
Question 54: When using coker LPG (liquefied petroleum gas) for propylene production, what contaminants are a concern for you and how do you mitigate them?

JIM FLESHMAN (Arivergy LLC)

Coker LPG contains various species of mercaptans and other organo-sulfur compounds, besides other contaminants. Depending on capacity and impurity levels, coker LPG treatment in a coker may include amine treating for CO₂ and H₂S, as well as a coker LPG mercaptan removal unit. The sweet coker LPG stream is typically rundown to battery limits. Making the treated sweet coker LPG stream suitable for propylene grade may require additional steps. It could be mole sieve drying/treating for water vapor and trace sulfur compounds. Oxygen, diolefins, and acetylenes can be removed by catalytic hydrogenation. Phosphine, arsine and mercury are removed by solid adsorbents.

SRINI SRIVATSAN (Amec Foster Wheeler)

Contaminants of concern include H₂S, mercaptans, COS (carbonyl sulfide), arsenic (arsine), dienes, and methyl acetylene. We have not been able to verify any appreciable amount of R-S-R, which is defined as dimethyl sulfide (DMS) or ethyl methyl sulfide (EMS) to be present in delayed coker LPG. Typical LPG sweetening includes amine treatment followed by caustic treatment for removal of COS and mercaptans. A drier package will be necessary to remove any water, as even a very small amount of COS in the presence of water will convert to H₂S. Arsine is typically “not detected” in samples of coker LPG. “Not detected” means that, if present, the concentration would be in the parts per billion range. However, because of the tight specifications on polymer-grade propylene, some clients have included an arsine guard reactor on the propylene product stream as a precaution.

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