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## IRG-WOEM OECD

International Research Group on Wear of Engineering Materials



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### Tribological challenges in small devices

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Micro-System Technology, which encompasses micro-electro-mechanical systems or MEMS, is a rapidly growing interdisciplinary technology dealing with the design and manufacture of miniaturised machines with major dimensions at the scale of tens, to perhaps hundreds, of microns. Because they depend on the cube of a representative dimension, component masses and inertias rapidly become small as size decreases whereas surface and tribological effects, which often depend on area, become increasingly important. Although our explanations of macroscopic tribological phenomena often involve individual events occurring at the micro-scale, when the overall component or device size is itself miniaturised it may be necessary to re-evaluate some conventional tribological solutions. While absolute loads are small in such micro-devices, tribological requirements, especially in terms of device longevity, which may be limited by wear rather than friction, are demanding and will need imaginative and novel solutions. Not only is the available material set limited by the fabrication process but, in addition, the resulting components which have small linear dimensions are not, by conventional standards, of high precision and this too can impact on their tribological performance.