

Product Certification Criteria for “Board Made of Wood or the like Version2.0”

Established: July 1, 2004

1. Environmental Background

The average of demand and supply of the timber in Japan is 92,000,000 m³ average in 2001. Scrap wood in factory (15,000,000 m³) and construction waste wood (12,000,000 m³) have been discharged during the use process; 12,000,000 m³ and 5,000,000 m³ of them are effectively used, respectively.

One of the efficient uses of these scrap wood and construction waste wood is wooden board such as the fiberboard etc. Total domestic supply and demand of particleboard and fiberboard (insulation board, MDF and hard board) is 3,150,000 m³ (2001), which uses effectively low quality scrap wood such as construction waste in addition to scrap wood in factory.

Looking at the changes in the volume of wood-based panels (plywood, fiberboards, and particleboards) supplied from 1991 to 2001 in Japan, the share of fiber and particleboards rose from a total of 19.5% to 29.2% as compared to plywood. Comparing the consumption of wood panels per population of 1000 in major countries of the world, the share of fiberboards and particleboards in Japan totaled 28.6%, which is a relatively low level compared to the average 67.4% of the world's major countries. Consumption in America, Canada, and Germany is 67.0%, 69.9%, and 90.8% respectively. Wood, even edges or chips, is a material that can be used entirely. In addition, even after use for the construction of buildings, etc., wood can be reused for boards and pulp, etc. It is necessary to continue promoting such reuse step-by-step in order to effectively utilize resources.

On the other hand, indoor environment pollution by chemical material is given as the problem which wooden boards have. Since July 2003, the Amended Building Standard Law prescribing regulations on construction materials related to the emission of formaldehyde has been completely enforced for living room interior finishing materials.. With the revision of the Building Standard Law, environment JIS on sick house syndrome was established and revised. JIS standards on fiber and particleboards were also revised in March 2003. As a result of this revision, the classification of formaldehyde emissions grade was changed. Regarding interior finishing materials, the top grade F**** not subject to area restrictions was established, etc. As for substances causing sick house syndrome, consumer interests are increasingly growing, and the Health and Welfare Ministry, etc. are continuing reviews of formaldehyde and other VOCs (volatile organic compounds), as well as guidelines on living room concentration of TVOCs.

2. Terminology

Thinned wood, waste wood, construction waste wood, and less useful wood were added as new definitions.

In Product Category No. 111 “Board Made of Wood or the Like” (Established on July 1, 1998) (hereafter referred to as Version 1.0), thinned wood was defined as wood (log) less than 14 cm in tip end diameter produced from plantation forests. However in Version 2.0, criteria based on tip end diameter were omitted. When Version 1.0 was first established, as thinned wood with comparatively large diameters was considered to have a relatively high market value, this product category was designed to target especially thinned wood with small diameters. However, with the forestry situation growing increasingly harsh over the past five years, profitability is decreasing due to sluggish wood prices and increasing management costs. Especially in Japan, there are concerns of declining management levels such as failure to implement the required thinning at the appropriate time in order to foster healthy forests. Giving priority to the further promotion of thinning activities necessitating forest maintenance, requirements based on tip end diameter were omitted because they contradict the actual situation.

Regarding certification of thinned wood, Version 1.0 required the submission of documents certifying place of origin, forest management plans, and information on tree type, etc. From this present version, requirements such as indicating the year of planting in the document certifying place of origin as well as attaching photographs of the concerned forest to prove that thinning was carried out have been added. Forest management plans have however been omitted from requirements, considering the difficulty presented to applicants in submitting these plans. In place, applicants are now required to report where possible information on the thinning percentage, how many times thinning has been carried out and, as information on the thinning activities, and to clarify their long term management plans. If the event of difficulty in providing this information, applicants may provide estimates of the year of planting based on the fact that the period of regenerating cutting for Japanese cedar and cypress is at shortest around 45 and 50 years respectively in Japan (though this can differ by region) and thinning is required before this.

For less useful wood, only those with relative marketability that are discarded or disposed were taken up in this product category. In Version 1.0, they included abandoned lumber in the forest, shrubs, and tree roots. In Version 2.0, wood obtained from lumber damaged by disease, pests, disasters, and bent or small diameter logs were added to these items. Logs whose relocation is prohibited by related laws such as logs damaged by pine weevils were excluded. It was reviewed if species that are difficult to use as materials in manufacturing due to quality, color, etc. should be included in the range of less useful wood. This however provided difficulty to determine owing to difference in regional conditions such as industrial level. Finally it was decided that such species shall not be determined as less useful wood based solely on characteristics such as quality and color.

Of less useful wood, small diameter logs were limited to logs obtained by thinning from plantation forests in Version1.0, however considering the existence of various national, regional, and natural conditions, all small diameter logs regardless of type of forest and logging method were adopted in Version2.0. Some small diameter logs are produced from clear-cutting over a wide area. Logging methods such as clear-cutting differ by situation, such as forestry measures of a country, geography, climate, characteristics of tree, etc., and thus cannot be handled in the same way. However, in the case of clear-cutting over a wide area, it may be inappropriate to recommend this logging method due to its risks of causing tremendous damage to the diversity of living things, as well as concerns of such problems as flowing out of soil, etc. For natural forests, this raises concerns of such problems as degradation of forest and deforestation due to illegal or excessive logging. It was therefore decided that timber produced from natural forests and wood produced by clear-cutting, patch logging, and strip logging would require certification that the forest is being sustainably managed by a neutral third party. For details on requirements that must be satisfied for forest certification, refer to criteria on “wood based panels”, and/or “furniture” in the Nordic Swan.

3. Certification Criteria

3-1 Details of establishing environmental criteria

When the criteria related to environment are laid out, “Environmental Impact Item Selection Matrix for Each Life Stage of Products” is used. Environmental impact for each stage of life should be evaluated for each impact item as shown in the table below to decide whether the item is important for the product on a specific stage of life. When decided important, either qualitative or quantitative criterion for the item will be established.

For the category “Board made of Wood or the Like”, the items (cells) with either X or XX in the matrix below were evaluated. And finally the items (cells) with XX (A-1, A-8, B-2, B-5, B-6, B-8, B-9, C-1, C-5, C-8, D-5, D-8, D-9, E-1, E-5, and E-8) were selected as the items for criteria to be established.

The other cells in the matrix were either not evaluated or evaluated subsequently with other items.

The process of the establishment of the criteria about the environment is shown below.

Table Chart for Selecting Environmental Impact Items at Each Stage of Life Cycle

| Environmental Impact Item | Product Life Stage | | | | | |
|---------------------------|----------------------------|------------------|-----------------|--------------------|-------------|--------------|
| | A. Raw Material Collection | B. Manufacturing | C. Distribution | D. Use/Consumption | E. Disposal | F. Recycling |

| | | | | | | |
|--|----|----|----|----|----|---|
| 1. Consumption of resources | XX | | XX | | XX | |
| 2. Release of global warming substances | X | XX | X | | | |
| 3. Release of ozone depleting substances | | | | | | |
| 4. Destruction of ecosystem | | | | | | |
| 5. Release of air polluting substances | | XX | XX | XX | XX | |
| 6. Release of water polluting substances | | XX | | | | |
| 7. Release/disposition of wastes | | | | | X | |
| 8. Use/release of harmful substances | XX | XX | XX | XX | XX | |
| 9. Other environmental impact | X | XX | | XX | | X |

A. Raw material collection

A-1 (Consumption of resources)

The following points were reviewed under this item:

- (1) The ratio of reused/unused timber as wooden parts shall be 100%.
- (2) Use of other materials during decorating and other processes
- (3) Content of adhesive and other agents
- (4) The sustainable forestry administration/management for timber felling and chip manufacture

As for (1), from the viewpoint to preserve a forest through effective use of non-used resources, re- use of timber, it is desirable to use reused/unused timber for the raw materials of the product by 100 %.

Therefore this was selected as the item to establish criteria.

As indicated in the terminology, the scope of reused/unused timber has been clarified in Version2.0. In view of the aggravating conditions or deforestation that need to be protected due to logging exceeding the amount of growth, there is significance in processing and using discarded timber with innovative technology, etc.

Considering that JIS A 5905 “Fiberboards” and JIS A 5908 “Particleboards” allow the use of plant fiber as a raw material, it was decided that reused/unused plant fiber such as rice hulls shall be recognized as a raw material in conjunction with Version1.0. Reused/unused timber includes used paper and jute bag as a type of raw material.

The addition of bamboo to the product category was also reviewed. The area of bamboo groves in Japan is 156,000 ha (2000), which is approximately 0.6% of the area of forests, and therefore small. In 1970, the total bamboo grove area was

167,000 ha, of which 92% was producing bamboo forests. In 2000, the percentage of bamboo-producing forests dipped to 37%, with many of these forests left neglected and not maintained. In recent years, proper management of bamboo groves is increasingly being neglected. This has resulted in overgrowth and invasion into forests and agricultural land, threatening proper growth and development. Poor growth of other plants due to the multiplication of bamboo groves also means a drop in the number of animal species. Furthermore, another land conservation problem brought on by neglected bamboo groves being pointed out is the tendency of the underground portion of the stem to extend about 50 cm into the ground, easily inviting the collapse of hillsides. Since bamboo grows in about two to three years and thus does not deplete as resources, its multiplication on the contrary prevents other agricultural products and trees from growing, thus requiring planned felling in order to protect forests. Furthermore, there are an increasing number of new products developed that use bamboo resources, along with improvement in the maintenance and management of bamboo groves. For these reasons, bamboo was acknowledged as being a raw material in the scope of “less useful wood”. The method of proving that a concerned bamboo “less useful” was reviewed. Due to the difficulty in setting quantitative criteria, it was decided that submission of the following shall be required: qualitative documents adequately describing the peripheral conditions of the bamboo grove and that logging is carried out for the purpose of appropriate maintenance and management in environment preservation, and photographs or maps showing peripheral conditions of the bamboo grove.

The mixture of waste plastic with timber for use as a raw material of wooden portions was also reviewed. Such plastic wood mixture composite products are already being put to practical application, and more and more will be introduced to the market with the advancement of product development efforts. As we strive towards realizing a recycle-oriented society, the recycling and use of waste plastic will continue to be a major issue. Because the addition of plastic to wooden materials contributes to improving water resistance and bending strength in some cases, and some of these plastic wood mixture products meet JIS standards in terms of quality, inclusion of these products in this product category was reviewed. As a result, it was decided that they will not be taken up in this product category, which focuses on the use of reused/unused timber, for reasons such as it is difficult to separate and sort composite products after use, there are risks of high environmental impact during incineration, and because plastic wood mixture materials which look like wood may cause misunderstanding on the part of consumers. Product Categories No.118 “Plastic Products Using Recycled Materials” and No.123 “Building Products Using Recycled Materials” cover these plastic wood composite materials if they meet the prescribed criteria.

For (2), JIS A 5905 and JIS A 5908 permit ornamental boards, and because these are sold on the market, they were included in this product category. The weight of the ornamental portions was limited to 5% of the overall product in

conjunction with Version1.0. JIS A 5905 and JIS A 5908 were referred to for calculation of weight. The prescription constituents for ornamental processing were reviewed in E-8.

For (3), the percentage of adhesive added was reviewed. As wood has the function of storing carbon, in view of this, it is desirable for the ratio of wood to added adhesive to be as high as possible in a product. However, due to the wide variety of adhesives available today whose functions and toxicity vary accordingly, it is difficult to establish standards for the amount of adhesive added. Consequently, this item was not selected as a criterion. However the prescription constituents and weight percentage of adhesives and additives need to be indicated.

For (4), from the time when Version1.0 was established, more and more forests in the world are certified as being sustainable forests by third parties. In Japan, the acquisition of forest certification is gradually spreading even among national forests, since the acquisition of forest certification by one forest from the FSC (Forest Stewardship Council) for the first time in 2000. As of August 2003, the area of certified forests total 175,000 hectares, equivalent to about 0.7% of the total forest area in Japan.

In the case of this Product Category, it was decided that the focus will be on promoting the use of reused/unused timber, considering that the unused rate of thinned wood in Japan is high, and the percentage of lumber generated in construction recycled for use as material is still low. However, it was decided that reviews will be continued regarding the inclusion of reused/unused timber, less useful wood, as well as wood produced from forests sustainably managed within the scope of raw materials. Still, there is increasing awareness worldwide for the need for adequate understanding and cooperation on both the side managing and running forests as well as the side purchasing forest products in order to realize proper forest management. Another growing trend is the formation of international networks of companies aiming to produce, distribute, and sell certified timber and wood products. Reviews will be continued based on such trends as well as domestic trends like the investigative commission for “Ideal Forest Management System in Japan” established in March 2003.

A-2 (Release of global warming substances)

The following point was reviewed under this item:

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| (1) Estimation of carbon storage of timber resources and CO ₂ abundance which accompanies energy consumption when consolidating of raw material |
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For (1), the carbon storage function of timber was reviewed. Though there are formulas to calculate and assess carbon storage amount, it is difficult to convert carbon storage function into values which can serve as criteria in this stage. At the point when it becomes feasible to establish overall evaluation criteria including the manufacturing, use, consumption, and disposal stages, the selection of this item as a criterion shall be reviewed.

A-8 (Use/release of harmful substances)

The following point was reviewed under this item:

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| (1) Construction waste wood subject to antiseptics, pesticides, and termicides |
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For (1), there is a possibility that some materials are processed to be aseptic and insect-repellant and so on. In particular, the discharge of CCA processed timber, whose undesirable inclusion of heavy metals such as chrome and arsenic, etc. is a problem, is predicted to peak in 2010. Regarding wood injected with CCA to prevent sepsis and termites, inappropriate incineration may cause the generation of toxic gases including arsenic, and in addition, the ashes may contain toxic substances such as hexavalent chrome and arsenic. The Construction Material Recycling Act prescribes that these materials need to be sorted and disposed of appropriately. Prefectural guidelines also instruct/recommend sorting during dismantling work. Some of these guidelines also recommend that if material identification is difficult, all foundations of wooden constructions built after 1975 be separated/sorted from other timber due to the possibility of CCA inclusion. Furthermore, as these materials may not be identifiable when mixed with other timber, the guidelines recommend that foundations be dismantled separately from other timber to ensure thorough separation. Other than CCA, it is also instructed that wood applied with chlordane (an organic chlorine termicides) or creosote oil, which contains the carcinogenic benzo(a)pylene, be separated and sorted from other portions.

In this way, for products in which the possibility of inclusion of materials subject to antiseptics, pesticides and termicides cannot be denied, separation and sorting are prescribed in the Construction Material Recycling Act and prefectural guidelines. In addition, even in dismantling work not subject to this Act, separation efforts are made by the companies handling the dismantling work. Board manufacturers also have their own guidelines on the purchase of construction waste wood. The amount of such materials used is therefore decreasing in board manufacturing, which uses various raw materials. For these reasons, the sorting and use of materials subject to septic agents, moths and insecticide was therefore selected as a criterion for the use of construction waste wood. For hexavalent chrome and arsenic contained in products, it was decided that verification will be carried out through content tests.

A-9 (Other environmental impact)

The following point was reviewed under this item:

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| (1) Illegal logging |
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For (1), there is the opinion that the issue of illegal logging is not only the

problem of the producing country, but also that of the importing countries to some extent. In July 2003, the Second Meeting of the Asia Forest Partnership (AFP) was held in Indonesia, and a framework was established to realize the goal of having various stakeholders jointly undertaking the issues of illegal logging, forest fires, and forest recycling. Prior to this, in June 2003, a joint declaration of Indonesia and Japan bilaterally working together to countermeasure the illegal logging problem in Indonesia and action plans were signed. In November 2002, the Japan Federation of Wood-Industry Associations announced their “Declaration on Illegal Logging”, which expresses the perspective of the timber industry based on various discussions carried out during the “Committee Meetings to Review Illegal Logging Issues” set up by the organization. Such efforts to prevent illegal logging jointly by the government, international organizations, and industrial organizations are therefore being attempted. In addition, there are a growing number of international NPO and civic activities aiming to recognize forests with high protection value, prevent illegal logging, and support management of sustainable forests. However, due to the difficulties involved in drawing up specific criteria owing to the ability to pinpoint the actual situation of illegal logging, this was not selected as a criterion. However, by requiring the submission of documents certifying the raw material used for wooden portions of products, manufacturers are called not to use illegally logged timber. This should also be effective for raising interest related to illegal logging among consumers. Such efforts by the government and industry are expected to heighten user interest as well as promote understanding and cooperation.

B. Manufacturing Stage

B-2 (Release of global warming substances)

The following points were reviewed under this item:

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| (1) Estimation of CO ₂ fixation of timber materials and CO ₂ abundance which accompanies energy consumption when manufacturing (2) Effective use of by-products generated during manufacturing |
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For (1), wooden boards consume less energy during manufacturing, but from the standpoint of preventing global warming, as it is significant to reduce energy consumption, this item was selected as a criterion to promote such awareness. Fiberboards consume more energy in the fibrillating process, forming and drying process (for insulation board) and hot pressing process (for hard board) etc. than other wooden boards.

However, considering the difficulty in transforming energy consumption levels into figures and setting down criteria for this, as in Version1.0, submission of reports clarifying the amount of energy used during manufacturing from reception of timber materials and drawings outlining the production process has been made mandatory as an indication that “efforts are

made to save energy”.

For (2), the use of shavings and sawdust produced during manufacturing as a heat source in replacement of fossil fuel was discussed. However, considering that shavings, etc. may already be reused as materials in some plants, this item was not selected as a criterion.

B-5 (Release of air polluting substances)

The following points were reviewed under this item:

- (1) Generation of Nox, SOx etc. when manufacturing
(Installation of preventer in each factory)
- (2) Release of air polluting substances from adhesive agent

For (1) and (2), because a impact to the environment of released air pollutants from the manufacturing process of the product was judged to reduce in conforming to a related environment law and a pollution prevention agreement and so on, this item was selected as the item to establish criteria.

B-6 (Release of water polluting substances)

The following point was reviewed under this item:

- (1) Release of water polluting substances from manufacturing process

For (1), because a impact to the environment of released water pollutants from the manufacturing process of the product was judged to reduce in conforming to a related environment law and a pollution prevention agreement and so on, this item was selected as the item to establish criteria

B-8 (Use/release of harmful substances)

The following points were reviewed under this item:

- (1) Restraint actions against generating of formaldehyde in manufacturing
(Management and the reduction measure by the environmental quality standard)
- (2) Use/release of harmful substances contained in adhesive agent etc.

Items (1) and (2) are explained in A-8 and D-8

Regarding harmful substances released from the manufacturing process, it was decided that the observance of relevant environmental regulations and agreements shall reduce environmental impact, and this item was selected as a criterion.

B-9 (Other environmental impact)

The following point was reviewed under this item:

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| (1) Generating of powder dust in manufacturing (Installation of preventer in each factory) |
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For (1), this item is meaning that the vicinage quarrel and the labor environment are appropriately dealt with. As environmental impacts were judged to reduce with conforming related environment laws and pollution prevention agreements and so on, this item was selected as the item to establish criteria.

C. Distribution Stage

C-1 Consumption of resources

The following point was reviewed under this item:

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| (1) Lightweight packaging, and ease of recycling |
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For (1), packaging materials which are light, simple, and can be repeatedly used were reviewed. In certain board packaging, side panels and protection panels are used to protect the products. Plastic sheets may also be used to protect products against humidity. For side panels and protection panels, efforts are being made by wooden board manufacturers to minimize use. Sometimes, side panels and protection panels are brought to wooden board manufacturing plants as raw material. Taking these facts into consideration, minimum use of packaging and use of reusable packaging were selected as criteria. For plastic sheets, use was approved, though undesirable, considering the need for these packaging materials to protect products.

C-2 (Release of global warming substances)

The following point was reviewed under this item:

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| (1) CO ₂ abundance which accompanies energy consumption when distributing |
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For (1), the conclusion was reached that it would be desirable to promote recycling activities closely related to the region generating reusable resources such as waste wood and regions generating unused resources in forests by shortening the distribution channels.

Given that about 80% of the timber consumed in Japan relies on imports, and the wood mile which multiples the timber transportation distance with the timber volume (km-m³) is about four times that of the U.S., which has the top ranking in timber imports, the shortening of the distribution route would serve as a means of reducing energy consumption in the distribution stage. The adoption of the transportation route distance as a criterion was

therefore discussed. However, this item was eventually not selected as a criterion due to the difficulty in establishing criteria, which ultimately may impede trade. The Japanese industry association for fiberboard manufacturers is making efforts to decrease long distance transportation, though only in Japan.

C-5 (Release of air polluting substances)

The following points were reviewed under this item:

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| (1) Release of air pollutants when distributing (2) Reduction of and making lightweight packaging material |
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For (1), this item was not selected as a criterion for the same reasons as indicated in C-2.

For (2), this item was selected as a criterion as explained in C-1.

C-8 (Use/release of harmful substances)

The following points were reviewed under this item

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| (1) Management of formaldehyde at materials storage (2) Restriction of packaging material |
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(1) was reviewed in D-8.

For (2), as reviewed in C-1, it was decided that use of plastic sheets required for maintaining quality shall be approved. Considering that these plastic sheets will be disposed by incineration after use, prohibition of the use of resins composed of halogens and organic halogenides was set down as a criterion.

D. Use/Consumption Stage

D-5 (Release of air polluting substances)

The following point was reviewed under this item:

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| (1) Release of air pollutants from adhesive agent |
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For (1), sick house syndrome due to the emission of formaldehyde from homes, etc. is being raised as an issue, and the Ministry of Health and Welfare has also set down guidelines on indoor air concentration levels of chemical substances. Regarding the emission of formaldehyde for interior finishing of living rooms, etc., the Amended Building Standard Law, which revised restrictions on construction materials, has been completely enforced since July 2003. It was therefore determined that environmental impact can be reduced by setting emissions of substances said to be potentially harmful substances from products as a criterion. Details of specific emission criteria were reviewed in D-8.

D-8 (Use/release of harmful substances)

The following points were reviewed under this item:

- (1) Formaldehyde from products
- (2) Substances during use/consumption
- (3) Harmful substances contained in non-formaldehyde adhesives
- (4) Other harmful substances

As for (1), it was selected as the item to establish criteria as explained in D-5.

Incidentally, MDF, hard boards and insulation boards are included in particleboards and fiberboards of this category. Among these, particleboards and MDF mainly use urea resin, melamin urea resin, and phenol resin as adhesives, which are made from formaldehyde. During the production of these resins, some of the un-reacted formaldehyde adheres inside the wood, and is released into air over time. In some cases, formaldehyde in hardened adhesive resin may also be decomposed and subsequently be released when exposed to humidity in the atmosphere. For hard boards, phenol resin, which poses the least formaldehyde emission, is used, but the amount used is very small. Still, there is a possibility of formaldehyde emission although low. Insulation boards on the other hand use starch type vegetable adhesives such as cornstarch, so again the possibility of formaldehyde emission is low. With the revision of JIS in March 2003, categories were established according to the amount of formaldehyde emitted, while in the Amended Building Standard Law, area restrictions of construction materials emitting formaldehyde used for interior finishing material were imposed according to the emission level. A new grade F**** (average 0.3mg/liter or less, maximum 0.4mg/liter or less) was installed. The grade is currently the highest grade in which emission level is even lower than E0. Construction materials rated with the F**** grade can be used without limit in interior finishing material. The F*** grade (average 0.5mg/liter or less, maximum 0.7mg/liter or less) which is equivalent to E0 limits use to less than two times the floor space, while the F** grade (average 1.5mg/liter or less, maximum 2.1mg/liter or less) which is equivalent to E1 limits use to less than 0.3 times the floor space (when the number of ventilations performed is less than 0.5 to 0.7 times/hour). Based on these new regulations, criteria were reviewed from the perspective of which grade should be chosen as a new criterion.

The grade of formaldehyde emissions shall be determined according to the size of the area being used. By differentiating use in this way, F*** grade boards may also be used in some cases, or may be used at areas not facing living rooms such as mats, etc. Whether F*** grade boards are also allowable based on formaldehyde concentrations in rooms was therefore reviewed. Since boards serve as intermediate products, they are used not only as interior materials for houses, but also for furniture. There were comments that even if a board is F*** grade, it

should be allowed if it becomes F**** grade finally after secondary processing. However, the F**** grade was eventually selected considering that F**** should be selected if the Eco Mark Program was aiming to be the top runner, that current social trends are towards realizing low formaldehyde levels, and that it is difficult for users to differentiate use between F*** boards and F**** boards, as well as bearing in mind the transition to the F**** board in the future. Discussions revolved around the issue of increased costs with the switch to F****, and around the fact that board user companies such as house and office furniture makers are currently moving in the direction of seeking F**** boards, and so price problems may be resolved with increased supply.

Regarding the measurement method, it was decided that the JIS A 1460 "Building boards Determination of formaldehyde emission -- Desiccator method" or JIS A 1901 "Determination of the emission of volatile organic compounds and aldehydes for building products -- Small chamber method" can be used.

For (2), the committee reviewing sick house syndrome problems of the Ministry of Health and Welfare set down guidelines on indoor air pollution in 2000 in addition to those on formaldehyde in 1997, prescribing indices on indoor concentrations of toluene and xylene in these guidelines. Thus, it was decided that criteria will be prescribed for these two substances as done in Version1.0. Moreover, since fiberboards and particleboards can be manufactured without using these substances, prohibition of use was set down as a criterion.

For the other thirteen VOCs, indices were listed individually. These are health indices based on risk assessment. It is assumed that below these concentrations, VOCs will have no adverse effects on health in normal use. Particularly, acetaldehyde is given as a VOC related to wooden materials. Because the correlation between the amount emitted from products and indoor concentration is still not clear, it is difficult to set down reference values for emissions from products. Consequently, this was not selected as a criterion. In the future, VOCs related to wooden materials including acetaldehyde shall further be reviewed based on guidelines proposed by the Ministry of Health and Welfare as well as revisions made in the Building Standard Law.

Regarding TVOC, the guidelines of the Ministry of Health and Welfare sets down tentative targeted values, and so these were again reviewed in continuation from Version1.0. There exist numerous VOCs inside rooms for which no guideline values have been set. Even if VOC concentrations for which guideline values are set are individually met, air quality may not be completely pleasant and safe. The review committee of the Ministry of Health and Welfare has, with the aim of preventing the progress of pollution by harmful substances for which guideline values have yet to be set, proposed appropriate allowable VOC concentrations considering it important to complement individual VOC guideline values. Again, because the correlation between TVOC emissions from products and tentative targeted values for indoor concentrations is still unclear, no criteria was set down

in this version for the TVOC emissions. It should also be noted that timber contains a natural VIC called terpenes, and that no individual guideline values have been set down for these. Like individual VOCs, TVOCs will continue to be reviewed in the future based on trends on TVOC guideline values set according to risk assessment results, etc.

For (3), the increasing use of non-formaldehyde adhesives as one countermeasure in response to rapid change into low-formaldehyde products was reviewed together with the concerns of emissions of harmful substances other than formaldehyde. In particular, the raw material monomer MDI (diphenylmethane-4,4'diisocyanate) used in isocyanate adhesives was reviewed. MDI has long been known to be allergenic. Criteria set down for wooden construction materials in Germany's Blue Angel and Canada's Environmental Choice prescribe standards on monomer MDI emission levels in the use of isocyanate adhesives. Products made in Japan are increasingly using soluble polymer isocyanate adhesives; consequently, the selection of this item as a criterion was considered. Isocyanate adhesives used in wooden products on the Japanese market are mainly of the soluble polymer type. They are considered to completely react in the manufacturing process of the adhesives, which means low possibility of monomer emission from products. Considering that there exist no standard measuring method or standard values in Japan and the lack of knowledge and techniques related to MDI emissions, this item was taken as difficult to select as a criterion and was therefore not selected. However, it was decided that further reviews will be carried out when information on measuring methods and standard values becomes available.

For (4), harmful substances that may contain additives such as formaldehyde catchers were reviewed. This item was selected as a criterion to report the prescription constituents.

D-9 (Use/Consumption)

The following point was reviewed under this item:

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|---------------------------------------|
| (1) Conveyance of product information |
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For (1), since wooden boards taken up in this Product Category are half-finished products, they are processed by secondary businesses into the final product. From the viewpoint that these secondary businesses, users of wooden boards, need to fully understand that these products are designed to have reduced environmental impact, and thus process them into eco-friendly products based on their characteristics, this item was selected as a criterion. Specifically, it was decided that the Eco Mark Program would compile a manual providing information on related criteria and distribute the manual to users. It would be desirable to place such information in product catalogues to convey the information extensively to secondary businesses.

E. Disposal Stage

E-1 (Consumption of resources)

The following point was reviewed under this item:

(1) Ease of disposal and recycling

This item was selected as a criterion as explained in D-9 with the aim of conveying product information to users with which they can consider appropriate disposal methods and facilitate recycling.

E-5 (Release of air polluting substances)

The following point was reviewed under this item:

(1) Release of air pollutants from product

For (1), as explained in E-1, the provision of information that can promote appropriate disposal was set down as a criterion.

E-7 (Release/disposition of wastes)

The following point was reviewed under this item:

(1) Release/disposition of wastes

For (1), as explained in E-1, the provision of information that can promote appropriate disposal was set down as a criterion.

E-8 (Use/release of harmful substances)

The following point was reviewed under this item:

(1) Reducing environmental impact during incineration

For (1), consideration to reducing environmental impact during incineration was set down as a criterion. Specifically, the use of adhesives and additives containing halogens such as chlorides, resins and organic compounds composed of halogens in ornamental boards was prohibited. Furthermore, as explained in E-1, the provision of information that can promote appropriate disposal was set down as a criterion.

F. Recycling Stage

F-9 (Other environmental impact)

The following point was reviewed under this item:

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| (1) On a recycling |
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For (1), designs facilitating recycling were reviewed. The Construction Material Recycling Act gives wood as a specific construction material, which includes fiberboards and particleboards. The Act requires wooden products to be dismantled and recycled. Means of facilitating recycling by labeling materials used, etc. are also reviewed. As discussed in E-1, the provision of information on disposal and recycling was set down as a criterion.

4. Others

In Version1.0, the line below the Eco Mark was specified as “100% recycled wood”, but in Version2.0, it has been set as “100% reused/unused wood used for wooden portions” following the clarification and definition of the scope of reused/unused wood and waste plant fiber, and to indicate clearly that 100% reused/unused wood is used for the wooden portions and not the entire product. In addition, as information on the emission of formaldehyde, a criterion of greatest interest to users, it has been decided that the line “Average formaldehyde emission below 0.3 mg/l” or “Formaldehyde emission speed below 5 μ g/(m²-h)” shall also be added according to the test method implemented.