

## Holstein Friesian linear type assessment

Linear assessment of type, with traits scored on their actual appearance (from one biological extreme to another) rather than desirability, was introduced into the UK in 1985.

The system allows more accurate and objective evaluation of dairy cattle than traditional desirability-based schemes (Sections 2, 3 and 4).

Linear classification is conducted by Breed Society-appointed classifiers for herds wishing to assess individual animal strengths and weaknesses and AI companies progeny testing sires.

Holstein Friesians in the UK are assessed for a total of 16 separate linear traits on a 1-9 scale to describe the degree of type shown by cows and heifers.

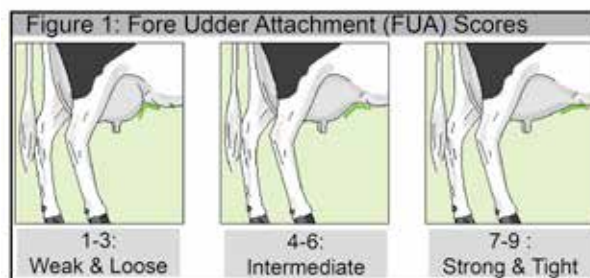
### Assessing udder traits

Seven separate traits are used to define the udder.

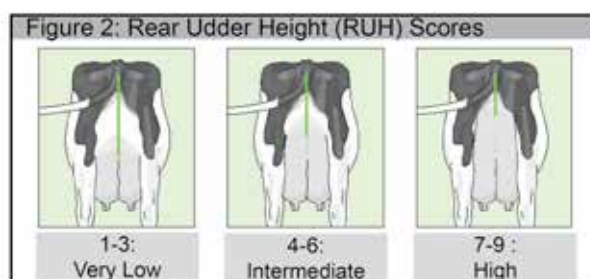
Fore Udder Attachment, Rear Udder Height and Udder Support all describe how the udder is attached.

In each case higher udder attachment scores are considered preferable, demonstrating udders that are held firmly in place and likely to withstand the pressure of large amounts of milk without breaking-down.

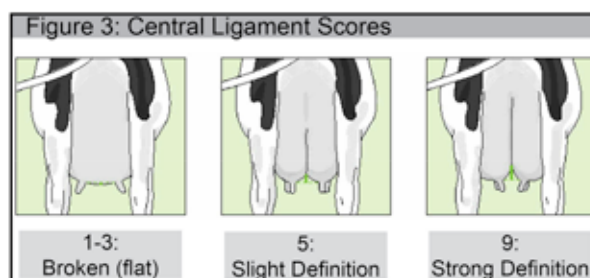
**Fore Udder Attachment** indicates the strength with which the front of the udder is attached to the abdominal wall (**Figure 1**).



**Rear Udder Height** indicates the distance between the top of the milk secreting tissue and the vulva (**Figure 2**).



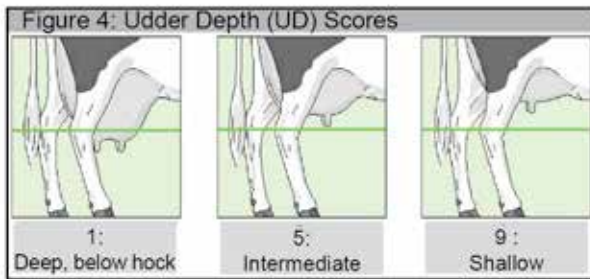
**Central Ligament** indicates the depth of the cleft in the udder caused by the central suspensory ligament (**Figure 3**).



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There is some concern that very defined clefts cause the rear teats to be drawn closer together which can cause problems when attaching the milk cluster, especially in systems where robots are used.

**Udder Depth** indicates the distance from the lowest part of the udder floor to the hock (**Figure 4**).



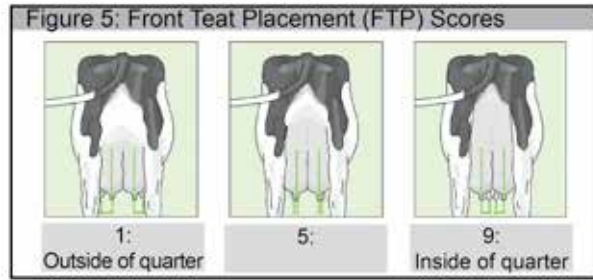
A higher Udder Depth score – indicating a shallower udder – is considered preferable since deep udders are more susceptible to damage.

A deep udder may not have a negative effect on longevity, providing it is well-attached but cows with shallower udders have generally been found to live longer.

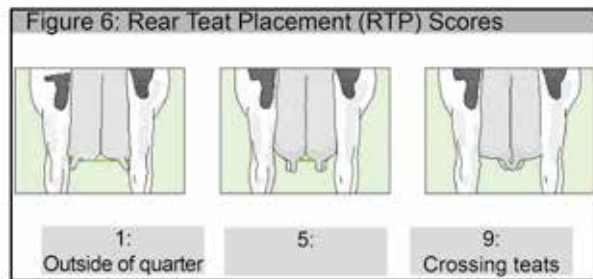
Rear Teat Placement, Teat Placement Side and Teat Length together describe all the elements of the teats.

Unlike most traits, scores mid-way between the extremes are considered preferable.

**Front Teat Placement** indicates the position of the front teats viewed from behind (**Figure 5**).



**Rear Teat Placement** indicates the position of the rear teats viewed from behind (**Figure 6**).



Again, close RTP has issues relating to the ease with which a milking unit can be attached to the udder, close rear teats would be a recent concern for many farmers, a problem more acute where robots are used for milking.

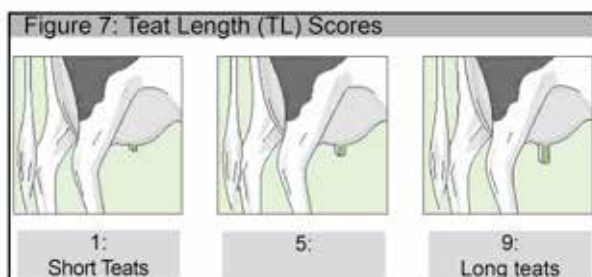
For the easiest milking, teats need to be well-placed on the bottom of each quarter and at right angles to the ground.

Teats on the outside of the quarter are more susceptible to damage.

Teats that cross over on the inside can actually be placed above the lowest point of the quarter resulting in incomplete milk-out and increased mastitis problems.

In the same way, **Teat Placement Side** indicates the distance between the front and rear teats; laterally well-placed teats also being important in ensuring the easiest possible milking.

**Teat Length** indicates the length of the front teat (**Figure 7**).

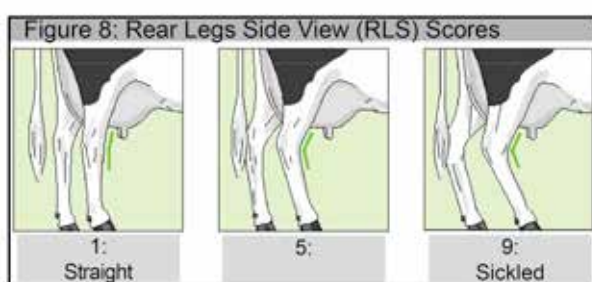


While long teats are more easily damaged, short teats cause problems for milking machine attachment.

### Assessing legs and feet traits

Between them, Rear Legs Side and Foot Angle describe the key functional elements of legs and feet, the importance of which cannot be under-estimated in determining herd survival.

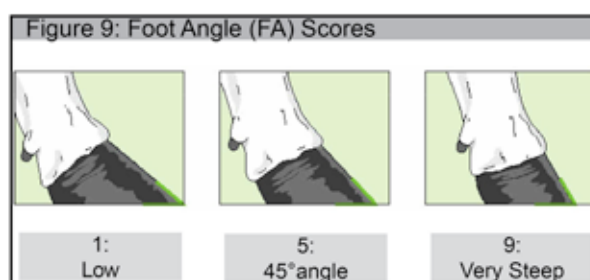
**Rear Legs Side** (or Set) indicates the angle at the front of the hock (**Figure 8**).



**Rear Legs Side is another mid-scoring trait, with both over-straight or over-sickled legs associated with reduced herd life.**

It is important to appreciate that both extremes can result from a poor rump structure as much as an inherently poor set of the legs.

It is also important to understand that leg set problems should always be corrected by using a bull with a correct leg set (a proof in the range -0.5 to +0.5) rather than one at the other extreme to the cow in question.

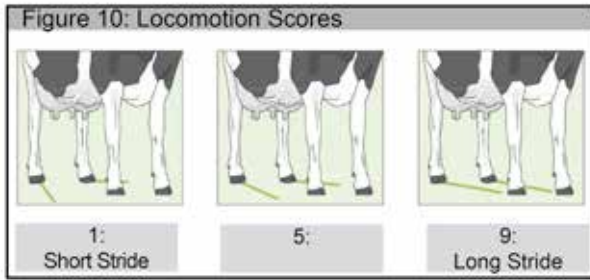


**A higher scoring – steeper – foot angle is generally considered preferable to keep the heel and pastern off the ground, enabling the cow to cope better with uneven or stony ground, however, like all traits this is not to an extreme steepness which has its own problems and issues.**

Locomotion is also scored in the UK on a linear scale (**Section 2**). Many countries do not score locomotion and there is no conversion formula for foreign bulls on locomotion.

Ideal locomotion is defined as when the back feet are placed exactly where the front feet were as the animal walks (**Figure 10**).

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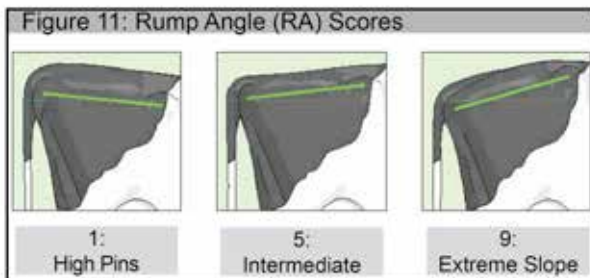


Locomotion is highly correlated to longevity (**Fact Sheet 4**).

## Assessing rump traits

Rump Angle and Rump Width describe the appearance of the rear of the cow.

**Rump Angle** indicates the angle from the top of the hip to the top of the pin bone (**Figure 11**).



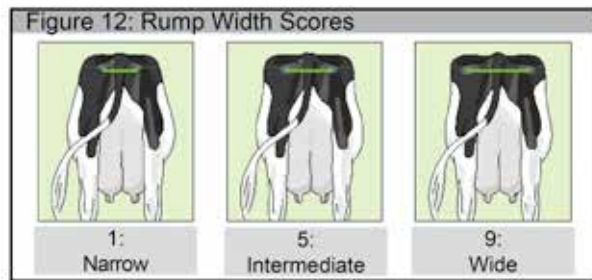
**An intermediate scoring Rump Angle is generally considered preferable, with both high pins at the one extreme and very sloped rumps at the other undesirable.**

A slight to moderate slope from the hips to the pins has been associated with less calving difficulty, fewer reproductive problems and great longevity, although such links have yet to be proven scientifically.

Pins tend to get higher with age, as the loin weakens.

It is important to appreciate that, like leg set, any Rump Angle problems should always be corrected by using a bull with a correct rump angle (a proof in the range  $-0.5$  to  $+0.5$ ) rather than one at the other extreme to the cow in question.

**Rump Width** indicates the distance between the rear-most point of the pin bones (**Figure 12**).



**A higher scoring – wider – rump is generally considered preferable unless associated with excessive lack of dairy character.**

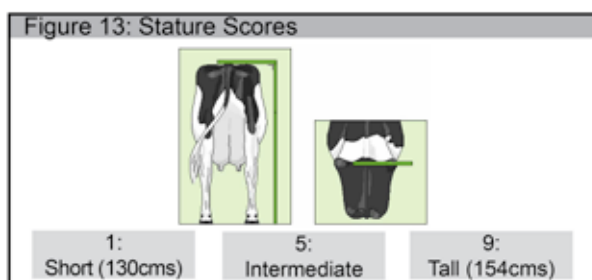
Like a wide chest and deep body, a wide rump is seen by many as indicator of a greater capacity to process forage.

Although not strongly related to longevity, it is also a trait known to be lacking in frail cows.

## Assessing body traits

The four final linear traits – Stature, Angularity, Chest Width and Body Depth – all describe aspects of the cow’s body size, form and capacity.

**Stature** indicates the height of the animal from the top of the spine in between the hips to the ground (**Figure 13**).



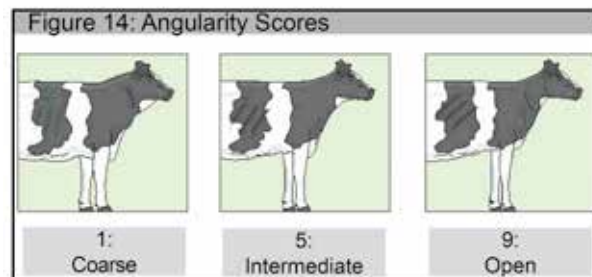
**Stature is a very much a matter of individual herd preference, although an intermediate score is generally considered better.**

Taller animals are not necessarily more desirable in their own right, as farmers with cows out-growing their cubicles have discovered.

However, increased Stature has tended to accompany increasing Angularity or Dairyiness.

In many cases, indeed, it can be associated with a level of Angularity and lack of width felt by many to be linked to frailty or lack of strength.

**Angularity** is the least objective of the linear traits, indicating the angle and openness of the ribs combined with leanness of bone (**Figure 14**).



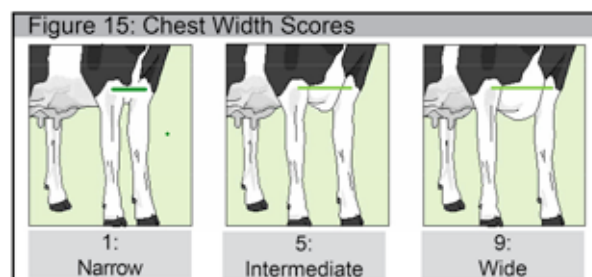
Defined as dairyiness or dairy character in other national systems, it has been found to be highly-correlated to milk yield (**Factsheet 4**).

Low scores are likely to be associated with lower yielding animals that are more likely to be culled on performance.

At the same time, however, high Angularity scores can be associated with frailty, which may restrict herd life through impaired health or fertility.

**Since both extremes have been shown to have a negative effect on longevity, an intermediate Angularity score is generally preferable.**

**Chest Width** measures the chest floor between the top of the front legs (**Figure 15**).



**A higher scoring – wider – chest is generally considered preferable unless associated with excessive lack of dairy character.**

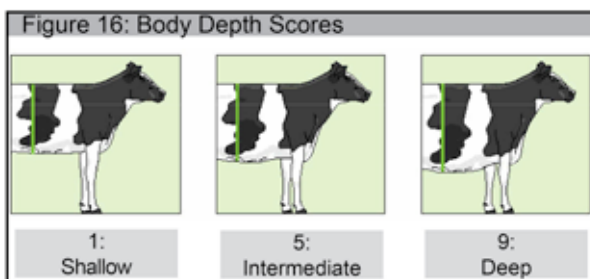
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Like a wide rump and deep body, a wide chest is seen by many as an indicator of a greater capacity to process forage.

Although not strongly related to longevity, it is also a trait known to be lacking in frail cows.

**Body Depth** measures the distance from the top of the spine to the bottom of deepest point of the rear rib (Figure 16).

Since the same composite trait value can be obtained from very different combinations of individual traits, it is vital to focus improvement on the specific traits that need attention rather than just the composites (Section 2).



An intermediate body depth is generally considered preferable.

Like a wide rump and chest, a deep body is seen by many as an indicator of a greater capacity to process forage. However, recent research has shown that excessive body depth is linked to reduced longevity.

Following linear assessment, individual trait scores are automatically combined to suggest composite scores for Mammary System, Legs and Feet, Dairy Strength and Rump which can be adjusted slightly by the classifier to reflect the way all the traits fit together in the complete cow.