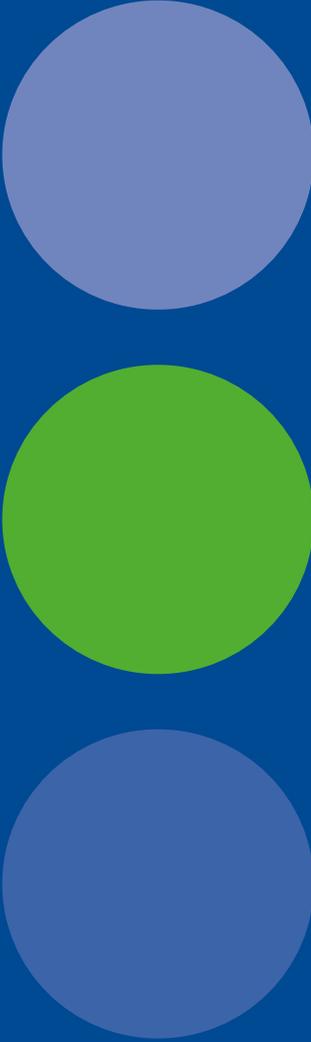


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Recommendations of the German Social Accident Insurance Institutions for a chemical safety assessment (“EGU”) in accordance with the Hazardous Substances Ordinance

Flour dust in bakeries

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Preliminary remarks

The so called „Empfehlungen Gefährdungsermittlung der Unfallversicherungsträger nach der Gefahrstoffverordnung“ (Recommendations of the German Social Accident Insurance Institutions for a chemical safety assessment in accordance with the Hazardous Substances Ordinance) are elaborated by:

- The German „Unfallversicherungsträger“ (Social Accident Insurance Institutions),
- The “Institut für Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung“ (Institute for Occupational Safety and Health of the German Social Accident Insurance),
- The „Bundesanstalt für Arbeitsschutz und Arbeitsmedizin“ (Federal Institute for Occupational Safety and Health),
- And where applicable, further test bodies, for example those of the German regional authorities.

„Empfehlungen Gefährdungsermittlung der Unfallversicherungsträger nach der Gefahrstoffverordnung“ (EGU) have the purpose of helping companies in conducting the parts of the risk assessment that deal with tasks involving hazardous substances. They form part of the German Social Accident Insurance (DGUV) body of rules and regulations and are listed as “DGUV Information” under order number 213-701 ff.

The EGU „Flour dust in bakeries“ were developed by the „Berufsgenossenschaft Nahrungsmittel und Gastgewerbe“ (German Social Accident Insurance Institution for the foodstuffs and catering industry) in Mannheim and the leading industrial medical inspector of the Saarland.

1 General

According to Section 6 of the „Gefahrstoffverordnung“ (German Hazardous Substances Ordinance)¹⁾ companies have to determine the nature and extent of exposure of their employees. This can be achieved by workplace measurements or other, equivalent assessment methods.

The EGU „Flour dust in bakeries“ constitute a suitable non-measuring identification method for assessing the exposure arising during the processing of grain flour in bakeries. It can be used in accordance with Sections 6 and 7 of the German Hazardous Substances Ordinance to perform a risk assessment and to implement protective measures. Furthermore it may also serve as a useful reference concerning risk assessment in accordance with Section 5 of the „Arbeitsschutzgesetz“ (German Occupational safety act)²⁾ and Section 3 of the „Betriebssicherheitsverordnung“ (German Ordinance on industrial safety and health).³⁾

However, the use of substances and/or methods representing a lower risk in accordance with the `Technische Regel für Gefahrstoffe` (Technical rule for hazardous substance) 600⁴⁾, observance of the ranking of protective measures, and provision of instruction to employees or operators (etc.) continue to be mandatory.

2 Scope of application

These recommendations apply to low-dust-generating working procedures in bakeries, pastry shops and manufacturing companies for other bakery products in which a potential risk of exposure to flour dust exists. They are based on measurements of the inhalable fraction in the workplace air and refer exclusively to the inhalative hazards of flour dust.

Corresponding working areas are flour stores, areas in which dough is produced and handled, and other working areas having relevant flour dust exposure. Grain mills are not in the scope of these recommendations.

These recommendations provide examples for technical, organizational and personal protective measures for cited operations. If these measures are implemented, the control of airborne flour dust exposure level can be renounced.

1) Gefahrstoffverordnung (Ordinance on hazardous substances) of 26 November 2010 (Federal Gazette I pp. 1643, 1644), amended by Article 2 of the Ordinance of 3 February 2015 (Federal Gazette I p. 49)

2) Arbeitsschutzgesetz (German Occupational safety and health act) of 7 August 1996 (Federal Gazette I p. 1246), last amended by Article 8 of the Act of 19 October 2013 (Federal Gazette I p. 3836)

3) Betriebssicherheitsverordnung (German Ordinance on industrial safety and health) of 27 September 2002 (Federal Gazette I p. 3777), last amended by Article 5 of the Act of 8 November 2011 (Federal Gazette I p. 2178)

4) TRGS 600 – Substitution (Technical rule for hazardous substances – Substitution), August 2008 edition

3 Definitions

3.1 Flour dust

In this document flour dust refers to grain flour dust arising in bakeries. The flour mainly used is wheat, rye or spelt flour.

3.2 Release agents

Release agents are substances like release flours, release oils or release waxes which prevent dough from sticking on work tables or parts of the machinery.

3.3 Low-dust release agents

Release agents with dust suppressed properties are:

- Hydrothermal (HT) flours,
- Other low-dust flours,
- Coarse-grained wheat flour and semolina,
- Release oil and release wax,
- Water.

3.4 HT-flours

Hydrothermal flours (HT-flours) are wheat and rye flours whose dust-raising property is minimized by special hydrothermal methods.

3.5 Functional ingredients

Functional ingredients are mixtures of foodstuffs including additives, which have the function of facilitating or simplifying the production of bakery products, to compensate for different processing properties of raw materials, and to improve therefore the quality of the bakery products. Functional ingredients may contain substances which may be able to sensitize the respiratory tract.

4 Working procedures

These recommendations describe working procedures in which flour dust formation may occur; particularly including:

- Dough mixing and kneading,
- Applying of release flour during the handling of dough,
- Cleaning.

The „Arbeits-Sicherheits-Information“ (Work Safety Information) 8.80⁵⁾ deals with the prevention of baker's asthma and describes procedures in bakeries in order to reduce the risk of getting baker's asthma and rhinitis to a minimum.

The protective measures required for this purpose are specified in part as so called basic protective measures. They have to be applied in consideration of the local conditions of a specific bakery. These basic protective measures should be applied to reduce the inhalation exposure to flour dust/sensitizing substances in accordance with the technical rule for hazardous substance 406 (TRGS 406)⁶⁾. They take into account also microbiological, chemical and physical influences and those of the work organization and the structural design of the bakery.

5 ASI 8.80 – Vermeidung von Bäckerasthma (avoidance of baker's asthma; bakeries – efficient and safe management; sectoral guide for good work organization), 2014 edition

6 TRGS 406 – Sensibilisierende Stoffe für Atemwege (Technical rule for hazardous substances – Substances with a sensitizing effect upon the respiratory tract), June 2008 edition

5 Hazardous substances

According to Article 20 paragraph 4 of the German Hazardous Substances Ordinance (GefStoffV) no occupational exposure limit for flour dust has been announced. However, according to the technical rule for hazardous substances 907 (TRGS 907)⁷, flour dust is sensitizing to the respiratory tract. The rule states that up to now occupational exposure limits which are toxicologically justified can be stated neither for the induction of an allergy (sensitization), nor for the triggering of an allergic reaction for a sensitized individual. The higher the concentration of an allergen during exposure is, the greater the risk of sensitization must be assumed, see also the technical rule for hazardous substances 900 (TRGS 900)⁸ number 2.8 concerning occupational exposure limits and sensitizing substance.

6 Exposure to flour dust

6.1 Exposure measurements

A total of 109 personal sampling measurements of the inhalable fraction were performed between 2009 and 2014 in the production areas of 81 bakeries (mostly craft-bakeries). In accordance with the technical rule for hazardous substances 402 (TRGS 402)⁹, the measurements were performed over an entire shift, primarily in dough areas, where dough mixing, shaping and dusting took place. These tasks are those in which the highest exposures to flour dust are expected.

The basic measures relevant to flour dust in accordance with the Work Safety Information 8.80 were implemented in all the companies concerned.

6.2 Results and interpretation

The results of the personal sampling (mean shift values) are shown in Table 1:

Table 1: Results of measurements of flour dust in bakeries (inhalable fraction, mean shift values)

Type of exposure measurement	n	50th percentile (mg/m ³)	75th percentile (mg/m ³)	95th percentile (mg/m ³)
personal sampling	109	1,9	2,7	3,5

The measurement results show that in all bakeries using the latest methods of good working practice and engineering control for minimizing flour dust, the concentration of flour dust could be reduced to less than 3.5 mg/m³ (95th percentile).

7 TRGS 907 (Technical rule for hazardous substances – Index of sensitizing substances and of tasks involving sensitizing substances), November 2011 edition

8 TRGS 900 (Technical rule for hazardous substances – Occupational exposure limits), January 2006 edition

9 TRGS 402 (Technical rule for hazardous substances – Identification and assessment of hazards associated with tasks involving hazardous substances: inhalative exposure), February 2010 edition