RKNGR

The RKNGR catalyst has for many years been the benchmark catalyst for industrial reforming of heavy hydrocarbon feedstocks. More than 60% of the naphtha being pre-reformed today is processed by Topsøe's RKNGR catalyst. The substantial high market share has been obtained due to the very reliable service of RKNGR even at severe operating conditions.

RKNGR - Great Operational Flexibility
RKNGR is especially suited for pre-reforming of heavy hydrocarbon feedstocks like naphtha. RKNGR can however reform any hydrocarbon feedstock ranging from natural gas through LPG to naphtha with aromatic contents up to 30 wt%.

RKNGR can on most naphtha feeds be operated down to a steam to carbon ratio of 1.5. For natural gas feedstocks a steam to carbon ratio as low as 0.25 can be applied.

RKNGR can be operated at a temperature range 350-650°C (660-1200°F).

Main Benefits by using RKNGR

Superior Resistance towards Carbon Formation
RKNGR offers a unique resistance towards carbon lay down in the pre-reformer and it is therefore able to operate down to a steam/carbon ratio at 1.5, even with heavy naphtha. The high carbon resistance is obtained through the special chemical and physical properties of the catalyst support.

High Activity and Sulphur Tolerance
RKNGR displays a very high and stable catalytic activity for the reforming reaction, which implies that chemical equilibrium is reached at the outlet of the pre-reformer.

The high activity together with a good resistance towards sulphur poisoning ensure the long lifetimes of RKNGR, which have been obtained even at severe feedstocks.

Two Catalyst Shapes for Customised Solutions
As standard, RKNGR is delivered as small cylinder-shaped tablets.

In some plants and especially in cases of installing a large pre-reformer in an existing plant, it may be crucial to minimise the pressure drop, either due to cost optimisation or due to limitation in feed gas pressure.

Due to the unique mechanical strength of RKNGR, it is possible to produce the catalyst in complex geometries, which minimise pressure drop and optimise the external surface. The RKNGR 7-hole catalyst

provides this combination of a very low pressure drop and a high external surface. The external surface and thereby the activity is some 40% higher than a tablet of the same size.

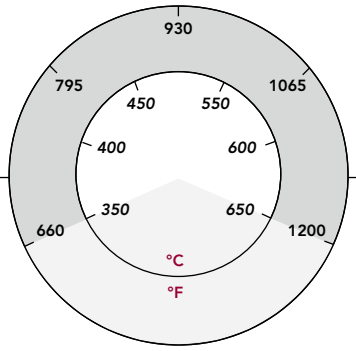
Prereduced Catalyst
RKNGR is delivered in the prereduced form. The plant can therefore be started up quickly and smoothly without any production loss arising from a lengthy reduction procedure.

Proven by performance

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES FOR RKNGR

	TABLET	7 HOLE CATALYST
Ni (WT %)	25	25
Al_2O_3 (WT %)	11	11
MgO	BALANCE	BALANCE
SIZE, D x H	4.3 x 4.3 mm	11 x 6 mm
HOLES, x D	-	7 x 2 mm

OPERATING TEMPERATURE RANGE



Industrial Experience
The RKNGR catalyst has proven its high performance in the following type of plants:

1. **Ammonia plants based on:**
   Naphtha or natural gas feed
   Mixture of natural gas and naphtha

2. **Hydrogen plants based on:**
   Naphtha, LPG, refinery off-gas or natural gas feed with steam to carbon ratios down to 1.8

3. **Carbon monoxide plants based on:**
   Naphtha feed with steam to carbon ratios down to 1.6

4. **Plants for town gas production based on:**
   Naphtha feed with steam to carbon ratios down to 1.5

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