



Humane Farm Animal Care
Animal Care Standards
August 2014

TURKEYS

TURKEYS

HUMANE FARM ANIMAL CARE

Humane Farm Animal Care is a non-profit charity whose mission is to improve the lives of farm animals by providing viable, credible, duly monitored standards for humane food production and assuring consumers that certified products meet these standards.

Humane Farm Animal Care is approved by a consortium of Animal Protection Organizations, Individuals, and Foundations, such as the American Society for the Prevention of Cruelty to Animals and the Humane Society of the United States.

The Humane Farm Animal Care Standards have been developed to provide the only approved standards for the rearing, handling, transport and slaughter of turkeys for use in the Certified Humane® program. These standards incorporate scientific research, veterinary advice, and the practical experience of the farmers. The standards are based on the Royal Society for the Prevention of Cruelty to Animals (RSPCA) guidelines, current scientific information and other practical standards and guidelines recognized for the proper care of animals.

Animal welfare is improved when livestock managers adhere to the following:

- Access to wholesome and nutritious feed
- Appropriate environmental design
- Caring and responsible planning and management
- Skilled, knowledgeable, and conscientious animal care
- Considerate handling, transport, and slaughter

HUMANE FARM ANIMAL CARE'S SCIENTIFIC COMMITTEE

Leading animal scientists, veterinarians, and producers work with Humane Farm Animal Care to develop the *Animal Care Standards* for humane farming and continue to work with Humane Farm Animal Care to continually review new information pertaining to improving the lives of farm animals.

Kenneth E. Anderson, PhD North Carolina State University

Michael Appleby, PhD World Animal Protection

Richard Blatchford, PhD Asst. Coop Extension Specialist, UC Davis

Elisabetta Canali, PhD Università degli Studi, Milan, Italy

Sylvie Cloutier PhD Associate Director of Assurance, Canadian Council
of Animal Care, Ottawa, Canada

Brenda Coe, PhD Pennsylvania State University

Hans Coetzee, PhD Iowa State University

Luiz Dematte, DVM, PhD Industrial Director of Korin Ltd, and General
Coordinator Of Mokichi Okada Research Institute

Inma Estéves, PhD Research Professor, Neiker-Tecnalia University, Spain

Anne Fanatico, PhD Appalachian State University, Boone, NC

***Valentina Ferrante, DVM, PhD,
DIPL ECAWBM-AWSEL*** University of Milan, Italy

Trent Gilbery, MS North Dakota State University

Alan Goldberg, PhD The Johns Hopkins University

Temple Grandin, PhD Colorado State University

Thomas G. Hartsock, PhD University of Maryland

Jörg Hartung, DVM Institute of Animal Hygiene, Welfare and Farm
Animal Behavior, University of Veterinary
Medicine, Hanover, Germany

Patricia Hester, PhD Purdue University

<i>Brittany Howell, PhD</i>	Fort Hays State University
<i>Pam Hullinger, DVM, MPVM</i>	University of California Lawrence Livermore National Laboratory
<i>Joy Mench, PhD</i>	University of California, Davis
<i>Suzanne Millman, PhD</i>	Iowa State University College of Veterinary Medicine
<i>Malcolm Mitchell, PhD</i>	SRUC, Scotland's Rural College
<i>Priya Moutupalli, PhD</i>	IKEA Food Global Sustainable Sourcing Specialist, Sweden
<i>Ruth Newberry, PhD</i>	Associate Professor, Norwegian University of Life Sciences; Adjunct Professor, Washington State University
<i>Abdullah Ozen, PhD</i>	Professor, Firat University, Elazig, Turkey
<i>Edmond Pajor, PhD</i>	University of Calgary, Alberta, Canada
<i>Jose Peralta, PhD, DVM</i>	Western University of Health Science, College of Veterinary Medicine, Pomona, CA
<i>Rosangela Poletto, DVM, PhD</i>	Professor, Instituto Federal do Rio Grande do Sul, Brazil
<i>Martin Potter, PhD</i>	Animal Welfare Consultant, Member of FAWT, UK and Advising Member of EIG
<i>Mohan Raj, PhD</i>	Honorary Visiting Fellow, School of Veterinary Sciences, Bristol University, Bristol, UK
<i>Jean-Loup Rault, PhD</i>	Research Fellow, The University of Melbourne, AU
<i>Nancy Roulston, MSc</i>	Animal Scientist for Farm Animal Welfare, ASPCA, NY
<i>J.K. Shearer, PhD</i>	Iowa State University
<i>Marilyn M. Simunich, DVM</i>	Director, Animal Health Laboratory, Division of Animal Industries, Idaho State Dept. of Agriculture
<i>Carolyn Stull, PhD</i>	Chairman, Scientific Committee University of

California, Davis

Janice Swanson, PhD

Michigan State University

William VanDresser, DVM

Retired Extension Veterinarian

Andreia De Paula Vieira, DVM, PhD

Animal Welfare Scientist, Universidade de São Paulo,
Brazil

Daniel M. Weary, PhD

Professor and NSERC Industrial Research Chair,
Animal Welfare Program, University of British
Columbia

Julia Wrathall, PhD

Director, Farm Animals Division, RSPCA, West Sussex,
UK

Adroaldo Zanella, PhD

Professor, Departamento de Medicina Veterinária
Preventiva e Saúde Animal\Faculdade de Medicina
Veterinária e Zootecnia Universidade de São Paulo,
Pirassununga, SP, Brazil

TABLE OF CONTENTS

TURKEYS0
PART 1: INTRODUCTION 1
 A. The Certified Humane Label 1
 B. Guide to the Use of the Welfare Standards 1
PART 2: FEED AND WATER..... 2
 A. Feed..... 2
 FW 1: Wholesome, nutritious feed 2
 FW 2: Free access to feed 2
 FW 3: Feeding systems that prevent health problems..... 2
 FW 4: Feed Records..... 2
 FW 5: Other substances added to feed..... 2
 FW 6: Fresh feed..... 2
 FW 7: Easy availability of feed..... 3
 FW 8: Wholesomeness of stored feed..... 3
 B. Water 3
 FW 9: Water supply 3
 FW 10: Placement and design of drinkers..... 3
 FW 11: Easy availability of water..... 3
 FW 12: Minimum number of drinkers 3
 FW 13: Emergency water supply 4
PART 3: ENVIRONMENT 5
 A. Buildings & Enclosures..... 5
 E 1: Records of features of facilities that promote animal welfare 5
 E 2: Facility design..... 5
 E 3: Internal walls 5
 E 4: Preventing contact with toxic substances 5
 E 5: Electrical installations..... 5
 E 6: Nearby environment 6
 B. Floor & Litter 6
 E 7: Design of floors 6
 E 8: Concrete floors 6
 E 9: Litter 6
 E 10: Prohibited Housing..... 7
 E 11: Litter storage..... 7
 E 12: Mitigating litter contamination 7
 E 13: Understanding the importance of proper litter management..... 7
 C. Lighting 7
 E 14: Lighting program 7
 E 15: Light intensity..... 7
 E 16: Sufficient light for inspection 8
 E 17: Lighting records..... 8
 D. Space Allowances 8
 E 18: Stocking density 8
 E 19: Records of space allowances 9

E. Air Quality & Thermal Environment	9
E 20: Air quality.....	9
E 21: Target air quality parameters.....	9
E 22: Thermal conditions.....	10
E 23: Temperature records.....	10
E 24: Maintenance of ventilation equipment	10
E 25: Factors contributing to the thermal environment.....	11
F. Environmental Enrichment.....	11
E 26: Stimulating environment	11
G. Free-Range	12
E 27: Outdoor area.....	12
E 28: Shelter.....	12
E 29: Exits.....	12
E 30: Access to range.....	12
E 31: Protection from predators	13
H. Specific Provisions for Brooding Poults	13
E 32: Preparation for poults	13
E 33: Day-old poults	13
E 34: Brooder guards	13
E 35: Brooder heaters.....	13
E 36: Supplementary feeders and drinkers.....	13
E 37: Adjusting the brooding temperature as poults grow.....	14
E 38: Lighting for poults.....	14
E 39: Keeping feeders and drinkers clear.....	14
E 40: Space for young birds.....	14
E 41: Transferring turkeys started in brooder houses.....	14
I. Special Provisions for Breeders.....	15
E 42: Space requirements.....	15
E 43: Elevated roosts.....	15
E 44: Breeder males of fast-growing strains	15
E 45: Feeder space	15
E 46: Water management.....	15
E 47: Semen collection.....	16
E 48: Artificial insemination of breeder females.....	16
E 49: Nest box space.....	16
E 50: Broody Hen Management.....	16
PART 4: MANAGEMENT.....	17
A. Managers.....	17
M 1: Understanding the standards.....	17
M 2: Management and record keeping activities	17
M 3: Abilities of caretakers.....	18
M 4: Complaints to operators.....	18
B. Caretakers.....	18
M 5: Mitigating problems	18
M 6: Awareness of welfare problems	18
M 7: Training	19

M 8: Compassionate Treatment	19
C. Inspection	19
M 9: Monitoring.....	19
M 10: Records of ill, injured, and dead birds.....	19
D. Handling.....	20
M 11: Quiet handling	20
E. Equipment	20
M 12: Automatic equipment	20
M 13: Alarms for critical systems	20
M 14: Auxiliary power supply	20
M 15: Using equipment.....	20
F. Pests & Predators	20
M 16: Protection from pests and predators	20
PART 5: HEALTH	21
A. Health Care Practices	22
H 1: Selecting birds for good health	22
H 2: Animal Health Plan.....	22
H 3: Quality Assurance Program for food safety.....	22
H 4: Preventing recurring injuries	22
H 5: Flock performance data.....	22
H 6: Care of sick and injured animals	23
H 7: Preventing leg problems.....	23
H 8: Monitoring records of leg problems.....	23
H 9: Segregation facilities for sick or injured birds	24
H 10: Physical alterations	24
H 11: Veterinary investigation of mortality	25
H 12: Cleaning and disinfection.....	25
H 13: Genetically modified Turkeys.....	25
B. Emergency Euthanasia	25
H 14: Euthanasia	25
H 15: Carcass disposal	26
PART 6: TRANSPORT	27
A. Depopulation	27
T 1: Culling unfit birds prior to loading.....	27
T 2: Preparing for depopulation	27
T 3: Training	27
T 4: Providing instructions for the operation	27
T 5: Monitoring welfare during depopulation.....	27
T 6: Ensuring sufficient time for compassionate care.....	27
T 7: Adequate environment.....	28
T 8: Mitigating unnecessary suffering	28
T 9: Catching and carrying.....	28
T 10: Minimizing fear	28
T 11: Preventing crowding.....	28
B. Modular Transport Systems	28
T 12: Using modular transport systems	29

C. Fixed Crate Transport Systems.....	30
T 13: Using fixed crate transport systems	30
D. Transport	30
T 14: Competent staff.....	30
T 15: Investigating mortality during transport	30
T 16: Limiting the period of transport.....	31
T 17: Minimizing noise.....	31
T 18: Avoiding thermal stress.....	31
T 19: Ventilation	31
T 20: Shelter from extreme weather.....	31
PART 7: PROCESSING	32
A. Training	32
P 1: Implementing an Animal Welfare Policy	32
P 2: Animal Welfare Officer	32
P 3: Training staff about processing procedures	32
B. Holding Areas.....	32
P 4: Humane treatment in the holding area.....	32
P 5: Minimizing waiting time	33
P 6: Emergency breakdowns.....	33
P 7: Unloading turkeys from fixed crate vehicles	33
P 8: Monitoring condition	33
P 9: Recording and reporting deaths and injuries.....	33
C. Shackling.....	33
P 10: Training staff.....	33
P 11: Sufficient personnel	34
P 12: Shackling procedure	34
P 13: Keeping birds in the correct position for stunning.....	34
P 14: Preventing escape.....	34
P 15: Limiting time birds are suspended.....	34
P 16: Checking crates.....	34
D. Stunning	34
P 17: Stunning equipment	34
P 18: Limiting unstunned birds' view	34
P 19: Electrical water stunning bath.....	35
P 20: Electrical hand-held stunners.....	35
P 21: Maintaining and monitoring equipment.....	35
P 22: Dealing with unavoidable delays	35
P 23: Checking birds leaving the stunner.....	36
E. Controlled Atmosphere Systems	36
P 24: Proper instruction.....	36
P 25: Mixing of gas supply	37
P 26: Daily checks.....	37
P 27: Gas monitors/sensors	37
P 28: Prior to entry	37
P 29: Ensuring a humane kill	37
P 30: Causes of injury	37

P 31: Contingency for failure or delays 38
 F. Bleeding 38
P 32: Cutting the blood vessels 38
P 33: Time between stunning and neck cutting 38
P 34: Checking birds before they are scalded 38
P 35: Time between neck cutting and scalding or plucking..... 38
REFERENCES 39

PART 1: INTRODUCTION

A. The Certified Humane Label

The Certified Humane® program was developed to certify products from animals of farms that adhere to these standards. Upon satisfactory application and inspection, farmers and ranchers will be certified and may use the Certified Humane Raised and Handled® logo. Program participants are inspected and monitored by *Humane Farm Animal Care* annually. Charges levied are to cover inspections and program costs which include promotional materials which help promote the products of the producers that are Certified Humane®.

B. Guide to the Use of the Welfare Standards

- The broad objectives of the standards are described at the beginning of each section. These objectives must be met.
- The numbered requirements are the standards, all of which must be complied with.
- The standards are written to cover facilities in varying geographic and temperature regions and facilities utilizing different systems. Therefore, not all sections in these standards will apply to each facility.
- Boxed sections provide additional information or may highlight areas where the standards will be reviewed in the future.
- Turkey producers must also comply with any local, state or federal mandates for turkey production that affect the environment or safety of their product. Turkey producers must also comply with their State's Veterinary Practices Act.

PART 2: FEED AND WATER

Objectives: Turkeys must have access to fresh water and a diet designed to maintain full health and promote a positive state of well-being. Feed and water must be distributed in such a way that turkeys can eat and drink without undue competition.

A. Feed

FW 1: Wholesome, nutritious feed

Turkeys must be fed a fresh, wholesome diet that is:

1. Appropriate to their species; age, and stage of production;
2. Fed to them in sufficient quantity to maintain good health; and
3. Sufficient for their nutritional needs as established by the National Research Council (NRC) and as recommended for the geographic area.

FW 2: Free access to feed

- a. Turkeys must have continuous access to nutritious feed each day, except:
 1. When feed restriction is directed by a veterinarian;
 2. When restricting the feed intake of male breeders (see E44); and
 3. Prior to processing (see T8).
- b. Withdrawal of feed to induce a molt in breeding birds is not permitted.

FW 3: Feeding systems that prevent health problems

Nutrient content, feed quality and feeding regimes must be carefully controlled to minimize leg abnormalities and other welfare problems associated with rapid rate of growth.

FW 4: Feed Records

- a. Producers must have a written record of the feed ingredients and nutrient content of each feed used, as declared by the feed-mill or manufacturer.
- b. Producers must make feed records available to *Humane Farm Animal Care* during inspection and at other times, upon request.

FW 5: Other substances added to feed

- a. No feedstuffs containing mammalian- and avian-derived protein are permitted, with the exception of eggs and egg products. Animal by-products are prohibited.
- b. The use of growth promoters is prohibited.
- c. Antibiotics may only be given for therapeutic reasons (disease treatment) and only under direction of a veterinarian.

FW 6: Fresh feed

- a. Feeders must be designed and managed so that they are safe for turkeys, and so that feed contamination and spillage is avoided.
- b. Feed must not be allowed to remain in feeders in a contaminated or stale condition.

FW 7: Easy availability of feed

- a. In all cases, there must be sufficient feeder space distributed throughout the house or enclosure to allow all turkeys to eat without undue competition.
- b. If feed intake is restricted, there must be sufficient feeder space for all birds to feed at the same time.

Trough feeders generally provide space on both sides of the trough (i.e. a 3ft long trough provides 6 linear ft of feeder space). Recommended required feeder space for trough feeders are as follows:

for birds up to 6.6lbs (3kg) 1.5 linear inches (3.8cm) per bird per side

for birds over 6.6lbs (3kg) 2.0 linear inches (5.1cm) per bird per side

FW 8: Wholesomeness of stored feed

- a. Feed storage bins must be:
 1. Clean;
 2. Dry;
 3. Vermin proof; and
 4. Well maintained.
- b. Old feed from previous flocks must be removed from bins and disposed of properly.

B. Water

FW 9: Water supply

- a. Turkeys must have access to an adequate supply of clean, fresh drinking water at all times, except when directed by a veterinarian and when restricting the feed intake of male breeders (see **E 46**).
- b. Provisions must be made for supplying water when temperatures are below freezing.

FW 10: Placement and design of drinkers

To reduce water spillage and prevent consequent problems with litter management, drinkers must:

1. Be designed appropriately for turkeys and
2. Be placed at an optimum height for the size and age of the birds.
3. Be checked and maintained regularly

FW 11: Easy availability of water

In all cases, there must be sufficient drinker space distributed throughout the house or enclosure to allow all turkeys to obtain sufficient water without undue effort (see **E 46** for information on water management for breeders).

FW 12: Minimum number of drinkers

The minimum number of drinkers required are:

1. 1 bell drinker/100 birds
2. 1 nipple drinkers /10 birds
3. 1 cup waterer/28 birds

4. For trough drinkers, the following space must be provided:

Females		0.5 linear inches (1.3cm)
Males	0-8 wks	0.5 linear inches (1.3cm)
	8-16wks	0.75 linear inches (1.9cm)
	over 16 wks	1.00 linear inches (2.5cm)

FW 13: Emergency water supply

A method for providing clean, fresh water for a period of at least 24 hours during a shut-off of the main water supply must be available on-site.

PART 3: ENVIRONMENT

Objectives: The environment in which turkeys are kept must take into account their welfare needs and be designed to protect them from physical and thermal discomfort, fear, and distress, and allow them to perform natural behaviors.

A. Buildings & Enclosures

E 1: Records of features of facilities that promote animal welfare

For all separate groups of turkeys, a notice containing a checklist of key points relating to welfare must be prominently displayed at, or near, the entrance to each building or enclosure and be amended accordingly. This checklist must include:

1. Total floor area available to the birds;
2. Total number of birds placed in house;
3. Space allowance and maximum number of birds permitted within the available space;
4. Total number of drinkers, or total trough length if using water troughs;
5. Total number of feeders and diameter if using round feeders, or total trough length if using linear feeders;
6. Feeding program;
7. Target air quality and temperature parameters;
8. Acceptable light levels and light/dark program; and
9. Emergency procedures (e.g., actions in the case of fire, flood, failure of automatic equipment, and when temperatures move outside acceptable ranges).

E 2: Facility design

To ensure that there are no sharp edges or protrusions likely to cause injury to the birds, any building structures, fences and equipment to which turkeys have access, including the floor, must be:

1. Carefully designed and constructed; and
2. Well maintained.

E 3: Internal walls

Internal walls must be smooth, unobstructed, and constructed of a durable material capable of withstanding clean-out procedures.

E 4: Preventing contact with toxic substances

Turkeys must not be exposed to fumes, paints, wood preservatives, disinfectants, or **any** other substances that are toxic to them.

E 5: Electrical installations

All electrical installations (voltage mains) must be:

1. Inaccessible to the turkeys;
2. Well insulated;
3. Safeguarded from rodents;

4. Properly grounded; and
5. Tested regularly for stray voltage.

E 6: Nearby environment

- a. The area immediately surrounding the outside of the house must be kept clean and tidy and must not offer shelter to wild birds or rodents.
- b. If the area immediately surrounding the house is covered with vegetation, the plants must be kept short and well managed.

B.Floor & Litter

E 7: Design of floors

Turkey house flooring must allow for effective cleansing and disinfection so as to prevent significant build-up of agents (e.g., parasites, bacteria, viruses) contributing to disease.

E 8: Concrete floors

- a. When internal house floors are concrete, they must be of solid, smooth, and hard construction.
- b. There must be no significant cracks in the floor; any significant cracks must be adequately repaired.

E 9: Litter

The floor of all houses must be completely covered in litter. The litter must be:

1. Of a suitable material and particle size (i.e., excessively fine and excessively coarse litter should be avoided to minimize litter consumption by poult and breast skin lesions, respectively);
2. Of good quality (clean, dry, dust-free, and absorbent);
3. Managed to maintain optimal moisture conditions;

Litter maintained at a moisture level of approximately 30% reduces dust levels in turkey houses. Litter moisture levels below 25% aggravate dust and mold infestations. Flies and ammonia become problems when litter moisture exceeds 40 %.

4. Of a sufficient depth for dilution of feces (at least 2 inches [5 cm]); and
5. Skimmed and topped up as necessary with fresh litter.
6. Housed turkeys must have access to litter at all times.

E 10: Prohibited Housing

Housing in cages, or on wire or slatted floors, is not permitted.

E 11: Litter storage

Fresh litter must be stored in a clean, dry vermin-proof area.

E 12: Mitigating litter contamination

- a. Litter that is wet, infested with mites, or otherwise contaminated must not be introduced into turkey housing.
- b. Litter that is wet or otherwise contaminated must not be introduced into hen housing.
- c. Wet litter resulting from accidental flooding must be replaced.
- d. Litter must maintain a minimum depth of 2 inches (5 cm).

E 13: Understanding the importance of proper litter management

Managers and caretakers must be aware of welfare problems associated with poor litter management and must understand the factors that affect litter condition. These factors include drinker design and management, litter type and depth, temperature and humidity, house design and insulation, condensation, ventilation, bird behavior, bird age, bird density, and bird diet.

C. Lighting

E 14: Lighting program

- a. Lighting programs must be designed to maintain eye health and minimize leg problems without compromising other aspects of turkey welfare.
- b. The lighting system in the turkey house must provide in each period of 24 hours:
 1. A minimum of 8 hours of light, from either artificial light or access to daylight;
 2. A minimum of 8 hours of continuous darkness, except when the natural period of darkness is shorter. This requirement need not apply during the first 10 days of brooding and the three days immediately prior to slaughter.

E 15: Light intensity

- a. Daytime light levels must allow birds to see and be inspected without difficulty.

- b. To stimulate bird activity and minimize leg problems, the lighting system in the turkey house must be designed and maintained to give an minimum illumination of 0.5 foot candles (5 lux) as measured on a horizontal plane at bird eye level.
- c. At least half the floor area must be provided with light of 2.0 foot candles (20 lux).
- d. Lower light levels are permitted only as a temporary measure to control cannibalism in the event of an outbreak of this behavior.

A light level of at least 3-foot candles (30 lux) is preferable for stimulating activity but brighter lighting increases the risk of cannibalism. A system that enables dimming of the lights in the event of a cannibalism outbreak is desirable.

E 16: Sufficient light for inspection

Adequate lighting, whether fixed or portable, must be available to enable turkeys to be thoroughly inspected at any time.

E 17: Lighting records

A record of the lighting program used in each house must be made available to *Humane Farm Animal Care* during inspection and at other times, upon request. This record will include:

1. The number of hours of light and dark provided, and turkey age(s) when any planned changes are made;
2. The average minimum light intensity (foot candles or lux) in the house as measured on a horizontal plane at bird eye level, and age(s) when any planned changes are made;
3. Any deviations from the planned lighting program for each flock, including the date and the reason for the deviation.

D.Space Allowances

E 18: Stocking density

Sufficient freedom of movement – all turkeys must have sufficient movement to be able to without difficulty, to stand normally, turn around and stretch their wings.

- a. Maximum stocking density is calculated as weight of birds per available floor space. This must not exceed 7.5 lbs/ft² (36.6 kg/m²). Maximum density equates to minimum space allowances of:

Type of Turkey	Weight of Turkey		Minimum Space Allowance per bird	
	lbs	kg	ft ²	m ²
Broiler turkey	up to 15	up to 6.8	2	0.19
Hens	up to 22.5	up to 10.2	3	0.28
Toms	up to 30	up to 13.6	4	0.37
Heavy toms	up to 37.5	up to 17.0	5	0.47

- b. Additional space per bird must be given:
1. During brooding (see **E 40**);
 2. For breeders (see **E 42**);
 3. For range turkeys; and
 4. As needed to maintain turkey welfare.

E 19: Records of space allowances

To ensure that the maximum permitted stocking density is not exceeded; the producer must keep records that enable stocking density to be verified easily by the producer and Inspector at any time. For each separate group of birds, the records must include the following:

1. Current number and sex of birds;
2. Floor area available to the birds;
3. Daily mortality;
4. Daily number culled (include reason for culling); and
5. Average weight of birds when marketed.

E. Air Quality & Thermal Environment

E 20: Air quality

- a. Aerial contaminants must not reach a level at which they are noticeably unpleasant to a human observer.
- b. Ventilation systems, whether natural or mechanical, must be designed to maintain air quality parameters under all foreseeable climatic conditions.

E 21: Target air quality parameters

- a. Ammonia concentration at bird height must be recorded in each house at least once every 2 weeks, and records made available to *Humane Farm Animal Care* during inspection and at other times, upon request.

- b. The ammonia concentration at bird height should be less than 10 ppm and must not exceed 25 ppm except during brief periods of severe inclement weather when ventilation is affected.

It is recommended that the following air quality measures also be monitored and maintained within the following limits:

- *Hydrogen sulfide should be less than 0.5 ppm and should not exceed 10 ppm.*
- *Carbon dioxide should be less than 3000 ppm and should not exceed 5000 ppm.*
- *Carbon monoxide should be less than 10 ppm and should not exceed 50 ppm.*
- *Dust should be less than 1.7 mg/m³ (for respirable dust) and 3.4 mg/m³ (for total dust) and should not exceed 5 mg/m³ (for respirable dust) and 15 mg/m³ (for total dust), averaged over an 8-hr period.*

E 22: Thermal conditions

- a. Provision must be made to ensure that turkeys have access to a thermally comfortable environment at all times so that heat/cold stress does not occur.
- b. The design of buildings, ventilation system and ventilation rate, must be such that it maintains the birds within a comfortable effective environmental temperature appropriate to their age and stage of growth.

- *After the brooding period, efforts should be made to keep the temperature in the house from rising above 80° F (27° C).*
- *Relative humidity should be kept between 40 and 80%. The recommended range is 50 - 70%.*
- *Insulating roofs and walls helps to minimize fluctuations in house ambient temperature during severe weather.*
- *A cooling system (e.g. evaporative cooling pads, high pressure fogging) appropriate for regional weather conditions can help prevent heat stress.*

E 23: Temperature records

- a. Maximum and minimum temperatures in each house, or primary rest area for range turkeys, must be recorded daily at bird height.
- b. Records must be made available to *Humane Farm Animal Care* during inspection and at other times, upon request.

E 24: Maintenance of ventilation equipment

- a. Ventilation equipment must be regularly maintained.
- b. Alarm systems must be installed that notify managers and caretakers of failures in ventilation equipment (i.e., malfunctions that result in a thermal environment outside the acceptable range).

E 25: Factors contributing to the thermal environment

Managers and caretakers must be knowledgeable about factors that affect the thermal environment that birds actually experience.

The thermal environment that birds actually experience (i.e., the effective environmental temperature) represents the combined effects of several variables, including air temperature, humidity, air speed, surrounding surface temperatures, insulating effects of the surroundings, stocking density, meal times, and the age and state of production of the bird. All of these factors should be considered when selecting and operating ventilating systems.

F. Environmental Enrichment

E 26: Stimulating environment

- a. Environmental enrichment should be used to stimulate exploratory, foraging and locomotive behavior and minimize injurious pecking. This requirement need not be applied during the first 10 days of brooding.
- b. Managers must be able to demonstrate to the *Humane Farm Animal Care* Inspector that they are using safe and effective methods of environmental enrichment throughout the rearing period.

Possible methods of enriching the environment include:

- *Providing hay or straw bales;*
- *Perches appropriate to the size and weight of the birds ; A suitable perch height can range from approximately 20 to 150 cm, but should be adjusted according to the size and breed of the turkeys being reared. Timber perches with rounded edges with a height of 5 cm and a width of 7.5 cm are preferred by turkeys; provide about 40 cm of perch space/bird; where applicable, sufficient space should be provided to allow birds to perch adjacent to each other; make perches more visible by painting them white or using brightly colored adhesive strips; to encourage use of perches, place them in the darker areas of the house.*
- *Enriching the litter with grain and long-cut straw;*
- *Lengths of rope, hung with the ends at bird height;*
- *Visual subdivision of the available space (e.g. using vertical plastic mesh panels approximately 30 inches [76 cm] wide with 0.25 inch [0.6 cm] mesh size); and*
- *Providing access to living vegetation.*

G. Free-Range

The Animal Care Standards for Turkeys do not require that turkeys have access to range. When range is provided, the following standards must be met.

E 27: Outdoor area

The outdoor area in free-range systems must be:

1. Designed and managed in ways that ensure the area around the house is well-drained and does not become contaminated or sodden; and
 2. Managed to avoid build up of agents (e.g., parasites, bacteria, viruses) that may cause disease.
- a. The pasture must be designed and actively managed to:
1. Encourage birds outside, away from the popholes, and to use the area fully;
 2. Prevent and/or minimize heavily degraded, muddy/sodden, or worn areas;
 3. Prevent hens from coming into contact with any toxic substances.

It is recommended that range be mainly covered by living vegetation to allow expression of foraging behavior.

E 28: Shelter

- a. Free-range turkeys must have access to a building or covered shelter providing shade, protection from inclement weather and litter for resting.
- b. The building or sheltered area must have sufficient space to allow all turkeys to rest together without risk of heat stress.
- c. Mobile houses must be moved on a regular basis to avoid a disease outbreak or muddy conditions.

E 29: Exits

- a. When turkeys are kept in free-range systems, there must be adequate numbers of exit areas appropriately distributed around the building to ensure that all birds can enter and exit the building freely.
- b. Each exit area must be large enough to allow free passage of more than one turkey at any one time.

It is recommended that exit areas be a minimum of 3.3 ft (1 m) high and 5 ft (1.5 m) wide.

E 30: Access to range

All exit areas must be open for a minimum of 8 hours each day, except when:

1. The birds are less than 12 weeks old;
2. Natural day length is less than 8 hours;
3. Weather is inclement; or
4. There is a disease outbreak.

The age at which poults are first given access to range may vary between 5 and 12 weeks of age depending on local weather conditions and predation risk.

E 31: Protection from predators

Protection must be provided from predators.

The range area should be enclosed with a 4-foot (1.2 m) fence with a mesh size that is small enough to keep predators out, and birds should be kept in a building at night.

Elevated perches may be used to provide additional refuge for range turkeys.

H. Specific Provisions for Brooding Poults

E 32: Preparation for poults

All equipment must be in place and in operating condition, along with the litter, in sufficient time to allow the environment to meet thermal requirements.

E 33: Day-old poults

- a. Day-old poults must be handled carefully to ensure they are not injured.
- b. Care must be taken to avoid thermal stress.
- c. Poults must be placed under brooders without delay on arrival from the hatchery.

E 34: Brooder guards

Brooder guards and feeding and watering equipment within the guards must be designed and constructed so that poults can move freely toward or away from the brooder.

E 35: Brooder heaters

- a. Particular care must be taken in placement and maintenance of brooder heaters to ensure against risk of:
 1. Fire; and
 2. Emission of carbon monoxide.
- b. Care must be taken to ensure that feeders and drinkers inside brooder surrounds do not become hot, especially when metal containers are used.

A fire alarm system should be installed in brooder houses.

E 36: Supplementary feeders and drinkers

In addition to regular feeders and drinkers, supplementary feed and water sources must be provided under the brooders for the first few days of brooding.

E 37: Adjusting the brooding temperature as poults grow

The behavior of poults must be closely monitored throughout the brooding period and the brooders adjusted to ensure that poults are maintained at a comfortable temperature.

- *Behavior such as huddling (too cold) or panting and staying at the perimeter of the brooding area (too hot) should be avoided by adjusting the thermostat on the brooder and its height.*
- *It is recommended that the temperature under the brooder be approximately 95 °F (35 °C) for the first week, and then lowered 5 °F (3 °C) each week thereafter until a temperature of 65-70 °F (18-21 °C) is achieved.*
- *Temperatures near the floor outside the brooding area should be 70-75 °F (21-24 °C) during the first week and then reduced by 5 °F (3 °C) each week until an ambient temperature of 55-60 °F (13-16 °C) is achieved.*
- *For the first 4 weeks of life, there should be a minimum of one brooder per 300 poults.*

E 38: Lighting for poults

If continuous or near-continuous light is provided during the first 2 days of life, then the duration of light must be reduced gradually to 16 hours or less during each 24-hour period by the time the poults are 10 days old.

A minimum light intensity of 25 lux should be provided during the first few days of life for extra illumination of feeders and drinkers. If pecking injuries become a problem, the intensity of the light should be lowered.

E 39: Keeping feeders and drinkers clear

Feeders and drinkers must be kept free from litter to ensure good access and sanitation.

E 40: Space for young birds

- a. After removal of the brooder guards, a minimum of 1.0 ft² of floor space per poult for poults up to 6 weeks of age, and 1.5 ft² (0.14 m²) of floor space per poult for poults between 6 and 8 weeks of age must be provided.
- b. Breeders must be provided with more space (see **E 42**).

E 41: Transferring turkeys started in brooder houses

- a. Turkeys started in brooder houses and then transferred to grower houses after they are 5-8 weeks old must be walked carefully onto, and off, the transport trailer.
- b. Since equipment may differ between the brooder and grower houses, and feeders and drinkers are of different sizes and placement, caretakers must take care to ensure that the birds are adapting to the new grower house facilities.

I. Special Provisions for Breeders

E 42: Space requirements

- a. Breeder males must be provided with a minimum of:
 1. 2 ft² (0.19 m²) of floor space per bird up to 8 weeks of age;
 2. 6 ft² (0.56 m²) per bird to 16 weeks of age; and
 3. 10 ft² (0.9 m²) per bird for those older than 16 weeks.
- b. Breeder females must be provided with a minimum of:
 1. 1.5 ft² (0.14 m²) of floor space per bird up to 8 weeks of age;
 2. 2.5 ft² (0.23 m²) per bird in the grower house;
 3. 3.5 ft² (0.33 m²) per bird during the darkening phase; and
 4. 5.5 ft² (0.51 m²) per bird in the laying phase.
- c. Additional space must be provided as needed to maintain bird welfare.

E 43: Elevated roosts

After 8 weeks of age, each breeder hen must have access to a minimum of 12 inches (30 cm) of elevated roost space per bird.

E 44: Breeder males of fast-growing strains

- a. To prevent obesity and lameness and to avoid fertility problems, breeder males of fast-growing strains must be feed-restricted beginning at approximately 16 weeks of age.
- b. Feed must be provided every day.

The feed restriction program should allow birds to continue to gain weight, but at a reduced rate. A random sample of males should be weighed every two weeks to ensure that the proper amount of feed restriction is maintained, using bird handling methods as described in standard T9.

E 45: Feeder space

When feed is restricted, each male must be provided with a minimum of 12 linear inches (30.5 linear cm) of feeder space. Prior to feed restriction, feeder space allowances must meet FW 7.

Feed restriction is prohibited for breeder hens.

E 46: Water management

- a. Breeder males must be provided with a minimum of 1 inch (2.5 cm) of water space per bird.
- b. When access to water is restricted to prevent wet litter and excessive water consumption by feed-restricted breeder males, water must be turned on every day and provided during the time that feed is being consumed and for at least one hour after feeding is finished.
- c. Additional access to water must be provided as needed to maintain bird welfare (e.g., during hot weather). Water must not be restricted in breeder hens.
- d. Provide 0.5 in (1.2 cm) of water space/breeder hen prior to 8 weeks of age
- e. Provide 0.75 inches (1.9 cm) of water space/breeder hen beginning at 8 weeks of age.

E 47: Semen collection

- a. Semen collection must be:
 - 1. Undertaken only by competent, trained staff; and
 - 2. Birds must be in good physical condition.
- b. Breeder males must not be ejaculated more than twice a week.

E 48: Artificial insemination of breeder females

- a. Artificial insemination must be:
 - 1. Undertaken only by competent, trained staff; and
 - 2. Birds must be in good physical condition.
- b. When performing artificial insemination, a new semen straw must be used for each hen.

E 49: Nest box space

- a. Adult breeder hens must be provided with sufficient nest box space to avoid undue competition and to minimize laying of eggs on the floor. At least 1 nest per 5 hens must be provided.
- b. Single nest size must be at least 20 x 24 inches (50 x 60 cm).

E 50: Broody Hen Management

- a. Broody hens can be placed in littered broody pens with feed and water
- b. Use of temperature and air velocity changes to disrupt broodiness is not allowed
- c. Changes in pen configuration or hen rotation to different pens is allowed to control broodiness.

PART 4: MANAGEMENT

Objectives: Empathy and responsible management are vital to ensure good animal welfare. Managers and caretakers must be thoroughly trained, skilled and competent in animal husbandry and welfare, and have a good working knowledge of their system and the turkeys under their care.

A. Managers

M 1: Understanding the standards

Managers must ensure that:

1. All caretakers have a copy of the current *Animal Care Standards for Turkeys*;
2. They and the caretakers are familiar with the standards; and
3. They and the caretakers understand the contents of the standards.

M 2: Management and record keeping activities

Managers must:

- a. Develop and implement a suitable training program for caretakers, with regular updates and opportunities for continuing professional development;
- b. Be able to demonstrate that staff with responsibility for animal care has the relevant and necessary skill to perform their duties. When deficiencies are noted, managers must provide appropriate training to ensure that all caretakers have the required skills.
- c. Develop and implement plans and precautions to prevent/cope with emergencies such as fire, flood, breakdown of environmental control or interruption of supplies (e.g. food, water, electricity);
 1. Provide an Emergency Action Notice Plan next to a telephone, highlighting the procedures to be followed by those discovering an emergency (e.g. fire, flood, power failure);
 2. Post emergency contact numbers by phones and entrances to buildings.
- d. Ensure that the Animal Health Plan (see H2) is:
 1. Implemented;
 2. Regularly updated; and
 3. That the required data are recorded appropriately.
- e. Maintain and make available to the *Humane Farm Animal Care* inspector records of production data and use of medications. These records must be dated and include documentation on:
 - a) Incoming and outgoing birds,
 - b) Mortality (with reasons stated, if known),
 - c) Culling (with reasons stated, recorded separately from mortality),
 - d) Feed consumption,
 - e) Water consumption,
 - f) Maximum and minimum temperatures at bird level,
 - g) Ventilation (including settings and any necessary changes), and
 - h) Ammonia concentrations at bird level;

2. Develop and implement a plan for transporting birds to the processing plant that minimizes waiting time for the birds; and
3. Comply with local, state and federal regulations.

M 3: Abilities of caretakers

Managers must take into account the abilities of caretakers when assigning duties and when considering expanding the unit or installing more complex equipment.

M 4: Complaints to operators

- a. To be certified, an operation must maintain systems for receiving, responding to, and documenting complaints alleging the operation's failure to comply with HFAC standards (ISO §15).
- b. Whenever an operator receives a complaint, the operator must:
 1. Take appropriate action to respond to the complaint; and
 2. Correct any deficiency in products or services that affect compliance with the requirements for certification
- c. Written records must be retained by the operation for a minimum of 3 years from the date of the records' creation. Records must contain information documenting:
 1. All complaints received (written or verbal),
 2. Actions taken by the operator to respond to the complaint.
- d. Records must be made available to *Humane Farm Animal Care* upon request. *Humane Farm Animal Care* will review these records at least annually, during the operation's annual inspection.
- e. Operators must notify *Humane Farm Animal Care* if an adverse ruling (such as suspension or revocation of certification, fine, or sanction) related to the operation's humane management practices is levied against the operation by another certifier or by a governmental program that regulates the operation.

B. Caretakers

M 5: Mitigating problems

- a. Caretakers must understand the normal behavior of turkeys and recognize signs that indicate good health and welfare.
- b. Caretakers should be able to recognize an impending problem in its earliest stages, as this may enable them to identify the cause and correct the problem promptly.
- c. When an outbreak of abnormal animal behavior occurs, it must be tackled promptly by appropriate changes in the system of management.

M 6: Awareness of welfare problems

- a. Caretakers must be aware of welfare problems associated with poor litter management (e.g. burnt hocks, footpad lesions, breast blisters, respiratory and eye problems).
- b. Caretakers must understand the factors that affect litter condition (see **E 13**) and effective environmental temperature (see **E 25**).

M 7: Training

- a. Prior to being given responsibility for the welfare of turkeys, caretakers must be properly trained and competent to:
 - 1. Carry out duties arising from the Animal Health Plan (see **H 1**) and the Quality Assurance Plan (see **H 2**);
 - 2. Recognize signs of common diseases and know when a veterinarian should be consulted so that appropriate treatment may be initiated.
 - 3. Recognize signs of normal behavior, abnormal behavior, and fear;
 - 4. Understand the environmental requirements for turkeys;
 - 5. Euthanize turkeys when necessary.
- b. Training must be documented and the competence of caretakers must be verified.

M 8: Compassionate Treatment

- a. Caretakers must be able to demonstrate competence in handling animals in a positive and compassionate manner
- b. Caretakers must also be able to demonstrate their proficiency in procedures that have the potential to cause suffering

C. Inspection

M 9: Monitoring

- a. Turkeys, and the facilities on which they depend, must be inspected a minimum of twice daily.
- b. At least one of these inspections must be sufficiently thorough to identify any bird that is showing signs of sickness or injury.
- c. Records must be kept of inspections.
- d. Any welfare problems seen during an inspection by the caretakers must be dealt with appropriately and without delay.

If the Inspector observes welfare problems of sufficient severity that they should have been noticed and dealt with on previous inspections by caretakers, this will be considered by the Inspector as evidence of negligence of duties by the caretakers.

M 10: Records of ill, injured, and dead birds

- a. Records must be kept of any dead and culled birds.
- b. The records must:
 - 1. Be dated and initialed by the caretaker making the inspection;
 - 2. Indicate the time of inspection;
 - 3. Note the causes of death, illness and injury, when known; and
 - 4. Record the reasons for culling.
- c. Treatment records for ill or injured birds must also be kept (see **H 5**).
- d. These records must be available to the *Humane Farm Animal Care* Inspector during inspection and at other times, upon request.

D. Handling

M 11: Quiet handling

Work routines and practices must be developed, and when necessary modified, to ensure that turkeys do not become fearful and that they are not frightened in avoidable ways. For example, all movement throughout the unit must be slow and deliberate, both to alleviate fear and to reduce possible injury to birds.

E. Equipment

M 12: Automatic equipment

- a. Caretakers must inspect equipment (including automatic equipment) on which turkeys depend at least once daily to ensure there are no defects.
- b. When a defect is identified (whether during inspection or at any other time):
 1. The defect must be rectified promptly; or
 2. If this is impracticable, such measures as are required to prevent turkeys from suffering unnecessary pain or distress as a result of the defect must promptly be taken, and maintained until the defect is rectified.

M 13: Alarms for critical systems

- a. Each automatic system that is critical to bird welfare (e.g., forced-air ventilation) must include an alarm, which cannot be switched off, that will provide adequate warning of the system's failure, unless an automatic back-up system is in place.
- b. Alarms must be checked regularly to ensure they are working.

M 14: Auxiliary power supply

- a. An auxiliary power supply, capable of providing power to critical electric equipment within the house for a 24-hour period, must be located on site.
- b. The power supply must be checked as frequently as recommended by the manufacturer, and these inspections must be documented.

M 15: Using equipment

For all equipment used in management (e.g., heaters, lighting, ventilation flaps and fans, feeders, drinkers), caretakers must be able to:

1. Demonstrate their ability to operate the equipment;
2. Demonstrate their ability to carry out routine maintenance;
3. Recognize common signs of malfunction; and
4. Demonstrate knowledge of action to be carried out in the event of failures.

F. Pests & Predators

M 16: Protection from pests and predators

Precautions must be taken to protect turkeys from predators and pests. Specifically:

1. The intrusion of wild birds into houses (for turkeys without access to free range) must be prevented by placing netting or similar material over roof ventilation ducts, windows, and curtain openings.
2. Dogs and cats must not be allowed access to turkeys. Predators, There must be the ability to enclose the birds into a predator-proof area at night.
3. Vegetation and debris directly outside a hen house that may provide harborage for pests must be removed. It is recommended that an additional physical barrier, such as gravel, be placed around the perimeter of the house to deter rodents and soil-borne parasites

Outdoor access areas may be enclosed with an electronet fence with a mesh size that is small enough to keep predators out. It is recommended that birds are kept in a building at night.

PART 5: HEALTH

Objectives: The environment in which turkeys are housed must be conducive to good health. All producers must develop a health plan for their birds in consultation with a veterinarian.

A. Health Care Practices

H 1: Selecting birds for good health

During selection of birds, care must be taken to avoid genetic strains with undesirable traits, particularly aggressiveness, broodiness, bone fragility, hysteria, cannibalism, and tendency to feather peck

H 2: Animal Health Plan

- a. An Animal Health Plan (AHP) must be drawn up and regularly updated in consultation with a veterinarian.
- b. The AHP must include:
 1. Details of any vaccinations;
 2. Information on medical and surgical treatments and other aspects of flock health;
 3. Causes of morbidity and mortality, when known;
 4. Tolerance limits on overall flock performance;
 5. Biosecurity provisions; and
 6. Cleaning and disinfection policy.

H 3: Quality Assurance Program for food safety

A Quality Assurance Program for the control of agents related (e.g., salmonella, campylobacter) to food safety concerns must be adopted and followed.

H 4: Preventing recurring injuries

- a. There must be no recurring injuries evident on birds that are attributable to physical features of their environment or handling procedures.
 1. Recurring injuries are those seen on a number of birds, with sufficient similarity to suggest they have a common cause.
 2. Injury is described as damage severe enough for the formation of granular scar tissue or that causing defects in bones or joints, and to an extent significantly greater than would be caused by occasional accidental bumps or scratches.
- b. Attention must be paid to foot lesions.
- c. If injuries or lesions are found, a program of preventive action must be specified in the AHP.

H 5: Flock performance data

- a. Flock performance data must be continuously monitored as an indicator of disease or production disorders. Producers must monitor at a minimum:
 1. Mortality and culling;
 2. Body weight;

3. Feed consumption; and
 4. Water consumption.
- b. If any flock performance parameter falls outside tolerance limits identified in the AHP, the veterinarian must be informed and the AHP revised to include a program of action that will remedy the problem.

H 6: Care of sick and injured animals

Sick turkeys and turkeys suffering from injuries such as open wounds or fractures must be:

1. Segregated (**H 8**); and
2. Treated without delay; or,
3. If necessary, euthanized (i.e., humanely killed).

H 7: Preventing leg problems

- a. Management plans must be implemented to prevent turkeys from suffering chronic joint disease or leg deformation.
- b. Leg weakness and deformity are serious welfare problems in turkeys, whether caused by infectious agents or growth abnormalities. Any turkey that, due to leg problems or other physical conditions, has difficulty reaching feed and water must be promptly removed from the flock and treated or, if necessary, euthanized.
- c. The presence of any untreated overtly disabled birds at a rate of 0.03% or greater will be deemed as noncompliance with the Animal Care Standards.

H 8: Monitoring records of leg problems

- a. Statistics on culls due to leg abnormalities and/or deformities (**M 2**) must be assessed weekly by the manager to ensure that the problem does not exceed tolerance limits.
- b. When a problem is identified, veterinary guidance must be sought to prevent further losses.

Lameness in birds can be assessed by observing the bird's walking ability and scoring the bird using a gait scoring system such as that presented by J.P. Garner et.al. 2002 in British Poultry Science 43:355-363

A plan of corrective actions should be implemented for all birds with a gait score of more than 1, to address possible causes and alleviate the problem.

Birds with a gait score of 4 or 5 should be humanely culled.

HFAC Standards for Production of Turkeys

<i>Gait score</i>	<i>Degree of impairment</i>	<i>Gait scoring system</i>
0	None	Smooth, fluid locomotion. The foot is furred while raised.
1	Detectable, but unidentifiable abnormality	The bird is unsteady, or wobbles when it walks. However, the problem leg is unclear, or cannot be identified in the first 20 s of observation. The bird readily runs from the observer in the pen. The foot may remain flat when raised but the rest of the stride is fluid and appears unimpaired.
2	Identifiable abnormality, that has little impact on overall function	The leg producing the gait defect can be identified within 20 s of observation. If a problem leg is identified after 20 s of observed locomotor behavior then the bird is classed as gait score 1. However, the defect seems to have only a minor impact on biological function. Thus the bird will run from the observer spontaneously or if touched or nudged with the padded stick. If the bird does not run at full speed, it runs, walks, or remains standing for at least 15 s after the observer in the pen has ceased to move towards or nudge it. Birds in this, and previous scores, are often observed to scratch their face with their feet-again indicating little impact on function. (The most common abnormality in this score is for the bird to make short, quick, unsteady steps with one leg, where the foot remains flat during the step.)
3	Identifiable abnormality which impairs function	Although the bird will move away from the observer when approached or touched, or nudged, it will not run, and squats within 15 s or less of the observer in the pen ceasing to approach or nudge it. If the bird squats after 15 s have elapsed it is classified as gait score 2.
4	Severe impairment of function, but still capable of walking	The bird remains squatting when approached or nudged. This criterion is assessed by approaching the bird, and if it remains squatting, gently nudging or touching the animal for 5 s. Animals may appear to rise but still be resting upon their hocks. Only rising to stand on both feet within 5 s of handling is counted-a bird which takes longer than 5 s to rise, or which does not rise at all is scored as 4, while a bird that rises in 5 s or less is counted as a 3 (or lower if its gait is good). Nevertheless, the bird can walk when picked up by the observer and placed in a standing position, but squats immediately following one or two steps. (Squatting often involves a characteristic ungainly backwards fall.)
5	Complete lameness	The bird cannot walk, and instead may shuffle along on its hocks. It may attempt to stand when approached but is unable to do so, and when placed on its feet is unable to complete a step with one or both legs.

H 9: Segregation facilities for sick or injured birds

If sick or injured birds are to be treated, facilities such as a hospital pen must be available to segregate them from the rest of the flock.

H 10: Physical alterations

- a. In facilities in which light intensity cannot be controlled (e.g., curtain-sided housing or birds with access to range), beak trimming may be necessary to minimize feather picking and cannibalism. Beak trimming is allowed under the following conditions:

1. Only the tip of the upper beak may be removed;
 2. The procedure is performed on birds not older than 10 days of age; and
 3. Only trained, competent personnel perform the procedure.
- b. Artificial devices designed to control cannibalism (e.g., goggles, bits, contact lenses) must not be used.
- c. All surgical procedures are prohibited such as:
Desnooding, Toe clipping, pinioning,
Note: any surgical intervention by a veterinarian for treatment purposes of injured birds must be done using proper pain management.

H 11: Veterinary investigation of mortality

- a. If mortality within a house is in excess of ½ % over 24 hours after birds are 7 days old, a veterinarian must perform an investigation.
- b. As soon as the investigation is complete, the producer must report the results to the *Humane Farm Animal Care* office.

H 12: Cleaning and disinfection

Following depopulation, all houses must be thoroughly cleansed and disinfected.

H 13: Genetically modified Turkeys

The use of genetically modified and /or cloned turkeys and their offspring are prohibited.

B. Emergency Euthanasia

H 14: Euthanasia

- a. If a bird is suffering from an illness, injury or other disability and treatment is not feasible, then the bird must be promptly euthanized (i.e., killed humanely).
- b. Each farm must have provisions for emergency euthanasia without delay by trained, competent members of staff.
- c. If there is any doubt about how to proceed, a veterinarian must be called at an early stage to advise whether treatment is possible or whether euthanasia is required to prevent suffering.
- d. The following methods of emergency euthanasia are permitted:
 1. Cervical dislocation (only for turkeys less than 17.5lbs (8 kg) in body weight).
 - a) Cervical dislocation must sever the spinal cord and cause extensive damage to the major blood vessels.
 - b) Equipment that crushes the neck, including killing pliers or burdizzo, is neither quick nor humane and must not be used.
 2. Carbon dioxide, or a mixture of carbon dioxide and argon, delivered in an appropriate container at acceptable concentrations.
 3. Electrical stunning, immediately followed by neck cutting to sever the major blood vessels and ensure death.
 4. Captive bolt. (should only be used outside of the house and the bird should be properly restrained).

H 15: Carcass disposal

- a. Following euthanasia, birds must be carefully examined to ensure that they are dead.
- b. Off-farm carcass disposal
 1. Carcasses must be disposed of through approved outlets in accordance with state and local laws.
 2. A record must be kept of the name(s) of the outlet(s) through which carcasses are disposed.
 3. On farm carcass disposal: If carcasses are disposed of on farm, a record of the method of disposal must be maintained. Methods used must be in accordance with state and local laws.

PART 6: TRANSPORT

Objectives: Animal transport systems must be designed and managed to ensure that turkeys are not caused unnecessary distress or discomfort. Transport and handling of turkeys must be kept to an absolute minimum. Personnel involved in transport must be thoroughly trained and competent to carry out tasks required of them.

A. Depopulation

T 1: Culling unfit birds prior to loading

- a. Caretakers must inspect the flock shortly before loading and cull any unfit birds.
- b. Birds that are visibly unfit before loading must not be transported; they must be euthanized promptly.

T 2: Preparing for depopulation

- a. All feeders, drinkers, and other obstacles must be raised or removed from the house prior to catching birds to minimize risk of bruising.
- b. Access routes to the turkey house must be adequately designed and maintained to permit safe passage of transport vehicles.
- c. House doors and passages must be large enough to allow safe removal of birds.
- d. Vehicles must be parked as near as practically possible to the house being depopulated.

T 3: Training

Managers must ensure that all personnel involved in the catching and transportation of birds are properly trained and competent.

T 4: Providing instructions for the operation

- a. Managers must communicate with the processor, transporter and catching crew to identify the number of birds to be transported and the birds' weight.
- b. Managers must establish the stocking density to be used during transport.
- c. Managers must prepare full and detailed written instructions for the catching staff
 1. All catching staff must have a copy of these instructions; and
 2. The catchers must be aware of their duties.

T 5: Monitoring welfare during depopulation

A nominated member of the catching team must be made responsible for supervising, monitoring, and maintaining high welfare standards throughout depopulation of the house and loading of birds onto the transport vehicle.

T 6: Ensuring sufficient time for compassionate care

Catching teams must never put speed of operation before bird welfare. Sufficient time must be available to ensure birds are handled with care.

T 7: Adequate environment

- a. Adequate ventilation at bird height must be provided for uncaught birds up to the time of loading.
- b. During loading, steps must be taken to protect birds from:
 1. Adverse weather conditions;
 2. Sources of heat; and
 3. Condensation.

T 8: Mitigating unnecessary suffering

- a. Turkeys must not suffer prolonged:
 1. Hunger;
 2. Thirst; or
 3. Deprivation of rest.
- b. Birds must have access to water up to the time of catching. Water must be given regularly to uncaught birds by periodically lowering the drinkers, ensuring that sufficient light is available for the birds to drink.
- c. Birds must not be deprived of feed for more than 12 hours before slaughter.

T 9: Catching and carrying

- a. Turkeys must not be caught or carried by a single leg, single wing or the neck.
- b. Time spent holding birds in an inverted position must be minimized.

The recommended method of catching turkeys is to grasp the shoulder of the wing furthest away from the catcher, as the free hand grips both legs. Lift and hold the bird close to the catcher's body. It is preferable to carry one bird at a time, with the bird held in an upright position. Transfer of birds between handlers should be avoided as much as possible.

T 10: Minimizing fear

Catching must take place in low lighting to minimize fear reactions of the birds.

T 11: Preventing crowding

- a. During depopulation, actions must be taken to prevent turkeys from crowding together.
- b. When crowding occurs, the house lights must be raised, the birds spread out calmly and quietly, and then allowed to settle before catching is resumed.

B. Modular Transport Systems

The use of modular transport systems for turkeys is recommended as they can improve bird welfare compared to fixed crate systems. It is recognized that, at the present time, many companies use fixed crate systems. When these are used, transporters are urged to consider investing in a modular transport system.

T 12: Using modular transport systems

- a. Before depopulation begins, the person appointed to supervise depopulation and loading must verify that modular crate transport trays:
 1. Have completely open tops with a depth of not less than 14 in (35 cm);
 2. Permit adequate ventilation and protect birds from adverse climatic conditions;
 3. Are thoroughly clean;
 4. Are well maintained; and
 5. Have no sharp edges or protrusions that could cause injury to birds.
- b. Turkeys must be put in transport modules in the house.
- c. A catcher must place one bird at a time into the transport tray.
- d. Birds must be placed carefully into the module drawer—birds must not be dropped or thrown into the drawer.
- e. When loading, one hand must lift the bird by the legs, and the other hand must support the breast; birds must not be lifted by just the wing or the neck.
- f. The stocking density in each tray must not exceed that specified in the following table:

Live Weight in lbs.	Birds per yd ²	ft ² /bird	Live Weight in kg.	Birds per m ²
Up to 11 lbs	12	0.75	Up to 5 kg	15
11 – 15.4	11	0.82	5 – 7 kg	14
15.4 – 17.6	9	1.00	7 – 8 kg	11
17.6 – 19.9	8	1.13	8 – 9 kg	10
19.9 – 24.3	6	1.50	9 – 11 kg	8
24.3 – 37.5	5	1.80	12 – 17 kg	6
37.5 – 52.9	4	2.25	18 – 24 kg	5

There is enormous variation in weight/size of different strains, sexes, and ages of turkeys. Therefore, optimum transport stocking densities for different ages and sexes of bird under different climatic conditions need to be developed.

- g. Stocking density must be reduced when birds are being transported during hot weather (in excess of 77°F or 25°C).
- h. As each drawer is filled, it must be closed carefully to ensure that the birds' heads, wings, or legs are not trapped.
- i. Modules must be taken from the shed slowly and care must be taken to ensure no damage is caused to the birds.

C. Fixed Crate Transport Systems

T 13: Using fixed crate transport systems

- a. The person appointed to supervise depopulation and loading must verify that fixed crate vehicles:
 1. Have adequate ventilation and protect birds from adverse climatic conditions;
 2. Are thoroughly clean;
 3. Are well maintained;
 4. Have doors that close securely; and
 5. Have no sharp protrusions on the vehicle or crates that could cause injury to the birds.
- b. Facilities must be provided for catchers that ensure they are able to load birds onto the vehicle from a position that gives them easy access to all crates (e.g., loading platform or steps).
- c. Catchers must not lift birds above the catcher's head height when loading them onto the vehicle.
- d. Birds must be loaded into the fixed crate carefully; birds must not be thrown into the crate.
- e. When loading, one hand must lift the bird by the legs, and the other hand must support the breast; birds must not be lifted by just the wing or the neck. Birds should be loaded one at a time.
- f. The stocking density in each fixed crate must not exceed that specified in **T 12**. Stocking density must be reduced when birds are transported during hot weather (in excess of 77°F [25°C]).
- g. The floor of each fixed crate must prevent feces falling on birds beneath but must not hinder ventilation inside the crate.
- h. The person responsible for supervising depopulation and loading must ensure that the door of each crate is securely fastened, and the wings, head, or legs of any bird are not trapped in the door or any part of the fixed crate.

D. Transport

T 14: Competent staff

Personnel in charge of turkey transporters must demonstrate their competence in:

1. Handling turkeys;
2. Securing the load;
3. Maintaining an appropriate thermal environment for the birds while in transit;
4. Driving and parking safely; and
5. Following emergency procedures.

T 15: Investigating mortality during transport

- a. When causes of mortality have been identified, prompt action must be taken to prevent further deaths, injury, or suffering.
- b. Transport mortality (in turkeys from any single source) above 0.5% during any three-month period must be investigated.

- c. As soon as the investigation is complete, the producer must report the results to the *Humane Farm Animal Care* office.

T 16: Limiting the period of transport

- a. The time between start of loading and completion of unloading must be less than 10 hours.
- b. Every effort must be made to ensure journeys are completed without unnecessary delays:
 - 1. Drivers must be aware of potential traffic problems;
 - 2. Drivers must plan their journey to minimize its duration; and
- c. The person supervising the catching and loading of birds must communicate clearly and work closely with the processing plant to minimize the time birds spend on the vehicle after transport to the processing plant.

T 17: Minimizing noise

Noise levels, from all sources, must be minimized during loading, unloading, and transport.

T 18: Avoiding thermal stress

- a. At times of high ambient temperature or when high humidity poses a threat to the birds, catching, loading, and transportation create particular risks of heat stress. In such cases, producers must:
 - 1. Monitor weather forecasts of predicted temperatures; and
 - 2. Arrange for turkeys to be transported at night or during the coolest parts of the day.
- b. If it is necessary to keep birds on a stationary vehicle, the driver must take action to avoid heat/cold stress in birds. In hot weather (in excess of 77°F or 25°C), an effective way to provide a cooling draft is to keep the vehicle moving.

T 19: Ventilation

- a. The transport vehicle must be equipped with suitable curtains that can be opened and closed by a single operator.
- b. During periods of hot weather (in excess of 77°F [25°C]), a central passageway must be left free of birds/crates to allow increased ventilation.
- c. Vehicles must be equipped with fan-operated ventilation.

Technology is becoming available to monitor temperature and humidity on board transport vehicles. This helps drivers take appropriate action to maintain ideal conditions for birds. Use of such equipment is encouraged.

T 20: Shelter from extreme weather

Turkeys must have shelter from extreme weather during transport.

PART 7: PROCESSING

Objectives: Processing systems must be designed and managed to ensure that turkeys are not caused unnecessary distress or discomfort. Pre-slaughter handling of turkeys must be kept to an absolute minimum. Personnel involved in slaughter must be thoroughly trained and competent to carry out tasks required of them.

A. Training

P 1: Implementing an Animal Welfare Policy

- a. The plant manager must develop and implement an Animal Welfare Policy addressing processing. This must include written procedures describing:
 1. Maintenance of animal welfare in the processing plant;
 2. The responsibilities and duties of staff; and
 3. Emergency procedures.
- b. The Animal Welfare Policy must be regularly reviewed and updated.

P 2: Animal Welfare Officer

- a. The plant manager must appoint at least one trained Animal Welfare Officer (AWO), who is responsible for implementation of the Animal Welfare Policy during processing.
- b. The AWO must make frequent checks throughout the day to ensure that turkeys are being effectively stunned and are insensible before processing.
- c. When this is found not to be the case, the AWO must take immediate remedial action.

Installation of a closed circuit television system can be useful for monitoring bird welfare during shackling, stunning and slaughter.

P 3: Training staff about processing procedures

- a. The plant manager, in conjunction with the AWO, must develop and implement a training program for all staff handling and slaughtering turkeys.
- b. The plant manager must ensure that staff are properly trained to carry out their duties and are competent to perform them.
- c. Training must be verified by training records. Records must be made available to *Humane Farm Animal Care* during inspection and at other times, on request.

B. Holding Areas

P 4: Humane treatment in the holding area

- a. The plant manager, in conjunction with the AWO, must ensure that any bird on their premises awaiting processing is:
 1. Protected from direct sun and from adverse weather (e.g., wind, rain, hail, snow);

2. Provided with adequate ventilation. Temperature and humidity in the holding area and within crates containing turkeys must be regularly monitored and controlled;
 3. Euthanized promptly if found to be suffering.
- b. When possible, transport crates must be unloaded immediately on arrival at the processing house and placed in an environmentally controlled holding area.
 - c. Temperature and lighting in the holding area must be controlled so that birds are comfortable and calm.

P 5: Minimizing waiting time

- a. Turkeys must be slaughtered as soon as possible after arrival at the processing plant.
- b. Slaughter must occur:
 1. No more than 12 hours after the time feed was withdrawn on the farm; and
 2. Within 4 hours of the birds' arrival at the plant.

P 6: Emergency breakdowns

- a. Once turkeys have arrived at the premises where they will be processed, they must not be moved to other premises for processing.
- b. Standby equipment (e.g., a generator) must be available for emergency breakdowns.

P 7: Unloading turkeys from fixed crate vehicles

When turkeys are unloaded from fixed crate vehicles:

1. Staff must be provided with facilities or equipment that provide access to all the crates in each tier.
2. Care must be taken when removing birds from crates.

P 8: Monitoring condition

- a. All transport trays or fixed crates must be examined on arrival at the processing plant to identify any birds suffering from injury, heat, or cold stress.
- b. Immediate action must be taken to prevent suffering and ensure that similar occurrences are prevented.
- c. Any bird identified as suffering from injury, heat, or cold stress, must be slaughtered promptly and humanely.

P 9: Recording and reporting deaths and injuries

- a. The processing plant must keep records of all birds found to be dead or injured on arrival at the processing plant.
- b. The plant manager must ensure that these records are reported to the farm manager before the next consignment of birds is received from that farm.
- c. These records must be made available to *Humane Farm Animal Care* during inspection and at other times, as requested.

C. Shackling

P 10: Training staff

Shackling teams must be thoroughly trained to handle the birds so as to avoid injury (e.g., bone breakage and dislocation, bruises).

P 11: Sufficient personnel

Plant managers must employ sufficient personnel on shackling lines at all times to ensure due care and diligence.

P 12: Shackling procedure

- a. Turkeys must be hung without causing them unnecessary pain or distress by using:
 - 1. Shackles of a suitable size and type, and
 - 2. An appropriate slaughter line speed.
- b. Birds must be hung on the shackles by both legs, with each leg placed on a separate shackle.

P 13: Keeping birds in the correct position for stunning

Appropriate measures must be taken to prevent wing flapping and birds raising their heads before reaching the stunning bath, such as:

- 1. Use of a breast bar;
- 2. Curtains;
- 3. Reduction in noise;
- 4. Low light intensity, or blue light;
- 5. Running hand down birds at shackling; and
- 6. Avoiding bends in the line between shackling and stunning.

P 14: Preventing escape

- a. Care must be taken to ensure that birds cannot escape from the holding area or fall from the shackle line.
- b. When loose birds are found they must be:
 - 1. Taken immediately to the hanging area; or
 - 2. If injured, promptly euthanized away from the line.

P 15: Limiting time birds are suspended

Turkeys must not be suspended for more than 90 seconds before they are stunned.

P 16: Checking crates

All crates must be checked to ensure that no turkeys are left inside them.

D. Stunning

P 17: Stunning equipment

The following types of stunning equipment are acceptable:

- 1. Electrically live stunning bath;
- 2. Dry stunner incorporating an electrically live metal grid or bar;
- 3. Hand-operated stunner;

P 18: Limiting unstunned birds' view

- a. Un-stunned birds must be screened from dead birds.

- b. The line to the stunner must be darkened or lit with a blue light

P 19: Electrical water stunning bath

When an electrical water stunning bath is used:

1. The stunning bath must be set at a height appropriate for the size and number of birds. In particular, the height must be set so that the heads of all birds make an effective contact with the water bath.
2. When turkeys are electrically stunned a current sufficient to induce immediate unconsciousness in all birds prior to neck cutting must be used. Birds must remain insensible until they die from exsanguination.
3. The water bath must be of sufficient size and depth, and the water must not overflow at the entrance. The electrode that is immersed in the water must extend the length of the water bath.
4. The water bath stunner must be designed and installed so as to prevent birds receiving pre-stun shocks.
5. The water bath must be fitted with an ammeter to monitor current flow through the bath when loaded with birds.
6. When turkeys are electrically stunned individually in a water bath, the current applied must be sufficient to induce immediate insensibility.

P 20: Electrical hand-held stunners

When electrical hand-held stunners are used:

1. Turkeys must be restrained in a cone or on a shackle;
2. Birds must be stunned immediately after being restrained;
3. Care must be taken to ensure that the stunning electrodes are applied in the optimum position (i.e. applied firmly to either side of the head between the eye and ear);
4. The current used must be sufficient to render birds unconscious immediately.
5. The stunner must be applied until initial wing flapping ceases (or if held in a cone, until legs become rigid and extended); and
6. Neck cutting must be performed immediately using a ventral neck cut to ensure that both carotid arteries are severed.

P 21: Maintaining and monitoring equipment

- a. All stunning and bleeding equipment must be:
 1. Regularly maintained;
 2. Frequently cleaned; and
 3. Checked to ensure that it is in proper working order.
- b. Any problems must be:
 1. Reported to the AWO; and
 2. Rectified promptly.

P 22: Dealing with unavoidable delays

The Animal Welfare Policy (see **P1**) must include contingency plans to deal with unavoidable delays in processing birds. Specifically, if the line is stopped for more than 3

minutes, birds between the point of shackling and slaughter must be removed and birds that have already been stunned must be humanely killed.

P 23: Checking birds leaving the stunner

- a. Regular checks of birds leaving the water bath must be conducted to ensure they have been effectively stunned.
- b. Employees must be trained to recognize the signs of an effective stun.
- c. The following characteristics must be used to determine the effectiveness of the stunning operation.
 1. The most reliable indicator that a bird is properly stunned is the electroplectic fit. Characteristics of this condition are:
 - a) Neck arched with head directed vertically;
 - b) Open eyes;
 - c) Wings held close to the body; and
 - d) Rigidly extended legs and constant rapid body tremors.
 2. When cardiac arrest is induced at stunning, characteristics are:
 - a) Completely limp carcass;
 - b) No breathing;
 - c) Loss of nictitating membrane reflex; and
 - d) Dilated pupils.

E. Controlled Atmosphere Systems

Humane Farm Animal Care believes that the use of gas under controlled conditions (controlled atmosphere systems (CAS) or controlled atmosphere killing (CAK)) as a means of killing birds can provide many welfare benefits, such as reduced manual handling and avoiding the need to shackle live birds. However, there are still a number of unresolved humane issues surrounding the proper gas mixture to be used and when unconsciousness occurs. Until these issues are investigated through scientific study, including the onset of unconsciousness at different gas concentrations, HFAC requires that any operation which uses CAS submit their full protocol for review by our scientific committee. CAS must be designed to kill the birds and must not be used as a stunning method.

Where processing facilities use, or intend to use, gas as a method of killing, the following conditions must be met:

P 24: Proper instruction

Every person involved in gas killing must be properly instructed as to:

- a. the method of operation of the CAS
- b. the procedures for any necessary flushing of the CAS with atmospheric air, and
- c. the procedures for any necessary evacuation of birds from the CAS.

P 25: Mixing of gas supply

Where more than one type of gas is used, the gases must be thoroughly mixed prior to supply into the CAS.

P 26: Daily checks

Daily checks must always be undertaken to ensure that there is a sufficient supply of gas to kill all birds to be received, prior to the start of the process.

P 27: Gas monitors/sensors

The gas concentrations and delivery of gas must be constantly monitored by sensors which are:

- a. Fitted in different locations along the equipment,
- b. Clearly marked and readily identified,
- c. Linked to an audible and visual alarm system,
- d. Calibrated at regular intervals, according to the manufacturers' advice, using certified calibration gases to ensure that correct concentrations are maintained. Documentation of these calibrations must be made available to the *Humane Farm Animal Care* Inspector.

P 28: Prior to entry

- a. Birds must not be subjected to any of the gas mixture prior to entry into the CAS. Appropriate equipment, such as an extractor must be fitted to the entrance to ensure no gas exposure prior to entry.
- b. Birds must not enter the equipment until the correct gas concentration has been established. This must be controlled automatically.

P 29: Ensuring a humane kill

- a. Birds must be immersed into approved gas mixtures and held there until they are dead.
- b. On exiting the CAS, all birds must be inspected immediately to ensure they are dead, and to identify and remove any birds that were dead before entry.
- c. Any birds found to be conscious on exiting the CAS must be removed and humanely killed immediately. Records of all instances of birds recovering consciousness after exposure to gas mixture must be kept.

P 30: Causes of injury

On exiting the CAS, birds must be checked to identify any signs of damage or injury which could have been caused while inside the CAS. If such damage or injury is found, then:

- a. the cause of the injury must be investigated to determine where and how it took place,
- b. if the injury took place while the birds were still conscious,
 1. immediate action must be taken to rectify the problem, and
 2. recorded in the corrective actions log.

P 31: Contingency for failure or delays

- a. In case of failure, a back-up method of humane slaughter must be available and ready for use at all times, which is capable of dealing with all birds awaiting slaughter.
- b. A contingency plan must be written and made available to the *Humane Farm Animal Care* Inspector, which includes details of actions taken if a breakdown occurs while birds are still in the CAS, to avoid prolonged delays.

F. Bleeding

P 32: Cutting the blood vessels

- a. Carotid arteries and jugular veins must be effectively severed using a ventral cut.
- b. This cut must be checked by an appointed employee who must be given sufficient time to sever the blood vessels manually, if necessary.
- c. No bird shall show (eye) blinking, spontaneous breathing, or wing flapping during bleeding.

P 33: Time between stunning and neck cutting

No more than 10 seconds must elapse between stunning and neck cutting.

P 34: Checking birds before they are scalded

- a. All birds must be accessible to workers before they enter the scalding tank so that workers can deal with any birds showing signs of recovery of consciousness, and
- b. Birds must be checked to ensure that they are dead before entering the scalding tank.

P 35: Time between neck cutting and scalding or plucking

Turkeys must not be immersed in a scalding tank or plucked until at least 120 seconds have elapsed since the major blood vessels in their necks have been severed.

REFERENCES

- Ashton, W.L.G., M. Pattison, and K.C. Barnett. 1973. "Light-induced eye abnormalities in turkeys and the turkey blindness syndrome." *Research in Veterinary Science* 14: 42–46.
- Buccholz, R. 1997. "Male dominance and variation in fleshy head ornamentation in Wild Turkeys." *Journal of Avian Biology* 28: 223-230.
- California Poultry Workgroup. 1998. *Animal Care Series: Turkey Care Practices* 2nd ed. University of California Cooperative Extension Service, Davis, CA.
- Codes of Recommendations for the Welfare of Livestock: Turkeys*. 2002. Department of the Environment, Food and Rural Affairs, London, UK. Available online at <http://www.defra.gov.uk/animalh/welfare/farmed/othersps/turkeys/pb0077/turkcode.htm> .
- Denbow, D.M., A.T. Leighton Jr, and R.M. Hulet. 1984. "Behavior and growth parameters of Large White turkeys as affected by floor space and beak trimming. 1. Males." *Poultry Science* 63: 31-37.
- Donaldson, W.E., J. Clark, and V.L. Christensen. 1994. "Protein, lipid and glycogen stores in newly-hatched turkey (*Meleagris gallopavo*) poults as affected by post-hatch stressors and holding time." *Comparative Biochemistry and Physiology A Comparative Physiology* 107: 559-562.
- Ekstrand, C., and B. Algers. 1997. "Rearing conditions and foot-pad dermatitis in Swedish turkey poults." *Acta Veterinaria Scandinavica* 38: 167-174.
- Euthanasia of Poultry: Considerations for Producers, Transporters, and Veterinarians*. 1998. Center for Animal Welfare, University of California, Davis, CA. Available online at <http://animalwelfare.ucdavis.edu>.
- Farm Animal Welfare Council. 1995. *Report on the Welfare of Turkeys*. London UK. Available online at <http://www.fawc.co.uk/turkeys/turkrtoc.htm> .
- Garner, J.P., C. Falcone, P. Wakenell, M. Martin, and J.A. Mench. 2003. "Reliability and validity of modified gait score system and its use in assessing tibial dyschondroplasia in broilers." *British Poultry Science* 43: 355-363.
- Gill, D.J. and A.T. Leighton, Jr. 1984. "Effects of light environment and population density on growth performance of male turkeys." *Poultry Science* 63: 1314-1321.
- Grigor, P.N., B.O. Hughes, and M.J. Gentle. 1995. "An experimental investigation of the costs and benefits of beak trimming in turkeys." *Veterinary Record* 136: 257-265.
- Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching* 1st Revised Edition. 1999. Federation of Animal Science Societies, Savoy, IL.
- Hester, P. Y., A.L. Sutton, and R.G. Elkin. 1987. "Effect of light intensity, litter source and litter management on the incidence of leg abnormalities and performance of male turkeys." *Poultry Science* 66: 666-675.

- Hocking, P.M., M.H. Maxwell, and M.A. Mitchell. 1999. "Welfare of food restricted male and female turkeys." *British Poultry Science* 40: 19-29.
- Hocking, P.M., R. Bernard R, and M.H. Maxwell. 1999. "Assessment of pain during locomotion and the welfare of adult male turkeys with destructive cartilage loss of the hip joint." *British Poultry Science* 40: 30-34.
- Leighton, A.T. Jr., D.M. Denbow, and R.M. Hulet. 1985. "Behavior and growth parameters of Large White turkeys as affected by floor space and beak trimming. II. Females." *Poultry Science* 64: 440-446.
- Mallia, J.G., J.P. Vaillancourt, S.W. Martin, and S.A. McEwen. 2000. "Risk factors for abattoir condemnation of turkey carcasses due to cyanosis in southern Ontario." *Poultry Science* 79: 831-837.
- Martrenchar, A. 1999. "Animal welfare and intensive production of turkey broilers." *World's Poultry Science Journal* 55: 143-152.
- Martrenchar, A., D. Huonnig, and J.P. Cotte. 2001. "Influence of environmental enrichment on injurious pecking and perching behaviour in young turkeys." *British Poultry Science* 42: 161-170.
- Martrenchar, A., D. Huonnic, J.P. Cotte, E. Boilletot, and J.P. Morisse. 1999. "Influence of stocking density on behavioural, health and productivity traits of turkeys in large flocks." *British Poultry Science* 40: 323-331.
- Mercia, L.S. 2001. *Storey's Guide to Raising Turkeys*. Storey Books, Pownal, VT.
- Newberry, R.C. 1992. "Influence of increasing photoperiod and toe clipping on breast buttons of turkeys." *Poultry Science* 71: 1471-1479.
- Newberry, R.C. 1993. "The role of temperature and litter type in the development of breast buttons in turkeys." *Poultry Science* 72: 467-474.
- National Research Council. 1994. "Nutrient requirements of turkeys." *Nutrient Requirements of Poultry*, 9th Revised Edition. National Academic Press, Washington, DC.
- Raj, M. 1998. "Welfare during stunning and slaughter of poultry." *Poultry Science* 77: 1815-1819.
- RSPCA Welfare Standards for Turkeys*. 2007. Royal Society for the Prevention of Cruelty to Animals. Southwater, West Sussex, UK.
- Sherwin, C.M. 1998. "Light intensity preferences of domestic male turkeys." *Applied Animal Behaviour Science* 58: 121-130.
- Sherwin, C.M., P.D. Lewis, and G.C. Perry. 1999. "The effects of environmental enrichment and intermittent lighting on the behaviour and welfare of male domestic turkeys." *Applied Animal Behaviour Science* 62: 319-333.



Humane Farm Animal Care
Animal Care Standards
August 2014

Copyright 2014 by Humane Farm Animal Care.
PO Box 727, Herndon VA 20172
All rights reserved.