

1997 Worldwide Refining Survey

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All figures in barrels per calendar day

All figures are
as of 1-1-98

LEGEND

Numbers identify processes in table

Coking

1. Fluid coking
2. Delayed coking
3. Other

Thermal Processes

1. Thermal cracking
2. Visbreaking

Catalytic Cracking

1. Fluid
2. Other

Catalytic Reforming

1. Semiregenerative

2. Cyclic
3. Continuous regen.
4. Other

Catalytic Hydrocracking

1. Distillate upgrading
2. Residual upgrading
3. Lubr oil manufacturing
4. Other

Catalytic Hydrotreating

1. Pretreating cat reformer feeds
2. Naphtha desulfurizing
3. Naphtha olefin or aromatics saturation
4. Straight-run distillate
5. Pretreating cat cracker feeds

Catalytic Hydrorefining

1. Residual desulfurization
2. Heavy gas oil desulfurization
3. Catalytic cracker and cycle stock feed pretreatment
4. Mid distillate
5. Other

6. Other distillates
7. Lube oil "polishing"
8. Other

Alkylation

1. Sulfuric acid
2. Hydrofluoric acid

Polymerization/Dimerization

1. Polymerization
2. Dimerization

Aromatics

1. BTX
2. Hydrodealkylation

3. Cyclohexane
4. Cumene

Isomerization

1. C₄ feed
2. C₅ feed
3. C₅ and C₆ feed

Oxygenates

1. MTBE
2. ETBE
3. TAME
4. Other

Hydrogen

- Production:
1. Steam methane reforming
 2. Steam naphtha reforming
 3. Partial oxidation
- a. Third-party plant
- Recovery:
4. Pressure swing adsorption
 5. Cryogenic
 6. Membrane
 7. Other

FOOTNOTES

- A Flexicoking.
B Dewaxing.
C Desasphalting.
D Raw gasoline hydrogenation.
E Hourdy.
F Previously listed as Tarnett.
G Mid distillate.
H Previously listed as Ste.
I Francoise des Petroleos BP.
J Solvent extraction.
K Distillate aromatics saturation.
TCC.
- L Merger of Erdol Raffinerie
Neustadt and
Raffineriegesellschaft.
M Previously listed as BP Oil
Deutschland GmbH.
N High corn. soaker cracking.
O Calcline.
P LPG.
Q Previously listed as Anonima
Petrol Italiana.
R Previously listed as Raffineria
Mediterranea SpA.
S Eureka.

Capacity expressed in barrels per calendar day (b/cd) is the maximum number of barrels of input that can be processed during a 24-hr period, after making allowances for the following:

- Types and grades of inputs to be processed.
 - Environmental constraints associated with refinery operations.
 - Scheduled downtime such as mechanical problems, repairs, and shutdowns.
- Capacity expressed in barrels per stream day (b/sd) is the amount a unit can process when running at full capacity under optimal feedstock and product slate conditions. Most U. S. capacity figures have historically been reported in b/sd, but all capacities are reported in b/cd here, as they will be in following years.

Totals

When an asterisk (*) appears beside a refinery location, this indicates that the figure has been converted from b/sd to b/cd by using the conversion factor 0.95 for crude oil and vacuum distillation units, and 0.90 for all downstream cracking and conversion units. Refining processes not covered are noted here.

Process definitions

- Hydrocracking includes processes where 50% of the feed or more is reduced in molecular size.
- Hydrorefining includes processes where 10% of the feed or less is reduced in molecular size.
- Hydrotreating includes processes where essentially no reduction in the molecular size of the feed occurs.
- Hydrogen volumes presented here represent either generation or upgrading to 90+% purity.

- T Previously listed as Mazheikiai
State Oil Refinery Nafra.
U Bitumen.
V Includes capacity transferred
from closed Pernis site.
W Estimate.
X RCC.
Y Isomax.
Z Demex.
AA Residue.
BB ROSE.
CC MEK dewaxing.
DD Previously listed as Honam Oil
Refinery Co.
EE Previously listed as Raffinerie
du Sud-Ouest SA.
FF VGO.
GG Previously listed as Witco Corp.
HH Previously listed as Unocal
Corp.
II Previously listed as Ultramar
Inc.
JJ Previously listed as Lunday-
Thagard Co.
KK Previously listed as Total
Petroleum Inc.

- LL Previously listed as the UNO-
VEN Co.
MM Leased by Gold Line Refining,
Ltd.
NN Nonregenerative.
OO Joint venture of Citgo and
Conoco.
PP Previously listed as Atlas
Processing Co.
QQ Previously listed as Basis
Petroleum Inc.
RR Isocracker.
SS HOC.
- TT C₆, C₇.
UU Previously listed as Deer Park
Refining.
VV Gas oil.
WW Previously listed as Diamond
Shamrock Corp.
XX Previously listed as Big West
Oil Co.
YY Previously listed as Quaker
State Oil Refining Corp.
ZZ Paraffin wax.
AAA Previously listed as Lagoven
and Maraven.

Catalytic reforming definitions

- Semiregenerative reforming is characterized by shutdown of the reforming unit at specified intervals, or at the operator's convenience, for in situ catalyst regeneration.
- Cyclic regeneration reforming is characterized by continuous or continual regeneration of catalyst in situ in any one of several reactors that can be isolated from and returned to the reforming operation. This is accomplished without changing feed rate or octane.
- Continuous regeneration reforming is characterized by the continuous regeneration of part of the catalyst in a special regenerator, followed by continuous addition of this regenerated catalyst to the reactor.
- Other includes nonregenerative reforming (catalyst is replaced by fresh catalyst) and moving-bed catalyst systems.

REFINERY SHUTDOWNS

EUROPE

1. Kuwait Petroleum Refining (Denmark) A/S - Gulthavn, Denmark, 57,400 b/cd capacity, April 1997.
2. Leuna Raffineriegesellschaft mbH - Leuna, Germany, 100,000 b/cd capacity, June 30, 1997.
3. Gulf Oil - Milford Haven, Wales, 112,000 b/cd capacity, October 1997.

JAPAN

1. Japan Energy Corp. - Funakawa, Japan, 6,000 b/cd capacity, March 1997.

SOUTH AMERICA

1. Refineria Texaco De Honduras, S.A. - San Pedro Sula, Honduras, 14,000 b/cd capacity.