

## Explanation concerning the data sheets

The data sheets given in pdf format for the respective material are to provide the basis for conceptual design, planning and detailed structural design stages. The data sheets are structured to cover the following areas:

- \_ General Description
- \_ Technical References
- \_ Range of applications
- \_ Typical sizes
- \_ Mechanical properties
- \_ Physical properties
- \_ Fire performance
- \_ Ecological Properties
- \_ Other

The aim of the database is to allow the user to have a direct comparison between the different building materials and systems. The sources, listed below, were used to compile this database:

### General Description

A short description of the manufacturing processes of the most common wood-based composites has been compiled. Possible applications of the products are also listed.

### Technical references

Among other documents the essential rules and provisions regarding the fitness for use of a building material are listed in the section " Technical references" . The Austrian Institute of Construction Engineering (OIB) (OIB-095.3-007/03-007) has ruled that the attestation of the fitness for purpose of building materials, which are not listed in the Building Materials List (ÖA), can be based on one of the following specifications, arranged in a hierarchical order of preference:

- \_ Harmonized European specification (i.e. harmonized standard, guideline, Common Understanding of Assessment Procedure a.k.a. CUAP)
- \_ ÖNORM EN
- \_ Austrian technical approvals
- \_ Other approvals issued in Austria (e.g. regulations by municipal departments of the city of Vienna)
- \_ European standards (not harmonized)
- \_ Approvals or national standards issued in other countries (e.g. UK)

For unregulated building materials (i.e. no attestation of conformity as listed above is provided) the OIB defines a set of requirements to be met by the respective building material. In the case that an approval but no evaluation on the

basis of an EN is provided for a given material, the values stated in the approval prevail over the values provided in the data sheets

### Range of applications

The fitness for purpose of a building material with respect to a particular service class is determined in the European product standard - where such a standard is available. Where building materials are not yet covered by European standards, the respective approvals are referenced.

### Common dimensions

Dimensions for building materials are taken from approvals or technical product information . Please note that these are provided for general guidance only. Due to the wide range of available products not all dimensions can be stated.

### Mechanical properties

At present, in Austria there are two design methods regarding wood-based composites, ÖNORM B 4100-2 and EN1995-1-1. Design and detailing to ÖNORM B 4100-2 is also still valid . The design methodology according to Eurocode EN 1995-1-1 is also employed and is currently in co-existence with the National codes and standards.

### \_ EUROCODE: EN 1995-1-1

In the Eurocode suite of documents, the strength properties for materials are given in tabulated form. These properties are characteristic values (i.e. determined using a statistically based evaluation) which are required for designing according to Eurocode EN 1995-1-1. The symbols used in the datasheets are described below:

Main symbols	
f	strength
E	modulus of elasticity (defined in EN 1995-1-1 as stiffness)
G	shear modulus
k	modification factor for strength ( $k_{mod}$ ) or stiffness ( $k_{def}$ ) depending on a specific time span and based on the original value. The values are given in EN 1995-1-1
t	thickness
$\rho$	density
oder 0	parallel to the major axis of OSB or parallel to the direction of the grain
- oder 90	parallel to the minor axis of OSB or perpendicular to the direction of the grain

### Explanation concerning the data sheets

Indices	
m	bending
t	tension
c	compression
v	shear perpendicular to the plane of the panel
r	shear parallel to the plane of the panel
mod	strength
def	deflection
mean	mean
0,05	5 % percentile value
0	along the grain
90	perpendicular to grain

These values are combined as  $X_k$  with the partial factors for material properties  $\gamma_M$  and the modification factors ( $k_{mod}$ ) or deformation factors ( $k_{def}$ ) given in the Eurocode to form the design value of the building material property (see Tab. 1 - 5).

Load-duration classes	Order of accumulated duration of characteristic load	Examples of loads
permanent	more than 10 years	self-weight
long-term	6 months - 10 years	imposed loads in warehouses
medium-term	1 week - 6 months	imposed floor load
short-term	less than one week	snow* and wind
instantaneous		accidental load

\* ... in areas where snow loads can occur over extended periods of time, part of the snow load should be assigned to the load-durations class " medium term"

Table 1: Load-duration classes

Service class 1*	- is characterised by a moisture content in the materials corresponding to a temperature of 20°C and the relative humidity of the surrounding air only exceeding 65 % for a few weeks per year.
Service class 2**	- is characterised by a moisture content in the materials corresponding to a temperature of 20°C and the relative humidity of the surrounding air only exceeding 85 % for a few weeks per year.
Service class 3***	- is characterised by climatic conditions leading to higher moisture contents than in service class 2.

\* ... In service class 1 the average moisture content in most softwoods will not exceed 12 %.  
 \*\* ... In service class 2 the average moisture content in most softwoods will not exceed 20 %.  
 \*\*\* ... Covered structures are only assigned to service class 3 in exceptional cases.

Table 2: Service classes

Ultimate limit states		
- Fundamental combinations:		
timber or wood composites		1,3
steel in connections		1,1
- Accidental combinations		1,0
Service ability limit states		1,0

Table 3: Partial factor  $\gamma_M$  for a material

Building material / Load-duration classes	Service classes		
	1	2	3
Solid timber, glued laminated timber, plywood			
permanent	0,60	0,60	0,50
long-term	0,70	0,70	0,55
medium-term	0,80	0,80	0,65
short-term	0,90	0,90	0,70
instantaneous	1,10	1,10	0,90
Particleboards acc. to EN 312 (Type 6* and 7), OSB acc. to EN 300 (Type 3 and 4)			
permanent	0,40	0,30	--
long-term	0,50	0,40	--
medium-term	0,70	0,55	--
short-term	0,90	0,70	--
instantaneous	1,10	0,90	--
Particleboards acc. to EN 312 (Type4* and 5), OSB acc. to EN 300 (Type 2*), fibreboards acc. to EN 622-2 (hardboard)			
permanent	0,30	0,20	--
long-term	0,45	0,30	--
medium-term	0,65	0,45	--
short-term	0,85	0,60	--
instantaneous	1,10	0,80	--
Fibreboards acc. to EN 622-3 (medium- and hardboard)			
permanent	0,20	--	--
long-term	0,40	--	--
medium-term	0,60	--	--
short-term	0,80	--	--
instantaneous	1,10	--	--

\* ... not suited for application in service class 2

Table 4: Values of the modification factor  $k_{mod}$

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Building material / Load-duration classes	Service classes		
	1	2	3
Solid timber*, glued laminated timber			
permanent	0,60	0,80	2,00
long-term	0,50	0,50	1,50
medium-term	0,25	0,25	0,75
short-term	0,00	0,00	0,30
Plywood			
permanent	0,80	1,00	2,50
long-term	0,50	0,60	1,80
medium-term	0,25	0,30	0,90
short-term	0,00	0,00	0,40
Particleboards acc. to EN 312 (Type 6** and 7), OSB acc. to EN 300 (Type 3 and 4)			
permanent	1,50	2,25	--
long-term	1,00	1,50	--
medium-term	0,50	0,75	--
short-term	0,00	0,30	--
Particleboards acc. to EN 312 (Type 4** and 5), OSB acc. to EN 300 (Type 2**), fibreboards acc. to EN 622-2 (hardboard)			
permanent	2,25	3,00	--
long-term	1,50	2,00	--
medium-term	0,75	1,00	--
short-term	0,00	0,40	--
Fibreboards acc. to EN 622-3 (medium- and hardboard)			
permanent	3,00	--	--
long-term	2,00	--	--
medium-term	1,00	--	--
short-term	0,35	--	--

\* ... For timber whose moisture content at the time of installation is at or near the fibre saturation point, and which is likely to dry out under load, the values of  $k_{def}$  should be increased by 1,0.

\*\* ... not suited for application in service class 2

Table 5: Values for the deformation modification factors  $k_{def}$

### ÖNORM B 4100-2

Materials for which characteristic properties are not yet available, can be designed using performance parameters and properties quoted in technical approvals (where available). When designing with building materials whose material properties exceed the characteristic values or for which no characteristic values are available technical approvals can be used if available. In most cases these provide allowable stresses in accordance with the design concept of ÖNORM B 4100-2.

Additional information: Pischl R. (2001): Design of timber structures. From national to European standards. ÖNORM B 4100 Teil 2 / EN 1995-1-1; proHolz Austria (in German)

### Physical properties

- Values for the thermal conductivity  $\lambda$  and the heat capacity  $c$  have been quoted from the "Catalogue of the thermal performance of building materials and components", (Austrian Standards Institute, 2001).
- The values for coincidence frequency  $f_K$  and the water vapour diffusion resistance  $\mu$  were determined in a research project (see "Determination of parameters concerning thermal, acoustic, fire performance as well as ecological drivers for wood and wood-based composites", Association of the Austrian Wood Industry, 2002).
- Thermal conductivity  $\lambda$  and the vapour diffusion resistance  $\mu$  have been extracted from EN 13986 where available (concerning solid wood panels, plywood, OSB, particleboard cement-bonded, particleboard and fibreboard).

### Fire performance

- With respect to European standardization, reaction to fire classes have been quoted according to the "Euroclasses" (EN 13986) and the charring rates are taken from EN1995-1-2.
- The values for both fire performance parameters as given in ÖNORM B 3800 part 1 (issued on 01.12.1988) are still valid and have been provided where appropriate (Reference: part 4). However, a classification of new generation wood-based composites is not possible in all cases.

### Ecological properties

The sustainability properties quoted throughout the database have been taken from the research report "Determination of parameters concerning thermal, acoustic, fire performance as well as ecological drivers for wood and wood-based composites", Association of the Austrian Wood Industry, 2002.

### Other

In this category, additional characteristics of the material are listed.