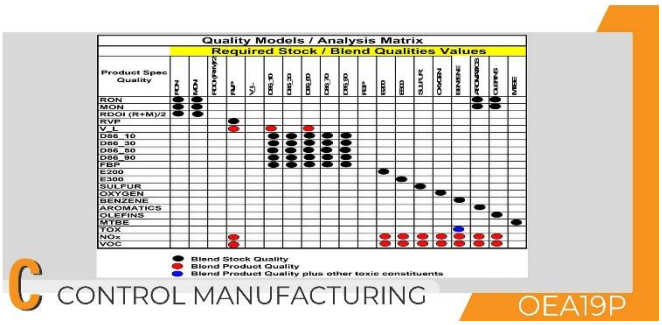
OMS eLearning Academy
For Refinery Offsite Operations Professionals

Control Matrix of Qualities



Topic ID	**OEA19T**
Title	**Control Matrix of Qualities**
Category	**C-Control Manufacturing**
eLearning Level	**Basic**

Introduction

Gasoline, diesel fuel, heating oil, and jet fuels are a few major refinery products produced through the product blending process. In this process, distinctive blending components are distributed so that the final product fulfills the required specifications. However, it is also vital to meet all specifications at the lowest possible cost because this increases the overall profitability. In addition, many of the blending fuel qualities, such as octane number, are non-linear. Therefore, determining the exact final product properties can be quite challenging.

The prime objective of this topic is to discuss the control matrix of qualities and their interdependent terminologies that are imperative to understand complexity in the gasoline blending process.

Control Matrix of Qualities

Conventional linear blending models do not provide precise results; therefore, it is vital to apply non-linear blending models to calculate blending attributes precisely. The non-linear models contain many equations and variables. The discrepancy between the linear and non-linear models is the strong interactions between molecules in the blend, making the blending process highly non-linear. More than thirty specifications meet in gasoline blending concurrently, and many of them are non-linear.

Moreover, blend quality not only relies on the overall blend composition but also on the component qualities. For example, there are different non-linear qualities in gasoline, such as RON, MON, RDOI, ASTM D86 points, VLI, FVI, TOX, NOX, and VOC. Thus, nonlinearity in blend models depends on the composition along with component qualities in an interactive manner. Moreover, it depends on other blended properties that, in turn, depend on mixture composition.

Gasoline Qualities and Their Blending Characteristics

1) Density, Reid vapor pressure, distillation points, aromatics, and olefins of gasoline are blended linearly on a volumetric basis.
2) Antiknock index and average boiling point are also blended linearly but on an arithmetic average basis.
3) Octane number and antiknock response are blended non-linearly on a volumetric basis.

Gasoline blend specification varies from country to country due to the weather conditions.

Summary

Gasoline blending is quite sophisticated due to the nonlinearity when compared with other types of fuels. Therefore, it is crucial to understand the non-linear behavior of gasoline qualities for obtaining accurate outcomes.

Mode of eLearning	Available?
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Advanced Level Course	Yes
Structured MCOR Curriculum	Yes