

## **balewa** Letter Nr. 05 Off gas related consulting

Dear reader

**balewa** provides technical consulting services for most off gas related issues. Modern, more efficient and less costly off gas control techniques are showing up on the market, as requirements for off gas and flue gas control techniques are becoming tighter and energy efficiency of production facilities gets more and more into the focus of interest. What can be expected from the new technologies available? How will they perform in practice?

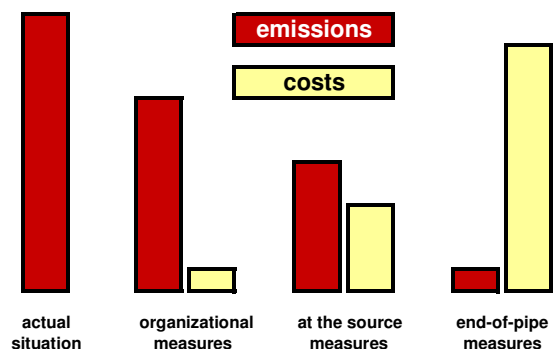


### Situation analysis as base for an efficient concept

**balewa** is specialized in assessing your off gas or odour problem applying a quick and comprehensive approach to elaborate optimized solutions. Different off gas relevant aspects like explosion and fire hazards (ATEX), industrial hygiene and environmental protection will be considered in achieving the goal.

**balewa** consequently pursuits the strategy to **avoid, minimize, and treat the gases/exhausts at their source** wherever possible and reasonable.

Avoiding of off gas streams is the most elegant way to “solve” an off gas problem. The reduction of volumes and loads may also have many positive effects, whether in relation to reduced emissions, or in a reduced energy requirement or the quantity of off gas to be treated.



Based on a thoroughly evaluated situation analysis, some simple organizational optimizations at the source may reduce of up to 30% of the gaseous emissions

### Process variety for off gas treatment and odor abatement

A wide variety of close-to-the source or end-of-pipe processes for off gas and flue gas treatment are available. They allow to control, remove or eliminate pollutants and/or bad odours off the gaseous phase by the application of dry or wet treatment processes. The abatement of off gas components are based on either an absorptive, adsorptive, or a thermal or biological process.

## Process evaluation supported by **balewa**

Optimal solutions for a given specific situation have to be evaluated carefully of a multitude of possible options.

**balewa**'s specialists know the advantages and disadvantages of different alternative solutions for a given off gas problem. Together with our customers we will establish a solid data base, to evaluate potential process options. Our economic evaluation of the technology takes into account the costs over the full life cycle, including costs for investment, operation and maintenance.

**balewa** is excellently documented in regard to

- chemical and physical properties of numerous volatile substances
- analytical and mathematical tools to determine, calculate, and/or simulate gaseous emissions of volatile chemicals
- process technical options to abate and/or treat volatile pollutants, aerosols, odours and/or dusts.

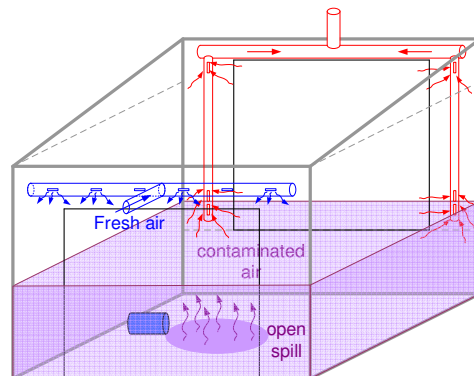
## Plant safety and operational reliability

Energy saving programs may result in the reduction of volumetric gaseous streams. Parallel to such action, the pollutant concentrations in ducts and vessels may increase, resulting in increased risks at even higher consequences. Hidden dangers such as e.g. the generation of explosive gaseous mixtures may be encountered when an existing production plant shall be used for another purpose. Special know-how will be required to identify critical situa-

tions and implement preventive measures to allow a reliable operation.

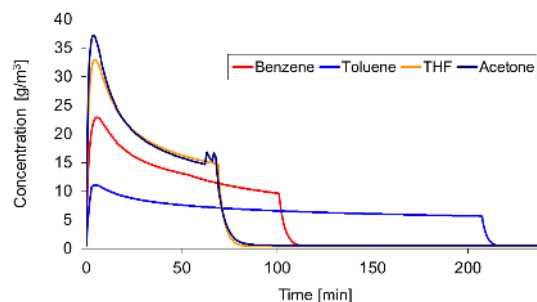
## Model calculation forecasting solvents release

In order to answer a specific question of a risk assessment team, **balewa** created a dynamic model for different situations, allowing a forecast of the concentration of a given solvent in an exhaust gas stream as a result of an accidental spill.



Space model to determine the solvent concentration in the exhaust gas

The scientifically elaborated models and calculations are used for safety considerations and to execute risk analysis. Results may be validated by well defined, additional measurements.



Concentrations of different solvents against time as out-put of our dynamic modelling approach

## Safe disposal of gases and waste solvents in incinerators

“Safety first” is the ultimate credo in the incineration of off gases and waste solvents in incinerator plants. The gases containing flammable mixtures of solvents at concentrations up to the flammability limit are fed under safe and permanently controlled conditions into the hot incineration zone, where they will decompose and be mineralised.



Off gas injection of flammable mixtures into an incinerator of the chemical industry. **balewa** was responsible for conceptual design, detail engineering and the commissioning of the project

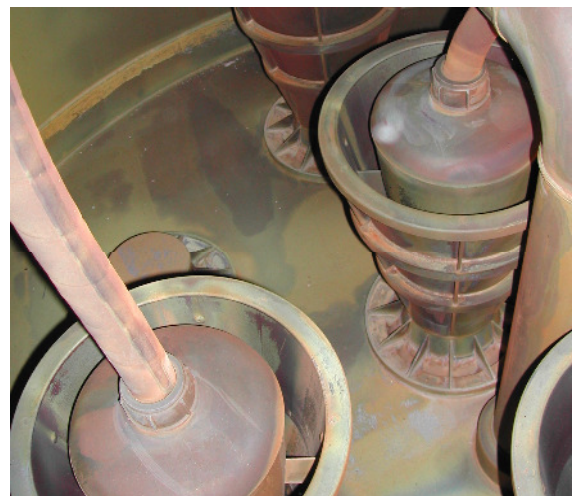
**balewa** offers a full variety of consultation services for the thermal disposal of off gases contaminated with volatile organic carbon. These include a scientific evaluation of the risk potential, clarification of technical safety aspects, a list of potential measures for risk reduction, evaluation of technical measures proposed by potential suppliers, conceptual and detailed planning of projects, estimation of investment and operational costs, and technical control during realization, commissioning, start-up and training.

## Well established portfolio of flue gas and off gas wet scrubbing equipment

The wet scrubbing equipment developed by the Basel chemical industry has proven its efficiency worldwide for more than 30 years. **balewa** takes pride in further distributing and providing technical support for these components. They include all the following:

- The Hedgehog column packing material. Its high specific surface area guarantees a high mass transfer at a small pressure drop.
- The Ring-Jet particulate separator is working on the venturi principle. The solid particles such as dust and/or aerosols are efficiently removed from off gases.
- The droplet separator as an efficient device to capture droplets and spray and to prevent carryover.

Further detailed technical information concerning this long proven hardware can be found on our web side [www.balewa.ch](http://www.balewa.ch).



Ring-Jet treatment stage for the aerosol removal, after 2 years in service without any interruptions

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## Maintenance and functional controls of gas treatment units

Production plants rely more and more on the permanent availability of their infrastructure. At the same time, the plants lack often skilled man power for maintenance and repair services. Down time of peripheral installations such as an off gas treatment unit or a waste water pre-treatment plant may delay or even stop the production processes.

To ensure the required availability and performance of the environmental installations, a regular maintenance and functional controls are essential. The preventive checks and maintenance works allow the production units to continue their operations with a minimum of interruptions.

**balewa** offers special services for maintenance and function control of off gas treatment units. Our special focus lies on the wet scrubbers equipped with nozzles, packed beds, particulates separation units, and droplets separators. The service includes a check of the instruments and the control of certain process parameters. In case of deviations, smaller corrective measures will be executed immediately. Larger repair work can be arranged upon urgency and/or request.

The long experience in the conceptual design, construction and commissioning of off gas units enables us to rapidly understand functions of any infrastructure used to treat off gas, and to evaluate their state and performance competently.



Encrusted treatment units (above droplet separator; below Ring-Jet) prevent the efficient operation of the control device. They may also lead to further problems by a reduced off gas volume and increased energy consumption, and may require interruptions of production lines.



Ring-Jet before and after our maintenance service