Igenity® Essential Results Key

Igenity Essential is a unique genomic profile specifically designed with the commercial dairy in mind. Featuring rapid turnaround time and a core set of key management traits, Igenity Essential is a quick and easy alternative to the traditional dairy evaluation. This profile provides Molecular Breeding Values (MBVs) generated by Neogen® on 15 key traits for Holstein and 13 key traits for Jersey cattle, allowing you to do simple heifer sorting based on the traits that are most important to your future profitability. In addition, sire verification is available to assist in maintaining accurate herd records.

Using Igenity Essential

Igenity Essential is the ideal simple sorting tool for commercial operations. It provides an accurate prediction of genetic merit that has excellent correlation with traditional dairy evaluations.

Make better breeding decisions. This profile can effectively sort animals into groups to make better mating decisions on your operation. Top animals can be bred using sexed semen to get females out of the best females, allowing you to make faster genomic progress. High quality, conventional semen can be used on the middle group and beef semen can be used on lower end animals whose genetics won't continue in the herd. By using beef semen, a premium can be obtained for the resulting crossbred calf.

Sire verification. An average dairy operation has a 15–20% incidence of incorrect parentage. With Igenity Essential, a list of potential sires can be provided by registration number or NAAB code. Assuming the potential sires are on file, they can be matched to the resulting offspring to correct any parentage conflicts.

What is an MBV?

Igenity Essential predictions utilize a Molecular Breeding Value (MBV) which relies solely on the animal's own genomic merit, while traditional dairy evaluations utilize a genomic-enhanced Predicted Transmitting Ability (PTA) which combines genomic information along with pedigree, progeny information, and the animal's own production records, if available.

This leads to some differences between Igenity Essential predictions and evaluations from a traditional dairy evaluation; however, there is a high correlation between the two.

Both MBVs and PTAs represent the genetic merit that will be transmitted to a potential offspring. To determine the animals own breeding value, the MBV must be multiplied by 2.

PTA vs. MBV

Predicted Transmitting Ability (PTA)

Pedigree history | Animal's own records | Genomic data | Progeny

Molecular Breeding Value (MBV)

Genomic data

NEOGEN®

Looking at your Igenity report

When you receive your Igenity report, the first thing you will see is information related to **Order Number** (this is a useful reference if you have questions, or if you wish to go online later to view your results), **Order Date** and your contact information.

In addition, each animal record includes the animal's **Farm ID** (this is usually the short ID such as an ear tag), the **Official ID** (if provided), **Breed** (HO for Holstein or JE for Jersey), **Sex** and **Birth Date** (if provided).

Farm ID	Official ID	Sample ID	Breed	Sex	Birth Date
1501	HO8400000xxxxxxxx	NE012345	HO	F	10/06/2018
1502	HO8400000xxxxxxxx	NE012346	HO	F	10/07/2018
1503	HO8400000xxxxxxxx	NE012347	HO	F	10/04/2018
1504	HO8400000xxxxxxxx	NE012348	HO	F	10/03/2018
1505	HO8400000xxxxxxxx	NE012349	HO	F	10/02/2018

Trait Definitions

Igenity Essential includes 15 key traits that enable sorting and decision-making on commercial dairies.

Net Merit. Net Merit is a composite index meaning that the results for a number of component traits are combined to provide an estimate of the lifetime profit of the animal, in dollars. Net Merit is a well balanced index that selects for greater lifetime profit by selecting highly productive animals that will survive in the herd and have good reproductive success.

Net Merit Report Rank. All of the animals included in the report you receive back are ranked from top to bottom. If there are 100 animals in the report, the animal with the best Net Merit $ score will be ranked #1 and the animal with the lowest Net Merit $ score will be ranked #100.

Milk Yield. Milk Yield is the estimated difference in pounds of milk produced per mature 305-day lactation.

Fat Yield (lbs). Fat Yield is the estimated difference in pounds of fat produced per mature 305-day lactation. The estimate of the actual amount of fat produced will be a result of the predicted milk yield, as well as the predicted percent of fat in the milk (fat %). Fat percent is a value that is typically reported separately, but most dairymen are interested in total fat yield per lactation.

Fat (%). Fat percent describes the fat content of the milk. When combined with the yield figures, it will result in the estimate of the total lactation yield of fat, in pounds. This is a percentage scale, and generally a higher value is more beneficial.

Protein Yield (lbs). Protein Yield—like Fat Yield—is the estimated difference in pounds of protein produced per mature 305-day lactation.

Protein (%). Protein percent is the MBV for protein content of the milk. When combined with the yield figures, it will result in the estimate of the total lactation yield of protein, in pounds. This is a percentage scale, and generally a higher value is more beneficial.

Cheese Merit. Like Net Merit, Cheese Merit is a composite index, and because of the economic value of components such as fat and protein for further processing, it places emphasis on the value of components and penalizes animals for excess milk yield.

Fluid Merit. Fluid Merit is targeted to producers whose marketing system favors milk yield and who do not receive premiums for protein production.

Somatic Cell Score (SCS). SCS is a profit driver for many producers as well as an indicator of potential for mastitis. SCS can be used to identify calves and heifers with potential for a high SCS and susceptibility to mastitis before they enter the parlor. An animal with a higher SCS has the potential for higher somatic cell counts and may be more susceptible to mastitis than an animal with a lower score.

Productive Life. The MBV for Productive Life is a prediction of the longevity of the animal (and its progeny) in the herd and is measured in months. Longer is better in this case since herds with greater longevity on average require fewer replacement females, which is a very important component of the cost of production.

Daughter Pregnancy Rate. The trait of Daughter Pregnancy Rate measures the likelihood of a cow to become pregnant. Animals—and herds—with higher DPR are more fertile and better able to conceive following calving.

Daughter Calving Ease. Daughter Calving Ease is a measure of the ability of an animal to have an unassisted birth. The trait measures the percentage of difficult births among first-calf heifers; therefore, a lower score is desirable. This trait is only available for Holstein cattle.

Daughter Stillbirth. This trait measures the genetic ability of a cow, or daughters of a bull, to have a live calf that survives past 48 hours. The trait measures the percentage of calves that will be stillborn; therefore, a lower score is desirable. This trait is only available for Holstein cattle.

PTA Type. The MBV for Type is a composite score of up to 19 individual structural and anatomic traits, related to traits such as feet and legs, udder, body frame and other measures that are known to be positively associated with longevity and performance in dairy cattle. A higher score for type is preferred.

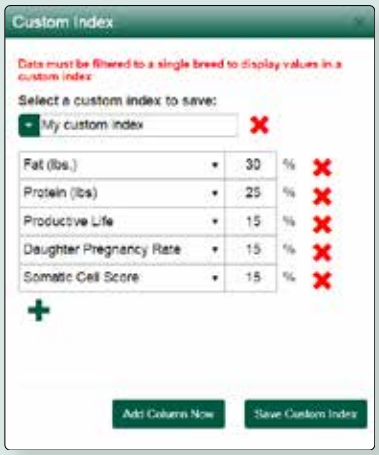
Dairy Form. Dairy Form is a measure of the amount of angularity in the female. Animals should be moderately angular suggesting high production, as opposed to being somewhat round (excessive fat cover) or skeletal (insufficient fat cover). A higher value indicates a more angular animal.

Wading through genomic data

Igenity Essential provides a lot of trait information for producers to make decisions on their dairy. When looking to make selection decisions, composite indices are a great place to start.

Composite indices, such as **Net Merit**, **Cheese Merit** and **Fluid Merit**, are recognized by the industry for their value in balanced selection.

In addition to the composite indices included with Igenity Essential, producers may want to create a **custom index** to meet their unique breeding goals.



A **custom index** can be created utilizing Igenity Dashboard. Simply define which traits and their respective weights should be included. Igenity Dashboard will automatically select for a lower value for traits where lower is better, such as somatic cell score (SCS).

It is important to keep your index balanced. Using this method can be a great way to sort heifers in a way that is specific to your own breeding goals.

Farm ID	Net Merit ($)	NM$ Rank	Milk Yield	Fat (lbs.)	Fat %	Pro (lbs.)	Pro %	Cheese Merit	Fluid Merit	SCS	PL	DPR	DCE	Daughter Stillbirth	PTA Type	DFM
1501	629	1	587	70	18%	25	2%	641	587	2.72	7.00	2.25	6.5	7.4	0.23	-0.57
1502	586	2	1201	76	12%	52	6%	613	512	2.96	2.46	-0.92	5.4	5.1	0.90	0.28
1503	584	3	378	62	18%	41	11%	641	455	2.92	4.71	0.60	6.1	5.1	-0.10	-0.88
1504	160	4	700	31	-0.05	10	-0.09	143	202	2.88	-0.2	-2.83	8.1	7.6	0.89	0.96
1505	72	5	542	9	-0.1	9	-0.07	58	106	3.06	-2.2	-0.35	8	6.9	1.65	1.47

Igenity Essential results include some the most important traits to consider when evaluating your dairy herd. When reports are returned, the animals are sorted by Net Merit($). In this case, the top ranking heifer (#1501) has a NM$ of $629 while the bottom heifer (#1505) has a NM$ of $72. Based on this example, we would expect #1501 to produce $1,114 [($629-$72) x2] more profit than #1505 over her lifetime. The difference in NM$ is multiplied by 2 since the estimate of the animals own performance is 2 times the PTA, or what they would contribute to their progeny.

Additional information available

In addition to the included traits, Igenity Essential includes the option to purchase add-on content for an additional fee. Both A2 beta casein and BVD diagnostic testing are available for purchase.

A2 beta casein. A beta casein protein that is less common than the A1 beta casein protein typically found in Holstein milk. Some studies have demonstrated health benefits associated with A2 milk, although this is debated. The milk does sell for a premium which is why some producers are choosing to select for it.

A2/A2: A2 Milk **A2/A1:** A2 carrier **A1/A1:** A1 Milk

BVDV status. Bovine Viral Diarrhea Virus or BVDV is one of the most economically significant diseases in dairy cattle causing reproductive disorders and increased mortality. If the animal is suspected to be positive for BVDV persistent infection (PI), genomic testing will not proceed unless advised otherwise.

For all BVDV positive samples, confirmatory testing using immunohistochemistry is available at no additional charge to you. Simply submit a second sample using a fresh ear notch or whole blood to confirm the animal's BVDV-PI positive status. It is advisable to cull persistently infected animals as they are sub-optimal performers and a source of infection for other animals.

Negative: No BVDV detected; sample negative for BVDV Persistent Infection (PI).

Positive: BVDV detected; sample positive for BVDV Persistent Infection (PI).

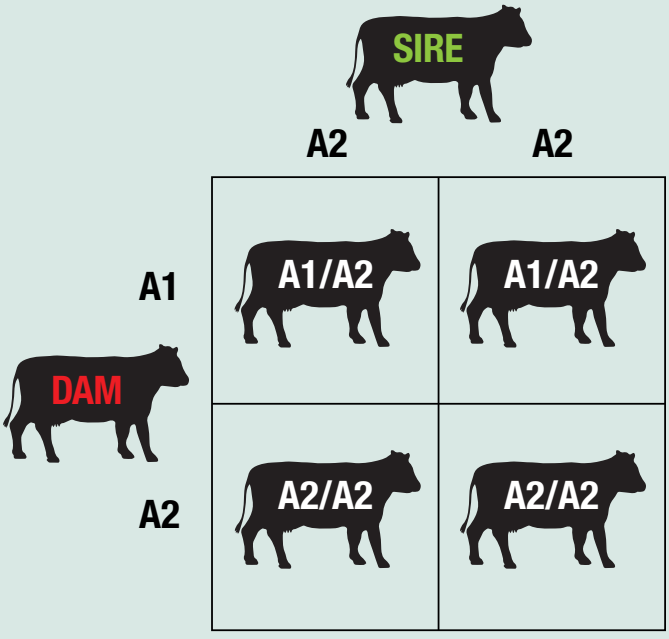
Inconclusive: Sample tested weakly positive for BVDV, but a final diagnosis regarding the BVDV status cannot be made at this time. Presence of BVDV may be from recent vaccination with modified live vaccine, from recent BVDV infection, or from being truly PI.

Selecting for A2 milk

Genetic traits such as milk proteins, coat color, or polled, rely on the fact that desirable traits can be passed from one generation to the next. For example, if an A2/A2 sire is mated with an A1/A2 dam, the resulting offspring will have a 50% chance of being A2/A2 and produce A2 milk.

A2 beta casein is a co-dominant trait, meaning both variants are fully expressed. So if an animal is A1/A2, about 50% of the milk produced will contain the A2 variant of the beta casein protein.

A herd can rapidly select for A2 milk. For example, even if all dams started as A1/A1 and A2/A2 sires were always selected, in the first generation all animals would be A1/A2. By the second generation approximately 50% of the animals would be A2/A2 and by the third generation approximately 75% of the animals would be A2/A2.



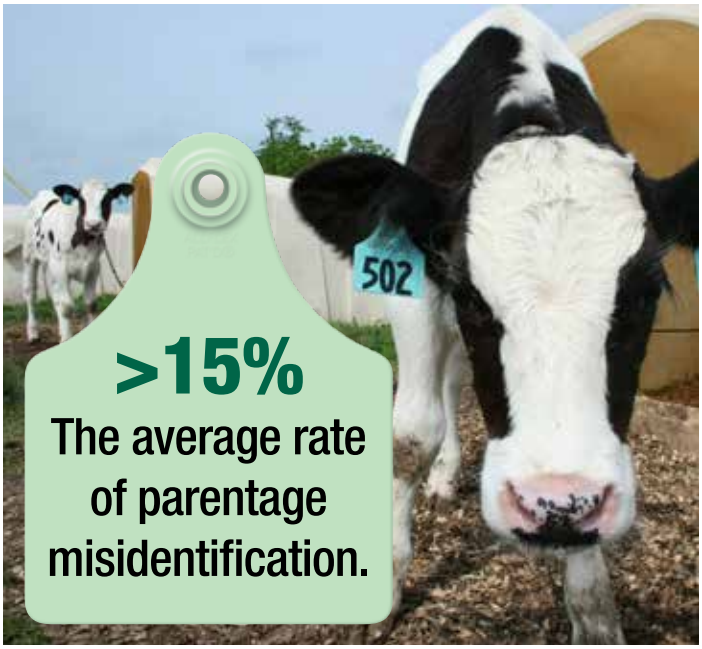
Parentage

Igenity Essential includes parentage verification. Neogen will compare the offspring to all sires submitted in the Igenity order, giving you the best chance of determining the true sire.

A potential sire can be submitted by its registration number or NAAB code, and if it is on file at Neogen, Neogen will perform parentage verification to determine the genomic sire.

If a sire is listed on your Igenity report as the Genomic Sire, it has been **confirmed** to be the sire of the given offspring using DNA markers. Igenity reports provide the Genomic Sire NAAB code and the Genomic Sire Registration Number of confirmed sires. If the Genomic Sire is different than the Submitted Sire, the Submitted Sire will be in red text to alert you to the sire conflict.

A sire may also be **excluded**. This means that none of the sires submitted in the order are the sire of the animal.



Animals not reported

On your Igenity report, you may find that some of your animals appear as **Animals Not Reported**. There are several reasons that an animal may not receive an initial result.

Farm ID	Sample Status	Customer Action Required
1506	Sample Received "low call rate" (failure)	New Sample Recommended
1507	Sample Processing	No Action Required at this time
1508	Sample Reprocessing	No Action Required at this time
1509	Not Enough Tissue to Process	New Sample Recommended
1510	BVDV positive; genomic testing cancelled	No Action Required - Confirmatory Sample Recommended

- **Sample Received "low call rate" (failure).** Samples can fail for a variety of reasons including biological or chemical contamination, improper storage or an insufficient sample. Usually, there are very few samples that will fail within an order. If you are receiving greater than 2% sample failures, please get in touch with your representative to review the sampling process.
- **Sample processing or sample reprocessing.** In this case, some of your samples are still in process or some of the samples may be reprocessing to try to recover a result. Results for these samples will be reported once available or you may receive notification of a sample failure.
- **Not enough tissue to process.** This sample did not contain enough tissue to process. Processing of this sample was not attempted as it would be an almost certain sample failure. You will not be charged for processing on this sample.
- **BVDV positive, genomic testing cancelled.** Because BVDV was detected in this sample, genomic testing was not performed, saving you money. A confirmatory sample is recommended to confirm BVDV status on this animal.

Farm ID	Sire Submitted	Genomic Sire NAAB	Genomic Sire Reg #	Status of Reported Sire
1501	HOUSA000074260987	001H011955	HOUSA000074260987	Confirmed
1502	HOUSA000069981349	007H012788	HOUSA000074261651	Confirmed
1503	HOUSA000069981349			Excluded
1504	H0840003135980340	001H012917	H0840003135980340	Confirmed
1505	H0840003134652425	001H012460	H0840003134652425	Confirmed

Igenity Essential parentage has revealed that the sire submitted for #1501 is, in fact, the true sire of the animal. In contrast, the sire submitted for #1502 is not the sire of the animal; however, another sire has been determined as the sire. For animal #1503, the sire submitted is not the sire of the animal and the true sire was not submitted within this order.

Your results are on Igenity Dashboard

Igenity Dashboard is an interactive tool for interpreting genomic results and guiding management decisions. Available from your phone, tablet or computer, Igenity Dashboard is available complimentary with your Igenity Essential purchase. It includes the ability to share your information with stakeholders on the dairy. With Igenity Dashboard, you can:

- View various reports about the herd.
- Customize reports to show only the desired traits.
- Categorize animals based on breeding decision.
- Create custom indices to meet specific breeding goals.
- Compare the herd to all herds in the breed database.
- See progress in the herd over time.

Don't forget the upgrade!

Igenity Essential results can be upgraded and submitted to the Council on Dairy Cattle Breeding (CDCB) at any time for an additional fee. Requesting the upgrade to Igenity Select allows you to receive official dairy evaluation results on your best animals, maximizing your benefit.

NEOGEN®

Neogen: GeneSeek® Operations • 4131 N. 48th Street, Lincoln, NE 68504
877-IGENITY • genomics.neogen.com • dairygenomics@neogen.com