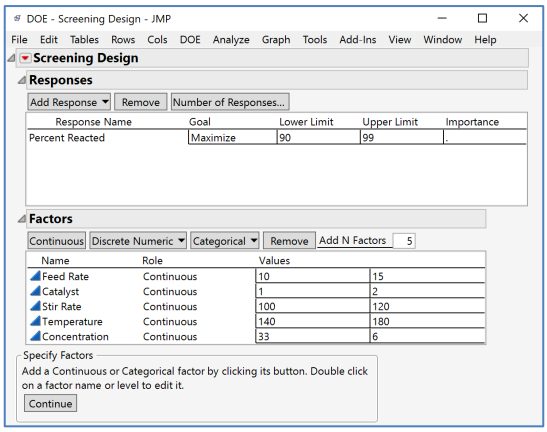
DOE Fractional Factorial Design

This guide provides instructions on designing a fractional factorial experiment using the Screening Design platform. Fractional factorial experiments are used when it's more efficient to not perform an experimental run for every possible treatment combination as is done in a full factorial design.

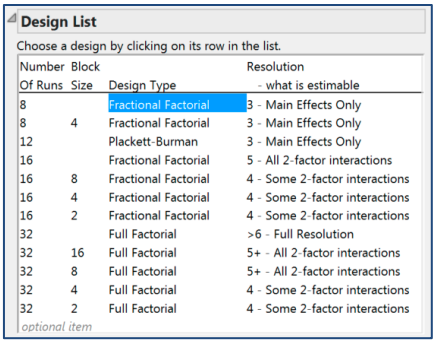
Create the Design (Screening Design)

To create an 8 run 2^{5-2} Resolution III fractional factorial design.

1. Open the platform under **DOE > Classical > Two Level Screening > Screening Design**.
2. Specify the **Response(s):**
   - Double-click on **Y**, under **Response Name**, to name the response.
   - If needed, change the response **Goal** and **Upper** and **Lower Limits**.
   - Click **Add Response** to add additional responses.
3. Specify the **Factors**:
   - Add the desired number of **Continuous** (2-level) and/or **2-** or **3-Level Categorical** factors.
   - Add the factor names and levels.



4. Click **Continue**. From the **Design List**, select the desired design and click **Continue**.
   Note: Choose an appropriate block size (i.e., runs within each block) if there is a blocking variable that needs to be accounted for in the experiment. Full factorial designs are also available to choose.



5. Specify the **Run Order** (default is Randomize), the **Number of Center Points** and the **Number of Replicates** (the number of additional sets of runs for each design point). Here we created an unreplicated fully randomized 2^{5-2} fractional factorial design with 3 center points, totaling 11 runs.
6. Select **Make Table** to generate the design table (or **Back** to make changes).

	Pattern	Feed Rate	Catalyst	Stir Rate	Temperature	Concentration	Percent Reacted
1	00000	12.5	1.5	110	160	4.5	.
2	++−−−	15	2	100	140	3	.
3	+−+−−	15	1	120	140	3	.
4	−−++−	10	1	120	180	3	.
5	00000	12.5	1.5	110	160	4.5	.
6	−+−+−	10	2	100	180	3	.
7	+++++	15	2	120	180	6	.
8	−++−+	10	2	120	140	6	.
9	−−−−+	10	1	100	140	6	.
10	+−−++	15	1	100	180	6	.
11	00000	12.5	1.5	110	160	4.5	.

The **Screening** and **Model** scripts will be saved to the data table and the design specification window stays open to change or regenerate the design.

Notes:

- Select **Evaluate Design** to view properties of the design.
- 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 a design.
- Screening designs can also be generated from the **Custom Design** platform.

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