

R-67-7H

The increasing variety of feedstocks available today, and the continual strive towards operating steam reformers at higher and higher rates has made selection of the proper catalyst for primary reformers more important than in the past, when one catalyst type installed in the entire tube usually provided adequate service.

For reforming of light feedstocks such as natural gas, Topsøe's R-67-7H catalyst normally meets all the requirements of today's demanding process conditions. When operating in high heat flux top-fired steam reformers and on feedstocks ranging from heavy natural gas to naphtha, R-67-7H is combined with Topsøe's series of alkali-promoted catalysts.

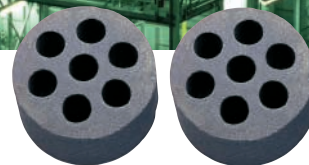
Topsøe is a main supplier of catalysts for steam reformers worldwide. Our catalysts are operating in all types of reforming furnace design and processes such as ammonia, methanol, syngas and hydrogen.

Chemical and Physical Characteristics

The base material of the R-67-7H carrier is magnesium aluminate, a ceramic inert oxide of the spinel family known for excellent stability at the entire range of temperatures. Furthermore, the catalyst does not suffer any degradation, either by exposure to condensing steam during start-up or by high temperature steaming.

The carrier is manufactured in a process, which gives the catalyst a porosity and pore size distribution resulting in an extraordinarily high surface area.

To initiate the reforming process immediately, the top 10-15% in the tubes are charged with R-67-7H in prereduced form, which makes it especially suited for the inlet conditions in a reforming furnace, where low temperatures are prevailing. The prereduced catalyst is denominated R-67R-7H.



Main Benefits by using R-67-7H

High Activity

Combination of high mechanical stability of the carrier and a large surface area result in a very high and stable catalytic activity for the reforming reaction. The high activity ensures that the reforming reaction is close to equilibrium at the outlet from the reformer. Furthermore, the high activity of R-67-7H results in a lower tube wall temperature, which prolongs life expectancy of reformer tubes, or alternatively allows operation at higher rates.

Low Pressure Drop

Due to the high void fraction provided by the optimised seven-hole shape of R-67-7H, a low pressure drop in the primary reformer is obtained. The high activity of R-67-7H allows use of a larger size catalyst, thereby reducing pressure drop without any significant increase in the approach to steam reforming equilibrium.

R-67-7H is available in three standard sizes. Often a combination of two or even three sizes is chosen to minimise pressure drop and to provide the desired activity, where required. Particles of a relatively larger size are often used in the lower part of the tubes, as a larger part of the pressure drop is generated in the bottom half.

Carbon Free Operation

Magnesium aluminate used as carrier for R-67-7H is a less acidic oxide than pure alumina, which is a major constituent of other commercially available steam reforming catalysts. The high activity of R-67-7H and the non-acidic nature of its carrier are sufficient to ensure carbon free operation when operating on light feedstocks.

Catalyst Poisons and Regeneration

Sulphur is the most severe poison to consider. Therefore, sulphur levels should be kept as low as possible to maintain the high activity throughout the catalyst lifetime. In severe cases of sulphur poisoning, the activity will decrease to such an extent that carbon is formed. However, sulphur and carbon deposited on R-67-7H can be removed by steaming and/or by a steam/air treatment.

CHEMICAL AND PHYSICAL CHARACTERISTICS

	R-67-7H	R-67R-7H
Ni, TOTAL (WT %)	>12	>12
Ni, REDUCED (WT %)	-	>10
SiO ₂ (WT %)	<0.2	<0.2
CARRIER	Balance	Balance
NICKEL SURFACE AREA	3.5-5 m ² /g	3.5-5 m ² /g
SHAPE	7 hole	7 hole

CATALYST DIMENSIONS

SIZE			
OD X H	16 x 11 mm 5/8" x 7/16"	20 x 13 mm 25/32" x 1/2"	20 x 18 mm 25/32" x 23/32"
HOLES X D	7 x 3.4 mm 7 x 0.13"	7 x 4.3 mm 7 x 0.17"	7 x 4.3 mm 7 x 0.17"

