

Scholven, Sept. 12, 1940.

Gasification in Hydrogenation with Catalyst 7019

In order to control the gasification values in the hydrogenation of middle oil by Catalyst 7019 calculated with the aid of laboratory analyses, the gasification should be calculated by a C-balance of the 7019 cyclic process.

C-content according to laboratory tests:

A-middle oil 86.7% by wt.
 CV2b middle oil 88.9% by wt.
 CV2b 88.3% by wt.

<u>Carbon balance</u>		<u>July 1940</u>	<u>August 1940</u>
<u>Feed:</u>			
A-middle oil charged	86.7% C	3,255 t	2,820 t C
Tank variation	86.7% C	- 406	- 352
Middle oil loss	88.9% C	- 188	- 168
Middle oil consumption		2,661 t	2,300 t C
			3,702 t
			3,195 t C
<u>Product:</u>			
Stabilized CV2b	88.3% C	2,083 t	1,840 t C
Gas benzine added to T705	88.3% C	+ 34	+ 30
			+ 45
			+ 40
CV2b Production	88.3% C	2,117 t	1,870 t C
			2,770 t
			2,450 t C
<u>Gasification:</u>			
Middle oil consumption--CV2b production t C			430 t C
Gasification, % of carbon charged			18.7%
Gasification, according to laboratory tests			20.3%
			745 t C
			23.3%
			23.7%
<u>Yield Factors:</u>			
Middle oil charged per ton CV2b			1.26 t/t
CV2b produced per t middle oil			795 kg./t
			1.34 t/t
			748 kg./t

Bag 2246 Target No. 30/4.09 - Scholven.
 Item 4 (B).

Comparison between Total Conversion by Catalyst 7019 and the Annexation of a Dehydrogenation Plant
 Both in Respect of Operating Methods of Aug. 26, 1940 and Sept. 19, 1940

	7019 Catalyst		Annexation of a DHD-Plant	
Starting material - auto benzine, - 185°				
Amount of production	t/yr.	240,000	DHD-B1	240,000
Gasification, total	t/yr.	211,500	approx.	206,000
1 C ₄ to T-52 Plant	t/yr.	54,000		66,500
Production T-52 constituent from Scholven	t/yr.	7,200		20,600
Production T-52 constituent from Gelsenberg	t/yr.	5,000	approx.	11,000
Total production T-52	t/yr.	11,000	"	11,000
Plant capital	R.M.	16,000	"	22,000
Energy cost (Electricity)	R.M.	14,100		14,600
(increased cost (Steam)	R.M.	815,000	4500 Kw/h	616,000
in year) (Heating gas - about 4000 kcal/m ³)	R.M.	224,000	23 t/h	515,000
	R.M.	106,000	3000 m ³ /h	264,000
	R.M.	140,000	1000 m ³ /h Res.)	160,000
	R.M.	200 m ³ /h Fresh)	200 m ³ /h Fresh)	
Total increased cost of energy per year	R.M.	1,285,000		1,555,000
Personnel requirement a) Operators		(1.00 RM/h) + 25%		100
Increased requirement b) Laborers		(1.23 RM/h) + 25%		20
Yearly personnel requirement (increased cost)	R.M.	170,000		375,000
Increased charge of materials: coke for H ₂ production	R.M.	17.60 RM/t		600,000
H ₂ SO ₄ - 2.0% Wt. of throughput	R.M.	120 RM/t)		686,000
NaOH - 0.5% Wt.	R.M.	170 RM/t)		

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 Item 4 (C).

	7019 Catalyst	DHD-Plant
Current catalyst consumption	R.M. approx. 400,000	approx. 400,000
Operating costs:		
XX		
a) Capital (Amortization & interest 14%)	R.M. 1,672,000	1,780,000
b) Personnel	170,000	375,000
c) Energy costs	1,285,000	1,555,000
d) Increased charge of operating materials	1,376,000	400,000
e) Current catalyst consumption	400,000	
f) Repairs and auxiliaries, about 3% of capital		
g) Taxes, about 2% of capital	R.M. 360,000	380,000
	R.M. 240,000	254,000
Total operating costs	R.M. 5,503,000	4,744,000
Increased price per ton finished product in contrast to previous methods of operation	R.M./t 26.1	23.0
Basic price of Scholven benzine	R.M./t 351.	351.
New calculated price	R.M./t 377.1	374.0

In the case of a total conversion by 7019 and annexation of a DHD-plant, the price for one ton finished product amounts to R.M. 400.10 - 400.00.

XX) Without energy

XXX) According to data by Dr. Donath.

Scholven/Ludwigshaven, Oct. 10, 1940.