

Oxygen-Enriched Combustion Technologies

fact sheet

Melting and reheating glass and metals are energy intensive processes. Though industrial furnaces have become much more energy efficient in recent years, oxygen-enriched combustion technologies can improve their efficiency still more. Oxygen enrichment reduces or eliminates the need for combustion air, resulting in less nitrogen oxide production. Oxy-fuel combustion also increases the flame temperature without increasing fuel cost. Consequently, productivity can be increased while cutting energy use by as much as 50 percent. Oxy-fuel combustion can be implemented as a retrofit or to replace older technologies.

REPORTED BENEFITS

- Cuts energy consumption 30% to 50%
- Decreases nitrogen oxides up to 90%
- Decreases particulate emissions 30% to 70%
- Eliminates the need for waste heat recuperators
- Increases production 10% to 30%
- Lowers maintenance costs
- Improves temperature stability, heat transfer, and control

Barriers to Market Acceptance

1. price
2. risk of failure
- ➔ 3. benefits not understood
- ➔ 4. priorities not on benefits of new technology
5. lack of technology awareness

Development Stage

1. need for the technology identified
2. technology concept developed
3. initial research findings reported
4. research on concept completed
5. commercial pilot completed
6. introduction to commercial market
- ➔ 7. immature market demand
8. mature market demand
9. market saturation

WISCONSIN APPLICATIONS

Oxy-fuel combustion is used to melt steel, aluminum, or glass; or to reheat metals and glass for further processing.

TYPICAL PAYBACK

Two years for good applications, based on energy savings. Taking other benefits into account will shorten the payback period.

MORE INFORMATION

U.S. Department of Energy, Office of Industrial Technologies:

- Information on oxy-fuel firing in the glass industry
www.oit.doe.gov/glass/factsheets/highluminosity.pdf
 - "Steel reheating for further processing,"
www.oit.doe.gov/nice3/factsheets/oxyfuel2.pdf
 - "Dilute oxygen combustion system improves reheat furnace performance and provides very low NO_x emissions"
www.oit.doe.gov/steel/factsheets/docsteel.pdf
 - "High efficiency, high capacity, low NO_x aluminum melting using oxygen-enhanced combustion"
www.oit.doe.gov/aluminum/factsheets/lownox.pdf
 - "The competitive position of natural-gas in oxy-fuel burner applications," Gas Research Institute Report GRI-96/0350. Available through the Energy Center library, 608.238.4601, library@ecw.org or order from GRI's website: www.gri.org
- Manufacturers:
- Praxair, 800.PRAXAIR, www.praxair.com
 - The BOC Group, 1720 Indian Wood Circle, E. Maumee, OH 43537-4005, 419.891.4000, www.boc.com
 - AirProducts, 7201 Hamilton Boulevard, Allentown, PA 18195-1501, Phone: 610.481.4911, Fax: 610.481.5900
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 - AirLiquide, www.airliquide.com



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