Section 3

Milking **Facilities**

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Introduction

Building a new milking parlour is a costly investment with a planned useful lifespan of up to 40 years, or more. Modern milking parlours are complex and labour intensive to construct. Good liaison and co-operation is vital between the farmer and all the various contractors, suppliers and trades involved.

1. How do I assess my current milking facility?
2. Ideally, where should a milking parlour be located?
3. What are the principles of good cow flow?
4. How many cows can one operator milk in an hour?
5. What type of collecting yard should I consider?
6. What size of collecting yard do I need?
7. How many units do I need for my herd size?
8. Which type of parlour should I choose?
9. What are the basic components of a milking machine?
10. Where are the specifications available?
11. What ancillary equipment is available for a basic milking plant?
12. What is the approximate cost of a milking plant?
13. What about testing the machine?
14. What size bulk tank is required?
15. What types of drafting facilities are available?

Milking Facilities

1 How do I assess my current milking facility?

An existing parlour may have potential for expansion but a parlour in poor condition might need to be replaced. The following conditions would give cause for concern.

- Structure and roof are not in good condition.
- A loft with low ceiling makes the parlour dark and unattractive to cows.
- The pit is shallow – forcing the milker to stoop.
- The fall in the pit is not equal to the fall in the milk line.
- Incorrect slopes or dips in milk lines can lead to more mastitis, raised cell count, slow milking, which can cause poor hygiene and rinse water drainage problems.
- The milking machine is more than 20 years old.
- Concrete floors are worn and rails are unsteady or badly designed.
- There is an antiquated (or no) in-parlour feeding system.
- The pump and motor are located in the dairy and the dairy and bulk tank are too small and the compressor out of date or undersized.
- The parlour is too narrow.

2 Ideally, where should a milking parlour be located?

How to

Choose a location for the parlour

- The parlour should be located as close to the grazing area as possible. As cows walk comfortably at about 3km/hr, the closer the parlour is to the grazing area, the better. Corners, junctions and u-turns in and near farmyards, even if designed correctly, can unnecessarily increase the time it takes to bring the cows in for milking.
- A parlour located centrally within the farm minimises walking time and distance for cows. This is particularly important for very large herds. For expanding herds, the parlour is likely to stay near the farmyard, as the cost of moving the parlour to a new location may be prohibitive.
- The access route for the milk lorry should be separate from the cow roadway. This is to minimise cow dung coming into contact with the lorry. In some situations, cows may have to cross the lorry route. The cross-over point should ideally be at a distance from the parlour where it is likely to be less dirty.
- Consider the prevailing wind direction. Ideally, parlour/silage, etc. should be downwind of the dwelling house and upwind of other livestock facilities. Some shelter may be needed to prevent a harsh wind blowing into the milking parlour.
- On sloping ground, build across the slope to minimise excavation and filling. The length of the parlour should be across the slope.

Consult **S103** or **S106** (from DAFM) for distances from diesel storage or any stored contaminant, silage or ensiled material, or a pig or poultry house. Soiled water tanks or slatted tanks should be at least a metre from the edge of the milker's pit (also a key point for expanders).

The choice of collecting yard will generally influence the location and orientation of the parlour. The aim is to have cows entering the collecting yard so that they are lined-up to the parlour entrance and can maintain their social order.

For a rectangular collecting yard, this means that they enter from the rear or the side of the rear so they are facing the parlour entrance. They generally exit from one side of the parlour by doing a u-turn and pass the collecting yard on their way out or do a 90^0 turn going out to the side. The dairy can be at the front or at the opposite side.

With circular collecting yards, cows generally pass the parlour exit on one side on their way in, move around the circular yard, and exit straight ahead from the front of the parlour. The dairy and plant room must be located at the opposite side to where the cows enter.

3 What are the principles of good cow flow?

How to

Optimise cow flow

- Ensure that cows are lined up towards the parlour entrance and that their social order is not interrupted.
- Cows should be lined up on entering the collecting yard i.e. enter the rear of rectangular yards and enter circular yards from the front of the parlour.
- There should be no steps at entrance or exit.
- There should be no doors at parlour entrance.
- All surfaces should be non-slip.
- There should be good light at the parlour entrance and exit.
- The front of the parlour should be spacious.

4 How many cows can one operator milk in an hour?

Key facts

In an ideal situation, the milker can carry out the complete milking without leaving the pit. The following factors influence the output of a milking parlour:

- cow drafting
- parlour design
- location of the parlour
- skill of the operator
- holding yard design
- milk yield and milking routine
- design of milking equipment
- location of udder wash hoses, teat spray jets, and power hose for occasional washing of cow standings.

Parlour throughput is very important. More units, good design, labour saving devices, labour efficient and safe handling facilities will all pay ongoing dividends.

Parlour throughput hinges on the number of units, good work routine, general design and layout of the parlour and collecting yard, backing gate, absence of obstructions entering and leaving the parlour, entrance and exit gates that can be opened from anywhere in the pit, good light, no stress-causing factors, etc.

Safety is important also. Any facility should be planned and built so that one person can operate it and handle animals in safety. Safety for the user is most important but the importance of safety during construction and subsequent maintenance is also key.

Milking routine

Production levels, design of the milking units, and work routine time (WRT) together decide the eventual performance of a parlour. The work routine time is the time taken to carry out all operations at a milking unit. The work routine practiced on a particular farm is the most important factor in determining the number of cows a milker can milk in an hour. The performance (P) of a parlour in terms of cows milked per man hour may be stated as P = 60/WRT (minutes). A typical work routine time is given in Table 1.

Table 1. Time for different elements of milking routine

Milking routine	Seconds/cow
Cow entry	3.4
Pre-spray and paper dry (estimate)	8.0
Attaching clusters	10.1
Disinfecting teats	1.9
Cow exit	1.9
Washing cow standings	3.9
Miscellaneous	5.0
Work routine time (WRT)	34.2 (0.57 minutes)
Output (cows per operator hour)	**105**

Milking Facilities

Table 1 shows a breakdown, in seconds per cow, of the various tasks in a typical milking routine. The times were recorded in the Moorepark labour survey. The total is 34.2 seconds, making it possible for one person to milk 105 cows in one hour (P = 60/0.57), assuming that the number of units is not the limiting factor. If we omit the pre-spray and paper dry, the WRT is 26.2 seconds (0.4366 minutes), making it theoretically possible for one milker to milk 137 cows in an hour.

5 What type of collecting yard should I consider?

Alternatives

There are two types of collecting yards: circular and rectangular.

Rectangular yards	Circular yards
Easier to build	More complex to build
Can be extended easily	Difficult to enlarge
Promote good cow flow if cows enter from rear	Promotes good cow flow
Important to taper the yard towards dairy entrance	Can support automatic backing gate cleaning system
Can support automatic backing gate cleaning system	Possible to put second herd onto same yard without moving backing gate

6 What size of collecting yard do I need?

How to

Size a collecting yard

There are two aspects to consider when sizing a collecting yard:

1) the average size of cows in the herd
2) future herd size.

- Small cows require 1.2 square metres per cow and large cows require 1.5 square metres per cow.
- Multiply average cow size by the maximum number of cows that need to be in the yard at one time to calculate the total area required.

Other choices to be made include:

- Roofed or unroofed.
- Backing gates – scraper, up and over type and water/electrically driven backing gates for circular yards. It should be possible to control the backing gate from the pit.

7 How many units do I need for my herd size?

Increasing the number of units will reduce overall milking time while increasing individual row time. Individual row time is influenced by pre-milking routine and stage of lactation, which in turn influences cow over-milking.

An operator can handle 14 units where cows are prepared and up to 22 where no preperation takes place. Aim for one unit/7-9 cows i.e. no more than nine rows of cows to be milked. For example: 120 cows ca. 16 units.

Number of Units

- Larger herds (150 cows +) – consider rotary parlour or long herringbone which requires two milking operators.

8 Which type of parlour should I choose?

How to

Choose a milking system

The choice of milking systems should be directly related to the number of cows currently being milked and the herd size envisaged for the future. **Plan to be able to milk an expanded herd in no more than 1 hour 30 mins.** Larger herd sizes will lead to a greater focus on time, working conditions and ergonomics associated with milking. It is important that maximum potential milking performance be achieved from new milking installations and from changes in existing milking parlour size and design.

The particular requirements of the individual dairying enterprise and the cost of labour must dictate the level of automation. The capital, maintenance and running costs of the automated equipment must be carefully considered also. If a high level of automation is installed, it is vital that it is reliable and dependable and can be operated by a person of reasonable skill.

Generally it is better to focus on having adequate milking units at the expense of high levels of automation.
It is extremely important that the operator does not have to leave the pit during milking.

Parlour types

Choice of system may come down to personal preference; farmers are advised to visit units with various systems before choosing. Ideally they should personally 'try-out' various systems by actually milking in each design rather than simply observing the parlour.

There are a range of widths and other critical dimensions for the herringbone, the 2' 6" and the side-by-side parlours and these are shown below. These are guidelines only, so consult milking machine manufacturers to get the exact dimensions for their machines.

3 ft. Centre herringbone
Many existing parlours are of this design. The cow is 'side-on' to the milker and clusters are generally applied in front of the cow's legs. There are a number of drawbacks associated with this design.

- Cows take up a lot of space in the parlour.
- Cows can kick off the clusters.
- Herringbone (3') – 915 mm centres.
- Cows are at 30° angle to milker.
- The longer pit increases walking time (less labour efficient).
- Cluster attachment is in front of hind leg.
- Troughs (concrete) are difficult to install accurately. Steel troughs are better.
- Measures 5' 3" to 6' 6" from wall to edge of pit.

Milking Facilities

There are two options:

- Zig-zag mangers with a straight rump rail. The width of the cow standing is typically 1.9m (6' 3") from wall to edge of pit. (1.7m approx for smaller cows).

- Adjustable breast rail with a zig-zag rump rail. This option allows the operator to adjust the breast rail as the cow gets heavier in calf and it keeps the number of cows equal to the number of clusters. It also helps when cows are lighter at the start of lactation. It also helps with the alignment of cluster removers. The width of the cow standing should be 2.1m or more for this design.

Design factors for 2' 6" parlours

- 2' 6" – 762 mm centres.
- Cows are at 50° angle to milker.
- As it is a shorter pit, there is less walking.
- Clusters are applied between back legs – less kicking off of clusters.
- Alignment of swing arms/clusters is important.
- Zig-zag concrete or steel troughs or straight breast rail and zig-zag rump rail.
- Generally no need for bailing/cow restraint.
- Easier to fit into existing shed (if wide enough).
- 1.9m (6' 3") from wall to edge of pit.
- Good cow flow.

Side-by-side - 2' 2" to 2' 4" parlour

Cows are almost at right angles to the edge of the pit and this system is often used with sequential baling systems. Clusters are applied between the cow's rear legs.

Design factors for side by side parlours:

- Cows at 660mm, 685mm or 710mm centres (2' 2", 2' 3", or 2' 4").
- Cows are at 85°–90° angle to pit.
- Provides good udder presentation – clusters are applied between back legs – easy to reach from pit.
- Shorter pit – less walking.
- Cows will need to be trained initially – good cow control.
- Designed to work with a manual/sequential bailing system.
- Results in good cow flow.
- Measures about 2.4m (8ft) from wall to edge of pit.

Other parlour types

Double-up

In this situation there is a cluster for each cow space. There will be a milk line on each side of the parlour. This type of parlour is rare in Ireland but may have a role where existing facilities have restricted space for expansion. Generally in Ireland, it is put in as a midi line rather than a low line. Cluster removers are a requirement with this type of machine.

Rotary

These systems should be considered where herd size exceeds 250 cows. Size can vary from 40 to 100 units. One operator can manage a very large number of units so capacity is high. Cows enter and exit one at a time rather than in groups as with other systems. It is impossible to expand once the system is in place. However, rotaries have the potential to milk several hundred cows by extending the milking time.

Main points to consider

- Six revolutions per hour, i.e. 360 cows per hour for a 60-point.
- Plan on the basis that each revolution takes approximately 10 minutes.
- 300–400 cows needs a 50–60 point rotary.
- Shed size would need to be 24m by 24m (80'x80') for a 60-point with extra space for the dairy, washroom, plant room and office at the end or the side.

- A big handling area is needed for the big numbers because more cows may have to be drafted and the farmer/vet can also deal with cows as they come off the table in single file or in groups after milking.
- The collecting yard can be a rectangular yard moving cows towards a race. The race funnels them into single file.
- Safety: no animal handling tasks should be performed on cows on the platform, whether moving or stationary – it's too dangerous. Access to the centre of rotary via a tunnel under the turntable. This is a requirement for safety and fire regulations.
- The most popular rotary is probably a side by side type with the cows' heads facing towards the centre.
- The platform is either a floating concrete type or it is mounted on tapered (cambered) rollers. The floating type may be unstable, easy to drive but difficult to stop – dangerous and awkward.
  The roller type is sturdy with a concrete standing for the cows.It is easy to stop and the tapered rollers are not affected by friction wear due to the inner and outer circumference.
- Good natural and artificial light is needed in the building.
- Allowance must be made for the different levels, the collecting yard and platform, the tunnel and the level at which the milker works at, to facilitate cluster attachment and minimise repetitive strain injury. Use soft mats or an adjustable standing for the milker.
- Cow flow rate: each cow passes the milker every ten seconds. Therefore, it will take 4,000 seconds to milk 400 cows. It will take one hour and seven minutes to milk them in a 60-point and one hour and twenty minutes to milk them in a 50-point.

Robotic or Automated Milking Systems (AMS)

One cow is milked at a time in a single stall AMS and milking is conducted over 22 hours each day. One robot can cater for approximately 70 cows. Cows volunteer for milking by walking from the cow accommodation or paddock to the AMS unit. The majority of the work for the operator becomes cow and data management rather than physical work.

9 What are the basic components of a milking machine?

- Vacum pump
- Milk line
- Wash line
- Air line
- Pulsation
- Breather line
- Vacuum regulator
- Gauge
- Cluster
- Liner
- Milk pump
- Sanitary trap
- Receiver jar
- Test points
- Milk filter

10 Where are the specifications available?

- International and Irish Milk Quality Co-operative Society (IMQCS) standards exist and are the basis for new milking machine installations. IMQCS was set up in 1989 to ensure that Irish milking machine installation and testing standards are at least equal to International Standards Organisation (ISO) standards. Teagasc, ICOS, milking machine manufacturers and the milking technicians were closely involved in implementing the new revision of ISO standards, which were introduced in 2008. They have published a guide to the ISO standards entitled "Teagasc/IMQCS Recommendations for the installation and testing of milking machines" to help those designing, manufacturing, installing, servicing and testing milking machines in Ireland. This publication can be downloaded from www.milkquality.ie.

Other useful sources of information are:

- Milk quality handbook available on www.milkquality.ie.
- Department of Agriculture, Food and the Marine specifications for milking parlours, **S106** and **S103.**
- Standard drawings and plans of milking parlours available from Teagasc B&T dairy advisers.

Milking Facilities

11 What ancillary equipment is available for a basic milking plant?

- Automatic cluster removers (ACRs)
- Bailing systems
- Automatic cow identification
- Automatic drafting
- Automatic milking machine wash systems
- Air purge systems
- Swing-over arms
- Low level wash
- Diversion line
- Cluster flushing system
- Feeding systems
- Electronic milk metres
- Auto entrance and exit gates

Automatic cluster removers

While cluster removers are often considered unnecessary, they offer great flexibility in large, two-milker parlours. ACRs ensure that clusters are removed consistently when cows are milked. Swing-over arms are usually required for correct operation. If planning to install cluster removers at a later date, swing-over arms should be installed at the start, making the fitting of cluster removers easier in the future.

Correct ACR operation requires good cow positioning in the parlour. They should be calibrated and maintained so that they shut off the vacuum before detaching the cluster and only detach the cluster when the cow is fully milked.

ACRs are recommended in parlours where one operator is expected to handle more than 14 units. They are generally not needed for less than 12 units and are very desirable at 16 units or more.

Bailing systems

Bailing systems allow cows to be located conveniently for proper operation of ACRs. The main advantage with bailing systems is that cows are controlled and positioned better for easy and safer cluster attachment and removal.

Automatic cow identification (Auto ID)

Auto ID allows full control and monitoring of each individual cow in the herd. It is used to monitor, feed and automate day-to-day cow management tasks on the farm. It operates in conjunction with such equipment as in-parlour and out-of-parlour feeders, and electronic milk metres. It can also be used to control drafting gates and weighing devices.

Automatic drafting

Where automatic drafting is available, cows can be diverted automatically in up to three different directions, according to management needs, with little effort. Cows can be accurately sorted and normal cow flows are not disrupted.

Automatic drafting provides gentle cow treatment and maximum cow flow away from the parlour. Semi-automatic drafting systems are available also. One such system uses a tail transponder. The tail transponder is attached to the tail of the cow to be drafted.

Automated milking machine wash systems

Automatic wash systems reduce wash-up time as well as ensuring safe and accurate addition of cleaning chemicals to wash water. Many farmers do not measure the exact amount of cleaning chemicals used in the wash trough for circulation or for plant rinsing. Automatic wash systems should eliminate this problem. Automatic wash systems should only be considered for larger parlours and should be serviced and calibrated annually. If you change your detergent steriliser product, you may need to recalibrate the autowasher. As with any wash system, the size of wash troughs must correspond with the number of units.

Key risks

- They can run out of detergent or detergent can crystallise and block the pumps.
- Automatic milking machine wash systems need an air purge system to function correctly.

Air purge systems

Air purge units remove residual milk after milking and residual water after washing from the milk delivery line. The milk delivery line is located between the milk pump(s) and the bulk tank. Using an air purge system eliminates the risk of inadvertently adding water to milk. It also saves time by not having to wait for milk and water to come through before and after milking and washing.

Swing arms

They should be located in the centre of the pit and above the head height of the milker. They help to eliminate clutter in the centre of the pit. They prevent clusters getting dirty and swinging free across the pit when detached. They also support the rams for cluster removers and the long milk tubes.

Wash-line

The trend now is to install a low level wash-line below the standing cow. This means that there are no jetter tubes hanging down in the pit. This improves the labour efficiency.

Diversion line

- Diverts waste milk (high SCC, antibiotic milk) for disposal, or milk for calf feeding.
- Improves labour efficiency, particularly in spring.
- The disadvantage is the initial cost and extra washing and maintenance costs.
- Other options – T-piece at plate cooler.

Cluster flushing systems

- Cluster flushing systems eliminate the need for cluster dipping or pre-spraying teats. They work by back-flushing the long milk tube and cluster with water and food grade disinfectant, e.g. peracetic acid.
- Some systems can also post-teat dip cows.
- Disadvantages of the system are the installation and subsequent maintenance and running costs. The perceived risk is that water and or disinfectant solution could contaminate the milk, especially if maintenance is neglected.
- It shouldn't be seen as a substitute for good hygiene and milking practices.

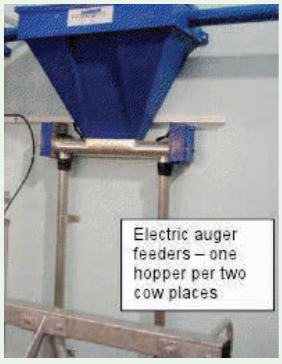
Feeding systems

Why install a feeding system?

- Saves time and improves labour efficiency.
- Eliminates drudgery by making the job of feeding easy.
- Systems available can feed individually, in batches, or be pre-programmed to feed automatically.
- Performance related feeding to yield, body weight and stage of lactation is possible.
- There can be a tendency to overfeed because it is so easy to do.
- It is necessary to calibrate feeders to ensure accuracy of feeding.
- Dust-free designs are desirable.
- The more units you have, the more beneficial they are.
- Consider the location of the meal bin and installation of the flexi-augers when designing the parlour.


Pneumatic feeders - one hopper per two cow places


Batch feeding system


Electric auger feeders – one hopper per two cow places

Milking Facilities

(12) What is the approximate cost of a milking plant?

How to Minimise milking machine costs:

- Milking machine costs vary widely from about €1,700 to €8,500 (per unit 2011) depending on the specification. Just €1,700 per unit would be a very basic machine, without feeders and possibly with some pre-owned parts. €8,500 per unit would supply a state of the art machine with swing arms, automatic front and rear gates, diversionline, automatic cluster removers (ACRs), electronic milk metres, electronic feeders, auto-identification, auto-washer, electronic drafting, etc.
- A price range of €3,500 to €5,000 per unit would include in-parlour meal feeders and a reasonable level of automation, such as swing arms, ACR's, diversion line and front and rear automatic gates. Discuss the various options with your agent before you get a written, itemised, quotation.
- The cost of some other items of equipment to take into account or consider are; a bulk tank, milk filter, plate cooler, waterheater(s), wash troughs, hand washing facilities, wash down system, backing gate, generator, air compressor, etc.

Table 1. Typical costs of ancillary equipment

Items		guide prices (2011) €
Air-operated gates - back	each	2,500
Air-operated gates - front	each	2,500
Augers	each	3,500 - 4,000
Auto ID	each	8,000 - 8,500
Automatic washer	each	4,500
Cluster removers	per unit	750
Compressor	each	-
Drafting	each	5,000 - 11,000
Dump line	per unit	550 - 600
Electronic milk metres	per unit	800 - 1,300
Generator	each	-
Feed mangers - all galvanised	each	270
Feed mangers - Stainless steel pan	each	400
Meal bin	each	2,500 - 3,000
Meal feeders	per unit	1,000
Milk pump - centrifugal (incl. in plant price)	each	1,300 - 1,500
Milk pump - variable speed centrifugal	each	1,500 extra
Plate cooler	each	1,500 - 2,500
Recording Jars	per unit	600
Manual individual bailing	per unit	250
Manual individual bailing compressed air rams	extra	1,700
Sequential bailing	per unit	800 - 900
Stainless steel droppers	per unit	85
Swing arms - depending on switches, etc.	per unit	200 - 250
Teat sprayer - in pit	each	600 - 1,000
Wash trough	each	500 - 800

13 What about testing the machine?

- Have your milking machine serviced and tested by an IMQCS registered milking machine technician at least once per year. A register of trained milking machine technicians is available on www.milkquality.ie.
- If a mastitis problem needs to be investigated, it is important to test twice; once before servicing and again after servicing. This will identify existing faults and confirm that such faults have been corrected after servicing.

Checklist

Milking machine maintenance

- Regulator filters should be cleaned regularly.
- Inspect all rubberware for wear and cracks regularly.
- Check vacuum pump oil regularly and oil drop rate.
- Check that claw air bleed holes are free daily.
- Liners should be changed every 2,000 cow milkings. Only liners suitable for the shells should be used. Under-milking due to worn liners can contribute to increases in cell count.
- Check vacuum gauge at milking time to ensure correct vacuum level is being maintained.
- Check that air is hissing through the regulator during normal milking.
- Check drain valves at low points on airlines.

14 What size bulk tank is required?

To calculate the capacity of the bulk tank you require, you need to know how many milkings you need to store at peak. It is five milkings for every two day (E2D) collection and seven for every three day (E3D) collection. Other factors are the number of cows, now and in five years' time, and the yield per cow e.g. 30 litres/day at peak (6.5 gallons/day).

Example: Herd Size: 100
Bulk tank capacity for E2D: 100 x 30 x 2.5 = 7,500 litres (1,652 gallons)
Bulk tank capacity for E3D: 100 x 30 x 3.5 = 10,500 litres (2,313 gallons)

Get a detailed written quotation stating: model of tank, rated capacity, make, model and HP of condensing unit(s), details of automatic washer, details of new pre-cooling system or modifications to existing system, rough sketch of where tank and any ancillary equipment fits into dairy, and clarification of who does what if any building work, plumbing, electrical or modifications to milking machine are required.

How to

Buy a second hand tank:

- Tanks have a lifespan of at least 20 years and many tanks are still in good condition after over 30 years of operation.
- Ice-bank tanks repolished and fitted with new copper coil evaporators are like new. However, some direct expansion tanks over 20 years old may not be able to withstand pressure developed by modern refrigerants.
- If buying a second-hand tank: buy from a reputable dealer, check the age of tank, and get a reputable refrigeration engineer/serviceman to examine the condition of the tank.
- If the tank is over 7/8 years old, install a new condensing unit and always get a reputable refrigeration engineer/ serviceman to move the tank and ancillary equipment.

Key risks

Choosing the wrong size bulk tank

- The dairy must be big enough for the tank.
- The dairy should have at least 0.6m (two feet) spare around the bulk tank on three sides and 0.9m (three ft) on the fourth side beside the wash troughs. This allows room for working at the wash trough, cleaning the outside of the tank and maintenance.

Milking Facilities

Key risks

Budget creep.
If you do not have a definite budget for your parlour there is a risk of spending more than you intended.

How to

Minimise construction costs:

- Plan what you want to do, get planning permission, get several quotations and prepare cost estimates. It is vitally important to know what costs you are letting yourself in for, when you go about building a new parlour or want to extend/renovate an existing one.
- Divide the costs into those associated with building the parlour/dairy; the milking machine; and the bulk tank. Allow for future expansion and the possibility of adding more automation.
- Construction costs: To build a 14 unit milking parlour, dairy, plant room, unroofed collecting yard with slatted tank and unroofed drafting area with a small crush costs about €5,000 per unit (2011 prices). Building an 18 unit parlour, to the same specification would cost about €4,300 per unit.
- When comparing one quotation with another ensure you are comparing like-with-like.
- The more automated and elaborate the milking installation is, the more servicing will be required. Increased maintenance costs will be a factor here. It is wise to enquire about these costs in advance.
- Aids for reducing the cost of the development are the VAT refund, the capital allowances and interest relief against income tax. Get an investment health check from your Teagasc adviser.

15 What drafting facilities are available?

Large herds will have bigger milking parlours; therefore the milker will be full-time in the pit. Identifying cows in heat and drafting them for insemination must be operated from the milker's pit.

There are three options:

- manual drafting
- automatic drafting
- automated herd detection and drafting.

Manual drafting requires the operator to pull a rope attached to a swing gate that diverts the cow in heat into a separate pen. It can operate successfully with side exit parlours and front exit parlours, especially for small herds. With large herds, and 16-20 unit parlours, it is more difficult, especially with side exit parlours.

For details on measurements and manual drafting options, check the Teagasc booklet "Cow Collecting Yards and Drafting Facilities." This is available from your Teagasc adviser.

Manual drafting from milking pit works well in front of parlour

With automated drafting, the cows are separated outside the milking parlour. Each cow has a transponder that the auto-drafter identifies. The milker can programme the auto-drafter from the pit or an office to separate out the cows. The transponder (ear tag/neckband) is also used for other management issues, e.g., milk recording, etc.

A simple auto-drafting system is also available where a transponder is attached to the tail of a cow in the parlour. As she passes through the drafting facility, the cow is separated. The tail transponder is then removed and can be used again at the next milking.

New technology is looking at automatic heat detection and associated drafting thus removing this task from the milker. Cows are fitted with neckbands or pedometers which give each cow automated ID. These record cow movements relative to the herd average. Cows in heat, which are much more active, can be identified and drafted automatically. Approximate cost is €2,500–€3,000 for software and €90–€100/cow for the collar/pedometer.

Can an expensive auto-drafting system be justified?

- It is desgned for large herds/parlours.
- It saves time in the parlour relative to manual drafting.
- It can be used where there is no room for a manual drafting system.

Checklist

The benefits of good drafting facilities

- The milker can stay in the pit and continue with the milking with minimal or no disruption when drafting (separating a cow from the herd). Disruption to milking extends milking time, reduces time at grass and may lead to overmilking.
- Good facilities greatly reduce the risk of getting injured when separating out cows as they exit the parlour.
- Farmers with a good system can safely draft out cows at their ease and are inclined to continue using AI for much longer.
- Automatic drafting allows cows to be drafted without the milker having to see the drafting taking place e.g. parallel to the parlour.
- Automatic drafting is also valuable for parlour locations which do not allow sufficient space for drafting to take place close to the exit. The drafting unit can be located anywhere suitable on the exit route.
- The holding pen for drafted animals should be at least large enough to hold 10% of the herd.
- Leave room for one complete row of cows before the auto-drafter and the parlour exit.

Entrance/exit gates

Entrance/exit gates that can be operated from anywhere in the pit are essential. There are a number of types available. They are either spring-loaded, opened and closed by a pneumatic or vacuum-operated ram or manually controlled rope and pulley.

Washdown systems

An effective washdown system is essential and should contain multi-stage centrifugal pump systems. You need a pipe going around the parlour with convenient outlets at various locations. A flow rate of 180 litre/min (40 gals/min) at (4 bar 60 psi) is recommended.

Soiled water collection

Soiled water consists of machine washings, bulk tank washings and washings from the cow standings. If the collecting yard is scraped into a tank the scrapings are regarded as slurry. Any rainfall collected from the scraped yard is regarded as soiled water.

If you don't scrape the yard, then what runs off it is regarded as slurry. This makes it difficult to size soiled water tanks in collecting yards. Under the Nitrates Directive soiled water is defined as having a dry matter less than 1% and a biological oxygen demand (BOD) less than 2,500. A ten-day storage capacity must be provided during the closed period. The tank in the collecting yard should be big enough to make washing efficient and avoid the need for frequent emptying.

Dairy and plant room design

- Size – according to bulk tank size (allow for future expansion).
- Leave enough space around tank.
- Ceiling - no common air space.
- Vermin proof.
- Double wash trough.

Milking **Facilities**

Plant room

- Houses motor, pump, and other equipment.
- Separate room with a separate entrance from outside or from milking premises.
- Adequate floor area - for installation and maintenance.
- Electrical distribution - accessible.
- Ceiling desirable – noise reduction is important.
- Condensing unit may be in the plant room – but preferably outside.
- Ice builders should be located in the plant room.
- Exhaust – noise, fumes, cleanliness. Exhaust vent pipe should direct fumes away from the building.

Construction recommendations – milking premises

- Adequate eave height allows room for equipment and prevents excessively warm parlour in summer.
- Good natural and artificial light is essential.
- Avoid steps at entrance and exit.
- Avoid channels and trapped gullies.
- Bonding.
- Good floor and wall finishes.
- Drainage, levels and falls – S106.
  - Cow standings, pit, dairy, yard washings, roofs.
  - 1:60 to 1:70 along standings.
  - 1:40 across standings and in pit.
  - Pit drainage to external pump sump.