

**Flow-controlled
System for Odorization of Gases** Type TAI-GOE04

1. Odorization of Gases

The call for public safety makes it an indispensable requisite to odorize gases not being detectable by smell such as natural gas, oxygen, etc. and there are many countries where such odorization is already imposed by law or where non-odorization is considered a bad failure in case of an accident.

Detection by smell remains an essential leak control device in gas handling, despite the accomplishments of modern instrumentation and signaling technology. Economy in the supply of gas is not assured unless all possible leaks are quickly recognized and immediately repaired.

1.1 Odorizing agents

Mercaptanes, disulfides, thioether and cyclic sulfides are available for use as odorizing agents (suppliers' names on request). The various substances differ by a varying stability in gas. In the concentrations used for odorization of gases they have a strong smell but do not cause nausea or toxic symptoms.

For odorization of natural gas the cyclic sulfide tetrahydrothiophene is in most common use. It is stable, of intense odour, does not react with the gas, volatile, colorless and combustible with the gas. Formula: C_4H_8S .

2. Operation and Features

The gas odorizer is working to the absorption principle, where a pressure differential is obtained by throttling the gas flow for the purpose of passing a proportional current of the gas through a vessel containing the odorizing agent and thereby saturating it with the agent.

The proper odorizer as well as the interchangeable odorant tank are mounted on a common base plate and equipped with piping so as to be ready for connection to the gas line. In spite of its space saving design the packaged unit features ease of access for operation and maintenance. The odorizer is made from welded steel, the interchangeable odorant tank to DIN 30 650 is made from stainless steel, pressure rating PN 16, flange bores to PN 16 or ANSI 150. The agent is supplied to the odorizer from the odorant tank (to which auxiliary pressure is admitted) over lift tube Ermeto 12, passing through a shutoff-valve arranged in the connecting pipeline. Filling of the odorizer vessel to the specified level may be achieved either under working pressure or, after shutting of the bypass lines and corresponding opening of vent device, under atmospheric pressure.

A grid type friction cloth screen is arranged inside the odorizer vessel being dipped into the odorizing agent with its bottom section so as to steadily suck up agent, the level of which is maintained at appr. one third of the full height of the vessel, controllable by level indicator.

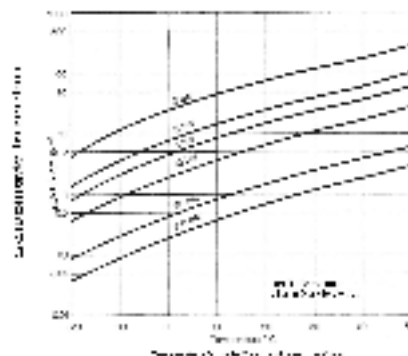
A partial flow whose rate is controlled by an annular type throttling valve is branched off at a point upstream of the throttling valve to be supplied over a bypass line to the odorizer vessel where it is passed through the agent soaked fabric screen. This way the partial stream is getting saturated by the agent and leaves the vessel over the outlet bypass line to be returned to the main gas line, this time downstream of the throttling valve. The odorant concentration in the gas stream is a function of the proportion saturated bypass flow/dry main gas flow. The desired feed rate obtained by the differential pressure is set by the lever of the annular type throttling valve. Partial and main stream of the gas are proportional to physical laws. The differential pressure resulting from the setting of the throttling valve is thus a basis for odorant concentration. Two sections of the throttling valve are cut out to ensure always opening for the main gas stream, thus to avoid excessive differential pressure and resulting excessive feed of agents.

3. Design and Technical Data

Odorizing vessels as well as incorporated liquid level indicator are designed for a pressure rating of 16 bar (230 psig), the same as the pipework up to the connecting flanges. The odorizer device is suitable for application with rates of gas flow from 0 to 3000 m³/h (appr. 108 000 cft/h). With an odorant concentration of 7 mg/m³ (appr. 7 ounces/10⁶ scft) one vessel charge is sufficient for odorization of 3,5 million m³ (appr. 126 000 000 scft). Service range covers temperatures from 0° C to +50° C, +32 to +122° F.

4. Benefits

- Plain construction, non-complicated design, to give no rise to troubles.
- No external energy required (pneumatic and/or electric).
- No gas meters required.
- No moving parts – a decisive feature to avoid troubles in operation.
- Constant concentration of the agent in gas.
- Mounted on common base plate for ease of installation and operation.
- Favorably priced.



5. Maintenance

The odorizer is largely maintenance free. Just watch odorant level and keep valves serviceable.

6. Tests

The odorizer undergoes shop proving: resistance test 1.5 x xPN and tightness test 1.1 x PN. All head to head welding are with 100% X ray tested, all welding are tested with dye penetration.

7. Accessories

A cabinet casing, removable, for installation in the open air, is available as an optional extra. The differential pressure manometer might be foreseen with min/max switches. The liquid indicator might be replaced with a magnetic level indicator with REED contacts. The butterfly valve might be foreseen with electric or pneumatic actuator.

- | | | |
|------------------------------------|--|--|
| 1. Inlet-outlet pipe | 19. Base frame | 35. Base frame |
| 2. Nipples EO 12 | 20. Screws M 16 | 36. Screws M 16 |
| 3. Ball valves EO 12 | 21. Producer's plate hinges | 37. Producer's plate hinges |
| 4. T piece EO 12 | 22. Screws M20 | 38. Screws M20 |
| 5. Coupling EO 12 | 23. Nuts M20 | 39. Nuts M20 |
| 6. Differential pressure manometer | 24. Washers M20 | 40. Washers M20 |
| 7. Butterfly valve | 25. Sealing | 41. Sealing |
| 8. Screws M20 | 26. Fabric frame | 42. Fabric frame |
| 9. Nuts M20 | 27. Superior coupling for the liquid indicator | 43. Superior coupling for the liquid indicator |
| 10. Washers M20 | 28. Flange | 44. Flange |
| 11. Sealing | 29. Inferior coupling for the liquid indicator | 45. Inferior coupling for the liquid indicator |
| 12. Odorant tank | 30. Screws M12 | 46. Screws M12 |
| 13. Ball valves | 31. Nuts M12 | 47. Nuts M12 |
| 14. Couplings for the ball valves | 32. Washers M12 | 48. Washers M12 |
| 15. Nipple | 33. Sealing | 49. Sealing |
| 16. Ball valves | 34. Liquid indicator | 50. Liquid indicator |
| 17. Nipple | | |
| 18. Nipple | | |

