



# Wrightline

## Staining and Lacquering Summary

### System A:

**Varnishes used:** Polyurethane v, Acrylic v, Ureic/melaminic acid drying v, Nitrocellulosic v, Polyester with peroxide initiator v, Water based acrylic v, Water based vnyilic v, Water based polyurethanic v,

**Stains/Dyes used:** Pigmented solvent based stain, Pigmented water based stain, Solvent based mix dyes/pigments, Water based mix dyes/pigments

### System B:

**Varnishes used:** Polyester polymer UV drying v, Acrylic polymer UV drying v,

**Stains/Dyes used:** Pigmented solvent based stain, Pigmented water based stain, Solvent based mix dyes/pigments, Water based mix dyes/pigments

### System C:

**Varnishes used:** Polyurethane v, Acrylic v, Ureic/melaminic acid drying v, Nitrocellulosic v, Polyester with peroxide initiator v, Water based acrylic v, Water based vnyilic v, Water based polyurethanic v,

**Stains/Dyes used:** Pigmented solvent based stain, Pigmented water based stain, Solvent based mix dyes/pigments, Water based mix dyes/pigments

	<b>System A</b>	<b>System B</b>	<b>System C</b>
Sanding Finish	120 Grit	120 Grit	120 Grit
Manual Spray Guns	20 gr/m stain		
Roller Machine		10gr/m stain	
Automatic Spray			15gr/m stain
Drying Oven (I.R. Lamps)	1 min	1 min	1 min
Manual Spray Guns	20 gr/m int coat		
Roller Machine		20 gr/m uv coat	
Automatic Spray			20 gr/m int coat
Drying Oven (warm air 45°C)	40 min		40 min
Drying Rack (ambient air)	3/6 hours		3/6 hours
Drying Oven (U.V. Lamps)		1 lamp 80W x 6"	
Sanding Finish	280 Grit		280/320 Grit
Manual Spray Guns	120 gr/m int coat		
Reverse Roller Coater		40 gr/m uv coat	
Automatic Spray			120 gr/m int coat
Drying Oven (warm air 45°C)	40 min		40 min
Drying Rack (ambient air)	3/6 hours		3/6 hours
Drying Oven (UV Lamps)		3 lamp 120W x 6"	
Sanding Machine	320 Grit	320 Grit	320 Grit
Manual Spray Guns	100 gr/m top coat		
Automatic Spray			100 gr/m top coat
Top Coat Roller Coater		5-10gr/m	
Drying Oven (warm air 45°C)	40 min		40 min
Drying Rack (ambient air)	4/6 hours		4/6 hours
Drying Oven (U.V. Lamps)		3 lamp 120W x 6"	

# Staining

## Why we recommend adding a stain to *Wrightline* before lacquering:

Increase in light fastness

Personalisation of the end product

Better homogeneity among products coming from different batches

## Types Of Stain:

**Pigment** An organic or inorganic coloured compound (iron oxides, sulphates, hydroxides), which can only be dissipated in a resin and solvent solution and generally has a high covering power, due to the size of the ground particle, with a very high light fastness.

**Dye** An organic compound that is soluble in hydrocarbon solvents or water resulting in coloured and completely transparent solutions due to the microscopic size of its molecules. Some peculiar features of the dye are the transparency and the chromatic brightness. On the other hand, the light fastness is very low.

## When and how you must stain:

To correct the differences in shades within a production, which must be uniform in colour and interchangeable. Stain the substrate directly if the shade corrections have to be heavy or on the surface, where the primer or the filler has been applied, if the corrections do not have to be quite so heavy. In this case the quantity of stain applied must be reduced because the primer is not able to absorb it.

In order to obtain slight shade corrections add a small quantity of the stain desired to the top coat, which can be done using various systems (film, spray, roller), again being careful to reduce the stain quantity in the top coat in order to avoid excessive darkening of the support and areas with non-homogeneity of colour due to accumulations of top coat on the support especially if it is not level. In the case of direct application of the stain on the support, you can isolate the latter through a suitable polyurethane or acrylic sealer in order to avoid undesired interactions between the stain and the above coats of lacquer (dye or pigment migrations, sometimes unwelcome, in the above coats).

## Groupings of Stains for *Wrightline*:

1. **Pigmented** In this kind of stain we use only pigments dispersed in a resin diluted in solvent.  
Advantages: high light fastness  
Disadvantages: tendency to cover the substrate optically, diminishing the aesthetical features of the product
2. **Coloured** In this kind of stain we use organic dyes dissolved in solvent.  
Advantages: bright shades, transparent colour which heightens the aesthetical features of the wood  
Disadvantages: low light fastness
3. **Pigmented/Coloured** Advantages and disadvantages fall between I and II

## Stains can be applied using the following methods:

1. **Roller with** a different hardness can be used to apply to the substrate more or less quantities of the stain depending on the penetration properties of the substrate. The staining machine consists of a pressing roller, a spreading roller and a dosing roller.
2. **Spray The** stain is applied with a spray-gun (manual, rotating, oscillating). The spraying of the stain from the nozzle is due to a compressed air current or a strong pressure generated by a hydraulic pump (airless). It is one of the most used staining systems and it allows a good penetration of the dye into the substrate. Any excess stain on the support can be removed with cloths or rotating

natural bristle brushes. With this method a sharp penetration into the pores in order to simulate ageing can be achieved.

3. **Immersion** This is generally a kind of mass staining and very good penetration is obtained because the product is completely bathed in it.
4. **Bleaching** This process is carried out through particular chemical solutions which react with certain natural compounds in the wood thus generating the bleaching. It is recommended that great care be taken because any residue from the chemical treatment is hard to remove and can create the following serious inconveniences to lacquering and thus to the overall appearance of the product-uniform yellowing of the film of the lacquer to shades that can reach intense orange non-uniform yellowing (coloured staining) of the film partial drying of the lacquering product, which is found with spray and curtain polyesters silvering (forming of stains with silver reflections under the polyester film). These inconveniences question the use of superficial chemical treatments and, as far as possible, it would be better to avoid their use.

**Correct equipment for the staining of a substrate:**

1. Sanding machine/abrasive paper fineness 120-180, brushes, tuming-guns, cleaning brushes, infra-red drying & warm air 2', sealer-spreading roller
2. sanding machine/abrasive paper fineness 120-180, brushes, programmed tilting-guns, cleaning brushes, infra-red drying & warm air 2', sealer-spreading roller
3. sanding machine/abrasive paper fineness 120-180, brushes, roller-dyeing machine, cleaning brushes, infra-red drying'& warm air 2', sealer-spreading roller,
4. For the staining of component size substrates manual spray staining with normal air guns 1.2/1.4 nozzles or airless with very small nozzles and by taking care that the stain is perfectly dry before painting, can be used.

## *Lacquering*

**Nitrocellulose Lacquers**

Field of use:	Reproduction/Antique	furniture,	frames
Cycle:	Spray with	manual	spray-gun
Ambient temperature:	15°C	to	25°C
Ambient moisture:	50%	to	60%
Wood moisture:	12%		

1. Sanding of the panel (paper fineness from 120 to 180)
2. Primer (from 120 gm per M2 to 150 gm per M2)
3. Drying (24 hours in an airy room)
4. Sanding (paper fineness from 280 to 320)
5. Topcoat (120 gm per M2)
6. Drying (12 hours)
7. Stacking

**Disadvantages:** the film of lacquer tends to yellow with the passing of time, in which case you should ask the supplier for the non-yellowing version, low physical fastness (knock, scratch), low chemical fastness (acid liquids, acetone, alimentary juices), poor filling of the support, high solvent emissions per M2

**Advantages:** easy application, it does not create coloured compounds with ammonia and hydrogen peroxide and can therefore be applied to bleached products without isolation,

**Application inconveniences:**

- opalescent or white film -high atmospheric moisture (70%-80%), high moisture in the panel
- Small bubbles included in the film - high atmospheric moisture (70%-80%), wrong dilution, wrong ventilation
- Formation of cracks - elevated changes in temperature, non-suitable diluting

## **Polyurethane Lacquers Hardened with a Catalyst**

Field of use:	Furniture, frames, parquet-floorings, match-boardings
Cycle:	1) application with manual or in-line spray-guns 2) application with curtain coater 3) application with spreading machine

### **Application with manual or in-line spray-guns**

Ambient temperature:	15°C-25°C
Atmospheric moisture:	50%-60%
Wood moisture:	about 12%

1. Sanding of the support (paper fineness from 120 to 180)
2. Primer (120 gm per M2) 30'(partial drying)
3. Primer (120 gm per M2)
4. Drying (24 hours)
5. Sanding (paper fineness from 280 to 320)
6. Topcoat
7. Drying (12-24 hours)
8. Stacking

### **Application with curtain coater** as per application above

Advantages compared to manual/spray-gun application: execution speed, precision in the weight in grams, which must not be less than 70-100 gm per M2 owing to the kind of machine used

Disadvantages: big installation, panels must be 100% level, 70/80 to 200/250gm/m2 min/max per ink fountain.

**Application with spreading machine** used for the application of polyurethane sealers in small weights 15-20 gm per M2 at the beginning of a complex lacquering cycle in-line after the dyeing or for very cheap finishing for interiors.

Disadvantages: tendency to yellowing of the applied film, reduced duration in the machine (from 1 to 5-6 hours) because of the catalysis in mass of the product, low filling, high emissions of solvents

Advantages: easy application, good chemical fastness, fairly good physical fastness (scratch, knock), good final appearance, which we can achieve in every grade of brightness, drying speed, easy availability

Application inconveniences:

Small bubbles included in the film: high ambient temperature, wrong ventilation, wrong dilution

Cracks - catalysis excess

Film opalescence - high ambient wood moisture

Non-uniform opacification - wrong dilution, wrong ventilation, high temperature

## **Acrylic lacquers with Catalyst**

Field of use:	Furniture, frames, doors, parquet-floorings, match-boardings.
Cycle:	1) application with manual or in-line spray-guns 2) application with curtain coater

### **Application with manual or on-line spray-guns**

1. Sanding of the support (paper fineness from 120 to 180)
2. Primer (120 gm per M2)
3. Drying (24-48 hours)
4. Sanding (paper fineness from 280 to 320)
5. Finishing (120 gm per M2)
6. Drying (12 hours)

### **Application with curtain coater** as per application above

Disadvantages: slow drying (double compared to polyurethane), duration in the machine reduced from 1 to 5-6 hours because of the, catalysis in mass of the product very low filling

Advantages: allows for greater precision in the weight in grams and greater speed of execution than manual/spray-gun application, absolutely no yellowing of the film, easy application, chemical inertia to the yellowing caused by contact with hydrogen, peroxide and ammonia, good chemical & physical fastness

Application inconveniences: as per polyurethane lacquers

## **Polyester Lacquers Catalysable with Peroxides**

Field of use:	high quality furniture, interior decoration
Cycle:	1) application with manual air-airless spray gun 2) application with curtain coater

### **Application with manual air-airless spray gun**

1. Sanding of the support (paper fineness from 120 to 180)
2. Staining of the support (dyeing with solvent roller-spray)
3. Drying in infra-red dryer (2')
4. Sealer coat (polyurethane or acrylic) spray
5. Drying (12 hours)
6. Slight sanding (paper fineness 220)
7. Polyester coat spray (250-300 gm per M2)
8. Gel pause (10'-15' depending on the type)
9. Polyester coat (250-300 gm per M2)
10. Drying - Truck - Tunnel (24-48 hours)
11. Sanding (paper fineness 180, 220, 320, 400 in progression)
12. Polishing with polish or alternatively lacquering with polyurethane finishing

### **Application with curtain coater as per application above except**

2. Staining (with roller)
4. Sealer coat (polyurethane or acrylic) with roller/curtain 15-100 gm per M2

Disadvantages: the peroxides present in polyester can decolourise the Veneerstyle dyes if the latter are not properly isolated, if the catalysed part is mixed with the accelerated one, we obtain an excessive reaction after only a short time in the machine (a few minutes). In the curtain application a part of the polyester is accelerated and another part is catalysed, both coming into contact in the support thus there are no problems about duration in the machine, excessive sensibility to temperature which must not be below 20°C or above 25°C-26°C to avoid the formation of little white spots and opalescent stains that are visible after the polishing, sensitivity of the product to the dyes applied by the customer on the support which can cause damage to the catalysis of the lacquer, greater fragility

Advantages: high dry content, low emission of solvents, full pore finishing, greater hardness

Application inconveniences: these are numerous and complex and thus a more specialized estimation are necessary

## **UV-Curing Polyester Systems**

Field of use:	furniture, parquet floorings, match-boardings, doors
Cycle:	1) application with spreading machine (primer & topcoat) 2) application with spreading machine (primer) & curtain (topcoat)

### **Application with spreading machine (primer & topcoat) - Inside of Furniture, Floors**

1. Sanding of the support (paper fineness from 120 to 180)
2. Staining (roller 10 gm per M2)
3. Drying (infra-red tunnel 2')
4. Sealer (roller 15-20 gm per M2)
5. Drying (infra-red tunnel 2'-3')
6. Polyester stucco coat (roller 30 gm per M2)
7. Partial drying (UV tunnel)
8. Polyester stucco coat (reverse 60 gm per M2 - see drawing no. 4)
9. Total drying (UV tunnel)
10. Sanding (paper fineness 280-320)
11. UV polyester lacquer coat with a different level of opacity (spreading machine 5-10 gm per M2)
12. Drying (UV tunnel)

### **Application with spreading machine (primer) & curtain (topcoat) - Outside of Furniture, Valuable Finishing, Floors**

1. Sanding of the support (paper fineness from 120 to 180)

2. Staining (roller 10 gm per M2)
3. Drying (infra-red tunnel 2')
4. Sealer coat (roller 20 gm per M2)
5. Drying (infra-red tunnel 2'-3')
6. Polyester stucco coat (roller 30 gm per M2)
7. Partial drying (UV tunnel)
8. Polyester stucco coat (reverse 70-80 gm per M2)
9. Drying (UV tunnel)
10. Sanding (paper fineness 280-320-400)
11. UV polyester lacquer coat with a different level of opacity (curtain 100-120gmperM2)
12. Tunnel despairing (tunnel 2')
13. Withering - gel (tunnel T.L. 3' UV low pressure)
14. Drying (UV tunnel 6")

Disadvantages: complex plant engineering, notable energy consumption, poor wetting power (poor prominence of the wood fibre), greying of the film with the passing of time, decrease in flexibility with the passing of time

Advantages: high productive cadence 10-12 m per minute, elevated filling, reduced emission, high chemical fastness, high physical fastness

Application Inconveniences: poor drying - high speed & exhausted lamps, little bubbles/craters - wrong dilution & exhausted lamps

UV-Curing Acrylic SystemsCycles

As per UV-curing polyester systems. These products, although different from polyesters, use the same equipment for both the UV-curing and application systems. These lacquering products are used because of the non-yellowing of the film applied and for chemical and physical fastness.

Advantages: non-yellowing of the film applied, high chemical and physical fastness, high UV-curing speed (higher than polyester), low electrostaticity (little dust on the support), better wetting of the fibre compared with polyesters, solvents, bad for health, are not used for dilutions

Disadvantages: high cost of the product, complex application plants with high energy

Application Inconveniences: as per polyesters

Important note for the use of UV-Curing products

- 1) They must not be diluted with any solvent, but only with suitable products recommended by the manufacturer.
- 2) UV-absorbers must, under no circumstances, be used in UV-curing products because this could cause one of the drying stages to be missed or serious problems eventually to the structure of the product. Such an additive has to be with the authorisation of the manufacturer of the lacquer.

## *Light Fastness*

As with natural veneers *Wrightline* colour will change over a period of time. Some will lighten and some will darken. Colour change will occur but this can be mitigated by the application of a wash coat or a tinted lacquer. UV sunlight can dramatically speed up any colour change. Please note that grey red and blue are the most unstable colours and are sold only against an indemnity that acknowledges the client understands that it will change quickly. Over staining is strongly recommended.

It is important to underline that the light fastness of a particular dye is also influenced by the kind of lacquer and by the quality of same (greater lacquer thickness = greater fastness) as well as by the quantity of light that irradiates the product. To help prevent this problem the use of non-yellowing acrylic lacquers (both primer and finishing) is recommended. Alternatively you can use polyurethane lacquers with an anti-yellowing UV absorber. Moreover, you should avoid different lacquering cycles on products that will be

sited together. You must also remember that in UV lacquers it is not advisable to add UV absorbers not authorised by the manufacture. This is to avoid serious problems during the drying process. If you have to restore a product that has suffered a colour change, as *Wrightline* is dyed right through the entire thickness, it is sufficient to remove the thin discoloured coat by sanding until the true original colour is seen. The same operation can be effected on a lacquered panel by sanding until you see the "coloured" raw wood. It is important to remove completely the old coat before proceeding to re-dye and re-lacquer.

Lastly, we would remind you that *Wrightline* is normally used in the manufacture of products that remain indoors. Therefore in the case of particularly bad ambient conditions of intense light, the specialised knowledge of the lacquer manufacturer is necessary. He will suggest the most suitable cycles and products so as to obtain the best results. The user, however, should take care to check the efficacy of the lacquering cycles suggested.

Every effort has been made to ensure the information above is accurate and correct but is offered for guidance only. Due to varying procedures and conditions this information is given without obligation or warranty. We recommend the thorough testing of this product, adhesives and finishing materials prior to application. The UV Group Plc shall not be liable in any way for damage to *Wrightline* caused by the application of further processes to them by the Buyer nor for any damage caused by the *Wrightline* to other property of the Buyer caused by them reacting to such further processes in any way, including inter alia, colour change, natural shrinkage or warping.

The sale of *Wrightline* is subject to the UV Group's conditions of Sale.