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## Stress-strain state analysis of the first-grade titanium foil of the accelerator output window in a static state

*Tuesday, 21 May 2024 16:00 (2 hours)*

The stress-strain state of the titanium foils of the accelerator output windows at various thicknesses was studied with the choice of first-grade titanium foil as a brand. The latter is more affordable and accessible compared to a second-grade titanium foil. The deformation diagram, density, Young's modulus, and Poisson's ratio of the first-grade titanium were selected as initial data. Atmospheric pressure was used as an external pressure, and the pressure from the vacuum side was taken as zero. The latter is acceptable in simulations of ultrahigh vacuum assemblies since it does not affect the overall picture of the stress-strain state. In addition to studying the central nodes of the metal foil, the sealing nodes were also considered as an object of research, with the study of stress intensity, meridional and circumferential stresses, and maximum displacements of the center. Based on the results, a function was obtained that allows us to accurately calculate the displacements of the center of the first-grade titanium foil depending on its thickness. The analysis of the received data was carried out.

### Footnotes

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