

Technical
Handbook

STATE INSPECTION
OF AGRICULTURAL MACHINERY
IN JAPAN

MARCH 1968

THE INSTITUTE OF AGRICULTURAL MACHINERY
OVERSEAS TECHNICAL COOPERATION AGENCY

Technical
Handbook

STATE INSPECTION
OF
AGRICULTURAL MACHINERY
IN
JAPAN

JICA LIBRARY



100882011

MARCH 1968

THE INSTITUTE OF AGRICULTURAL MACHINERY
OVERSEAS TECHNICAL COOPERATION AGENCY

国際協力事業団

受入 月日 84. 4. 20	000
	83.8
登録No. 02741	KA

PREFACE

We consider it highly significant for us to have this opportunity to issue this hand book, one of the OTCA Technical Hand Book Series, for the introduction of the "State Inspection Standards for Agricultural Machinery" through the close cooperation of Ministry of Agriculture and Forestry and the Institute of Agricultural Machinery in response to increasing request from overseas countries for issuing of the above-mentioned standard introduction.

We sincerely hope that this publication will be suggestive and useful for those concerned in any way prove helpful for the development of agricultural mechanization in your respective country.

Shin-ichi Shibusawa
Director General
Overseas Technical Cooperation Agency

Japanese Text

Established by the Institute of Agricultural Machinery

Date of Establishment: March, 1964.

Date of Revision: March, 1967.

PREFACE

National inspection for agricultural machinery will be an effective lever when we intend to promote our agricultural productivity and to improve each farmer's agricultural management keeping up with the social and economical conditions which are suddenly changeable.

In introducing of agricultural machinery, national inspection for them shall be carried out by the State desiring the production and spread of superior machinery of which the farmer can handle with a safe consciousness.

Main characters of the inspection are as follows:

1. Testing shall be carried out by the Institute of Agricultural Machinery as an agent for the State.
2. The kinds of machinery for testing shall be specified by the Ministry of Agriculture and Forestry every fiscal year and testing shall be made only for them.
3. The inspection is designated as Type Inspection, that is, a single success in the inspection is enough for the same type of machinery.
4. There are four items in the inspection, which are performance, mechanism, durability and operational difficulties of machinery.

In carrying out of the State inspection, the testing methods and the standards to make the decision of the test results are specified in accordance with each type of agricultural machinery

and printed as an independent volume. There exist much inconvenience in looking over the whole inspection procedure as being several kinds of related laws and regulations which state the application for testing and application forms after passing the inspection.

In order to solve these inconvenience, we have lumped together the necessary documents referring to the State inspection for agricultural machinery and published the first issue of it as the inspection materials No. 1 in March, 1964. However, in accordance with the afterwards progress in agricultural mechanization, the new "Principal testing methods and standards for new types has set up and a partial amendment has been made in the old one.

Under these situations, we herewith present this revised edition before you and sincerely wish this will be helpful to readers concerned.

Director
THE INSTITUTE OF AGRICULTURAL MACHINERY

C O N T E N T S

Preface

Acknowledgement

	<u>Page</u>
I. Standards and Procedures of the Inspection and Forms for the Inspection Record Sheet	
I - 1. Agricultural Tractors (Walking Type)	1
I - 2. Fertilizing Seeders (for Rice and Wheat)	51
I - 3. Power Sprayers	169
I - 4. Urine Spreaders	193
I - 5. Self-Feeding Type, Power Threshers	241
I - 6. Forage Cutters	269
I - 7. Blowers for Ventilating Type Dryer Use	311
I - 8. Grain Dryers (Ventilating Type)	341
I - 9. Rubber Rolls for Rice Hulling Use	373
II. Extraction of the Laws and Regulations Concerning the State Inspection of Agricultural Machinery	
II - 1. Extraction of the Agricultural Mechanization Promotion Law	383
II - 2. Extraction of the Enforcement Regulations of the Agricultural Mechanization Promoting Law ..	395
II - 3. Public Notice concerning the Attaching Method of Duplicate of the Inspection Record Sheet	411

I **Standards and Procedures of the Inspection
and Forms for the Inspection Record Sheet**



I - 1. AGRICULTURAL TRACTORS

(Walking Type)

I - 1 AGRICULTURAL TRACTORS (WALKING TYPE)

(Date of Public Notice in Official Gazette: October 22, 1962.)

1. Scope

This standard specifies testing methods and procedures of inspection of Walking Type Tractors for agricultural use, inclusive of Tractor that can be temporarily used for riding by the use of attachments (hereinafter referred to as the "Tractor").

2. Classification of Tractors

The classification of tractors shall be shown as follows:

(1) Pull Type

The pull type means the tractor pulls various kinds of implements.

(2) Power - Tilling Type

The power-tilling type means that has a tillage device (such as rotary, crank or screw blades), which is driven by the engine power.

(3) Pull and Power - Tilling Dual Purpose Type

The pull and power-tilling dual purpose type means that can be used both as the Pull type and as the Power-tilling type (hereinafter referred to as the "Dual-Purpose Type").

3. Definition of Terms

The meaning of terms to be used in this standard shall be defined as follows:

(1) Rated Horsepower

The term of the "rated horsepower" within the meaning of this standard shall be the rated horsepower which is indicated on the specification sheet (hereinafter referred to as the "specification") submitted by a manufacturer.

(2) Rated Speed

The rated speed that is the indicated number of revolutions of the engine on the specification.

(3) Applicable Work

The applicable work means that is mentioned as applicable work on the specification.

(4) Operating Weight

The operating weight means the total weight with 80% of fuel tank capacity and with regular amount of cooling water and lubricating oil when the Tractor is at work.

4. Procedures of Inspection

4.1 Item to be Inspected

The inspection shall be carried out by the following tests and investigations:

- (1) Verification of the Specification
- (2) Field Performance Test
- (3) Handling Test
- (4) Continuous Running Test on the Bench
- (5) Inspection after Disassembling

4.2 General Conditions for Inspection

(1) The tractor to be put on the test (hereinafter referred to as the "Tractor on test") shall have been run-in enough prior to the test. The preliminary running for each test shall be within 30 minutes.

(2) Fuel and Lubricating Oil

Fuel and lubricating oil shall conform to the specification and be easily available at the market. The regular amount of lubricating oil shall be filled before the test and lubricating oil shall not, as a rule, be exchanged during the entire test.

(3) Measuring Instruments

The instruments to be used for measuring shall have been checked and calibrated prior to the measurements, and shall be capable of taking the following minimum scale and accuracy.

Main purpose of use	Kind of instrument	Required minimum scale and accuracy
Measurement of tilling depth and width	metal - measure	1 mm
Measurement of tractor's total weight	platform scale	below 1 kg.
Measurement of hours	chronometer	with minimum scale not more than 0.2 sec.

Main purpose of use	Kind of instrument	Required minimum scale and accuracy
Measurement of number of revolutions	Hasler tachometer	capable of reading 1% of measured value
Measurement of temperature	centigrade thermometer	capable of taking finer scale than 2°C
Measurement of fuel consumption	measuring cylinder	below 10 cc
Measurement of load	platform scale	with scale capable of indicating up to 1% of applied load

(4) Suspension of Test

When one of each test stops more than 3 times or longer than 30 minutes, the test shall be stopped. However, the test which may be stopped irrespective of the manufacturer's responsibility shall be recovered.

4.3 Methods of Test and Investigation

4.3.1 Verification of Structure

(1) Object

The object of this investigation is to ascertain the mechanism, main dimensions, weights and equipments for the Tractor on test in comparison actual things with the said items indicated on the specification.

(2) Place

The impenetrable plain concrete surface shall be used for this investigation.

(3) Items to be Investigated

1) Dimension

Overall length

Overall width

Overall height

Weight at work

2) Coupling Part for Implements

Shape and dimension of hitching or mounting part for the implements.

3) Engine

Type, rated horsepower, rated speed, kind of fuel, capacity of fuel tank, cooling system, number of strokes, starting system and other necessary items.

4) Power Transmission System

The power transmission from the engine crankshaft to the final shaft.

5) Type of Clutch

Main clutch, steering clutch and tilling clutch.

6) Number of Speed-Positions for Transmission

Number of speed positions for the main transmission

Number of speed positions for the auxiliary transmission

Number of speed positions for the tilling transmission

7) Mechanism of Transmission Gear

Kind of lubricating oil and its recommended amount for filling.

8) Type of Running Part

Track or tread range

Adjustable range of track or tread

9) Others

Tilling width, kinds and number of blades, available auxiliary blades or not, special devices for tilling the levee and other necessary items.

4.3.2 Field Performance Test

(1) Object

The object of this test is for ascertaining the field performance of the Tractor on test.

(2) Kinds of Field Operation Tests

Plowing

Tilling

Intercultivating and ridging

(3) Plowing Test

This test shall be applied to the Tractor, for which the plowing work is mentioned as applicable field work in the specification.

1) Place

The test shall be carried out on the paddy field where mechanical structure of soil and moisture content are medium natured.

2) Testing Method

(a) Testing equipment

The Tractor on test shall be equipped with the implements mentioned in the specification. The wheels and balance-weight to be used for the tractor should be available at the market as common attachments for the tractor.

(b) Plowing method and field working passage

The return plowing shall be done in the way of one-side converting with the reversible plow and gathering way with fixed (or common) plow in principle, for more than 15 passages inclusive of the opening work. The plowing work of headland shall be omitted.

3) Items to be Measured

- (a) Travelling speed
- (b) Time required for turning
- (c) Depth of plowing
- (d) Width of plowing
- (e) Working hours
- (f) Working area
- (g) Fuel consumption
- (h) Temperature of fuel
- (i) Atmospheric temperature

4) Items to be Investigated

- (a) Turning of furrow
- (b) Throwing of furrow

- (c) Pulverization
- (d) Surface leveling of the plowed land
- (e) Other necessary items

5) Calculating Method

The required hours for the plowing work converting into 10 ares of the field can be calculated by the following formula:

$$T = \left(\frac{55}{V} + t \right) \frac{18.2}{60 b}$$

where,

- T : required hours for plowing 10 ares of the field (min)
- t : average required hours for turning (sec)
- V : travelling speed of the tractor (m/sec)
- b : average width of furrow (m)

$$L = \frac{\ell T}{T_0}$$

where,

- L : fuel consumption per 10 ares (ℓ)
- ℓ : fuel consumption for the plowing work in the total area tested (ℓ)
- T : working hours per 10 ares (min)
- T₀ : required hours for the plowing work in the total area tested (min)

(4) Rotary Tilling Test

This test shall be applied to the Tractor, for which the rotary tilling work is mentioned as applicable field work in the specification.

1) Place

The place for this test shall be selected the same place as stipulated in 4.3.2-(3)-1).

2) Testing Method

(a) Testing equipment

The Tractor on test shall be equipped with the implements mentioned as the equipments for the rotary tilling work in the specification. The wheels and balance-weight to be used for the tractor should be available at the market as common attachments for the tractor.

(b) Tilling method and number of passes

More than 10 passages shall be carried out in the plain paddy field in the form of successively connected row or every other row. The head land shall be omitted.

3) Items to be Measured

- (a) Travelling speed
- (b) Required time for turning
- (c) Depth of tilling
- (d) Actual tilling width and overall width of the tilling work
- (e) Exposure of stubs
- (f) Working hours

- (g) Working area
- (h) Fuel consumption
- (i) Temperature of fuel
- (j) Atmospheric temperature

4) Items to be Investigated

- (a) Working condition
- (b) Untilled land in the working area
- (c) Pulverization
- (d) Surface leveling of the tilled land
- (e) Other necessary items

5) Calculating Method

The required working hours and fuel consumption converted into 10 ares can be able to obtained with the formula in 4.3.2-(3)-5). However, the average width of tilling shall be calculated by the following formula:

$$b = \frac{W}{n}$$

where,

b : average width of tilling (m)

W : overall width of the total tilling work (m)

n : number of passages

(5) Intercultivating and Ridging Test

This test shall be applied to the Tractor to be used mainly for the field work of intercultivating and ridging.

1) Place

The place to be used for this test shall, as a rule,

be selected from the upland fields where wheat is grown. However, the place for ridging test shall be selected in the land where have been intercultivated.

2) Testing Method

(a) Number of passages and method of field work

More than 5 passages shall be carried out, but the method of field work shall not be prescribed particularly.

(b) Width of intercultivating

Approx. 55 Cm and the minimum width of intercultivating of the Tractor on test.

(c) Depth of intercultivating

Approx. 6 Cm

(d) Depth of ridging

12 Cm and the maximum depth to be obtained by the Tractor on test.

3) Items to be Measured and Investigated

(a) Travelling speed

(b) Time required for turning

(c) Depth of intercultivating and ridging

(d) Damage to plant

(e) Profile of the ridge

4) Calculating Method

The required working hours converted into 10 ares (in the case of width is 60 Cm) can be calculated by the formula of 4.3.2-(3)-5), but the tilling width "b" shall be 60 Cm in this calculating method.

4.3.3 Handling Test

(1) Object

The object of this test is for ascertaining ease or otherwise of handling for the Tractor on test.

(2) Field Work to be Tested

The field work to be tested shall conform to the mentioned field work as applicable in the specification.

- 1) Plowing
- 2) Harrowing
- 3) Power tilling
- 4) Intercultivating and ridging
- 5) Transportation work

(3) Place

The field work for plowing, harrowing and power tilling shall be done at the same conditioned field stipulated in the test of 4.3.2-(3)-1). The ridging work shall be carried out in the upland field and transportation work on the roadable ground.

(4) Testing Method

The investigation shall be required to do by more than two investigators operating the Tractor on test.

(5) Items to be Investigated

- 1) Easiness of handling and stability when the tractor is travelling and turning
- 2) Easiness of handling the levers
- 3) Safety
- 4) Vibration
- 5) Easiness of replacing and adjusting the parts

4.3.4 Continuous Running Test on the Bench

(1) Object

The object of this test is to ascertain the operating condition, and that there is no abnormality or trouble under the continuous running condition of the Tractor on test.

(2) Testing Equipment

The Tractor on test, bare of wheel or track, shall be fixed on the frame and driven by the engine mounted on the Tractor on test. Brake load is applied on rotary tilling shaft or wheel axle by a Prony brake.

(3) Testing Method

1) Pull Type

(a) The brake load of 80% of the rated engine horsepower shall be applied on a wheel axle.

(b) Ratio of loads on left and right axles shall correspond individually to that of allotted loads on each axle when the Tractor is at standstill and average plowing depth. The ratio for the Tractor, however, plowing work of which is not mentioned in the specification shall be 1 to 1.

(c) The engine shall be run at rated speed and the change-gear position shall be at the largest-ratio-reduction within the plowing speed range mentioned in the specification.

(d) Duration of continuous running shall be for 5 hours. However, loads on each axle shall be interchanged after 2.5 hours, except the Tractor for

which plowing work is not mentioned on the specification.

2) Power Tilling Type

- (a) The brake load of 80% of the rated engine horsepower is applied on the rotary tilling shaft.
- (b) The engine shall be run at rated speed and change-gear position shall be at the largest-ratio-reduction within the tilling speed range mentioned in the specification.
- (c) The wheel axles shall be driven under no load.
- (d) Duration of running hours shall be for 5 hours continuously.

3) Dual-Purpose Type

- (a) For this test, there shall be two kinds of tests, which are wheel loading test and tilling shaft loading test.
- (b) The method of loading on wheel axles shall be the same as stipulated in 4.3.4-(3)-(b).
- (c) The method of loading on tilling shaft shall conform to that of the Power tilling type.
- (d) Duration of continuous running shall be for 3 hours in either case. However, load on each wheel axle shall be inter-changed after 1.5 hours in case of loading on wheel axles.

4) Items to be Measured and Investigated

The following measurements and investigations shall be made during the continuous running.

- (a) Temperature of lubricating oil
- (b) Surface temperature on the bearings
- (c) Room temperature
- (d) Vibration
- (e) Noise
- (f) Oil leakage
- (g) Other development of irregularities and abnormalities

Remarks: In the case when the engine is stopped during the test, which is not more than 2 times and not longer than 30 minutes of total hours for the running-stop, it may be permitted to continue the test by extending the test by the length of time the engine was stopped.

4.3.5 Investigation after Disassembling

This investigation shall, as a rule, be made immediately after the continuous running test on the bench.

(1) Object.

The object of this investigation is to ascertain that there is no development of irregularities for the Tractor on test which has undergone the continuous running test on the bench.

(2) Items to be Investigated

This investigation shall be made for ascertaining of any abnormalities on the Tractor on test after disassembling completely the Tractor tested, and if necessary, further

investigation and measurement shall be taken against fitting condition, hardness, processing and touch degree of finishing, etc.

5. Standards to Pass the Inspection

The decision of inspection for Walking Type Tractor for agricultural use shall conform to the following standards and shall be required to satisfy the respective requirement stipulated hereunder:

5.1 Performance Inspection

(1) Average plowing depth in the test of 4.3.2-(3) shall be deeper than 14 Cm, but for the small pull type tractor, mainly to be used for intercultivating and ridging work shall be deeper than 12 Cm.

(2) Average tilling depth in the test of 4.3.2-(4) shall be deeper than 14 Cm, but for the dual-purpose type should be over 12 Cm.

(3) The required working hours per 10 ares in the test of 4.3.2-(3) and (4) should be within 120 minutes.

5.2 Durability Inspection

(1) The durability inspection shall be required to satisfy the requirements, particularly in principal parts and parts which may be difficult to replace easily, as specified follows:

(2) No abnormal abrasion

(3) No oil leakage

(4) No seizure

5.3 Handling Inspection

(1) Handling condition shall not show any defects that may bring much fatigues to the operator in the test of 4.3.3.

(2) No defects that may bring much dangerous feelings to the operator in the test of 4.3.3.

(3) No defects that shall be the cause of difficulties to carry out the field work smoothly and to replace or adjust the parts in the test of 4.3.3.

Form 1. PULL-TYPE: For Plowing and intercultivate-ridding uses, but mainly plowing use.

INSPECTION RECORD SHEET

Date:

THE INSTITUTE OF AGRICULTURAL MACHINERY

Certificate No.

Kind of agriculture machinery Agriculture Tractor (Walking Type) Pull-Type

Manufacturer's type designation

Manufacturer's name and add.

1. Main Structure

(1) Dimension (inclusive of the engine, but no fitting with attachments)

Dimension		Weight	Remarks
Overall length Cm	Overall width Cm		
	Overall height Cm	Kg	Weight: (inclusive of appx. 80% of fuel, regular amounts of lubricating oil and cooling water.

(2) Engine Mounted on the Tractor

Rated horse-power	Rated revolutions	Kind of fuel	Stroke	Cooling system	Starting system	Remarks
Ps	rpm					Designated type at the time of inspection

(3) Power Transmission System

From the crankshaft to the first shaft	From the first shaft to the wheel axle

(4) Type of Clutch

Main clutch	Steering clutch

(5) Number of Change-Gear Positions

Main transmission		Auxiliary transmission	Belt speed change	Total	
Forward	Reverse			Forward	Reverse
Posi-tions	Posi-tions	Posi-tions	Posi-tions	Posi-tions	Posi-tions

(6) Lubricant

Main part of power transmission	
Kind of oil	Regular amount

(7) Equipment and its Weight according to the Field Work

Name of Field Work Test	Type of attachment	Additional weight	Wheel	Gross Weight	Remarks
Plowing 2-(1) Field work		kg		kg	
Harrowing (after plowing)					
Intercultivation Wheat (upland)					
Ridging Wheat (upland)					
Transportation	Tractor (carrying 350)				

(8) Other attachments

2. Summary of Inspection Record

(1) Flowing Performance Test (See the attached sheet for the place of testing plot and soil property.)

The result of test made under the following conditions has marked deeper than 14 Cm in plowing depth, and the working time converted into 10 ares has been within 120 minutes (Inspection Standard)

Field Conditions			
Date of test	Degree of softness or hardness	Weeds growth	Space between stubs rows x hills
			Cm
			Depth of top soil Cm

Change-gear positions			Size of wheel and type
Main transmission	Auxiliary transmission	Belt speed-change	

Range of tread or track	Additional weight		Gross weight	Type of plow	Method of flowing	Average width of flowing	Running speed	Time required for turning
	Front part	Wheel						
Cm	kg	kg						

(2) Continuous Running Test on the Bench

The result of test made under the condition of 80% of break load application to the wheel axle has not shown any abnormalities after carrying out the continuous running test on the bench for 5 hours.

Item	Speed change position	Break load on of wheel axle	Break load ratio applied on wheel axle	Engine r. p. m.	Wheel axle revolutions	Remarks
Conditions of test				rpm	rpm	

(3) Reference records to the Handling (Showing the condition at the time of inspection.)

Position of clutch lever		Kind of speed-change lever	Shape and adjustment of handle	Fitting method of wheel	Adjusting method and adjusting range of tread range	Others
Main clutch	Steering clutch					

3. Additional Remarks

2. From 2. PULL-TYPE: For intercultivate-ridging and plowing uses, but mainly intercultivate-ridging use.

INSPECTION RECORD SHEET

Date:

THE INSTITUTE OF AGRICULTURAL MACHINERY

Certificate No.

Kind of agricultural machinery Agricultural Tractor (Walking Type) Pull-Type

Manufacturer's type designation

Manufacturer's name and add.

1. Main Structure

(1) Dimension (inclusive of the engine, but no attachment fitted on the tractor)

Dimension		Weight	Remarks
Overall length	Overall width		
Cm	Cm	Cm	kg Weight: (inclusive of appx. 80% of fuel, regular amounts of lubricating oil and cooling water.

(2) Engine Mounted on the Tractor

Rated horse-power	Rated revolutions	Kind of fuel	Stroke	Cooling system	Starting system	Remarks
Ps	rpm					Designated type at the time of inspection

(3) Power Transmission System

From the crankshaft to the first shaft	From the first shaft to the wheel axle

(4) Type of Clutch

Main clutch	Steering clutch

(5) Number of Change-Gear Positions

Main transmission		Auxiliary transmission		Belt speed change		Total	
Forward	Reverse			Forward	Reverse	Forward	Reverse
Position	Position	Position		Position	Position	Position	Position

(6) Lubricant

Main part of power transmission	
Kind of oil	Regular amount
	ℓ

(7) Equipments and Weight according to the Field Work

Name of Field Work Test	Type of attachment	Additional weight	Wheel	Gross Weight	Remarks
Plowing 2-(1) Field work		kg		kg	
Harrowing (after plowing)					
Intercultivation Wheat (upland)					
Wheat (upland)					
Transportation	Trailer kg (carrying 350)				

(8) Other attachments

2. Summary of Inspection Record

(1) Field Work Performance Test

(a) Intercultivating and Ridging. (See the attached sheet for the place of testing plot and soil property.)

The result of test made under the following conditions has been marked as capable of doing the ordinary intercultivating and ridging practices and the working time converted into 10 ares has been within 50 minutes (Inspection Standard).

Date of test	Kind of field work	Field conditions		Change-gear positions			Type of wheel and its size	Outside width of wheel
		Kind of crop	Sowing width inter-row	Main transmission	Belt speed-change			
	Inter-cultivating							Cm
	Ridging							

Additional weight	Gross weight	Kind of attachment	Method of field work	Depth of inter-cultivating and ridging	Traveling speed	Time required for running
kg	kg			Cm	m/s	S

(b) Plowing. (See the attached sheet for the place of testing plot and soil property.)
 The result of test made under the following conditions has been recorded deeper than 12 Cm in plowing depth and the working time converted into 10 ares has been within 120 minutes (Inspection Standard).

Date of test	Field conditions			Depth of top soil Cm
	Degree of softness or hardness	Weeds growth	Space between stubs rows x hills Cm	

Main transmission	Change-gear positions		Type of wheel and its size
	Auxiliary transmission	Belt Speed-change	

Range of tread or track	Additional weight		Gross weight	Type of plow	Method of plowing	Average width of tillage	Traveling speed	Time required for turning
	Front	Wheel						
Cm	kg	kg				Cm	m/s	S

(2) Continuous Running Test on the Bench

The result of test made under the conditions of 80% of break load application to the wheel axil has not shown any abnormalities after carrying out the continuous running test on the bench for 5 hours.

Item	Position of change-gear	Break load on wheel axle	Ratio of loads wheel axles	Engine r.p.m.	r.p.m. wheel axles	Remarks
Conditions of test		Ps				

(3) Reference Records to the Handling. (Showing the conditions at the time of inspection.)

Position of clutch lever		Kind of speed-change lever	Shape and adjustment of handle	Fitting method of wheel	Adjusting method and range of tread or track	Other
Main clutch	Steering clutch					

Form 3. POWER-TILLING TYPE

INSPECTION RECORD SHEET

Date:

THE INSTITUTE OF AGRICULTURAL
MACHINERY

Certificate No.

Kind of agricultural machinery Agricultural Tractor (Walking Type) Power Tilling Type

Manufacturer's type designation

3 Manufacturer's name and add.

1. Main Structure

(1) Dimension

Dimension		Weight	Remarks
Overall length	Overall width		

(2) Engine Mounted on the Tractor

Rated horsepower	Rated revolutions	Kind of fuel	Stroke	Cooling system	Starting system	Remarks
Ps	rpm					Designated type

(3) Power Transmission System

From the crankshaft to the first shaft	From the first shaft to the wheel axil	From the first shaft to tilling shaft

(4) Type of Clutch

Main clutch	Steering clutch

(5) Number of Change-Gear Positions

Main transmission		Auxiliary transmission	Belt speed-change	Total		Tillage transmission
Forward	Reverse			Forward	Reverse	
Posi-tions	Posi-tions	Posi-tions	Posi-tions	Posi-tions	Posi-tions	Posi-tions

(6) Lubricant

Main transmission part		Tillage transmission part	
Kind	Regular amount	Kind	Regular amount
	0		0

(7) Tillage part

Type	Tillage shaft driving system	Width of tillage		Rear wheel (at the time) (of inspection)	
		Max.	At the time of inspection	Type	No. of wheels
		Cm	Cm		

(8) Other attachments

2. Summary of Inspection Record

(1) Rotary Tilling Performance Test. (See the attached sheet for the place of testing plot and soil property.)

The result of test made under the following conditions has been marked deeper than 14 Cm in plowing depth and the working time converted into 10 ares has been within 120 minutes (Inspection Standard).

Date of test	Field conditions			Depth of top soil
	Degree of softness or hardness	Weeds growth	Space between stubs rows x hill	
				Cm

Change-gear position		Rotary tilling time	
Main transmission	Auxiliary transmission	Type	No. of tines

Size of wheel and type	Range of tread or track	Additional weight	Gross weight	Method of tillage	Average width of tillage	Traveling speed	Time required for turning
	Cm	kg	kg		Cm	m/s	s

(2) Continuous Running Test on the Bench

The result of test made under the conditions of 80% of break load application to the wheel axle has not shown any abnormalities after carrying out the continuous running test on the bench for 5 hours.

Item	Speed change positions	Break load of wheel axle	Engine r. p. m.	Rotary shaft r. p. m.	Remarks
Conditions of test		Ps	rpm	rpm	

(3) Reference records to the Handling. (Showing the conditions at the time of inspection.)

Position of clutch lever		Kind of speed-change lever	Shape and adjustment of handle	Fitting method of wheel	Adjusting method and adjusting range of tread	Rotary tilling method for headland	Others
Main clutch	Steering clutch						

3. Additional Remarks

Form 4. DUAL-PURPOSE TYPE

INSPECTION RECORD SHEET

Date:

THE INSTITUTE OF AGRICULTURAL
MACHINERY

Certificate No.

Kind of agricultural machinery Agricultural Tractor (Walking Type) Dual-Purpose Type

Manufacturer's type designation

Manufacturer's name and add.

1. Main Structure

(1) Dimension

Dimension		Weight	Remarks
Overall length	Overall width		
Cm	Cm	Cm	kg
			Weight: (inclusive of appx. 80% of fuel, regular amounts of lubricating oil and cooling water.

(2) Engine Mounted on the Tractor

Rated horse-power	Rated revolution	Kind of fuel	Stroke	Cooling system	Starting system	Remarks
Ps	rpm					Designated type at the time of inspection

(3) Power Transmission System

From the crank-shaft to the first shaft	From the first shaft to the wheel axil	From the first shaft to tilling shaft

(4) Type of Clutch

Main clutch	Steering clutch

(5) Number of Change-Gear Positions

Main transmission		Auxiliary transmission	Belt speed-change	Total		Tillage transmission
Forward	Reverse			Forward	Reverse	
Posi- tions	Posi- tions	Posi- tions	Posi- tions	Posi- tions	Posi- tions	Posi- tions

(6) Lubricant

Main transmission part		Tillage transmission part	
Kind	Regular amount	Kind	Regular amount
	0		0

(7) Tillage Part

Type	Tillage shaft driving system	Width of tillage		Rear wheel (at the time of inspection)	
		Max.	At the time of inspection	Type	No. of wheels
		Cm	Cm		

(8) Equipments and Weight according to the Field Work

Name of Field Work Test	Type of attachment	Additional weight	Wheel	Gross weight	Remarks
Plowing 2-(1) Field work		kg		kg	
Harrowing (after plowing)					
Power tilling 2-(1) Field work					
Transporting	Trailer kg (carrying 350)				

(9) Other attachments

2. Summary of Inspection Record

(1) Field Work Performance Test. (See the attached sheet for the place of testing plot and soil property.)

(a) Plowing

The result of test made under the following conditions has been marked deeper than 14 Cm in plowing depth and the working time converted into 10 ares has been within 120 minutes (Inspection Standard).

Field conditions				
Date of test	Degree of softness or hardness	Weeds growth	Space between stubs rows x hills	Depth of top soil
	Cm			

Changing-gear positions			Type of wheel and its size
Main transmission	Auxiliary transmission	Belt speed-change	

Range of tread or track	Additional weight		Gross weight	Type of plow	Method of plowing	Average width of tillage	Traveling speed	Time required for turning
	Front	Wheel						
Cm	kg	kg	kg			Cm	m/s	s

(b) Rotary Tilling

The result of test made under the following conditions has been marked deeper than 12 Cm in tillage depth and the working time converted into 10 ares has been within 120 minutes (Inspection Standard).

Date of test	Field conditions				Change-gear positions			Rotary tilling time	
	Degree of softness or hardness	Weed growth	Space between stubs rows x hills	Depth of top soil	Main transmission	Auxiliary transmission	Belt speed-change	Type	No. of tines
			Cm	Cm					

Size of wheel and type	Range of tread or track	Additional weight	Gross weight	Method of plowing	Average width of tillage	Traveling speed	Time required for turning
	Cm	kg	kg		Cm	m/s	s

(2) Continuous Running Test on the Bench

The result of test made under the conditions of 80% of break load application to wheel axle has not shown any abnormalities after carrying out the continuous running test on the bench for 5 hours.

Item	Applied place of break load	Hour	Change-gear positions		Load	Ratio of loads on wheel axles	Engine r. p. m.	r. p. m. of loaded shaft	Remarks
			Running part	Tillage part					
Con- ditions of test	Steel axle	3			Ps		rpm	rpm	
	Rotary tilling shaft	3			Ps	-	rpm	rpm	

(3) Reference Records to the Handling. (Showing the conditions at the time of inspection.)

Position of clutch lever	Kind of speed-change lever	Shape and adjustment of handle	Fitting method of wheel	Adjusting method and range of tread	Taking-off and fitting method of rotary tilting part	Others

3. Additional Remarks

1 - 2. FERTILIZING SEEDERS

I - 2 FERTILIZING SEEDERS

(FOR RICE, WHEAT AND BARLEY CULTIVATING USES)

(Date of Public Notice in Official Gazette: March 11, 1965.)

1. Scope

This standard for the inspection specifies testing methods and procedures of inspection for power driven fertilizing seeders to be used for the direct-sowing of rice on the dry paddy field or seeding of wheat or barley on the dry field (upland) along with the fertilizer application of granular form. Furthermore, the machines to be used for seeding only shall be included herein.

2. Classification of Fertilizing Seeders

2.1 The classification of fertilizing seeders for rice, wheat and barley cultivating uses shall be grouped according to the purpose of use as followings:

(1) Fertilizing Seeder (for combined use - rice direct sowing on the dry paddy field and wheat seeding on the dry field).

(2) Fertilizing Seeder (for rice direct sowing use only on the dry paddy field).

(3) Fertilizing Seeder (for wheat or barley seeding use).

2.2 The said grouped fertilizing seeders of (1), (2) and (3) shall be classified according to the type of machine as follows:

(1) Power Tilling Type Seeder

The power tilling type seeder means the seeding shall be done along with power tillage (inclusive of rotary tillage).

(2) Pull Type Seeder

The pull type seeder means the seeder has a ground contacting parts tracted, (such as planting opener, soil covering plate, pressure wheel and ground contacting wheel, etc.), and the seeding shall be done on the soil-prepared field.

(3) Multi-Hills Planting Type Seeder

The multi-hills planting type seeder means the sowing of seeds shall be made by dropping the seed-grains into the hole made on the surface of ground by a seeder.

3. Definition of Terms

The meaning of terms to be used in this standard shall be defined as follows:

(1) Feed-Roll Shaft Revolutions

The feed-roll shaft revolutions shall mean the number of revolutions per minute or the number of reciprocations per minute of the feeding part.

(2) Specified Revolutions

The specified revolutions shall mean the number of revolutions for the feed-roll main shaft which is indicated on the specification.

(3) Operating-Equipment Weight

The operating-equipment weight shall mean the full-equipped weight including a tractor at work. In this case,

however, the weight shall be with 80% of fuel tank capacity, regular amounts of lubricating oil and cooling water, and approx. 80% of each hopper's capacity for fertilizers and seed-grains.

4. Procedures of Inspection

4.1 Items to be Inspected

The inspection shall be made by the following tests and investigations:

- (1) Verification of the Specification
- (2) Test of Field Work Performance
- (3) Handling Test
- (4) Feed-Roll Performance Test
- (5) Continuous Running Test in the Laboratory
- (6) Investigation after Disassembling

4.2 General Conditions for Inspection

(1) Tractor to be Fitted with Equipments

The fertilizing seeder to be put on the test (hereinafter referred to as the "Fertilizing seeder on test") shall be mounted on the tractor, but this tractor shall not be permitted to exchange throughout the test.

(2) Preliminary Running of the "Fertilizing Seeder on Test"

The Fertilizing seeder on test shall be considered to have been run-in enough prior to the test. The preliminary running for each test shall be within 60 minutes.

(3) Materials to be Used in Test

1) Seed-Grains

Rice and wheat seeds to be used for this test shall conform to the following requirements and pre-treatments before seeding:

(a) Seed-grains of paddy rice

Seed-grains of paddy rice to be used for the tests shall be selected the medium sized and uniformed grains and the "Petit brachis" should be removed from the grains as many as possible. Then, the following pre-treatments shall be required prior to the test of seeding.

- i) Salt-water selection
- ii) Disinfection by mercury compounds
- iii) Coating the seed-grains with organic chloric chemicals

Remarks: Seed-soaking shall not be practiced for giving the required moisture to seed-grains in order to promote the germinations in the above pre-treatment.

(b) Fertilizer

The fertilizers to be used in the test shall be highly compound fertilizer of granular or pellet form and ordinary compound fertilizer as follows:

- i) Highly compound fertilizer: The percentage of the main element contained shall be 10-20-20, and the size of granular particle or pellet shall be from 1.19 to 4.76 mm (or

4 - 16 mesh).

- ii) Ordinary compound fertilizer: The percentage of the main element contained shall be 8-8-5, and the size of granular particle or pellet shall be from 1.19 to 4.76 mm (or 4 - 16 mesh).

(4) Measuring Instruments

Main instruments to be used for the measuring shall have been checked and calibrated prior to the measurements, and shall be capable of reading down to 1% of the maximum measuring value.

(5) Suspension of Test

When one of each test stops longer than 30 minutes, the test shall be stopped. However, the test which may be stopped irrespective of manufacturer's responsibility shall be recovered.

4.3 Methods of Test and Investigation

4.3.1 Verification of Structure

(1) Object

The object of this investigation is to ascertain the main dimensions, weights, materials, equipments and so forth in comparison actual things of the Fertilizing Seeder on test with the said items indicated on the specification.

(2) Items to be Investigated

- 1) The following items for the tractor to be fitted with equipments shall be checked:

Type of Tractor

Type of Mounted Engine on the Tractor

2) The size of body shall be checked in accordance with each seeding method:

Dimension Overall length
 Overall width
 Overall height

Weight of Operating-Equipment

3) Power Transmission System

The power transmission system shall be checked from the P. T. O. shaft to the Feed-roll main shaft.

4) Feeding Parts

(a) Seeds feeding part

The following points of the seed feeding part shall be checked:

Feeding mechanism

Adjusting mechanism for feeding volume

Number of adjusting positions

Number of hoppers

Capacity of each hopper

Number of feeding outlets

Other necessary items

(b) Fertilizer feeding part

The following items of the fertilizer feeding part shall be checked.

Feeding mechanism

Adjusting mechanism for feeding volume

Number of adjusting positions

Number of hoppers

Capacity of each hopper
Number of feeding outlets
Materials used for the outlet
Other necessary items

5) Ground Contacting Parts

(a) In case of the multi-rows drill seeding, the following points of the ground contacting parts shall be investigated.

Maximum available number of rows
Adjustable range of inter-row space
Number of tilling tines or craws and type,
(only for the Power tilling type seeder)
Covering device
Number of pressure rollers and size
With or without a planting device
Relative position between fertilizer and grain
Other necessary items

(b) In case of the deep-placement seeding, the following points of the ground contacting parts shall be investigated.

Adjustable range of seeding width
Number of tines and its type
Size of pressure roller
Other necessary items

(c) In case of the multi-hills planting, the following points of the ground contacting parts shall be investigated.

System of hole making

Number of rows

Adjustable range of inter-row space

Shape of hole making wheel

Other necessary items

4.3.2 Field Work Performance Test

(1) Object

The object of this test is to ascertain the field work performance of the Fertilizing seeder on test which is mounted on the tractor.

(2) Classified Testing Items

The classified testing items for the field work performance shall be grouped in accordance with the classification of types and purposes of use as shown in Table 1.

Classified Seeding Types and Purposes		Classified Testing Items
For combined use of rice-direct sowing on the dry paddy field and wheat seeding on the dry field	Power-Tilling Type Seeder	Multi-rows drill seeding test for rice, as stipulated in (3)-(3)-1. Deep-placement seeding test for wheat as stipulated in (3)-(3). However, this test shall not be made for the seeder which has not equipped with the device of deep placement seeding.

Classified Seeding Types and Purposes		Classified Testing Items
	Pull-Type Seeder	Multi-rows drill seeding test for rice, as stipulated in (3)-(3)-1.
	Multi-Hills Planting Type Seeder	Multi-hills planting test for rice, as stipulated in (3)-(3)-4.
For rice-direct sowing use only on the dry paddy field	Power-Tilling Type Seeder	Multi-rows drill seeding test for rice, as stipulated in (3)-(3)-1.
	Pull-Type Seeder	Multi-rows drill seeding test for rice, as stipulated in (3)-(3)-1.
	Multi-Hills Planting Type Seeder	Multi-hills planting test for rice, as stipulated in (3)-(3)-4.
For wheat seeding use on the dry field	Power-Tilling Type Seeder	Multi-rows drill seeding test for wheat, as stipulated in (3)-(3)-1. Deep-placement seeding test for wheat, as stipulated in (3)-(3). However, this test shall not be made for the seeder which has not equipped with the device of deep-placement seeding.
	Pull-Type Seeder	Multi-rows drill seeding test for wheat, as stipulated in (3)-(3)-2.

Classified Seeding Types and Purposes	Classified Testing Items
	Multi-hills planting test for wheat, as stipulated in (3)-(3)-5.

(3) Methods of Testing for the Classified Testing Items

(3)-1 Multi-Rows Seeding Test for Rice

1) Materials to be Used in Test

Seed-grains of paddy rice and highly compound fertilizer shall be used in this test, and the requirements for materials shall conform to 4.3-(3).

2) Testing Method

(a) The soil prepared paddy field shall be used for this test.

(b) Number of passages

More than 4 passages shall be carried out, but the headland shall be omitted herefrom.

(c) Rate of seeding

The rate of seeding shall, as a standard, be 150 grains per 1 m.

(d) Amount of fertilizer application

The amount of fertilizer to be applied in this test shall be within the range of quantity from 30 to 50 kg per 10 ares.

(e) Inter-row space

The inter-row space within a passage shall be from 20 to 30 Cm, and 20 - 40 Cm of the

inter-row space shall be kept between the adjoining passages. The number of rows shall be made up to the maximum available number of rows.

(f) Depth of seeding

The depth of seeding shall, as a standard, be 2 - 3 Cm.

(g) The investigation shall be made for the depth of sown seeds and unevenness of sprouting at the time of the 2nd or 3rd leaves stage.

3) Items to be Measured and Investigated

(a) Items to be Measured

- i) Travelling speed
- ii) Time required for turning
- iii) Space between rows
- iv) Depth of tillage (exclusive of the Pull-type seeder)
- v) Working width
- vi) Other necessary items

(b) Items to be Investigated

- i) Feeding condition
- ii) Soil movement, pulverization (exclusive of the Pull type seeder) and state of soil covering
- iii) States of soil-pressuring and leveling
- iv) Unevenness of sowing
- v) Missing parts of hills and no germinations
- vi) Germinations taken in outside of the fixed range of field work

vii) Relative position between the sown-seed and applied fertilizer

viii) Other necessary items

4) Calculation

In converting of working hours into 10 ares, the following formula shall be applied.

In the case when the seeder is equipped with both the fertilizing device and the seeds-feeding device;

$$T_1 = \left\{ \left(\frac{A}{V} + t_1 \right) \frac{B}{b} + \left(\frac{F}{0.8Q_1} - 1 \right) t_2 + \frac{S}{0.8Q_2} - 1 \right\} / 60$$

..... "a" formula

In the case when the seeder is equipped only with the seeds-feeding device;

$$T_2 = \left\{ \left(\frac{A}{V} + t_1 \right) \frac{B}{b} + \frac{S}{0.8Q_2} - 1 \right\} / 60$$

..... "b" formula

where, $T_1 T_2$: working time converted into 10 ares (min)

A : length of long side of the testing plot = 55 (m)

B : length of short side of the testing plot = 18.2 (m)

V : travelling speed = measured value (m/sec)

t_1 : time required for turning = measured value (sec)

F : amount of fertilizer application per 10 ares = 50 (kg)

- Q_1 : capacity of fertilizer's hopper
 = measured value (kg)
- S : seeding amount per 10 ares
 = $150 \times r$ (weight of 1,000
 grains in g) / 1,000 (kg)
- Q_2 : capacity of seed-hopper
 = measured value (kg)
- t_2 : time required for supplying
 fertilizer = 20 (sec)
- t_3 : time required for supplying
 seeds = 20 (sec)
- b : working width of one passage
 = space between rows \times
 (no. of rows - 1) + space
 between passages (m)
 but in case of the irregular
 interval between rows,
 b = measured value

(3)-2 Multi-Rows Drill Seeding Test for Wheat

1) Materials to be Used in Test

Seed-grains of wheat and ordinary compound fertilizer shall be used as stipulated in 4.2-(3).

2) Testing Method

(a) The plot to be used for testing of the Power tilling type seeder shall be chosen the paddy field where the soil preparation has not been made after harvesting crops, and the soil prepared paddy field after cropping shall be used for the Pull type seeder.

(b) Number of passages

More than 4 passages shall be carried out, but the headland shall be omitted herefrom.

(c) Rate of seeding

The rate of seeding shall, as a standard, be 250 grains per 1 m².

(d) Amount of fertilizer application

The amount of fertilizer to be applied in this test shall be within the range of quantity from 30 to 50 kg per 10 ares.

(e) Inter-row space

The inter-row space within a passage shall be 20 Cm, and 25 Cm of the inter-row space shall be kept between the adjoining passages.

(f) Depth of seeding

The depth of seeding shall, as a standard, be 3 Cm.

(g) Number of rows

The number of rows shall be made up to the maximum available number of rows.

(h) The investigation shall be made for the depth of sown seeds and unevenness of sprouting at the time of the 2nd or 3rd leaves stage.

3) Items to be Measured and Investigated

(a) Items to be measured

- i) Travelling speed
- ii) Time required for turning
- iii) Space between rows
- iv) Depth of tillage (exclusive of the Pull type seeder)
- v) Working depth

vi) Other necessary items

(b) Items to be Investigated

i) Feeding condition

ii) Soil movement, pulverization (exclusive of the Pull type seeder) and state of soil covering

iii) States of soil-pressuring and leveling

iv) Unevenness of sowing

v) Missing parts of hills and no germinations

vi) Germinations taken in outside of the fixed range of field work

vii) Relative position between the sown seed and applied fertilizer

viii) Other necessary items

4) Calculation

The conversion of working hours into 10 ares shall be calculated by "a" or "b" formular in the preceding paragraph of the calculation method of (3)-1.

where, F : amount of fertilizer application per 10 ares = 75 (kg)

S : seeding amount per 10 ares (kg)
= $250 \times r$ (weight of 1,000 grains in g)/1,000

(3)-3 Deep-Placement Seeding for Wheat

1) Materials to be Used in Test

Seed-grains of wheat and ordinary compound fertilizer shall be used in this test, and the requirements for materials shall conform to 4.2-(3).

2) Testing Method

(a) The plot to be used for this test shall be chosen the paddy field where the soil preparation has not been made after harvesting crops.

(b) Number of Passages

More than 4 passages shall be carried out, but the headland shall be omitted.

(c) Rate of Seeding

The rate of seeding shall, as a standard, be 250 grains per 1 m².

(d) Amount of Fertilizer Application

The amount of fertilizer to be applied in this test shall be within the range of quantity from 30 to 50 kg per 10 ares.

(e) Width of Seeding

The width of seeding shall be within the range from 30 to 40 Cm.

(f) Depth of Seeding

The depth of seeding shall, as a standard, be from 5 to 6 Cm.

(g) Inter-Ridge Space

The space between ridges shall, in principle, be the same with the width of seeding.

(h) The investigation shall be made for the depth of sown seeds and unevenness of sprouting at the time of the 2nd or 3rd leaves stages.

3) Items to be Measured and Investigated

(a) Items to be measured

- i) Travelling speed
- ii) Time required for turning
- iii) Width of seeding
- iv) Depth of tillage
- v) Working width
- vi) Other necessary items

(b) Items to be investigated

- i) Feeding condition
- ii) Soil movement, pulverizing and state of soil covering
- iii) States of soil-pressuring and leveling
- iv) Unevenness of seeding
- v) Missing parts of hills and no germinations
- vi) Germinations taken outside of the fixed range of field work
- vii) Other necessary items

4) Calculation

The conversion of working hours into 10 ares shall be calculated by "a" or "b" formular in (3)-1.

where, F : amount of fertilizer application per
10 ares = 75 (kg)

S : seeding amount per 10 ares =
 $250 \times \gamma$ (weight of 1,000 grains
in g)/1,000

(3)-4 Multi-Hills Planting Test for Rice

1) Materials to be Used in Test

Seed-grains of paddy rice shall be used in this test,

and the requirements for seed-grains shall conform to 4.2-(3).

2) Testing Method

(a) The soil prepared paddy field shall be used for this test.

(b) Number of passages

More than 4 passages shall be carried out, but the headland shall be omitted.

(c) Rate of seeding

The rate of seeding shall, as a standard, be 7 grains of rice per hole.

(d) Number of rows

The number of rows shall be made up to the maximum available number of rows.

(e) The investigation shall be made for the depth of sown seeds and unevenness of sprouting at the time of the 2nd or 3rd leaves stage.

3) Items to be Measured and Investigated

(a) Items to be measured

- i) Travelling speed
- ii) Time required for turning
- iii) Working width
- iv) Space between rows
- v) Space between hills
- vi) Number of seed-grains dropped into the hole or dropped on outside of the hole
- vii) Method of soil covering and time required for covering

viii) Other necessary items

(b) Items to be investigated

i) Feeding condition

ii) Field work condition

iii) Missing parts of hills

iv) Other necessary items

4) Calculation

The conversion of working hours into 10 ares shall be calculated by "b" formula in (3)-1.

(3)-5 Multi-Hills Planting for Wheat

1) Materials to be Used in Test

Seed-grains of wheat shall be used in this test, and the requirements for seed-grains shall conform to 4.2-(3).

2) Testing Method

(a) The plot to be used for this test shall be chosen the paddy field where the soil preparation has not been made after harvesting crops.

(b) Number of passages

More than 4 passages shall be carried out, but the headland shall be omitted.

(c) Rate of seeding

The rate of seeding shall, as a standard, be 7 or 8 grains of wheat per hole.

(d) Number of rows

The number of rows shall be made up to the maximum available number of rows.

(e) The investigation shall be made for the depth of sown seeds and unevenness of sprouting at the time of the 2nd or 3rd leaves stage.

3) Items to be Measured and Investigated

(a) Items to be measured

- i) Travelling speed
- ii) Time required for turning
- iii) Working width
- iv) Space between rows
- v) Space between hills
- vi) Number of seed-grains dropped into the hole or dropped on outside of the hole
- vii) Method of soil covering and time required for covering
- viii) Other necessary items

(b) Items to be Investigated

- i) Feeding condition
- ii) Field work condition
- iii) Missing parts of hills
- iv) Other necessary items

4) Calculation

The conversion of working hours into 10 ares shall be calculated by "b" formula in (3)-1.

where, S : seeding amount per 10 ares (kg)
 $= 25 \times r$ (weight of 1,000 grains
in g)/1,000

4.3.3 Handling Test

(1) Object

This test is made for the purpose of ascertaining ease or otherwise of handling the Fertilizing seeder on test which is fitted to the tractor and also its fitting easiness.

(2) Field Work to be Tested in Handling Test

The field work to be tested in the handling test shall be made for the same work as carried out in the field work performance test.

(3) Testing Method

The investigation shall be done by more than two investigators operating the Fertilizing seeder on test with seed-grains and fertilizers feeding practice in the similar field condition where the field work performance test has been made.

(4) Items to be Investigated

- 1) Easiness of handling and stability when the tractor is travelling and turning
- 2) Easiness of handling the levers
- 3) Safety
- 4) Easiness of fitting to the tractor and taking-off
- 5) Easiness of replacing and adjusting the parts
- 6) Easiness of supplying or taking out the materials and confirming the amount remained
- 7) Other necessary items

4.3.4 Feeding Part Performance Test

(1) Opening Degree Test

1) Object

This test is carried out for the purpose of ascertaining the unevenness of feeding amounts among the feeding outlets and the range of feeding for seed-grains and fertilizers.

2) Materials to be Used in Test

Seed-grains and fertilizers to be used in this test shall be the same as stipulated in 4.2-(3), and the division of material use in accordance with the type of the Fertilizing seeder on test shall conform to the way of dividing as shown in Table 2.

Table 2.

Purpose of use Materials	For combined use of rice direct-sowing on the dry paddy field and wheat seeding on the dry field	For rice direct sowing use on the dry paddy field	For wheat seeding use on the dry field
Seed-grains	Seed-grains of rice and wheat	Seed-grains of rice	Seed-grains of wheat
Fertilizers	Highly compound fertilizer and ordinary compound fertilizer	Highly compound fertilizer	Ordinary compound fertilizer

3) Testing Equipment

In the case that the power is transmitted from the tractor to the feeding part, the seeder shall be driven

by the engine mounted on the tractor after fixing it on the bench. However, for those which get the driving power through the ground contacting wheel or the hole digging wheel, the Fertilizing seeder on test shall be driven by a motor through the reduction-gear.

4) Testing Method

(a) Materials stipulated in preceding paragraph (1)-2) shall be used in this test and the test shall be carried out for the respective division.

(b) Number of feed-roll shaft revolutions

The rotating speed of a feed-roll shaft shall be run at the specified revolutions.

(c) Number of feeding outlets

(The number of feeding outlets correspond to the number of fertilizing and seeding rows.)

The number of rows shall be made up to the maximum number of rows.

(d) Filling amounts for seed-grains and fertilizers

About 80% of capacity of each hopper shall be filled with fertilizers or seeds.

(e) Opening-degree test

The test for opening degree shall be made for 5 different opening degrees on the feeding shutter (approx. $1/4$, $2/4$, $3/4$ and $4/4$) including the one at the minimum available opening degree for feeding.

5) Items to be Measured and Investigated

(a) The measurement of feeding amount at each opening degree shall be made for the individual outlet, taking the measurement for 30 seconds on each degree.

(b) Feeding condition

(c) Other necessary items

6) Calculation

The feeding amount of each outlet per 1 m of travelling distance shall be calculated by the following formula:

$$gm = \frac{gh}{30V} \quad \dots\dots\dots \text{"c" formula}$$

where,

gm : feeding amount of one outlet per 1 m (g/m)

gh : average feeding amount of each outlet for 30 sec. (g)

V : travelling speed (m/sec)

(The travelling speed shall be computed by the number of revolutions and effective diameter of wheel.)

(b) The feeding amount of fertilizer to convert into 10 ares shall be made by the following formula:

$$Gf = \frac{Gm \times Nf}{b} \quad \dots\dots\dots \text{"d" formula}$$

where,

Gf : applied amount of fertilizer per 10 ares (kg/10a)

Gm : average feeding amount of feeding outlets per 1 m (fertilizer) (g/m)

Nf : number of fertilizer feeding outlets

b : working width per passage (m)

(c) In converting of the number of sown seeds per 1 m and per hole shall be computed by the following formulae:

i) Number of sown seeds converted into 1 m (in case of the Power-tilling type and the Pull type uses).

$$G_s = \frac{G_m \times N_s \times 1,000}{b \times x} \quad \text{"e" formulae}$$

where,

G_s : number of sown seeds per 1 m² (grains/m²)

G_m : average feeding amount of feeding outlet per 1 m (seed-grains) (g/m)

N_s : number of seed-feeding outlets

b : working width per passage (m)

x : weight of 1,000 grains (g)

ii) Number of sown seeds converted into one hole (in case of the Multi-hills planting type use).

$$G_a = \frac{2gh \times 1,000}{Z \times H} \dots\dots\dots \text{"f" formula}$$

where,

G_a : number of sown seeds per hole (seeds/hole)

gh : average feeding amount per outlet for 30 seconds (g)

: weight of 1,000 grains (g)

Z : number of projecting teeth the hole digging wheel

H : number of revolutions per minute for the hole digging wheel (rpm)

iii) Unevenness of feeding amount among the feeding outlets shall be computed by the following formula:

$$G_p = \frac{(g_m - G_m)}{G_m} \times 100 \dots\dots\dots \text{"g" formula}$$

where,

G_p : unevenness of feeding amount among the feeding outlets (%)

g_m : maximum or minimum feeding amount of one outlet per 1 m (g/m)

G_m : average feeding amount of outlets per 1 m (seed-grains and fertilizers). However, as to the unevenness of feeding amount, the numerical value shall be of feeding amount at opening degree which may be within the range of feeding amount as shown in Table 3.

Table 3.

Materials		Purpose of use	
		Power-Tilling Type Seeder and Pull Type Seeder	Multi-Hills Planting Type Seeder
Seed-grains	Seed-grains of paddy rice	120 - 320 (grains/m ²)	5 - 14 (grains/hole)
	Seed-grains of wheat	200 - 350 (grains/m ²)	7 - 12 (grains/hole)
Fertilizers	Highly compound	30 - 100 (kg/10 a)	
	Ordinary compound	40 - 100 (kg/10 a)	

(2) Test for Feed-Roll Shaft Revolutions Changing

1) This test is made for the purpose of ascertaining the feeding amount per unit distance in case when the shaft speed of the Fertilizing seeder on test is changed due to the change of travelling speed.

2) Materials to be Used in Test

Seed-grains and fertilizers stipulated in 4.2-(3) shall be used in this test, and the division of material use according to the type of the Fertilizing seeder on test shall conform to the way of dividing as shown in Table 4.

Table 4.

Purpose of use Materials	For combined use of rice di- rect sowing on the dry paddy field and wheat seeding on the dry field	For rice di- rect sowing use on the dry paddy field	For wheat seeding use on the dry paddy field
Seed-grains	Seed-grains of paddy rice	Seed-grains of paddy rice	Seed-grains of wheat
Fertilizers	Highly compound fertilizer	Highly compound fertilizer	Ordinary compound fertilizer

3) Testing Equipment

The equipment to be used for this test shall conform to 4.3.2-(1).

4) Testing Method

(a) Materials stipulated in preceding paragraph (2) shall be used in this test.

(b) Number of feed-roll shaft revolutions

In this test, the feed-roll shaft shall be run at 15% higher than specified speed, and 15% lower than specified speed and including one at specified speed. However, if the engine speed per minute of the tractor exceeds the specified speed, in case of the feed-roll shaft is run at 15% higher than specified speed, the specified revolutions shall be applied.

(c) Opening degree

The opening degree for the feed-shutter shall, as a standard, be kept to be able to obtain the following amounts of feeding for the respective division as shown in Table 5.

Table 5.

Materials \ Purpose of use		Power-Tilling Type Seeder and Pull Type Seeder	Multi-Hills Planting Type Seeder
Seed-grains	Seed-grains of paddy rice	approx. 150 (grains/m ²)	approx. 7 (grains/hole)
	Seed-grains of wheat	approx. 250 (grains/m ²)	approx. 7 (grains/hole)
Fertilizers	Highly compound	approx. 50 (kg/10 a)	
	Ordinary compound	approx. 75 (kg/10 a)	

Remarks: For the Power-Tilling Type Seeder, this test shall be made for the field work of multi-drill seeding.

5) Items to be Measured and Investigated

(a) The measurement of feeding amount at each opening degree shall be made for the individual outlet, taking the measurement for 30 seconds and be repeated it for 3 times on each degree.

(b) Feeding condition

(c) Other necessary items

6) Calculation

(a) The amount of feeding per 1 m shall be calculated by "c" formula.

(b) The percentage of feeding amount variance per unit distance shall be obtained from the following formula:

$$Gnp = \frac{(Gmp - Gms)}{Gms} \times 100 \dots\dots \text{"h" formula}$$

where,

Gnp : variance percentage of feeding amount per unit distance (%)

Gmp: average feeding amount of outlets in case when the feed-roll shaft is run at ($\pm 15\%$) higher or lower than specified speed (g/m)

Gms: average feeding amount of outlets under the specified revolutions of feed-roll shaft (g/m)

(3) Feeding Test under Travelling Condition

1) Object

This test is made for the purpose of ascertain the feeding function of the Fertilizing seeder on test under the travelling condition.

2) Materials to be Used in Test

Seed-grains stipulated in 4.2-(3) shall be used, and the division of material use in accordance with the type of the Fertilizing seeder on test shall conform to the way of dividing as shown in Table 6.

Table 6.

Purpose of use	For combined use of rice direct sowing on the dry paddy field and wheat seeding on the dry field	For rice direct sowing use on the dry paddy field	For wheat seeding use on the dry field
Materials	Seed-grains of paddy rice	Seed-grains of paddy rice	Seed-grains of wheat

3) Testing Method

The test shall be made by dropping seed-grains on the ground while travelling at the specified revolutions of feed-roll shaft in the (bear land) test plot, and with regard to the opening degree of the feed-shutter shall be the same as stipulated in (2)-4)-(c). For this test, materials stipulated in (3)-2) shall be used.

4) Items to be Investigated

- (a) Feeding condition
- (b) Number of sown seeds per 1 m
- (c) Other necessary items

4.3.5 Continuous Running Test in the Laboratory

This test shall be made after testing of the feeding part.

(1) Object

The object of this test is to ascertain the operating condition, degree of damaged seed-grains, smashed fertilizer's particles and that there is no development of irregularities or troubles under the continuous running of the Fertilizing seeder on test.

(2) Materials to be Used in Test and Quantity

Seed-grains and fertilizers to be used in this test shall conform to 4.2-(3). Seeding and fertilizing amounts per row shall be 1 kg of seed-grains and 10 kg of fertilizers.

Materials to be used for this test shall be divided into the following combined use in accordance with the using purpose of the Fertilizing seeder on test as shown in Table 7.

Table 7.

Purpose of use Materials	For combined use of rice direct sowing on the dry paddy field and wheat seeding on the dry field	For rice direct sowing use on the dry paddy field	For wheat seeding use on the dry field
Seed-grains	Seed-grains of paddy rice	Seed-grains of paddy rice	Seed-grains of wheat
Fertilizers	Highly compound fertilizer	Highly compound fertilizer	Ordinary compound fertilizer

(3) Testing Equipment

1) The equipment to be used for this test shall conform to 4.3.4-(1)-3).

(4) Testing Method

1) Materials stipulated in preceding paragraph (2) shall be used in this test.

2) Number of Feed-Roll Shaft Revolutions

The rotating speed of feed-roll shaft shall be run at the specified number of revolutions.

3) Degree for Feed-Shutter Opening

In this test, the arrangement of opening degree for the feed shutter shall be the same as stipulated degree in 4.3.4-(3)-(a).

4) Running Hours

For this test, the Fertilizing seeder on test shall be run continuously for 3 hours through the arrangement of keeping the materials' circulation during the test.

5) Investigation for Damaged Seed-Grains

The specimens (feeding amount) shall be collected from each outlet, sampling the specimens for 30 seconds and be repeated it for 3 times on each outlet. And the dividing of collected specimens into the improper hulled, smashed, damaged seed-grains and so forth, shall be made by hands.

6) Investigation for Smashed Fertilizers

For the purpose of this investigation, about 10 kg of specimen shall be collected during the first feeding round of circulation and be separated by a siever of 0.84 mm in net-size which corresponds to 20 mesh.

(5) Items to be Measured and Investigated

1) Items to be Measured

(a) Percentage of damaged seed-grains

The weight of defective seed-grains among the specimens collected in (4)-5), such as improper hulled, crashed and damaged seed-grains, shall be measured and the percentage of defective grains' weight to the specimen shall be the percentage of damaged seed-grains.

(b) Percentage of smashed fertilizer

With regard to the specimens collected in (4)-5). The weight of fertilizer smashed down to less than 0.84 mm (20 mesh) shall be measured, and the percentage of smashed fertilizers' weight to the specimen shall be the percentage of smashed fertilizers.

2) Items to be Investigated

(a) Feeding condition

(b) Adherent state of materials to the parts

(c) To ascertain that there is no development of irregularities or troubles

4.3.6 Investigation after Disassembling

This investigation shall, as a rule, be carried out immediately after the continuous running test in the laboratory.

(1) Object

The main object of this test is to ascertain that there is no development of irregularities on the Fertilizing seeder on test after the continuous running test.

(2) Items to be Investigated

The Fertilizing seeder on test shall be disassembled in order to make the investigation for the necessary measures taken against the dust, water and corrosion proof.

5. Standards to Pass the Inspection

The decision of inspection for Fertilizing Seeders (rice and wheat cultivating uses) shall be made by the followings:

5.1 Performance Inspection

(1) The result of test in 4.3.2, the working hours converted into 10 ares for the Power-tilling type seeder and the Multi-hills planting type seeder shall be within

(min.) = $\frac{60}{\text{working width per passage}}$, and be within

(min.) = $\frac{36}{\text{working width per passage}}$ for the Pull type seeder.

(2) The result of test in 4.3.2, there shall not be noticeable parts of hill missing and no-germination.

(3) The result of test in 4.3.2, there shall not be noticeable germinations taken in the outside of fixed place.

(4) In case of the test has been carried out with rice seed-grains, wheat seed-grains, highly compound fertilizer and ordinary compound fertilizer, the range of feeding for the test of 4.3.2 must satisfy the following requirements as shown in Tables 8, 9 and 10.

(a) The following range of feeding amounts shall be applied to the fertilizing seeder for combined use in

rice direct-sowing on the dry paddy field and wheat seeding on the dry field.

Table 8.

Type of seeder Materials	Power-Tilling Type Seeder and Pull Type Seeder	Multi-Hills Planting Type Seeder
Seed-grains of paddy rice	Infimum (greatest lower bound): below 120 grains/m ² Supremum (least upper bound): over 320 grains/m ²	Infimum: below 5 grains/hole Supremum: over 14 grains/hole
Seed-grains of wheat	Infimum: below 200 grains/m ² Supremum: over 350 grains/m ²	Infimum: below 7 grains/hole Supremum: over 12 grains/hole
Highly compound fertilizer	Infimum: below 30 kg/10a Supremum: over 100 kg/10a	-
Ordinary compound fertilizer	Infimum: below 40 kg/10a Supremum: over 100 kg/10a	-

(b) For rice direct-sowing use on the dry paddy field.

Table 9.

Type of seeder Materials	Power-Tilling Type Seeder and Pull Type Seeder	Multi-Hills Planting Type Seeder
Seed-grains of Rice	Infimum: below 120 grains/m ² Supremum: over 320 grains/m ²	Infimum: below 5 grains/hole Supremum: over 14 grains/hole
Highly compound fertilizer	Infimum: below 30 kg/10 a Supremum: over 100 kg/10 a	-

(c) For wheat seeding use on the dry field.

Table 10.

Type of Seeder Materials	Power-Tilling Type Seeder and Pull Type Seeder	Multi-Hills Planting Type Seeder
Seed-grains of Wheat	Infimum: below 200 grains/m ² Supremum: over 350 grains/m ²	Infimum: below 7 grains/hole Supremum: over 12 grains/hole
Ordinary compound fertilizer	Infimum: below 40 kg/10 a Supremum: over 100 kg/10 a	-

Remarks: The above numerical values for the range of feeding amounts are obtained through the consideration of various factors, such as difference in the rate of sowing method from place to place, varietal difference in grain-size and variance of grain-size when it is soaked in water for the pre-treatment before sowing.

(5) In the test of 4.3.4-(1), the unevenness of feeding amounts among the feeding outlets should be within the range of unevenness as shown in Table 11.

Table 11.

Type of Seeder	Power-Tilling Type Seeder and Pull Type Seeder	Multi-Hills Planting Type Seeder
Seed-grains of Rice and wheat	$\pm 15\%$	$\pm 15\%$
Highly compound fertilizer	$\pm 10\%$	-
Ordinary compound fertilizer	$\pm 15\%$	-

(6) When the test is carried out at different speed of feed-roll shaft instead of the specified revolutions, the feeding

amount per unit distance must not exceed $\pm 15\%$ of the feeding amount under the specified revolutions.

(7) The percentage of damaged seed-grains in the test of 4.3.5, in case of rice seed-grains use must not exceed 2% and 0.5% for wheat seed-grains use.

5.2 Durability Inspection

(1) The durability inspection shall be required to satisfy the requirements that there has no development of abnormalities and failures in principal parts and parts which may be difficult to replace easily.

(2) The parts contacting with fertilizers and chemicals or the parts which may have the possibility of contacting with the said materials shall be of those having the necessary measures taken against corrosion.

5.3 Handling Inspection

(1) Handling condition shall not show any defects than may bring much fatigues to the operator in the test of 4.3.3.

(2) There shall be no defects that may bring much dangerous feeling to the operator in the test of 4.3.3.

(3) No defects that shall be the cause of difficulties to carry out the field work smoothly due to uneasy fitting to the tractor and replacing or adjusting the parts in the test of 4.3.3.

INSPECTION RECORD SHEET

Date:

THE INSTITUTE OF AGRICULTURAL
MACHINERY

Certificate No.

Kind of agricultural
machinery

Fertilizing Seeder (Combined use for rice direct-sowing on the
dry paddy field and wheat seeding on the dry field), (Multi -
Hills Planting Type)

Manufacturer's type
designation

Manufacturer's name and add.

1. Type's name of the tractor used in this test for fitting the "Fertilizing Seeder on test"
to it.

2. Main Structure

(1) Dimension of Body and Weight

(The numerical value shown herein shall mean the measured value under the condition of being fitted the "Fertilizing Seeder on test" to the tractor.)

Overall length	Overall width	Overall height	Gross weight	Remarks
mm	mm	mm	kg	Seeds, fertilizers (over 80% of each capacity), regular amount of lubricating oil and water shall be included in the gross weight.

(2) Position of Power Take-Off

Seed-feeding:

Fertilizer-feeding:

(3) Structure of Feeding-Section and Materials Used

Feeding section	Type of feeding mechanism	Type of adjusting mechanism for feeding amount	Adjusting degree and position for feeding amount	Capacity of hopper	Number of feeding outlets
Seed-feeding part					
Fertilizer feeding part					

Main parts of feeding section	Hopper	Feeding box	Feeding roll-shaft	Feeding roll	Remarks
Materials used for fertilizer feeding part					Materials used at the time of inspection

(4) Structure of Ground Contacting Part and its Adjusting Range

(The following records show the conditions of tilling tines, pressure-roller, screaper and soil covering device at the time of inspection.)

No. of rows	Adjusting range of inter-row space	Kinds of tilling tines and number of tines	Size of pressure roller (mm) and number of roller	Type of screaper	Relative position between seed and fertilizer
	Cm				

3. Summary of Inspection Records

(1) Field Work Performance Test (See Note (2) for the condition of testing plot and its location.)

The results of the field work test and working condition have been recorded as follows. And the time required for the field work converted into 10 ares has been considered as proper working hours from the standpoints of structure and number of seeding rows of the "Fertilizing Seeder on test".

With regard to the state of germination has been recognized as proper sprout looking through the records of germination survey.

	Materials used for the test	Seeding method	Date of test	No. of rows and width of seeding	Track or tread	
					Space between rows	Type Range of track
Condition of Field Work	Seed-grains of paddy rice and highly compound fertilizer Note (4)	Multi-rows seeding		rows		Cm
	Seed-grains of wheat and ordinary compound fertilizer Note (4)	Deep placement seeding		Cm		Cm

Position of change gear	No. of feeding outlets		Opening degree of feed shutter	
	Seeds	Fertilizer	Seeds	Fertilizer
Main Aux. Tilling				
Main Aux. Tilling				

Testing Records						
Seeding method	Working width of one passage, (1)	Travelling speed	Time required for turning	Hours required for 10 acres of field work	Relative position between seed and fertilizer	Remarks
Multi-rows seeding	Cm	m/s	sec	min.		
Deep placement seeding	Cm	m/s	sec	min.		

Note (1) Working Width per Passage

Working width per passage for the deep placement seeding shall be double that of seeding, and in case of the multi-rows seeding, the inter-row spacing shall be Cm and Cm for a passage.

Note (2) Testing Plot and its Location

The testing plot for the deep placement seeding has been selected the following conditioned field.

1. Height of stub: Cm
2. State of foot stamping:
3. Space between the hills (Cm) x Space between the rows (Cm)

The condition of testing plot for the multi-rows seeding has been recorded as follows:

1. State of pulverization:
2. Degree of leveling:
3. Degree of exposed stubs:
4. Degree of wet or dry condition of soil:

(2) Feeding Section Performance Test

1) Opening Degree Test

The results of this test have been recorded as followings. The figures of which show the feeding amount at different opening degrees converted into 10 ares under the field work condition stated in (1). However, in case of the multi-rows seeding with seed-grains of wheat and ordinary compound fertilizer, the width of passage shall be Cm (20 Cm of space between the rows and 25 Cm of inter-row spacing between the passages). The numerical value in the parenthesis shows the maximum and minimum feeding amount for each outlet under its opening degree of the feed-shutter. The value shown outside of the parenthesis is the mean value of

Materials	Number of shaft revolutions tested (r.p.m.)	Items (unit)	Average feeding amount at different degrees of the feed-shutter				
			Minimum degree	Approx. 1/4 opening degree	Approx. 1/2 opening degree	Approx. 3/4 opening degree	Full open
Seed-grains of paddy rice Note (4)		Degree of opening adjustment					
		Multi-rows seeding: rows (kg/10 a)					
Seed-grains of wheat Note (4)		Degree of opening adjustment					
		Multi-rows seeding: rows (kg/10 a)					
		Deep placement seeding: outlets (kg/10a)					

Highly compound fertilizer Note (4)	Degree of opening adjustment						
	Multi-rows seeding: rows (kg/10 a)						
Ordinary compound fertilizer Note (4)	Degree of opening adjustment						
	Multi-rows seeding: rows (kg/10 a)						
	Deep placement seeding: outlets (kg/10 a)						
Remarks							

2) Feed-Roll Shaft Speed-Change Test

The feeding amount has been changed in accordance with speed-change as follows:

Materials	Normal number of feed roll shaft revolutions N (r.p.m.)	Opening degree tested	Average amount of feeding (kg/10 a)		
			at normal speed (3)	15% lower than N	15% higher than N
Seed-grains of passy rice (4)					
Highly com-pounded fertilizer (4)					

Note (3) The normal number of feed-roll shaft revolutions is the indicated number of revolutions as optimum speed by a manufacturer at the time of inspection.

(3) Continuous Running Test on the Bench

The results of continuous running test on the bench for 3 hours made under the following conditions have not shown any noticeable abnormalities.

Materials	Method of material use and tested quantities	Opening degree of feed shutter and number of feed-roll shaft revolutions	Remarks
Seed-grains of paddy rice and highly compound fertilizer Note (4)	Seed-grains: 1 kg/1 seeding row Fertilizers: 10 kg/1 seeding row	At the same opening degree and r.p.m. of feed-roll shaft as stated in (2)-1.	

Note (4) The materials which having of those qualities mentioned hereunder have been used for this test.

Seed-grains of paddy rice
Weight of 1,000 grains: Harvesting year: (kg)

Seed-grains of wheat
Weight of 1,000 grains: Harvesting year: (kg)

Highly compound fertilizer Ratio of component (three elements): 10:20:20
Size of particle: 1.2 - 4.8 mm (4 - 16 mesh)
Weight per litter: (kg)

Ordinary compound fertilizer Ratio of component: 8 : 3 : 5
 Size of particle: 1.2 - 4.8 mm (4 - 16 mesh)
 Weight per litter: (kg)

(4) Reference Record to Handling (The following records show the conditions for the articles listed hereunder at the time of inspection.)

Balance weight at the time of field work test	Position and type of clutch lever	Adjusting system of opening degree	Position of hopper	Confirming method of the remained amount inside of hopper	Taking-out method of the remained amount inside of hopper

Fitting method to the tractor	Others

4. Additional Remarks

INSPECTION RECORD SHEET

Date:

THE INSTITUTE OF AGRICULTURAL
MACHINERY

Certificate No.

Kind of agricultural machinery Fertilizing Seeder (Combined use for rice direct-sowing on the dry paddy field and wheat seeding on the dry field), (Power Tilling Type).

Manufacturer's type designation

Manufacturer's name and add.

- i. Type's name of the tractor used in this test for fitting the "Fertilizing Seeder on test" to it.

2. Main Structure

(1) Dimension of Body and Weight

(The numerical value shown herein shall mean the measured value under the condition of being fitted the "Fertilizing Seeder on test" to the tractor.)

Overall length	Overall width	Overall height	Gross weight	Remarks
mm	mm	mm	kg	Seeds, fertilizer (over 80% of each capacity), regular amount of lubricating oil and water shall be included in the gross weight.

(2) Position of Power Take-Off

Seed-feeding:

Fertilizer-feeding:

(3) Structure of Feeding-Section and Materials Used

Feeding section	Type of feeding amount	Type of adjusting mechanism for feeding amount	Adjusting degree and position for feeding amount	Capacity of hopper	Number of feeding outlets
Seed-feeding part					
Fertilizer feeding part					

Main parts of feeding section	Hopper	Feeding box	Feeding roll-shaft	Feeding roll	Remarks
Materials used for fertilizer feeding part					Materials used at the time of inspection

(4) Structure of Ground Contacting Part and its Adjusting Range. (The following records show the conditions of tilling fines, pressure-roller, screaper and soil covering device at the time of inspection.)

No. of rows	Adjusting range of inter-space	Kinds of tilling tines and number of tines	Size of pressure roller (mm) and number of rollers	Type of screaper	Relative position between seed and fertilizer
	Cm				

3. Summary of Inspection Records

(1) Field Performance Test (See Note (2) for the condition of testing plot and its location.)

The results of the field work test and working condition have been recorded as follows. And the time required for the field work converted into 10 ares has been considered as proper working hours from the standpoints of structure and number of seeding rows of the "Fertilizing Seeder on test".

With regard to the state of germination has been recognized as proper sprout looking through the records of germination survey.

Condition of Field Work		Materials used	Date of test	No. of rows	Space between the rows	Track or tread		Position of change-gear	Number of feeding outlets		Opening degree of feed-shutter		
Type	Range of track					Seeds	Ferti-lizer		Seeds	Ferti-lizer			
		Seeds-grains of paddy rice and highly compound ferti-lizer, Note(4)		rows			mm	Main					
									Aux.				
									Tilling				

Testing Records		Working width of one passage, Note (1)	Travelling speed	Time required for turning	Time required for the field work converted into 10 ares	Relative position between drop-down seed and ferti-lizer	Remarks
	Cm	m/s	sec	min			

Note (1) Working Width per Passage

The working width per passage shall mean the width kept under the following spaces.

Inter-row-space: Cm

Inter-row-space between the adjoining passages: Cm

Note (2) Testing Plot and its Location

Location:

(soil prepared plot by a tractor)

Soil condition of testing plot:

1. State of pulverization
2. Degree of leveling
3. Degree of exposed stubs
4. Degree of wet or dry condition of soil

(2) Feeding Section Performance Test

1) Opening Degree Test

The results of this test have been recorded as followings. The figures of which show the feeding amount at different opening degrees converted into 10 ares under the field work condition stated in (1). However, in case of the multi-rows

seeding with seed-grains of wheat and ordinary compound fertilizer, the width of passage shall be 20 Cm (20 Cm of space between the rows and 25 Cm of inter-row spacing between the passages). The numerical value in the parenthesis shows the maximum and minimum feeding amount for each outlets under its opening degree of the feed-shutter. The value shown outside of the parenthesis is the mean value of feeding amount for each outlet.

Materials	Number of shaft revolutions tested (r.p.m.)	Items (unit)	Average feeding amount at different degrees of the feed-shutter				
			Minimum degree	Approx. 1/4 opening degree	Approx. 1/2 opening degree	Approx. 3/4 opening degree	Full Open
Seed-grains of paddy rice Note (4)		Degree of opening adjustment					
		Multi-rows seeding: rows (kg/10 a)					
Seed-grains of wheat Note (4)		Degree of opening adjustment					
		Multi-rows seeding: rows (kg/10 a)					

Highly compound fertilizer Note (4)	Degree of opening adjustment Multi-rows seeding: rows (kg/10 a)					
Ordinary compound fertilizer Note (4)	Degree of opening adjustment Multi-rows seeding: rows (kg/10 a)					
Remarks						

2) Feed-Roll Shaft Speed-Change Test

The feeding amount has been changed in accordance with speed-change as follows:

Materials	Normal number of feed roll shaft revolutions N (r.p.m.)	Opening degree tested	Average amount of feeding (kg/10 a)		Remarks
			At normal speed, (3)	15% lower than N	
Seed-grains of paddy rice, (4)			15% higher than N		
Highly compounded fertilizer (4)					

Note (3) The normal number of feed-roll shaft revolutions is the indicated number of revolutions as optimum speed by a manufacturer at the time of inspection.

(3) Continuous Running Test on the Bench

The results of continuous running test on the bench for 3 hours made under the following conditions have not shown any noticeable abnormalities.

Materials	Method of material use and tested quantities	Opening degree of feed shutter and number of feed-roll shaft revolutions	Remarks
Seed-grains of paddy rice and highly compound fertilizer Note (4)	Seed-grains: 1 kg/1 seeding (circulating use) Fertilizer: 10 kg/1 seeding row	at the same opening degree and r.p.m. of feed-roll shaft as stated in (2)-1.	

Note (4) The materials which have of those qualities mentioned hereunder have been used for this test.

Seed-grains of paddy rice

Harvesting year:

Weight of 1,000 grains: g

Grain-weight per litter: kg

Seed-grains of wheat

Harvesting year:
Weight of 1,000 grains: g
Grain-weight per litter: kg

Highly compound fertilizer

Ratio of component: 10: 20: 20
Size of particle: 1.2 - 4.8 mm
(4 - 16 mesh)
Grain-weight per litter: g

Ordinary compound fertilizer

Ratio of component: 8: 8: 5
Size of particle: 1.2 - 4.8 mm
(4 - 16 mesh)

(4) Reference Records to Handling

(The following records show the condition for the articles listed hereunder at the time of inspection.)

Balance weight at the time of field work test	Position and type of clutch lever	Adjusting system of opening degree	Position of hopper	Confirming method of the remained amount inside of hopper	Taking-out method of the remained amount inside of hopper

Fitting method to the tractor	Others

4. Additional Remarks

INSPECTION RECORD SHEET

Date:

Certificate No.

THE INSTITUTE OF AGRICULTURAL
MACHINERY

Kind of agricultural
machinery

Fertilizing Seeder (Combined use for rice direct-sowing
on the dry paddy field and wheat seeding on the dry field),
(Multi-Hills Planting Type)

Manufacturer's type
designation

Manufacturer's name and add.

1. Type's name of the tractor used in this test for fitting the "Fertilizing Seeder on test"
to it.

2. Main Structure

(i) Dimension of Body and Weight

(The numerical value shown herein shall mean the measured value under the con-
dition of being fitted the "Fertilizing Seeder on test" to the tractor.)

Overall length	Overall width	Overall height	Gross weight	Remarks
mm	mm	mm	kg	Seeds, fertilizers (over 80% of each capacity), regular amount of lubricating oil and water shall be included in the gross weight.

(2) Position of Power Take-Off

Seed-feeding:
Fertilizer-feeding:

(3) Structure of Feeding-Section (exclusive of the fertilizer feeding part)

Feeding section	Type of feeding mechanism	Type of adjusting mechanism for feeding amount	Adjusting degree and position for feeding amount	Capacity of hopper	No. of feeding outlets
Seed-feeding part					

(4) Adjusting Range and Mechanism for Ground Contacting Part

Maximum number of seeding-rows	Adjusting range for space between the rows	Method of hole digging on the ground	Position of hole digging wheel	Space between the rows
	Cm			Cm

3. Summary of Inspection Records (See Note (4) for seed-grains used in this test.)

(1) Field Work Performance Test (See Note (2) for the condition of testing plot and its location.)

The results of the field work test and working condition have been recorded as followings. And the time required for the field work converted into 10 ares has been considered as proper working hours from the standpoints of structure and number of seeding rows of the "Fertilizing Seeder on test".

With regard to the state of germination has been recognized as proper sprout looking through the records of germination survey.

Materials	Date of test	No. of seeding rows	Space between the rows	Track of tread Type Range of track	Position of change gear	No. of seed feeding outlet	Opening degree of the feed-shutter for seed feeding
Seed-grains of paddy rice Note (4)			Cm	Cm			

Working width per passage Note (1)	Travelling speed	Time required for turning	Time required for the field work converted into 10 ares	Remarks
Cm	m/s	sec	min	

Note (1) $\frac{\text{Working Width per Passage}}{\text{Space between the rows}}$ Cm
 Inter-row-space between the adjoining passages: Cm

Note (2) Testing Plot and its Location
Location: (soil prepared plot by a tractor)

Soil condition of testing plot:

1. State of pulverization
2. Degree of leveling
3. Degree of exposed stubs
4. Degree of wet or dry condition of soil

(2) Feeding Section Performance Test

1) Opening Degree Test

The following figures show the feeding amounts at different opening degrees converted into the amount per hole. And the numerical value in the parenthesis shows the maximum and minimum feeding amount for each outlet under its opening degree of the feed-shutter. The value shown outside of the parenthesis is the mean value of feeding amount for each outlet.

Materials	Number of feed-roll shaft revolutions tested (r. p. m.)	Item (unit)	Average feeding amount at different degrees of the feed-shutter			
			Minimum degree	Approx. 1/4 opening degree	Approx. 1/2 opening degree	Approx. 3/4 opening degree
Seed-grains of paddy (4) rice Note (4)		Degree of opening adjustment				
		Hill-planting: rows (grains/hole)				
Seed-grains of wheat Note (4)		Degree of opening adjustment				
		Hill-planting: rows (grains/hole)				
Remarks						

2) Feed-Roll Shaft Speed-Change Test

The feeding amount has been changed in accordance with speed-change as follows:

Materials	Normal number of feed roll shaft revolutions N (r.p.m.)	Opening degree tested	Average amount of feeding (grains/hole)		Remarks
			at normal speed, (3)	15% lower than N 15% higher than N	
Seed-grains of paddy rice Note (4)					

Note (3) The normal number of feed-roll shaft revolutions is the indicated number of revolutions as optimum speed by a manufacturer at the time of inspection.

(3) Continuous Running Test on the Bench

The results of continuous running test on the bench for 3 hours made under the following conditions have not shown any noticeable abnormalities.

Materials	Method of material use and tested quantities	Opening degree of feed shutter and number of feed-roll shaft revolutions	Remarks
Note (4)	Seed-grains: 1 kg/1 seeding row (circulating use)	At the same opening degree and r. p. m. of feed-roll shaft as stated in (2)-1.	

Note (4) The following materials have been used in this test.

Seed-grains of paddy rice

Harvesting year:
 Weight of 1,000 grains: g
 Grain-weight per litter: kg

Seed-grains of wheat

Harvesting year:
 Weight of 1,000 grains: g
 Grain-weight per litter: kg

(4) Reference Records to Handling

(The following records show the conditions for the articles listed hereunder at the time of inspection.)

Balance weight at the time of field work test	Position and type of clutch lever	Adjusting system of opening device	Position of hopper	Confirming method of the amount remained inside of hopper	Taking-out method of the amount remained inside of hopper
Fitting method to the tractor			Others		

4. Additional Remarks

INSPECTION RECORD SHEET

Date:

Certificate No.

THE INSTITUTE OF AGRICULTURAL
MACHINERY

Kind of agricultural
machinery

Fertilizing Seeder (For rice direct-sowing use on the dry
paddy field), (Power Tilling Type or Pull Type Seeder)

Manufacturer's type
designation

Manufacturer's name and add.

1. Type's name of the tractor used in this test for fitting the "Fertilizing Seeder on test"
to it.

2. Main Structure

(1) Dimension of Body and Weight

(The numerical value shown herein shall mean the measured value under the con-
dition of being fitted the "Fertilizing Seeder on test" to the tractor.)

Overall length	Overall width	Overall height	Overall weight	Remarks
mm	mm	mm	kg	Seeds, fertilizers (over 80% of each capacity), regular amount of lubricating oil and water shall be included in the gross weight.

(2) Position of Power Take-Off

Seed-feeding:

Fertilizer-feeding:

(3) Structure of Feeding-Section and Materials Used

Feeding section	Type of feeding amount	Type of adjusting mechanism for feeding amount	Adjusting degree and position for feeding amount	Capacity of hopper	Number of feeding outlets
Seed-feeding part					
Fertilizer feeding part					

Main parts of feeding section	Hopper	Feeding box	Feeding roll-shaft	Feeding roll	Remarks
Materials used for fertilizer feeding part					Materials used at the time of inspection.

(4) Structure of Ground Contacting Part and its Adjusting Range. (The following records show the conditions of tilling tines, pressure-roller, screaper and soil covering device at the time of inspection.)

No. of rows	Adjusting range of inter-space	Kinds of tilling tines and number of tines	Size of pressure roller (mm) and number of roller	Type of screaper	Relative position between seed and fertilizer
	Cm.				

3. Summary of Inspection Records

(See Note (4) for seed-grains and fertilizer used at the time of inspection.)

(1) Field Work Performance Test, (See Note (2) for the condition of testing plot and its location).

The results of the field work test and working condition have been recorded as follows: And the time-required for the field work converted into 10 ares has been

considered as proper working hours from the standpoints of structure and number of seeding rows of the "Fertilizing Seeder on test".

With regard to the state of germination has been recognized as proper sprout looking through the records of germination survey.

Item	Date of test	No. of rows	Space between rows	Tracker or tread		Position of change gear	No. of feeding outlets		Opening degree of feed shutter	
				Type	Range of track		Seeds	Fertilizer	Seeds	Fertilizer
Condition of field work at the time of inspection		rows	Cm		mm	Main Aux. Tilling				

Item	Working width of one passage, (l)	Travelling speed	Time required for turning	Hours required for 10 ares of field work	Relative position between seed and fertilizer	Remarks
Testing records for the field work	Cm	m/s	sec	min		

Note (1) Working Width per Passage

The working width per passage shall mean the width kept under the following spaces.

Inter-row-space: Cm

Inter-row-space between the adjoining passages: Cm

Note (2) Testing Plot and its Location

Location: (soil prepared plot by a tractor)

Soil condition of testing plot:

1. State of pulverization
2. Degree of leveling
3. Degree of exposed stubs
4. Degree of wet or dry condition of soil

(2) Feeding Section Performance Test

- 1) Opening Degree Test

The results of this test have been recorded as follows. The figures of which show the feeding amount at different opening degrees converted into 10 ares under the field work condition stated in (1). However, in case of the multi-rows seeding

with seed-grains of wheat and ordinary compound fertilizer, the width of passages shall be 20 Cm of space between the rows and 25 Cm of inter-row spacing between the passages). The numerical value in the parenthesis shows the maximum feeding amount for each outlets under its opening degree of the feed-shutter. The value shown outside of the parenthesis is the mean value of feeding amount for each outlet.

Materials	Number of feed-roll shaft revolutions tested (r.p.m.)	Item (unit)	Average feeding amount at different degrees of the feed-shutter				
			Minimum degree	Approx. 1/4 opening degree	Approx. 1/2 opening degree	Approx. 3/4 opening degree	Full Open
Seed-grains Note (4)		Degree of opening adjustment Multi-rows seeding: (kg/10 a)					
Fertilizer Note (4)		Degree of opening adjustment Multi-rows seeding: (kg/10 a)					
Remarks							

2) Feed-Roll Shaft Speed-Change Test

The feeding amount has been changed in accordance with speed-change as follows:

Materials	Normal number of feed roll shaft revolutions N (r. p. m.)	Opening degree tested	Average amount of feeding (kg/10 a)		Remarks
			At normal speed, (3)	15% lower than N 15% higher than N	
Seed-grains Note (4)					
Fertilizer Note (4)					

Note (3) The normal number of feed-roll shaft revolutions is the indicated number of revolutions as optimum speed by a manufacturer at the time of inspection.

(3) Continuous Running Test on the Bench

The results of continuous running test on the bench for 3 hours made under the following conditions have not shown any noticeable abnormalities.

Materials	Method of material use and tested quantities	Opening degree of feed shutter and number of feed-roll shaft revolutions	Remarks
Note (4)	Seed-grains: 1 kg/1 seed-ing row (circulating use) Fertilizer: 10 kg/1 seed-ing row	At the same opening degree and r.p.m. of feed-roll shaft as stated in (2)-1.	

Note (4) The following fertilizer and seed-grains have been used for this test.

Seed-grains Harvesting year: Weight of 1,000 grains: g
Grain-weight per litter: kg

Fertilizer (Granular form highly compound fertilizer)
Ratio of component: 10 : 20 : 20
Size of particle: 1.2 - 4.8 mm
Weight per litter: (4 - 16 mesh) kg

(4) Reference Records to Handling

(The following records show the conditions for the articles listed hereunder at the time of inspection.)

Balance weight at the time of field work test	Position and type of clutch lever	Adjusting system of opening degree	Position of hopper	Confirming method of the remained amount inside of hopper	Taking-out method of the remained amount inside of hopper

Fitting method to the tractor	Others

4. Additional Records

INSPECTION RECORD SHEET

Certificate No. _____ Date: _____
THE INSTITUTE OF AGRICULTURAL
MACHINERY

Kind of agricultural machinery Fertilizing Seeder (For rice direct-sowing use on the dry paddy field) - (Multi-Hills Planting Type)

Manufacturer's type designation _____

Manufacturer's name and add. _____

1. Type's name of the tractor used in this test for fitting the "Fertilizing Seeder on test" to it. _____

2. Main Structure _____

(1) Dimension of Body and Weight _____

(The numerical value shown herein shall mean the measured value under the condition of being fitted the "Fertilizing Seeder on test" to the tractor.)

Overall length	Overall width	Overall height	Gross weight	Remarks
mm	mm	mm	kg	Seeds, fertilizers (over 80% of each capacity), regular amount of lubricating oil and water shall be included in the gross weight.

(2) Position of Power Take-Off

Seed-feeding:

Fertilizer-feeding:

(3) Structure of Feeding-Section (exclusive of the fertilizer feeding part)

Feeding section	Type of feeding mechanism	Type of adjusting mechanism for feeding amount	Adjusting degree and position for feeding amount	Capacity of hopper	No. of feeding outlets
Seed-feeding part					

(4) Adjusting Range and Mechanism for Ground Contacting Part

Maximum number of seeding rows	Adjusting range for space between the rows	Method of hole digging on the ground	Position of hole digging wheel	Space between the rows
	Cm			Cm

3. Summary of Inspection Record (See Note (4) for seed-grains used in this test)

(1) Field Performance Test (See Note (2) for the condition of testing plot and its location)

The results of the field work test and working condition have been recorded as follows. And the time required for the field work converted into 10 ares has been considered as proper working hours from the standpoints of structure and number of seeding rows of the "Fertilizing Seeder on test".

With regard to the state of germination has been recognized as proper aprout looking through the records of germination survey.

Item	Date of test	No. of seeding rows	Space between the rows	Track or tread		Position of change of gear	No. of seed feeding outlets	Opening degree for seed feeding
				Type	Range of track			
Field work condition at the time of inspection.			Cm		mm			

Item	Working width per passage Note (1)	Travelling speed	Time required for turning	Time required for the field work converted into 10 ares	Remarks
	Cm	m/s	sec	min	

Note (1) Working Width per Passage

Space between the rows: Cm

Inter-row-space between the adjoining passages: Cm

Note (2) Testing Plot and its Location

Location:

(soil prepared plot by a tractor)

Soil condition of testing plot:

1. State of pulverization
2. Degree of leveling
3. Degree of exposed stubs
4. Degree of wet or dry condition of soil

(2) Feeding Section Performance Test

1) Opening Degree Test

The following figures show the feeding amounts at different opening degrees converted into the amount per hole. And the numerical value in the parenthesis shows the maximum and minimum feeding amount for each outlet under its opening degree of the feed-shutter. The value shown outside of the parenthesis is the mean value of feeding amount for each outlet.

Materials	Number of feed-roll shaft revolutions tested (r.p.m.)	Item (unit)	Average feeding amount at different degrees of the feed-shutter			
			Minimum degree	Approx. 1/4 opening degree	Approx. 1/2 opening degree	Approx. 3/4 opening degree
Seed-grains of paddy rice Note (4)		Degree of opening adjustment				
		Hill-planting: rows (grains/hole)				
Remarks						

2) Feed-Roll Shaft Speed-Change Test

The feeding amount has been changed in accordance with speed-change as follows:

Materials	Normal number of feed roll shaft revolutions N (r.p.m.)	Opening degree tested	Average amount of feeding (grains/hole)		Remarks
			At normal speed, (3)	15% lower than N	
Seed-grains of paddy rice, (4)			15% higher than N	15% lower than N	

Note (3) The normal number of feed-roll shaft revolutions is the indicated number of revolutions as optimum speed by a manufacturer at the time of inspection.

(3) Continuous Running Test on the Bench

The results of continuous running test on the bench for 3 hours made under the following conditions have not shown any noticeable abnormalities.

Materials	Method of material use and tested quantities	Opening degree of feed shutter and number of feed-roll shaft revolutions	Remarks
Note (4)	Seed-grains: 1 kg/l seeding row (circulating use)	At the same opening degree and r.p.m. of feed-roll shaft as stated in (2)-1.	

Note (4) The following seed-grains of paddy rice have been used for this test.

Seed-grains of paddy rice

Harvesting year:

Weight of 1,000 grains: g

Grain-weight-per-liter: kg

(4) Reference Records to Handling (The following records show the conditions for the articles listed hereunder at the time of inspection.)

Balance weight at the time of field work test	Position and type of clutch lever	Adjusting system of opening degree	Position of hopper	Confirming method of the amount remained inside of hopper	Taking-out method of the remained amount inside of hopper

Fitting method to the tractor	Others

4. Additional Remarks

INSPECTION RECORD SHEET

Date:

THE INSTITUTE OF AGRICULTURAL
MACHINERY

Certificate No.

Fertilizing Seeder (For wheat seeding use), (Power Tilling
Type)

Kind of agricultural
machinery

Manufacturer's type
designation

Manufacturer's name and add.

1. Type's name of the tractor used in this test for fitting the "Fertilizing Seeder on test"
to it.

2. Main Structure

(1) Dimension of Body and Weight

(The numerical value shown herein shall mean the measured value under the
condition of being fitted the "Fertilizing Seeder on test" to the tractor.)

Method of seeding	Overall length	Overall width	Overall height	Gross weight	Remarks
Deep placement seeding	mm	mm	mm	kg	Seeds, fertilizers (over 80% of each capacity), regular amount of lubricating oil and water shall be included in the gross weight.
Multi-rows seeding					

(2) Position of Power Take-Off

Seed-feeding:

Fertilizer-feeding:

(3) Structure of Feeding-Section and Materials Used

Feeding section	Type of feeding mechanism	Type of adjusting mechanism for feeding amount	Adjusting degree and position for feeding amount	Capacity of hopper	Number of feeding cutlets
Seed-feeding part					
Fertilizer feeding part					

Main parts of feeding section	Hopper	Feeding box	Feeding roll-shaft	Feeding roll	Remarks
Materials used for fertilizer feeding part					Materials used at the time of inspection.

(4) Structure of Ground Contacting Part and its Adjusting Range

(The following records show the conditions of tilling tines, pressure-roller, screaper and soil covering device at the time of inspection.)

Method of seeding	Max. available number of rows	Seeding width or adjustable range for inter-row-space	No. of tilling tines and type	No. of pressure rollers and size (mm)	Type of screaper
Deep placement seeding Multi-rows seeding					

3. Summary of Inspection Records

(See Note (4) for seed-grains and fertilizer used at the time of inspection.)

(1) Field Work Performance Test (See Note (2) for the condition of testing plot and its location.)

The results of the field work test and working condition have been recorded as follows. And the time required for the field work converted into 10 ares has been considered as proper working hours from the standpoints of structure and number of seeding rows of the "Fertilizing Seeder on test".

With regard to the state of germination has been recognized as proper sprout looking

through the records of germination survey.

Condition of Field Work		Method of seeding	Date of test	Seeding width	No. of rows	Space between rows	Track or tread		Position of change gear	Number of feeding outlets		Opening degree of feed-shutter		Remarks
							Type	Range of track	Main Aux. Tilling	Seeds	Fertilizer	Seeds	Fertilizer	
	Deep placement seeding			Cm		Cm		mm	Main Aux. Tilling					
	Multi-rows seeding			rows		Cm		mm	Main Aux. Tilling					
Testing Records	Method of seeding	Working width of one passage, (1)	Travelling speed	Time required for turning	Time required for the field work converted into 10 ares	Relative position between drop-down seed and fertilizer	Remarks							
	Deep placement seeding	Cm	m/s	sec	min									
	Multi-rows seeding	Cm	m/s	sec	min									

Note (1) Working Width per Passage

Working width per passage for the deep placement seeding shall be double that of seeding, and in case of the multi-rows seeding, the inter-row spacing shall be 20 Cm and 25 Cm for a passage.

Note (2) Testing Plot and its Location

The testing plot for the deep placement seeding and multi-rows seeding have been selected the following conditioned fields.

1. Location:
2. Height of stub (in D plot):
Height of stub (in M plot):
3. State of foot stamping (in D plot):
State of foot stamping (in M plot):
4. Moisture content in soil (in D plot): %
Moisture content in soil (in M plot): %
5. Space between rows (Cm) x Space between hills (Cm)
(in D plot):
(in M plot):

Remarks: "D plot" and "M plot" shall mean the testing plot for the deep placement seeding and multi-rows seeding respectively.

(2) Feeding Section Performance Test

1) Opening Degree Test

The following figures show the feeding amounts at different opening degrees converted into 10 ares under the field work condition stated in (1). And the numerical value in the parenthesis shows the maximum and minimum feeding amount for each outlet under its opening degree of the feed-shutter. The value shown outside of the parenthesis is the mean value of feeding amount for each outlet.

Number of feed-roll shaft revolutions tested (r. p. m.)		Item (unit)	Average feeding amount at different degrees of the feed-shutter				
			Minimum degree	Approx. 1/4 opening degree	Approx. 1/2 opening degree	Approx. 3/4 opening degree	Full open
Materials	Seed-grains Note (4)	Degree of opening adjustment					
		Deep placement seeding: outlets (kg/10 a)					
		Multi-rows seeding rows (kg/10 a)					
Fertilizer Note (4)		Degree of opening adjustment					
		Deep placement seeding: outlets (kg/10 a)					
		Multi-rows seeding: rows (kg/10 a)					
Remarks							

2) Feed-Roll Shaft Speed-Change Test

The feeding amount has been changed in accordance with speed-change as follows:

Materials	Normal number of feed roll shaft revolutions N (r. p. m.)	Opening degree tested	Average amount of feeding (kg/10 a)		Remarks
			At normal speeds, (3)	15% lower than N	
Seed-grains Note(4)			15% higher than N		
Fertilizer Note(4)					

Note (3) The normal number of feed-roll shaft revolutions is the indicated number of revolutions as optimum speed by a manufacturer at the time of inspection.

(3) Continuous Running Test on the Bench

The results of continuous running test on the bench for 3 hours made under the following conditions have not shown any noticeable abnormalities.

Materials	Method of material use and tested quantities	Opening degree of feed shutter and number of feed-roll shaft revolutions	Remarks
Note (4)	Seed-grains: 1 kg/1 seeding row (circulating use) Fertilizer L 10 kg/1 seeding row	At the same opening degree and r. p. m. of feed-roll shaft as stated in (2)-1.	

Note (4) The following fertilizer and seed-grains have been used for this test.

<u>Seed-grains</u>	Harvesting year:	Weight of 1,000 grains: g
		Grain-weight per litter: kg
<u>Fertilizer</u>	(Ordinary compound fertilizer)	Ratio of component: 8 : 8 : 5
	Size of particle:	4 - 16 mesh. (12 - 48 mm)
	Weight per litter:	kg

(4) Reference Records to Handling

(The following records show the conditions for the articles listed hereunder at the time of inspection.)

Balance weight at the time of field work test	Position and type of clutch lever	Adjusting system of opening degree	Position of hopper	Confirming method of the remained amount inside of hopper	Taking-out method of the remained amount inside of hopper
Fitting method to the tractor			Others		

4. Additional Remarks

INSPECTION RECORD SHEET

Date:

THE INSTITUTE OF AGRICULTURAL
MACHINERY

Certificate No.

Kind of agricultural
machinery

Fertilizing Seeder (For wheat seeding use)
(Pull Type Seeder)

Manufacturer's type
designation

Manufacturer's name and add.

1. Type's name of the tractor used in this test for fitting the "Fertilizing Seeder on test"
to it.

2. Main Structure

(1) Dimension of Body and Weight

(The numerical value shown herein shall mean the measured value under the con-
dition of being fitted the "Fertilizing Seeder on test" to the tractor.)

Parts of feeding section	Hopper	Feeding box	Feeding roll-shaft	Feeding roll	Remarks
Materials used for fertilizer feeding part					Materials used at the time of inspection

(4) Structure of Ground Contacting Part and its Adjusting Range

(The following records show the conditions of tilling tines, pressure-roller, screaper and soil covering device at the time of inspection.)

No. of rows	Adjusting range of inter-row space	Kinds of tilling tines and number of tines	Size of pressure roller (mm) and number of rollers	Type of screaper	Relative position between seed and fertilizer
	Cm				

3. Summary of Inspection Records

(See Note (4) for seed-grains and fertilizer used at the time of inspection.)

(1) Field Work Performance Test (See Note (2) for the condition of testing plot and its location.)

The results of the field work test and working condition have been recorded as follows. And the time required for the field work converted into 10 ares has been considered as proper working hours from the standpoints of structure and number of seeding rows of the "Fertilizing Seeder on test"

With regard to the state of germination has been recognized as proper sprout looking through the records of germination survey.

Item	Date of test	No. of seeding rows	Space between rows	Track or tread		Position of change of gear	No. of feeding outlets		Opening degree of feed shutter	
				Type	Range of track		Seeds	Ferti-lizer	Seeds	Ferti-lizer
Condition of field work at the time of inspection			Cm							

Item	Working width of one passage, (l)	Traveling speed	Time required for turning	Time required for 10 areas of the field work	Relative position between seed and fertilizer	Remarks
Testing records for the field work	Cm	m/s	sec	min		

Note (1) Working Width per Passage

The working width per passage shall mean the width kept under the following spaces.

Inter-row-space: 20 Cm

Inter-row-space between the adjoining passages: 25 Cm

Note (2) Testing Plot and its Location

Location: (soil prepared plot by a tractor)

Soil condition of testing plot:

1. State of pulverization
2. Degree of leveling
3. Degree of exposed stubs
4. Degree of wet or dry condition of soil

(2) Feeding Section Performance Test

1) Opening Degree Test

The following figures show the feeding amount at different opening degrees converted into the amount per 10 ares. And the numerical value in the parenthesis shows the maximum and minimum feeding amount for each outlet under its opening degree of the feed-shutter. The value shown outside of the parenthesis is the mean value of feeding amount for each outlet.

Materials	Number of feed-roll shaft revolutions tested (r. p. m.)	Item (unit)	Average feeding amount at different degrees of the feed-shutter				
			Minimum degree	Approx. 1/4 opening degree	Approx. 1/2 opening degree	Approx. 3/4 opening degree	Full open
Seed-grains Note (4)		Degree of opening adjustment					
		Multi-rows speeding: rows (kg/10 a)					
Fertilizer Note (4)		Degree of opening adjustment					
		Multi-rows speeding: rows (kg/10 a)					
Remarks							

2) Feed-Roll Shaft Speed-Change Test

The feeding amount has been changed in accordance with speed-change as follows:

Materials	Normal number of feed roll shaft revolutions N (r. p. m.)	Opening degree tested	Average amount of feeding (kg/10 a)			Remarks
			At normal speed, (3)	15% lower than N	15% higher than N	
Seed-grains Note (4)						
Fertilizer Note (4)						

Note (3) The normal number of feed-roll shaft revolutions is the indicated number of revolutions as optimum speed by a manufacturer at the time of inspection.

(3) Continuous Running Test on the Bench

The results of continuous running test on the bench for 3 hours made under the following conditions have not shown any noticeable abnormalities.

Materials	Method of material use and tested quantities	Opening degree of feed shutter and number of feed-roll shaft revolutions	Remarks
Note (4)	Seed-grains: 1 kg/1 seeding row (circulating use) Fertilizer: 10 kg/1 seeding row	At the same opening degree and r.p.m. of feed-roll shaft as stated in (2)-1.	

Note (4) The following qualities of seed-grains and fertilizers have been used for this test.

Seed-grains

Harvesting year:
Weight of 1,000 grains:
Grain-weight per litter:

g
kg

Fertilizer

(Ordinary compound fertilizer)

Ratio of component: 8:8:5
Size of particle: 4 - 16-mesh
(1.2 - 4.8 mm)
Weight per litter: kg

(4) Reference Records to Handling

(The following records show the conditions for the articles listed hereunder at the time of inspection.)

Balance weight at the time of field work test	Position and type of clutch lever	Adjusting system of opening degree	Position of hopper	Confirming method of the remained amount inside of hopper	Taking-out method of the remained amount inside of hopper

Fitting method to the tractor	Others

4. Additional Remarks

INSPECTION RECORD SHEET

Date:

Certificate No. THE INSTITUTE OF AGRICULTURAL
MACHINERY

Kind of agricultural machinery Fertilizing Seeder (For wheat seeding use),
(Multi-Hills Planting Type)

Manufacturer's type designation

Manufacturer's name and add.

1. Type's name of the tractor used in this test for fitting the "Fertilizing Seeder on test" to it.

2. Main Structure

(1) Dimension of Body and Weight

(The numerical value shown herein shall mean the measured value under the condition of being fitted the "Fertilizing Seeder on test" to the tractor.)

Overall length	Overall width	Overall height	Gross weight	Remarks
mm	mm	mm	kg	Seeds, fertilizers (over 80% of each capacity), regular amount of lubricating oil and water shall be included in the gross weight.

(2) Position of Power Take-Off

Seed-feeding:
Fertilizer-feeding:

(3) Structure of Feeding-Section (exclusive of the fertilizer feeding part)

Feeding section	Type of feeding mechanism	Type of adjusting mechanism for feeding amount	Adjusting degree and position for feeding amount	Capacity of hopper	No. of feeding outlets
Seed-feeding part					

(4) Adjusting Range and Mechanic, for Ground Contacting Part

Maximum number of seeding rows	Adjusting range for space between the rows	Method of hole digging on the ground	Position of hole digging wheel	Space between the rows
	Cm			

3. Summary of Inspection Records. (See Note (4) for seed-grains used in this test.)

(1) Field Work Performance Test. (See Note (2) for the condition of testing plot and its location.)

The results of the field work test and working condition have been recorded as follows. And the time required for the field work converted into 10 ares has been considered as proper working hours from the standpoints of structure and number of seeding rows of the "Fertilizing Seeder on test".

Item	Date of test	No. of seedings on rows	Space between rows	Track or tread Type Range of track	Position of change gear	No. of feeding outlets Seeds Fertilizer	Opening degree of feed shutter Seeds Fertilizer
Condition of field work at the time of inspection			Cm	mm			

Item	Working width of one passage Note (1)	Travelling speed m/s	Time required for turning sec	Time required for 10 areas of the field work min	Remarks
Testing records for the field work	Cm				

Note (1) Working Width per Passage

The working width per passage shall mean the width kept under the following spaces.

Inter-row-space: Cm
 Inter-row-space between the adjoining passages: Cm

Note (2) Testing Plot and its Location

Location: (used the field after harvesting rice)

Soil condition of testing plot:

1. Height of stub: Cm
2. State of foot stamping:
3. Moisture content in soil: %
4. Space between rows (Cm) x Space between hills (Cm)

(2) Feeding Section, Performance Test

1) Opening Degree Test

The following figures show the feeding amounts at different opening degrees converted into the amount per hole. And the numerical value in the parenthesis shows the maximum and minimum feeding amount for each outlet under its opening degree of the feed-shutter. The value shown outside of the parenthesis is the mean value of feeding amount for each outlet.

Materials	Number of feed-roll shaft revolutions tested (r. p. m.)	Item (unit)	Average feeding amount at different degrees of the feed-shutter				
			Minimum degree	Approx. 1/4 opening degree	Approx. 1/2 opening degree	Approx. 3/4 opening degree	Full open
Seed-grains (Note (A))		Degree of opening adjustment					
		Hill-planting: rows (grains/hole)					
Remarks							

2) Feed-Roll Shaft Speed-Change Test

The feeding amount has been changed in accordance with speed-change as follows:

Materials	Normal number of feed roll shaft revolution N (r.p.m.)	Opening degree tested	Average amount of feeding (grains/hole)		Remarks
			At normal speed, (3)	15% lower than N 15% higher than N	
Speed-grains Note (4)					

Note (3) The normal number of feed-roll shaft revolutions is the indicated number of revolutions as optimum speed by a manufacturer at the time of inspection.

(3) Continuous Running Test on the Bench

The results of continuous running test on the bench for 3 hours made under the following conditions have not shown any noticeable abnormalities.

Materials	Method of material use and tested quantities	Opening degree of feed shutter and number of feed-roll shaft revolutions	Remarks
Note (4)	Seed-grains: 1 kg/1 seeding row (circulating use)	At the same opening degree and r.p.m. of feed-roll shaft as stated in (2)-1.	

Note (4) The following seed-grains have been used for this test.

Seed-grains:

Harvesting year:

Weight of 1,000 grains: g

Grain-weight per litter: kg

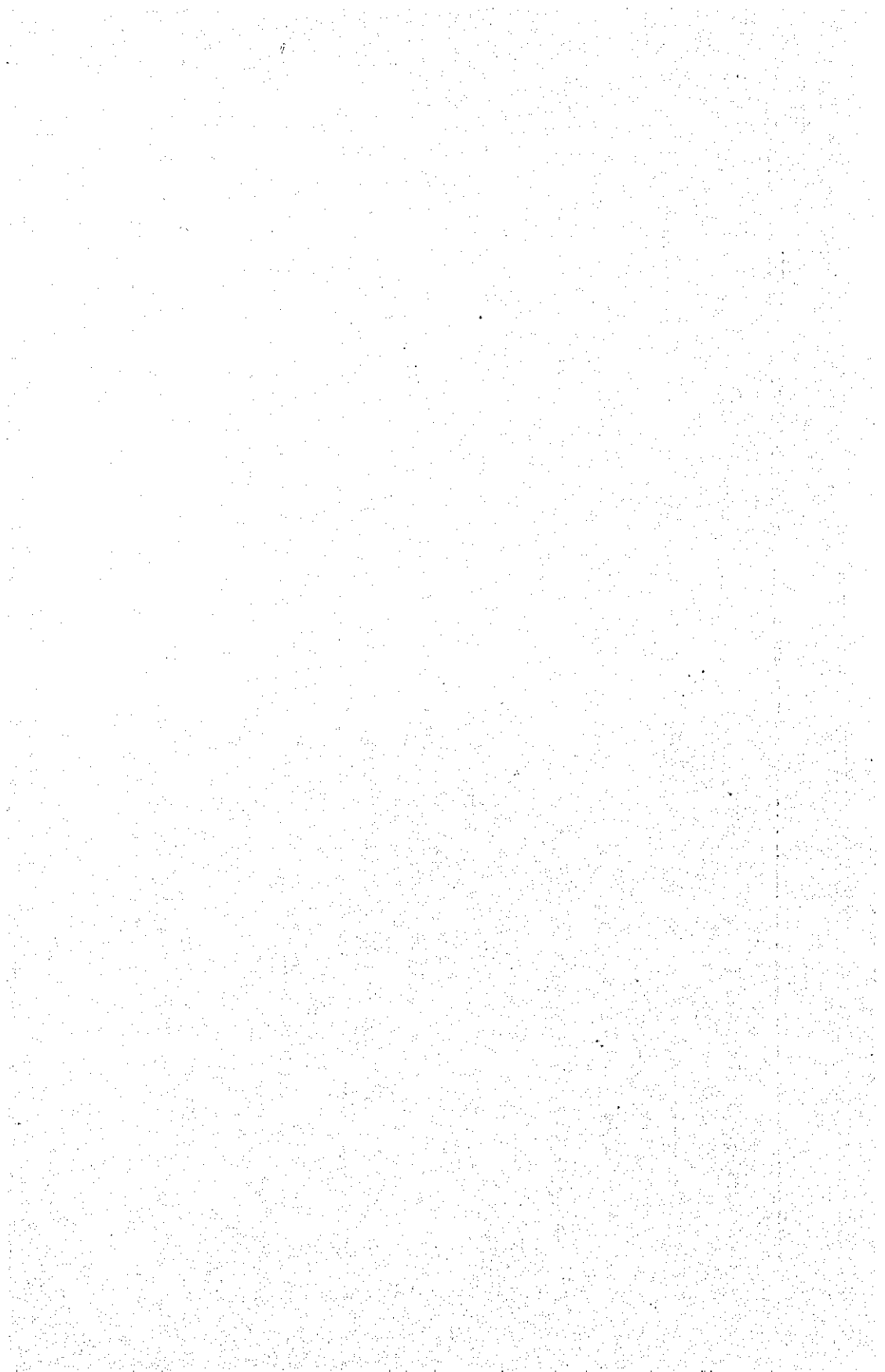
(4) Reference Records to Handling

(The following records show the conditions for the articles listed hereunder at the time of inspection.)

Balance weight at the time of field work test	Position and type of clutch lever	Adjusting system of opening degree	Position of hopper	Confirming method of the remained amount inside of hopper	Taking-out method of the remained amount inside of hopper

Fitting method to the tractor	Others

4. Additional Remarks



I - 3. POWER SPRAYERS

I - 3 POWER SPRAYERS

(Date of Public Notice in Official Gazette: October 22, 1962.)

1. Scope

The standard specified testing methods and procedures of inspection of the reciprocating pump type Power Sprayers for agricultural use, but the variable stroke type is excluded herefrom.

2. Definition of Terms

The meaning of terms to be used in this standard shall be defined as follows:

2.1 Full-Equipment

The full-equipment means the state of the machine body equipped with the engine, base-frame, supply-pipe and overflow pipe, (regular amount of cooling water shall be included when the water cooled engine is mounted on the body), and the regular amount of lubricating oil and 80% of fuel tank capacity shall be filled under the above condition of the full-equipment.

2.2 Normal Working Pressure, Specified Revolutions and Maximum Working Pressure

These mean the indicated normal working pressure, number of revolutions of sprayer shaft and the maximum working pressure on the specification.

2.3 Main Shaft

Main shaft means the first shaft to which the power is transmitted from a Prime Mover.

3. Procedures of Inspection

The inspection shall be made by the following items:

3.1 Items to be Inspected

- (1) Verification of the Specification
- (2) Test of Efficiency
- (3) Test of Pressure Adjustment
- (4) Continuous Running Test
- (5) Treatment Test
- (6) Spraying Performance Test
- (7) Investigation after Disassembling
- (8) Pressure-Resistance Test of Air Chamber

3.2 General Conditions for Inspection

(1) Preliminary Running

The power sprayer to be put on the test (hereinafter referred to as the "Power Sprayer on test"), shall be considered to have been run-in enough prior to the test. The preliminary running for efficiency and continuous running tests shall be within 60 minutes respectively.

(2) Liquid to be Used

1) Fresh Water

Here temperature covers temperature range from 0° to 40°C and the weight per unit volume of liquid shall be taken for fresh water as 1 kg/ .

2) Lime Solution

The temperature ranges from 0° to 40°C and rate of dilution shall be as follows:

Lime 20g: Fresh water 1,000 cc

3) Fuel and Lubricating Oil

Fuel and lubricating oil to be used for the test shall conform to the specification and be easily available at the market. The regular amount of lubricating oil shall be filled before the test and shall not, as a rule, be exchanged throughout the test of spray performance.

(4) Measuring Instruments

Main instruments to be used for measuring shall have been checked and calibrated prior to the measurements, and shall be capable of taking the following minimum scale and accuracy:

Main purpose of use	Kind of instrument	Required minimum scale and accuracy
Measurement of number of main shaft revolutions	Hasler tachmeter	The instrument shall be capable of reading down to $\pm 1\%$ of the measured value.
Measurement of hours	stop watch	Minimum scale: less than 0.2 sec.
Measurement of torque	electric dynamometer	capable of reading down to 1% of the maximum measured value
Measurement of pressure	resistant-wire, pressure measuring apparatus	allowable error should be within $\pm 1\%$ of the rating value.

Main purpose of use	Kind of instrument	Required minimum scale and accuracy
Measurement of pressure	Bourdon tube type, pressure gauge	Minimum value: less than 1 kg/Cm ²
Measurement of discharge volume	electromagnetic type, flow meter	within the range of $\pm 1\%$ of the rating value
Measurement of temperature	centigrade thermometer	capable of taking finer scale than 1° C
Measurement of weight	platform scale	capable of reading down to 2% of load applied.
Measurement of overflow volume	floating type, flow meter	Minimum scale: less than 0.2 / Cm ²
Measurement of pressure resistance	high pressure, hand pump	Minimum scale: less than 5 kg/Cm ²

(5) Adjustment of "Power Sprayer on Test" During the Test

No adjustment, such as refilling oil, more tightening cylinder packing and so forth, shall be permitted while carrying out the test in principle.

(6) Suspension of Test

When one of each test stops more than 3 times or longer than 30 minutes, the test shall be stopped. However, the test which may be stopped irrespective of manufacturer's responsibility shall be recovered.

3.3 Methods of Test and Investigation

3.3.1 Verification of Structure

(1) Object

The object of this investigation is to ascertain the main dimensions, weights, materials, equipments and so forth in comparison actual things of the Power Sprayer on test with the said items indicated on the specification.

(2) Items to be Investigated

1) Dimension of the Body under the Full-Equipment

(a) Overall height

Overall length

Overall width

(b) Gross weight

2) Body

(a) To investigate either vertical type or horizontal type

(b) Single acting or double acting

(c) Kinds of pressured parts

Number of pressured parts
and dimensions of the pressured parts

(d) Number of discharge ports

(e) Capacity of air chamber

(f) Power transmission system

(g) Outside diameter of sprayer pulley

(h) Number of belts and sizes

(i) Kind of lubricating oil and quantity of regular filling

(j) Kind of packing

- (k) Other necessary items
- 3) Prime Mover
 - (a) Type
 - (b) Cooling system
 - (c) Number of strokes
 - (d) Rated horsepower and rated number of revolutions
 - (e) Starting system
 - (f) Capacity of fuel tank and kinds of fuel
 - (g) Other necessary items
- 4) Attachments
 - (a) Size of base-frame
 - (b) Inside diameter of suction pipe and overflow pipe
 - (c) Mesh of (wire net) strainer
 - (d) Type of main nozzle
 - (e) Other necessary items
- 5) Materials
 - (a) Base-frame
 - (b) Air chamber
 - (c) Pressured part
 - (d) Valve and valve seat
 - (e) Cylinder packing
 - (f) Frame of body
 - (g) Other necessary items

3.3.2 Test of Efficiency

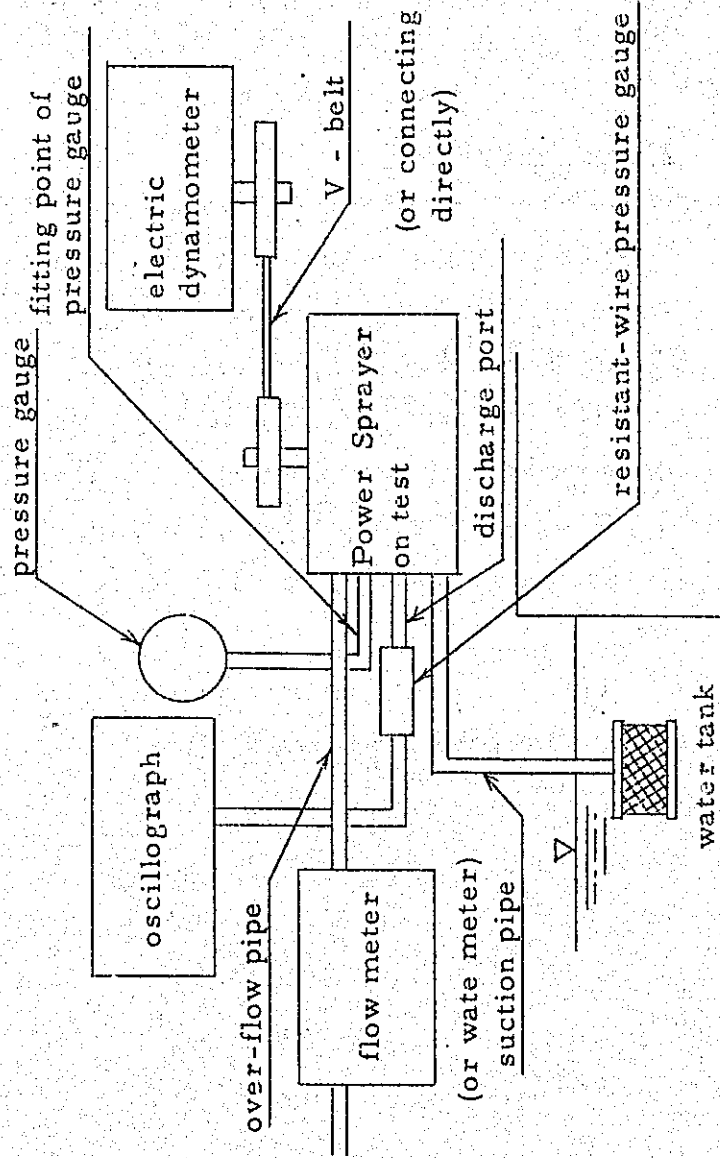
(1) Object

The object of this test is for ascertaining the pump efficiency of the Power Sprayer on test.

(2) Testing Equipment

- 1) The measurement of the required power for driving the sprayer shaft shall be made by an electric dynamometer coupled to the V-belt or direct connecting to the Power Sprayer on test.
- 2) The measurement of discharge volume shall be measured by a flow meter or a water meter.
- 3) The measurement of pressure shall be made by a pressure gauge which shall be fitted to the discharge port.
- 4) The testing equipment to be used for this test shall, as a rule, conform to Fig. 1.

Fig. 1



(3) Testing Method

- 1) Number of revolutions for the test shall be kept at the specified speed and 30% increased speed more than the number of specified revolutions of main shaft.
- 2) Testing pressure shall be taken more than 4 states involving the normal working pressure and the maximum working pressure.
- 3) Fresh water shall be used for the test and operation of power sprayer shall be carried out by means of the total over-flow operation (which means the operation by utilization of total volume of discharge in the arrangement of getting it back through the over-flow pipe. However, in case of the rate of discharge measured by a water meter shall be calculated by the hour required for discharging a certain volume.

(4) Items to be Measured

- 1) Required horsepower
- 2) Rate of discharge
- 3) Pressure
- 4) Other necessary items

(5) Calculation

Required horsepower, hydraulic power and pump efficiency shall be calculated by the following formulae:

$$B = \frac{W \cdot N}{K}$$

where, B : required horsepower (Ps)

W : load on the end of the dynamometer (kg)

- N : number of revolutions of the dynamometer (rpm)
- K : coefficient given to the dynamometer

$$W = \frac{10 P \times Q}{75 \times 60}$$

- where, W : hydraulic power (Ps)
- P : pressure (kg/Cm)
- Q : rate of discharge (ℓ/min)

$$\text{Pump efficiency (\%)} = \frac{W}{B} \times 100$$

3.3.3 Pressure Adjustment Test

(1) Test of Pressure Fluctuation

1) Object

The object of this test is to ascertain the effects on decrease of pressure fluctuation due to the air chamber and other functions.

2) Testing Equipment

The equipment to be used for this test shall, as a rule, conform to the equipment and apparatus as shown in Fig. 1 of 3.3.2.

3) Testing Method

(a) Number of revolutions for the test shall conform to the specified number of main shaft revolutions.

(b) Testing pressure. The test shall be carried out under the specified normal working pressure for 30 minutes, and the state of fluctuation of pressure and the center fluctuation shall be

recorded by an oscillograph.

(c) The test shall be carried out with fresh water under the condition of total over-flow operation.

4) Items to be Measured

The fluctuation range by pressure and the vibration difference from the center all recorded in the oscillograph shall be calculated at first and then the ratio to the pressure at the time of measuring shall be given in percentage.

(2) Capacity Test of Pressure Regulating Valve

1) Object

The object of this test is to ascertain the pressure regulating performance of regulating valve for the Power Sprayer on test under less volume of the over-flow operation.

2) Testing Equipment

The testing equipment shall, as a rule, conform to the equipment of 3.3.2. An flow meter shall be connected to the top of over-flow pipe.

3) Method of Test

(a) The test shall be carried out under the normal working pressure and specified number of main shaft revolutions.

(b) The test shall be made with fresh water under the total over-flow operation.

4) Items to be Measured

The pressure-drop shall be measured, in case of 90% of suction volume discharged to the discharge port under the total over-flow operation. The ratio between decreased pressure and the normal working pressure shall be given in percentage.

3.3.4 Continuous Running Test

(1) Object

The object of this test is to ascertain the operating condition and that there is no development of irregularities, abnormalities and troubles under the continuous running of the Power Sprayer on test.

(2) Equipment

1) The Power Sprayer on test shall be operated under the condition of the full-equipment.

2) The measuring part of thermometer shall be placed on the surface of the body and bearing-parts of the Power Sprayer on test. And it shall be inserted into lubricating oil.

(3) Testing Method

1) The test shall be carried out under the following conditions: At the speed of specified revolutions of main shaft and maximum working pressure.

2) The test shall be made continuously for 5 hours with lime solution under the total over-flow operation.

3) The volume of lime solution shall be prepared to keep about 10 times that of discharging per minute by the Power Sprayer on test.

(4) Measurements and Items to be Investigated

The following items shall be measured and investigated during the continuous running of the Power Sprayer on test.

- 1) Temperature of lubricating oil
- 2) Atmospheric temperature
- 3) Surface temperature of various parts on the body
- 4) Fluctuation of pressure
- 5) Vibration
- 6) Noise
- 7) Liquid leakage
- 8) Oil leakage
- 9) Any abnormality on various parts of the body

3.3.5 Handling Test

(1) Object

This test is made for the purpose of ascertaining ease or otherwise of handling the Power Sprayer on test.

(2) Test Method

The investigation shall be required to do by more than two investigators using the Power Sprayer on test.

(3) Items to be Investigated

- 1) Easiness of transporting the power sprayer
- 2) Easiness of operating the power sprayer
- 3) Safety
- 4) Easiness of adjusting various parts of the body
- 5) Other necessary matters

3.3.6 Spraying Performance Test

(1) Object

The object of this test is to ascertain the spraying performance of nozzle-part, pressure resistance, water leakage, any abnormalities on the parts of nozzle, spray-cock, spray-rod and extension-boom, etc.

(2) Testing Equipment

Rubber-hose, spray-rod, nozzle and spray-pipe shall be connected to the discharge port before running of the Power Sprayer on test.

(3) Testing Method and Items to be Investigated

- 1) The state of spraying shall be checked under the conditions of the normal working pressure and specified number of main shaft revolutions.
- 2) The investigation shall be made on the spray-cock, spray-pipe and nozzle part for the purpose of seeing water leakage and any abnormality under the operation of the Power Sprayer at the normal working pressure and specified number of main shaft revolutions.

3.3.7 Investigation after Disassembling

(1) Object

The object of this test is mainly to ascertain that there is no development of irregularities and abnormalities on the Power Sprayer on test after having carried out the continuous running test.

(2) Items to be Investigated

This investigation shall be made for ascertaining of any abnormalities on the Power Sprayer on test after

disassembling it completely, and if necessary, the measurement and investigation shall be taken for fitting condition, hardness, processing and touch degree of finishing, etc.

3.3.8 Pressure Resistance Test of Air Chamber

(1) Object

The object of this test is for ascertaining the pressure-resistance of air chamber for the Power Sprayer on test.

(2) Testing Equipment

The air chamber shall be taken off from the Power Sprayer on test; and then, it shall be connected to the pump by a copper-pipe.

(3) Testing Method

The air chamber shall be subjected for 30 sec. to pressure of five times that of the normal working pressure or three times that of the maximum working pressure when five times of the normal working pressure is less than three times of the normal working pressure.

4. Standards to Pass the Inspection

The decision of inspection for Power Sprayers of agricultural use shall conform to the following specified standards, and shall be required to satisfy the respective requirement stipulated hereunder:

4.1 Performance Inspection

(1) The pump efficiency in the test of 3.3.2 shall be over 63% in case of over 6 /min. in the actual measured

discharge-rate⁽¹⁾ respectively.

Note (1) The actual measured discharge-rate shall be the rate of discharge under the normal working pressure and specified number of main shaft revolutions.

(2) The central fluctuation of pressure in the test of 3.3.3-(1) shall be below 15% under the normal working pressure and specified number of main shaft revolutions.

(3) The fluctuation of pressure in the test of 3.3.3-(1) shall be below 30% in case of the single and double-cylinder under the normal working pressure.

(4) The pressure-drop in the test of 3.3.3-(2) shall be below 40% of the normal working pressure.

(5) The test of 3.3.8 shall have no abnormalities such as the liquid leakage and failure.

(6) Spray particles shall be uniformly distributed and spray volume shall be even.

4.2 Durability Inspection

The durability inspection shall be required to satisfy the requirements specified hereunder, particularly in principal parts and parts which may be difficult to replace easily.

(1) No abnormalities and failures in the above mentioned parts

(2) No liquid and oil leakages

(3) No abnormal abrasion

(4) No seizure

(5) To have the necessary measures taken against corrosion

4.3 Handling Inspection

- (1) Handling condition shall not show any defects that may bring much dangerous feelings to the operator during the operation of the Power Sprayer in the test of 3.3.5.
- (2) No defects that shall be the cause of difficulty to replace or adjust the parts during the operation of the Power Sprayer in the test of 3.3.5.

INSPECTION RECORD SHEET

Date:

Certificate No.

THE INSTITUTE OF AGRICULTURAL
MACHINERY

Kind of agricultural
machinery

Power Sprayer

Manufacturer's type
designation

Manufacturer's name and add.

1. Main Specification

Specified number of main - shaft revolutions	rpm	Specified number of crank - shaft revolutions	rpm	Normal working pressure	kg/cm ²	Maximum working pressure	kg/cm ²
--	-----	---	-----	----------------------------	--------------------	-----------------------------	--------------------

2. Main Structure

(1) Dimensions

Classification	Overall length (mm)	Overall width (mm)	Overall height (mm)	Gross weight (kg) Note (1)
Body				
Full-equipment (1)				

Note (1) Gross weight shall include 80% of fuel, regular amounts for lubricating oil, cooling water and liquid respectively.

Note (2) Besides the body, the following items shall be included in the full-equipment.

(2) Structure of Body and Materials Used

Type of pump	Pressured Part				Cylinder Packing	
	Kind	Diameter	Stroke	Materials	Kind	Materials
		mm	mm			

Suction valve and Discharge valve		Pressure regulating valve		Air chamber		No. of discharge ports
Type	Materials	Type	Materials	Capacity	Materials	
				cc		

Belt-pulley of the body		Materials used for the casing	Lubricating oil in the casing		Remarks
Type	Outside diameter		Kind	Volume	
				ℓ	

3. Summary of Inspection Record

(1) Pump Performance

The results of test made under the following specified conditions have been recorded as shown in Fig. (1).

Liquid used		Room temperature	Belt used		Outside Dia. of belt pulley for dynamometer	Remarks
Kind	Temp. °C		Type	Number of belts		
	°C	°C				

(2) The test of pressure regulating performance shall conform to the conditions of (1).

In the case when the discharging 90% of total suction volume by opening the discharge-cock under the running conditions of normal working pressure, specified revolutions and total over-flow operation, the pressure drop has been marked less than 40%, and there has not shown any development of irregularities in other pressure regulating performance.

(3) Spraying Performance Test

Type of nozzle	Inside dia. of hose	Length of hose	Pressured part of nozzle	Max. reaching distance	Rate of spraying	Unevenness of spraying
	mm	m	kg/cm ²	m	/min.	

(4) Continuous Running Test

The result of test made under the following conditions has not shown any abnormalities after the continuous running test for 3 hours.

Room temperature	Pressure	Number of main-shaft revolutions	Liquid used	Remarks
°C	kg/cm ²	rpm	Lime solution	Lime solution: Diluted 1 l of water with 20 g of lime.

(5) Pressure-resistance Test of Air Chamber

Pressure tested	Pressured time	Remarks
Kg/cm ² (5 times of that of normal working pressure) (3 times of that of max. working pressure)	30 sec.	

4. Reference Records concerning the Handling (showing the state at the time of inspection.

5. Additional Remarks:

