



## TRI-Funori FAQ

### Q. What is TRI-Funori?

A. TRI-Funori™ is a conservation product that is effective in three distinct areas of application: as a fixative, as a cleaning agent, and as a light adhesive.

It is derived from two species (*Gloiopeltis furcata* and *Gloiopeltis tenax*) of red seaweed (“funori” in Japanese) harvested along the coast of the Sea of Japan. The key component of the seaweed is a unique polysaccharide starch. We import the raw untreated funori directly from Japanese harvesters and extract the starchy material using simple sun bleaching and mechanical processes. The characteristic that makes this polysaccharide starch valuable is its interesting ability to bind large amounts of water relative to its mass. This means that it does not wet the surface to which it is applied. In turn, it does not mobilize salts and therefore does not leave tide lines. As a fixative, it dries matte. As an adhesive, it is fully reversible with water. These performance characteristics are why funori has had such a long tradition of use in the conservation of books, paper and art objects.

### Q. How did TRI-Funori evolve?

A. For more than three centuries, funori has been used extensively in Japan for its adhesive and consolidating properties. Initially, it served as a lubricant for the threads in silk production, and gradually took on applications in arts, crafts and domestic household chores. Most commonly it is used for “dry” cleaning of silk kimonos and as the adhesive for paper on traditional “shoji” sliding screens in Japanese houses.

Since the end of the Second World War, funori which is usually in dried sheet form (ita funori) has been used by paper and objects conservators in the West. It is now widely used in conservation laboratories worldwide.

One challenge related to ita funori is consistency. Conservators have no knowledge of the purity of the raw materials used or how they have been bleached. Nor do they know about the starch content of the material they have to work with.

In order to address the vagaries of the supply and provide the conservation community with a pure form of funori, European pigment producer Lascaux Colours and Restauro developed a powdered concentrated form of funori called JunFunori in the 1980's. This was the first scientific approach of the use of starch as a conservation application.

In 2010 Rod Stewart and Masumi Suzuki were challenged with the task of developing a method of cleaning a large gilded ceiling in a historically designated building in Ottawa. Being familiar with funori from childhood, Masumi Suzuki suggested it as a method of cleaning the ceiling. Alternatives that had been considered were Vansol in a water suspension with Q-tips, and simple Sunlight soap. The Vansol was far too labour intensive, and required a high degree of safety precautions and training. The Sunlight soap was too aggressive and disturbed some of the patination layers on the metallic finish. A source of sundried funori was found in Japan and Masumi returned to Canada with enough sun dried raw seaweed material to produce the cleaning product in fifty gallon batches.

The ita funori was cooked, strained, filtered and packaged in a 3 liter “bag in box” format.

The project went very well with satisfaction expressed by all concerned.

The material cost was moderate compared to what it would have been using the prepared product from Europe. The downside was that the liquid funori went “off” rather quickly and had to be refrigerated. We decided to look for a way to make a consistently stable product with a long shelf life and at a moderate cost.

TRI-Funori comes out of that quest. It is stable, consistent in quality and relatively inexpensive.

### Q. What is the effect of climate change on funori?

A. We don't know the scientific answer to this question. We are committed to maintaining an inventory of unprocessed raw seaweed from all locations we examine in any given year. We already have dozens of samples from many locations for as far back as 2010. We expect this archive to be of interest to climate change researches in the future.

All of the anecdotal information we have from Japanese colleagues is that the variations from year to year are getting greater and that the frequency of good high starch yielding harvests is becoming less reliable. For this reason we think it is important to identify the genus, source location and harvest year for our raw material and to test and publish the results of our production, however they may vary, so that conservators can make informed selection.



### **Q. How is TRI-Funori produced?**

A. Each year, our buyer visits funori harvesters in Japan and selects only the strongest starch-bearing plant material available, verifying its characteristics by field testing.

The pure unbleached plant material is packaged and sent by air freight to our lab in Canada. No processing occurs in Japan. During July and August the raw material is rinsed in fresh water and set out to bleach on mats in the sun. No chemical bleaches are used. In this natural process the raw stock becomes almost white.

The raw material is then chopped and gently cooked in fresh water. The process takes several hours and is controlled at about 50C.

The resulting slurry of plant material is pressed through a series of bag filters, the finest of which is 1 micron in size. The result is an almost colorless starchy liquid with a viscosity similar to light cream.

In order to attain an optically clear appearance, the liquid is tumbled with a small amount of activated carbon for thirty minutes. To finish the process, the activated carbon is removed by centrifuge at 5,000 RPM for thirty minutes.

The clear liquid that remains is frozen in silicon trays and then freeze dried. This results in the cottony fluffy finished product – TRI Funori FD (freeze-dried).

The product is close to pH neutral (ranges from 6.6 to 6.9) and totally non toxic and non-allergenic.

TRI-Funori FD is then packaged in a Faraday Shield re-sealable vacuum bag. Unopened shelf life can be measured in years.

### **Q. Why does TRI-Funori have a Vintage designation?**

A. TRI-Funori is a 100% natural product. As such, it will vary from year to year. We foresee and expect that there will be some years that produce stronger or more concentrated starch content than others. All of our Japanese contacts in the industry express this view. Just as with the wines of Burgundy, some years will produce better results than others. We extract the starch and freeze dry it so that it is permanently saved and will be available for years to come exactly as we have extracted it. We think that conservators deserve to know what they are buying when they purchase a conservation product.

A conservator who has used a particular vintage, and become familiar with its specific characteristics, could, years from now, ask for that specific vintage and be assured that the product supplied is exactly the same as the previous material.

### **Q. How do I read a TRI-Funori Vintage designation?**

A. 2014.jp.n.hirado.1.10062015.003 is a typical Vintage designation.

The first part of the designation indicates the raw material was from harvest year 2014 from the port of Hirado in Nagasaki prefecture in Japan.

This information is followed by the number 1, 2 or 3 for the Japanese genus identifier 1 – furcata funori , 2 – ma funori or 3 – a mixture of the two,

This is followed by the date of packaging (10 June, 2015) and the actual vacuum package number in the processing sequence.

### **Q. Is all TRI-Funori freeze dried?**

A. NO. We produce three different types of TRI-Funori. They all start with us selecting the best raw seaweed, bringing it to Canada and drying it under our intense UV sunlight.

TRI-Funori FD is chopped and cooked after the sun bleaching. The starch is released in the cooking and separated out from the plant pulp by filtering through fine felt filters. The material is clarified using activated charcoal which is then removed with a centrifuge process. The clear liquid is frozen into blocks and then freeze dried resulting in the billowy cotton candy material that is vacuum sealed for later use.

TRI-Funori S is frozen in blocks after the sun bleaching process has rendered it almost snow white. These blocks of uncooked seaweed are then freeze dried and packaged in poly bags. Conservators will measure out the amount they need and cook it up with water as they would do with raw golden colored sheet material they may already be familiar with. TRI-Funori S is almost clear and colorless.

The final product is TRI-Funori L. This material is cooked and filtered after sun bleaching. Rather than freeze it, we package it in a three liter “bag in box” format in a nitrogen atmosphere with a small amount of the biocide. This biocide, similar to that used in all latex paint, will keep the TRI-Funori L fresh for up to a year in storage.



**Q. What are the benefits of TRI-Funori?**

A. All funori products are not created equal. Each year our buyer visits harvesters in Japan and selects only the strongest starch bearing plant material available. The entire “vintage” is then processed as a single batch -ie “TRI-Funori 2015”. The resulting vintage is then tested for viscosity, adhesive strength and optical clarity in an ISO certified lab with the results being published and available to the purchaser.

Consistent Quality; ISO Certified; Dries Matte; Leaves no Tide Lines; Is fully Reversible as an Adhesive; Non Toxic; Affordable

**Q. How do I Re-hydrate TRI-Funori FD?**

A. TRI-Funori FD is re-hydrated for use by adding it to distilled water at a ratio of 1 part TRI-Funori FD to 100 parts water by weight. Start by breaking up the TRI-Funori FD into the measured cold water in a small container.

Then whisk or stir vigorously for 15 to 20 minutes over a hot water bath at about 50°C. (125°F) until the particles have become completely dissolved. An infant bottle warmer works well as does a simple kitchen double boiler.

Fine air bubbles will form due to the stirring action, but these will float out after a few minutes rest.

After re-hydrating TRI-Funori FD, it can be further diluted for the purpose at hand.

Prepared TRI-Funori should be kept refrigerated in an airtight container.

**Q. What is the best way to keep re-hydrated TRI-Funori?**

A. Put any left-over TRI-Funori in a clean glass beaker and draw it up into a 60cc syringe. Invert the syringe and expel any air that might be present. Put the syringe, point down, back in the beaker in a refrigerator

**Q. How can TRI-Funori be used on larger architectural projects?**

A. In 2012, we introduced a funori product in a 3 litre “bag in a box” liquid format. Over the next few years, the product has been successfully used in a number of large architectural conservation projects in North America.

1. Glanmore National Historic Site – a prominent Canadian historic museum.

A spray application of TRI-Funori effectively consolidated powdery binderless tempera paint on a large architectural frieze as well as on the flat plaster ceiling.

2. Sir John A Macdonald Building – a national historic site.

A poultice method involving TRI-Funori and kozo tissue was used to clean two large (15,000 sq. ft.) coffered fibrous plaster ceilings featuring delicate gilt and metallic painted surfaces.

3. Lower East Side Tenement Museum

At the Lower East Side Tenement Museum, which has a challenging curatorial mandate to stabilize and preserve all of the dilapidated finishes “as found”, TRI-Funori was extensively used to re-adhere curling flakes of early 20th C. ceiling papers, all of which had water stains and were in precarious condition.