

2009

Threshold Limit Values for Physical Agents in the Work Environment

Adopted by ACGIH®
with Intended Changes

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INTRODUCTION TO THE PHYSICAL AGENTS

This section presents Threshold Limit Values (TLVs®) for occupational exposure to physical agents of acoustic, electromagnetic, ergonomic, mechanical, and thermal nature. As with other TLVs®, those for physical agents provide guidance on the levels of exposure and conditions under which it is believed that nearly all healthy workers may be repeatedly exposed, day after day, without adverse health effects.

The target organs and health effects of these physical agents vary greatly with their nature; thus, TLVs® are not single numbers, but rather integrations of the measured parameters of the agent, its effects on workers, or both. Due to the many types of physical agents, a variety of scientific disciplines, detection techniques, and instrumentation are applied. Therefore, it is especially important that the physical agents TLVs® be applied only by individuals adequately trained and experienced in the corresponding measurement and evaluation techniques. Given the unavoidable complexity of some of these TLVs®, the most current *Documentation* of the TLVs® for Physical Agents must be consulted when they are applied.

Because of wide variations in individual susceptibility, exposure of an individual at, or even below, the TLV® may result in annoyance, aggravation of a pre-existing condition, or occasionally even physiological damage. Certain individuals may also be hypersusceptible or otherwise unusually responsive to some physical agents at the workplace because of a variety of factors such as genetic predisposition, age, personal habits (e.g., smoking, alcohol, or other drugs), medication, or previous or concurrent exposures. Such workers may not be adequately protected from adverse health effects from exposures to certain physical agents at or below the TLVs®. An occupational physician should evaluate the extent to which such workers require additional protection.

TLVs® are based on available information from industrial experience, from experimental human and animal studies, and when possible, from a combination of the three, as cited in their *Documentation*.

Like all TLVs®, these limits are intended for use in the practice of occupational hygiene and should be interpreted and applied only by a person trained in this discipline. They are not intended for use, or for modification for use, 1) in the evaluation or control of the levels of physical agents in the community or 2) as proof or disproof of an existing physical disability.

These values are reviewed annually by ACGIH® for revision or additions as further information becomes available. ACGIH® regularly examines the data related to mutagenicity, cancer, adverse reproductive effects, and other health effects of physical agents. Comments, accompanied by substantive documentation in the form of peer-reviewed literature, are solicited and should be forwarded in electronic format to The Science Group, ACGIH® (science@acgih.org).

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ACGIH® disclaims liability with respect to the use of TLVs®.

Notice of Intended Changes

Each year, proposed actions for the forthcoming year are issued in the form of a “Notice of Intended Changes” (NIC). These physical agents, with their corresponding values, comprise those for which (1) a limit is proposed for the first time (i.e., NIE), (2) a change in the Adopted Values are proposed, or (3) retention as an NIC is proposed, or (4) withdrawal of the *Documentation* and adopted TLV® is proposed. In each case, the proposals should be considered trial values during the period they are on the NIC/NIE. These proposals are ratified by the ACGIH® Board of Directors and will remain as NICs/NIEs for approximately one year following this ratification. If the Committee neither finds nor receives any substantive data that change its scientific opinion regarding the TLVs® for a NIC/NIE physical agent, the Committee may then approve its recommendation to the ACGIH® Board of Directors for adoption. If the Committee finds or receives substantive data that change its scientific opinion regarding an NIC/NIE TLV®, the Committee may change its recommendation to the ACGIH® Board of Directors for the matter to be either retained on or withdrawn from the NIC.

Documentation is available for each of these physical agents and their proposed values.

This notice provides an opportunity for comment on these proposals. Comments or suggestions should be accompanied by substantiating evidence in the form of peer-reviewed literature and forwarded in electronic format to The Science Group, ACGIH®, at science@acgih.org. Please refer to the ACGIH® TLV®/BEI® Development Process on the ACGIH® website (<http://www.acgih.org/TLV/DevProcess.htm>) for a detailed discussion covering this procedure, methods for input to ACGIH®, and deadline date for receiving comments.

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Definitions

TLV® categories used in this section include the following:

- a) Threshold Limit Value–Time Weighted Average (TLV–TWA). The time-weighted average exposure for an 8-hour workday and 40-hour workweek.
- b) Threshold Limit Value–Ceiling (TLV–C). Exposure limit that should not be exceeded even instantaneously.

Carcinogenicity

The Threshold Limit Values for Physical Agents (TLV®-PA) Committee will apply, as necessary, the carcinogenicity designations developed by the Threshold Limit Values for Chemical Substances (TLV®-CS) Committee. Refer to “Appendix A: Carcinogenicity” in the Chemical Substances section of this *TLVs® and BEIs®* book for these classifications.

Physical and Chemical Factors

Combinations of physical factors such as heat, ultraviolet and ionizing radiation, humidity, abnormal pressure (altitude), and the like, as well as the interaction of physical factors with chemical substances in the workplace, may place added stress on the body so that the effects from exposure at a TLV®

may be altered. This stress may act adversely to increase the toxic response to a foreign substance. Although most TLVs® have built-in uncertainty factors to guard against adverse health effects when there are moderate deviations from normal environments, the uncertainty factors for most exposures are not of such a magnitude as to compensate for gross deviations. In such instances, informed professional judgment must be exercised in the proper adjustment of the TLVs®.