



Development of linear profiling in the Holsteiner horse



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Holstein linear system DEVELOPMENT

- **Since 2010:** linear description of foals using an assessment sheet
- **2014: Pilot study:** linear description of mares at the studbook registration and mare performance test in Schleswig-Holstein
- **2015:** Start of the project “Implementation of new sustainable strategies to promote equine health” within the EU-funding program “European innovation partnership” (EIP)
 - One part of the project is the extension of linear profiling
- **2015: Pilot study:** linear description of young stallions at the preselection for licensing



Linear description of foals



- Only offspring of young or outcross stallions (2015: 508 offspring)
- Until 2015: constant further development of the trait scheme in consultation with the judges (adding of new traits etc.)
- Since 2014: Scale -3 to +3
- Using of an assessment sheet for the linear description at the foal shows is established
 - The application of the mobile system for data collection is still difficult
 - The group of judges is often different from place to place
 - An assistance for the documentation with a tablet PC is essential!
- Regular training of the judges (once a year)



ASSESSMENT SHEET FOR FOALS

Breeding district: _____ Cat.No.: _____ Sex: _____

Sire: _____ Dam: _____ birth date: _____

HEAD	coarse	<input type="checkbox"/>	<input type="checkbox"/>	normal	<input type="checkbox"/>	<input type="checkbox"/>	dish face	<input type="checkbox"/>
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NECK	short/low	<input type="checkbox"/>	<input type="checkbox"/>	normal	<input type="checkbox"/>	<input type="checkbox"/>	long	<input type="checkbox"/>
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TOPLINE	short	<input type="checkbox"/>	<input type="checkbox"/>	correct	<input type="checkbox"/>	<input type="checkbox"/>	long	<input type="checkbox"/>
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BACK	dipped (weak)	<input type="checkbox"/>	<input type="checkbox"/>	normal	<input type="checkbox"/>	<input type="checkbox"/>	roached	<input type="checkbox"/>
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GROWTH/ SIZE	short	<input type="checkbox"/>	<input type="checkbox"/>	normal	<input type="checkbox"/>	<input type="checkbox"/>	tall	<input type="checkbox"/>
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FORELIMB	short pastern/upright	<input type="checkbox"/>	<input type="checkbox"/>	normal	<input type="checkbox"/>	<input type="checkbox"/>	long pastern	<input type="checkbox"/>
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Toe stance	toe-in	<input type="checkbox"/>	<input type="checkbox"/>	correct	<input type="checkbox"/>	<input type="checkbox"/>	toe-out	<input type="checkbox"/>
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HINDLIMB	short pastern	<input type="checkbox"/>	<input type="checkbox"/>	normal	<input type="checkbox"/>	<input type="checkbox"/>	long pastern	<input type="checkbox"/>
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Hock	straight	<input type="checkbox"/>	<input type="checkbox"/>	correct	<input type="checkbox"/>	<input type="checkbox"/>	angulated	<input type="checkbox"/>
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Special features: _____

GAIT	stiff/tied	<input type="checkbox"/>	<input type="checkbox"/>	normal	<input type="checkbox"/>	<input type="checkbox"/>	elastic/rhythm	<input type="checkbox"/>
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Anomalies

Eyes painted eye artificial eye fish eye Missing eye/s

Bit underbite overbite

Rupture umbilical hernia scrotal hernia

Hoof club foot

Other: _____

NOTES:


TYPE: _____

GAIT: _____

Assessment sheet for foals (2010)

→ 7-point scale: +1 to +7



→ 10 traits + anomalies

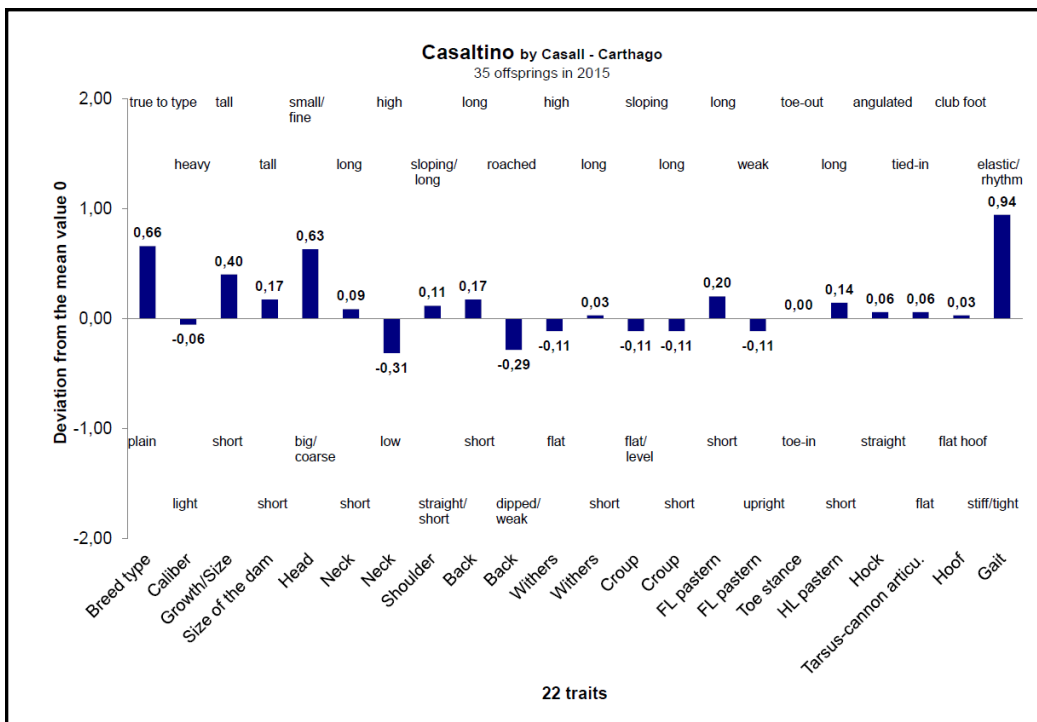
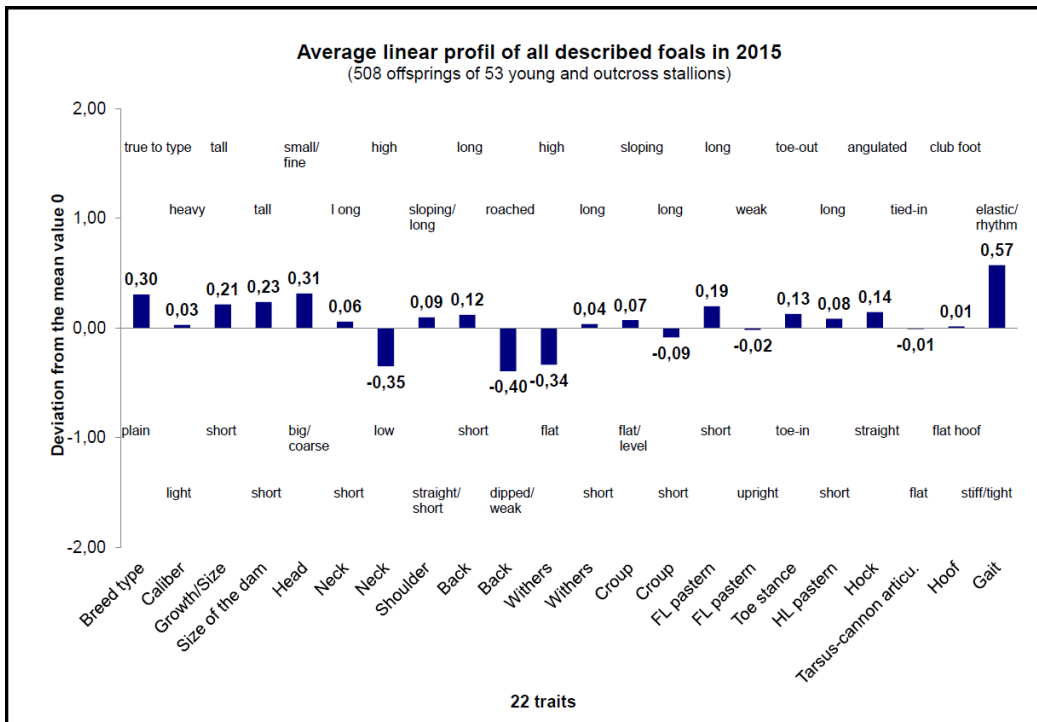
	BREED TYPE	plain <input type="checkbox"/>	normal <input type="checkbox"/>	true to type <input type="checkbox"/>
	CALIBER	light <input type="checkbox"/>	normal <input type="checkbox"/>	heavy <input type="checkbox"/>
	GROWTH/ SIZE	short <input type="checkbox"/>	normal <input type="checkbox"/>	tall <input type="checkbox"/>
	SIZE of the MARE	short <input type="checkbox"/>	normal <input type="checkbox"/>	tall <input type="checkbox"/>
	HEAD	big, coarse <input type="checkbox"/>	normal <input type="checkbox"/>	small, fine <input type="checkbox"/>
	NECK	short <input type="checkbox"/>	normal <input type="checkbox"/>	long <input type="checkbox"/>
		<input type="checkbox"/>	normal <input type="checkbox"/>	high <input type="checkbox"/>
	SHOULDER	straight/short <input type="checkbox"/>	normal <input type="checkbox"/>	sloping/long <input type="checkbox"/>
	BACK	short <input type="checkbox"/>	normal <input type="checkbox"/>	long <input type="checkbox"/>
		dipped (weak) <input type="checkbox"/>	normal <input type="checkbox"/>	roached <input type="checkbox"/>
	Withers	flat <input type="checkbox"/>	normal <input type="checkbox"/>	high <input type="checkbox"/>
	Croup	Short <input type="checkbox"/>	normal <input type="checkbox"/>	long <input type="checkbox"/>
		flat/level <input type="checkbox"/>	normal <input type="checkbox"/>	sloping (weak) <input type="checkbox"/>
		short <input type="checkbox"/>	normal <input type="checkbox"/>	long <input type="checkbox"/>
	FORELIMB	short pastern <input type="checkbox"/>	normal <input type="checkbox"/>	long pastern <input type="checkbox"/>
		upright pastern <input type="checkbox"/>	normal <input type="checkbox"/>	weak pastern <input type="checkbox"/>
	Toe stance	toe-in <input type="checkbox"/>	normal <input type="checkbox"/>	toe-out <input type="checkbox"/>
	unilateral <input type="checkbox"/>	bilateral <input type="checkbox"/>	<input type="checkbox"/>	
HINDLIMB	short pastern <input type="checkbox"/>	normal <input type="checkbox"/>	long pastern <input type="checkbox"/>	
	straight <input type="checkbox"/>	normal <input type="checkbox"/>	angulated <input type="checkbox"/>	
Tarsus- Cannon art.	flat <input type="checkbox"/>	normal <input type="checkbox"/>	tied-in <input type="checkbox"/>	
HOOF	flat hoof, low heels <input type="checkbox"/>	normal <input type="checkbox"/>	club foot, high heels <input type="checkbox"/>	
GAIT	stiff/tied <input type="checkbox"/>	normal <input type="checkbox"/>	elastic/rhythm <input type="checkbox"/>	
Anomalies	<input type="checkbox"/> painted eye <input type="checkbox"/> artificial eye <input type="checkbox"/> fish eye <input type="checkbox"/> Missing eye/s (left or right)			
	<input type="checkbox"/> Bit <input type="checkbox"/> underbite <input type="checkbox"/> overbite			
	<input type="checkbox"/> Rupture <input type="checkbox"/> umbilical hernia <input type="checkbox"/> scrotal hernia			
	<input type="checkbox"/> Hoof <input type="checkbox"/> club foot			
	Other: _____			
	NOTES: TYPE: _____ GAIT: _____			

Assessment sheet for foals (2015)

→ 7-point scale: -3 to +3

→ 17 traits + anomalies

	<h2>Linear description of foals</h2>		
	<ul style="list-style-type: none"> • Provision of the linear data to the breeder: <ul style="list-style-type: none"> → Average linear profile (diagram) of all described foals in that year (published on the website and in the association journal) → Average linear profile (diagram) of all described foals of a stallion (progeny groups) (published on the website and in the association journal) → The breeders can receive a copy of the assessment sheet of all their described foals (on demand) → Future: The breeders receive the linear profile of all their presented foals in the form of a diagram with the passport 		





Linear description of mares



- **2014: Pilot study:** linear description of mares at the studbook registration and mare performance test in Schleswig-Holstein
 - using the mobile system of the Oldenburger Verband with an adapted trait scheme or an assessment sheet
 - lower number of traits (25 conformation traits, 35 performance traits and 32 performance traits for movement under rider)
 - different approach of assessment (every trait in the scheme will be judged, “trait by trait”; future aim: only striking traits will be recorded)
- Adjustment of the trait scheme in consultation with the judges (adding and exclusion of traits) at the beginning of 2015 and 2016



Linear description of mares



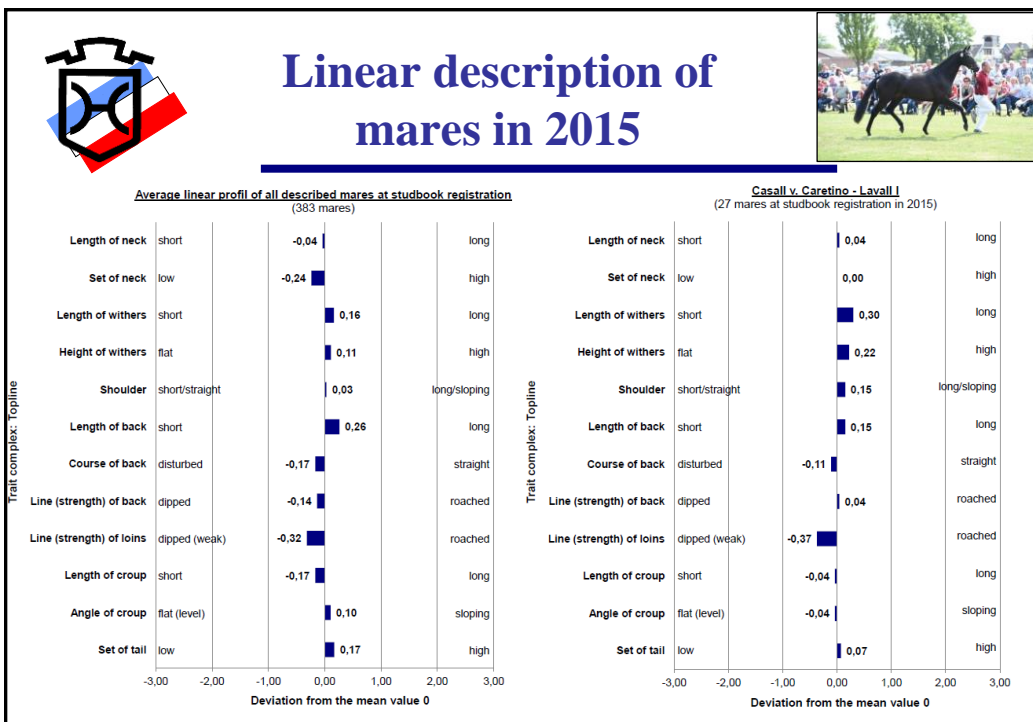
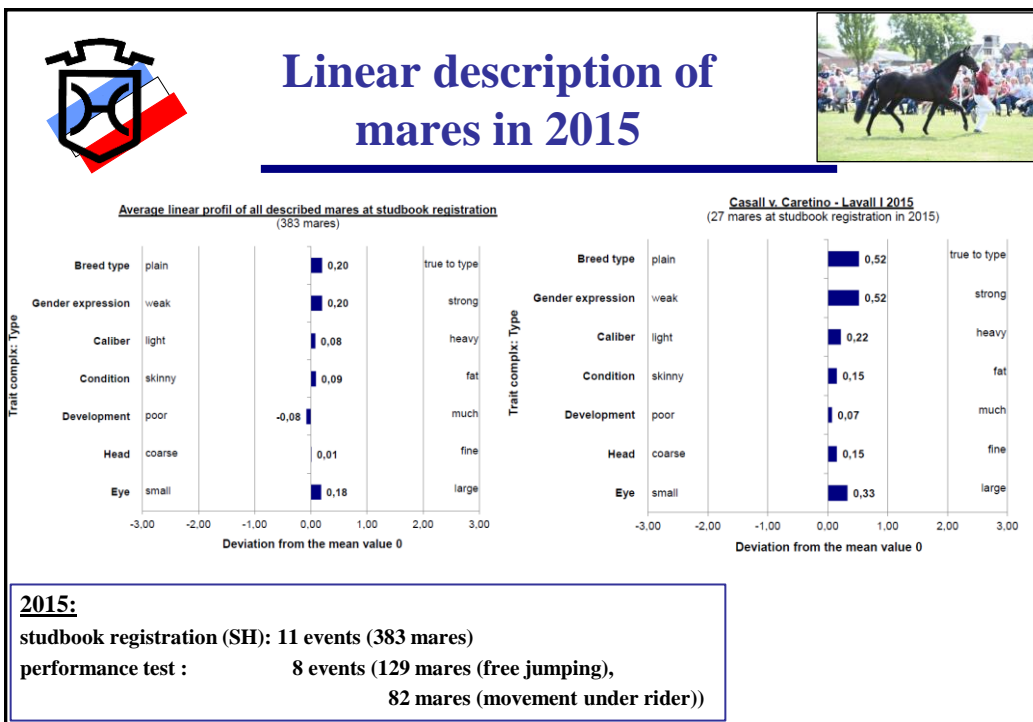
Trait spectrum in 2016

CONFORMATION	Number of traits
Type	10 (12)
Topline	7 (13)
Forelimb	4 (10)
Hindlimb	4 (11)
	25 (46)

MOVEMENT	Number of traits
Walk in Hand	5
Trot in hand / free movement	7
Canter in hand / free movement	6
Correctness (movement)	6 (7)
Behaviour	2
Free jumping	9
	35 (36)

MOVEMENT UNDER RIDER	Number of traits
Walk	5
Trot	7
Canter	7
Rideability	5
Correctness (movement)	6 (7)
Behaviour	2
	32 (33)

→ The original linear scheme was extended by further conformation and performance traits





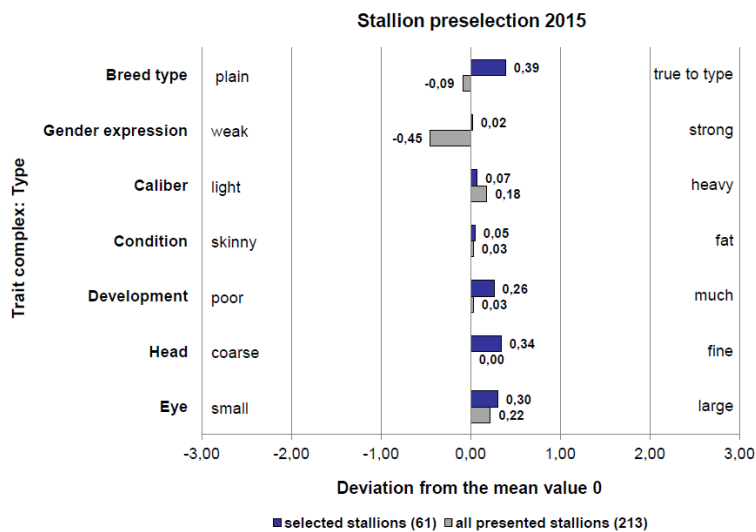
Linear description of young stallions



- **2015: Pilot study:** linear description of young stallions at the preselection for licensing
- Linear description of 213 young stallions
- Different approach of assessment: division of the trait complexes among the four judges (aim: to relieve the judges and to increase the precision of linear description)
 - 1. judge: free jumping
 - 2. judge: type, topline, trot
 - 3. judge: forelimbs, walk
 - 4. judge: hindlimbs, canter, correctness (movement), behaviour



Linear description of young stallions






Future aims / work steps

- Establishment of the mobile data collection with the tablet PC
- Development of a procedure for the provision of the linear profiles to the breeder/owner of the horse
- Changing of the assessment procedure (“trait-by-trait documentation” to recording of striking traits)
 - training of the judges!
- Population genetic analyses



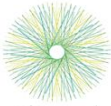
Thank you!






European Innovation Partnership (EIP)

PARTICIPATING IN




eip-agri
AGRICULTURE & INNOVATION

- Funding program by the EU and the federal states in Germany (country program for Rural Areas of Schleswig-Holstein, LPLR)
- Aim of EIP: encouraging and promoting of innovations in order to increase the sustainability and efficiency in agriculture
- The implementation of EIP is based on the “bottom up” approach
 - The need for innovation comes from the practice and the practice has a leading role in the development of solutions
- Funding of formation and operation of Operational groups (working groups) which perform the innovation project
 - Persons of the agricultural sector (Farmers, scientists, consultants etc.)



OG „Equine health“

PARTICIPATING IN



eip-agri
AGRICULTURE & INNOVATION

- Stakeholders of the equine sector in Schleswig-Holstein
 - Farmers, breeders, consultants, service companies, scientists, veterinarians
 - The Holsteiner Verband is responsible for the management and coordination
- Aim: development of strategies to strengthen equine health and the sustainability of the husbandry, use and breeding of horses
- The following areas are processed in the project:
 - Promotion of data flow in the central equine health database
 - Extension of linear profiling in the Holsteiner horse
 - Collection of parameters for equine husbandry and management
 - Development of a web-based information system for horse breeders/owners



OG „Equine Health“

Farmers und aktive breeders of the Holsteiner horse:
Hans Joachim Ahsbahs, Hanno Köhncke, Johann Peter Laß,
Timm Peters, Ulrich Steuber, Christian Thoroë, Holger Wesselmann

AND

PFERDEKLINIK BARGTEHEIDE

Dr. med. vet. W. Jahn / Dr. med. vet. V. Sill
 Dr. med. vet. I. Lorenz / Dr. med. vet. J. Brunk





Landwirtschaftliche
Kontroll- und Dienst-
leistungsgesellschaft mbH



Landwirtschafts-
kammer
Schleswig-Holstein














Linear description of mares and stallions

Conformation I

CONFORMATION					-3	-2	-1	0	1	2	3		
Type	Breed type	plain										true to type	
	Gender expression	weak										strong	
	Frame	small-framed										large-framed	
	Caliber	light										heavy	
	Condition	skinny										fat	
	Development	poor										much	
	Length of legs	short-legged										long-legged	
	Harmony of proportions	unharmonious										harmonious	
	Body shape	square										(long-) rectangular	
	Body direction	downhill										uphill	
	Head	coarse										fine	
	Eye	small										large	
	Topline	Length of neck	short										long
		Set of neck	low										high
Length of withers		short										long	
Height of withers		flat										high	
Length of shoulder		short										long	
Shoulder angle		straight										sloping	
Length of back		short										long	
Course of back		disturbed										straight	
Line (strength) of back		dipped										roached	
Line (strength) of loins		dipped (weak)										roached	
Inclination of croup		flat (level)										sloping	
Length of croup		short										long	
Set of tail		low										high	



Linear description of mares and stallions Conformation II

CONFORMATION			-3	-2	-1	0	1	2	3		
Forelimbs	Length of pastern	short								long	
	Stance of pastern	upright								sloping (weak)	
	Toe stance	toe-in								toe-out	
	Standing position of limbs	base-narrow	unilateral								bilateral
			unilateral								bilateral
	Definition of carpus	flat (weak)								distinct	
	Hoof	narrow, small									wide, big
		flat hoof (-3), low heels									high heels, club foot (+3)
		uneven shape of feet									markedly uneven shape
	Hindlimbs	Length of pastern	short								long
Stance of pastern		upright								sloping (weak)	
Toe stance		toe-in								toe-out	
Standing position of limbs		base-narrow	unilateral								bilateral
			unilateral								bilateral
Hock		bow-hocked									cow-hocked
		straight									angulated
		capped hock									markedly capped hock
Tarsus-cannon articulation		flat									markedly curby hock
											tied-in



Linear description of mares and stallions Movement I

MOVEMENT			-3	-2	-1	0	1	2	3	
Walk in Hand	Rhythm	irregular								regular
	Activity	lazy								diligently striding
	Suppleness	tense								supple
	Freedom of shoulders	short								long
	Reach of hind limbs (overstepping)	inactive (short)								active (long)
Trot in hand/ free movement	Rhythm	irregular								regular
	Mechanics of front limbs	straight forelimb								much knee action
	Freedom of shoulders	short								long
	Impulsion	weak								powerful
	Thrust (hind limb activity)	inactive, sluggish								active, energetic
	Carrying power	pushing								carrying
	Suppleness	tense								supple
Canter in hand/ free movement	Rhythm	irregular								regular
	Freedom of shoulders	short								long
	Mechanics of front limbs	straight forelimb								much knee action
	Direction of movement	downhill								uphill
	Thrust (hind limb activity)	inactive, sluggish								active, energetic
	Carrying power	pushing								carrying



Linear description of mares and stallions

Movement II

MOVEMENT			-3	-2	-1	0	1	2	3	
Correctness movement	Limb movement	plaiting (brushing)								dishing (winging)
	Breathing sound									marked breathing sound
	Lameness									marked lameness
	Coordination									uncoordinated
	Tail position									markedly off-center
	Tail tone	un-toned								over-toned
Behavior	Confidence	shy, timid								confident
	Cooperativeness	dominat, incooperative								obedient, cooperative
Free jumping	Course	not fluent								fluent
	Foreleg technique	straight								angulated
	Back technique (bascule)	straight back								rounded back
	Hind leg technique	under the body								open
	Attention	inattentive								attentive
	Overview	little								much
	Jumping ability	little scope								much scope
	Willingness to perform	little								much
	Preparation	not at all								much



Linear description of mares and stallions

Movement under rider I

MOVEMENT			-3	-2	-1	0	1	2	3	
Walk in Hand	Rhythm	irregular								regular
	Activity	lazy								diligently striding
	Suppleness	tense								supple
	Freedom of shoulders	short								long
	Reach of hind limbs (overstepping)	inactive (short)								active (long)
Trot in hand/ free movement	Rhythm	irregular								regular
	Mechanics of front limbs	straight forelimb								much knee action
	Freedom of shoulders	short								long
	Impulsion	weak								powerful
	Thrust (hind limb activity)	inactive, sluggish								active, energetic
	Carrying power	pushing								carrying
	Suppleness	tense								supple
Canter in hand/ free movement	Rhythm	irregular								regular
	Freedom of shoulders	short								long
	Mechanics of front limbs	straight forelimb								much knee action
	Direction of movement	downhill								uphill
	Thrust (hind limb activity)	inactive, sluggish								active, energetic
	Carrying power	pushing								carrying



Linear description of mares and stallions

Movement under rider II

MOVEMENT			-3	-2	-1	0	1	2	3	
Rideability	Contact and acceptance of the bit	no contact								good contact
	Speed	hurried								slowly
	Reaction to the aids	No reaction								good reaction
	Suppleness	tense								supple
	Direction of movement	markedly shewed								straight
Correctness movement	Limb movement	plaiting (brushing)								dishing (winging)
			unilateral							bilateral
	Breathing sound									marked breathing sound
	Lameness									marked lameness
	Coordination									uncoordinated
	Tail position									markedly off-center
Behavior	Tail tone	un-toned								over-toned
	Confidence	shy, timid								confident
	Cooperativeness	dominat, incooperative								obedient, cooperative