Vacuum Handbook Appendix 2: Knife Edge Flange Definition

MPEX-00-ENG-002-A2

MATERIAL PLASMA EXPOSURE EXPERIMENT

(MPEX)

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Vacuum Handbook Appendix 2: Knife Edge Flange Definition for the Material Plasma Exposure Experiment Project

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Change Log

Revision History		
Revision	**Date**	**Description of Changes**
0	2022-09-08	Initial issue
1	2022-09-23	Minor document re-structuring with headers. Refined Copper Alloy knife edge definition including removal of reference [2] as it is no longer applicable. Added detail on leak check port as required for all knife edge flanges.

The purpose of this appendix is to define the acceptable dimensions for knife edge (aka Conflat ®) flanges on the MPEX project. The definitions are broken into two classifications, Stainless Steel Flanges and Glidcop AL-15 (UNS C15715) / CuCrZr (UNS C18150) Flanges. These two definitions differ only in the detail of the knife edge itself, not in the overall flange dimensions. There is also a requirement for leak check ports specified.

Overall flange dimensions shall be in accordance with ASTM E2734/E2734M - Dimensions of Knife Edge Flanges [1]. This includes the gasket dimensions as defined in FIG 3 of the standard.

A2-1 Knife Edge Definition

All Stainless-Steel knife edge detail shall comply with ASTM E2734/E2734M - Dimensions of Knife Edge Flanges [1], FIG 2 of standard.

All Glidcop AL-15 and CuCrZr shall be defined by the knife-edge detail in Figure 1 where dimension F refers to the knife edge radius from ASTM E2734/E2734M: TABLE 1 of standard, dimensioned to the center mark of the R.006 dimension.

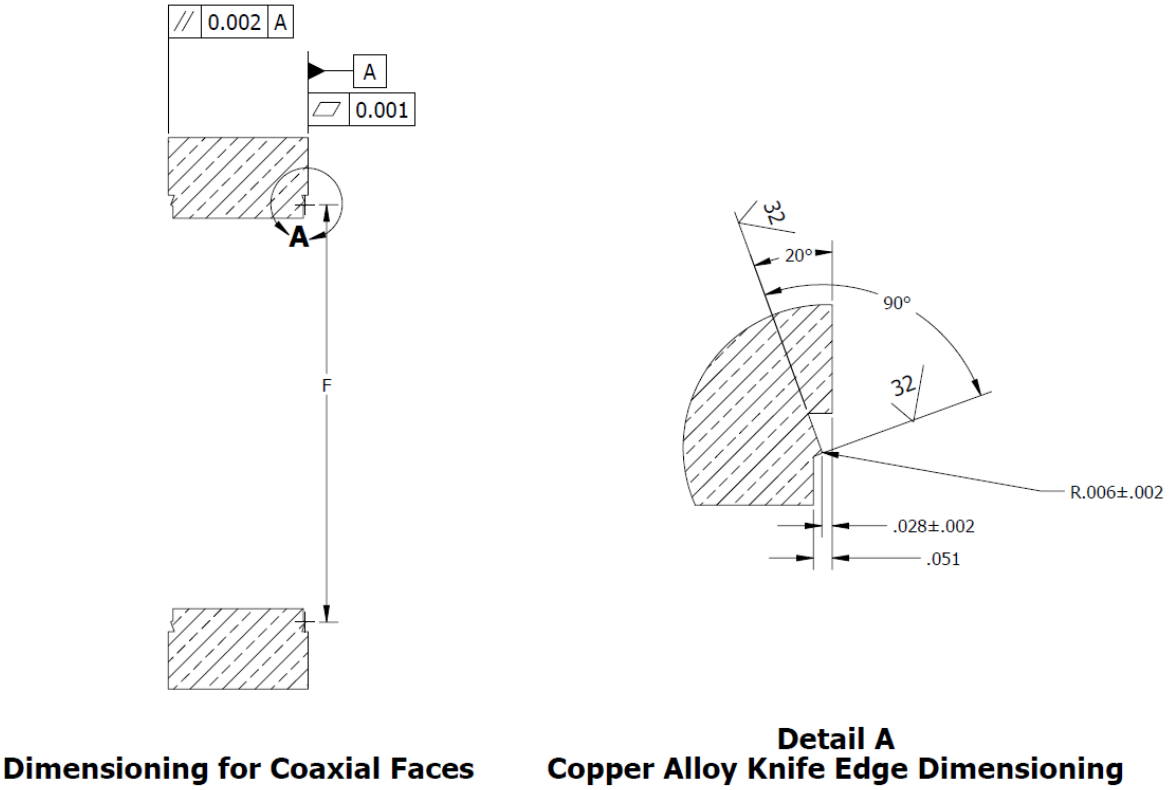


Figure 1. Knife-Edge Detail for Copper Alloy Components

A2-2 Vent Grooves for Leak Checking

The preferred implementation of the vent grooves is shown in Figure 2.

All knife edge vacuum flanges shall have at minimum two opposing vent grooves.

The preferred orientation in assembly for the vent grooves is vertical, with one groove pointing downward and the other upward. This preference might not allow access for leak checking, in which case the orientation of the grooves may be changed to accommodate.

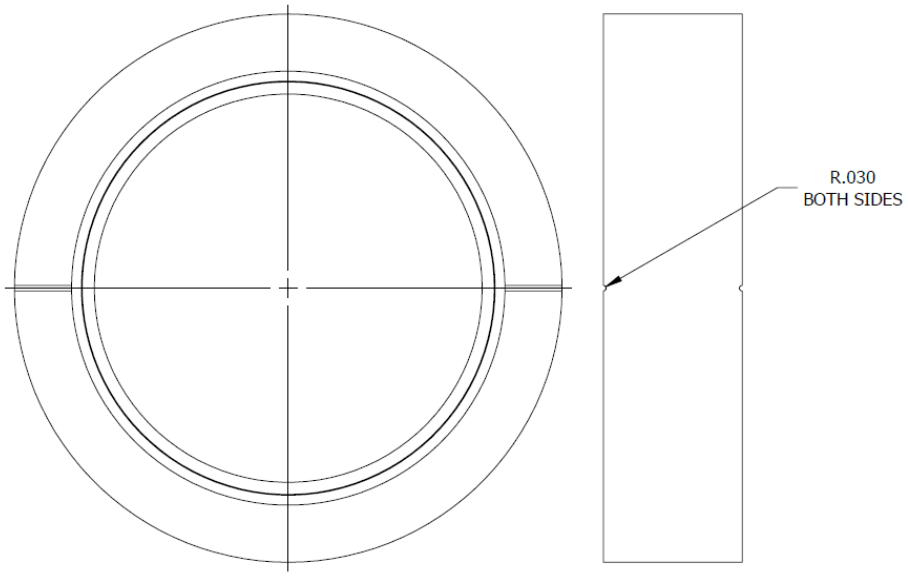


Figure 2. Preferred Dimensioning for Vent Grooves for leak checking

References

[1] ASTM Standard E2734/E2734M, 2018, "Standard Specification for Dimensions of Knife-Edge Flanges," ASTM International, West Conshohocken, PA, 2018, DOI: 10.1520/E2734_E2734M-10R18