# DEMERUS PROCESSES FOR MERCAPTANS REMOVAL

**The DEMERUS processes developed by R&D Center "AhmadullinS" from Kazan, Russia are economically efficient solutions solving multifaceted problems of mercaptans removal from hydrocarbon feedstock. The proposed technologies is characterized by the use of heterogeneous polymer-based KSM-X catalyst.**

Depending on the feedstock to be treated the following DEMERUS processes are used:

## FEEDSTOCK

- Natural gas – DEMERUS NG
- LPG – DEMERUS LPG
- Gasoline fraction – DEMERUS NAPHTHA
- Kerosine fraction - DEMERUS JET
- Gas condensates – DEMERUS GASCOND

## BENEFITS FOR CUSTOMERS

The proposed technologies are characterized by the heterogeneous polymer-based catalyst (Fig. 1) that offers the following advantages:

- Extremely high service life of catalyst of not less than 8 years
- Reduced alkali consumption and reduced quantity of alkaline process water
- Improved resistance of the KSM-X catalyst to catalyst poisons and thermal stresses
- High, stable catalyst activity over the whole commercial operation period
- High environmental compatibility, no catalyst entrainment from regenerator and thus no pollution of the refinery waste water by derivates or salts of heavy metals
- No activation and dosing of catalyst so that the operating personal does not have to handle toxic catalyst substances

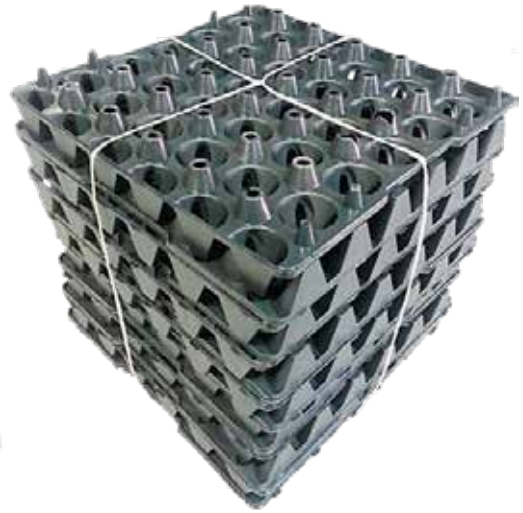

Fig. 1: KSM-X catalyst packing

## SERVICES

EDL and AhmadullinS offer customers both license packages for DEMERUS technologies for new plants and plant revamps as well as engineering services for mercaptans removal units.

## REFERENCES

Seven plants using DEMERUS technologies have already been put into operation across the globe and eight more units are under construction. Among customers are e. g. ROSNEFT, Gazpromneft, LUKOIL, TAIF, SIBUR, Orlen Lietuva.

## DEMERUS LPG PROCESS

Mercaptans contained in LPG interact in the extractor with alkali and pass into an alkaline solution in the form of mercaptides. In the regenerator mercaptides are converted into disulfides in the presence of air and heterogeneous catalyst KSM-X. The recovered alkali is returned to the extractor for mercaptans removal from LPG.

Disulfides insoluble in alkali are mixed with naphtha and separated in the settler due to a difference in density. After that disulfides are sent to a hydrotreating unit or are used as commercial product – dialkyl disulfides.

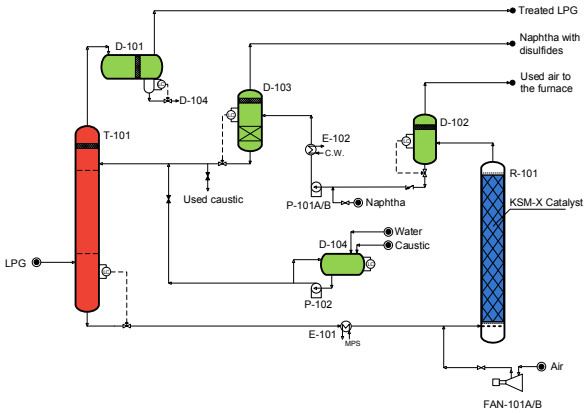


Fig. 2: DEMERUS LPG process scheme

## DEMERUS JET PROCESS

Straight-run kerosene fraction purified from naphthenic acids at the pre-wash stage is led to the reactor with a certain quantity of air and alkali, where in the presence of KSM-X catalyst corrosive mercaptans are converted into inert disulfides remaining in the kerosene. After settlement of the alkaline solution the kerosene passes sand and clay filters and is then led outside the battery limit to the storage tanks.

Salts of acids removed from the alkaline solution at the pre-wash stage are released as by-product - concentrate of naphthenates.

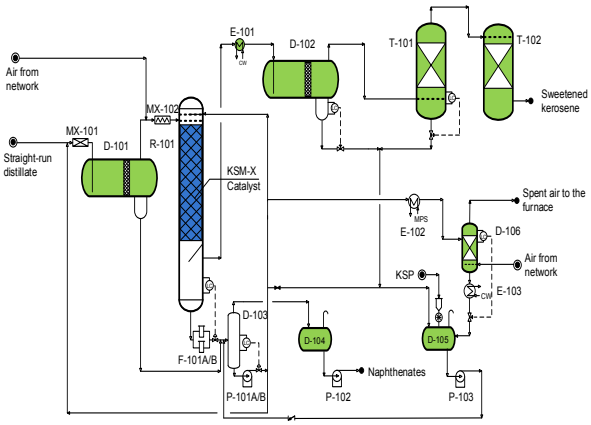


Fig. 3: DEMERUS Jet process scheme

## ADVANTAGES

1. Total sulfur content in treated LPG – less than 10 ppmw
2. High environmentally friendly production:
   - Service life of alkaline solution is significantly increased (up to 1 year) and the quantity of spent alkali is reduced
   - In the spent alkali there are no salts of metals of variable valency
   - Absence of alkaline pre-treatment stage, therefore, there are no toxic, sulfide-containing alkaline wastes at the outlet of the unit
   - No need for water washing of treated LPG from entrained alkali, therefore, the consumption of water and the quantity of effluents are reduced

## ADVANTAGES

The use of KSM-X catalyst allowed developing a simple low-waste process for kerosene sweetening with the following advantages:

1. Decreased capital and operating costs by reducing the number of treatment stages
2. Environmentally friendly production, almost complete absence of alkaline waste waters (spent alkali) containing naphthenates
3. Production of a valuable by-product - naphthenates concentrate
4. Extended service life of heterogeneous catalyst - 8 years with no need for make-up, regeneration or replacement (compared to charcoal-based catalysts)

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