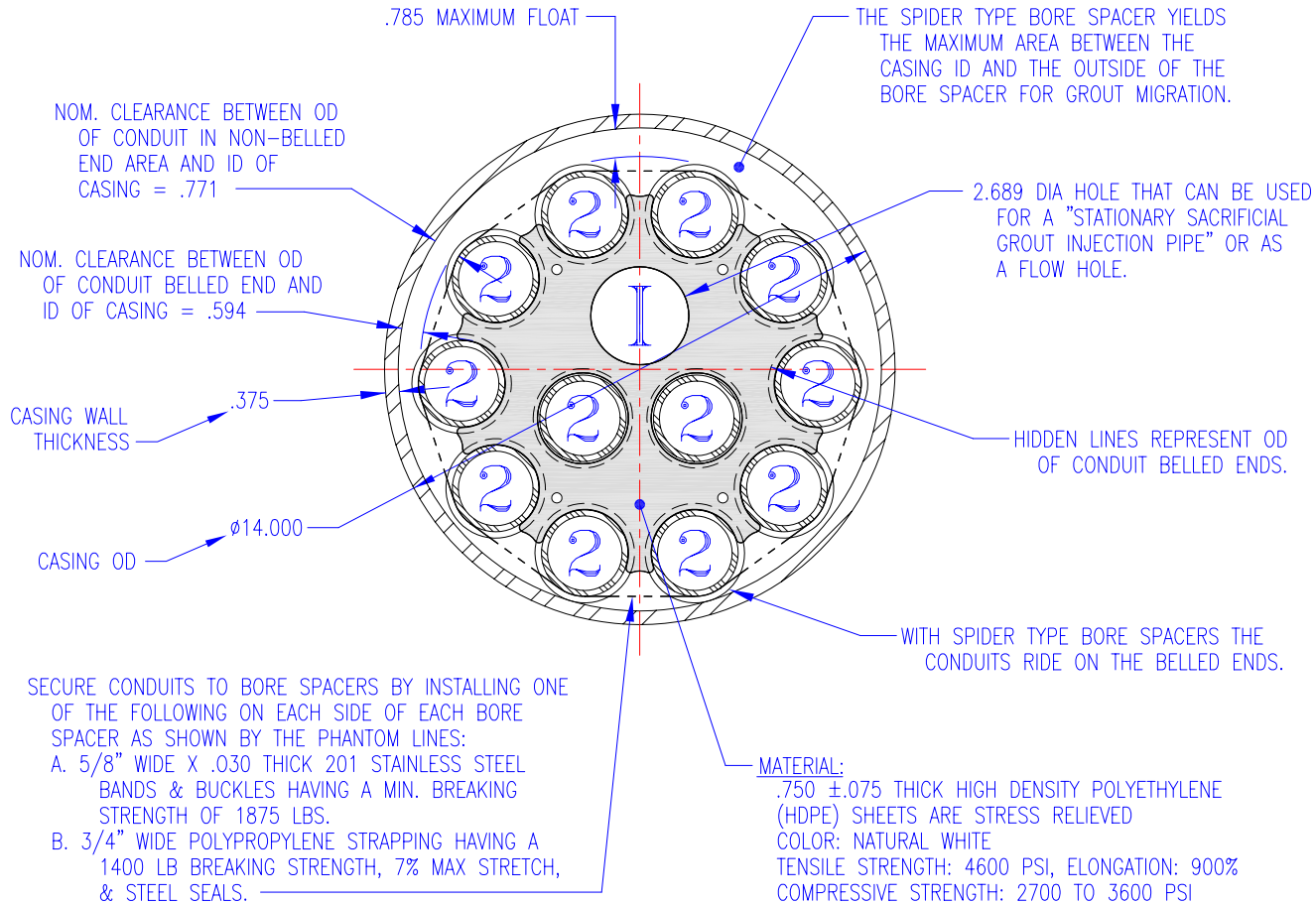


MINIMUM DISTANCE BETWEEN CONDUITS

CONDUIT SIZE	MIN. DISTANCE
2 & 2	.625



NOTES:

1. USE ONE BORE SPACER FOR EVERY 5 FEET OF DUCT BANK.
2. THE CASING ID MUST BE SMOOTH AND FREE FROM RIDGES, PROJECTIONS AND SEAMS THAT MIGHT IMPEDE THE SLIDING OF DUCT BANK.
3. A TROUGH OR FEEDER BRIDGE SHOULD BE CONSTRUCTED AT THE LEADING END OF THE CASING TO SUPPORT SECTIONS OF DUCT BANK AS THEY ARE ASSEMBLED AND PULLED INTO THE CASING.
4. THIS BORE SPACER IS DESIGNED FOR A CASING THAT IS STRAIGHT AND TRUE.
5. IT IS POSSIBLE THAT THE DUCT BANK WILL ROTATE (CORKSCREW) AS IT IS PULLED THRU THE CASING UNLESS AN "OFF CENTER WEIGHT TECHNIQUE" IS USED.
6. THIS BORE SPACER WILL ACCOMMODATE BOTH "SINGLE-END" AND "STATIONARY SACRIFICIAL INJECTION PIPE" METHODS OF GROUT FILLING.
7. IT IS ESSENTIAL THAT THE BORE SPACERS ARE HELD IN PLACE RELATIVE TO THE CONDUIT. REASON: AS THE GROUT IS PUMPED INTO THE CASING, THE COMPARTMENTS FORMED BETWEEN THE BORE SPACERS ARE MORE OR LESS FILLED SEQUENTIALLY, PLACING A TEMPORARY THRUST LOAD ON EACH BORE SPACER.
8. THE DUCT BANK MUST BE HELD IN POSITION AT BOTH ENDS TO ACCOMMODATE POSSIBLE UNEVEN THRUST LOADS THAT MAY BE GENERATED DURING THE GROUTING OPERATION.
9. WHEN FILLING THE AREA BETWEEN THE CONDUITS AND CASING WITH GROUT, TAKE CARE NOT TO EXCEED THE HYDRAULIC COLLAPSE PRESSURE OF THE CONDUITS.
10. DEPENDING ON THE GROUT SPECIFIC GRAVITY AND GROUT FLOW, IT IS POSSIBLE THAT THE DUCT BANK WILL FLOAT TO THE TOP OF THE CASING.
11. ACTUAL QUANTITY OF GROUT USED SHOULD BE MEASURED AND RECORDED.

THIS BORE SPACER DESIGN IS COVERED BY ONE OR MORE PENDING PATENT APPLICATIONS. FURTHER, THIS DRAWING AND PROPRIETARY DESIGN IS SOLELY THE PROPERTY OF UNDERGROUND DEVICES, INC. AND IS SUBMITTED WITH THE UNDERSTANDING THAT IT WILL BE KEPT IN STRICT CONFIDENCE.

THIS INFORMATION IS BASED ON OUR EXPERIENCE TO DATE AND WE BELIEVE IT TO BE RELIABLE. IT IS INTENDED ONLY AS A GUIDE FOR USE AT YOUR DISCRETION AND RISK. WE CANNOT GUARANTEE FAVORABLE RESULTS AND ASSUME NO LIABILITY IN CONNECTION WITH ITS USE OR USE OF THE PRODUCTS DESCRIBED.

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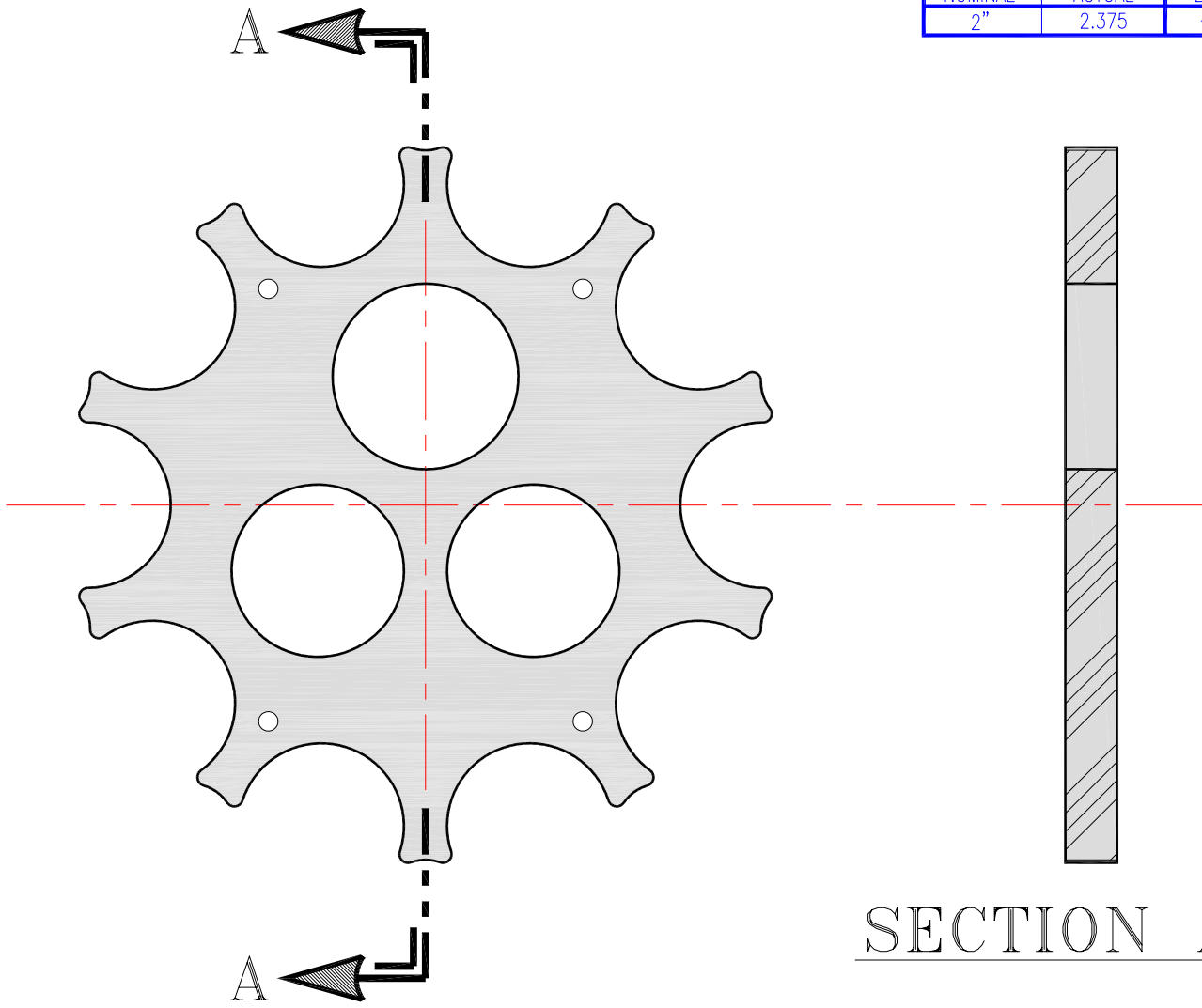


**SPIDER TYPE BORE SPACER
 With 12 Ea. 2" EPC40 (Sch.40) PVC Conduits
 In A 14.000 OD X .375 Wall Steel Casing**

SCALE: See At Left	DESIGNED BY: Alan Armstrong	DETAINED BY: Alan Armstrong	CHECKED BY: Don McCoy
DATE: 1-10-06	APPROVED BY:	REVISION B 1-16-06	

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CONDUIT AND HOLE SIZES				
CONDUIT OD		FULL HOLE DIAMETER		PARTIAL HOLE DIAMETER
NOMINAL	ACTUAL	BANDED	NON-BANDED	
2"	2.375	----	2.495	2.395



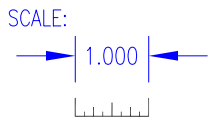
SECTION A-A

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SCALE: See At Left	DESIGNED BY: Alan Armstrong	DRAWN BY: Alan Armstrong	CHECKED BY: Don McCoy
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PHOTOGRAPH OF ACTUAL PART

BS3949

RESERVED BY UNDERGROUND DEVICES, INC.



1-10-06

B 1-16-06

90-3949