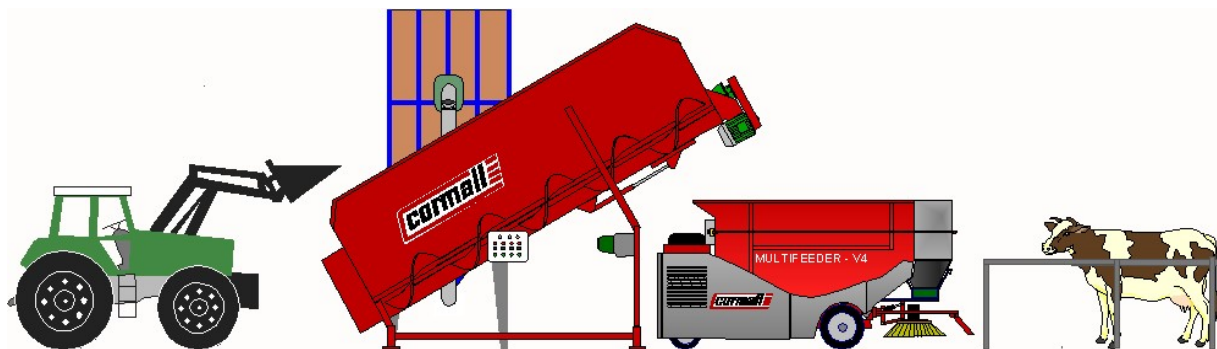


Your cowshed!

CCC

(Clean with Comfort and Continuity)

Your dairy cow wants it:
Clean with Comfort and Continuity
In return for more and better milk

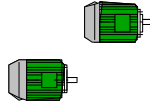


Automatic

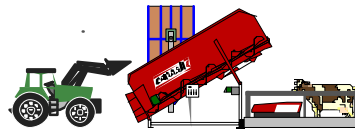
Save one tractor and the maintenance of it.



Reduce your energy costs to a minimum.



Avoid the daily obstacle race.



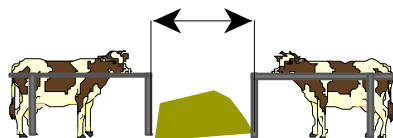
No waiting time.

Have your feeding done clean and full automatically, several times a day

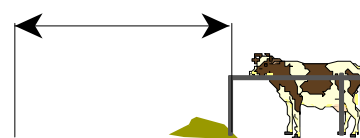
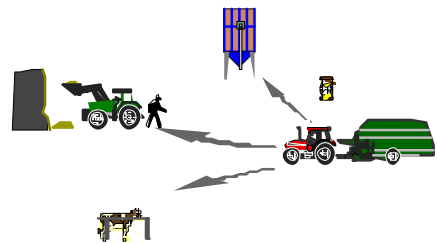
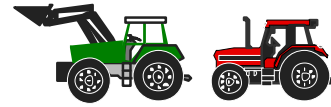
No more sweeping of the manger.

No more shovelling of the manger.

Save building costs and get space for more cows.





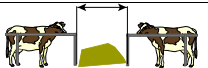

Mobile



Building for 130 Cows:

Working hours	Cormall CCC (min)	Mobile (min)
Filling the concentrates	0	15
Silage, tractor in/out, parking...	15	15
Mixing time.	0	5
Driving to barn and back 2x	0	5
Feeding on the table, parking the tractor	0	10
Sweeping the manger.	0	15
Cleaning the manger	0	15
Total	15 min	80 min
Wage £10 / hour.	£2.50 /day	£13.33 /day
Wage per year.	£912 / year	£4867 / year

Energy consumption		
Energy per hour	15 kWh	15 Litre Diesel
8p / kWh, and 38p / Litre Diesel, 365 day	£ 438 / Year	£ 2.080 / year

Space inside the building		
Width of the feeding table	2,2 Metre table	5,5 metre table
Length 45 Metre	99m ²	248m ²
£175 per m ²	£17.325	£43.400

The Economy

Savings year 1	£ 31.672	-
Annual savings	£ 5.597	-

CCC feeding

Feeding per day per cow group.	6-7	1
Always fresh feed on the manger	YES	NO
Feed leftover = 0	YES	NO
24 hour feeding plan.	YES	NO
Cows eat little and often thus reducing extra protein	YES	NO
Clean system without dirt on the manger.	YES	NO
More milk per day	YES	??

Objective	Reason	Method and means	Cormall CCC supports
Improving the live quality for the dairy cow	For more and better milk	Comfort No stress in the barn due to ranking order C	Your cow must feel comfortable without the competition and stress over running for fresh food. Frequent automatic feeding can ensure this. Further we ensure less space for feeding, giving more space for your cow.
	And	Continuity Everyday the same feed at the same time exact C	Automatic feeding system ensures the same amount of feed at the same time several times a day. Always-fresh food in the manger. The mixer ensures high mixing efficiency with optimal structure, - every day the same mix, in all the manger.
	Reducing costs to animal doctor and medication	Clean Clean system without dragging dirt to the manger C	Clean and accurate - is how dairy management should be in the milking parlour and on the feeding table. Keep the feed manger clean and don't drive on it with a tractor. Mixer design that doesn't allow feed to get stock in corners, and provided good cleaning methods

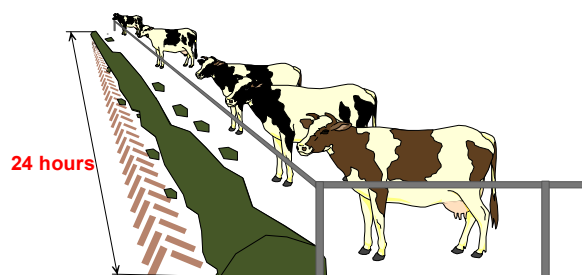
Test: 1/3 of the cows

Trough many tests it has been established measurement to see whether the cows are being feed ad lib or restrictive. If more than 1/3 of the cows are going to the manger when feeding starts, then there will be stress and it is no longer ad libido feeding.

Restrictive feeding results in stress and lower milk yield.

The reason for this is the long time the feed has been in the manger. If you only feed once ore two times a day, the feed will get old at the end of the day and you have to calculate 5 to 8 percentage of feed loss, often this is given to the young cows.

Another advantage with the CCC feeding systems, - Frequent feeding in smaller portions ensures constant fresh feed on the table. If you had to eat the same bread all day, you would only slice a leaf when you need it, and place the break bag again, not letting is stand on the kitchen table.





Rubber belt conveyer

This system was developed and sold already in the 1960's. It has been used a lot in big farms from 500 to 1500 cows. Rubber belt conveyers are a reliable system. They keep the manger area free for driving and working on with other machinery. It can work with longer mangers and can be used for group feeding.

Railwagon

The rail wagon system was developed in the 1960's and was originally only used for distribution of the beets. It is a flexible system that keeps the manger area free for driving and working on it with other machinery. It is very suitable for farm sizes up to 450 cows, and a good system for group feeding.



Robot Multifeder from Cormall

The Multifeder is developed by Cormall from start of 2000, and introduced at Agromek 2003. It is a 100% automatic feeding system The Multifeder is the cheapest system to expand with, and competes all other systems, once there is more than 2 feed areas The system can handle daily feeding of 800 cows.

CCC

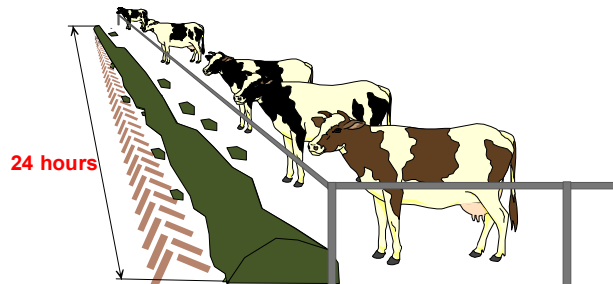
(Clean with Comfort and Continuity)

Feeding principles:

Whatever feeding principle you choose, you cannot do the job without a homogeneous feed formula that ensures that no cow can sort the feed, and thereby weed out "treats". Pure and bad mixture will cause poor rumen function and stress on the feed table.

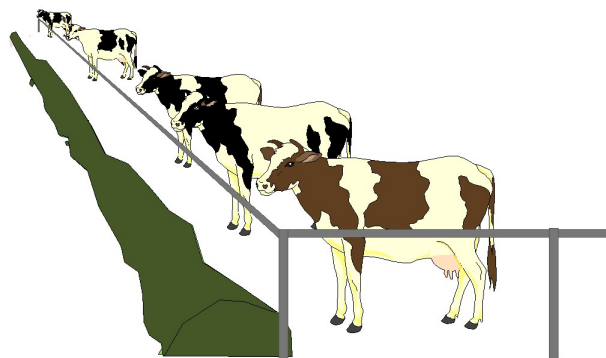
Fresh feeding?

Oxidation of the feed table and the cow pushing around in the diet over a period of 24 hours leads to the residual feed which is on the table at the end of the day, tasteless, and only a very hungry cow will eat this which in fact means restrictive feeding. With automatic feeding you can program the system to feed 4, 6 or more times a day. This method can also increase the amount of roughage and reduce feed costs.



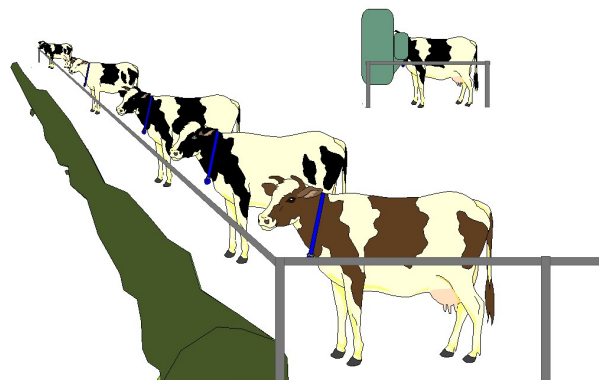
TMR feeding

Total Mixed Ration (TMR), is a philosophy saying that the cow eats more when it needs more it is self-regulating. This can be a problem of getting to work, if not the mixer has a good mix coefficient. The dominant cows will then eat the treats and keeping the high yielding younger cows away. Frequent feeding counteracts this.



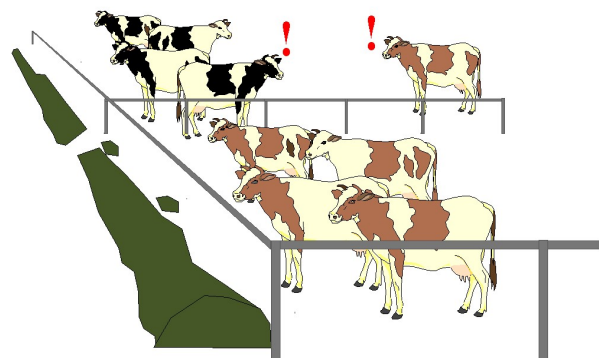
PMR feeding

Partial Mixed Ration (PMR) is a solution which ensures the high yielding cows their treat. In barns with milking robots, this is an integrated part of the solution. The diet feed mixture in the PMR is a base mixture, which only variants little.



GMR feeding

Group Mixed Ration (GMR), involves dividing the cows in groups where you frequently move around in the composition of cows, depending on what food they need. This solution can be very difficult to manage if you are constantly creating new rank order matches and decrease in milk yield will be a consequence. This solution will add also to the daily farm management tasks, moving around on the cows.



LEAN production – also for dairy farmers.

The same principles that apply to the industry in terms of LEAN production, also applies to a modern cowshed.

By planning work routines and develop its logistics correctly and with as little handling and short transport routes as possible, you can have significant time savings.

When was the last time you reviewed your layout and your work routines, along with someone who can give you a different view of your production?

The areas where it is particularly important, can be divided into the following groups.

Logistics / layout:

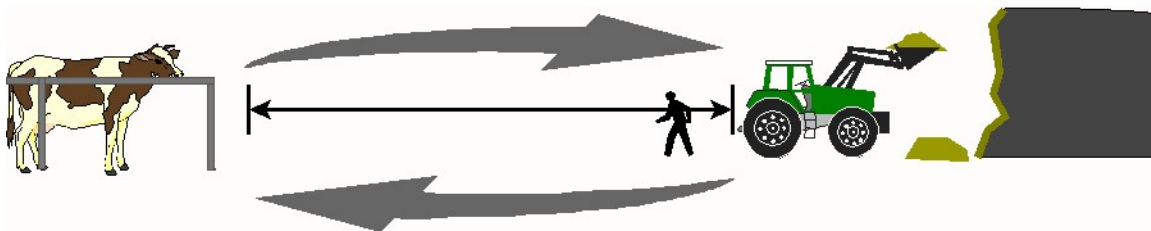
Ensure that there is short routes, with a minimum number of joints and handling.

Space Requirements:

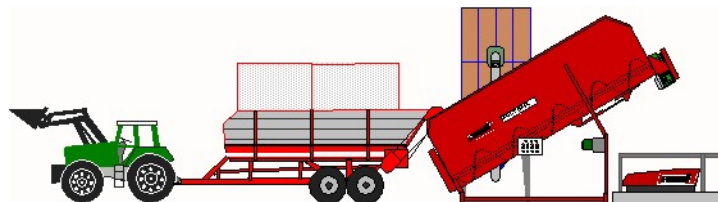
Use only solutions that require least space for feeding, and maximizes space for the cow wellness.

Logistics:

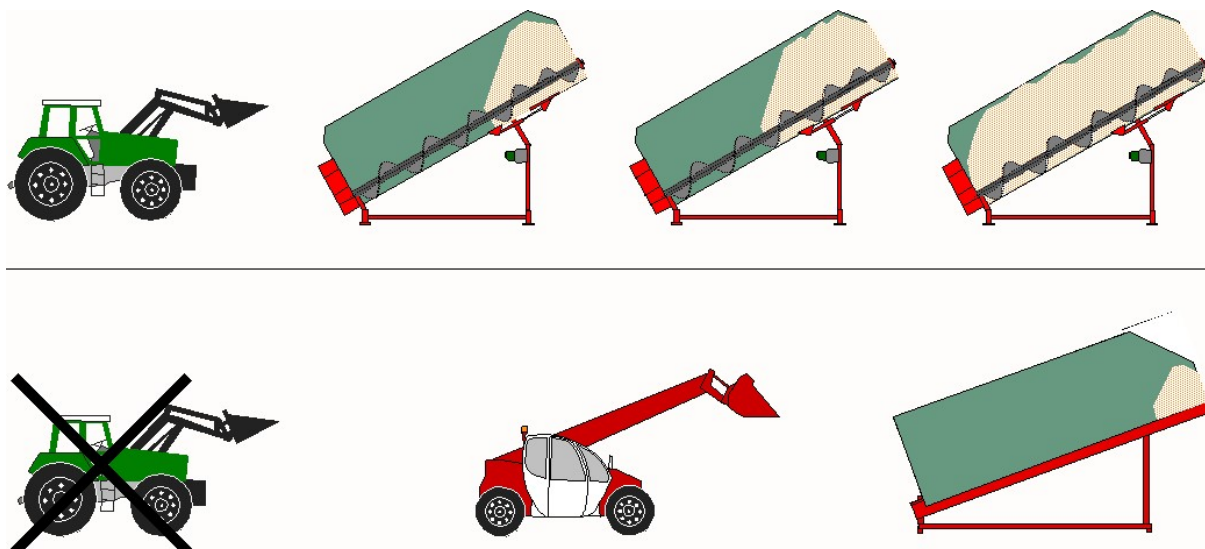
In layout it is important to place the silage at home and not in a field stack, or small lunch packages wrapped in plastic to be retrieved around the feeding season, these are real time-wasters!



Forage feed should be placed close to your cowshed. Make it easy to fill into the stationary mixer remote storage requires two tractors. In a small farm where the farmer is alone, this means that you have to go back and forth between the cowshed and the tractor, unless you have a tractor placed permanently at the remote storage or dismount the tractor during loading work.

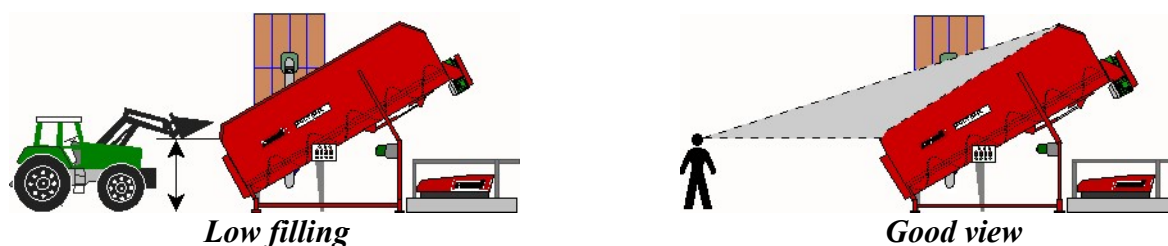


If it is unavoidable to have a remote storage than better is to fill the stationary mixer with a forage wagon. The forage wagon can also act as a buffer, which allows up to 2 days of consumption at a time in the cold season. The static mixer can also be filled directly with freshly harvested grass.

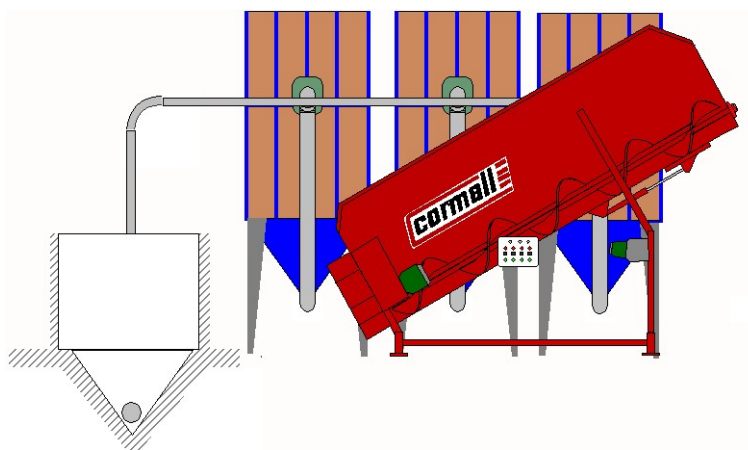


Filling equipment:

The filling of a Cormall mixer is particularly advantageous. You can always fill it from the same place where the material is moving up in the mixer until the mixer has been filled completely. If you use a loading table principle for feeding then this will require a telescopic loader, unless you can ensure that all food is eaten every day before refilling.



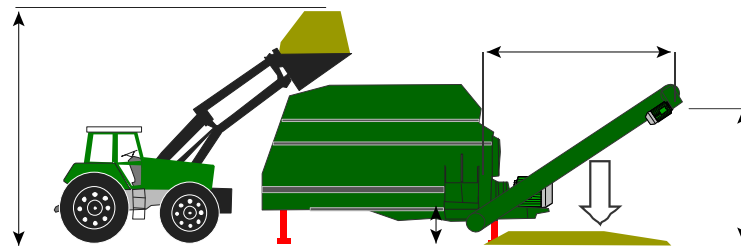
Most mixers require a filling height, which makes it impossible to observe the mixture without having to climb up on the machine. The higher filling level also means that the choice of lifting equipment is limited. On the stationary mixer is the filling level lower and the inclined position allows a good view from the tractor or from the ground.



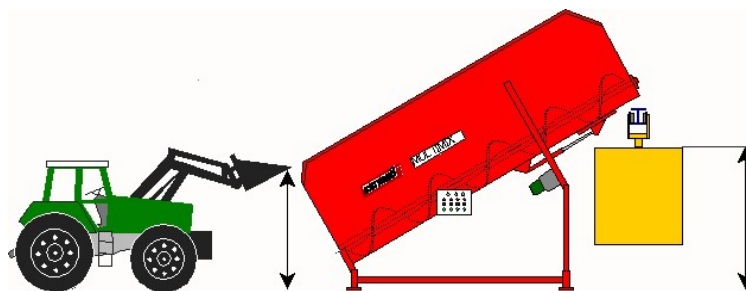
There may be money to be saved by arranging an embedded silo, which can be filled directly from a truck, bulk handling can often result in better feed prices.

Height inside the building:

Whatever principle is chosen it will require a certain height inside the building to install the stationary feeding system.

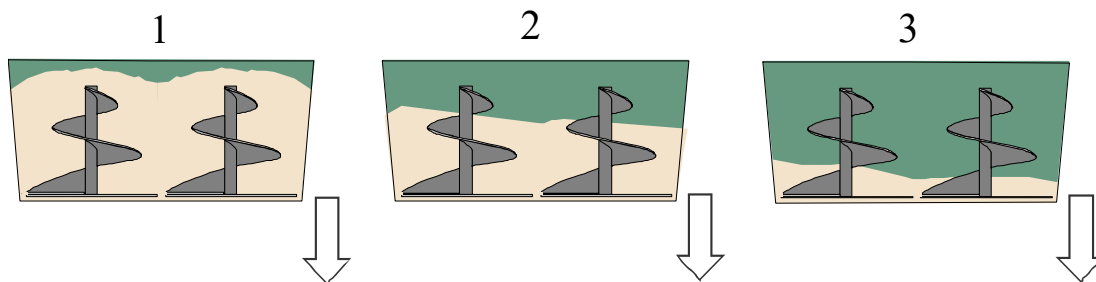


When filling into a rail feed wagon, a feed truck or a rubber band, it is convenient to empty high and not from a low position. This saves conveyer from between emptying position and filling position:



Emptying:

A problem that must be evaluated when choosing mixer for automatic feeding, is the demand for even discharge out of the mixer. Some mixers have a greater variation in discharge flow than others. This problem leads not only to a less precise dosing onto the feed trough but for some of the systems may this make it impossible to work and feed with, particularly the rubber band feeding conveyer is sensitive to this:



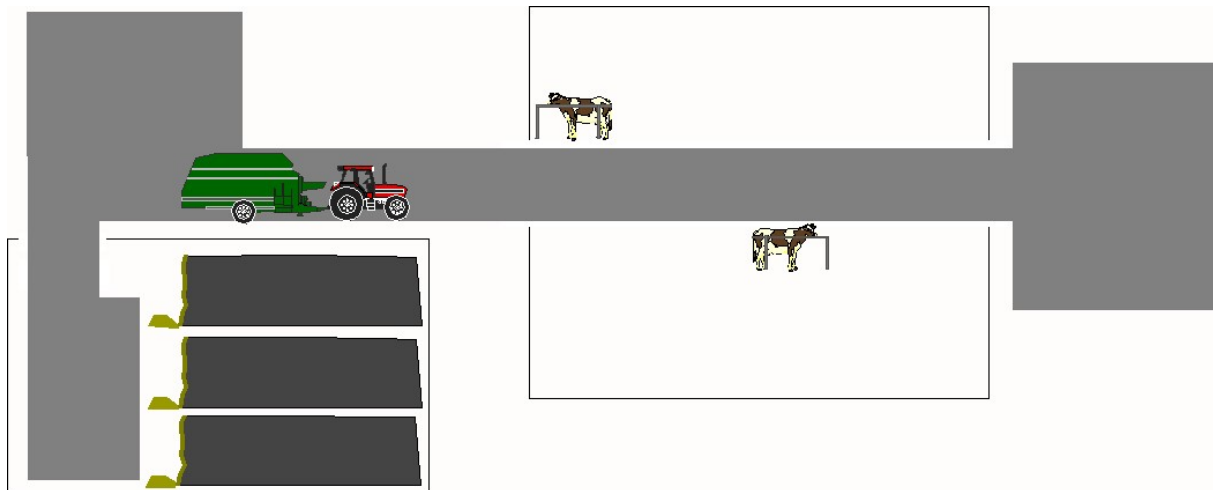
The feed trough/manger:

With an automatic feed table can save a lot of time, as there must be swept in the manger. The cow can eat from the table. The frequent feeding which ensures fresh feed, also contributes to the greatly reduced what should be eliminated by feed residues:



Space requirements:

Price difference between the reduced feed table and mobile feeding table, can save you as much as the entire investment in feeding. You can also choose to convert saved square area in the building into more room for the cow wellness.



Turning Space and driveway:

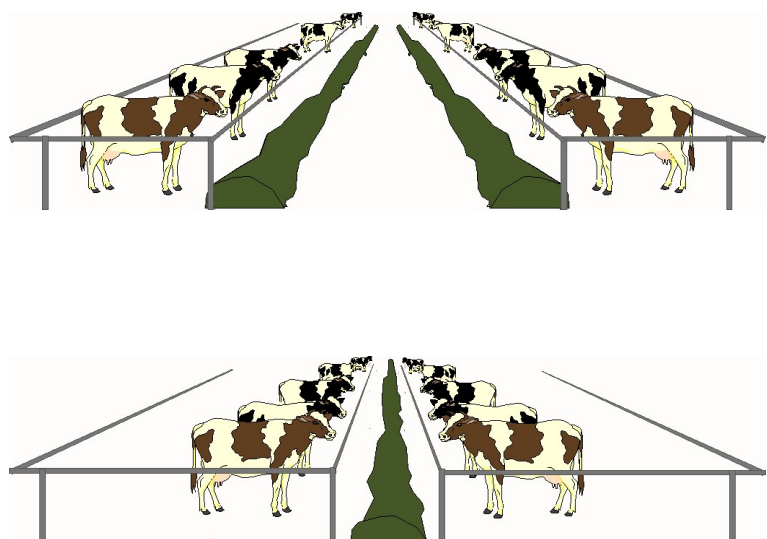
For storage of silage, there is a substantial savings from a stationary plant, in relation to the turning space, a mobile mixer requires. The same applies to the outer surface.

A clean feed table requires a clean space to turn and clean driving roads. It is not possible to save on this and simultaneously obtain a clean pure feed table.

The cost of making these driveways and keeping them clean must be weighed against the costs of not doing so.

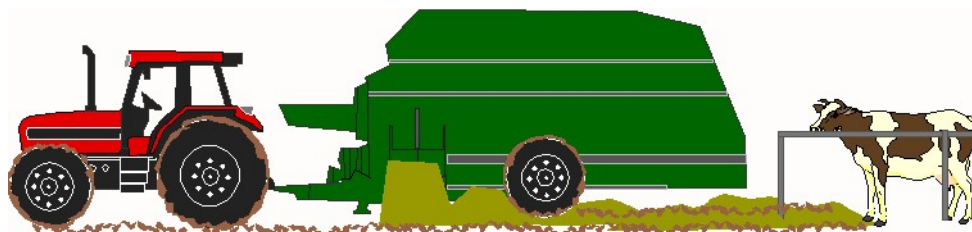
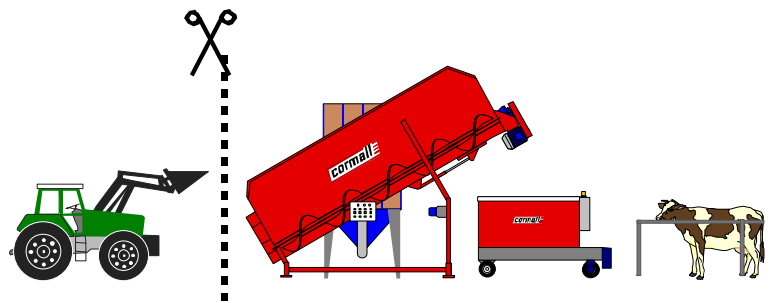
Space for cows - not technology!

A frequent cause of problems when moving into a new cowshed, is the stressors that arise, particularly when there is saved on the walkways around the food table and collection site. There should be prevented from 7-8 m²/cow up to 15-16 m²/cow.



Hygiene in the stable:

The stationary mixer with a automatic feeding system, can ensure clean zones, with a clear cut separation between the feed table and feed storage area.

**Hygiene around your building:**

It is important in the choice of feeding system to ensure a system without much work also provides the most optimal hygiene.

There also needs to be ensured against contamination from sick cows in a way that ensures that no droppings/manure are transported back into the feed table.

Cleaning of plant

It must be possible to clean the feed system, without requiring major surgery. Cormall's system is particularly suitable for cleaning and the mixer is equipped with two cleaning hatches at the bottom of the mixer.

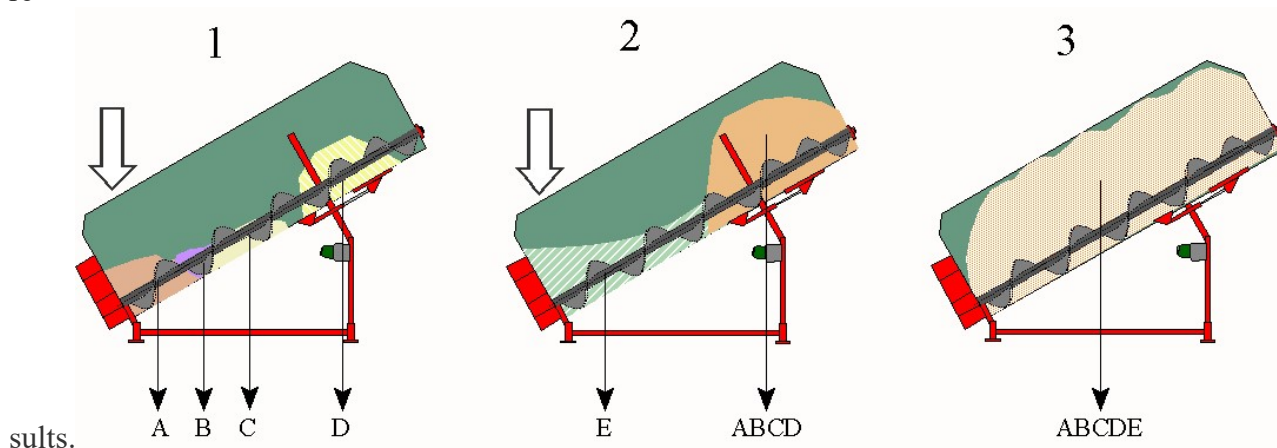
Generally, the more technology there is, the more must be kept clean.

High mixing coefficient with Multimix.

The feed material is charged to the mixer at the bottom end and transported by the two screws to the top of the mixer, where an oppositely directed auger winding and plates pushes the material up into a "molehill" and it naturally falls back into the mixer.

The mixing of the different materials is actually made in the molehill and the fall-back into the mixer. When filling the mixer one first fills the small quantities (concentrates), and then filled the large more volumes forage material into the mixer. This ensures that minerals and vitamins are evenly distributed throughout the mixture.

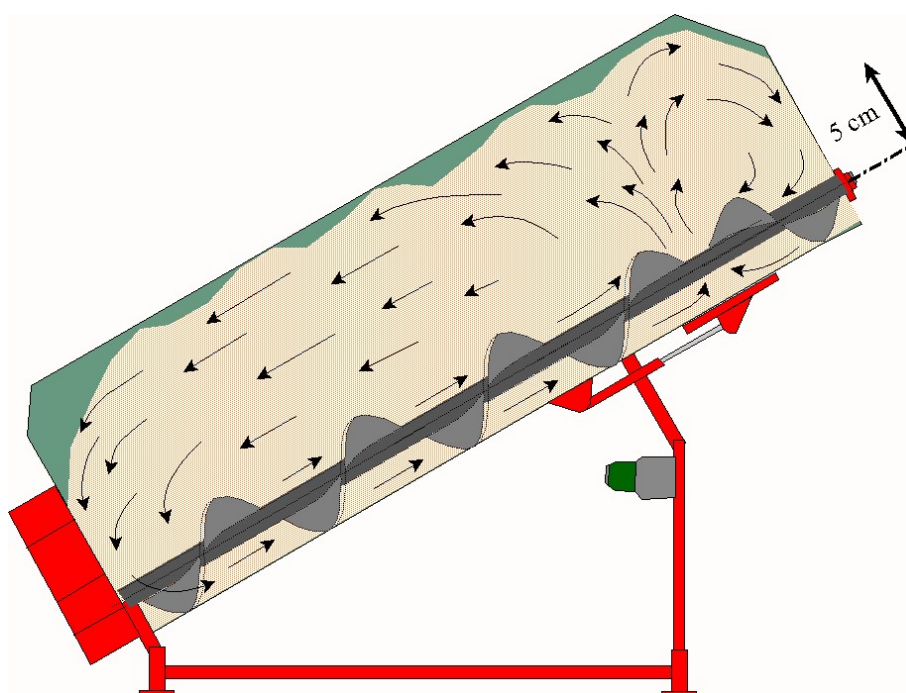
This mixing principle has over the years proven itself in all test trials and has the best mixing re-



Optimal feed structure

The diagonal mixing angle ensures a low energy cost and a gentle handling of the materials, this principle ensures that there is no musing of the material.

There is no proven knowledge of how gentle processing of the food must be, but there is likely a connection between energy consumption and musing rate of the feed. Overall it is a problem for all mixers if you mix for a too long period.

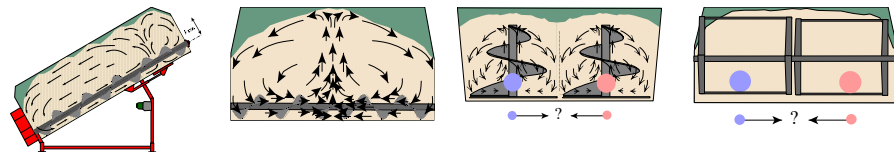


Mixing principles:

When choosing a mixer, it is necessary to determine between the different mixing principles and the use of them. All mixers can be used if they are used correct and within the boundaries that the design allows.

At Cormall we choose in the 70's to exchange our previous chain mixer principle with a diagonal mixer, primarily following the reasons:

Mixing coefficient	Ensure that smaller concentrates, minerals and vitamins are mixed equally in all of the mixture and homogeneously.
Energy consumption	Keeping the farm energy cost low and avoid installation costs for higher amp. fuses. A low energy consumption also indicates a gentle treatment of the feed, and a long lifespan of the mixer in terms of low wear and tear.
Durability	A machine that is not using chains and sprockets that can burst instead we use augers that only requires tenant on bearings. We have also removed all chains and sprockets from the operating transmissions.



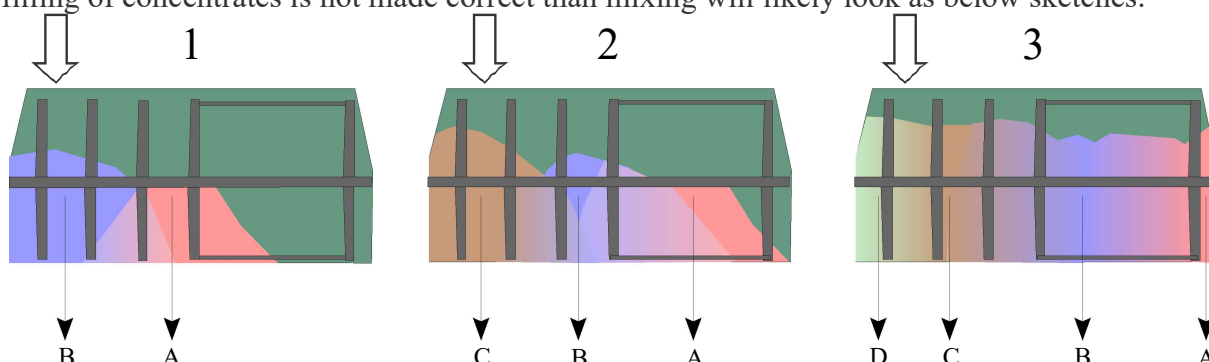
Mixing principles	Diagonal Molehill	Horizontal Molehill	Vertical Segment Molehill	Horizontal Segment Fall mixing
Mixing coefficient	+	+	-	-
Feed structure	+	(+)	+	+
Discharge flow	+	+	-	+
Energy consumption	+	-	-	-
Filling degree	90	70	90	65
Automatic feeding:				
Chain feeding table	+	+	(+)	+
Rubber belt conveyer	+	+	-	-
Rail wagon feeder	+	+	+	+
Robot feeder	+	+	+	+

Mixing coefficient:

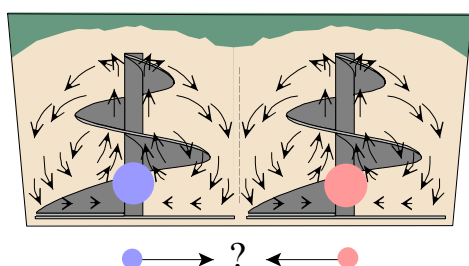
All mixers can achieve high mixing coefficient, when you fill them correctly. This is very important when filling into the mixing principles described below. If this is not observed than the risk is that up to 80% of the vitamins are placed inside 20% of feed mixture. These machines must be filled at several positions when filling in concentrates and especially not all into the end of the machine!

Proper filling of concentrates:

If filling of concentrates is not made correct than mixing will likely look as below sketches:



Vertical mixer with more than one auger can cause the same problems, - the augers will act as individual mixers that separately makes their own mix:



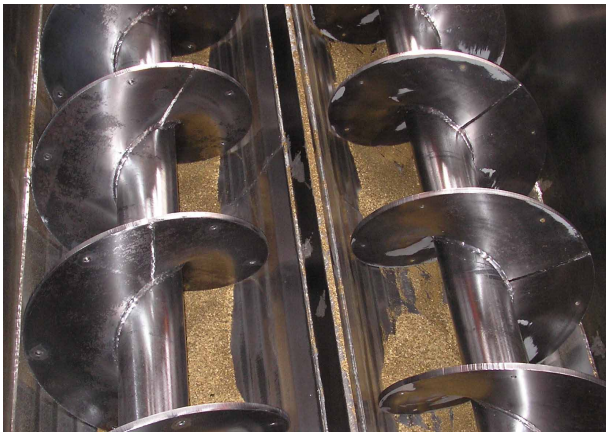
One must ensure that concentrates are distributed evenly in the mixer on these machines to obtain the best mixing results and not fill them all in one end of the machine.

Farm test: 23 different mixers at Hoffmandsgave on the island of Fyn in Denmark, 1998.
Test: Mixing 50 Kg yellow pies to see mixing coefficient after feeding out.



PPM? *(Parts Per Million)*

When making several mixtures a day for different groups, it is important that there is as little leftovers from the previous mixture as possible, before you fill the next. It is of course matter of measuring, to find leftovers, and nothing can be made 100% free, unless the machine is cleaned in between every mixture.



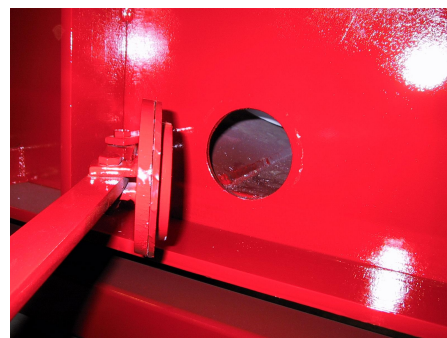
The Cormall MTX mixer can be delivered with extra teight small distance between the auger and the mixer bottom, thus leaving as little leftover from previous mix as possible



Not all mixers are suitable to accommodate the need for minimising PPM leftover between the mixing batches, the above solution will need cleaning in between.

Cleaning

All MTX mixers are equipped with cleaning plugs as standard for leading out the water when cleaning the mixer. The plugs are placed at the lower end of the mixer with a Ø 100 mm hole in both sides one for each auger



Report no. 1

Eddition : The Danish ministry of agriculture and fishing, state livestock laboratory for soil technology and production systems, testing center Bygholm
Report no 904, 1995

Name : Test of dairy feed mixers

Results : It was tested the difference in mixing and feeding out from the mixer with 2 auger mixer, 3 auger mixer, 4 auger mixer, keenan type mixer, combined paddle and auger mixer and paddle mixer.

Mixing system	Mixing time min	Feeding, variation in %	Mixing may's variation in %	Mixing minerals variation in %
2 Auger	15	16,1	3,7	2,4
3 Auger	15	18,5	10,4	5,2
4 Auger	15	41,9	9,4	6,1
Hasp type	15	38,3	12,7	10
Paddle/auger	30	20,7	6,8	8
Paddle 10 m3	30	42,2	7,4	9,4
Paddle 14 m3	15	60,7	8,9	4,9

Report no. 2

Eddition : This test was performed in Germany:
Sächsische Landesanstalt für Landwirtschaft und DLZ Agrarmagazin,
Die landwirtschaftliche Zeitschrift für Management Produktion und Technik.
Nr 11 November 2000

Name : Futtermischtechnik im Vergleich (mixer technology in comparison)

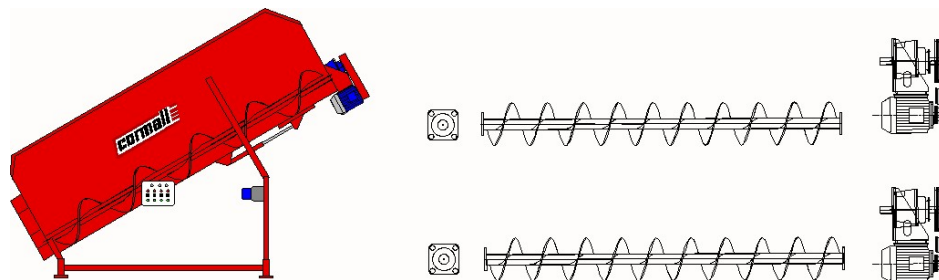
Results : It was tested the difference in mixing quality, feeding out from the mixer, feed structure and power consumption between 4 different systems, 2 auger, 3 auger, vertical mixer and keenan type.
Alle four systems were given the grade after the German school system from 1 to 5 where 1 is the best and 5 is the worst (failed).

Mixing system	Feeding out	Mixing	Feed structure	Energy consumption	Over all result
2 Auger	1,5	1,5	1,5	2,5	1,6
3 Auger	2,5	1,5	2	2,5	1,87
Vertical	4	2,1	1	4	2,47
Hasp type	2,5	1,7	1,5	1	1,72

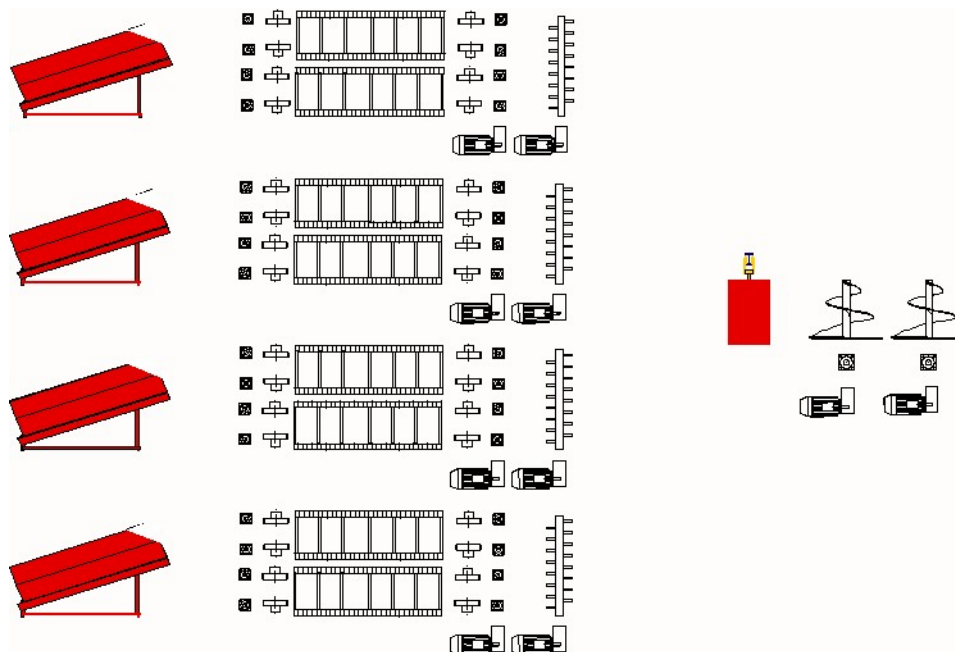
Maintenance:

The only essential parts to be maintained on the Cormall mixer system is pressure bearing in the bottom, augers and planetary gears.

TMR/PMR system:



GMR system:





Proper mixer size

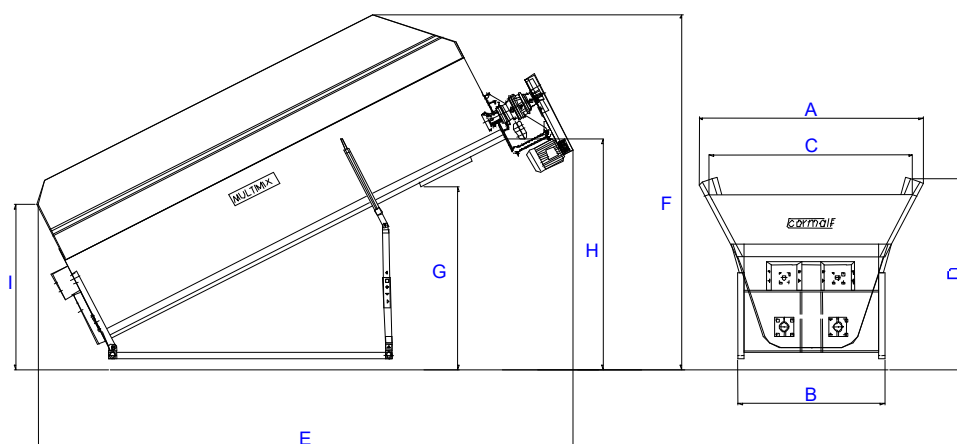
For proper choice of mixer size, it is important to consider what you want to mix. In the table below can be seen how many animals a mixer can feed with a single mixture, depending on how many cows can be fed per cubic meter.:

Mixer volume

Mixer size	6 cows/m ³ Organic farming	7 /m ³	8 /m ³	9 /m ³
10 m ³	60	70	80	90
12 m ³	72	84	96	108
15 m ³	90	105	120	135
18 m ³	108	126	144	162
22 m ³	132	154	176	198
30 m ³	180	210	240	270
42 m ³	252	294	336	378
50 m ³	300	350	400	450

Motor size

MTX	10	12	12	15	15	18	18	22	22	30	30	42	50
2x kW	5,5	5,5	7,5	7,5	11	11	15	11	15	15	18,5	18,5	22
Motor ⁻¹	1400	900	1400	900	1400	700	900	700	900	700	900	700	700
Snegl ⁻¹	18	11	18	11	18	8	10	8	10	8	10	8	8
Standard	X		X		x		x		x		x	x	x



Dimentions:

Mixer	10 m ³	12 m ³	15 m ³	18 m ³	22 m ³	30 m ³	42 m ³	50 m ³
A	2700	2700	2700	2900	2900	3100	3800	3800
B [#]	1850	1850	1850	2400	2400	2600	3190	3190
C	2080	2080	2080	2450	2450	2640	3380	3380
D	2250	2250	2250	2550	2550	3040	3290	3290
E	4900	6000	6900	6000	6900	7800	8000	8500
F	3600	4200	4700	4550	5100	5650	5990	6200
G	1800	2050	2300	2050	2300	3030	3030	3500
H	2100	2550	3000	2550	3000	3640	3640	4150
I	1750	1750	1750	2050	2050	2150	2150	2150
Weight kg	3600	4400	5000	5800	6900	7900	10200	13100
Cows/Mix	70-79	84-108	105-135	126-162	154-198	210-270	240-360	300-450
Plating mm	6	10	10	10	10	10	10	10
Auger								
Mm	10	15	15	15	15	15	15	15
Ø	400	400	400	600	600	600	800	800
Pipe mm.	139,7/10	139,7/10	139,7/14,2	159/14,2	159/20	159/20	300/14,2	300/14,2
RPM	17,5	17,5	17,5	10	10	10	8	8
Motor								
V-belt	3/355/140	3/355/140	3/355/140	4/400/140	4/400/140	4/400/140	5/400/160	5/400/160
kW	2x 5,5	2x 7,5	2x 11	2x 11	2x 15	2x 18,5	2x18,5	2x 22
kW	0,75	0,75	0,75	0,75	0,75	0,75	0,75	0,75
Amp	25	32	50	50	63	80	80	100

#) incl. Load cells

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