

DOE Fractional Factorial Design

This page provides information on designing a fractional factorial experiment using the JMP® DOE Screening Design platform. Note that the Custom Design platform can also be used to create efficient screening designs.

Create the Design

(DOE > Classical > Screening Design)

1. 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.

2. Specify the **Factors**:

- Add the desired number of **Continuous** (2-level) and **2- or 3-Level Categorical** factors.
- Double-click to change the factor names.
- Tab to change the values for each factor.

3. Click **Continue** > Choose from a list of fractional factorial designs.

4. From the **Design List**, select the desired design and click **Continue**.

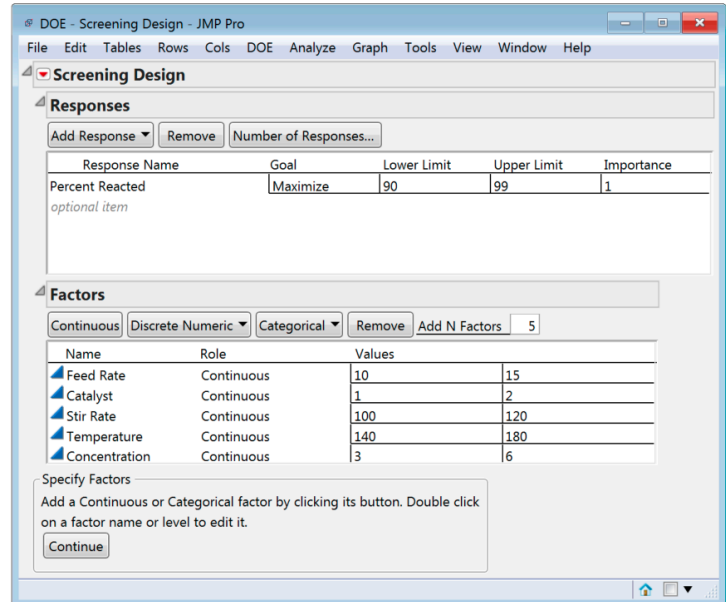
Note that **Plackett-Burman** screening designs, and **Incomplete Block Designs** (with a value under **Block Size**) are also available.

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).

We will design 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).

Screening and **Model** scripts will be saved to the data table (top left), and the design specification window stays open to change or regenerate the design.



Number Of Runs	Block Size	Design Type	Resolution
8	4	Fractional Factorial	3 - Main Effects Only
8	4	Fractional Factorial	3 - Main Effects Only
12		Plackett-Burman	3 - Main Effects Only
16		Fractional Factorial	5 - All 2-factor interactions
16	8	Fractional Factorial	4 - Some 2-factor interactions
16	4	Fractional Factorial	4 - Some 2-factor interactions
16	2	Fractional Factorial	4 - Some 2-factor interactions
32		Full Factorial	>6 - Full Resolution
32	16	Full Factorial	5+ - All 2-factor interactions
32	8	Full Factorial	5+ - All 2-factor interactions
32	4	Full Factorial	4 - Some 2-factor interactions
32	2	Full Factorial	4 - Some 2-factor interactions

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	•

Notes: Screening designs can also be generated from the Custom Design platform. For more details, search for “fractional factorial” or “screening designs” in the JMP Help or see the **Design of Experiments Guide** (under **Help > Books**).