

Progress of type harmonization
Results General Assembly
Killarney, Ireland,
Octobre 2008

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1. Introduction

One of the main activities of the WHFF is the harmonization of procedures in Holstein breeding. The success of harmonized linear evaluation should be looked at as one of the greatest accomplishments of the Federation. Progress in harmonized type evaluation might seem slow to some, but in the 18 years since the first workshop for classifiers in Cremona, giant strides have been made.

2. History

The first workshop was attended by participants from 14 countries. The one just concluded in Cremona had classifiers from 26 countries. There were doubts on whether the countries could have high correlations measuring the same traits compared to other countries. We have seen linear correlations for type at the same level as production traits. This is very significant since classifiers only visually inspect the cow and the production traits are actually weighed and measured. I think we can all agree that from a beginning that was somewhat uncertain, we have universally developed a program that fits our breeder's needs.

3. What happened since the general assembly WHFF in Paris 2004?

- A. In 2005 the 7th Workshop was organised in The Netherlands (Naarden). Important recommendations from that workshop are:
1. Locomotion; suggestion is to appoint this trait, in the short-term, as the 17th Standard Trait (adopted by the Council in December 2005)
 2. Angularity; in order to try to increase the correlation of this trait, in case of conversion between countries, the working group recommends accentuating this trait. The suggested definition is "The angle and openness of the ribs".
 3. Body Condition Score; in a number of countries this trait is already scored. Given the highly positive results, the suggestion is to continue with this trait. Further, regard this trait in the future as a Standard Trait.
 4. General characteristics; the recommendation of Montreal 2003 was elaborated the recommendation that all countries should use four basic general characteristics remain unimpaired valid. Proposed is to name the four sections as follows:
 - Frame (including Rump), (instead of Frame and Capacity)
 - Dairy Strength (instead of Dairy Character)
 - Feet and Legs
 - Udder.
 5. Rear Udder Width; more information is needed. Therefore countries that already measure this trait should supply information for further research.
 6. The next workshop will be held in Italy in 2007 in week 43, around Cremona.

During the practical part of this workshop, not only was there attention for the linear traits but also for the General Characteristics, in order to get more understanding for especially the traits Frame (including Rump) and Dairy Strength, the working group formulated two definitions that describe the most ideal cow for these traits.

Frame including Rump: A well balanced skeletal frame of sufficient stature, exhibiting width of chest and depth of body and includes a sloped rump of adequate width that is supported by a strong loin.

Dairy Strength: An angular, open and well-sprung fore and rear rib with a wide chest and sufficient depth of body to support the ability to produce milk.

Of course the practical workshop was mainly focussed on the score of the linear traits, since these traits are more important than the General Characteristics from an international point of view is.

B. In 2007, the 8th workshop was held in Italy (Cremona)

The working group recommends the following topics to the committee:

- a) Locomotion and Body Condition Score are acknowledged completely as a standard trait. From 2005 eight countries started BCS and also the first correlations from Interbull are looking good (average 0.83). Locomotion is being scored in 15 countries with an average correlation of 0.75 at the first testrun of Interbull.
- b) Angularity, in order to try to increase the correlation of this trait, in case of conversion between countries, the working group recommends accentuating this trait. The suggested definition is "The angle and spring of the ribs".
- c) The definition of all standard traits will be brought up to date and reported to all the countries. This concerns small adjustments in the definition and/or adjustments concerning reference point and scale to the traits Angularity, Body Condition Score, Rear Leg Rear View, Foot Angle and Locomotion.
- d) Rear Udder Width should not be advised as a standard trait. This trait is scored in quite a few countries, but there are already seven standard udder traits. The aim is to limit the number of traits, so the advice is to keep this trait from the list of standard traits.
- e) Thurl position is not recommended as a standard trait. Initial research in the US indicates that other linear traits are more related to mobility and calving difficulty.
- f) Next time, again, send a questionnaire to keep everyone informed which traits are scored and to gain a clear insight in how the recommendations are followed up.
- g) The next workshop is held in France in 2009. During this workshop mainly give attention to the Feet & Legs traits and spend more time to harmonisation in practice.

4. Linear Definitions

One of the proactive steps taken by the WHFF was the publishing of the Standard Linear Traits and their definitions on the Web Site 50 they can be downloaded and printed out by anyone who wants them. I would like to go over the traits and their definitions quickly to possibly spark some discussion during this discussion and later. As a group in Cremona we all went over the definitions and had some discussions on fine-tuning anything that was giving the classifiers trouble but there were not any major problems expressed.

The following traits are approved standard traits:

- | | |
|------------------------|---------------------------|
| 1. Stature | 10. Locomotion |
| 2. Chest Width | 11. Fore Udder Attachment |
| 3. Body Depth | 12. Front Teat Placement |
| 4. Angularity | 13. Teat Length |
| 5. Rump Angle | 14. Udder Depth |
| 6. Rump Width | 15. Rear Udder Height |
| 7. Rear Legs Rear View | 16. Central Ligament |
| 8. Rear Legs Set | 17. Rear Teat Position |
| 9. Foot Angle | 18. Body Condition |

Standard Trait Definition

The precise description of each trait is well defined and it is essential to use the full range of linear scores to identify the intermediate and extremes of each trait within its population. The assessment parameters for the calculations should be based on the expected biological extremes of two year-old heifers.

All countries at the WHFF conference in Sydney had approved and agreed to use the recommended standard linear traits, although some countries did not consider that all the traits were essential or have an economic value in their breeding programme. The position is that changes in the standard traits could occur based on scientific evidence or the requirement of the international dairy market for specific information. It is not always possible to have a single linear point of measurement, as with fore udder attachment and angularity. Angularity has been particularly questioned as to its relevance within the programme. Acknowledging that it is a descriptive trait required internationally, it's assessed with a high degree of confidence and accuracy producing a heritability figure equivalent to that for production traits – around 0.33. In an attempt tot answer criticism of the trait angularity, a new definition has been developed which is explained in the trait definitions.

Note

The linear scale used must cover the expected biological extremes of the population in the country of assessment. The precise measurements in the scale given, may be used as a guide and should not be treated as an exact recommendation.

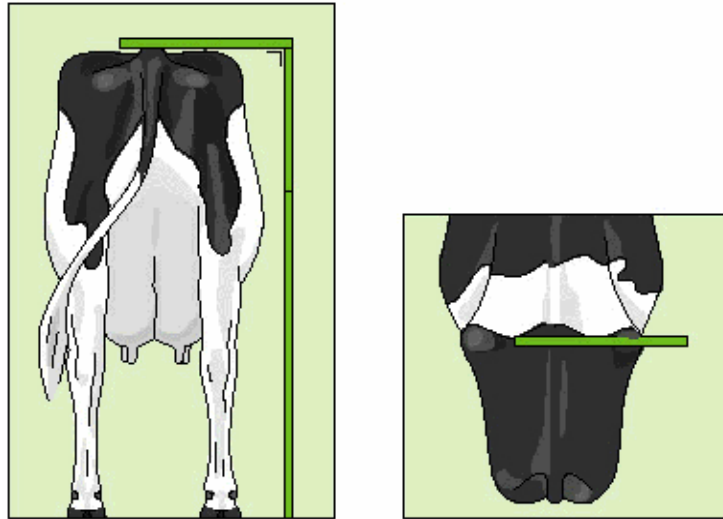
1. Stature

Ref. point:

Measured from top of the spine in between hips to ground.
Precise measurement in centimetres or inches, or linear scale.

1 Short	(1.30 cm)
5 Intermediate	(1.42 cm)
9 Tall	(1.54 cm)

Reference scale: 1.30 cm – 1.54 cm; 3 cm per point



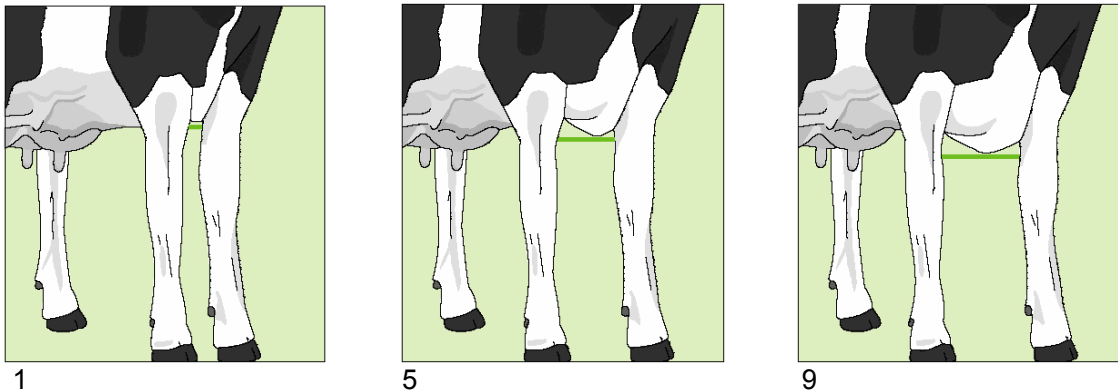
2. Chest Width

Ref. point:

Measured from the inside surface between the top of the front legs.

1 – 3	Narrow
4 – 6	Intermediate
7 – 9	Wide

Reference scale: 13 cm – 29 cm; 2 cm per point

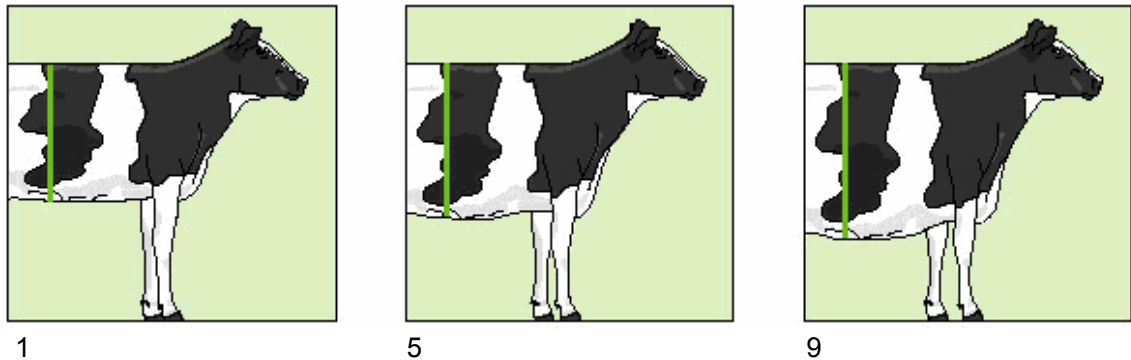


3. Body Depth

Ref. point: Distance between the top of spine and bottom of barrel at last rib – the deepest point. Independent of stature.

- 1 – 3 Shallow
- 4 – 6 Intermediate
- 7 – 9 Deep

Reference scale: optical in relation with the balance of the animal

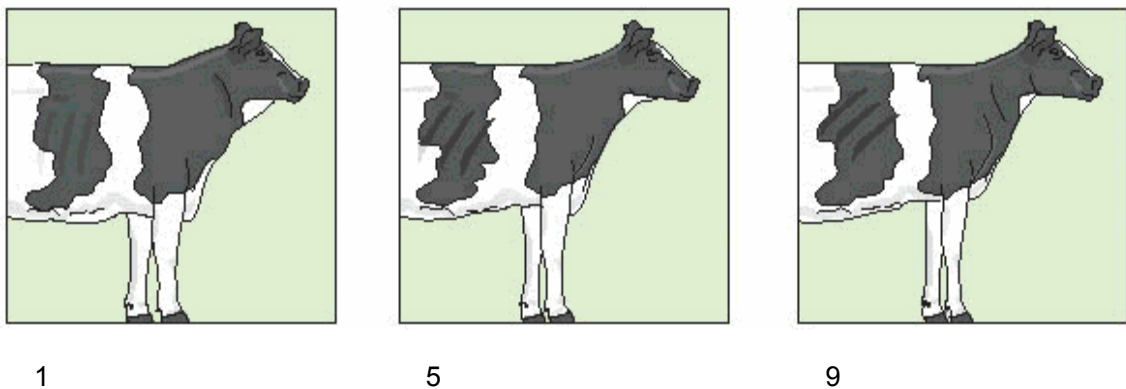


4. Angularity

Ref. point: The angle and spring of the ribs. Not a true linear trait.

- 1 – 3 Lacks angularity
- 4 – 6 Intermediate angle
- 7 – 9 Very angular

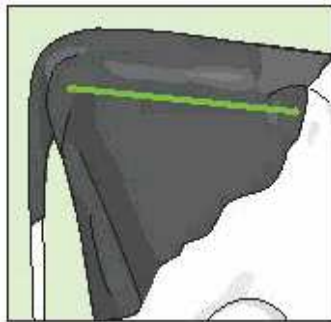
Defining “spring of ribs” is another way of referring to the degree of openness between the ribs. When ribs are tight there is no opening. When the ribs springs apart or expands open, the space between ribs becomes greater.



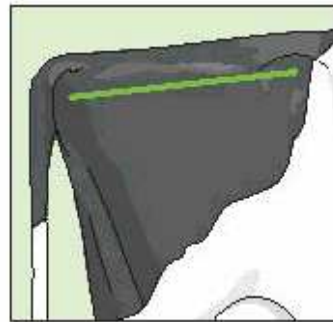
5. Rump Angle

Ref. point: Measured as the angle of the rump structure from hooks (hips) to pins.

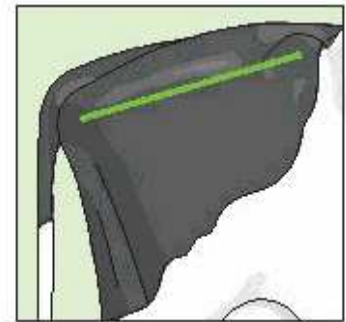
1 High Pins	(+4 cm)
2	(+2 cm)
3 Level	(+0 cm)
4 Slight slope	(-2 cm)
5 Intermediate	(-4 cm)
6	(-6 cm)
7	(-8 cm)
8	(-10 cm)
9 Extreme slope	(-12 cm)



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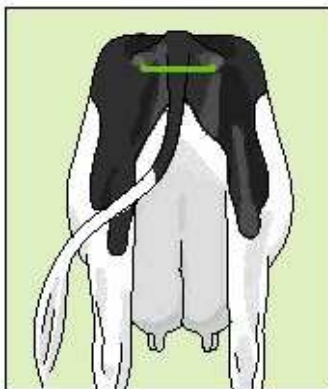
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6. Rump Width

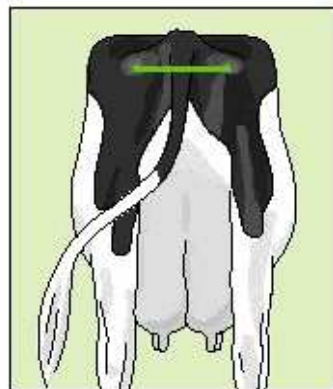
Ref. point: The distance between the most posterior point of pin bones.

- 1 – 3 Narrow
- 4 – 6 Intermediate
- 7 – 9 Wide

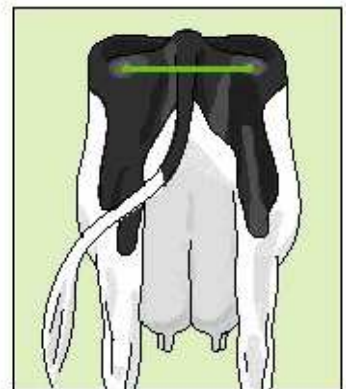
Reference scale: 10 cm – 26 cm; 2 cm per point



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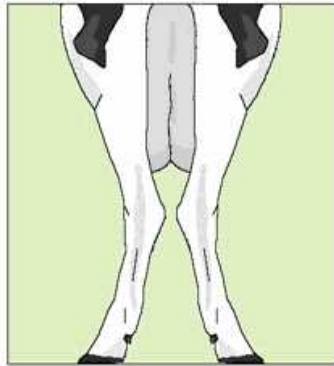


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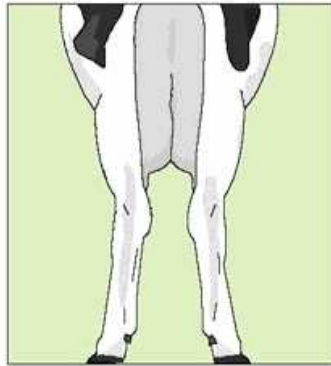
7. Rear Legs Rear View

Ref. point: Direction of the rear feet when view from the rear.

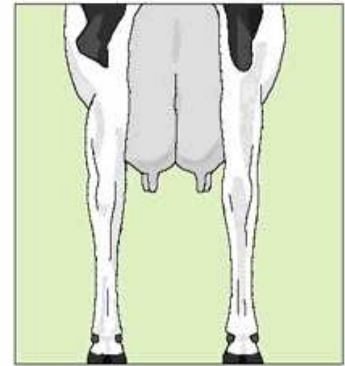
- 1 Extreme toe-out
- 5 Intermediate; slight toe-out
- 9 Parallel feet



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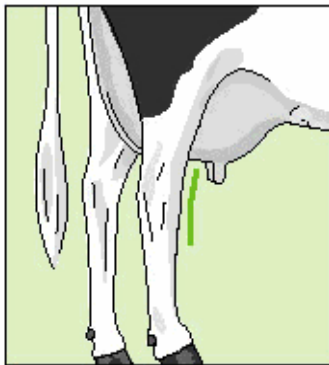


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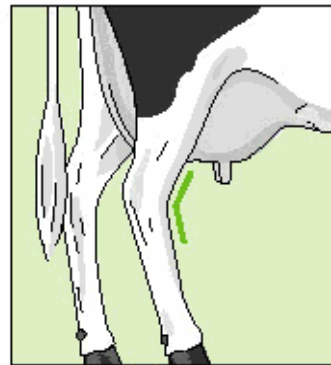
8. Rear Legs Set

Ref. point: Angle measured at the front of the hock.

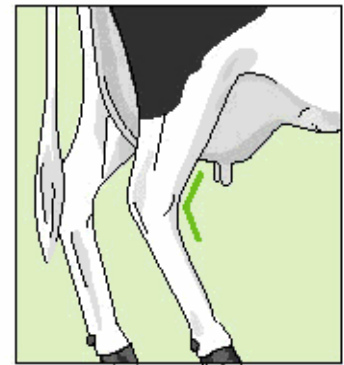
- 1 – 3 Straight (160 degrees)
- 4 – 6 Intermediate (147 degrees)
- 7 – 9 Sickie (134 degrees)



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9. Foot Angle

Ref. point: Angle at the front of the rear hoof measured from the floor to the hairline at the right hoof.

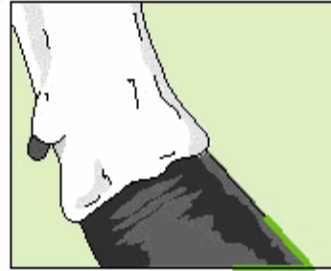
- 1 – 3 Very low angle
- 4 – 6 Intermediate angle
- 7 – 9 Very steep

Reference scale: 1=15 degrees; 5=45 degrees; 9=65 degrees

If the Foot Angle is difficult to score because of hooftrimming, bedding, manure etc. it is also possible to look at the Angle of Hairline.



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10. Locomotion

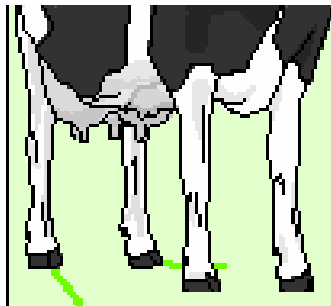
"The use of legs and feet, length and direction of the step". Not a true linear trait.

Ref. Point:

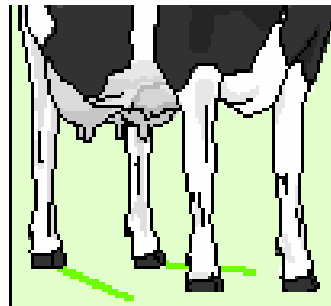
- 1 – 3 Severe abduction and short stride
- 4 – 6 Slight abduction and medium stride
- 7 – 9 No abduction and long stride

Abduction is the lateral deviation in respect to the straight line.

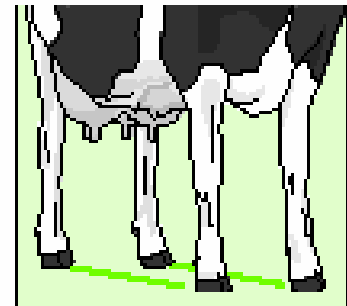
Can and should only be scored in herds where cow regularly do walk and has no lameness. If so, score all cows, be classified that day. The score of 9 means that the rear leg is put straight forward with force upon the step of the foreleg, and (extreme) lame cows getting score 1 because they have short strides.



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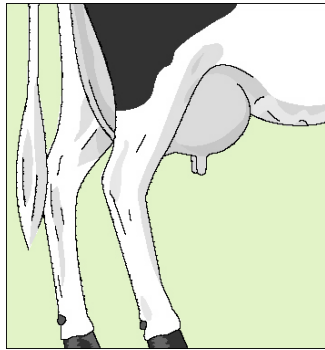
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11. Fore Udder Attachment

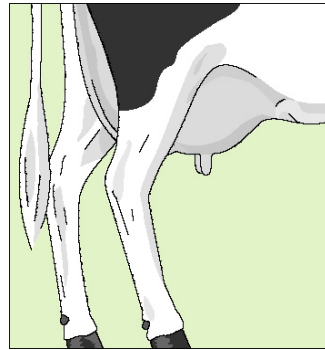
Ref. point: The strength of attachment of the fore udder to the abdominal wall.
Not a true linear trait.

- 1 – 3 Weak and loose
- 4 – 6 Intermediate acceptable
- 7 – 9 Extremely strong and tight

In case of a significant difference in the quality of udder attachment of both sides by scoring fore udder attachment, than the worse side must be scored. This only if the udder is healthy.



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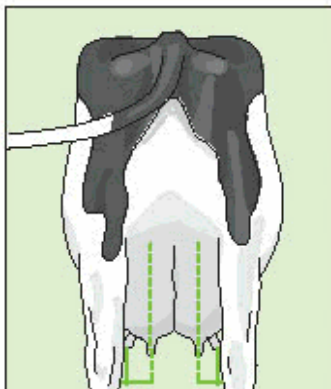


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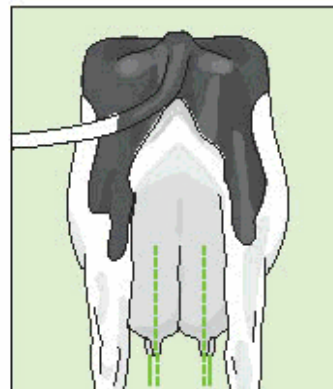
12. Front Teat Position

Ref. point: The position of the front teat from centre of quarter as viewed from the rear.

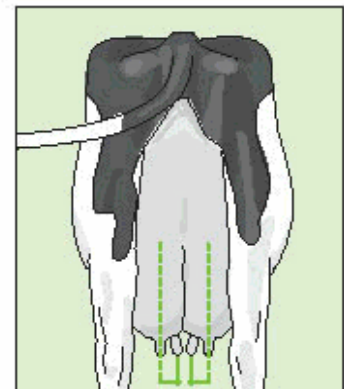
- 1 – 3 Outside of quarter
- 4 – 6 Middle of quarter
- 7 – 9 Inside of quarter



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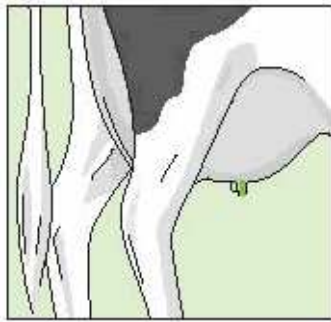
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13. Teat Length

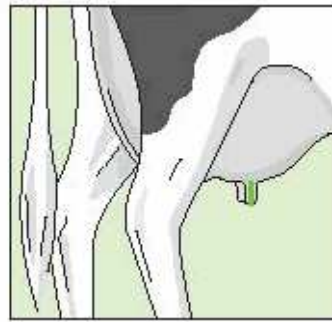
Ref. point: The length of the front teat.

- 1 – 3 Short
- 4 – 6 Intermediate
- 7 – 9 Long

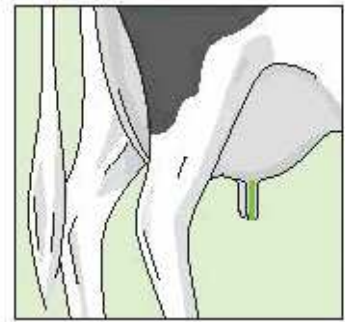
Reference scale: 1-9 cm; 1 cm per point



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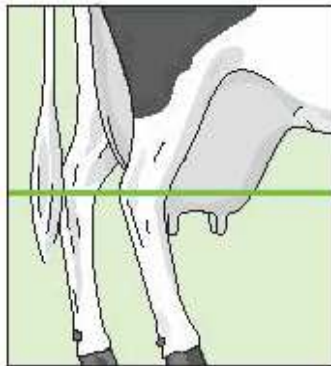
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14. Udder Depth

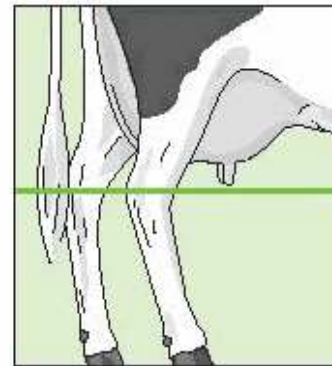
Ref. point: The distance from the lowest part of the udder floor to the hock.

- 1 Below hock
- 2 Level with hock
- 5 Intermediate
- 9 Shallow

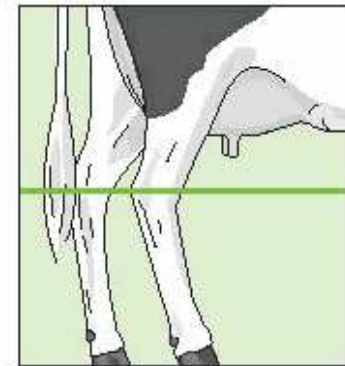
Reference scale: level=2 (0 cm); 3 per point



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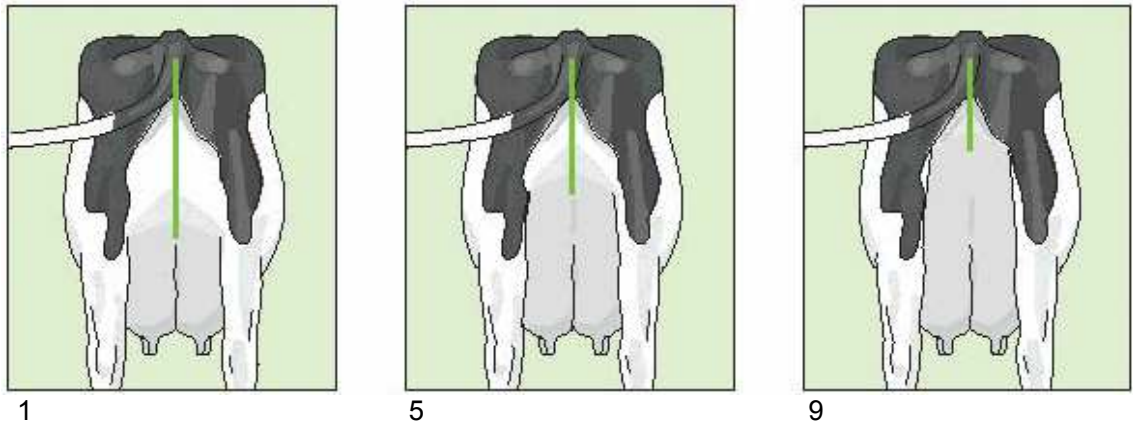
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15. Rear Udder Height

Ref. point: The distance between the bottom of the vulva and the milk secreting tissue: in relation to the height of the animal.

- 1 – 3 Very low
- 4 – 6 Intermediate
- 7 – 9 High

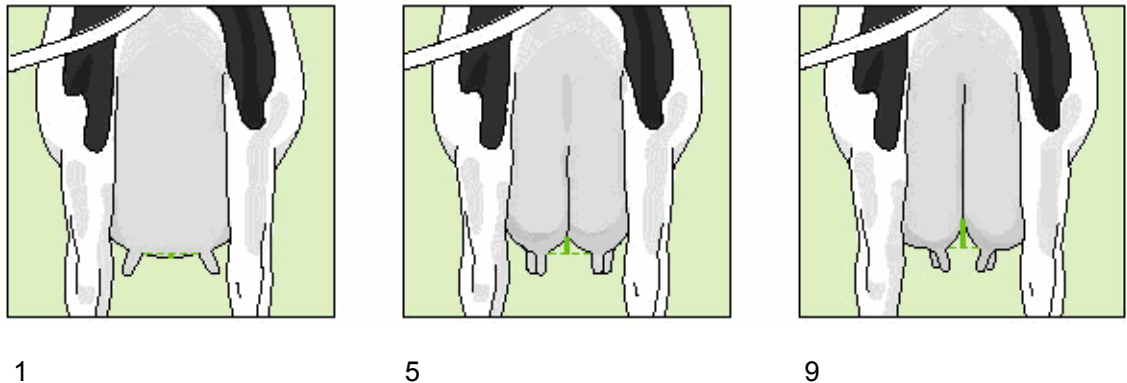
Reference scale: measured on a scale between the bottom of the vulva and the hock; the midpoint represents a score 4 (29 cm); 2 cm per point



16. Central Ligament

Ref. point: The depth of cleft, measured at the base of the rear udder.

- 1 Convex to flat floor (+1 cm)
- 2 (+0.5 cm)
- 3 (+0 cm)
- 4 Slight definition (-1 cm)
- 5 (-2 cm)
- 6 (-3 cm)
- 7 Deep definition (-4 cm)
- 8 (-5 cm)
- 9 (-6 cm)

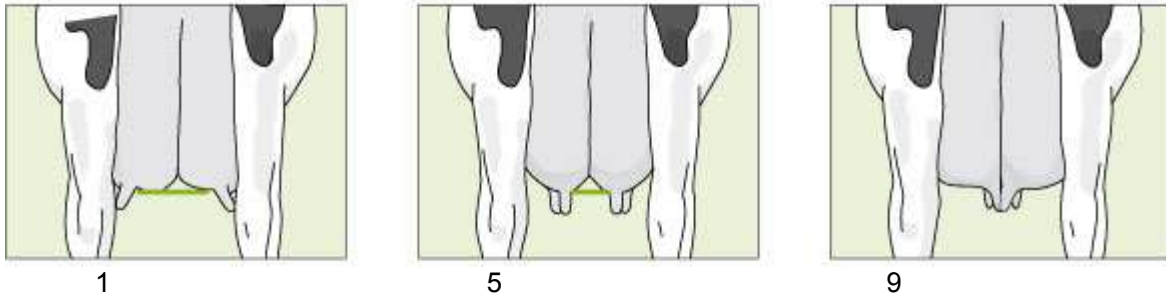


17. Rear Teat Position

Ref. Point: The position of the rear teat from centre of quarter.

- 1 – 2 Outside
- 4 Mid point
- 7 – 9 Inside of quarter (8= touching, 9=crossing)

Reference scale: to obtain population distribution it is recommended that 4 represents mid point of the quarter



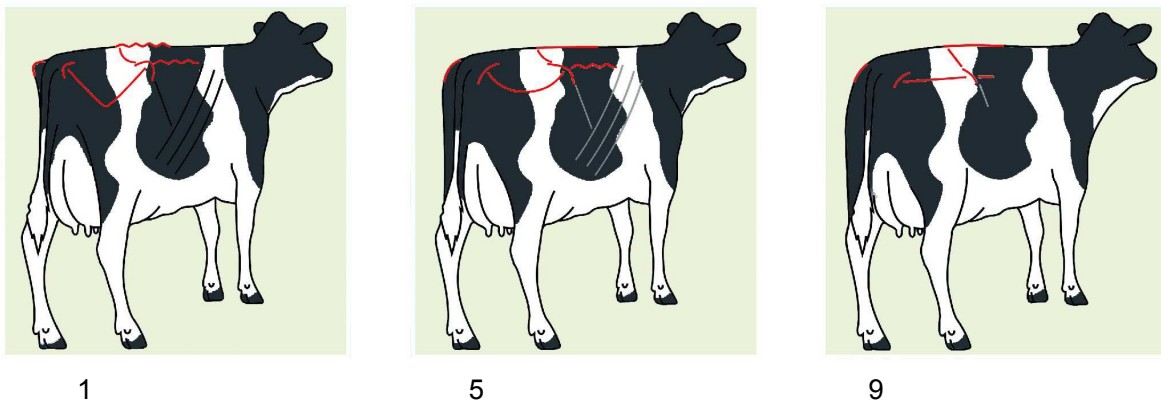
18. Body Condition Score

The covering of fat over the tail head and rump, not a true linear trait.

Ref. Point:

- 1 – 3 Poor
- 4 – 6 Intermediate
- 7 – 9 Grossly fat

The loin is the main area to observe for scores 1-6, while the tail implant is important with the higher score (7 – 9)



5. Genetic correlation

One of the reports received most enthusiastically was that given by Dr. Gerben de Jong and supported by Dr. Stephan Rensing that the correlations between countries have improved greatly. One of the main reasons for this is the improved definitions and more countries using the international definitions. (I will show some of the tables provided by Dr. De Jong on the improvements in correlations in the last 5 years). It is critical that the harmonization effort is backed by good science since we can then bring this information back to our members and breeders with a high degree of confidence. Our correlations will be even higher as we get rid of old information, which used old definitions.

Average of genetic correlation between countries for 19 traits analysed by Interbull

Trait	Average correlation				
	May '01	May '02	November '03	September '05	September '07
Stature	0.89	0.92	0.91	0.92	0.92
Chest width	0.76	0.79	0.79	0.80	0.79
Body depth	0.75	0.79	0.80	0.82	0.81
Angularity	0.76	0.78	0.76	0.78	0.77
Rump angle	0.93	0.94	0.94	0.95	0.95
Rump width	0.75	0.83	0.84	0.84	0.84
Rear leg set side view	0.82	0.85	0.84	0.85	0.85
Rear leg rear view	0.77	0.79	0.76	0.76	0.74
Foot angle	0.57	0.68	0.66	0.68	0.72
Fore udder	0.74	0.79	0.80	0.83	0.84
Rear udder height	0.74	0.81	0.82	0.84	0.85
Udder support	0.77	0.80	0.78	0.80	0.81
Udder depth	0.90	0.94	0.95	0.96	0.96
Teat placement	0.89	0.92	0.91	0.94	0.93
Teat length	0.96	0.96	0.95	0.96	0.96
Rear teat placement	--	--	0.96	0.96	0.96
Overall conformation	0.67	0.73	0.70	0.73	0.75
Overall udder	0.74	0.77	0.76	0.78	0.81
Overall feet & legs	0.60	0.67	0.67	0.69	0.69

6. Results General Assembly WHFF, Killarney Ireland, October 2008

The General Assembly agreed on:

- the results of the workshop Naarden 2005 and Cremona 2007
- Locomotion and Body Condition score are accepted as a standard trait
- the proposal to organise the next head classifiers in February 2010 in Paris (February 2009 is too early, time for preparation is too short)

7. Where do we go from here?

As stated at the beginning, we are in a global market for genetics. This is an exciting time to be a breeder or Holstein enthusiast. It also is a time to make sure we are all collecting the most accurate, economically important information that is possible as classifiers and as herdbooks. As someone who has been involved on the committee from the beginning, I am pleased to report that the committee has from the start put the Holstein cow and her owner's first instead of trying to advance a particular country's agenda. The welfare of our breed looks bright around the world. We still have much to do. The discussion of an international classification program goes on and I'm sure many of you will talk about this very thing this week. Each country has their own breeding goals but our members seem to like the same kind of cow regardless of where she comes from. It will be an exciting future. Hopefully we can continue to make much progress in evaluation of the functionality and durability of the Holstein cow. I would like to thank the members of the working committee who have worked very hard on your behalf:

- Tom Byers, Canada
- Gabriel Blanco, Spain
- Arie Hamoen, The Netherlands
- Jun Kunita, Japan
- Stefan Reising, Germany
- John Connor, United States
- John Gribbon, United Kingdom
- Mauro Carra, Italy

8. References

Rensing, Stefan, 2007, Results form questionnaire WHFF

De Jong, Gerben, 2007, Overview of Genetic Correlations Between Countries for Conformation Traits in 2007

Crossen, Dan, 2004, Progress of type Harmonization

World Holstein Friesian Federation website: <http://www.whff.info/>