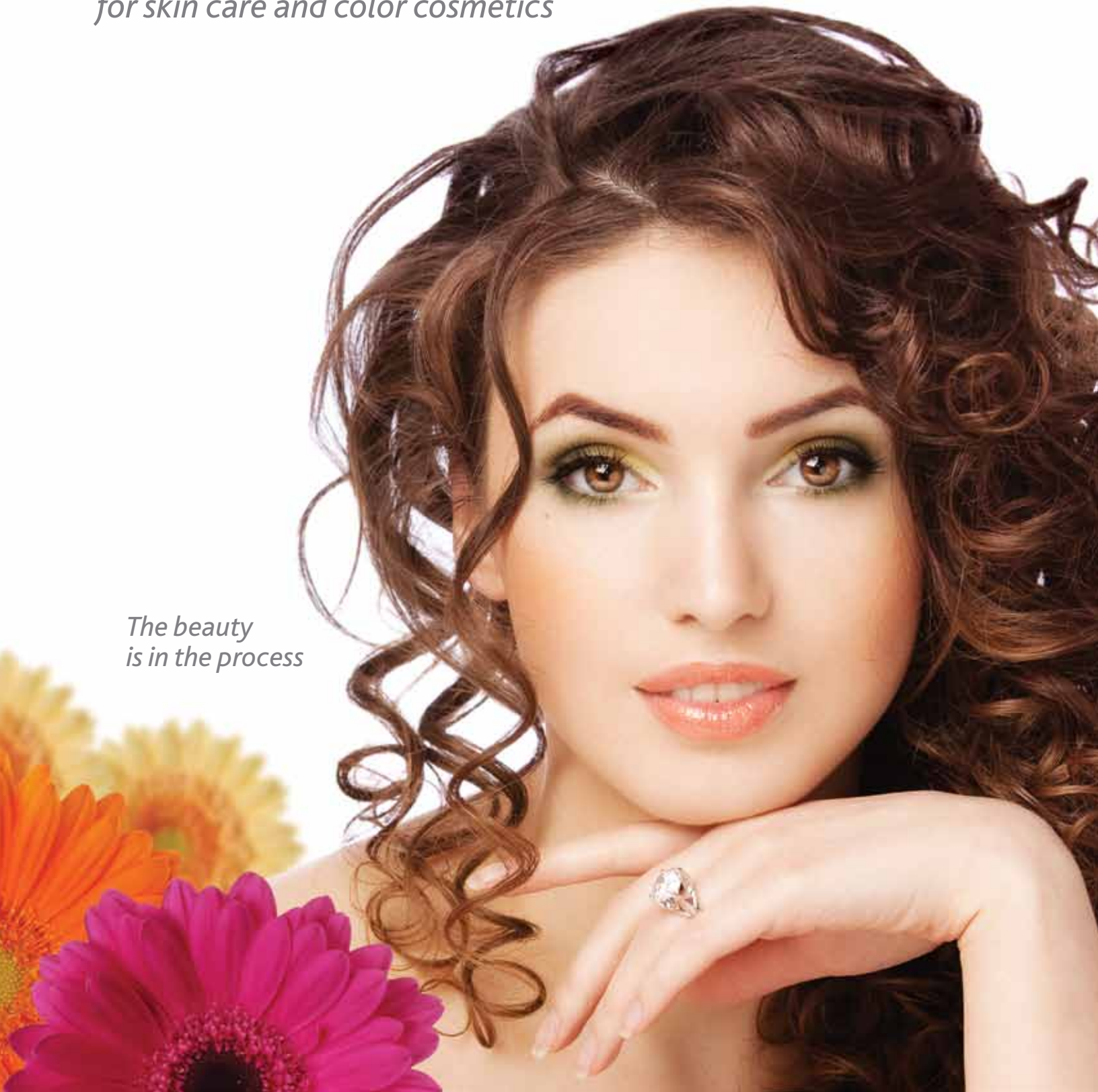


EASTMAN

Eastman GEM™
2-ethylhexyl palmitate
for skin care and color cosmetics

*The beauty
is in the process*



Redefining sustainable manufacturing . . . *the beauty is in the process*

Eastman GEM™ technology is setting a new standard in sustainably manufactured cosmetic ingredients. Eastman GEM™ 2-ethylhexyl palmitate is manufactured via Eastman's proprietary GEM™ technology, a process that uses enzymes and closely controlled manufacturing conditions to eliminate high temperatures, strong acids, and unwanted by-products, and consumes less energy compared with conventional manufacturing processes. Eastman GEM™ 2-ethylhexyl palmitate is a high quality material with the added benefit of sustainable manufacturing, guided by the U.S. EPA's Twelve Principles of Green Chemistry. *The beauty is in the process.*

Sustainable advantages of GEM™ technology

- Low energy consumption
- Low greenhouse gas emissions
- Minimal waste generated
- No process water consumption
- Adheres to the Twelve Principles of Green Chemistry
- Can utilize natural source materials to produce ingredients

A closer look

Benefits of GEM™ technology vs. conventional manufacturing

- 52% reduction in CO₂ emissions
- 59% reduction in energy consumption
- 93% waste reduction
- 100% reduction in process water consumed
- E factor of 0.06

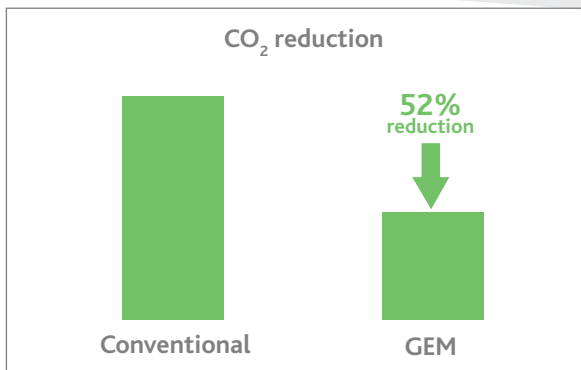


Winner of the 2009
Presidential Green Chemistry
Challenge Award*

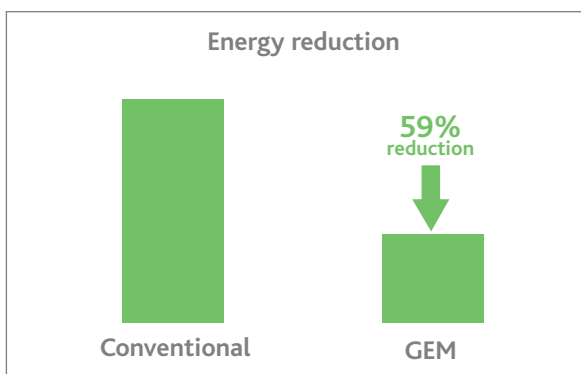
Property	Specification	Typical
Identity		Consistent with structure
Appearance	Clear, colorless liquid	Conforms
Assay	95% min.	>98%
Acid number	2 max.	<1.5
Pt-Co (APHA) color	25 max.	<10
Iodine value	1 max.	<0.5

Property	Typical
Refractive index	1.4445-1.4465
Specific gravity at 25°C	0.85-0.865
Saponification value	150-160

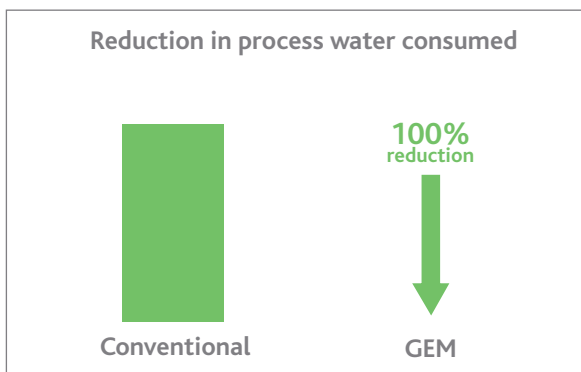
*Eastman GEM™ technology was formerly known as the Eastman™ green biocatalytic process.



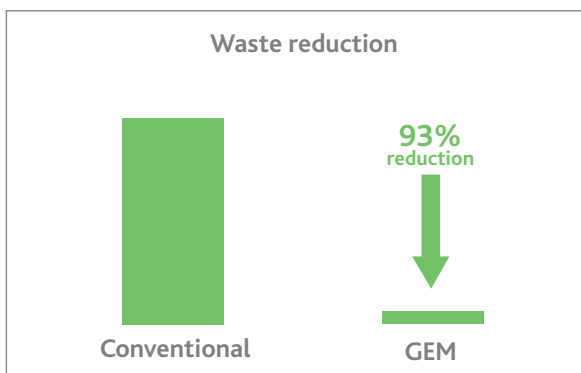
Did you know . . . that compared with conventional processes the 52% reduction in CO₂ emissions with GEM™ technology to produce 100 metric tons is approximately the same amount of CO₂ emitted from driving a standard sized car 14,400 miles?



Did you know . . . that compared with conventional processes the 59% reduction in energy consumption using GEM™ technology to produce 100 metric tons is enough to power a standard laundry dryer for 5,900 loads?



Did you know . . . that compared with conventional processes the 100% reduction in process water consumed with GEM™ technology to produce 100 metric tons is approximately the amount of water contained in 141,000 standard bottles of water?



Did you know . . . that Eastman GEM™ technology can reduce waste by 93% compared with conventional processes?

Data shown is based on a simple process analysis comparing the Eastman GEM™ technology to the process described in US patent 6635775 (B1, Example 13). Data is based on a gate-to-gate screening LCA.

EASTMAN

Eastman Chemical Company

Corporate Headquarters

P.O. Box 431

Kingsport, TN 37662-5280 U.S.A.

Telephone:

U.S.A. and Canada, 800-EASTMAN (800-327-8626)

Other Locations, (1) 423-229-2000

Fax: (1) 423-229-1193

Eastman Chemical Latin America

9155 South Dadeland Blvd.

Suite 1116

Miami, FL 33156 U.S.A.

Telephone: (1) 305-671-2800

Fax: (1) 305-671-2805

Eastman Chemical B.V.

Fascinatio Boulevard 602-614

2909 VA Capelle aan den IJssel

The Netherlands

Telephone: (31) 10 2402 111

Fax: (31) 10 2402 100

Eastman (Shanghai) Chemical Commercial Company, Ltd. Jingan Branch

1206, CITIC Square

No. 1168 Nanjing Road (W)

Shanghai 200041, P.R. China

Telephone: (86) 21 6120-8700

Fax: (86) 21 5213-5255

Eastman Chemical Japan Ltd.

AIG Aoyama Building 5F

2-11-16 Minami Aoyama

Minato-ku, Tokyo 107-0062 Japan

Telephone: (81) 3-3475-9510

Fax: (81) 3-3475-9515

Eastman Chemical Asia Pacific Pte. Ltd.

#05-04 Winsland House

3 Killiney Road

Singapore 239519

Telephone: (65) 6831-3100

Fax: (65) 6732-4930

www.eastman.com



Material Safety Data Sheets providing safety precautions, that should be observed when handling and storing Eastman products, are available online or by request.

You should obtain and review the available material safety information before handling any of these products.

If any materials mentioned are not Eastman products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be observed.

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