

INSTRUCTIONS FOR THE COLLECTION OF WOOD AND BIOMASS FOR ENERGY PURPOSES

With regard to the classification of roundwood, this manual is mainly based on the technical conditions established:

By Order No. 51 of the Director General of the State Forests dated 30 September 2019. (mark: ZM.800.8.2019) on the introduction of technical conditions in the trade of wood raw material in the State Forests National Forest Holding.

The technical conditions are available on the website - STANDARDS - [LEŚNO-DRZEWNY PORTAL \(lasy.gov.pl\)](https://portal.lasy.gov.pl)

THE NAMES AND MARKINGS OF THE DIFFERENT TIMBER GRADES.

Roundwood - wood harvested in the round state with the natural shape of the side of the trunk or crown elements preserved.

Medium-sized timber (S) - round, short timber in rolls of 1.0 ÷ 3.0 mb in length, with diameters measured without bark: the upper part of the roll, i.e. thinner from 5 cm upwards, and the lower part of the roll, i.e. the thicker part up to 50 cm. The diameter range agreed upon in contracts with the State Forests is 7 cm to 30 cm.

Depending on the quality and dimensions, the wood is divided into four groups:

- S1 - long timber , e.g. quarry timber, sawn timber
- S2a - stacked, usable timber which is subdivided into S2a and S2b on the basis of qualitative and quantitative parameters.
- S3 - poleswood
- S4 - firewood

2.1 S2a coniferous is medium-sized round coniferous pulpwood in rolls .

Can be supplied in lengths : 1,0 ; 1,2 ; 1,8 ; 2,0 ; 2,4 ; 2,5 ; 3,0 mb of such species as: so - pine ; md - larch ; św - spruce ; jd - fir ; dg - Douglas fir

2.2 S2a hardwood is medium-sized round hardwood pulpwood in rolls.

It can come in lengths : 1,0 ; 1,2 ; 1,8 ; 2,0 ; 2,4 ; 2,5 ; 3,0 mb of such species as: birch - birch; alder - alder; tp - poplar; aspen - aspen; jw. - sycamore ; js - ash; kl - maple; lp - linden; wb - willow.

3. small-sized wood (M) - round wood with a diameter of the lower part of the wood, i.e. thicker measured without bark up to 5 cm , and in bark up to 7 cm. Depending on the quality of the wood

small-scale is divided into two subgroups:

- M1 - pole-and-line fines
- M2 - fine branches
- M1 - pole-and-line fines
- S3a - poles

4. Chipped wood - wood chips, a wood raw material made from wood by means of a shredders, e.g. chippers

Sawn wood chips - waste wood produced by sawing roundwood or the production of edged lumber.

Sawdust - all types of waste wood resulting from various woodworking processes, e.g. sawing, slicing, turning, milling, planing, etc.

Biomass for energy purposes (to be used as solid biofuel) - forest biomass, agricultural biomass, post-consumer wood and other wood waste as shown in the integrated permit for the operation of an installation for the production of wood-based panels: oriented strand board (OSB), particleboard or fibreboard with a production capacity of more than 600 m³ per day and a fuel combustion installation with a nominal capacity of not less than 50 MW, taking into account waste processing activities. In the case of the supply of biomass, treated as waste, the supplier of biomass must provide the relevant decisions for the generation or collection of waste and have a registration entry in BDO (Database on Products and Packaging and Waste Management) appropriate to the type of activity. The waste transporter must have a registration entry in BDO for the transport of waste with the required codes. The requirement for a registration entry in BDO for the transport of waste does not apply to a transporter of waste he has generated. If a biomass supplier classifies biomass as a by-product and the nature of the biomass indicates that it may constitute waste (e.g. used wood packaging, other post-consumer wood), this classification must be confirmed by a decision issued by the Regional Marshal stating that the object or substance is considered a non-waste by-product. Such a decision is not required for objects or substances that meet the conditions for recognition as a by-product, which are products of wood processing such as bark, shavings, post-harvest gins, grease rollers, sawdust, shavings, chips, shavings, chippings, billets and others derived from the processing of these products, including briquettes and pellets, **which are mechanically processed natural wood raw material containing no other substances.**

It is recommended that in the case of biomass for energy purposes, the supplier should provide tests on the calorific value. **In the case of woody biomass containing chemically treated woody material, tests on the content of halogenated compounds (chlorine and fluorine content tests required) and heavy metals are required.** The basic reference base for the content of these substances is Annex B of EN ISO 17225-1 Solid biofuels - Fuel specifications and grades - Part 1: General requirements, which defines typical contents of chlorine, fluorine and heavy metals in different types of raw wood material, taking into account their typical variability. Below is a table with aggregated typical ranges of values for heavy metals, chlorine and fluorine. The content of these substances in the delivered fuel biomass must not exceed the aggregated typical value ranges specified in the table. EN ISO 17225-2, 17225-3 and 17225-4, concerning the different requirements for pellets, briquettes and woodchips respectively, EN ISO 17225-6 and 17225-7, concerning the requirements for pellets and non-wood briquettes respectively, and EN ISO 17225-9, concerning the grades of fuel from shredded wood waste and woodchips for industrial use, may also apply where appropriate. If the supplier does not have the tests referred to above, they may be commissioned by SWISS KRONO.

Table with aggregated typical ranges for chlorine, fluorine and heavy metals

Parameters determining biomass purity		Raw wood material - limit ranges summarised in Tables B.1, B.2, B.3 and B.4 of EN ISO 17225-1)	Raw wood materials with little or no bark, leaves and needles (classification and values according to EN ISO 17225-1) - ranges according to table B.1		Raw bark (classification and values according to EN ISO 17225-1) - ranges according to table B.2		Raw wood materials, logging residues (classification and values according to EN ISO 17225-1) - ranges according to table B.3		Raw wood materials, short rotation coppice (classification and values according to EN ISO 17225-1) - ranges according to table B.4 (without eucalyptus)	
<u>Determined content of chlorine, fluorine and heavy metals in biomass (comparison with typical values is relevant - obligatory)</u>		Wood biomass - raw wood materials	Coniferous wood (1.1.3.2 and 1.2.1.2)	Hardwoods (1.1.3.1 and 1.2.1.1)	Conifer bark (1.1.6 and 1.2.1.5)	Bark from deciduous trees (1.1.6 and 1.2.1.5)	Coniferous wood (1.1.4.2 and 1.1.4.4)	Hardwoods (1.1.4.1 and 1.1.4.3)	Willow (Salix) (1.1.1.3)	Poplar (1.1.1.3)
Parameter	Unit	Aggregate typical value ranges	Typical range of values	Typical range of values	Typical range of values	Typical range of values	Typical range of values	Typical range of values	Typical range of values	Typical range of values
Chlorine, Cl	% w/w s.m.	<0.01 to 0.05	<0.01 to 0.03	<0.01 to 0.03	<0.01 to 0.05	<0.01 to 0.05	<0.01 to 0.04	<0.01 to 0.02	0.01 to 0.05	<0.01 to 0.05
Fluorine, F	% w/w s.m.	0 to 0.01	<0,0005	< 0,0005	<0,0005 up to 0.002	not specified	0,001	0 to 0.002	0 to 0.01	not specified
Arsenic, As	mg/kg b.w.	0 to 4	<0.1 to 1	<0.1 to 1	0.1 to 4	0.1 to 4	0.2 to 1	0 to 2	<0,1	<0.1 to 0.2
Cadmium, Cd	mg/kg b.w.	0 to 5	<0.05 to 0.5	<0.05 to 0.5	0.2 to 1	0.2 to 1.2	0.1 to 0.8	0 to 3	0.2 to 5	0.2 to 1
Chromium, Cr	mg/kg b.w.	0.2 to 40	0.2 to 10	0.2 to 10	1 to 10	1 to 30	0.7 to 1.2	1 in 40	0.3 to 5	0.3 to 2
Copper, Cu	mg/kg b.w.	0.5 to 200	0.5 to 10	0.5 to 10	3 to 30	2 to 20	10 to 200	1 to 100	2 to 4	2 to 4
Mercury, Hg	mg/kg b.w.	0 to 2	<0.02 to 0.05	<0.02 to 0.05	0.01 to 0.1	<0,05	0,03	0 to 2	<0,03	<0,03
Nickel, Ni	mg/kg b.w.	<0.1 to 80	<0.1 to 10	<0.1 to 10	2 to 20	2 to 10	0.4 to 3	1 to 80	0.2 to 2	0.2 to 1.0
Lead, Pb	mg/kg b.w.	0.4 to 30	<0.5 to 10	<0.5 to 10	1 to 30	2 to 30	0.4 to 4	0.5 to 5	0.1 to 0.2	0.1 to 0.3
Zinc, Zn	mg/kg b.w.	2 to 200	5 to 50	5 to 100	70 to 200	7 to 200	8 to 30	2 to 100	40 to 100	30 to 100

CONTROL OF WOOD RAW MATERIAL AND BIOMASS FOR ENERGY PURPOSES

1. Measurement

1.1 Measurement on means of transport.

The elements for measuring medium-sized timber (S) in shafts are :
length (L) , width (S) and height (H) of the individual parts (rows) of the cargo according to the drawing below.
These elements should be defined separately for each part of the load (row).

The length (L) of the part of the load (row) is taken according to the nominal timber lengths

The width (S) of the load section is taken according to the nominal widths of the load space of the means of transport.

The height (H) of a part of the load is determined as the arithmetic mean of two measurements taken at mid-length on both sides of the vehicle using a measuring instrument. All elements shall be determined to the nearest 1 cm.
The same is done for measuring scraps of equal lengths.

1.2 Measurement on railway wagons

Measurement on rail wagons is done in the same way as on vehicle measures.
Load capacity is calculated in cubic metres (mp) by multiplying the length, width and height of the individual stacks and times the number of stacks on the wagon or car.

1.3 Measurement of shredded raw material (woodchips, sawdust, short chips and biomass for energy purposes).

The elements of measurement are: length, width and height of a load of timber in a box.
Measurements are taken at the recipient's premises, i.e. SWISS KRONO.

1.4 Determination of the quantity of raw material in the means of wurtable transport can be based on the following units of measurement:

- Weighted tonnes (lutro tonnes), determined from the difference between the gross weight of the load and the tare weight of the car. Called net weight.
- spatial metres (mp), determined from the product of the length, width and length of the charge in metres.
- tonnes of atro (weight of dry wood tissue), determined from the net weight of the load and the subtracted weight of water determined from the sample taken.

2. Determination of volume

1.1 The wood **volume** measured in stacks (**pulpwood**) is calculated in cubic metres (**m3**). Appropriate conversion factors are used to calculate the load capacity from **mp** to **m3**

$$V_{mp} = L \cdot S \cdot H \quad V_{m3} = V_{mp} \cdot K$$

Vmp - volume in mp **K** - relevant conversion factor

L - mb length from Table 1

S - width in mb

H - height in mb

1.2 Woodchips, sawdust and shavings are accepted and billed to suppliers in Atrö tonnes and to transport companies on the basis of a price list for the provision of transport services.

1.3 Biomass for energy purposes is accepted and billed to suppliers in Atrö tonnes, weighted tonnes and space metres, and to transport companies on the basis of a price list for the provision of transport services.

Table No. 1 Replacement factors for timber measured in stacks and for forest and sawmill chips.

Group Sorting	in the bark	without bark
	mp in the bark per m3 without bark	mp without bark per m3 without bark
Group S2a -so		
1,0 ; 1,2	0,65	0,75
2,0 ; 2,4 ; 3,0	0,62	0,72
Group S2a -flw		
1,0 ; 1,2	0,70	0,78
2,0 ; 2,4 ;	0,67	0,75
Group S2a -bk		
1,0 ; 1,2	0,70	0,75
2,0 ; 2,5 ; 2,6 ; 3,5	0,70	0,75
Group S2a -brz		
and other deciduous		
1,0 ; 1,2	0,65	0,75
2,0 ; 2,4 ; 2,5	0,60	0,75
Group S3a		
up to 4 m long	0,50	
S4 Group		
soy and deciduous	0,65	0,75
St, jd	0,70	0,75
Group M1	0,40	
Group M2	0,25	
Forest chips	0,43	
Sawdust chips	0,42	

1. De-branching

Round and split wood should be stripped of branches and protruding knots.
The quality of limbing is divided into:

- very good - limbing flush with the wood surface
- good - limbing, leaving knots up to 3 cm long and occasionally longer.
- Sufficient - limbing leaving knots up to 5 cm long and occasionally longer.
- coarse - limbing by partial removal of thin slices of wood
(non-needed or non-limbed) parts of the branches.

Good quality limbing is required for pulpwood imported into SWISS KRONO

VISUAL INSPECTION AND ASSESSMENT

1. Qualitative assessment.

1.1 The quality assessment of pulpwood is divided into two stages:

a/ inspection of dimensions and their compliance with requirements. The following are subject to inspection:

- length (tolerance of ± 5 cm)
- diameter min 7 cm measured without bark

b/ visual assessment of defects and their extent according to table no. 2

Jakość ^{1) 2)}						
Grupa	S1	S2			S3	S4
Podgrupa		S2A	S2B	S2AP		
Rodzaj wady	Dopuszczalny rozmiar występowania wad					
Krzywizna jednostronna	pozwalająca na wymanipulowanie odcinków o długości 1,5 m o strzałce ugięcia 1 cm/m	dopuszczalna do:			10 cm/m	dopuszczalna
		do 8 cm/1 m, przy długości powyżej 1 m do 10 cm na całej długości	iglaste 2 cm/m liściaste 3 cm/m	12 cm/m		
Krzywizna wielostronna	dopuszczalne z wyjątkiem brunatnicy	wynosząca połowę krzywizny jednostronnej			dopuszczalne	dopuszczalne
Zabarwienia		dopuszczalne	sinizna dopuszczalna do 50% powierzchni bielu ³⁾ ; brunatnica niedopuszczalna	dopuszczalne		
Zgnilizna	niedopuszczalna	niedopuszczalna miękka	niedopuszczalna	dopuszczalna; miękka do 50 % powierzchni czoł	niedopuszczalna	dopuszczalna; miękka do 50% powierzchni czoł
Chodniki owadzie głębokie	niedopuszczalne	dopuszczalne	niedopuszczalne	dopuszczalne	niedopuszczalne w S3B	dopuszczalne
Obecność obcych ciał	niedopuszczalna widoczna	niedopuszczalna widoczna	niedopuszczalna	niedopuszczalna ⁴⁾ widoczna	dopuszczalna	dopuszczalna
Zwęglenia	niedopuszczalne	niedopuszczalne	niedopuszczalne	niedopuszczalne ⁴⁾	dopuszczalne	dopuszczalne

¹⁾ Wad niewymienionych w tablicy nie bierze się pod uwagę.

²⁾ W przypadkach uzasadnionych gospodarczo oraz za zgodą stron dopuszcza się inny zakres występowania wad.

³⁾ Sinizna czarna dopuszczalna za zgodą stron w rozmiarze ustalonym między stronami.

⁴⁾ Za zgodą stron dopuszczalne.

2. final assessment of wood raw material and biomass for energy purposes with a view to allocating it to appropriate production and directing it to appropriate storage yards.

2.1 Final evaluation of S2a softwood pulpwood for OSB production

Coniferous pine and spruce or poplar pulpwood with the following parameters may be used for OSB production

- Species - Pine , Spruce
- Length - 2.40 - 2.50 mb
- Minimum diameter - $\varnothing \geq 7$ cm
- Maximum diameter - 30 cm
- Fresh wood (not dried) free from blue stain and other discolouration
- No foreign contaminants
- Very well trimmed
- A one-sided curvature of up to 10 cm along the entire length, or a multi-sided curvature of half the one-sided value, is permissible.

Only such timber meeting the above requirements can be diverted directly to OSB production or to the OSB timber yard.

On the other hand, coniferous pulpwood that does not meet the requirements and above-mentioned parameters for OSB is diverted to the production of MDF or to a wood yard for MDF.

Woodchips:

The quality of the woodchips is assessed mainly by an organoleptic, i.e. visual, assessment of the delivered batch directly on the means of transport by the lackey at the delivery control point. This assessment is subject to:

- Checking the type of wood the wood chips are made from,
- Checking the quality of the woodchips,
- Checking the dry wood content,
- Checking the measurement of a batch of woodchips (measurement of the internal dimensions of the transport vehicle's box or container),
- In cases of doubt, check the dimensions of the woodchips (only at the request of the production department) by sieve analysis by the laboratory.

Scraps:

The quality of the chips is assessed by a logger using an organoleptic method (mainly metal content and other mineral impurities).

The chips are sent directly to the chipper for chipping, which can be used for both MDF and particleboard production.

Sawdust:

Sawdust quality assessment is carried out by a wood storer using an organoleptic method (mainly for metal, plastic and other mineral impurities).

Sawdust is diverted to particleboard production or to a sawdust storage yard.

Biomass for energy purposes:

The assessment of biomass quality is carried out by a lackey using an organoleptic method (mainly for metal, plastic and other mineral impurities).

In the event that the delivered raw material does not meet the quality requirements, it will be disqualified

and the price is reduced.

In the case of biomass for energy purposes containing chemically treated woody material, biomass contaminated with heavy metals and halogenated compounds (see point 7 of the NAMES AND INDICATIONS OF THE INDIVIDUAL WOOD SORTS section) will not be accepted.

In the case of deliveries of wood raw material and biomass for energy purposes that are in accordance with expectations and this Receiving Instruction, no quality records indicating that the batch is good are recorded in the JMC (Flexus) or SAP system. Only observations in cases of doubt or non-compliance with expectations and this Instruction are recorded.

FINAL EVALUATION OF THE WOOD RAW MATERIALS

All wood grades are subjected to a detailed inspection by a logger.

1. The checker verifies the conformity of the load with the information given on the forestry delivery note from the State Forests or the WZ document for other suppliers.
2. The woodcutter proceeds with the measurement and quality assessment of the wood.
3. The brakeman finally confirms acceptance of the delivery in the JMC (Flexus) or SAP system if the cargo meets the quality and quantity requirements.

After assessing the quality of the timber, the brakeman directs the vehicle to the appropriate unloading yard.

4. In the event that the delivered raw material does not meet the quality requirements, it is disqualified and sent to the firewood yard under the supervision of a deficiency officer.

DETERMINATION OF THE DRY MASS OF THE WOOD BY THE DRYING AND WEIGHING METHOD

For the internal purposes of the SWISS KRONO plant as well as the acceptance of sawdust, sawdust and sawmill chips for settlement with the supplier, each delivery of wood raw material is marked in **Atro tonnes**.

The method consists in determining the dry matter content of the wood in a given delivery, after eliminating water. For this purpose, each delivery of raw material, whether pulpwood, shavings, chips or sawdust, is weighed on a scale at the entrance gate. There, the delivery is pre-registered by entering the delivery number (IB) into the JMC system (Flexus) by scanning the QR code or by entering the delivery number from the keyboard, which contains all the information about the raw material, i.e. assortment, quantity, delivery owner, carrier and gross weight of the entire load. After unloading, each car is weighed again and its tare is recorded in the JMC system. The lorry with the load pulls up to the delivery control point where the previously described control takes place.

The baler takes a sample of the raw material from the batch delivered. In the case of pulpwood, sawdust is taken from the incision of several or more shafts with a chain saw.

The notches are made in the middle of the shaft at a certain distance from the front (min. 20 cm). The notched shafts are selected so that the number of shafts coming from the butt, the middle and the top of the stem (arrow) is the same.

Sawdust is collected in a plastic bag attached to the sawdust outlet. Immediately after taking the sample, the sawdust is thoroughly mixed by the sawmill operator and the sample is weighed on a scale at a rate of approximately 100 g. The data is transferred directly from the scale to the JMC system. A ticket is printed with the sample and QR code. The ticket together with the sample goes into the drying cabinet. Similarly, samples are taken from the scrap.

In the case of woodchips and sawdust, samples shall be taken directly from the vehicles after the top layer has been shoveled off and taken from inside the load at a minimum of two locations. Sampling in the yard after unloading is allowed. The further procedure is the same as for pulpwood. In the case of sawdust or shavings of small mass in relation to the space they occupy (downy shavings like feathers) a sample of less than 100 g is allowed. However, in the case of short chips (so-called blocks), any mass is taken, which is due to the fact that blocks are a very finely divided material and it is difficult to weigh 100 g and, for safety reasons, a chain saw is not taken and the relative humidity of the samples is calculated from the moisture content formula.

The following morning, after a minimum drying time of ten hours (minimum 24 hours for short chips), each sample is weighed again by the sample checker. Entering the weight of the dry sample by scanning the QR code of the delivery in question. Based on the difference in sample weight (wet sample - minus dry sample), the system calculates the dry wood content, which is defined as the so-called Atro tonnage of the entire delivery.

The dry matter content of the wood thus calculated, the so-called Atro expressed in % in each sample taken, which is represented for a specific delivery (car or wagon), is recorded in the SAP system.

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