

Worldwide refining

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All figures in barrels per calendar day

All figures are
as of 1-1-96

LEGEND

Numbers identify processes in table

Thermal processes

1. Thermal cracking
2. Visbreaking
3. Fluid coking
4. Delayed coking
5. Other

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. Lube-oil manufacturing
4. Other
- c. Conventional (high-pressure) hydrocracking; (>100 barg or 1,450 psig)
- m. Mild to moderate hydrocracking; (<100 barg or 1,450 psig)

Catalytic hydrotreating

1. Residual desulfurization
2. Heavy gas oil desulfurization
3. Catalytic cracker and cycle stock feed pretreatment
4. Mid distillate
5. 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
6. Other distillates
7. Lube oil "polishing"
8. Other

Alkylation/Polymerization/Dimerization

1. Sulfuric acid
2. Hydrofluoric acid
3. Polymerization
4. Dimerization

Aromatics/Isomerization

1. BTX
2. Hydrodealkylation
3. Cyclohexane
4. Cumene
5. C₄ feed
6. C₅ feed
7. C₅ and C₆ feed

Oxygenates

1. MTBE
2. TAME
3. ETBE

Hydrogen

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

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
- Types and grades of products to be manufactured
- Environmental constraints associated with refinery operations.
- Scheduled downtime such as mechanical problems, repairs, and slowdowns.

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. Other refining processes not covered are noted here.

Process definitions are:

- Hydrocracking includes processes where 50% of the feed or more is reduced in molecular size.
- Hydrotreating includes processes where 10% of the feed or less 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.

Catalytic reforming definitions are:

- 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

United States

1. Indian Refining Co.-Lawrenceville, Ill. 83,700 b/d crude capacity, 1995.
2. Marathon Oil Co.-Indianapolis, Ind. 48,000 b/d crude capacity, October 1993.
3. Pacific Refining Co.-Hercules, Calif. 50,000 b/d crude capacity, 1995.
4. Pennzoil Products Co.-Roosevelt, Utah 8,000 b/d crude capacity, October 1994.
5. Powerine Oil Co.-Santa Fe Springs, Calif. 46,500 b/d crude capacity, 1995.

Canada

1. Imperial Oil Ltd.-Iloilo, B.C. 44,000 b/d crude capacity, July 1995.

2. Ultramar Canada Inc.-Halifax, N.S. 22,000 b/d crude capacity, May 1995.

Germany

1. Hydrierwerk Zeitz GmbH-Zeitz, 73,700 b/d crude capacity, December 1995.
2. Mobil Oil AG-Woerth, 105,000 b/d crude capacity, 1995.

Mexico

1. Petroleos Mexicanos-Reynosa, 9,000 b/d crude capacity, 1994.

Singapore

1. BP Refinery Singapore Pty. Ltd.-Pasir Panjang, 28,000 b/d crude capacity, 1994.