

Re: any limits on mechanical seals?

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In article <1152565206.144921.242990@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx>, Alex Terrell <alexterrell@xxxxxxxx> wrote:

2. As well as people, you need to transfer fluids (water, air in, carbon dioxide out), and electricity, and data. Data can probably done with laser links between the two sections. Electricity with very large commutators. Fluids are difficult...

Data you can definitely do optically or by microwave. Power can go by commutator, by rotary transformer (a transformer with one winding on each side of a narrow air gap), or even by microwave beaming. Fluids are a bit more challenging, but there are ways...

Notably, consider a car tire: it has a U-shaped cross-section, and holds air because the ends of the U are sealed to the central wheel. A tire is fixed to its wheel, but with suitable seals, it could rotate while the wheel was held stationary.

As I suggested earlier, build the joint between rotating and stationary sections as a pair of concentric cylinders, say the rotating one outside and the stationary one inside. The passageway is through the middle; the annular space between the cylinders is where all the engineering is located — bearings, seals, etc. Most of the engineering hardware is fixed to the outer cylinder, and slight pseudo-gravity is available there because of the rotation. The stationary inner cylinder "rotates" overhead.

Consider a trough, open side facing inward, running all the way around the engineering space, fixed to the outer cylinder, mounted overhead on struts so people and equipment can pass under it (it's the "tire"). Its upper edges seal against the inner cylinder (the "wheel"). Blow air into it from an air duct opening into its bottom, and pull air out of it through a duct opening out of its top, and you can pass air from one section to the other. Add another such assembly to pass air the other way. (The ducts are **not** concentric cylinders — just ordinary square-ish ducts at a few places around the circumference — so they don't have any problem going around each other.)

Re: any limits on mechanical seals?

Similar setups will work for water, pressurized gases, even sewage — just make sure the seals are good. :-)

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