



*Photo: A steam-assisted flare*

# VISIBLE FLAMES ON INDUSTRIAL FLARES

## WHY FLAMES MAY BE VISIBLE MORE FREQUENTLY FROM INDUSTRIAL FLARES

There are more than 1,300 flares at industrial sites across the state. This brochure explains why flares may have visible flames (like the flame in the above photo) more frequently when they are operating.



TCEQ General Information  
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## WHAT ARE FLARES?

- Industrial flares are devices that are designed to burn waste gas in a safe, controlled manner. The majority of industrial flares in Texas combust waste gas using a specially designed burner tip that produces a flame in the open air.
- Flares are used in a wide variety of industrial operations, including petroleum refining and chemical processing.
- Two major types of flares are the steam-assisted flare and the air-assisted flare, in which steam or air is injected at the flare tip.
- The TCEQ authorizes flares to burn waste gas resulting from certain routine operations as well as some nonroutine situations, such as power loss to the site or equipment failure.

## WHY ARE FLARES NECESSARY?

- **For safety purposes:** Flares protect industrial sites and the adjacent communities by safely burning waste gas.
  - Flares can be used during nonroutine situations—such as power outages, emergency conditions, or plant-maintenance activities—to safely burn and destroy large volumes of waste gas in a controlled manner. The TCEQ categorizes these flares as nonroutine-operations flares. These flares may operate occasionally and may have extremely large, visible flames.
- **For pollution reduction:** Flares help to reduce the amount of pollution released into the environment by burning and destroying waste gas instead of allowing it to vent directly to the atmosphere.
  - Flares can also be used to burn and destroy waste gas from normal plant operations instead of releasing this gas to the atmosphere. The TCEQ categorizes these flares as routine-operations flares. These flares typically operate continuously, process smaller volumes of waste gas, and have smaller visible flames.

## HOW CAN I TELL IF A FLARE IS EFFECTIVELY DESTROYING WASTE GAS?

- A visible flame is an indicator that the flare is burning and destroying waste gas.\*

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\*The TCEQ 2010 Flare Study demonstrated that a flare is burning hydrocarbon waste gas effectively when it has a visible flame, even if the flame occasionally has a small amount of smoke.

## SHOULD A FLARE ALWAYS HAVE A FLAME VISIBLE?

- No, not always:
  - Some flares are used only occasionally, and therefore will not have a constant visible flame.
  - Some flares may burn a waste gas that does not produce visible flames. For example, a flare that burns hydrogen generally produces a clear flame.

## IS A VISIBLE FLAME REALLY OKAY?

- Yes, a visible flame on the flare tip is a good indicator that the flare is burning and destroying waste gas.
  - This may not pertain to nonroutine operations, such as power loss to the site or equipment failure, when flares may display extremely large visible flames.
- In cases where too much steam or air is injected into the flare tip, the flame may become invisible and also less efficient at burning and destroying waste gas. This is why a visible flame is a good indicator that the flare is operating at high efficiency.
- Visible flames may become even more prevalent, as industry and the TCEQ work together to improve flare operations.

## WHY DOES A FLARE SMOKE?

- Black smoke can form when the flame does not have enough oxygen to completely burn the waste gas. (If insufficient amounts of steam or air are injected into the flare tip, the flare may be likely to smoke.)
- In some cases, steam can also be visible from flares and other plant equipment and may look like white smoke even though it's not.

## CAN THE SMOKE FROM A FLARE BE REDUCED?

- Smoke can be reduced by injecting more steam or air at the flare tip (depending on whether the flare is steam assisted or air assisted).
- However, too much steam or air assist can affect flare efficiency. The TCEQ 2010 Flare Study has shown that adding too much steam or air can also reduce how effectively the flare burns and destroys the waste gas.

## WHAT ARE THE REGULATIONS REGARDING SMOKE FROM FLARES?

- According to the U.S. Environmental Protection Agency, a flare cannot have visible emissions, including smoke, for more than five minutes during a two-hour period.
- Flames not accompanied by smoke are not considered visible emissions.

## FOR ADDITIONAL INFORMATION

- TCEQ Flare Task Force stakeholder Web page: <[www.tceq.texas.gov/goto/flareforce](http://www.tceq.texas.gov/goto/flareforce)>.
- TCEQ 2010 Flare Study, available online at: <[www.tceq.texas.gov/goto/2010flarestudy](http://www.tceq.texas.gov/goto/2010flarestudy)>.
- If you have questions or concerns about a flare in your area, please contact the appropriate TCEQ regional office. Contact information for regional offices is available at <[www.tceq.texas.gov/goto/regions](http://www.tceq.texas.gov/goto/regions)>.
- The TCEQ is available 24 hours every day to receive complaints under our jurisdiction. To submit a complaint, either use our online form, which is available at <[www.tceq.texas.gov/goto/complaints](http://www.tceq.texas.gov/goto/complaints)>, or call us toll-free at 888-777-3186.



*This is an example of an air-assisted flare effectively burning and destroying waste gas (achieving high efficiency). Notice the flame.*



*This is an example of a steam-assisted flare effectively burning and destroying waste gas (achieving high efficiency). Notice the flame.  
The photograph on the front also shows a steam-assisted flare.*