

I-INCE PUBLICATION: 09-1

**SURVEY OF LEGISLATION, REGULATIONS,
AND GUIDELINES FOR CONTROL OF
COMMUNITY NOISE**

**Final Report
of the**

**I-INCE TECHNICAL STUDY GROUP ON NOISE POLICIES
AND REGULATIONS (TSG 3)**

**Results shown in this edition of I-INCE Publication 09-1 represent
information collected through 2008.**

**Each I-INCE Member Society is invited to periodically check the data
in this report and inform the I-INCE Secretary General of revisions
that may be needed.**

Prepared by the Members and Consultants of TSG 3

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FOREWORD

I-INCE is a non-governmental federation of professional societies from countries around the world. I-INCE is dedicated to advancing the engineering control of noise and vibration. Operational policies and procedures of I-INCE are established by a Board of Directors and approved by a General Assembly. The General Assembly consists of representatives of the member professional societies and the Board of Directors. The Board of Directors and the General Assembly meet at least once a year during annual Congresses sponsored by I-INCE on noise control engineering. This report is an I-INCE Technical Report. It is intended that there be wide consideration of the data contained in the report.

This report was approved for publication by the I-INCE General Assembly at its meeting in Shanghai, China on 2008 October 27.

BACKGROUND

At the meeting of the I-INCE General Assembly held in Fort Lauderdale, Florida, USA, in 1999 December, it was decided to start a program to assess the effectiveness of noise-control policies, guidelines, and regulations around the world related to exposure to noise. With this decision; it was agreed to form Technical Study Group 3 (TSG 3), "Assessment of the Effectiveness of Noise Policies and Regulations."

Each member of TSG 3 was appointed by an I-INCE Member Society. In addition, there were Co-Conveners and Consultants. The following lists the membership of TSG 3.

Co-Conveners: Hideki Tachibana and William W. Lang

Member	I-INCE Member Society
Warren Renew	Australian Acoustical Society
Gisela Vindevogel	Belgische Akoestische Vereniging
Josef Novak	Czech Acoustical Society
Pierre-Etienne Gautier	Société Française d'Acoustique
Andrea Franchini	Associazione Italiana di Acustica
Jiro Kaku	Acoustical Society of Japan and INCE/Japan
Soogab Lee	Korean Society for Noise and Vibration Engineering
Sigurd Solberg	Acoustical Society of Norway
Primož Gspan	Slovenian Acoustical Society
Selma Kurra	Turkish Acoustical Society
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SURVEY OF LEGISLATION, REGULATIONS, AND GUIDELINES FOR CONTROL OF COMMUNITY NOISE

1. INTRODUCTION

This report documents the results of surveys of legislation, regulations, and guidelines related to the control of community noise. The information in this report may be of value for the development of global policies on noise control.

This report was prepared under the auspices of, and as a public service by, the International Institute of Noise Control Engineering (I-INCE) for consideration by appropriate international and national authorities.

2. THE WORK OF TSG 3

The work of TSG 3 was carried out by correspondence and at meetings held during INTER-NOISE Congresses over the eight-year period from 2000 through 2007. Appendix A provides a summary of the meetings of TSG 3 in this period.

At the first meeting of TSG 3 on 2000 August 27, it was decided to assemble and catalog community noise regulations, guidelines, and legal standards¹ at the national and regional levels in the countries of the members of TSG 3 [1]² as well as information on implementation of noise-control technologies. A questionnaire was prepared to assist in collecting the data.

After the meeting, the first questionnaire was sent to all members of TSG 3. Data were received from I-INCE Member Societies in the following countries:

Australia ³	Austria	Belgium ⁴
Denmark	Finland	France
Germany	Greece	Ireland
Italy	Japan	Korea
The Netherlands	Norway	Portugal
Slovenia	Spain	Sweden
Switzerland	Turkey	UK
USA		

Additional information was obtained from published articles and reports.

The results were arranged in a table by (1) category of the law, regulation, or ordinance; (2) the subject as emission or immission; (3) the noise level descriptor; (4) the noise-level limits; and other information.

¹ In general, national standards for instruments, measurement procedures, and recommended practices were excluded from the surveys in order to concentrate on legislation and regulations.

² Numbers enclosed within brackets refer to entries in the list of References.

³ The data for Australia included data for Western Australia, New South Wales, and Queensland.

⁴ The data for Belgium included data for Flanders, Wallonia, and the Brussels Capital Region.

During the second meeting of TSG 3 on 2001 August 28, it was decided that a second survey was required to obtain additional information about the characteristics of the laws, ordinances, and codes regarding sound insulation and noise criteria for sound in buildings.

A second questionnaire survey was carried out with responses received from the TSG Members in five countries. The questionnaire included the following request:

“Please check your country’s entry in the list of the results of the first questionnaire survey (document I-INCE TSG 3 N-22) and complete the description by paying particular attention to the following items: category of each law, regulation, guidelines, etc.; nature of the legislation (emission or immission); assessment position (outdoor, indoor, free field, façade, etc.); and other relevant characteristics.”

At the third meeting of TSG 3 on 2002 August 19, the results of the second questionnaire survey were discussed [2].

As noted in Appendix A, The fourth through the eighth (and last) meeting of TSG 3 were devoted to discussions of the preparation of the report of the work of the TSG.

3. QUESTIONNAIRES

The following paragraphs summarize the data obtained in responses to the questions in the two surveys of noise control legislation and regulations in countries of the Member Societies of I-INCE.

Q1 Please describe the legislative and administrative structures for the enactment and enforcement of noise policies and regulations or standards in your country

The following three approaches were observed in the collected data.

Centralized—Noise-control regulations were enacted and enforced by the national government. Norway and France had centralized approaches to control of community noise.

Tiered—The national government enacts noise-control laws. Local governments enforce specific regulations, ordinances, building codes, etc. Countries with tiered approaches included Germany, Japan, Korea, The Netherlands, Slovenia, Turkey, UK, and the USA.

Decentralized—In a decentralized system, noise-control regulations, especially immission-oriented requirements, were enacted and enforced by local governments. Australia used the decentralized approach. However, in many countries with a decentralized approach for noise-immission there was also a centralized approach for noise-emission requirements, such as for control of noise emission from automobiles, trucks, and motorcycles.

In addition to their respective national noise requirements, countries within the European Union had common noise control approaches as follows [3-5]:

The EU Directives on noise control were enacted and enforced at the national level.

- The EU Directive on Environmental Noise (mainly immission requirements) was enacted at the national level and enforced either at the central level or at the regional level.
- In most EU countries, additional national legislation was enforced partly centrally and partly at the regional or local level.⁵
- In some countries—for example, Belgium, Germany, and Spain—there was additional regional legislation. Most countries had local noise regulations, noise ordinances, and building codes. The work of TSG 3 focused mainly on national level legislation.

Appendix B and Appendix C present short descriptions of the 2007 status of the European Union (EU) requirements on emission and immission related to community noise.

Some responses to the first question in the survey described existing noise-control requirements in their countries, but then added that these requirements were in the process of being modified or replaced according to the EU Directives.

The following list contains keywords observed in the survey responses for describing the relevant legislative and administrative context for each approach to control of community noise.

Legislative Keywords:

Act of Parliament
 Regulation
 Standards
 Guidelines
 Code of Practice
 Provision
 Statute Law
 Public Laws
 Bylaw
 Ordinance
 European Commission Directives
 Notices
 Orders
 Circulars
 Notifications
 Building Codes
 Recommendations

Administrative Keywords:

Federal Authority
 Local Councils, Local Government,
 and Local Authority
 Governor
 Environmental Protection Authority and
 Environmental Protection Agency
 Government Transport and Planning Agency
 Government Planning Organization
 Parliament/Congress
 Ministry of: - Environment, -Transport,
 -Labor, -Industry and Trade, - Interior,
 -Physical Planning, -Local Government
 and Regional Development, - Transport
 and Communications, - Health and
 Social Affairs
 Environmental Health Department
 Planning Department
 Criminal Courts of law
 Pollution Control Authority
 Civil Aviation Authority
 Health and Safety Executive
 Police

⁵ Regional: pertaining to an administrative area, division, or district of a country or a state as, for example, a province, a county, or a prefecture (2.2 of [6])

Local: relating to, or involving, a particular limited geographical area for administrative purposes (2.2 of [6])

Many terms used to describe the approach to control of noise in a community, and the responsible agency, varied with the country. The data and discussions with the Members of TSG 3 revealed that there were substantial differences in the definitions of terms across countries, especially the use of the words: regulation, guideline, and standard. Recommended definitions were developed by I-INCE Technical Study Group 5 to foster greater agreement on terminology [6].

In some countries in addition to government organizations, there were other organizations that develop standards and guidelines related to community noise issues. These organizations include professional scientific or technical organizations, national standards institutes, special committees, and noise-review Working Parties. The various documents create a complex situation. Sometimes regulations and laws reference national and international noise standards and guidelines, making it difficult to distinguish between noise approaches to noise control that are 'legally required' and those that are 'recommended.'

Q2 Please enumerate the major laws or ordinances relevant to environmental noise problems in your country

Most countries had a basic community law or act that established approaches to control of community noise. This law or act established a responsible agency, specified the duties of the implementing or enforcing agency or national government, and established the overall administrative and legislative structure for the nation's approach to noise control.

It was expected that many different approaches would be found for the development of major noise-control laws, regulations, guidelines, ordinances, etc.

For aircraft, countries that responded to the survey indicated that they relied on the noise-certification criteria given in Annex 16 to the Convention on International Civil Aviation of the International Civil Aviation Organization (ICAO Annex 16). In the USA, the Federal Aviation Administration (FAA) requires comparable noise certification under Part 36 of Title 14 of the U.S. Code of Federal Regulations. The requirements for noise certification have, over time, yielded significant reductions in the noise produced by civil, subsonic airplanes in communities around airports.

The European Union's Directives established noise-emission requirements that, together with the Environmental Noise Directive, were in the process, at the time of the surveys, of being adopted by countries in the European Union. These requirements are intended to replace national-level noise-control documents with the requirements of appropriate European Union Directives. Flexibility of implementation at the national level was emphasized, especially concerning the choice of immission criteria for exposure to noise.

Regarding community noise, several countries in Europe had national-level programs although many countries both inside and outside of Europe dealt with community noise at the local level. Complaints were typically, but not always, addressed at the local level.

The majority of responses to Question 2 in the survey included noise-immission statements as part of a broader approach to community protection. Few responses included information on emission requirements for control of community noise, perhaps because the way in which the questions in the survey were constructed may have led the respondents to think primarily in terms of noise immission.

Criteria for noise emission, however, were generally included as part of the national noise requirements described by the respondents. These criteria applied to specific products in the transportation sector as well as other sectors. Emission criteria limit the level of sound produced by a source and complement the immission criteria for exposure to noise. Such immission criteria are ideally used to assess the exposure of an individual in a community from moving or stationary sound sources.

Limits on both noise emission and noise immission were found in the surveyed countries. In general, noise immission limits were incorporated in non-mandatory guidelines, while noise emission limits existed as regulations where compliance was legally required.

Q3 What is the nature of these laws and ordinances?

The summary of the responses to this question was included in the summary for Question 1.

Q4 What is the subject to which these laws and ordinances apply?

The responses to this question were in two groups. The first group focused on 'who' has to follow the regulations and ordinances and included the following:

- | | |
|---------------------|-----------------------|
| Contractors | Manufacturers |
| Equipment Operators | Management |
| Area Planners | Industrial Facilities |
| Property Owners | Exporters |

The second group emphasized 'what' as the subject of the approach to community noise control and included:

- Noise descriptors for national and local legislation
- Noise at the source of a sound
- Receiver locations
- Sources of noise on streets (loudspeakers, audible intruder alarms, vehicles, machinery, and equipment)
- Entertainment noise during nighttime hours from amplified music or singing
- Compensation to home-owners for high levels of exposure to noise
- Categories of exposure to noise
- Control of noise from aircraft
- Protection of hearing
- Minimum requirements for sound insulation between buildings
- Specific sound sources such as bird-scaring devices, barking dogs, musical ice cream vans, chimes, and similar sources.

Q5 Please give the noise-level limits specified in these laws, ordinances, or both

Data obtained in response to Questions 3, 4, and 5 are given in Appendix D.

Q6 How effective have the noise laws proven in the reduction of environmental noise?

Few respondents were able to answer this question. For those that responded, there were wide differences in the definition of effectiveness and the way to assess effectiveness.

Options for assessing the effectiveness of an approach to community noise control included (1) examining changes in noise-related complaints over time, (2) assessing the results of periodic inspections, (3) reducing the number of people exposed to community noise, and (4) examining the results of questionnaire surveys.

No uniform approach to assessing the effectiveness of the approaches was observed at the international level. Assignment of responsibility for national-level noise control can be viewed as either a legislative responsibility (that is, by regulations) or an administrative responsibility (that is, by implementation and enforcement) [7,8].

4. OBSERVATIONS

The results of the two questionnaires provided detailed information describing the current status of community noise legislation in the countries of participating I-INCE Member Societies and in other countries where information was available from publications [9-12].

Appendix D contains the results of the surveys on noise legislation organized by country. Because of the nature of the survey questionnaires, the information emphasized requirements on noise immission. There was a variety of approaches and criteria for evaluating exposure to noise in different countries, although some commonalities were observed.

In general, the results of the surveys indicated that the legislation was difficult to compare and the immission data simply could not be compared in any meaningful way.

Factors that influenced the development of a country's community noise legislation included the following:

- Noise ordinances and other local noise-level limits and enforcement tools
- Culture, history, and climate
- Legal system
- Planning and building laws and regulations
- Environmental laws and acts
- The influence of public attitude and public-interest groups
- Product noise-control regulations
- Role of government and international regulations
- Scientific research, standards, and guidelines
- Available noise-control technology
- Available financial resources
- Status of infrastructure development

The above factors explain many of the differences identified from the surveys in approaches to community noise control.

Complicating factors in comparing legislation from one country to another included the following:

- Differences in descriptors for exposure to noise;
- Differences in assessment methods: measurement or calculation procedures;
- If noise levels in a community were to be predicted for some time in the future, the computation method that should be used;
- Differences in duration of assessment or averaging times for measurements of sound level;
- Character of each legislative document: 'Law,' 'Decree,' 'Act,' 'Regulation,' or 'Guideline';
- Control of emission from noise sources(s) or immission at receiver(s);
- Intention of the noise levels specified in a document: mandatory limits or targets;
- Requirements for existing situations or new installations, or both;
- Differences in methods for measuring sound levels;
- Differences in measurement location:
 - Outdoors or indoors
 - Nominal free-field (How to deal with reflections from buildings or other structures?)
 - Measurement height above ground and location relative to nearby structures

Review of the information provided by the respondents to the questionnaire led to the following observations:

- Most survey responses indicated that their approaches to control of community noise included limits on levels of noise emission and noise immission.
- Emission noise requirements generally contained limits for controlling product noise at the source and for noise-certification purposes. These requirements were almost always embodied in noise regulations or laws.
- Immission noise levels, on the other hand, were concerned with the limits that were considered acceptable at a receiver location, typically near the façade of a residence or near specified infrastructures such as alongside a road or railway. The majority of these limits were given in guidelines rather than in regulations. The latter approach was typical for transportation noise sources. Many limits on immission levels for industrial noise and construction noise were included in regulations.
- Land-use planning, including zoning and control of development of housing, was often closely associated with the establishment of community-noise-immission limits. Some limits applied to future developments including large-scale remodeling, while others were applied retroactively to existing developments such as residential areas, especially for projects such as widening a highway or a railway right-of-way or lengthening a runway at an airport.
- For the three types of transportation noise sources (road vehicles, trains, and aircraft), most governments regulated noise emissions from these sources because they were considered national concerns. Noise-immission criteria typically were based on some form of time-averaged, A-frequency-weighted sound level.

- For the sound of road traffic, most responses to the questionnaires indicated a combination of individual vehicle-emission limits included in national regulations, as well as national road-traffic noise-immission limits. Road-traffic noise-immission limits were typically included in guidelines, although some countries had adopted immission regulations for road-traffic noise. There was more variability in the choice of a descriptor of the sound level used to control road traffic noise than for other transportation noise sources. Although the majority of countries used some version of time-averaged, A-weighted sound level, it was not uncommon to find some requirements based on the level of a time-weighted and A-frequency-weighted sound level that is exceeded some percentage of the time during a specified period of a day or other duration.
- Many countries had noise-immission guidelines concerning the intrusion of aircraft noise into communities. National guidelines for noise immission reflected economic and technical considerations relevant to the circumstances of each country. For aircraft noise-immission limits, the most common measure of aircraft noise was the 24-hour-averaged, A-weighted sound level or some variant, such as the day-night averaged, A-weighted sound level (DNL), or day-evening-night averaged, A-weighted sound level (DENL) where sound levels occurring during nighttime, or evening and nighttime, hours are weighted by an appropriate factor, respectively.
- The weighted equivalent-continuous perceived noise level (WECPNL) was used in several countries such as Japan and Korea as a measure of aircraft noise in communities around airports, although it was not measured directly but was calculated from measurements of maximum S-time-weighted and A-frequency-weighted sound level. Several countries still used descriptors such as the noise and number index (NNI) and the noise-exposure forecast (NEF). In the future, all countries in the European Union will use DENL and the yearly-average of 8-h-nighttime-average, A-weighted sound levels, as required by the European Environmental Noise Directive, see Appendix C.
- For the sound from railway operations, most countries had a combination of railway noise-emission regulations and community noise-intrusion guidelines. In some countries, different guidelines applied for conventional and high-speed railways. For railway noise-immission limits, the most common descriptor of noise level was the time-averaged, A-weighted sound level or the maximum in a given time period of the FAST (F) or SLOW (S) exponentially-time-weighted, A-frequency-weighted sound level. In a concern about sleep disturbance, some countries adopted a limit on both time-averaged, A-weighted sound level and the maximum F or S-time-weighted, A-weighted sound level.
- The following observations pertain to exposure to noise indoors and to sound insulation:
 - Few countries had adopted criteria for exposure to indoor noise.
 - Only the responses from Belgium and the UK included criteria as regulations for exposure to noise indoors. Specific noise sources identified were neighborhood (or ambient) sound, amplified music, or sound from industrial sources.
 - For noise planning (land-use and building), Norway and the UK had criteria for exposure to noise indoors as regulations. Builders and homeowners were required to take the responsibility to comply with the criteria in order to get permission to build. To comply with the indoor noise criteria, technical data about sound insulation performance or calculation of outdoor-to-indoor noise reduction would be needed.

- Many countries had sound insulation programs for homes exposed to the sound from road traffic, railways, and aircraft. Some of these programs included compensation or noise-mitigation measures as part of land–use planning.
- The UK and Norway described sound insulation criteria for both airborne and floor impact noise in dwellings.
- Many countries had sound insulation criteria for noise-sensitive buildings such as schools and hospitals.

Implications from this study for the development of a Global Noise Policy included the following: Limits on levels of noise emission and noise immission were used in most countries to limit exposure to community noise at the national level, in combination with regional or local responsibility. Noise-emission restrictions should continue to be implemented using both national and local regulations. Noise measurement and prediction procedures differed considerably among countries. A considerable amount of work is needed to achieve harmonization.

It is important that national governments continue to work to harmonize (1) criteria for limits on exposure to noise, (2) international standards for definitions of terms, (3) measures of exposure to noise, (4) measurement methods, and (5) noise-prediction models.

The Final Report of I-INCE Technical Study Group 5, *Noise as a Global Policy Issue*, contains a consensus on definitions for terms for use in the assessment and evaluation of noise levels in communities [6].

5. SUMMARY

A review of the information on national-level approaches to control of community noise revealed that there were differences in national choices of the descriptors of exposure to noise and the associated exposure criteria. The complex legal systems to implement and enforce the different approaches to national control of community noise make it difficult to provide recommendations for a standardized approach.

Differences were found in both legislative characteristics and technical aspects among the countries for which responses to the questionnaires were received. These differences included (1) the category of legislative documents (law, decree, act, regulation, recommendation, guidelines, or legal standard); (2) the nature of each document (emission or immission); (3) the measure of exposure to noise for each noise source; (4) the noise assessment method (field measurement or calculation); (5) the measurement method for describing exposure to noise (measurement position, outdoor or indoor, height above the local ground or floor, influence of reflections, nominal free-field condition or the inclusion of reflections, and others); and (6) the measurement and assessment time interval.

Among the EU Member States, the noise assessment methods had been partly unified, at the time of the surveys, by the EU Environmental Noise Directive and other related EU Directives.

A variety of approaches was used in different countries for their national approach to control of community noise. A meaningful comparison of the approaches was not possible. It was noted that the most common descriptor of noise immission was based on time-averaged, A-frequency-weighted sound level.

The following differences were found in the legislative and technical aspects of the national approaches to control of community noise:

- Character (category) of each legislative document: law, decree, act, regulation, guidelines, or standard, mandatory regulation (noise-level limits) or recommendation or guidelines (target)
- Nature of each document: emission or immission
- Requirements for existing situations (retrofit), new installations, or both
- Descriptors for expressing exposure to noise from each sound source
- Noise assessment method: field measurement or calculation
- Measurement or assessment time interval: reference time interval in a day (daytime, evening, nighttime, or whole day), long-term time interval (a week, a month, a year)

Control of noise at the source through limits on noise emission was considered by many responders to be the most economic and technically feasible approach to controlling noise in a community. These limits generally apply to one type of sound source at a time. Control of community noise by means of noise-immission limits complements the use of noise-emission limits. Both approaches will continue to be used, but where the noise measurement point is located and who is responsible for reducing unacceptable levels of exposure to community noise need to be considered.

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APPENDIX A: RESULTS FROM DISCUSSIONS AT MEETINGS OF TSG 3

A.1 NICE, FRANCE, INTER-NOISE 00, 2000 AUGUST 27

This first meeting of TSG 3 was an organizing meeting in which it was decided to prepare a questionnaire to be circulated to the Secretariats of the Member Societies of I-INCE in order to collect data on legislation and regulations related to community noise.

A.2 DEN HAAG, THE NETHERLANDS, INTER-NOISE 01, 2001 AUGUST 28

The results from the first questionnaire were reported at the second meeting of TSG 3 in Den Haag.

The following two actions were discussed:

- Each Member was to reconsider and respond to the questionnaire paying particular attention to the characteristics of the laws, regulations, and other relevant documents.
- If related to measurements for community noise, building codes regarding sound insulation and noise criteria/standards in buildings should be included in the response.

The following comments were made concerning the difficulties faced by TSG 3:

- It is difficult to directly compare the assessment methods and requirements of the countries, and therefore the responses should be compared by considering each concept rather than the details.
- It is necessary to define the terms regarding the noise regulations (laws) and guidelines of each country for which data were obtained from the survey.
- For an effective approach to control of community noise, it is essential to obtain data on the population's exposure to noise; therefore, measurement and prediction methods in each country should be investigated.

Regarding general problems of community noise, the following points were discussed:

- The goal of a program to control community noise should be to reduce the deleterious effects of exposure to noise. The suitability of an assessment and measurement method for each category of noise should be considered for complex urban noise environments.
- Noise mapping requires reliable methods to predict noise levels and establish action plans. Assessing the effectiveness of approaches to control of community noise requires reliable means to evaluate the effects of the sound from specific noise sources as well as indications of the reliability of predicted sound levels.

A.3 DEARBORN, MICHIGAN, USA, INTER-NOISE 02, 2002 AUGUST 19

At the third meeting of TSG 3 in Dearborn, the results of the second questionnaire survey were reported and the following issues were discussed:

- Differences between requirements for limits on noise emission and noise immission;
- Differences among approaches taken in each country represented by a participating I-INCE Member Society;
- Criteria for exposure to noise and methods for comparing different approaches;
- Relationship between national and local governments in the major western European countries, and the methods of modeling and describing exposure to noise including mapping of noise-level contours.

A.4 JEJU ISLAND, KOREA, INTER-NOISE 03, 2003 AUGUST 21

At the fourth meeting of TSG 3 on Jeju Island, preliminary tables summarizing the inputs from the participating Member Societies were presented for discussion and review [13].

A.5 PRAGUE, CZECH REPUBLIC, INTER-NOISE 04, 2004 AUGUST 23

The fifth meeting of TSG 3 was held in Prague. Progress had been made since the third meeting in developing the database, and work had begun on preparing the draft Final Report [14]. The draft Final Report and its associated database were circulated subsequently to the members of TSG 3 for their review.

A.6 RIO DE JANEIRO, BRAZIL, INTER-NOISE 05, 2005 AUGUST 06

The sixth meeting of TSG 3 was held in Rio de Janeiro where the text of the draft report was reviewed. The tables with the results of the surveys were discussed in depth [15].

A.7 HONOLULU, HAWAII, USA, INTER-NOISE 06, 2006 DECEMBER 03

The draft report from TSG 3 was discussed. It was agreed that the data from the surveys needed to be updated and re-organized. It was decided to prepare a preliminary draft report for circulation in 2007 to the Member Societies for review and comment, with special emphasis on the tabulated data from the surveys.

A.8 ISTANBUL, TURKEY, INTER-NOISE 07, 2007 AUGUST 26

A preliminary draft of the report from TSG 3 was circulated on 2007 July 09 to the Secretariats of the Member Societies for review and comment. The preliminary draft contained an EXCEL spreadsheet for Appendixes with information on regulations and legislation for community noise. The Member Societies were asked to update the information in this spreadsheet as well as to review the draft of the main text of the report. TSG 3 met on 2007 August 26 to discuss the comments of the Member Societies on the preliminary draft report. This was the last meeting of TSG 3.

**APPENDIX B:
EUROPEAN UNION LEGISLATION ON NOISE EMISSION
RELATED TO COMMUNITY NOISE
(Known as 'Environmental Noise' in the EU)**

The European Union has extensive legislation in terms of European Directives (which are laws) to limit the sound that may be emitted by road vehicles, aircraft, boats, trains, construction machinery, and other sources. The European Commission Directives and Technical Specifications that are listed in Table B.1 were implemented in the national legislation of the Member States of the European Union. Furthermore, Switzerland, Norway, and Iceland also adopted some of them and candidate countries such as Turkey have taken actions to implement all of them. Some of the Directives and particularly several of the directives on aircraft noise and automotive noise are in line with similar legislation in countries outside the EU. Many directives are unique, however. Examples are the directives on the noise emission by tires for motor vehicles and on the noise emission by equipment for use outdoors.

Table B.1 — Overview of EU legislation on noise emission related to community noise

(See the website: <http://www.europa.eu.int> for details.)

Noise source(s)	Document code(s)	Type of measures	Remarks
Aircraft	80/51/EEC, 83/206/EEC, 89/629/EEC, 92/14/EEC, 98/20/EC, 1999/28/EC	Certification (the EU expression is 'type approval') with limit values; Phase outs; Limitations on use	Civil subsonic jet airplanes
Aircraft	2002/30/EC	Rules and procedures for noise-related operating conditions at airports	
Cars, trucks busses and motorcycles (motor vehicles)	70/157/EEC, 73/350/EEC, 77/212/EEC, 81/334/EEC, 84/372/EEC, 84/424/EEC, 89/491/EEC, 92/97/EEC, 96/20/EC, 97/24/EC, 1999/101/EC	Certification with limit values	Most of the listed documents are amendments to 70/157/EEC
Tires for motor vehicles	92/23/EEC, 2001/43/EC	Certification with limit values	First legislation on tire noise in the world; a revision was underway
Trains and railway tracks	96/48/EC, 2002/735/EC, 2002/732/EC, 2001/16/EC, 2004/50/EC, 2006/66/EC	Limit values, or recommendations for rolling stock and/or infrastructure, or both	Concerns the trans-European high speed and conventional railway systems
Equipment for use outdoors	2000/14/EC and 2005/88/EC	Certification with labeling (the EU expression is 'marking') for all equipment and limit values for 22 types of equipment	57 types of equipment: ground moving machinery, gardening machines construction equipment and others; a revision was underway
Recreational craft (boats)	2003/44/EC	Certification with limit values	Recreational craft (boats)
Tractors	74/151/EEC, 82/890/EEC, 97/54/EC	Certification with limit values	Tractors

APPENDIX C: EUROPEAN UNION LEGISLATION ON NOISE IMMISSION RELATED TO COMMUNITY NOISE

EU Environmental Noise Directive 2002/49/EC (END)

On 2002 May 21, the Council of Ministers formally approved Directive 2002/49/EC, relating to the “assessment and management of environmental noise”. By 2007 March, all EU Member States had implemented the Directive in national legislation.

The Environmental Noise Directive (END) is a direct result of the European Union's Noise Policy Green Paper issued in 1996. It covers noise from transportation and industrial sources. The Directive requires that noise maps and action plans be made for:

- Agglomerations with populations greater than 100 000
- Major roads with more than 3 000 000 vehicles per year (approximately 8000 per day)
- Major railways with more than 30 000 trains per year
- Major civil airports with more than 50 000 operations per year (approximately 135 per day).

Noise maps show contours of the day-evening-night averaged, A-weighted sound level and nighttime-averaged A-weighted sound level for each type of sound source (road, rail, industry, etc.) at a height of 4 m above the ground. The European Union requires the making of maps of transportation and industrial noise levels using models that comply with certain requirements. The following methods are recommended:

- Roads: NMPB-96 (method used in France)
- Railways: RLM2 (method used in The Netherlands)
- Airports: European Civil Aviation Conference, ECAC Document 29
- Industrial sites: ISO 9613

Guidelines with adopted specifications for these methods and guidelines for their application have been published (see website: <http://forum.europa.eu.int/Public/irc/env/noisedir/library>). Software is commercially available.

The development of refined methods was underway; it is the intention of the European Commission to introduce these refinements as harmonized methods at a later date.

The general public must be informed and consulted during the process. The European Environment Agency in Copenhagen will collate the results in a central European database. The first maps for major areas are required by mid 2007, and action plans are required one year later. These activities are repeated at five-year intervals and all defined areas are to be incorporated in the round of deadlines starting in 2012.

The above are minimum requirements; several EU countries are doing more.

The END is not entirely immission oriented, but also has an important article that requires the European Commission to present further proposals on the reduction of noise emission.

The text of the directive in English and other languages may be found on the website: <http://europa.eu.int/>.

**APPENDIX D:
RESPONSES TO SURVEYS OF LEGISLATION, REGULATIONS, AND GUIDELINES
FOR CONTROL OF COMMUNITY NOISE**

Information from the surveys is given in this Appendix in Tables D.1, D.2, and D.3.

Table D.1 lists the letter symbols used to describe limits on permitted noise levels. All acoustical levels are in decibels, unit symbol dB, with a reference value of 20 μ Pa.

Table D.1 — Letter symbols from the surveys

Letter symbol	Description
$L_{Aeq,T}$	Level of time-averaged, A-frequency-weighted sound pressure averaged over a specified time interval T
$L_{Aeq,1h}$	Level of a one-hour-averaged, A-frequency-weighted sound pressure
$L_{Aeq,16h}$	Level of 16-hour-averaged, A-frequency-weighted sound pressure
$L_{Aeq,24h}$	Level of 24-hour-averaged, A-frequency-weighted sound pressure
$L_{Aeq,8h(day)}$	Level of a 8-hour-averaged, A-frequency-weighted sound pressure over specified daytime hours
$L_{Aeq,0.5h(night)}$	Level of a 0.5-hour-averaged, A-frequency-weighted sound pressure during specified nighttime hours
L_d	Level of A-frequency-weighted sound pressure averaged over a specified daytime interval d
L_e	Level of A-frequency-weighted sound pressure averaged over a specified evening interval e
L_n	Level of A-frequency-weighted sound pressure averaged over a specified nighttime interval n
L_{dn}	Day-night averaged sound level determined in accordance with the following expression $L_{dn} = 10 \lg \left\{ (1/24) \left[(d \times 10^{0.1L_d}) + (n \times 10^{0.1[L_n+10]}) \right] \right\} \quad (D.1)$ <p>In Equation (D.1), L_d and L_n are the daytime and nighttime averaged sound levels, d is the number of daytime hours, n is the number of nighttime hours, and $d + n = 24$ for a 24-hour day.</p>
L_{den}	Day-evening-night averaged sound level determined in accordance with the following expression $L_{den} = 10 \lg \left\{ (1/24) \left[(d \times 10^{0.1L_d}) + (e \times 10^{0.1[L_e+5]}) + (n \times 10^{0.1[L_n+10]}) \right] \right\} \quad (D.2)$ <p>In Equation (D.2), L_d, L_e, and L_n are the daytime, evening, and nighttime averaged sound levels, d is the number of daytime hours, e is the number of evening hours, n is the number of nighttime hours, and $d + e + n = 24$ for a 24-hour day.</p>
L_{AE}	Level of A-weighted sound exposure

Table D.1 — Concluded

L_r	Sound level calculated from a measurement of time-averaged sound level, including adjustments for tonal components and impulsive character, and used as a rating level
L_{va}	In Italy, aircraft noise is assessed by L_{va} , the 24-h average A-frequency-weighted sound level, with a 10 dB nighttime (23-06) penalty, and averaged over 21 days representing the three busiest weeks in each of the three 4-month periods: 01 October – 31 January, 01 February – 31 May and 01 June – 30 September.
L_{AF}	As used in Japan, level of F (fast) exponential-time-weighted, A-frequency-weighted sound pressure for measurements of continuous sounds
L_{AF5}	As used in Japan, F-time-weighted, A-frequency-weighted sound level exceeded 5 % of the time interval for measurements of continuously fluctuating sounds
L_{AFmax}	Level of maximum F (fast) exponential-time-weighted, A-frequency-weighted sound pressure in a specified time interval
L_{ASmax}	Level of maximum S (slow) exponential-time-weighted, A-frequency-weighted sound pressure in a specified time interval
L_{ASmax5}	In Japan, when the sound from an industrial source has an impulsive character and the maximum F-time-weighted, A-frequency-weighted levels of the impulsive sounds are not all the same, the noise level limit applies for the greatest 5 % of the maximum sound levels occurring within the specified periods of a day
$L_{Aeq,sp}$	As used in the Brussels Capital Region of Belgium, time-averaged sound level at a particular location with an adjustment for tonal components in the ambient sound and calculated from the most-frequently observed 1-s-averaged sound levels without the contribution of short-duration sounds from a particular sound source
S_{pte}	As used in the Brussels Capital Region of Belgium, threshold sound level above which a short-duration sound is counted as a noise event
$L_{A10,T}$	Level of F (fast) exponential-time-weighted, A-frequency-weighted sound pressure exceeded 10 % of the time during an observation interval T
$L_{A10,18h}$	Arithmetic average of 18 individual 10-percentile levels of F (fast) exponential-time-weighted, A-frequency-weighted sound pressure during each hour from 0600 to 2400.
$L_{A95,1h}$	Level of F (fast) exponential-time-weighted, A-frequency-weighted sound pressure exceeded 95 percent of the time during a 1-hour interval
L_{WA}	Level of A-frequency-weighted sound power
$L_{Z,peak}$	Level of Z-weighted peak sound level in a specified time interval

NOTE Frequency weightings A and Z are specified in International Standard IEC 61672-1.

Table D.2 lists the acronyms used to describe limits on permitted noise levels.

Table D.2 — Acronyms from the surveys

Acronym	Description
ANEF	<p>Australian version of the Noise Exposure Forecast (NEF) procedure developed for estimating community response to the sounds of airplane departures and arrivals. The procedure for calculating ANEF contours around an airport is given in Australian Standard AS2021-2000.</p>
NEF	<p>At a location under or to the side of a takeoff or landing flight path, the contribution to the total Noise Exposure Forecast, NEF_{ij}, is determined from the effective perceived noise level, $L_{epn}(i)$, calculated for a particular airplane model i and minimum distance to flight path, in accordance with the following expression</p> $NEF(ij) = L_{epn}(i) + 10 \lg[n_d(ij) + 16.7n_n(ij)] - 88 \text{ dB} \quad (D.3)$ <p>In Equation (D.3), $n_d(ij)$ is the annual average number of daytime (07 to 22) flights by airplane model i on flight path j and $n_n(ij)$ is the corresponding annual average number of nighttime (22 to 07) flights. The total annual average NEF at the chosen location is then determined from</p> $NEF = 10 \lg \left[\sum_i \sum_j 10^{0.1NEF(ij)} \right] \quad (D.4)$ <p>The -88 dB constant in Equation (D.3) is an empirical adjustment.</p>
NNI	<p>The Noise and Number Index (NNI) is calculated for specified locations under the nominal takeoff and landing flight paths in accordance with the following expression</p> $NNI = L_{pn}(av) + 15 \lg(N) - 80 \text{ dB} \quad (D.5)$ <p>In Equation (D.5), $L_{pn}(av)$ is the annual average of the maximum perceived noise level for all operations for which the maximum perceived noise level is greater than 80 dB and N is annual average number of airplane operations in daytime hours (06 to 22).</p> <p>The -80 dB constant in Equation (D.5) is an empirical adjustment.</p>

Table D.2 — Continued

Acronym	Description
TE	<p>Tonal Emergence, TE, is used in the Brussels Capital Region of Belgium to evaluate sounds from industrial facilities in the interior of dwellings when tonal components are suspected in the spectrum of the sound.</p> <p>Determination of tonal emergence begins with a measurement of the one-third-octave-band spectrum of the non-frequency-weighted level of the sound at the 90th percentile over the range of midband frequencies from 100 Hz to 10 kHz. The spectrum of the 90th percentile sound pressure level is calculated from at least 400 measurements of one-third-octave-band sound pressure levels sampled at a rate not less than one spectrum per second and then averaged to form the 90th percentile spectrum of the sound prevailing inside a dwelling.</p> <p>Tonal components in the spectrum of the 90th percentile sound pressure level are determined as the smallest of the arithmetic differences between a one-third-octave-band level and the level in adjacent bands.</p> <p>Tonal emergence must be taken into account when the largest of the tonal components exceeds the corresponding limit specified in the regulation.</p>

Table D.2 — Concluded

WECPNL	<p>In practice, Weighted Equivalent-Continuous Perceived Noise Level, WECPNL, for a 24-h day is calculated, in decibels, according to:</p> $\text{WECPNL} = \overline{L_{\text{ASmax}}} + 10 \lg(M) - 27 \text{ dB} \quad (\text{D.6})$ <p>In Equation (D.6), the weighted number of daily flights, M, is determined according to:</p> $M = N_2 + 3N_3 + 10(N_1 + N_4) \quad (\text{D.7})$ <p>In Equation (D.7), N_1 is the number of flights between 0000 and 0700 hours, N_2 is the number of flights between 0700 and 1900 hours, N_3 is the number of flights between 1900 and 2200 hours, and N_4 is the number of flights between 2200 and 2400 hours. The number of flights in a period is that for which maximum sound levels are measured.</p> <p>In Equation (D.6), $\overline{L_{\text{ASmax}}}$ is the average of the maximum A-frequency-weighted and S-time-weighted sound levels from aircraft flying over or by a measuring location and determined from</p> $\overline{L_{\text{ASmax}}} = 10 \lg \left(\frac{\sum_{i=1}^{N_{\text{all}}} 10^{0.1 L_{\text{ASmax}}(i)}}{N_{\text{all}}} \right) \quad (\text{D.8})$ <p>In Equation (D.8), $L_{\text{ASmax}}(i)$ represents one of the measured maximum sound levels and N_{all} represents the total number of flights in a 24-h period for which a maximum sound level is measured.</p> <p>The total number of flights in 24 h is related to the number in each period by</p> $N_{\text{all}} = N_1 + N_2 + N_3 + N_4 \quad (\text{D.9})$ <p>In Equation (D.6), the -27 dB constant accounts for various reference times: (1) a reference time of 1 s for determination of sound exposure level, (2) a reference time of 86 400 s for the number of seconds in 24 h, (3) a reference duration of 10 s for determination of effective perceived noise level, and (4) a reference duration of 20 s assumed for the average duration of the significant level of the A-frequency-weighted and S-time-weighted sound from aircraft.</p>

Responses to the surveys are given in Table D.3 in landscape format.

Entries in Table D.3 with gray shading indicate that no updates to the entries were received.

Table D.3 — Responses to surveys of legislation, regulations, and guidelines, organized alphabetically by country

Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
Australia	Australia is a Federation of six States and two Territories. Legislation on community noise is the responsibility of each of the State and Territory governments. For some issues, such as aircraft noise and motor vehicle noise, the Federal government has the responsibility for legislation for type approval.								
Australia	ADR 83/00	Motor vehicles - type approval	Regulation	Emission	Outdoor, at 7.5 m	None	L_{AFmax}	Drive-by test: 74 dB to 80 dB	Nationally applicable for vehicles under previous Australian Design Rules (ADR) and the new ADR 83/00.
Australia	ADR 83/00	Motor vehicles - in service	Regulation	Emission	Outdoor, at 0.5 m, but 1050 mm for heavy vehicles	None	L_{AFmax}	Exhaust noise: 84 dB to 103 dB	Enforced at the State level under previous ADRs. A signature stationary noise test is being introduced under ADR 83/00 for in service vehicles.
Australia	The name varies from State to State	Road traffic	Guidelines	Immission	Outdoor, 1 m from façade Outdoor, 1 m from façade Outdoor, Free field	Day Night Day-night 18 hour	$L_{Aeq,T}$ $L_{Aeq,T}$ $L_{Aeq,T}$ $L_{A10,18h}$	Ranges from 55 dB to 60 dB. Ranges from 50 dB to 55 dB Ranges from 40 dB for night to 65 dB for day Ranges from 58 dB to 60 dB	Varies from State to State Depends on type of area The 18-h period generally is from 06 h to 24 h
Australia	AS2021-2000	Civil aircraft	Guidelines	Immission	Outdoor	Annual average	ANEF	<20 20-25 >25	Types of development based on contour levels: - No restrictions - New dwellings with appropriate insulation - New dwellings not allowed
Australia	The name varies from State to State	Industry	Regulation	Immission	Outdoor, at nearest affected residence or boundary	Depending on the area and time of day	$L_{Aeq,T}$ $L_{A10,T}$	Either comparison with background noise level or with zone noise standards	Each state has appropriate environmental legislation. Noise from large sources is controlled in the licensing process. A typical time interval is 10 to 15 minutes.
Australia	The name varies from State to State	Construction	Regulation/ Guidelines	Immission	Outdoor	See Notes	varies	Sound level limits may be prescribed based on exceedance over level of background noise	Generally controlled by hours of operation. In 2008, guidance in AS2436-1981 was under revision.
Australia	Vibration	Vibration	Guidelines	Immission	Outdoor and indoor	Day Night	Vibration dose	Particle acceleration or velocity limits	Triaxial
Austria	The name of the law?	Road traffic	Guidelines ?	Immission	Free field	Day-night	$L_{Aeq,T}$	50-55 dB (06-22), 40-45 dB (22-06) 60 dB (06-22), 50 dB (22-06) 65 dB (06-22), 55 dB (22-06)	- Planning (target) limits - Noise level limits for new federal roads - Threshold noise levels for remedial measures at (existing) federal roads
Austria	Railway Noise Immission Ordinance 1993	Railways	Guidelines ?	Immission	Free field	Day-night	$L_{Aeq,T}$	65 dB (06-22), 55 dB (22-06)	Limits for the level of railway noise are adjusted by -5dB to allow for lower perceived annoyance from trains at the same average sound level as other sources.

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
Austria	The name of the law?	Civil aircraft	Guidelines ?	Immission	Free field	Day-night	L_{dn} / L_{Amax}	L_{dn} / L_{Amax} >75 dB / 105 dB >65 dB / - >60 dB / - >55 dB / - >65 dB / - >55 dB / -	<New Buildings> - Agricultural, military and airport buildings only. No new residential zones. - Residential buildings in existing zone and commercial buildings to have required sound insulation. No new residential zones. - Residential building in Existing zone. No new residential zones. - Noise sensitive buildings only in case of overriding need with required sound insulation. <Existing Buildings> - Residential and noise sensitive buildings (schools, hospitals, nursing homes) to have required sound insulation. - Noise sensitive buildings (schools, hospitals, nursing homes) to have required sound insulation.
Austria	The name of the law?	Industry	Guidelines ?	Immission ?	?	Day-night	L_r ¹⁾	60-65 dB (day) 50-55 dB (night).	1) Rating level $L_{Aeq,8h}$ (day) or $L_{Aeq,0.5h}$ (night) plus an adjustment of 3 dB to 6 dB for tonal components or an adjustment of 3 dB to 5 dB for impulsive components in the sound from the industry.
Belgium	Belgium is a federal state that is divided into three regions: the Flemish region, the Wallonia region and the Brussels Capital region. Each region has its own environmental policy and develops its own legislation. As a result, laws and regulations on noise immission can differ among the three regions. Additionally, local councils can enact by-laws or ordinances. The federal (national) authority has the power when it comes to noise emission limits, i.e., by product legislation. Emission limits for motor vehicles and aircraft are adopted from those given in EU Directives.								
Belgium	The Framework Law on Noise Nuisance (1973)	This law states that measures can be taken by Regional Authorities to combat and prevent noise nuisance such as that produced by motor vehicles, aircraft, and railways. This framework law does not apply in the Brussels Capital region where special legislation has been enacted. Noise emission limits for construction machinery and lawn mowers were issued in 1998 to implement the Directives of the EU on noise.							
Belgium: Flemish Region	Decree of the Flemish Council concerning Environmental Licenses (1985) Flemish Regulation on Environmental Licenses VLAREM I (1991) & II (1992 and 1995)	Ambient sounds	Guidelines	Immission	Outdoor ¹⁾	Day-evening-night	$L_{A95,1h}$	40 dB to 60dB (07-19) 35 dB to 55dB (19-22) 30 dB to 55dB (22-07) ²⁾	1) At a height typical for the height of living spaces in the area and at least 3.5 m from walls, buildings, and other structures that could reflect sound waves. 2) Noise level limits depend on the nine categories of land-use zones specified in the Guidelines

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
Belgium: Brussels Capital Region	Environmental convention concerning noise and vibration from subways and streetcars (2004)	Subways and streetcars (new infrastructures only)	Guidelines	Immission	Outdoor	Daytime and nighttime	$L_{Aeq,sp}$	70 dB (07-22) ¹⁾ 65 dB (22-07) 63 dB to 68 dB (06-22) ²⁾ 58 dB to 63 dB (22-06)	¹⁾ Subways ²⁾ Streetcars Noise level limits for the sound from subway and streetcar operations are for time-averaged sound levels that are not to be exceeded during daytime or nighttime periods. ¹⁾ Subways: In addition, the Guidelines provide goals for limits lower than the specified limits. The Guidelines also describe situations where urgent intervention may be needed to reduce the existing time-averaged sound level so as to not exceed the limits. ²⁾ Streetcars: Choice of noise level limits depends on the five/three categories of land-use zones specified in the Convention (day/night, respectively)
Belgium: Brussels Capital Region	Decision concerning noise of airplanes (1999)	Civil aircraft	Regulation	Immission	Outdoor*	Daytime and nighttime	L_{AE} $L_{Aeq,sp,aircraft}$	80 dB to 100 dB(07-23) 70 dB to 90 dB(23-07) 55 dB to 65 dB(07-23) 45 dB to 55 dB(23-07)	* At a height between 1.5 m and 25 m and at least 1.5 m from walls, buildings, and other structures that could reflect sound waves. L_{AE} : A-weighted sound exposure level calculated for the sound from a particular aircraft type at a specified location around an airport and a specified flight operation during daytime and nighttime periods. $L_{Aeq,sp,aircraft}$: time-averaged, A-weighted sound level calculated for a specified location for the sound from all aircraft operations within a specified period. Choice of noise level limits depends on the three categories of land-use zones specified in the Regulation.

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
Denmark	Guideline from the Environmental Protection Agency, 5/1994: Noise from airfields: Assessment, measurement, calculation, and control	Civil aircraft	Guidelines	Immission	Free Field	Day-evening-night Night	L_{den} L_{den} L_{den} L_{Amax}	45 dB / 50 dB ¹⁾ 45 dB to 50 dB / 55 dB 60 dB / 60 dB 50 dB / 60 dB 70 dB / 80 dB	- Summer Residential / Camping - Hospital, School / Residential - Hotel / Office - Rural - During nighttime ¹⁾ Smaller airfield, airport, or military airfield The Danish Government has subsidized noise insulation for dwellings exposed to 24-h averaged sound levels greater than 65 dB.
Denmark	Outdoor noise emission from industrial sites Guideline nr. 5/1984	Industry	Regulation	Immission	Free Field	Day-evening-night	$L_{Aeq,T}$	A B C 70 dB 70 dB 70 dB 60 dB 60 dB 60 dB 55 dB 45 dB 40 dB 50 dB 45 dB 40 dB 45 dB 40 dB 35 dB 40 dB 35 dB 35 dB * * * ** ** **	A: 07-18(Mon/Fri), 07-14(Sat) B: 18-22(Mon/Fri), 14-22(Sat), 07-22(Sun) C: 22-07(All days) - Commercial / Industrial - Commercial / Industrial; Ban on Noisy Activities - Residential / Commercial Mix - High Rise Residential - Low Rise Residential - Recreational Areas - Allotment Gardens - Rural * Levels vary depending on location and planning purpose for an area ** Levels are not to exceed the background sound levels Noise level limits are adjusted by -5dB for clearly audible tonal sounds and also for impulsive sounds.
Finland	The Finnish Noise Abatement Policy	All sources	Guidelines	Immission	Free field	Day-night	$L_{Aeq,T}$	55dB (07-22), 50dB (22-07) 55dB (07-22), 50dB (22-07) 55dB (07-22), 50dB (22-07) 55dB (07-22), 45dB (22-07) 45dB (07-22), 40dB (22-07)	Type of area: - Residential - Recreation in conglomerations and areas in their proximity - Areas serving nursing or educational institutions - New residential and recreation areas and areas serving nursing or educational institutions - Holiday settlements (camping sites, etc.)
France	In France, national policies, regulations, and standards are enacted and enforced by the national government.								
France	Basic law about the fight against noise n°92-1444 (31/12/92) Decree n°95-22(9/01/95) about land-transport noise limits /Order of 5/05/95 concerning road noise	Road traffic	Regulation	Immission	Outdoor 2 m in front of windows	Day-night	$L_{Aeq,T}$	60 dB (06-22), 55 dB (22-06) 57 dB (06-22), 55 dB (22-06) 65 dB (06-22), 60 dB (22-06)	New or modified land uses: - Residential areas, and schools - Hospitals - Other areas
France	Circular of 12/06/01 about land transport noise in areas with high noise levels	Traffic on existing roads	Regulation	Immission	Outdoor 2 m in front of windows	Day-night	$L_{Aeq,T}$	70 dB (06-22), 65 dB (22-06) 65 dB (06-22), 60 dB (22-06)	- For existing infrastructures - After modifications

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
France	Basic law about the fight against noise n°92-1444 (31/12/92) Decree n°95-22(9/01/95) about land-transport noise limits /Order of 8/11/99 concerning railway noise	Railways	Regulation	Immission	Outdoor 2 m in front of windows	Day-night	$L_{Aeq,T}$	60 dB (06-22), 55 dB (22-06) 57 dB (06-22), 55 dB (22-06) 65 dB (06-22), 60 dB (22-06)	New or modified land uses: - Residential areas, and schools - Hospitals - Other areas
France	Law about urbanism around airports (11/07/85), and Decree 2002-626, (26 April 2002)	Civil aircraft	Regulation	Immission	Outdoor 10 m from the façade of a building and 3.5 m above the ground	Day-evening-night	L_{den}	Zone A: $L_{den} > 70$ dB Zone B: $62 \text{ dB} \geq L_{den} \geq 70$ dB Zone C: $57 \text{ dB} \geq L_{den} \geq 65$ dB Zone D: $L_{den} \geq 50$ dB to the lower limit for zone C (57 dB to 55 dB)	Zones are defined by calculated contours of day-evening-night averaged sound level around an airport. Land planning restrictions are imposed within zones exposed to aircraft noise, particularly concerning building insulation. For some airports, the lower noise-level limit for zones B and C may be chosen as 65 dB instead of 62 dB and 55 dB instead of 57 dB, respectively
France	Law about industrial activities (19/07/76) Order (23/01/97) about noise radiated in the environment by installations classified for the protection of the environment	Industry	Regulation	Emission Immission	Border of the industrial premises Outdoor 2 m in front of windows	Day-night Day-night	$L_{Aeq,T}$ $L_{Aeq,T}$ $L_{A50,T}$	50 dB (day), 40 dB (night) 55 dB (day), 45 dB (night) Difference between ambient sound level ¹⁾ and background sound level ²⁾ not greater than 5 dB in daytime hours and not greater than 3 dB in nighttime hours	- Rural residential areas - Urban residential areas ¹⁾ Ambient sound level at some location is the Time-averaged, A-weighted sound level, $L_{Aeq,T}$, measured with all sound sources operating including the source of interest in a stated averaging time. ²⁾ Background sound level at the same location is the A-weighted sound level, $L_{A50,T}$, measured 50 % of the time with all sound sources operating except the source of interest during a stated period. Use the 50 th percentile level of background sound when the difference between ambient and background sound levels exceeds 5 dB.
France	Law about industrial activities (19/07/76) Decree 2006-1099 about community noise control (31/08/06)	Industry	Regulation	Immission	Outdoor 2 m in front of windows or indoors	Day-night	$L_{A50,T}$ or other	Difference between ambient sound level ¹⁾ and background sound level ²⁾ not greater than 5 dB in daytime hours and not greater than 3 dB in nighttime hours	Choice of sound level index to be made in accordance with French Standard NF S31:010 Decree 2006-1099 includes a requirement that the difference between the octave-band ambient sound pressure levels and the corresponding octave-band background sound pressure levels shall not exceed 7 dB for nominal midband frequencies of 125 Hz and 250 Hz, or 5 dB for nominal midband frequencies from 500 Hz through 8 kHz.

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
France	Decree 98-1143 about facilities regularly featuring amplified music	Entertainment	Regulation	Immission	50 cm from loudspeakers	Day-night	$L_{Aeq,T}$ $L_{C,peak}$	105 dB 120 dB	Time-averaged sound levels and Z-weighted peak sound levels are those measured in a 10-minute period that includes the loudest sounds. 1) Ambient sound level at some location is the time-averaged, A-weighted sound level, $L_{Aeq,T}$, measured with all sound sources operating including the source of interest in a stated averaging time. 2) Background sound level at the same location is the A-weighted sound level, $L_{A50,T}$, measured 50 % of the time with all sound sources operating except the source of interest during a stated period. The difference between the octave-band ambient sound pressure levels and the corresponding octave-band background sound pressure levels inside the premises shall not exceed 3 dB for nominal midband frequencies of 125 Hz 8 kHz.
				Emission	Outdoor 2 m in front of windows or indoors	Day-night	$L_{Aeq,T}$	Difference between ambient sound level ¹⁾ and background sound level ²⁾ not greater than 3 dB	
Germany	Traffic Noise Ordinance, 1990 June 12	Road traffic and railways	Regulation	Immission	Outdoor, free field	Day / night	$L_{Aeq,T}$	57 dB (06-22) / 47 dB (22-06) 59 dB (06-22) / 49 dB (22-06) 64 dB (06-22) / 54 dB (22-06) 69 dB (06-22) / 59 dB (22-06)	Limits for new & significantly modified roads ^{*)} - Hospitals and schools - Residential areas - Mixed business & residential areas - Areas with light industry ^{*)} The sound from railway operations on new lines or existing lines is subject to the noise immission limits as for road traffic except that 5 dB is subtracted from the measured or calculated time-averaged A-weighted sound level of a railway before comparison with these limits to allow for the lower perceived annoyance from the sound of trains having the same time-averaged sound level as other sources.
Germany	Remedial Program for existing federal roads (since 1978) and railways (since 1999)	Road traffic and railways	Guidelines	Immission	Outdoor, Free field	Day / night	$L_{Aeq,T}$	70 dB (06-22) / 60 dB (22-06) 72 dB (06-22) / 62 dB (22-06) 75 dB (06-22) / 65 dB (22-06)	- Hospitals, schools, & residential areas - Mixed business & residential areas - Areas with light industry (with 5 dB adjustment for the sound of railway operations, see above)
Germany	Annex 1 to DIN 18005 Noise Protection in Urban Planning (1987)	Road traffic and railways	Guidelines	Immission	Outdoor, free field	Day / night	$L_{Aeq,T}$	50 dB (06-22) / 40 dB (22-06) 55 dB (06-22) / 45 dB (22-06) 55 dB (06-22) / 45 dB (22-06) 60 dB (06-22) / 45 dB (22-06) 60 dB (06-22) / 50 dB (22-06) 65 dB (06-22) / 55 dB (22-06)	Noise level limits apply for planning of new residential and other areas - Purely residential areas, spa areas, vacation areas - Mainly residential areas, campgrounds - Cemeteries, parks - Special residential areas - Rural areas, mixed residential and commercial areas - Town centers, commercial areas (with 5 dB adjustment for the sound of railway operations, see above)

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
Germany	Air Traffic Noise Act 2007 June 01	Civil & military aircraft	Regulation	Immission	Outdoor, free field	Day / night	$L_{Aeq,16h}$	see notes	see notes
Germany	Technische Anleitung zum Schutz gegen Laerm 16 Juli 1968)	Industry	Regulation	Immission	Outdoor, quasi free field	Day / night	$L_{Aeq,16h}$ and $L_{Aeq,1h}$	45 dB (06-22) / 35 dB (22-06) 50 dB (06-22) / 35 dB (22-06) 55 dB (06-22) / 40 dB (22-06) 60 dB (06-22) / 45 dB (22-06) 65 dB (06-22) / 50 dB (22-06) 70 dB (06-22) / 70 dB (22-06)	Type of area: - Hospital - Exclusively residential - Mainly residential - Mixed residential & commercial - Commercial & industrial - Industrial Sounds from industrial operations are measured in a quasi free field without reflections except from the ground. $L_{Aeq,16h}$ (06-22) or $L_{Aeq,1h}$ (22-06) with a 3 dB or 6 dB adjustment for tonal components and an adjustment for impulsive sound of $L_{Aeq,T} - L_{Aeq,T}$ or $L_{AFTeq} - L_{Aeq,T}$
Greece	Ministerial Decision 17252 (6.1992)	Road traffic	Regulation ?	Immission	Façade	Day?	$L_{Aeq,T}$ $L_{A10,T}$	67 dB (08-20) 70 dB (06-24)	In the case of specific buildings, such as schools and hospitals, the noise level limits can be reduced by 5 dB to 10 dB.
Greece	Presidential Decree 1178 (10.1981)	Civil aircraft	Regulation ?	Immission	Free field?	Day-night	NEF	Three zones are specified: NEF >40 NEF 30 to 40 NEF <30.	The procedure for determining an annual average Noise Exposure Forecast at a point around an airport is described in Table D.2.
Greece	Presidential Decree 1180 (10.1981)	Industry	Regulation ?	Emission? ?	? ?	? ?	L_{Amax}	70 dB 65 dB 55 dB 50 dB	Type of area: - Industrial - Mixed (Predominantly Industrial) - Mixed (Predominantly Residential) - Urban (Strictly Residential) or Rural
Ireland	The Environmental Protection Agency Act (Noise) Regulations 1994?	Road traffic	Regulation ?	Immission	? ?	Day only?	$L_{A10,T}$	65 dB to 68 dB (06-24)	
Ireland	The name of the law?	Civil aircraft	Regulation ?	Immission	? ?	? ?	NNI	No limits are specified.	The procedure for determining an annual average Noise and Number Index (NNI) is described in Table D.2.
Ireland	The name of the law?	Industry	Regulation ?	Immission	Free Field	Day-night	$L_{Aeq,1h}$ $L_{Aeq,5min}$	$L_{Aeq,T} - L_{A90,T} < 5$ dB to 10 dB	Industrial noise is assessed using the British Standard BS4142 in which the free-field $L_{Aeq,1h}$ (day), or $L_{Aeq,5min}$ (night), of the noise source, with a 5 dB adjustment for tonal or impulsive components, is compared with the background noise measured using $L_{A90,T}$. Complaints are considered likely if the adjusted specific noise level exceeds the background by 10 dB or more. A difference of 5 dB is considered to be of marginal significance.

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
Italy	Decree of the President of the Republic 30 March 2004, n. 142	Road traffic	Regulation	Immission	Outdoor, 1 m from façade	Day-night	$L_{Aeq,T}$	70 dB (06-22), 60 dB (22-06) 50 dB (06-22), 40 dB (22-06)	Existing major roads, road-receiver distance not greater than 100 m. Sensitive receivers: schools, hospitals
Italy	Decree of the President of the Republic 18 November 1998, n. 459	Railways	Regulation	Immission	Outdoor, 1 m from façade	Day-night	$L_{Aeq,T}$	70 dB (06-22), 60 dB (22-06) 50 dB (06-22), 40 dB (22-06)	Railway-receiver distance not greater than 100 m. Sensitive receivers: schools, hospitals
Italy	Decree of the Ministry of Environment 31 October 1997	Aircraft	Regulation	Immission	Free field	Day-night	L_{va}	Zone A: $L_{va} < 65$ dB Zone B: $L_{va} = 65$ dB to 75 dB Zone C: $L_{va} > 75$ dB	Zone A: no restriction to land use. Zone B: no residential land use. Zone C: activities linked to airport only.
Italy	Decree of the Prime Minister 14 November 1997	Industry	Regulation	Emission	Outdoor, 1 m from façade	Day-night	$L_{Aeq,T}$	45 dB (06-22), 35 dB (22-06) 50 dB (06-22), 40 dB (22-06) 55 dB (06-22), 45 dB (22-06) 60 dB (06-22), 50 dB (22-06) 65 dB (06-22), 55 dB (22-06) 65 dB (06-22), 65 dB (22-06)	For the emission of a specific sound source, noise limits depend on the type of land use: - Sensitive: hospital, school, etc. - Residential - Mixed Residential / Commercial - High density of Residential / Commercial - Industrial (mainly) - Industrial. Penalties of + 3 dB must be applied when the sound has tonal components and + 3 dB when the sound is impulsive.
Italy	Decree of the Prime Minister 14 November 1997	Industry	Regulation	Immission	Outdoor, 1 m from façade	Day-night	$L_{Aeq,T}$	50 dB (06-22), 40 dB (22-06) 55 dB (06-22), 45 dB (22-06) 60 dB (06-22), 50 dB (22-06) 65 dB (06-22), 55 dB (22-06) 70 dB (06-22), 60 dB (22-06) 70 dB (06-22), 70 dB (22-06)	For the sound immission from all sources, noise limits depend on the type of land use: - Sensitive: hospital, school, etc. - Residential - Mixed Residential / Commercial - High density of Residential / Commercial - Industrial (mainly) - Industrial. Penalties of + 3 dB must be applied when the sound has tonal components and + 3 dB when the sound is impulsive.

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
Japan	In Japan, national policies and regulations or standards are enacted and enforced by the national government. Local governments issue ordinances for enforcement of the national regulations or standards. Local governments can also enact their own ordinances for noise regulations or standards.								
Japan	Environmental Quality Standards for Noise (1971, last revised in 1998)	General sources and road traffic	Guidelines	Immission	Outdoor: free field If the effect of reflections from a nearby building or buildings cannot be ignored in a measurement of sound level, the sound shall be measured where the effects of reflections are negligible.	Day and night	$L_{Aeq,T}$	50 dB (06-22), 40 dB (22-06) 55 dB (06-22), 45 dB (22-06) 60 dB (06-22), 50 dB (22-06) 60 dB (06-22), 55 dB (22-06) 65 dB (06-22), 60 dB (22-06) 70 dB (06-22), 65 dB (22-06) 45 dB (06-22), 40 dB (22-06)	For general Residential Areas: - Area AA *) - Area A and Area B - Area C Roadside Areas: - Area A (facing two or more lanes) - Area B (facing two or more lanes) and Area C (facing one or more lanes) For Areas adjacent to arterial roads: - Outdoor - Indoor *) AA: Areas that especially require a quiet environment, such as those in which convalescent facilities and welfare institutions are concentrated A: Areas exclusively for residential use B: Areas mainly for residential use C: Areas for commercial and industrial use and significant residential use
Japan	Noise Regulation Law (1970, last revised in 2000)	Motor vehicles	Regulation	Emission	at 0.5 m at 7.5 m at 7.5 m	None	L_{AFmax}	96-100 dB ¹⁾ 72-83 dB ¹⁾ 76-82 dB ¹⁾	- exhaust sound - drive-by at a steady speed - drive-by with acceleration ¹⁾ The limits apply to new vehicles and differ by vehicle type.
Japan	Noise Regulation Law (1970, last revised in 2000)	Road traffic	Regulation	Immission	at roadsides	Day and night	$L_{Aeq,T}$	65 dB (6-22), 55 dB (22-06) 70 dB (6-22), 65 dB (22-06) 75 dB (6-22), 70 dB (22-06)	- Area A and Area B facing a single lane road - Area A facing a road with two or more lanes - Area B facing a road with two or more lanes and Area C facing a road with two or more lanes
Japan	Noise Regulation Law (1970, last revised in 2001)	Industry	Regulation	Emission	On the boundary	Day, morning and evening, and night	L_{AF} ¹⁾ L_{AF5} ²⁾ L_{AFmax} ³⁾ L_{AFmax5} ⁴⁾	50-60 dB (day) *) 45-50 dB (morning and evening) 40-50 dB (night) *) Local governments determine the limits and the hours.	¹⁾ For steady sounds ²⁾ See Table D.1 ³⁾ For impulsive sounds all with the same maximum level ⁴⁾ See Table D.1
Japan	Noise Regulation Law (1970, last revised in 2001)	Construction	Regulation	Emission	On the boundary	Day (Nighttime and holiday work is prohibited in principle)	L_{AF} ¹⁾ L_{AF5} ²⁾ L_{AFmax} ³⁾ L_{AFmax5} ⁴⁾	85 dB	¹⁾ For steady sounds ²⁾ F-time-weighted and A-frequency-weighted sound levels exceeded 5 % of the time interval that applies for continuously fluctuating sounds ³⁾ For impulsive sounds all with the same maximum level ⁴⁾ When the sound from a construction source has an impulsive character and the maximum F-time-weighted and A-frequency-weighted levels of the impulsive sounds are not all the same, the noise level limit applies for the greatest 5% of the maximum sound levels occurring within the specified periods of a day

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
Japan	Environmental Quality Standards for Noise of Shinkansen Trains (1975)	Super-Express trains	Guidelines	Immission	Outdoor: free field	Any time (06-24)	$L_{ASmax}^{1)}$	70 dB 75 dB	- Area I (mainly for residential use) - Area II (where normal living conditions should be preserved, including commercial and industrial areas) ¹⁾ The maximum S-time-weighted and A-frequency-weighted sound level is measured at a prescribed position during the passage of 20 consecutive trains. For assessing compliance with the noise-level limits, the level of the average of the squared sound pressure signals is calculated from the ten highest of the 20 measured maximum sound levels.
Japan	Guidelines of noise levels for conventional railways, - notification 174 (Dec. 20 1995)	Conventional railway	Guidelines	Emission	Outdoor, at 12.5 m	Day and night	$L_{Aeq,T}$	60 dB (07-22), 55 dB (22-07) ¹⁾	¹⁾ The noise level limits apply to new construction of conventional railways. In the case of a large-scale alteration of existing rail tracks, the average sound level after completion of construction shall not exceed the average sound level before the start of the alterations.
Japan	Environmental Quality Standards for Aircraft Noise (1973, revised 2007)	Civil aircraft	Guidelines	Immission	Outdoor: free field	Day-evening-night	$L_{den}^{1)}$	57 dB 62 dB	- Area I (exclusively for residential use) - Area II (where normal living conditions should be preserved) ¹⁾ The index L_{den} was introduced in the 2007 version of the Guidelines replacing WECPNL.
<p>Korea In Korea, national policies on noise are enacted by the national government with Environmental Quality Standards and Regulatory Standards. Local governments have the responsibility for noise control by enforcing the Regulatory Standards under the Regulatory Laws.</p>									
Korea	Environmental Quality Standards under the Basic Law for Environment (1991)	General	Guidelines	Immission	Outdoors	Day-night	$L_{Aeq,T}$	50 dB (06-22), 40 dB (22-06) 55 dB (06-22), 45 dB (22-06) 65 dB (06-22), 55 dB (22-06) 70 dB (06-22), 65 dB (22-06)	- Areas that especially require a quiet environment. - Areas mainly for residential with some commercial use - Areas for commercial use - Areas for industrial use
Korea	Environmental Quality Standards (1991)	Road traffic	Guidelines	Immission	Outdoors in areas facing roads	Day-night	$L_{Aeq,T}$	65 dB (06-22), 55 dB (22-06) 70 dB (06-22), 60 dB (22-06) 75 dB (06-22), 70 dB (22-06)	- Areas mainly for residential with some commercial use - Areas for commercial use - Areas for industrial use
Korea	Environmental Quality Standards (1991, revised 2000)	High speed trains	Guidelines	Immission	Outdoors (affected areas)	Day-night	$L_{Aeq,24h}$	63 dB 68 dB 60 dB 65 dB	Existing train lines - Area I: Areas for mainly residential use. - Area II: Areas for commercial and industrial use with no significant residential use. For new train lines after 2015 - Area I - Area II
Korea	Noise and Vibration Regulatory Law (1991, revised 2004)	Civil aircraft	Regulation	Immission	Outdoors (affected areas)	Day-evening-night	WECPNL ¹⁾	75 dB	- Areas either exclusively residential or with some commercial activities ¹⁾ WECPNL calculation method shown in Table D.2
Korea	Noise and Vibration Regulatory Law (1991, revised 2004)	Road traffic	Regulation	Emission	Outdoor (affected areas)	Day-night	$L_{Aeq,T}$	68 dB (06-22), 58 dB (22-06) 73 dB (06-22), 63 dB (22-06)	- Areas for mainly residential and green belt use. - Areas for commercial, industrial and other uses

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
The Netherlands	Civil Aviation Act with associated (ministerial) regulations	Civil aircraft	Statutory	Emission and immission	For immission: outdoor, free field	For immission - Day-evening-night - Night For emission See ICAO or EU Directives	L_{den} L_n	Limits range from 55 dB to 62 dB at specific positions near Schiphol Airport. No limits are prescribed for arbitrary immission positions. Limits range from 45 dB to 53 dB at specific positions near Schiphol Airport. No limits are prescribed for arbitrary immission positions See ICAO Annex 16 for limits on certification noise levels for civil aircraft	The Civil Aviation Act has other rules for Amsterdam Schiphol Airport than for the regional airports in The Netherlands. For regional airports, the outdated index ($Ke = \text{Kosten unit}$) is still applied, except for noise mapping that is in accordance with the END, where applicable. For regional airports, there is a zoning system with strict rules and limits for the area within a zone. For Schiphol Airport, there is a related and more complicated system. The EU noise-emission directives for aircraft noise and the aviation part of the END are implemented by the Civil Aviation Act. There is no legislation to limit the sound from military aircraft, but the Ministry of Defense voluntarily follows the zoning rules for civil aviation.
New Zealand	Acoustics – Environmental noise (NZS 6802:2008)	All except transportation and wind turbines	Guidelines	Emission	Outdoor, free field	Day/Night	$L_{Aeq,15 \text{ min}}$ L_{AFmax}	At residential sites: 55 dB, daytime 50 dB, evening 45 dB, nighttime ¹ 75 dB, nighttime	Local authorities may adopt different noise-level limits ¹ Guidelines recognize that nighttime should be a minimum of 8 hours.
New Zealand	Transit New Zealand’s Guidelines for the Management of Road Traffic Noise – State Highway Improvements	Road traffic	Guidelines	Emission	Outdoor, 1 m from façade most exposed to the sound of road traffic	All day	$L_{Aeq,24 \text{ h}}$	- 55 dB in low-noise areas with long-term ambient sound level <43 dB - 62 dB in medium noise areas with long-term ambient sound level between 43 dB and 59 dB for high noise areas: - ambient + 3 dB for ambient sound levels between 59 dB and 67 dB - 70 dB for ambient sound levels between 67 dB and 70 dB - ambient level when the ambient sound level is >70 dB	Noise-level limits depend on current ambient sound level. Limits apply to design year 10 years after completion of highway improvement

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
New Zealand	Acoustics – Port Noise Management and Land Use Planning (NZS 6809:1999)	Seaports	Regulation	Emission	Outdoor, free field	Day/Night Night Night Day/Night	L_{dn} $L_{Aeq,T}$ L_{Amax} L_{dn}	65 dB (average of the highest day-night sound levels on any five days in a month) 60 dB from 2100 to 0700 provided that no single measurement of $L_{Aeq,15\ min}$ exceeds 65 dB 85 dB 65 dB for the Inner Control Boundary 55 dB for the Outer Control Boundary	Seaport noise boundaries Area A: inside Inner Control Boundary where noise-sensitive development is prohibited Area B: between Inner and Outer Control Boundaries where limited noise-sensitive development is permitted with conditions Area C: outside the Outer Control Boundary where noise-sensitive developments are permitted
New Zealand	Acoustics – Wind Turbine Generators (NZS 6808:1998)	Wind turbines	Guidelines	Emission	Outdoor, free field in the vicinity of dwellings		$L_{Aeq,T}$ $L_{A95,T}$	40 dB, or $L_{A95,T} + 5\ dB$, whichever is the greater in some appropriate time interval	
New Zealand	Acoustics – Airport Noise Management and Land Use Planning (NZS 6805:1999)	Civil aircraft	Regulation	Emission	Outdoor, free field	Day/Night	Ldn	65 dB for the Air-Noise Boundary 55 dB for the Outer Control Boundary	Day-Night averaged sound levels are calculated for the sound from aircraft operating in a 3-month period Limited potential for development for noise-sensitive uses at sites inside the Air-Noise Boundary No new incompatible uses are to be established inside the Outer Control Boundary Location of Control Boundaries reviewed at 10-year intervals
New Zealand	Noise Management and Land Use Planning for Helicopter Landing Areas (NZS 6807:1994)	Helicopters	Regulation	Emission	Outdoor, free field	Day/Night	L_{dn} L_{Amax} L_{dn} L_{Amax}	75 dB for industrial sites 65 dB for commercial sites For residential areas and for rural areas at a notional boundary 20 m from a dwelling: 50 dB 70 dB For the interior of residences: 40 dB 55 dB	Complementary to NZS 6805 for aircraft

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
New Zealand	Acoustics – Construction Noise	Construction	Guidelines	Emission	Outdoor, 1 m from façade most exposed to the sound of construction activities	Day/Night	$L_{Aeq,T}$ L_{Amax} $L_{Aeq,T}$ L_{Amax} $L_{Aeq,T}$ L_{Amax} $L_{Aeq,T}$ L_{Amax}	For residential sites: (0630 to 0730) 60 dB 75 dB (0730 to 1800) 75 dB 90 dB (1800 to 2000) 70 dB 85 dB (2000 to 0630) 45 dB 75 dB For business and commercial sites: 75 dB (0730 to 1800) 80 dB (1800 to 0730)	Noise-level limits depend on the duration of construction. For short durations of <15 days, 5 dB higher limits are permitted. For long durations of >20 weeks, the limits are reduced by 5 dB.
Norway	In Norway, national policies and regulations are enacted and enforced by the national government through parliament and ministries. Standards are enacted by independent national standardization bodies, where the ministries may take part. Both regulations and standards during the last few years have been strongly organized by EC-directives through the membership in the European Economic Area. When a standard is referred to in a regulation, the use of it becomes mandatory.								
Norway	Guideline on noise in planning (T-1442, 2005)	Various sounds in sensitive buildings or areas.	Guidelines	Immission	Outdoor, most exposed facade, free-field, relevant height for dwelling	Day-evening-night	L_{den}	Road: 55 dB Railway : 58 dB Aircraft: 52 dB Industrial (impulsive): 50 dB Industrial (non-imp): 55 dB Motor-sport: 45 dB Shooting ranges: 30 dB Wind turbines: 45 dB	Transport and industrial noise sources have supplemental maximum levels at night (23-07), when the maximum A-frequency-weighted and F-time-weighted sound level of 10 events exceeds a specified limit. For motor-sport and shooting ranges: nighttime activities should be avoided
Norway	Technical Regulations (1997) -Sound classes for buildings (1997)	Inside homes ¹⁾	Regulation	Immission	Indoor	All day and night	$L_{Aeq,24h}$ L_{AFmax}	30 dB (24 hours) 45 dB (06-22) if more than ten events	¹⁾ Noise from transport and general outdoor sources
Norway	Regulation on limits for local pollution and noise (1997)	Inside homes	Guidelines	Immission	Indoor	All day	$L_{Aeq,24h}$	42 dB ²⁾	²⁾ Initial situation: with closed air inlets. Mitigated situation: with mechanical ventilation.
Norway	Control of Products Act (1976)- / Regulations on power mowers (1994)	Power mowers	Regulation	Emission			L_{WA}	96 dB - 105 dB ³⁾	³⁾ Depending on cutting width
Norway	Regulations on toys	Toys	Regulation	Immission			L_{AFmax}	95 dB at 50 cm, 90 dB at 2.5 cm ⁴⁾	⁴⁾ Small items, possibly used close to an ear

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
Portugal	General Regulation on Noise: Decree-Law no. 09/07 (January 2007)	All sources except industry	Statutory	Immission	Outdoor: free field or 2 m from façade	Day-evening-night and night Day: 07-20; Evening: 20-23; Night: 23-07	L_{den} and L_n	$L_{den} \leq 65$ dB $L_n \leq 55$ dB $L_{den} \leq 55$ dB $L_n \leq 45$ dB	Classification: - mixed zones (land use criteria: Commercial and Residential) - - Sensitive zones (land use criteria: Residential) New residential buildings, schools, and hospitals shall not be authorized if they would be in violation of the applicable land-use criteria. Sensitive zones in the vicinity of existing road and rail-traffic infrastructures, defined in accordance with the END ¹⁾ , shall comply with the mixed-zone noise-level limits. Sensitive zones in the vicinity of projected (future) road and rail-traffic infrastructures, defined in accordance with the END, shall comply with the mixed-zone noise-level limits, minus 5 dB. Sensitive zones in the vicinity of air traffic infrastructures, defined in accordance with the END, shall comply with the mixed-zone noise-level limits. Air traffic movements in (and around) airports are forbidden between 00h to 06h.
Portugal	General Regulation on Noise: Decree-Law no. 09/07 (January 2007)	Industry	Regulation	Immission	Outdoor and indoor	Day: 07-20 Evening: 20-23 Night: 23-07	$L_{Aeq,T}$	$L_{Aeq,T} - L_{Aeq,T}(\text{residual}) \leq 5$ dB $L_{Aeq,T} - L_{Aeq,T}(\text{residual}) \leq 4$ dB $L_{Aeq,T} - L_{Aeq,T}(\text{residual}) \leq 3$ dB	In addition to the limit on the difference between the time-averaged sound levels, the limit for the time-averaged level of the sound from industrial sources shall be reduced by 3 dB if the sound is impulsive in character or by 3 dB if the sound is tonal in character or by 6 dB if the sound is both impulsive and tonal.
Slovenia	In Slovenia, the national government enacts legislation on noise. The Ministry of the Environment and Spatial Planning implements the legislation with regulations on community noise and environmental inspection.								
Slovenia	Decree relating to assessment and management of environmental noise (O. J. RS, 121/2004)	Road traffic, railways, civil aircraft, industry	Regulation	Immission	Outdoor per ISO 1996-2	Day-evening-night Day: 06-18 Evening: 18-22 Night: 22-24 & 00-06	L_n L_{den}	Area L_n L_{den} A 65 dB 75 dB B 50 dB 60 dB C 45 dB 55 dB D 40 dB 50 dB	Noise level limits applicable to individual areas depend on the corresponding land use and the applicable time-average sound level. Four types of areas are specified as follows: - A: Areas where high sound levels are permitted, for example, non-residential areas used for industry and manufacturing - B: Areas where lower levels of intruding noise are permitted, for example, residential areas with some retail and light-manufacturing businesses - C: Areas where disturbing sounds are not permitted, for example, primarily residential areas - D: Areas that require the lowest level of prevailing sound, for example, quiet regions in open country
Slovenia	Decree relating to limits on time-average sound level indicators of environmental noise (O. J. RS, 105/2005)	Road traffic, railways, civil aircraft	Regulation	Immission	Outdoor per ISO 1996-2	Day-evening-night Day: 06-18 Evening: 18-22 Night: 22-24 & 00-06	L_d L_e L_n L_{den}	Area L_d L_e L_n L_{den} A 70 dB 65 dB 60 dB 70 dB B 65 dB 60 dB 55 dB 65 dB C 60 dB 55 dB 50 dB 60 dB D 55 dB 50 dB 45 dB 55 dB	These noise level limits apply to individual areas as described above and for the sound from road traffic, railways, and operations of civil aircraft from major airports

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
Slovenia	Rules on Initial Measurement of Noise and Operational Monitoring of Sources of Noise (O. J. RS, 70/1996)	Civil aircraft, industry	Regulation	Immission	Outdoor per ISO 1996-2	Day-evening-night Day: 06-18 Evening: 18-22 Night: 22-24 & 00-06	L_d L_e L_n L_{den}	Area L_d L_e L_n L_{den} A 73 dB 68 dB 63 dB 73 dB B 58 dB 53 dB 48 dB 58 dB C 52 dB 47 dB 42 dB 52 dB D 47 dB 42 dB 37 dB 47 dB	These noise level limits apply to individual areas as described above and for the sound from operations of civil aircraft from major airports and from industrial activities
Spain	The Noise Law (1993)?	All sources	Regulation ?	Immission	Façade	Day-night	$L_{Aeq,T}$	A B C D ¹⁾ 60/50, 55/45, 50/40, 50/40 65/55, 60/50, 60/45, 55/40 70/60, 65/60, 70/60, 65/55 75/75, 75/70, 75/70, 70/65	- Hospitals, schools, theatres, parks - Residential areas, hotels, recreational areas - Offices, shops, restaurants - Industry 1) A: Existing source-Existing receiver B: New source-Existing receiver C: Existing source-New receiver D: New source-New receiver These area classifications were under review. There are many different local requirements and regulations.
Spain	Royal legislative decree 1302/1986	Railways	Regulation ?	Immission	Outdoor?	All day or day-night	$L_{Aeq,T}$	$L_{Aeq,24h}$: 65 dB or $L_{Aeq,d}$: 65 dB and $L_{Aeq,n}$: 55 dB	For residential areas and areas where wildlife are to be protected
Spain	Royal legislative decree 1302/1986	Civil aircraft	Regulation ?	Immission	Outdoor?	Day-night	$L_{Aeq,T}$	65 dB (07-23), 55 dB (23-07)	Grants for noise insulation are applicable to residential buildings built before April 1996.
Sweden	In Sweden, immission requirements for control of noise generally follow the recommendations of the World Health Organization. Noise level limits are given as guidelines that are generally followed. If a measured noise level exceeds a guideline, there is an obligation for the person responsible for the sound source to take actions to reduce the level of the sound to comply with the guideline. A notation of "free field" for the Space of Assessment refers to sound levels measured outdoors and adjusted for the effects of reflections from the façade of nearby houses and other structures, but not reflections from the ground. Emission requirements to limit the level of the sound from products generally follow EU Directives. The maximum F-time-weighted and A-frequency-weighted sound level is the 3 rd or 5 th highest during nighttime hours or during the daytime hour having the highest maximum sound level.								
Sweden	Guidelines adopted by Parliament and implemented by government authorities	Road traffic	Guidelines	Immission	Free field	All day	$L_{Aeq,24h}$ L_{AFmax}	55 dB outdoors 30 dB indoors 70 dB outdoors 45 dB indoors	Noise level limits apply in the following places: - Permanent dwellings, health care institutions, educational premises - Recreational parts of built up areas including private areas and spaces - Occupational premises The limits on indoor sound levels are strictly applied for the sound of road traffic. Some flexibility in application of the noise-level limits is allowed for outdoor locations in urban areas. Special action plans are required for established areas where the sound level from road traffic exceeds the guidelines.
Sweden	Guidelines adopted by Parliament and implemented by government authorities	Railways	Guidelines	Immission	Free field	All day	$L_{Aeq,24h}$ L_{AFmax}	55 dB outdoors 30 dB indoors 70 dB outdoors 45 dB indoors	

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
Sweden	Guidelines adopted by Parliament and implemented by government authorities	Civil aircraft	Guidelines	Immission	Free field	Day-evening-night	L_{den} L_{AFmax}	55 dB outdoors 70 dB outdoors	-No planning restrictions
Sweden	Guidelines issued by the Swedish Environmental Protection Agency	Industry	Guidelines	Immission	Free field	Day: 07-18 Evening: 18-22 Night: 22-07	$L_{Aeq,T}^{1)}$ L_{AFmax}	60dB(D), 55dB(E), 50dB(N) 50dB(D), 45dB(E), 40dB(N) 40dB(D), 35dB(E), 35dB(N) 65dB(D), 60dB(E), 55dB(N) 55dB(D), 50dB(E), 45dB(N) 45dB(D), 40dB(E), 40dB(N) 55 dB 50 dB	New establishments: - Industrial - Residential, hospitals, schools - Outdoor Recreational areas Existing establishments: - Industrial - Residential, hospitals, schools - Outdoor recreational areas ¹⁾ $L_{Aeq,T}$ with a 5 dB adjustment for the presence of tonal components Nighttime limits outdoors - Near dwellings - In recreational areas
Switzerland	Noise Abatement Ordinance, issued 1986 (latest rev: 2006 Sep)	Road traffic	Regulation	Immission	Middle of open window	Day: 06-22 Night: 22-06	$L_{Aeq,T}^{1)}$	D = day N = night 55 dB (D), 45 dB (N) 60 dB (D), 50 dB (N) 65 dB (D), 55 dB (N) 70 dB (D), 60 dB (N) 50 dB (D), 40 dB (N) 55 dB (D), 45 dB (N) 60 dB (D), 50 dB (N) 65 dB (D), 55 dB (N)	¹⁾ Rating level $L_r = L_{Aeq,T} + K1$, where adjustment K1: K1= 0 dB for $N > 100$ K1= $10 \cdot \lg(N/100)$ dB for $31.6 \leq N \leq 100$ K1= -5 dB for $N < 31.6$ (N = vehicle/hour) For existing noise sources and existing zones: - recreation zones - residential zones - mixed zones - industrial zones For new noise sources and new zones: - recreation zones - residential zones - mixed zones - industrial zones
Switzerland	Noise Abatement Ordinance, issued 1986 (latest rev: 2006 September)	Railways	Regulation	Immission	Middle of open window	Day: 06-22 Night: 22-06	$L_{Aeq,T}^{1)}$	same noise-level limits as for road-traffic noise	1) Rating level $L_r = 10 \lg(10^{0.1 \cdot L_{r1}} + 10^{0.1 \cdot L_{r2}})$ with $L_{r1} = L_{Aeq,T} + K1$ for regular train traffic $L_{r2} = L_{Aeq,T} + K2$ for train-shunting noise Adjustment K1 for regular train traffic: K1= -5 dB for $N > 79$ K1= $10 \lg(N/250)$ dB for $7.9 \leq N \leq 79$ K1= -15 dB for $N < 7.9$ (N = trains/day or night) Adjustment K2 for shunting noise: 0 to +8 dB

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
Switzerland	Noise Abatement Ordinance, issued 1986 (latest rev: 2006 September)	Civil aircraft	Regulation	Immission	Middle of open window	Day: 06-22 Early night: 22-23; 23-24 Night: 05-06	$L_{Aeq,T}^{1)}$	<p>55 dB (D) 60 dB (D) 65 dB (D) 70 dB (D)</p> <p>50 dB (D) 55 dB (D) 60 dB (D) 65 dB (D)</p> <p>55 dB(06-22); 45 dB(22-24,05-06) 60 dB(06-22); 55dB(22-23) 50 dB(23-24,05-06) 65 dB(06-22); 55 dB(22-24,05-06) 70 dB(06-22); 60 dB(22-24,05-06)</p> <p>same limits, but 2 dB to 5 dB lower</p>	<p>1) Rating level L_r defined for small aircraft and for all aircraft (see below) for small aircraft (takeoff mass ≤ 8618 kg) $L_{rk} = L_{Aeq,T} + K$ Adjustment K for annual number of takeoffs and landings N: K=0 dB for $N < 15\ 000$ K=10 lg($N/15\ 000$) dB for $N \geq 15\ 000$</p> <p>For small aircraft (takeoff mass ≤ 8618 kg) For existing noise sources and existing zones: - recreation zones - residential zones - mixed zones - industrial zones</p> <p>For new noise sources and new zones: - recreation zones - residential zones - mixed zones - industrial zones</p> <p>Additional noise-level limits for all aircraft $L_r = 10 \lg (10^{0.1 L_{rk}} + 10^{0.1 L_{rg}})$ with $L_{rg} = L_{Aeq,T}$ L_{rk} see above for small aircraft</p> <p>For existing noise sources and existing zones: - recreation zones - residential zones - mixed zones - industrial zones</p> <p>For new noise sources and new zones: No takeoffs/landings permitted from 24h to 05h Additional noise-level limits for helicopters based on L_{Amax} Different values and adjustments for military aviation</p>
Switzerland	Noise Abatement Ordinance, issued 1986 (latest rev: 2006 September)	Industry	Regulation	Immission	Middle of open window	Day: 07-19 Night: 19-07	$L_{Aeq,T}^{1)}$	Same noise-level limits as for road-traffic noise	<p>1) Rating level $L_r = L_{Aeq,T} + K1 + K2 + K3$ Adjustment K1 for type of noise source: 0 to +10 dB Adjustment K2 for tonal component: 0 to +6 dB Adjustment K3 for impulsive component: 0 to +6 dB</p>

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes												
Turkey	In Turkey, the State Planning Organization prepares Development Plans based on Environmental Policies and Strategies. Other governmental authorities make legal arrangements according to the Plan approved by the Turkish Parliament. In general, laws, by-laws (ordinances), and other regulations are enacted by the National Government. Local authorities are responsible for implementing the regulations by issuing additional by-laws, circulars, and notifications regarding noise issues. Emission of sound produced by various equipment and machinery is regulated in compliance with EU Directives.																				
Turkey	Evaluation and Management of Environmental Noise, 01 July 2005 No. : 25862	Road traffic	Regulation	Immission	Outdoors	Day: 07-19 Evening: 19-23 Night: 23-07	$L_{Aeq,T}$	<table border="0"> <tr> <td>A</td> <td>B</td> </tr> <tr> <td>55 dB(Day)</td> <td>60 dB(Day)¹⁾</td> </tr> <tr> <td>60 dB(Day)</td> <td>65 dB(Day)²⁾</td> </tr> <tr> <td>63 dB(Day)</td> <td>68 dB(Day)³⁾</td> </tr> <tr> <td>65 dB(Day)</td> <td>70 dB(Day)⁴⁾</td> </tr> <tr> <td>67 dB(Day)</td> <td>72 dB(Day)⁵⁾</td> </tr> </table>	A	B	55 dB(Day)	60 dB(Day) ¹⁾	60 dB(Day)	65 dB(Day) ²⁾	63 dB(Day)	68 dB(Day) ³⁾	65 dB(Day)	70 dB(Day) ⁴⁾	67 dB(Day)	72 dB(Day) ⁵⁾	¹⁾ Rural areas ²⁾ Noise-sensitive areas such as schools, cultural and health centers, summer houses, and camps ³⁾ Residential ⁴⁾ Commercial and residential ⁵⁾ Industrial A: Traffic on new and upgraded roads B: Traffic on existing roads Limits on average sound levels in evening and nighttime hours are 5 dB and 10 dB less than the specified limits on average sound levels in daytime hours, respectively.
A	B																				
55 dB(Day)	60 dB(Day) ¹⁾																				
60 dB(Day)	65 dB(Day) ²⁾																				
63 dB(Day)	68 dB(Day) ³⁾																				
65 dB(Day)	70 dB(Day) ⁴⁾																				
67 dB(Day)	72 dB(Day) ⁵⁾																				
Turkey	Evaluation and Management of Environmental Noise, 01 July 2005 No. : 25862	Railways	Regulation	Immission	Outdoors	Day: 07-19 Evening: 19-23 Night: 23-07	$L_{Aeq,T}$	65 dB(Day) 55 dB(Night) ¹⁾	¹⁾ Residential areas and the natural environment												
Turkey	Evaluation and Management of Environmental Noise, 01 July 2005 No. : 25862	Civil aircraft	Regulation	Immission	Outdoors	Day: 07-19 Evening: 19-23 Night: 23-07	$L_{Aeq,T}$	<table border="0"> <tr> <td>Q < 50,000</td> <td>Q > 50,000</td> </tr> <tr> <td>55 dB(Day)</td> <td>60 dB(Day)¹⁾</td> </tr> <tr> <td>65 dB(Day)</td> <td>70 dB(Day)²⁾</td> </tr> <tr> <td>67 dB(Day)</td> <td>72 dB(Day)³⁾</td> </tr> <tr> <td>70 dB(Day)</td> <td>75 dB(Day)⁴⁾</td> </tr> </table>	Q < 50,000	Q > 50,000	55 dB(Day)	60 dB(Day) ¹⁾	65 dB(Day)	70 dB(Day) ²⁾	67 dB(Day)	72 dB(Day) ³⁾	70 dB(Day)	75 dB(Day) ⁴⁾	Q = Number of takeoffs and landings per year ¹⁾ Noise sensitive areas such as schools, cultural and health centers, summer homes, and camps ²⁾ Residential areas ³⁾ Mixed areas (commercial and residential) ⁴⁾ Industrial areas For Q > 50,000, continuous sound-level monitoring is obligatory. For Q > 50,000, insulation and acoustical tests are compulsory for houses in the vicinity of an airport. Limits on average sound levels in evening and nighttime hours are 5 dB and 10 dB less than the specified limits on average sound levels in daytime hours, respectively.		
Q < 50,000	Q > 50,000																				
55 dB(Day)	60 dB(Day) ¹⁾																				
65 dB(Day)	70 dB(Day) ²⁾																				
67 dB(Day)	72 dB(Day) ³⁾																				
70 dB(Day)	75 dB(Day) ⁴⁾																				
Turkey	Evaluation and Management of Environmental Noise, 01 July 2005 No. : 25862	Helicopter	Regulation	Immission	Helipads	Day: 07-19 Evening: 19-23 Night: 23-07	$L_{Aeq,T}$	65 dB(Day) 60 dB(Evening) 55 dB(Night)													
Turkey	Evaluation and Management of Environmental Noise, 01 July 2005 No. : 25862	Seaway traffic	Regulation	Immission	Outdoors at nearest shore	Day: 07-19 Evening: 19-23 Night: 23-07	$L_{Aeq,T}$	65 dB(Day) 60 dB(Evening) 55 dB(Night)													

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
Turkey	Evaluation and Management of Environmental Noise, Date: 01 July /2005 No : 25862	Industry	Regulation	Immission	Outdoors	Day: 07-19 Evening: 19-23 Night: 23-07	$L_{Aeq,T}$	70 dB(Day) ¹⁾ 68 dB(Day) ²⁾ 65 dB(Day) ³⁾ 60 dB(Day) ⁴⁾	<p>¹⁾ Industrial areas ²⁾ Mixed areas (heavily industrial) ³⁾ Mixed areas (heavily residential) ⁴⁾ Noise sensitive areas (schools, cultural and health centers, summer houses, camps, etc.)</p> <p>The regulation lists the types of industrial facilities that are obliged to demonstrate compliance with the applicable noise-level limits. A Certificate of Compliance is issued when the sound from an affected facility has been demonstrated to comply with the requirements. Compliance must be demonstrated by 01 July 2008. Limits on average sound levels in evening and nighttime hours are 5 dB and 10 dB less than the specified limits on average sound levels in daytime hours, respectively.</p>
Turkey	Evaluation and Management of Environmental Noise, Date: 01 July 2005 No : 25862	Construction	Regulation	Immission	Outdoors at construction site	Day: 07-19	$L_{Aeq,T}$	60 dB(Day) ¹⁾ 65 dB(Day) ²⁾ 67 dB(Day) ³⁾	<p>Construction activities are prohibited during evening and nighttime hours. ¹⁾ Building construction ²⁾ Road construction ³⁾ Other sound sources Municipal authorities may prohibit construction activities for longer periods of a day in tourist areas, summer residential areas, and similar areas, and during weekends.</p>
Turkey	Evaluation and Management of Environmental Noise, Date: 01 July 2005 No : 25862	Recreational and entertainment sound sources (Amplified music)	Regulation	Immission	Near entertainment places ¹⁾ At distant locations ²⁾		$L_{Aeq,T}$	<p>$L_{Aeq,T}$ (background) + 5 dB</p> <p>$L_{Aeq,T}$ (background) + 10 dB</p>	<p>¹⁾ Discos, bars, amusement parks, clubs, restaurants, and similar establishments. If these places are next to a noise-sensitive building or land-use, the specified indoor noise-level limits given in the regulation also apply. ²⁾ The distance to a receiver from one of the covered establishments is determined by municipal authorities. If the noise-level limits are exceeded, specific measures to be taken are described in the regulation.</p>

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
United Kingdom	<p>The legislative and administrative control of noise in the UK is based on a variety of Acts of Parliament, regulations, standards, and codes of practice. Some aspects of these provisions, such as the control of nuisance, date from the early 20th century, or even earlier. Other measures originated in the 1960s and 1970s, and have subsequently been revised. The laws on noise nuisance do not apply to Statutory Undertakings, for example, roads or railways. These types of sources are mainly dealt with via Regulations on noise emissions and by land-use planning legislation. In addition to the framework of Statute Law, it is also possible for people to take action against the perpetrator(s) of a noise nuisance via the provisions of Common Law, through the civil courts. The Local Government Act of 1972 gives local authorities the powers to create by-laws to cover sources such as model aircraft, water skiing, ice cream van chimes, dogs, bird scaring devices, and clay pigeon shooting. Some British Standards define acceptable levels of noise and are widely applied. Noise within dwellings and schools is further controlled by the Building Regulations which specify standards for noise levels (in the case of schools) and sound insulation.</p> <p>The Environmental Noise (England) Regulations 2006 implement the requirements of the European Noise Directive relating to noise indicators, noise maps, and action plans.</p>								
United Kingdom	<p>Land Compensation Act (1973):</p> <p>a) Noise Insulation Regulations 1975 as amended – new roads</p> <p>b) Noise Insulation (Railways and other Guided transport systems) 1996, 1998 - new railways</p>	<p>New road</p> <p>New railway</p>	Regulation	Immission	1 m from the façade of eligible premises	<p>18 hours</p> <p>Day/night</p>	<p>$L_{A10,18h}$</p> <p>$L_{Aeq,T}$</p>	<p>68 dB (06-24)</p> <p>68 dB (06-24)</p> <p>63 dB (00-06)</p>	Grants given for sound insulation to dwellings affected by newly upgraded roads where limits are exceeded. Similar scheme for railways.
United Kingdom	<p>Town and Country Planning Acts, (1990):</p> <p>a) Planning Policy Guidance Note 24 (PPG24) (PAN 56, Scotland)</p> <p>b) Planning Directive 85/337 (Environmental Impact assessments)</p>	Road traffic, railways, civil aircraft, and mixed sources	<p>Guidelines</p> <p>Regulation</p>	Immission	Free Field	<p>Day: 06-24</p> <p>Night: 00-06</p>	$L_{Aeq,T}$	<p>A B C D¹⁾</p> <p>For road traffic:</p> <p>D: <55 55-63 63-72 >72</p> <p>N: <45 45-57 57-66 >66</p> <p>For railways:</p> <p>D: <55 55-66 66-74 >74</p> <p>N: <45 45-59 59-66 >66</p> <p>For aircraft:</p> <p>D: <57 57-66 66-72 >72</p> <p>N: <48 48-57 57-66 >66</p> <p>For mixed sources:</p> <p>D: <55 55-63 63-72 >72</p> <p>N: <45 45-57 57-66 >66</p>	<p>¹⁾ A: Noise not a factor</p> <p>B and C: Noise mitigation measures need to be included in the planning proposal before permission to build is granted.</p> <p>D: Planning permission should normally be refused, because of noise.</p> <p>PPG24 applies to situations where residential development is planned close to an existing noise source.</p> <p>D = daytime</p> <p>N = nighttime</p> <p>Where a new noise source is planned close to existing residential development a noise impact assessment is required.</p>
United Kingdom	Civil Aviation Act 1982	Civil aircraft	Regulation	Emission	Free Field (monitoring position)	Day-night	L_{Amax}	<p>94 dB (0700-2300)</p> <p>89 dB (2300-2330 & 0600-0700)</p> <p>87 dB (2330-0600)</p>	ICAO standards also implemented in <i>The Aerodromes (Noise Restrictions) (Rules and Procedures) Regulations 2003</i> , in accordance with EU Directive 2002/30/EC.
United Kingdom	Noise Act 1996	Amplified music	Regulation	Immission	Indoor		$L_{Aeq,15min}$	< 35 dB, or < $L_A' + 10$ dB ²⁾	²⁾ L_A' : underlying level of ambient sounds (that is, sound level not exceeded more than 0.6 s in a 1 to 5 minute period).
United Kingdom	<p>Road Traffic Act 1972</p> <p>a) Road Vehicles (Type Approval) Regulations</p> <p>b) Road Vehicle Construction and Use Regulations 1986*</p>	Vehicle	Regulation	Emission	Free Field Monitoring position 7.5 m from vehicle		L_{AFmax} during drive by	Maximum levels according to 'class' of vehicle, for specified drive-by conditions ³⁾	<p>* In compliance with EC Directive 1992/97/EC</p> <p>³⁾ Measurement in accordance with ISO 362</p>

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
United Kingdom	Environmental Protection Act 1990	Entertainment, industry, neighborhood, intruder alarms, pets	Regulation	Immission				No fixed limits, but limits may be set depending upon local circumstances, or comparison with background noise may be used.	This Act contains all the provision for dealing with Statutory Noise Nuisance from sound sources on fixed premises (see also Noise and Statutory Nuisance Act).
United Kingdom	Noise and Statutory Nuisance Act 1993	Sounds in a street	Regulation	Immission				No fixed noise-level limits, but limits relating to times of use (for example, not during nighttime hours)	This Act supplements and extends the powers under the UK Environmental Protection Act to deal with sources of noise in a street (loudspeakers, audible intruder alarms, vehicles, machinery, and equipment).
United Kingdom	Control of Pollution Act 1974	Construction	Regulation	Immission			$L_{Aeq,T}$ L_{AFmax}	Depending upon local circumstances, noise level limits are usually set in terms of $L_{Aeq,T}$ and L_{AFmax} as well as restrictions on type of equipment to be used and hours of use	The Control of Pollution Act 1974 gives Local Authorities the power to control noise from construction and open sites. Limits may be set at the boundaries of construction sites or of designated Noise Abatement Zones.
United Kingdom	Pollution Prevention and Control Act 1999*	Industry ⁴	Regulation	Emission and Immission	Outdoors at specified distance from item of plant, or at site boundary or nearest noise-sensitive property		L_A , and others	Site and plant-specific emission or immission limits	* In compliance with EC Directive 96/61 IPPC ⁴ For large industrial items of plant (Part A1 installations)
United Kingdom	BS4142: 1997 Method of rating industrial noise affecting mixed residential and industrial areas*	Industrial and commercial premises	Standard	Immission	Free Field, Outdoors	Day or night	Based upon $L_{Aeq,T}$ ⁶	Rating level ($L_{Aeq,T} - L_{A90,T}$): > +10 dB complaints likely +5 dB marginal significance < -10 dB complaints unlikely	* Widely used for planning and noise nuisance situations ⁶ $T = 1$ hour daytime; $T = 5$ minutes nighttime Corrections may be made to $L_{Aeq,T}$ for character of the sound
United Kingdom	BS8233: 1999 Code of Practice for Sound Insulation and Noise Reduction for Buildings ^{*)}	All sources affecting building	Standard / Code of Practice	Immission	Indoors and outdoors (amenity areas)	Day or night	$L_{Aeq,T}$ L_{AFmax} (at night)	Living rooms: $L_{Aeq,T}$ 30 dB to 40 dB Bedrooms: $L_{Aeq,T}$ 30 dB to 35 dB Bedrooms: L_{AFmax} 45 dB indoors Bedrooms: L_{AFmax} 60 dB outdoors	* Widely used for planning situations (Noise impact assessments) Also gives guidance on reverberation times and sound insulation
United Kingdom	BS5228: 1997 Parts 1, 2, 3 and 5 Noise and Vibration control on construction and open sites* also Part 4, 1992	Construction demolition and mineral extraction	Standard / Code of Practice adopted as a Regulation	Immission	Outdoors at site boundary	Day time (0700-1900), evening (1900 – 2300) and night (2300 – 0700)	$L_{Aeq,T}$ and L_{AFmax}	Variable, depending upon situation, no limits specified and emphasis on best practical means to minimize noise	* Widely used for planning and noise nuisance situations

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
USA	In the USA, national policies and regulations are enacted and enforced by the federal government through the Congress and the Executive Branch. State governments may issue policies that comply with federal requirements unless exempted by the judicial process. Local governments may enact ordinances to control community noise so long as they do not conflict with federal and state requirements.								
USA	Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (The EPA "Levels" Document) [U.S. Environmental Protection Agency (EPA), 1974]	General	Guidelines	Immission	Outdoor, free field	Day-night	L_{dn} $L_{Aeq,24h}$	<65 dB ¹⁾ <55 dB ²⁾	¹⁾ Maximum long-term average sound level that should be allowed in communities ²⁾ Goal for protection of the public with an adequate margin of safety
USA	"The Noise Guidebook" from the U.S. Department of Housing and Urban Development (HUD)	General	Regulation	Immission	Outdoor, free field	Day-night	L_{dn}	65 dB to 75 dB 60 dB to 65 dB < 60 dB	- normally unacceptable - normally acceptable - acceptable The HUD Noise Guidebook is available over the Internet. To view the Guidebook, hold down the control (Ctrl) key and click the left mouse button with the pointer anywhere in the following hyperlink. www.hud.gov/offices/cpd/energyenviron/environment/resources/guidebooks/noise For additional information see Title 24 of the U.S. Code of Federal Regulations, Subtitle A, Part 51: "Environmental Criteria and Standards." Available over the Internet at http://www.ecfr.goaccess.gov .
USA	Highway Traffic Noise Analysis and Abatement Policy and Guidance [Federal Highway Administration (FHWA), 1995]	Road traffic	Regulation	Immission	Outdoor, free field	Hourly	L_{A10} $L_{Aeq,1h}$	70 dB 67 dB	Noise-level limits apply for the busiest hour of the day. More information is available from the Internet website for the FHWA at: www.fhwa.dot.gov/environment/noise
USA	Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment, 2006	All types of rail-borne transit, buses, and subways	Guidelines	Immission	Outdoor, free field	Day-Night	L_{dn} L_{AE}	See document in the Notes	More information about the requirements is available from the Internet website for the FTA at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf
USA	High-Speed Ground Transportation Noise and Vibration Impact Assessment [Federal Railway Administration (FRA), 1998]	New high-speed trains	Regulation	Immission	Outdoor, free field	Day-night	L_{dn}	65 dB 50 dB to 55 dB.	A day-night averaged sound level of 65 dB is considered "severe impact". A day-night averaged sound level between 50 dB and 55 dB is considered to be an "impact". The "impact" boundary varies with the type of the land use and with the existing level of ambient sound.

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Country	Title	Noise type	Category	Nature	Space of assessment	Time	Index	Noise level limits	Notes
USA	Surface Transportation Board (STB, 1998)	Railways	Regulation	Immission	Outdoor, free field	Day-night	L_{dn}	65 dB 50 dB to 55 dB.	A day-night averaged sound level of 65 dB is considered “severe impact”. A day-night averaged sound level between 50 dB and 55 dB is considered to be an “impact”. The “impact” boundary varies with the type of the land use and with the existing level of ambient sound.
USA	Noise Standards: Aircraft Type and Airworthiness Certification (14 CFR Part 36, as amended)	Civil aircraft	Regulation	Emission			L_{epn}	Limits on effective perceived noise level (EPNL) apply for various aircraft types according to maximum takeoff gross mass	Applicability of the requirements for noise certification along with the test and analysis procedures are specified in the regulation
USA	Federal Agency Review of Selected Airport Noise Analysis Issues (FICON, 1992)	Civil aircraft	Guidelines	Immission	Outdoor, free field	Day-night	L_{dn} L_{AE} ³⁾	<65 dB for L_{dn}	³⁾ Used only for evaluating sleep disturbance. A predicted 3 dB change at a day-night averaged sound level of 60 dB or 1.5 dB change at 65 dB are used as criteria for requiring further analysis
USA	Air Installations Compatible Use Zones [Department of Defense (DoD), 1977]	Military aircraft	Regulation	Immission	Outdoor, free field	Day-night	L_{dn}	65 dB	Locations inside a calculated contour of day-night averaged sound level of 65 dB may qualify for Federal funding of noise- mitigation projects inside the contour
USA	Federal Energy Regulatory Commission (FERC)	See the Notes	Regulation	Immission	Outdoor, free field	Day-night	L_{dn}	55 dB	The noise-level limit applies to the sound from compressors or other pipeline facilities as predicted or measured for nearby noise-sensitive areas
USA	National Park Service (NPS) Grand Canyon National Park Enlargement Act, 1975	Activities in National Parks	Objective	Immission					The act recognizes “natural quiet” as a resource
USA	National Park Service (NPS) National Parks Overflight Act, 1987	Activities in National Parks	Reporting	Immission					Report on noise impact Requires restoration of “natural quiet” in Grand Canyon National Park
USA	National Park Service (NPS) Title 36 of the Code of Federal Regulations	Activities in national parks	Regulation	Emission	At 15 m At 15 m SAE J1970 SAE J2005	Not specified	L_{AFmax}	60 dB 78 dB (For snowmobiles manufactured after 1975 July 01) 75 dB (for vessels underway) 88 dB (for stationary vessels)	Audio disturbances: see 2.12(a)(1) of 36 CFR Part 2, Resource Protection, Public Use, and Recreation Snowmobiles; see 2.18(d)(1) of 36 CFR Part 2, Resource Protection, Public Use, and Recreation Boating and water-use activities; see 3.15 of 36 CFR Part 3, Boating and Water Use Activities

NOTES

- 1) END = European Noise Directive 2002/49/EC, see Appendix C.
- 2) EU legislation on noise is enacted in EU Member States, see Appendixes B and C.