

7 Workplace

It is essential that indoor workplaces correspond with the needs and attributes of the people who work in them. Otherwise, both the workplace design and the work equipment used can prompt complaints from employees. The following section gives advice on how to investigate and assess workplace design and the work equipment selected, including laser printers/copiers and display screen equipment.

7.1 Workplace design

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The Arbeitsstättenverordnung (Ordinance on Workplaces) [1], particularly its annex, and the Technical Rules for Workplaces [2] specify key requirements concerning the design of indoor workplaces.

The Bildschirmarbeitsverordnung (Ordinance on Display Screen Work) [3] sets out the general health and safety requirements for work using display screen equipment, transposing the European Display Screen Directive [4] into national law for the Federal Republic of Germany. DGUV Information 215-410, formerly BGI 650 “Bildschirm- und Büroarbeitsplätze” (Display screen and office workstations) [5] defines the ordinance’s requirements in more detail. As a general rule, people who work with display screen equipment (DSE) should be offered regular eye and eyesight tests, carried out by a person with the necessary capabilities (DGUV Principle G37 [6]). The German statutory accident insurance institutions have also published various brochures [7 to 16] providing information and guidance on specific topics in the area of office workplace design.

7.1.1 Investigation and assessment of the workplace

A special questionnaire, S7, dealing with workplace environment and work equipment, is available on the internet (www.dguv.de, webcode e650356). It was developed on the basis of the above-mentioned DGUV directives, ordinances and informative publications on office workplace design. The questionnaire can be used to investigate whether particular health complaints can be attributed to non-ergonomic workplace design.

The S7 questionnaire does not include lighting, noise or indoor climate because they are covered at length in Section 6.3 and in Chapters 8 and 9. Occupational safety aspects, such as prevention of tripping hazards, are also not included.

Some of the questions on the questionnaire indicate potential solutions. For instance, the questions concerning furniture, hardware, software and positioning of work equipment give guidance on workplace design.

7.1.2 Reduction of musculoskeletal strain

The following recommendations are intended to help reduce musculoskeletal strain:

- the strain caused by poor or uneven posture (e.g. twisted posture or prolonged periods in a seated position) or repetitive movements (e.g. prolonged use of a keyboard) should be reduced by shortening the period spent on such activities. This can be done by combining different tasks, giving the employee additional tasks or ensuring sufficient breaks;
- favourable posture and changes in posture should be promoted by ensuring individually adjustable and ergonomic workstations.

7.1.3 References

- [1] Verordnung über Arbeitsstätten (Arbeitsstättenverordnung – ArbStättV) vom 12. August 2004. BGBl. I (2004), p. 2179-2189; last revision BGBl. I (2010), p. 960-967
- [2] Technische Regeln für Arbeitsstätten. Published by: Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA), Dortmund. <http://www.baua.de/de/Themen-von-A-Z/Arbeitsstaetten/ASR/ASR.html>
- [3] Verordnung über Sicherheit und Gesundheitsschutz bei der Arbeit an Bildschirmgeräten (Bildschirmarbeitsverordnung – BildscharbV) vom 4. Dezember 1996. BGBl. I (1996), p. 1843-1845; last revision BGBl. I (2008), S. 2768
- [4] Council Directive 90/270/EEC of 29 May 1990 on the minimum safety and health requirements for work with display screen equipment (fifth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC. OJ EC No. L 156 (1990), p. 14; revision by Directive 2007/30/EC, OJ EC No. L 165 (2007), p. 21
- [5] DGUV Information 215-410: Bildschirm- und Büroarbeitsplätze – Leitfaden für die Gestaltung (formerly BGI 650). Published by: Verwaltungs-Berufsgenossenschaft, Hamburg 2012
- [6] DGUV Information 250-007: DGUV-Grundsatz für arbeitsmedizinische Vorsorgeuntersuchungen „Bildschirmarbeitsplätze“ G 37 (mit Kommentar) (formerly BGI 785). Published by: Verwaltungs-Berufsgenossenschaft, Hamburg 2015
- [7] DGUV Information 215-441: Büroraumplanung – Hilfen für das systematische Planen und Gestalten von Büros (formerly BGI 5050). Published by: Verwaltungs-Berufsgenossenschaft, Hamburg 2009

- [8] DGUV Information 215-444: Sonnenschutz im Büro – Hilfen für die Auswahl von geeigneten Blend- und Wärmeschutzvorrichtungen an Bildschirm- und Büroarbeitsplätzen (formerly BGI 827). Published by: Verwaltungs-Berufsgenossenschaft, Hamburg 2005
- [9] DGUV Information 215-442: Beleuchtung im Büro; Hilfen für die Planung der künstlichen Beleuchtung von Räumen mit Bildschirm und Büroarbeitsplätzen (formerly BGI 856). Published by: Verwaltungs-Berufsgenossenschaft, Hamburg 2009
- [10] DGUV Information 215-421: Laserdrucker – sicher betreiben (formerly BGI 820). Published by: Verwaltungs-Berufsgenossenschaft, Hamburg 2008
- [11] DGUV Information 215-520: Klima im Büro – Antworten auf die häufigsten Fragen (formerly BGI 7004). Published by: Deutsche Gesetzliche Unfallversicherung, Sankt Augustin 2007. Carl Heymanns, Köln 2007
- [12] DGUV Information 215-443: Akustik im Büro – Hilfen für die akustische Gestaltung von Büros (formerly BGI/GUV-I 5141). Published by: Verwaltungs-Berufsgenossenschaft, Hamburg 2012
- [13] Berufsgenossenschaftliche Informationen: Nutzungsqualität von Software – Grundlegende Informationen zum Einsatz von Software in Arbeitssystemen (BGI 852-1). Published by: Verwaltungs-Berufsgenossenschaft, Hamburg 2003
- [14] Berufsgenossenschaftliche Informationen: Management und Software – Arbeitshilfen zur Erhöhung der Nutzungsqualität von Software im Arbeitssystem (BGI 852-2). Published by: Verwaltungs-Berufsgenossenschaft, Hamburg 2003
- [15] Berufsgenossenschaftliche Informationen: Einrichten von Software – Leitfaden und Check für Benutzer (BGI 852-3). Published by: Verwaltungs-Berufsgenossenschaft, Hamburg 2003
- [16] Berufsgenossenschaftliche Informationen: Software – Kauf und Pflichtenheft – Leitfaden und Arbeitshilfen für Kauf, Entwicklung und Beurteilung von Software (BGI 852-4). Published by: Verwaltungs-Berufsgenossenschaft, Hamburg 2003

7.2 Laser printers and copiers

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Laser printers and copiers have become an indispensable part of modern office life, used by millions of people every day. However, reports of potential health hazards due to laser printers purportedly causing exposure to toner dust have provoked public concern on more than one occasion. It was this concern that, more than a decade ago, prompted the Institut für Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung (IFA; Institute for Occupational Safety and Health of the German Social Accident Insurance, formerly known as BGIA) to conduct numerous projects on this topic in cooperation with the Verwaltungs-Berufsgenossenschaft (VBG; German Social Accident Insurance Institution for the administrative sector). The aim of this work was to identify the emissions released by laser printers and copiers and to assess whether they were potentially harmful to health [1 to 3]. In addition to the IFA's activities in this field, the Landesgewerbeanstalt Bayern (LGA Bayern; Bavarian state trade agency) emission-tested various devices and toners between 2000 and 2007 [4]. The findings of this research remain valid today since printer technology has not undergone any significant change since then. They show that laser printers and copiers do not emit significant amounts of dust or gas (see the sections on the individual substance categories).

In the interests of environmental and user protection, the “Environmental Label Jury” has developed award criteria, referred to as RAL-UZ 122 [5] and RAL-UZ 171 [6], for office equipment that has a print function (printers, copiers and multifunctional devices (MFDs)) (Figure 7). As well as general requirements, e.g. recyclability and power consumption, and toner substance requirements, a major part of the awarding process involves emission testing. Chamber tests are carried out to determine the quantities of dust, ultrafine particles (UFPs), ozone, TVOCs, benzene and styrene emitted. The emissions are assessed on the basis of the current guideline values for environmental or indoor emissions, which are far lower than the applicable occupational exposure limits (OELs).

Generally speaking, the equipment is only tested in combination with the toner and paper sold for the specific device in question. In practice, however, the toner used often comes from a different manufacturer or in a recycled toner cartridge and has not been tested in conjunction with the device. The former Fachausschuss Verwaltung (Expert Committee for the Administrative Sector) has therefore created an additional DGUV Test certification mark for toner powder, which indicates that the product has been pollutant-tested (Figure 8) [7]. The intention is that this will assist buyers of toner cartridges when judging quality and comparing products. Toners bearing this mark meet strict requirements concerning the metals, volatile organic compounds and other substances they contain as well as particle size.