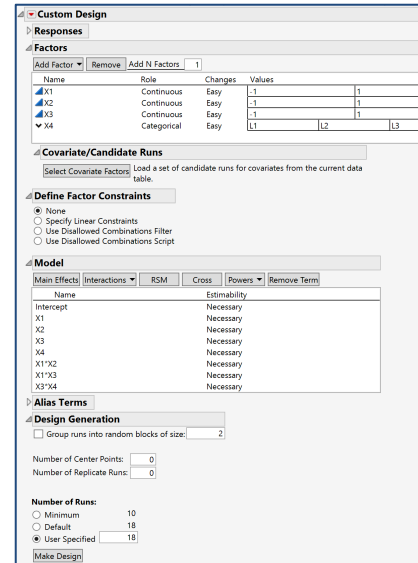# DOE - Custom Designs

This guide provides instructions on designing optimal experiments using the flexible Custom Design platform. The Custom Designer can be used for almost any experimental situation, including factor screening, optimization, and mixture problems, and can accommodate designs with hard-to-change factors and other constraints.

DOE: Generating A Custom Design

1. Select **DOE > Custom Design**.
2. Under **Responses**, specify the response(s):
   - Double-click to rename the response (default is **Y**).
   - Change the response goal (default is **Maximize**).
   - Click **Add Response** to add additional responses.
3. Under **Factors**, specify the experimental factors:
   - Click **Add Factor**, and select the factor type and number of levels. To add several factors of the same type and number of levels use **Add N Factors** (enter a number) and click **Add Factor**.
   - Double-click to rename the factors.
   - Change the factor values (the experimental settings).
   - Change "Easy" under **Changes** to "Hard" or "Very Hard" to generate a split-plot or split-split plot design. Click **Continue**.
4. Under **Model**, specify the statistical model to be estimated:
   - To add all **interaction** or **power** terms up to a given degree, click the corresponding button.
   - To add terms needed to perform a response surface analysis, click **RSM** (or **Scheffe Cubic** for mixture designs).
   - To add specific power terms, highlight one or more factors in the **Factors** window and click **Powers**. To add an interaction term, highlight one or more factors in the **Factors** window and select the factors you in the **Model** window that wish to cross with those chosen factors.
   - To remove a term, highlight it and click **Remove Term**.
   - To reduce the number of runs needed (at the expense of effect aliasing), click "Necessary" for a term (under **Estimability**) and change to "If Possible."
5. Under **Design Generation**, fine-tune the design (as needed):
   - Specify the **block size** or number of **whole plots** (with "Hard" to change factors).
   - Enter the **Number of Center Points** and/or **Number of Replicate Runs**.
   - Select (or specify) the desired **number of runs**.
6. Click **Make Design.** The resulting design displays under **Design**.
7. Select the desired **Run Order**, then click **Make Table** to generate the design table (or **Back**) to make changes.

   Model, **Evaluate Design** and **DOE Dialog** scripts are saved to the data table (top left), and the design specification window stays open to change or regenerate the design if needed.

Note: The **Easy DOE** platform (under DOE menu) provides a guided workflow to step through the process of creating and analyzing experiments and is an alternative to the steps above for creating the experiment.

Visit **Design of Experiments Guide** in **JMP Help** to learn more.