

Heat Flux Calibration Heat Release Rate (HR2) Task Group Updates

2012 June Materials Meeting
Toulouse

Materials Working Group

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June, 2012



Federal Aviation
Administration



Agenda

- Chapter HF (Heat Flux) Updates
- HR2 Standardization Of Components:
 - Metal Thicknesses
 - Dimensions
 - Tolerances
- Chapter HR (Chapter 5) Updates



Chapter HF (Heat Flux) Updates

- Added Dry Film Thickness 1 ± 0.3 mils
- Minor change in Required Reporting criteria
- Removed non-mandatory language from Laboratory Environment section
- Draft document is complete



HR2

Component Metal Thickness & Tolerances for Cold Rolled Stainless Steel

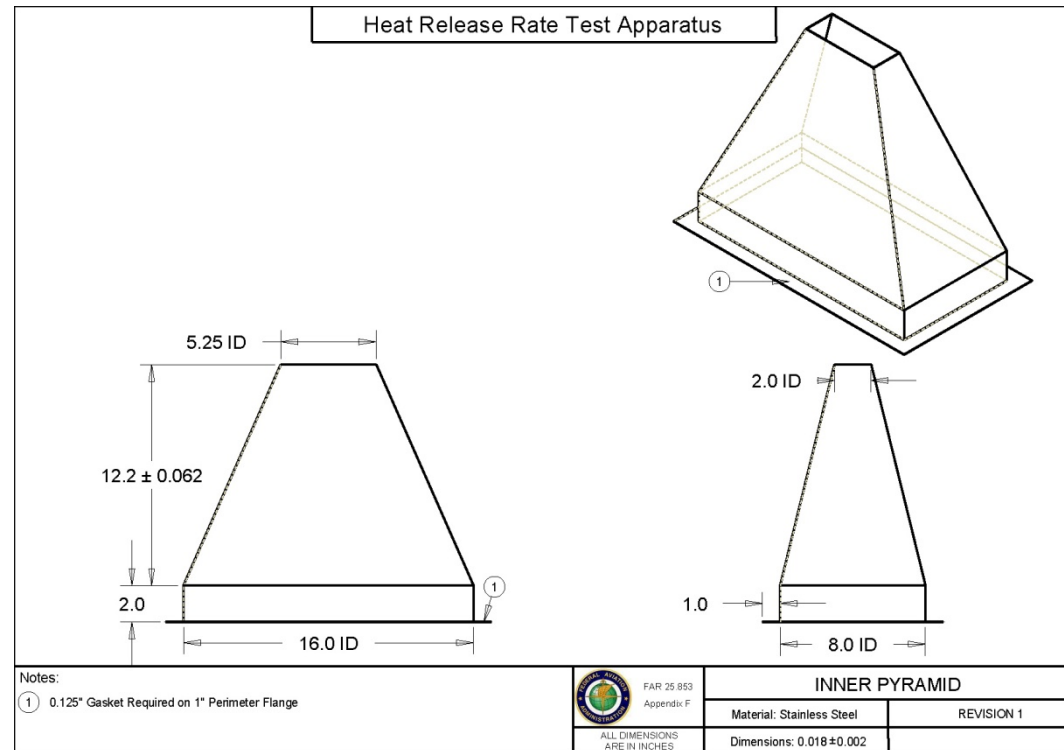
New	Previous	Component
¼ inch Aluminum	Unchanged	Holding Chamber Door
	Unchanged	Air Distribution Plate
0.125 ± 0.005	Not Specified	1/8 inch Retaining Rod
0.048 ± 0.004	(0.049 ± 0.002)	Main Body
	Not Specified	Globar Pan
	Not Specified	Holding Chamber
	Not Specified	Second Stage Plate
	Not Specified	Lower Air Plenum
0.042 ± 0.004	(0.042 ± 0.002)	Diamond Mask
0.036 ± 0.003	(0.030 ± 0.008)	Reflector Plate
	24-Gauge Steel	Sample Holder Plate
0.030 ± 0.003	(0.031 ± 0.002)	Outer Pyramid
	Not Specified	Radiation Doors
0.018 ± 0.002	Unchanged	Inner Pyramid
	Unchanged	Chimney
	Unchanged	Baffle Plate
	Unchanged	Sample Holders
	Unchanged	Holder Spring
	Unchanged	Retaining Ring



HR2 Standardization Of Components

INNER PYRAMID

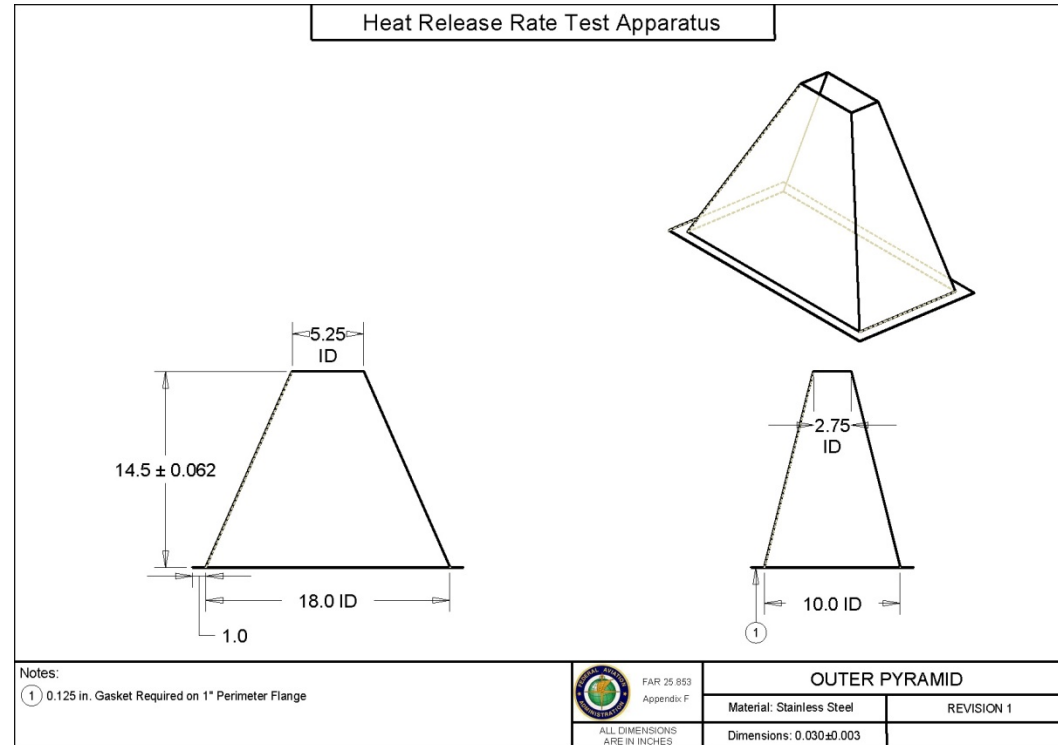
- Inner pyramid section bolts to bottom surface of cooling manifold
- 1" perimeter base flange
- 2" rise at base section
- Base opening 8" x 16" ID
- Upper opening 5.25" x 2" ID
- Height tolerance reduced from ± 0.25 " to ± 0.062 "



HR2 Standardization Of Components

OUTER PYRAMID

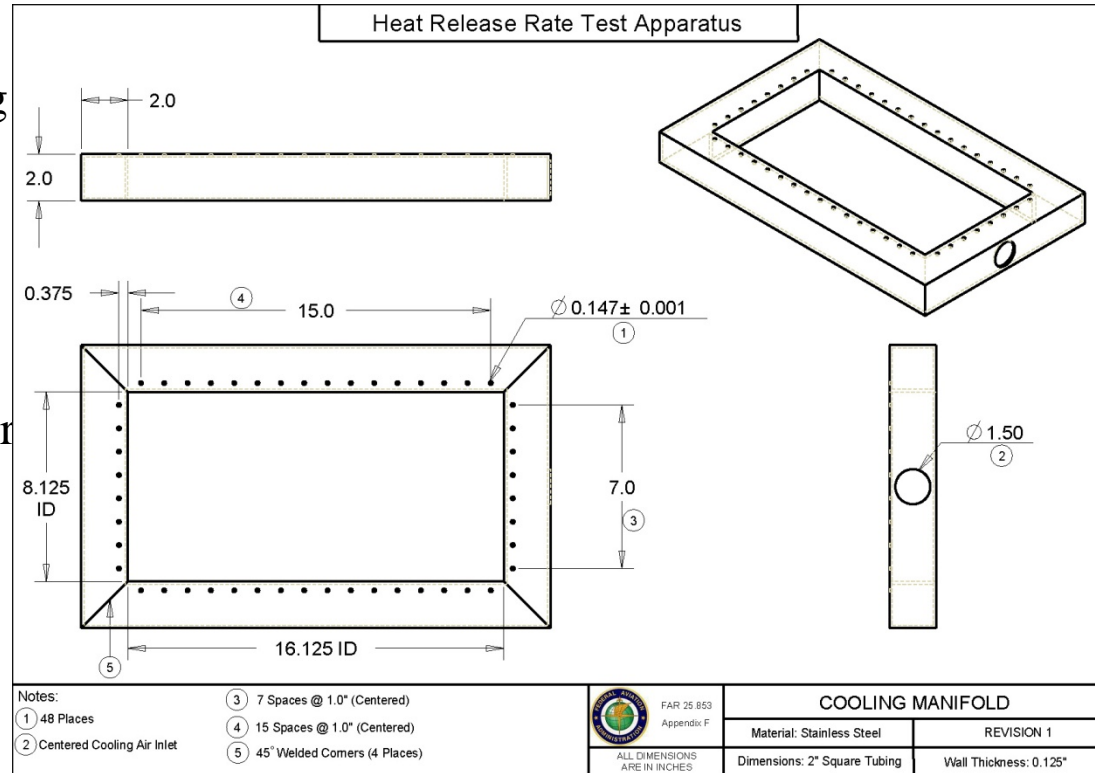
- Outer pyramid section bolts to top surface of cooling manifold
- 1" perimeter base flange
- Base opening 18" x 10" ID
- Upper opening 5.25" x 2.75" ID
- Height 14.5 ± 0.062" (measured vertically from top of cooling manifold)



HR2 Standardization Of Components

COOLING MANIFOLD

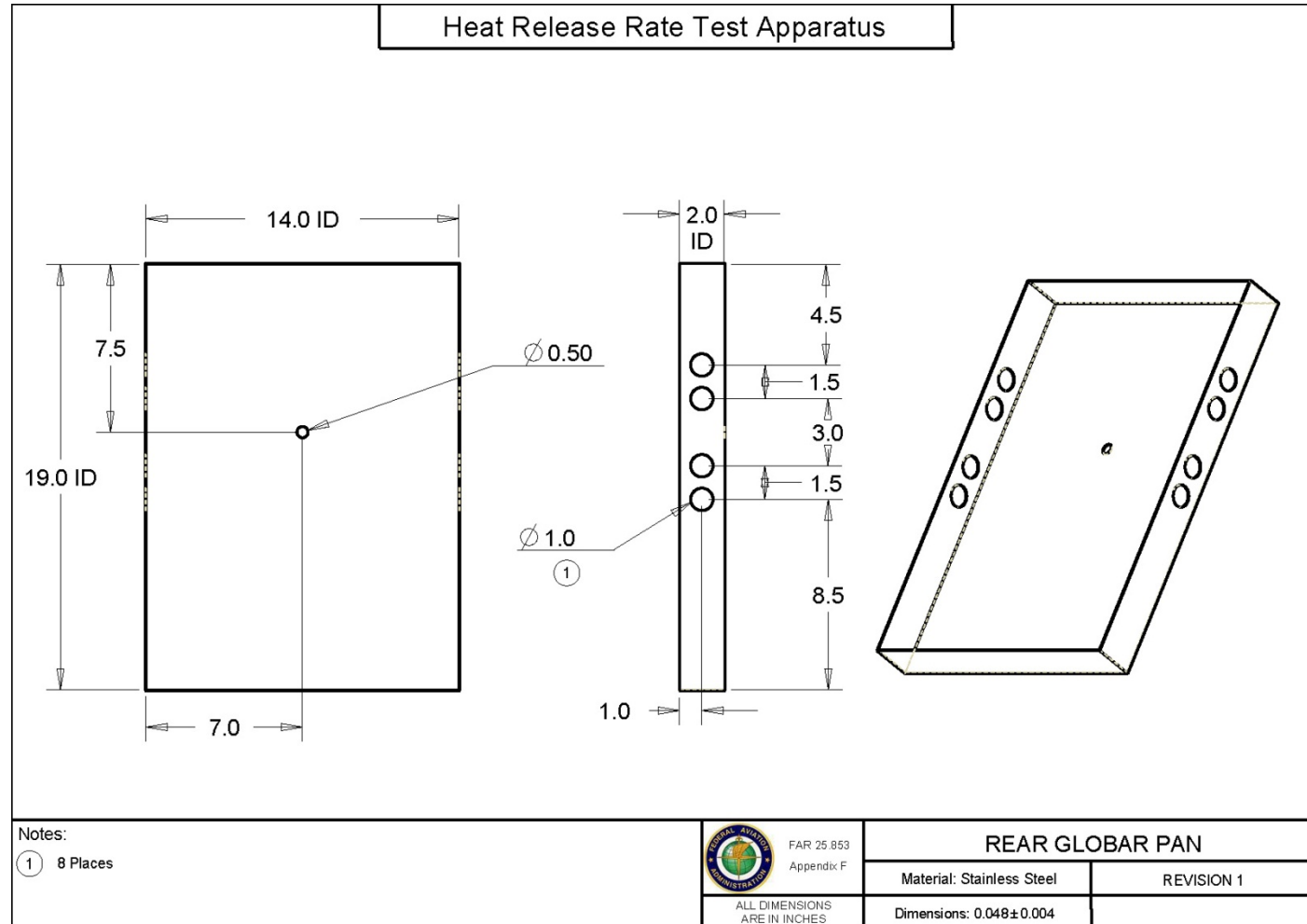
- 2" x 2" Stainless Steel Square Tubing
- 1/8" (0.125) Wall Thickness
- 45° cut on corners, then welded
- 48 holes with standardized pattern
- 8.125" x 16.125" ID
- Cooling air inlet port centered on short dimension



HR2 Standardization Of Components

GLOBAL PAN

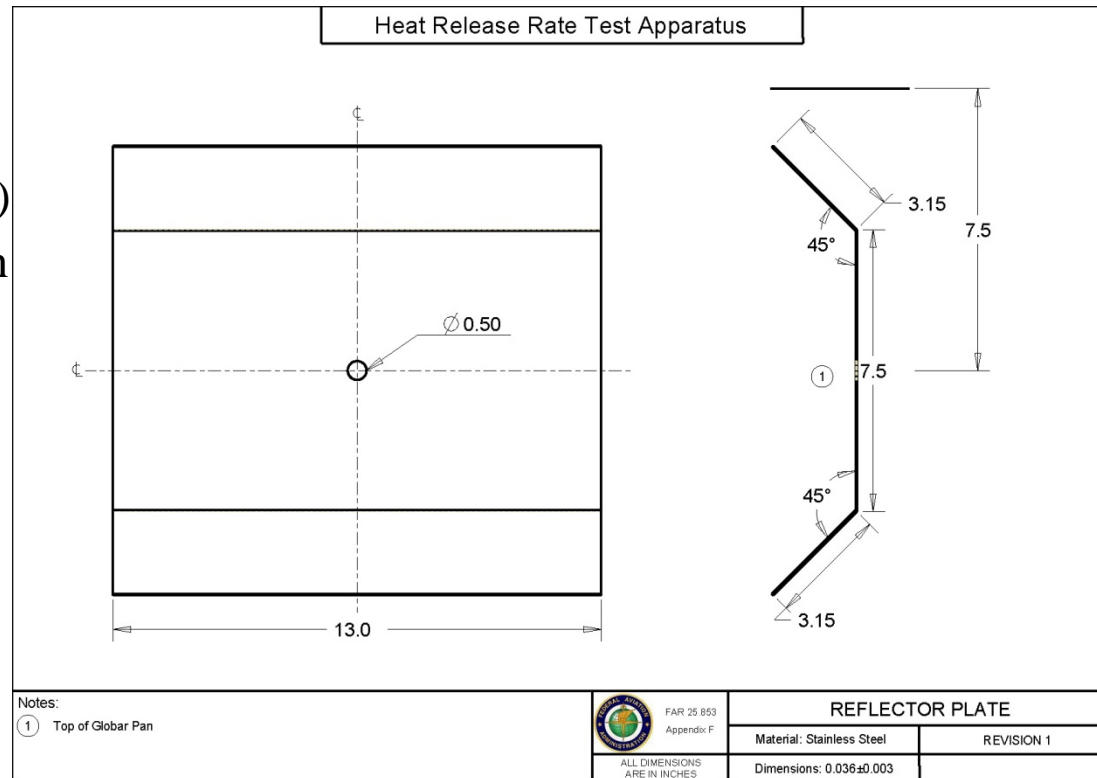
-14" x 19" x 2"
(Added Height dimension)



HR2 Standardization Of Components

REFLECTOR PLATE

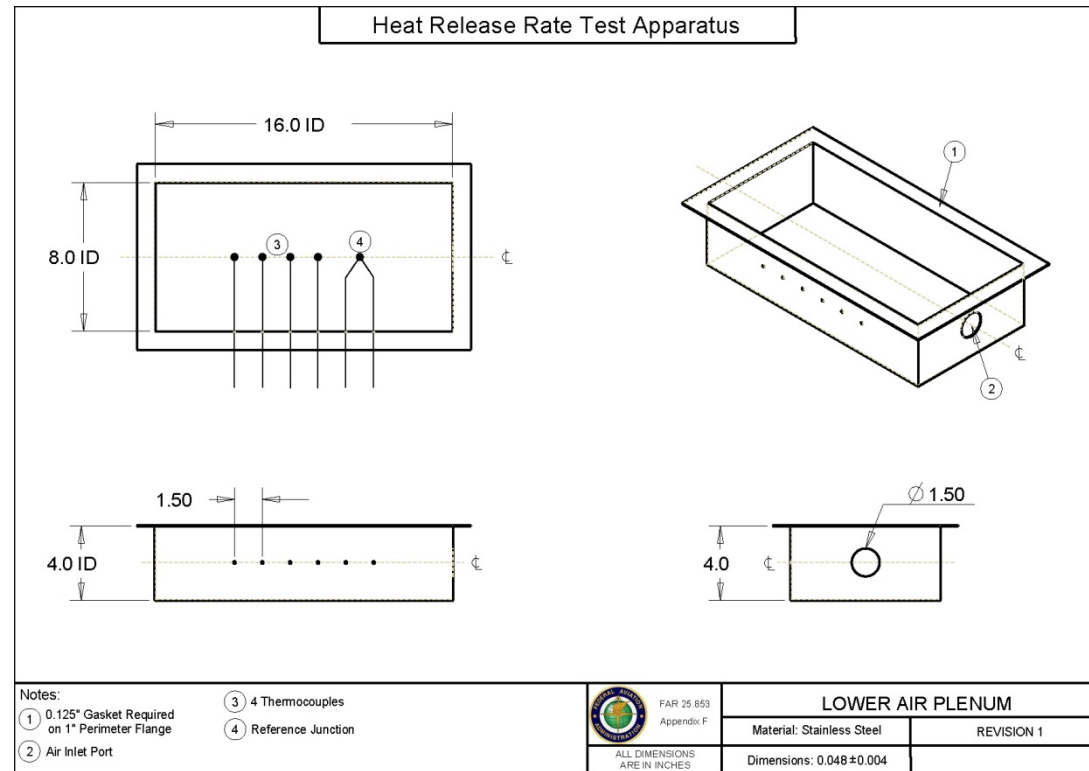
- Added width dimension 13" OD
- Each angled leg @ 3.15" (unchanged)
- Initial angle of 45° set at factory (then can be adjusted as required)



HR2 Standardization Of Components

LOWER AIR PLENUM

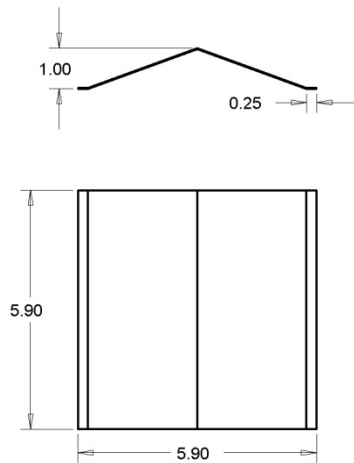
- Centered Air Inlet port (on narrow dimension)
- Thermocouple sensing tips and reference junction to be centrally located @ 1 1/2" spacing
- Reference junction positioned closest to air inlet port



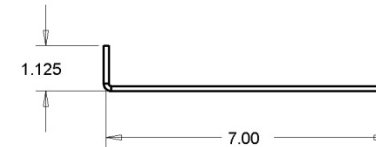
HR2 Standardization Of Components

SAMPLE HOLDER & COMPONENTS

Heat Release Rate Test Apparatus



Heat Release Rate Test Apparatus



Notes:



FAR 25.853
Appendix F
ALL DIMENSIONS
ARE IN INCHES

SPRING

Material: Stainless Steel
REVISION 1
Dimensions: 0.018±0.002

Notes:



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Appendix F
ALL DIMENSIONS
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RETAINING ROD

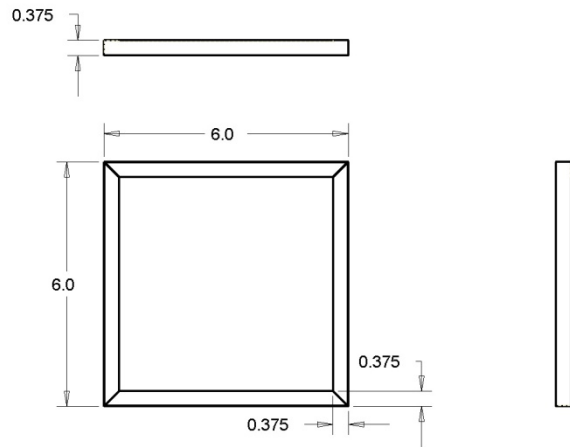
Material: Stainless Steel
REVISION 1
Dimensions: 0.125±0.005



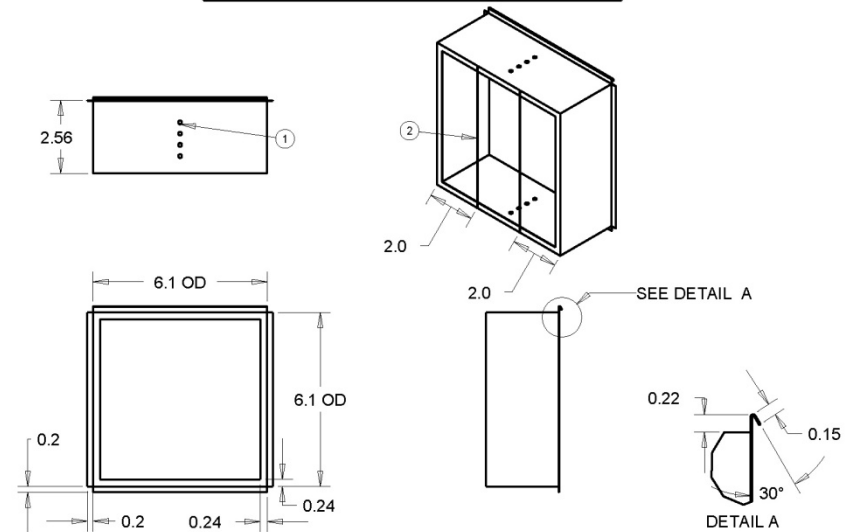
HR2 Standardization Of Components

SAMPLE HOLDER & COMPONENTS

Heat Release Rate Test Apparatus



Heat Release Rate Test Apparatus



Notes:



FAR 25.853
Appendix F

ALL DIMENSIONS
ARE IN INCHES

RETAINER FRAME

Material: Stainless Steel

REVISION 1

Dimensions: 0.018±0.002

Notes:

- ① 4 Holes Spaced at 15, 25, 35, 45 mm from the Rear of the Holder for the Retaining Rod Top & Bottom
- ② 0.020 Wire (2 Places)



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Appendix F

ALL DIMENSIONS
ARE IN INCHES

SPECIMEN HOLDER

Material: Stainless Steel

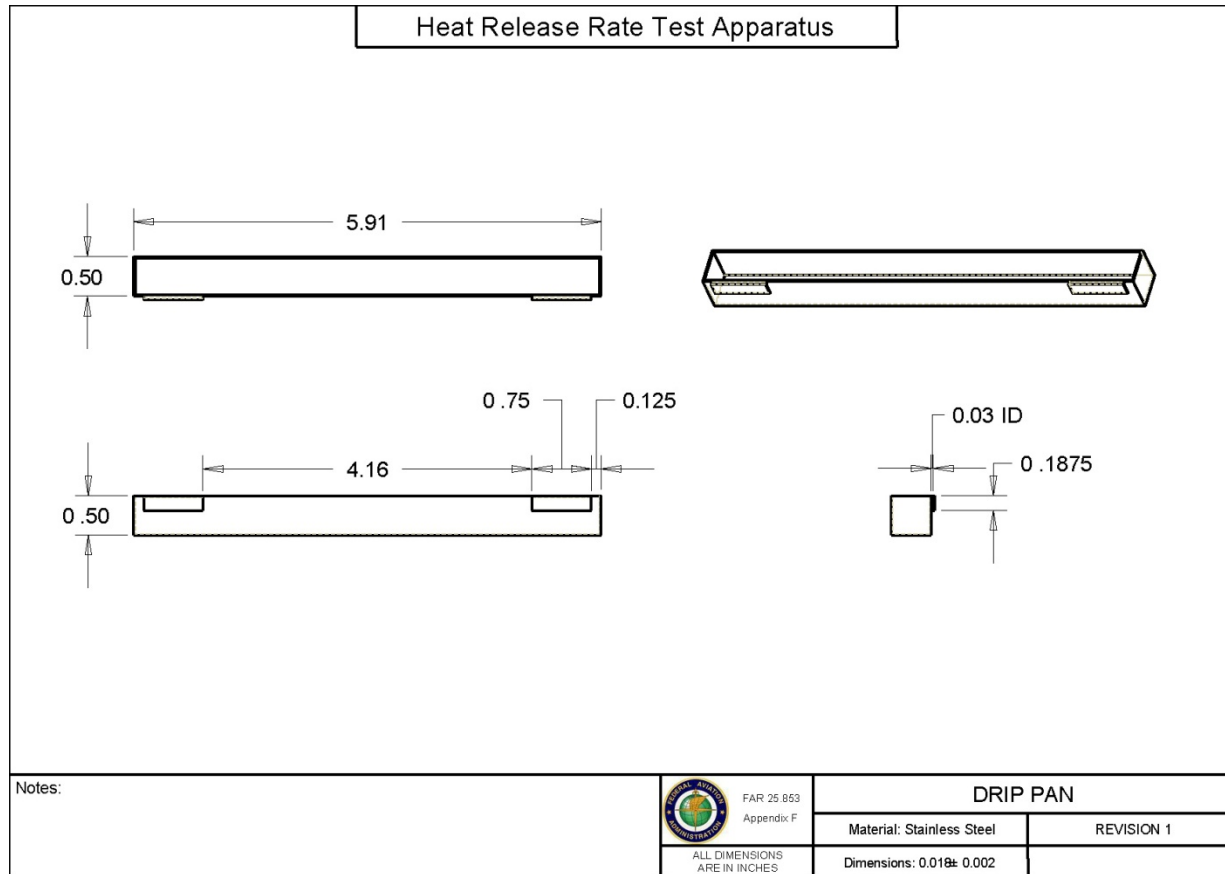
REVISION 1

Dimensions: 0.018±0.002



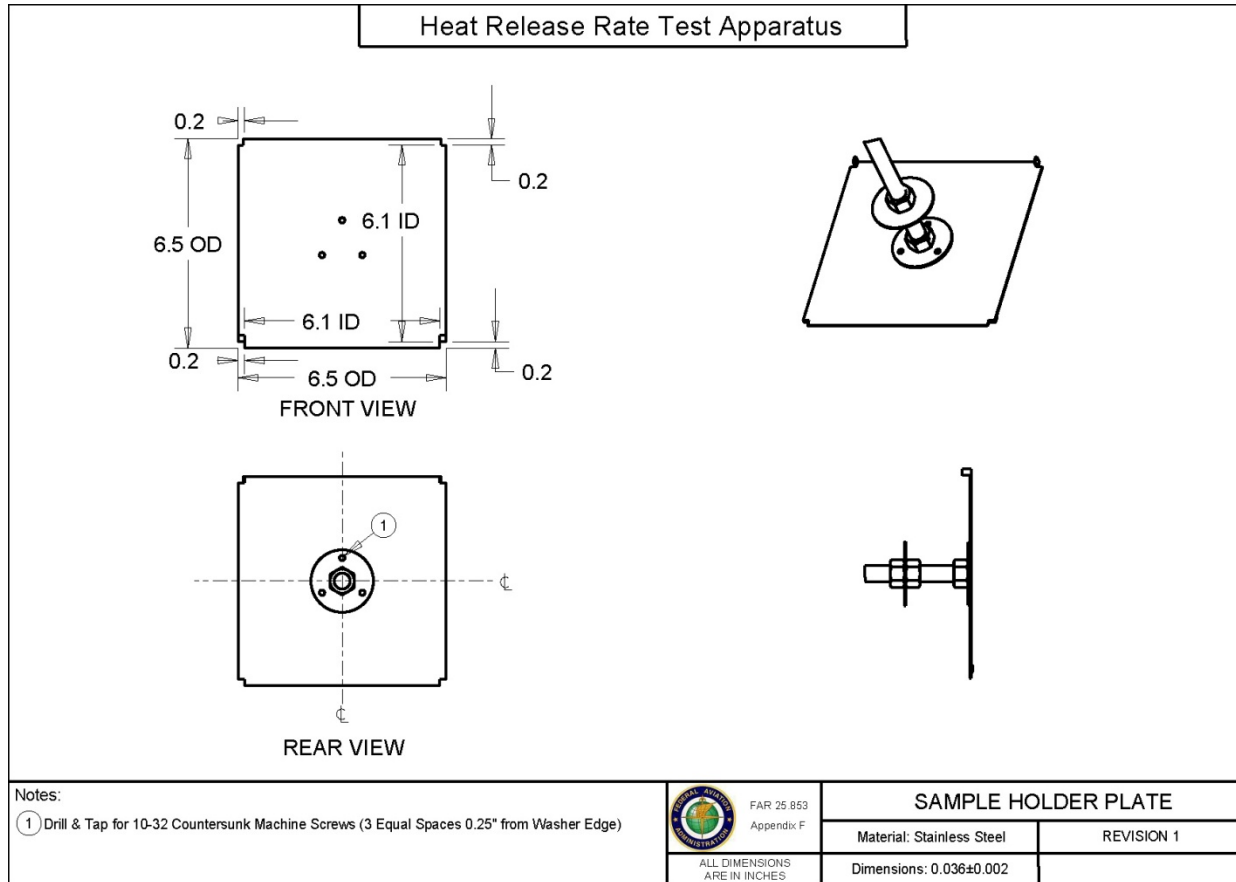
HR2 Standardization Of Components

SAMPLE HOLDER DRIP PAN



HR2 Standardization Of Components

SAMPLE HOLDER MOUNTING PLATE



HR2 Standardization Of Components

Diamond Shaped Mask

- 1/2 inch Shaft [Removed thread size of bolt from handbook drawing]
- Shaft head or nut only on side facing specimen [no threads extending towards specimen]
- Removed length of bolt from drawing (Added to supplemental section)

Viewing Window

- 4 ± 0.5” x 4 ± 0.5” standardized viewing area

Clean Outs

- No dimensions but note in document (Chapter HR): “Provisions shall be made to access lower air plenum area and area below second stage plate”
- Note in document (Chapter HR) to include gaskets on all access panels

Gaskets

- Note on drawings to include 0.125 inch gasket (Lower Plenum, Main Body and Upper Pyramid Section)

Inner Radiation Doors

- Constructed of 2 sheets of 0.030 ± 0.003” Stainless Steel with a layer of 1/4” rigid refractory board in between. Overall thickness would be approximately 5/16” (0.31”)



Chapter HR (Chapter 5) Revision Updates

- The following drawings were added:
 - General overview identifying each component
 - Individual components / parts of test apparatus
 - New thermopile system drawing
- Return to original gas flow parameters (1, 4, 6, 8 SLPM) for calibration
- Better defined calculation of heat release rate, total heat release and calibration factor
- Increased upper thermocouple range from 25 to 30 Degree F
- Added the following statement to requirements section:
 - “A minimum of three samples must be tested, and greater than 80% must pass (See Recovery Testing section)”
- Supplemental section additions:
 - More detail added to Supplemental Information (Part numbers, manufacturers etc.)
 - Added Cold / Hot recommended checklist



Q & A

