Inner-surface finish N7 for the nozzle section
NOTE:
"elbow_300u.SLDPRT" has same dimensions but a bigger wall thickness marked in curly brackets { }
SECTION A-A
SCALE 10 : 1

Inner-surface finish N7
<table>
<thead>
<tr>
<th>Item #</th>
<th>Name</th>
<th>Material</th>
<th>Manufacturer</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Heat Exchanger</td>
<td>316L</td>
<td>EDMC</td>
<td>AM Metal Printer + lathe post manufacturing</td>
</tr>
<tr>
<td>2</td>
<td>Thruster Inflow</td>
<td>316L</td>
<td>EDMC</td>
<td>AM Metal Printer + lathe post manufacturing</td>
</tr>
<tr>
<td>3</td>
<td>Thruster Casing</td>
<td>316L</td>
<td>EDMC</td>
<td>CNC machining</td>
</tr>
<tr>
<td>4</td>
<td>Thruster Support</td>
<td>316L</td>
<td>EDMC</td>
<td>CNC machining</td>
</tr>
<tr>
<td>5</td>
<td>Collar</td>
<td>Alumina</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Nozzle Spacer</td>
<td>Shapal</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Radiation Shielding Assembly</td>
<td>Shapal</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Insulation Package</td>
<td>Porous Ceramic</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>Thruster Casing</td>
<td>Metal Foil</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
NOTE: EDM wire cut to be performed at 1mm from print base plate.
NOTE: EDM wire cut to be performed at 1mm from print base plate.
Alumina 99.7%

If in doubt please ask.

Do not scale.

All dimensions in mm unless otherwise stated.

Tolerances unless otherwise stated:
- Linear: ±0.20
- ±0.10
- ±0.05
- Angular: ±0.50

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Title: Washer

Date: 07/11/2017

Supervisor: AN Grubisic

Design: VHTR

Drawing No: 1 of 11

Job No: 16

Assembly Number: 1 of 1

Revision: 4

SURFACE FINISH

TEXTURE

MATERIAL

SUPERVISOR

PROJECT

DEPARTMENT

DRAWN AND DESIGNED BY

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6 holes equi-spaced on a Ø9mm PCD
Ø1.50

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1 of 1

2 of 11

A3

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Astronautics

A3

DO NOT SCALE

Book Bottom Insulator

DRAWN AND DESIGNED BY
F Romei

TOLERANCES UNLESS OTHERWISE STATED

2 of 11

DO NOT SCALE

IF IN DOUBT PLEASE ASK

F Romei

AN Grubisic

07/11/2017

5:1

All Overunless otherwise stated

All dimensions in mm unless otherwise stated

Linear

.X = +/- 0.20

.XX = +/- 0.10

.XXX = +/- 0.05

Angular

+/- 0.50

VHTR

AN Grubisic

SHAPAL

MATERIAL

TEXTURE

SURFACE FINISH

REMOV E ALL SHARP EDGES

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Disk Pipe Insulator

Shapal

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DRAWN AND DESIGNED BY
F Romei

F Roman

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TOLERANCES UNLESS OTHERWISE STATED
LINEAR
.X = +/- 0.20
.XX = +/- 0.10
.XXX = +/- 0.05

ANGULAR
+/- 0.50

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REMOVE ALL SHARP EDGES
IF IN DOUBT PLEASE ASK.
Insulating Sleeve
6 holes equi-spaced on a 0.35mm PCD
NOTES:
- the as-printed Heat Exchangers are manufactured in job 772270
- use suggested jig for performing this job
- all cuts are performed on the nozzle end

Suggested machining steps:
1. Polish down the bottom cylindrical surface;
2. CUT 1 (with the datum provided and up to the CUT 1 dia.);
3. Radius R1;
4. CUT 2 to obtain the required close running fit with a ceramic component.
5. CUT 3 up to the specified dia. to avoid contact with the internal nozzle;
6. CUT 4 and CUT 5 to obtain the specified tolerance to couple the nozzle with the Thruster Casing component;
7. CUT 6 to obtain the nominal Heat Exchanger length;
8. Manual nozzle surface polishing on lathe (using jig for CUT 3), details to be further discussed with technician;
9. Nozzle throat drilling with 0.42mm drill bit (using jig for CUT 3)
CUT 1 + radius R1 (section view)

CUT 2

CUT 3 + CUT 4 + nozzle polishing + throat drilling

Suggested jig for HE post-man

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Suggested jig dimensions

- **SECTION B-B**: B = 1.75

- **SECTION C-C**: C = 2

- **R6.25**

- **R5.08**

---

**Notes**: DO NOT SCALE. ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED. TOLERANCES: UNLESS OTHERWISE STATED, LINEAR ±0.20, ±0.10, ±0.05; ANGULAR ±0.50. REMOVE ALL SHARP EDGES. IF IN DOUBT PLEASE ASK.
NOTES:
- the as-printed Thruster Inflows are manufactured in job 772270
- all cuts are performed on the top end

Suggested machining steps:
1. 6 holes machining
2. CUT 1 (with the datum provided and up to the CUT 1 radius)
3. 10° chamfer up to 8.85mm radius at top face of disk
4. CUT 2
5. CUT 3 to obtain the nominal Thruster Inflow length

6 holes equi-spaced on a \( \varnothing 35 \text{mm PCD} \)
6 holes equi-spaced on a $\phi 35$mm PC $\phi 6$

DETAIL D
SCALE 4 : 1

SECTION C-C

Thrust Casing

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DO NOT SCALE

R6 TYP
R15.80

DO NOT SCALE

ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED

TOLERANCES UNLESS OTHERWISE STATED

ASTRONAUTICS

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F Romei
AN Grubisic

07/11/2017
2:1

A3

VHTR

316L

TEXTURE

UNIVERSITY

PROJECT

2 of 3

REV.

ASSEMBLY NUM.

1 of 1

1

Sheet

4
3 holes equi-spaced on a \( \phi 27\text{mm} \) PCD

\( \phi 5.20 \)

E

R5

\( \phi 3 \)

60°

R6

E

R6

\( \phi 6.90 \)

\( \phi 4.90 \)

\( \phi 1.50 \)

\( 6.00 \)

\( \phi 36 \)

\( 3 \)

\( 5.20 \)

\( 1.50 \)

\( 8 \)

\( 6 \)

\( 3 \)

SECTION E-E
Thickness required = 3mm

Holes summary:
- M6 full thread x6
- 6mm x 22
- 4mm x 10
- 3.2mm x 4

Rack plate