



## SyPly™ HANDBOOK



SYKTYVKAR PLYWOOD MILL



We are glad to welcome you on behalf of our collective.

Today any enterprise is considered to be successful if it has a professional team capable to create a high-quality product and reliable relations with partners. We aim at improving our production, all processes and technologies, providing protection of the environment. These values are the core of the development strategy of Syktyvkar Plywood Mill.

Due to the constant growth of quality and adoption of high technologies, SPM has got the reputation of an enterprise with the world standard product.

The greatest value for us is our clients. Therefore we constantly work at optimization of service and try to find an individual approach to each customer. We are very proud of the fact that our partners are the leading building organizations, automobile and furniture manufactures of Russia, Europe and America.

We are sure that having Syktyvkar Plywood Mill as a partner you will feel all the advantages of work with high quality production and the professional team working for you.

Version – July 2009.

Authors of the guide do not guarantee completeness and accuracy of the information given below as the present manual is not the technical one and bears only an advertising character.

The given directory cancels and replaces all previous versions.

## ABBREVIATION

BFU – Bau–Furniersperrholz aus Nadelholz – birch plywood for construction and furniture.

BFU–100 – class of construction materials the requirements of which Plywood SyPly meets. It is confirmed by a WKI certificate.

DNV – Det Norske Veritas (Finnish presentation) – independent certification and classification society of Norway.

GOST – Russian State Standard.

TU – Technical conditions for the manufacture of plywood.

SPM – Syktvykar Plywood Mill Ltd.

SyPly – Syktvykar Plywood – plywood trade mark, registered in March 24, 2005 in Russia and April 6, 2005 in 32 countries.

VTT – Technical Research Center of Finland

CPD – Construction Product Directive – construction materials directive, adopted by the European Union.

CE – (fr. Conformite Europeenne) – European conformity – product marking according to the construction standard CPD that satisfies European standards.

FSC – Forest Stewardship Council.

ISO – International Standard Organization.

WBP – plywood made on the basis of phenol–formaldehyde resin.

MR – plywood made on the basis of carbamide–formaldehyde resin.

WKI – Wilhelm Klauditz Institut – Fraunhofer–Institut für Holzforschung (Germany).



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SPM is located on the river Vychegda not far from Syktyvkar Timber Industrial Complex (Mondi Syktyvkar)

## SYKTYVKAR PLYWOOD MILL

SPM is one of the largest Russian manufacturers of full-sized plywood and furniture chipboard. Rich experience in chipboard and plywood production (saved since 1976 and 1987 accordingly) makes it possible to produce chipboard and plywood in accordance with the world standards.

The mill is situated in the rich forest region. For manufacture of our production the best selected wood from taiga and birch groves of the Komi Republic, Tatarstan and Udmurtiya, Arkhangelsk, Vologda, Kirov, Kostroma, Nizhniy Novgorod and Yaroslavl areas is delivered.

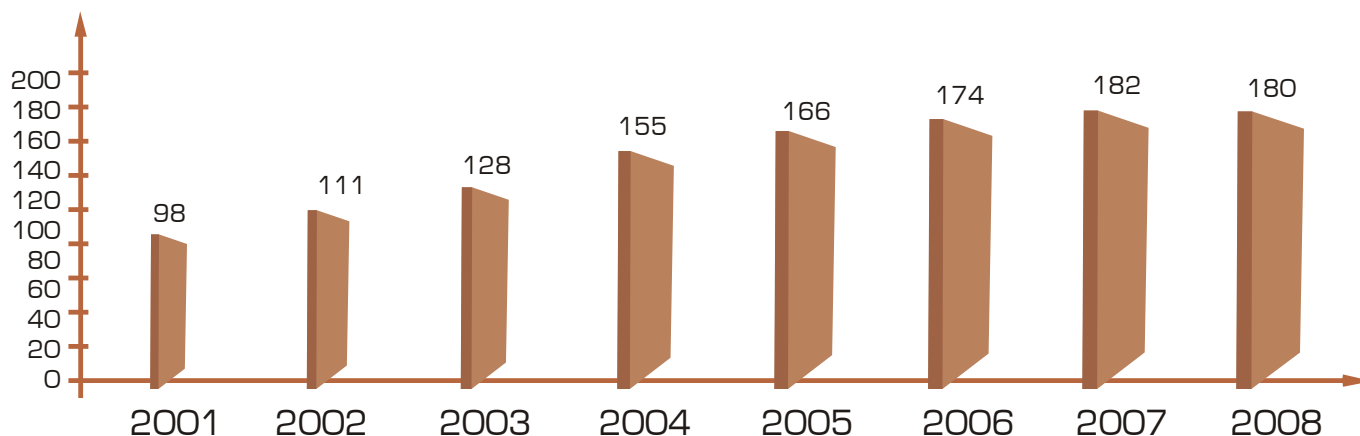
The use of modern woodworking equipment together with modern technologies of deep processing allows to produce high quality production answering the highest customers demands.

Today the annual production capacity of the enterprise amounts more than 180 000 cubic meters per year for plywood and more than 260 000 cubic meters per year for chipboard.

The highly qualified and technically competent personnel is one of the competitive advantages of SPM. Efficient administration and production control of the enterprise is provided due to the competent management, realization of marketing actions and the presence of the complex computer network which helps to unite all structures of the enterprise. Quality control policy is a part of corporate culture and strategy of SPM. The System of quality of the enterprise is certificated under the international standard ISO 9001:2008, according to which all operations inside the mill from designing of the production up to its delivery are standardized.

High quality SYPLY plywood is used in different spheres of life: building, construction, furniture, vehicle building, packing and other industries.

The strategy of SPM is to satisfy customer's demands in quality, service, reliability and convenience of delivery.



Dynamics of plywood production volumes, Km<sup>3</sup>



## FOREWORD

Performance of CE requirements for construction plywood led to the edition of the revised version of the guide on SYPLY plywood. This version cancels and replaces earlier editions.

The revised and corrected edition is intended both for consumers of plywood production and for dealers, designers, marketing experts, other users and experts in the given area.

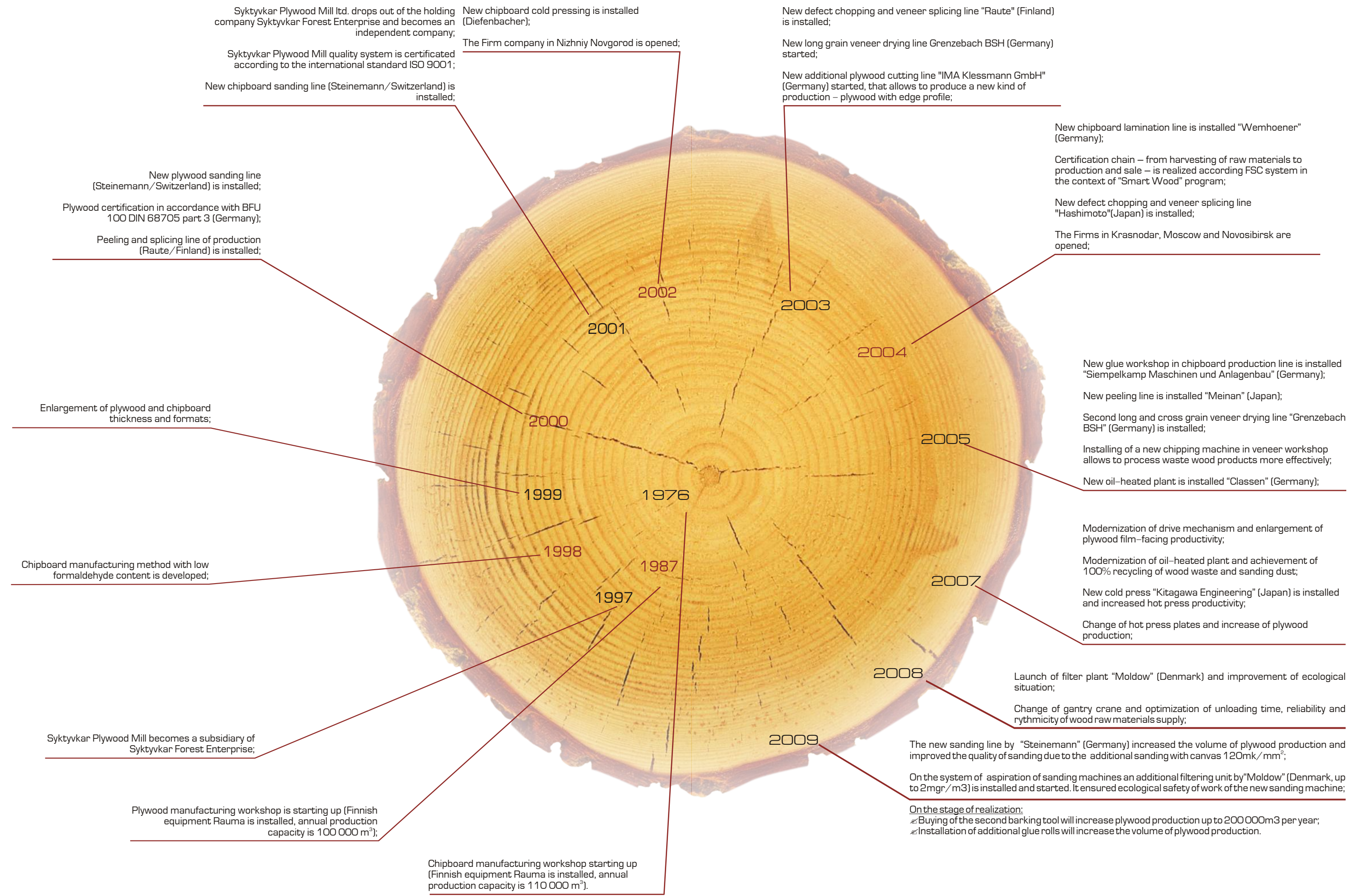
During the preparation of the manual all necessary for the consumer information was taken into account – the description of properties and kinds of plywood, spheres of application, the right choice and usage of its grades.

Due to the guide and excellent characteristics of SYPLY plywood you will raise the efficiency of your business and receive high results.



Administration building of SPM

The sources of present day success lie in the past,  
the future success will depend on SPM's work today.





## TO THINK OF THE FUTURE

One of the principles of SPM's work is to care of the ecology of the region. The enterprise is responsible to the country for the use of natural resources for the sake of their prosperity. For manufacture of plywood one of the most ancient building materials – wood – self-renewed and non-polluting – is used. It is easy in processing and can be utilized without any damage for the environment.

Plywood manufacture is practically non waste production as chips are used in manufacture of chipboards. Due to the modern technologies of deep processing, wood waste is completely utilized, turning into thermal energy. The latest development in the field of resins and various additions in manufacture of wood panels allowed to increase ecological compatibility of the production preserving high physic mechanical parameters.

Plywood meets the requirements of the German national standard DIN 68705–3 for BFU 100 and the requirements of the European standard EN 636 as well.

## FSC–certification

June 24, 2004 SPM received a certificate confirming that the circuit from harvesting of wood raw materials to manufacture and selling of plywood is certificated on the system of FSC. Plywood produced on the mill and marked by FSC trade mark is completely made of wood which is grown in the FSC certificated forest.

Smart Wood Program created in 1989 is the first largest program of forest control certification. The reception of the given certificate contributes to the observance of the wood legislation and support the development of a steady forest usage as at the signing of the contract on wood delivery it is required to give logging tickets to prove the legality of stocking up.

On realization of a circuit of deliveries of FSC certificated production SPM is certificated by Smart Wood company. The mill sells both certificated and non certificated production. Forest usage of SPM agrees with the strict nature protection , social and economic standards based on the principles and criteria of FSC. Smart Wood is a program of Rainforest Alliance company. The certificate estimation which is the basis of FSC certification was carried out by NEPCon company – a member of Smart Wood comission.



## The Rainforest Alliance

### SYKTYVKAR PLYWOOD MILL OOO

66 Ukhinskoye shosse  
Syktyvkar  
Republic of Komi, 167026  
RUSSIA

IS CERTIFIED FOR FOREST STEWARDSHIP COUNCIL  
CHAIN-OF-CUSTODY

Certificate Registration Code: SW-COC-001254

Valid from: June 24, 2009 to June 23, 2014

#### CERTIFICATE SCOPE:

Single Chain-of-Custody certificate based on FSC-STD-40-004.  
Additional details regarding the certificate scope, including products  
and species, are found at [fsc-info.org](http://fsc-info.org).

*Jon Jickling*

Jon Jickling  
Certification Quality and Systems Manager  
SmartWood Program of the Rainforest Alliance  
65 Millet Street, Suite 201, Richmond, Vermont USA 05477

SMARTWOOD IS A PROGRAM OF THE RAINFOREST  
ALLIANCE ACCREDITED BY THE FSC

This certification was conducted in collaboration with NEPCon,  
a partner organization to the FSC accredited Rainforest Alliance.

This certificate is not evidence that a product is FSC-certified;  
additional documentation is required from the certificate holder.

This certificate is the property of the SmartWood program of the  
Rainforest Alliance. Upon suspension or termination of your  
certification or reuse of your certificate, this certificate must be  
returned to SmartWood.

ACCREDITED  
FSC-ACC-004  
© 1996 Forest Stewardship Council A.C.





Oil heating  
plant works on  
wood waste products  
(Classen / Germany)



### Ecological principles

The main principles of SPM in environmental protection are based on constant development and the use of the unique selfrenewed raw materials and controlled processes. Hence, commercial interest in such forest usage which will allow to keep woods for future generations is quite justified.

Completely understanding the responsibility before the society and nature, SPM tries to use wood resources as reasonable and careful as possible to minimize harmful influence on the environment.

External and internal audits confirm constant participation of the mill in environmental protection , and ecological product and process characteristics are the subject of constant control.

### Use of last development

The legislation on the environmental protection and the expected result for founders and the know-how in the field of accessible modern technologies are going to continue their development. SPM is planning to use last development in its work. The ecological program of the enterprise provides stage-by-stage introduction of adequate measures, constant monitoring of the results and updating of the plans in accordance with the international standards.



## DIPLOMAS, AWARDS AND CERTIFICATS



For successful attraction of foreign investments

The Russian Union of Industrialists and businessmen, Moscow, February 21, 2008



Certificate of social confidence

Syktyvkar Plywood Mill Ltd is the insurer with a high level of organization of obligatory pension insurance act execution.

Pension fund of the Russian Federation  
Syktyvkar, July 6, 2009



The best exporter to the countries of the European Union

Chamber of commerce and industry of Komi Republic  
Syktyvkar, June 2003



The leader of the branch

The winner of the all-Russian competition "The best Russian enterprise" in nomination "THE LEADER OF THE BRANCH"

Jury  
Moscow, December 2006



The best exporter enterprise

The winner of the Komi Republic competition "Gold Mercury – 2006" in nomination "The best exporter enterprise"

The chamber of commerce of RK  
Syktyvkar, January 26, 2007



Winner of a prize "100 best goods of Russia"

Film-faced and birch plywood SYPLY three times became the winner of the program «100 best goods of Russia in 2002, 2004 and 2008

Coordinating committee  
(Moscow, 2002, 2004 and 2008)



The certificate on graphic representation of the trade mark

The present certificate protects graphic representation of the trade mark of «SPM ltd» concerning 19 class of goods (services) – “nonmetallic construction materials...”  
The certificate operates till December 18, 2011.

Federal service of intellectual property, patents and trade marks  
(Moscow, September 4, 2002)



The certificate on Plypan

The present certificate protects the trade mark “Plypan” of “SPM ltd” concerning 19 class of goods (services) – “nonmetallic construction materials...”  
The certificate operates till August 24, 2011.

Federal service of intellectual property, patents and trade marks  
(Moscow, May 20, 2002)



The certificate on SyPly™

The present certificate protects the trade mark “Syply” of “SPM ltd” concerning 19 class of goods (services) – “nonmetallic construction materials...”  
The certificate operates till October 15, 2014.

Federal service of intellectual property, patents and trade marks  
(Moscow, March 24, 2005)





## MANUFACTURE AND QUALITY CONTROL OF PLYWOOD SyPly

### *Wood raw materials*

The process of plywood manufacture begins with the selection and delivery of high– qualitative wood. Plywood SyPly is made of birch. Northern wood differs in special durability due to narrow annual rings because of slow growth of trees in severe climatic conditions.

In plywood SyPly the best characteristics of deciduous wood are united: birch is an excellent raw material providing high physic mechanical characteristics and an excellent surface. Due to these and other characteristics the quality of plywood SyPly is rather high.



Wood stock provides regular uninterrupted work of the enterprise

### *USE of GLUE*

According to EN 636 Plywood glued on the basis of carbamide formaldehyde glue (MR) – can be used in dry conditions ( $W^* < 65\%$ ) and is in keeping with the first class of biological stability.

According to EN 636 Plywood glued on the basis of phenol– formaldehyde glue (WBP) – can be used in damp conditions ( $W < 85\%$ ) and is in keeping with the second class of biological stability.

According to EN 636 Plywood stuck together on the basis of phenol– formaldehyde glue (WBP) and covered by film can be used in open air ( $W > 85\%$ ) and is in keeping with the third class of biological stability.

Bonding strength and the content of formaldehyde agree with the requirements of BFU 100 DIN 68705–3. Plywood SYPLY has a low level of formaldehyde emission E 1 – actually up to 3 mg on 100 gr. of absolutely dry plywood.



\*W – parameter of relative humidity



## Quality control

The system of quality at the enterprise is certificated under the international standard ISO 9001:2008 according to which all operations and processes inside the mill – from designing of the production to its delivery are standardized and traced:

- ✓ Production of the suppliers (raw materials, resins, chemicals, additional materials, spare parts of the equipment, cutting tools and others),
- ✓ Parameters of technological process,
- ✓ Service and exploitation of the equipment,
- ✓ Professional training,
- ✓ Quality of half-finished items and finished goods,

– All this is under the constant external and internal control of the system of quality. Internal control is carried out by the laboratory of the enterprise, external – by an independent institutes and bodies of certification.



Plywood SyPly satisfies the requirements of EN 13986 and EN 636 (VTT, Finland)

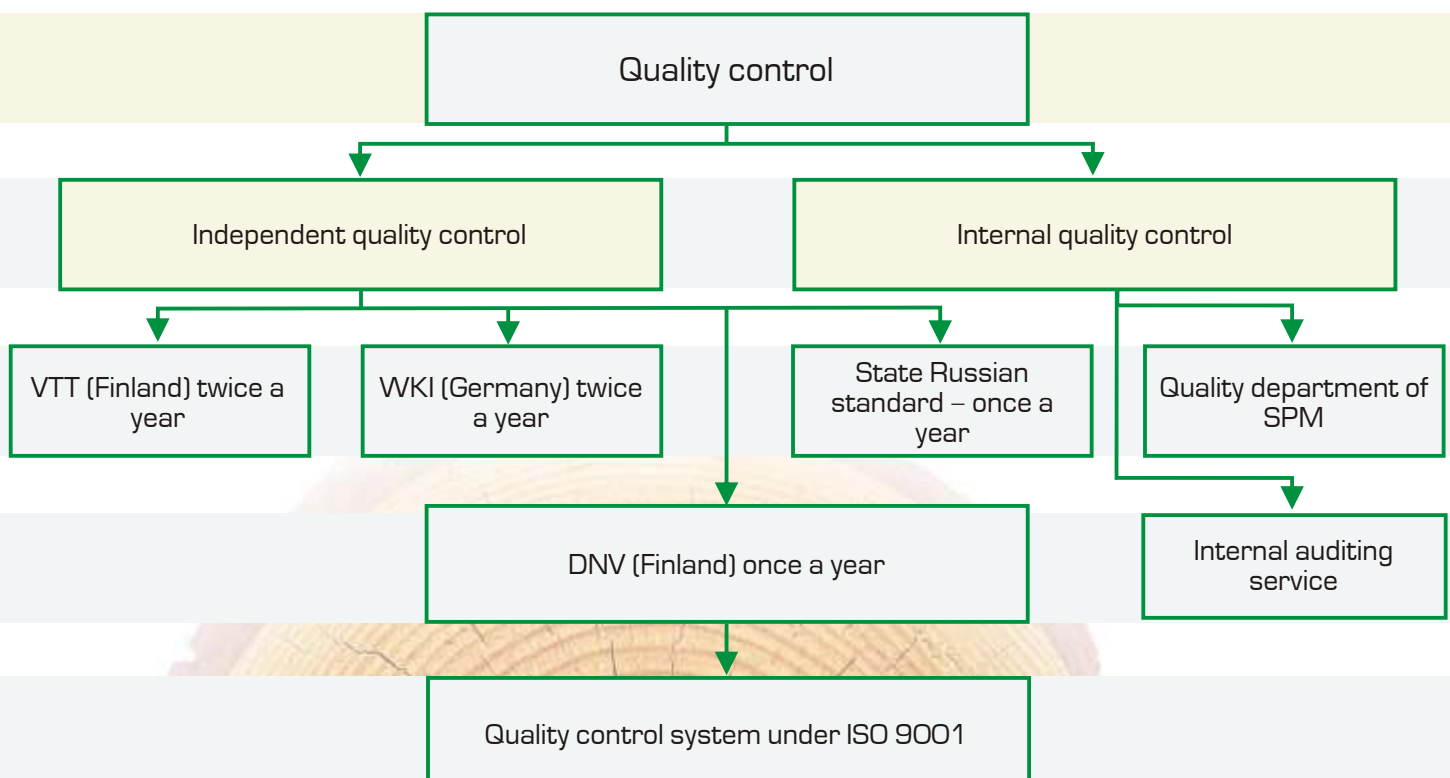


Quality control system satisfies the requirements of ISO 9001:2008 (DNV, Finland)



Birch and film-faced plywood SyPly satisfies the requirements of BFU 100, DIN 68705-3 (WKI, Germany)

## The system of control and quality conformation



## The process of manufacture



### 1–6 stages:

Logs enter the manufacturing process from the wood stock. On a preparatory section the raw material is graded and processed in a special way to ensure the highest possible quality veneer. After processing logs are debarked and sawn into peeler logs. Then they are peeled into veneer mats, which are then cut into sheets. The wet sheets are dried. Veneer drying is fulfilled at special automated drying cases where the moisture content is regulated. After drying veneer sheets are graded depending on quality categories.

### 7 stages:

Dried-up and graded veneer is exposed to refinement. Refining process means repair of wood structured defects, which are cut out and replaced with special patches made of high quality veneer. Then pieces of unformatted veneer are chopped and joint together till full-sized format at a splicing line.

### 8–10 stages:

Sorted out, refined and spliced veneer pass through the gathering of bundles process, where veneer covered with glue are alternated with dry veneer sheets. Ready bundles come through the cold pressing for easier transportation. Agglutination of bundles is carried out by means of hot pressing under high pressure and temperature.

### 11–14 stages:

After hot pressing the panels are edge cut and sanded on both sides to achieve the correct thickness tolerance. Next, the boards are graded according to quality and conveyed to further processing or packaging and delivery.

### 15–18 stages:

Further processing includes film-facing of boards, sawing, surface grading and edge sealing. The latest stages are packing and delivery to a customer.

### 19–20 stages:

The sheets of plywood are packed into bundles according to the sort (the number of sheets in a bundle depends on thickness of a plywood sheet). The packing is made from special non-standard plywood and/or hardboard tightend with steel strapping. The bundles are marked, and then stored at a warehouse and ready to be shipped to the customer at stipulated time.

# PLYWOOD SyPly

## Birch plywood

### ALL THE BEST FROM THE REAL RUSSIAN PLYWOOD

Birch plywood SyPly is really strong and water-resistant material. The birch gives SyPly production heat, beautiful wood structure, and the increased physic mechanical characteristics. These qualities have made it popular in furniture manufacture, construction, interior and exterior design.

#### Advantages:

- The increased water resistance
- Exclusive durability
- The big format
- Excellent hardness of the surface
- Beautiful wood structure
- High quality of sanding
- Fast installation and easy processing
- The ability to combine with other materials

#### Application:

- Furniture manufacture
- Internal design
- Constructional materials
- Building
- Motor industry
- Wagon building
- Packing



### Specification according to TU 5512-001-44769167-02

|                                            |                                                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                      |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Dimensions, mm<br>+/- limit deviation      | Long grain fibers: 2440x1220, 2500x1250 +/- 2mm<br>Cross grain fibers: 1220x2440, 1250x2500 +/- 2 mm              |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                      |
| Thickness, mm<br>-----<br>Number of layers | 4.0                                                                                                               | 6.0                                                                                 | 6.5                                                                                 | 9.0                                                                                 | 12.0                                                                                | 15.0                                                                                | 18.0                                                                                | 21.0                                                                                | 24.0                                                                                 |
|                                            |                                |  |  |  |  |  |  |  |   |
|                                            | 3                                                                                                                 | 5                                                                                   | 5                                                                                   | 7                                                                                   | 9                                                                                   | 11                                                                                  | 13                                                                                  | 15                                                                                  | 17                                                                                   |
|                                            | 27.0                                                                                                              |                                                                                     |                                                                                     | 30.0                                                                                |                                                                                     |                                                                                     | 32.0                                                                                |                                                                                     | 35.0                                                                                 |
|                                            |                                |                                                                                     |                                                                                     |  |                                                                                     |                                                                                     |  |                                                                                     |  |
|                                            | 20                                                                                                                |                                                                                     |                                                                                     | 21                                                                                  |                                                                                     |                                                                                     | 24                                                                                  |                                                                                     | 25                                                                                   |
| Grade of face veneer                       | B ( I ), B/BB ( I/II ), BB ( II ), BB/CP ( II/III ), BB/C ( II/IV ), CP ( III ), CP/C ( III/IV ), C ( IV )        |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                      |
| Surface quality                            | Sanded two sides (S2), sanded one side (S1), non-sanded (NS)                                                      |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                      |
| Formaldehyde emission class                | E1                                                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                      |
| Water resistance                           | MR (moisture resistance), WBP (weather and boil-proof) marked                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                      |
| Moisture content                           | 5-12%                                                                                                             |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                      |
| Breaking point, MPa                        | DIN standard                                                                                                      |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     | The facts in 2008                                                                   |                                                                                     |                                                                                      |
|                                            |                                                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     | MR                                                                                  | WBP                                                                                 |                                                                                      |
|                                            | Under shelling (bonding strength)                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     | > 1,0                                                                               | 2,5                                                                                 | 2,11                                                                                 |
|                                            | Under static bending lengthwise face veneer fibers                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     | > 40,0                                                                              | 85,4                                                                                | 80,0                                                                                 |
|                                            | Under static bending across face veneer fibers                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     | > 15,0                                                                              | 66,5                                                                                | 61,0                                                                                 |
| Certification                              | DIN 68705-3, EN 13986, EN 636, GOST,<br>Conformity declaration, Hygiene and sanitary certificate, Certificate FSC |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                      |

## Film-faced plywood SyPly

### THE BEST CHOICE FOR BUILDING AND CONSTRUCTIONAL WORKS

The film-faced surface of the panel creates high stability to various natural and chemical conditions. This property makes film-faced plywood SyPly irreplaceable for manufacture of wearproof surfaces (manufacture of concrete forms, storage and transportation of food stuffs and the pharmaceutical goods, publicity boards, facing and floors of motor vans and cars, decks of ship going vessels.

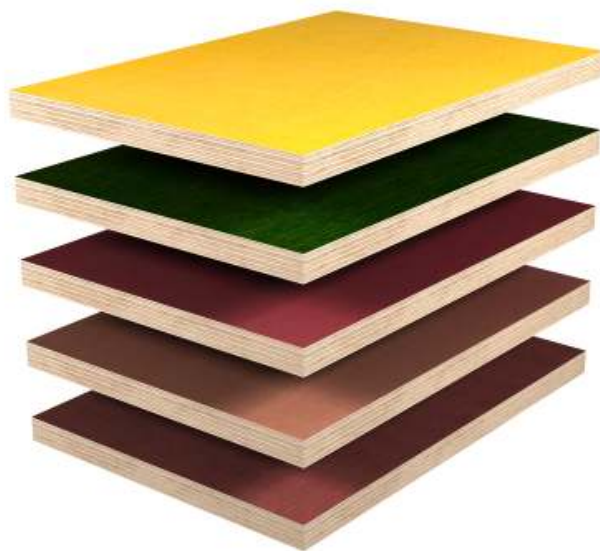
The possibility to choose the color and the kind of the surface (smooth or wire mesh) expands the spheres of application of film-faced plywood SyPly, and makes it even more popular.

#### Advantages:

- Exclusive wear capacity and durability
- Fast installation and easy processing
- The increased water resistance
- The ability to a combine with other materials
- Variants of smooth and wire mesh surface
- Opportunity to choose the color and density of the film
- The big format of a sheet

#### Application:

- Construction
- Concrete forms
- Constructional works
- Motor industry
- Wagon building
- Interior and exterior design
- Advertising boards and barriers
- Arrangement of sport and children's playgrounds
- Packing



### Specification according to TU 5512-002-44769167-04

|                                            |                                                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                     |                                                                                       |                                                                                      |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Dimensions, mm<br>+/- limit deviation      | Long grain fibers: 2440x1220, 2500x1250 +/- 2mm<br>Cross grain fibers: 1220x2440, 1250x2500 +/- 2 mm              |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                     |                                                                                       |                                                                                      |
| Thickness, mm<br>-----<br>Number of layers | 6.0                                                                                                               | 6.5                                                                                 | 9.0                                                                                 | 12.0                                                                                | 15.0                                                                                 | 18.0                                                                                | 21.0                                                                                  | 24.0                                                                                 |
|                                            |                                |  |  |  |   |  |    |  |
|                                            | 5                                                                                                                 | 5                                                                                   | 7                                                                                   | 9                                                                                   | 11                                                                                   | 11, 13                                                                              | 13, 15                                                                                | 17                                                                                   |
|                                            | 27.0                                                                                                              |                                                                                     | 30.0                                                                                |                                                                                     | 32.0                                                                                 |                                                                                     | 35.0                                                                                  |                                                                                      |
|                                            |                                |                                                                                     |  |                                                                                     |  |                                                                                     |  |                                                                                      |
|                                            | 20                                                                                                                |                                                                                     | 21                                                                                  |                                                                                     | 24                                                                                   |                                                                                     | 25                                                                                    |                                                                                      |
| Grade of face veneer                       | 1, 1/2, 2, 2/3, 3                                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                     |                                                                                       |                                                                                      |
| Variants of film-facing                    | F/F – smooth film on both faces;<br>F/W – smooth/wire mesh (one face smooth, other – wire mesh)                   |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                     |                                                                                       |                                                                                      |
| Edge sealing                               | Waterproof acrylic paint                                                                                          |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                     |                                                                                       |                                                                                      |
| Surface color                              | Dark-brown (DBR), light-brown (LBR),<br>black-brown (BBR), yellow (YLW), green (GRN), grey (GRY)                  |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                     |                                                                                       |                                                                                      |
| Basis for film-facing                      | Birch plywood SyPy (WBP)                                                                                          |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                     |                                                                                       |                                                                                      |
| Formaldehyde emission class                | E1                                                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                     |                                                                                       |                                                                                      |
| Moisture content                           | 5–12%                                                                                                             |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                     |                                                                                       |                                                                                      |
| Breaking point, MPa                        |                                                                                                                   |                                                                                     |                                                                                     |                                                                                     | DIN standard                                                                         |                                                                                     | The facts in 2008                                                                     |                                                                                      |
|                                            | Under shelling (bonding strength)                                                                                 |                                                                                     |                                                                                     |                                                                                     | > 1,0                                                                                |                                                                                     | 2,13                                                                                  |                                                                                      |
|                                            | Under static bending lengthwise face veneer fibers                                                                |                                                                                     |                                                                                     |                                                                                     | > 40,0                                                                               |                                                                                     | 77,0                                                                                  |                                                                                      |
|                                            | Under static bending across face veneer fibers                                                                    |                                                                                     |                                                                                     |                                                                                     | > 15,0                                                                               |                                                                                     | 68,2                                                                                  |                                                                                      |
| Certification                              | DIN 68705–3, EN 13986, EN 636, GOST, Conformity declaration,<br>Hygiene and sanitary certificate, Certificate FSC |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                     |                                                                                       |                                                                                      |

## Plywood SyPly with edge profile

### FAST INSTALLATION AND DURABILITY OF THE STRUCTURE

Joints and connections are important components of plywood constructions. The use of panels with edge profiles provides reliability of wall design, floors, supporting elements, and also prevents panels from rising or subsidence and is capable to bear bigger loadings, than the usual connection end-to-end is. The panels can be cut on one, two or from all four sides depending on the customer's request.

Standard panels can be "Tongue and groove" by special glue. Connection "Half and Lap" can be fixed by screws or long nails.

#### Advantages:

- Any desirable format is available
- Economy due to the reduction of waste products at board cutting
- Rigid fixing of panels
- Absence of the effect of rising or subsidence
- Dense fitting of a panel due to the special structure "tongue and groove" guaranteeing absence of gaps
- Fast installation due to the system "tongue – groove" joint

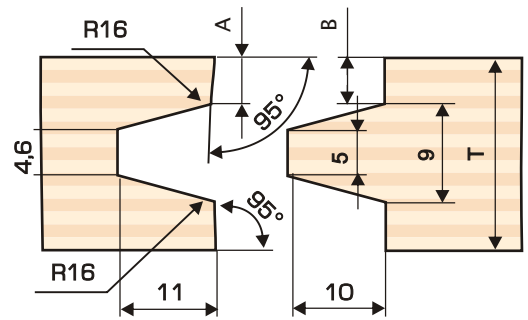
#### Application:

- Motor industry
- Interior and exterior design
- Wagon building
- Frame housing construction
- Flooring underlayment
- Roofing materials
- Industrial packing



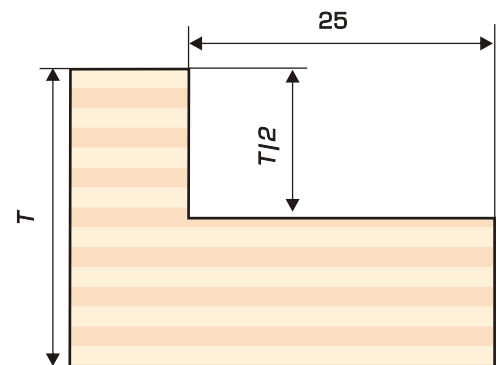
## "Tongue and groove" edge profile

|                                     |                                                                                   |      |                                                                                   |                                                                                   |                                                                                   |       |
|-------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|
| Formats, mm                         | 2440 x1220, 2500 x1250<br>(long grain fibre)                                      |      |                                                                                   |                                                                                   |                                                                                   |       |
| Thickness, mm /<br>number of layers | 18.0                                                                              |      | 21.0                                                                              |                                                                                   | 24.0                                                                              |       |
|                                     |  |      |  |                                                                                   |  |       |
|                                     | 11, 13                                                                            |      | 13, 15                                                                            |                                                                                   | 17                                                                                |       |
|                                     | 27.0                                                                              |      |                                                                                   |                                                                                   | 30.0                                                                              |       |
|                                     |  |      |                                                                                   |  |                                                                                   |       |
|                                     | 20                                                                                |      |                                                                                   | 21                                                                                |                                                                                   |       |
| Density of landing                  | is adjusted at the request of the customer                                        |      |                                                                                   |                                                                                   |                                                                                   |       |
| Profile parameters                  | T                                                                                 | 18   | 21                                                                                | 24                                                                                | 27                                                                                | 30    |
|                                     | A                                                                                 | 4.47 | 5.96                                                                              | 7.45                                                                              | 8.94                                                                              | 10.43 |
|                                     | B                                                                                 | 4.50 | 6.00                                                                              | 7.50                                                                              | 9.00                                                                              | 10.50 |



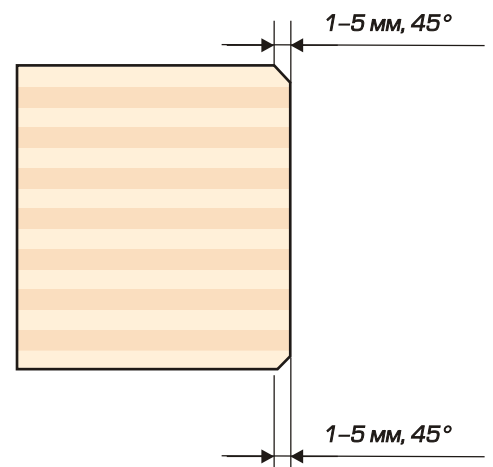
## "Half and Lap" edge profile

|                                     |                                                           |        |      |  |  |
|-------------------------------------|-----------------------------------------------------------|--------|------|--|--|
| Dimensions, mm                      | 2440 x1220<br>(long grain fibre)                          |        |      |  |  |
| Thickness, mm /<br>number of layers | 12.0                                                      | 15.0   |      |  |  |
|                                     | 9                                                         | 11     |      |  |  |
|                                     | 18.0                                                      | 21.0   | 24.0 |  |  |
|                                     | 11, 13                                                    | 13, 15 | 17   |  |  |
|                                     |                                                           | 27.0   | 30.0 |  |  |
|                                     |                                                           | 20     | 21   |  |  |
| Profile parameters                  | step width – 25 mm,<br>step height 1/2 of board thickness |        |      |  |  |



## "Chamfer" profile

|                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Dimensions, mm                      | 2440 x1220, 2500 x1250<br>(long grain fibre)                                        |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Thickness, mm /<br>number of layers | 4.0                                                                                 | 6.0                                                                                 | 6.5                                                                                 | 9.0                                                                                 | 12.0                                                                                | 15.0                                                                                |
|                                     |  |  |  |  |  |  |
|                                     | 3                                                                                   | 5                                                                                   | 5                                                                                   | 7                                                                                   | 9                                                                                   | 11                                                                                  |
|                                     | 18.0                                                                                |                                                                                     | 21.0                                                                                |                                                                                     | 24.0                                                                                |                                                                                     |
|                                     |  |                                                                                     |  |                                                                                     |  |                                                                                     |
|                                     | 11, 13                                                                              |                                                                                     | 13, 15                                                                              |                                                                                     | 17                                                                                  |                                                                                     |
|                                     |                                                                                     |                                                                                     | 27.0                                                                                |                                                                                     | 30.0                                                                                |                                                                                     |
|                                     |                                                                                     |                                                                                     |  |                                                                                     |  |                                                                                     |
|                                     |                                                                                     |                                                                                     | 19                                                                                  |                                                                                     | 21                                                                                  |                                                                                     |
|                                     |                                                                                     |                                                                                     | 30.0                                                                                |                                                                                     | 32.0                                                                                |                                                                                     |
|                                     |                                                                                     |  |                                                                                     |  |                                                                                     |                                                                                     |
| Profile parameters                  | 21                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                                     | 24                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                                     | 35.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                                     |  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                                     | 25                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Profile parameters                  | Chamfer cutting at size 1-5mm at the angle 45°. One-sided milling is possible.      |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



## Thickness tolerance of plywood SyPly

Thickness tolerance of plywood panels agrees with the requirements of the German national standard DIN 68705–3 and EN 315 and is placed in the table below.

### Birch plywood SyPly, mm

| Rated thickness | Thickness tolerance (DIN 68705–3) |                     |         |      |      |
|-----------------|-----------------------------------|---------------------|---------|------|------|
|                 | min                               | Actual size in 2008 |         |      | max  |
|                 |                                   | min                 | average | max  |      |
| 4               | 3.9                               | 3.9                 | 4.0     | 4.1  | 4.1  |
| 6               | 5.8                               | 5.8                 | 6.0     | 6.1  | 6.2  |
| 6.5             | 6.3                               | 6.3                 | 6.4     | 6.5  | 6.7  |
| 9               | 8.7                               | 8.7                 | 8.9     | 9.1  | 9.3  |
| 12              | 11.6                              | 11.7                | 11.9    | 12.1 | 12.4 |
| 15              | 14.5                              | 14.5                | 14.7    | 14.9 | 15.5 |
| 18              | 17.5                              | 17.5                | 17.6    | 17.8 | 18.5 |
| 21              | 20.4                              | 20.4                | 20.7    | 21.0 | 21.6 |
| 24              | 23.3                              | 23.5                | 23.8    | 24.3 | 24.7 |
| 27              | 26.2                              | 26.4                | 26.8    | 27.3 | 27.8 |
| 30              | 29.1                              | 29.1                | 29.7    | 30.1 | 30.9 |
| 32              | 31.0                              | 31.5                | 32.0    | 32.5 | 33.0 |
| 35              | 34.0                              | 34.2                | 34.9    | 35.4 | 36.0 |

PS: For unsanded birch plywood SyPly grade “C” tolerance is  $\pm 6\%$  from nominal thickness.

### Film-faced plywood SyPly, mm

| Rated thickness | Thickness tolerance (DIN 68705–3 and EN 315) |                     |         |      |      |
|-----------------|----------------------------------------------|---------------------|---------|------|------|
|                 | min                                          | Actual size in 2008 |         |      | max  |
|                 |                                              | min                 | average | max  |      |
| 6               | 5.4                                          | 5.6                 | 5.7     | 6.0  | 6.4  |
| 6.5             | 5.9                                          | 6.3                 | 6.3     | 6.3  | 6.9  |
| 9               | 8.3                                          | 8.4                 | 8.6     | 8.9  | 9.5  |
| 12              | 11.2                                         | 11.3                | 11.5    | 11.7 | 12.6 |
| 15              | 14.1                                         | 14.1                | 14.5    | 14.9 | 15.7 |
| 18              | 17.1                                         | 17.1                | 17.5    | 17.9 | 18.7 |
| 21              | 20.0                                         | 20.0                | 20.4    | 20.9 | 21.8 |
| 24              | 22.9                                         | 22.9                | 23.3    | 23.7 | 24.9 |
| 27              | 25.5                                         | 25.5                | 26.4    | 26.9 | 28.1 |
| 30              | 28.5                                         | 29.1                | 29.7    | 30.1 | 31.1 |
| 32              | 30.5                                         | 31.5                | 32.0    | 32.5 | 33.1 |
| 35              | 33.5                                         | 34.2                | 34.9    | 35.4 | 36.1 |

## Reference data on weight and volume of plywood SyPly

| Thickness, mm | Length, mm | Width, mm | Volume 1 sheet, m <sup>3</sup> | Number of sheets in a bundle | Volume 1 bundle, m <sup>3</sup> | Weight of birch plywood, kg           |            |                      | Weight of film-faced plywood, kg      |                 |                       |
|---------------|------------|-----------|--------------------------------|------------------------------|---------------------------------|---------------------------------------|------------|----------------------|---------------------------------------|-----------------|-----------------------|
|               |            |           |                                |                              |                                 | Factor of volume conversion to weight | of 1 sheet | of 1 bundle          | Factor of volume conversion to weight | of 1 sheet      | of 1 bundle           |
| 1             | 2          | 3         | 4<br>(=1 x 2 x 3)              | 5                            | 6 (=4 x 5)                      | 7                                     | 8 (=4 x 7) | 9 (=6 x 7<br>+cover) | 10                                    | 11<br>(=4 x 10) | 9 (=6 x 10<br>+cover) |
| 4             | 2440       | 1220      | 0,0119072                      | 120                          | 1,429                           | 645                                   | 7,7        | 932                  | 665                                   | 7,9             | 960                   |
|               | 2500       | 1250      | 0,0125000                      | 120                          | 1,500                           | 645                                   | 8,1        | 978                  | 665                                   | 8,3             | 1 008                 |
| 6             | 2440       | 1220      | 0,0178608                      | 80                           | 1,429                           | 645                                   | 11,5       | 932                  | 665                                   | 11,9            | 960                   |
|               | 2500       | 1250      | 0,0187500                      | 80                           | 1,500                           | 645                                   | 12,1       | 978                  | 665                                   | 12,5            | 1 008                 |
| 6,5           | 2440       | 1220      | 0,0193492                      | 73                           | 1,412                           | 645                                   | 12,5       | 921                  | 665                                   | 12,9            | 949                   |
|               | 2500       | 1250      | 0,0203125                      | 73                           | 1,483                           | 645                                   | 13,1       | 966                  | 665                                   | 13,5            | 996                   |
| 9             | 2440       | 1220      | 0,0267912                      | 54                           | 1,447                           | 645                                   | 17,3       | 943                  | 665                                   | 17,8            | 972                   |
|               | 2500       | 1250      | 0,0281250                      | 54                           | 1,519                           | 645                                   | 18,1       | 990                  | 665                                   | 18,7            | 1 020                 |
| 12            | 2440       | 1220      | 0,0357216                      | 40                           | 1,429                           | 645                                   | 23,0       | 932                  | 665                                   | 23,8            | 960                   |
|               | 2500       | 1250      | 0,0375000                      | 40                           | 1,500                           | 645                                   | 24,2       | 978                  | 665                                   | 24,9            | 1 008                 |
| 15            | 2440       | 1220      | 0,0446520                      | 32                           | 1,429                           | 645                                   | 28,8       | 932                  | 665                                   | 29,7            | 960                   |
|               | 2500       | 1250      | 0,0468750                      | 32                           | 1,500                           | 645                                   | 30,2       | 978                  | 665                                   | 31,2            | 1 008                 |
| 18            | 2440       | 1220      | 0,0535824                      | 27                           | 1,447                           | 645                                   | 34,6       | 943                  | 665                                   | 35,6            | 972                   |
|               | 2500       | 1250      | 0,0562500                      | 27                           | 1,519                           | 645                                   | 36,3       | 990                  | 665                                   | 37,4            | 1 020                 |
| 21            | 2440       | 1220      | 0,0625128                      | 23                           | 1,438                           | 645                                   | 40,3       | 937                  | 665                                   | 41,6            | 966                   |
|               | 2500       | 1250      | 0,0656250                      | 23                           | 1,509                           | 645                                   | 42,3       | 984                  | 665                                   | 43,6            | 1 014                 |
| 24            | 2440       | 1220      | 0,0714432                      | 20                           | 1,429                           | 645                                   | 46,1       | 932                  | 665                                   | 47,5            | 960                   |
|               | 2500       | 1250      | 0,0750000                      | 20                           | 1,500                           | 645                                   | 48,4       | 978                  | 665                                   | 49,9            | 1 008                 |
| 27            | 2440       | 1220      | 0,0803736                      | 18                           | 1,447                           | 645                                   | 51,8       | 943                  | 665                                   | 53,4            | 972                   |
|               | 2500       | 1250      | 0,0843750                      | 18                           | 1,519                           | 645                                   | 54,4       | 990                  | 665                                   | 56,1            | 1 020                 |
| 30            | 2440       | 1220      | 0,0893040                      | 16                           | 1,429                           | 645                                   | 57,6       | 932                  | 665                                   | 59,4            | 960                   |
|               | 2500       | 1250      | 0,0937500                      | 16                           | 1,500                           | 645                                   | 60,5       | 978                  | 665                                   | 62,3            | 1 008                 |
| 32            | 2440       | 1220      | 0,0952576                      | 15                           | 1,429                           | 645                                   | 61,4       | 932                  | 665                                   | 63,3            | 960                   |
|               | 2500       | 1250      | 0,1000000                      | 15                           | 1,500                           | 645                                   | 64,5       | 978                  | 665                                   | 66,5            | 1 008                 |
| 35            | 2440       | 1220      | 0,1041880                      | 13                           | 1,354                           | 645                                   | 67,2       | 884                  | 665                                   | 69,3            | 911                   |
|               | 2500       | 1250      | 0,1093750                      | 13                           | 1,422                           | 645                                   | 70,5       | 927                  | 665                                   | 72,7            | 956                   |

## DESTINATION OF PLYWOOD GRADES ON DEFECTS

They distinguish such notions as grades of plywood panels and grades of veneer. Grades of plywood panels are formed of grades of veneer, used for facing. For example, the plywood panels faced on the one side with veneer grade "B" and from the other "BB" will have "B/BB" grade – the first goes higher class.

### Grades of birch plywood

Plywood raw materials and technologies of their processing allow to produce the following grades of veneer – B, BB, CP, C (in order of quality reduction).

Judging by the experience of sales department the most needed grades of veneer are:

| Grade of face side –        |           | B    | BB    | CP   | C |
|-----------------------------|-----------|------|-------|------|---|
| <i>B</i>                    | <i>BB</i> | B    | BB    |      |   |
| <i>Grade of back side –</i> | <i>CP</i> | B/BB | BB/CP | CP   |   |
|                             | <i>C</i>  |      | BB/C  | CP/C | C |

# B

Grade "B" of birch plywood SyPly



### Defects

Practically without defects: some healthy inter-grown knots up to 25 mm in diameter, insignificant brown veins and dropped out knots up to 5 mm in diameter are admitted.

### Application

Used for covering by transparent varnish and further facing of the rooms, and for manufacture of furniture.



# BB

Grade "BB" of birch  
plywood SyPly™



## Defects

Repairing of the surface is admitted. Knots and visible defects are repaired with veneer patches.

## Application

Used as facing, can be covered with transparent finishing materials, veneer or painted.



# CP

Grade "CP" of  
birch plywood SyPly

## Defects

Flat surface without  
restrictions on discoloration  
and number of patches.

## Application

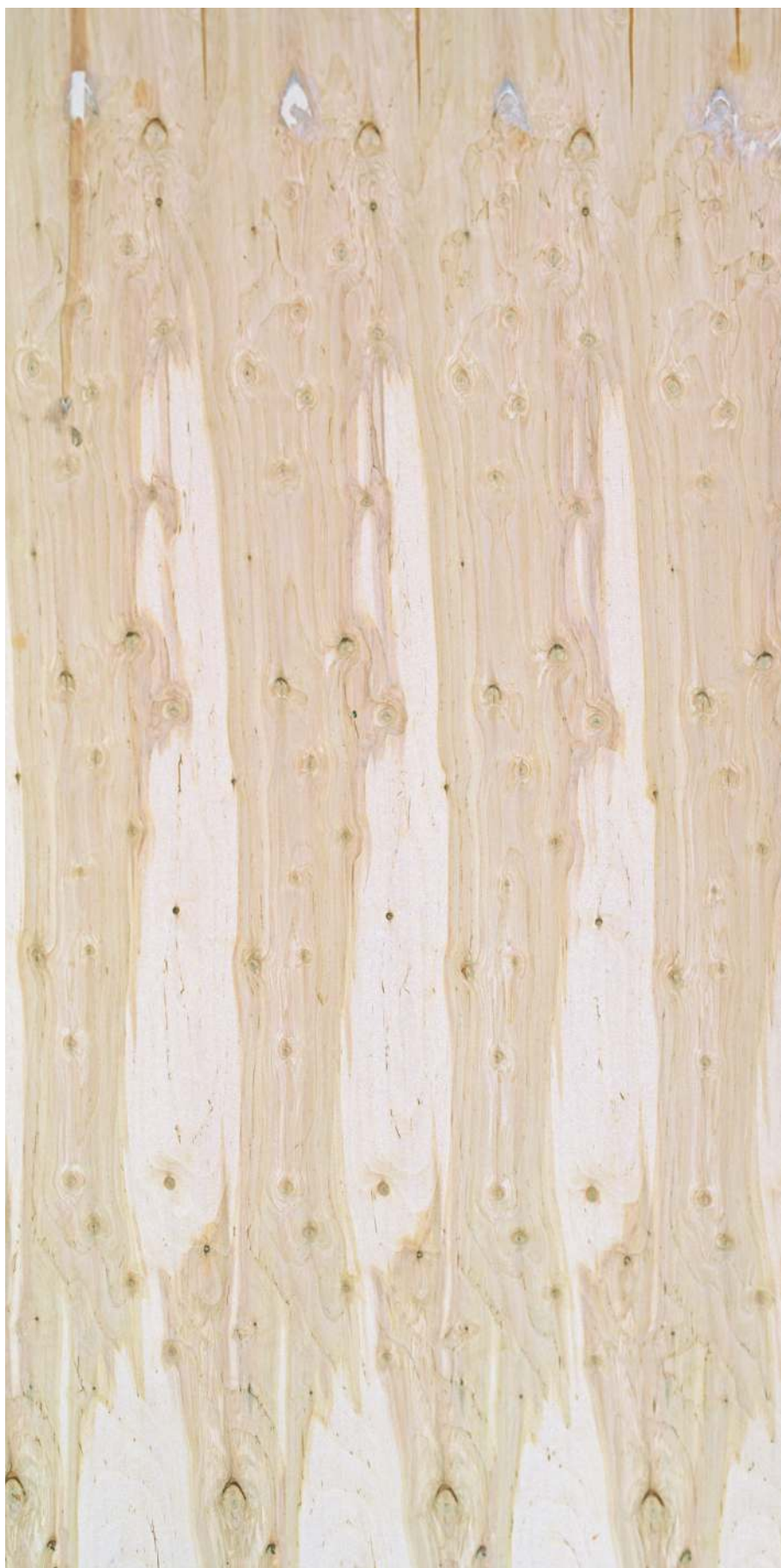
Used for further film-facing,  
veneering or painting.





# C

Grade "C" of  
birch plywood SyPly



## Defects

Defects of processing and structure of wood are admitted.  
High-quality agglutination is guaranteed.

## Application

Packaging.



| Defects <sup>1</sup>                                                                                                   | Restriction norms on grades                         |             |         |                                                                        |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------|---------|------------------------------------------------------------------------|
|                                                                                                                        | B                                                   | BB          | CP      | C                                                                      |
| c) black, loose knots and knotholes                                                                                    | Among inter-grown knots                             | not allowed |         | Allowed no more than                                                   |
|                                        | 3                                                   |             |         | 10                                                                     |
|                                                                                                                        | knots per 1 m <sup>2</sup> of the sheet, up to (mm) |             |         | knots per 1 m <sup>2</sup> of the sheet, up to (mm)                    |
|                                                                                                                        | 5                                                   |             |         | 40                                                                     |
| d) tobacco knots                                                                                                       | not allowed                                         |             |         | Allowed up to 40 mm, no more than 10 per 1 m <sup>2</sup> of the sheet |
| <br>tobacco knot with dropped middle |                                                     |             |         |                                                                        |
| 2. Splits:                                                                                                             |                                                     |             |         |                                                                        |
| a) Closed splits                                                                                                       | Allowed edge splits up to (mm)                      |             | allowed |                                                                        |
|                                      | 250                                                 | 300         |         |                                                                        |
|                                                                                                                        | quantity up to                                      |             |         |                                                                        |
|                                                                                                                        | 5                                                   | 10          |         |                                                                        |
|                                                                                                                        | per 1 m of panel width                              |             |         |                                                                        |

| Defects <sup>1</sup>                                                               | Restriction norms on grades                                                        |                                                                                      |                             |                                                                        |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------|
|                                                                                    | B                                                                                  | BB                                                                                   | CP                          | C                                                                      |
| b) Open splits                                                                     | Not allowed                                                                        | Allowed edge splits with the width up to (mm)                                        |                             |                                                                        |
|    |                                                                                    | 2                                                                                    | 2                           | 10                                                                     |
|                                                                                    |                                                                                    | length up to (mm)                                                                    |                             |                                                                        |
|                                                                                    |                                                                                    | 250                                                                                  | 600                         | 400                                                                    |
|                                                                                    |                                                                                    | quantity per 1 m of panel width up to                                                |                             |                                                                        |
|                                                                                    |                                                                                    | 2                                                                                    | without quantity limitation | 5                                                                      |
| 3. Defects of wood structure                                                       |                                                                                    |                                                                                      |                             |                                                                        |
| a) Cross grain, wavy fiber, curly grain, eye-shaped                                | Allowed                                                                            |                                                                                      |                             |                                                                        |
|                                                                                    |  |  |                             |                                                                        |
|                                                                                    | Eye                                                                                | Curl                                                                                 |                             |                                                                        |
| b) inter-grown bark pocket (light)                                                 | Not allowed                                                                        | Allowed among inter-grown knots in quantity and size according item 1a               | allowed                     | Allowed among inter-grown knots in quantity and size according item 1c |
|  |                                                                                    |                                                                                      |                             |                                                                        |
| c) False heartwood                                                                 | Not allowed                                                                        | Allowed up to (%)                                                                    |                             |                                                                        |
|  |                                                                                    | 25                                                                                   | 75                          | 75                                                                     |

<sup>1</sup> Names of wood defects are determined by GOST 2140 and defects of processing by GOST 15812



| Defects <sup>1</sup>                                                               | Restriction norms on grades                                                       |                                 |                                                                                     |   |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------|-------------------------------------------------------------------------------------|---|
|                                                                                    | B                                                                                 | BB                              | CP                                                                                  | C |
| d) Flecks:                                                                         |                                                                                   |                                 |                                                                                     |   |
|                                                                                    |  |                                 |  |   |
|                                                                                    | Punctation                                                                        |                                 | Gum                                                                                 |   |
| – fiber veins and their traces                                                     | Allowed long up to (mm )                                                          |                                 |                                                                                     |   |
|   | 175                                                                               | 250                             | allowed                                                                             |   |
|                                                                                    | wide up to (mm)                                                                   |                                 |                                                                                     |   |
|                                                                                    | 4                                                                                 | 10                              |                                                                                     |   |
|                                                                                    | quantity up to                                                                    |                                 |                                                                                     |   |
|                                                                                    | 3<br>per 1m <sup>2</sup><br>of the sheet                                          | no restrictions<br>for quantity |                                                                                     |   |
| – veins grouping                                                                   |                                                                                   |                                 |                                                                                     |   |
|  | Allowed<br>shape of spot<br>no more than<br>60x40 mm                              | Allowed                         |                                                                                     |   |
| 4. Chemical<br>colouring                                                           |                                                                                   |                                 |                                                                                     |   |
|  | Not allowed                                                                       | Allowed                         |                                                                                     |   |



| Defects <sup>1</sup>                                                                                                | Restriction norms on grades                                                       |                                                                                                                                                                                                                                                     |                                                                                                                     |                                 |
|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------|
|                                                                                                                     | B                                                                                 | BB                                                                                                                                                                                                                                                  | CP                                                                                                                  | C                               |
| 5. Fungal affection                                                                                                 |                                                                                   |                                                                                                                                                                                                                                                     |                                                                                                                     |                                 |
| a) sap fungous coloring<br>(blue stain, colored<br>sap spots)                                                       |  |                                                                                                                                                                                                                                                     |                                  |                                 |
|                                                                                                                     | Fungous coloring                                                                  |                                                                                                                                                                                                                                                     | sap-wood fungic<br>colour (blue stain)                                                                              |                                 |
|                                                                                                                     | allowed up to % of the sheet surface                                              |                                                                                                                                                                                                                                                     |                                                                                                                     |                                 |
|                                                                                                                     | 30                                                                                | 50                                                                                                                                                                                                                                                  | Allowed                                                                                                             |                                 |
| b) Brown streak                                                                                                     |                                                                                   |                                                                                                                                                                                                                                                     |                                                                                                                     |                                 |
|                                                                                                                     | Not allowed                                                                       | Allowed up to 50 %<br>of the sheet<br>surface, general<br>area of brown<br>streak together<br>with false<br>heartwood should<br>not be more than<br>50 % of the sheet                                                                               | Allowed                                                                                                             |                                 |
| 6. Knots and holes repair                                                                                           |                                                                                   |                                                                                                                                                                                                                                                     |                                                                                                                     |                                 |
| <br>Repairing<br>mashine patching | Not allowed                                                                       | Knots and knotholes<br>should be repaid by veneer patches                                                                                                                                                                                           |                                                                                                                     |                                 |
|                                                                                                                     |                                                                                   | Veneer patching<br>with selection of<br>color and direction<br>of wood grain.<br>Total number of<br>patches with<br>allowed sound inter-<br>grown knots should<br>not be more as per<br>item 1 a. One double<br>patching is allowed<br>on the sheet | Allowed double<br>patches. Allowed<br>repair of holes from<br>fallen patches with<br>putty and following<br>sanding | Allowed<br>without putty repair |
|                                                                                                                     |                                                                                   | <br>Double patching                                                                                                                                               |                                                                                                                     |                                 |

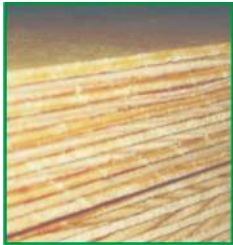
<sup>1</sup> Names of wood defects are determined by GOST 2140 and defects of processing by GOST 15812

| Defects <sup>1</sup>                                                               | Restriction norms on grades                                                           |                                                                                                         |                                            |                                   |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------|
|                                                                                    | B                                                                                     | BB                                                                                                      | CP                                         | C                                 |
| 7. Splits repair                                                                   | Not allowed                                                                           |                                                                                                         | Allowed putty repair with width up to (mm) |                                   |
|    |                                                                                       |                                                                                                         | 10                                         | 25                                |
|                                                                                    |                                                                                       |                                                                                                         | length up to (mm)                          |                                   |
|                                                                                    |                                                                                       |                                                                                                         | 600<br>with following<br>sanding           | 1000<br>with following<br>sanding |
| completed split                                                                    |                                                                                       |                                                                                                         |                                            |                                   |
| 8. Glue penetration                                                                |                                                                                       |                                                                                                         |                                            |                                   |
|   | Allowed 1 per 1 m <sup>2</sup> ,<br>in shape of streak<br>with length up to<br>175 mm | Allowed in shape<br>of spot no more<br>than 25x25 mm<br>quantity 1 per 1<br>m <sup>2</sup> of the sheet | Allowed                                    |                                   |
| 9. Hollows                                                                         |                                                                                       |                                                                                                         |                                            |                                   |
|                                                                                    |    |                    |                                            |                                   |
|                                                                                    | veneer imprint                                                                        | pressed veneer                                                                                          |                                            |                                   |
|                                                                                    | Not allowed                                                                           | Allowed on condition<br>of putty repair                                                                 | Allowed                                    |                                   |
| 10. Mechanical defects – scratches                                                 |                                                                                       |                                                                                                         |                                            |                                   |
|  | Not allowed                                                                           |                                                                                                         | Allowed                                    |                                   |
| wave                                                                               |                                                                                       |                                                                                                         |                                            |                                   |

| Defects <sup>1</sup>                                                                                              | Restriction norms on grades   |     |                                      |                                       |
|-------------------------------------------------------------------------------------------------------------------|-------------------------------|-----|--------------------------------------|---------------------------------------|
|                                                                                                                   | B                             | BB  | CP                                   | C                                     |
| 11. Sanding through                                                                                               |                               |     |                                      |                                       |
|                                   | not allowed                   |     | Allowed no more than 5% of the sheet | Allowed no more than 25% of the sheet |
| 12. Spots of production nature                                                                                    |                               |     |                                      |                                       |
| <br>dirty spots from drying line | Not allowed                   |     |                                      | Allowed                               |
| 13. Presence of glue tape                                                                                         |                               |     |                                      |                                       |
|                                                                                                                   | Allowed in non-sanded plywood |     |                                      |                                       |
| 14. Lack of veneer in inner layer                                                                                 |                               |     |                                      |                                       |
|                                 | Allowed with depth up to (mm) |     |                                      |                                       |
|                                                                                                                   | 2                             | 5   | 5                                    | 5                                     |
|                                                                                                                   | width up to (mm)              |     |                                      |                                       |
|                                                                                                                   | 100                           | 150 | 200                                  | 250                                   |
|                                                                                                                   | in case of putty repair       |     |                                      |                                       |

<sup>1</sup> Names of wood defects are determined by GOST 2140 and defects of processing by GOST 15812



| Defects <sup>1</sup>                                                                                | Restriction norms on grades                                                                                               |    |                                                                                                    |                                                                         |
|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
|                                                                                                     | B                                                                                                                         | BB | CP                                                                                                 | C                                                                       |
| 15. Edge defects after cutting                                                                      |                                                                                                                           |    |                                                                                                    |                                                                         |
| a) Scriber saw traces                                                                               | <br>Saw traces                           |    | <br>Chopped cut |                                                                         |
|                                                                                                     | not allowed                                                                                                               |    |                                                                                                    | Allowed within edge length up to 2 mm wide                              |
| b) Chips                                                                                            | <br>Not allowed                          |    | Allowed within edge length with putty repair                                                       | Allowed within edge length up to 5 mm, more than 5 mm with putty repair |
| 16. Roughness parameter per GOST 7016–82, mkm (not exciding)                                        |                                                                                                                           |    |                                                                                                    |                                                                         |
| <br>crude peeling |                                                                                                                           |    |                                                                                                    |                                                                         |
|                                                                                                     | For sanded plywood – 100;                                                                                                 |    |                                                                                                    |                                                                         |
|                                                                                                     | For non-sanded plywood – 200                                                                                              |    |                                                                                                    |                                                                         |
| 17. Warp                                                                                            |                                                                                                                           |    |                                                                                                    |                                                                         |
|                                                                                                     | Doesn't apply to thickness under 5 mm,<br>for plywood over 5 mm thick allowed up to 15 mm per 1 m panel's diagonal length |    |                                                                                                    |                                                                         |

Note: Wood defects and defects of processing not mentioned in the table are not allowed

## Grades of film-faced plywood SyPly

Purchased films and technologies of plywood SyPly film-facing allow to produce the following grades of the surface – 1, 2, 3, [in order of quality reduction]. In the market the following combinations of grades of film-faced plywood SyPly – 1, 1/2, 2, and also one sided with wire mesh pattern overlay for giving the surface antislid effect are very popular.

1

Grade “1”  
of film-faced  
plywood SyPly



### Defects

Visual defects are not  
admitted

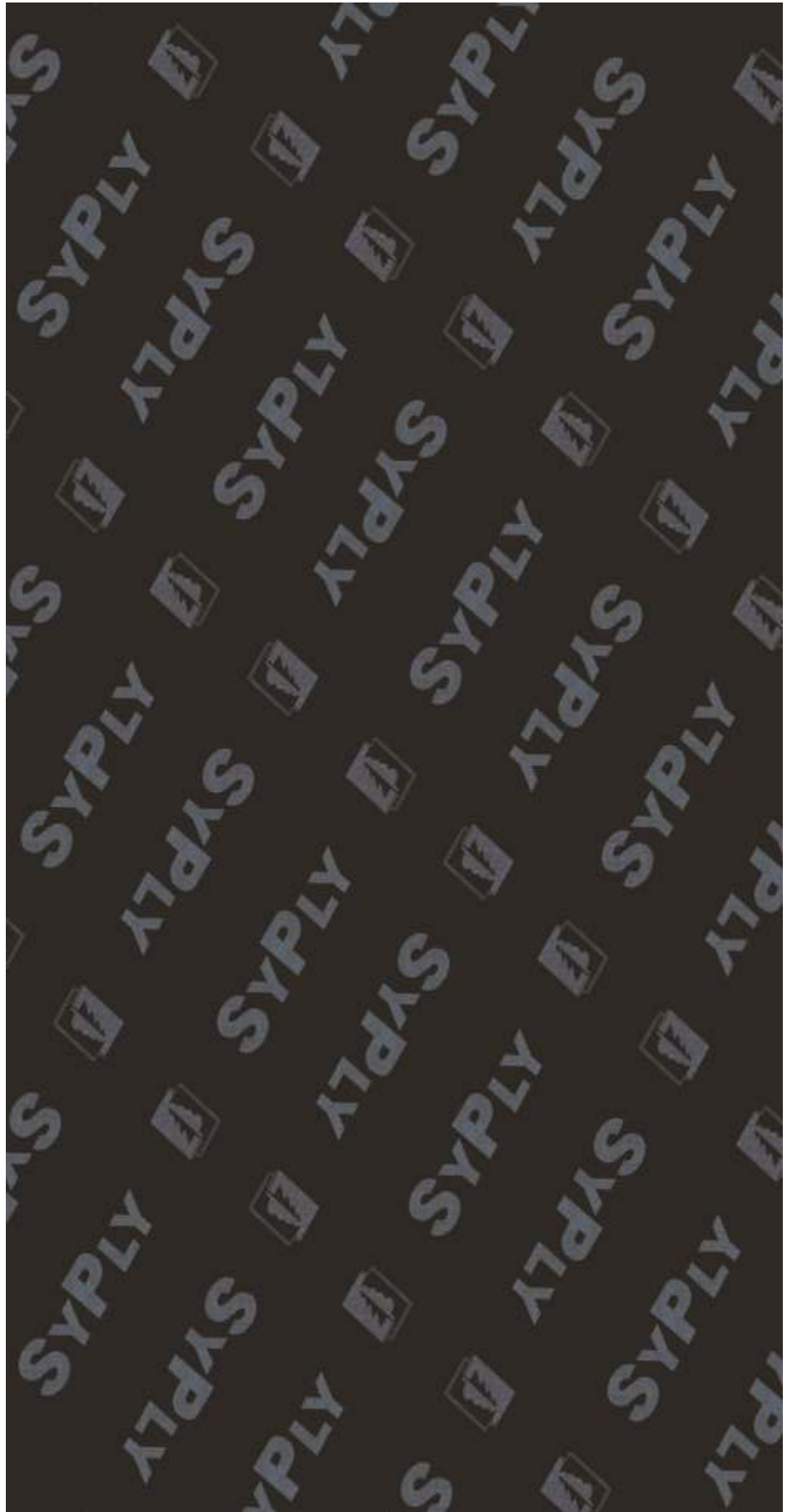
### Application

Concrete house building and  
motor industry



2

Grade "2"  
of film-faced  
plywood SyPly



#### Defects

Insignificant defects without  
damage of film are admitted

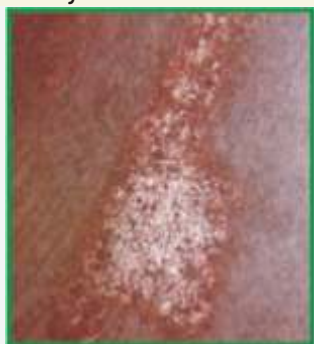
#### Application

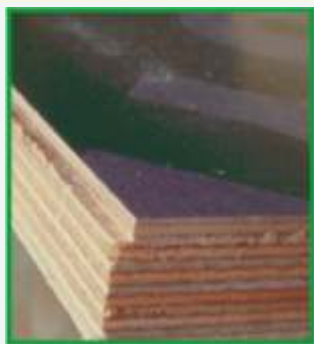
Concrete house building



The difference of film-faced plywood SyPly™ grades in defects  
 Quote from EC 5512-002-44769167-04 from 29.01.2004 (version 28.11.2008)

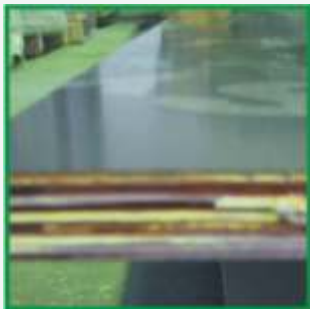
| Name of defects                  | Restrictions for grades                                                                         |                                                                                                     |                                                                  |         |
|----------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------|---------|
|                                  | 1                                                                                               | 2                                                                                                   | 3                                                                |         |
| 1. Film–lifting off and breaking | <br>film brake | <br>film lifting |                                                                  |         |
|                                  | Not allowed                                                                                     |                                                                                                     | Allowed                                                          |         |
| 2. Film crumbling on the edges   |                | Not allowed                                                                                         | Allowed up to 5 mm from edge on condition of waterproof painting | Allowed |
| 3. Overlaps of film              |               | Not allowed                                                                                         | Allowed                                                          |         |
| 4. Burning:<br>– burnt film      |               | Not allowed                                                                                         | Allowed without film damages                                     | Allowed |

| Name of defects                                                                                                                       | Restrictions for grades                   |                             |         |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------------------------|---------|
|                                                                                                                                       | 1                                         | 2                           | 3       |
| <div>– from defects in inner layers</div> <div></div> | Allowed in the form of dotty imperfection | Allowed                     |         |
| 5. Whitish stains and strip on the film                                                                                               | Not allowed                               | Allowed                     |         |
| 6. Stains on the film from defects in inner layers                                                                                    |                                           |                             |         |
| <div></div>                                          | Allowed                                   |                             |         |
| 7. Hollows                                                                                                                            |                                           |                             |         |
| <div></div>                                         | Slight are allowed                        | Allowed without film damage | Allowed |
| 8. Scratches                                                                                                                          |                                           |                             |         |
| <div></div>                                         | Allowed without coating damages           |                             | Allowed |

| Name of defects                                                                    | Restrictions for grades                                                          |                                                           |         |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------|---------|
|                                                                                    | 1                                                                                | 2                                                         | 3       |
| 9. Edge defects after cutting:                                                     |                                                                                  |                                                           |         |
| – chips                                                                            |  | Allowed up to 15 mm long on condition of waterproof paint | Allowed |
| – scribe saw traces                                                                |                                                                                  |                                                           |         |
|   |                                                                                  | Allowed                                                   |         |
| 10. Imprints (occurs after press roughness)                                        | Allowed without burnout                                                          | Allowed                                                   |         |
| 11. Sticking of extraneous film slices                                             |                                                                                  |                                                           |         |
|  | Not allowed                                                                      | Allowed                                                   |         |
| 12. Film creases                                                                   |                                                                                  |                                                           |         |
|  | Not allowed                                                                      | Allowed                                                   |         |



| Name of defects                          | Restrictions for grades                                                             |                                                                                                  |                                                                                       |
|------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                          | 1                                                                                   | 2                                                                                                | 3                                                                                     |
| 13. Blowholes, delamination of the edge  |                                                                                     |                                                                                                  |                                                                                       |
|                                          | Not allowed                                                                         |                                                                                                  | Allowed not more than 25% of the sheet surface                                        |
| 14. Film swelling                        |                                                                                     |                                                                                                  |                                                                                       |
|                                          | Not allowed                                                                         | Allowed up to 40 mm without quantity limitations, up to 100mm no more than 3 per 1m <sup>2</sup> | Allowed                                                                               |
| 15. Weak corner, weak edge, glue lacking |  |                                                                                                  |  |
|                                          | Weak angle                                                                          |                                                                                                  | Weak edge                                                                             |
|                                          | Not allowed                                                                         |                                                                                                  | Allowed                                                                               |
| 16. Mechanical defects of corner, edge   |  |                                                                                                  |  |
|                                          | Mechanical failure of the angle                                                     |                                                                                                  | Mechanical failure of the edge                                                        |
|                                          | Not allowed                                                                         |                                                                                                  | Allowed                                                                               |

| Name of defects                                                                                                                        | Restrictions for grades                                                                                                    |         |         |
|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------|---------|
|                                                                                                                                        | 1                                                                                                                          | 2       | 3       |
| 17. Spots of production nature                                                                                                         | Not allowed                                                                                                                | Allowed |         |
| 18. Drips on sheet surface                                                                                                             | Allowed on edges up to (mm)                                                                                                |         |         |
|                                                        | 3                                                                                                                          | 5       | Allowed |
| 19. Warp                                                                                                                               | Doesn't apply to thickness under 6.5 mm, for plywood over 6.5 mm thick allowed up to 15 mm per 1 m panel's diagonal length |         | Allowed |
| 20. Veneer missing in core lines at sheets edges<br> | Allowed with up to 5 mm deep, 250 mm wide                                                                                  |         | Allowed |

Notes: defects not mentioned in the table are not allowed



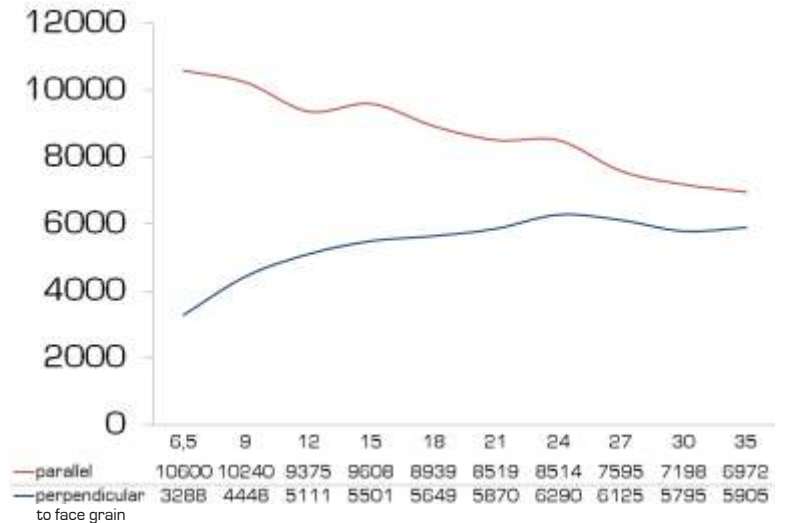
## PROPERTIES OF PLYWOOD SyPly

Physic mechanical characteristics, N/mm<sup>2</sup>  
(average figures for 2008)

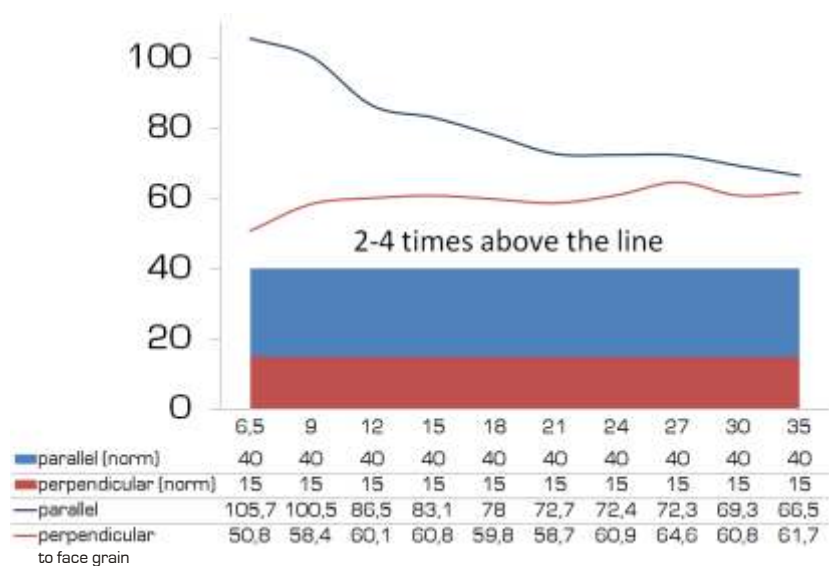


Determination of bending strength of plywood SyPly

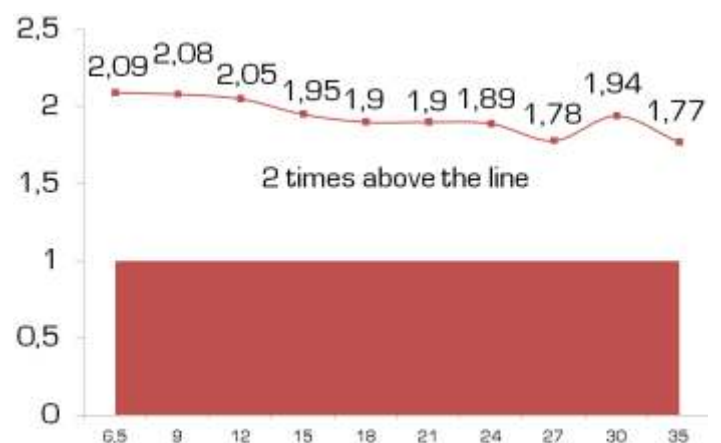
### Mean modulus of elasticity



### Bending strength



### Bonding strength



Details: "The results of plywood SyPly testing on bonding strength" (p.45)



Determination of shear strength on a glutinous layer of plywood SyPly

The mechanical strength of the plywood surface is dependent on many different factors: density, veneer thickness, surface hardness, and type of facing, density of the film.

The surface strength of plywood can be improved by film-facing. It increases abrasion resistance and resistance to rolling wear of the plywood surface. These properties are highly appreciated in floors and sidewalls of trucks, railway wagons, warehouses etc.

Film-faced plywood SyPly also has high cracking and scratching resistance, which is important in exterior usage (traffic signs and roadside signboards)

## Surface properties

| Type of plywood SyPly | Resistance to |           |           |            |
|-----------------------|---------------|-----------|-----------|------------|
|                       | Rolling wear  | Abrasion  | Cracking  | Scratching |
| Birch                 | good          | good      | very good | very good  |
| Film-faced            | excellent     | excellent | excellent | excellent  |

The surface strength of film-faced plywood depends on film density. Film density increases the abrasion resistance of the surface and plywood durability. The abrasion resistance properties of Syktyvkar film-faced plywood SyPly are shown in the table.

Taber test results for film-faced plywood SyPly  
(test methods confirm to DIN 52371, 53255,53799)



Determination of plywood stability to abrasion  
(taber-test)

The number of revolutions (taber test)



## Moisture properties

Standart moisture content of plywood is 5–12%, but it may change during transportation, storage, further processing and end usage. The average moisture content of plywood depending on the type of plywood is shown in the table below.

The average moisture content of plywood SyPly for 2008

| Type of plywood SyPly | Moisture content, %                  |
|-----------------------|--------------------------------------|
| Birch                 | 7.5 (6.5–8.4 – depends on thickness) |
| Film-faced            | 6.9 (6.2–7.5 – depends on thickness) |

Moisture content of plywood depends on temperature and relative humidity. The moisture content of plywood may rise above the critical limit of 20%, if plywood is subjected to a relative humidity of more than 85% for prolonged period of time at a temperature over 0°C.

At a temperature of 20°C and relative humidity of 65%, moisture content of thin-ply plywood is about 12% and thick-ply plywood is about 10%. Within a decrease in temperature the moisture content of plywood decreases and is about 0.7% per each 10°C of temperature change.

The sizes of a plywood panel also depend on moisture content. Changes in the length and width of a plywood panel are on average 0.010%–0.017% per 1% change of moisture level. The change of plywood thickness averages 0.3–0.4% per 1% change of moisture level in the panel.

The swelling of a thick panel is smaller than of a thin one. Changes in moisture content of plywood may cause warping and twisting of the panel. The flatness of the panel is at its optimum at a moisture content of 9–11%, that corresponds to the moisture content of plywood upon leaving the hot press.

In spite of the fact that plywood only partially contacts with water, it may be wetted by condensing water, rain or at the point of use.

Prolonged influence of steam may cause rotting, softening and strength decreasing of unsurfaced plywood panel. After drying the panel properties are restored. The resistance to steam can be improved by film-facing. Film-faced plywood is suited for application where the panel is cleaned with the help of steam washing. The panel's sensitivity to moisture and steam can also be reduced through edge sealing. Edges of the panel are usually processed with the durable acrylic paint. In this way the edges have a very good protection. The purpose of the edge-sealing painting is to fill up emptiness, slowing down the absorption of moisture through the edge into the panel.

## Bonding strength and emission of formaldehyde

Plywood SyPly is certificated on conformity to the German national standard DIN-68705-3, as plywood of class BFU-100 – a weather resistant building material. Testing of plywood for bonding strength is carried out according to DIN 68705-3 “building plywood” and EN314-1 “Plywood – quality of agglutination. Test methods”. The results of the tests are summarized in the table.

The results of plywood SyPly testing on bonding strength (dated from 2008) N/mm<sup>2</sup>

| Thickness, mm | Birch plywood SyPly      |                         | Film-faced plywood SyPly |                         |
|---------------|--------------------------|-------------------------|--------------------------|-------------------------|
|               | after cold water soaking | after two-stage boiling | after cold water soaking | after two-stage boiling |
| 6,0 / 6,5     | 1,46 – 3,45              | 1,35 – 3,44             | 2,4 – 2,4                | 2,19 – 2,19             |
| 9.0 / 9.5     | 1,35 – 3,27              | 1,14 – 2,72             | 1,68 – 2,57              | 1,47 – 2,34             |
| 12.0 / 12.5   | 1,42 – 3,36              | 1,16 – 2,94             | 1,71 – 2,81              | 1,43 – 2,55             |
| 18.0 / 19.0   | 1,3 – 3,21               | 1,15 – 3,11             | 1,38 – 2,93              | 1,34 – 2,42             |
| 21.0          | 1,37 – 3,26              | 1,11 – 2,79             | 2,17 – 2,7               | 2,02 – 2,27             |

P. S. Norm according to DIN 68705-3 is 1.0 N/mm<sup>2</sup>

– Plywood SyPly bonding strength significantly stronger

The results of plywood SyPly testing on emission of formaldehyde SyPly (dated from 2008)

| Test method              | Chamber<br>(EN 717-1)                                                                                                                                                                                                                 | Perforator<br>(EN 120 and GOST 27678)                                                                                                                                                                                           | gas analytical<br>(EN 717-2)                                                                                                                                                                                                                                                                                              |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Summary                  | Samples are located in the chamber, are blown by the air which circulates with the certain speed at established temperature and humidity. In a certain time they take test of the air to determine the content of formaldehyde in it. | Perforator method consists of the extraction of formaldehyde from samples with boiling toluene, its absorption by distilled water and determination of the content of formaldehyde in a solution with the help photocalorimeter | Samples are located into a closed chamber, the formaldehyde allocated from samples mixes up with the air in the chamber. Further the air from the chamber passes through a gas collector containing water which absorbs free formaldehyde. With the help of photocalorimeter concentration of formaldehyde is determined. |
| Unit of measure          | Mg/m <sup>3</sup>                                                                                                                                                                                                                     | mg/100gr of absolutely dry plywood                                                                                                                                                                                              | Mg/(m <sup>2</sup> *h)                                                                                                                                                                                                                                                                                                    |
| Norm                     | <0,124 (birch)<br><0,01 (film-faced)                                                                                                                                                                                                  | < 8                                                                                                                                                                                                                             | < 3,5                                                                                                                                                                                                                                                                                                                     |
| Birch plywood SyPly      | WBP: 0,040–0,056<br>MR: 0,069–0,102                                                                                                                                                                                                   | 0,75 (WBP), 2,4 (MR)                                                                                                                                                                                                            | WBP: 0,5–1,1<br>MR: 0,6–1,1                                                                                                                                                                                                                                                                                               |
| Film-faced plywood SyPly | 0,0029–0,0034 (2007 y.)                                                                                                                                                                                                               | 1,1                                                                                                                                                                                                                             | 0,1                                                                                                                                                                                                                                                                                                                       |

## Biological and chemical stability

Plywood SyPly is resistant to fungi and bacterium due to phenol-formaldehyde glue.

Film-facing and edge-sealing by acrylic paint provide good protection against adverse weather conditions and allow exterior usage.

It is not recommended to exceed moisture content over 20%. To avoid rotting it's necessary to keep plywood at a temperature from +20 to +30 C. If film-facing and edge-sealing are damaged in use, resistance to rot is reduced.

Film-facing and impregnation by special solutions prevent plywood from blue stain and mould and exclude descolouration of the surface.

Plywood SyPly is resistant to most weak acids, acid saline solutions and fuel oils. Basic solutions make wood soft and bulging, acids substances have a destructive effect on wood.

It should avoid direct contact with chlorine, hypochlorite and nitrates. Organic solvents like acetone, gasoline, alcohol etc. dissolve resin, fats and waxes, causing swelling and strength reduction.

Film-facing of plywood improves its resistance to chemicals and disinfectants (in contact with most of the chemicals only a slight discolouration is possible).

### Thermal conductivity

Thermal conductivity of plywood SyPly depends on moisture content. It is because water is heated approximately three times as faster as wood. In temperature range from 0°C up to 100°C heating of plywood can achieve 1.4 KJ / (kg K).

The more the moisture content the more the conductivity. Thermal conductivity of dry birch plywood SyPly is about 0.15 BW / (mK).

At a normal temperature wood properties stay practically unchanged. However when the temperature rises from 20°C up to 100°C the strength of wood decreases. At a temperature below 0°C the strength and elasticity of plywood are better than at room temperature.

### Fire resistance

Plywood SyPly is included into a group of combustible materials with medium inflammability. The ignition temperature is about 280°C. Spontaneous ignition is impossible until the temperature is 440°C.

The fire resistance of birch plywood SyPly is about to 13–15 minutes for 18 mm of thickness. Carbonization rate of birch plywood SyPly varies in the range 0.8–1.2 mm/min depending on the thickness of the panel. The charred surface of plywood has insulating properties and slows down the process of burning.

At impregnation with special chemicals and covering of the panel with fire-resistant substances the fire resistance of plywood SyPly is improved.

### Sound insulation

Sound-insulating characteristics of plywood are rather low. This is mainly because of the low density of wood.

Sound-insulating capacity is proportional to the mass to be penetrated, irrespective of the material.

The coefficient of sound reduction depends on the thickness of the panel and reaches 22–25 dB for 18 mm plywood thickness.

The sound-proofing characteristics of plywood depend on the type of construction and the method of wall fastening (partition or building panel). They can be improved due to a special lining between panels of plywood.

### Ecological compatibility

For manufacture of plywood SyPly one of the most ancient building materials – the wood (self-renewed non-polluting raw material) is used. It is easy in processing and is utilized without damage for the environment.

Plywood manufacture SyPly is practically without waste as the waste of wood raw materials is used for manufacture of chipboards.

Plywood SyPly corresponds to the state sanitary-and-epidemiologic norms and standards.



## USE OF PLYWOOD SyPly

### Processing

Plywood SyPly can be processed in different ways with standard manual and electric woodworking tools.

However it is necessary to note that the glue in plywood panel causes rapid wear of cutting tools, therefore hard metal-tipped tools are recommended. Plywood SyPly can be cutted with modern systems of laser beams and 3500 bar pressurized hydraulic systems.

### Sawing

The best result of sawing is achieved by using a cut-off type saw blade. To receive a clean cut, the sawing must be carried out correctly. First sawing is made across fibers of the face veneer then lengthwise. It allows avoiding splitting of corners. In circular sawing high speed and low feed rate are recommended. The limit of penetration of a disk saw – tooth should be small.

### Drilling

A clean hole is obtained by using a sharp wood drill equipped with a front cutter. Drilling should be started with the right side. Splittings of the reverse side can be avoided by using of a backing block.

### Edge processing

For getting smooth edges of the panel after sawing it is possible to plane them slightly. The best result is achieved, if to plane in the direction from angles to the middle, thereby avoiding splitting at the corners. The edges of the panel can be also sanded. Painting of edges is made 2–3 times by acrylic paint with special additions.

### Sanding

Usually the surface of plywood is sanded with abrasive paper (№ 80–100) perpendicular to the direction of fibres of external layers of veneer sheet. If extremely smooth processing is required, for example, for high-quality varnishing, sanding by a fine-grained paper along the wood texture is recommended.

### Fastening and installation

Plywood can be fastened to the construction by means of glue, nails, staples, screws, rivets or bolts. When choosing the way of fastening it is important to take into account operating conditions, required durability and appearance. Before installation is necessary to prepare the plywood panel from the point of view of final operating conditions, safety measures for prevention of probable expansion or compression of a panel under the influence of moisture or temperature drops should be taken. It is necessary to leave a 2 mm backlash. You can use elastic filler, for example, between the edge of the panel and a steel frame construction. In constructions with heating it is necessary to provide appropriate ventilation of a plywood plate.

### Gluing

Unfaced plywood is usually glued with any type of wood glue. The choice of glue depends on the working methods, moisture content during final usage and from required durability. The standard kinds of glue are: phenol-formaldehyde, carbamide-formaldehyde and epoxide resins.

PVAC glue is good for use indoors. This glue is colorless and has good agglutination strength. Phenol and epoxide glue have high agglutination strength, capable to withstand unfavourable condition of the environment. When gluing plywood with metal, epoxide glue is recommended. Contact bonding substances are usually used for gluing big surfaces and faced plywood for inside usage.

It is not recommended to glue film-faced plywood: film faced plywood is not capable to long gluing. If film-faced plywood is fixed with the help of glue, the surface of the film-faced plywood needs to be sanded up to the wood layer, for example, with grinding paper. It is recommended to use epoxide glue. The gluing surface must be dry and clean.

Glue must be applied to in regular intervals on both glued surfaces by a roller or a brush. The desirable strength is achieved with the help of clamps, screws or nails. Suitable interval between nails – 1 nail per 40 cm<sup>2</sup>.

The glue manufacturer's instructions shall always be carefully taken into account.



## Nailing

For wall, ceiling and floor panels nails with a groove or special screws with hidden or pressed head is used. For hidden nailing usual wire nails can be used. To nail external facing panels acid-resistant nails are recommended as they give the best protection of the panel against rust.

The length of nails should be 2.5–3 times the thickness of the panel. The best suitable interval between nails for wall and ceiling panels is 10–20 cm along the edges, 20–30 cm – in the middle, depending on the loading and the kind of nails. In floor panels interval should be 20–30 cm along the edges and 40–50 cm in the middle. Because of the cross banded structure of a plywood panel, nails can be placed quite near the edge. A suitable distance from the edge of the panel is 12–15 cm.

In load bearing structures, an important role for their integrity play durability and fixing of nails. Nails should be placed in the right order; they should be long, with big heads. It is possible to use screws. As it was mentioned before, fixing can also be improved by using glue on joints.

## Screwing

In many spheres of plywood application panels are fastened with screws. In finishing application, manufacture of furniture, exhibition stands and shipbuilding, use of screws is preferable. Auxiliary holes can be predrilled, the hole in the panel should correspond to the diameter of the screw and to smaller hole in the frame; diameter of the last will make half from the previous one. The head of the twisted screw should not penetrate into the face veneer. At use of nails with domed head it is necessary to use washers.

When fastening shuttering plywoods to metal components of the construction it is possible to use special screws to fix the panel from the reverse side, not damaging the face side of the sheet.

The floor panels for cargo containers and trailers floor are usually fastened to metal chassis with self-drilling and tapping screws. For example, plywood panels of 27 mm thick are possible to fasten by means of M6x40 mm screws. First the screw penetrates a plywood panel and then cuts a thread through the metal. This way is fast enough.

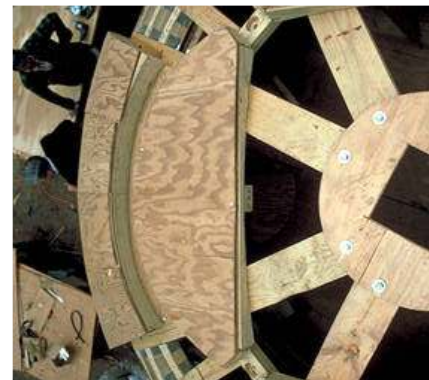
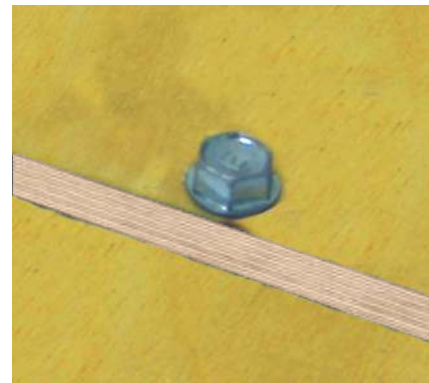
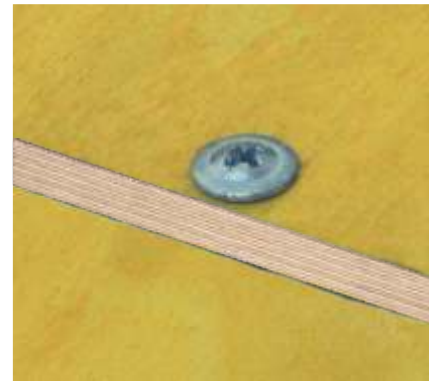
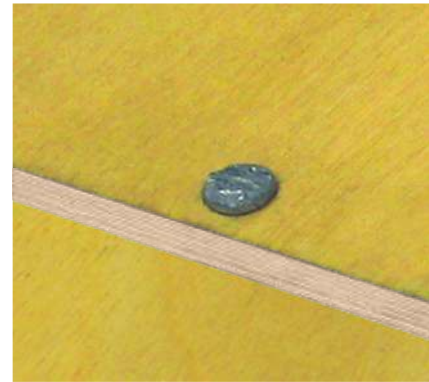
Thin plywood panels for transport mechanical engineering are also easily fixed to metal constructions by means of the above mentioned self-drilling screws.

## Bolting

Plywood panels are easily fastened with bolts. The hole for a bolt should be 2 mm more than the diameter of the bolt. Under the bolt heads should be washers and nuts for protection of the surface of the panel from damage. To avoid damages of wood you should not tighten the bolt too much. Plywood being used out doors can expand from moisture, and too much tightened bolt can be pressed into the surface of the panel resulting in crack formation on the surface of plywood around the bolt.

## Clamps

Locks, hinges, shelves can be easily and reliably fixed to the surface of plywood from any side or edge. Fastening with the help of clamps is considered to be one of the stable ones. It is necessary to predrilled holes if clamps are located close to the edge of the panel.





## Corrosion of fastenings

At final consumption of birch plywood in humid conditions even galvanized screws and bolts can be exposed to small corrosion. Therefore, it is necessary to pay attention to the quality of galvanizing and the thickness of the galvanized layer. Hot dip provides better protection than electro-galvanization. The fastenings made of acid-resistant steel – nails, screws and bolts – give full protection against corrosion.

## Joints and connections

Joints and connections are important components of plywood constructions. There are many kinds of plywood connection: tongue-and-groove joint, finger joint and others. Correctly performed they provide reliability of walls, floors and supporting elements. Plywood edges are usually the most sensitive part of a panel, therefore special attention should be paid to processing of joints, especially, if plywood is intended to be used in the open air.

It's recommended to use butting, open joints, tongue-and-groove joints, fillistered and strip joints in the walls and ceilings. When used outside, various connections by strips give the best protection against external influence. The vertical and horizontal aluminium structures effectively protect edges of the panel. Immunity to rust makes them suitable for making facades. However, if, because of architectural reasons, in outside usage open joints are preferred, edges should be properly sealed. About 2 mm / m is necessary for expansion of the panel. In connections end-to-end this distance should be 3–6 mm.

Tongue and Groove connection is usually applied for floors and inside panels. It effectively prevents rising of panels and damage of roofing materials and is capable to maintain bigger loadings, than usual butting. The panel is fixed with nails.

The best bearing capacity is achieved by using of staged profile or a similar special structure with flanges supporting edges of adjoining panels. Similar structures find application, for example, in construction of floors for containers and trailers.



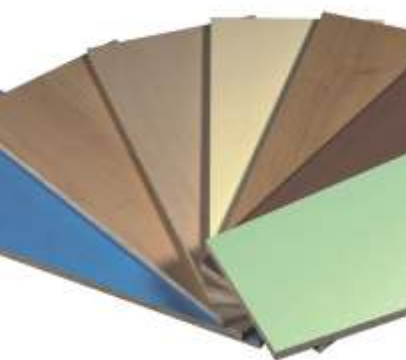
## Finishing

Sanded, smooth surface of plywood represents an excellent basis for the further finishing. Plywood can be film-faced, , painted, impregnated with a special paint or solution etc. When you choose a paint or grounding, it is important to take into account the tendency of crack formation in facing veneer. The surface can also be covered with plastic or valuable timber veneer. Application of a thin film is also possible. At the same time plywood can be faced with wall-paper. If plywood is stored in conditions with high humidity it is necessary to dry it up before usage. The surface should be cleared of dust appeared as a result of the previous processing. This procedure must be repeated before each stage of finishing. It is recommended to coat with 1–2 layers depending on the quality required.



## Painting

Painting gives plywood natural textural figure. The surface of a panel can also be painted entirely – without display of wood structure. The paint is brushed or sprayed. Coloured plywood is used both for internal, and external finishing. But before final painting the surface should be processed with a special solution for prevention of blue and fungus as biological resistance of transparent paints is limited because of the minimal content of connecting substance.



## Varnish coating

Varnished birch plywood is pleasant to look at and is easy to handle. Before varnishing the surface of the panel needs to be sanded with fine-grained sandpaper. The dust from grinding should be carefully removed, and the surface be covered with diluted varnish.



## APPLICATION of PLYWOOD SyPly

### Construction

High physic mechanical characteristics of Syktyvkar plywood make it ideal material for construction. Due to a long grain direction of veneer fibers, special strength of a panel, and as a result durability, crashworthiness and stability to loadings are reached. The covering of plywood with special film and sealing of edges with water-proof paint provide moisture and wear resistance. It allows using it in any weather conditions, and to clear easily with washing-up liquids. Correct storage, operating conditions, installation and careful sealing of edges of a panel after sawing up guarantee long term of operation in any weather conditions (without swelling in humid environment).

The big size of plywood SyPly allows reducing the amount of joints and fastenings, and it in its turn facilitates the realization of installation works.

The wide choice of special kinds of plywood SyPly facilitates construction work: plywood with wire mesh (antislip) surface for building scaffolding and floors, plywood for painting, plywood for decking.

### Adjustable floor on plywood

Nowadays there is a technology that helps to make smooth, beautiful and clean floor for no time, – an adjustable floor on plywood.

From below in a sheet of plywood (predrilled), bushes with groove are inserted, from above bolts are rolled in bushes, thus absolutely smooth and horizontal surface is reached. Each bolt is rigidly fastened to the concrete basis with dowels. Then for rigidity and absence of joints the second layer of plywood is put. Further covering of the floor (parquet, laminate, parquet board etc.) is starting.

Let's compare this technology with a traditional, parquet (laminate) one – concrete buckle, leveling buckle, plywood. First – the cost. Cost of work together with materials, taking into account a double layer of plywood for adjustable floor, is cheaper than in classical technology where less plywood is necessary, but it is required to do concrete preparation and a leveling buckle with special structure. If you want to get really high quality all this will not cost less. Further – the loss of height. In the offered variant no more than 3 cm is lost, in traditional – the same, taking into account height of a buckle.

So, we shall consider the advantages of use of plywood in comparison with a standard concrete buckle:

- Between the concrete and plywood the air layer that creates additional heat and sound isolation is formed.
- Plywood does not adjoin to a concrete floor and in case of leaking does not decay and swell out. So the covering of the floor serves longer.
- Time savings. The process of concrete preparation and smoothing buckles takes not less than 28 days. Only then it is possible to start parqueting. When using plywood all works are carried out in no time.
- Cleanliness. There are no wet processes so, there is no dust and dirt.

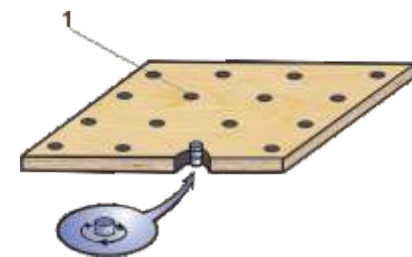
It is also necessary to note high reliability of plywood usage. Bolts and bushes are not made of simple plastic, but of polymer with special durability, bearing intensive loadings. Tests have shown, that such floors can bear not less than 3 t/m<sup>2</sup> loading, the minimal term of their service is 50 years, including administrative and sports constructions.

The technology of leveling the floors with plywood is widely used not only in apartments and cottages, but also at schools, hotels, sports halls and even on industrial objects, especially when all works need to be realized in minimal terms.

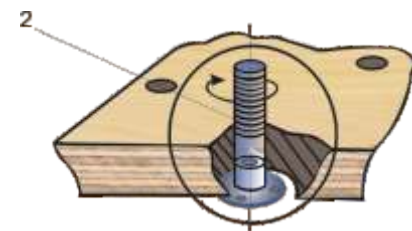
### Formwork house building

Due to the application of the film-faced plywood manufacture of concrete formwork is essentially speeded up. The phenolic film faced panels are impenetrable for dirt and are easily cleaned. They are steady against corroding environments, scratches and abrasion. Minimal requirement for further processing of concrete surfaces and an opportunity of repeated use of concrete forms make the application of film-faced plywood rather favorable.

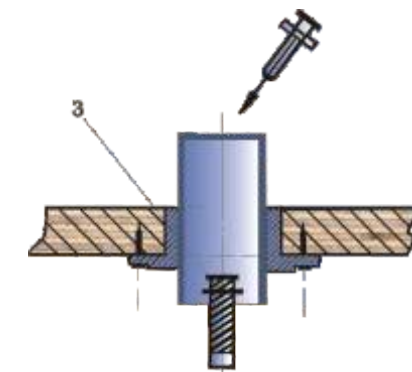
Decking forms made of plywood differ in easy weight that considerably reduces their gross weight and facilitates installation works. This characteristics of plywood allow to cut expenses on transportation and to increase bearing capacity of decking constructions. Wire meshed surface of a panel improves friction of the surface, preventing sliding that makes imprinted plywood irreplaceable in manufacture of floors for building scaffolds used in erection of decking and other installation works.



hole drilling and fixation of plastic bushes with screws;



bolt screwing into bushes;

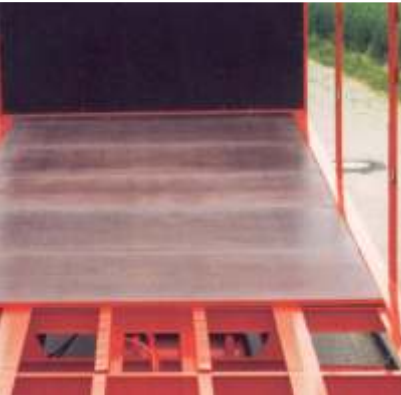


fastening of bolts to the base with metallic pin nails.



## Transport engineering

The leading world manufacturers of vehicles apply plywood, as the easiest, wearproof, harmless and favorable material. Compared with metal the advantage of plywood is that it does not give in to corrosion, has easy weight, is easily combined with other materials, simple in processing and steady against temperature drops. Plywood SyPly differs not only in special durability, but in water- and wear resistance. Plywood SyPly with a wire mesh surface is irreplaceable in manufacture of floors for lorries and containers.



## Agriculture

The minimal service and maximum durability are the key principles of plywood SyPly usage in agricultural constructions. Plywood plates provide an excellent aesthetic look, the surface is good for cleaning, both in external, and in internal finishing of buildings and constructions of agriculture.

Stability of plywood SyPly to acid and alkaline solutions allows using it in building of storehouses for fertilizers. Storage of fruit and vegetables in pallets made of plywood SyPly keeps fruit fresh. Plywood SyPly does not absorb smells and in condition of dense connection of panels, plywood boxes become actually impenetrable to smells and moisture. The automobile vans trimmed from within with plywood SyPly, serve longer and give in to no rot.



## Manufacture of furniture

Plywood became an integral part in manufacture of qualitative and harmless furniture for house and office. Due to durability, beautiful appearance and low cost price application of various kinds of plywood in manufacture of furniture is widely used. The cabinet furniture made of plywood SyPly, due to its beautiful structure, easy weight and durability, gets its best properties. Excellent machining and high quality of gluing of our plywood provide excellent physic mechanical characteristics of the panel. Such plywood allows carrying out any kinds of fixture and joints. The homogeneous structure of wood together with qualitative sanding is ideal for varnishing and painting. Covering of plywood with color transparent film [the color film-faced plywood] allocates wood structure with bright shades and allows realizing the most courageous design decisions.



## Shipbuilding

Due to increased moisture resistance and edge sealing application of film-faced plywood is possible in conditions of high humidity. Stability to corrosion, easy weight at high durability, an opportunity of manufacturing of bent-glued details – all these characteristics are highly appreciated in shipbuilding. Wire mesh surface on film-faced plywood makes it non slippery, therefore it is widely applied in covering of ship decks.



## Children's furniture and the arrangement of playgrounds

The world surrounding our children should be safe for their health. Our plywood corresponds to the international quality standards and differs in high ecologicality confirmed with necessary certificates. The high quality sanding of plywood SyPly guarantees ideal surface smooth and pleasant to touch. Strong plywood easily takes the form, developed by the designer, is simple in processing and installation, and is easily combined with other materials. The assortment of plywood SyPly includes rich scale of color films of plywood. The colorful film-faced plywood is an excellent choice in the designing of colorful children's furniture and playgrounds.

## Interior design

Plywood is an excellent material for interior design due to its natural beauty and unique visual effect of natural wood. Besides an attractive structure plywood is pleasant to touch and has excellent sound insulations and thermal conducting properties. The plywood used in internal finishing, is stable to humidity and temperature fluctuation. These properties are especially appreciated in wall covering of concert and sport halls, nurseries and hospital establishments. If necessary plywood plates can be processed with special fire-resistant substances.

## Exterior design

Birch plywood SyPly and its special kinds are widely used in creation of modern exterior, and in reconstruction of old buildings.

The attractive structure of natural wood and also special coverings of plywood allow creating original and colorful facades. Plywood SyPly is easily combined with other materials is simple in installation and assembling of designs, therefore it is well fit for any courageous design.

High water resistance allows using plywood SyPly in any weather conditions, even in conditions of the increased humidity.

Due to the big size of plywood SyPly the significant surface of walls can be covered and as a result the number of joints and fastenings can be decreased. Plywood is easily fastened and established. It is also well fit for other external applications: a balustrade of a balcony and floors, cornice and roofs, sound insulating panels.

At building reconstruction and facades design work film-faced plywood with wire mesh surface for building scaffolds has perfectly recommended itself. Easy weight at high durability, nonslippery surface, the raised wear and moisture resistance allow to use plywood for many times.

## Packaging

Due to its easy weight, durability, wear resistance, ecologicality and high moisture resistance plywood is widely used for manufacture of packaging. Plywood is easily combined with other materials and can be covered with varnish or paint. The packaging made of film-faced plywood, is steady against washing and cleaning substances, scratches and rusts.

## Trading, service and store equipment

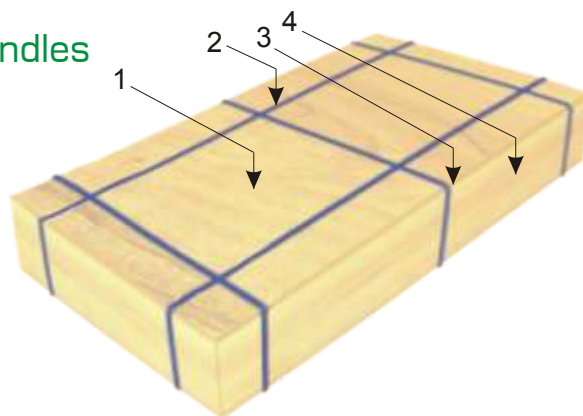
Film-faced plywood differs in raised durability, moisture resistance, ecologicality and stability to washing-up liquids. Edges sealing with a special water-proof paint on acryl basis excludes hit of moisture and as a result swelling of panels, that makes the usage of plywood in raised humidity and in open air possible. Attractive colors of facing materials (film, plastic) allow to realize original ideas in designing cabinet furniture and interior. The opportunity of manufacture of plywood with a long grain direction of fibres provides increased durability of plywood that is especially important in manufacture of trading and store equipment. Stability to abrasion and antislippery surface of film-faced wire mesh plywood are ideal for floors in trading centers and warehouses.



## DELIVERY AND STORAGE OF PLYWOOD SyPly

### Packing in bundles

Sheets of plywood are packed into bundles. The number of sheets in a bundle depends on thickness of a plywood sheet. Each bundle is packed from different sides in covers and is tightened with metal bands.



Requirements for packing of plywood SyPly

|                   | Birch plywood SyPly                      |                                                      | Film-faced plywood SyPly |         |
|-------------------|------------------------------------------|------------------------------------------------------|--------------------------|---------|
|                   | Grade B, B/BB, BB or thickness 4,0–6,5mm | Grade BB/CP, BB/C, CP, CP/C, C and thickness > 6,5mm | Grade 1 –2/3             | Grade 3 |
| 1 Cover*          | 2 pcs                                    | 2 pcs (except grade                                  | 2 pcs                    | –       |
| 2 Packing bands** | 2 pcs along<br>4 pcs cross               | 2 pcs along<br>3 pcs cross                           | 2 pcs along, 4 pcs cross |         |
| 3 Angles          | –                                        |                                                      | 24 pcs                   |         |
| 4 Edge cover      | 4 pcs                                    |                                                      | 4 pcs                    | –       |

\* hard board 2,5 – 4,0 mm thick and low-grade plywood 4,0 – 6,0mm thick is used. Low-grade 9 mm plywood is used as the bottom cover for packing of cross grain plywood 4 – 6,5 mm thick.

\*\* is made of steel 16 – 29 mm width and 0,5 – 0,7mm thick.

### Bundle marking

#### Mark “CE”

Marking with CE speaks that the production at its use according to its special-purpose designation is safe.

The manual about constructional products (CPD) was accepted by the European authorities in 1988. Purpose of CPD is to cancel a big number of technical barriers for trade and to create the common European market for building products. Within CPD the constructional product is determined, as « a product made for installation on a constant basis including constructional and civil building ». Thus, constructional products are applied, both in building and non building purposes.

Under CPD requirements all building products should have CE-marks before their marketing. CE-marks specifies, that the given product corresponds to all necessary requirements, and is allowed for sale in the markets of EU countries. Under the law, the states – EU members are not allowed to demand any other marks. On the other hand, the manufacturer has an opportunity to place additional marks on the product if they do not interfere with clearness of CE marks and do not confuse the user. Detailed requirements for CE marks are determined in coordinated standards. European standard EN13986 is considered to be the coordinated standard on use of wood panels in construction.

CE-marks is some kind of a passport indicating production conformity to the requirements of the European rules which are the instructions of the European Union act, including CPD.



0809-CPD-0347



Plywood SyPly conforms the requirements of EN 13986:2004 standard (CE-marks)

## Label

Company: name, trade mark, logo

Plywood type

Dimensions: length, width, thickness  
R – shop

Glue type: WBP, MR

Surface quality: (sanded, unsanded)  
For film-faced plywood: color of film

For film-faced plywood: film density

Plywood bundle unique bar code – is used for the internal calculation of the production

Packaging date (date, month, year)

Contact information

Marks of Russian voluntary certification "RST" confirms the agreement of the production to the requirements

Certificate mark of WKI (Germany)

Certificate mark of VTT (Finland)

CE – mark confirming that the production agrees with the requirements of EN 13986:2004

Mark conforms the compliance of the Quality Management System with the international standard ISO 9001:2008

Grade of plywood:  
B, BB, CP, C – birch, unfaced plywood;  
F/F – film-faced (smooth both sides);  
F/W – film-faced (I side smooth, II side wire mesh);  
L – with SyPly logo.

The number of panels in the bundle

Kind of edge profile and the number of sides with this profile:  
P1 – "Tongue & groove" profile  
P2 – "Half and Lap" profile  
P3 – "Chamfering"

Presence of the mark confirms that the chain from logging of raw materials up to selling of ready made plywood is certificated on FSC standard. Plywood is made of FSC certificated wood.

The concentration of formaldehyde in plywood SyPly satisfies the requirements of CARB(California Air Resources Board)

|                                                                                                                                                          |                  |                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------------------|
|  <b>SyPly</b><br>СЫКТЫВКАР ПЛЫВООД МИЛЛ<br>СЫКТЫВКАРСКИЙ ФАНЕРНЫЙ ЗАВОД |                  |  |
| <b>Фанера</b><br>Класс эмиссии формальдегида - E1                                                                                                        |                  | <b>Plywood</b><br>Formaldehyde emission class - E1                                  |
| <b>Наименование вида фанеры</b><br><b>Ламинированная березовая/Film-Faced</b>                                                                            |                  | <b>Plywood type</b>                                                                 |
| <b>Формат листа (длина x ширина x толщина), мм</b><br><b>1250*2500 R*21</b>                                                                              |                  | <b>Size (length x width x thickness), mm</b>                                        |
| <b>Смола</b><br><b>WBP</b>                                                                                                                               | <b>Glue type</b> | <b>Сорт</b><br><b>F/F</b>                                                           |
| <b>Поверхность</b><br><b>DBR</b>                                                                                                                         | <b>Surface</b>   | <b>Grade</b>                                                                        |
| <b>Штрих код</b><br>                                                   | <b>Bar code</b>  | <b>Пленка, г/м²</b><br><b>120/120</b>                                               |
|                                                                                                                                                          |                  | <b>Профиль</b><br><b>Profile</b>                                                    |
|                                                                                                                                                          |                  | <b>Листов</b><br><b>22</b>                                                          |
|                                                                                                                                                          |                  | <b>Дата</b><br><b>09/07/09</b>                                                      |
|                                                                                                                                                          |                  | <b>Вес, кг</b><br><b>1003</b>                                                       |
|                                                                                                                                                          |                  | <b>Объем, м³</b><br><b>1,509</b>                                                    |
|                                                                      |                  |                                                                                     |
|                                                                       |                  |                                                                                     |
|                                                                       |                  |                                                                                     |
|                                                                       |                  |                                                                                     |
| <b>www.syply.ru</b> <b>www.plypan.com</b>                                                                                                                |                  |                                                                                     |
| <b>MADE IN RUSSIA</b>                                                                                                                                    |                  |                                                                                     |

Spacious warehouse of finished goods ensures regular shipment.



## Transportation

Plywood SyPly is transported in bundles containing sheets of plywood of one and the same kind, grade, size and thickness. The stipulated packaging preserves panels against damage during transportation.

Sheets of plywood SyPly should be carefully protected during transportation from factory up to the client and be stored in dry conditions for prevention from rain, splashes or subsoil waters. When using a fork lift for loading plywood bundles, it is necessary to be careful not to damage plywood sheets and packing strapping. Bundles of plywood cannot be geared by freight elevator's cogs, they should be stored in horizontal position. On delivery conditions, bundles of plywood are transported by:

- Covered wagons
- Containers
- Trucks

Norms of loading for plywood SyPly , bundles

| Type of transport and plywood SyPly | 2440 x 1220 mm | 2500 x 1250 mm |
|-------------------------------------|----------------|----------------|
| <b>Containers</b>                   |                |                |
| Birch                               | 28             | 27             |
| Film-faced                          | 27             | 26             |
| <b>Covered wagons</b>               |                |                |
| Birch, Film-faced                   | 51, 53         | 49, 51         |
| <b>Trucks</b>                       | 20             |                |

Details: "Reference data on weight and volume of plywood SyPly" (p.22)



## Unloading and storage

When unloading, bundles must not be damaged. There should not be any contacts with loops, hooks or chains. It is necessary to take panel out of bundles manually not to damage edges and the surface of the panel – without dropping or dragging them on the ground. When rising sheets with the help of a fork lift it is necessary to prevent them from damaging as well.

Sheets should be stored indoors in initial packaging in conditions of the same humidity and temperature where further usage is planned. Raised humidity and temperature changes can cause an internal strain, increase of thickness or superficial defects. It is necessary to place plywood SyPly on the pallet with the supports, sufficient to avoid sagging, and to cover for protection against moisture penetration.



## Recycling

Operation life of plywood SyPly is long. After its termination there are some methods of recycling. It is necessary to note, that recycling rules in different countries differ depending on the current legislation.

Recirculation is a preferable way of recycling of the majority of products – the used plywood is used in some other sphere. Such recirculation should not damage the environment more, than any other method of recycling, and be more expensive than the usage of a new product.

If plywood is used as fuel, burning of plywood is equivalent to recirculation. At a temperature of combustion +700°C plywood SyPly ( painted as well) does not leave more dangerous products , than wood. It is not recommended to burn plywood in open fire as at a temperature of burning lower +700°C more harmful products of combustion start to be allocated.

Products of combustion of plywood have higher density in comparison with products of combustion of the raw wood products that proves the idea of higher fuel value.

Practically any plywood can be used, as compost. For this purpose it is necessary to crush plywood and take into account long process of processing. Almost all products from plywood can be placed on a garbage dump. But it is necessary to check up, if there are any substances having smaller term of decomposition since plywood products decompose very slowly.

Plywood SyPly does not contain substances classified as "dangerous refuse".



## SyPly TABLE OF STANDARDS

SyPly plywood is being manufactured in accordance with the following Russian and foreign quality standards:

### *Production standards SyPly*

|                         |                                                                                                    |
|-------------------------|----------------------------------------------------------------------------------------------------|
| TU 5512-001-44769167-02 | Technical conditions for the manufacture of birch plywood.                                         |
| TU 5512-002-44769167-04 | Technical conditions for the manufacture of film-faced plywood.                                    |
| DIN 68 705-3: 1981      | DIN requirements for constructional plywood (Deutsche Industrie Norm – German industry standard)   |
| EN 636                  | Plywood Specifications. Part 2 and Part 3: Requirements for plywood for use in exterior conditions |
| EN 13986                | Wood-based panels for use in construction – characteristics, evaluation of conformity and marking  |

### *Test methods standards SyPly*

|                  |                                                                                                          |
|------------------|----------------------------------------------------------------------------------------------------------|
| GOST 7016-82     | Wood products. Parameters of surface roughness.                                                          |
| GOST 15612-85    | Wood products. Test methods of parameters of surface roughness.                                          |
| GOST 27678-88    | Wood-based panels. Perforating method for determination of formaldehyde content.                         |
| DIN 53 255: 1964 | Determination of ultimate strength in shearing strength.                                                 |
| EN 120           | Wood-based panels – perforating method for determination of formaldehyde content.                        |
| EN 310: 1993     | Determination of ultimate strength and elasticity modules in bending strength.                           |
| EN 314-1: 1993   | Plywood bonding quality. Test methods.                                                                   |
| EN 315: 1999     | Determination of thickness tolerance of plywood.                                                         |
| EN 322: 1993     | Wood-based panels – determination of moisture content.                                                   |
| EN 323: 1993     | Wood-based panels – density determination.                                                               |
| EN 324-1: 1993   | Wood-based panels – determination of cut precision. Part 1: determination thickness and size of a panel. |
| EN 325: 1993     | Wood-based panels – determination of samples sizes.                                                      |
| EN 326-1: 1994   | Wood-based panels – selection of samples.                                                                |
| EN 326-1: 1994   | Requirements for plywood for use in dry, humid and exterior conditions.                                  |
| EN 717-2: 1995   | Wood-based panels. Determination of formaldehyde content by the gas analysis method.                     |

## WHERE TO BUY PLYWOOD SyPly

Address: 66, Ukhtinskoe ave., Syktyvkar, Komi Republic, 167026, Russia  
Web: [www.syply.com](http://www.syply.com)

### Reception:

Tel.: +7 (8212) 29-37-00

Fax: +7 (8212) 29-38-48

E-mail: [info@syply.com](mailto:info@syply.com)

### Export managers:

Tel.: +7 (8212) 29-37-71

Fax: +7 (8212) 29-37-73

E-mail: [export@syply.com](mailto:export@syply.com)

Quality, you should try!

