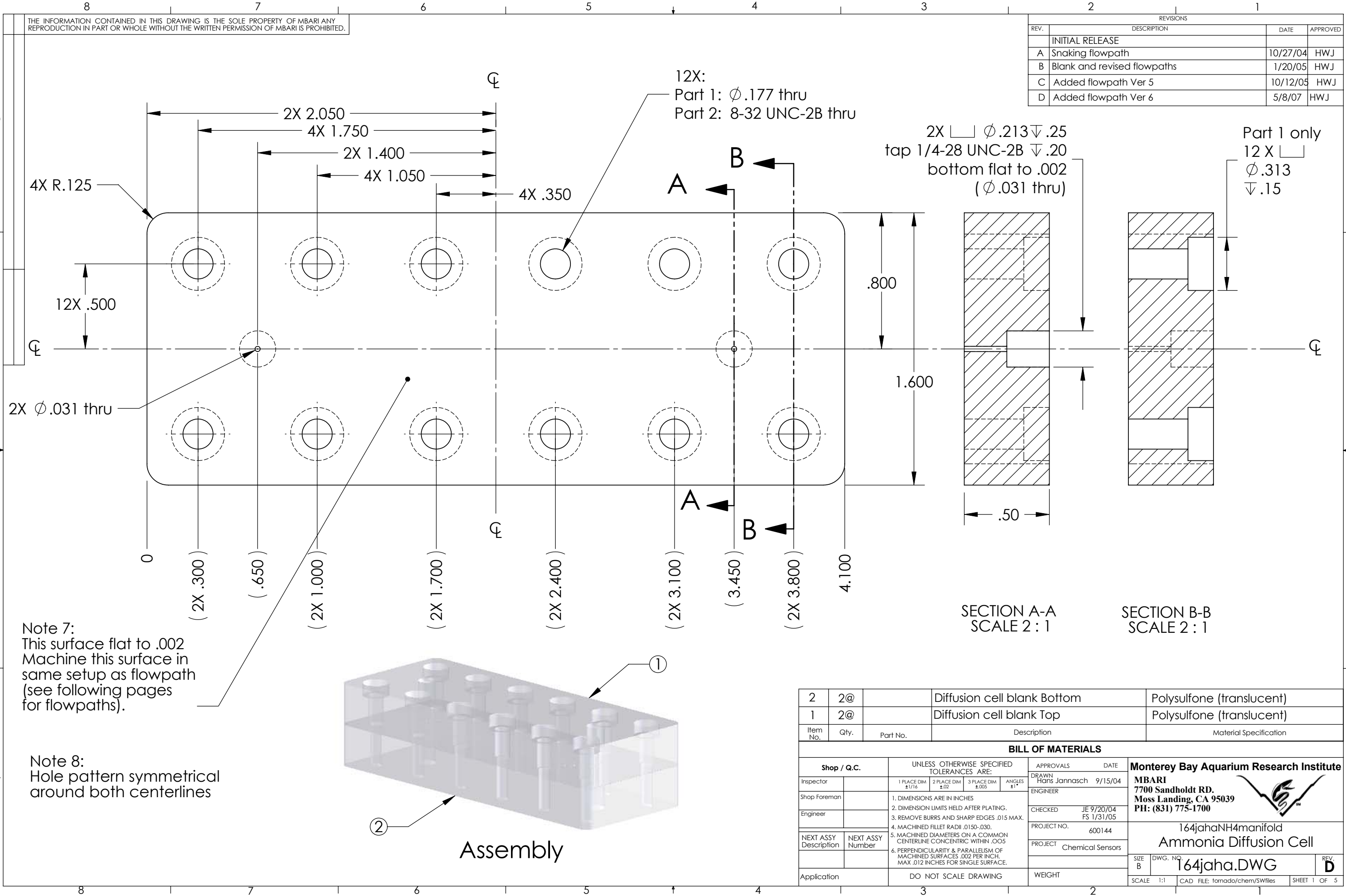


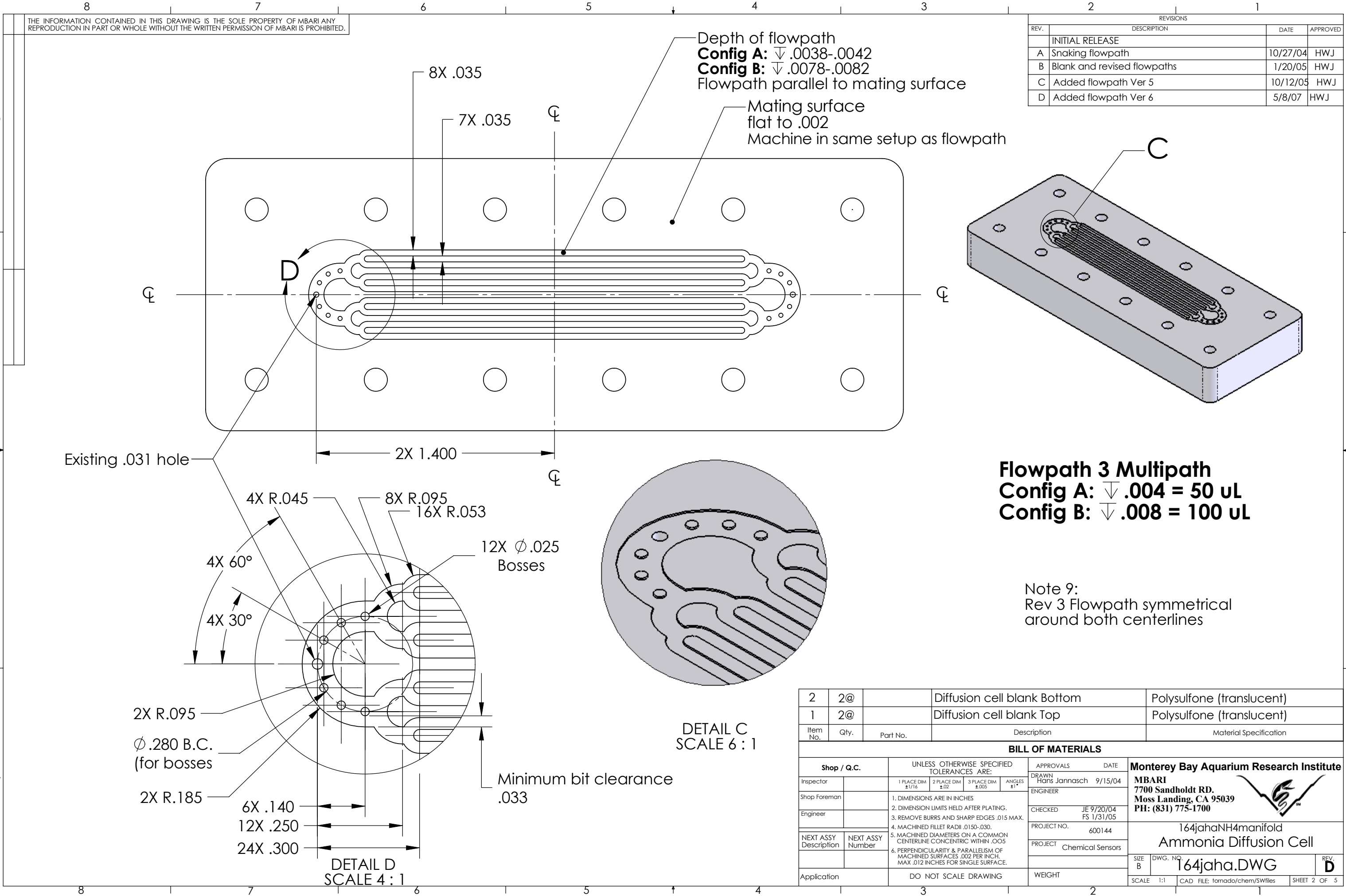


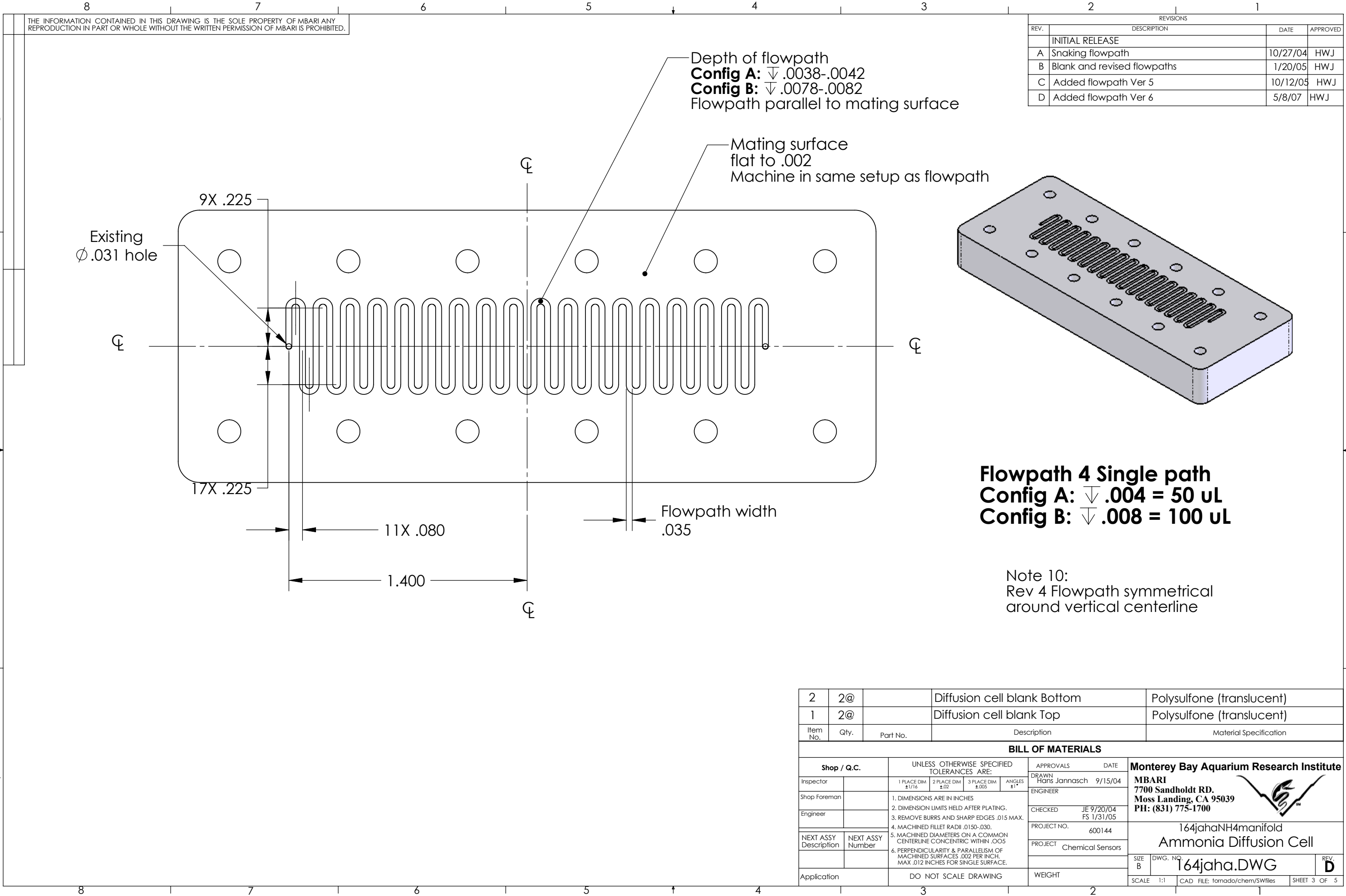
| REVISIONS |                             |          |          |
|-----------|-----------------------------|----------|----------|
| REV.      | DESCRIPTION                 | DATE     | APPROVED |
|           | INITIAL RELEASE             |          |          |
| A         | Snaking flowpath            | 10/27/04 | HWJ      |
| B         | Blank and revised flowpaths | 1/20/05  | HWJ      |
| C         | Added flowpath Ver 5        | 10/12/05 | HWJ      |
| D         | Added flowpath Ver 6        | 5/8/07   | HWJ      |

|                       |                      |                                                                                                           |                                |                           |                      |                                                                                                                                       |                                                                                       |
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| 2                     | 2@                   |                                                                                                           | Diffusion cell blank Bottom    | Polysulfone (translucent) |                      |                                                                                                                                       |                                                                                       |
| 1                     | 2@                   |                                                                                                           | Diffusion cell blank Top       | Polysulfone (translucent) |                      |                                                                                                                                       |                                                                                       |
| Item No.              | Qty.                 | Part No.                                                                                                  | Description                    | Material Specification    |                      |                                                                                                                                       |                                                                                       |
| BILL OF MATERIALS     |                      |                                                                                                           |                                |                           |                      |                                                                                                                                       |                                                                                       |
| Shop / Q.C.           |                      | UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:                                                                |                                | APPROVALS DATE            |                      |                                                                                                                                       |                                                                                       |
| Inspector             |                      | 1 PLACE DIM ±1/16                                                                                         | 2 PLACE DIM ±.02               | 3 PLACE DIM ±.005         | Angles ±1°           | <b>Monterey Bay Aquarium Research Institute</b><br><b>MBARI</b><br>7700 Sandholdt RD.<br>Moss Landing, CA 95039<br>PH: (831) 775-1700 |  |
| Shop Foreman          |                      | 1. DIMENSIONS ARE IN INCHES                                                                               |                                |                           |                      |                                                                                                                                       |                                                                                       |
| Engineer              |                      | 2. DIMENSION LIMITS HELD AFTER PLATING.                                                                   |                                |                           |                      |                                                                                                                                       |                                                                                       |
|                       |                      | 3. REMOVE BURRS AND SHARP EDGES .015 MAX.                                                                 |                                |                           |                      |                                                                                                                                       |                                                                                       |
|                       |                      | 4. MACHINED FILLET RADII .0150-.030.                                                                      |                                |                           |                      |                                                                                                                                       |                                                                                       |
| NEXT ASSY Description | NEXT ASSY Number     | 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005                                       |                                |                           |                      | PROJECT NO. 600144                                                                                                                    | 164jahaNH4manifold<br>Ammonia Diffusion Cell                                          |
|                       |                      | 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH. MAX .012 INCHES FOR SINGLE SURFACE. |                                |                           |                      | PROJECT Chemical Sensors                                                                                                              |                                                                                       |
|                       |                      |                                                                                                           |                                |                           |                      |                                                                                                                                       |                                                                                       |
| Application           | DO NOT SCALE DRAWING |                                                                                                           | WEIGHT                         | SIZE B                    | DWG. NO. 164jaha.DWG | REV. D                                                                                                                                |                                                                                       |
|                       |                      | SCALE 1:1                                                                                                 | CAD FILE: tornado/chem/SWfiles |                           | SHEET 1 OF 5         |                                                                                                                                       |                                                                                       |

**Monterey Bay Aquarium Research Institute**  
MBARI  
7700 Sandholdt RD.  
Moss Landing, CA 95039  
PH: (831) 775-1700

164jahaNH4manifold  
Ammonia Diffusion Cell



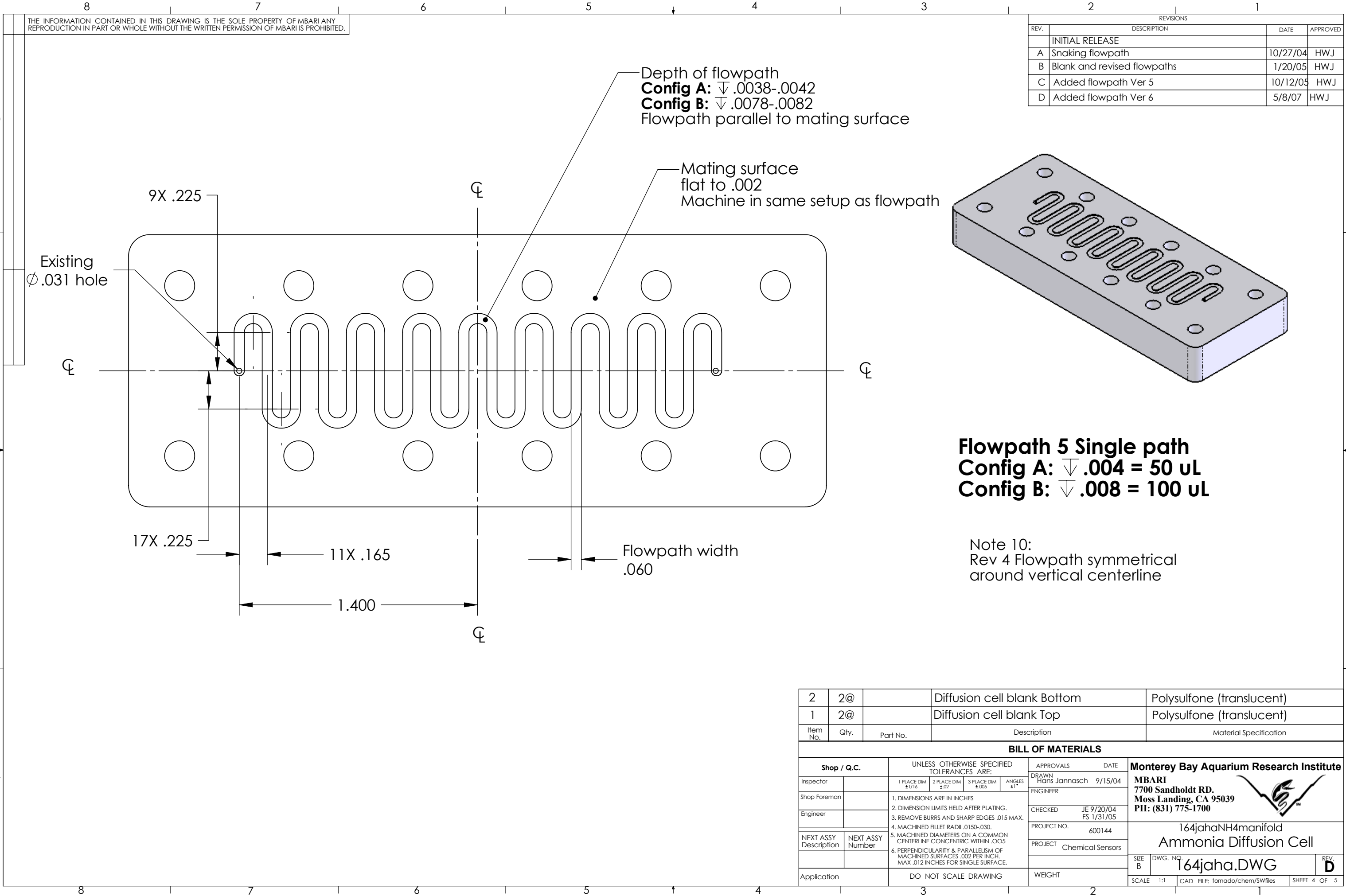


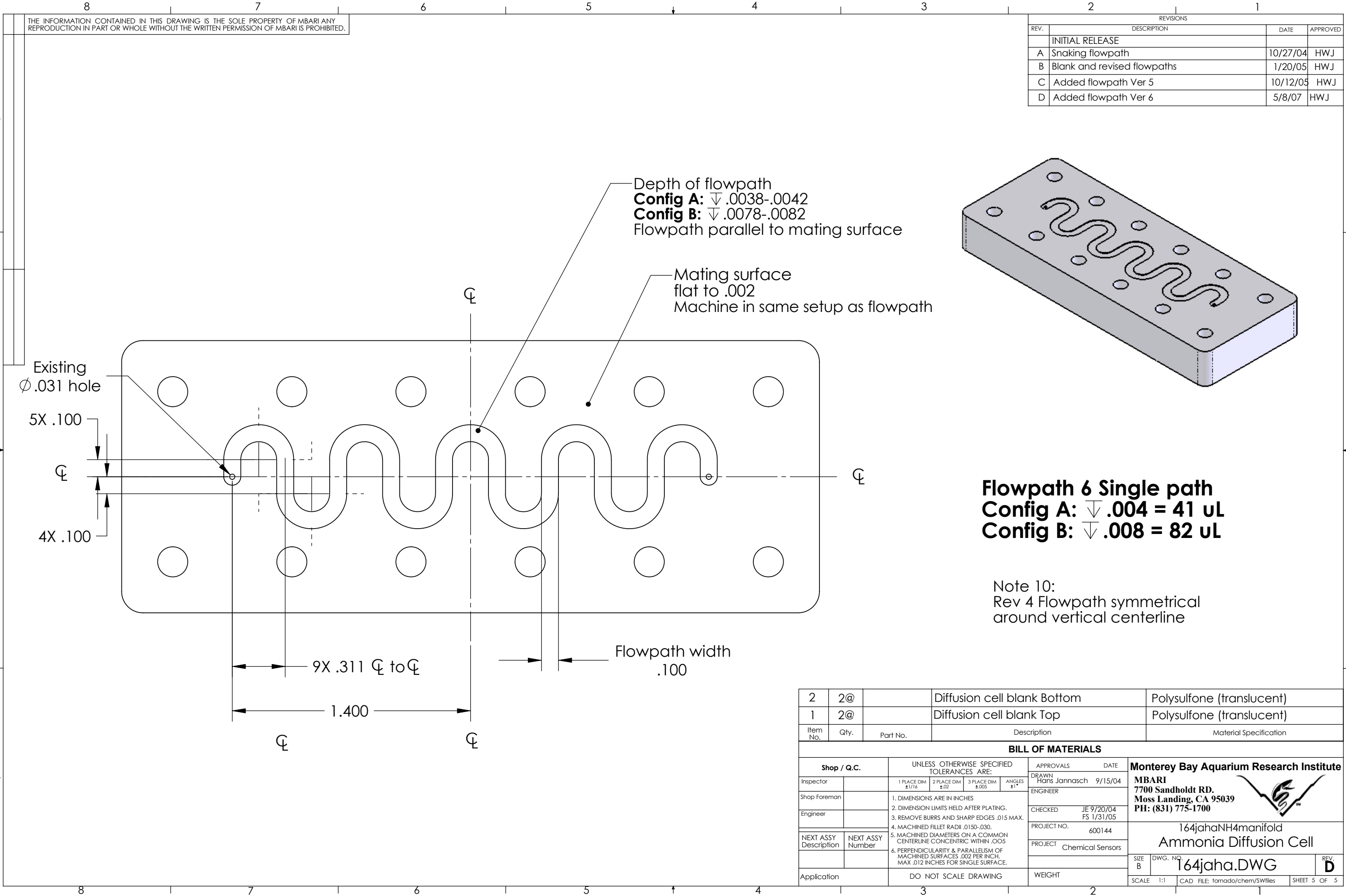
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| 2                     | 2@               |                                                                                                           | Diffusion cell blank Bottom | Polysulfone (translucent) |                                                                                                                                                                                                                                                     |
| 1                     | 2@               |                                                                                                           | Diffusion cell blank Top    | Polysulfone (translucent) |                                                                                                                                                                                                                                                     |
| Item No.              | Qty.             | Part No.                                                                                                  | Description                 | Material Specification    |                                                                                                                                                                                                                                                     |
| BILL OF MATERIALS     |                  |                                                                                                           |                             |                           |                                                                                                                                                                                                                                                     |
| Shop / Q.C.           |                  | UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:                                                                |                             | APPROVALS DATE            |                                                                                                                                                                                                                                                     |
| Inspector             |                  | 1 PLACE DIM ±1/16                                                                                         | 2 PLACE DIM ±.02            | 3 PLACE DIM ±.005         | <br><b>Monterey Bay Aquarium Research Institute</b><br><b>MBARI</b><br><b>7700 Sandholdt RD.</b><br><b>Moss Landing, CA 95039</b><br><b>PH: (831) 775-1700</b> |
| Shop Foreman          |                  | 1. DIMENSIONS ARE IN INCHES                                                                               |                             |                           |                                                                                                                                                                                                                                                     |
| Engineer              |                  | 2. DIMENSION LIMITS HELD AFTER PLATING.                                                                   |                             |                           |                                                                                                                                                                                                                                                     |
|                       |                  | 3. REMOVE BURRS AND SHARP EDGES .015 MAX.                                                                 |                             |                           |                                                                                                                                                                                                                                                     |
|                       |                  | 4. MACHINED FILLET RADII .0150-.030.                                                                      |                             |                           |                                                                                                                                                                                                                                                     |
| NEXT ASSY Description | NEXT ASSY Number | 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005                                       |                             |                           |                                                                                                                                                                                                                                                     |
|                       |                  | 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH. MAX .012 INCHES FOR SINGLE SURFACE. |                             |                           |                                                                                                                                                                                                                                                     |
| Application           |                  | DO NOT SCALE DRAWING                                                                                      |                             | WEIGHT                    |                                                                                                                                                                                                                                                     |
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|                       |                  |                                                                                                           |                             |                           |                                                                                                                                                                                                                                                     |
|                       |                  |                                                                                                           |                             |                           |                                                                                                                                                                                                                                                     |

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164jahaNH4manifold  
Ammonia Diffusion Cell



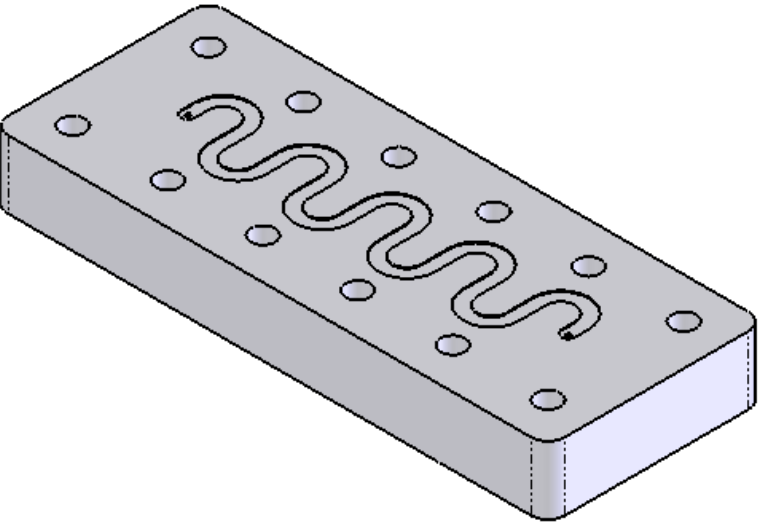


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| REVISIONS |                             |          |          |
|-----------|-----------------------------|----------|----------|
| REV.      | DESCRIPTION                 | DATE     | APPROVED |
|           | INITIAL RELEASE             |          |          |
| A         | Snaking flowpath            | 10/27/04 | HWJ      |
| B         | Blank and revised flowpaths | 1/20/05  | HWJ      |
| C         | Added flowpath Ver 5        | 10/12/05 | HWJ      |
| D         | Added flowpath Ver 6        | 5/8/07   | HWJ      |

Depth of flowpath  
**Config A:** ∇ .0038-.0042  
**Config B:** ∇ .0078-.0082  
Flowpath parallel to mating surface

Mating surface  
flat to .002  
Machine in same setup as flowpath



**Flowpath 6 Single path**  
**Config A:** ∇ .004 = 41 uL  
**Config B:** ∇ .008 = 82 uL

Note 10:  
Rev 4 Flowpath symmetrical  
around vertical centerline

|                       |                      |                                                                                                                                                                                                                                                                                                                                                 |                             |                                |
|-----------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------------------|
| 2                     | 2@                   |                                                                                                                                                                                                                                                                                                                                                 | Diffusion cell blank Bottom | Polysulfone (translucent)      |
| 1                     | 2@                   |                                                                                                                                                                                                                                                                                                                                                 | Diffusion cell blank Top    | Polysulfone (translucent)      |
| Item No.              | Qty.                 | Part No.                                                                                                                                                                                                                                                                                                                                        | Description                 | Material Specification         |
| BILL OF MATERIALS     |                      |                                                                                                                                                                                                                                                                                                                                                 |                             |                                |
| Shop / Q.C.           |                      | UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:                                                                                                                                                                                                                                                                                                      |                             | APPROVALS DATE                 |
| Inspector             |                      | 1 PLACE DIM ±1/16                                                                                                                                                                                                                                                                                                                               | 2 PLACE DIM ±.02            | DRAWN Hans Jannasch 9/15/04    |
| Shop Foreman          |                      | 3 PLACE DIM ±.005                                                                                                                                                                                                                                                                                                                               | ANGLES ±1°                  | ENGINEER                       |
| Engineer              |                      | 1. DIMENSIONS ARE IN INCHES<br>2. DIMENSION LIMITS HELD AFTER PLATING.<br>3. REMOVE BURRS AND SHARP EDGES .015 MAX.<br>4. MACHINED FILLET RADII .0150-.030.<br>5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005<br>6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH. MAX .012 INCHES FOR SINGLE SURFACE. |                             |                                |
| NEXT ASSY Description | NEXT ASSY Number     | CHECKED JE 9/20/04 FS 1/31/05                                                                                                                                                                                                                                                                                                                   |                             |                                |
|                       |                      | PROJECT NO. 600144                                                                                                                                                                                                                                                                                                                              |                             |                                |
|                       |                      | PROJECT Chemical Sensors                                                                                                                                                                                                                                                                                                                        |                             |                                |
| Application           | DO NOT SCALE DRAWING |                                                                                                                                                                                                                                                                                                                                                 | WEIGHT                      |                                |
|                       |                      | SCALE 1:1                                                                                                                                                                                                                                                                                                                                       |                             | CAD FILE: tornado/chem/SWfiles |
|                       |                      | SHEET 5                                                                                                                                                                                                                                                                                                                                         |                             | OF 5                           |

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SIZE B DWG. NO. 164jaha.DWG REV. D