

Agri. Machinery Testing Facilities of K.O.A.T., Rep. of Korea

Meeting of Power tillers TWG of ANTAM
on 26 July 2023, Los Baños, Laguna, Philippines

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KOrea Agriculture Technology promotion Agency

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Nat'l Agri. Materials
Inspection Center
in **Ministry of Agri.**

1966

1979

Official Test by
'Agricultural
Mechanization
Promotion Law'



Nat'l Agri. Machinery
Research Institute
in **Rural Development Admin.**

1994

Dec. 1995



OECD Designated
Test station



Agri. Machinery Test Team
In **K.O.A.T.**

Sep. 2009

Dec. 2008



ISO/IEC 17025
Accredited



Yr.	66	~	69	70	~	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	~	94	95	~	11	12	13	14	15	16	~
Initial Test											Mandatory												Mandatory									
Pre-shipment Conformity Check	None		All units			Sampled		Self-Quality Assurance										None														
Expiry Test Report	2 or 3 Yr.										3					5					None											



-1978 Enacted 'Agricultural Mechanization Promotion Act'

-1979 Established 'The 1st 5 years Nat'l basic plan for Agricultural Mechanization'

- ❖ National test has Always been required for all the machine Purchased or supported by the government.
- ❖ Ex-post Conformity Inspection has always been required and performed by the Government Authority.

- Mandatory National test by the law

	Kinds of test	Machinery	No. of Tests Performed, 2022
Before market release	General test(Performance, Operability, Safety)	22 kinds designated by the Ministry of Agri.	261
	Safety Test	22 kinds designated by the Ministry of Agri.	172
	Extension check	All tested machinery if minor modification required	227
After market release	After-test conformity Check by R.D.A.	All tested machinery	551

- Voluntary tests

	Kind of Tests	Machinery	
For supporting Tractor trades	OECD Official Test	Tractor and Rollover Protective structures	15(10 approved including 3 extensions)
For supporting R&D, exporting	K.O.A.T. test Method by clients/KOAT	Whole machinery or Parts	1 037

1. Tractor



2. Tractor ROPS



3. Combine Harvesters



4. Paddy Transplanter



5. Seedlings Transplanter



6. Heater



7. Agr. product dryer



8. Agr. product cold storage



9. Household type Rice miller



10. Transporter(Riding type)



11. Mini Loader(<4t)



12. Mini Excavator(<1t)



13. Cultivator(Riding type)



14. Fertilizer



15. Baler(Riding type)



16. Harvesters



17. Seeder



18. Power tiller



19. Air-assist sprayer(Riding type)



20. Sprayer(Riding type)



21. Wide-area mister



22. Boom sprayer(Riding type)



23. The others



1. Mini-tiller



2. Trailer



3. Transporter(Walking type)



4. Elevating work platform



5. Box lifter



6. Air-assist sprayer(Except riding type)



7. Sprayer(Except riding type)



8. Boom sprayer(Except riding type type)



9. Cut & Binder



10. Weeder



11. Twig branch chopper



12. Saw-duster



13. Crude-feed chopper



14. Fertilizer distributor



15. Thresher(Vehicle type)



16. Grain dryer



17. Baler(Except riding type)



18. Bale wrapper



19. Feeds mixer



20. Feeder



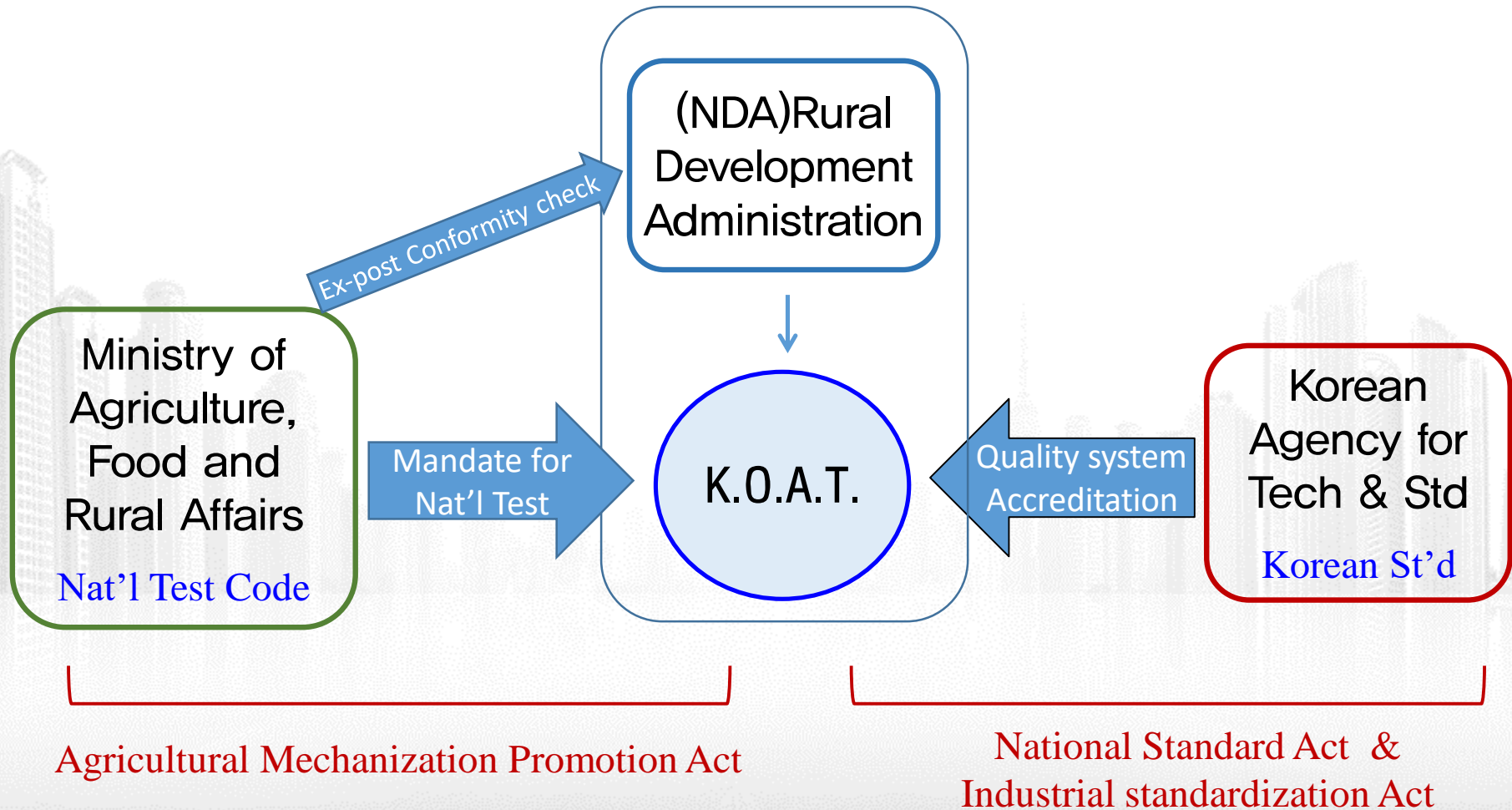
21. Washer



22. Peeler



23. The others



Maintains ISO/IEC 17025:2017 Accredited Test Lab in Tractor test

Korea Laboratory Accreditation Scheme

CERTIFICATE OF ACCREDITATION

Korea Agriculture Technology Promotion Agency

Accreditation No. : KT384

Corporation Registration No. : 135871-0007158

Address of (Branch site) 457 Pyeongdong-ro Iksan-si Jeollabuk-do, Republic of Korea
Laboratory : Korea

Date of Initial Accreditation : December 01, 2008

Validity of Accreditation : November 11, 2021 ~ November 10, 2025

Scope of Accreditation : Attached Annex

Date of issue : March 22, 2022

This testing laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to Joint ISO-ILAC-IAF Communiqué).



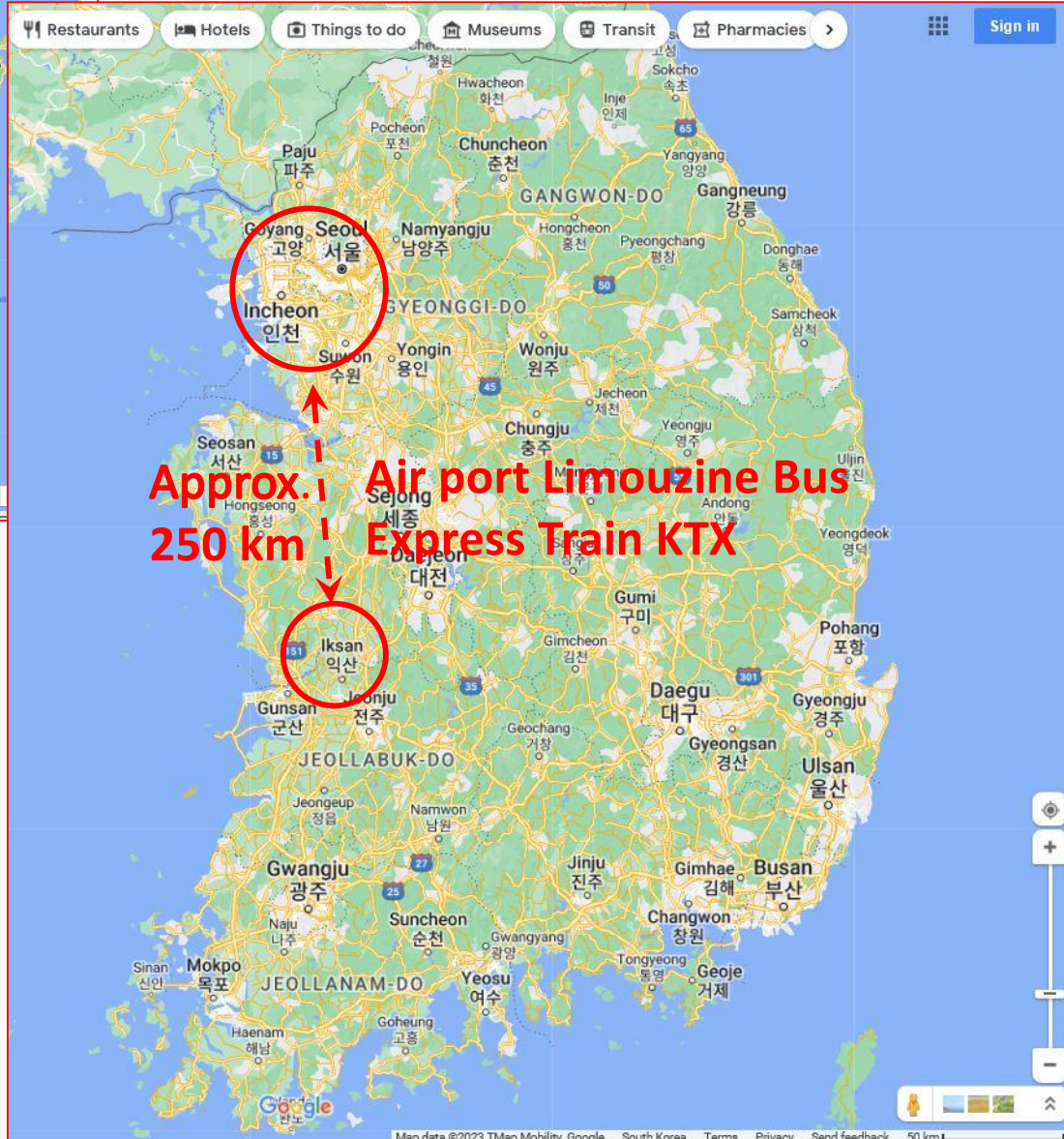
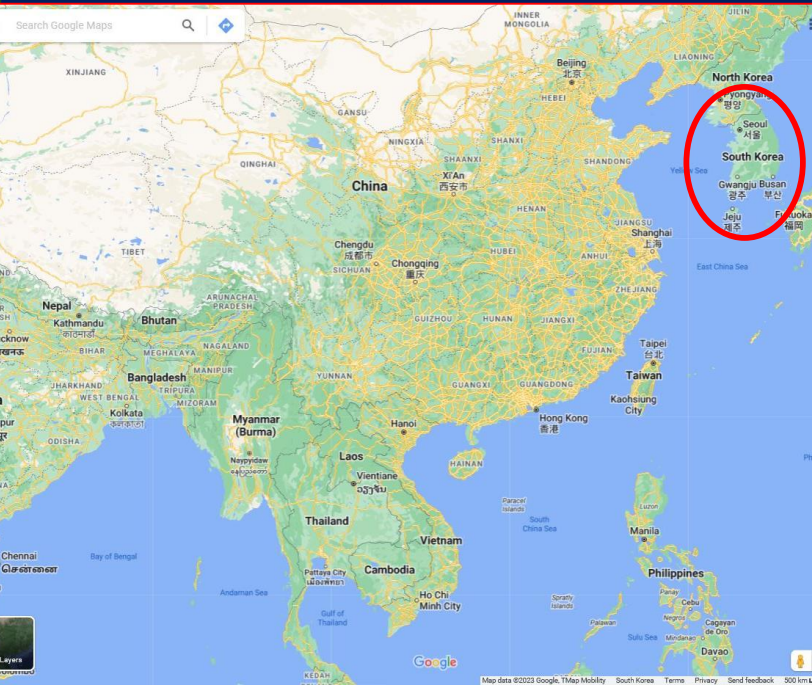
Sanghoon Lee
Head
Korea Laboratory Accreditation Scheme

Scope of Accreditation

- OECD & National Tractor Test
 - PTO and Engine Tests
 - Hydraulic Power & Lift
 - Drawbar Power & Fuel consumption
 - Turning Area & Turning Circle
 - Centre of Gravity
 - Braking
 - External Noise Level
 - Steering capability of wheeled tractors
- Protective structures Test
 - ROPS: OECD Code 4, 6, 7, 8, KS B ISO 12003-1, & -2
 - Falling object protective structures
 - Seatbelt anchorage performance

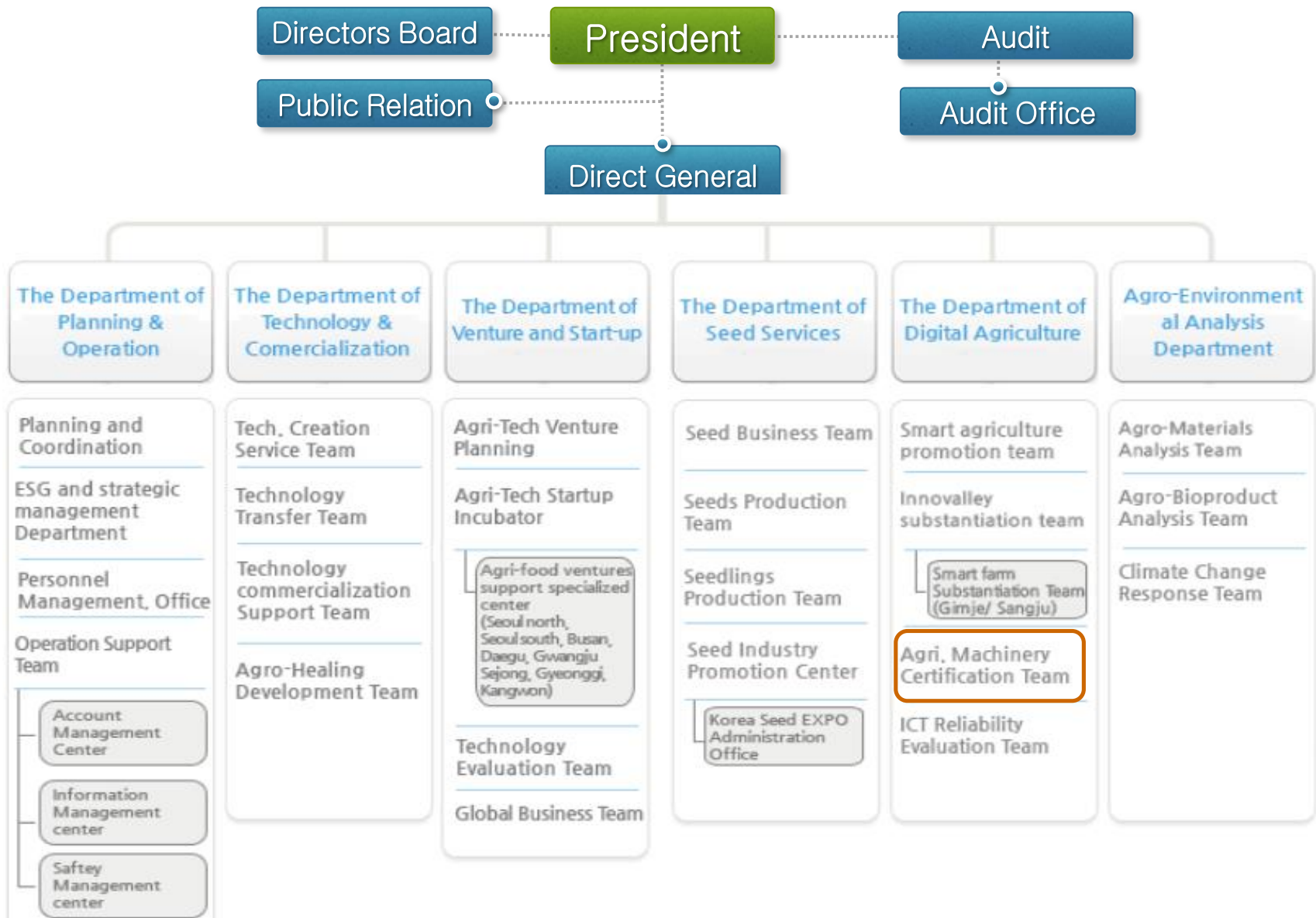
Quality manual for Impartiality, Independency, Confidentiality

	Personnel requirements	Facilities and equipment	Proficiency Test
Required	<ul style="list-style-type: none"> ▶ Education (First time, pass the test education) <ul style="list-style-type: none"> – ISO/IEC 17025 General requirements for the competence of testing laboratories – ISO/IEC Guide 98–3 Guide to the expression of Uncertainty in measurement 	<ul style="list-style-type: none"> ▶ The premises and facilities should provide sufficient environment for the test ▶ Equipment shall not be released for use until it has been verified and, if relevant, calibrated 	<ul style="list-style-type: none"> ▶ Shall pass the national or international proficiency test, if there exit the test program
WE DO	<ul style="list-style-type: none"> ▶ All 10 engineers are qualified and receive education every 3 years. 	<ul style="list-style-type: none"> ▶ All involved 130 test equipments are calibrated by external authorized body every year. 	<ul style="list-style-type: none"> ▶ Proficiency is checked by external auditor every year.





Agricultural Machinery Test Bldg.





3 Test Buildings for Agri. Machinery Testing

- Total area: 5,185 m² – 3 Buildings, 23 Test cell, 26 test facilities

Building A – Power test

- Engine,pto dynamometer



- Hydraulic power



- Sound level test



Building B – Safety test

- ROPS test



- Turn over test



- Center of Gravity test



Building C – Stationary machinery

- Dryer performance






- Cooltainer test chamber






- Water boiler test





3 Engine performance Test Rooms




	Room1	Room2	Room3
			
Max. Power	30 kW @ 2 493 r/min	96 kW @ 2 132 r/min	110 kW @ 2 000 r/min
Max Torque	115 Nm	430 Nm	525 Nm
Max Speed	6 000 r/min	5 000 r/min	5 000 r/min
Type	AC Dynamometer		
Others	Nm, r/min, Fuel Consumption, C, %RH, kPa		
Test Method	– ISO 15550 measurement of engine power. – ANTAM St' d code for Power tillers – 8. Engine test , 9. Rotary shaft Test		

3 PTO performance Test Rooms




	Room1	Room2	Room3
			
Max. Power	250 kW @ 2 000 r/min	400 kW @ 2 000 r/min	720 kW @ 1 500 r/min
Max. Torque	1 200 Nm	2 000 Nm	4 500 Nm
Max Speed	6 000 r/min	4 500 r/min	3 750 r/min
Type	Eddy Current Dynamometer		
Others	Nm, r/min, Fuel Consumption, C, %RH, kPa		
Test Method	<ul style="list-style-type: none"> – ISO 789–1 Agricultural tractors – Test procedures of Power tests for PTO – OECD Tractor Code 2 – PTO performance test, etc 		

3 Hydraulic Power & Hydraulic Lift performance Test Room

	Hydraulic power	3-point linkage Lifting capacity
		
Max. Lifting Force	–	100 kN
Max. Hydraulic Power	100 kW	–
Max Flow Rate	250 L/min	–
Max. Hydraulic Pressure	30 MPa	–
Others	C, %RH, kPa	Hydraulic Pressure, Lifting Height
Test Method	<ul style="list-style-type: none"> – ISO 789–10 Agricultural tractors – Test procedures of Hydraulic power at tractor/implement interface – OECD Tractor Code 2 – Hydraulic Power Performance test 	<ul style="list-style-type: none"> – ISO 789–2 Agricultural tractors – Test procedures of Rear 3-point linkage lifting capacity – OECD Tractor Code 2 – Hydraulic Lift Performance test

WaterProofing Test Bench	Center of gravity test	Tilt table
		
Roller bed type	4 load scales	Max. Tilting angle: 45 deg
Max. load 15 t	Hydraulic Lift for 2 load scales	Max. Load: 15 t
Size : L7.0 × W3.5 m	Tape Measures	
<ul style="list-style-type: none"> – ANTAM St' d codes for Power Tillers, Paddy Transplanter – Waterproof test – OECD Tractor Code 2 – Waterproof test 	<ul style="list-style-type: none"> – ISO 789-6 Agricultural tractors – Test procedures of Center of gravity test – OECD Tractor Code 2 Center of gravity test 	

Protective Structure tests

	Roll-over protective structures	Falling object protective structures
		 
Actuator	Hydraulic Servo Cylinders	drop test object mass of 45kg or 227 kg
Max. Force/Energy	20 t (X, Y, Z Axis respectively)	to develop an energy of 1365J, 11600J, etc
Deflection	800 mm approx. (X, Y, Z Axis respectively)	–
Test Method	Static Testing of R.O.P.S. like – ISO 3471, 5700, 12117 – OECD Tractor Code 4, 6, 7, 8, 9	Testing of F.O.P.S. like – ISO 3449 – OECD Tractor Code 10

Noise emission Test room

Sound absorbing coefficient :
99% (~125 Hz)

**Machine Load can be controlled
by Dynamometer**

**Constant Temperature
Room**

Size : L7.8 × W7.8 × H4.9 m
Temp Range : - 20 °C ~ 55 °C
Humidity : 50 % R.H. or less

**Agricultural Products
Dryer Performance Test**

Flat form Size : L4.0 × W4.0 m
Max Load : 3 ton
Data logger
Power meter
Calorimeter

Greenhouse Heater test

Heat pump Performance Test



Capacity : 10 ~ 50 RT (35~176 kW)

Flow meter

Temperature sensors

Data logger

Electric Power meter

Calorimeter

Heater Performance Test



Air volume : 24 points pitot tube

Temperature: 24 points on grid

Data logger

Electric Power meter

Calorimeter

Boiler Performance Test



Capacity : 1..4 MW

Flow meter

Temperature sensors

Data logger

Electric Power meter

Calorimeter

Real time Drone–Mounted Flight track acquisition system



- DGPS Accuracy
 - Position: X/Y 5cm, Height 2cm
 - Angle: Roll/Pitch 0.001° Yaw 0.04°
- Sampling rate : up to 200 Hz
- Memory : 8 GB
- Size: 13 x 10 x 8cm
- Weight: 900g
- Wireless Modem 300 Mbps
- With GLONASS Antenna

Indoor test room



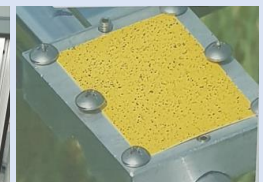
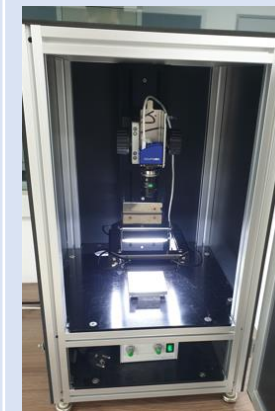
- Controlables
 - Flight Height
 - Flight Speed
 - Flight posture
 - Wind speed
 - Wind direction
- Collector
 - water sensitive papers
 - Seed/fertilizer collecting trays

Portable weather station



Temperature
 R.H. %
 Atm. kPa
 Wind speed
 Wind direction

Water Sensitive Paper and Scanner



- Total Area : 400 m x 100 m
- Track length 300 m, Track radius 40 m



Dynamometer car (Max. 250 kW)



Dynamometer car (Max. 150 kW)



- Draw bar pull
- Travel speed
- PTO speed
- Fuel consumption
- Wheel slippage, revolution of driving wheels
- Temperatures(Fuel, Coolant, Engine oil, Air intake), RH%, Atmospheric pressure, etc

For

- ISO 789-9: 2018 Agricultural tractors – Test procedures of Power tests for drawbar
- OECD Tractor Code 2

Service brake system



Parking brake system



Steering emergency mode check ISO 789-11



Harsh surface Durability test system



- Keeping straight forwardness Test - Under Updating -

Tractor



Paddy Translanter



- Newly built in 2020 - Agri. ICT equipment Test Center



- Under Designing - Battery test Building



Thank You for your attention !

We Welcome Your visit to KOAT !

