

## Weibull Growth Model for Predicting Pot Life of Refractory Cement

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**Abstract:** The foundry industry employs thermocouples for measuring the molten metal temperature. Thermocouple manufacturing involves mainly the refractory cement, this component protects it from high temperatures that might arise during the use; its performance depends on this thermal protection. In that sense, there is a viscosity range in which the refractory cement must be applied during its manufacturing; this range is termed the pot life. Modeling and predicting this pot life adequately will help to improve the quality of the thermocouples. The viscosity behavior related to the pot life should be represented by a nonlinear growth model, but some operational factors must be considered. This paper proposes a generalization of the Weibull Growth Model including covariates for modeling the pot life. Modified Gauss-Newton method is used to fit the proposed model. The pot life is obtained by nonlinear inverse prediction and the inference is realized by means of the nonlinear asymptotic theory. The results show that the proposed model performs adequately and also is able to realize reliable predictions.

*Keywords:* Refractory Cement, Viscosity, Weibull Growth Model, Nonlinear Regression, Pot Life