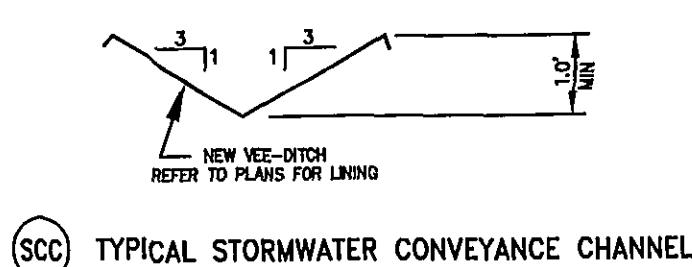
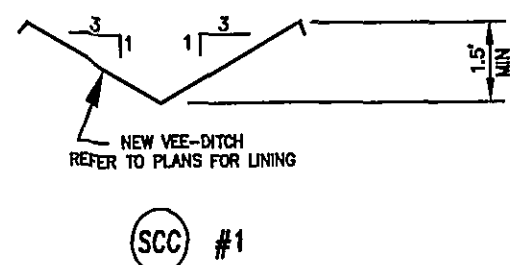


STORMWATER MANAGEMENT COST ESTIMATE

ALL COSTS GIVEN ARE COMPLETE IN PLACE

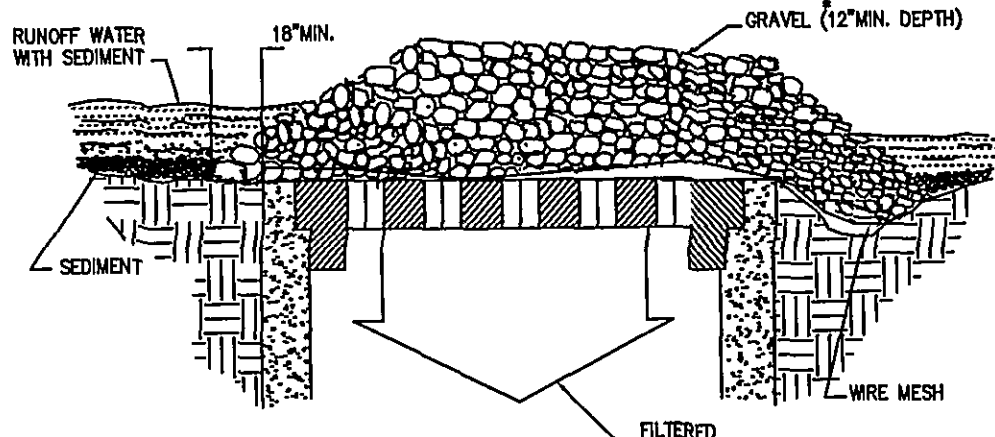
DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
CLEAR & GRUB	LS		\$	\$
EXCAVATION	CY			
EMBANKMENT	CY			
FENCING	LF			
STRUCTURES	EA			
ACCESS ROAD				
AS-BUILTS				
SUB-TOTAL				\$



STORMWATER CONVEYANCE CHANNEL LINING

SCC	BEG. STA.	END STA.	REQUIRED DITCH LINING
1	10+00	12+00	NONE
	12+00	END	VDOT STD EC-3A
2	10+00	END	NONE
3	10+00	11+50	NONE
	11+50	END	VDOT STD EC-2
4	10+00	END	NONE
5	10+00	END	VDOT STD EC-2
6	10+00	END	NONE
7	10+00	END	VDOT STD EC-2
8	10+00	END	VDOT STD EC-2
9	10+00	END	NONE
10	10+00	14+00	NONE
	14+00	END	VDOT STD EC-2
11	10+00	END	VDOT STD EC-3A
12	10+00	END	NONE
13	10+00	END	VDOT STD EC-2

NOTE: STORMWATER CONVEYANCE CHANNEL STATIONS MEASURED ALONG CENTER OF DITCH WITH THE MOST UPSTREAM POINT WHERE THE DITCH BEGINS AS STA. 10+00.



SPECIFIC APPLICATION

This method of inlet protection is applicable where heavy concentrated flows are expected, but not where ponding around the structure might cause excessive inconvenience or damage to adjacent structures and unprotected areas.

* Gravel shall be VDOT #3, #357 or #5 coarse aggregate.

IP GRAVEL AND WIRE MESH DROP INLET SEDIMENT FILTER

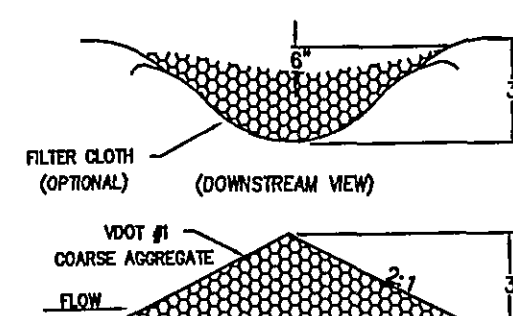
GENERAL NOTES

- DESIGN OF DETENTION BASINS SHALL CONFORM TO THE REQUIREMENTS OF THE COUNTY OF ROANOKE DRAINAGE STANDARDS (REF. SECTIONS 503.02, 503.03, AND 505.02). THE DESIGN OF THE FACILITY AND PREPARATION OF AS-BUILT PLANS SHALL BE BY A CERTIFIED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE COMMONWEALTH OF VIRGINIA.
- ACCESS TO THE FACILITY MUST BE PROVIDED IN ACCORDANCE WITH THE COUNTY OF ROANOKE DESIGN AND CONSTRUCTION STANDARDS FOR DETENTION PONDS, LATEST EDITION.
- IF THE FACILITY IS OVER FOUR (4) FEET DEEP, TAKES OVER TWO (2) HOURS TO DRAIN, OR THE INTERIOR SLOPE EXCEEDS 3 (H): 1 (V), PERMANENT FENCING MAY BE REQUIRED. ADDITIONALLY, IF THE FACILITY IS IN A CONGESTED AREA OR WILL IN ANY WAY POSE A HAZARD TO THE GENERAL PUBLIC, FENCING MAY BE REQUIRED. FENCING SHALL BE A MINIMUM OF SIX (6) FEET HIGH, A MINIMUM OF STANDARD NINE GAUGE LINK FENCE, AND MUST HAVE ONE OR MORE LOCKING DOUBLE GATES (MINIMUM TEN FEET WIDE) FOR ACCESS.
- DETENTION PONDS SHALL BE BONDED IN ACCORDANCE WITH THE ROANOKE COUNTY BONDING POLICY FOR SUBDIVISION AND SITE DEVELOPMENT. A SEPARATE BOND FOR THE DETENTION FACILITY WILL BE REQUIRED AND ADMINISTERED APART FROM THE SUBDIVISION DEVELOPMENT BOND. REFERENCE ESTIMATE - THIS SHEET.
- REFERENCE THE COUNTY OF ROANOKE DESIGN AND CONSTRUCTION STANDARDS FOR DETENTION PONDS, LATEST EDITION, FOR ACCEPTANCE AND MAINTENANCE OF THE FACILITY. CERTIFIED AS-BUILTS ARE REQUIRED AND MUST INCLUDE:
 - DIMENSIONS OF THE FACILITY
 - VOLUME & MAXIMUM DEPTH
 - ELEVATIONS OF STRUCTURES, SPILLWAYS, AND TOP
 - MATERIALS VERIFICATION INCLUDING RESULTS OF DENSITY TESTS CONDUCTED BY AN INDEPENDENT SOIL TESTING LABORATORY
 - LOCATION AND ELEVATION OF BENCHMARK
- ONE FOOT MINIMUM FREEBOARD REQUIRED FOR THE 100 YR WATER SURFACE ELEVATION.

CONSTRUCTION NOTES

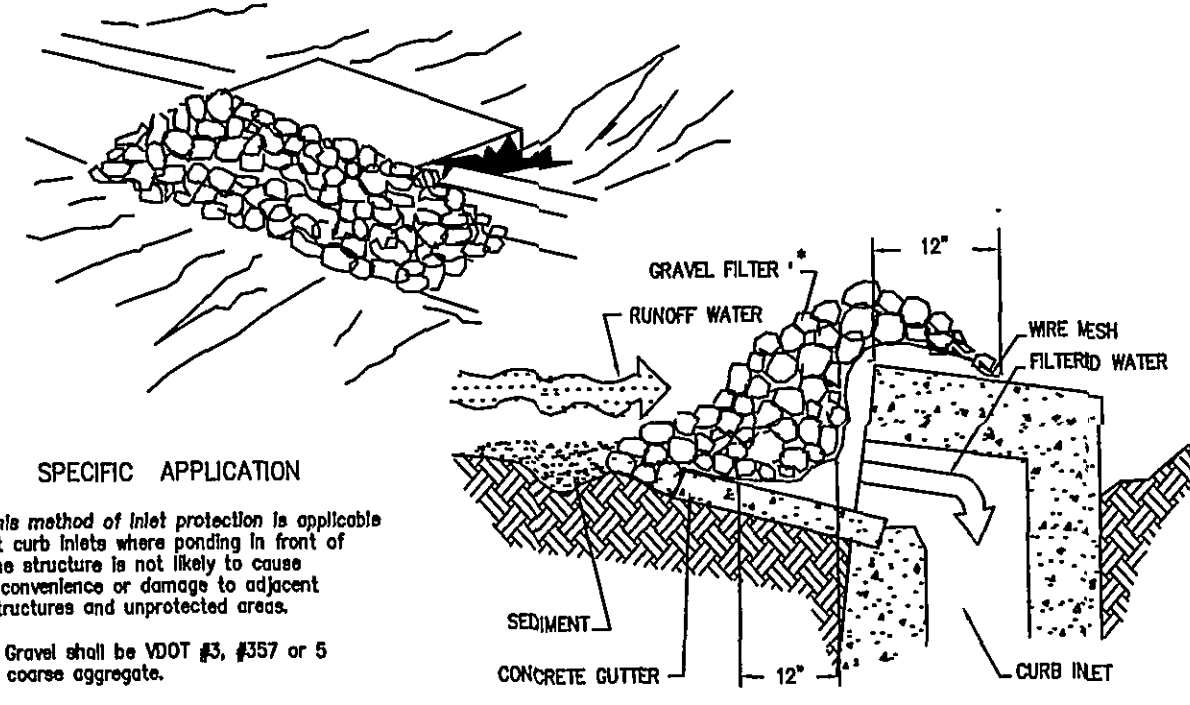
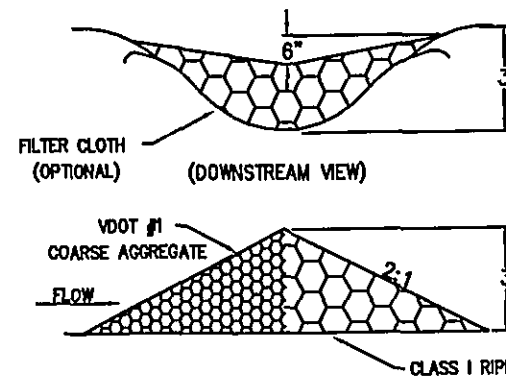
- SITE PREPARATION SHALL BE IN ACCORDANCE WITH THE COUNTY OF ROANOKE DESIGN AND CONSTRUCTION STANDARDS FOR DETENTION PONDS, LATEST EDITION.
- SLOPES STEEPER THAN 3 TO 1 (HORIZONTAL TO VERTICAL) SHALL BE BENCHMARKED OR STEPPED PRIOR TO PLACING FILL ON THEM.
- ON-SITE FILL MATERIAL OR BORROW FILL MATERIAL MAY BE UTILIZED. FILL MATERIAL SOILS, IN GENERAL:
 - SHALL BE COMPACTABLE
 - SHALL BE WITHIN AN ACCEPTABLE RANGE OF MOISTURE CONTENT WHICH IS READILY CONTROLLED
 - SHALL NOT BE HIGHLY SUSCEPTIBLE TO VOLUME CHANGE (SHRINKAGE OR SWELL) OR SETTLEMENT
- FILL MATERIALS CONTAINING ROCKS LARGER THAN SIX (6) INCHES (15.2 CM) SHALL NOT BE USED. THE UPPERMOST TWO (2) FEET (61 CM) SHALL NOT HAVE ANY ROCK LARGER THAN TWO (2) INCHES (5.1 CM) IN DIAMETER.
- THE APPROVED FILL SHALL BE PLACED IN EIGHT (8) INCH (20 CM) LOOSE LIFTS. EACH LIFT SHALL BE SPREAD IN UNIFORM LAYERS. FILL SOIL SHALL BE UTILIZED ONLY WITHIN A MOISTURE RANGE OF $\pm 5\%$ OF THE OPTIMUM MOISTURE CONTENT. COMPACTION OF THE FILL SHALL BE PERFORMED WITH APPROVED EQUIPMENT. COMPACTION OF THE LAYERS SHALL BE CONTINUOUS AND UNIFORM.
- EMBANKMENT MATERIAL IN FILL AREAS SHALL BE PLACED IN LIFTS NOT EXCEEDING EIGHT (8) INCHES AND SHALL BE COMPACTED TO A MINIMUM 90% DENSITY IN ACCORDANCE WITH SECTION 303 OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS.
- FIELD DENSITY TESTS ARE TO BE CONDUCTED BY AN INDEPENDENT SOILS TESTING LABORATORY UNDER THE DIRECTION OF A QUALIFIED GEOTECHNICAL ENGINEER. THE RESULTS OF THESE TESTS SHALL BE SUBMITTED TO THE COUNTY OF ROANOKE WITH AS-BUILT PLANS AS A CONDITION OF ACCEPTANCE OF THE FACILITY BY THE COUNTY. FIELD DENSITY TESTS, AS DIRECTED BY THE ENGINEER SHALL BE PERFORMED PERIODICALLY TO DETERMINE THE DEGREE OF COMPACTION. ANY AREAS FAILING TO MEET THE ABOVE REQUIREMENTS SHALL BE REWORKED AND/OR RECOMPACTED UNTIL THE REQUIRED DEGREE OF COMPACTION IS ACHIEVED.
- ANTI-SEEP COLLARS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.
- ALL DISTURBED AREAS SHALL BE COVERED WITH FOUR (4) INCHES OF TOPSOIL AND SEEDING.
- THE MINIMUM SLOPE OF THE BASIN "FLOOR" SHALL BE ONE (1) PERCENT GRADED TO DRAIN TO THE PRINCIPAL SPILLWAY.

2 ACRES OR LESS OF DRAINAGE AREA:



CD ROCK CHECK DAM

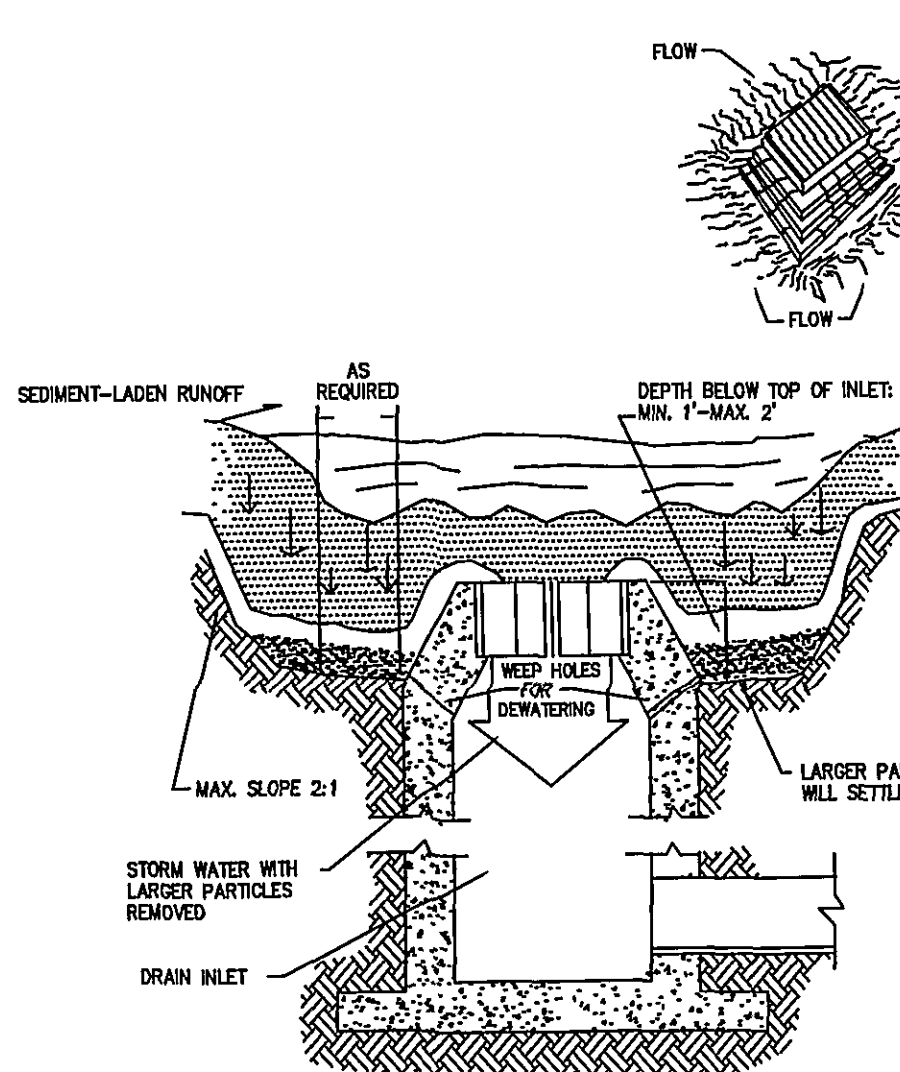
2-10 ACRES OF DRAINAGE AREA:



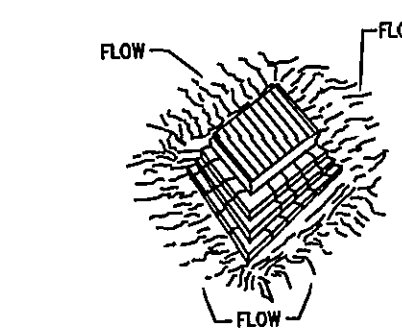
IP GRAVEL CURB INLET SEDIMENT FILTER

SPECIFIC APPLICATION
This method of inlet protection is applicable at curb inlets where ponding in front of the structure is not likely to cause inconvenience or damage to adjacent structures and unprotected areas.

* Gravel shall be VDOT #3, #357 or #5 coarse aggregate.



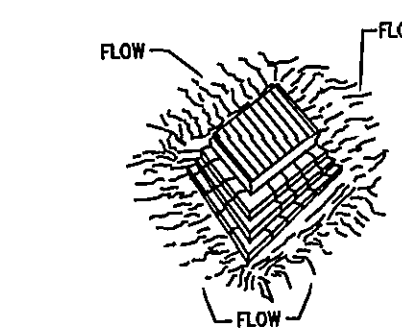
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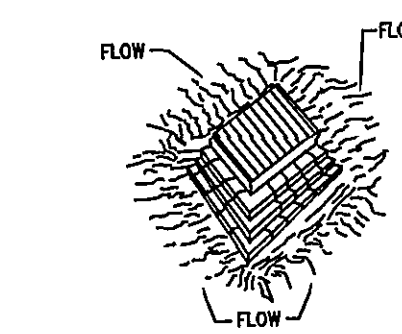
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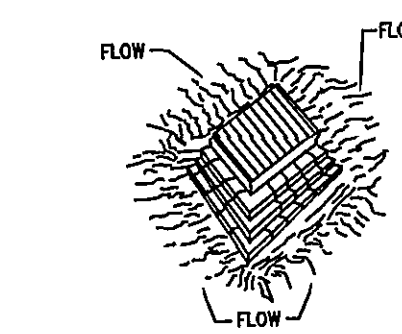
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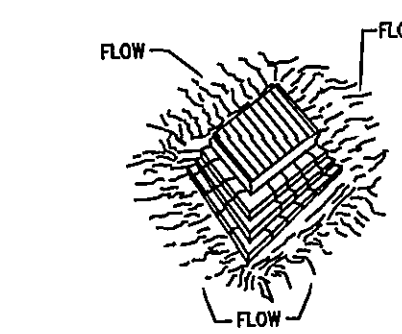
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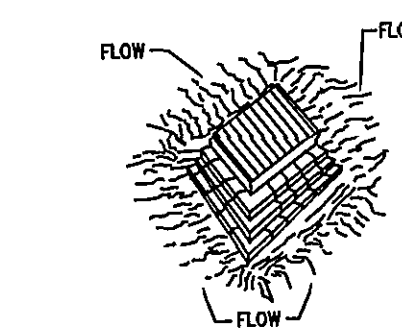
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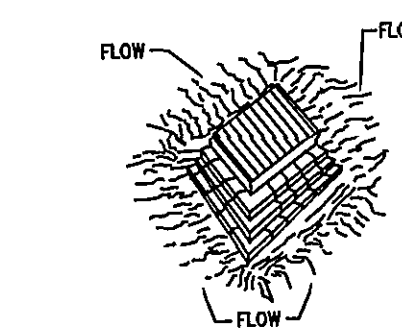
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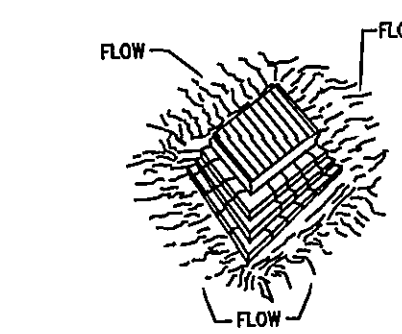
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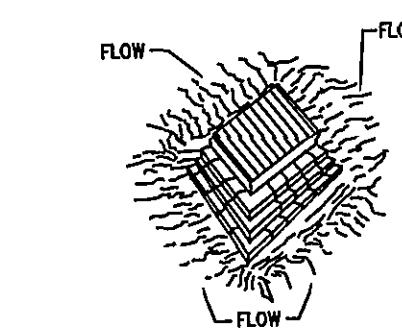
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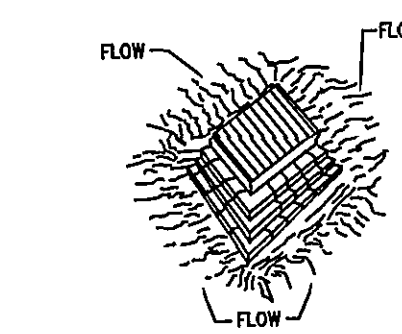
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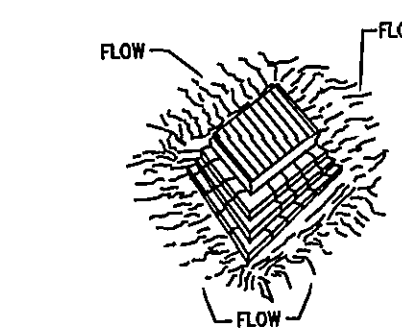
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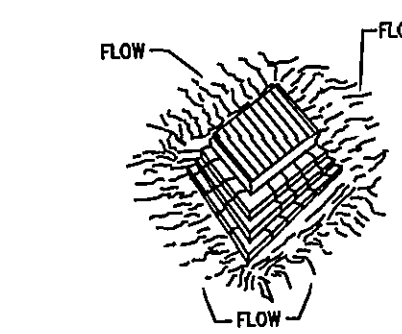
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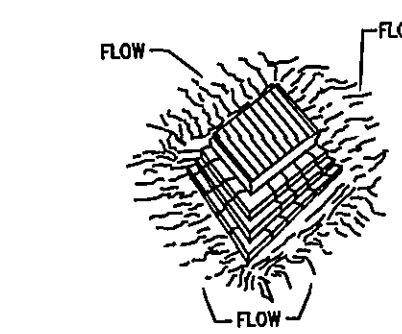
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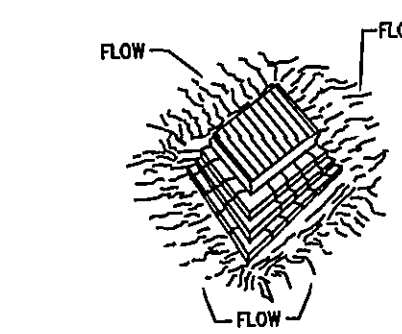
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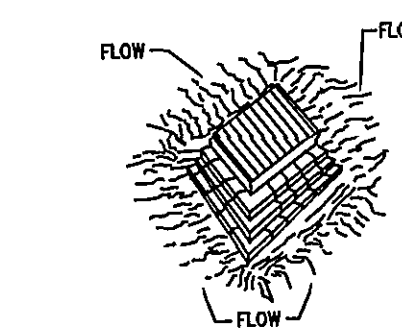
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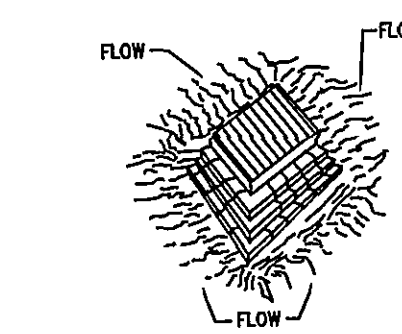
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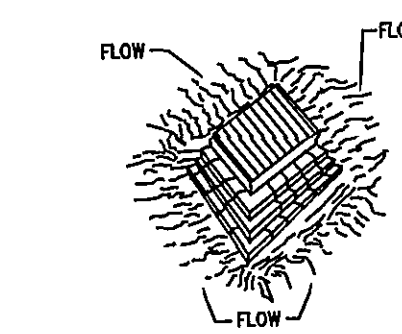
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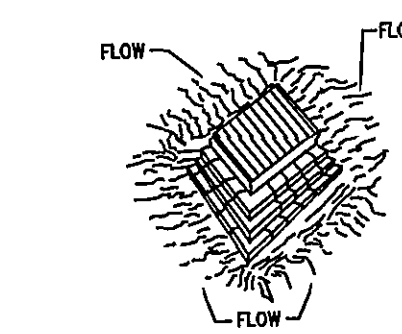
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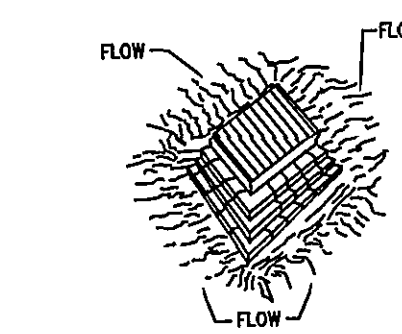
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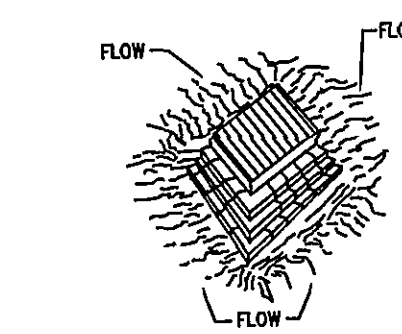
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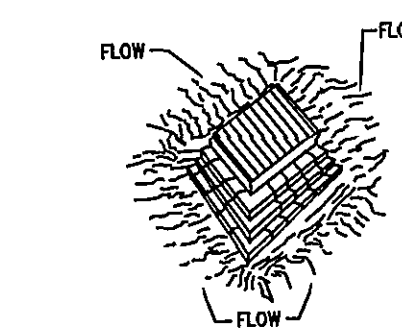
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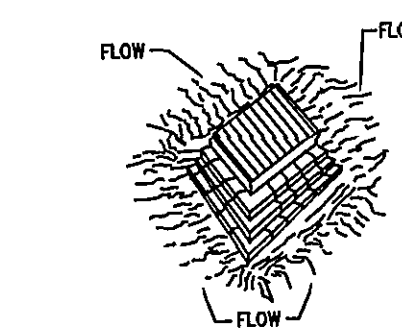
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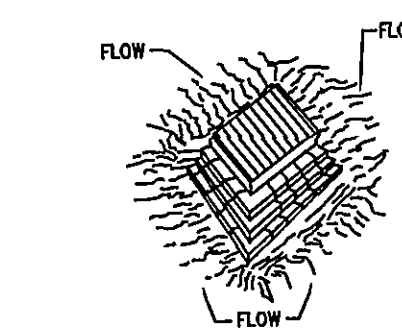
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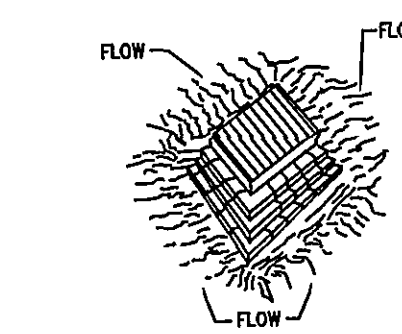
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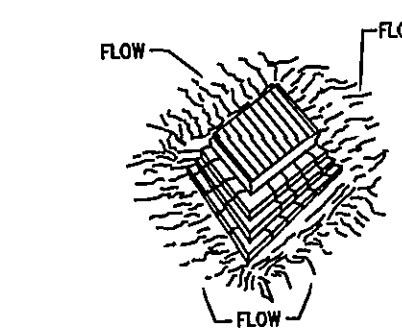
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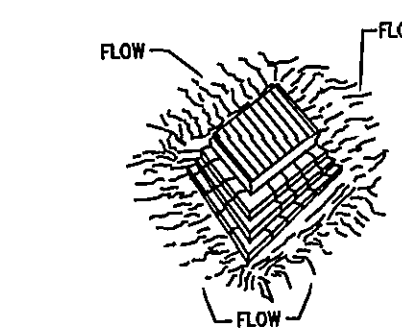
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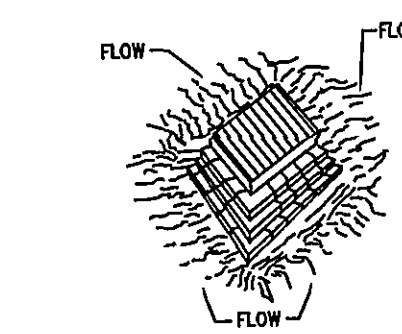
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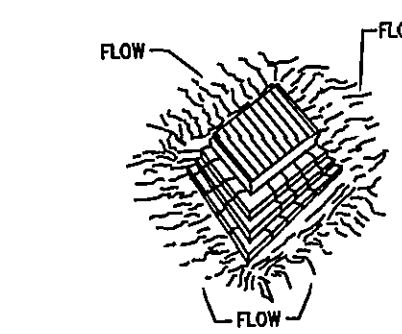
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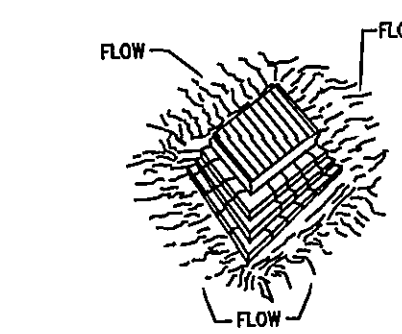
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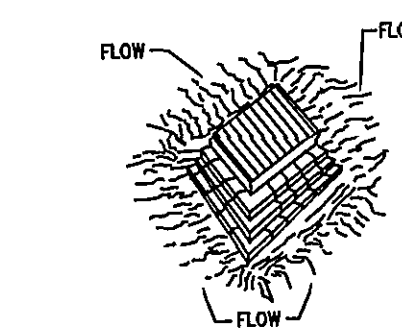
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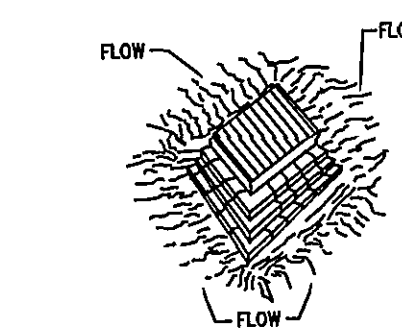
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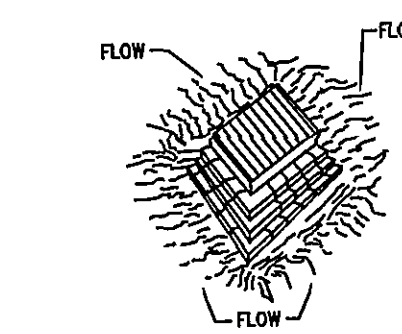
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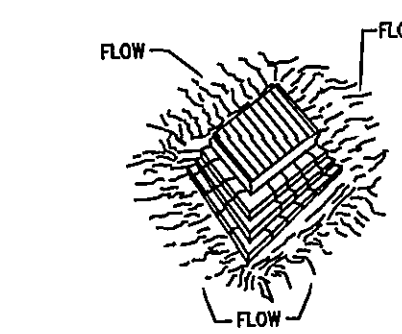
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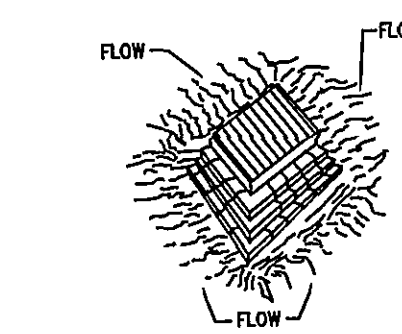
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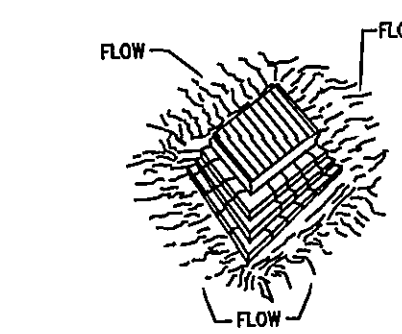
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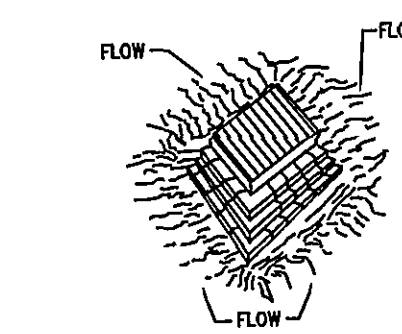
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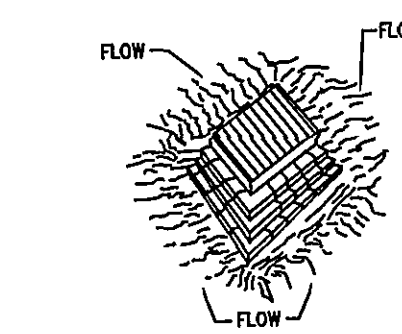
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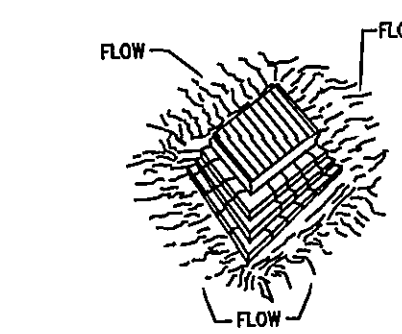
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