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Report to the European Commission in accordance with Article 10 Para. 2 of Directive 2002/49/EC relating to the assessment and management of environmental noise

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in

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1. STRATEGIC NOISE MAPS 5

2. AFFECTED POPULATION 9

2.1 Agglomerations with more than 250,000 inhabitants 10

2.2 Major airports 10

2.3 Major roads > 6 mio motor vehicle passages/year outside agglomerations ... 11

2.4 Major railways > 60,000 train passages/year outside agglomerations 11

3. COMPUTATION METHODS 12

3.1 Computation methods used and binding provisions 12

3.2 Method for determining equivalence 13

3.3 Equivalency of procedures 15

3.3.1 Operations on sites of industrial activity 15

3.3.2 Air traffic 15

3.3.3 Road and rail traffic 15

3.3.3.1 Emission control 15

3.3.3.2 Sound propagation 17

1. Strategic Noise Maps

Article 10 Para. 2 of Directive 2002/49/EC requires that the information contained in the strategic noise maps and referred to in Annex VI to the Directive for

- agglomerations with more than 250,000 inhabitants
- major roads which have more than six million vehicle passages per year
- major railways which have more than 60,000 train passages per year
- major airports

is sent to the European Commission.

Noise control in Austria is a cross-sectional matter. Depending on the subject matter concerned, it is either subject to Federal or provincial legislation. Therefore, the EU Environmental Noise Directive 2002/49/EC is transposed into national legislation at Federal as well as at provincial level.

At Federal level, the following acts and ordinances were enacted for the purpose of implementation:

- Federal Act on Environmental Noise (Federal Law Gazette I 60/2005)
- Federal Ordinance on Environmental Noise (Federal Law Gazette II 144/2006)

At provincial level, the following acts and ordinances were enacted for the purpose of implementation:

- Burgenland Regional Planning Act (Provincial Law Gazette No 47/2006)
- Burgenland IPPC Plants, SEVESO II companies and Environmental Information Act (Provincial Law Gazette No 8/2007)
- Burgenland Road Act of 2005 (Provincial Law Gazette No 11/2007)
- Carinthian Road Act (Provincial Law Gazette No 87/2005)
- Carinthian Municipal Planning Act (Provincial Law Gazette No 88/2005)
- Carinthian Environmental Planning Act (Provincial Law Gazette No 89/2005)
- Carinthian IPPC Plants Act (Provincial Law Gazette No 13/2006)
- Carinthian Environmental Noise Ordinance (Provincial Law Gazette No 76/2006)
- Lower Austrian Regional Planning Act (Provincial Law Gazette No 8000-19)
- Upper Austrian Environmental Protection Act (Provincial Law Gazette No 44/2006)

- Salzburg Environmental Protection and Environmental Information Act (Provincial Law Gazette No 72/2007)
- Styrian IPPC Plants, SEVESO II companies and Environmental Information Act (Provincial Law Gazette No 113/2006)
- Styrian Regional Planning Act (Provincial Law Gazette No 47/2007)
- Styrian Act on Environmental Noise on Provincial Roads of 2007 (Provincial Law Gazette No 56/2007)
- Styrian Environmental Noise Ordinance (Provincial Law Gazette No 50/2008)
- Tyrol Road Act (Provincial Law Gazette No 101/2006)
- Vorarlberg Road Act (Provincial Law Gazette No 22/2006)
- Vienna Environmental Noise Act (Provincial Law Gazette No 19/2006)
- Vienna Environmental Noise Ordinance (Provincial Law Gazette No 26/2006)

Among the Federal authorities, the responsibilities for implementing these acts and ordinances are allocated on the basis of the current distribution of tasks in the Federal government. Accordingly, the Federal Minister for Transport, Innovation and Technology, who is the supreme authority for motorways and expressways, railway traffic and airports, is responsible for the implementation of the Federal Environmental Noise Act. According to the respective plant type, IPPC plants are subject to the Federal Minister for Economics and Labour or the Federal Minister for Agriculture, Forestry, Environment and Water Management.

With regard to the preparation of strategic noise maps, the competencies are distributed among the relevant bodies. The competent authorities and the scope of application relevant for the preparation of the strategic noise maps are listed below:

Road traffic

- Federal Minister for Transport, Innovation and Technology (motorways and expressways)
- Government of the Federal Province of Burgenland (Roads excluding motorways and expressways)
- Government of the Federal Province of Carinthia (Roads excluding motorways and expressways)
- Government of the Federal Province of Lower Austria (Roads excluding motorways and expressways)

- Government of the Federal Province of Upper Austria (Roads excluding motorways and expressways)
- Government of the Federal Province of Salzburg (Roads excluding motorways and expressways)
- Government of the Federal Province of Styria (Roads excluding motorways and expressways)
- Government of the Federal Province of Tyrol (Roads excluding motorways and expressways)
- Government of the Federal Province of Vorarlberg (Roads excluding motorways and expressways)
- Municipal Department of the City of Vienna (Roads excluding motorways and expressways)

Rail traffic

- Federal Minister for Transport, Innovation and Technology

  In addition (only relevant for the Vienna agglomeration):
- Provincial Governor of the Federal province of Vienna (tramway routes)

Air traffic

- Federal Minister for Transport, Innovation and Technology

IPPC plants in the Vienna agglomeration

- Federal Minister for Economics and Labour
- Federal Minister for Agriculture, Forestry, Environment and Water Management

Due to the complexity of data gathering, the need for comprehensive collection and the request of the European Commission of 24 October 2007 to supply the data not only conventionally, but also electronically, i.e. in predetermined data set structures, the preparation has unfortunately been partly delayed.

For being reported to the European Commission, the data are converged, and the reporting is intended to be extensively in line with the guidelines published by the European Commission.

Until complete mapping is available, data are converged to constitute aggregate values for all of Austria. As soon as further figures are available, these figures will be updated and re-submitted. After completing the entire mapping, there will be a representation providing a break-down of values on the basis of agglomerations or - outside agglomerations - on the basis of the Federal provinces. Due to an overlapping of noise zones, individual reporting according to the competent authorities or individual traffic sections is obviously not suitable.

The strategic noise maps and related action plans are made available in Austria at www.umgebungslaerm.at. The first partial noise maps and action plans will be released shortly.

2. Affected Population

When all strategic noise maps are available, formats provided by the European Commission will be used for reporting.

As evident from the current preparation stage, the persons concerned were identified and included in the tables below.

Persons (registered at their main residence) concerned by noise from road traffic:

	Noise Level L_{den}				
	55-59	60-64	65-69	70-74	>75
Number of people	354029	166463	163779	34760	297
Number of people in dwellings with a quiet facade	6778	18820	75806	24115	214

	Noise Level L_{night}				
	50-54	55-59	60-64	65-69	>70
Number of people	187261	170225	44292	1468	4
Number of people in dwellings with a quiet facade	17540	72411	29740	885	0

Persons (registered at their main residence) concerned by noise from railway traffic:

	Noise Level L_{den}				
	55-59	60-64	65-69	70-74	>75
Number of people	46874	32268	20611	10858	3970
Number of people in dwellings with a quiet facade	443	481	585	1584	1285

	Noise Level L_{night}				
	50-54	55-59	60-64	65-69	>70
Number of people	42295	27958	15498	8316	1468
Number of people in dwellings with a quiet facade	763	536	745	2116	451

No persons registered at their main residence are exposed to ambient noise levels of more than 55 dB for the L_{den} or more than 50 dB for the L_{night} due to noise from IPPC-plants in the agglomeration of Vienna.

The tables cover the data relevant for the following reported units.

2.1 Agglomerations with more than 250,000 inhabitants

In Austria, only one agglomeration - the Vienna agglomeration - is to be considered for the 2007 strategic noise mapping.

The Vienna agglomeration consists of the municipalities of Vienna, Perchtoldsdorf, Brunn am Gebirge, Wiener Neudorf, Maria Enzersdorf and Mödling. For the Vienna agglomeration, report data are available on noise caused by road and railway traffic as well as on IPPC plants. There is no airport located in the Vienna agglomeration. Therefore, reporting for the agglomeration shall be confined to the population affected by Vienna Airport which was identified in connection with Vienna Airport - a major hub which is located outside the agglomeration municipalities.

2.2 Major airports

In Austria, only one major airport, Vienna Airport, is to be considered for the 2007 strategic noise mapping.

The strategic noise maps for Vienna Airport need to be completed.

2.3 Major roads > 6 mio motor vehicle passages/year outside agglomerations

Report data cover the population affected by noise caused by provincial roads in the Federal provinces of Carinthia, Tyrol and Vorarlberg. As there are areas overlapping with the noise zones which are part of the motorway and expressway network, which have to be handled jointly, final data on the respective areas can only be reported after the data for the motorway and expressway network are available.

For the provincial roads not yet covered by the data and for the motorway and expressway network, the strategic noise maps must yet be finished.

2.4 Major railways > 60,000 train passages/year outside agglomerations

For major railways, the strategic noise maps must yet be finished.

3. Computation Methods

3.1 Computation methods used and binding provisions

The strategic noise maps for Austria were prepared on the basis of national computation methods and in accordance with the legal implementation. For this purpose, computation methods have also been adapted to the requirements laid down in the relevant laws and regulations on environmental noise protection.

For the calculation of noise caused by road traffic, the method set out in the RVS 04.02.11 guideline of 1 March 2006, published by Forschungsgesellschaft Straße - Schiene – Verkehr, the Austrian Association for Research on Road – Rail – Transport, shall be used in Austria.

For the calculation of noise caused by railway traffic, the methods set out in the ON Rule 305011 of 1 September 2004, published by Österreichisches Normungsinstitut, the Austrian Standards Institute and ÖAL, Österreichischer Arbeitsring für Lärmbekämpfung, the Austrian Association for Noise Abatement, shall be used in Austria.

For the calculation of noise caused by civil air traffic, the methods set out in Guideline No 24-1 of January 2004, published by Österreichischer Arbeitsring für Lärmbekämpfung, shall be used in Austria.

For the calculation of noise caused by operations on industrial activity sites, the methods set out in ISO 9613-2 of 15 December 1996 or a comparable computation method shall be used.

For identifying environmental noise caused by road traffic, railway traffic or operations on industrial activity sites according to the above-mentioned computation methods, the meteorology correction shall be determined in accordance with Section 8 of ISO 9613-2, with the factor used for the meteorological damping coefficient C_0 being set at 0 for all of Austria.

National computation methods are used in accordance with Article 6, Paragraph 2 of Directive 2002/49/EC, because there has been an adaptation according to Annex II to the Directive (introduction of the evening as a separate period, definition of L_{den} and L_{night} in accordance with the Directive, introduction of an assessment level of 4 m). According to Article 6, Paragraph 2, it

shall be demonstrated that the computation methods are equivalent to the interim computation methods set out in the Directive.

3.2 Method for determining equivalence

In a written communication of 8 January 2008 by the European Commission it was stated that the European Commission intends to prepare inspection sheets to be applied by the member states in order to provide the Commission services with information to be used for examining the equivalence of results.

It should be noted here that, in accordance with Directive 2002/49/EC, the use of national computation methods is expressly allowed and that computation methods are required to be equivalent, but not identical. Accordingly, the consideration of the propagation terms included in the computation is deemed as sufficient proof of equivalence. If computation methods are based on similar-type physical considerations, it can be assumed that they are as suitable for the determination of immission values as the interim methods. In addition, mention has to be made of the fact that the national computation methods used in Austria represent a widely-recognized and tried-and tested basis for acoustic planning. Similar to interim computation methods, they are aimed at providing for the highest-possible congruence with the actual immission situation. As long as two computation methods are not identical, results will always differ. It also has to be mentioned that, in view of the comprehensive noise mapping already conducted in Austria in the framework of railway and road traffic noise abatement, continuity in noise measurement constitutes the most suitable approach until harmonised computation methods will be introduced.

In Austria, it is assumed that the interim methods set out in the Environmental Noise Directive claim equivalence among one another under the guidelines on the revised interim computation methods for industrial noise, aircraft noise, road traffic noise and railway noise. This is especially relevant with regard to land-based emission sources, i.e. industry, roads and railways as regards transmission per se.

In the framework of the computation methods used for determining road traffic and railway traffic noise, interim methods take different approaches for determining soil damping as well as acoustic shields. Yet as regards propagation, the measures (adaptations) set out in the guidelines only take into account the impact of weather conditions as well as air absorption.

This definitely creates a framework for soil impact and screening within which equivalence can be expected.

For identifying environmental noise caused by road traffic, railway traffic or operations on industrial activity sites, the meteorology correction shall be determined in accordance with Section 8 of ISO 9613-2 in the framework of implementation in Austria, with the factor used for the meteorological damping coefficient C_0 being set at 0 for all of Austria.
This determination, which is now uniform in Austria and has not been contained so far in the computation provisions used, is based on Table 1 (decision table for meteorological correction) of the Commission recommendation of 6 August 2003 on Guidelines on the revised interim computation methods for industrial noise, aircraft noise, road traffic noise and railway noise and related emission data. Due to the alpine topography found in Austria, no representative values for C_0, i.e. the meteorological damping coefficient, are available for large parts of the country. Thus, the representation of sound propagation based on C_0 not equal to 0 would no longer be consistent in Austria and would differ according to the availability of meteorological data in a given area. This would result in unequal treatment of affected persons, as, in this case, there would be justified level reduction: yet following the provisions of the recommendation, situations lacking meteorological data would require an approach which favours propagation. Setting C_0 at 0, Austria continues its tradition of computation by way of a cautious approach which considers prevention and the avoidance of potentially hazardous and/or harmful impact of noise on the population. Consequently, there is no contradiction to the recommendations.
In road and railway traffic, the issue of air absorption is considered by way of a reference to ÖAL Guideline No 28. Considering Austrian climate conditions, 10°C (air temperature) and 70% (air moisture) shall be entered here for the purpose of calculation of sound absorption. Also here, no contradiction to the recommendations has been detected so far.

As the national as well as the interim computation methods aim at reflecting the actual immission situation, equivalence can be assumed. Furthermore, it has to be considered that only a strategic approach has been laid down with environmental noise legislation and that – as long as there are no uniform European limit or threshold values and only an estimated number of affected persons is to be determined – deviations in computation methods will have no major impact on achieving the goals which have been set.

3.3 Equivalency of procedures

3.3.1 Operations on sites of industrial activity

For the calculation of noise caused by operations on industrial activity sites, no proof of equivalence is required, as the computation method is identical with the interim computation method set out in the Directive.

3.3.2 Air traffic

With regard to the calculation method used for aircraft noise, the “Guidelines on the revised interim computation methods for industrial noise, aircraft noise, road traffic noise and railway noise and related emission data” published by the European Commission in the Official Journal L212 of 22 August 2003 mention the data contained in the Austrian computation provision as a standard recommendation. With the 2004 version of the ÖAL Guideline, which is binding within the Austrian implementation framework, all adaptations to the provisions of the guidelines have been fully implemented. It can thus be assumed that the computation method will eventually lead to equivalent results.

3.3.3 Road and rail traffic

3.3.3.1 Emission control

Road traffic

In the RVS 04.02.11 guideline, the emission is described by using the $L_{A,eq}$[1] emission sound level, i.e. the A-rated, energy-equivalent permanent sound level produced by traffic on a “long and straight” road at a distance of 1 m from the emission line. This value is made up of

- the number of passenger cars and the number of HGVs (which are again subdivided into light-weight and heavy-weight as well as into low-noise and non-low-noise HGVs)
- the road surface (bituminous concrete, concrete, drain asphalt)
- the speed (with varying dependence for different vehicle types and different types of road surface)
- the longitudinal inclination (different levels for passenger cars/HGVs and for road gradient/incline).

The emission is specified by using the A-rated sound level. When determining the results by way of calculation software, the octavos shall be calculated for octaves ranging between 63 Hz and 4,000 Hz. In addition, a reference spectrum shall be specified.

Yet when using the interim method, the vehicle type, speed, traffic flow and longitudinal profile have to be considered. To make things easier, basically maximum speeds are used in the interim method. This also corresponds to the approach taken in the Austrian computation method, which also standardises the approach using the maximum speed level, but also allows for a more detailed approach. Consideration of the traffic flow (below 60 or 70 km/h, depending on the situation) is of rather theoretical relevance for the mapping of main roads carried out in the course of the implementation of Directive 2002/49/EC. In practice, this approach cannot challenge equivalence, particularly because the Austrian procedure also allows for a procedure of calibration of this model in particular situations.

Location of the noise source

The Austrian computation method provides for a division of the emission line into different sections. The section length which can be chosen is confined to at maximum 9° through the restriction of the angle sector (seen from the immission point). At the point of intersection of the emission line and the angle bisector, a point source of noise is assumed as a replacement of the emission line. In the interim computation method, the emission line is also subdivided into different sections which are treated as point sources of noise. Subdivision is carried out with equal angles <10° or with constant lengths, with the highest admissible distance between the point sources of noise not exceeding the value of the vertical distance of the road to the next immission point.
Hence, the Austrian and the interim computation methods basically match with regard to the positioning of noise sources on the road.

With regard to the formation of emissions, the procedures are equivalent.

<u>Railway traffic</u>

For the determination of sound emissions caused by railway traffic, Technical Rule ONR 305011 provides for the following differentiations:

1 Railway passenger car, equipped with block brake

2 Railway passenger car, equipped with disk brake
3 Rail car BR 4010
4 Rail car BR 4020
5 Diesel rail car BR 5047
6 Freight wagon
7 Low-floor train

Depending on the speed driven, all information concerning sound emission is specified in octavos ranging between 63 Hz and 4,000 Hz. In addition, this information also covers comprehensive data on the sound power levels produced by noise sources in the course of shunting and freight-handling operations. For the determination of sound emitted by tramways, the ON rule refers to the applicable measuring method. The measurement of the length-related sound power level is described in the Austrian standard ÖNORM S 5026. Compared with the interim method, this break-down, which is a part of the Austrian provision, provides for an equally detailed approach and is thus equivalent.

3.3.3.2 Sound propagation

With regard to transmission, the computation methods used for road traffic and railway traffic noise are based on ÖAL Guideline No 28 “Schallabstrahlung und Schallausbreitung” (Sound propagation and sound radiation). Find below a relevant comparison of the individual propagation terms with regard to the interim methods

Distance dimension

For the area of road traffic, the Austrian and interim computation methods use different terms for describing the distance dimension, as the emission level is in one case specified as the sound pressure level located at a distance of 1 m from the emission axis and in the other case as the length-related sound power level. In the distance dimension, only the correction - which is based on these different emission dimensions - is carried out, while the geometrical propagation damping is respectively displayed.
In the computation method used for calculating railway traffic noise, the distance dimension also corresponds to the relevant formula.

Air absorption dimension

Both methods determine the air absorption dimension in the same way. The values used in the Austrian computation method are 10° C for temperature and 70% for relative moisture, while in the interim computation method the values of 15°C and 70% (relative moisture) shall be applied. What is taken into account here is the necessary consideration of Austrian alpine climate conditions, as expressly set out in the Commission recommendations.

Impact of meteorological conditions

In the Austrian computation methods, meteorological conditions are not mentioned expressly. As regards the computation of the sound shield dimension and the soil damping dimension, “favourable” propagation conditions are, however, assumed. The interim computation method uses a weighted averaging of the immission values calculated for favourable as well as for homogenous conditions.
For weighting, respective meteorological data must be available. In large parts of Austria, the wind direction distribution levels are, however, extensively adapted to Alpine topography and are to be used only as selectively relevant information. The spatial representation of the data is low. Therefore no data set is available which could serve as a basis for a ubiquitous consideration of meteorological conditions for the purpose of determination of a long-term index for Austria. Accordingly, in the framework of the implementation of Directive 2002/49/EC, the meteorology correction was – according to Section 8 of ISO 9613-2 – expressly set at the value of 0 for all computation methods used in Austria.

Soil damping dimension

In the Austrian computation method, the soil damping dimension is determined in accordance with the calculation contained in ISO 9613-2. Interactions between the acoustic shield dimension and the soil damping dimensions are formulated differently in all procedures. This applies to the interim methods used for road traffic and railway traffic noise as well as to ISO 9613-2.

Acoustic shield dimension

In the Austrian computation method, a downward-bent sound propagation path is assumed for the sound shield dimension and centre frequency of the lowest third of the octave is assumed.
In the interim computation model used for road traffic, the same calculation is carried out for favourable sound propagation; for homogenous propagation, a straight sound ray is assumed. In addition, octave centre frequencies are assumed. As the calculation of the acoustic shield dimension with a straight sound ray and with octave centre frequency will always result in higher reduction of the sound level, the immission level calculated by way of the interim computation method is lower than the level calculated by way of the Austrian computation method. The proposed interim method ISO 9613-2 essentially also uses the straight sound ray for the purpose of calculation; the impact of meteorological effects is described by way of a meteorology correction. Yet it can be clearly concluded from the ISO Annex that a bent sound ray (with a radius of 5 km) is at the root of considerations. The interim method used for railway traffic noise shows - in a way that is comparable to ÖAL Guideline No 28 - an approximation to the bent sound ray in the form of actual shield height. From this consideration it can be clearly concluded that the interim method does not imply a determination of the acoustic shield dimension which is uniform and in accordance with the relevant formula and that equivalent national provisions can hence not be required to take such an approach. This means that Austrian procedures are equivalent.

Surface reflection dimension

The computation methods for sound levels caused by reflecting surfaces are identical.

Vegetation damping dimension

The Austrian computation method provides for a vegetation damping dimension in the amount of at maximum 4 dB (if the respective route crosses the forest at a length of 200 m or more) in the case of sound propagation through forest area.
Interim computation methods used for road traffic also contain the factor “forest” in the soil damping dimension. Also ISO 9613-2 provides for a regulation with regard to vegetation damping: in the case of large distances, the (bent) sound path through the vegetation is the crucial factor; for individually located and dense groups of vegetation, ÖAL Guideline No 28 corresponds exactly to ISO 9613-2. The procedures are equivalent.

Availability of standards and guidelines for calculation methods:

Road traffic noise:
RVS 04.02.11, ausgegeben 2006.
Österreichische Forschungsgemeinschaft Straße-Schiene-Verkehr, Karlsgasse 5, 1040 Wien

Railway traffic noise:
ON-Regel 305011 – Berechnung der Schallimmission durch Schienenverkehr – Zugverkehr, Verschub- und Umschlagbetrieb, ausgegeben am 1. September 2004.
Österreichisches Normungsinstitut, Heinestraße 38, 1020 Wien

Air traffic noise:
ÖAL-Richtlinie Nr. 24-1 – Lärmschutz in der Umgebung von Flughäfen, Planungs- und Berechnungsgrundlagen, in der Fassung von Jänner 2004.
Österreichisches Normungsinstitut, Heinestraße 38, 1020 Wien

Noise from industrial sources:
ISO 9613-2 – Akustik – Dämpfung des Schalls bei der Ausbreitung im Freien – Teil 2: Allgemeines Berechnungsverfahren, ausgegeben am 15. Dezember 1996, oder ein vergleichbares Berechnungsverfahren.
Österreichisches Normungsinstitut, Heinestraße 38, 1020 Wien