
Tribological properties of bronze filled PTFE under dry sliding conditions and aqueous environments (distilled water and sea water)

Mohammad Jebran Khan and M.F. Wani*

Tribology Laboratory,
Department of Mechanical Engineering,
National Institute of Technology,
Srinagar, Kashmir, India
Email: jebrankhan99@gmail.com
Email: mfwani@nitsri.net
*Corresponding author

Rajat Gupta

Department of Mechanical Engineering,
National Institute of Technology,
Mizoram, India
Email: rguptanitsri@gmail.com

Abstract: The tribological behaviour of 60 wt. % bronze filled PTFE sliding against AISI 420 stainless steel in ambient air, distilled water and sea water was investigated. The experiments were conducted on a pin on disc tribometer at room temperature at a normal load of 10N. The bronze filled PTFE showed superior tribological performance in sea water as compared to distilled water and dry sliding. The lowest average coefficient of friction (0.045) and lowest specific wear rate ($1.10 \times 10^{-5} \text{mm}^3/\text{Nm}$) were observed under sea water environment. Surface morphological and surface analytical studies were conducted using optical microscopy, SEM, EDS and 3D surface profilometer to reveal wear mechanisms. From profilometric traces of counterface, it was observed that there was no increase in the surface roughness of the counterface after sliding against bronze filled PTFE in sea water and hence indirect corrosive wear is not the dominant wear mechanism.

Keywords: friction; wear; PTFE; bronze; sea water.

Reference to this paper should be made as follows: Khan, M.J., Wani, M.F. and Gupta, R. (2018) 'Tribological properties of bronze filled PTFE under dry sliding conditions and aqueous environments (distilled water and sea water)', *Int. J. Surface Science and Engineering*, Vol. 12, Nos. 5/6, pp.348–364.

Biographical notes: Mohammad Jebran Khan is a Post-graduate in Mechanical Engineering and pursuing his PhD at the National Institute of Technology Hazratbal, Srinagar, India under the supervision of Professor M.F. Wani. His research interests are tribology of polymer matrix composites, ocean tribology and design of self lubricating components for mechanical systems.