

**In the event significant errata are required, they  
will be listed on the ACGIH® website at  
<http://www.acgih.org/TLV/>.**

## TABLE OF CONTENTS

Policy Statement on the Uses of TLVs® and BEIs® .....	inside front cover
Statement of Position Regarding the TLVs® and BEIs® .....	v
TLV®/BEI® Development Process: An Overview .....	viii
Online TLV® and BEI® Resources .....	xiv
Revisions or Additions for 2015 .....	xvi
<b>Chemical Substances</b>	
Committee Members .....	2
Introduction .....	3
General Information .....	3
Definition of the TLVs® .....	3
Excursion Limits .....	5
Peak Exposures	
Notice of Intended Change .....	6
TWA and STEL versus Ceiling (C) .....	7
Mixtures .....	7
Deviations in Work Conditions and Work Schedules .....	7
Application of TLVs® to Unusual Ambient Conditions .....	7
Unusual Work Schedules .....	8
TLV® Units .....	9
User Information .....	10
References and Selected Readings .....	10
Adopted Threshold Limit Values .....	11
2015 Notice of Intended Changes .....	62
Chemical Substances and Other Issues Under Study .....	65
Definitions and Notations .....	68
Adopted Appendices	
A. Carcinogenicity .....	75
B. Particles (insoluble or poorly soluble) Not Otherwise Specified (PNOS) .....	76
C. Particle Size-Selective Sampling Criteria for Airborne Particulate Matter .....	76
D. Commercially Important Tree Species Suspected of Inducing Sensitization .....	79
E. Threshold Limit Values for Mixtures .....	80
F. Minimal Oxygen Content .....	83
G. Substances Whose Adopted <i>Documentation</i> and TLVs® Were Withdrawn for a Variety of Reasons, Including Insufficient Data, Regrouping, Etc. ....	88
H. Reciprocal Calculation Method for Certain Refined Hydrocarbon Solvent Vapor Mixtures .....	92

## Biological Exposure Indices

Committee Members .....	98
Introduction.....	99
Adopted Biological Exposure Determinants.....	104
2015 Notice of Intended Changes .....	112
Chemical Substances and Other Issues Under Study.....	113

## Physical Agents

Committee Members.....	116
Introduction.....	117
Threshold Limit Values	
<i>Acoustic</i>	
Infrasound and Low-Frequency Sound.....	120
Noise .....	121
Ultrasound.....	124
<i>Electromagnetic Fields 0–300 GHz</i>	
Electromagnetic Radiation Spectrum and Related TLVs® .....	126
Static Magnetic Fields.....	127
Sub-Radiofrequency (30 kHz and below) Magnetic Fields .....	128
Sub-Radiofrequency (30 kHz and below) and Static Electric Fields.....	130
Radiofrequency and Microwave Radiation .....	132
Notice of Intended Change.....	138
<i>Optical Radiation</i>	
Light and Near-Infrared Radiation .....	144
Ultraviolet Radiation.....	153
Lasers .....	159
<i>Ionizing Radiation</i> .....	174
<i>Ergonomics</i>	
Statement on Work-Related Musculoskeletal Disorders .....	176
Hand Activity Level .....	179
Lifting.....	182
Hand–Arm Vibration .....	186
Upper Limb Localized Fatigue Notice of Intent to Establish.....	191
Whole–Body Vibration .....	194
Notice of Intended Change.....	202
<i>Thermal Stress</i>	
Cold Stress .....	209
Heat Stress and Heat Strain.....	218
Physical Agents Under Study .....	228

## Biologically Derived Airborne Contaminants

Committee Members .....	230
Introduction.....	231
Biologically Derived Agents Under Study.....	234
CAS Number Index.....	235
Endnotes and Abbreviations .....	inside back cover