

No.



201700133

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Pioneer Hi-Bred International, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

An application requesting a certificate of protection for an alleged novel variety of sexually reproduced, or tuber propagated plant, the name and description of which are contained in the application and exhibits, a copy of which is hereunto annexed and made a part hereof, and the various requirements of law in such cases made and provided have been complied with, and the title thereto is, from the records of the PLANT VARIETY PROTECTION OFFICE, in the applicant(s) indicated in the said copy, and whereas, upon due examination made, the said applicant(s) is (are) adjudged to be entitled to a certificate of plant variety protection under the law.

Now, therefore, this certificate of plant variety protection is to grant unto the said applicant(s) and the successors, heirs or assigns of the said applicant(s) for the term of TWENTY years from the date of this grant, subject to the payment of the required fees and periodic replenishment of viable basic seed of the variety in a public repository as provided by law, the right to exclude others from selling the variety, or offering it for sale, or reproducing it, or importing it, or exporting it, or conditioning it for propagation, or stocking it for any of the above purposes or using it in producing a hybrid or different variety therefrom, to the extent provided by the PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)



Attest:

Acting Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

CORN, FIELD

'PHIVKM'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this twenty-ninth day of November, in the year two thousand and eighteen.

Secretary of Agriculture

Inari Exhibit 1008
Inari v. Pioneer

U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE <i>(Instructions and information collection burden statement on reverse)</i>		<i>The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.</i> <i>Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).</i>	
1. NAME OF OWNER Pioneer Hi-Bred International, Inc.		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME	
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) 7100 NW 62nd Avenue P.O. Box 1000 Johnston, IA 50131-1000		3. VARIETY NAME PH1VKM	
7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) Corporation		5. TELEPHONE (include area code) (515) 535-4900	
8. IF INCORPORATED, GIVE STATE OF INCORPORATION Iowa		6. FAX (include area code)	
9. DATE OF INCORPORATION March 5th, 1999		FOR OFFICIAL USE ONLY PVPO NUMBER 201700133	
10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers) PVP Coordinator Pioneer Hi-Bred International, Inc. 7100 NW 62nd Avenue P.O. Box 1000 Johnston, IA 50131-1000		11. TELEPHONE (Include area code) (515) 535-4900	
12. FAX (Include area code)		FILING DATE 3/20/2017	
13. E-MAIL PVP@pioneer.com		F E E S R E C D FILING AND EXAMINATION FEES: \$ 4382.00 3/20/2017 DATE CERTIFICATION FEE: \$ DATE	
14. CROP KIND (Common Name) Corn		15. GENUS AND SPECIES NAME OF CROP Zea mays	
16. FAMILY NAME (Botanical) Gramineae		17. IS THE VARIETY A FIRST GENERATION HYBRID? ☐ YES ☒ NO	
18. DOES THE VARIETY CONTAIN ANY TRANSGENES? (OPTIONAL) ☐ YES ☒ NO IF YES, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE APPROVED PETITION TO DEREGULATE THE GENETICALLY MODIFIED PLANT FOR COMMERCIALIZATION.		20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act) ☐ YES (If "yes", answer items 21 and 22 below) ☒ NO (If "no", go to item 23) ☐ UNDECIDED	
19. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. ☒ Exhibit A. Origin and Breeding History of the Variety b. ☒ Exhibit B. Statement of Distinctness c. ☒ Exhibit C. Objective Description of Variety d. ☐ Exhibit D. Additional Description of the Variety (Optional) e. ☒ Exhibit E. Statement of the Basis of the Owner's Ownership f. ☒ Filing and Examination Fee (\$4,382), make checks payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office) other methods of payment explained in the instructions		21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? ☐ YES ☐ NO IF YES, WHICH CLASSES? ☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED	
23. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? ☐ YES ☒ NO IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)		22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☐ YES ☐ NO IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS. ____ FOUNDATION ____ REGISTERED ____ CERTIFIED <i>(If additional explanation is necessary, please use the space indicated on the reverse.)</i>	
25. The owners declare that a viable sample of basic seed will be furnished directly to an acceptable depository in support of the variety within three months of filing. Seed will be replenished upon request in accordance with such regulations as may be applicable. For a tuber propagated variety or vegetative propagated parent of the variety, a tissue culture or vegetative sample will be deposited in a public repository within three months of the date of the certificate fee request letter. These will be maintained for the duration of the certificate. The undersigned owner(s) is (are) the owner(s) of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Owner(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.		24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? ☒ YES ☐ NO IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)	
SIGNATURE OF OWNER		SIGNATURE OF OWNER	
NAME (Please print or type) Benjamin B. Drake		NAME (Please print or type)	
CAPACITY OR TITLE IP Asset Senior Analyst		CAPACITY OR TITLE	
DATE		DATE	

22. CONTINUED FROM FRONT *(Please provide a statement as to the limitation and sequence of generations that may be certified.)*

23. CONTINUED FROM FRONT *(Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)*

24. CONTINUED FROM FRONT *(Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)*

U.S. Patent Application date: March 31, 2016 - Serial No. 15/086604

201700133

CLARIFICATION OF DATA IN EXHIBITS B AND C

Please note the data presented in Exhibit B and C, "Objective Description of Variety," are collected in Johnston, Iowa. The quantitative data presented in Exhibit B are from two sample t-tests using data collected during the two growing seasons shown, 2015 and 2016. Qualitative trait data are presented from environments where the data best represents the variety(ies). The traits in Exhibit B collectively show distinct differences between the two varieties.

For each given year of data collection, our experimental design was arranged so entries with similar maturities were planted side by side with one replication of the new variety grown in each environmental location. The experiment procedures are carried out over a two year period with observation plots planted in 17.42 ft., 4 row plots for each variety. Approximately 30 plants emerge per row and are thinned for a total of 24 to 26 plants in each of the 4 rows for a total of approximately 96 to 104 plants being evaluated in each environment and a minimum of 192 to 208 plants across multiple years. For plant level traits, we sampled up to 20 representative plants from a single row of the 4 row plot (group) of plants. For plot level traits we evaluated the 4 row plot (group) and observed a representative score or average on the 96-104 plants in the group within an experiment.

Month	Growing Degree Units (GDUs)	Precipitation (Inches)	Growing Degree Units (GDUs)	Precipitation (Inches)
	2015	2015	2016	2016
	Johnston, IA	Johnston, IA	Johnston, IA	Johnston, IA
May	429	4.78	402	2.86
June	647	8	719	3.14
July	748	8.62	729	8.38
August	650	3.71	709	6.88
September	623	7.61	574	4.01
Total	3097	33.83	3133	25.27

Growing Degree Units use following formula: $GDU = ((T1+T2)/2)-50$

Where T1 = minimum temperature for a given day with 50 degrees Fahrenheit as the minimum temperature used and 86 degrees Fahrenheit is the maximum temperature used.

Where T2 = maximum temperature for a given day with 86 degrees Fahrenheit as the maximum temperature used and 50 degrees Fahrenheit is the minimum temperature used.

GDUs are calculated each day and accumulated (summed) over certain number of days.

U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE EXHIBIT A – ORIGIN AND BREEDING HISTORY <small>** Use additional pages as needed.</small>		FOR OFFICIAL USE ONLY PVPO NUMBER
1. Name of Owner Pioneer Hi-Bred International, Inc.	2. Temporary Designation or Experimental Name	3. Variety Name PH1VKM
4. Describe the genealogy (back to and including public and commercial varieties, lines, or clones used) and the breeding method(s). ** <p>Pioneer variety PH1VKM, an inbred of Yellow corn (<i>Zea mays L.</i>), was developed by Pioneer Hi-Bred International, Inc. from a cross made in 2005 in Salinas, PR between PH12P0 and PHPCW (PVP Application No. 200800293) using the pedigree method of plant breeding. Varieties PH12P0 and PHPCW are proprietary inbred lines of Pioneer Hi-Bred International, Inc.</p> <p>During line development, crosses were made to inbred testers for the purpose of estimating hybrid combining ability. Yield trials were grown at Marion, Iowa and other Pioneer research locations.</p>		
5. Give the details of subsequent stages of selection and multiplication. **		
Year	Detail of Stage	Selection Criteria
2005	The initial cross PH12P0 x PHPCW was made.	The criteria used were yield per se and yield in hybrid combination. Late season plant health, grain quality, and stalk lodging resistance were important criteria considered during selection. Other selection criteria include: ability to germinate in adverse conditions, disease and insect resistance, pollen production and tassel size.
2006	F1 was planted, self-pollinated and harvested in bulk.	
2007	F2 population was self-pollinated and ears were selected.	
2008	F3 families were self-pollinated and ears were selected.	
2009	F4 line was self-pollinated and ears were selected.	
2009	F5 line was self-pollinated and ears were selected.	
2010	F6 line was self-pollinated and ears were selected.	
2010	F7 line was self-pollinated and ears were selected.	
2011	F8 line was self-pollinated and ears were selected.	
2011	F9 line was self-pollinated and ears were selected.	
2014	F10 line was self-pollinated and ears were selected.	
2015	F11 line was self-pollinated and ears were bulked as breeders seed.	
6. Is the variety uniform? ☒ Yes ☐ No How did you test for uniformity? Field trials were grown and observed for uniformity and stability over 7 generations, with one or more environments in each generation. Genetic purity testing was used in the purification process.		
7. Is the variety stable? ☒ Yes ☐ No How did you test for stability? Over how many generations? Field trials were grown and observed for uniformity and stability over 7 generations, with one or more environments in each generation.		
8. Are genetic variants observed or expected during reproduction and multiplication? ☐ Yes ☒ No If yes, state how these variants may be identified, their type and frequency.		

U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE EXHIBIT B – STATEMENT OF DISTINCTNESS ** Use additional tables to present clear differences for additional comparison varieties. Use additional pages to present supporting evidence.		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; font-weight: bold;">FOR OFFICIAL USE ONLY</td> </tr> <tr> <td style="height: 50px; vertical-align: top;"> PVPO NUMBER </td> </tr> </table>	FOR OFFICIAL USE ONLY	PVPO NUMBER										
FOR OFFICIAL USE ONLY														
PVPO NUMBER														
1. Name of Owner Pioneer Hi-Bred International, Inc.	2. Temporary Designation or Experimental Name	3. Variety Name PH1VKM												
Based on overall morphology, <u>PH1VKM</u> <i>Applicant's new variety</i> is most similar to <u>PHPCW</u> <i>Most similar comparison variety(ies)</i> . <u>PH1VKM</u> <i>Applicant's new variety</i> most clearly differs from <u>PHPCW</u> <i>Most similar comparison variety(ies)</i> in the following traits . Name the specific trait, then list the value of that trait for each variety in the comparison. Submit appropriate supporting evidence (see the Guidelines for Presenting Evidence in Support of Variety Distinctness in the instructions):														
<table style="width: 100%; border: none;"> <tr> <td style="width: 25%;"><i>Eg. Leaf Pubescence</i></td> <td style="width: 25%;"><i>heavy pubescence</i></td> <td style="width: 25%;"><i>glabrous</i></td> <td style="width: 25%;"><i>photograph attached</i></td> </tr> <tr> <td><i>Eg. Leaf Color</i></td> <td><i>Dark Green (5GY 3/4)</i></td> <td><i>Light Green (2.5GY 8/10)</i></td> <td><i>Munsell Color Chart</i></td> </tr> <tr> <td><i>Eg. Plant Height</i></td> <td><i>200 cm +/- 10 cm (N=25)</i></td> <td><i>250 cm +/- 15 cm (N=25)</i></td> <td><i>statistics attached</i></td> </tr> </table>			<i>Eg. Leaf Pubescence</i>	<i>heavy pubescence</i>	<i>glabrous</i>	<i>photograph attached</i>	<i>Eg. Leaf Color</i>	<i>Dark Green (5GY 3/4)</i>	<i>Light Green (2.5GY 8/10)</i>	<i>Munsell Color Chart</i>	<i>Eg. Plant Height</i>	<i>200 cm +/- 10 cm (N=25)</i>	<i>250 cm +/- 15 cm (N=25)</i>	<i>statistics attached</i>
<i>Eg. Leaf Pubescence</i>	<i>heavy pubescence</i>	<i>glabrous</i>	<i>photograph attached</i>											
<i>Eg. Leaf Color</i>	<i>Dark Green (5GY 3/4)</i>	<i>Light Green (2.5GY 8/10)</i>	<i>Munsell Color Chart</i>											
<i>Eg. Plant Height</i>	<i>200 cm +/- 10 cm (N=25)</i>	<i>250 cm +/- 15 cm (N=25)</i>	<i>statistics attached</i>											
Application Variety	1. Qualitative traits: kernel row alignment: Straight kernel row regularity: Indistinct	2. Color traits: glume color: Dark Red (Munsell: 10RP3/8)	3. Quantitative traits: cob diameter (mm): 25.47 ± 1.05 (N=40) ear diameter (mm): 46.74 ± 1.33 (N=40) ear length (cm): 14.51 ± 0.75 (N=40) rows on the ear (no.): 17.65 ± 1.11 (N=40) kernels per row (no.): 26.13 ± 1.69 (N=40)											
Comparison Variety 1	kernel row alignment: Slightly Curved kernel row regularity: Distinct	glume color: Purple (Munsell: 10RP2/6)	cob diameter (mm): 22.46 ± 1.55 (N=40) ear diameter (mm): 41.42 ± 1.92 (N=39) ear length (cm): 17.69 ± 0.91 (N=39) rows on the ear (no.): 14.95 ± 1.53 (N=40) kernels per row (no.): 33.93 ± 3.45 (N=40)											
Comparison Variety 2														
Comparison Variety 3														

**** Use additional tables to present clear differences for additional comparison varieties. Use additional pages to present supporting evidence.**

Supporting Data for Exhibit B

Table 1: Data supporting differences between PH1VKM and PHPCW. The varieties were grown in two locations having different planting dates and growing environments. A two-sample t-test was used to compare differences between means.

cob diameter (mm)

Year	Location	VARIETY-1	n	Mean	Stdev	VARIETY-2	n	Mean	Stdev	Diff	SEdiff	t-value	prob
2015	JHBF4IB2	PH1VKM	20	26.0	1.00	PHPCW	20	22.6	1.90	3.4	0.93	7.16	0.000
2016	JHRFAP41	PH1VKM	20	24.9	1.10	PHPCW	20	22.3	1.09	2.6	0.90	7.49	0.000

ear diameter (mm)

Year	Location	VARIETY-1	n	Mean	Stdev	VARIETY-2	n	Mean	Stdev	Diff	SEdiff	t-value	prob
2015	JHBF4IB2	PH1VKM	20	45.6	1.20	PHPCW	19	40.4	2.13	5.2	0.94	9.49	0.000
2016	JHRFAP41	PH1VKM	20	47.9	1.44	PHPCW	20	42.4	1.69	5.5	0.93	11.02	0.000

ear length (cm)

Year	Location	VARIETY-1	n	Mean	Stdev	VARIETY-2	n	Mean	Stdev	Diff	SEdiff	t-value	prob
2015	JHBF4IB2	PH1VKM	20	14.8	0.72	PHPCW	19	18.4	0.45	-3.6	0.85	-18.81	0.000
2016	JHRFAP41	PH1VKM	20	14.2	0.78	PHPCW	20	17.0	1.19	-2.8	0.89	-8.70	0.000

rows on the ear (no.)

Year	Location	VARIETY-1	n	Mean	Stdev	VARIETY-2	n	Mean	Stdev	Diff	SEdiff	t-value	prob
2015	JHBF4IB2	PH1VKM	20	17.4	1.19	PHPCW	20	14.2	1.70	3.2	0.93	6.89	0.000
2016	JHRFAP41	PH1VKM	20	17.9	1.02	PHPCW	20	15.7	1.34	2.2	0.91	5.84	0.000

kernels per row (no.)

Year	Location	VARIETY-1	n	Mean	Stdev	VARIETY-2	n	Mean	Stdev	Diff	SEdiff	t-value	prob
2015	JHBF4IB2	PH1VKM	20	26.5	1.61	PHPCW	20	35.0	3.42	-8.6	0.98	-10.13	0.000
2016	JHRFAP41	PH1VKM	20	25.8	1.77	PHPCW	20	32.9	3.48	-7.1	0.99	-8.07	0.000

Exhibit B: Statement of Distinctness

Variety PH1VKM is most similar to variety PHPCW; however variety PH1VKM has indistinct kernel row regularity, where as PHPCW has distinct kernel row regularity.

Variety PH1VKM is most similar to variety PHPCW; however variety PH1VKM Has a larger ear diameter than variety PHPCW.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 3.5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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201700133

**U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE**

Exhibit C

**OBJECTIVE DESCRIPTION OF VARIETY
Corn (*Zea mays* L.)**

NAME OF APPLICANT (S) Pioneer Hi-Bred International, Inc.	TEMPORARY OR EXPERIMENTAL DESIGNATION	VARIETY NAME PH1VKM
ADDRESS (Street and No. or RD No., City, State, Zip Code, and Country) 7100 NW 62nd Avenue P.O. Box 1000 Johnston, IA 50131-1000		FOR OFFICIAL USE ONLY PVPO NUMBER

PLEASE READ ALL INSTRUCTIONS CAREFULLY AND COMPLETE AS MUCH AS POSSIBLE:

1. TYPE: (Describe intermediate types in Comments section)

 2 1 = Sweet 2 = Dent 3 = Flint 4 = Flour 5 = Pop 6 = Ornamental 7 = Pipecorn
8 = Other (specify) _____

2. REGION WHERE DEVELOPED:

 2 1 = Northwest 2 = North central 3 = Northeast 4 = Southeast
5 = South central 6 = Southwest 7 = Other _____

3. MATURITY (In Region Best Adaptability: show Heat Unit Formula in Comments section):

DAYS	HEAT UNITS	
<u> 49 </u>	<u> 1228 </u>	From emergence to 50% of plants in silk
<u> 50 </u>	<u> 1256 </u>	From emergence to 50% of plants in pollen
<u> 5 </u>	<u> 140 </u>	From 10% to 90% pollen shed
_____	_____	From 50% silk to optimum edible quality
_____	_____	From 50% silk to harvest at 25% moisture

4. PLANT:

	Standard Deviation	Sample Size
<u> 252.4 </u> cm Plant Height (to tassel tip)	<u> 8.32 </u>	<u> 20 </u>
<u> 97.7 </u> cm Ear Height (to base of top ear node)	<u> 10.78 </u>	<u> 20 </u>
<u> 19.4 </u> cm Length of Top Ear Internode	<u> 0.79 </u>	<u> 20 </u>
<u> 0 </u> Average Number of Tillers	<u> 0 </u>	<u> 0 </u>
<u> 1 </u> Average Number of Ears per Stalk	<u> 0 </u>	<u> 20 </u>
<u> 3 </u> Anthocyanin of Brace Roots: 1 = Absent 2 = Faint 3 = Moderate 4 = Dark		

5. LEAF:		Standard Deviation	Sample Size
<u>9.8</u>	cm Width of Ear Node Leaf	<u>0.51</u>	<u>20</u>
<u>81.4</u>	cm Length of Ear Node Leaf	<u>2.08</u>	<u>20</u>
<u>5.5</u>	Number of leaves above top ear	<u>0.5</u>	<u>20</u>
<u>15.8</u>	degrees Leaf Angle (measure from 2nd leaf above ear at anthesis to stalk above leaf)	<u>3.37</u>	<u>20</u>
<u>4</u>	Leaf Color (Munsell Code <u>5GY3/6</u>)		

1= light green 2= medium green 3= dark green 4= very dark green

- 6 Leaf Sheath Pubescence
(Rate on scale from 1 = none to 9 = like peach fuzz)
- ___ Marginal Waves (Rate on scale from 1 = none to 9 = many)
- ___ Longitudinal Creases (Rate on scale from 1 = none to 9 = many)

6. TASSEL:		Standard Deviation	Sample Size
<u>9.5</u>	Number of Primary Lateral Branches	<u>2.25</u>	<u>20</u>
<u>16.5</u>	Branch Angle from Central Spike	<u>6.02</u>	<u>20</u>
<u>50.9</u>	cm Tassel Length (From top leaf collar to tassel tip)	<u>3.14</u>	<u>20</u>
<u>39.8</u>	Tassel Peduncle Length (From top node below flag leaf to bottom tassel branch)	<u>3.08</u>	<u>20</u>
<u>25.1</u>	Tassel Central Spike Length (From top tassel branch to tassel tip).	<u>2.72</u>	<u>20</u>

- ___ Branch Attitude from Central Spike
(From main spike to tip of tassel branch).
1= Erect 2= Horizontal 3= Drooping

9 Pollen Shed (Rate on Scale from 0 = male sterile to 9 = heavy shed)

- 1 Anther Color (Munsell Code 2.5GY8/6)
1= Green or Yellow (ex. Munsell Code 2.5GY 8/6 or 10Y 8.5/6)
3= Pink (ex. Munsell 2.5R 7/6 or 5R 5/6)
5= Red (ex. Munsell 2.5R 4/8)
7= Dark Red (ex. Munsell 10RP 4/8)
9= Purple (ex. Munsell 5RP 5/8)

- 7 Glume Color (Munsell Code 10RP3/8)
1= Green or Yellow (ex. Munsell Code 2.5GY 8/6 or 10Y 8.5/6)
3= Pink (ex. Munsell 2.5R 7/6 or 5R 5/6)
5= Red (ex. Munsell 2.5R 4/8)
7= Dark Red (ex. Munsell 10RP 4/8)
9= Purple (ex. Munsell 5RP 5/8)

- 1 Bar Glumes (Glume Bands): 1 = Absent 2 = Present

___ Bar Glume Anthocyanin Color (on the bottom 1/3 of glume; see UPOV)

Diagram; Note: the bar glume is listed as "present" if it is present and the ring is at least 50% closed)
1= Green or Yellow (ex. Munsell Code 2.5GY 8/6 or 10Y 8.5/6)
3= Pink (ex. Munsell 2.5R 7/6 or 5R 5/6)
5= Red (ex. Munsell 2.5R 4/8)
7= Dark Red (ex. Munsell 10RP 4/8)
9= Purple (ex. Munsell 5RP 5/8)

1 Husk Extension (at harvest): 1 = Short (ears exposed) 2 = Medium (<8 cm)
3 = Long (8-10 cm beyond ear tip) 4 = Very Long (>10 cm)

2 Ear Taper: 1 = Slight 2 = Average 3 = Extreme

_____ gm Weight per 100 Kernels (unsized sample)_____

9. COB: Standard Deviation Sample Size

26 mm Cob Diameter at mid-point 0.98 20

4 Cob Color (Munsell Code 2.5YR4/8)

1= White (ex. Munsell 5Y 9/1 or 2.5Y 8.5/2)

2= Pink (ex. Munsell 2.5R 7/6 or 5R 5/6)

3= Red (ex. Munsell 2.5R 4/8 or 10RP 4/8)

4= Other (describe pink-orange)

10. DISEASE RESISTANCE (Rate from 1 (most susceptible) to 9 (most resistant); leave blank if not tested; leave Race or Strain Options blank if polygenic):

A. Leaf Blights, Wilts, and Local Infection Diseases

☐ Anthracnose Leaf Blight (*Colletotrichum graminicola*)

☐ Common Rust (*Puccinia sorghi*)

☐ Common Smut (*Ustilago maydis*)

☐ Eyespot (*Kabatiella zeae*)

☐ Goss's Wilt (*Clavibacter michiganense* spp. *nebraskense*)

☐ Gray Leaf Spot (*Cercospora zeae-maydis*)

☐ Helminthosporium Leaf Spot (*Bipolaris zeicola*) Race _____

☐ Northern Leaf Blight (*Exserohilum turcicum*) Race _____

☐ Southern Leaf Blight (*Bipolaris maydis*) Race _____

☐ Southern Rust (*Puccinia polysora*)

☐ Stewart's Wilt (*Erwinia stewartii*)

☐ Other (Specify) _____

B. Systemic Diseases

☐ Corn Lethal Necrosis (MCMV and MDMV)

☐ Head Smut (*Sphacelotheca reiliana*)

☐ Maize Chlorotic Dwarf Virus (MCDV)

☐ Maize Chlorotic Mottle Virus (MCMV)

☐ Maize Dwarf Mosaic Virus (MDMV) Strain _____

☐ Sorghum Downy Mildew of Corn (*Peronosclerospora sorghi*)

☐ Other (Specify) _____

C. Stalk Rots

☐ Anthracnose Stalk Rot (*Colletotrichum graminicola*)

☐ Diplodia Stalk Rot (*Stenocarpella maydis*)

☐ Fusarium Stalk Rot (*Fusarium moniliforme*)

☐ Gibberella Stalk Rot (*Gibberella zeae*)

☐ Other (Specify) _____

D. Ear and Kernel Rots

☐ Aspergillus Ear and Kernel Rot (*Aspergillus flavus*)

☐ Diplodia Ear Rot (*Stenocarpella maydis*)

☐ Fusarium Ear and Kernel Rot (*Fusarium moniliforme*)

☐ Gibberella Ear Rot (*Gibberella zeae*)

☐ Other (Specify) _____

11. INSECT RESISTANCE (Rate from 1 (most susceptible) to 9 (most resistant) Leave blank if not tested):

Standard Deviation Sample Size

☐ Banks Grass Mite (*Oligonychus pratensis*)

Corn Earworm (*Helicoverpa zea*)

☐ Leaf-Feeding

☐ Silk Feeding: _____ mg larval wt. _____

☐ Ear Damage

☐ Corn Leaf Aphid (*Rhopalosiphum maidis*)

☐ Corn Sap Beetle (*Carpophilus dimidiatus*)

11. INSECT RESISTANCE (continued)

Standard Deviation

Sample Size

Fall Armyworm (*Spodoptera frugiperda*)☐ Leaf-Feeding

Silk Feeding:

☐ ☐ ☐ ☐ mg larval wt.☐ Maize Weevil (*Sitophilus zeamais*)☐ Northern Rootworm (*Diabrotica barberi*)☐ Southern Rootworm (*Diabrotica undecimpunctata*)Southwestern Corn Borer (*Diatraea grandiosella*)☐ Leaf-FeedingStalk Tunneling: ☐ ☐ ☐ ☐ cm tunneled/plant☐ Two-spotted Spider Mite (*Tetranychus urticae*)☐ Western Rootworm (*Diabrotica virgifera virgifera*)☐ Other (Specify) **12. AGRONOMIC TRAITS:**☐ Stay Green (at 65 days after anthesis)

(Rate on a scale of 1 = worst to 9 = excellent)

☐ ☐ ☐ % Dropped Ears (at 65 days after anthesis)☐ ☐ ☐ % Pre-anthesis Brittle Snapping☐ ☐ ☐ % Pre-anthesis Root Lodging☐ ☐ ☐ % Post-anthesis Root Lodging (at 65 days after anthesis)☐ ☐ ☐ ☐ Kg/ha Yield of Inbred Per Se (at 12-13% grain moisture)**13. MOLECULAR MARKERS:** (0 = data unavailable; 1 = data available but not supplied; 2 = data supplied)☐ Isozymes ☐ RFLP's ☐ RAPD's ☐ SSRs ☐ SNPs ☐ Other (Specify)

Characteristics of Isozyme Polymorphism: 1= Absent 2= Present

☐ Acp1☐ Acp4☐ Adh1☐ Dia1☐ Dia2☐ Idh1☐ Idh2☐ Mdh1☐ Mdh2☐ Mdh3☐ Mmm☐ Mdh4☐ Mdh5☐ Mdh6☐ Pgd1☐ Pgd2☐ Pgi1☐ Pgm1☐ Pgm2☐ Phi1

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COMMENTS: (e.g., state how heat units were calculated, standard inbred seed source, and/or where data was collected. Continue in Exhibit D.)

U.S. DEPARTMENT OF AGRICULTURE
 AGRICULTURAL MARKETING SERVICE
 SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE
 APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

FOR OFFICIAL USE ONLY

PVPO NUMBER

EXHIBIT E - STATEMENT OF THE BASIS OF OWNERSHIP

1. Name of Owner Pioneer Hi-Bred International, Inc.	2. Temporary Designation or Experimental Name	3. Variety Name PH1VKM
4. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. If no, please explain.		☒ YES ☐ NO

5. Is the applicant a U.S. national or a U.S. based entity? **If no, give name of country.** ☒ YES ☐ NO

6. Is the applicant the original owner? ☒ YES ☐ NO **If no, please answer one of the following:**

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

☐ YES ☐ NO **If no, give name of country**

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

☐ YES ☐ NO **If no, give name of country**

7. Additional explanation on ownership (*Trace ownership from original breeder to current owner. Use the reverse for extra space if needed*):

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.