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Murphy & Son Ltd is the exclusive Distributor of Linsegal WRD in the United Kingdom and Republic of Ireland.
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LINSEGAL WRD

Special auxiliary for rapid dyeing of wool, other animal fibres and their blends with polyamide in all types of processing forms and for all classes of wool dyestuffs.

P r o p e r t i e s :

Chemical composition	:	modified ethylene oxide condensation products
Appearance	:	almost water clear viscous liquid
Ionic character	:	non-ionic
pH (10% solution)	:	approx. 6.5 ï 7.0 (neutral)
Density (at 20°C)	:	approx. 1.0 g/m³
Viscosity (at 20°C)	:	approx. 125 mPas
Solubility	:	can be mixed with cold or warm water in any ratio; 10-20% stock solutions are stable to storage The product can be added directly to the dye bath without previous dissolution
Stability	:	stable against acids, alkalis and electrolytes in the concentrations usually applied in mills
Compatibility	:	compatible with anionic, non-ionic and cationic products

Storage	:	storable in closed container at room temperature for at least 12 months; protect from heat and direct exposure to sunlight
Degradability	:	Biologically degradable by more than 90 %

E f f e c t s :

Advantages conferred by **Linsegal WRD**, when used to promote rapid dyeing are:

1. *Carrier properties* ï penetrates the fibre and allow speedy diffusion and absorption of dyestuffs through cuticle and cortex regions. The fibre shows no ring dyeing

2. *Dispersing and wetting properties* ï prevents dyestuff aggregation and reduces draining effect

3. *Levelling and migrating properties* ï reduces the danger of unlevel dyeings during the quick absorption of the dyestuff starting at 40°C, and levels out irregularities in affinity of wool of different origins

4. *Protective colloid property* ï prevents damage to both fibre and dyestuff in the dye bath during rapid rise of temperature. Results in increased yarn strength and extension of up to 30%

5. *Softening property* ï improves handle, reduces soiling, increases spinnability and processing yield of loose stock and combed tops, lowering fibre breakage. Improves the performance of yarn in spinning, winding, warping, tufting and weaving

6. *Slipping property* ï minimises the danger of rope-marks on the winch, prevents felting of the materialôs surface texture

7. *Significant increase in dye bath exhaustion* ï results in higher dyestuff yield and better shade reproduction, as well as obtaining a clear, mostly re-usable dye liquor reducing the effluent load

8. *Prevention of yellowing of wool* ï reduces wool protein degradation resulting in more brilliant colour shades and excellent fastness

Although reasonably good time savings will occur when using a rapid dyeing method to dye pale shades, the greatest and more significant savings accrue when a rapid dyeing method is used with medium to dark shades.

A p p l i c a t i o n :

Linsegal WRD permits the rapid dyeing of wool fibre (and other animal fibres)

1. in all processing regimes, e.g.:

loose stock fibres	(stock dyeing)
yarn hanks	(hank dyeing)
cones, bobbins, packages, bumps, tops	(package dyeing)
fabrics, pieces	(piece dyeing)
80/20 wool/nylon blends	

2. and with all classes of wool dyestuffs *(within a pH range of 2-7, a temperature range of 85 -105°C and dyeing temperature rates of rise between 2 -4°C)*, e.g.:

acid dyestuffs	afterchroming dyestuffs
1:1 metal complex dyestuffs	metachrome dyestuffs
2:1 metal complex dyestuffs	reactive dyestuffs

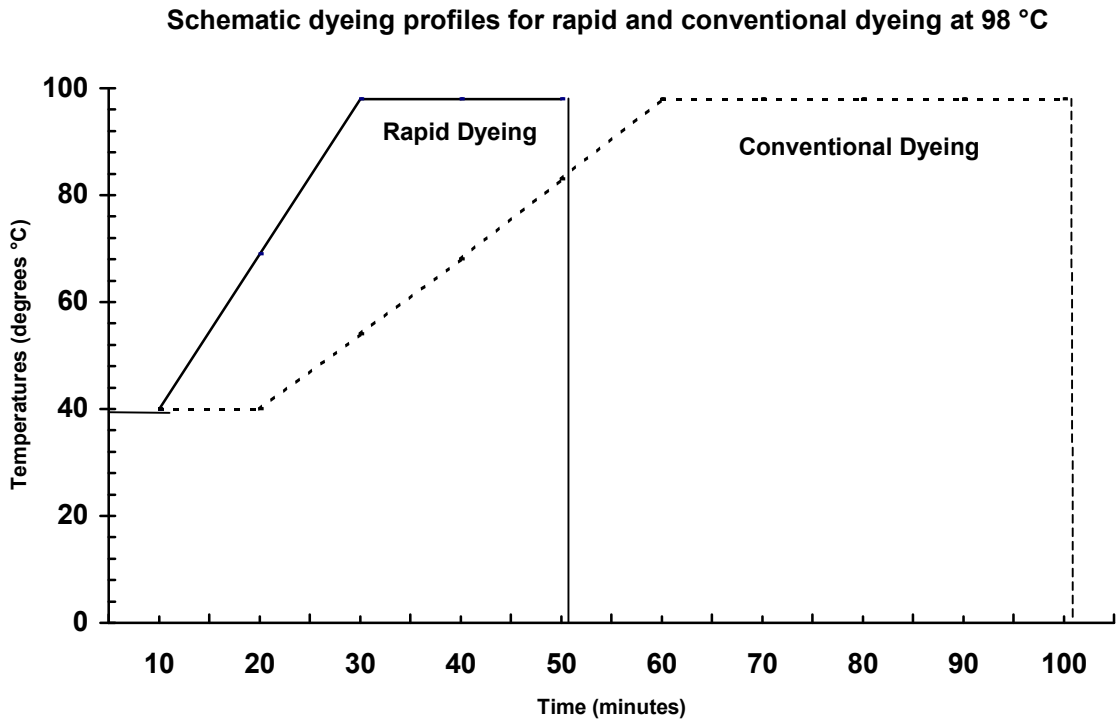
D y e i n g m e t h o d s :

A rapid dyeing process for wool has been developed using **Linsegal WRD** to minimise dyeing times and to increase fibre tensile strength and colour yield.

When applied a reduction in dyeing time of up to 50 % can be observed compared to conventional dyeing methods without compromising dyeing parameters, such as levelness, dye bath exhaustion and, most importantly, fastness. These results were reproduced in commercial trials and industrial use of the product, increasing the productivity by around 50 %, with labour cost reductions of at least 30 %. Additional savings result from lower energy use since boiling times are considerably reduced.

Comparison of dye bath profiles

Dyeing method	***Conventional Dyeing***	***Rapid Dyeing***
Pre-circulation with auxiliaries and dyestuffs	20 min.	10 min.
Rise of temperature to boiling stage	1 ï 1.5°C / min.	2 ï 4°C / min.
Hold at boiling temperature for:		
Pale shades	20 min.	10 min.
Medium shades	40 min.	15 ï 20 min.
Dark shades	60 min.	20 ï 30 min.



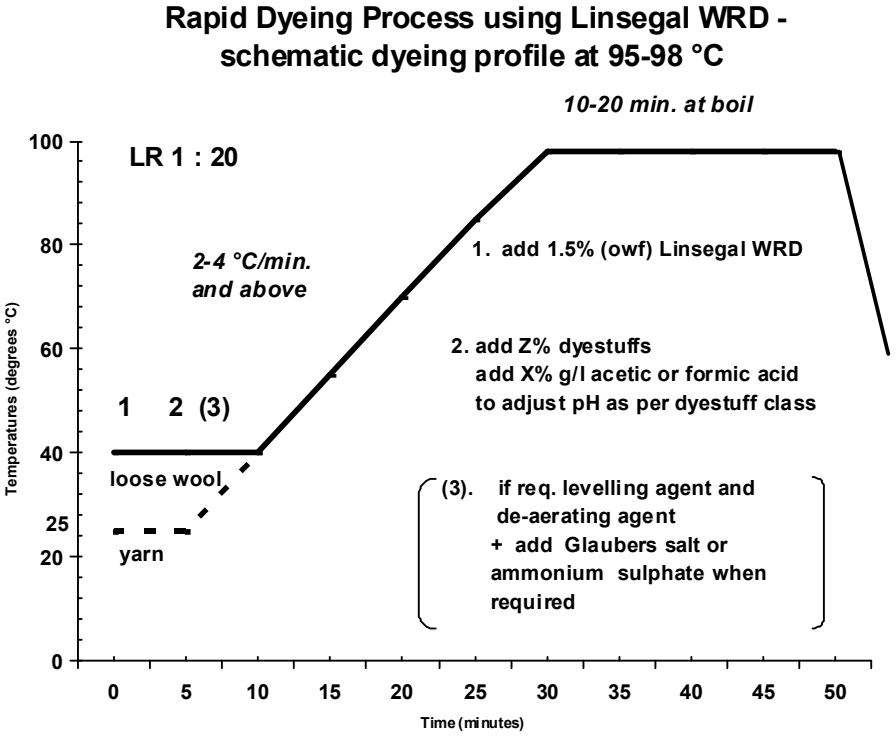
Note: *the following applications are intended as a guide only.*

1. Rapid dyeing of loose wool fibre (stock dyeing)

Fill the dye machine with loose stock wool and the required amount of water.

- Heat up the dye liquor under circulation to 40°C.
- Having reached this temperature add 1.0 ï 1.5 % owf **Linsegal WRD** and circulate for another 5 min. (in case of foaming add approx. 0.2 % owf of de-foaming / de-aerating agent).
- Add the metal complex dyes, acid or chrome dyestuffs to the bath and circulate for 5 min.
- Adjust the correct dyeing pH according to the dyestuff class using acetic or formic acid (pH approx. 4.0-5.0).
- For very pale shades an addition of 0.2 % owf levelling agent is recommended.
- Heat up the dye liquor as quickly as possible (at a rate of temperature rise of 3°C /min. or higher) until boiling (95°C ï 98 °C).
- Hold at boil for 10 to 30 min. (depending on the required depth of shade for pale to dark shades) and dye until the liquor is almost clear or until the required depth of shade is obtained.
- Then finish the dyeing in the usual manner.

When using reactive dyestuffs, e.g. Lanasol dyes or similar, the holding stage at 70-75°C can be omitted but 1.0-1.5% owf levelling agent should be added in addition to **Linsegal WRD**. The usual addition of ammonium sulphate is not required with the rapid dyeing process using reactive dyes when dyeing loose stock wool



2. Rapid dyeing of yarns and fabrics (hank dyeing, package or piece dyeing)

Obviously for these processing forms parameters like type of dyeing machine, correct preparation (e.g. highly or loose twisted yarns, unequal strength of ropes etc.) need to be considered. This can result in changes in the heating temperature, and also in adjustments of recipe.

Experience has shown in hank dyeing, package or piece dyeing with all classes of wool dyestuffs that the dyeing process is started at low temperature between 25-30°C. Here, besides an addition of 1.0-1.5 % **Linsegal WRD** and acetic or formic acid, also 5.0-10.0 % Glaubers salt or 1.0-4.0 % ammonium sulphate is required to give optimum levelness. For very pale shades an addition of 0.5% levelling agent is recommended.

For the rapid dyeing of yarns and fabrics always pre-wet with **Linsegal WRD** as described in the above method for stock dyeing which can be applied in general.

When using reactive dyestuffs a holding stage at 70-75°C for 10-15 min. during the temperature rise to the boiling stage is required.

In case post-adds for dye shading are required, it is advisable to let the liquor cool down to 85-80°C.

Recommended recipe

Quantity (owf)	**Product**
1.0 ï 1.5 %	**Linsegal WRD**
0.2 %	(De-foaming / de-aerating agent)
Z %	Dyestuffs (1-4%)
X %	Acetic or formic acid, pH adjusted according to dyestuff type (approx. 4.0 ï 5.0)
0.5 %	If required add levelling agent
5.0% -10.0%	Glaubers salt (or 4% ammonium sulphate)

3. Rapid dyeing of 80 / 20 wool-polyamide blended yarns

For the rapid dyeing of such blends the above described methods can be applied in general. Besides an addition of 1.0-1.5 % **Linsegal WRD** and acetic or formic acid a polyamide reserving agent and ammonium sulphate or Glaubers salt are required.

Recommended recipe

Quantity (owf)	**Product**
1.0 ï 1.5 %	**Linsegal WRD**
0.2 %	(De-foaming / de-aerating agent)
Z %	Dyestuffs
X %	Acetic or formic acid ,pH adjusted according to dyestuff type
5.0% -10.0%	Glaubers salt (or 4% ammonium sulphate)
Y %	Polyamide reserving agent