

Milking Parlours

The Cafre dairy unit has been designed to best meet the education and training needs of agriculture students and the dairy industry, to enable the delivery of knowledge and technology transfer and to comply with all relevant legislation and animal welfare recommendations.

This is one of a series of technical notes aimed at farmers and students. The notes are designed to provide the level of technical detail required to assist farmers in adopting technologies and practices demonstrated in the Greenmount Campus dairy unit on their farm business.

Milking Parlour Choice

Milking parlours on family farms should be sized to complete the actual milking in approximately 1.5 hours and allow for future herd expansion. On large commercial farms where staff are employed to carry out specific tasks such as milking, the length of the milking operation can be considerably longer depending on the farm management practices employed.

The throughput of a milking parlour depends on the level of automation, the udder preparation routine, the number of milkings per day and the efficiency of the operator. Throughputs for herringbone milking parlours typically range from 6 to 10 rows of the milking parlour per hour as outlined in Table 1. Throughputs of rotary milking parlours range from 4.2 to 5.3 cows per point per hour.

Table 1. Milking parlour throughput

Daily Milkings	Swing - Over	Doubled - Up	Rapid Exit	Internal Rotary	External Rotary
	Rows milked per hour			Cows/point/hour	Cows/point/hour
2	6.6	7.2	8.0	4.2	4.8
3	8.2	9.0	10.0	4.6	5.3

Source: Kingshay 2011

The complexity of the udder preparation routine will be dictated by a range of farm specific factors. A full preparation routine can reduce parlour throughput by 10 to 20%. However, the increased stimulation from a full udder preparation routine will increase peak milk flow rate and reduce the total milking unit on-time.

Milking units per operator

The number of milking units that can be effectively utilised per operator depend largely on the milking routine

employed on the farm. Research carried out by Teagasc (2005), based on an average milking time per cow of 10 minutes, suggests the optimum varies from 13 to 20 units per operator. The optimum number of units in a swing-over herringbone milking parlour increases as the udder preparation routine is reduced from a full routine to a basic routine including only foremilk stripping. The time taken for each potential part of the preparation routine is detailed in Table 2.

Table 2. Time associated with udder preparation routine tasks

<i>Milking routine task</i>	<i>Time per routine task (seconds)</i>
Cow entry	3.4
Drawing foremilk	10.0
Washing teats	5.1
Drying teats	6.5
Dry wiping teats	5.0
Attaching clusters	10.1
Changing clusters	14.8
Disinfecting teats	1.9
Cow exit	1.9
Washing cow standings	3.9
Miscellaneous	5.0

Source: O'Brien et al Teagasc 2005

Adding the time taken for the various tasks involved in a milking routine and dividing this figure into the typical milking time per cow at peak milk yield will give an indication of the number of milking units that can be fully utilised per operator.



More units, more operators or automation can be added to increase the throughput. With automatic cow identification (auto ID) and cluster removal, the operator need only prepare the cows and attach the

clusters. Auto ID allows automation of meal feeding and milk recording and other equipment such as electronic heat detection. **More information on milking parlour automation is provided in the accompanying technical note.**

Doubled up parlours reduce the number of stalls required but increase the number of units. This adds to the initial capital expenditure and the running and maintenance costs. The major disadvantage is that this extra cost is not reflected in the performance.

The number of cows that can be milked by various swing-over or equivalent doubled up parlours is shown in Table 3. A herd of 120 cows milked in 1.5 hours minutes will need 12 milking points in a swing over configuration or 20 milking points in a doubled up parlour.

Table 3. Herringbone milking parlour throughput

Cows milked in 1hr 30mins	Swing over parlour	Doubled up parlour
120	12 : 24	20 : 20
150	15 : 30	24 : 24
180	18 : 36	28 : 28
200	20 : 40	32 : 32
250	24 : 28	40 : 40

Herringbone Milking Parlour Dimensions

Maximising the number of milking units has always been seen as the simplest solution to reducing time spent milking. However, as parlour length increases to accommodate greater numbers of milking points, it has been necessary to change the stance of the cow in herringbone arrangements. The traditional 30 degree parlour has

largely been replaced by more steeply cranked parlours. Greater numbers of cows are stalled in shorter parlours as stall work cranking angle moves through 50, 70, 80 and ultimately 90 degrees. The consequence for the parlour building is that pit remains relatively short but the overall parlour width increases as outlined in Table 5.



Table 5. Herringbone Milking parlour dimensions

Parlour Size	Crank Angle	Overall Length (m)	Overall Width (m)
12 points: 24 stalls	30 Degree	14.9	5.2
	50 Degree	13.5	5.9
	90 Degree	10.8	6.8
20 points: 20 stalls	30 Degree	13.1	5.2
	50 Degree	12	5.9
	90 Degree	9.5	6.8
18 points: 36 stalls	30 Degree	20.4	5.2
	50 Degree	18.1	5.9
	90 Degree	14.8	6.8
28 points: 28 stalls	30 Degree	18.6	5.2
	50 Degree	16.6	5.9
	90 Degree	13.5	6.8

In addition to parlour type and output, there are other key considerations in design that affect performance;

- cow collection / ease of entry to the parlour
- cow exit and drafting

Rotary Milking Parlours

Rotary milking parlours potentially offer the highest throughput of cows per hour and per labour unit. However,

rotary parlours are generally the most expensive option. Throughputs of rotary milking parlours can vary considerably depending on factors including milk yield, cow flow, labour availability, rotation speed and the number of milking points. Throughputs are generally less on internal rotary parlours due to slower cow entry onto the platform.

CAFRE DAIRY UNIT MILKING PARLOUR

The milking parlour has been designed to milk the 150 cow Future Herd in approximately 1.5 hours. When not used for training students, two herdsmen will be on duty at milking time, one working full time in the milking parlour and the other moving cows, cleaning cubicles and feeding calves in addition to milking duties.

During the academic year, the milking parlour is used to train Students to use a full udder preparation milking routine optimize milk quality. The routine includes:

- fore-milk stripping
- pre-milking teat dipping
- dry wiping teats
- cluster application
- post milking teat dipping

To ensure that 4 students each have 4 cows available per row on which to practice a sequential. preparation routine, a parlour size of 16 units per

to ensure adequate udder stimulation, to minimize mastitis incidence and

side has been installed. To provide sufficient space to accommodate students, instructors and assessors, a 2.4m wide pit has been constructed.

The choice of the number of milking units installed is a compromise between student training needs and commercial operation of the milking parlour outside of student tuition periods.

Milking parlour key features:

- 32-point doubled-up 50 degree herringbone
- Feed mangers with dual feed hoppers
- Dump line and buckets for colostrum feeding
- Backing gate (up and over)
- Collecting yard pre-wetting sprinkler system
- Rubber flooring to improve cow welfare
- High flow rate plate cooler system
- 13,000 & 3,500 litre bulk tanks + heat recovery
- Variable speed vacuum pump

Milking Parlour – Automation:

- Automatic per stall ID
- Walk over weighing (handling area)
- Electronic milk meters
- ACR's, auto cluster drop
- Pedometer heat detection system
- Automatic plant washing
- 3-way automatic segregation
- Automatic hoof washer and footbath



Herd Management System:

- Fullwood Crystal software
- Touchscreen computer in parlour
- Computer access points:
 - farm office
 - viewing gallery
 - handling area
- Herd management system Campus access
- Automatic data transfer to Campus
- Remote broadband backup