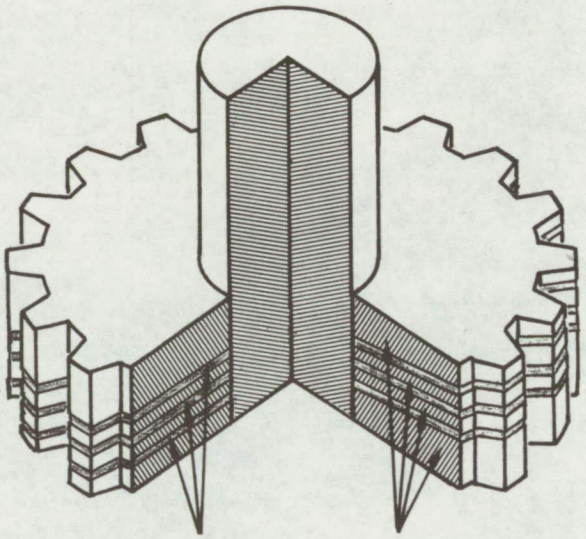
# NASA TECH BRIEF



## Self-Lubricating Gear




A self-lubricating gear has been designed for long-term operation in vacuum at high and low temperatures as well as at ambient conditions. Conventional fluid lubricants cannot be used in vacuum without hermetic sealing as these rapidly volatilize under the low pressure and expose the metal wearing surfaces to seizure and binding. Solid-film lubricants are effective only for relatively short-term use. Gears, and other rotating mechanical parts, made entirely of a self-lubricating plastic, such as polytetrafluoreothylene (TFE), have a limited load-carrying capability compared to gears made of metal.

The new self-lubricating gears are constructed of alternating layers of metal and a dry lubricant material, e.g., TFE with a suitable reinforcing material (such as bronze powder) bonded into a laminated composite unit which is machined to form a standard gear. The lubricating material is layered in planes at an angle with respect to the top and bottom metal surfaces of the gear; so that during rotation, the dry lubricating material tends to move across the entire meshing surface of the opposing gear and thereby provide a continuous replenishment of an interfacial lubricant film. The use of an odd number of gear teeth on one gear of each set will ensure a full 360-degree lubricant interface. The advantage of this gear construction is that it combines the strength of a metal, such as hardened steel, for high load-carrying capacity and a continuously replenishable, solid-film lubricant between the meshing surfaces of a gear set.

(continued overleaf)

**Note:**

Documentation is available from:

Clearinghouse for Federal Scientific and Technical Information
Springfield, Virginia 22151
Price $3.00
Reference: TSP69-10408

**Patent status:**

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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