

# QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR AGRICULTURE AND ALLIED INDUSTRY

## What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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## Introduction

### Qualifications Pack – Tractor Mechanic

**SECTOR:** AGRICULTURE AND ALLIED

**SUB-SECTOR:** Agriculture Crop Production

**OCCUPATION:** Farm Machinery, Equipment Operation and Maintenance

**REFERENCE ID:** AGR/Q1108

**ALIGNED TO:** NC0-2015/7231.0300

**Brief Job Description:** A Tractor Mechanic performs routine checks, carries out overhauling and repair of engine parts and assembly of repaired and serviced parts, assesses transmission, hydraulic and auto-electrical systems, etc.

**Personal Attributes:** A Tractor Mechanic must have mechanical aptitude and analytical ability. S/he must also possess troubleshooting, problem solving and decent communication skills. S/he must know basic operations of a tractor.

Job Details	<b>Qualifications Pack Code</b>	<b>AGR/Q1108</b>		
	<b>Job Role</b>	<b>Tractor Mechanic</b>		
	<b>Credits (NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
	<b>Sector</b>	<b>Agriculture and Allied</b>	<b>Drafted on</b>	<b>24/05/2016</b>
	<b>Sub-sector</b>	<b>Agriculture Crop Production</b>	<b>Last reviewed on</b>	<b>01/07/2016</b>
	<b>Occupation</b>	<b>Farm Machinery, Equipment Operation And Maintenance</b>	<b>Next review date</b>	<b>01/07/2019</b>
	<b>NSQC clearance on</b>	<b>22/06/2017</b>		

Job Role	Tractor Mechanic
<b>Role Description</b>	A Tractor Mechanic is responsible for carrying out repair and maintenance activities of various parts of a tractor.
<b>NSQF level</b>	4
<b>Minimum Educational Qualifications</b>	Class 10, preferably
<b>Maximum Educational Qualifications</b>	Not Applicable
<b>Training</b> (Suggested but not mandatory)	N/A
<b>Minimum Job Entry Age</b>	18 years
<b>Experience</b>	0-1 year experience in related field
<b>Applicable National Occupational Standards (NOS)</b>	<b>Compulsory:</b> <a href="#">1. AGR/N1126 Prepare for carrying out tractor repair and maintenance</a> <a href="#">2. AGR/N1127 Perform necessary routine checks and maintenance of the tractor</a> <a href="#">3. AGR/N1128 Carry out overhauling and repair of engine parts</a> <a href="#">4. AGR/N1129 Carry out overhauling and repair of transmission, hydraulic and tractor-electrical systems</a> <a href="#">5. AGR/N1130 Carry out assembly of repaired and serviced parts</a> <a href="#">6. AGR/N9903 Maintain health and safety at the workplace</a>
<b>Performance Criteria</b>	As described in the relevant OS units

## Definitions

Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian context.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard , which is denoted by an 'N'
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.

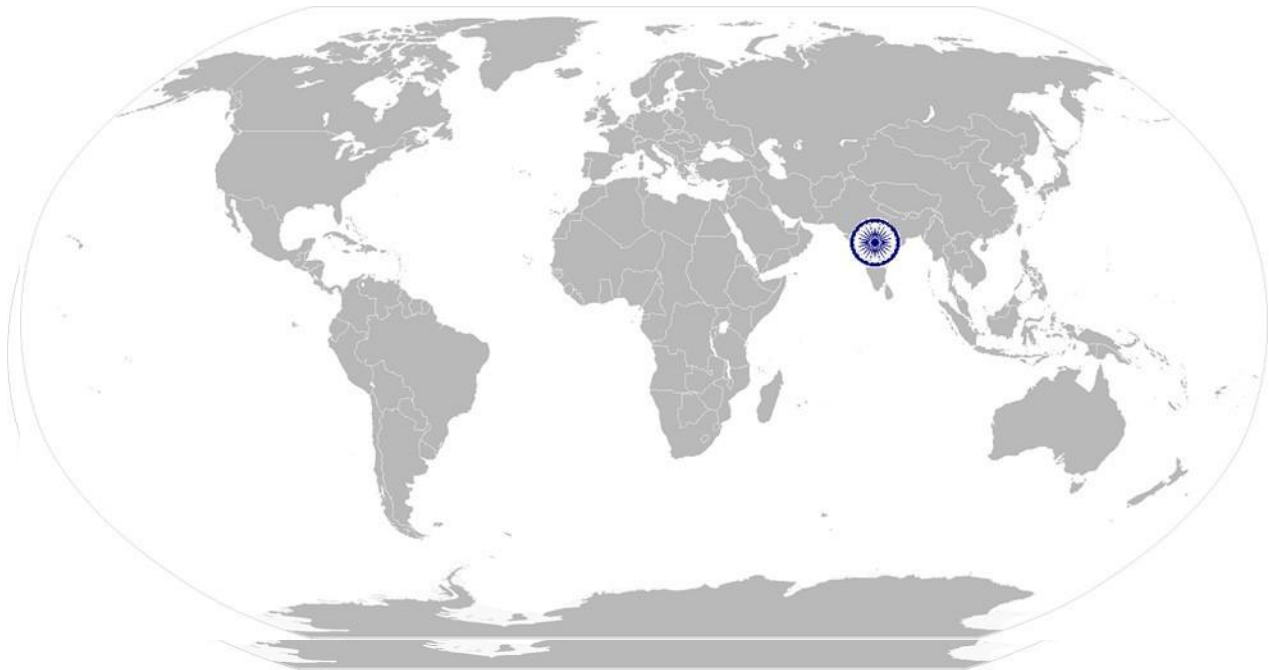
Acronyms	Keywords /Terms	Description
	GAP	Good Agricultural Practices
	NOS	National Occupational Standard
	NSQF	National Skill Qualification Framework
	OS	Occupational Standard
	OEM	Original Equipment Manufacturer
	PC	Performance Criteria
	QP	Qualification Pack
	SSC	Sector Skill Council
	IC	Internal Combustion
RPM	Revolutions per minute	

AGR/N1126

Prepare for carrying out tractor repair and maintenance

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# National Occupational Standard



## Overview

This OS unit is about preparing for tractor repair and maintenance by checking different parts of a tractor.

**AGR/N1126**
**Prepare for carrying out tractor repair and maintenance**

<b>Unit Code</b>	<b>AGR/N1126</b>
<b>Unit Title (Task)</b>	<b>Prepare for carrying out tractor repair and maintenance</b>
<b>Description</b>	This OS unit is about preparing for tractor repair and maintenance by checking different parts of a tractor.
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>Identify and study the different parts of a tractor</li> <li>Identify and study different implements and attachments and their usage</li> <li>Identify tools and measuring instruments required</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Identify and study the different parts of a tractor</b>	To be competent, the user/individual must be able to <p>PC1. identify types of tractor, their components and agricultural/commercial applications</p> <p>PC2. identify, understand and monitor working of:</p> <ul style="list-style-type: none"> <li>types of clutches ( single, dual and independent) and actuation mechanisms</li> <li>working and types of gear box</li> <li>chassis</li> <li>IC engine, lubrication, cooling system, air and exhaust system</li> <li>fuel supply and transmission systems</li> <li>front and rear axle</li> <li>steering and suspension systems</li> <li>wheel and tyres</li> <li>brakes ( both dry and oil immersed)</li> <li>tractor electrical system ( charging, starting, wiring harness, instrument cluster,etc)</li> <li>types of hydraulics system</li> </ul> <p>PC3. carry out field trial measurement and check fuel consumption, coverage and depth</p>
<b>Identify and study different implements and attachments and their usage</b>	To be competent, the user/individual must be able to, <p>PC4. identify the different applications of a tractor – agricultural and non-agricultural</p> <p>PC5. identify and study different agriculture implements</p> <ul style="list-style-type: none"> <li>seed bed preparation - tillage implements –mb plow,disc plow,cultivator etc.,</li> <li>sowing implements – seed drill, planter etc.,</li> <li>crop care implements – sparyers,irrigation pumps,ridger etc.,</li> <li>harvesting implements/quipments –reaper,harvertor etc.,</li> <li>post harvesting implements – thresher,baler etc.,</li> </ul> <p>PC6. select implement as per tractor by checking tractor versus implement compatibility</p> <p>PC7. hitch and adjust the implements with the tractor</p>

**AGR/N1126**
**Prepare for carrying out tractor repair and maintenance**

	PC8. drive and operate the tractor with and without implements
<b>Identify tools and measuring instruments required</b>	To be competent, the user/individual must be able to PC9. identify tools required in dismantling and assembling different systems of a tractor PC10. identify and select measuring tools and equipments required for repair and maintenance PC11. identify and select marking tools as well as OEM recommended special service tools
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. code of business conduct KA2. job responsibilities and duties KA3. standard tractor repair and maintenance procedures
<b>B. Technical Knowledge</b>	The user/individual on the job needs to know and understand: KB1. OEMs Special tools, OEMs specific lubricants KB2. types of tractor, their uniqueness and use KB3. basic terminology regarding engines, transmission systems, hydraulic systems and auto-electric systems KB4. construction, working principles and functioning of tractors KB5. types of tools and equipment required for repair and maintenance KB6. wheel track width adjustment for different working conditions KB7. water and weight ballasting KB8. types and uses of different agriculture and non agriculture implements KB9. different precision measuring instruments KB10. types of measuring tools and its use KB11. use of instruments such as micrometer, (outside, inside ,depth, screw thread), Vernier caliper, dial caliper, dial test indicator, thickness gauge, screw pitch gauge, sheet and wire gauge KB12. use of common hand tools KB13. tyre pressure required for different applications KB14. common faults and repairing procedures of a tractor KB15. usage of tractor in stationary, commercial and industrial applications KB16. hitching and unhitching of implements KB17. trailer hitch height for different trailer tyre sizes KB18. weight transfer such as front weight, need of mast height KB19. dangerous machines(regulation), act 1983
<b>A. Core Skills/ Generic Skills</b>	
	<b>Writing Skills</b> The user/ individual on the job needs to know and understand how to: SA1. note the information communicated SA2. note the equipments to be used
	<b>Reading Skills</b>

**AGR/N1126**

**Prepare for carrying out tractor repair and maintenance**

	The user/individual on the job needs to know and understand how to: SA3. read and interpret the process required for repair and maintenance
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to: SA4. effectively communicate with customers, farmers and team members SA5. attentively listen to and comprehend the information given by the speaker SA6. communicate clearly regarding issues
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to: SB1. handle issues pertaining to machine parts and equipments and decide corrective actions to be undertaken
	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to: SB2. plan and prioritize the work based on the instructions received SB3. plan to utilize time and equipments effectively
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to: SB4. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to: SB5. ensure fault finding and solution generation in consultation with key stakeholders such as farmers and team members
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB6. apply domain information about maintenance processes and technical knowledge about tools and equipment
<b>Critical Thinking</b>	
The user/individual on the job needs to know and understand how to: SB7. use common sense and make judgments on day to day basis	



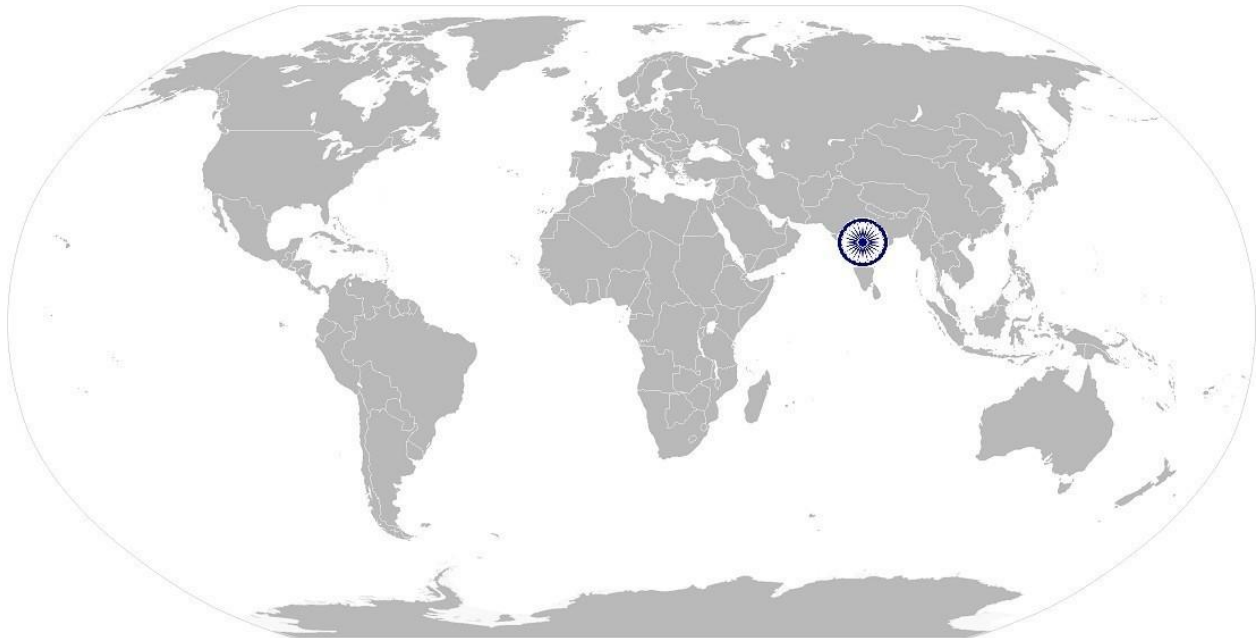
**AGR/N1126**

**Prepare for carrying out tractor repair and maintenance**

## NOS Version Control

<b>NOS Code</b>	<b>AGR/N1126</b>		
<b>Credits (NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Agriculture and Allied</b>	<b>Drafted on</b>	<b>24/05/2016</b>
<b>Industry Sub-sector</b>	<b>Agriculture Crop Production</b>	<b>Last reviewed on</b>	<b>01/07/2016</b>
<b>Occupation</b>	<b>Farm Machinery, Equipment Operation And Maintenance</b>	<b>Next review date</b>	<b>01/07/2019</b>

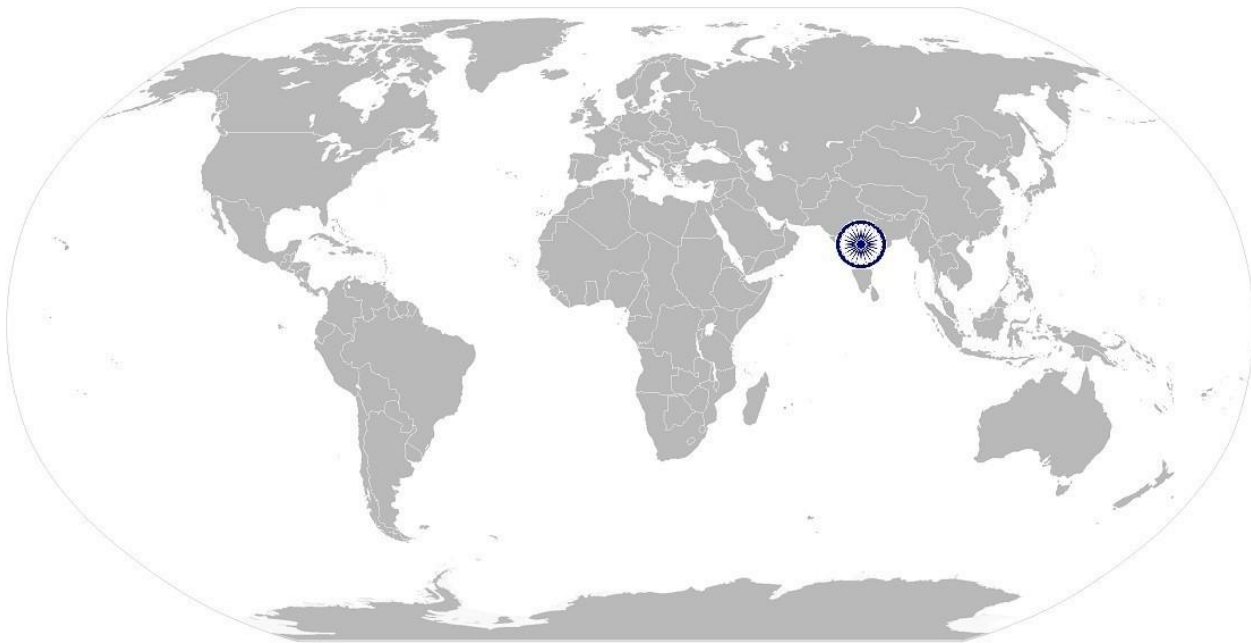
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**AGR/N1127 Perform necessary routine checks and maintenance of the tractor**

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# National Occupational Standard



## Overview

This OS unit is about performing necessary and important routine checks and maintenance of the tractor.

**AGR/N1127**
**Perform necessary routine checks and maintenance of the tractor**

National Occupational Standard

<b>Unit Code</b>	<b>AGR/N1127</b>
<b>Unit Title (Task)</b>	<b>Perform necessary routine checks and maintenance of the tractor</b>
<b>Description</b>	This OS unit is about performing necessary and important routine checks and maintenance of the tractor.
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Carry out routine maintenance of tractor</li> <li>• Perform fluid and lubricant checks</li> <li>• Check the working of all gauges</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Carry out routine maintenance of tractor</b>	To be competent, the user/individual must be able to: PC1. read the manufacturer's manual, the maintenance schedule and understand specifications of components and accessories PC2. carry out periodical maintenance of tractor (10 hours, 50 hours, 100 hours, 250 hours, 500 hours and 1000 hours) PC3. test tractor on the road to check working of the engine, clutch, gears, brakes and steering PC4. assess the working of implements such as harrow, rotavator, seed drills, etc PC5. carry out fan belt play checks and adjustment
<b>Perform fluid and lubricant checks</b>	To be competent, the user/individual must be able to: PC6. check for oil level and leakage of engine, air cleaner, gear box, rear axle and steering PC7. change engine oil filter, turbo filter, fuel filter and hydraulic filter PC8. check the coolant in the radiator/reservoir tank PC9. check for any bleeding or air locks in the fuel system PC10. check battery electrolyte level
<b>Check the working of all gauges</b>	To be competent, the user/individual must be able to: PC11. check that the right temperature is maintained in the gauge PC12. check for the right oil pressure PC13. check that the hour meter is adjusted correctly
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company /	The user/individual on the job needs to know and understand: KA1. code of business conduct KA2. job responsibilities and duties KA3. procedures and processes for performing routine checks on tractor parts

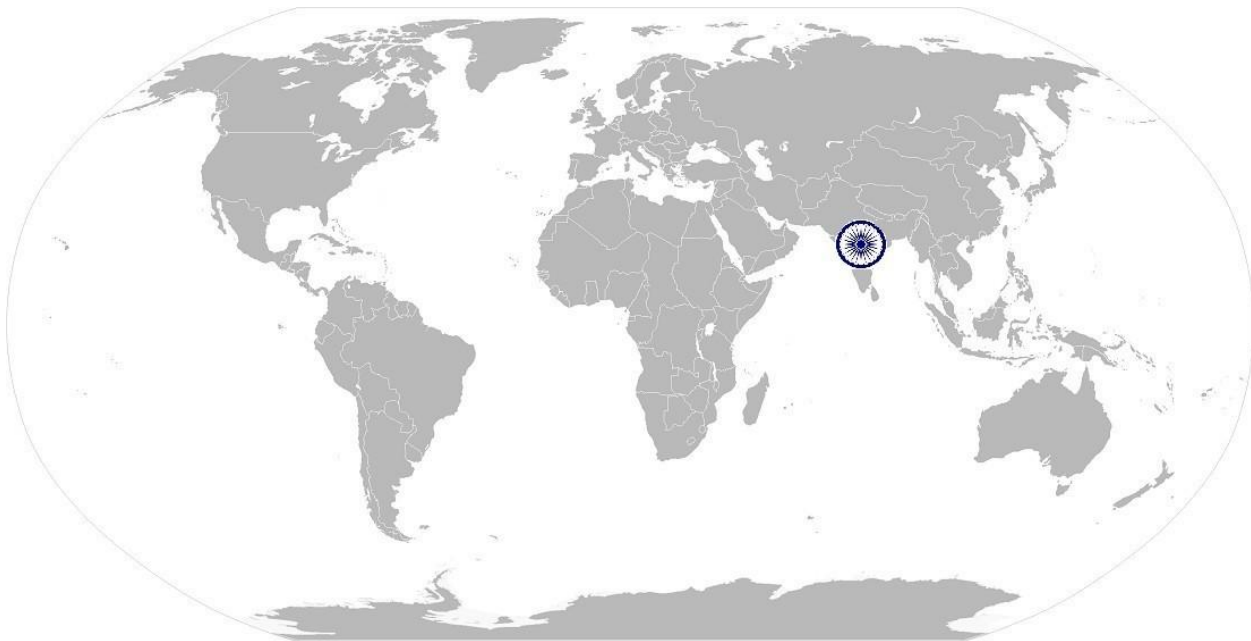
**AGR/N1127 Perform necessary routine checks and maintenance of the tractor**

organization and its processes)	
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. how to carry out the tractor repair and maintenance as instructed in the operator manual</p> <p>KB2. servicing schedule and checkups before, during and after starting a tractor</p> <p>KB3. constructional details of different systems of a tractor</p> <p>KB4. working of different systems of engine</p> <p>KB5. types of brakes, clutches and steering systems</p> <p>KB6. auto electrical system and its use in a tractor</p> <p>KB7. four wheel drive, hydraulics and power take off</p> <p>KB8. different pulley sizes for compressor and thresher applications</p> <p>KB9. tractor driving with different implements</p> <p>KB10. dangerous machines (regulation), act 1983</p>
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	The user/ individual on the job needs to know and understand how to:
	SA1. note the information communicated
	SA2. note the tools and equipments to be used
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to:
SA3. read and interpret the process required for repair and maintenance	
<b>Oral Communication (Listening and Speaking skills)</b>	
The user/individual on the job needs to know and understand how to:	
SA4. effectively communicate with farmers and team members	
SA5. attentively listen and comprehend the information given by the speaker	
SA6. communicate clearly on the issues being faced	
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to:
	SB1. handle issues pertaining to machine parts and equipments and decide corrective actions to be undertaken
	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to:
	SB2. plan and prioritize the work based on the instructions received
	SB3. plan to utilize time and equipments effectively
<b>Customer Centricity</b>	
The user/individual on the job needs to know and understand how to:	
SB4. understand customer requirements and their priority and respond as per their needs	
<b>Problem Solving</b>	

**AGR/N1127**

**Perform necessary routine checks and maintenance of the tractor**

	The user/individual on the job needs to know and understand how to: SB5. ensure proper fault finding and solution generation in consultation with key stakeholders such as farmers and team members
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB6. apply domain information about maintenance processes and technical knowledge about tools and equipment
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB7. use common sense and make judgments on day to day basis

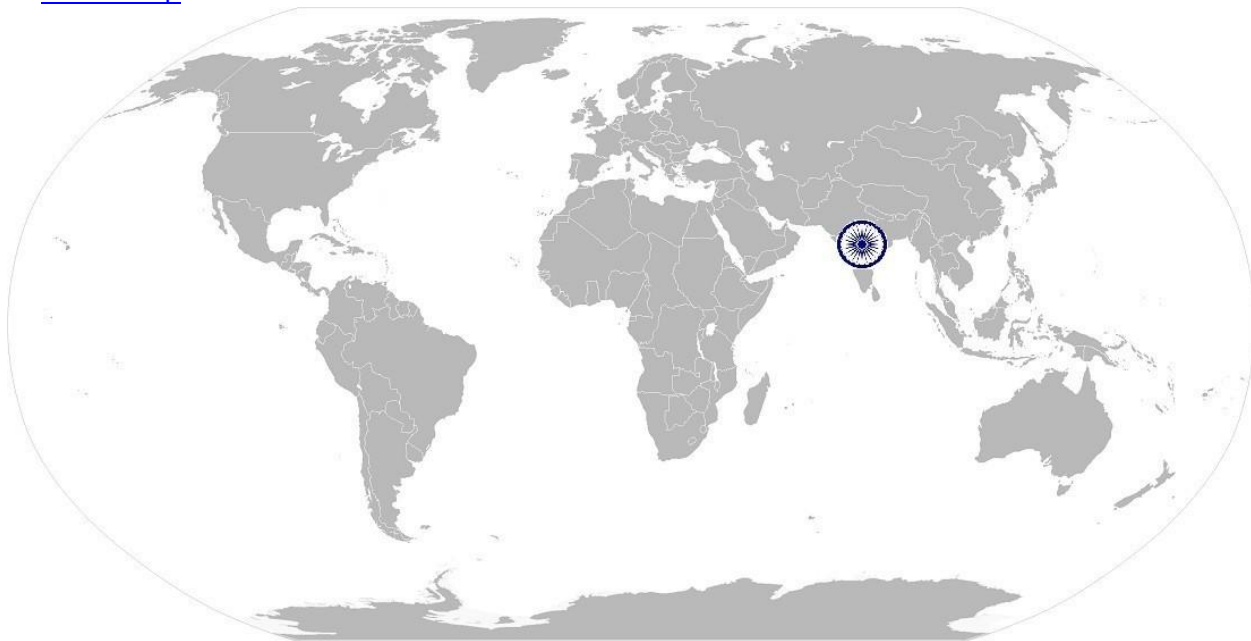


**AGR/N1127 Perform necessary routine checks and maintenance of the tractor**

**NOS Version Control**

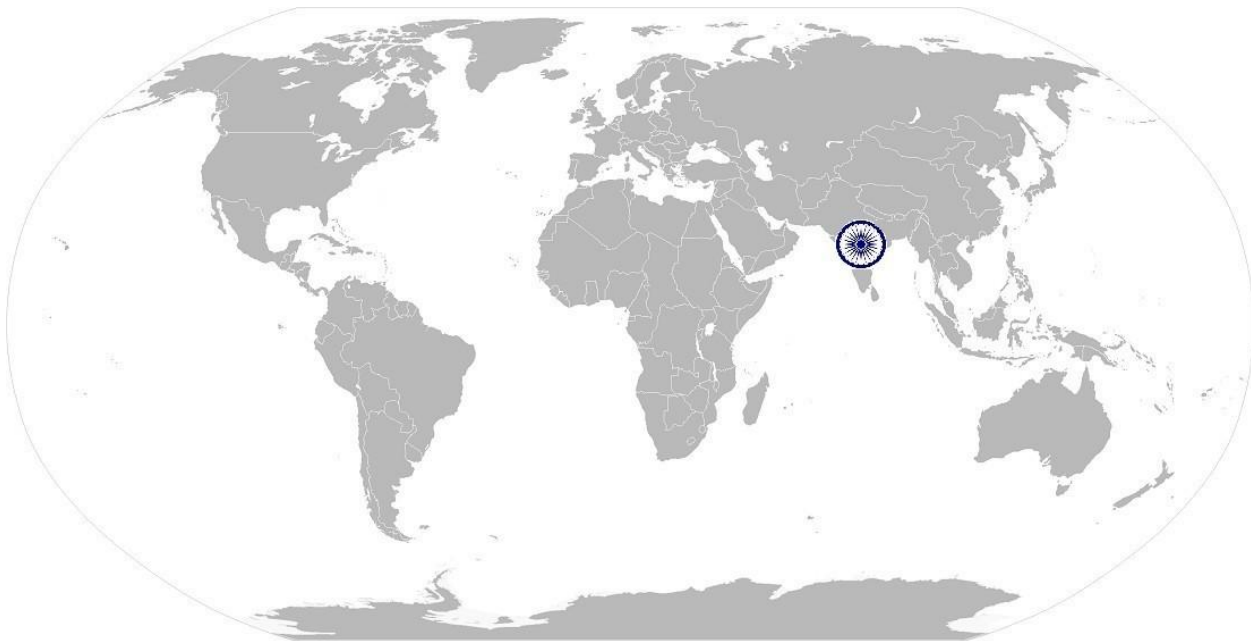
<b>NOS Code</b>	<b>AGR/N1127</b>		
<b>Credits (NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Agriculture and Allied</b>	<b>Drafted on</b>	<b>24/05/2016</b>
<b>Industry Sub-sector</b>	<b>Agriculture Crop Production</b>	<b>Last reviewed on</b>	<b>01/07/2016</b>
<b>Occupation</b>	<b>Farm Machinery, Equipment Operation And Maintenance</b>	<b>Next review date</b>	<b>01/07/2019</b>

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# National Occupational Standard



## Overview

This OS unit is about dismantling engine parts and carrying out repairs

**AGR/N1128**
**Carry out overhauling and repair of engine parts**

National Occupational Standard

<b>Unit Code</b>	<b>AGR/N1128</b>
<b>Unit Title (Task)</b>	<b>Carry out overhauling and repair of engine parts</b>
<b>Description</b>	This OS unit is about dismantling engine parts and carrying out repairs
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Dismantle engine parts and check their working</li> <li>• Assess the wear and tear of engine components and carry out troubleshooting</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Dismantle engine parts and check their working</b>	To be competent, the user/individual must be able to: <ul style="list-style-type: none"> <li>PC1. identify the types of engines and their components</li> <li>PC2. identify and understand the working of engine</li> <li>PC3. arrange all prerequisites required for the dismantling process such as tools, wooden blocks, protective clothing, etc.</li> <li>PC4. follow the prescribed dismantling procedures as defined in service manual</li> <li>PC5. clean the dismantled parts/nuts bolts</li> <li>PC6. keep the dismantled parts in a safe and dust free zone</li> <li>PC7. carry out visual inspection of all the parts</li> <li>PC8. check engine idle RPM and max idle RPM</li> <li>PC9. check the working of following Engine systems:             <ul style="list-style-type: none"> <li>• fuel system</li> <li>• lubrication system</li> <li>• cooling system</li> <li>• air intake and exhaust system</li> </ul> </li> <li>PC10. dismantle and inspect cylinder head, and check whether it requires replacement</li> <li>PC11. check water temperature, sensors, wiring, gauge, thermostat</li> <li>PC12. inspect engine front and rear oil seal and check whether they need replacement</li> <li>PC13. remove, flush and re-assemble radiator</li> </ul>
<b>Assess the wear and tear of engine components and carry out troubleshooting</b>	To be competent, the user/individual must be able to: <ul style="list-style-type: none"> <li>PC14. assess general wear and tear and decide on whether the parts are to be replaced or repaired</li> <li>PC15. assess taperness and ovality of cylinder bore</li> <li>PC16. inspect procedure of engine compression pressure, turbo charger, and exhaust gas recirculation systems</li> <li>PC17. check ovality of crank shaft/bearings</li> <li>PC18. measure the diameter of the piston rings and ring clearances</li> </ul>



**AGR/N1128**
**Carry out overhauling and repair of engine parts**

	PC19. measure and check the side clearance of piston rings PC20. check wear and tear in the valves PC21. check for the spring stiffness of the valves and clearance adjustment PC22. check for clearance between gear and oil pump body PC23. repair defective parts using hand tools, welding equipment, grinders, saws and other tools PC24. trouble shoot in case of any anomalies in engine parts
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. code of business conduct KA2. job responsibilities and duties KA3. safety precautions to be undertaken during operations KA4. standard dismantling procedures followed by the organization
<b>B. Technical Knowledge</b>	The user/individual on the job needs to know and understand: KB1. construction, working principles and functioning of tractor engines KB2. different engine components, their construction details, material used for engine parts , assembling and dismantling of engine parts, and their cleaning , repair, adjustment KB3. sequence for dismantling, re-assembling and all critical settings such as valve clearance, timing gears, FIP timing for inline and rotary pump KB4. measuring tools such as feeler gauge, fillet radius gauge, vernier, micrometer, dial gauge, dial bore gauge KB5. torque, back-up torque, power and its units and working of a four-stroke diesel engine KB6. working principle of fuel supply system including inline fuel injection pump and rotary pump system KB7. removal, flushing and assembly of engine radiator KB8. engine valves operating mechanism KB9. handling and use of working tools (incl. special tools) and equipments KB10. different systems of engines such as air intake and exhaust system , fuel supply system, cooling system, lubrication system, governing system KB11. repair and maintenance procedure of different components of engine and their troubleshooting KB12. testing procedure of repaired engine KB13. dangerous machines(regulation), act 1983
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	The user/ individual on the job needs to know and understand how to: SA1. note the information communicated SA2. note the tools and equipments to be used
	<b>Reading Skills</b>

**AGR/N1128**

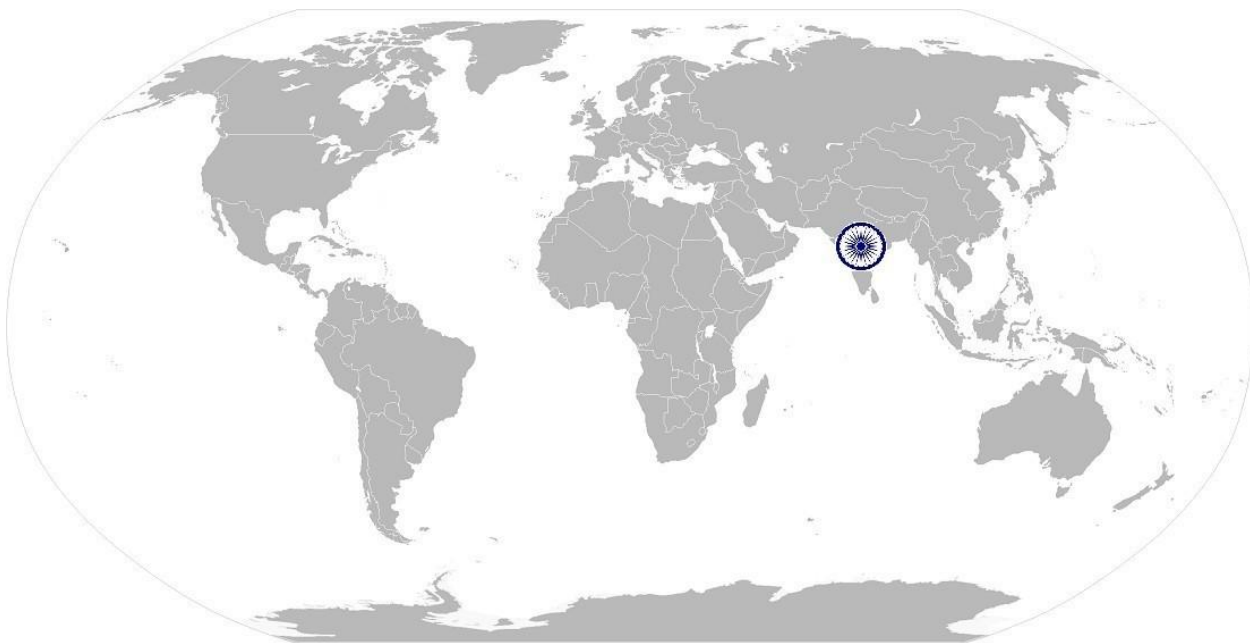
**Carry out overhauling and repair of engine parts**

	The user/individual on the job needs to know and understand how to: SA3. read and interpret the process required
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to: SA4. effectively communicate with customers, farmers and team members SA5. attentively listen and comprehend the information given by the speaker SA6. communicate clearly on the issues being faced
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to: SB1. handle issues pertaining to machine parts and equipments and decide corrective actions to be undertaken
	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to: SB2. plan and prioritize the work based on the instructions received SB3. plan to utilize time and equipments effectively
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to: SB4. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to: SB5. ensure proper fault finding and solution generation in consultation with key stakeholders such as farmers and team members
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB6. apply domain information about maintenance processes and technical knowledge about tools and equipment
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB7. use common sense and make judgments on day to day basis

**AGR/N1128**
**Carry out overhauling and repair of engine parts**

## NOS Version Control

NOS Code		AGR/N1128	
Credits (NSQF)	TBD	Version number	1.0
Industry	Agriculture and Allied	Drafted on	24/05/2016
Industry Sub-sector	Agriculture Crop Production	Last reviewed on	01/07/2016
Occupation	Farm Machinery, Equipment Operation And Maintenance	Next review date	01/07/2019

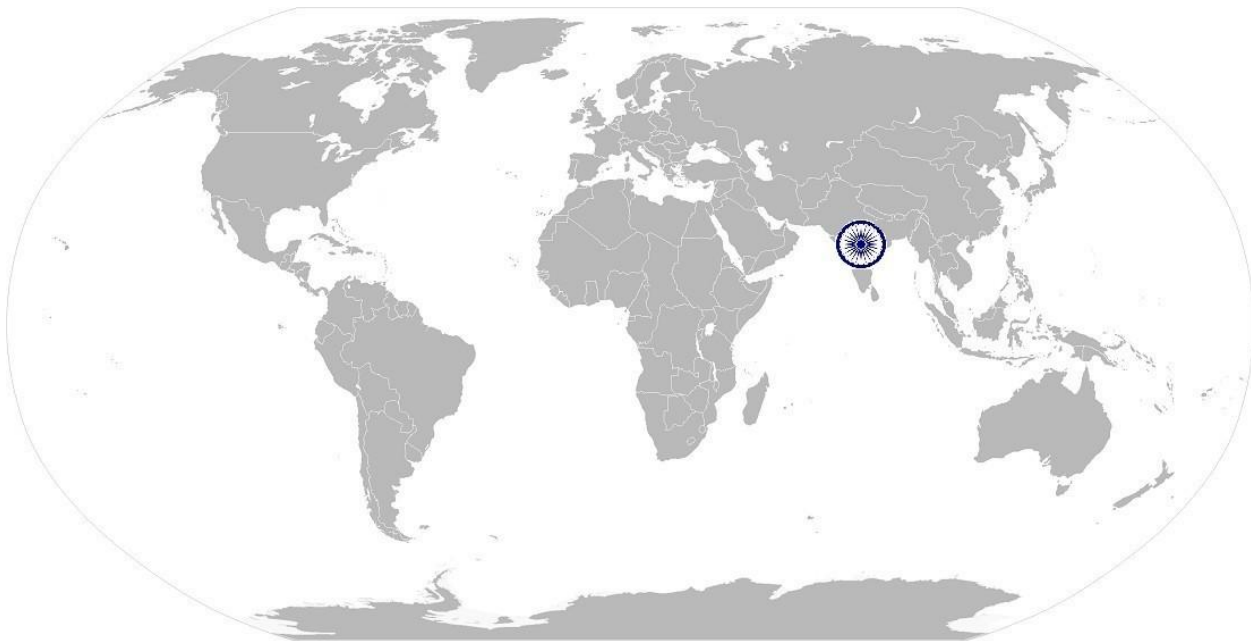
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**AGR/N1129**

**Carry out overhauling and repair of transmission, hydraulic and tractor-electrical systems**

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# National Occupational Standard



## Overview

This OS unit is about carrying out overhauling and checking the working and performance of transmission, hydraulic and tractor-electrical systems.

**AGR/N1129**

## Carry out overhauling and repair of transmission, hydraulic and tractor-electrical systems

National Occupational Standard

<b>Unit Code</b>	<b>AGR/N1129</b>
<b>Unit Title (Task)</b>	<b>Carry out overhauling and repair of transmission, hydraulic and tractor -electrical systems</b>
<b>Description</b>	This OS unit about carrying out overhauling and checking the working and performance of transmission, hydraulic and tractor-electrical systems
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>Diagnose, dismantle, check and repair transmission system</li> <li>Diagnose, dismantle, check and repair hydraulics system</li> <li>Diagnose, dismantle, check and repair tractor-electrical system</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Diagnose, dismantle, check and repair transmission system</b>	To be competent, the user/individual must be able to: <p>PC1. dismantle and assemble the transmission system as per the manufacturer's recommendation and by using appropriate hand tools</p> <p>PC2. check and adjust the working &amp; performance of clutch, gear box, rear axle, power take off, brakes and hydraulics system</p> <p>PC3. troubleshoot in case of any anomalies</p> <p>PC4. check free play setting of the clutch, finger height setting, alignment of clutch and plate</p> <p>PC5. check wear and tear of various parts of the clutch:</p> <ul style="list-style-type: none"> <li>flywheel</li> <li>clutch plate</li> <li>pressure plate</li> <li>clutch springs</li> <li>clutch fingers</li> <li>release bearings</li> </ul> <p>PC6. trouble shoot in case of any anomalies in Clutch</p> <p>PC7. check the reasons for noisy gear,slipping of gear, oil leakage in gearbox</p> <p>PC8. dismantle and check the working and performance of the gear box</p> <p>PC9. check gear ratio, torque ratio, and types of gear used in gear box</p> <p>PC10. trouble shoot in case of any anomalies in Gear box</p> <p>PC11. check and adjust front wheel hub play</p> <p>PC12. check all nuts and bolts and their tightening</p> <p>PC13. adjust steering geometry (toe in, toe out, camber angle, caster angle and kingpin inclination) and carry out troubleshooting of steering system</p> <p>PC14. check the brake discs ( dry and oil immersed), their working and maintenance and carry out troubleshooting including replacement of brake shoes and adjustment of free play</p> <p>PC15. ensure proper adjustment of brake and clutch and make sure the brakes and</p>

**AGR/N1129**

**Carry out overhauling and repair of transmission, hydraulic and tractor-electrical systems**

	<p>clutches free play are adjusted properly</p> <p>PC16. ensure that the brake paddle latch is engaged while driving on road</p> <p>PC17. carry out wheel track adjustment</p> <p>PC18. check the working and performance of the rear axle –differential, final reduction –bull &amp; pinion ,epyclic (planetary reduction unit) and wheel assembly</p> <p>PC19. check axle shaft,bearings oil seals and replace where necessary</p> <p>PC20. trouble shoot in case of any anomalies in rear axle</p> <p>PC21. check the steering system – in mechanical steering –steering box,linkages.in powersteering – steering motor (steering unit),steering cylinders &amp; linkages</p> <p>PC22. trouble shoot in case of any anomalies in mechanical &amp; power steering system</p> <p>PC23. dismantle &amp; check the 2wd front axle –centere pin, stub axle &amp; wheel assembly</p> <p>PC24. trouble shoot in case of any anamolies in 2wd front axle</p> <p>PC25. dismantle &amp; check the 4 wd front axle –drop box,propeller shaft,differential,axle shaft &amp; wheel assembly</p> <p>PC26. trouble shoot in case of any anamolies in 4wd front axle</p> <p>PC27. monitor the inflation pressure on the tyre as per the usage of the tractor</p> <p>PC28. check the tyres for any puncture and carry out refitting in that case</p>
<p><b>Diagnose, dismantle, check and repair hydraulics system</b></p>	<p>To be competent, the user/individual must be able to:</p> <p>PC29. dismantle the hydraulic system as per the manufacturer’s recommendation and by using appropriate hand tools</p> <p>PC30. check and adjust the components and functioning of the hydraulic pump</p> <p>PC31. check the components of the hydraulic distributor and hydraulic cylinder and find faults if any</p> <p>PC32. check the components of the hydraulic pipes</p> <p>PC33. check and adjust the functioning of draft control and position control hydraulics</p> <p>PC34. check the quality of hydraulic oil and check important linkages</p> <p>PC35. check working and functioning of hydraulic system pressure and carry out troubleshooting</p> <p>PC36. check the functioning of auxillary valve ( for external hydraulics)</p> <p>PC37. check the lift mechanism ( 3 point linkage ) of implements for tractors</p> <p>PC38. trouble shoot in case of any anomalies in hydraulics</p>
<p><b>Diagnose, dismantle, check and repair tractor-electrical system</b></p>	<p>To be competent, the user/individual must be able to:</p> <p>PC39. check the working and performance of battery</p> <p>PC40. check the functioning of different gauges in the instrument panel such as RPM guage, hour meter, fuel gauge, battery charging indicator, air filter choke indicator, etc</p> <p>PC41. monitor working and performance of alternator/dynamo and self starter</p>

**AGR/N1129**
**Carry out overhauling and repair of transmission, hydraulic and tractor-electrical systems**

	PC42. check the working and performance of regulating system PC43. monitor the working and performance of starting system, relays and fuses PC44. check the working of headlights, brakelights and horns PC45. perform trouble shooting of tractor electrical parts when required
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. code of business conduct KA2. job responsibilities and duties KA3. safety precautions to be undertaken during operation KA4. functioning of hydraulic, transmission and auto electrical systems
<b>B. Technical Knowledge</b>	The user/individual on the job needs to know and understand: KB1. construction and working of transmission systems KB2. different types of transmission systems – mechanical and hydraulic KB3. types of gears, types of transmission and power flow KB4. working principle of differential and final drive KB5. the sequence for dismantling, re-assembling and all critical settings KB6. principal of clutch, types of clutches (disc and plate type clutch, band type, cone type etc) and their general maintenance & trouble shooting KB7. principles of the working of the differential system and the steering system, their types and functioning KB8. types and functioning of power take off systems KB9. components and working of four wheel drive of front axle KB10. steering geometry, sequential dismantling of steering linkages, steering gear box, front axle hubs, pivot pins, re-assembling and critical settings KB11. toe in and toe out setting KB12. types of brakes (mechanical brake, hydraulic brake, vacuum brake, air assists hydraulic brake etc.) and their working KB13. principles of hydraulic system KB14. circuit reading in neutral, lift and lower conditions KB15. different types of hydraulic pump, valves and cylinders KB16. constructional features of battery, alternator and self starter KB17. working and usage of multimeter and hydrometer KB18. working of regulatory system, starting system and fuses/relays KB19. handling and use of working equipment tools and equipments KB20. lift mechanism for tractor KB21. working principle of hydraulic pascal's law KB22. basic electrical principle, ohm's law KB23. usage of special tools, leakage testing and trouble shooting KB24. dangerous machines(regulation), act 1983
<b>Skills (S)</b>	
<b>A. Core Skills/</b>	<b>Writing Skills</b>

**AGR/N1129**
**Carry out overhauling and repair of transmission, hydraulic and tractor-electrical systems**

<b>Generic Skills</b>	The user/ individual on the job needs to know and understand how to: SA1. note the information communicated SA2. note the tools and equipments to be used
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to: SA3. read and interpret the process required
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to: SA4. effectively communicate with customers, farmers and team members SA5. attentively listen and comprehend the information given by the speaker SA6. communicate clearly on the issues being faced
	<b>B. Professional Skills</b>
	The user/individual on the job needs to know and understand how to: SB1. handle issues pertaining to machine parts and equipments and decide corrective actions to be undertaken
	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to: SB2. plan and prioritize the work based on the instructions received SB3. plan to utilize time and equipments effectively
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to: SB3. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to: SB4. ensure proper fault finding and solution generation in consultation with key stakeholders such as farmers and team members
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB5. apply domain information about maintenance processes and technical knowledge about tools and equipment
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB6. use common sense and make judgments on day to day basis

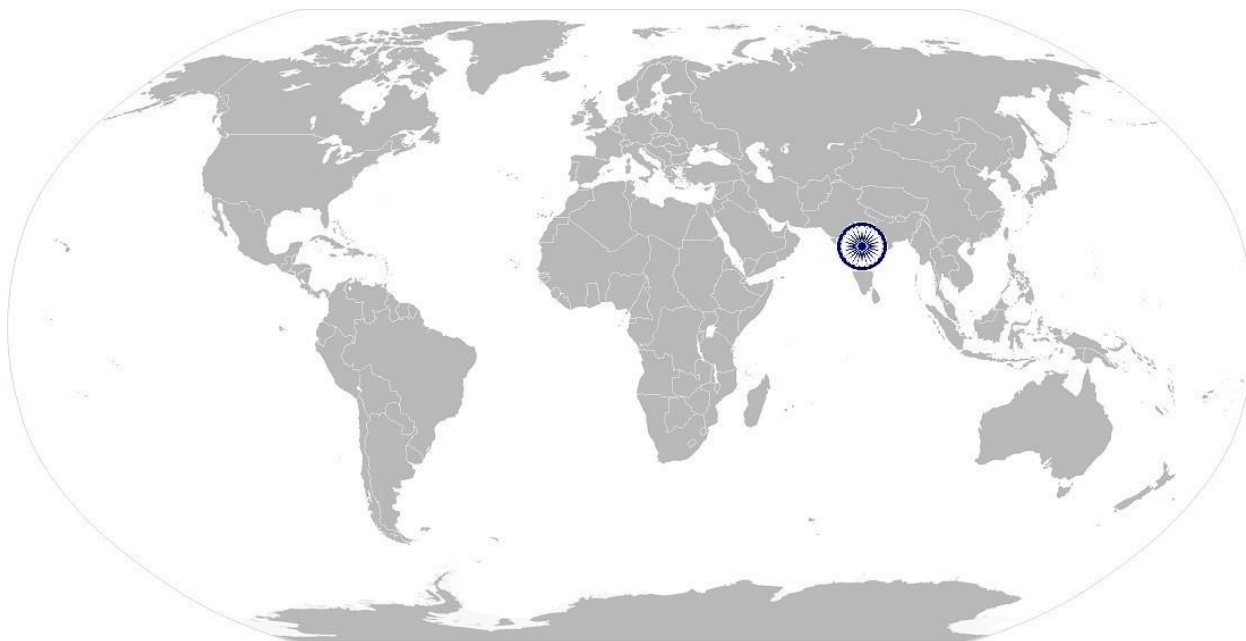


**AGR/N1129 Carry out overhauling and repair of transmission, hydraulic and tractor-electrical systems**

**NOS Version Control**

<b>NOS Code</b>	<b>AGR/N1129</b>		
<b>Credits (NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Agriculture and Allied</b>	<b>Drafted on</b>	<b>24/05/2016</b>
<b>Industry Sub-sector</b>	<b>Agriculture Crop Production</b>	<b>Last reviewed on</b>	<b>01/07/2016</b>
<b>Occupation</b>	<b>Farm Machinery, Equipment Operation And Maintenance</b>	<b>Next review date</b>	<b>01/07/2019</b>

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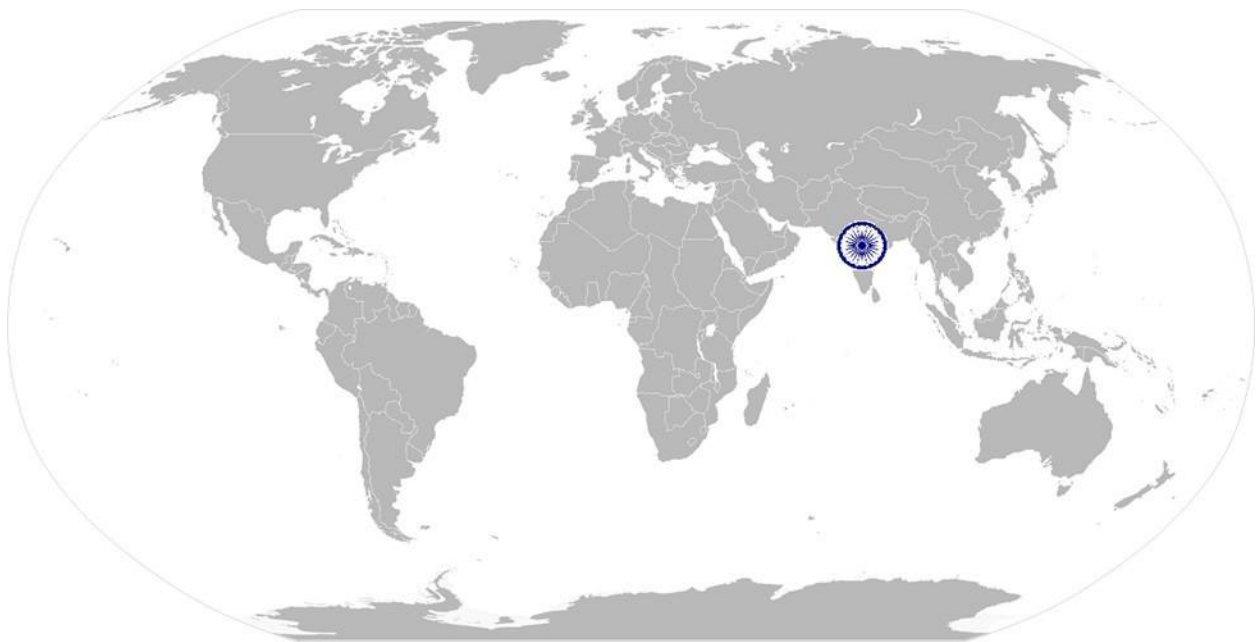


AGR/N1130

Carry out assembly of repaired and serviced parts

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# National Occupational Standard



## Overview

This OS unit is about assembling the repaired and serviced parts as per the instructions specified.

**AGR/N1130**
**Carry out assembly of repaired and serviced parts**

National Occupational Standard

<b>Unit Code</b>	<b>AGR/N1130</b>
<b>Unit Title (Task)</b>	<b>Carry out assembly of repaired and serviced parts</b>
<b>Description</b>	This OS unit is about assembling the repaired and serviced parts as per the instructions specified
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Clean and lubricate the parts</li> <li>• Assemble parts</li> <li>• Perform pre start checks</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Clean and lubricate the parts</b>	To be competent, the user/individual must be able to: PC1. carry out precise cleaning of fast moving parts/shafts and bearings PC2. carry out lubrication of parts where necessary PC3. follow the reverse sequence as in dismantling
<b>Assemble parts</b>	To be competent, the user/individual must be able to: PC4. assemble parts in reverse sequence of dismantling PC5. set position of draft control levers PC6. adjust and pre load bearings of gear box PC7. fit cage wheel and adjust track PC8. check tyre pressure suitability for different operations
<b>Perform pre start checks</b>	To be competent, the user/individual must be able to: PC9. ensure there is proper fuel bleeding before starting the tractor PC10. check for any leakages and tighten loose parts if any is detected PC11. start the engine and observe functioning for a certain period of time PC12. carry out troubleshooting in case any anomalies are detected
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. code of business conduct KA2. job responsibilities and duties KA3. standard procedures for carrying out assembly of repaired and serviced parts KA4. organization procedures for performing pre start checks
<b>B. Technical Knowledge</b>	The user/individual on the job needs to know and understand: KB1. importance of cleaning and procedure of cleaning various system of a tractor KB2. types of lubricant, life of lubricants and procedure of its application KB3. assembly procedure of various components of tractor KB4. dangerous machines(regulation), act 1983
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	The user/ individual on the job needs to know and understand how to: SA1. note the information communicated SA2. note the tools and equipments to be used

**AGR/N1130**

**Carry out assembly of repaired and serviced parts**

	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to: SA3. read and interpret the process required
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to: SA4. effectively communicate with customers, farmers and team members SA5. attentively listen and comprehend the information given by the speaker SA6. communicate clearly on the issues being faced
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to: SB1. handle issues pertaining to machine parts and equipments and decide corrective actions to be undertaken
	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to: SB2. plan and prioritize the work based on the instructions received SB3. plan to utilize time and equipments effectively
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to: SB4. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to: SB5. ensure proper fault finding and solution generation in consultation with key stakeholders such as farmers and team members
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB6. apply domain information about maintenance processes and technical knowledge about tools and equipment
<b>Critical Thinking</b>	
The user/individual on the job needs to know and understand how to: SB7. use common sense and make judgments on day to day basis	

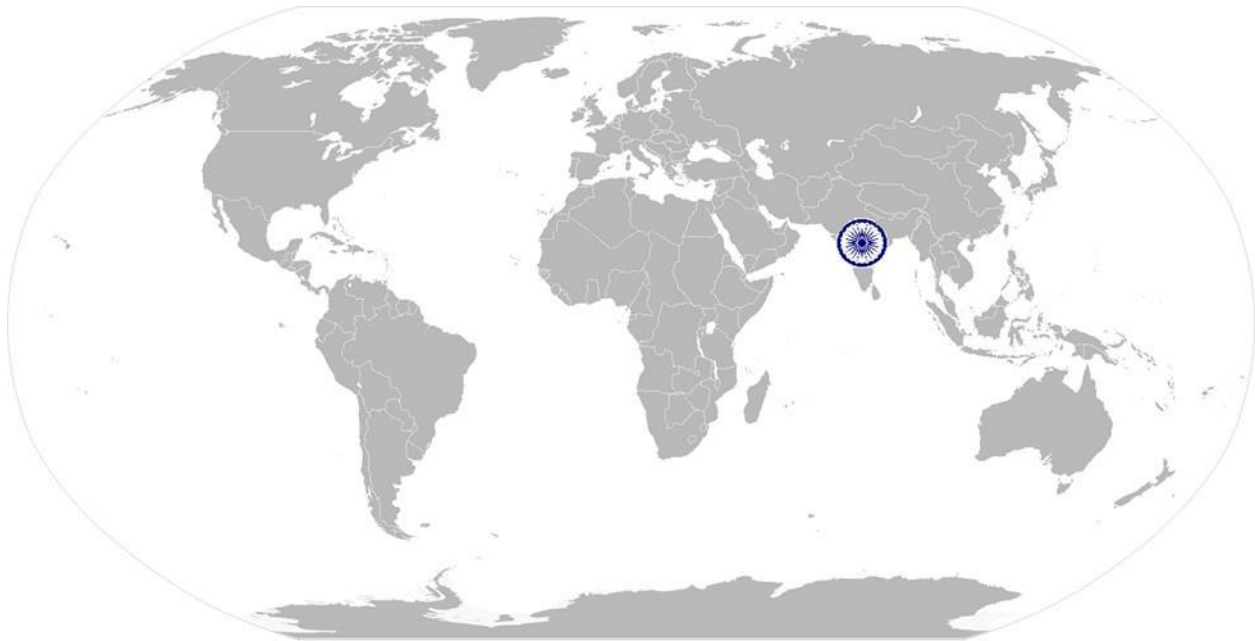
**AGR/N1130**

**Carry out assembly of repaired and serviced parts**

## NOS Version Control

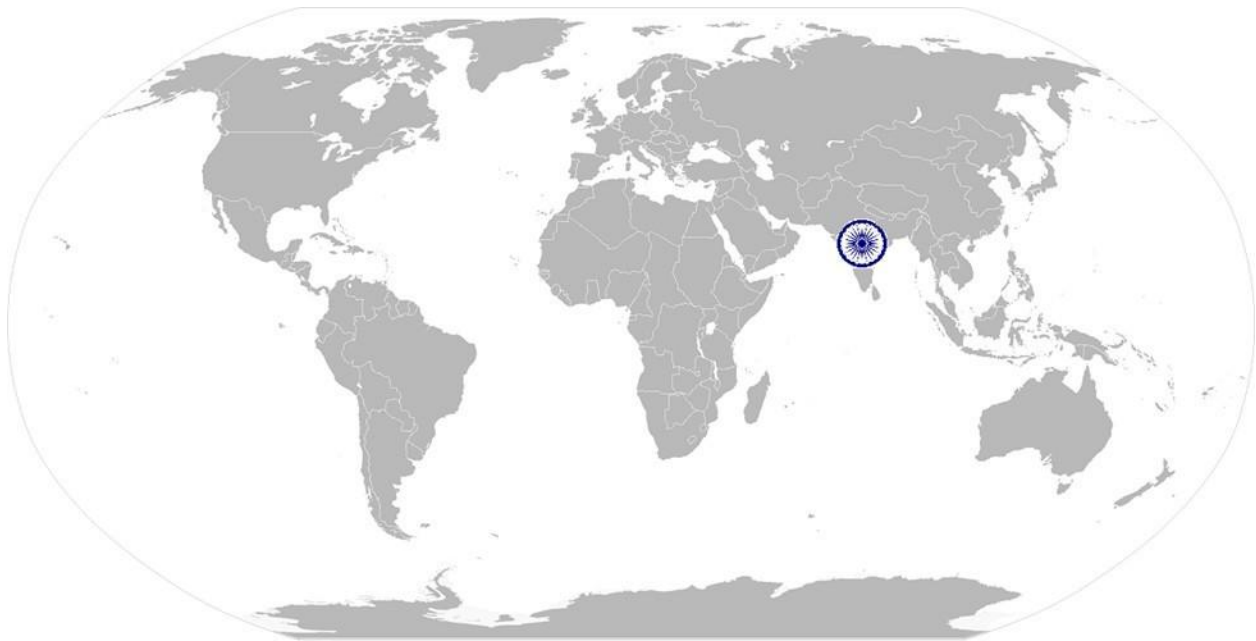
<b>NOS Code</b>	<b>AGR/N1130</b>		
<b>Credits (NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Agriculture and Allied</b>	<b>Drafted on</b>	<b>24/05/2016</b>
<b>Industry Sub-sector</b>	<b>Agriculture Crop Production</b>	<b>Last reviewed on</b>	<b>01/07/2016</b>
<b>Occupation</b>	<b>Farm Machinery, Equipment Operation And Maintenance</b>	<b>Next review date</b>	<b>01/07/2019</b>

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# National Occupational Standard



## Overview

This OS unit is about maintaining health and safety at the workplace.

## Maintain health and safety at the workplace

<b>Unit Code</b>	<b>AGR/N9903</b>
<b>Unit Title (Task)</b>	<b>Maintain health and safety at the workplace</b>
<b>Description</b>	This OS unit is about maintaining health and safety of self and other co workers at workplace.
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Maintain a clean and efficient workplace</li> <li>• Render appropriate emergency procedures</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Maintain a clean and efficient workplace</b>	To be competent, the individual must be able to: <ul style="list-style-type: none"> <li>PC1. undertake basic safety checks before operation of all machinery and vehicles and report all potential hazards to the supervisor</li> <li>PC2. identify work for which protective clothing or equipment is required and perform those duties in accordance with workplace policy</li> <li>PC3. read and understand the hazards of use and contamination mentioned on the labels of pesticides/fumigants, etc.</li> <li>PC4. assess risks prior to performing manual handling jobs, and work according to currently recommended safe practices</li> <li>PC5. use equipment and materials safely and correctly and return the same to designated storage when not in use</li> <li>PC6. dispose off waste safely and correctly in a designated area</li> <li>PC7. recognize risks to bystanders and take action to reduce risk associated with jobs in the workplace</li> <li>PC8. perform work in a manner which minimizes environmental damage all procedures and ensure work instructions for controlling risks are followed closely</li> <li>PC9. report any accidents, incidents or problems without delay to an appropriate person and take necessary immediate action to reduce further danger</li> </ul>
<b>Render appropriate emergency procedures</b>	To be competent, the individual must be able to: <ul style="list-style-type: none"> <li>PC10. follow procedures for dealing with accidents, fires and emergencies, including communicating location and directions for emergency evacuation</li> <li>PC11. follow emergency procedures to company standard / workplace requirements</li> <li>PC12. use emergency equipment in accordance with manufacturers' specifications and workplace requirements</li> <li>PC13. provide treatment appropriate to the patient's injuries in accordance with recognized first aid techniques</li> </ul>

**AGR/N9903**

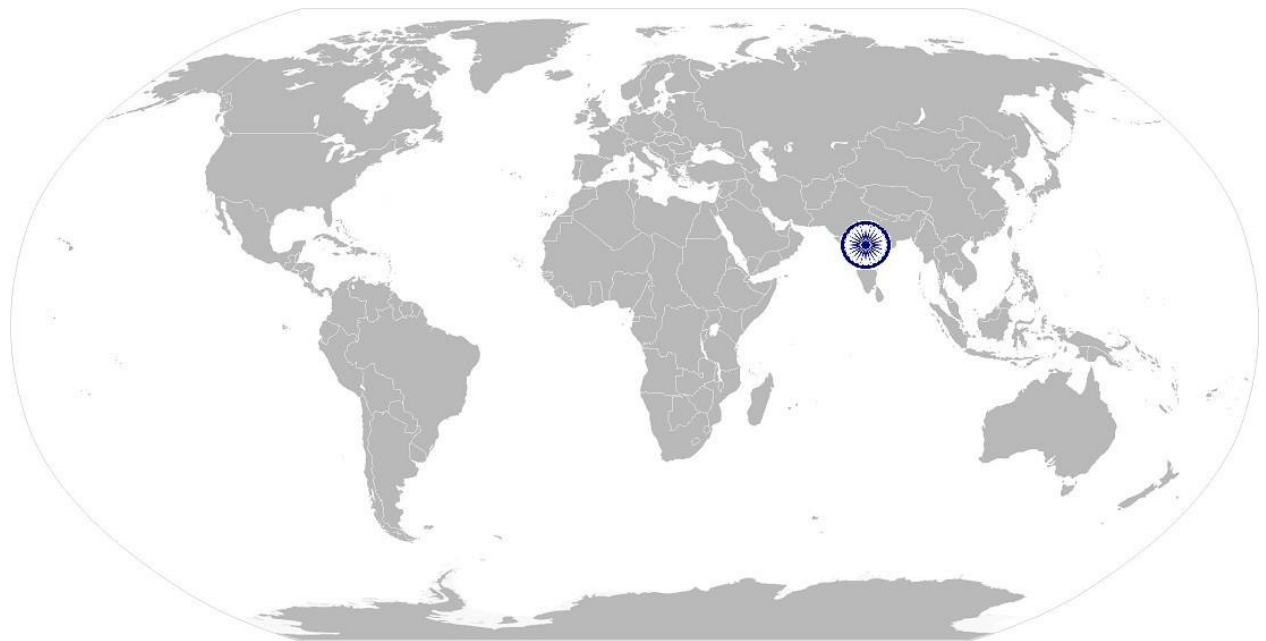
**Maintain health and safety at the workplace**

	<p>PC14. recover (if practical), clean, inspect/test, refurbish, replace and store the first aid equipment as appropriate</p> <p>PC15. report details of first aid administered in accordance with workplace procedures</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. personal hygiene and fitness requirements</p> <p>KA2. general duties under the relevant health and safety legislation</p> <p>KA3. personal protective equipment to be worn and how it is cared for the correct and safe way to use materials and equipment required for your work</p> <p>KA4. the correct and safe way to use materials and equipment required for work</p> <p>KA5. importance of good housekeeping in the workplace</p> <p>KA6. safe disposal methods for waste</p> <p>KA7. methods for minimizing environmental damage during work</p>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. the risks to health and safety and the measures to be taken to control those risks in your area of work</p> <p>KB2. workplace procedures and requirements for the treatment of workplace injuries/illnesses</p> <p>KB3. basic emergency first aid procedure</p> <p>KB4. local emergency services</p> <p>KB5. importance of reporting accidents, incidents and problems and the appropriate action to take</p>
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	The user/ individual on the job needs to know and understand how to:
	SA1. mention the data which are required for record keeping purpose
	SA2. report problems to the appropriate personnel in a timely manner
	SA3. write descriptions and details about incidents in reports
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to:
	SA4. read instruction manual for hand tool and equipments
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to:
	SA5. communicate clearly and effectively with others like farmers and team members , concerned officer/stakeholders
	SA6. comprehend information shared by senior people and experts
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to:
	SB1. make decisions pertaining to types of tools to be used
	SB2. identify need of first aid and render it accordingly
	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to:
	SB3. schedule daily activities and drawing up priorities, allocate start times,



### Maintain health and safety at the workplace

	estimation of completion times and materials, equipment and assistance required for completion.
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to: SB4. manage relationships with co-workers and managers of the who may be stressed, frustrated, confused or angry
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to: SB5. think through the problem, evaluate the possible solutions and take up optimum / best solutions
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB6. monitor and maintain the condition of tools and equipment SB7. assess situation and identify appropriate control measures
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB8. take up own work and learning



**Maintain health and safety at the workplace**

**NOS Version Control**

<b>NOS Code</b>	<b>AGR/N9903</b>		
<b>Credits (NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Agriculture and Allied</b>	<b>Drafted on</b>	<b>24/05/2016</b>
<b>Industry Sub-sector</b>	<b>Agriculture Crop Production</b>	<b>Last reviewed on</b>	<b>01/07/2016</b>
<b>Occupation</b>	<b>Farm Machinery, Equipment Operation And Maintenance</b>	<b>Next review date</b>	<b>01/07/2019</b>

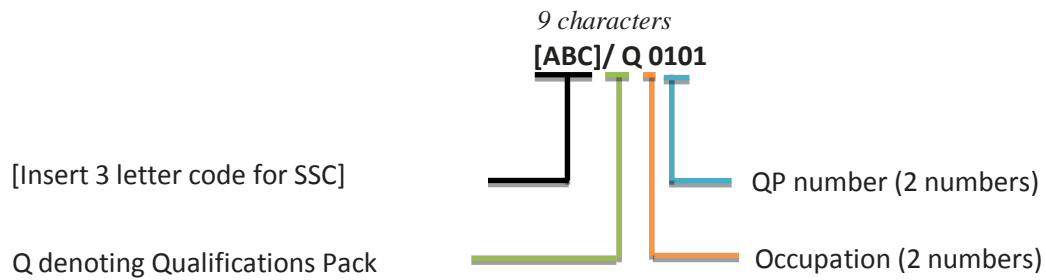
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## Annexure

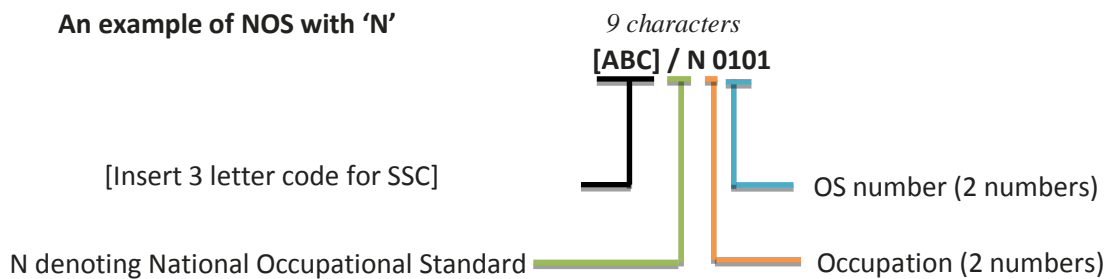
### Nomenclature for QP and NOS

#### Qualifications Pack



#### Occupational Standard

##### An example of NOS with 'N'



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The following acronyms/codes have been used in the nomenclature above:

Sub-sector	Range of Occupation numbers
<b>Agriculture Crop Production</b>	<b>01 – 40</b>
<b>Dairying</b>	<b>41 – 42</b>
<b>Poultry</b>	<b>43 – 44</b>
<b>Animal Husbandry</b>	<b>45 – 48</b>
<b>Fisheries</b>	<b>49 – 51</b>
<b>Agriculture Allied Activities</b>	<b>52 – 60</b>
<b>Forestry, Environment and Renewable Energy Management</b>	<b>61 - 70</b>
<b>Agriculture Industries</b>	<b>71 – 90</b>
<b>Generic Occupations</b>	<b>96 - 99</b>

Sequence	Description	Example
<b>Three letters</b>	Industry name	AGR
<b>Slash</b>	/	/
<b>Next letter</b>	Whether QP or NOS	Q or N
<b>Next two numbers</b>	Occupation code	01
<b>Next two numbers</b>	OS number	01

Note:

- The range of occupation numbers have been decided based on the number of existing and future occupations in a segment
- Occupation numbers from 91 – 95 have been intentionally left blank to accommodate any emerging segment in future

## CRITERIA FOR ASSESSMENT OF TRAINEES

**Job Role** Tractor Mechanic

**Qualification Pack** AGR/Q1108

**Sector Skill Council** Agriculture Skill Council of India

### Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criterion.
6. To pass the Qualification Pack, every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.
7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Compulsory		Marks Allocation			
Total Marks: 600					
Assessment outcomes	Assessment criteria for outcomes	Total Marks	Out Of	Theory	Skills Practical
<b>1. AGR/N1126 Prepare for carrying out tractor repair and maintenance</b>	PC1. identify types of tractor, their components and agricultural/commercial applications	<b>100</b>	9	3	6
	PC2. identify, understand and monitor working of:				
	• types of clutches ( single, dual and independent) and actuation mechanisms		10	3	7
	• working and types of gear box				
	• chassis				
• IC engine, lubrication, cooling system, air and exhaust system					

	<ul style="list-style-type: none"> <li>fuel supply and transmission systems</li> </ul>				
	<ul style="list-style-type: none"> <li>front and rear axle</li> </ul>				
	<ul style="list-style-type: none"> <li>steering and suspension systems</li> </ul>				
	<ul style="list-style-type: none"> <li>wheel and tyres</li> </ul>				
	<ul style="list-style-type: none"> <li>brakes ( both dry and oil immersed)</li> </ul>				
	<ul style="list-style-type: none"> <li>tractor electrical system ( charging, starting, wiring harness, instrument cluster,etc)</li> </ul>				
	<ul style="list-style-type: none"> <li>types of hydraulics system</li> </ul>				
	PC3. carry out field trial measurement and check fuel consumption, coverage and depth		9	3	6
	PC4. identify the different applications of a tractor – agricultural and non-agricultural		9	3	6
	PC5. identify and study different agriculture implements				
	<ul style="list-style-type: none"> <li>seed bed preparation - tillage implements –mb plow,disc plow,cultivator etc.,</li> </ul>				
	<ul style="list-style-type: none"> <li>sowing implements – seed drill, planter etc.,</li> </ul>				
	<ul style="list-style-type: none"> <li>crop care implements – sprayers,irrigation pumps,ridger etc.,</li> </ul>		9	3	6
	<ul style="list-style-type: none"> <li>harvesting implements/quipments – reaper,harvester etc.,</li> </ul>				
	<ul style="list-style-type: none"> <li>post harvesting implements – thresher,baler etc.,</li> </ul>				
	PC6. select implement as per tractor by checking tractor versus implement compatibility		9	2	7

	PC7. hitch and adjust the implements with the tractor		9	2	7
	PC8. drive and operate the tractor with and without implements		9	2	7
	PC9. identify tools required in dismantling and assembling different systems of a tractor		9	3	6
	PC10. identify and select measuring tools and equipments required for repair and maintenance		9	3	6
	PC11. identify and select marking tools as well as OEM recommended special service tools		9	3	6
			<b>100</b>	<b>30</b>	<b>70</b>
<b>2. AGR/N1127 Perform necessary routine checks and maintenance of the tractor</b>	PC1. read the manufacturer's manual, the maintenance schedule and understand specifications of components and accessories	<b>100</b>	8	3	5
	PC2. carry out periodical maintenance of tractor (10 hours, 50 hours, 100 hours, 250 hours, 500 hours and 1000 hours)		8	3	5
	PC3. test tractor on the road to check working of the engine, clutch, gears, brakes and steering		8	3	5
	PC4. assess the working of implements such as harrow, rotavator, seed drills, etc		8	3	5
	PC5. carry out fan belt play checks and adjustment		8	2	6
	PC6. check for oil level and leakage of engine, air cleaner, gear box, rear axle and steering		8	2	6
	PC7. change engine oil filter, turbo filter, fuel filter and hydraulic filter		8	2	6
	PC8. check the coolant in the radiator/reservoir tank		8	2	6
	PC9. check for any bleeding or air locks in the fuel system		8	2	6
	PC10. check battery electrolyte level		7	2	5
	PC11. check that the right temperature is		7	2	5

	maintained in the gauge				
	PC12. check for the right oil pressure		7	2	5
	PC13. check that the hour meter is adjusted correctly		7	2	5
			<b>100</b>	<b>30</b>	<b>70</b>
<b>3. AGR/N1128 Carry out overhauling and repair of engine parts</b>	PC1. identify the types of engines and their components	<b>100</b>	4	1	3
	PC2. identify and understand the working of engine		4	1	3
	PC3. arrange all prerequisites required for the dismantling process such as tools, wooden blocks, protective clothing, etc.		4	2	2
	PC4. follow the prescribed dismantling procedures as defined in service manual		5	2	3
	PC5. clean the dismantled parts/nuts bolts		4	1	3
	PC6. keep the dismantled parts in a safe and dust free zone		4	1	3
	PC7. carry out visual inspection of all the parts		4	1	3
	PC8. check engine idle RPM and max idle RPM		4	1	3
	PC9. check the working of following Engine systems:		5	2	3
	• fuel system				
	• lubrication system				
	• cooling system				
	• air intake and exhaust system				
	PC10. dismantle and inspect cylinder head, and check whether it requires replacement		4	1	3
PC11. check water temperature, sensors, wiring, gauge, thermostat	4	1	3		
PC12. inspect engine front and rear oil seal and check whether they need replacement	5	2	3		
PC13. remove, flush and re-assemble radiator	4	1	3		



	PC14. assess general wear and tear and decide on whether the parts are to be replaced or repaired		5	2	3
	PC15. assess taperness and ovality of cylinder bore		4	1	3
	PC16. inspect procedure of engine compression pressure, turbo charger, and exhaust gas recirculation systems		4	1	3
	PC17. check ovality of crank shaft/bearings		4	1	3
	PC18. measure the diameter of the piston rings and ring clearances		4	1	3
	PC19. measure and check the side clearance of piston rings		4	1	3
	PC20. check wear and tear in the valves		4	1	3
	PC21. check for the spring stiffness of the valves and clearance adjustment		4	1	3
	PC22. check for clearance between gear and oil pump body		4	1	3
	PC23. repair defective parts using hand tools, welding equipment, grinders, saws and other tools		4	1	3
	PC24. trouble shoot in case of any anomalies in engine parts		4	2	2
			<b>100</b>	<b>30</b>	<b>70</b>
<b>4. AGR/N1129 Carry out overhauling and repair of transmission, hydraulic and tractor-electrical systems</b>	PC1. dismantle and assemble the transmission system as per the manufacturer's recommendation and by using appropriate hand tools	<b>100</b>	3	1	2
	PC2. check and adjust the working & performance of clutch, gear box, rear axle, power take off, brakes and hydraulics system		3	1	2
	PC3. troubleshoot in case of any anomalies		2	1	1
	PC4. check free play setting of the clutch, finger height setting, alignment of clutch and plate		3	1	2
	PC5. check wear and tear of various parts of the clutch:		3	1	2
	— flywheel				

	— clutch plate				
	— pressure plate				
	— clutch springs				
	— clutch fingers				
	— release bearings				
PC6.	trouble shoot in case of any anomalies in clutch	2	1	1	
PC7.	check the reasons for noisy gear,slipping of gear, oil leakage in gearbox	2	0.5	1.5	
PC8.	dismantle and check the working and performance of the gear box	2	0.5	1.5	
PC9.	check gear ratio, torque ratio, and types of gear used in gear box	2	0.5	1.5	
PC10.	trouble shoot in case of any anomalies in Gear box	2	0.5	1.5	
PC11.	check and adjust front wheel hub play	2	0.5	1.5	
PC12.	check all nuts and bolts and their tightening	2	0.5	1.5	
PC13.	adjust steering geometry (toe in, toe out, camber angle, caster angle and kingpin inclination) and carry out troubleshooting of steering system	3	1	2	
PC14.	check the brake discs ( dry and oil immersed), their working and maintenance and carry out troubleshooting including replacement of brake shoes and adjustment of free play	3	1	2	
PC15.	ensure proper adjustment of brake and clutch and make sure the brakes and clutches free play are adjusted properly	2	0.5	1.5	
PC16.	ensure that the brake paddle latch is engaged while driving on road	2	0.5	1.5	
PC17.	carry out wheel track adjustment	2	0.5	1.5	
PC18.	check the working and performance of the rear axle –differential, final reduction –bull & pinion ,epyclic	3	1	2	

	(planetary reduction unit) and wheel assembly				
PC19.	check Axle shaft,bearings oil seals and replace where necessary	2	0.5	1.5	
PC20.	trouble shoot in case of any anomalies in rear axle	2	0.5	1.5	
PC21.	check the steering system – in mechanical steering –steering box,linkages.in powersteering – steering motor (steering unit),steering cylinders & linkages	3	1	2	
PC22.	trouble shoot in case of any anomalies in mechanical & power steering system	2	1	1	
PC23.	dismantle & check the 2wd front axle –centere pin, stub axle & wheel assembly	3	1	2	
PC24.	trouble shoot in case of any anomalies in 2wd front axle	2	0.5	1.5	
PC25.	dismantle & check the 4 wd front axle –drop box,propeller shaft,differential,axle shaft & wheel assembly	2	0.5	1.5	
PC26.	trouble shoot in case of any anomalies in 4wd front axle	2	1	1	
PC27.	monitor the inflation pressure on the tyre as per the usage of the tractor	2	0.5	1.5	
PC28.	check the tyres for any puncture and carry out refitting in that case	2	0.5	1.5	
PC29.	dismantle the hydraulic system as per the manufacturer's recommendation and by using appropriate hand tools	2	0.5	1.5	
PC30.	check and adjust the components and functioning of the hydraulic pump	2	0.5	1.5	
PC31.	check the components of the hydraulic distributor and hydraulic cylinder and find faults if any	2	0.5	1.5	
PC32.	check the components of the	2	0.5	1.5	

	hydraulic pipes				
	PC33. check and adjust the functioning of draft control and position control hydraulics		2	0.5	1.5
	PC34. check the quality of hydraulic oil and check important linkages		2	0.5	1.5
	PC35. check working and functioning of hydraulic system pressure and carry out troubleshooting		2	0.5	1.5
	PC36. check the functioning of auxillary valve ( for external hydraulics)		2	0.5	1.5
	PC37. check the lift mechanism ( 3 point linkage ) of implements for tractors		2	0.5	1.5
	PC38. trouble shoot in case of any anomalies in hydraulics		2	0.5	1.5
	PC39. check the working and performance of battery		2	0.5	1.5
	PC40. check the functioning of different gauges in the instrument panel such as RPM guage, hour meter, fuel gauge, battery charging indicator, air filter choke indicator, etc		3	1	2
	PC41. monitor working and performance of alternator/dynamo and self starter		2	1	1
	PC42. check the working and performance of regulating system		2	0.5	1.5
	PC43. monitor the working and performance of starting system, relays and fuses		2	0.5	1.5
	PC44. check the working of headlights, brakelights and horns		2	0.5	1.5
	PC45. perform trouble shooting of tractor electrical parts when required		2	0.5	1.5
			<b>100</b>	<b>30</b>	<b>70</b>
<b>5. AGR/N1130 Carry out assembly of repaired and serviced parts</b>	PC1. carry out precise cleaning of fast moving parts/shafts and bearings	<b>100</b>	8	3	5
	PC2. carry out lubrication of parts where		8	2	6

	necessary				
	PC3. follow the reverse sequence as in dismantling		8	2	6
	PC4. assemble parts in reverse sequence of dismantling		9	3	6
	PC5. set position of draft control levers		8	2	6
	PC6. adjust and pre load bearings of gear box		8	2	6
	PC7. fit cage wheel and adjust track		8	2	6
	PC8. check tyre pressure suitability for different operations		9	3	6
	PC9. ensure there is proper fuel bleeding before starting the tractor		9	3	6
	PC10. check for any leakages and tighten loose parts if any is detected		8	3	5
	PC11. start the engine and observe functioning for a certain period of time		8	2	6
	PC12. carry out troubleshooting in case any anomalies are detected		9	3	6
			<b>100</b>	<b>30</b>	<b>70</b>
<b>6. AGR/N9903 Maintain health and safety at the workplace</b>	PC1. undertake basic safety checks before operation of all machinery and vehicles and report all potential hazards to the supervisor	<b>100</b>	6	2	4
	PC2. identify work for which protective clothing or equipment is required and perform those duties in accordance with workplace policy		7	2	5
	PC3. read and understand the hazards of use and contamination mentioned on the labels of pesticides/fumigants, etc.		7	2	5
	PC4. assess risks prior to performing manual handling jobs, and work according to currently recommended safe practices		7	2	5
	PC5. use equipment and materials safely and correctly and return the same to designated storage when not in use		7	2	5
	PC6. dispose off waste safely and correctly		6	2	4

	in a designated area				
	PC7. recognize risks to bystanders and take action to reduce risk associated with jobs in the workplace		7	2	5
	PC8. perform work in a manner which minimizes environmental damage all procedures and ensure work instructions for controlling risks are followed closely		7	2	5
	PC9. report any accidents, incidents or problems without delay to an appropriate person and take necessary immediate action to reduce further danger		7	2	5
	PC10. follow procedures for dealing with accidents, fires and emergencies, including communicating location and directions for emergency evacuation		7	2	5
	PC11. follow emergency procedures to company standard / workplace requirements		6	2	4
	PC12. use emergency equipment in accordance with manufacturers' specifications and workplace requirements		7	2	5
	PC13. provide treatment appropriate to the patient's injuries in accordance with recognized first aid techniques		7	2	5
	PC14. recover (if practical), clean, inspect/test, refurbish, replace and store the first aid equipment as appropriate		6	2	4
	PC15. report details of first aid administered in accordance with workplace procedures.		6	2	4
			<b>100</b>	<b>30</b>	<b>70</b>
	<b>GRAND TOTAL</b>	<b>600</b>	<b>600</b>	<b>180</b>	<b>420</b>

