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# 40 C.F.R. § 1065.1137

## Determination of thermal reactivity coefficient.

This section describes the method for determining the thermal reactivity coefficient(s) used for thermal heat load calculation in the accelerated aging protocol.

(a) The calculations for thermal degradation are based on the use of an Arrhenius rate law function to model cumulative thermal degradation due to heat exposure. Under this model, the thermal aging rate constant, $k$, is an exponential function of temperature which takes the form shown in the following equation:

$$k = A \cdot e^{-\frac{E_a}{R \cdot T}}$$

Eq. 1065.1137-1

Where: $A$ = frequency factor or pre-exponential factor. $E_a$ = thermal reactivity coefficient in kJ/mol. $R$ = molar gas constant. $T$ = catalyst temperature in K.

(b) The process of determining $E_a$ begins with determining what catalyst characteristic will be tracked as the basis for measuring thermal deactivation. This metric varies for each type of catalyst and may be determined from the experimental data using good engineering judgment. We recommend the following metrics; however, you may also use a different metric based on good engineering judgment: