KRAFT FLUID SYSTEMS

TECHNICAL PAPER **JUNE 2018**

Subject: Starting & Stall Torque

When applying a motor to a propel, slewing or conveyor application, we need to pay close attention to the worst-case scenarios. We normally focus just on the GVW, grade or friction coefficients as these worst cases and overlook the actual motor itself. Whether the application requires a LSHT or piston style motor or even includes a gearbox, there must be consideration given to whether the load will ever come to a stop and then be asked to move again while under the worst case or any load. Motors all "run" at different efficiencies based on rpm and pressure. These results are traditionally provided in a graph form in a manufacturer's technical information.

The motor condition that is overlooked the most, is when the motor is not spinning at all. Motors are more efficient when they are moving. If you have a load that is brought to a halt and is then asked to move again, that condition is called STARTING torque. If you have a load that increases to the point that it makes the motor stop, then that is STALL torque. These are quite different as the motor at each condition has completely different mechanical and volumetric efficiencies (Overall efficiency is a combination of both).

Starting torque is normally a tested torque vale that is provided by the manufacturer. This will be given in the form of a minimum in./lbs. available at either a continuous or intermittent pressure value. When doing your torque calculations for the application, you need to make sure that this minimum is higher that the torque required at your worst condition. For example, if you have a vehicle that on the max designed grade and load you calculate a need for 5,000 in./lbs., then you need to find a motor that has a minimum starting torque of at least 5,000 in./lbs. at your max available pressure or once you come to a stop on that grade, you will not be able to start again. Don't be fooled by the fact that you can drive up the grade while moving from a flat to the grade. This is only working because of the efficiency you are running at when you hit the grade. This condition applies to all motor applications like conveyors, winches, slewing, etc.

Stall torque is a little different in that you need be aware of all the running conditions you may see on an application. If your load increases to a point that the available pressure is not enough to provide the torque required than your load will stall. Knowing that a motor's efficiency changes based on speed and pressure, the selected motor must be verified through testing in the application to make sure it has the capacity and performance required to handle every situation it may encounter. Stall torque can come in handy when trying to protect a mechanical structure where you can limit the amount of pressure to have it stall instead of breaking the structure.

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