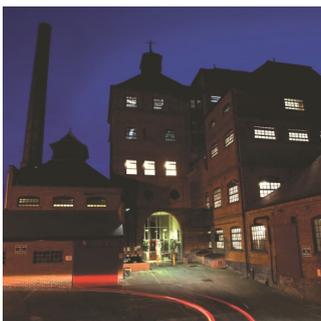


TECHNICAL INFORMATION SHEET: PROTAFLOC TABLETS - KETTLE FININGS

PRODUCT NAME:	Description
PROTAFLOC TABLETS	Protafloc Tablets (E407) are a semi-refined grade carrageenan product which is added to the wort in the kettle to enhance protein removal as the wort cools.
PRODUCT CODE:	
PFT	
COMMODITY CODE:	Benefits
13023900	<ul style="list-style-type: none">• Brilliant wort clarity - Protafloc is optimised for removal of haze sensitive proteins from wort. It achieves clarity by precipitating virtually all haze material from cold worts and giving extensive cold break formation• Reduced costs of beer processing - Protafloc reduces costs by removing fine proteinaceous particles, simplifying downstream fining, filtration and beer stabilisation• Energy savings from reduced boil times - Protafloc will maintain performance even with reduced boil times• Consistent beer fining - Protafloc can clean up worts with variable particle content presenting a more consistent beer for racking• Prolonged beer shelf-life - Protafloc removes substantial qualities of proteinaceous haze-precursor material without affecting head retention
PACKAGING:	
2 and 20 KG	



TECHNICAL SUPPORT

tel: +44 (0) 115 978 5494 | e: techsupport@murphyandson.co.uk

REGULATORY COMPLIANCE INFORMATION

Refer to the **Product Specification Sheet** or contact us on
tel: +44 (0) 115 978 5494 | e: compliance@murphyandson.co.uk

HEALTH & SAFETY INFORMATION

Refer to the **Safety Data Sheet (SDS)**

Principle

The active ingredient in Protafloc is a polysaccharide called carrageenan which is derived from seaweed. Carrageenan in solution is negatively charged, owing to the sulphate groups along the polysaccharide backbone. It is these charged sites which interact with wort proteins.

In solution at temperatures above 65°C, the carrageenan has a random coil structure. As the wort cools the carrageenan takes a much more compact and ordered helical structure which is thought to drag the protein particles together to form aggregates. The aggregates, having a larger particle radius, settle faster.

Kettle finings are added in the kettle only to allow the carrageenan to dissolve. Wort proteins react with carrageenan as the wort cools and settle as a cold break during fermentation to be removed along with the excess yeast.

The removal of particles and protein from wort has been demonstrated by microscopic examination of pre-filtered beers and protein assay.

As the levels of kettle finings increase, the fine particle counts decrease. It should be noted that the particles below two microns are mostly responsible for blinding filter pores.

Since Kettle Finings remove both particulate and soluble protein, and soluble protein is a component of chill haze, it is unsurprising that the colloidal stability of kettle fined beers is enhanced.

Guidelines for use

- Check that the product is within its shelf life before use
- Ensure that the product is dispersed into the wort and does not stick to the walls of the kettle or be drawn up the stack with the steam
- Carry out optimisation trials to determine the correct rate of use
- Read the Safety Data Sheet prior to use
- DO NOT open the kettle to make the addition unless the boil has been temporarily turned off
- DO NOT add the product significantly earlier or later than the recommended time

Application and rates of use

Protafloc Tablets should be added to the kettle five minutes prior to the end of the boil or to the whirlpool if this is not possible. This allows the powder to dissolve and disperse the carrageenan into the wort. Should Protafloc be added early in the boil, then degradation of the polymer may occur and product efficiency is lost. The reaction between wort proteins and carrageenan is pH dependant and occurs at an optimum pH of 5.3. Below pH 4.4, the reaction does not occur and little benefit is gained from using Kettle finings.

Kettle finings optimisation procedure

The exact rate for a given wort will vary according to the brewery, the recipe and the types of malt and adjuncts used. Typical rates vary from a range of half to three tablets per hl, but a kettle finings optimisation should be carried out to determine this more accurately. Rates of use should be checked when you change supplier or move to new seasons malt.

When the dose rate increases, the clarity improves, but the level of sediment increases. Over-fining will give rise to beer losses in fermentation vessel. The optimisation procedure is as follows:

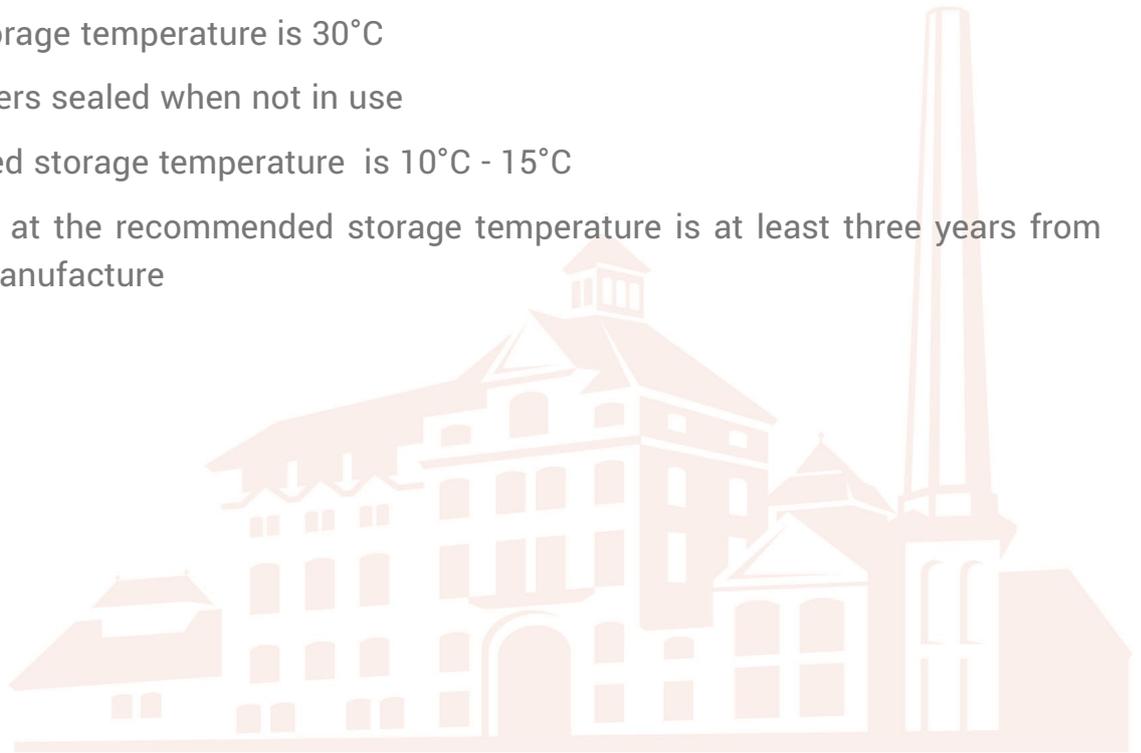
- Make up a solution of kettle finings by dissolving 1g of carrageenan product in a litre of boiling water. (This gives a 0.1% solution)
- Label seven 100 ml measuring cylinders in 5 ppm increments, including a 0ppm control up to 30ppm
- Add a range of finings rates to the 100ml measuring cylinders using a 10ml pipette (0.5 ml of kettle finings solution = 5ppm).
- Take a wort sample (approx. 2L) 15 minutes before the end of the boil and just before the addition of kettle finings.
- Fill the measuring cylinders with 100ml of hot wort.
- Record the wort clarity and appearance of the hot break.
- Cool by immersion in cold water in the bucket for 20 minutes.
- Allow to settle for 2 – 4 hrs and observe the appearance of the cold break, recording the wort clarity and cold break volume.
- Allow to stand for a full 24 hours to get a final result.

- Decide on the optimum rate of kettle finings addition for the beer in question, there should be bright clear wort and compact sediment.

Kettle Optimisation Kits can be purchased from Murphy and Son Ltd

Storage and shelf life

- Store in cool conditions away from direct sunlight
- Keep in original container
- Maximum storage temperature is 30°C
- Keep containers sealed when not in use
- Recommended storage temperature is 10°C - 15°C
- The shelf life at the recommended storage temperature is at least three years from the date of manufacture



PRODUCT	PROTAFLOC TABLETS	PRODUCT CODE	PFT
ISSUE No.	6	DATE	23/11/21
WRITTEN BY	I Kenny	AUTHORISED BY	RJ Haywood

TECHNICAL INFORMATION SHEET:

SUPER F

PRODUCT NAME:
SUPER F

PRODUCT CODE:
MS_SF

COMMODITY CODE:
28391900

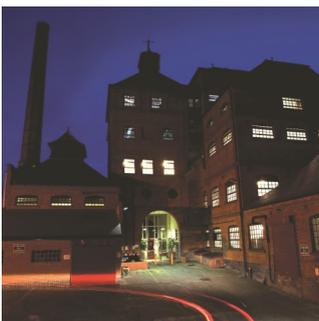
PACKAGING:
5, 25, 200, 1225 KG

Description

SUPER F is a blended formulation that has been specifically designed for the rapid sedimentation of yeast, protein and other haze forming particles producing bright beer..

Benefits

- Helps achieve excellent beer clarity
- Vegan friendly product
- Rapid action finings to be used in maturation and conditioning tank
- Can be used in cask
- Low dosage rates, concentrated formulation
- Super F is stable at ambient temperatures with a long shelf life
- Suitable for breweries worldwide



TECHNICAL SUPPORT

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REGULATORY COMPLIANCE INFORMATION

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HEALTH & SAFETY INFORMATION

Refer to the **Safety Data Sheet (SDS)**

Application

Super F can be added direct to DPV or during transfer of beer from fermentation vessel (FV) to conditioning tank. It can also be added direct to cask.

Rates of Use

Rates of addition are typically within the range of 70ml per hectolitre up to 200ml per hectolitre. The exact rate will depend upon whether or not kettle finings have been used in the Brewhouse, the addition of auxiliary finings, the degree of yeast flocculation, yeast count, pH, temperature and the residence time on chill at the end of fermentation and the strength of the beer. Optimisations should be carried out to determine the dosage rates more accurately.

Optimisation guides can be obtained from Murphy and Son Ltd. Yeast count and viability kits can also be purchased from Murphy and Son Ltd.

Storage and Shelf Life

Store away from bright sunlight.

Recommended storage between 2-35°C.

Do not allow the product to freeze.

Keep in original container.

Shelf life is a minimum of 9 months from the date of manufacture.

PRODUCT	SUPER F	PRODUCT CODE	MS_SF
ISSUE No.	5	DATE	09/06/2022
WRITTEN BY	I Kenny	AUTHORISED BY	RJ Haywood

TECHNICAL INFORMATION SHEET: FININGS ADJUNCT - AUXILIARY FININGS

PRODUCT NAME:
FININGS ADJUNCT

PRODUCT CODE:
FADJ

COMMODITY CODE:
13012000

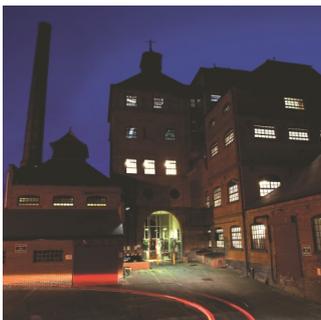
Description

Finings Adjunct is a ready for use product that is used to clear protein and some yeast out of freshly fermented beer. Finings Adjunct is a silicate based auxiliary fining for use in conjunction with isinglass finings to fine cask conditioned beers which are more difficult to clarify.

PACKAGING:
**12.5, 25, 200, 600 AND
1000 KG**

Benefits

- Removes the protein that causes haze in beer
- Improves filterability for bright beers
- Reduces conditioning time
- Leads to polished beers
- Speeds up beer processing
- Easily mixed into beer in fermentation vessel or cask
- Long shelf life
- Suitable for vegan beers



TECHNICAL SUPPORT

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HEALTH & SAFETY INFORMATION

Refer to the **Safety Data Sheet (SDS)**

Principle

Auxiliary finings works with isinglass in cask conditioned beers. With many beers, the best clarity is achieved by using an isinglass finings product in combination with an auxiliary. Auxiliary finings can be added at one of several points: into the fermentation vessel, into the beer main feeding the racking heads or into the cask before it is filled.

Using the product

How much of the product to add

Most beers will require an addition of auxiliary finings at a rate between 100ml to 500ml per hl. It is important to note that if auxiliary finings are being used with isinglass, it must be added before the isinglass.

Where to add auxiliary finings

Auxiliary finings can be added at one of several points:

Into the fermentation vessel

The auxiliary can be added to the fermentation vessel either through the CIP spray ball at the top of the tank or pumped through the outlet valve of the bottom of the tank. The addition should be made at the end of fermentation, as the vessel goes onto chill. The residue fermentation and convection currents are sufficient to mix the product.

Into the beer main feeding the racking heads

This method can be combined with proportional metering to ensure the correct rate of addition. The auxiliary is added first followed by the isinglass finings if required.

Into the cask before it is filled

The appropriate quantity of auxiliary is put into the cask before filling. If the filling rate is fast and turbulent, isinglass can then be added towards the end of the fill or after.

Into cask when in pub cellar

Auxiliary finings can also be added to cask beer in the pub cellar to a beer with a persistent haze, and Finings Adjunct is well formulated for this work.

Using auxiliary finings with isinglass

When using auxiliary finings with isinglass it is important to add it before the isinglass. Otherwise they will not clarify the beer properly. This is because the two products carry

opposite charge and will react with each other rather than the hazes on the beer that they are designed to clear.

Into the beer main feeding the racking heads

This method can be combined with proportional metering to ensure the correct rate of addition. The auxiliary is added first followed by the isinglass finings if required.

Finings Optimisation

Auxiliary finings should be optimised at the same time as isinglass finings as they are used together. This should be carried out on a regular basis and certainly when a new seasons' malt comes on stream. Usage rates need to be optimised both to ensure economic cost is achieved and in order to gain the best possible results. Over fining can cause hazes just as under fining can leave hazes: it is not a case of more finings always giving better clarity. An easy way to check your beer fining performance is by using 500ml plastic bottles. An optimisation is run by making trials to optimise the rate of Isinglass addition within the range of 0.4–1.6 litres per hl by adding 2, 4, 6 and 8 mls of RFU Isinglass to 4 labelled 500 ml bottles and mixing well. Samples containing Auxiliary finings within the range 0.2, 0.4, 0.8 and 1.2 litres per hl are set up to run concurrently.

After an appropriate time interval, which will vary with beer type, an assessment is made of the optimum rate of isinglass required to fine the beer. This will not necessarily be the brightest beer, since the Auxiliary will improve the polish. With the Isinglass we are looking for the point at which an extra pint of Isinglass appears to add only excess bottoms, with no appreciable improvement in clarity. This rate of Isinglass is then added to all the sample bottles of Auxiliary finings, mixing well. It is then quite easy to check the effects of three or four re-settles as required.

Once an optimum rate has been assessed, it is important to keep a check to ensure that it is going to work. Take a sample of the beer, either from FV after fermentation or from the Conditioning Tank/Racking Back. Add to this the equivalent rate of Auxiliary and mix well. An hour or so later add the optimum rate of Isinglass and remix. Within a short period of time you should see floc formation and clarification of the beer occurring. You can then have peace of mind that the beer should fine well in trade.

However the real purpose of this verification is to find the one occasion when the beer doesn't fine. If you do not get a satisfactory result in a milk bottle then you are highly likely to experience a problem in trade. This simple procedure means that you have an

early warning of a potential problem, and that you can take the necessary corrective action whilst the beer is still in one tank and under your full control.

Addition of an 300 ml per hl of Auxiliary for example is rather easier in a tank in the brewery than it is in 40 firkins spread far and wide in the trade.

Clarification products

Murphy and Son will carry out free finings optimisation for our customers. For Isinglass and Auxiliary optimisations please send in one litre of your unfiltered beer. All samples must be in plastic containers, fully labelled and accompanied by a cover letter with full contact details.

Guidelines for use

DO

- Check that the product is within its shelf life before use
- Ensure that auxiliary finings are well mixed into the beer before adding isinglass
- Carry out optimisation trials to determine the correct rate of use
- Read the Safety Data Sheet prior to use

DO NOT

- Mix Auxiliary and isinglass before they are added to beer
- Add isinglass finings before auxiliary finings—it rarely works
- Add too much auxiliary finings. Tank bottoms will be very loose with high beer losses
- Allow the product to have prolonged contact steel and aluminium.

Storage and shelf life

- Store in cool conditions away from direct sunlight
- Keep in original container
- Keep containers sealed when not in use
- Storage temperature is 10°C - 20°C
- Precipitation may occur at low temperatures
- The shelf life at the recommended storage temperature is 12 months from the date of manufacture
- The product may take on an opaque appearance when stored for a long time. This doesn't adversely affect its performance



PRODUCT	FININGS ADJUNCT	PRODUCT CODE	FADJ
ISSUE No.	6	DATE	18/2/22
WRITTEN BY	I Kenny	AUTHORISED BY	RJ Haywood



Mr. Malt® GF-Clear Zyme FAQ

Q. What is Mr. Malt® GF-Clear Zyme and what is it for?

A. Mr. Malt® has repacked valuable brewing enzymes from an industry leading manufacturer to make these solutions available to brewers on a smaller scale. Home brew, brewing trials or for craft and smaller independent brewers. The enzyme is a proline specific endo-protease (PEP) used for degrading gluten and keeping clear beer clear. Enzymatic stabilization can eliminate the need for traditional stabilization techniques such as long-cold maturation, silica gels and even PVPP.

Q. How can it help my range of beers?

A. As a known allergen, a significant number of consumers are attracted to beer that has a reduced gluten. Although it is possible to make beer under 20ppm of gluten without using a PEP enzyme, most craft producers opt for an enzymatic solution due to consistent results and the ease of introduction into the process. It can also be a highly effective way to ensure that chill haze and permanent haze does not become a problem through the shelf life of beers that are designed to be bright and clear. Significant reductions in energy, emissions and costs can be achieved. PEP can be a good match with unfiltered beer where clarity is achieved gently with finings and then stabilized with a simple enzyme addition prior to the start of fermentation. Our PEP has also been shown to improve beer foam!

Q. I don't like using chemicals/aids. Isn't there a more natural way to produce Gluten free & bright stable beers?

A. Most things are possible with beer, but there is always a compromise! Natural is a challenging term with many grey areas. Enzymes are both natural and high-tech as they are created by living organisms but are powered by clever biotechnology, much like modern beer! Gluten free beer can be made with alternative cereals which are often difficult to process (especially without exogenous enzymes). Bright beer can be kept clear with traditional stabilization but cold temperatures are required and it tends to involve more work for the brewer. Gluten reduction can also be achieved through traditional processing but most brewers prefer the enzymatic approach for consistency and convenience.

Q. How does Mr. Malt® GF-Clear Zyme work?

A. Chill haze and eventually permanent haze is formed through beer aging through the interaction of haze sensitive proteins and polyphenols. GF-Clear Zyme targets the proline rich haze sensitive proteins meaning they cannot form large particles through



polyphenol interactions which cause the haze through the scattering of light. Through the enzyme action gluten content is also reduced & measurement is possible to confirm reduction falls below 20ppm.

Q. How should I dose Mr. Malt® GF-Clear Zyme?

A. A simple addition into cold wort prior to the start of fermentation of 0.1-2g/hl of wort. Fast gluten reduction and stabilization have been achieved at low dose rates & typically rates are ~50% lower than benchmark PEPs. PEP addition is simple compared to traditional stabilization regimes & does not require deep cooling to form protein-polyphenol complexes for removal through adsorption. Significant energy savings and lower utility demands are possible. **Contact our technical team for detailed guidance around dosage optimization with different recipes and adjuncts.**

Q. What beers should Mr. Malt® GF-Clear Zyme be used for?

A. Any beers requiring consistent clarity through the shelf life or gluten reduction. For hazy styles, the PEP is not recommended, for hazy gluten reduced beers contact our technical team to discuss your process and the best approach.

Q. Does the activity of Mr. Malt® GF-Clear Zyme continue? How is the enzyme denatured/deactivated & does it impact flavour?

A. The high specificity of the PEP means that the haze sensitive proteins will continue to be targeted until there is no more substrate & the enzyme becomes inactive. Unlike early enzymes targeting haze & traditional stabilizers such as silica gels, foam is **improved** rather than deteriorating through stabilization. Mr. Malt® GF-Clear Zyme is considered a brewing aid/processing aid and is not typically labelled. In depth testing from the manufacturer have shown no significant flavour impacts with controlled sensory analysis.

Q. What about microbial and food safety?

The product is stable under recommended storage conditions, with exacting standards of manufacturing and repacking. Any additions to be and wort should be made with care as the brewer would with any other additions e.g. yeast or dry hopping.

Q. Is Mr. Malt® GF-Clear Zyme a GMO?

A. Mr. Malt® GF-Clear Zyme is not a GMO, does not contain GMOs, and is classified as a technological aid. It is produced by fermentation of microorganisms optimized through modern biotechnologies that are not present in the final product.



Q. Is GF-Clear Zyme Expensive

GF-Clear Zyme is highly effective at stabilizing clear beers and reducing gluten at low dose rates, typically half that of many PEPs on the market. Savings in energy and time can also be significant as is the cost of traditional stabilization products which may no longer be required.

Q. Who can I contact if I have questions?

A. Our technical team our happy to help!

Italian: davide.bombardier@mr-malt.it,

English + German: adam.johnson@mr-malt.it