

TREVERLYST Catalyst

Loading and Washing Procedure

In general, no special pretreatment of the TREVERLYST catalyst is required prior to loading into the etherification reactor. Once the catalyst has been loaded, however, the following steps can be used to minimise any initial production problems. Although these steps are provided as examples of a typical or recommended sequence of operations for start-up, it is highly recommended that each end-user also consult with their process licensor for additional recommendations.

FOR NEW PLANTS/REACTORS

1. If the reactor is made from carbon steel (as opposed to stainless steel), physically remove the rust and particulates from the vessel. This can be done in several ways including scrubbing down by hand, or by use of a water jet (SP3 or SP6). Care should be taken that the removed particulates do not become embedded in bed supports or screens.

Optional

Fill the reactor at least $\frac{1}{4}$ full with fully deionised water. This acts as a cushion during loading of the catalyst and helps to prevent bead breakage or damage to the retaining screens. The water also helps the resin to settle and pack properly.

2. Load the catalyst into the reactor by dumping from the SuperSak or drums or by using an eductor or pump to dispense from the drums. The exact method used will depend on the packaging of the catalyst and the physical facilities available at the plant.
3. Backwash the catalyst with approximately 4 bed volumes of deionised water to remove fines and (acidic) colour bodies. This water should not be allowed into downstream units but should be drained from the reactor at a point as close to the catalyst bed as possible. The water can then be neutralized and disposed in accordance with local regulations. The water backwash also helps to classify the bed but this is not strictly necessary from an operational standpoint.
4. Remove the free water and some of the bound water by flushing with methanol or BB feed. Draining of the water is not recommended because of the potential for introduction of air into the interstitial space in the resin bed which can lead to corrosion problems later on. The preferred way to flush the water from the resin is by use of methanol because this is a good swelling solvent for the catalyst and causes a minimal change in the volume (from the water hydrated state). The exchange of the water for methanol will be accompanied by a mild evolution of heat, due to the heat of adsorption of methanol. The bed temperature should be monitored while adding the methanol. If a methanol rinse is not feasible, an alternative approach is to use the C4 stream (preferably without isobutylene) to displace the water. The disadvantage of this latter approach, however, is that as the catalyst is dehydrated, the volume will shrink (swelling of the gel phase in butane/butylene is very low), and the reactor packing will shift.
5. If methanol was used to displace the water and to remove colour, this methanol can probably be recovered for reuse by treatment in the stripping/methanol recovery section, as long as the recovered water and acidic species are flushed from the unit and disposed.
6. Once the water is displaced, the normal feed stream can be introduced and the inlet temperature raised to the desired operating temperature.

Operating conditions refer to the use of the product under normal operating conditions. They are based on experience in industrial applications. However, additional data are needed to calculate the resin volumes for larger plants. For more questions please contact our technical experts.

Governmental regulations vary from country to country. Please seek advice from your local CHEMRA representative in order to determine the best catalyst choice and operating conditions.

Safety

Please note, that polymeric resins can swell significantly between the aqueous and pure solvent phases or when rewetted. Care should be taken. Glass columns and even steel columns can break. Wear glasses when using resin systems. To avoid high pressure build up, an operation in counter current or up-flow through the polymer bed shall be considered.

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