varnishes

International
yachtpaint.com

AKZO NOBEL

contents

An introduction to varnishes & varnishing 3

The correct equipment for the job 10

The varnishing process 19

A brief introduction to wood types 35

Introduction to high quality varnishes 40

VARNISHES

An introduction to varnishes & varnishing

International
yachtpaint.com

A brief history of varnishes

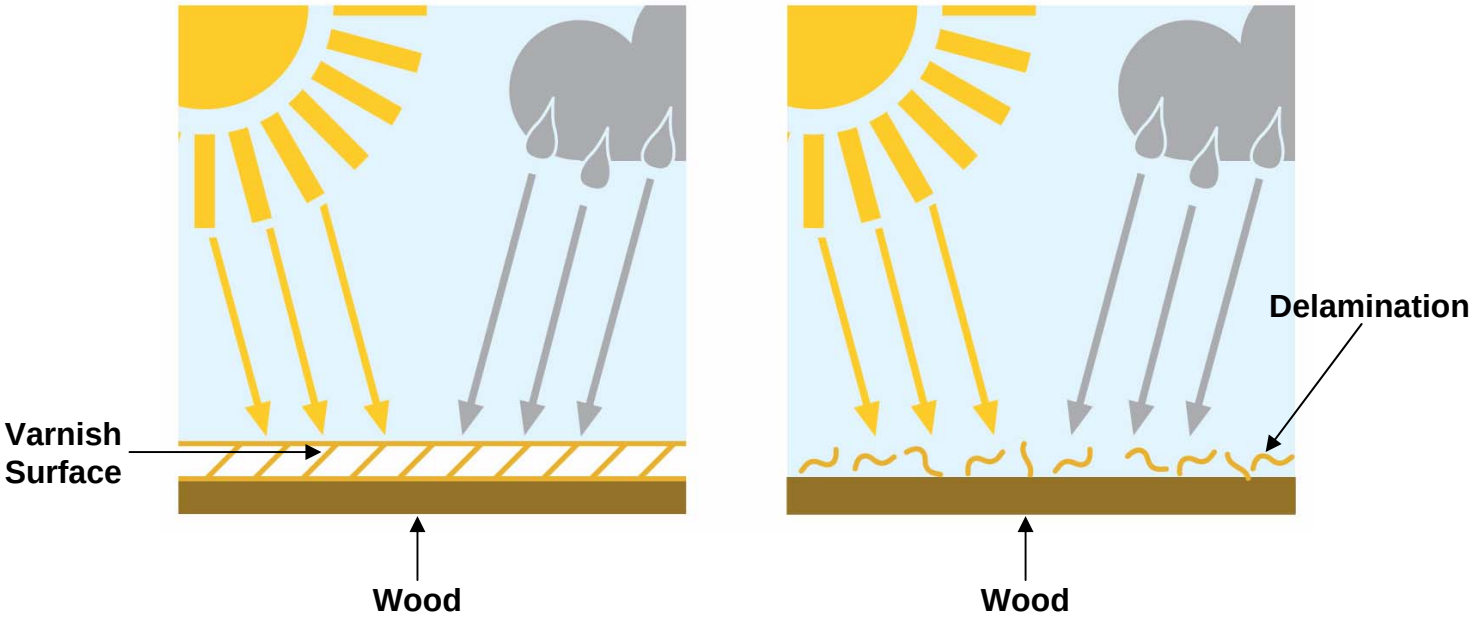
- Based upon natural materials such as resins, oleoresinous compositions, gums, linseed oils and glue; varnish has been used throughout history for preservation and protection.
- Their use can be traced back as far as the 9th Century.
- The 20th century saw the introduction of Tung Oil, which was imported from China.
- Synthetic resins were also developed which allowed varnishes to dry harder and faster and gave them better water resistance.
- After the Second World War, alkyd resins started to gain in popularity.

Why it is important to varnish

- Wood is a natural material but it suffers from swelling when wet and shrinkage when it dries.
- Therefore the coating is required to be flexible, especially when exposed to the exterior environment.
- Wood has a beauty of its own that a good varnish job will enhance and protect.
- Enhancing the boat’s natural beauty can increase its value.

Factors affecting the life of a varnish

- Degradation phenomena over time due to weathering



Factors affecting the life of a varnish

- The environment has the greatest influence over how long a varnish system will last:

- **Oxidation** - caused by oxygen reacting with the varnish over a long period of time. As the film becomes more and more brittle, it becomes much more prone to cracking and crazing.

- **Water Penetration** through the varnish to the wood causes cracking and delamination. Water resistance of a varnish can be improved by hard resin formulations; however, if the varnish is constantly immersed the water will eventually penetrate and cause the varnish to blister and delaminate.

Factors affecting the life of a varnish

- **Contamination** of a surface from salt is another important factor affecting longevity. Salt crystals effectively act as miniature magnifying glasses that intensify the ultra-violet effect of the sun's rays on the surface. Even a good UV package cannot protect against this magnifying phenomenon, therefore it is very important to keep the varnish film clean of contaminants.

- **Chemicals** – this hazard can be reduced as it is possible to engineer varnishes to be resistant to spillages of common chemicals such as fuels and alcoholic beverages.

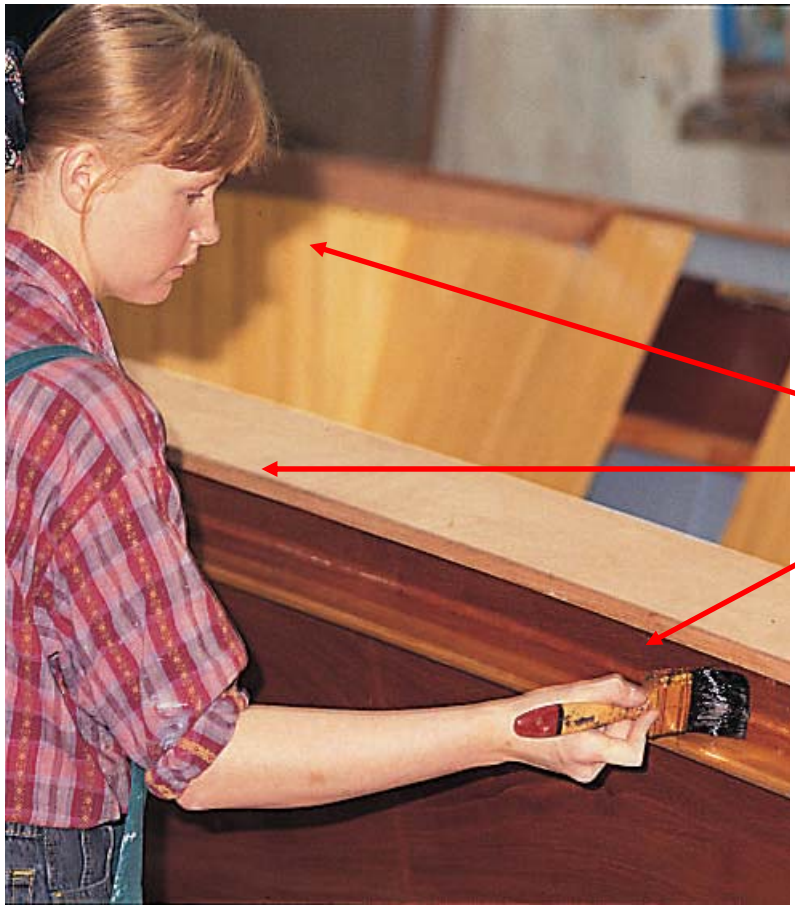
- **Natural Oils** from within certain types of wood, like teak, will rise to the surface of the wood and begin to lift the varnish. This can result in detachment of the varnish. Care must be taken to remove as much oil as possible prior to varnishing.

Varnishing: good results speak for themselves…

International
yachtpaint.com

The correct equipment for the job

Equipment needed for successful varnishing



First of all…
protective clothing!

Equipment needed for successful varnishing

Personal safety:
glasses, gloves, overalls and dust filter masks

Equipment needed for successful varnishing

- For bare wood preparation, 120-180 grit paper provides a good mechanical key.
- 180 grit should be used on degreased, existing varnished surfaces, followed by finer grades (320-400) to improve cosmetic finish.

Top Tip

Always sand along the grain.

International yachtpaint.com

Equipment needed for successful varnishing

Power sanders: belt (L) or orbital (R)

Equipment needed for successful varnishing

- **Avoiding paint contamination:**
  - Never dip the brush directly into varnish can as this will introduce contamination.
  - Pour a suitable amount of varnish for the job into a separate container (‘paint kettle’ with ladder hook is the best solution).

Equipment needed for successful varnishing

Chinese bristle brush

Top Tip

Varnish brushes should only be used for applying varnish (and not paint or antifouling).

Equipment needed for successful varnishing

Oval (traditional Dutch style) varnish brush

Top Tip

After cleaning with the correct thinners, wash the brush in detergent and warm water. Then dry and wrap in greaseproof paper.

International yachtpaint.com

Equipment needed for successful varnishing

…and varnish!

The varnishing process

The varnishing process

Why preparation is necessary

- Preparation is the most critical aspect of any coating process.
- Poor preparation will always show through to the final coat.
- It will also reduce the effectiveness of the coating system.

To achieve a first class finish, 80% of the job time should be spend on surface preparation.

Why preparation is necessary

Teak:
before (R) and (L) after sanding

International
yachtpaint.com

Preparation for varnishing – existing schemes

To achieve a good finish, the condition of the existing varnish should be thoroughly checked to determine the extent of the preparation required.

1. Look for areas of damage, separation or peeling or any other signs that the varnish does not have a firm hold on the substrate.

2. Clean and prepare the surface by washing with Yacht Line Super Cleaner to remove any contamination. Then inspect again to ensure no damage has been missed.

Preparation for varnishing – existing schemes

3. **Varnish – Good condition – No Damage:**
   Sand with 320-400 grade wet or dry paper and when dry, wipe with a dust wipe.

International
yachtpaint.com

Preparation for varnishing – existing schemes

4. **Varnish – Good Condition – Some Damage:**
   These areas may be repaired using Interfill 100. Spot priming and varnishing may then be required and the area rubbed down prior to the full varnish job.

5. **Varnish – Poor Condition:**
   If the previous varnish coating is cracking, peeling or generally showing signs of separation over the whole area, it should be totally removed by either scraping, sanding or with a chemical paint stripper.

Applying varnish

- After degreasing, mechanical preparation with ‘wet or dry’ abrasive paper can begin.

- The grain should be filled during the process of application:
  - Sand down between varnish coats
  - Use medium grade of paper such as 320 (before the final coat, finer grades can be used)

- A minimum of three full, un-thinned coats is recommended for all varnishes

Preparation for varnishing – bare wood

Preparation for varnishing – bare wood

- To apply a really good varnish scheme from scratch onto bare wood:
- Sand with 120-180 grit abrasive paper to obtain good mechanical grip.
- Remove all wood dust with vacuum cleaner or damp cloth. Do not rinse with water as this tends to raise the grain.
- Degrease surface with solvent degreaser.

Varnishing – bare wood

- Thin first coat up to 10% to promote good penetration of the surface and adhesion of subsequent coats

Varnishing – bare wood

- After the first coat has been applied, the surface will appear rough. Sand smooth with 320-400 grit paper.

- Brush out the varnish with firm strokes along and across the grain holding the brush at 90° to the surface

- Finally, ‘tip-off’ by gently stroking the surface with the brush at 45°.

Things to do when varnishing (1)

- **Ideal conditions for successful results:**
  - Apply varnish on warm, dry mornings – cold weather slows drying and damp spoils the gloss.

Things to do when varnishing (2)

- Ensure timber is clean and free of dirt and dust
- Sand by numbers, finishing the surface with progressively finer grades of paper. Take care not to over-sand and so remove film build
- Stir product slowly in can, allow to sit for 10 min.
- Apply with a clean dedicated **QUALITY** varnish brush
- Apply extra coats to edges

Things to do when varnishing (3)

- For interior satin finish, build depth with a gloss finish prior to finishing off with a satin varnish – this improves depth of image
- Ongoing upkeep – check regularly check for minor damage to varnish and repair quickly
- Regularly wash down surfaces with fresh water to remove salt and dirt

To sum up

- Choose the right varnish for your boat and it’s use
- Make sure surface is well prepared, clean and dry
- Apply the correct amount of paint for your vessels surface area
- Remember high wear areas
- Protect yourself with overalls, goggles, gloves and filter mask

A brief introduction to wood types

A brief introduction to wood types

- The two different wood types used in boat building are hardwoods and softwoods

Hardwood types

- From deciduous trees. Have good strength characteristics across the grain and along length due to characteristic tight, straight grain.

Mahogany

Teak

Oak

Hardwood types

- **Mahogany:**
  Traditional timber. Lasts for many years below the waterline with little protection as salt water has preservative qualities
  Uses: Planking, interiors & veneers

- **Teak:**
  Oily timbers with natural resistance to rot and decay. Contains silica, which gives it hard wearing characteristics
  Uses: Deck planking, exterior hardware

- **Oak:**
  Ferrous metals such as steel and iron react badly with oak due to the tannin in the fibres reacting chemically with the metal. Results in dark staining
  Uses: Framing, interior panels

Softwoods

- Generally widely spaced, long, straight grains contributing to strength along the length

  Uses: Masts, spars, tillers, rubbing strakes, oars and modern epoxy strip planked hulls

VARNISHES

An introduction to high quality varnishes

International
yachtpaint.com

An introduction to high quality varnishes

International
yachtpaint.com

What is a varnish?

- Varnishes are generally made up of five specific ingredients:

1. **Oil** - improves penetration into the wood: the more oil in a varnish the better the penetration.

2. **Resin** - Phenolic resins are used in varnishes where a faster dry and harder finish is required for maximum water resistance.

3. **Solvent** - used to increase the standard flow-out without destroying the full-bodied resin content; are also critical to maintaining the *wet edge* capacity of varnish.

What is a varnish?

4. **Dryers** - act to accelerate the dry through and the hardness of the coating. The blend of driers used also has a great impact on the clarity, colour of the varnish.

5. **Additives** - *anti-skinning agents* allow the varnish to maintain a wet surface upon exposure to the oxygen; *flattening agents* are used for interior varnishes, where a rubbed effect is desirable.

Varnish technology

Ultra-violet additives

- The latest development in varnish technology, which most directly impacts long-term performance, is the use of ultraviolet stabilisers.

- Ultra-violet (UV) light is energy. It must either be absorbed by the coating or dissipated. Without the use of adequate additives, the coating absorbs the UV light.

- *Photo-degradation* is the destructive process by which UV energy is absorbed. It is characterised by a dramatic loss of gloss, film cracking and yellowing, eventually resulting in de-lamination and peeling of the varnish.

Main types of ultra-violet additives

- ***Ultra-violet Absorber (UVA)*** UV light entering the paint film is diffused back as infrared energy (IR). Those UV rays not reflected are dispersed evenly throughout the coating so that no sustained attack on the film occurs.

- ***Surface Stabilisers*** work at the surface to maintain the gloss and colour retention through constant surface repair and stabilisation. By keeping the film surface repaired and stabilised, the amount of water which can attack a broken paint film is reduced, prolonging the overall life of the coating.

- ***Anti-oxidants*** combat photo-degradation and the effects of oxidation on the varnish film. Without the use of an effective anti-oxidant, the varnish will gradually fade and become cloudy.

The correct varnish for every situation

APPLICATION	Perfection	Schooner	Goldspar	Goldspar Satin	Original
Pro-quality finish	●●●	●●●	●●	NO	●
Suitability for teak	●●● (teak version)	●	NO	NO	NO
Suitability for interior wood	●●	●●	●●	●●●	●
Scratch resistance exterior wood	●●●	●●	●●●	NO	●
Suitable for interior and exterior	YES	YES	YES	INTERIOR ONLY	YES
Long-lasting and durability	5-7 YEARS	3 - 4 YEARS	1 - 2 YEARS	1 - 2 YEARS	1 - 2 YEARS
Applicable over existing varnish	YES, IF 2 PACK	YES	YES	YES	YES
UV protection, resists yellowing	●●●	●●●	●●●	●	●
Best gloss retention	●●●	●●	●●	NO	●●

KEY: ●●● Excellent for this purpose ●● Good for this purpose

● Average for this purpose

International yachtpaint.com

Two pack polyurethanes

- Utilise a chemical curing mechanism that imparts to the cured film very high film toughness and good chemical resistance.

- Require attentive application, but reward this care with exceptional performance and will long outlive a single pack product, especially if the surface is subjected to hard knocks.

- Like the single pack polyurethanes they give very good performance with UV absorbers added.

- If this is the type of varnish you require ask for *Perfection Varnish.*

Oil modified varnishes

- Use a variety of natural oils, such as Tung oil, to enhance water resistance, timber penetration and flexibility, so improving resistance to cracking and crazing.

- Being slightly amber in colour they impart a warm attractive golden colour to plain timbers such as pine; however these types of varnishes may also be slightly slower drying than the polyurethane modified types.

- Marine grade products tend to have lower viscosity to give improved flow from the brush resulting in superb finishes.

- When formulated with the correct type of UV absorber, they give excellent exterior exposure performance.

- If this is the type of varnish you require ask for *Schooner***.**

International
yachtpaint.com

Polyurethane modified varnishes

- Based upon alkyd resins somewhat similar to the type used in enamel paints, however, longer chain resins are chosen to give greater flexibility.
- The addition of a polyurethane component during the manufacturing stage imparts faster drying times, tougher cured films and a degree of mild chemical resistance.
- With UV absorbers added these products give very good performance under extreme conditions.
- These types of products are also available in satin type finishes that are strictly for interior use.
- If this is the type of varnish you require ask for *Goldspar Gloss or Goldspar Satin***.**

Perfection

1. Excellent chemical and abrasion resistance > best performance and durability.
2. Exceptional gloss and gloss retention > superior, long-lasting aesthetic appeal.
3. Hardest finish > enhanced toughness.
4. Best UV protection > up to four times longer service life than ordinary varnishes.
5. Also available – Perfection for Teak

International
yachtpaint.com

Schooner

1. Excellent UV resistance > for prolonged life.
2. Golden colour and deep, rich gloss > pleasing appearance.
3. Good flow-out and self-levelling characteristics > easier application and smooth, high gloss appearance
4. For interior and exterior use > convenient and versatile solution.

Goldspar

1. Hard, abrasion-resistant polyurethane > increased durability and toughness on high-wear areas.
2. Interior and exterior use > versatility.
3. Good UV resistance > for longer lasting gloss and improved wood protection
4. Quick drying and fast overcoating > reduced project time.

Goldspar Satin

1. Fast drying > reduced project time.
2. Satin sheen > refined and pleasing appearance suitable for interiors
3. UV, scratch and alcohol resistant > increased durability and service life.
4. Good flow-out characteristics > easier application.

International
yachtpaint.com

Original

1. Multi-purpose use > interior, exterior and over existing varnishes.
2. Good flow > ease of application even at low temperatures
3. Good flexibility and gloss retention > enhanced durability and prolonged life.
4. High clarity finish > suitable for lighter coloured timbers

yachtpaint.com – Interactive assistance

For further information on any of the topics dealt with in this presentation or for detailed product information on International® products, please visit our website:

yachtpaint.com

International yachtpaint.com

Thank you for your attention