APPENDIX II

PUREBRED SPANISH HORSE BREEDING PROGRAM

The PRE Breeding Program, which is modified by that approved by the Resolution by the General Director for Livestock on the 14th of November, 2003, has been elaborated according to the guidelines established in the legislation know as Orden APA/1018/2003, by which the basic requirements of the Breeding Programs and the Performance Tests for the genetic assessment of pure bred equines are established and by Royal Decree 2129/2008, dated the 26th of December, by which the national program for the preservation, improvement and promotion of livestock breeds is established.

The following organizations intervene in the execution and supervision of the Breeding Program:

- The National PRE Breeders’ Association of Spain (ANCCE), hereinafter the Breeder Association, as the official organization handling the Stud Book for the breed, shall be responsible for the development of the Breeding Program.

- The General Office for Agrarian Productions and Markets for the Ministry of Agriculture, Food and the Environment (MAGRAMA) shall be responsible for the approval and supervision of the Breeding Program.

- The Research Group “MERAGEM” (PAI AGR-158) (Selection Schemes for the Native Breeds, Characterization and Preservation of Animal Genetic Resources and their Traditional Productive Methods, Applied and Molecular Genetics and Cytogenetics) as the Official Center of Animal Genetics shall be
responsible for the Technical Management of the Breeding Program and the genetic assessment of the horses.

This Breeding Program shall detail the objectives for improvement, the selection criteria, the performance tests and the genetic assessment that shall permit the establishment of the various categories for Breeding Stock within the program: Young Recommended Breeding Stock, Qualified Breeding Stock, Improver Breeding Stock and Elite Breeding stock. In addition, the stages or phases included in the program shall be established, detailing in each of these, the phenotypical tests, the correction factors, the methodology for the calculation of the genetic value and the minimum reliability required for each of the categories established.

Purebred Spanish Horse stud farms, owners of horses who request an assessment for Basic Assessment as Breeding Stock, shall be undersigned to the Breeding Program, once included, as collaborating farms and during the time that they remain, they must fully comply with all the Rules and Regulations that govern it. The collaborating PRE Stud Farms, registered by the Breeder Association and voluntarily included in the Breeding Program for the breed, must comply with the conditions established in the Royal Decree 2129/2008, dated the 26th of December, by which the national program for the preservation, improvement and promotion of livestock breeds is established. These farms shall adopt the necessary means to ensure an adequate genetic connection between them, which shall favor the genetic evaluation of the breeding stock and guarantee an adequate dissemination of the improvement. The General Office for Agrarian Productions and Markets shall have a list of the collaborating farms participating in the Program, which shall be sent by the official handling association of the Stud Book. This list may be subject to eventual modifications at the proposal of the Association, due to health or zootechnical reasons, with the aim of guaranteeing compliance with the objectives established in this Program.
SELECTION OBJECTIVES AND CRITERIA

The main objective is to improve the morphology, conformation and functionality of the PRE Horse. To achieve this general objective, the following specific objectives are contemplated:

- Obtain horses that are healthy, with no hereditary defects.
- Improve the morphological characteristics of the breed, in accordance with the breed quality established for the PRE Horse.
- Improve the conformation, this being understood as the improvement of the (visible) morphology directed towards a specific function, especially Dressage.
- Improve the functional potential of the PRE Horse for the various competitive disciplines, fundamentally Dressage.
- Maintain, and where relevant, improve behavioral traits.

To achieve these objectives the following selection criteria shall be taken into consideration:

Genealogical: The genealogical information is vital, both to obtain the relationship matrix that is necessary in the genetic assessments, and to establish the type of inheritance for specific hereditary diseases and defects. In addition, it is necessary for the calculation for the level of inbreeding, both at individual and herd level, as an indicator of the level of genetic variability.
Reproductive, health and genetic: A study of the reproductive and locomotory apparatus of the horse may be performed, paying specific attention to characteristics related to functional and reproductive aptitudes. Where deemed necessary, when considered that a horse may be susceptible to hereditary defects, it shall be subject to a genetic study using cytogenetic or molecular analysis or an inheritance test, according to the nature of the problem.

Conformation-functional and behavioral: Starting with the performance tests established in the Breeding Program, the conformation shall be assessed using the Lineal Conformation Score and the behavioral parameters of interest for the PRE shall be determined in relation to the functional performance of the horses in the tests.

Functional: Derived from the results obtained by horses in the competitive performance tests, which offer a safe and objective tool to measure the functionality. The functional performance test shall be carried out for the discipline of Dressage, with this program remaining open to the addition of new disciplines, provided there are an adequate number of horses.

Environmental: These are complementary tests carried out in those tests in which the environmental and handling factors condition the results of the horses participating in the test, serving as correction factors in the genetic assessments.
2. MANAGEMENT COMMITTEE OF THE PRE BREEDING PROGRAM

The PRE Breeding Program Management Committee has been created as a dependant organization of the officially recognized Breeder Association to handle the Stud Book and the Breeding Program. The functions of the management Committee include:

- Facilitating the coordination and follow-up of the PRE Breeding Program
- Working as a liaison between the General Government and the Breeder Association officially recognized to handle the Stud Book and the development of the Breeding program, in zootechnical terms and, as would be the case, exercise as an organization to study, analysis and propose zootechnical actions for the breed.
- The periodic review of the development of the Breeding Program, proposing the necessary modifications for the efficient compliance of the objective, or presenting, where relevant, proposals for regulations.
- Presenting proposals before the competent authorities, which permit a better execution of the current regulations.
- Proposing, where relevant, modifications to the Breeding Program and the zootechnical Regulations of the breed.
- Coordinating, evaluating, reporting on and analyzing the situation of the performance tests and the genetic assessments.
- Providing the necessary means to train authorized personnel, as well as establishing information routes and the training of the breeders.
• Guarantee the correct application of rules and regulations by authorized personnel and to periodically evaluate and report on the achievement of the objectives.

• Attending incidents and claims deriving from the development of the PRE Breeding Program.

The PRE Breeding Program Management Committee shall be composed of members of the Breeders Association officially recognized to handle the Stud Book and the Breeding Program.

The Committee shall approve its own operational rules and regulations and in all cases, shall meet at least once every six months, and as often as the situation requires, by means of a summons from its President. The Committee may consist of work groups and specific sub-committees for the study and proposal of specific questions.

Similarly, breed inspectors and the person responsible for the Official Animal Genetic Center supervising the Breeding Program and those who, bearing in mind their professional competence, are expressly invited by the President, may also attend the meetings.

3. PERFORMANCE TESTING

The genetic assessment of the breeding stock shall be carried out using both the genealogical information and information derived from the performance tests. For this, the systemic collection of these types of information is necessary.
3.1 Genealogical Data

The genealogical information shall be obtained from the data collected in the PRE Stud Book (LG PRE), which shall be responsible for periodically supplying the data to the Official Animal Genetic Center.

3.2 Morphological Data

The morphological performance test shall be carried out using a system of lineal morphological scoring, which has been launched in the PRE, whose methodology is based on the translation of the degree to which a specific morphological characteristic is expressed on a scale of numerical values according to the fixed model. This scoring system may be complemented with other morphological data, of secondary nature, which offers complementary information regarding the breed character of the horse.

These performance tests shall be carried out during the Assessment for Basic Aptitude as Breeding Stock. In addition, these tests may be carried out during other concentrations of animals (competitions, young horse selection tests, federative tests, etc). The morphological scores shall be granted by a judge, belonging to the group of lineal morphological judges for the breed, who has passed the training course for lineal morphological scoring organized by the Breeder Association.
These performance tests may collect the following information:

- **Identification of the horse**: The information necessary for the correct identification of the horses is collected, which figures in the Equine Identification Document (EID), established by the Royal Decree 1515/2009, and dated the 2nd of October, by which an identification and registration system for equine has been established. In addition, this is complemented by the information available in the PRE Stud Book Office, and with any other relevant information to ensure a perfect connection between all the databases used in the various performance tests performed: breeder, current owner, etc.

- **Lineal Morphological Scoring**: A score sheet, launched for the PRE is used and shall be the methodology used in the genetic assessment of the morphology of the horses.

- **Zoometric measurements**: the measurements for length, height, angles, perimeters, etc are collected, which permit the subsequent conformation characterization of the horses, as well as their functional capacity for dressage.

- **Detection of defects**: The degree of expression of morphological and/or phaneroptic-type defects is collected on a lineal scale, with a minimum of five classes.

### 3.3 Functional Data

The functional performance test for Dressage shall take place during the Young Horse Selection Tests and at Dressage Competitions officially recognized by the
Royal Equestrian Federation of Spain, both national and international. The following information maybe collected at these performance tests:

- Identification of the horse: The information necessary for the correct identification of the horses shall be collected.

- Functional Data: The final score and the placing of each participant shall be collected, as well as the scores from the judges for walk, trot, canter, submission, elasticity, flexibility, contact, straightness, obedience and general impression, among others.

- Environmental data: Any environmental data that may influence the results of the horses during the tests shall be collected, such as type and state of the arena, atmospheric conditions, transport, level of training, rider, etc.

- Lineal Morphological Score: The lineal morphological score may be performed during the test, according to that described in section 3.2.

Initially, the PRE Breeding Program shall only include the aptitudes of the horses for Dressage as criteria for functional selection, as this is the equestrian discipline undertaken by most PRE horses. Nevertheless, in the future, it is possible that the assessment of their functional aptitude for other disciplines may also be included, always assuming that the number of horses involved is adequate.

4. GENETIC ASSESSMENT

The data from the performance tests, together with the genealogical data, shall be used to perform the genetic assessments of the breeding stock for conformation
traits and their aptitude for Dressage. For these assessments, a suitable methodology shall be used, generally based on the mixed models of the BLUP (Best Linear Unbiased Predictor), by applying an animal model in which all the known relationships between the participants in all the performance tests and the results obtained are considered. This genetic assessment methodology may be substituted by other more advanced methodologies.

The different environmental factors that have resulted significant in an analysis of variance shall be included in the genetic model as correction factors.

Before performing the genetic assessment of the horses, the genetic parameters of the variables to be valued shall be estimated.

All the participants in the performance tests established within the PRE Breeding Program shall be assessed annually depending on their own results and those of all the individuals genealogically related, always provided there is a sufficient amount of data.

5. GENETIC CATEGORIES OF BREEDING STOCK

Following the genetic assessment of the horses, they may achieve the following categories:
A) **Young Recommended Breeding Stock for Conformation Traits**: Those horses registered in the Permanent Register of the PRE Stud Book, which participate in the performance tests established in this Breeding Program, between 4 and 6 years of age and that have achieved genetic index for conformation traits for dressage exceeding that of 70 percent (the 30% of horses with the best genetic index). This percentage may be modified periodically. Likewise, these horses must be outstanding, individually, for their morphological-functional aptitudes, passing the reproductive and health requirements established for this effect by the Breeder Association. This category shall be available to horses aged 4, 5 and 6 years, on reaching the age of 7, they shall lose it.

B) **Young Recommended Breeding Stock for Dressage**: Those horses that participate in the established performance tests (functional Dressage tests), between 4 and 6 years of age and that have achieved a genetic index for Dressage exceeding the population average. The horses must be able to demonstrate that their health and reproductive status complies with the mandates established by the Breeder association. This category shall be available to horses aged 4, 5 and 6 years, on reaching the age of 7, they shall lose it.

C) **Qualified Breeding Stock**: Those horses that have achieved a genetic index in conformation traits for Dressage or a genetic index for Dressage exceeding the population average, and that have passed a test organized by the Breeder Association in which their morphological and/or functional, biomechanical and locomotive qualities are assessed, along with their movement in the three basic paces: Walk, trot and canter (assessing the elasticity, straightness, impulsion, equilibrium, cadence, power, regularity, rhythm, amplitude, suspension and coordination) and their internal aptitudes (behavior, character, temperament and nobility), in addition to their health and reproductive characteristics, according to the procedure established by the Breeder Association. All these data may be complemented by parameters for
locomotion, through a physiological analysis and a bio-kinematic analysis using video-graphic techniques.

D) **Improver Breeding Stock for Conformation Traits:** Those horses 7 years or over, which have achieved a genetic index for conformation traits for Dressage exceeding the population average, with a minimum reliability of 0.6 (repeatability) and which have sufficient descendants with the category of Young Recommended Breeding Stock. In addition, they must fulfill the reproductive and health requirements established by the Breeder Association.

E) **Improver Breeding Stock for Dressage:** Those horses 7 years or over, which have achieved a genetic index for Dressage exceeding the population average, with a minimum reliability of 0.6 (repeatability) and which have sufficient descendants with the category of Young Recommended Breeding Stock. In addition, they must fulfill the reproductive and health requirements established by the Breeder Association.

F) **Elite Breeding Stock:** Those horses 7 years or over, which have achieved the category of Improver Breeding Stock for Conformation Traits for Dressage (section 5.D) and for Dressage (section 5.E). In addition, they must fulfill the reproductive and health requirements established by the Breeder Association.

### 6. PHASES OF THE PRE BREEDING PROGRAM

The PRE Breeding Program is structured into 5 different phases, as has been established in legislation *Orden APA/1018/2003*, dated the 23rd of April:
Phase 1. Genealogical Assessment: Birth Register

In this phase, the foals born each year are identified, and a parentage test is performed using DNA molecules, for their registration in the PRE Std Book Birth Register, thus assuring the reliability of the genealogical data upon which the genetic assessments proposed in this Breeding Program are based.

In addition, the biological material of the horses forms a part of the sample bank for future use in the diagnosis of hereditary diseases.

Phase 2. Genealogical Assessment: Definitive Register

To access the Permanent Register of the PRE Stud Book, the horses in the Birth register must pass, as of the age of three (3) years, the assessment for Basic Approval as Breeding Stock, established in the current Zootechnical Regulations for this breed.

As of the data supplied by the PRE Stud Book Registers, a genealogical study is periodically performed to determine the main population parameters that facilitate the establishment of genetic variability for the breed: sanguinity coefficient and average relationship, average kinship, influence of blood lines and of emblematic sire stallions, etc.

All this information, combined with the molecular data from the parentage tests, is used in the establishment of objective criteria that favor the genealogical handling of the population. Within the scope of the PRE Breeding Program, all those
measures may be adopted as deemed necessary to guarantee the maintenance of
the genetic variability of the population and control the levels of consanguinity,
avoiding the loss of horses and productive characters of the breed.

In addition, a genetic study of hereditary diseases shall be performed, using the
information collected at the morphological performance tests, genetic and
molecular information, with the objective of eliminating from breeding those horses
that are carriers of injurious characteristics or those that cause hereditary diseases,
as well as transmissible morphological defects.

**Phase 3. Performance Tests and Individual Genetic assessment: Young
Recommended Breeding Stock and Qualified Breeding Stock**

During this phase of the Program, the performance tests for conformation traits and
the aptitude for Dressage are carried out, as well as the corresponding genetic
assessments of all the individuals with performance tests are performed (using a
matrix of relationships that includes at least up to the fourth known generation of
all the horses with available performance tests). Following the genetic assessments,
the following categories, previously defined in sections 5A, 5B and 5C are
determined:

- Young Recommended Breeding Stock for Conformation Traits (see section
  5A)
- Young Recommended Breeding Stock for Dressage (see section 5B)
- Qualified Breeding Stock (see section 5C)
The Breeder Association, in accordance with the officially approved *Dissemination of the PRE Breeding Program*, shall give maximum coverage of these horses to increase their reproductive actions in order to achieve a more rapid genetic progress in the breed. In addition, the early use of *Young Recommended Breeding Stock* and *Qualified Breeding Stock* for breeding by breeders shall rapidly help to increase the number of descendants, contributing to facilitate their achieving the category of *Improver and/or Elite Breeding Stock*.

**Phase 4. Genetic Assessment by Descendants: Improver and Elite Breeding Stock**

In this phase of the Breeding Program, genetic assessments of the horses are performed, to determine which horses can be considered as “*Improver Breeding Stock*” for each of the previously established and defined categories:

- Improver Breeding Stock for Conformation Traits (see section 5D)
- Improver Breeding Stock for Dressage (see section 5E)
- Elite Breeding Stock (see section 5F)

These breeding horses are of utmost importance for the breed, as they have proven their genetic quality through the assessment of their descendants and shall therefore be given the maximum possible dissemination so that they may significantly contribute to the improving the breed.
Phase 5. Catalog of Breeding Stock

Following the annual genetic assessment, the MERAGEM research group shall send the results of the genetic assessments to the Breeder Association, indicating those horses that have achieved any of the aforementioned genetic categories. This information shall be published in the various means of communication available to the Breeder Association, such as in a Catalogue of Young Recommended Breeding Stock, Qualified Breeding Stock, Improver Breeding Stock and Elite Breeding Stock. The Young Recommended Breeding Stock and/or Improver Breeding Stock may be for both established categories, or only for one of these.

To offer the breeder the most possible information, the Breeding Stock catalog shall present a record sheet for each horse that includes, in addition to the genetic assessments for each of the aptitudes genetically assessed in the Breeding Program, their genealogical data (parents and grandparents), phenotype data and the genetic values of their predecessors.

Those horses that have achieved any of the categories contemplated in the PRE Breeding Program shall be awarded a diploma accrediting their inclusion in said category, and this fact shall be noted in their Equine Identification Document (EID). In addition, the information regarding these breeding horses shall be disseminated so as to facilitate their use within the breed.

The PRE Breeding Program Managing Committee, as is detailed in the appendix to legislation *Orden APA/1018/2003*, may design a mating system establishing a number of descendants per assessed Breeding Horse, with the object of achieving the maximum genetic progress, without prejudice to the drastic reducing the population variability.