

## Changes in the calculation of indices for type traits

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In the November 2024 index calculation, there will be changes in the calculation of indices for type traits: frame, feet and legs and udder, which affect all three dairy breeds. For all three breeds, there are changes especially for frame. Additionally, Holstein will see changes in the udder index, as they have decided to change the weight of the sub-indices in udder.

### It could feel like some traits are turned upside down

The breed averages for the single traits are updated for all breeds, which is the first time in many years. When the breed average changes, it can affect the relative assumption of the individual animals within the breed. This is because the breed average can move to the other side of the breed optimum. For a trait where that happens, the contribution into the index for frame, feet and legs or udder can change significantly and thereby it can feel like the index is turned around.

### Large reranking for frame for Jersey

For Jersey there will be big changes for frame. Over the past years, Jersey cows have become larger in size, which has significantly shifted the breed average. For Jersey 1st lactation cows, the breed optimum for stature is 129 cm, while the breed average we have assumed in the breeding evaluation has increased from 125.9 cm to 129.8 cm. This means that previously Jersey aimed to breed taller cows, but now the goal is to breed smaller cows. The changed breed average means that the optimum on the index scale changes from >130 to 89 for stature. There are also other sub traits in frame that will change the optimum. For example, the optimum for body depth will change from index 105 to index 122. These changes will cause major re-rankings for frame at the November evaluation for Jersey.

Table 1: Old and new breed average and breed optimum for frame for Jersey

Sub traits in Frame	Jersey average old	Jersey average new	Optimum old	Optimum new
Stature	125,9	129,8	>130	89
Body depth	5,9	5,7	105	122
Chest width	4,8	4,9	113	109
Rib structure	5,5	4,9	>130	>130
Top line	5,6	6,0	>130	>130
Rump width	5,2	5,0	126	>130
Rump angle	5,2	5,2	91	92

**Minor changes for RDC and Holstein according to updated breed average**

For RDC and HOL, a technical optimum for frame is used, where the frame index explains the size of the cow, so higher index indicates taller, wider and deeper cows. Therefore, the change in breed average does not affect the calculation of frame for these two breeds. Only the position of the optimum dot on the graph will change, as it indicates the real optimum for these breeds' frame. For example, the optimum point for stature for Holsteins was index 115, but from November it will be index 83, because Holsteins on average are taller than the 148 cm breed optimum. For RDC, the optimum point for body depth will change from index 118 to the farthest right on the scale (index >130). This is because the new breed average is lower than the breed average earlier used in the index calculation for frame.

For udder and feet and legs, the breed average update will only have a limited effect for all three breeds. Either because the change in the breed averages is very small, the optimum is still far away from the breed average, so it is really a matter of breeding in one direction, or the breeds do not have any weight on the sub traits in the combined index for udder and feet and legs.

**Correction in Frame for RDC**

For RDC, an incorrect weight has unfortunately been used in the past to calculate frame. The error caused that relatively too little weight was put on stature compared to the other sub traits in the weighting for frame. This means that RDC bulls that breed taller cows will generally get higher index for frame in the index calculated in November 2024.

**Changed weights and optimum in udder for Holsteins**

There has been a desire from Nordic Holstein breeders to change weights and optimum for the sub traits in the udder index, in order to gain greater ownership of the udder index. The optimum on the linear scale changes from 5.0 to 6.2 for teat placement back, and from 5.0 to 5.4 for udder balance. This means that the new optimum on the index scale will be a bit below 100, as the new optimums are not far from the current breed average.

The change in optimum ensures that the Holstein breed will continue to move in the desired direction with wider back teat placement and less heavy front udder. This happens without bulls with extremely low breeding values for these traits, e.g. 70 in teat placement back, will have a very large positive contribution to the index for udder. The new optimum on the index scale will be 89 for teat placement back while the old optimum was 73. For udder balance, the optimum on the index scale will change from index 87 to index 93.

In addition to the changed optimum for teat placement back and udder balance, Holstein breeders also wanted to adjust the weight of the sub-traits in udder. There is a small weight on both teat length and thickness, so that bulls with very deviant breeding values for teat size will be penalized in the index for udder. In the table below you can see the old and new weights and optimum that are included in udder index for Holstein.

*Table 2: Old and new optimum on the linear scale and the weights of the sub-traits in udder index for Holstein. The negative weight for teat placement back and udder balance simply indicates that the optimum on the index scale is below 100.*

Sub traits in udder	Optimum, old	Optimum, new	Weight, old	weight, new
Fore udder attachment	9	9	20	18
Rear udder height	9	9	10	5
Rear udder wide	9	9		5
Udder support	8	8	20	17
Udder depth	9	9	25	18
Teat length	5.5	5.5		3
Teat thickness	5	5		4
Teat placement front	8	8		
Teat placement back	5.0	6.2	-15	-15
Udder balance	5.0	5.4	-10	-15

In general, changes in weights and optimum in udder index for Holstein will have a moderate effect on the ranking of the bulls, but there are some bulls that will change significantly in the udder index. This particularly affects bulls with very low breeding values for teat placement back, udder balance and teat size. These bulls have previously had a large positive contribution to udder index from the teat placement back and udder balance, while not being penalized for breeding shorter and thinner teats.