FOOD for THOUGHT with Dana Scott

PORT PLASTICS

UNDERSTANDING K-FACTOR

There is no doubt that if you build automation equipment for the **food, beverage, and conveyance** industry, you understand the importance good wearing materials. In general, **wear** is mechanically induced surface damage that results in the progressive removal of material due to relative motion between two contacting surfaces (erosion). When reading a materials data sheet, "WEAR" is expressed by K-Factor value **K = W/(F x V x T)**. A lower K-Factor typically implies better wear resistance.

Wear Factor (K) used to define wear resistance
Lower Value = Better Wear Resistance
K = W/(F x V x T)

SO WHY IS K-FACTOR PROPERTY OFTEN MISSUNDERSTOOD?

1. **STM / ISO Standards** – Engineers are taught to use quantifiable standards and match them to the specific application needs. In the case of K-Factor property, there is no governing ASTM or ISO Test standard. Having no industry standards means that engineers will need to interpret the manufacturer's methodology and data.

2. **K = W/(F x V x T) is a variable formula** that all manufacturers use to define a material's specific "WEAR" characteristics. Force, velocity, and time are not defined and thus are variables. Each manufacturer uses its own standards for each of these variables.
   - Therefore, when comparing Manufacturer A to Manufacturer B we cannot assume it is "apples to apples".
   - We can assume K-Factor is a relative constant across a manufacturer's entire product line.
   - The test is performed in a dry environment at ambient temperature and does not account for material softening or soluble lubricants, which can greatly impact performance.

In most food, beverage and conveyance applications, the occurrence of **wear is highly undesirable**. It leads to material erosion, deterioration, or component failure. This can be enormously expensive to food processors. Component wear and failure can lead **to foreign contamination, expensive recalls, and brand image damage**.

Wear is usually anticipated. When understood and applied appropriately to a specific application, it could mean the difference between **a component's life** cycle lasting 6 months or 6 years. For food beverage, and equipment OEMs and aftermarket consumables, understanding K-Factor can influence your bottom line.

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Typ Food Grade Materials

	K-Factor	Pressure Velocity *PV	Heat Deflection Temp (F)
UHMW Solid Lubricant	**n/a**	8000	120
Nylon	**85**	12,000	200
PA6 MoS_2	**60**	21,000	200
PA6 Solid Lubricant	**15**	65000	200
POM	**210**	11,000	225
POM with PTFE	**63**	25,000	230
PET	**60**	11,000	240
PET with PTFE	**40**	23,000	190
PPS	**>1000**	13,000	260
PPS Solid Lubricant	**70**	26,000	235
PEEK	**100**	25,000	325
PEEK Solid Lubricant	**95**	75,000	370

*Note a 4:1 safety factor is recommended for PV

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