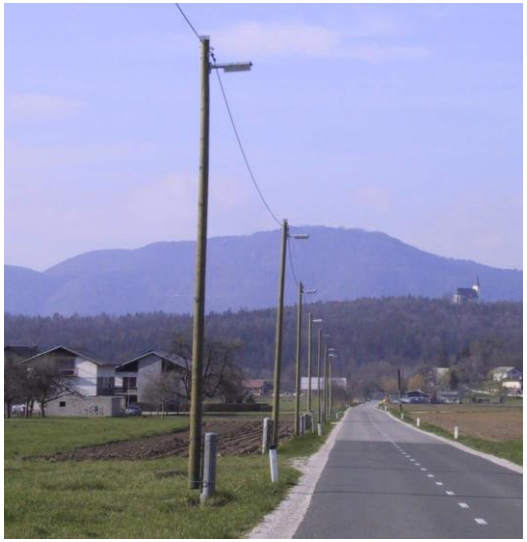
PRESENTATION OF POLE PRODUCTION



1. Company General Information Sheet

Company Name:	Imont Industry for chemical treatment of timber Dravograd Ltd
Abbreviated name:	Imont d.o.o. /LTD./
Registered office:	Otiški vrh 156,2373 ŠENTJANŽ PRI DRAVOGRADU, SLOVENIJA
Established:	1950
Legal form:	Company with Limited Liability (Ltd.) Manufacturer: Industry for chemical treatment of timber
Ownership:	Private ownership
Chairman and Managing Director:	Mr. Maksimiljan URANŠEK
Number of employees:	50 (in Imont Head Quarter in Slovenia) Additionaly, the number of employees of Imont´s associated partners for creosote impregnation in Poland are 20.

Company Management :	
- General Manager:	Maksimiljan URANŠEK , B.Sc. (Eng.)
- Head of Purchase & Sales:	Maksimiljan URANŠEK , B.Sc. (Eng.)
- Head of Finance & Accounting:	Tatjana MARSEL , B.SC. (Econ)
- Head of Production:	Iztok Breznik
- Assistant Head of Pole Production:	Franci Založnik
- Sales:	Anita Knez
Certificates (Quality Accreditation):	- ISO STANDARD 9001, 14001

PRODUCTION PROGRAMME:

Production of wood poles with chemical protection – impregnated products

I. Impregnated wood poles for telecommunication and overhead power lines.

II. Other Products Made of Wood

1. Garden furniture
2. Palisades
3. Fence for various purposes
4. Wood noise barriers on roads
5. Play equipment for children
6. Various wood products for construction
   - facades
   - bridges
   - roofing
   - support walls
   - assembly facilities.

GENERAL TECHNICAL TERMS AND CONDITIONS

FOR THE MANUFACTURE, STORAGE AND DELIVERY OF IMPREGNATED WOOD POLES FOR TELECOMMUNICATION AND OVERHEAD POWER LINES

I. GENERAL

Impregnated wood pole is used as a vertical support for telecommunication and overhead power lines. It is made of lean and round pieces of timber of suitable dimensions. We remove the bark and apply the process of impregnation with special chemical substances to provide protection against decay caused by biological agents as for ex. fungi, insects, bacteria and some water animals. Impregnated wood poles are installed directly in the ground or on a concrete foundation.

II. TIMBER FOR POLE PRODUCTION

1. Tree species used for pole manufacture:

Name	Latin name
Pine, black	Pinus nigra, Arnold
Pine, ordinary	Pinus sylvestris, L.
Maritime pine	Pinus pinaster, Ait.
Spruce, ordinary	Picea aibes, Karst.
Sitka spruce	Picea sitchensis. Carr.
Larch	Larix spp. Mill.
Fir, ordinary	Abies alba, Mill.
Fir	Abies pectinata, D.C.
Douglas fir	Pseudotsuga menziesi

2. Purchase Criteria for Timber Applied for Poles

Timber from the previously mentioned tree species is purchased and used for poles, and it has to comply with the following general requirements:

- timber is purchased with bark or roughly debarked,
- timber has to be solid and felled in winter season, if possible,
- after being cut down, timber should be transported from a temporary storage in the wood to the Imont warehouse within 45 days at the latest,
- timber is treated and/or debarked at the Imont warehouse as soon as possible (within 45 days at the latest),
- if it is not possible to immediately debark the pole, timber has to be stored without being in contact with the ground, however, allowing air flowing freely between logs,
- if pole cannot be debarked in the required time frame, timber has to be roughly peeled and stacked together in the way that individual stacks are separated by 3 – 4 transverse logs, and stacks have to be at least 1.5 m away.

When purchasing timber for poles, the following characteristics have to be considered and/or the following defects have to be eliminated which are inadmissible for a debarked pole:

- timber has to be of a uniform growth, with a diameter growth of 0.6 to 1.0 cm per meter of length.

The following characteristics and/or defects are not allowed:

- timber damaged by wind, snow or fire,
- timber containing reaction wood,
- double sweep,
- sweep in the first third only,
- single sweep exceeding the one when the line connecting the center of the top and the center of pole butt does not fall out,
- cracks running in the transverse direction on the log axis,
- sharp and deep mechanical damage on 5 % log diameter, more than two damages at a distance of 50 cm, blue coloration of pine, larger than 50 % for every meter in length,
- excentricity of heartwood larger than 1/10 timber diameter on the area of knot measurement.

We purchase timber in the following dimensions: (Table 1)

Length	Diameter 30 cm below top	m3/pc.
6 m	14 – 15	0.132
7 m	15 – 16	0.187
8 m	16 – 17	0.253
9 m	16 – 17	0.284
10 m	17 – 18	0.369
11 m	18 – 19	0.469
12 m	19 – 20	0.586
13 m	19 – 20	0.637
14 m	19 – 20	0.719
15 m	19 – 20	0.807
16 m	19 – 20	0.904

Compulsory excess length:

Along the length, min. +1 cm per every running meter
in thickness +1 cm for all lengths

Delivery conditions:

All in bark, delivery immediately after felling,
measures acc. to standard (up to ∅ 30 – 1 cm in diameter)

III. PROCESS OF POLE DEBARKING

1. Production process:

Debarked poles are made from high-quality timber on a special peeling machine which removes the bark only while the white colour is preserved to the highest possible level. When poles are peeled off, such timber is than tailored in accordance with the prescribed dimensions and required properties for a debarked pole.

2. Surface Treatment of Debarked Poles:

Poles have to undergo treatment to obtain a smooth surface, with a completely removed bark except for the allowed quantity of bark pockets which comes to a 4-times diameter of a pole along its length, 0.5 diameter of pole along the width and which can be 12 mm deep. Debarked poles are on their bottom cut off rectangularly to the axis and trimmed. On the top, a roof-shape finish is made under 90 ° to 130 ° angle. Areas where resin bags appear have to be suitably treated, however, pole diameter must not fall under 1 cm.

3. Pole Dimensions:

A debarked pole is specified with its length, with a diameter at a 1.5 m distance from the pole butt and a 30 cm diameter below the pole tip. Usually, users define the required dimension for the pole tip depending on electric connections. The dimension 1.5 m from the pole butt depends on the required diameter growth per length meter whereby the smallest growth defines the nominal load capacity of poles.

The company Imont produces poles of standard dimensions – I class and poles outside standard dimensions – E class. Poles outside standard dimensions are made in compliance with demands and/or customer order and they are primarily of larger diameters than standard poles (see Appendix 1/2007).

Standard Pole Dimensions – I Class (Table 2)

Length	Diameter 30 cm below top	Diameter of 1.5 m above bottom	m3/pc.
6 m	13 – 14	16 – 17	0.125
7 m	13 – 15	17 – 19	0.167
8 m	14 – 16	19 – 21	0.228
9 m	14 – 16	19 – 21	0.256
10 m	15 – 17	21 – 23	0.336
11 m	16 – 18	23 – 25	0.430
12 m	17 – 19	25 – 27	0.540
13 m	17 – 19	25 – 27	0.587
14 m	17 – 19	26 – 28	0.665
15 m	17 – 19	27 – 29	0.747
16 m	17 – 19	28 – 30	0.838

DK 621.315.668.1

PRILOGA 3/2007

DEUTSCHE NORMEN

Oktober 1954

Fernmelde- und Starkstrom-Freileitungen

Holzmaste

DIN 48 350

Bezeichnung eines Holzmastes der Nenngröße 8×16 aus Kiefer (Ki)[1] mit dachförmigem (D)[2] Zopfende:

Holzmast 8×16 DIN 48 350 Ki D

1 Maße

1 Nenngröße[3]) Holzmast Länge × Fußdurchmesser	2 Länge l m Zul. Abw. + 10 cm	3 Fußdurchmesser[4]) f cm mind.	4 Zopfdurchmesser[4]) z cm mind.	5 Nutzzug[5]) an der Mastspitze N kg	6 Richtwert des Festgehaltes (in fm) für die Tränkung[6]) V m³
6×13		13	10	61	0,077
6×14		14	11	77	0,089
6×15+)	6	15	12	97	0,102
6×16+)	X	16	13	119	0,117
6×17	X	17	14	144	0,132
7×14		14	10	59	0,100
7×15+)		15	11	75	0,115
7×16+)		16	12	93	0,131
7×17+)	7X	17	13	113	0,149
7×18+)	X	18	14	136	0,167
7×19	X	19	15	162	0,187
7×20		20	16	191	0,208
7×21		21	17	223	0,230
8×15		15	10	59	0,124
8×16+)		16	11	73	0,142
8×17+)		17	12	91	0,162
8×18+)		18	13	110	0,183
8×19+)	8X	19	14	131	0,205
8×20	X	20	15	155	0,228
8×21	X	21	16	182	0,253
8×22		22	17	211	0,278
8×23		23	18	244	0,305
9×16		16	11	60	0,160
9×17+)		17	12	74	0,182
9×18+)++)		18	13	90	0,205
9×19+)++)	X	19	14	108	0,230
9×20+)++)	9X	20	15	129	0,256
9×21+)	X	21	16	151	0,284
9×22		22	17	176	0,313
9×23		23	18	204	0,343
9×24		24	19	234	0,375
9×25		25	20	267	0,408
10×17		17	11	61	0,194
10×18		18	12	75	0,219
10×19++)		19	13	91	0,246
10×20+)++)		20	14	108	0,275
10×21+)++)	10X	21	15	126	0,304
10×22+)	X	22	16	150	0,336
10×23	X	23×	17×	174	0,369
10×24		24×	18×	201	0,404
10×25		25×	19×	230	0,440
10×26		26	20	261	0,478
11×18		18	11	63	0,231
11×19		19	12	77	0,259
11×20++)		20	13	93	0,290
11×21+)++)		21	14	110	0,322
11×22+)++)		22	15	129	0,357
11×23+)	11X	23	16	151	0,392
11×24	X	24	17	174	0,430
11×25	X	25×	18×	200	0,469
11×26		26×	19×	228	0,511
11×27		27	20	258	0,553
11×28		28	21	291	0,597

1 Nenngröße[3]) Holzmast Länge × Fußdurchmesser	2 Länge l m Zul. Abw. + 10 cm	3 Fußdurchmesser[4]) f cm mind.	4 Zopfdurchmesser[4]) z cm mind.	5 Nutzzug[5]) an der Mastspitze N kg	6 Richtwert des Festgehaltes (in fm) für die Tränkung[6]) V m³
12×20		20	12	79	0,304
12×21+)		21	13	95	0,339
12×22+)		22	14	112	0,375
12×23+)		23	15	131	0,414
12×24		24	16	152	0,454
12×25	12X	25	17	175	0,496
12×26	X	26	18	200	0,540
12×27	X	27	19	227	0,586
12×28		28×	20×	257	0,634
12×29		29×	21×	289	0,683
13×22+)		22	14	97	0,407
13×23+)		23	15	114	0,450
13×24+)		24	16	133	0,493
13×25	X	25	17	153	0,539
13×26	13X	26	18	176	0,587
13×27	X	27	19	201	0,637
13×28		28	20	227	0,688
13×29		29	21	256	0,742
13×30		30	22	287	0,798
14×23		23	14	100	0,466
14×24		24	15	116	0,513
14×25+)		25	16	135	0,561
14×26+)	X	26	17	155	0,611
14×27+)	14X	27	18	178	0,665
14×28	X	28	19	202	0,719
14×29		29	20	228	0,777
14×30		30	21	257	0,836
14×31		31	22	287	0,898
14×32		32	23	320	0,961
15×25		25	15	119	0,580
15×26		26	16	138	0,633
15×27	X	27	17	158	0,689
15×28+)	15X	28	18	180	0,747
15×29+)	X	29	19	204	0,807
15×30+)		30	20	230	0,870
15×31		31	21	258	0,935
15×32		32	22	288	1,002
16×26		26	15	122	0,655
16×27		27	16	140	0,715
16×28	X	28	17	161	0,775
16×29+)	16X	29	18	183	0,838
16×30+)	X	30	19	206	0,904
16×31+)		31	20	232	0,973
16×32		32	21	260	1,043
16×33		33	22	289	1,117

Fußnoten siehe Seite 2

Fortsetzung Seite 2

Fachnormenausschuß Elektrotechnik im Deutschen Normenausschuß (DNA)

Fachnormenausschuß Holz im DNA

Früher Ausgaben: 5.47, 12.48

× Oktober 1957: Im Abschnitt 2 „im Einvernehmen mit dem Verbraucher auch" gestrichen

Änderung Oktober 1954: Inhalt vollständig überarbeitet. Sämtliche Festlegungen von Zopfmaß auf Fußmaß umgestellt.

Alleinverkauf der Normblätter durch Beuth-Vertrieb GmbH, Berlin W 15 und Köln

DIN 48 350 Okt. 1954 × Preisgr

4. Criteria Required for Wood Quality in the Production of Debarked Poles:

We cannot identify and eliminate all permissible defects when purchasing timber. Therefore, a selection of debarked poles is made in the tailoring phase in regard to the following forbidden defects:

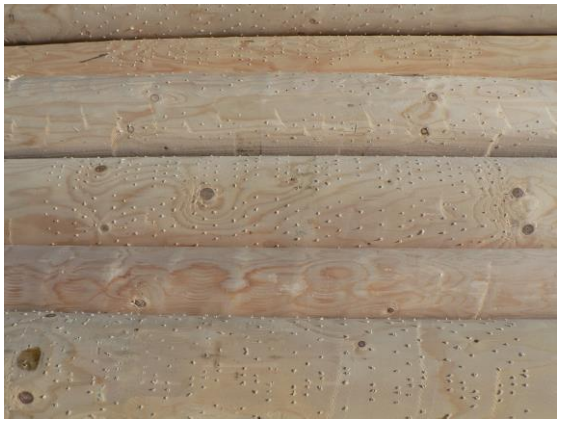
- Damage by fungi and beginnings of wood rot,
- Damage – holes made by insects with a diameter larger than 1.5 mm, exceeding 5 in number, evenly distributed in any 1 m length of the pole,
- Sapwood included in heartwood,
- Cracks running accross the pole axis,
- Mechanical damage deeper than 5 % log diameter and more than two in number at 50 cm distance,
- blue coloration of pine tree larger than 50 % for each meter of pole length,
- heartwood eccentricity larger than 1/10 diameter,
- a knot or knot clusters with a diameter and/or sum of diameters larger than ¼ log diameter on the area of knot measurement.

- Fissures resulting from wood drying must not be deeper than a pole radius and one continued fissure must not be running on a length that exceeds a half of the pole,
- Ring shake on the pole tip and a star-like crack with more than five legs,
- More than one ring shake on the pole butt and a star-like crack where more than two such cracks spread up to 5 mm from the pole surface,
- Double sweep, bending only in the upper third of the pole,
- Single sweep larger than the one where the line connecting the pole tip center and the pole butt center does not stick out of the log,
- Cracks across the log axis,
- Twisted growth, exceeding 1/6 per log meter in length.

IV. STORAGE OF DEBARKED POLES

Finished debarked poles are stored on the works storage, well arranged by lengths and classifications in stacks until they reach 28 – 32 % humidity through natural drying. Storage in stacks has to ensure separation of individual rows with 3 or 4 logs lying across. Contact between poles in one stack row must be prevented. Minimum distance between stacks is 1.5 m. This will guarantee the air flow necessary for natural drying. Sand or strengthened floor must be applied for stacking to prevent brushwood or grass growing.

The level of drying and/or humidity is checked on the storage visually or using a special instrument for humidity measurement. When checking visually, humidity lies near the desired value when tiny uniform longitudinal fissures appear along the whole length of pole showing there is no more free water in the wood mass. Humidity measuring instrument then finally defines which poles are dry enough for further treatment which is impregnation. If necessary, poles are additionally machined – perforated prior to impregnation, and they are then all identified with the required designations.

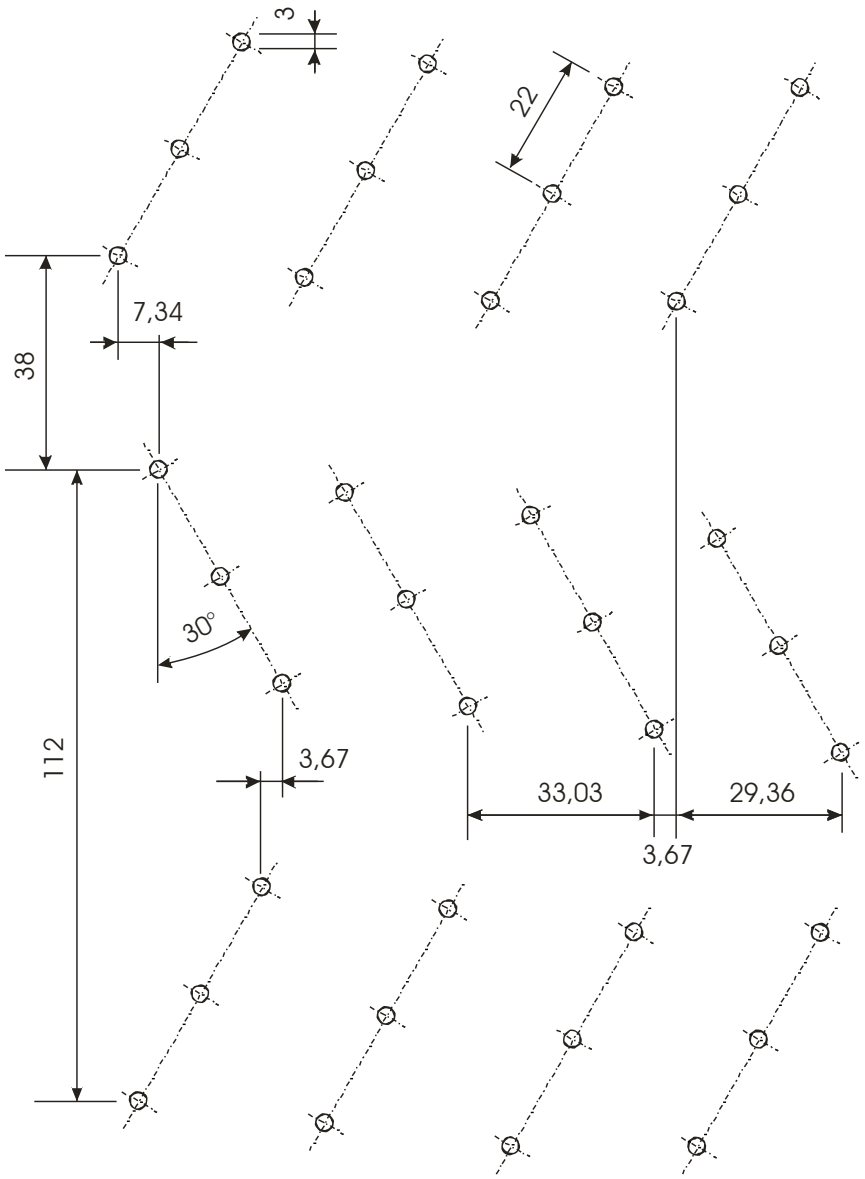


V. ADDITIONAL MECHANICAL TREATMENT OF DEBARKED POLES – PERFORATION PROCESS

Poles made of pine or fir which are installed directly into ground are due to their small sapwood thickness subjected to additional machining on the contact area – ground – air to achieve a deeper impregnation of wood. The process of perforation provides 4 cm impregnation 4 cm radially on the pole axis about 40 cm above the contact line ground – air and 50 cm below that line.

Drills about 3 cm thick and 30 cm long are used for perforation according to a special scheme. Here, we have to be careful that distance between the first and last row of boreholes is not larger than 80 mm and not smaller than 50 mm (see Sketch 1 – 3). Due to these boreholes, pole loses only 2 – 3 % physical properties. The process of perforation is made on dried poles, not more than 5 days prior to impregnation. E-class poles of standard or non-standard dimensions are used for perforated poles which have to ensure maximum straightness as required by the technological process of perforation.

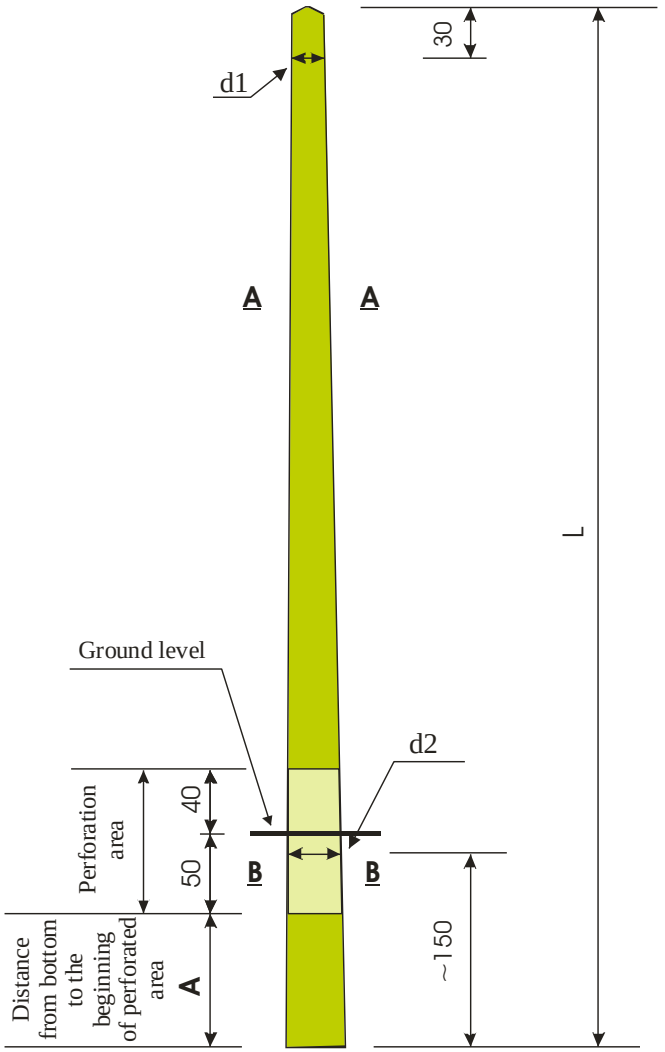
SHEME OF BORING WHOLES
BY PERFORATION



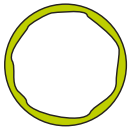
POLES FOR GROUND INSTALLATION

SKETCH OF THE POLE - PERFORATED

(Spruce - Picea abies, Fir - Abies alba)

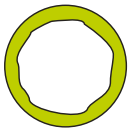


A - A



Class of penetration P 7
(EN - 351 - 1; 2004)
min 6 mm
d1 - diameter top
d2 - diameter butt

B - B



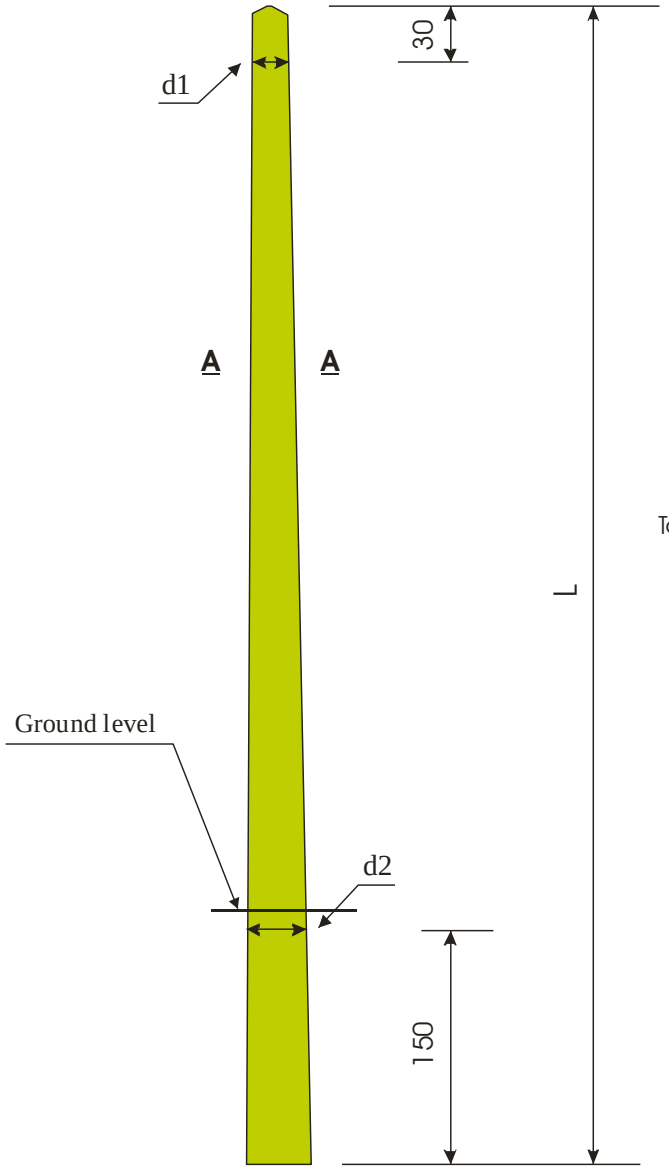
Class of penetration P 9
(EN - 351 - 1; 2004)
Sapwood and Blackwood
min 40 mm

POLE LENGHT (m)	A (cm)
7m	110
8m	110
9m	110
10m	120
11m	135
12m	150
13m	170
14m	185
15m	200
16m	220

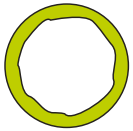
POLES FOR GROUND INSTALLATION

SKETCH OF THE POLE

(Pine - Pinus sylvestris)



A - A

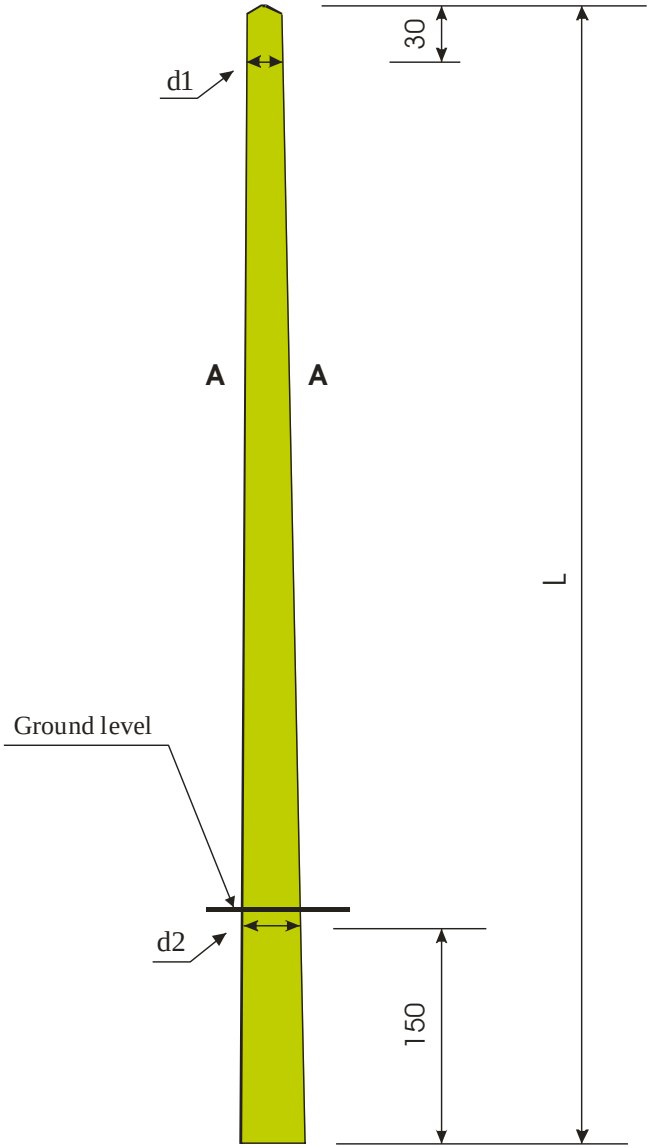


Class of penetration P 8
(EN - 351 - 1; 2004)
Total Sapwood min 20 mm
d1 - diameter top
d2 - diameter butt

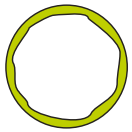
POLES FOR GROUND INSTALLATION

SKETCH OF THE POLE

(Spruce - Picea abies, Fir - Abies alba)



A - A



Class of penetration P 7
(EN - 351 - 1; 2004)
min 6 mm
d1 - diameter top
d2 - diameter butt

VI. DESIGNATION OF POLES

Special stainless nails are used for designation of poles. These nails are knocked into a pole in the radial direction, about 3.5 m high for poles installed directly into the ground and 2 m high for poles which are installed into a concrete foundation (See the sketch!).

Designation of I class poles:

- Nail for length
- Nail for impregnation year and D designation indicating Imont impregnation in Dravograd.

E-class poles get the same designation as I class poles except for obtaining another nail for the length which is knocked in on the pole face at the pole butt. Poles can get additional designation, if required by the customer. The storekeeper has to receive the required special designation 5 days prior to preparation of poles for impregnation.

VII. IMPREGNATION OF POLES

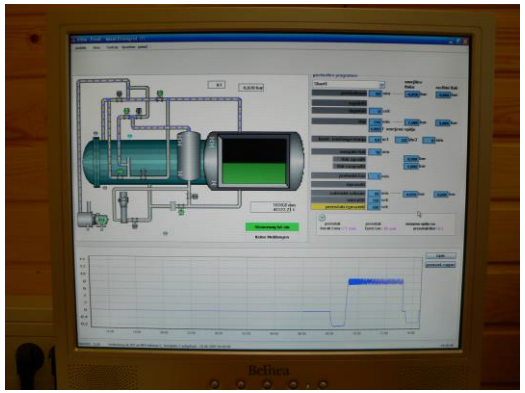
1. Impregnation process

Wood poles are impregnated in a special chamber – pressure chamber, in a vacuum process – pressure till complete absorption is achieved since this treatment ensures the largest possible absorption depth and quantity of impregnation agent.

Impregnation process includes the following steps:

- In one impregnation process, the following species of timber can be treated together: pine, larch, Douglas and/or pine, fir.
- Poles having the same final cubic capacity are placed into the pressure chamber.
- When pressure chamber is hermetically closed, we can start generating subpressure down to about 0.9 bar. This pressure phase has to last at least 90 minutes for pine tree, larch and Douglas, and at least 150 minutes for pine and fir.
- After expiry of the necessary subpressure time, vacuum pump fills the chamber with impregnation solution (4 – 4.5 %, at 20 – 30 ° C).

- When pressure chamber is filled with impregnation solution, the pressure pump starts generating pressure and impregnation agent flows into the pressure boiler as wood begins absorbing impregnation solution under pressure. The pressure of at least 8 bar persists until the necessary quantity of impregnation solution has penetrated into wood and got absorbed and/or at least 90 minutes for pine, larch, Douglas and at least 210 minutes for pine and fir. The necessary quantity of absorbed impregnation agent depends on wood quantity, solution concentration and the quantity of concentrated chemical substance absorbed in one cubic metre of wood as defined by standard.
- When absorption process is finished, impregnation solution is sucked out of pressure chamber. Underpressure is generated for a short time to get the poles dried on the outside and the impregnation process is finished.



Imont d.o.o.
Otiški vrh 156
SLO - 2373 Šentjanž pri Dravogradu
Tel. +386 (0)2 87 85 082 Fax +386 (0)2 87 85 498

vkljucitev podatkov

številka serije : 02072007
datum : 02.07.2007
narocnik/številka narocila :
ime zaščitnega sredstva : Tanalith

vrsta lesa : smreka
vlaga lesa : 30 - 35 %
vrsta kvalitete : I
vrsta zaščite : 4

tabela lesa

pos	izdelek	oznaka	dimenzije	kom	racunski
	!Test	drog 8 m E	9,150	30	9,15000
	!0000	drog 7 m E	7,130	31	7,13000
	EArtikelnummer	drog 8 m perforirani	9,576	42	9,57600

vkljucitev podatkov

predvakuum :	50 min	-0,82 bar	48352,0 liter
napolniti :	321 sek	-0,63 bar	11923,9 liter
dopolniti :	0 sek	-0,63 bar	11923,9 liter
tlak :	219 min	8,27 bar	14054,8 liter
kontrola koncnega stanja :	0 min	8,27 bar	14054,8 liter
menjalni tlak :	10 min		14057,6 liter
prehodni cas :	1 min	7,33 bar	14063,2 liter
izprazniti :	755 sek	-0,04 bar	10820,8 liter
naknadni vakuum :	60 min	-0,67 bar	43312,8 liter
odzraciti :	150 sek	-0,01 bar	43312,8 liter
preostalo izprazniti :	300 sek	-0,02 bar	44298,7 liter

kolicina vpitja zaščitnega sredstva izracunani

	željeno	dejansko
prosti volumen :	25,856 m³	25,331 m³
raztopina - skupno :	4099,12 liter	4053,32 liter
raztopina / m³ :	158,54 liter/m³	160,01 liter/m³
koncentracija raztopine na zacetku :	4,10 %	4,10 %
koncentracija raztopine na koncu :	4,10 %	4,10 %
kolicina vpitja zaščitnega sredstva - skupno :	168,06 kg	166,19 kg
kolicina vpitja zaščitnega sredstva / m³ :	6,50 kg/m³	6,56 kg/m³

vrtalni preizkus

1 : 0,0	4 : 0,0	7 : 0,0	10 : 0,0	13 : 0,0	16 : 0,0	Nr.19 : 0,0
2 : 0,0	5 : 0,0	8 : 0,0	11 : 0,0	14 : 0,0	17 : 0,0	Nr.20 : 0,0
3 : 0,0	6 : 0,0	9 : 0,0	12 : 0,0	15 : 0,0	18 : 0,0	

ime impregnatorja : datum / podpis :

2. Impregnation Agent

For impregnation of poles, a special chemical substance called TANALITH E 3475 is used, produced by ARCH Timber Protection. Chemical substance is in the aggregation as paste consisting of the basic chemical elements: copper and boron with additions. (See details in Safety Data Sheet!).
Wood poles are impregnated requiring IV-class level – which indicates contact with the ground. Therefore, one cubic metre timber has to absorb 6.5 kg concentrated chemical substance during impregnation process.

3. Machinery for Impregnation

Machine line consists of the following basic plants:

- **Stirring tank** for preparation of a homogeneous solution from impregnation substance and water. It allows complete stirring also at the bottom of the bath.
- **Preparation tank** with a volume sufficient to prepare impregnatiion solution, the required concentration and implementation of one impregnation process.
- **Measuring tank** allows measuring of the quantity of the absorbed impregnation solution in the impregnation process.
- **Pressure chamber (Avtoklav)** that can hold working pressure and vacuum (chamber length 24 m, chamber diameter 1.80 m).
- **Pressure pump** which allows 8 – 9 bar pressure generated in the pressure chamber.
- **Vacuum pump** which allows min. 0.9 bar underpressure generated in the chamber. It is also used for transport of impregnation solution from one tank into another one.
- **Process controlling plant** and recording of the complete impregnation process.

4. Control of Impregnation Quality:

The quantity of impregnation agent absorbed into timber mass is seen with the instrument used for control of impregnation process.
Computer records show the whole process. Immediately after impregnation ends, the depth of impregnated zone has to be additionally checked; it has to be min. 6 mm for pine and fir trees and 20 mm for pine tree, Douglas and larch, and min. 40 mm in the perforated zone (see Sketch 2 and 3).
This is carried out by drilling using the Pressler drill producing tree ring samples which show the depth of impregnation agent penetration.

Tree ring samples must not be taken near knots, cracks or perforation boreholes. Six poles are tested from each impregnation process. If the sample shows that the desired impregnation depth is not obtained, we make a new borehole on the same pole 1 m away and/or 30 cm near the perforated zone and make a 90 º turn. If the second sample is sufficiently impregnated, the whole impregnation process is approved.
Should tree ring samples show that the depth of impregnated zone is too small, the process of impregnation has to be repeated.

IX. STORAGE OF IMPREGNATED POLES

When fixation stage is finished, poles are stacked separately by lengths and classes. Here, it is crucial to avoid stress due to loading.

IX. CONCLUSION

1. Life of Poles

Poles produced in accordance with these technical conditions provide the following mimumum life:

- Perforated pole, installed in the ground 25 – 30 years
- Poles installed into a concrete foundation 30 – 35 years

2. External Inspection of Production Process and Quality:

The company BUREAU VERITAS in Ljubljana carries out inspection of production process for impregnated poles and conformance with the required regulations.

Enclosures:

- Sketch 1
- Sketch 2
- Sketch 3
- Enclosure 1/2007
- Enclosure 2/2007
- Enclosure 3/2007

3. Standards and Directives Applied :

DIN 68800, Teil 3
Slovenian standard SIST EN 351-1:2004
Slovenian standard EN 351 – 2:2004
Slovenian standard EN 599-1:2004
Slovenian standard EN 252:2004
Slovenian standard 12480:2002
Slovenian standard EN 12509:2002
Slovenian standard EN 12510:2002
Slovenian standard EN 12511:2002
Slovenian standard EN 12465:2002
Slovenian standard EN 335:1992
German standard DIN 12510
German standard DIN 18 900
Technical guidelines for material and equipment –Elektro Ljubljana
Bulletin of Croation Electrical Engineering No. 48
German Telekom AG TS-Nr.:5510-3001
Technical specification E.ON

IMPREGNATION AGENTS

(BIOCIDE AGENTS)

I. HEAVY OILS:

- **Creosote oils**

TIP WEI A bap > 100
TIP WEI B bap < 50
TIP WEI C bap < 50 smallest odour

bap - benzoapyrene
Rütgers oils bap < 15

Current application:

Great Britain
France
Sweden
Near East
Finnland
Turkey

Limitations:

Application only where impregnated pole does not come in contact with people (skin contact).
In particular, in a strictly rural area.

II. WATER-SOLUBLE SALT

1. CCA (copper, chromium, arsenic)

Limitations: arsenic is prohibited

2. CCB (copper, chromium, boron)

Current application:

Germany
Austria
France
Spain
Portugal
Italy
Ex-Yugoslavia
Hungary
Czech Republic
Poland
Slowakia,
etc.

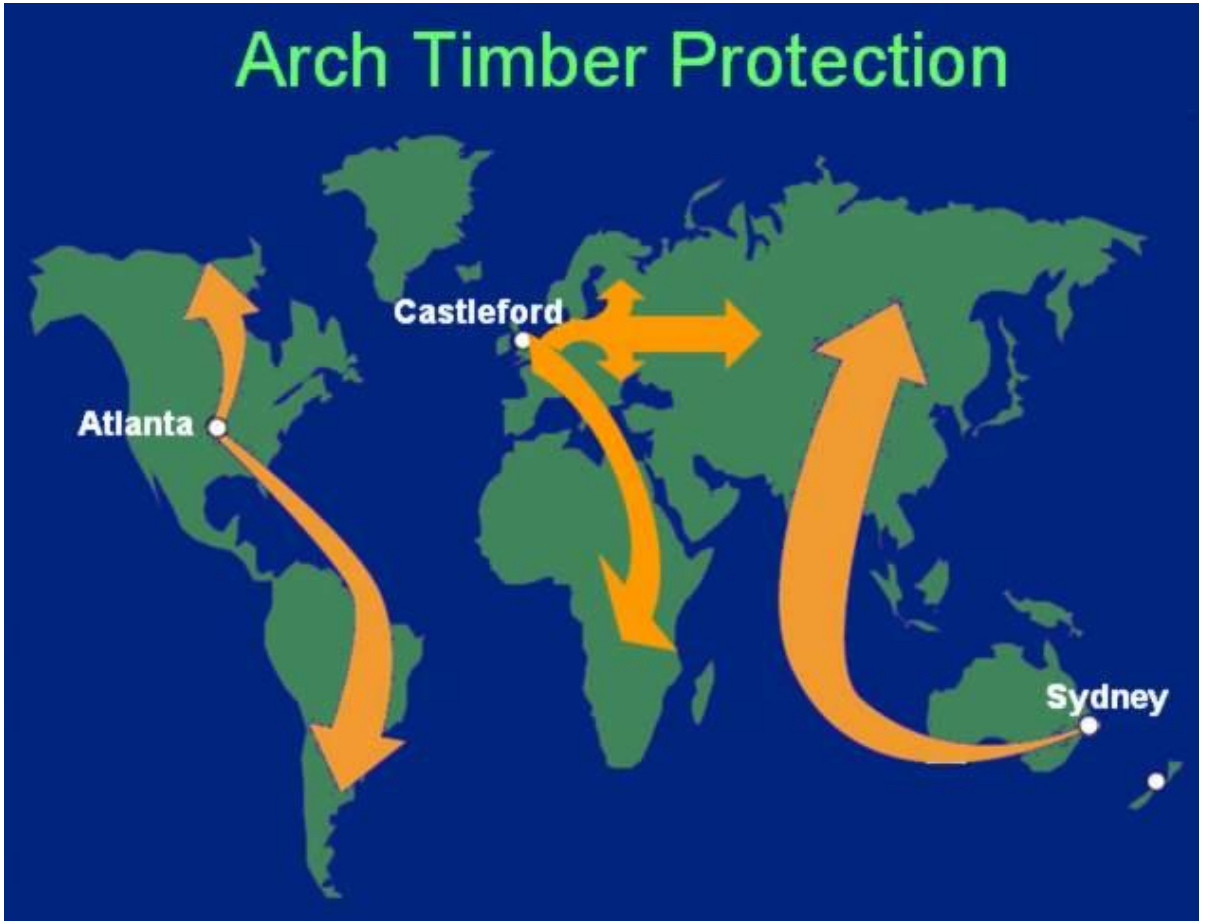
Limitations : - European Directive 98/7 for biocide preparations announces the withdrawal of chromium from the permitted biocide agents.

- Second revision of regulations defines the time schedule for withdrawal of chromium combinations, namely on 1 September 2006.

3. Salt free from chromium (copper, boron, …)

TANALITH – E 3475

Producer: **ARCH, Arch Timber Protection**
Castleford, England



Chemical composition: **copper, boron**
tebuconazol, propiconazol

This composition covers the whole spectrum of fungi and insects (also the white cell fungus - Antrodia vaillantii)

This impregnation corresponds to the European standards:

EN 599 – 1
EN 335 – 1
EN 351 – 1

It received positive judgement also by other standards and independent research organizations.

USA - A WPA
Scandinavia - NTR
Australia - AUS
France - CTBA
Japan - JWPA
Germany - RAL, DIBE
South Africa - SABS
etc.

Analysis of impregnation agent's efficiency:

I. Laboratory testing

This testing is made for all possible wood destructors. Of course, such accelerated tests cannot provide a safe application in the natural environment.

II. Test fields

Test fields are used to establish efficiency of impregnation agent in a natural environment where impregnated elements of certain dimensions are installed into the ground or are exposed to weather conditions only.

Tanalith – E has been tested on numerous test fields across the world for more than 10 years (in England for 14 years).

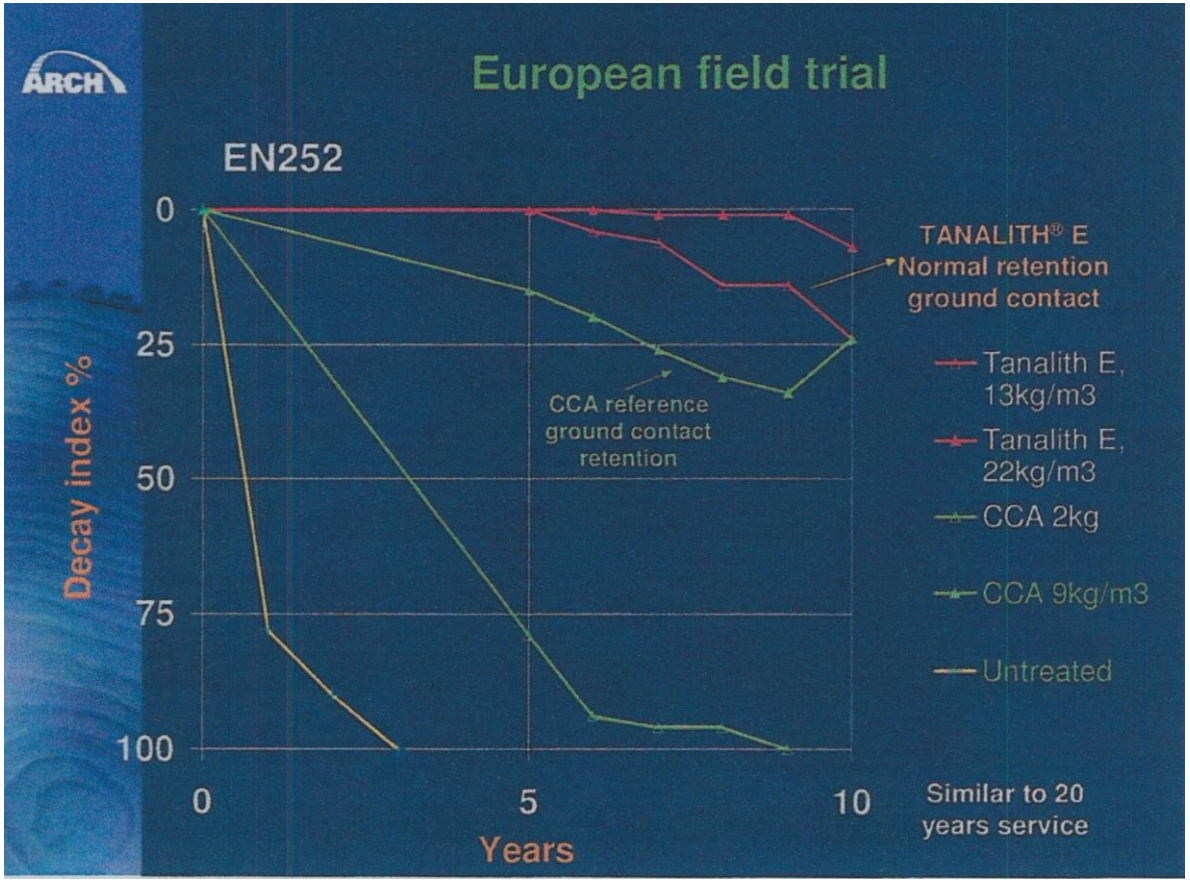
Simlangsdalen	Sweden
Sorkedalen	Sweden
Taastrup	Sweden
Boras	Sweden
Princess Ruisboroug	UK
Garston	UK
Eberswalde	Germany
Conley Georgia	USA
Gainesville FI	USA
Monte St. Michele	Italy
Guang dong	China
Bordeaux	France
Guadaloupe	France
Valpa up	Australia
Canal Creek	Australia
Beerberrum	Australia
Fiji Island	Fiji
Whakarewarewa	New Zeland
Glenbervie	New Zeland
Hanmer	New Zeland
Fokorowaroa	New Zeland
Hilo	Hawaii

Simlangsdalen, Sweden

Unimpregnated pole after 4 years, visible damage (Italy)

Pole impregnated with CCA after 4 years (Italy)

Pole impregnated with Tanalith – E after 6 years (Italy)



Results obtained on these test field for a period of 10 years were published by IRG – WP (International Research Group an Wood Preservations).

This information provides consistent results as shown in the above diagram.

TABLE 2.0: Performance of TANALITH E after 8 years in Scandinavian EN 252 tests				
Formulation	**Copper retention kgm^{-3}**	**Product retention kgm^{-3}**	**Index of decay after 8 years**	
			Sweden (Brown rot site)	**Norway (Soft rot site)**
TANALITH E	2.1 2.5	14.2 22	7.6 11	27 25
EN ref: CCA-C		2.0 10.3	95 19	83 35
Untreated controls			100	100

Results obtained on the Scandinavian test fields, analysed by the Nordic Timber Council (NTR) are seen in the above table.

Analogue results are shown also by parallel researches at the Swedish university of agriculture and the national Swedish Test Institute. All test reports prove Tanalith-E as impregnation agent providing a favourable fixation and long-term protection of timber.

Tanalith – E is registered among permitted biocide preparations and its use is allowed in Slovenia.
No Slovenian institution, however, has defined the demand for impregnation agent quantity in regard to the whole wood mass and/or in regard to the impregnated zone.
Therefore, we attached a table showing demands of individual countries for different impregnation agents which are free of chromium.

Chromfreie Holzschutzmittel Zulassung
Deutschland

Schutzmittel	Wirkstoffe	Zulassung Deutschland GK 4	GK 3	Zulassung NTR Finland, Norwegen, Dänemark, Irland u. Schweden GK 4	Frankreich GK 4
Wirkstoffe – Kupfer/Kupfer-HDO/Bor					
Wolmanit CX 10	Kupfer HDO Bor	7 kg **(4)kg**	4 kg **(3)kg**	9 kg (18) kg	7,5 kg (15)kg
Wolmanit CX 8	Kupfer HDO Bor	7,5 kg **(5)kg**	5 kg **(3,75)kg**	11 kg (22) kg	9,4 kg (18,4)kg
Wolmanit CX SD	Kupfer HDO		2 kg		
Wirkstoffe – Kupfer/Ammoniumverbindungen (Quat) Bor					
Kemwood ACQ 2300	Quat Kupfer				
Kemwood ACQ 1900	Quat Kupfertramminit	15 kg	12,5 kg	18 kg (36) kg	
Korasit KS	Quat Kupfer	9 kg **(6)kg**	4,5 kg **(3)kg**		15 kg (30)kg
Impralit KDS	Quat Kupfer Bor	5 kg **(4)kg**	3 kg **(2,5)kg**	12,5 kg (25)kg	7,5 kg (15)kg
Impralit KDS 4	Quat Kupfer Bor	10 kg **(8)kg**	6 kg **(5)kg**	25 kg (50) kg	15 kg (30)kg
Wirkstoffe – Kupfer/Triazole/Bor					
Tanalith E 3485 Tanalith E 3492	Kupfer Bor Tebuconazol	**8 kg** **6,5 kg**	**8 kg** **5kg**	 (16) kg	(12,1) kg (13,3) kg

Einbringmengen je m³ **neu**
Einbringmengen je m³ ( ) **alt**

IMONT

IMONT d.o.o.
Otiški vrh 156, 2373 Šentjanž pri Dravogradu
Tel.: 00386 (0)2 87-85-082, Fax: 00386 (0)2 87-85-498
Identifikacijska številka za DDV: **SI29612489**

Bančni transakcijski računi:
Probanka d.d. Maribor: 25100-9710313198
A Banka Ljubljana: 05100-8012301532

3. Third level: the phase of preservation

- wood miosture,
- method of preservation
- concentration of the preservative,
- depth of the preservation
- quantity of preservative to be put in.

- The certifikation for the preservative is given by the supplier
- The certifikation for the quality of wood and adequation of the preservation is given by: BUREAU VERITAS LJUBLJANA.
- Registers are made for all the levels of quality assurance.
- Buyer can see all the certificates and registers at taking over the poles.
- He can visually estimate technical quality of the poles. The depth of preservation can be established by drilling.
- Buyer, if he wants, can be present at all phases of the quality assurance.

Direktor:
Maksimiljan URANŠEK, univ.dipl.inž.grad.

IMONT d.o.o.
Otiški vrh 156
ŠENTJANŽ PRI DRAVOGRADU

Date: 23.4.2019

INSPECTION REPORT

No.: POR/08-309/19

This is to certify that we have performed on behalf of M/S IMONT - Dravograd the quality inspection of raw and impregnated poles of conifers, as follows:

Impregnator: IMONT d.o.o. – Otiški vrh 156, 2372 Šentjanž pri Dravogradu

Goods: IMPREGNATED POLES - PINE - PINUS SYLVESTRIS, L.
F R ABIES ALBA, Mil.sin.
SPRUCE - PICEA ABIES, Karst.

Inspection and supervision of production:

Bureau Veritas, d.o.o. performs regular inspections at the manufacturer Imont d.o.o. as follows:

- input inspection of wood quality
- inspection of wood humidity before impregnation
- perforation and perforation device inspection
- inspection of impregnation (inspection of absorption measured by water column, journal inspection and computer record of impregnation)
- impregnation solution inspection (determination of salt concentration)
- impregnation agent penetrating inspection
- inspection of auxiliary devices for impregnation
- inspection of wood quality after impregnation

Production capability:
Imont Dravograd can produce cca. 25 m³ per shift, which amounts to 75 m³ daily in three shifts.
Inspection is conducted in accordance with standard ISO 2859-1 unannounced, at least one per month. Inspection of auxiliary devices for impregnation (pumps, perforation) is conducted once per year.

Wooden poles are inspected in accordance with the following standards: SIST EN 1310, SIST EN 13183-1, SIST EN 13183-2, SIST EN 252, SIST EN 335:2016, SIST EN 350-1, SIST EN 350-2, SIST EN 351-1, SIST EN 351-2, SIST EN 460:1995, SIST EN 338:2010, SIST EN 599-1:2009, SIST EN 599-2:2009, SIST EN 14229:2011.

Department of Wood inspection:
Nace Kregar B. Sc.

Date: 23.4.2019

INSPECTION REPORT
No.: POR/08-308/19

For the impregnation process of wooden poles.

Goods: IMPREGNATED POLES - PINE - PINUS SYLVESTRIS, L.
FIR - ABIES ALBA, Mil.sin.
SPRUCE - PICEA ABIES, Karst.

Impregnator: IMONT d.o.o., Otiški vrh 156, Šentjanž pri Dravogradu

Inspection and supervision of production:

Bureau Veritas, d.o.o. performs once per year inspection on equipment for impregnation of wooden poles:

- Inspection on device for measurements humidity of the wood.
- Inspection of kiln drying process.
- Inspection on impregnation process (pressure, vacuum, recordings).
- Inspection of software for kiln drying and impregnation.

BUREAU VERITAS LJUBLJANA 5 SLOVENIJA

Department for Wood inspection
Nace Kregar, B. Sc.

IMONT
DRAVOGRAD

ÖQA

Certificate

The ÖQA Austrian Society for the Promotion of Quality
will award

IMONT

IMONT d.o.o.
Otiški vrh 15C
SLO-2373 Šentjanž pri Dravogradu

the

International Quality Seal

for following goods

pressure-impregnated wood

Report 1577/2019
Holzforschung Austria, Vienna

Registration No. IZ.133
Valid until 2020-07-31

Vienna, July 2019/MP

HOLZ FORSCHUNG AUSTRIA

Issuing Authority

ÖQA President

ÖQA General Manager

Austrian Society for the Promotion of Quality

IMONT

Zavod za gradbeništvo Slovenije
Slovenian National Building and Civil Engineering Institute
Dimičeva ulica 12, 1000 Ljubljana, Slovenija
http://www.zag.si, e-mail: info@zag.si

Ljubljana, 25.02.2013

IMONT d.o.o.
Otiški vrh 156

2373 Šentjanž pri Dravogradu

(g. Maksimiljan Uranšek)

Subject: Testing of wood poles according to EN 14229:2010

To whom it may concern,

Zavod za gradbeništvo Slovenije – ZAG (the Slovenian National Building and Civil Engineering Institute), Dimičeva ulica 12, 1000 Ljubljana, hereby confirms that has in year 2005 performed bending tests of wood poles according to EN 12509:2002 (*Timber poles for overhead lines - Test methods - Determination of modulus of elasticity, bending strength, density and moisture content*) for company IMONT d.o.o. Results of tests (modulus of elasticity, bending strength, density and moisture content) are presented in the report P 963/05-640-1 on tests of IMONT impregnated timber poles (length 8 m), issued by Slovenian National Building and Civil Engineering Institute.

We also confirm that ZAG Laboratory for Structures has all equipment needed for performing mechanical tests according to EN 14229:2010 (*Structural timber - Wood Poles for overhead lines*). We will be pleased to perform any test according to EN 14229:2010 for company IMONT d.o.o. on their request.

Slovenian National Building and Civil Engineering Institute is also Certification and Inspection Body, pursuant to article 10 of the Construction Products Directive 89/106/EEC – number of Notified Body: NB 1404. Certification and inspection relates to various structural timber products, among others also for the wood poles for overhead lines according to EN 14299:2010.

Prepared by:
Tomaž Pazlar, Ph.D. (Civ Eng.)

ZAVOD ZA GRADBENIŠTVO SLOVENIJE LJUBLJANA 13

Head of Section for Metal, Timber and Polymer Structures:
Iztok Klemenc, Ph.D. (Civ Eng.)

IMONT

IMONT DRAVOGRAD

BUREAU VERITAS Certification

Certificate

Awarded to

IMONT d.o.o.

OTIŠKI VRH 156, 2373 ŠENTJANŽ PRI DRAVOGRADU, SLOVENIA

Bureau Veritas Certification Holding SAS – UK Branch certify that the Management System of the above organization has been audited and found to be in accordance with the requirements of the management system standard detailed below

STANDARD

ISO 9001:2015

SCOPE OF CERTIFICATION

IMPREGNATION OF WOODEN PRODUCTS, PRODUCTION AND SALES OF IMPREGNATED WOODEN POLES

Original certification date: **19/06/2007**

Certification cycle start date: **10/06/2019**

Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on: **09/06/2022**

Certificate number: **SL22951Q** *Version number:* **01** *Revision date:* **03/05/2019**

UKAS MANAGEMENT SYSTEMS

0008

IMONT

Bureau Veritas Certification

IMONT d.o.o.

Otiški Vrh 156, 2373 Šentjanž pri Dravogradu, Slovenia

Bureau Veritas Certification Holding SAS – UK Branch certifies that the Management System of the above organization has been audited and found to be in accordance with the requirements of the management system standards detailed below

ISO 14001:2015

Scope of certification

IMPREGNATION OF WOODEN PRODUCTS, PRODUCTION AND SALES OF IMPREGNATED WOODEN POLES

Original cycle start date:	**09-09-2016**
Expiry date of previous cycle:	**08-09-2019**
Certification / Recertification Audit date:	**29-05-2019**
Certification / Recertification cycle start date:	**04-09-2019**
Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on:	**08-09-2022**

Certificate Number: **SI007128** Version: **1** Revision date: **04-09-2019**

Certification body address: 5th Floor, 66 Prescot Street, London E1 8HG, United Kingdom

Local office: ***Linhartova cesta 49A, 1000 Ljubljana, Slovenija***

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organization.

To check this certificate validity please call: +386 1 47 57 570

With best regards,

General Manager:

Maksimiljan URANŠEK, B.Sc. (Build.)

Otiški Vrh, 4 July 2007