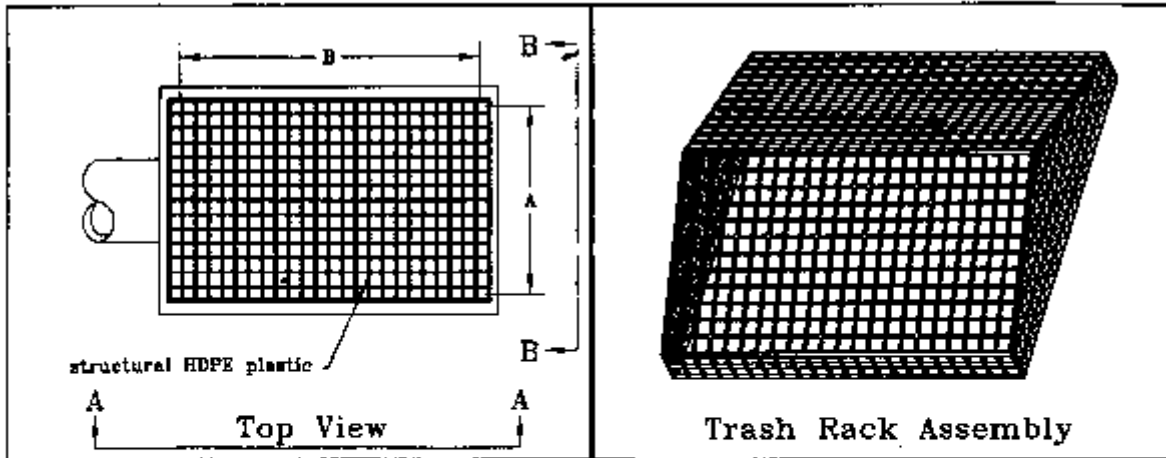
part code= FR + width code + length code + height code  
(ex. FR080802)

NOTE: CUSTOM SIZES AVAILABLE UPON REQUEST

**FLAT ROOF TRASH RACK**



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Elev. A-A

Elev. B-B

A	48 3/4	50 3/4	60 1/2	70 1/2	80 1/2	90 1/2	100 1/4	120 1/2
width code	10	12	14	16	18	20	22	24
C	16	20	22	24	26	28	30	32

B	49	54 1/2	59 3/4	65 1/4	70 1/2	75	82	87 1/4
length code	09	10	11	12	13	14	15	16

numbers rounded to 1/4"

part code= PR + width code +length code  
(ex. PR1213)

NOTE: CUSTOM SIZES AVAILABLE UPON REQUEST

PEAKED ROOF TRASH RACK



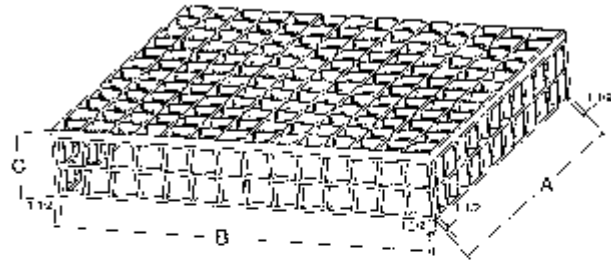
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**FLAT ROOF RECTANGULAR RACKS/WEIRS**

(Standard Sizes)

Dimensions in Inches to the Nearest 1/4"



STANDARD WIDTHS

A	11 3/8	16 3/4	22 1/8	27 1/2	32 7/8	38 1/4	43 5/8	49	54 3/8	59 3/4	65 1/8	71 1/8	76 1/2	81 7/8	87 1/4
Width Code	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16

STANDARD LENGTHS

B	11 3/8	16 3/4	22 1/8	27 1/2	32 7/8	38 1/4	43 5/8	49	54 3/8	59 3/4	65 1/8	70 1/2	75 7/8	81 7/8	87 1/4
Length Code	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16

STANDARD HEIGHT

C	7 1/2	12 1/8
Height Code	01	02

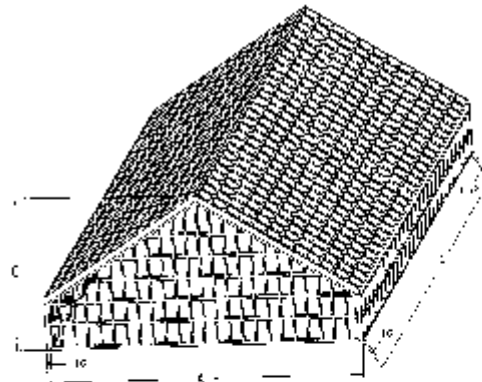
PART CODE = FR \_\_\_\_\_ (example: FR080902)  
 Width Code      Length Code      Height Code

\*\*\* CUSTOM SIZES AVAILABLE UPON REQUEST \*\*\*

**PEAK ROOF STRUCTURE**

(Standard Sizes)

Dimensions in Inches to the Nearest 1/4"



STANDARD WIDTHS AND HEIGHTS

A	49 3/4	59 3/4	69 1/2	79 1/2	89 1/2	99 1/2	109 1/4	120 1/2
Width Code	10	12	14	16	18	20	22	24
C	18	20	22	24	26	28	30	32

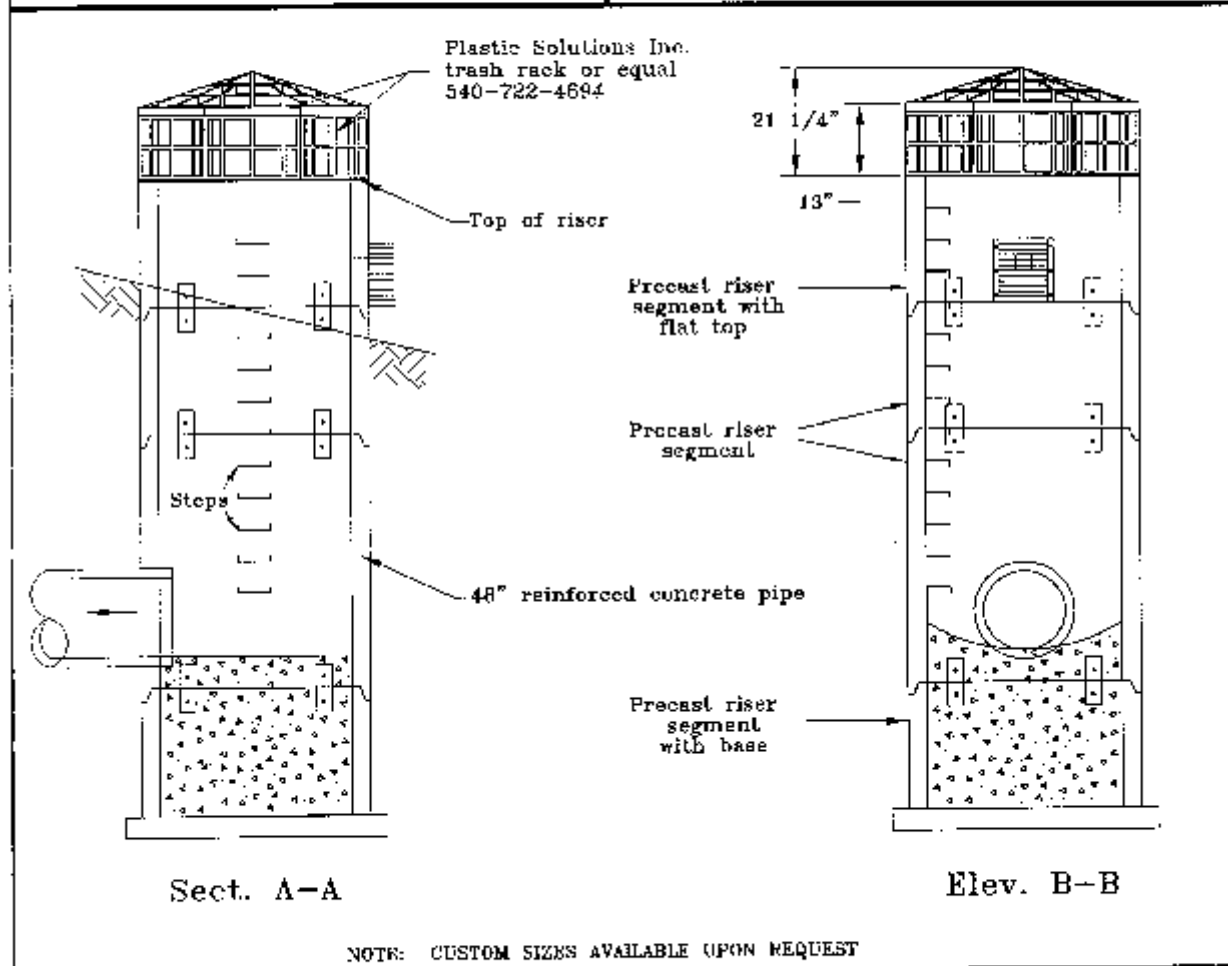
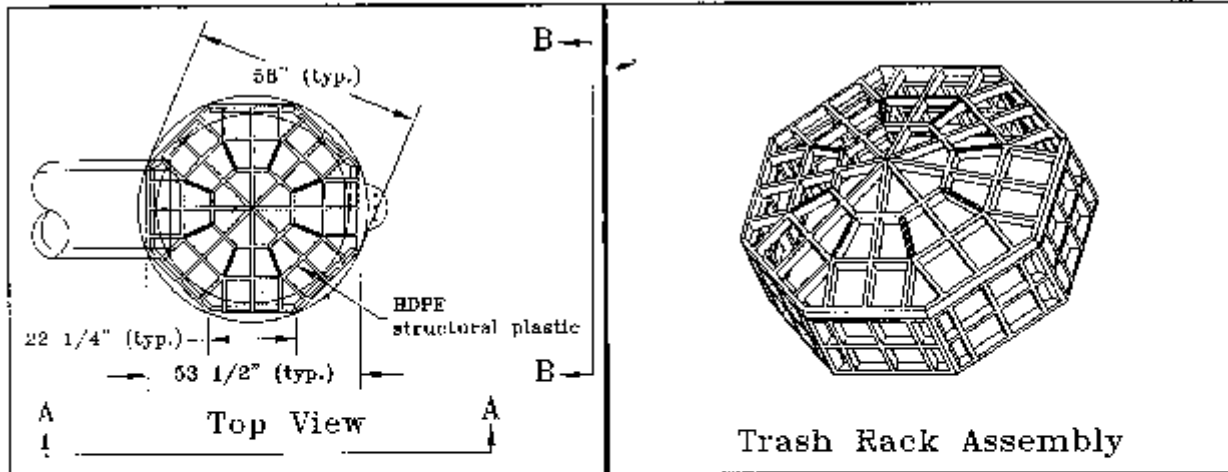
STANDARD LENGTHS

B	49	54 1/2	59 3/4	65 1/4	70 1/2	76	82	87 1/4	92 3/4	98	103 1/2	108 3/4
Length Code	09	10	11	12	13	14	15	16	17	18	19	20

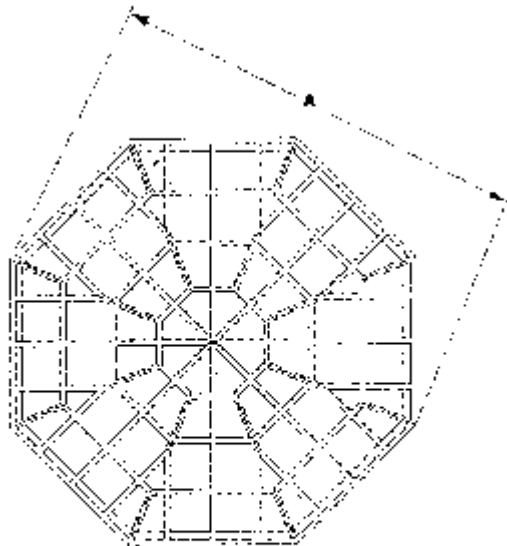
PART CODE = PR \_\_\_\_\_ (example: PR121020)  
 Width Code      Length Code      Height Code

\*\*\* CUSTOM SIZES AVAILABLE UPON REQUEST \*\*\*

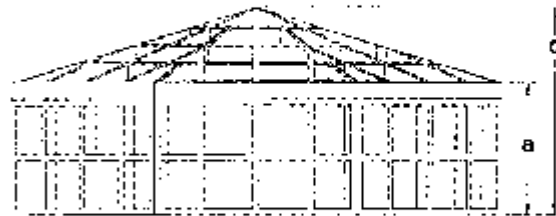




PART NO	<b>48" PYRAMID TRASH RACK</b> WITH CONCRETE RISER	 <b>PLASTIC SOLUTIONS INC.</b>	240 McGhee Road P.O. Box 4306 Winchester VA 22604 540-722-4694 <a href="http://www.plastic-solution.com">www.plastic-solution.com</a>
PYD 48			



**PYRAMID STRUCTURES**  
 (STANDARD SIZES)  
 Dimensions in inches to the Nearest 1/4"



Pyramid Racks for Concrete Pipe

Part No.	I.D.	O.D.	A	B	C
PYD-24	24	30	30	7 1/2	11 3/4
PYD-36	36	44	44	13	19 1/4
PYD-48	48	58	53	13	21 1/4
PYD-60	60	72	71	17 3/4	28
PYD-72	72	86	84	23 1/2	31 3/4
PYD-84	84	100	94 1/2	25 1/2	39 1/2
PYD-96	96	114	114	22 3/4	39 1/2

Pyramid Racks for Plastic and Metal Pipe  
 (includes Fastening Kit)

Part No.	Corrugated	Plastic	A	B	C
PYDP-24	12,15,18	12,15,18	30	7 1/2	11 3/4
PYDP-36	21,24,27,30	24,30	44	13	19 1/4
PYDP-48	33,36,42	36,42	58	13	21 1/4
PYDP-60	48,54	48	71	17 3/4	28
PYDP-72	60,68	60	84	23 1/2	31 3/4
PYDP-84	72,78		94 1/2	25 1/2	39 1/2
PYDP-96	84,90,96		114	22 3/4	39 1/2



CAD Drawings Available from Our Website [www.plastic-solution.com](http://www.plastic-solution.com)  
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