SPRUCE, NORWAY SPRUCE

Botanical name: *Picea abies,* family PINACEAE

Other important species: *Picea sitchensis*

Distribution: Europe, North America (Picea sitchensis)

Other important trade names: Picea abies: Rotfichte, Rottanne (D); spruce, Norway spruce, whitewood (GB); Picea sitchensis: Sitka-Fichte (D); Sitka spruce (F, GB, USA)

Abbreviation as per DIN EN 13556: PCAB for *Picea abies;* PCST for *Picea sitchensis*

Colour and structure of the wood:

Heartwood yellow or pale. In terms of colour, sapwood matches heartwood (Norway spruce) or clearly contrasts heartwood (Sitka spruce). Freshly planed wood of the European Spruce is almost white and matt glossy, however darkens to brownish yellow. Sitka Spruce heartwood is, on the other hand, pale to medium brown, often with reddish hues. The growth zones are clearly marked by the regular change from darker latewood to lighter earlywood. The growth zones (year ring widths) and the latewood proportions can develop very differently through age, location and cultivation methods. Particularly with old trees from higher regions the year ring width can be lower than 1 mm over large parts of the cross-section. The dark (yellowish brown) latewood bands cause clear raised “cathedral effect” formed by innermost growth rings on the tangential areas and narrow stripes on the radial surfaces. Due to a finely twisted grain, hazel growth can be observed with both spruce species in individual cases.

Properties:

Weight fresh [kg/m³]		700 – 800 – 850
Bulk density air-dry (12-15 % u) [g/cm³]		0.33 – 0.47 – 0.68
Compression strength u_{12-15} [N/mm²]		40 – 50
Bending strength u_{12-15} [N/mm²]		65 – 80
Modulus of elasticity (bending) u_{12-15} [N/mm²]		10000 – 12000
Toughness [kJ/m²]		40 – 50
Hardness (BRINELL) ⊥ to the grain u_{12-15} [N/mm²]		12 – 16
Drying shrinkage (fresh up to u_{12-15})	radial [%]	2.0
	tangential [%]	4.0
Differential shrinkage [%/%]	radial	0.15 – 0.19
	tangential	0.27 – 0.36
pH value (suspension)		4.0 – 5.3
pH value (surface)		4.4
Natural durability (DIN-EN 350-2)		category 4

Additional information:

When spruce wood is processed, breathing in dust can lead to bronchial asthma. In isolated cases, there is also evidence that the balm (Hydroxystilbene) can trigger an allergy.

Workability:

Spruce wood is easy to work, good for slicing and cutting, if the number of knots and their size is low. The screw and nail fastening strength is lower than with pine. Bonding good.

Drying:

Drying is quick and easy. However, very harsh drying may lead to fine cracks occurring and knots loosening. Spiral grain results in severe deformation.

Use:

Outdoor and indoor use; supporting or non-supporting. Especially suitable for: Outdoor construction with no ground contact, building supplies (scaffolding, formwork), exterior cladding (facades), frame structure (windows, house doors, conservatories), wall and ceiling coverings (internal), furniture, music instruments (resonance wood for string and keyboard instruments) packing material.

Macroscopic cross-section of spruce
(10 times magnification lens)

Wood surface of spruce (radial section)

Surface treatment:

No known problems. Through bacteria contamination (e.g. after a long immersion in water) an uneven absorption of fluid matter (so-called over acceptance) and thus a staining can occur in the sapwood area. Treatability poor or very poor (sapwood poor; EN 350–2, 1994).

Coating systems:

The coating systems selected here are variants which ensure utmost durability and lasting quality.

Other coating systems are basically possible; however, they must be coordinated with Teknos.

Details on processing can be found in the technical data sheets for each product.

Windows, doors, conservatories and folding shutters:

System coating	Translucent
Wood preservative	GORI 356 / TEKNOL AQUA 1410-01
Primer	AQUAPRIMER 2900-22
Intermediate	AQUAFILLER 6500-01
Topcoat	AQUATOP 2600-9X

System coating	Opaque
Wood preservative	GORI 356 / TEKNOL AQUA 1410-01
Primer	ANTISTAIN AQUA 5200-01
Intermediate	ANTISTAIN AQUA 5200-01
Topcoat	AQUATOP 2600-2X

System coating	Colourless
Wood preservative	GORI 356 / TEKNOL AQUA 1410-01
Intermediate	AQUAFILLER 6500-01
Topcoat	AQUATOP 2600-6X

Further information:

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WE MAKE THE WORLD LAST LONGER

Wood is a unique, beautiful and very versatile material

The features and properties of wood vary greatly and therefore individual attention is required in processing and surface finishing.

With this Teknos wood data sheet we would like to go into detail on the features and range of applications in the coating of important wood species.

The data sheet originated from a collaboration with the Johann Heinrich von Thünen-Institute in Hamburg.

The pH values of wood have been determined as important chemical variables for the first time.

The concentration dependence of extracts such as tannic acids or tannins to the pH value is important.

A good surface coating and targeted selection of system structures shall be safer based on these variables determined by Thünen-Institute and demonstrate wood-related problem solving.

All system structures named in the data sheet are selected according to utmost durability and quality and are considered to be relevant systems. However, a practical test is always necessary.

Due to different application possibilities and stresses of parts to be coated, variations are required.

To select individual systems easily, the Teknos technical department will be happy to assist you.