

Sustainable Public Procurement-fiche

Product / service	Version	Date
Windows and external doors	Basic	December 2010

Scope

These criteria apply to:

- A. Fixed and opening windows, external glazed doors and skylights.
- B. Other exterior doors (specific requirements for wooden doors).

The first group (A) is defined as an opening in a wall or roof with glass mounted in a fixed frame to admit day-light, forming the boundary between free and heated areas. Often it is possible to open the window through a sliding or hinged component of the frame to allow air to enter into the building.

The second group (B) is defined as an opening in a wall with a door fixed in a frame forming the boundary between free and heated areas. This group contains also specific criteria for wooden doors.

The frame, door leaf or window casement may be made of wood, wood-aluminium, aluminium, plastic, steel or composite material.

The goal of these criteria is to promote the use of energy-efficient windows and exterior doors to reduce building's heating requirement and climate impact.

PART A: FIXED AND OPENING WINDOWS, EXTERNAL GLAZED DOORS AND SKYLIGHTS

1) Subject matter

Windows and external doors produced with environmentally friendly materials and processes and produced in a socially responsible way.

1.1. The subject matter in the framework of the organizations policy.

“For <.....> (name of the public authority), the care for the environment and social aspects is important. It is stated in her <strategic policies>, <mission>, <vision>, <procurement policy>, ...”

1.2. “Reserved contracts”

This category of contract is handled separately in Article 19 of Directive 2004/18/EC. This article permits the member states to “reserve” the right to participate in public contract award procedures. It includes contracts awarded to sheltered workshops or awarded in the context of sheltered employment programmes restricted to handicapped persons who cannot conduct professional activities under normal conditions. Paragraph 2 of Article 18a of the Law of 24 December 1993 has already taken a step in this direction by enabling, within the European thresholds, an identical strategy.

2) Exclusion criteria

2.1. Social aspects:

Buyers can take account of social aspects in there procurement. For more information about the different possibilities see:

<http://www.gidsvoorduurzameaankopen.be/en/node/108>

3) Technical capacity

/

4) Market information

/

5) Technical specifications

a) Marking of plastic parts (GPP Toolkit, Nordic)

- Plastic components weighing more than 50g should be marked according to ISO 11469⁽¹⁾ or equivalent. Products holding a relevant Type 1 Ecolabel fulfilling the listed criteria will be deemed to comply. Other appropriate means of proof will also be accepted.

⁽¹⁾ http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=27946.

b) Filler gases (GPP Toolkit, Nordic)

- Filler gases that contribute to the greenhouse effect, with a Global Warming Potential (GWP) > 5 over a period of 100 years, may not be used in the insulating units. Inert gases (e.g. argon, krypton) have a GWP < 5. Products holding a relevant Type 1 Ecolabel fulfilling the listed criteria will be deemed to comply. Other appropriate means of proof will also be accepted.

c) Wood origin (GPP Toolkit, Nordic, FSC, PEFC)

For detailed information on this criterion, see validated document on furniture (technical specifications, criterion 1 (available in Dutch or in French))

For Dutch version:

<http://www.gidsvoorduurzameaankopen.be/?q=nl/node/34&cid=25&pid=1205>

For French version:

<http://www.gidsvoorduurzameaankopen.be/?q=fr/node/35&cid=99&pid=1206>



Evidence:

The compliance with all the criteria a), b) and c) can be proved with the following label:



NORDIC,



(Only for the criterium c 'wood origin':   or equivalent)

In case that the tendering company can present this label, any further proof is not necessary. Any other suitable evidence from a recognized body can also be used.

d) Thermal efficiency (GPP Toolkit)

- Ensure that all windows, external glazed doors and skylights fitted into new buildings and as replacement windows in pre-existing buildings, achieve greater thermal efficiency than required by Belgian Regional Regulations. To achieve this, the total heat transfer coefficient (U-value) shall demonstrate at least 20% improvement on the value defined in the Regional regulations:

Actual U-values in Belgian Regional regulations (Energy Performance Building-Regulation) are:

Directive	Link	U-value window ⁽¹⁾ (U _w)
Decree of the government of the Brussels-Capital Region (7 June 2007) on the Energy Performance of Buildings (EPB).	http://www.bruxellesenvironnement.be/Templates/download/20070607_Ord_perf_energ_batiment.pdf?langtype=2060	2.5
Decree of the government of the Walloon Region (17 April 2008) determining the methodology, requirements, approvals and sanctions applicable to energy performance and indoor building.	http://energie.wallonie.be/fr/arrete-du-gouvernement-wallon-du-17-avril-2008.html?IDC=7313	2.5
Decree of the Flemish Government (11 April 2005) establishing the requirements in terms of energy performance and indoor environment of buildings.	http://212.123.19.141/ALLESNL/wet/detailframe.vwp?WETID=-1&SID=0 http://www2.vlaanderen.be/economie/energiesparen/epb/doc/epbbesluitbijlage3.pdf	2.5

(1) The U-value of a window is a measurement of the rate of heat loss, indicating how well your windows are keeping valuable heat in. It is expressed as Watts per square meter Kelvin (W/m² K). The lower the U-value the better the thermal performance of the glass.

The supplier should also provide the values corresponding to the solar transmittance value (G-value), the window air leakage (L50 value) and Daylight transmittance. The indicators are to be applied to the whole window, glazing and frame combined.

Verification: Where the listed criteria for a product are included in a relevant harmonised European standard, under the Construction Products Directive (89/106/EEC⁽¹⁾), for CE marking, the supplier must provide the information accompanying the required CE marking to demonstrate compliance with the listed criteria.

Where the listed criteria for a product are not included in the accompanying information to CE marking under the Construction Products Directive (89/106/EEC), products holding a relevant Type 1 Ecolabel fulfilling the listed criteria will be deemed to comply. Other appropriate means of proof or a signed declaration will also be accepted.

(1) Council Directive 89/106/EEC:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31989L0106:EN:HTML>

e) PVC (GPP Toolkit)

- The bidder shall demonstrate that the production of PVC complies with best practice in accordance with Vinyl 2010⁽¹⁾ (Vinyl 2010 is a voluntary European program on Sustainable Development by the whole PVC industry) or equivalent. Verification: Participation with Vinyl2010 will be acceptable, otherwise the bidder must provide written evidence that Vinyl2010's recommendations, or equivalent, are complied with.

(1) <http://www.vinyl2010.org/>

6) Awarding the contract:

	Criteria --- For example ---	Weight
1	Price <i>Calculation (e.g.):</i> Lowest offered price/ stated price x 0,60	e.g. 60%
2	Environmental criteria (The public authority formulates the points it wants to assign to the below mentioned criteria) <i>Calculation (e.g.):</i> Total scored points / maximum number of points x 0,35	e.g. 35%
3	...	e.g. 5 %
4	...	e.g.

In above mentioned table, the weight of the environmental criteria shall be stated by the buyer in function of its particular procurement. Representatives of several sectors federations mention often to not underestimate this weight to give sustainability in the awarding phase a chance at all.

The environmental criteria in the above mentioned table concern the following issues:

a) Thermal efficiency (Nordic)

Additional points will be awarded for:

- Thermal efficiency requirements:
 - o Windows:
 - The window's U-value can be specified for one of two formats: 1.2 x 1.2 m or 1.48 x 1.23 m.
 - For a 1.2 x 1.2 m window, the heat transfer coefficient (U-value) must not exceed 1.0 W.m⁻².K-1 for the entire window including the frame.
 - For a 1.48 x 1.23 m window, the heat transfer coefficient (U-value) must not exceed 0.95 W.m⁻².K-1 for the entire window including the frame.
 - o Window doors/external glazed doors:
 - The heat transfer coefficient (U-value) must not exceed 1.0 W.m⁻².K-1 for the entire window door including the frame for a door size

of 0.9 x 2.1/1.3 m. 1.3 m is the height of the glass section of the window door.

- The U-value must be performed by an accredited national institute or equivalent.
- The U-value must be measured according to the applicable ISO 8990 standard or EN-ISO 12567-1, known as the 'Hot-box method'. As an alternative, the U-value can be calculated according to the standard EN 673 (glazing) and EN ISO 10077 2 (frame/casement). A computer simulation program, e.g. FRAME, VISION or equivalent, can be used to assist calculations.

b) G value (solar energy transmittance) and daylight transmittance of windows
(Nordic)

- Additional points will be awarded for :
 - The solar energy transmittance (G-value) of the window pane must be $50 \pm 2\%$ or higher measured perpendicular to the glass.
 - The daylight transmittance must be $63 \pm 2\%$ or higher.
 - The G-value must be performed by an accredited national institute or equivalent.
 - The total solar light transmittance (TST or G-value) and daylight transmittance (LT) must be measured in accordance with EN 410 or ISO 9050.

c) Air permeability of windows (Nordic)

- The window must fulfill Class 4 according to EN 12207 for air permeability under negative and positive pressure.

d) Chemical hazards

(For more information on R, S and H phrases, see annex 1 and 2)

- Lead (R23, R25 and H301, H331) and its compounds must not intentionally be added to the plastics and coatings used in windows. (GPP Toolkit, Nordic)
- The final window product will not release or leach out any substances or preparations that are classified according to Directive 1999/45/EC⁽¹⁾ and 67/548/CEE⁽²⁾ and any substances with the listed R-phrases specified below, under normal usage conditions (see annex 1 for R-phrases meaning): (GPP Toolkit)
 - R40, R45, R49,,R60, R61, R62, R63,R46, R68,R23, R24, R25, R26, R27, R28, R51,R42,R50, R50/53, R51/53, R52, R52/53, R53,R48.Regulation (EC) No 1272/2008⁽³⁾, amending and repealing Directives 67/548/EEC1 and 1999/45/EC2, and amending Regulation (EC) No 1907/2006, gives the following H-phrases which relate to the above R-phrases. The final window

product will not release or leach out any substances or preparations that are classified with the listed H-phrases, below under normal usage conditions (see annex 2 for translation between Directive 67/548/EEC and CLP Directive 1272/2008/EEC):

- H350, H350i, H351H360F, H360D, H361f, H361d, H360FD, H361fd, H360Fd, and H360DfH340 and H341H330, H331, H311, H301, H310, H300, H412,
- H334, H400, H410, H411, H412, H413, H372, H373.

Products holding a relevant Type 1 Ecolabel fulfilling the listed criteria will be deemed to comply. Other appropriate means of proof will also be accepted.

- (1) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31999L0045:en:NOT>
- (2) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31967L0548:EN:HTML>
- (3) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008R1272:EN:NOT>

- Additional point will be awarded if the final window product does not release or leach out any substances or preparations that are classified according to Directive 1999/45/EC⁽¹⁾ and 67/548/CEE⁽²⁾ and any substances with the listed R-phrases specified below, under normal usage conditions: R22, R35 R39, R46, R48. (Nordic)

- (1) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31999L0045:en:NOT>
- (2) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31967L0548:EN:HTML>

e) Pressure impregnation (Nordic)

- Pressure impregnation is not permitted.

7) Performance clauses:

7.1. Environmental aspects:

a) Packaging (Nordic)

- Halogenated plastics and timber that is treated with wood preservatives / biocides must not be used in packaging.

b) Guarantee (Nordic)

- The window manufacturer must provide a 10-year guarantee covering function, thermopanels and wood rot. The guarantee must encompass all functional requirements in the applicable/relevant standards.

c) User's information (GPP Toolkit, Nordic)

- The bidder must ensure maintenance recommendations are provided with the product.
It also has to provide documented procedures and instructions for quality and environmental assurance.

7.2. Social aspects:

Buyers can take account of social aspects in their procurement. For more information about the different possibilities see:

<http://www.gidsvoorduurzameaankopen.be/en/node/108>

7.3. Ethical aspects:

"The tenderer undertakes, until the contract has been executed in full, to respect the 8 Basic Conventions of the ILO:

1. The prohibition of forced labour (C29 Forced Labour Convention, 1930, and C105 Abolition of Forced Labour Convention, 1957);
2. The right to freedom of association (C87 Freedom of Association and Protection of the Right to Organise, 1948);
3. The right to organise and collective bargaining (C98 Right to Organise and Collective bargaining, 1949);
4. The prohibition of any discrimination in terms of labour and remuneration (C100 Equal Remuneration, 1951 and C111 Discrimination (Employment and Occupation), 1958);
5. The minimum age for child labour (C138 Minimum Age Convention, 1973), together with the prohibition of the worst forms of child labour (C182 Worst Forms of Child Labour Convention, 1999).

The non-respect of this undertaking may, by virtue of Article 20, §1, 4° of the general specifications annexed to the Royal Decree of 26 September 1996, give rise to the application of the official measures described in § 6 of the same article, including unilateral termination of the contract.”

References

[Information of the public authority that used these clauses in a procurement case]

PART B: Other external doors

1) Subject matter

Other external doors than specified in part A produced with environmentally friendly materials and processes and produced in a socially responsible way.

1.1. The subject matter in the framework of the organizations policy.

“For <.....> (name of the public authority), the care for the environment and social aspects is important. It is stated in her <strategic policies>, <mission>, <vision>, <procurement policy>, ...”

1.2. “Reserved contracts”

This category of contract is handled separately in Article 19 of Directive 2004/18/EC. This article permits the member states to “reserve” the right to participate in public contract award procedures. It includes contracts awarded to sheltered workshops or awarded in the context of sheltered employment programmes restricted to handicapped persons who cannot conduct professional activities under normal conditions. Paragraph 2 of Article 18a of the Law of 24 December 1993 has already taken a step in this direction by enabling, within the European thresholds, an identical strategy.

2) Exclusion criteria

2.1. Social aspects:

Buyers can take account of social aspects in their procurement. For more information about the different possibilities see:

<http://www.gidsvoorduurzameaankopen.be/en/node/108>

3) Technical capacity

/

4) Market information

/

5) Technical specifications

5.1 General criteria for all external doors

a) Marking of plastic parts (Nordic)

- Plastic parts heavier than 50 g must be visibly labelled for recycling in accordance with ISO 11469⁽¹⁾. This requirement does not apply to glazing beads and glazing blocks that constitute less than 3% by weight of the total weight of the window.

⁽¹⁾ http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=27946

b) Classification of chemical products (Nordic)

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- (For more information on R, S and H phrases, see annex 1 and 2)
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- Chemical products used during the manufacture of the exterior door must not be classified as in the following table. Substances shall be classified according to the European substance and preparation directives, 67/548/EEC⁽¹⁾ and 1999/45/EEC⁽²⁾ (with amendments).

Danger class	Symbol and R-phrase
Dangerous for the environment	N with R50, R50/53 or R51/53
Carcinogenic	T with R45 or R49; Xn with R40
Mutagenic	T with R46; Xn with R68
Toxic for reproduction	T with R60 or R61; Xn with R62 or R63
Very toxic	T+ with R26, R27, R28 or R39
Toxic	T with R23 or R24, R35, R39 or R48
Harmful	Xn with R22, R48, or R68

Material safety data sheet are required by applicable legislation in the country of application, e.g. Annex II of REACH (Council Regulation 1907/2006/EEC) for all chemical products.

- (1) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31967L0548:EN:HTML>
(2) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31999L0045:en:NOT>

c) CMR substances (Nordic)

-
- (For more information on R, S and H phrases, see annex 1 and 2)
-
- Chemical products used in the manufacture of an exterior door must not contain substances classified as carcinogenic (Carc with R45 and/or R49), mutagenic (Mut with R46) and/or toxic for reproduction (Rep with R61 and/or R62).

The total content of substances classified as carcinogenic (Carc with R40), mutagenic (Mut with R68) and/or toxic for reproduction (Rep with R62 and/or R63) must not exceed 0.5% by weight in products used to manufacture the exterior door.

“Content” refers to substances or ingredients that are actively added by the chemical manufacture or its suppliers. Impurities that are classified as above and found in such concentrations that they are specified on the products material safety data sheet are also considered constituent substances.

Material safety data sheet as required by applicable legislation in the country of application, e.g. Annex II of REACH (Council Regulation 1907/2006/EEC) for all chemical products

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32006R1907:en:NOT>

Evidence:

The compliance with all the criteria mentioned above can be proved with the following label:



NORDIC

5.2 Specific criteria for wooden doors

a) Wood origin (Nature Plus, Nordic)

- Virgin wood material should solely come from sustainably managed forests. The sustainable management of the forest of origin should have been certified by an independent and internationally recognized institution.

Evidence:

The compliance with all the criteria mentioned above can be proved with the following label:



NORDIC, NATURE PLUS,



(Only for the criterion 'raw materials (wood)': FSC PEFC or equivalent)

In case that the tendering company can present this label, any further proof is not necessary. Any other suitable evidence from a recognized body can also be used.

6) Awarding the contract:

	Criteria --- For example ---	Weight
1	Price <i>Calculation (e.g.):</i> Lowest offered price/ stated price x 0,60	e.g. 60%
2	Environmental criteria (The public authority formulates the points it wants to assign to the below mentioned criteria) <i>Calculation (e.g.):</i> Total scored points / maximum number of points x 0,35	e.g. 35%
3	...	e.g. 5 %
4	...	e.g.

In above mentioned table, the weight of the environmental criteria shall be stated by the buyer in function of its particular procurement. Representatives of several sectors federations mention often to not underestimate this weight to give sustainability in the awarding phase a chance at all.

The environmental criteria in the above mentioned table concern the following issues:

6.1 General criteria for all external doors

a) Air permeability (Nordic)

- The exterior door must fulfill Class 4 according to EN 12207 for air permeability under negative and positive pressure.

d) Insulation material (Nordic)

- Additional points will be awarded for :
 - Thermal insulation materials must not contain halogenated flame retardants or flame retardants containing borax or boric acid.
 - Mineral insulation material must not be classified as carcinogenic according to Council Directive 97/69/EC⁽¹⁾.

⁽¹⁾ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31997L0069:EN:HTML>

6.2 Specific criteria for wooden doors

a) Raw materials (Nature Plus)

- Doors made from wood and wood-based materials must be made to at least 90 mass-% from wood or ligno-cellulose based ⁽¹⁾ fibres and shavings. Locks, fittings and lighting apertures are not considered within the scope of these criteria.
- (1) Ligno-cellulose based raw materials = Wood, Flax, Hemp, Straw among other renewable raw materials

b) Synthetic organic fire retardants (Nature Plus)

- On top of the general criteria for doors, additional points will be awarded if the use of any synthetic-organic fire retardants is avoided.

c) Wood preservatives (Nature Plus)

- The use of wood preservatives, halogen-organic compounds and synthetic-organic fire retardants is prohibited.

7) Performance clauses:

7.1. Environmental aspects:

7.1.1 General criteria for all external doors

a) Raw material collecting system (Nordic)

- Exterior doors made of plastic shall be covered by a system that ensures their collection for recycling.

b) Packaging (Nordic)

- Halogenated plastics and timber that is treated with wood preservatives / biocides must not be used in packaging.

c) Guarantee (Nordic)

- The door manufacturer must provide a 10-year guarantee for form stability and a 2-year guarantee for function.

d) Customer information (Nordic)

- The following must be enclosed with each delivery of exterior doors or provided as information on a product-related website:
 - Instructions on the handling of the exterior door during transportation, reception and storage at the building site.
 - Instructions on how the exterior door shall be installed into a wall, adjusted and protected during the construction period. General physical parameters for fitting must be specified. Instructions on how exterior door should best be installed from an energy point of view, in order to prevent heating loss as a result of poor installation. In addition, the fitting instructions must assist installation without the risk of door, or the wall into which it is placed, suffering damage resulting from the effects of moisture from convection, diffusion or external factors such as rain or snow.
 - Information on the exterior door's U-value. Specify for which format the U-value applies.
 - Instructions describing the recommended maintenance for the exterior door. Care instructions must contain details on how often the finish should be checked and maintained/re-applied, and which surface treatment is recommended.
 - Details of what should be done with exterior door once it reaches the end of its service life.

e) Component materials (Nordic)

- Specify the materials and chemical products of which the exterior door comprises. Specify the percentage weight of each material and component of the entire window/exterior door. It is not necessary to specify the percentage weight for chemical products such as adhesives and surface treatments.

7.1.2 Specific criteria for wooden doors

a) User's information (Nature Plus)

- The following information, including the production standards and proof of product control procedures, is to be provided with the product in a form which is suitable for the consumer and/or user (also see EN 14351, Appendix ZA).
 - General data (labelling/designation, type, name, etc.)
 - The areas of application
 - The sound-proofing properties
 - Coefficient of heat transfer (for house and apartment doors)
 - Fire resistance class
 - Intrusion resistance class (for house and apartment doors)
 - The type and origin of the wood

7.2. Social aspects:

Buyers can take account of social aspects in their procurement. For more information about the different possibilities see:

<http://www.gidsvoorduurzameaankopen.be/en/node/108>

7.3. Ethical aspects:

"The tenderer undertakes, until the contract has been executed in full, to respect the 8 Basic Conventions of the ILO:

1. The prohibition of forced labour (C29 Forced Labour Convention, 1930, and C105 Abolition of Forced Labour Convention, 1957);
2. The right to freedom of association (C87 Freedom of Association and Protection of the Right to Organise, 1948);
3. The right to organise and collective bargaining (C98 Right to Organise and Collective bargaining, 1949);
4. The prohibition of any discrimination in terms of labour and remuneration (C100 Equal Remuneration, 1951 and C111 Discrimination (Employment and Occupation), 1958);
5. The minimum age for child labour (C138 Minimum Age Convention, 1973), together with the prohibition of the worst forms of child labour (C182 Worst Forms of Child Labour Convention, 1999).

The non-respect of this undertaking may, by virtue of Article 20, §1, 4° of the general specifications annexed to the Royal Decree of 26 September 1996, give rise to the application of the official measures described in § 6 of the same article, including unilateral termination of the contract.”

References

[Information of the public authority that used these clauses in a procurement case]

Annex 1: R-PHRASES:

(R-phrases are mentioned on product labels and in product safety datasheets. It can be a useful tool for verification-procedures.)


<u>R1:</u>	Explosive when dry.
<u>R2:</u>	Risk of explosion by shock, friction, fire or other sources of ignition.
<u>R3:</u>	Extreme risk of explosion by shock, friction, fire or other sources of ignition.
<u>R4:</u>	Forms very sensitive explosive metallic compounds.
<u>R5:</u>	Heating may cause an explosion.
<u>R6:</u>	Explosive with or without contact with air.
<u>R7:</u>	May cause fire.
<u>R8:</u>	Contact with combustible material may cause fire.
<u>R9:</u>	Explosive when mixed with combustible material.
<u>R10:</u>	Flammable
<u>R11:</u>	Highly flammable
<u>R12:</u>	Extremely flammable
<u>R13 (obsolete):</u>	<i>Extremely flammable liquid gas (This R-phrase is no longer designated by the version of the GefStoffV published on 26.10.93.)</i>
<u>R14:</u>	Reacts violently with water.
<u>R15:</u>	Contact with water liberates extremely flammable gases.
<i>Merck R15.1</i>	<i>Contact with acid liberates extremely flammable gases.</i>
<u>R16:</u>	Explosive when mixed with oxidizing substances.
<u>R17:</u>	Spontaneously flammable in air.
<u>R18:</u>	In use, may form flammable/explosive vapour-air mixture.
<u>R19:</u>	May form explosive peroxides.
<u>R20:</u>	Harmful by inhalation.
<u>R21:</u>	Harmful in contact with skin.
<u>R22:</u>	Harmful if swallowed.
<u>R23:</u>	Toxic by inhalation.
<i>Riedel-de Haen R23K:</i>	<i>Also toxic by inhalation.</i>
<u>R24:</u>	Toxic in contact with skin.
<i>Riedel-de Haen R24K:</i>	<i>Also toxic in contact with skin.</i>
<u>R25:</u>	Toxic if swallowed.
<i>Riedel-de Haen R25K:</i>	<i>Also toxic if swallowed.</i>
<u>R26:</u>	Very toxic by inhalation.
<i>Riedel-de Haen R26K:</i>	<i>Also very toxic by inhalation.</i>
<u>R27:</u>	Very toxic in contact with skin
<i>Riedel-de Haen R27A:</i>	<i>Very toxic in contact with eyes.</i>
<i>Riedel-de Haen R27K:</i>	<i>Also very toxic in contact with skin.</i>

<i>Riedel-de Haen R27AK:</i>	<i>Also very toxic in contact with eyes.</i>
<u>R28:</u>	Very toxic if swallowed.
<i>Riedel-de Haen R28K:</i>	<i>Also very toxic if swallowed.</i>
<u>R29:</u>	Contact with water liberates toxic gas.
<u>R30:</u>	Can become highly flammable in use.
<u>R31:</u>	Contact with acids liberates toxic gas.
<i>Merck R31.1</i>	<i>Contact with alkalies liberates toxic gas.</i>
<u>R32:</u>	Contact with acids liberates very toxic gas.
<u>R33:</u>	Danger of cumulative effects.
<u>R34:</u>	Causes burns.
<u>R35:</u>	Causes severe burns.
<u>R36:</u>	Irritating to eyes.
<i>Riedel-de Haen R36A:</i>	<i>Lacrimating</i>
<u>R37:</u>	Irritating to respiratory system.
<u>R38:</u>	Irritating to skin.
<u>R39:</u>	Danger of very serious irreversible effects.
<u>R40:</u>	Possible risk of cancer. <i>CAUTION: Until 2001 this R-phrase was used for possible mutagenic or teratogenic risks as well. These risks are now labelled with R68!</i>
<u>R41:</u>	Risk of serious damage to eyes.
<u>R42:</u>	May cause sensitization by inhalation.
<u>R43:</u>	May cause sensitization by skin contact.
<u>R44:</u>	Risk of explosion if heated under confinement.
<u>R45:</u>	May cause cancer.
<u>R46:</u>	May cause heritable genetic damage.
<i>R47(obsolete):</i>	<i>May cause deformities. (This R-phrase is no longer designated by the version of the GefStoffV published on 26.10.93.)</i>
<u>R48:</u>	Danger of serious damage to health by prolonged exposure.
<u>R49:</u>	May cause cancer by inhalation.
<u>R50:</u>	Very toxic to aquatic organisms.
<u>R51:</u>	Toxic to aquatic organisms.
<u>R52:</u>	Harmful to aquatic organisms.
<u>R53:</u>	May cause long-term adverse effects in the aquatic environment.
<u>R54:</u>	Toxic to flora.
<u>R55:</u>	Toxic to fauna.
<u>R56:</u>	Toxic to soil organisms.
<u>R57:</u>	Toxic to bees.
<u>R58:</u>	May cause long-term adverse effects in the environment.
<u>R59:</u>	Dangerous for the ozone layer.
<u>R60:</u>	May impair fertility.
<u>R61:</u>	May cause harm to the unborn child.
<u>R62:</u>	Possible risk of impaired fertility.
<u>R63:</u>	Possible risk of harm to the unborn child.
<u>R64:</u>	May cause harm to breastfed babies.
<u>R65:</u>	Harmful: may cause lung damage if swallowed.
<u>R66:</u>	Repeated exposure may cause skin dryness or cracking.
<u>R67:</u>	Vapours may cause drowsiness and dizziness.

R68: Possible risks of irreversible effects.

COMBINATIONS OF R-PHRASES:

- R14/15: Reacts violently with water, liberating extremely flammable gases.
- R15/29: Contact with water liberates toxic, extremely flammable gas.
- R20/21: Harmful by inhalation and in contact with skin.
- R21/22: Harmful in contact with skin and if swallowed.
- R20/22: Harmful by inhalation and if swallowed.
- R20/21/22: Harmful by inhalation, in contact with skin and if swallowed.
- R21/22: Harmful in contact with skin and if swallowed.
- R23/24: Toxic by inhalation and in contact with skin.
- R24/25: Toxic in contact with skin and if swallowed.
- R23/25: Toxic by inhalation and if swallowed.
- R23/24/25: Toxic by inhalation, in contact with skin and if swallowed.
- R24/25: Toxic in contact with skin and if swallowed.
- R26/27: Very toxic by inhalation and in contact with skin.
- R27/28: Very toxic in contact with skin and if swallowed.
- R26/28: Very toxic by inhalation and if swallowed.
- R26/27/28: Very toxic by inhalation, in contact with skin and if swallowed.
- R36/37: Irritating to eyes and respiratory system.
- R37/38: Irritating to respiratory system and skin.
- R36/38: Irritating to eyes and skin.
- R36/37/38: Irritating to eyes, respiratory system and skin.
- R39/23: Toxic: danger of very serious irreversible effects through inhalation.
- R39/24: Toxic: danger of very serious irreversible effects in contact with skin.
- R39/25: Toxic: danger of very serious irreversible effects if swallowed.
- R39/23/24: Toxic: danger of very serious irreversible effects through inhalation and in contact with skin.
- R39/23/25: Toxic: danger of very serious irreversible effects through inhalation and if swallowed.
- R39/24/25: Toxic: danger of very serious irreversible effects in contact with skin and if swallowed.
- R39/23/24/25: Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.
- R39/26: Very toxic: danger of very serious irreversible effects through inhalation.
- R39/27: Very toxic: danger of very serious irreversible effects in contact with skin.
- R39/28: Very toxic: danger of very serious irreversible effects if swallowed.
- R39/26/27: Very toxic: danger of very serious irreversible effects through inhalation and in contact with skin.
- R39/26/28: Very toxic: danger of very serious irreversible effects through inhalation and if swallowed.
- R39/27/28: Very toxic: danger of very serious irreversible effects in contact with skin and if swallowed.
- R39/26/27/28: Very toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.
- R42/43: May cause sensitization by inhalation and skin contact.
- R48/20: Harmful: danger of serious damage to health by prolonged exposure through inhalation.
- R48/21: Harmful: danger of serious damage to health by prolonged exposure in contact with skin.
- R48/22: Harmful: danger of serious damage to health by prolonged exposure if swallowed.
- R48/20/21: Harmful: danger of serious damage to health by prolonged exposure through inhalation and in contact with skin.
- R48/20/22: Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
- R48/21/22: Harmful: danger of serious damage to health by prolonged exposure in contact with skin and if swallowed.
- R48/20/21/22: Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.
- R48/23: Toxic: danger of serious damage to health by prolonged exposure through inhalation.

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- R48/24: Toxic: danger of serious damage to health by prolonged exposure in contact with skin.
 - R48/25: Toxic: danger of serious damage to health by prolonged exposure if swallowed.
 - R48/23/24: Toxic: danger of serious damage to health by prolonged exposure through inhalation and in contact with skin.
 - R48/23/25: Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
 - R48/24/25: Toxic: danger of serious damage to health by prolonged exposure in contact with skin and if swallowed.
 - R48/23/24/25: Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.
 - R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
 - R51/53: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
 - R52/53: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
 - R68/20: Harmful: possible risk of irreversible effects through inhalation.
 - R68/21: Harmful: possible risk of irreversible effects in contact with skin.
 - R68/22: Harmful: possible risk of irreversible effects if swallowed.
 - R68/20/21: Harmful: possible risk of irreversible effects through inhalation and in contact with skin.
 - R68/20/22: Harmful: possible risk of irreversible effects through inhalation and if swallowed.
 - R68/21/22: Harmful: possible risk of irreversible effects in contact with skin and if swallowed.
 - R68/20/21/22: Harmful: possible risk of irreversible effects through inhalation, in contact with skin and if swallowed.

Annex 2: Translation between classification in accordance with Directive 67/548/EEC and Directive 1272/2008/EEC.

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:353:0001:1355:EN:PDF>

Classification under Directive 67/ 548/EEC	Physical state of the substance when rele-vant	Classification under 1272/2008/EEC		Note
		Hazard Class-and-Category	Hazard statement	
E; R2		No direct translation possible.		
E; R3		No direct translation possible.		
O; R7		Org. Perox. CD	H242	
		Org. Perox. EF	H242	
O; R8	gas	Ox. Gas 1	H270	
O; R8	liquid, solid	No direct translation possible.		
O; R9	liquid	Ox. Liq. 1	H271	
O; R9	solid	Ox. Sol. 1	H271	
R10	liquid	No direct translation possible.		
		Correct translation of R10, liquid is:		
		<ul style="list-style-type: none"> Flam. Liq. 1, H224 if flashpoint < 23 °C and initial boiling point ≤ 35 °C Flam. Liq. 2, H225 if flashpoint < 23 °C and initial boiling point > 35 °C Flam. Liq. 3, H226 if flashpoint ≥ 23 °C 		
F; R11	liquid	No direct translation possible.		
		Correct translation of F; R11, liquid is:		
		<ul style="list-style-type: none"> Flam. Liq. 1, H224 if initial boiling point ≤ 35 °C Flam. Liq. 2, H225 if initial boiling point > 35 °C 		
F; R11	solid	No direct translation possible.		
F+; R12	gas	No direct translation possible.		
		Correct translation of F+; R12, gaseous results either in Flam. Gas 1, H220 or Flam. Gas 2, H221.		
F+; R12	liquid	Flam. Liq. 1	H224	
F+; R12	liquid	Self-react. CD	H242	
		Self-react. EF	H242	
		Self-react. G	none	
F; R15		No translation possible.		
F; R17	liquid	Pyr. Liq. 1	H250	
F; R17	solid	Pyr. Sol. 1	H250	
Xn; R20	gas	Acute Tox. 4	H332	(1)
Xn; R20	vapours	Acute Tox. 4	H332	(1)
Xn; R20	dust/mist	Acute Tox. 4	H332	
Xn; R21		Acute Tox. 4	H312	(1)
Xn; R22		Acute Tox. 4	H302	(1)
T;R23	gas	Acute Tox. 3	H331	(1)
T;R23	vapour	Acute Tox. 2	H330	
T;R23	dust/mist	Acute Tox. 3	H331	(1)

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T;R24		Acute Tox. 3	H311	(1)
T;R25		Acute Tox. 3	H301	(1)
T+; R26	gas	Acute Tox. 2	H330	(1)
T+; R26	vapour	Acute Tox. 1	H330	
T+; R26	dust/mist	Acute Tox. 2	H330	(1)
T+; R27		Acute Tox. 1	H310	
T+; R28		Acute Tox. 2	H300	(1)
R33		STOT RE 2	H373	(3)
C; R34		Skin Corr. 1B	H314	(2)
C; R35		Skin Corr. 1A	H314	
Xi; R36		Eye Irrit. 2	H319	
Xi; R37		STOT SE 3	H335	
Xi; R38		Skin Irrit. 2	H315	
T;R39/23		STOT SE 1	H370	(3)
T;R39/24		STOT SE 1	H370	(3)
T;R39/25		STOT SE 1	H370	(3)
T+; R39/26		STOT SE 1	H370	(3)
T+; R39/27		STOT SE 1	H370	(3)
T+; R39/28		STOT SE 1	H370	(3)
Xi; R41		Eye Dam. 1	H318	
R42		Resp. Sens. 1	H334	
R43		Skin Sens. 1	H317	
Xn; R48/20		STOT RE 2	H373	(3)
Xn; R48/21		STOT RE 2	H373	(3)
Xn; R48/22		STOT RE 2	H373	(3)
T;R48/23		STOT RE 1	H372	(3)
T;R48/24		STOT RE 1	H372	(3)
T;R48/25		STOT RE 1	H372	(3)
R64		Lact.	H362	
Xn; R65		Asp. Tox. 1	H304	
R67		STOT SE 3	H336	
Xn; R68/20		STOT SE 2	H371	(3)
Xn; R68/21		STOT SE 2	H371	(3)
Xn; R68/22		STOT SE 2	H371	(3)
Carc. Cat. 1; R45		Carc. 1A	H350	
Carc. Cat. 2; R45		Carc. 1B	H350	
Carc. Cat. 1; R49		Carc. 1A	H350i	
Carc. Cat. 2; R49		Carc. 1B	H350i	
Carc. Cat. 3; R40		Carc. 2	H351	
Muta. Cat. 2; R46		Muta. 1B	H340	
Muta. Cat. 3; R68		Muta. 2	H341	
Repr. Cat. 1; R60		Repr. 1A	H360F	(4)
Repr. Cat. 2; R60		Repr. 1B	H360F	(4)
Repr. Cat. 1; R61		Repr. 1A	H360D	(4)
Repr. Cat. 2; R61		Repr. 1B	H360D	(4)

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Repr. Cat. 3; R62		Repr. 2	H361f	(4)
Repr. Cat. 3; R63		Repr. 2	H361d	(4)
Repr. Cat. 1; R60-61		Repr. 1A	H360FD	
Repr. Cat. 1; R60 Repr. Cat. 2; R61		Repr. 1A	H360FD	
Repr. Cat. 2; R60 Repr. Cat. 1; R61		Repr. 1A	H360FD	
Repr. Cat. 2; R60-61		Repr. 1B	H360FD	
Repr. Cat. 3; R62-63		Repr. 2	H361fd	
Repr. Cat. 1; R60 Repr. Cat. 3; R63		Repr. 1A	H360Fd	
Repr. Cat. 2; R60 Repr. Cat. 3; R63		Repr. 1B	H360Fd	
Repr. Cat. 1; R61 Repr. Cat. 3; R62		Repr. 1A	H360Df	
Repr. Cat. 2; R61 Repr. Cat. 3; R62		Repr. 1B	H360Df	
N; R50		Aquatic. Acute 1	H400	
N; R50-53		Aquatic Acute 1 Aquatic Chronic 1	H400 H410	
N; R51-53		Aquatic Chronic 2	H411	
R52-53		Aquatic Chronic 3	H412	
R53		Aquatic Chronic 4	H413	
N; R59		Ozone	EUH059	