

**Country****Luxembourg**

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**Trait category:****Individual trait(s):****Reproduction-calving****Calving performance (direct, maternal)****Stillbirth (direct, maternal)****Reproduction-fertility****Non-return rate 90 (female, male)****Health****Somatic cell count****Conformation****Udder****Locomotion****Other****Federation des Herdbooks Luxembourgeois****4 Zone Artisanale & commerciale****BP 313****L-9004 Ettelbruck, Luxembourg****Telephone +352 81 0770****Facsimile +352 81 0771****Evaluation:****Vereinigte Informationssysteme Tierhaltung w.V. (VIT Verden)****Heideweg 1****D-27283 Verden, Germany****Telephone +49 4231 955 - 171 or 173****Facsimile +49 4231 955 - 166****E-mail [vital@rzv-srv.vit.de](mailto:vital@rzv-srv.vit.de)**

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**LUXEMBOURG**

<b>Reproduction calving traits</b>	<b>Calving performance (direct, maternal) Stillbirth (direct, maternal)</b>
<b>Breed(s)</b>	Holstein Friesian, Red & White
<b>Trait definition and unit(s) of measuring</b>	Calving performance is scored in 3 categories; normal or easy (1), hard pull (2), veterinary help or caesarian (3) Stillbirth is defined as stillborn or died within 24 hours after birth
<b>Method of measuring and collecting data</b>	Scored by farmer and collected by milk recording system
<b>Time period for data inclusion</b>	Since 1986
<b>Age groups</b>	All
<b>Genetic parameters</b>	$h^2_{\text{calving performance (direct)}} = 0.05$ $h^2_{\text{calving performance (maternal)}} = 0.05$ $r_g(\text{calving performance (direct, maternal)}) = -0.10$ $h^2_{\text{stillbirth (direct)}} = 0.05$ $h^2_{\text{stillbirth (maternal)}} = 0.05$ $r_g(\text{stillbirth (direct, maternal)}) = -0.10$
<b>Sire categories</b>	All bulls
<b>Environmental effects pre-adjustment evaluation model</b>	None Herd x calving year, calving month, parity, age within parity, sex of calf, permanent cow effect
<b>Base for age adjustment</b>	None
<b>Use of genetic groups and/or relationships</b>	AM with genetic "phantom" groups for unknown parents
<b>Method (model) of genetic evaluation</b>	Maternal effects ST BLUP AM for repeated records
<b>System validation</b>	Plausibility checks of recorded data, check on model suitability (fixed effects, EBV), genetic trend
<b>Expression of proof</b>	RBV-C standardized with M = 100 and SD = 12, higher values are more desirable
<b>Genetic (reference) base</b>	All cows born 1990 within breed
<b>Criteria for official publication of sire proofs</b>	REL > 0.50
<b>Number of evaluations/publications per year</b>	One; August
<b>Use in total merit index</b>	Development of selection index in progress
<b>Key reference on methodology applied</b>	Gierdziewicz, M. et al., 1994. 45 <sup>th</sup> Meeting of EAAP, Edinburgh. Evaluation of calving ease using a reduced animal model in German Fleckvieh Averdunk, G. et al., 1995. Proc. of the open session of the Interbull annual meeting Prague. Sire evaluation for fertility and calving ease in Germany

<b>Reproduction fertility traits</b>	<b>Non-return rate 90 (female, male)</b>
<b>Breed(s)</b>	Holstein Friesian, Red & White
<b>Trait definition and unit(s) of measuring</b>	Percentage non-returns within 90 days after first insemination
<b>Method of measuring and collecting data</b>	Collected by AI-service technicians, veterinarians and milk recording system
<b>Time period for data inclusion</b>	Since 1986
<b>Age groups</b>	All
<b>Genetic parameters</b>	$h^2_{\text{non-return rate 90 (female)}} = 0.02$ $h^2_{\text{non-return rate 90 (male)}} = 0.02$ $r_{g(\text{non-return rate 90 (female, male)})} = -0.05$
<b>Sire categories</b>	All bulls
<b>Environmental effects pre-adjustment evaluation model</b>	None Herd x year, calving month, parity, age within parity (only heifers), interval between calving and 1 <sup>st</sup> insemination (only cows), permanent cow effect
<b>Base for age adjustment</b>	None
<b>Use of genetic groups and/or relationships</b>	AM with genetic "phantom" groups for unknown parents
<b>Method (model) of genetic evaluation</b>	ST BLUP AM, including paternal and maternal genetic effects
<b>System validation</b>	Plausibility checks of recorded data, checks on model suitability for fixed effects and breeding value
<b>Expression of proof</b>	RBV-F standardized with M = 100 and SD = 12, higher values are more desirable
<b>Genetic (reference) base</b>	All cows born in 1990 within breed
<b>Criteria for official publication of sire proofs</b>	REL > 0.50
<b>Number of evaluations/publications per year</b>	One; August
<b>Use in total merit index</b>	No
<b>Key reference on methodology applied</b>	Thaller, G et al., 1994. 45 <sup>th</sup> Meeting of EAAP, Edinburgh. Breeding value estimation for reproductive traits by an animal model with paternal and maternal effects Averdunk, G. et al., 1995. Proc. of the open session of the Interbull annual meeting Prague. Sire evaluation for fertility and calving ease in Germany

## LUXEMBOURG

Health traits	Somatic cell count
Breed(s)	Holstein Friesian, Red & White
Trait definition and unit(s) of measuring	Somatic cell score is log 2 transformed test-day somatic cell counts, taken between 4 and 365 days in lactation; number of cells should be between 5,000 and 6,400,000
Method of measuring and collecting data	Test-day results from milkrecording
Time period for data inclusion	Since 1990
Age groups	1 <sup>st</sup> to 3 <sup>rd</sup> lactation
Genetic parameters	$h^2_{\text{somatic cell score (lactation 1)}} = 0.08$ $h^2_{\text{somatic cell score (lactation 2)}} = 0.13$ $h^2_{\text{somatic cell score (lactation 3)}} = 0.14$ $r_{g(\text{somatic cell score (lactation 1, lactation 2)})} = 0.90$ $r_{g(\text{somatic cell score (lactation 1, lactation 3)})} = 0.85$ $r_{g(\text{somatic cell score (lactation 2, lactation 3)})} = 0.97$
Sire categories	All bulls
Environmental effects pre-adjustment evaluation model	None Region, age of calving, stage of lactation, season of calving, herd x test-date, permanent environment
Base for age adjustment	None
Use of genetic groups and/or relationships	All known relations in an AM. Phantom parent groups according to selection path, breed, year of birth
Method (model) of genetic evaluation	MT BLUP AM for test-day records. Lactation 1, 2 and 3 are considered as separate traits
System validation	Edits for age of calving and days in milk
Expression of proof	Combined RBV: $0.26 \times \text{SCS}_{\text{lactation 1}} + 0.37 \times \text{SCS}_{\text{lactation 2}} + 0.37 \times \text{SCS}_{\text{lactation 3}}$ , with $M = 100$ and $SD = 12$ , higher values are more desirable
Genetic (reference) base	Rolling bull base, defined by all 8-10 year old AI-bulls
Criteria for official publication of sire proofs	REL $\geq$ 50 %
Number of evaluations/publications per year	Two; March, September
Use in total merit index	No
Key reference on methodology applied	Reents, R., J. Jamrozik, L.R. Schaeffer & J.C.M. Dekkers, 1995. Estimation of genetic parameters for test-day records of somatic cell score. J. Dairy Sci. 78: 2847 Reents, R., J.C.M. Dekkers & L.R. Schaeffer, 1995. Genetic evaluation for somatic cell score with a test-day model for multiple lactations. J. Dairy Sci. 78: 2858

<b>Conformation traits</b>	<b>Udder:</b> fore udder attachment, fore udder length, rear udder height, suspensory ligament, udder depth, teat placement, teat length, udder overall <b>Locomotion:</b> rear leg set, foot angle <b>Other:</b> stature, body depth, rump angle, rump width, strength, dairy character, body type overall
<b>Breed(s)</b>	Holstein Friesian, Red & White
<b>Trait definition and unit(s) of measuring</b>	Most individual traits scored on a linear 1-9 point scale, following recommendation of the European and World-wide group for harmonization of linear type classification, except for stature, which is measured in cm Overall traits are scored on a 0-50 point scale
<b>Method of measuring and collecting data</b>	Scored by classifier
<b>Time period for data inclusion</b>	Since 1984
<b>Age groups</b>	1 <sup>st</sup> lactation
<b>Genetic parameters</b>	$h^2_{\text{udder traits}} = 0.18 \text{ to } 0.27$ $h^2_{\text{locomotion traits}} = 0.13$ $h^2_{\text{other traits}} = 0.21 \text{ to } 0.43$
<b>Sire categories</b>	All bulls
<b>Environmental effects pre-adjustment evaluation model</b>	Heterogeneous variances between classifiers Classifier x year, herd x year, stage of lactation, age of calving
<b>Base for age adjustment</b>	None
<b>Use of genetic groups and/or relationships</b>	All known relations in an Animal model. Phantom parent groups according to selection path, breed, year of birth
<b>Method (model) of genetic evaluation</b>	ST BLUP AM
<b>System validation</b>	Check for reasonable age of calving and stage of lactation at time of classification, only 1 <sup>st</sup> lactation 1 <sup>st</sup> classification are used
<b>Expression of proof</b>	EBV standardized with M = 100 and SD = 12
<b>Genetic (reference) base</b>	Rolling bull base, defined by all 8-10 year old AI-bulls
<b>Criteria for official publication of sire proofs</b>	≥ 20 daughters in 5 herds
<b>Number of evaluations/publications per year</b>	Two; March, September
<b>Use in total merit index</b>	No
<b>Key reference on methodology applied</b>	Reents, R, 1993. Estimation of breeding values for type traits in Germany, Interbull Bulletin No. 8, 1993