TYPE 572: EQUIPMENT FOULING

General Description

This component can be used to degrade and reset the performance of other components over the course of a simulation. For example, as a solar thermal collector sits on a roof, dust and pollen accumulate on its glass cover, degrading its performance until it rains or until it is washed. The component calculates a "fouling factor" for equipment as a function of time. Cleanings can be scheduled, at which time the fouling percentage is set back to zero The model also allows for the equipment to self-clean at a user specified rate with the input of a control signal.

Nomenclature

FoulFactor	0..1]	The fraction that the equipment is fouled. A FoulFactor of 0 indicates that the equipment is completely clean. A FoulFactor of 1 indicates that the equipment is completely fouled.
FoulingRate	[1/hr]	The rate at which the equipment is fouled.
CleaningRate	[1/hr]	The rate at which the equipment is cleaned.
$CTRL_1$	[0..1]	Control signal to turn ON or OFF the continual fouling process.
$CTRL_2$	[0..1]	Control signal to turn ON or OFF the continual cleaning process.

Detailed Description

Type572 computes the value of a linear fouling function as shown in equation 572.1.

$$FoulFactor_{t+\Delta t} = FoulFactor_t + \left(FoulingRate * CTRL_1\right) - \left(CleaningRate * CTRL_2\right) \quad \text{(Eq. 572.1)}$$

As with most outputs in TRNSYS, Type572 reports the average Foul Factor over the time step, not the Foul Factor at the end of the time step. It also reports a CleanFactor, which is simply 1 – FoulFactor.

One other important feature of Type572 is that the user is able to schedule complete cleanings of the equipment through the use of PARAMETER 2. At this point, the FoulFactor is immediately set back to a value of 0.