



**Arch
Timber
Protection**



**TANALITH®
E**

The logo for TANALITH E, consisting of the word "TANALITH" in a bold, white, sans-serif font with a registered trademark symbol, and the letter "E" below it in a smaller, white, sans-serif font. The text is centered within a dark green, diamond-shaped background that has a slight 3D effect with a white highlight on the top edge.

International Dossier

A horizontal band across the middle of the page, featuring a green-tinted map of Europe. The map shows the outlines of the continent and surrounding regions, with a textured, slightly grainy appearance. The band is set against a light green circular background that frames the entire page.

March 2004

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Introduction to Arch Timber Protection/ Arch Chemicals Inc.

Arch Timber Protection, formerly Hickson Timber Products Ltd, is part of Arch Chemicals, Inc., a global speciality chemicals company with an annual turnover of more the \$900 million.

Arch Chemicals, Inc. is based in Norwalk, Connecticut, USA, but has operations in North and South America, Europe, Africa, the Far East and Australasia.

WORLDWIDE OPERATIONS OF ARCH CHEMICALS INC.



The key values of Arch Chemicals, Inc. are product innovation, customer service, technical support and responsible care.

Arch Chemicals, Inc. acquired Hickson International in August 2000, the successful timber protection and coatings businesses of Hickson being a key reason for the acquisition.

Arch Chemicals, Inc. comprises three business sectors:

Protection Products – Timber protection products;

Biocides for marine and architectural paints, metal working fluids; Water sanitation products for various industries, including swimming pool chemicals.

Microelectronics – High purity products for microprocessor and micro controller devices.

Performance Products – Products for adhesives, paints and coatings, foods, pharmaceuticals, cosmetics, plastics and rubber; Ingredients for rocket and satellite propulsion.

Arch Timber Protection UK

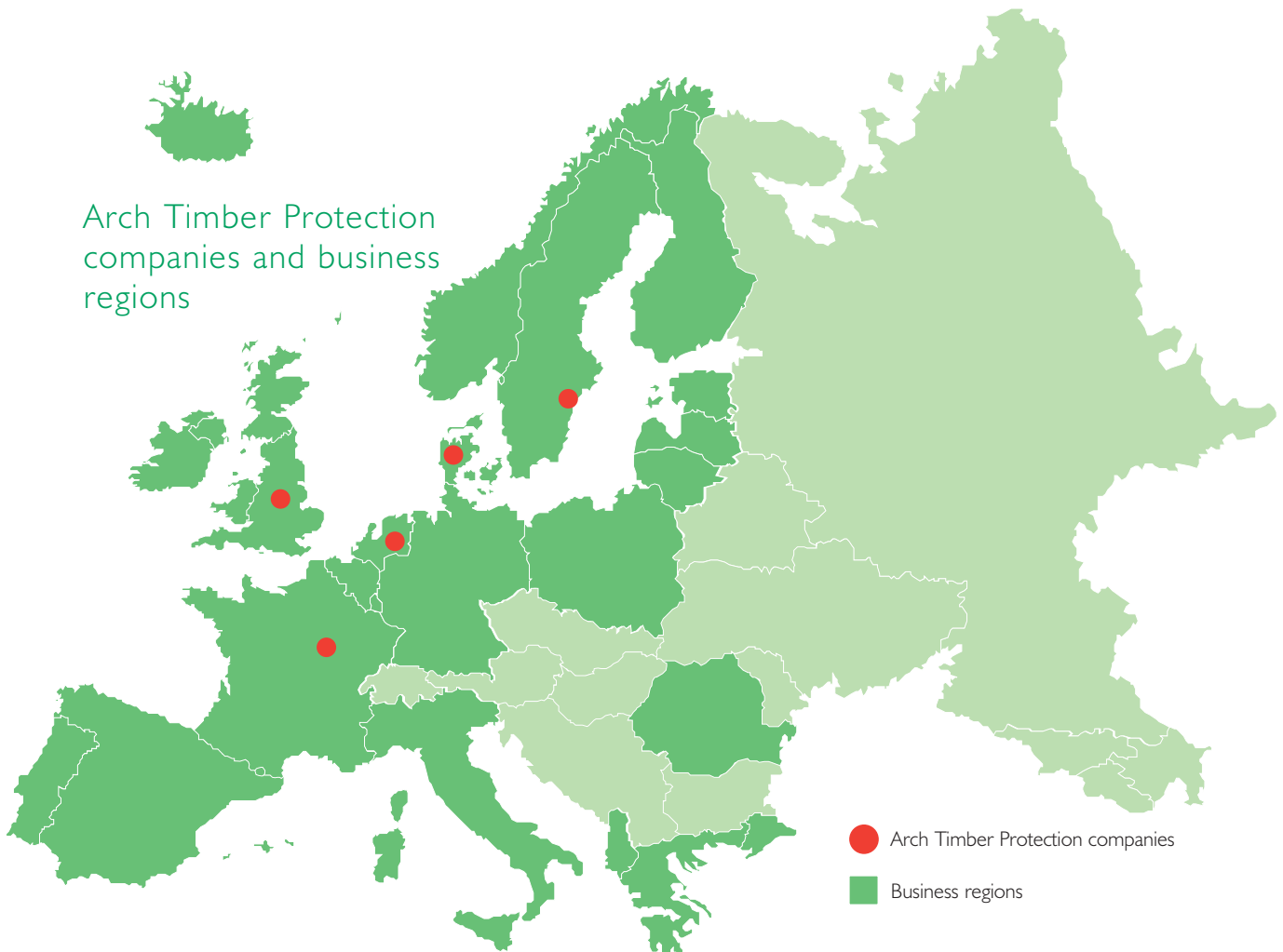
Part of the Treatments Sector of Arch Chemicals Inc., Arch Timber Protection specialises in products for the industrial pre-treatment and surface protection and decoration of wood, managing operations in Europe and the key overseas markets of Africa and the Middle East. For over 55 years Arch Timber Protection has pioneered the worldwide development of industrial wood protection and today is one of the most important and influential companies in the industry.

The company's approach to business is characterised by innovative products, valued brands and exceptional customer service. The company's Responsible Care, and Health, Safety and Environment Policies (see overleaf) demonstrate its commitment to protecting the health and safety of employees, associates, customers, the public and the environment.

As well as its headquarters in Castleford, England, the company has sales and service operations in France, Holland, Denmark, Sweden and Ireland. Representation is further strengthened by associate and joint venture operations in Australia, New Zealand, Malaysia, Turkey, South Africa and India, together with sales agencies in Latvia, Lithuania, Estonia, Poland, Romania, Finland, Norway, Italy, Spain, Portugal, Greece, as well as throughout Africa and the Middle East.

Arch Chemicals, Inc's timber treatment business in America is handled by Arch Wood Protection Canada and Arch Wood Protection USA, which has sales agencies throughout Central and South America.

Arch Timber Protection companies and business regions



Accreditations

Arch Timber Protection is accredited by the following organisations:



BS EN ISO 9001
FM 1636



Responsible Care™ & Health, Safety and Environment Policies

Arch Timber Protection is a member of the UK Chemical Industries Association and is committed to the Responsible Care™ programme for the continuous improvement in relation to health, safety and the environment.

Responsible Care Policy

GUIDING PRINCIPLES

Arch Timber Protection manages all aspects of its business so that we provide a high level of protection for the health and safety of employees and associates, customers and the public, and for the environment. We will demonstrate our commitment to sustainable development and continual improvement by adhering to the following principles.

POLICY

We will have a health, safety and environmental (HS&E) policy that will reflect our commitment and be an integral part of our overall business policy.

EMPLOYEE INVOLVEMENT

Each employee has a vested interest in providing for and assisting in the development and implementation of work practices to protect employee health and welfare and the environment. We will adopt communication and training programmes aimed at achieving that involvement and achievement.

LEGISLATORS AND REGULATORS

We will seek to work in co-operation with legislators and regulators.

PRODUCT STEWARDSHIP

We will assess the risks associated with our products and seek to ensure these risks are properly managed throughout the supply chain through product stewardship programmes involving our customers, suppliers and distributors.

RESOURCE CONSERVATION

We will work to conserve resources and reduce waste in all our activities.

STAKEHOLDER INVOLVEMENT

As part of the Arch Chemicals Responsible Care® policy we will communicate our performance to the Arch Corporate Responsible Care® programme and participate in the "Goal is Zero" initiative.

CONTINUOUS IMPROVEMENT

We will demonstrate continuous improvement in environmental, health and safety performance as part of the Company's commitment to operational excellence.



Dr. D A Lewis
Business Director
June 2002

Health, Safety & Environment Policy

Arch Timber Protection is concerned with the promotion and supply of timber protection products and processes which extend the useful service life of non-durable timber species, thereby encouraging a better utilisation of the world's timber resources.

Arch Timber Protection's Board recognises its collective and individual member's role in providing health, safety and environmental leadership within the organisation.

Arch Timber Protection is committed to operating in a manner that provides high levels of protection for the health and safety of the Company's employees, customers, contractors, the public and the environment.

Arch Timber Protection has extensive research and development programmes for new products and processes with an emphasis on the inclusion of modern biocides in its products.

Arch Timber Protection will continually seek to improve in the efficiency of use of resources. For example energy consumption, product distribution and a reduction in waste generation.

Product and process risks will be evaluated and managed.

Arch Timber Protection will endeavour to ensure that its contractors and suppliers understand and comply with the requirements of Arch Timber Protection with respect to health, safety and the environment through its Product Stewardship programmes.

Legal requirements and regulations will be considered to be minimum standards and Arch Timber Protection will have a pro-active approach in co-operating with regulatory authorities.

Wherever possible best practice will be incorporated into Arch Timber Protection's activities.

Relevant processes and procedures will be audited to ensure compliance with regulatory requirements.

Arch Timber Protection is committed to supporting the principles of Responsible Care® and reports within the Arch Chemical Corporate Responsible Care® management system and participation in the "Goal is Zero" initiative.

Employees at all levels will be accountable for the health, safety and environmental aspects of Arch Timber Protection's business in which they are involved and will be given the appropriate training to enable this commitment to be met.



Dr. D A Lewis
Business Director
June 2002

The evolution of TANALITH® Preservatives: **A Brief History**

Arch Timber Protection (formerly Hickson Timber Products) has been in the timber preservation business for 55 years, and is dedicated to enhancing the durability and service life of timber.

In the timber preservation industry, chromated copper arsenate dominated the scene throughout the 20th century. Indeed, Hickson Timber Products pioneered the development of TANALITH® C (CCA) preservatives more than 50 years ago.

During the last decade, around the world, pressure against this product has increased, although it is important to stress that there are numerous scientific experiments that prove that timber treated with CCA is safe and poses little risk to the environment, providing it is used in the recommended manner.

In Europe, pressures against CCA began in Holland at the beginning of the 90's. Sweden adopted an agreement which permitted the continued use of CCA for high risk situations,

when the timber is in ground contact, but not for low risk situations, when the timber is not in ground contact. In Denmark, the Timber Preservation Association and the Environment Agency agreed a phased programme of change, aimed at reducing the level of heavy metals and ending the use of formulations which contain chrome and arsenic; this objective was achieved on 1 January 1997, since when only CCA-alternatives can be used in the Danish market. In countries further afield, such as Japan, CCA can only be used in industrial applications; and in Australia and New Zealand, it is permitted in certain segments of the market, whilst in others, such as nature reserves, CCA-alternatives have to be used.

Very recently, in the USA and Europe, legislation limits, or will limit, the use of CCA-based products for certain applications. In Europe, the European Commission set a deadline of June 2004 for the change from CCA to alternative products in the specified end uses.

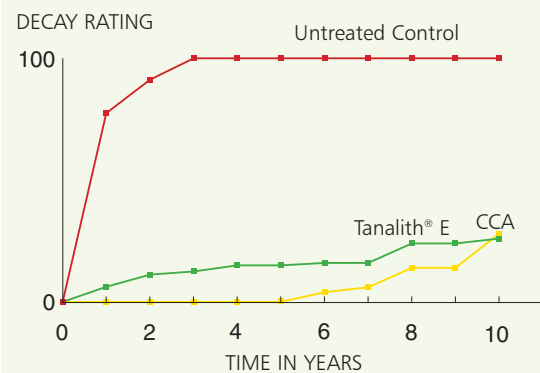
Introduction to **TANALITH® E**

TANALITH® E wood preservative is Arch Timber Protection's alternative to the use of CCA. It has been in commercial use since its launch in 1992 and continues to gain acceptance around the world. **TANALITH® E** is the unique, proven and established choice in treated timber for fencing, decking, leisure wood, playground equipment and building applications.

Currently **TANALITH® E** is used in more than 25 countries around the world.

At the start of the 80s, Arch Timber Protection started work on developing a new generation water based product, which was technically and commercially viable. Laboratory tests clearly identified the excellent combination of copper and triazole active ingredients. After numerous rigorous laboratory tests, the optimum formulation of **TANALITH® E** was chosen, and field trials were begun in more than 20 locations around the world. The results clearly demonstrated the long term performance of **TANALITH® E** against a wide range of conditions and biological hazards, which is vitally important in predicting whether a preservative will be successful in real life. For example, in the Swedish test site at Simlangsdalen,

TANALITH® E is achieving results similar to the CCA treated control sample. This 10 year field test gives great confidence in the performance of **TANALITH® E**, both for timber in ground contact and above ground.



*The graph shows that small samples of **TANALITH® E** pressure treated timber are providing outstanding performance, in an aggressive field test site, after 10 years. This demonstrates that commercial sized timbers can achieve a desired service life of 20 years in ground contact.*

Advantages of **TANALITH® E**

The tests carried out, and wide commercial experience, have demonstrated how easy it is to convert to, and use, **TANALITH® E**. Its ancillary properties, such as corrosivity and resistance, are very similar to CCA treated timber.

As **TANALITH® E** was being introduced, it became clear that the colour and appearance of the treated timber was an important factor in its acceptance by the consumer. Once

impregnation, **TANALITH® E** rapidly acquires a uniform aesthetically pleasing natural green tone, whose durability is as good as that of CCA. Independent trials have confirmed the colour durability of timber treated with **TANALITH® E** in comparison to other new generation products; trials were carried out by the Centre for Technological Research in Finland, VTT, on various treated products, such as garden swings.



*Colour durability field trials showing **TANALITH® E** pressure treated timber compared against untreated and a competitor product after 8 months exposure.*

Treatment Specification

In an ideal world before timber actually arrives at a timber treatment plant for preservative treatment, a series of decisions will have already been made based on what the timber components are, what species the timber is and what type of treatment is necessary. Occasionally, information available is minimal with vague instructions as to the desired treatment. In these cases, a specification for treatment needs to be prepared in the following manner prior to any treatment being carried out:

- **Identify the situation of use**
E.g. roofing timbers
- **Identify the timber component**
E.g. Truss
- **Consider the species of timber**
E.g. Spruce (Whitewood)
- **Consider the use of treatment (Hazard Class)**
- **Decide upon the correct treatment parameters / code / cycle**

Features

- **TANALITH® E** is a chrome- and arsenic-free formulation, and is an effective alternative to traditional copper chrome arsenic (CCA) formulations.
- Impregnated into the wood under controlled conditions in a vacuum pressure treatment plant, the components of **TANALITH® E** fix to the structure of the wood and cannot easily be washed out.
- Treated timber is protected long term against fungal and insect attack, including termites, both in ground contact and above ground. **TANALITH® E** is approved for use in many countries around the world.
- **TANALITH® E** is ideal for a wide range of end uses including construction, fencing and landscaping.



Technical Issues

A Preparation of timber before treatment

Timber must be free of dirt, surface coatings, ice or snow.

All inner and outer bark must be removed.

Timber must be free of any sign of fungal or insect attack.

Timber must be dried to a moisture content of less than 28% or as specified.

Wherever possible, all cutting, machining, planing, notching or boring must be carried out before treatment (see section on post treatment machining).

Do not fix metal fittings before treatment.

B Post treatment drying

The time lag between preservative impregnation and installation of the treated timber will normally be sufficient for re-drying to take place.

When close tolerance work is involved, it is advisable to pre-machine the timber at the in service equilibrium moisture content, and it is the contractor's responsibility to ensure that the need for re-drying is recognised and allowed for.

Air drying is achieved by the circulation of air over every surface of the timber, and timber dries faster and further if the humidity is low.

Air dried timber must be open stacked and protected from rain and snow. Stickers should be used to augment airflow over the timber.

C Post treatment machining

Any untreated timber exposed by cross-cutting, boring etc must be protected by the application of ENSELE, following the instructions on the label, to guarantee good protection.

Pieces which are rip sawn, thickened, equalised or planed must be re-treated.

Under no circumstances should fence posts be pointed after treatment. The shortening of posts and columns should be avoided if possible, but in any event cross-cutting must be limited to the top of the post or column and the cross cut surface liberally brushed with ENSELE® following the instructions on the label.

D Surface coatings

TANALITH® E treated timber does not need to be painted to maintain preservative properties.

Provided **TANALITH® E** treated timber has been re-dried to a moisture content of not more than 22% any normal surface coating may be used.

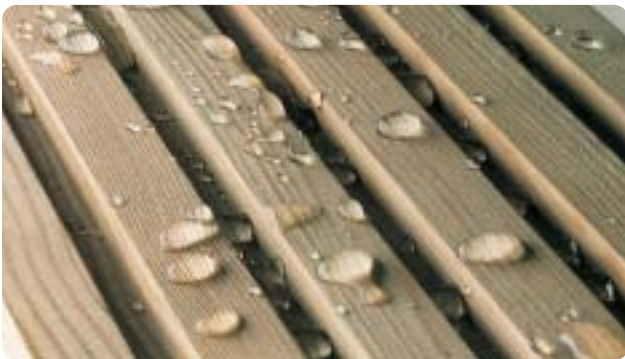
If the treated timber is to be coloured, painted or varnished, the timber should be allowed to dry and the surface of the timber should be prepared in accordance with the coating manufacturer's instructions.

It should not be assumed that the treatment is a substitute for knotting, priming or base-coating.

If water-based coatings are applied some discoloration may occur in exceptional circumstances. If this occurs, allow the coating to dry completely, then apply an additional coat of product, preferably one with a high solids content.

Additives for TANALITH® E, TANALITH® Extra, TANATONE®

TANALITH® E treatment is also available with a water repellent additive - **TANALITH® Extra**. This provides the added benefit of improved anti-weathering properties, which makes it ideal for timber structures destined for gardens, decking or garden furniture.



*PRESSURE TREATED TIMBER
WITH BUILT-IN WATER REPELLENT*

TANALITH® Extra is added to the **TANALITH® E** treatment solution and applied by the normal vacuum pressure process.

TANATONE® is a colour additive which gives timber a pleasant brown tone for those who prefer an alternative colour. It can be used both for timber in ground contact and above ground. **TANATONE®** is added to the **TANALITH® E** solution and applied by the normal vacuum pressure process.

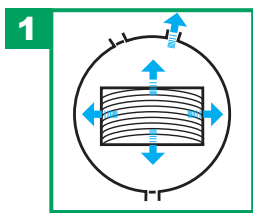
It is ideal for rough sawn fencing and other landscaping constructions, and avoids the need for brush application of colour at the point of installation.



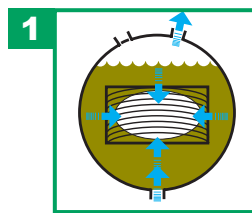
*PRESSURE TREATED TIMBER
WITH BUILT-IN COLOUR*

The vacuum pressure **treatment process**

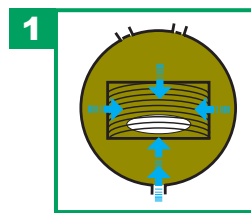
Essentially there are four stages to a vacuum pressure process:



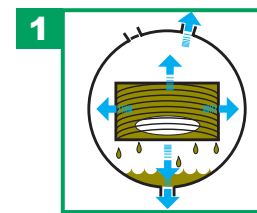
Vacuum is created and the timber cells are evacuated of air. Vacuum is held for a short period.



Treatment vessel is flooded under vacuum.



Application of hydraulic pressure up to 12kgf/cm².



Final vacuum removes excess solution, which is pumped back to the storage tank.

Treatment cycles

These types of treatment are generally used for treatment to Hazard Classes 1, 2, 3 and 4).

As **TANALITH® E** conforms to the new European standards, the treatment process is defined in terms of penetration and preservative loading. Such results based specifications therefore mean that treatment cycles are plant specific.

In the past, cycles were set up to a fixed uptake, which then involved the need to set up multiple cycles for thin and thick timbers. This is fundamentally flawed and often gave retentions which, derived by analysis, were above or below the required retention in the analytical zone.

The modern approach is to use computer spreadsheets to calculate theoretical loadings for each timber dimension treated in a mixed charge to obtain an overall mean retention. This is the mathematically correct approach since although different absorptions are obtained depending on dimension, all timbers within a charge are treated equally.

A typical treatment cycle would be:

TE/BI Specification (Internal construction timber)

Initial Vacuum: 600 mm Hg for 5 minutes

Pressure Period: 12.8kgf/cm² for 15 minutes

Final Vacuum: 600 mm Hg or 15 minutes

TE/GFa Specification (Fencing and landscaping material above ground)

Initial Vacuum: 600 mm Hg for 5 minutes

Pressure Period: 12.8kgf/cm² for 30 minutes

Final Vacuum: 600 mm Hg or 15 minutes

TE/GFb Specification (Timber in contact with the ground or with freshwater)

Initial Vacuum: 600 mm Hg for 5 minutes

Pressure Period: 12.8kgf/cm² for 60 minutes

Final Vacuum: 600 mm Hg or 15 minutes

Less segregation of timbers is required with this approach (depending upon plant efficiency / configuration) and therefore fewer treatment cycles. Confirmatory analysis and reporting of treated timber would ensure compliance with BS EN standards.

TANALITH® E treated timber: **A Definition**

TANALITH® E treated timber is timber that has been impregnated with **TANALITH® E** timber preservative under controlled conditions in a vacuum pressure plant.

Timber treated with **TANALITH® E** can be used with total confidence for applications in Hazard Classes 1-4, internal and external, in ground contact or now. (See below for definitions of Hazard Classes.) The loading and penetration of preservative in the treated zone is derived from standards according to the end use and according to set national and international standards.

The treatment process/parameters are controlled such that an appropriate amount of preservative is impregnated into the timber to give the necessary protection.

Decorative surface coatings can then be applied, but these are not necessary to maintain the preservative properties of the timber.

Hazard Classification

The system of Hazard Classes (Hazard Class 1-5) is used to classify the end use of a piece of treated timber and is common to all preservatives not just **TANALITH® E**. The relevant European standard is:

EN 335: 1994 Durability of wood and wood-based products - Definition of hazard classes of biological attack.

TANALITH® E preservative is appropriate for use in Hazard Classes 1-4.

Hazard Class 1:

Above ground, indoors, permanently dry, < 18% moisture content. Main hazard - insects

Hazard Class 2:

Above ground, indoors, occasional risk of wetting, Occasionally >20% moisture content. Main hazard - fungi and insects

Hazard Class 3:

Above ground, outdoors, Frequent wetting, often >20% moisture content. Main hazard – Fungi.

Hazard Class 4:

In contact with the ground, or with fresh water. Permanently exposed to wetting, moisture content permanently >20%. Main hazard – Fungi.

Standards: An overview

There are several national and European standards relating to the required retention and penetration of preservatives in wood. Some products that have been used for many years are covered by national standards, while newly developed products are tested using the suite of European standards.

European Standards (EN)

The drive towards European standards has been made through pressure from the Construction Products Directive (C.P.D.) and the Committee for Standardisation (C.E.N.). The aim is mutual recognition and harmonisation of standards across Europe. The primary difference between European standards and traditional British based standards is that treatment cycles are not PROCESS specified but based on RESULTS, in that treatment must result in a certain retention of preservative in a specified area of the timber referred to as the analytical zone. Confirmation that this has been achieved is by analysis of the treated timber.

TANALITH® E has been tested in accordance with these standards:

EN 599: Durability of wood and wood-based products - Performance of preventative wood preservatives as determined by biological tests

This standard lists the European test standards that must be carried out for relevant hazard class in which the treated timber is to be used.

The efficacy of **TANALITH® E** has been evaluated using the efficacy assessment procedures required by EN599. The application of EN599 results in the calculation of a critical value for a preservative in each hazard class. This critical value is not necessarily the required retention, but can be used to calculate the required retention as described in EN351.

EN 351: 1994 Durability of wood and wood-based products - Preservative treated solid wood

This standard establishes a classification of preservative treated wood in terms of preservative penetration and gives guidance on a classification of retention. Nine penetration classes (P1 to P9) are defined, along with corresponding analytical zones relevant to the analysis of preservative retention. The standard allows the use of a multiplication factor in the derivation of the

required retention such that the required retention may be greater than or less than the critical value (derived in EN599) as deemed appropriate for the required end use in the prevailing conditions.

Individual countries within Europe have their own national interpretive documents of the European standards simply because hazards are variable from country to country. Indeed, EN599 accounts for this as it lists additional or local tests that may be needed in some countries but not others. The net result is that individual countries will set their own penetration and retention values when it comes to the use of **TANALITH® E** preservatives.

Compliance with standards

Compliance with standards in practice appears complicated. However, it should not be if a proper working practice, covering analysis of the treated timber and a treatment process is established. This has been undertaken by Arch Timber Protection which has adopted set phrases when specifying **TANALITH® E** treated timber:

'TANALITH® E conforms to the efficacy requirements of BS EN 599/BS 8417 and is treated in accordance with the penetration and retention guidance in BS EN351 to give a desired service life in the selected hazard class. Hazard classes are defined in BS EN 335'

In addition to such phrases, penetration and retention values need to be stated and acceptable quality level needs to be specified, usually 10% for pine, 25% for spruce.

Ultimately, all **TANALITH®** treated timber has been tested using the biological tests listed in:

EN 599-1: 1997

Is treated in accordance with the penetration and retention guidelines in:

EN 351-1: 1996

To give a desired service life in the selected hazard class as defined in:

EN 335-1: 1992

Efficacy

EN 599 lists the minimum performance criteria in biological tests (with and without artificial ageing) for each Hazard Class (HC 1, 2, 3 and 4) relevant to **TANALITH® E**. **TANALITH® E** goes through a series of biological tests prior to approval for sale and use in the market.

HAZARD CLASS 1

The main hazard in this class is insects. Therefore it is a requirement that any **TANALITH® E** preservative for use in this hazard class should have been tested using the following biological tests:

EN 47 Wood preservatives, determination of the toxic values against larvae of *Hylotrupes bajulus* (Linnaeus).

Artificial ageing requirements:

EN 73 Wood preservatives. Accelerated ageing tests of treated wood prior to biological testing. Evaporative ageing procedure

Local or additional tests (with ageing EN 73) if required:

EN I 17 Wood preservatives. Determination of toxic values against *Reticulitermes santonenensis* de Reytau.

HAZARD CLASS 2

The primary hazard in this class is both fungi and insects but contained within an indoor environment. Therefore the testing listed in Hazard Class 1 for insects has to be combined with further testing (plus artificial ageing EN73).

EN I 13 Wood preservatives. Test method for determining the procedure effectiveness against wood destroying basidiomycetes. Determination of toxic values.

Local or additional tests if required:

EN 152-2 Wood preservatives. Laboratory method for determining the protective effectiveness of a preservative treatment against bluestain in service (Part 2 = application by methods other than brushing).

HAZARD CLASS 3

The main hazard in this class is fungi (plus termites where present). The hazard may be subdivided into two, first without the application of a surface coating and second, with an external coat applied. **TANALITH® E** can be used with or without a surface coating. This requires further testing in addition to those carried out to meet Hazard Classes 1 and 2.

Testing listed in hazard classes 1 and 2 together with further artificial ageing to **EN 84**

EN 84 Wood preservatives. Accelerated ageing of treated wood prior to biological testing. Leaching procedure.

HAZARD CLASS 4

The main hazard in this class is fungi (plus termites where present). Preservatives for use in this hazard class require testing in accordance with that required for hazard class 3 (without external coat) plus:

ENV 807 Wood preservatives – Determination of the effectiveness against soft rotting micro-fungi and other soil inhabiting micro-organisms.

An additional test of particular value to this hazard class is the ground contact field test **EN 252**.

EN 252 Field test method for determining the relative protective effectiveness of a wood preservative in ground contact.

This field test, along with similar worldwide ground contact field tests, provides valuable long-term performance information that cannot be obtained from laboratory tests for this high hazard class. Field test data of this type can be extremely useful when determining appropriate retentions for preservatives used in Hazard Class 4.

International Use and Approval of TANALITH® E

TANALITH® E is currently used and/or approved in more than 25 countries around the world, including:

Austria, Belgium, Canada, Denmark, Germany, Finland, France, Greece, Ireland, Italy, Japan, New Zealand, Norway, Poland, United Kingdom, Russia, Sweden, Turkey, USA and various countries in Africa and the Middle East.

Research & Development: **The Future**

Arch Corporate Research and Development is carried out centrally in Cheshire, Connecticut in the USA. However, there are development centres in Castleford (UK), Atlanta (USA) and Auckland (NZ), which carry out development on a regional scale to take account of specific hazard conditions.

However, close liaison between centres ensures that technology and ideas are shared. This will continue to create new developments in TANALITH® E preservatives with new introductions in the near future.