Please note that the following pack has been developed as part of a distance learning programme that includes a workbased skills assessment and knowledge test.

Due to current restrictions on face to face meetings etc this pack is presented here just for online learning with no offer of a site based assessment.

Seafish and the NFFF are working to offer additional support for fish friers. For more information on this please email onshore@seafish.co.uk or training@nfff.co.uk

Introduction to Fish Frying Skills

Name:
Module Number:

This is a Seafish qualification that has been developed in collaboration with the National Federation of Fish Friers.

Introduction to Fish Frying Skills
A flexible training module for the seafood industry

Contents Page

 ISBN No. 0 903941 03 1

SEGMENT FIVE – FRYING RANGES

SEGMENT SIX – COOKING PRODUCTS

Developed in 2004 by Richard Wardell of Seafish Training with assistance from Arthur Parrington and Arthur Brecknell of the National Federation of Fish Friers and the North West England Group Training Association respectively, based on the original text in the Seafish Open Learning module, “Introduction to Fish Frier Practice”.

Revised and updated in 2019 by Mark Drummond on behalf of the National Federation of Fish Friers and Richard Wardell of Seafish.

General Guide

This will help to explain what flexible training is all about. It will help you to make best use of your flexible training module.

WHAT'S SO GOOD ABOUT FLEXIBLE LEARNING?

Flexible learning gives you the freedom to choose.
You study:

- What you like;
- Where you like;
- When you like;
- At a pace to suit you.

You can pick the subjects you want. You don't have to be in a certain classroom at a certain time. You won't be bored because the teaching is too slow, or lost because it's too fast.

You seldom need any qualifications before you are allowed to study.

All this freedom lets you fit your studying into your daily routine.

The best thing about it for most, is that they can study without taking valuable time off work.

THINGS YOU SHOULD KNOW ABOUT YOUR MODULES

What is a module?

A module is the name we have given to a study package. It will have a printed text.

Each module will be divided into segments. You could think of each segment as a lesson. Each segment has a short introduction and a series of aims.

The Fish Frying Skills training materials consist of two modules, which are the Introduction to Fish Frying Skills module and the Introduction to Food Hygiene and Health & Safety in Fish Frying module.

These materials can be used to provide some of the underpinning knowledge for the Fish Frying Skills qualification awarded by Seafish and the National Federation of Fish Friers.

Please note that temperatures are displayed in Celsius (°C). To convert to Fahrenheit (°F), simply multiply the °C number by 1.8 and add 32.

All weights are stated in pounds (lb) and ounces (oz). To convert ounces to grams (g) multiply by 28. To convert pounds to kilograms (kg) multiply by 0.454.

EXERCISES

At the end of each segment there are a series of exercises for you to complete. These are included to help you with your learning and development. Completion of these exercises will assist you in gaining confidence and will also help you to complete the assessment process.

Upon successful completion of the exercises, you should sign and date in the space provided. This will act as evidence that you have read through the segments and completed the exercises.

You must have **ALL** exercises in your modules signed off, dated and available for your assessor to look at on the day of your assessment. Failure to do so will void your assessment.

HELP IF YOU GET STUCK

At the time of obtaining your module you will be told of any support which can be arranged.

This might be through one of the following:

- Telephone;
- Face to face meeting; *or*
- Email.

HINTS ON STUDYING

When?
Try to get into a regular study routine. Set aside times for study but be ready to give and take a bit. Miss one of your planned sessions if you must, but try to make it up later.

Set yourself realistic targets such as 'I will finish segments one and two by this weekend' and stick to them!

Grab the chance to study at odd moments. You'll be amazed how much you can learn in fifteen minutes. It's difficult for the average person to really concentrate for more than twenty minutes at a time anyway. A word of warning – don't think you can learn anywhere. You need to be able to concentrate; there are often distractions which prevent this.

How?

- Time spent just reading a module is not the same as time spent learning.

- You must become involved, the best learning happens when you're active, e.g. completing the exercises and making notes.

- Don't study for too long without a break.

This module will remind you of suitable places to stop for a while, but if you need a break earlier, take one. It's entirely up to you.

Where?

Try to find somewhere where you will not be distracted. Almost anywhere will do. It all depends on how you are placed at home and at work. Don't forget your local library.

The secret is, **be flexible**. All you need is somewhere where you can get on with it and not be disturbed.

Carry your module with you when you can. Try to find gaps in your normal routine when you could do some useful work.

Now that you've decided to have a go, **stick with it!** Don't give up. Most people find studying hard at times, this is quite natural. It is also quite natural to need help with parts that you find especially difficult. Don't be afraid to ask for help. I'm sure that you'll find it worthwhile.

ASSESSMENT

Once you have read the two modules, (Introduction to Fish Frying Skills, Introduction to Food Hygiene and Health & Safety in Fish Frying), completed all of the exercises and signed them off, you should be ready to complete your assessment.

An assessor will arrange a time and a date to come and assess you at your place of work. The assessment will consist of a multiple choice exam paper, practical tasks and answering questions asked by the assessor.

Upon successful completion, a jointly branded (Seafish and the National Federation of Fish Friers) certificate will be awarded to the candidate.

Segment One – Fish

INTRODUCTION

Buying, preparing and storing fish correctly have a big impact on a fish frier's business. Conducting these tasks correctly can lead to the successful operation of a business. However, if any of these jobs aren't completed to their required standard, then this will have a huge impact on the profitability of the business.

AIMS OF THE SEGMENT

After studying this segment you will be able to:

- List some species of fish commonly sold in fish & chip businesses;
- Explain the advantages of chilled, Frozen at sea and IQF fish;
- State the importance of quality and the characteristics to look for when buying fish;
- Understand issues surrounding fish sustainability;
- Outline some of the rules for storing fish;
- Identify the correct methods of preparing fish by looking at skinning, boning and portioning; *and*
- State why minimising the wastage of fish and consistent portion sizes are important.

CHOICE AND SELECTION OF FISH

What species of fish should I buy?

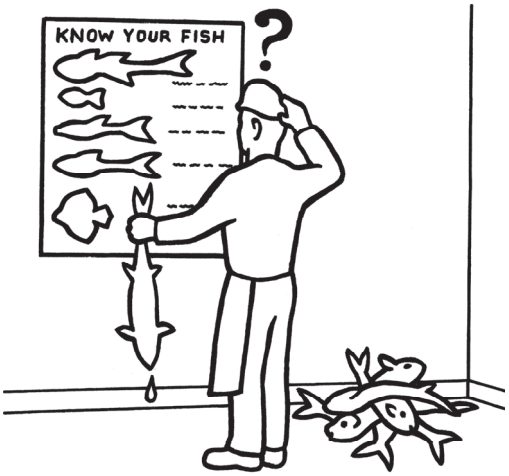
Choosing fish for your shop can be a complicated affair. Some shops offer just one or two species of fish, whereas other may offer a very wide choice of different species.

This will often depend on the part of the country your shop is in. Either cod or haddock will be the best seller and most shops offer both.

Fish may be sold with skin on or skinless. Again, this is often down to regional preferences. Some shops may sell cod skinless but haddock with skin on. This can be helpful in differentiating species when cooked.

Other species you may sell include:

- Plaice;
- Skate;
- Dogfish (Huss);
- Sole;
- Scampi;
- Whiting;
- Hoki;
- Pangasius;
- Monkfish;
- Swordfish;
- Salmon.

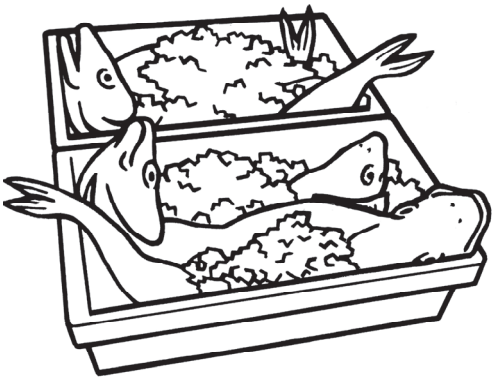


Chilled or Frozen?

Once you've decided on the types of fish you wish to buy, you can buy it chilled (often referred to as "wet fish") or frozen. Frozen fish can come in various formats.

Chilled Fish

Chilled fish is caught and packed in ice on the boat. Some boats are day boats (meaning they fish for one day and land each morning) whereas others will fish for several days at a time before landing their catch.



If you buy chilled fish, you'll need to get the weight put onto the invoice and you should check your weights regularly. A short-weight means a loss of profits. Chilled fish needs immediate handling. The contents of the box should be separated out, re-iced and then put straight into your fish fridge otherwise the whole point (freshness) will be lost. Chilled fish must be kept **moist** and should be delivered and stored at a temperature of approximately +1^{o}C to +2^{o}C. Try not to order more fish than you expect to use within two days.

Chilled fish can be bought as “counts” which are individual fillets size graded (so a set number of fillets per stone (14lb) box of fish) or as larger fillets that can be cut into portions.

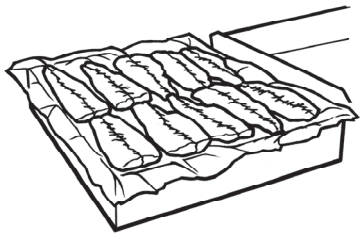
One disadvantage of chilled fish is that its price varies as the supply varies. This makes predicting your profit margins more difficult.

If buying chilled fish it is important to know when it was caught and also that it hasn’t been previously frozen then “refreshed” as this could affect the quality.

Frozen Fish

Frozen fish comes in three categories: frozen-at-sea block fillets (FAS), frozen-on-shore block fillets and IQF (Individual Quick Frozen). When it is delivered to your shop, the temperature of the fish should be no warmer than -15°C. This should be checked and recorded for each delivery.

Fish that is frozen at sea is of a high quality as it is usually not more than four hours old when it is frozen. FAS fish can be bought in various size grades, commonly 5-8oz, 8-16oz, 16-32oz and 32oz+. It can be bought skin on or skinless, pin bone in or boneless. Tight graded FAS fish is also available, usually skinless and boneless in 4-6oz, 6-8oz, 8-10oz, 10-12oz (odd number gradings such as 7-9oz are available from some boats). These options cost more to buy but can result in less preparation work and minimal waste, compared to buying larger fillets and boning and portioning them to the required size. However, every fish frier should have the ability to portion larger fillets in case the usual size they buy is not available.



On-shore frozen fish will be slightly older when frozen but can still be of a high quality. This comes in the same format and gradings as FAS fish. It is important to know when buying if fish was frozen at sea or on-shore.

IQF can be frozen on the boat or on shore after being landed. IQF fish has a glaze added. The amount of glaze can affect the quality of the fish. IQF is usually bought by fillet weight (for example 7-9oz) and can be cooked from frozen or defrosted before use.

Block frozen fish needs different organisation from chilled fish as you need to get it out of the freezer in advance. You therefore need to know your likely customer demand in order to decide what you’ll need tomorrow. It is very important that fish is defrosted correctly and only allowed to reach a temperature of around 0°C to +2°C to both ensure food safety and to maintain the quality.

Always follow the instructions for defrosting.

Frozen fish should **never** be re-frozen after it is allowed to thaw.

Which is best?
Generally, which fish you choose will depend on your preference.

It used to be said that chilled fish is fresher than frozen fish, but with correct handling and quick-freezing methods, this need not be true.

- Frozen fish maintains a predictable price.
- It is always available.
- The quality of frozen fish is consistently high.

IQF fish can be very convenient for species where you only sell a small number each day, as it can be cooked directly from frozen or small numbers of individual fillets defrosted each day.

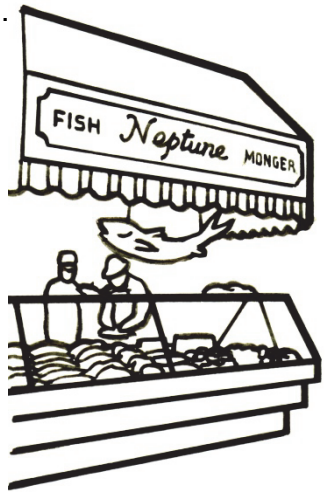
The best way for you to decide is to think about:

- The availability;
- The all the year round cost;
- Preparation time, skills needed and wastage levels; *and*
- Your customer preferences.

Then decide which type would best suit your organisation.

Where to buy Fish
Chilled fish is usually bought from specialist fish merchants.

FAS and IQF can also be bought from fish merchants, but is also available from many frozen food wholesalers and companies that supply other products to fish & chip businesses. It is very important to have a good relationship with your fish supplier.



Some considerations to take into account are:

- Availability of a consistent supply;
- The cost of fish;
- Order-delivery time;
- Delivery days;
- Sustainability; *and*
- Payment arrangements (e.g. credit).

Your fish supply must be quick, efficient and reliable. A fish & chip shop without fish will suffer badly. Ask other fish friers about where they get their fish. If they'll tell you and they're happy, that's a good recommendation.

If at any time your delivery of fish is sub-standard, you should place it in a fridge or freezer marking it "not for use". You should then contact your supplier and arrange for it to be returned on the next delivery.

Fish quality

Whatever fish you buy, it is important that it is of the **required quality.**

If you are going to buy **chilled fish fillets** you should look for:

- Clean white fillets;
- Wet fillets;
- No worms; *and*
- No "off" odour.

The table below indicates some of the specifications that you should look for when buying **chilled fish fillets**. These specifications apply to all **white fish** including cod, haddock, coley, whiting and hake.

Specification	**What to look for**
Colour (blemishes)	There should be no signs of bruising, blood clots or discolouration.
Bones, skin and belly lining	Only the pin bones should remain. All of the other bones should have been removed during filleting.
Worms and parasites	Occasionally, nematode worms can be present and these must be removed. No other visible parasites should be present.

Eating quality	The fillets must not contain abnormal intrinsic odours or flavours such as 'weedy' or 'diesel' flavours.
Packaging	Chilled fish should be packed in lidded, water-resistant packaging of such material that will not impart a taint to the product.

With **frozen fish**, the rules are different. You must check that the fish is still properly frozen and that any packaging is intact. You do not want to serve fish suffering from freezer burn. Extensive freezer burn causes the flesh to dry out and the texture is like suede. Early signs of freezer burn take on a whitening of the fillet edges.

Block frozen fish can also be damaged whereby the fillets are shattered by being dropped when frozen. Occasionally FAS fish can be mislabelled with the incorrect species or fillet size.

If you have any problems with the quality of the fish that is delivered to you, it's recommended that you discuss these with your fish supplier.

Sustainability

Whatever fish you buy and in whatever format you buy it, it is imperative to ensure it is from a sustainable source. Selling fish that isn't from sustainable sources could severely damage your business reputation. Many customers care about sustainability issues, and also it's simply "the right thing to do".

There are various ways you can ensure your fish comes from sustainable sources. Firstly, ask your fish supplier. They may be able to provide you with a letter you can display that states you only buy sustainably sourced fish.

The Marine Stewardship Council (MSC) has a certification scheme for sustainably sourced fish. If the fish you are selling is from an MSC certified boat and supplier, you can be confident that it is sustainable. However, there are strict rules about using the MSC name and logo, and you can only do so if you are audited by MSC and licenced to do so (there is a cost involved in this). Many shops have gone through this process and now have MSC Chain of Custody certification, and can display the MSC blue logo against the fish they sell. It can be a very good marketing tool that justifies the cost. It is important to note that even if you only buy MSC certified fish, you cannot display the logo or make claims about your fish sustainability using the words Marine Stewardship Council or initials MSC unless you have been audited and paid the licence fee.

The Marine Conservation Society (MCS) produce an annual 'Good Fish Guide' which uses a traffic light system for rating 'fish to eat' and 'fish to avoid'. This is free for all to use, and is a useful tool for helping to ensure the fish you sell is sustainable.

Seafish has an online resource known as RASS (Risk Assessment for Seafood Sourcing). Although this doesn't give fish a rating, it is a very helpful resource for finding out information on any fish you could potentially buy.

Many shops now display to their customers which boat caught the fish they are selling, and in which area of the sea it was caught. Traceability is very important to be able to do this.

STORING FISH

If you are storing chilled fish, don't let it dry out. The temperature of chilled fish should be checked and recorded on each delivery. Chilled fish should be de-boxed and put straight into the fish fridge. Check it regularly for quality. As stated previously, it should be stored at a temperature of around 1°C to 2°C. It is important the trays used to store fish have false bottoms so that the fish does not sit in its own juice, as this can affect the flavour. Species should never be mixed in the same tray.

With chilled fish, there is no use by date on the boxes. When boxes of fish are split up you will need to mark each container with either a delivery date or an appropriate use by date. There are a number of ways of doing this. Choose the method that suits you best. Then, when you receive another delivery of chilled fish, this can be placed to the bottom of the fridge with the older stock moved to the top, so that the older stock is used first. The sooner you use your chilled fish, the better the quality will be.

Frozen fish must be stored in a freezer at -18°C or below and not left exposed or to thaw out. If you are storing frozen fish, it must be rotated accordingly. This means that the product with the longer life (the one with the catch date nearest to the current date) should be put to the bottom of the pile. This should ensure that the product with the shortest life (the one with the catch date furthest from the current date) should be at the top of the pile and thus used first. Rotation of your stock should ensure that you don't have any product going beyond its best before date. If you do have fish that goes beyond its best before date, it means that you are going to have to dispose of some of your stock, or use fish that may be poor quality which will impact on your profits.

You should never prepare more fish than you need. Fish lying around on a board on your work surface is deteriorating. **Always put fish back into the refrigerator if you don't need it immediately.** If you're using frozen fish, don't try to separate the fillets straight from the freezer. Block frozen fish can be defrosted in a fridge but this can take up to 72 hours so is not always practical. Most friers defrost fish in a cool room (a potato storage area can be the ideal temperature of 7°C to 10°C). Depending on the room temperature this could take up to twenty-four hours. Remember that the time of the year will impact on the room temperature. It is essential fish isn't over defrosted or allowed to get warm. The cloudy liquid that you can see in your tray contains fish juices. You are therefore pouring away the goodness of the fish.

Once defrosted it should be handled just the same as chilled fish.

Careful storage of your fish ensures that your customer gets top quality products and returns.

HOW TO PREPARE FISH

The three main processes in preparing fish for your shop are:

- Skinning;
- Boning; *and*
- Portioning.

Not all fish friers skin their fish. Some areas of the country prefer their fish to be skinned and some don't. Find out what the customers want in your area. If selling fish skinless, it is better to buy your fish ready-skinned as the cost saving of buying skin on fish is outweighed by the loss of weight in skinning and the time and effort taken.

Whether you bone your fish will also depend on where your business is. Most customers expect their fish to have the bones taken out. You can buy fillets that are already boneless or can remove the pin bone yourself.

There are three main ways of taking out the bones in fish:

- The V-cut;
- The J-cut; *and*
- Using pliers.

Whichever method you use, make sure that you do not damage the fish or waste too much stuck to the bone. Boning should be a 'clean-cut' affair, and the fish should look reasonably complete at the end of it. You should take into account the time taken for boning fish by each method, as well as the cost savings as your time is valuable.

Portioning fish should be done with the right size and thickness for your portions in mind. Choosing the size grading to buy that works best for the portion size you wish to sell is very important. Cutting should be done with care and a very sharp knife. Many friers cut at a 45^{o} angle (this makes the portion look bigger). Try to look at your fillets carefully before you cut them, as you don't want lots of little bits left over at the end of the day, which would affect your profit margin. You need to make your portions look the same size, be the same thickness and weigh the same for consistency both in terms of cost and customer expectation, and also frying time.

Selling more than one size portion is common and choosing the sizes that you sell can help minimise waste. Many shops also sell fish bites to help use up small pieces that would otherwise be wasted.

Wastage

Let's look further at wastage. Why is it so important? Wastage means a loss of profits for a business. You're in business for profit, so you must try to minimise wastage as much as possible.

As far as fish goes, the following lists the main wastage areas:

- Poor cutting, skinning and boning;
- Thawing out too early (you can't re-freeze);
- Buying too much chilled fish at once;
- Poor portion control;
- Preparing too much fish for the day;
- Letting chilled fish dry out; *and*
- Not bringing older frozen fish to the top of the freezer.

If you get these areas under control, you should find that you don't waste your money by throwing fish away due to one cause or another.

Making homemade products like fishcakes or fish pies is another way to help minimise fish wastage.

Work out what your wastage rate is as it is important to know this for budgeting, and also in the case of a tax inspection.

EXERCISES

State two ways to ensure your fish is from sustainable sources: 1. 2.
Check the temperature of your fish when it's delivered and record the temperature below. Chilled fish temperature = or Frozen fish temperature =
Candidate's signature and date

We have now reached the end of segment one and you should feel more confident in buying, preparing and storing fish.

Perhaps take a break before moving on to the next segment.

Segment Two – Batter

INTRODUCTION

Good batter is essential to your trade as a fish frier. Poor quality batter could affect business, so it's important that you know what you're doing. You can either make your own batter or use one of the proprietary brands.

AIMS OF THE SEGMENT

When you come to the end of this segment you'll be able to:

- State what choices are available for you to make batter;
- Explain how to store the ingredients used to make batter;
- Describe the advantages of hand whisking and machine mixing batter;
- Explain how to make the batter you use;
- Describe how to check the consistency of a batter;
- Understand why friers may choose to pre-dust; *and*
- Describe the effect of poor batter on the quality of your product.

SELECTION OF BATTER

Proprietary brands or own recipe?

Some fish friers make their own batter while many use a proprietary brand. The biggest advantage of using a pre-mixed batter is that you know, if you follow the instructions, that it will be consistent. Good batter needs the right grades of flour and other ingredients in a correct balance. It should coat the food evenly and fry crisply. Good batter should 'look good' in terms of colour. You may find that pre-mixed batter helps you achieve all this. Another advantage in using a proprietary brand is that it is quick to use. You can store it in advance too; so you can meet sudden extra demands. Pre-mixed batters are specially blended not to absorb too much fat.

To the inexperienced fish frier, pre-mixed batter may be of considerable help.

There are many brands of batter available and each company makes several different mixes to suit different tastes. Look around at the type of pre-mixed batter on the market. Asking suppliers or other friers which mixes are most popular in your area can give a good guide.

If making your own batter, you need a good grade of bread flour or biscuit flour, a raising agent and possibly salt and/or colouring to taste. The usual raising agent is bicarbonate of soda. Making your own batter can make you unique and stand out from the crowd if you have a good recipe that your customers like.

Some friers make their own batter using plain flour and a batter powder. A batter powder is a product that contains the ingredients usually in a pre-mix batter other than the flour. This allows the frier to choose the ratio of quantities of ingredients and choose a brand of flour that best suits their needs to make their batter unique while still giving consistency.

STORAGE OF INGREDIENTS

- The plain flour or pre-mixed bags should be stored in a dry place. (The bags should never be allowed to become damp.)
- Store loose flour in bins with tight-fitting lids
- Do not leave partly used bags open to the air

HOW TO MAKE BATTER

Hand whisk or machine mix

Batter can be mixed with a hand whisk or a batter mixing machine. It is important not to overmix batter as this can make it go flat. It is very hard to overmix batter by hand but if using a machine mixer it is important to limit the mixing time to around 1 minute, to avoid over mixing.

A hand whisk is cheap to buy whereas a batter mixing machine costs several hundreds of pounds, but for a busy shop making a lot of batter a mixing machine can be a huge labour saving device, and can help with consistency if used correctly.

Method

Obviously, a pre-mix batter will only work well if you follow the instructions properly and an own recipe batter if made consistently. To mix batter properly you should:

- Always use **cold water chilled in a fridge (ideally under +8°C and no more than +15°C);**
- Add the mixture/ingredients to the water;
- Whisk briskly whilst adding it;
- Make sure it's smooth and the correct consistency (see next paragraph); *and*
- Allow to stand in a fridge for around 30 minutes.

WHAT GOOD BATTER SHOULD LOOK LIKE

What is considered to be good batter will change from place to place. Make sure you know what people in your part of the country prefer. But, as a guide, good batter should be thin. Thin batter is not only economical but gives good results. Ideally batter ought to be the consistency of **thin cream**. There are several ways to test the thickness of your batter:

- A flow cup – some batter manufacturers supply flow cups to test the flow rate of their batter. You fill the cup and time how long the cup takes to drain. Depending on your batter this time will be anything between 15 and 45 seconds. There is not a single correct flow time, but every batter you make should be the same flow time to give consistency.

- Figure of 8 test – if you make a pattern of a figure of 8 on the surface of your batter with the whisk it should just disappear as you get back to the start.

- Back of a spoon – the batter should slide off the back of a spoon so you can see the spoon but it shouldn't disappear entirely.

PRE-DUSTING

Some friers will coat fish with either rice-cones, rice flour or batter mix/flour before battering their fish. This is to ensure the surface of the fish is dry which helps the batter stick. If a pre-dust is used, a thinner batter is usually used than if no pre-dusting is done.

THE EFFECT OF POOR BATTER

You want your end product to appeal to your customers. The end product should be properly cooked and nicely presented. Poor quality batter could seriously affect business. If you make the batter too thick, it will be soggy on the inside. You may also prevent the fish from cooking properly. The product will not look crispy and inviting. If too thin the batter won't fully cover the fish and parts may blow away, resulting in dry/burnt patches on the fish.

Batter scraps: It is worth noting that batter scraps must be stored in a metal container with a lid, outside the main building, prior to disposal. Larger quantities may need dousing with water to cool them. This is because batter scraps are capable of spontaneous combustion.

EXERCISES

Make up your normal quantity of batter and measure its temperature before use. Record its temperature below. Batter temperature =
Record the temperature of the batter when the batch has almost been used up (to find out if your batch of batter warms up too much during use). Batter temperature =
Record the difference between the two temperatures recorded above. Difference in batter temperatures =
Candidate's signature and date

You have now completed segment two. Perhaps take a break before moving on to the next segment.

Segment Three – Potatoes

INTRODUCTION

Potatoes are a very important part of a fish frier's life. It is vital that your chips are of a high quality and that you avoid selling a greasy product. There's nothing worse than soggy chips for spoiling your reputation and therefore your trade.

AIMS OF THE SEGMENT

By the time you've worked through this section you'll be able to:

- List some varieties of potato;
- State what affects the chipping quality of potatoes;
- List other factors in buying such as:

  disease,
  conditions,
  age,
  sampling.

- Explain the effect of potato wastage on your profits;
- State how such wastage can be limited;
- Identify the correct methods of storing potatoes;
- Outline the stages in the preparation of potatoes for chipping;
- State the effect of a high sugar content on frying chips;
- Explain the difference between prepped chips and chips prepared from raw potatoes; *and*
- State the importance of portion size and appearance.

CHOICE AND SELECTION OF POTATOES

Using prepared chips or preparing your own?

Historically, most shops have bought whole potatoes and made their own chips. Now, many shops are buying in prepared chips.

If you prepare your own chips you have full control over the process, but you need the space to store sacks of potatoes and to undertake the preparation and you have the time (or labour costs) of doing so. Prepared chips cost more to buy but saves space and time. If you choose to use prepared chips you need a high quality supplier who can provide a regular supply of chips that meet a high standard of preparation and quality. It is then also essential they are stored and used correctly. One potential downside of prepared chips is you will not usually be offered a choice of variety of potato used to make them, or a choice of cut size (thickness) of the chips.

Potato variety

There is no variety of potato which can be said to give a consistently high chipping quality all year round. The potato season starts around July when first early varieties are available and main crop varieties from late August/early September.

Good chipping grade potatoes will contain 20-22% dry matter. If lower than this, chips will fry soft and soggy, if higher chips will be very dry. The amount of dry matter is mainly determined by variety, but also growing conditions. You cannot test the dry matter content yourself, but your potato supplier should be able to tell you the dry matter content of each batch.

New varieties are being developed all the time, but the following are just some of the varieties available at the time of writing. (A good potato merchant will be able to provide you with an up to date comprehensive list of suitable varieties).

Earlies:

- Casablanca;
- Accord;
- Maris Bard;
- Amora;
- Miranda;
- Toronto.

Main Crop:

- Cabaret;
- Divaa;
- Maris Piper;
- Challenger;

- Fontane;
- Ramos;
- Performa;
- Markies;
- Agria.

All of these can be used for making chips, but whether or not they will be consistently good depends on several things.

What affects the chipping quality?

Soil and Weather

The condition of a potato when it reaches your shop will be brought about by the soil and weather conditions under which it was grown. The same potato grown in different soil or in a different part of the country will be a different quality potato.

The conditions potatoes have been stored in

When a potato becomes chilled in cold weather through either being stored at very low temperature (below +5°C), on a cold floor or in a draught, the potato undergoes a change that converts some of its starch to sugar to provide energy to combat the cold.

Potatoes affected this way, when chipped and fried will turn dark brown in colour. This is called caramelisation. The resulting chips will also taste sweet and will soon become soggy.

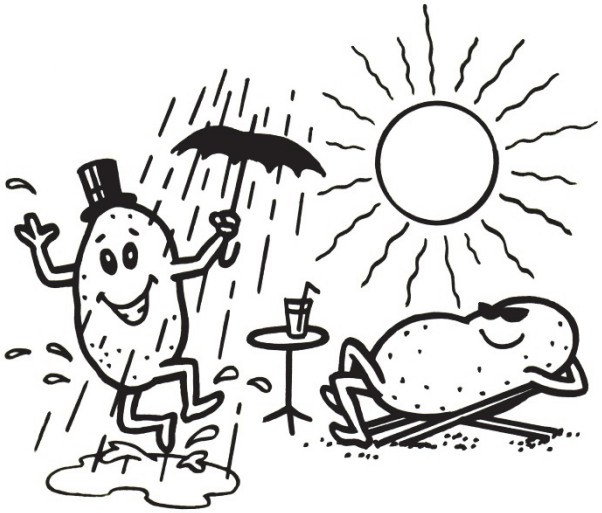
Each batch of potatoes delivered should be tested for sugar content before being accepted. To produce even coloured chips, it is necessary to ensure that potatoes contain no more than 0.25% sugar.

Use a sugar testing kit available from some sundries merchants, or you can use Diastix, which are diabetic reagent sticks available from pharmacies.

Cut a small potato in half; hold the stick between the closed halves of the potato for 30 seconds. Compare the resulting colour change with the chart on the side of the tube. This will indicate the severity of any sugar level increase.

Potatoes with a high level of sugar can be treated with a product such as Drywite Starch Doctor or, after washing out excess starch from the chips, place them in a tub and cover them with very hot water and allow them to cool. This will leach out the sugar.

Condition



The physical condition of the potato is important because it can cost you money. Badly damaged potatoes will lose more weight than 'perfect' potatoes. This applies also to:

- Oddly shaped ones;
- Potatoes which have started to sprout because of poor storage; *and*
- Diseased potatoes affected by blight. (Such potatoes will be mottled brown on the outside and marbled grey on the inside.) They lose more weight because they get left in the peeler (rumbler) longer and more of the flesh disappears with the imperfections.

Age

The age of the potato is important for the length of time it will take to peel it. When potatoes are newly harvested, their skins are thin and easily removed. As they age, the peeling time increases. The time increases also because of the lower water content of older potatoes that are more 'rubbery' than newly harvested ones.

For any new batch of potatoes, it is best to prepare a sample and test fry them to ascertain their quality.

Every sack of potatoes should be marked with:

- The name of the grower;
- Variety of potatoes; *and*
- The weight of the contents.

This applies to prepped chips too, but these should also have a production or best before date shown.

You should also check that the weight is on the invoice.

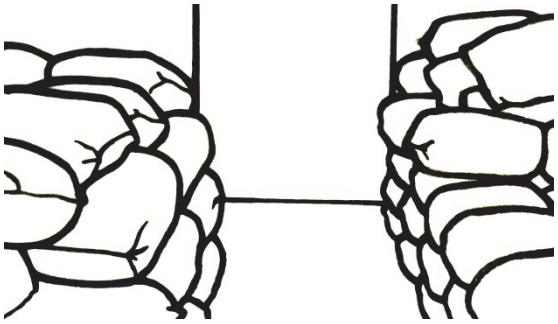
HOW TO STORE POTATOES

- Potatoes must be stored on pallets in a dry, dark place at +7°C to +10°C, away from walls to allow air circulation. Damp potatoes will sprout or go mouldy;

- No higher than six bags high to prevent the weight of potatoes causing bruising;

- Sacks of potatoes don't have a best before date on their packaging. So, it is good practice to write on the packaging the date that they were delivered. These potatoes must then be placed beneath any existing bags. This will ensure that your oldest potatoes are used first and will also reduce the chances of your stock becoming substandard. Remember that potatoes that are substandard will impact on your profits, as you will have to dispose of these potatoes.

Correct storage of potatoes is easier if you don't buy too many at one go. Buying in bulk is not necessarily economical if you're going to lose some of the



stock. Also, if there's any disease, you'll find it will spread through the whole supply.

PREPARATION TECHNIQUES

Empty potatoes into buckets, taking care to watch for stones and other debris. Remove very large potatoes at this stage and rumble them separately; this will prevent them pushing smaller potatoes to the bottom of the peeler and wearing them flat causing excess waste. Never overfill the peeler, always allow room for potatoes to move about, then the smaller ones do not get trapped on the bottom plate.

Test each delivery of potatoes for the optimum peeling time. Under normal circumstances 1½ minutes is sufficient to remove all necessary peel and most slight blemishes. Longer than this can cause unnecessary waste, as the rumbler removes flesh. Eyes and deeper blemishes should be removed with a potato peeler. **Never use a knife, unless major trimming is required or to cut large potatoes to avoid jamming in the chipper.**

Potatoes may be peeled and stored in water overnight whole, but chips should not be stored under water. Chipped potatoes must be rinsed in cold water to remove excess starch. Since you are trying to provide dry chips for your customers, many friers use an anti-oxidant preservative, such as Drywite, that you add to cold water. The chips should be soaked for 15 minutes and allowed to dry for an hour before cooking. This leaves the chips in a dry condition, protecting your frying medium, and the chips absorb less fat. The preservative is dispelled in cooking, so there is no taste attached to the food. The manufacturers of these products give advice on its use and storage times.

If you do not use a potato preparation preservative, you need to find an alternative method of ensuring your potatoes are adequately dried before frying without them discolouring.

Storing uncooked chips

Once you have prepared your chips they should be stored in a cool place with a lid covering them until needed. Chips prepared correctly using a potato preparation preservative will keep up to 48 hours in ideal conditions, but the warmer the place where they are stored, the shorter the time will be before they start to deteriorate in quality.

Chips bought in prepared should be stored in a fridge between +2 to +5°C. Before use the bags should be opened and any excess water drained off before tipping them into barrels. They can then be used just as chips you have prepared yourself. It is **not considered best practice** to fry prepared chips directly out of the packaging.

EXERCISES

Describe below using brief notes, the conditions in which your potatoes or bought in prepared chips are stored. (State which)
How would you measure the sugar content of your potatoes?
Record the variety and source of the potatoes you are currently using.
Candidate's signature and date

You have now completed segment three.

You may feel like taking a break before considering the next segment.

Segment Four – Frying medium management

INTRODUCTION

Your frying medium is as an important part of your product as fish, potatoes and batter. Choosing the correct frying medium and ensuring it remains in prime condition is of utmost importance to the success of a fish & chip business.

AIMS OF THE SEGMENT

By the time you reach the end of this segment you should be able to:

- Be aware that different regional areas prefer different frying media;
- List several different frying media and their qualities;
- State the causes of deterioration of frying media;
- How to recognise signs your frying medium has broken down; *and*
- Understand how to dispose of broken down frying medium correctly.

CHOOSING A FRYING MEDIUM

When you are deciding which frying medium to use, you need to consider customer preferences, which will depend on the area of the country in which your business is located. Some parts of the country prefer the taste of vegetable based media, while other areas expect the taste of beef dripping in traditional fish & chips. These preferences are personal, but you should find out what is generally used around you.

Which frying media will you choose?

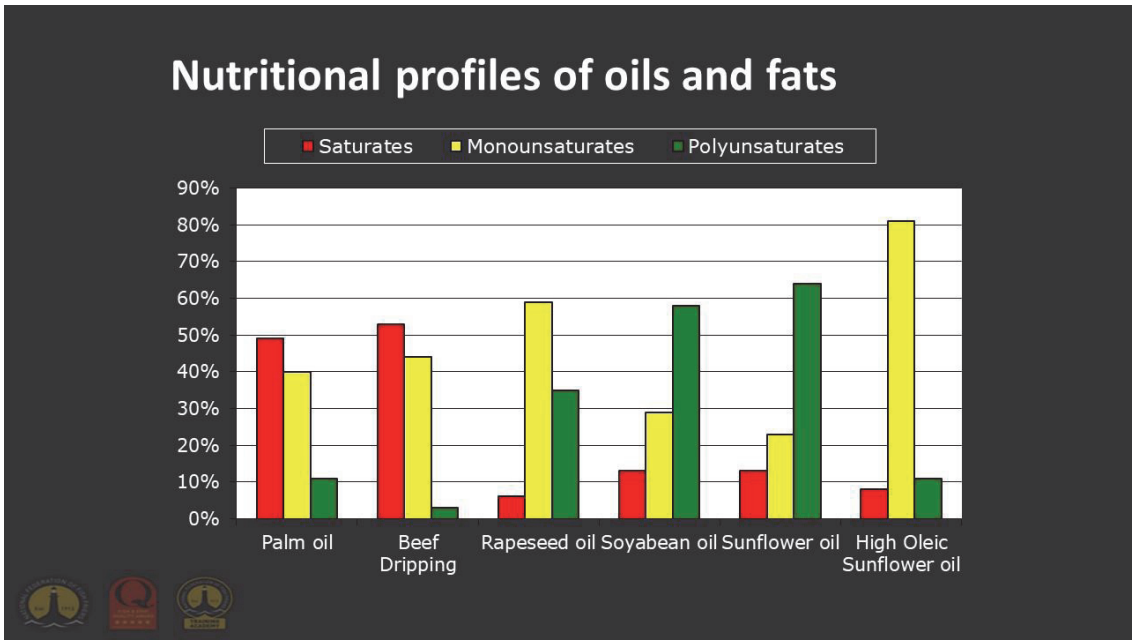
LIQUID OILS

- Groundnut
- Rapeseed
- Soya
- Sunflower oil
- High oleic sunflower oil

SOLID FATS

- Dripping
- Lard
- Palm
- Hydrogenated palm
- Hydrogenated rapeseed

Different frying media behave in different ways. This is mainly due to their basic chemical make-up. Some fats are more stable than others. Saturated fats are more stable under frying conditions than unsaturated fats.



Source: National Federation of Fish Friers Healthy Frying Techniques course

Health concerns

Food Standards Agency guidelines recommend the public limit saturated fat in their diets, as some scientists believe excess saturated fat in the diet increases the risk of coronary heart disease. **Artificial trans fats occur in high levels in hydrogenated fats so it is strongly recommended they be avoided**. Trans fats also naturally occur in small quantities in animal fats and are not considered to pose the same health risk.

The choice of which frying medium to use is therefore down to a balance of choosing a healthy oil, but also a stable oil when frying, along with the all-important taste factor. You need a frying medium which the majority of your customers like the taste of.

Smoke points and flash points of frying media

Smoke point: The temperature at which the oil gives off a visible stream of smoke.

Flash point: The temperature at which the oil gives off vapours which can be ignited in the presence of a flame.

For most fully refined vegetable oils the smoke point will be around +230°C and the flash point around +325°C. This is well above the normal frying temperature and explains why fresh oil does not smoke when heated. However, when the oil is used to cook food, breakdown products are formed (often referred to as artificial free fatty acids) which reduce the smoke and flash point temperatures. After a time, the oil degrades to the point where the smoke point falls inside the frying temperature range.

Fully refined beef dripping will have a slightly lower smoke point and flash point due to the presence of small quantities of naturally occurring free fatty acids. Traditional (yellow) beef dripping is likely to smoke at frying temperatures so is now rarely used.

Source: NEODA document - "Smoke without fire"

WHY DO FRYING MEDIA DETERIORATE?

Here's a list of things that will shorten the life of your frying medium:

- Oxygen (exposed to air too long);
- Water (frying chips which are too wet or products with ice crystals on them);
- Excess heat (frying at too high a temperature or inaccurate thermostats);
- Allowing the frying medium to come into contact with copper or brass;
- Carbon not being removed;
- Traces of cleaning fluids left in the pans after cleaning or on equipment;
- Adding unrefined fat by frying meat products not in batter;
- The pans are over loaded with fish and/or chips; *and*
- Too high a sugar content in the chips.

Let's look at these more closely as the deterioration of the frying medium is a serious problem for many friers.

Oxygen – Oxidation is responsible for the ageing of the fat due to the transfer of oxygen from the air, as fat is porous. For each 10˚C increase in temperature, the rate of oxidation doubles. Good frying practice is to cook products in only enough oil or fat to cover the thermostat probe throughout the frying session. You can then top up daily (ideally adding at least 1/3 of the depth used each day) with new oil or fat to replace that taken up by the product and pulled out with the steam by the extraction system. This keeps the oil or fat fresh and oxygen levels low.

Water – Hydrolysis is triggered by water from the food being cooked into the oil or fat. The drier the food when introduced to the oil or fat, the less water the oil or fat will absorb. Good practice is to drain the chips before cooking. Frying dry chips gives a healthier product and because the temperature drop is lower during cooking, it reduces the amount of gas required and therefore saves money.

Excess Heat – Excessive heat will lead to oil or fat burning and a build-up of free fatty acids. A level of 5% leads to rapid breakdown. Good practice begins by making sure the thermostats are calibrated. Pans should be heated slowly in stages to avoid overshooting or melt cycles used if available. Pans not being used should be turned off.

Carbon – Batter scraps and breadcrumbs sink to the bottle of the pan and burn, turning to carbon, which is an excellent conductor of heat. These create hotspots and burn the fat. Good practice is to use a 50 micron sieve after each fry and to use either in-built filtration or an external filtering machine.

Cleaning materials – These are designed to breakdown fat! It is therefore very important no traces of cleaning fluids are left after cleaning the frying range and any other equipment you use when frying.

Frying other products – Unrefined fat in meat-based products including sausages and burgers burns at a lower temperature, which leads to a faster breakdown of refined oils and fats.

Repairing equipment with solder – Solder contains copper and brass which reacts with the oil or fat causing it to break down very rapidly.

Overloaded pans – Putting too much food in a pan at a time can cause too big a temperature drop and also increases the amount of water in the frying

medium so should be avoided.

Sugar - Excess sugar in the chips causes a chemical reaction with the oil which increases the rate of breakdown of the frying medium.

IDENTIFYING FRYING MEDIUM BREAKDOWN

Some signs that your frying medium has broken down are:

- Foaming when frying chips;
- Very fine bubbles around other products when frying;
- Darker colour;
- Rancid odour;
- Soggy, greasy product; *and*
- Smoking at lower temperatures.

Some frier's use an electronic devise that measures TPM (Total Polar Molecules) in the frying medium, which gives a measure of degree of breakdown. Frying medium no longer suitable for frying good quality product is likely to have a TPM reading of over 23%.

In a well-managed business it should not be necessary to routinely dispose of frying medium on a regular basis, but it is essential to replace frying medium if it has broken down.

Corrective actions

If your frying medium in any pan is broken down there is no way to "mend" it. All of the frying medium in that pan should be emptied and the contents put into a waste oil recycling container. **Oil or fat should NEVER be poured down the drains.**

Note: Oil should only be disposed of at a safe temperature, ideally below 40°C.

If the frying medium from one pan has been disposed of, it is best practice to split the frying medium in the remaining pans between all pans and top each pan to the required level.

Taking care of your frying media makes good business sense. It saves on the cost of oil or fat and also improves the quality of your cooked product which encourages customers to come back.

EXERCISES

State which frying medium you use in your business and why.
Write down four factors that cause your frying medium to break down.
Visually assess the condition of your frying medium today and record your findings.
Candidate's signature and date

You have now completed segment four.

You may feel like taking a break before considering the next segment.

Segment Five – Frying ranges

INTRODUCTION

Your frying range is the most important (and most expensive) piece of equipment in your business.

There are many makes of frying ranges but they fall into two categories and three formats.

AIMS OF THE SEGMENT

By the time you reach the end of this segment you should be able to:

- List the different categories of frying range available;
- List the different formats of frying range available; *and*
- Understand the differences between ranges.

TYPES OF FRYING RANGES

Traditional ranges: These ranges all have flat bottomed pans that are heated from below. Pans are all identical and can be used to fry any products and all products are usually “free fried” (not in baskets).

High efficiency ranges: These ranges are more technical and often have pans designed to fry just chips or just battered products. They may have round pans or pans with sloping bottoms. Many high efficiency ranges are designed to basket fry chips. The pans are usually double skinned and the oil heated by passing hot gasses between the skins.

High efficiency ranges are more powerful than traditional ranges and tend to drop less (if at all) in temperature when products are introduced. They use less gas (or electricity) to run as more of the energy from the gas goes to heating the oil. They are more expensive to buy, service and repair but tend to have a higher output per pan than a traditional range. Basket frying allows for smaller quantities of chips to be cooked at a time, but also the flexibility to introduce more product quickly if needed.

STYLES OF FRYING RANGES

Both traditional and high efficiency ranges can be the following formats:

Wall ranges: the range is fitted against a wall and the frier works with their back to the counter.

Counter ranges: the range is across the middle of the shop with the counter attached to one end.

Island ranges: the range forms an island across the middle of the shop and the frier works behind it with servers in front of it and a counter between the servers and customers.

The format of range is usually determined by the shape and size of the shop.

GAS OR ELECTRIC RANGE?

Most frying ranges are powered by gas. If there is no mains gas supply a range may be powered by LPG from a tank or cylinder. Mobile units use this method. Electric powered ranges are also available but less common as they cost more to run than gas ranges. (All frying ranges also require electricity to power the extraction system and the heaters in the hot boxes and chip boxes etc.)

It is important your frying range is serviced and maintained properly. Insurance policies will insist that a frying range is serviced by a suitably qualified Gas Safe registered engineer at specified intervals. The extraction ducting and fan must be cleaned by a professional maintenance company at the specified intervals. It is recommended that duct cleaning is undertaken by A.E.M.E. (Air Environmental Mechanical Equipment) Ltd trained personnel.

For further information on the safe use of frying ranges see the Health & Safety module.

EXERCISES

Write down the category and format of the frying range in your business.
Find out the date your frying range was last serviced and the date your ducting was last cleaned and record it here. Service date: Duct cleaning date:
Candidate's signature and date

You have now completed segment five.

You may feel like taking a break before considering the next segment.

Segment Six – Cooking products

INTRODUCTION

A vital skill to be held by any fish frier is that of frying. How you cook your fish and chips, and the other products you sell, will have a huge impact on the quality of the food that you serve to your customer.

AIMS OF THE SEGMENT

By the time you reach the end of this segment you should be able to:

- Understand best practice methods when frying fish;
- Understand the different techniques used for frying chips:
- State the advantages of blanching and cooking chips straight through; *and*
- Know how to ensure your food is cooked so it is safe for customers to eat.

Please note: Every frying range is different and the following stated times and cooking temperatures are a guide only and not definitive. Expected portion size and product appearance will also vary regionally and from shop to shop.

Safety Tip: Remember when working with hot oils and fats, there is the danger of burns and fires occurring. It is important to follow safe working practices at all times. Never leave a pan unattended whilst frying. Further information is provided in the Introduction to Food Hygiene and Health & Safety in Fish Frying module.

FRYING FISH

Some shops will cook fish to order, whereas others will have some product ready. Many would say that cooking to order is best, but in some areas customers expect fish to be ready. Knowing and meeting your customer's expectations is key to your businesses' success. If frying to order, it is very important to allow fish time to drain before serving to avoid it containing excess fat. If you have cooked product ready it is crucial it doesn't stand in the hot box too long.

Serving the correct size portion is important for you in two ways; too much and you'll lose profits, too little and you'll also lose profits (as customers won't come back).

Ensuring each portion of fish is the same shape and thickness will ensure they cook evenly and in the same time.

The size of portion you sell, as well as the frying range you have will determine how many pieces of fish can be fried at any one time. Never overcrowd the pan, and if not cooking to order do not fry too many fish when demand is slow. An overcrowded pan will restrict the turning of the fish and will reduce the frying temperature. This will result in the fish absorbing too much oil. The frying temperature is usually around +180°C to 185°C when using a traditional or high efficiency frying range.

Fish needs to be evenly coated with the batter, which needs to be the correct consistency. Some friers will pre-dust their fish (with rice cones, rice flour or flour/dry batter mix) before coating it with batter. If this is done it is essential that it is only done just before battering, not in advance to avoid the pre-dusting forming an uncooked layer under the cooked batter.

Lay the battered pieces in the hot oil gently floating them away from you. This will leave enough space for the next piece of fish. **Do not drop them in and take care not to lay one over another.** Leave until a golden colour develops around the edges (2-3 minutes) then place the fish turner under the fish and gently flip the fish over. Leave the fish for a further 2 to 3 minutes before removing the fish from the pan. When correctly cooked, the batter should be cooked right through, but the fish still moist inside. Any holes or gaps in the batter will let the oil into the product, resulting in dry, scorched fish. If the batter is too thick and not cooked right through, it results in a soft soggy layer inside which most customers will not like.

Allow the cooked fish to drain in the heated display box. Remember that display boxes should be maintained at a **minimum temperature of +63°C.** Finally, the fish should be served in strict rotation.

It has been noted that some fish friers in Northern Ireland also blanch their fish, as well as their chips.

DIFFERENT METHODS OF FRYING CHIPS

Different friers cook their chips in different ways depending upon their preference for appearance of cooked chips, or the levels of trade in their business. Some prefer blanched chips as they can have an extra crisp exterior, while others prefer chips cooked straight through. Some will blanch for extra capacity when very busy, others so they can have small amounts ready quickly in quieter periods. However you cook your chips its essential your customers are happy with the product you serve.

Frying method: Straight Through

Traditional range: A full cooking consists of around 10lb of raw chips. As the cooking session progresses, smaller loads may need to be used as the oil level drops preventing overload and the subsequent breakdown of the frying medium. The chips must be well drained before cooking.
Allow the chips to bunch and rise in the pan, then separate them from underneath. **Do not stir.**
Raw chips on introduction will reduce the temperature of the fat of up to 60°C This is why a high starting temperature is needed. When the chips are all floating they will be ready to take out. Many friers will test if the chips are done by squeezing a chip to check its soft inside as well as crisp on the outside. If not back up to frying temperature the oil must be allowed to recover to +185°C before the next batch of chips is introduced.

Frying Temperature: +185°C **Time:** 7 to 9 minutes

High Efficiency range:

Free frying: Chips can be free fried as above in a high efficiency range, although a lower starting temperature will be used as the temperature will not drop as much and will recover faster

Frying Temperature: +175°C **Time:** 6 to 8 minutes

Basket frying: Chips are fried in baskets and baskets are put in at staggered time intervals of every few minutes. This means from one pan a smaller number of fresh chips can be ready every couple of minutes if a pan holds 3 baskets. As there is little or no temperature drop as each basket is introduced and the pans recovers with a minute or two, a lower frying temperature can be used.

Frying Temperature: +165 to +170°C **Time:** 6 to 8 minutes

Frying method: Blanching

Description: Blanched chips are partially cooked at a lower temperature until soft but not crisp and still pale, removed from the fat, allowed to drain then finished at a higher temperature They can be finished quickly which means it is easy to always have fresh chips. They can be used as "stock" during busy periods.

Traditional range:

Blanching and finishing may be done in the same pan, allowing the temperature to rise before finishing, or in separate pans. Some friers will finish the chips in the same pan as they fry fish.

Blanching Temperature: +150°C to +170°C **Time:** 4 to 6 minutes

Finishing Temperature: +185°C **Time:** 2 to 3 minutes

High Efficiency range:

Blanching and finishing are usually done in baskets, in separate pans, with one dedicated blanching pan and another finishing pan

Blanching Temperature: +130°C to +150°C **Time:** 4 to 7 minutes

Finishing Temperature: +180 to +190°C **Time:** 2 to 3 minutes

Storage: (relevant to all frying methods)

Cooked chips should be stored in the chip box, which is equipped with heating elements with thermostatic controls.

Chips must be rotated in the box; ensuring serving staff uses the chips that have been out longest first.

Don't pile chips high in the chip box or against the element.

Keep the perforated plate on which the chips stand clean on both upper and undersides.

Note on frying temperatures

The temperatures and times used for frying will depend on:

- The type of equipment being used;
- The condition of the oil and fat;

- The portion size of the food being fried and thickness of the cut of the chips; *and*

- Local preferences.

Note On Acrylamide

Chips should be cooked to a light golden colour. Not only are these the best quality, but they are also low in acrylamide.

Acrylamide is formed when starchy products are cooked at high temperatures. You may have seen the advice to cook toast to a light colour - the same applies to chips. Acrylamide could be a health hazard, so it is important we manage it and try to reduce it.

The best practice for quality is also best practice for reducing acrylamide.

COOKING OTHER PRODUCTS

Pies

Most businesses buy in their pies ready cooked either fresh or frozen. These must be stored either in the fridge or freezer, whichever is appropriate and used in date order.

Reheating can be either in an oven or microwave but NEVER in the hot display of the frying range.

Chicken portions

These are usually bought in ready cooked and frozen. Best practice suggests that the frozen chicken is defrosted in a fridge and then reheated in a microwave to a temperature of no less than +75ºC at the core. If a crisp skin is preferred, you can place the chicken into the chip pan for a further minute.

Sausages

Frozen or defrosted battered sausages can be fried in the fish pan. If un-battered, it is advisable to use either a table top frier or a griddle. Temperature regulations state that all meat products must reach a temperature of at least +75ºC at their core.

In Scotland the regulations state that cooked food that is being reheated must be heated to +82ºC or more.

EXERCISES

Do you cook chips straight through or blanch in your business? What is the typical weight of a batch of chips for frying in your shop? What is the usual frying temperature of your fat/oil at the start of the frying process? How low does the temperature get whilst frying chips (measure by watching your temperature gauge)? How long do you cook a batch of chips, if you cook chips straight through in your shop? If you blanch what are the blanching and finishing times you use?
Candidate's signature and date

You have now finished segment six, and have also completed the Introduction to Fish Frying Skills module.

Well done!

APPENDIX

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Marine Stewardship Council (MSC)
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www.msc.org

Marine Conservation Society (MCS)
Overross House,
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Ross-on-Wye,
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