

EURISG

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EURISG Sizing Case Report

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Dimensioning of ATEX explosion zones in the vicinity of relief pipe outlets

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Revisions

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1 Introduction

A key concept for explosion protection concepts is the definition of three hazard zones, where specific measures must be complied with. The determination of the size and shape of these zones in the vicinity of relief pipe outlets e.g. from safety valves or rupture disks is the subject of this report.

2 Rules and Regulations

The requirements for operational explosion protection are demanded by the EU directive 2014/34/EU [1] and 1999/92/EG [2] which are regulated for Germany in the "Gefahrstoffverordnung" (GefStoffV) [3] and the "Betriebssicherheitsverordnung" (BetrSichV) [4]. Based on a risk assessment the employer has to ensure the safety of his employees. The risk assessment as a base for an explosion protection document is demanded by several regulations: Arbeitsschutzgesetz [5], GefStoffV, BetrSichV, BGV A1 [6]. The "GefStoffV" defines ATEX hazard zones for explosion protection as follows:

Zone 0

is a place in which a potentially explosive atmosphere consisting of a mixture of air and flammable substances in the form of gas, vapour or mist is present continuously, for long periods or frequently.

Zone 1

is a place in which an explosive atmosphere consisting of a mixture of air and flammable substances in the form of gas, vapour or mist may occasionally occur in normal operation.

Zone 2

is a place in which, during normal operation, a dangerous explosive atmosphere consisting of a mixture of air and flammable substances in the form of gas, vapour or mist is not likely to occur and, if it does occur, only rarely and for a short period of time.

Regarding the size and dimensions of hazard zones in the vicinity of relief pipe outlets to the environments the following regulatory passages and guidance is available.

As guidance the "Deutsche Gesetzliche Unfallversicherung" (DGUV); department "Rohstoffe und chemische Industrie", subject area "Explosionsschutz" developed the document "DGUV Regel 113-001 – Explosionsschutz-Regeln (EX-RL)" [7]. This document is a collection of technical rules specifying the "GefStoffV" and the "BetrSichV". To determine the ATEX hazard zones in the vicinity of relief pipes, this rule refers to the "DVGW-Hinweis G 442".