

# Mercúrio

# Análise Laboratorial

Setembro, 2024



# Mercury Concentration Limit – References

Although ANP does not establish a mercury concentration limit in natural gas, it indicates that the concentration must be monitored, and the carrier must provide the results of mercury analysis when requested.

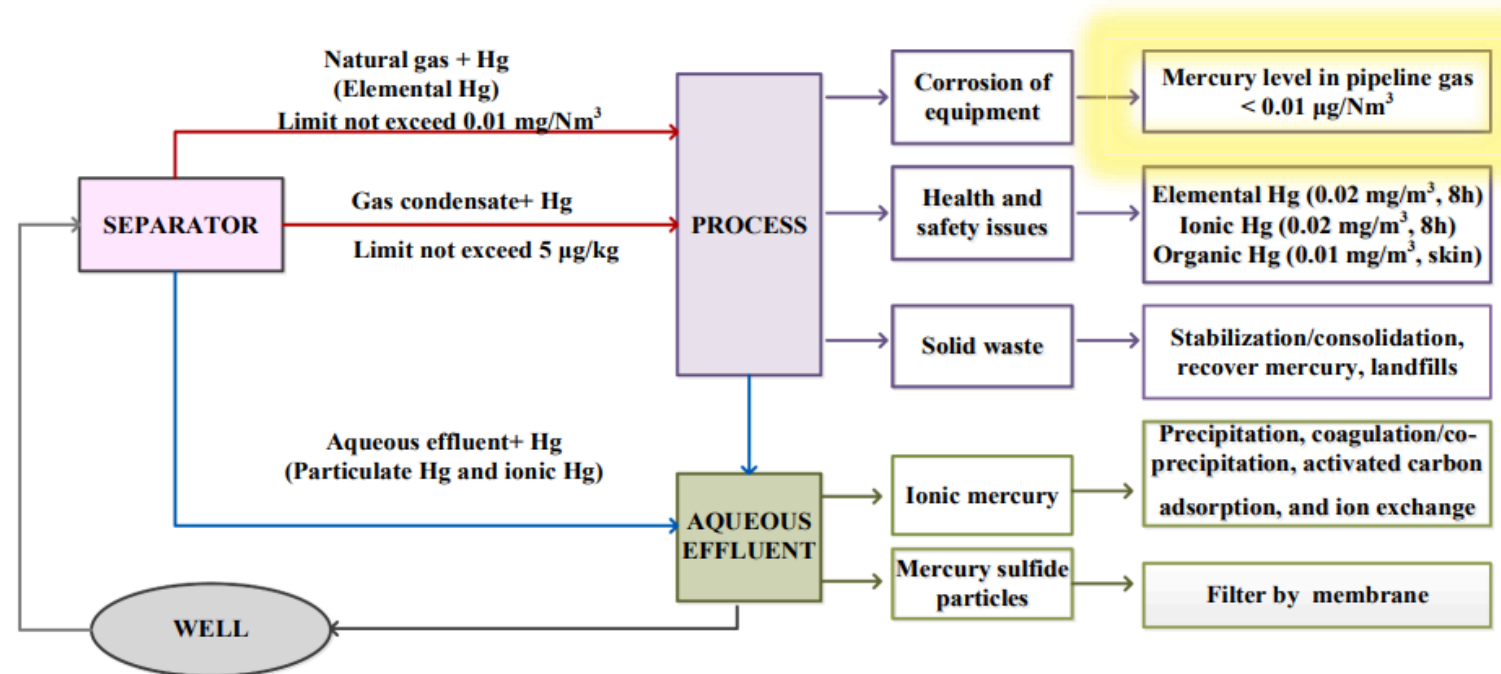
*Resolução ANP Nº 16, 17.6.2008*

The Global Oil and Gas Industry Association for Environmental and Social Issues (IPIECA) reports that one approach to minimize potential mercury accumulation is limiting the concentration input to a refinery. The association suggests “the mercury content of incoming crudes to refinery will be less than 10 wt ppb, on a month-average basis, and no individual crude should exceed 100 wt ppb”.

*PAG13\_5\_StudyReport\_OG\_.pdf(unep.org)*

<https://www.ourenergypolicy.org/wp-content/uploads/2014/06/Mercury.pdf>

The paper “A Review on Mercury in Natural Gas and its Condensate: Accurate Characterization and Efficient Control Technologies for Total and Speciated Mercury” underscores the importance of maintaining a mercury level in pipeline gas below  $0,01 \mu\text{g}/\text{Nm}^3$  to prevent equipment corrosion.



<https://www.sciencedirect.com/science/article/pii/S0016236123021403>



# Mercury Concentration Limit – References

The paper “Mercury Removal from Natural Gas in Egypt” shows some problems caused by mercury in natural gas and suggests mercury allowable limits:

- Reports that elemental mercury is the probable cause of mercury corrosion problems;
- Highlight that many reported cases worldwide (USA, Algeria, Holland, and Indonesia) describe massive failures resulting in significant damage and environmental catastrophes as a consequence of the uncontrolled presence of mercury in gas plants, especially in cryogenic natural gas operations.
- Suggests that mercury concentrations should be reduced to values less than 0,01  $\mu\text{g}/\text{Nm}^3$  before the gas enters cryogenic process equipment.

[40079263.pdf \(iaea.org\)](#)

Following an incident at REFAP (Alberto Pasqualini Refinery) in the 90s, where mercury was detected in the oil from Argentina, a routine of analyses was established. It was determined that oil with a mercury concentration above 20 ppb would not be processed. Today, some sites have mercury removal systems capable of reducing the mercury concentration from 2  $\mu\text{g}/\text{m}^3$  to 0,01  $\mu\text{g}/\text{m}^3$ .

[https://www.agirazul.com.br/a2/\\_a2/000001fb.htm](https://www.agirazul.com.br/a2/_a2/000001fb.htm)

Terms and Conditions for Transportation of Gas in GASSLED (the unitized Norwegian gas export network) report the maximum mercury specification equal of 0,01  $\mu\text{g}/\text{Nm}^3$ .

<https://gassco.eu/wp-content/uploads/2023/03/gassled-terms-and-conditions.pdf>

Terms and Conditions for Transportation of Gas in Utsira High Gas Pipeline (94-kilometer-long gas pipeline running from the Edvard Grieg field 57 km north of Sleipner in the northern North Sea) report the mercury specification as “Negligible” which means less than a concentration of the relevant species that the Shipper will have any problem to accept redelivery by Article 4.3.

<https://gassco.eu/wp-content/uploads/2023/03/uhgp-terms-and-conditions-incl-appendices-01.10.2022.pdf>

# Mercury Concentration Limit – References

**Argentina:** The country follows international standards for natural gas quality, which generally aim to keep mercury levels very low to prevent corrosion and health problems. Specific limits may be adopted according to ISO standards or recommendations from the International Association of Oil & Gas Producers (IOGP), which suggest values typically below 10 ng/m<sup>3</sup> (0.01 µg/m<sup>3</sup>) ([CEPAL](#)) (*Environment Go!*).

**Mexico:** There is no specific publicly available limit, but common industry practice is to keep mercury levels as low as possible to prevent pipeline corrosion and other associated problems ([Intertek](#)).

**United States:** The EPA recommends keeping mercury levels in natural gas below 10 ng/m<sup>3</sup> (0.01 µg/m<sup>3</sup>) to minimize public health risks and avoid damage to gas transportation and processing infrastructure ([US EPA](#)).

**Canada:** Similar to the US, Canada follows international guidelines and industry practices that keep mercury levels very low. Common reference values are in the order of 10 to 50 ng/m<sup>3</sup> (0.01 to 0.05 µg/m<sup>3</sup>) ([NEPIS EPA](#)).

**Colombia:** Specific information about regulatory limits in Colombia is scarce. However, it is likely that the country follows standards similar to international norms and other Latin American countries, keeping mercury levels in natural gas below 10 ng/m<sup>3</sup> (0.01 µg/m<sup>3</sup>) ([Intertek](#)) ([NEPIS EPA](#)).

**France:** France, like many other European countries, follows European Union standards and industry recommendations, maintaining mercury levels in natural gas very low, typically below 10 ng/m<sup>3</sup> (0.01 µg/m<sup>3</sup>) ([Intertek](#)).

**Belgium:** Similar to France, Belgium adopts low limits for the concentration of mercury in natural gas, aligning with European Union practices, also keeping levels below 10 ng/m<sup>3</sup> (0.01 µg/m<sup>3</sup>) ([CEPAL](#)) (*Environment Go!*).

# Mercury Concentration Limit – References

**Holland:** In the Netherlands, the regulation also follows European guidelines, with limits generally below 10 ng/m<sup>3</sup> (0.01 µg/m<sup>3</sup>), ensuring the integrity of pipelines and public health (*Intertek*).

**Germany:** Germany adopts strict limits for mercury in natural gas, generally keeping levels below 10 ng/m<sup>3</sup> (0.01 µg/m<sup>3</sup>), in line with European standards (*Intertek*).

**Italy:** Italy follows similar standards to other European Union countries, with typical limits of mercury in natural gas also around 10 ng/m<sup>3</sup> (0.01 µg/m<sup>3</sup>) (*Intertek*).

**Russia:** In Russia, mercury limits in natural gas are also kept low, with typical values following international standards, usually around 10 to 50 ng/m<sup>3</sup> (0.01 to 0.05 µg/m<sup>3</sup>), to prevent damage to infrastructure and protect health (*US EPA*).

## Mercury Concentration Limit – Conclusion

It is recommended that the Mercury concentration remains between 10 and 100 ng/m<sup>3</sup> (0.01 to 0.1 µg/m<sup>3</sup>) throughout the Natural Gas Brazil Pipeline.

**Thank you!**