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Introduction

This brochure from BG Verkehr is aimed at company management and occupational physicians and is intended to support them in the implementation of their respective duties and tasks arising from national occupational safety and health regulations, accident prevention regulations, and other standards or regulations. Aeromedical Examiners (AME) are also addressed in order to supplement medical fitness issues with prophylactic elements. National standards for the concretisation of statutory occupational health and safety regulations must always be given priority.

This brochure shows ways in which accidents at work, occupational diseases, and work-related health risks can be prevented. According to the German 'Accident prevention regulation. Occupational physicians and OSH professionals (DGUV Regulation 2)', companies must appoint occupational physicians in order to fulfil the tasks specified in the German Occupational Safety Act (ASiG). For these tasks, the occupational physicians in aviation companies have basic service time available – which is calculated based on the number of employees – as well as company-specific time to fulfil other permanent or temporary tasks in accordance with risk assessment. The provision of occupational medical prophylaxis on the basis of the German Ordinance on Preventive Occupational Health Care (ArbMedVV) is part of the spectrum of company-specific working hours. In addition to the formal requirements specified in ArbMedVV, the tasks of occupational physicians require industry-specific knowledge as well as precise knowledge of the special stresses and requirements at the workplaces of the company in question (see Chapter 5 'Qualification').

Medical examinations in accordance with aviation law do not represent primary occupational medical prophylaxis. These examinations are aptitude tests and cannot replace comprehensive occupational physician care.

Qualified occupational medical prophylaxis is a prerequisite for the consultation of employers and employees required by the German ASiG, but the insured person's right to self-determination with regard to information must not be restricted either by the precautionary measures or by the physician's consultation duties. In this brochure, special consideration is given to the physiological aspects of flying when describing activities and stresses as well as occupational medical consultation and prophylaxis, including the medical examination methods used. Even if not specifically noted for all occupational medical criteria, all the recommendations given in connection with identified health restrictions are aimed exclusively at preventing the development or aggravation of existing health problems. References in the text to performance or fitness for work are also to be understood in this sense. Statements on health effects are also applicable to the examination under aviation law.

The described prophylaxis is an 'elective' event within the meaning of the ArbMedVV unless the criteria for recommended or compulsory prophylaxis are also met in individual cases.

This brochure was compiled on the basis of the previous publications that were developed in collaboration with representatives of the German Society for Occupational Medicine and Environmental Medicine, the German Society for Aerospace Medicine, the German Association of Company Doctors, German Lufthansa (Medical Service), the German Air Line Pilots' Association, the German Federal Armed Forces, and individual occupational physicians and aviation medical experts. It has been adapted to the current legal situation in Germany and has been professionally updated.

1 Foundations

Like all employers, aviation companies in Germany are subject to the German Occupational Safety Act (ASiG), the German Act on the Implementation of Measures of Occupational Safety and Health (ArbSchG), and all regulations based on these acts as well as the relevant accident prevention regulations (UVV).

In order to organise occupational safety and health efficiently, employers must carry out a risk assessment at all workplaces in their company (§§ 3–6 ArbSchG). The expert advice provided by the occupational physician and the occupational safety specialist corresponds with the employer's comprehensive and up-to-date risk assessment. All necessary occupational safety and health measures – such as technical and medical measures, the provision of PPE (personal protective equipment), and the obligation to offer vaccinations – are derived from the risk assessment, which shall take into account the relevant occupational safety and health regulations. Occupational medical prophylaxis measures are carried out on the basis of ArbMedVV.

Due to the frequency and scope of the examinations required under aviation law, flying personnel in commercial air traffic are among the occupational groups that receive the best medical care. Even if medical action fundamentally considers the whole person and their integration into their social environment, different objectives must be taken into account. Aero-medical examinations under transportation law – for example, in accordance with EU Regulation Aircrew (EU Reg 1178 / 2011) – are aptitude medical examinations that the legislator uses to ensure that the applicant is able to carry out the activity in question or to determine whether a health restriction poses a risk to the general public or to air traffic or whether such a restriction could become a risk. The legislator's aim of protection in transportation medical issues is therefore not identical to that of occupational medical prophylaxis. Accordingly, while the protection of third parties dominates the issue of transportation medical examinations, the goal of occupational medical prophylaxis is prevention. Occupational medical prophylaxis focuses on the interaction between the activity and the employee and

thus on any work-related health risks that may exist. Possible work-related health disorders should be recognised at an early stage, or their development should be prevented.

The risk assessment is also the most important foundation for occupational medical prophylaxis for flying personnel. ArbMedVV specifies the activities or risks for which the employer must arrange occupational medical prophylaxis measures for their employees as compulsory prophylaxis or offer these measures as recommended prophylaxis. The respective activities or risks are exhaustively listed in the annex of ArbMedVV. This appendix is part of ArbMedVV. If the 'particularly dangerous activities' listed in the annex to ArbMedVV are present at an employee's workplace, the required occupational medical prophylaxis is a prerequisite for the activity. A special position is occupied by 'medical supervision' in the event of exposure to ionising radiation, and this examination must be carried out in accordance with the Radiation Protection Ordinance.

Notwithstanding the above-mentioned obligation, employees also have the option of receiving occupational medical prophylaxis at their own request ('elective prophylaxis') in accordance with ArbMedVV (see also § 11 ArbSchG) unless a health risk can be ruled out on the basis of an assessment of the working conditions and the protective measures taken.

All occupational medical prophylaxis measures (see Table 1) should be carried out by the company's appointed occupational physician (see Chapter 5) because an occupational medical assessment and the consultation of employees generally require knowledge of the individual workplace conditions and the associated stresses.

Occupational medical prophylaxis may only be carried out by specialists in occupational medicine or by physicians with the additional qualification of 'Occupational Medicine' (and, in the case of work abroad under special climatic conditions, by physicians with the additional qualification of 'Tropical Medicine'). The occupational physician may consult other physicians (see also Chapter 5). For the examination as part of the prophylaxis and the subsequent consultation, the current state of occupational medicine must be taken into account (§ 4 ArbSchG and § 6 ArbMedVV), which is laid down, for example, in the occupational medical rules (AMR). The 'DGUV Recommen-

dations for Occupational Medical Consultations and Examinations' also support the operational implementation of ArbMedVV in this sense.

The following decision path applies to the allocation of activities or risks to the various categories of occupational medical prophylaxis:

Figure 1: Decision path in accordance with ArbMedVV

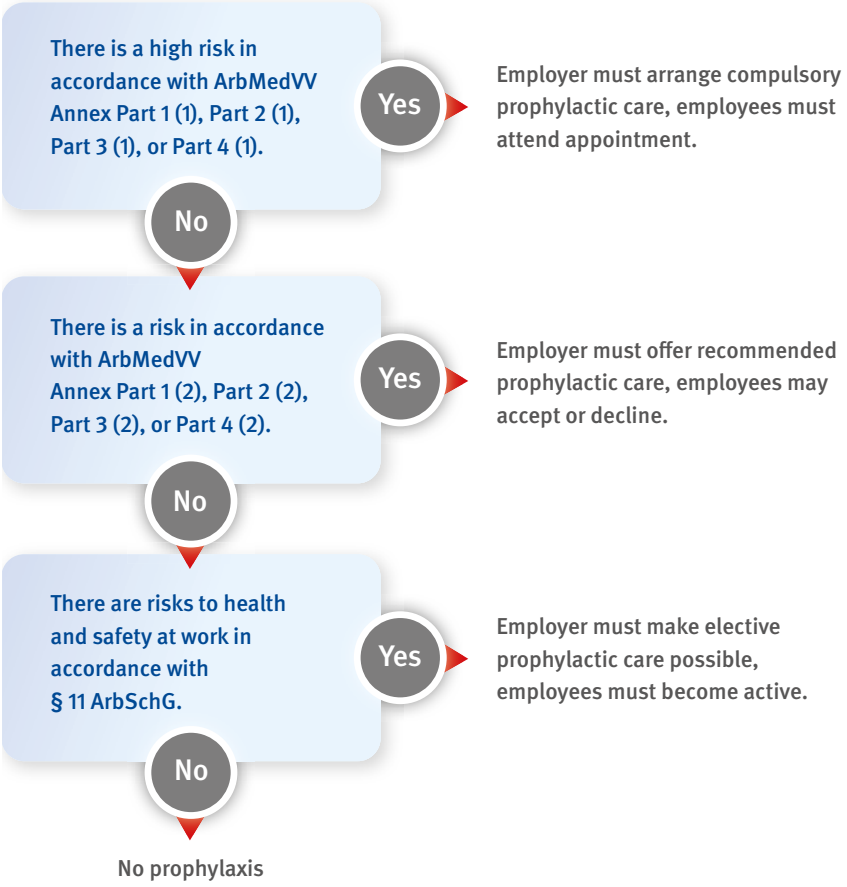

Table 1: Overview of possible examinations and occupational medical prophylaxis in connection with the activities and risks of flying personnel

Activity / risk (chapter)	Examination interval
Aircraft pilot	12 months, 6 months in cases pursuant to MED.A.045 a) (2)
Flight attendant	Maximum 60 months
Ionising radiation (Chapter 2.6)	Maximum 1 year
Noise (Chapter 2.1)	In accordance with AMR 2.1[1]
Visual display units (Chapters 2.2, 2.12)	In accordance with AMR 2.1[1]
Driving, steering, inspection activities (Chapter 2.2)	
Respiratory protective device wearer (Chapter 2.3)	In accordance with AMR 2.1[1]
Working under pressure (Chapter 2.4.2)	Yearly
Working abroad under particular climatic or health conditions (Chapter 2.5)	In accordance with AMR 2.1[1]
Night work and shift work (Chapter 2.10)	‹ 50 years of age: no less than 3 years, › 50 years of age: annually

1 First prophylaxis within three months before starting work,second prophylaxis after 12 months at the latest, any further prophylaxis after 36 months at the latest.

	ArbMedVV			Examination in accordance with other legal foundations
	Compulsory prophylaxis	Recommended prophylaxis	Elective prophylaxis	
				Aviation Personnel Ordinance (LuftPersV) in conjunction with EU Regulation 1178/2011 (Part MED) and ED Decision 2019/002R (EASA) Subpart B
				LuftPersV in conjunction with EU Regulation 1178/2011 (Part MED) in conjunction with ED Decision 2019/002R (EASA) Subpart C
				§ 77 StrSchV
	≥ 85 dB(A)	≥ 80 < 85 dB(A)	Possible	
	No	Yes	Possible	
	No	No	Possible	If applicable, according to individual or collective agreements
	Device Grp 2/3 in accordance with AMR 14.2	Device Grp 1 in accordance with AMR 14.2	Possible	Possible depending on the activity, e.g. UVV 'Fire Brigades' (DGUV Regulation 49)
				DruckLV § 10
	Yes	After completing the activity	Possible, § 2 (4) in conjunction with § 5a	
	No	For night work within the scope of the ArbZG	Possible	§ 6 (3) ArbZG

2 Activities and Risks

The nature and scope of the activities of the flying personnel can lead to risks, particularly due to the factors outlined below.

2.1 Noise

2.1.1 Determining noise exposure

The noise exposure of an employee results from the summation of all noise events that occur in the course of a representative working day as the average level $L_{pAeq,T}$. This level averaged over working time T is then calculated (normalised) over eight hours and yields the daily noise exposure level $L_{EX,8h}$, which is used to assess noise exposure. If the noise exposure varies from day to day, the representative working day can be defined by analysing the work situation over several days.

Depending on the level of the noise, protective measures may have to be taken, which are specified in the Ordinance on Noise and Vibration Protection (LärmVibrationsArbSchV), the Technical Rules on the Ordinance on Noise and Vibration Protection, and ArbMedVV.

When determining the daily noise exposure level, the attenuation effect of any hearing protection device or headset used is not taken into account. In addition, for pilots, the sound impact on the ear from the headset is also taken into account because the noise level of radiotelephone communication can be higher than the noise level of the cockpit.

Noise exposure is expertly determined in accordance with DIN EN ISO 9612.

2.1.2 Noise exposure of cabin crew

Investigations by BG Verkehr have shown that the time-averaged cabin level $L_{pAeq,T}$ (off-blocks to on-blocks) is an acceptable approximation for

determining the daily noise exposure level $L_{EX,8h}$ if daily flight times of less than eight hours are to be expected.

Some activities in a noisy environment, such as during the stay on the apron on the way from the crew bus to the aircraft, are usually in the minute range. This means that these activities have only a minor impact on the daily noise level provided that a noise exposure level of approx. 90 dB(A) is not exceeded. Nevertheless, the use of hearing protection is strongly recommended. In particular, hearing protection must not be omitted during outside checks or walkarounds. The use of hearing protection is mandatory on the apron in any case as this is a noisy area.

For the aircraft types currently in use with passenger service via cabin crew, average noise levels in the cabin of just under 80 dB(A) to ‹ 85 dB(A) can be assumed when taking into account not only the operating noise generated by the aircraft, but also the working noise (e.g. the closing of baggage compartment flaps, the operation of trolley brakes, the operation of kitchen equipment, etc.). As a rule, the assessment of the noise risk for the daily noise exposure level must therefore be based on the assumption that the lower trigger value is exceeded (for the necessary measures, see LärmVibrationsArbSchV and the Technical Rules on Noise).

If there is any doubt about the extent of the exposure, the employer must determine the noise exposure and, if no reliable cadastral values are available, arrange for measurements to be taken. This is the case, for example,

- if the aircraft equipment differs significantly from the standard type (special technical features),
- if it is assumed that the noise level is below the lower trigger value (‹ 80 dB(A); see also LärmVibrationsArbSchV, Section 3) and prophylactic measures are not required (e.g. very quiet aircraft type or, without exception, very short flight times of ≤ 2.5 h), and
- for long-haul flights with flight times of more than 8 hours or for operationally necessary longer stays on the apron, such as the inspection of baggage loading (special organisational reasons).

With significantly longer exposure times [T_F], the upper trigger value can be exceeded even with average noise exposure. The increased risk due to longer exposure times results from the equation $L_{EX,8h} = L_{pAeq,T} + 10 \lg (T_F/8h)$.

In principle, the employer is obliged to take technical measures as a matter of priority if the upper trigger values ($L_{EX,8h}$ = 85 dB(A) or L_{pC},peak = 137dB (C); LärmVibrationsArbSchV, Section 3, § 6) are reached or exceeded. Although the operator of an aircraft is subject to strict limits in this area, consultation with the manufacturer should always take place, preferably before procurement. The retrofitting of noise-reducing equipment must also be considered. An example for organisational measures to reduce noise exposure is the intelligent planning of crew duty times.

When selecting hearing protection, it must be demonstrated that acoustic warning signals can still be heard and that flight attendants can communicate with one another and with cockpit personnel. Depending on the risk assessment, this can be achieved, for example, by selecting low-attenuation earplugs or earmoulds with flat attenuation (for good speech intelligibility). If the upper exposure trigger value is exceeded, the hearing protection must be used throughout the flight but can be removed for a short time during communication with passengers if there are speech intelligibility problems.

Summary: As a rule, it can be assumed that the lower exposure trigger value is exceeded, and hearing protection must be provided. Occupational medical prophylaxis must be offered before starting work and at regular intervals thereafter. Deviations require proof by measurement.

2.1.3 Noise exposure of cockpit personnel

Cockpit personnel have the special requirement to communicate via headset. Although these headsets can have a protective effect in individual cases, headsets are communication devices and not personal protective equipment as defined by the ‘EU Regulation on Personal Protective

Equipment' (Regulation (EU) 2016 / 425). Heavy headsets for helicopter pilots can be cited here as an example. As the specified attenuation values of headsets are not regularly determined in accordance with the PPE standard, expert advice is required when selecting headsets.

Not only is the volume level at the ear determined by the cockpit level minus the attenuation effect of the headset, but it also depends on the volume setting of the radio communication system. No maximum levels are specified here – as for personal protective equipment, for example – because in the event of poor radio quality or in critical flight situations, the pilot must be able to readjust the volume level so that communication and thus flight safety are guaranteed at all times. The radio volume level should be set by the pilot in such a way that the lowest possible level is achieved at the ear while still ensuring good speech intelligibility.

Particularly with so-called 'open headsets' (with open-cell foam padding), the volume level of the headset must be set at least 6 dB (averaged) above the ambient noise level in order to ensure sufficient intelligibility of the radio communication. This value may be even higher in the case of hearing impairment, unsuitable headsets, or incorrect use (e.g. one-sided placement), and it may be lower when using headsets with active noise reduction (ANR).

Reaching the upper trigger value (i.e. a daily noise exposure level of ≥ 85 dB(A)) and thereby fulfilling the selection criteria must be assumed (if necessary, until proven otherwise) in aircraft with typically high noise exposure (e.g. helicopters, turboprop, aircraft types with piston engines).

Even in the cockpits of jet aircraft, radio communication can raise the volume level at the ear above the indicated limit if open headsets are used.

Unless refuted by measurements, it is assumed that the upper trigger threshold is exceeded, thus requiring occupational medical prophylaxis and the examination of further technical and organisational measures for the following areas of use:

- Helicopter: more than 10 hours in a typical week
- Turboprop / piston engines
  more than 15 hours in a typical week
- Jets with an average cockpit noise level above 82 dB(A) when using headsets with open-cell foam ear pads[2]: more than 20 hours in a typical week

Secondary activities in the noise zone are also important for determining the daily noise exposure level.

2.1.4 Measures for reducing noise exposure

Hearing protection must always be used when on the apron, for example, during the outside check (noise zone).

The following points must be observed with regard to the quality of the radio communication equipment or headset:

- Helicopters, older turboprop aircraft, and small aircraft: headsets with ear-enclosing, highly attenuating capsules, preferably with ANR
- Jets, newer turboprop aircraft: at cockpit levels of approx. 74–84 dB(A), closed supra-aural (over-the-ear) headsets instead of open systems, preferably with ANR (a moderate attenuation effect and therefore low radio communication volume levels can be set)
- Radio communication system: separately adjustable volume for pilot and co-pilot

If the pilot and co-pilot communicate via the hotmike function and the headset microphones are set to 'permanently open', there is a risk of the radio volume being set too high due to the higher background noise level (imported via the microphone). Radio equipment and/or headsets should be designed in such a way that in the event of interference (e.g. induced voltage peaks), no acoustic peak levels above 137 dB(C) are generated (peak limiter).

[2] The primary issue here is not the attenuation effect of the hearing protection or the headset against the ambient noise (which is irrelevant for the indication of occupational prophylaxis relating to 'noise'), but the fact that without attenuation or noise reduction, the radiotelephone communication is set too loud. The headset should correspond to the state of the art, regardless of the noise risk.

2.2 Driving, steering, and inspection activities

All tasks in the cockpit are undoubtedly control or inspection activities, even if aeronautical activities are not explicitly listed in the 'DGUV Recommendations for Occupational Medical Consultations and Examinations'. However, it makes sense to apply the recommendations because, for example, the occupational medicine–relevant aspects of vision are covered. The recommendations also provide an algorithm for diagnosing sleep apnoea or daytime sleepiness of other causes.

At the request of employees whose workplace is characterised by driving, steering, or inspection activities, occupational medical prophylaxis must be made possible (elective prophylaxis in accordance with § 2 (4) in conjunction with § 5a ArbMedVV).

2.3 Respiratory protective devices

Respiratory protective devices place a burden on their wearers due to their weight and possibly also due to increased breathing resistance (over 5 mbar). Occupational medical prophylaxis can be omitted if respiratory protective devices are used only for self-rescue or have negligible breathing resistance (e.g. in a simulator), or if the masks are used only as an emergency measure in the event of a sudden drop in pressure until the aircraft reaches an altitude of below 10,000 ft.

Consideration within the scope of occupational medical prophylaxis is necessary if, for example, certain flight routes or procedures (e.g. crossing the Himalayas) require the pilot to fly wearing a respiratory mask. The mask then has the character of personal protective equipment (PPE). It is therefore necessary to check in these cases whether there is a risk that requires occupational medical prophylaxis as an obligation or an option.

If smoke masks are used during fire-fighting exercises, it is necessary to check whether the criteria for occupational medical prophylaxis have been met depending on the type of equipment used. In this context, special occupational medical attention must be paid to fire-fighting instructors as this group may be exposed to frequent or prolonged exposure through the use of masks.

In times of special protection against infection, the regular wearing of particle-filtering half masks (FFP1–3) must be regulated by the employer. Occupational medical prophylaxis must be offered because these masks fall into Device Group 1.

2.4 Changes in pressure

2.4.1 Changes in pressure due to regular flight operations

Flying personnel are exposed to changes in atmospheric pressure and to the associated altitude-related physiological stresses as a result of their work. In aircraft with pressurised cabins, the cabin pressure is significantly higher than the ambient atmospheric pressure but lower than at ground level.

At altitudes below 3,000 ft (above sea level), there is no risk of changes in pressure. However, if there is a sudden drop in pressure at the usual cruising altitudes, which is a rare but nevertheless typical operational incident that aircraft crews must expect, pressure changes of 50 kPa (0.5 bar) and more can occur.

The reduced pressure inside the aircraft cabin, which is already more than 20 kPa (0.2 bar) at normal flight altitudes compared with at ground level, also plays a role.

Changes in altitude, for example, during a rapid descent, change the pressure conditions. This can lead to discomfort in the area of air-filled cavities in the body. The swelling of the mucous membranes at the entrances to the cavities of the upper respiratory tract leads to a ventilation mechanism in which the expanding air can escape during ascent, but during descent, there is negative pressure in the affected cavities. The descent is therefore often more uncomfortable than the ascent. Decongestant nasal spray and careful (!) Valsalva manoeuvres are considered helpful measures for reducing acute discomfort.

Infections of the upper respiratory tract or allergic rhinitis or sinusitis are therefore frequent causes of the incapacity to work among flying personnel. The lack of pressure equalisation in the air-filled cavities of the skull can lead to severe headaches and earaches. This can also apply to the middle ear if the Eustachian tube (tuba auditiva), which provides the connection to the nasopharynx, is blocked by an infection with swelling of the mucous membrane or is obstructed by mucus masses. Severe ear pain with tympanic cavity effusion and even rupture of the eardrum or interruption of the ossicular chain can result in those affected. Particularly during ascent and occasionally also during descent, caries profunda of the teeth in teeth with pulp necrosis with gangrene can lead to severe, acute toothache (aerodontalgia) due to gas pockets caused by decay.

In addition to these temporary health problems, permanent structural changes in the ENT area can also be the cause of the occurrence of sometimes-serious barotraumatic complications. In the nasal region, these include significant bending of the septum, severe enlargement of the conchae (either vasomotoric or allergic), polyps with obstruction of the sinus ducts leading into the nasal cavity, and chronic swelling of the mucous membrane. The involvement of ENT specialist expertise is absolutely essential here. This also applies after hearing-improving operations on the eardrum and the ossicular chain (as a result of sound conduction disorders).

A mild eardrum defect or one that has been surgically removed without consequences (stable tympanoplasty) is just as unproblematic as a tympanostomy tube. The prosthetic replacement of the entire ossicular chain or parts of it is critical in terms of occupational medicine and also regularly leads to unfitness for flying activities. If a violent Valsalva manoeuvre is performed, for example, during a landing approach, the round window of the cochlea may be perforated, and perilymph may leak out (barotrauma of the inner ear), which is accompanied by acute inner ear hearing loss, tinnitus, and nystagmus as well as by rotatory vertigo with nausea and possible vomiting (vestibular symptoms).

To prevent barotraumas in the ENT area, the following examinations are therefore useful:

- Otoscopy with Valsalva pressure test to check the tube pressure equalisation function between the nasopharynx and the middle ear cavity
- Anterior rhinoscopy with the nasal speculum to rule out significant conchal hyperplasia, massive septal deviation, or obstructive nasal polyps
- Blowing the nose right and left, which helps to rule out nasal obstruction, even with difficult mask breathing

Even if the examination findings are unproblematic in this respect, the possibility of the occurrence of temporary pressure equalisation problems should always be pointed out in the case of acute nasopharyngeal infections or allergic rhinitis.

In addition, a rough examination of the dental status is always indicated in order to prevent the development of very painful aerodontalgia.

Finally, as part of a practice-orientated anamnesis survey, it is obligatory to ask about previous ossicular replacement surgery in order to reduce the risk of developing an inner ear barotrauma.

In the event of uncertainty or problematic clinical findings, a specialist medical or dental assessment is required. However, the final assessment is always the responsibility of the occupational physician or aviation physician.

2.4.2 Changes in pressure due to technical measures

Overpressurisation of the cabin is used on ground level to check the tightness of the doors. The pressure generated is around 1 kPa (0.01 bar). This does not formally fulfil the criteria for the application of the Regulations on Work in Compressed Air.

However, cabin pressure tests on the ground with pressure differences › 0.1 bar fall under the provisions of the Regulations on Work in Compressed Air (DruckLV). If individuals must be present in the cabin in these cases, an occupational medical examination is mandatory (§ 10 DruckLV). § 13 of the DruckLV requires official qualification to carry out these examinations.

Based on the risk assessment, however, the contents of the DGUV recommendations on 'overpressurisation' can be adapted to the risks of the workplace of affected aircraft crews.

Exposure to intermittent altitude-dependent mild hypoxia is not covered by these recommendations and should be considered separately as part of occupational medical prophylaxis.

2.5 Hygiene, infectious diseases, working abroad, climate

Through their work, flying personnel come into close contact with passengers with an unknown infection status and are exposed to particular risks of infection depending on their range of duties abroad. Even if the risk can be reduced through the careful selection of crew hotels and risk-appropriate behaviour, no one can escape the specific risks of infection or the climatic conditions at the respective destination.

ArbMedVV requires compulsory prophylaxis when working in the tropics, subtropics, and other foreign countries with special climatic conditions and infection risks. This means that crew members on long-haul flights must at least receive a consultation when travelling to countries between 30° north and 30° south latitude, even if the individual assessment of the regional conditions (risk assessment) already requires a specific consultation. Prophylaxis must be offered after completion of the activity.

The risk assessment may result in recommendations for the implementation of vaccinations or drug prophylaxis. The STIKO (Standing Commission on Vaccination) recommendations contain corresponding information on this subject. If the risk of infection is work-related and is higher than that among the general population, a vaccination offer is part of the prophylaxis, and the vaccination must be covered by the employer as an occupational safety and health measure (§ 6 (2) ArbMedVV).

In times of special infection situations (e.g. pandemics, epidemics), the particular risk of infection is not limited to tropical destinations. In this case, an individual assessment and appropriate consultation services are required independently of ArbMedVV. In special infection situations, the supplementary publications of government agencies and statutory accident insurance organisations are an important source of information.

As natural UV radiation also plays a role, AMR 13.3 must also be followed, which recommends prophylaxis.

2.6 Ionising radiation

The cosmic radiation to which flying personnel are unavoidably exposed is internationally specified at an effective dose of an additional › 1 up to 8 mSv per calendar year depending on the range of operations (high dose rate only for long-haul flights determined by latitude and altitude). The dose rate depends on the cumulative flight time, the flight altitude, the flight routes, and solar activity.

This fulfils the requirements for the obligation to determine the body's dose in accordance with § 64 StrlSchV because it must be assumed that the effective dose of cosmic radiation for flying personnel in commercial aircraft exceeds 1 mSv per calendar year. If no measurements are taken, the dose must be determined using a calculation programme (§ 50 StrlSchG), and this is generally done.

As a rule, flying personnel shall be categorised as occupationally exposed individuals in Category B in accordance with § 71 (2) StrSchV (› 1 mSv per calendar year). Classification in Category A requires exposure that can exceed 6 mSv in a calendar year. This cannot be ruled out, for example, in the case of very many flights over polar routes, but solar activity also has a significant influence. § 77 StrSchV requires the annual examination of personnel in Category A. The competent authority can order further examinations. A special qualification in accordance with § 175 StrlSchV is required for medical supervision and necessary examinations.

Flying personnel are the occupational group with the highest occupationally acquired radiation exposure. Nevertheless, lifetime dose values of up to an effective dose of 150 mSv are still in the low-dose range. In line with several comprehensive studies, BG Verkehr has not been able to demonstrate any increased risk of damage to health caused by cosmic radiation to which flying personnel are exposed in the course of their working lives.

2.7 Whole-body vibrations, seat ergonomics

Vibrations occur in all aircraft, especially in rotary-wing aircraft. Whole-body vibrations as well as forced body and sitting postures (e.g. due to the arrangement of control elements in the aircraft) can cause acute and/or chronic musculoskeletal issues. As a rule, as far as is currently known, aircraft do not reach vibration values for the longitudinal axis of the body that are likely to cause damage to the spinal column or its structures. Under special operating conditions, however, it is possible for threshold values to be exceeded in individual cases. The expected vibrations can also exacerbate muscular complaints due to an unergonomic sitting posture and an unfavourable arrangement of controls, and these vibrations are therefore important in occupational medical prophylaxis. Typical examples include an unfavourable sitting posture (e.g. twisted, strongly bent, or sideways leaning) in a helicopter, for example, when checking suspended loads.

According to ArbMedVV, occupational medical prophylaxis must be arranged by the employer as compulsory prophylaxis depending on whether the threshold values specified there (1.15 m/s^2 in the X or Y direction, or 0.8 m/s^2 in the Z direction) have been reached or exceeded, in which case, this is a job requirement, or the occupational medical prophylaxis must be offered from 0.5 m/s^2. This value was not reached in any of the aircraft we tested.

External loads can unfavourably change vibration behaviour. Measurements may therefore be necessary.

Working with helicopters always requires the consideration of the often-unfavourable posture in the prophylaxis measures.

2.8 Strain on the musculoskeletal system

Unfavourable working conditions, such as suboptimal break management, prolonged standing and walking, and wearing shoes with high heels, as well as manual load handling can lead to musculoskeletal complaints in flight attendants. In particular, loading and moving the trolleys in an occasionally unergonomic posture and against the angle of attack of the aircraft are physically stressful activities. Tray service can also be strenuous, especially when walking long distances. Overhead activities (e.g. when loading the luggage compartments) can lead to increased strain on the shoulder girdle and spine. The lower extremities of flight attendants are also subject to increased strain during flight operations, which is why, for example, suitable footwear is required. Technical and organisational measures must be given priority, but due to the characteristics of the aircraft, physical strain cannot simply be avoided. By analysing load handling, the probability of physical overload and the need for action can be quantified and – if necessary – result in recommended prophylaxis, or at least in elective prophylaxis.

2.9 Psychological stress

Mental resilience is subject to changes depending on internal and external factors. In addition to the risks already mentioned, external factors include, for example, the respective flight assignment, the duration of the flights, working hours, destinations, the type of aircraft, as well as interactions with colleagues and passengers. Internal factors include personality, competences, and the state of an individual's health. Dealing with everyday stressful situations and coping with them forms a basis for performance. However, if stress exceeds an individual's tolerance, this can result in stress reactions among the cockpit and cabin crew that can lead to health problems. Furthermore, in critical flight situations, each crew member's own life and the lives of others depend on the mental stability and resilience of the flight crew. Personal resilience is therefore important for prophylaxis and professional fitness.

The work of flight attendants is associated with particular psychological stress resulting from looking after passengers. This stress is aggravated by the special conditions on board the aircraft, such as restricted freedom of movement due to confined spaces, the associated short physical distance from other people, and limited opportunities to withdraw. An important prerequisite for working as a cabin crew member is a high level of stress tolerance in critical situations (e.g. bad weather conditions, incidents, accidents, or dealing with 'unruly passengers'). Signs of excessive stress must be identified at an early stage so that targeted interventions can be made to prevent physical or mental health problems. Mental stress is therefore an important part of risk assessment.

Possible psychological traumatisation, for example, due to critical flight situations, altercations with passengers, or any form of violence, including sexual assault, must be taken into account. If the risk assessment shows that there is a relevant risk of psychological trauma in the aviation company, an operational structure must be set up to ensure rapid initial support

and immediate reporting of the traumatising event as an occupational accident. Rapid accident reporting is the only way to ensure that traumatised employees receive prompt professional help. The aspect of psychological stress should be addressed regularly as part of the prophylaxis.

2.10 Shift work, night work, on-demand work, time zone changes

Commercial air traffic crews are often subject to irregular and inconsistent working hours. Shift schedules with irregular alternation between day and night work are typical. This results in classic occupational physiological risks that need to be taken into account when providing occupational medical advice. The problem is made considerably more difficult by flights that cross several time zones. The International Agency for Research on Cancer (IARC) has categorised 'shift work with disruption of the circadian rhythm' as a probable carcinogen for humans (IARC Classification 2a). However, the scientific data on this are inconsistent. This risk is not reflected in the BG Verkehr study data on the risk of mortality among flying personnel.

2.11 Hazardous substances

The exposure of flying personnel to engine exhaust fumes or diesel engine emissions, for example, from aircraft ground support equipment, is not detectable to any relevant extent. However, as fossil fuels in particular generally contain substances that can have carcinogenic potential due to their production, contact must be minimised through workplace measures.

Intensely unpleasant odours can arise in aircraft due to a variety of different causes and can result in acute, non-specific health complaints. In the context of these so-called 'fume-and-smell events', organophosphates as components of turbine oils and hydraulic fluids as well as volatile organic compounds (VOCs) have been the subject of intensive research in recent years. However, the available study results cannot support the assumption of a relevant risk beyond acute reactions. Longer-term persistent symptoms cannot be plausibly justified in this context. Irrespective of this, however, a background exposure of flying personnel to these substances that differs from that of the general population can be assumed.

In special cases, such as when pesticides are applied in aircraft, occupational medical prophylaxis may have to be offered in accordance with ArbMedVV and be aimed at the respective hazardous substance used. Such disinsection measures are primarily carried out with pyrethroids.

Relevant exposure to hazardous substances may also occur during spreading and spraying operations in agricultural flights due to the agents used (primarily pesticides, less so fertilisers).

The air quality limit value for emissions of ozone that was valid until 2004 is no longer exceeded in aircraft with ozone converters. For aircraft without ozone filters or converters, an individual assessment is required. Measurements show that the former limit value of 0.1 ppm is repeatedly exceeded in such aircraft, even in the short- and medium-haul range, depending on the altitude and flight route. Irrespective of the existence of a limit value, the minimisation requirement applies with regard to possible ozone exposure. A technical solution to this problem is the method of choice.

2.12 Visual display unit

Neither the cockpit nor the cabin are typical visual display unit workstations. Nevertheless, the displays installed are work equipment consisting of a screen, an input device, and a control unit. Therefore, a recommended prophylaxis is required. Even if the other risks mentioned above place sufficient demands on prophylaxis, it is important to include this aspect of the activity. For example, the assessment of visual performance must take into account the distance to the screen.

3 Examination Intervals, Scope, and Content

The legal basis for determining medical fitness, in particular, EASA's ED Decision 2019/002/R, Annex 1, Guidance Material GM 1 Med.C.025, provides information on the tasks of cabin crew that determine their medical fitness and that are also important for occupational medical prophylaxis.

These tasks include the following:

- Monitoring the situation inside the aircraft cabin and being aware of conditions outside the aircraft
- Providing assistance to special categories of passengers
- Safely stowing of cabin luggage
- Operating and monitoring aircraft systems
- Managing and observing passengers
- In case of pilot incapacitation: Securing pilot in their seat or removing them from flight crew compartment; administering first aid and assisting the operating pilot as required
- In case of disruptive passenger behaviour: Managing passengers as appropriate, including the use of restraint technique (as required)

The above-mentioned tasks or stresses may result in the need for required or offered occupational medical prophylaxis on the basis of the risk assessment in conjunction with ArbMedVV. In addition, medical examinations may be required on other legal bases (StrlSchV, DruckLV). Prophylaxis at the request of employees in accordance with Section 11 ArbSchG should always be considered justified.

The 'DGUV Recommendations for Occupational Medical Consultations and Examinations' are available as basic recommendations for the scope and content of occupational medical prophylaxis.

3.1 Examination intervals

Different reasons for receiving occupational medical prophylaxis and examinations are linked to different examination intervals, which are based on the respective risk potential or are specified by a standard (AMR 2.1). In Germany, examination periods for occupational medical prophylaxis based on ArbMedVV are governed by AMR 2.1 'Intervals for the Initiation / Provision of Occupational Medical Prophylaxis'. In principle, the following applies: The first prophylaxis must be arranged or offered within three months before starting work. The second prophylaxis must follow after twelve months at the latest (after six months in defined cases, and after 24 months in the case of stays abroad in accordance with the above-mentioned criteria). All further prophylaxis must be arranged or offered after 36 months at the latest. It is not possible to extend the examination interval, but it is possible to shorten it following consultation and the decision of a physician. The intervals for aptitude tests are laid down in the respective legal bases of transportation and aviation law.

3.2 Scope and content

Depending on the above-mentioned risks, the following procedure is recommended for flying personnel:

As with all prophylaxis services, the focus here is on consultation. An examination is only possible if there is a medical indication and the employee agrees.

As part of occupational medical prophylaxis, unless the employee objects, their medical history (general medical history, work history, previous stays abroad, vaccination status) should be regularly enquired about. Moreover, detailed consultations and a general physical examination relating to the individual's work as well as special examinations should be carried out (see Table 2).

Table 2: Recommended scope of examinations

Organ system / object of examination	Examination	Notes
Urine	Test strip with min. 9 items	
Blood	Blood count (if necessary, with differential blood count) Blood sedimentation test or CRP Fasting glucose, creatinine, hepatic enzymes (γ-GT, GPT), cholesterol	Further parameters in case of anamnestic or clinical suspicion, offer HIV test
Stool	Pathogenic germs Parasites	Only follow-up examination in case of exposure
Heart, circulation	Blood pressure, heart rate ECG with at least 12 leads	Ergometry only if indicated
Respiratory organs	Spirometry incl. flow-volume curve	
Eyes	Visual acuity at distance and near, distance to screen, if applicable Colour vision, field of vision	The criteria from the respective medical fitness requirements apply in order to be able to clarify any deviations at an early stage as part of the prophylaxis
Hearing	Audiometry with air conduction 1–6 kHz Otoscopy with pressure equalisation at the eardrum (Valsalva test)	
Dental status	Examination	
Nervous system	Examination: Cranial nerves, gross and fine motor skills, sensitivity, reflex status, balance	
Mental health	Examination in conversation	In case of suspicion, targeted exploration to rule out disorders
Musculoskeletal system	Examination of all major joints	

The regular scope of the prophylaxis for flying personnel includes the recommendations for exposure to noise, activities abroad, driving, steering, and inspection activities, and respiratory protective devices (Group 1). However, the scope of the prophylaxis must be adapted in order to meet an individual's exposure (e.g. musculoskeletal stresses) in addition to being appropriate, suitable, and necessary. The individual scope of the prophylaxis indicated in each case results from risk assessment, consultation, and categorisation according to ArbMedVV.

Findings obtained, for example, as part of the aviation medical examination or in accordance with other legal regulations can be used to avoid duplicate examinations and to supplement occupational medical examinations. As a rule, previous findings should not be older than six months. The utilisation of existing findings requires the consent of the employee. If findings from other examinations are used, it must be possible to interpret them on the basis of personal experience and knowledge. However, the physician conducting the examination should at least take the medical history or interim medical history personally. The 'DGUV Recommendations for Occupational Medical Consultations and Examinations' provide a suitable basis for the individual organisation of the scope of the examination.

4 Occupational Medical Assessment and Statement

Air traffic operates within the scope of national law. Therefore, the criteria for examinations under aviation law (EU Reg 1178 / 2011, Part-MED) are binding for the fitness assessment and cannot be tightened or weakened by occupational medical criteria.

The occupational medical statement is advisory in nature. Health concerns on the part of the occupational physician are conceivable in principle even if the employee is deemed fit to fly. In such situations, the aim of consulting employees is to provide them with a sufficient basis for making their own decisions and assuming responsibility.

In accordance with ArbMedVV, the findings are recorded in writing, and the employees are advised accordingly. The results are made available to the employees on request, and the employers receive a prophylaxis qualification stating that an occupational medical prophylaxis appointment (compulsory, recommended, elective prophylaxis) has taken place, including when and for what reason. The prophylaxis qualification also states when further occupational medical prophylaxis is indicated from a medical perspective.

At the request of the employee and only following the release from medical confidentiality are medical reports to the employer possible. If the prophylaxis gives rise to indications that call into question the continuation of the activity temporarily or permanently, the aim is to find a solution together with the person concerned and the company management depending on the risk and the identified health disorder (special occupational safety and health measures, change of activity or transfer within the company, change in the focus of tasks, temporary release from flying activities, etc.). The regulations of ArbMedVV apply without restriction!

Assessment Criteria

In the context of occupational medical prophylaxis, these criteria serve only to advise the employee. In the case of a written statement at the request of the employee, the requirements of AMR 6.4 apply.

The medical assessment of abnormal findings and long-term (medicinal) therapies is carried out in accordance with the current state of generally accepted medical knowledge. The assessment takes into account the workplace conditions on the basis of both the risk assessment and the individual exposure.

The following illnesses or health restrictions are relevant for assessing the performance of the activity. They require the measures recommended in the respective section.

Findings for which a change of job activity should be considered:

Musculoskeletal system

- Systemic rheumatic diseases with significant functional impairment
- Functionally relevant changes to the musculoskeletal system
- Functionally relevant complaints and/or radicular symptoms after surgically or non-surgically treated disc disease
- Degenerative spinal diseases with chronic symptoms
- Functionally relevant joint diseases
- Consequences of injuries to bones, muscles, tendons, or ligaments with permanent, significant functional limitations

Heart and circulation

- Cardiovascular diseases with a tendency towards decompensation
- Haemodynamically effective heart valve pathology
- Clinically manifest coronary heart disease
- Condition after heart transplantation
- Cardiac ischaemia

- Symptomatic QT prolongation (long QT syndrome)
- Clinically manifest sinoatrial heart disease
- Complete atrioventricular conduction disorder
- Paroxysmal tachycardia, atrial flutter, atrial fibrillation (except lone atrial fibrillation), therapy-resistant tachycardia with aberrant conduction
- Therapy-resistant arrhythmias beginning from Lown classification III b
- Implanted automatic defibrillator
- Pacemaker to compensate for paroxysmal tachycardia
- Recurrent deep vein thrombosis, severe post-thrombotic syndrome
- Long-term systemic anticoagulation
- Aortic aneurysm
- Therapy-resistant hypertension

Respiratory organs

- Condition after partial pneumonectomy
- Lung transplantation
- Pulmonary hypertension
- Chronic disease of the lungs or respiratory tract with significant restriction of respiratory or lung function (e.g. FEV 1 < 70 %), such as acute asthma, bronchial asthma, acute inflammatory diseases, allergic rhinitis
- Recurrent spontaneous pneumothorax
- Diseases that impair ventilation of the lungs and oxygen supply to the blood (gas exchange) at altitude, such as COPD (clinically relevant)
- Untreated or unsuccessfully treated sleep apnoea

Digestive organs / intestines

- Chronic or severe recurrent diseases of the digestive tract, liver, bile ducts (including stone disease), or pancreas that restrict performance and ability to work
- Surgical complications in the area of the digestive tract that can impair the ability to work
- Intestinal hernias that can impair the ability to work

Kidneys, urinary tract

- Chronic diseases of the kidney or urinary tract with significant functional impairment
- Stone disease with recurrent colic
- Colic without evidence of stone clearance

Endocrine system

- Metabolic diseases that reduce performance and fitness for work
- Diabetes mellitus requiring medication, such as insulin or sulphonylurea therapy, with significant changes in blood glucose levels, especially with a tendency towards hypoglycaemia
- Untreated or treatment-resistant hyperthyroidism and hypothyroidism

Blood and haematopoietic organs

- Diseases of the haematopoietic system with significant functional limitations, such as therapy-resistant anaemia, sickle-cell disease, haemoglobinopathies, polycythaemia, clinically relevant blood coagulation disorders
- Clinically relevant diseases of the immune system

Skin

- Pronounced skin diseases that are not expected to heal, provided that
  - the protective function of the skin is significantly impaired or
  - the skin disease is likely to worsen unter the particular conditions of the flight duties
- Allergic skin diseases that reduce performance and fitness for work

Eyes

(in the case of transportation law issues, the provisions of the transportation law standard apply)

- Binocular uncorrected or corrected distance visual acuity of less than 0.8 (initial examination) or 0.7 (follow-up examination) as well as uncorrected or corrected distance visual acuity of less than 0.5 in the worse eye
- Binocular uncorrected or corrected near visual acuity of less than 0.8 (initial examination) or 0.5 (follow-up examination)

- If applicable, insufficient visual acuity for the distance to the computer screen
- Acquired or existing (incl. functional) monocularity if the corrected or uncorrected distance visual acuity is less than 1.0 (follow-up examination)
- A correction of more than –6 or +5 dioptres (initial and follow-up examinations) depending on the activity
- Therapy-refractory glaucoma
- Clouding of the refractive media with functional restrictions
- Progressive eye diseases with functional impairment
- Double vision
- Insufficient colour vision

ENT

- Circumscribed high-frequency loss in the tone threshold audiogram (high-frequency depression) with a hearing loss of 30 dB initial examination or 40 dB follow-up examination or more at 2 kHz in the ear with poorer hearing
- Significant hearing loss in the speech range that impedes communication with passengers, especially when there is ambient noise
- Clinically conspicuous diseases of the inner ear and auditory nerve, for example, as a result of cranial trauma, acoustic neuroma:
  - sudden hearing loss (if not a single episode and largely healed without further complications)
  - disruption of the vestibular system
  - vestibular vertigo disorders (e.g. Meniere's disease, kinetosis of significant pathological value)
- Condition after hearing-improving surgery for middle ear diseases (e.g. otosclerosis) with replacement of the entire auditory ossicular chain and risk of perforation in the round window of the cochlea (perilymph fistula) during Valsalva pressure test
- Chronic disorder of tube ventilation, tube dysfunction with recurrent barotraumas of the middle ear, or permanently insufficient function of pressure equalisation
- Chronic sinusitis (e.g. in the case of significant polyposis of the paranasal sinuses)
- Non-rehabilitated chronic pathology of middle ear or inner ear function

Nervous system and mental health

Any disease of the nervous system that leads to an impairment of performance and operational capability, especially:

- Chronic progressive diseases of the CNS
- Diseases of the nervous system or mental illness that require long-term medication
- Craniocerebral trauma with residuals and/or EEG abnormalities
- Seizure disorders (with the exception of rare paediatric febrile convulsions before the age of 7)
- Unexplained loss of consciousness
- Chronic progressive myopathies
- Psychoses of any origin, dissociative disorders, schizophrenia (in case of doubt, neurological / psychiatric clarification)
- Apparent depression
- Personality disorders and neurotic developments with a significant impact on performance, commitment, and teamwork skills
- Personality disorders with signs of self-harm, suicide attempt
- Addictions with pathological value, especially abuse of or dependence on medication, drugs, or alcohol
- Persistent post-traumatic stress disorder (PTSD)

Findings for which a temporary exemption from flying, shortened prophylaxis periods, or other measures are recommended:

Musculoskeletal system

- Acute and treatable chronic illnesses or injuries until the individual is able to return to work

Heart and circulation

- Cardiovascular diseases that are expected to lead to a full recovery
- Acute stress reaction until further assessment
- Inadequately treated hypertension until adequate treatment has been found

Respiratory tract

- Acute disorders of the upper respiratory tract
- Florid tuberculosis
- Sarcoidosis (depending on stage/course)
- Acute illnesses that impair ventilation of the lungs and oxygen supply to the blood (gas exchange), especially at high altitudes (e.g. spastic bronchitis)

Digestive organs / intestines

- Acute diseases of the gastrointestinal tract or abdominal viscera until clinical and functional healing has been demonstrated
- Partial or total removal of abdominal organs until healing has occurred and full physical capacity has been regained
- Clinically conspicuous hernias until healing after surgery

Kidneys and urinary tract

- Acute diseases of the urinary organs that impair performance until they have healed

Endocrine system

- Type 2 diabetes mellitus under medication that can cause hypoglycaemia until it has been safely managed for at least three months
- Illnesses that can lead to a temporary reduction in performance

Blood

- Acute and chronic leukaemia
- Acute and chronic lymphomas

Skin

- Pronounced and extensive skin diseases that are expected to heal

Eyes

- Acute keratopathy, iritis, or uveitis
- Stable condition for at least six weeks after surgery on the refractive media and retina
- Stable condition for at least three months after refractive corneal surgery
- Acquired monocularity for at least three months

ENT

- Acute diseases of the ear–nose–throat area that are expected to heal without further issues

Nervous system and mental health

- All affections of the central, peripheral, and autonomic nervous system, provided that healing without issues can be expected
- Suspicion of psychiatric disorders until diagnosis

Tooth, mouth, and jaw

(in each case, until successful rehabilitation)

- Untreated caries media and caries profunda
- Functionally inadequate dentures

Findings for which no measures are required:

No further measures are required in the case of only minimal symptoms of the above-mentioned illnesses that are not expected to be aggravated by the flight service and that do not affect operational capability on board. There may be increased requirements for consultation.

Pregnancy/breastfeeding

Pregnancy and breastfeeding are not health disorders but do have an impact on the occupational medical consultation. The Maternity Protection Act provides for restrictions, for example, on night work, on work on transportation vehicles, as well as on various physical and other activities. The risk assessment in accordance with Section 10 of the Maternity Protection Act is therefore an important reason for consultation with the employer. The measures defined here for adequately protecting mother and child from harmful effects should generally make it difficult to continue working after the pregnancy has become known, but at the latest after the third month. For flight attendants, in particular, the restrictions imposed by the MuSchG effectively mean a ban on working.

5 Qualification

In Germany, the qualification of the occupational physician is defined by national standards (e.g. ASiG, ArbMedVV). Occupational medical prophylaxis and any associated examinations can only be recognised as a measure within the meaning of ArbMedVV and of 'Accident prevention regulation. Occupational physicians and OSH professionals (DGUV Regulation 2)' if they are carried out by a physician with the professional qualification of 'Occupational Medicine' (exception: occupational medical prophylaxis for work in the tropics, subtropics, or other foreign countries with special climatic stresses and infection risks can also be carried out by a physician with the additional qualification of 'Tropical Medicine' if it is a mandatory examination). If the occupational physician lacks the necessary expertise, special accreditations, or equipment for certain examinations, the occupational physician must consult other physicians who meet these requirements (§ 7 (1) ArbMedVV).

BG Verkehr recommends that the consulted physicians – if necessary – have special occupational medical and aviation physiological expertise. This expertise can be demonstrated, for example, by the BG Verkehr certificate 'Occupational Medicine in Aviation'. This qualification can be obtained by completing the basic seminar 'Occupational Medicine in Aviation' and by providing evidence of participation in a total of 60 suitable training hours or qualification points (including the basic seminar). The training must have been finished within 24 months prior to applying for the certification.

The basic seminar 'Occupational Medicine in Aviation' must comprise at least 15 hours and include the following content:

- Legal bases and framework conditions, especially for assessing the cabin crew and the interface between occupational and transportation medicine
- Professional knowledge of aviation-related professions, including at least commercial airline pilots, flight attendants, and air traffic control personnel as well as, depending on the specialisation, work assignments with helicopters, medical evacuation, aircraft mechanics, ground services, etc.

- Information on typical occupational exposures (physical, chemical, psychological)
- Information on accidents at work, occupational diseases, and work-related health risks
- Emergency management
- Clinical issues (e.g. internal medicine, neurology, ENT)
- Chronobiology / sleep medicine
- Special examinations of the eye
- Assessment criteria

Where possible, the basic seminar should be supplemented by practical items, for example, through:

- Exercises for clinical examinations, especially of the eye
- Insights into processes at commercial airports or in aviation companies
- Insights into current aeromedical research

In order for the basic seminar to be recognised for the certification, it is necessary that BG Verkehr have previously recognised the seminar in writing if the seminar is not conducted by BG Verkehr itself. Recognition must be applied for from BG Verkehr before the seminar is held.

Suitable supplementary training courses for specialists in occupational medicine include, e.g.:

- Courses and seminars organised by BG Verkehr on aviation-specific topics
- Annual conferences and training courses organised by the German Society for Aerospace Medicine, the Aerospace Medical Association, or the International Congress of Aviation and Space Medicine
- Aeromedical training courses certified by the German Medical Association.

For occupational physicians of air carriers, attending events in order to obtain the certificate is recognised as further training within the meaning of Section 2 (3) ASiG.

Suitable training courses for physicians with the additional qualification of 'Aviation Medicine' or 'Aeromedical Examiner' (AME) include:

- Courses and seminars organised by BG Verkehr on aviation-specific and occupational medical topics
- Annual conferences and training courses organised by the German Society for Occupational and Environmental Medicine or by the German Association of Company Doctors
- National and international occupational medical congresses
- Occupational medical training courses certified by the German Medical Association

The certification is valid for five years and can be extended for a further five years by providing proof of participation in 45 training units (hours/points) that fulfil the above-mentioned criteria. This further training must be completed within five years prior to the application for renewal.

The qualification does not replace the occupational medical expertise required for the occupational physician service of a company within the meaning of the ASiG or for the provision of occupational medical prophylaxis in accordance with ArbMedVV.

Occupational physicians can obtain the qualification upon application without a time limit if they are in possession of a higher level of aeromedical expertise.

This includes:

- The additional qualification of 'Aviation Medicine'
- Qualification as an 'Aeromedical Examiner' (AME)
- Qualification as a flight surgeon of the German Federal Armed Forces

However, attendance of the 'Occupational Medicine in Aviation' basic seminar is also required in these cases.

Physicians who wish to use the 'Occupational Medicine in Aviation' certificate as proof of aeromedical knowledge for the examination of flight attendants as required by the German Federal Aviation Authority (LBA) must hold the official specialisation 'Occupational Medicine'. EU Regulation 1178 / 2011 Section MED.D.040 – on which this option is based – only accepts the full qualification. Approval by the LBA is mandatory.

The point of contact for the 'Occupational Medicine in Aviation' certification and for recognition of the basic seminar is:

BG Verkehr
Ottenser Hauptstraße 54
22765 Hamburg
Email: arbeits-und-verkehrsmedizin@bg-verkehr.de

Occupational medical examinations on the basis of the StrSchV require the examining physician to have been previously qualified by the responsible state authority. According to § 175 StrSchV, the prerequisite for qualification is the separate acquisition of specialist knowledge in radiation protection.

Examinations in accordance with the Regulations on Work in Compressed Air require the examining physician with occupational medical expertise to have been previously certified by the competent authority.

All questions relating to the provision of occupational medical prophylaxis (e.g. distinction from fitness assessment, free choice of physician, assumption of costs, duty of confidentiality) are addressed in detail in Chapter 1 of the 'Explanatory Notes on the DGUV Recommendations for Occupational Medical Consultations and Examinations'.

6 Abbreviations

A

AME

Aeromedical examiner, aviation medicine occupational safety and health expert

AMR

German Occupational medical rules, which reflect the state of occupational medicine and other established occupational medical findings. They are determined or adapted by the Committee for Occupational Medicine and are published by the Federal Ministry of Labour and Social Affairs.

ANR

Active noise reduction

ArbMedVV

German Ordinance on Preventive Occupational Health Care

ArbSchG

German Act on the Implementation of Measures of Occupational Safety and Health to Encourage Improvements in the Safety and Health Protection of Workers at Work

ArbZG

German Hours of Work Act

ASiG

German Act on Occupational Physicians, Safety Engineers, and Other Occupational Safety Specialists

D

DGUV

German Social Accident Insurance

DOG

German Ophthalmological Society

DruckLV

German Ordinance on Work in Compressed Air

E

EASA

European Union Aviation Safety Agency

ED Decision

Executive Director Decision of the EASA

ENT

Ear–Nose–Throat

EU Regulation

Regulation of the European Union

EURATOM

European Atomic Energy Community

I

IARC

International Agency for Research on Cancer

IfSG

German Protection against Infection Act

ISSA

International Social Security Association

L

LärmVibrationsArbSchV

German Ordinance on Noise and Vibration Protection

LuftfahrtPersV

German Aviation Personnel Ordinance

O

OSH

Occupational safety and health specialist

P

PPE

Personal protective equipment

S

StGB

German Criminal Code

StrlSchV

German Radiation Protection Ordinance

T

TRLV

German Technical Rules on the Ordinance on Noise and Vibration Protection

U

UVV

German Accident Prevention Regulation

7 Literature

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The original version of this guideline (1999) and the update (most recently in 2015) were the result of technical discussions by a working group under the leadership of BG Verkehr. The members of this working group were (in alphabetical order):

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