City & Guilds Level 2 Award in Safe Application of Pesticides using Variable Geometry Boom or Broadcast Sprayers (PA3) (0216-51)

Version 1.1 (February 2025)

Assessment Pack – Candidate Version

Version and date	Change detail	Section
1.0	First version	All
1.1 February 2025	Unit Number updated Formatting	Throughout

Contents

Introduction

This assessment relates to the unit in the Qualification handbook. The assessment can be achieved at pass only. If any task is not yet met the candidate is unsuccessful.

This assessment is for the following units and learning outcomes:

Unit 238 Operating a broadcast sprayer with air assistance covering the following learning outcomes:

1. Know the legislative and safety regulations relating to application equipment
2. Be able to assess the environmental factors relating to mixing and application
3. Be able to read and interpret product information
4. Be able to prepare and calibrate the applicator
5. Be able to operate the application equipment
6. Know how to carry out post-operational procedures

Unit 239 Operating a variable geometry boom sprayer with air assistance covering the following learning outcomes:

1. Know the legislative and safety regulations relating to application equipment
2. Be able to assess the environmental factors relating to mixing and application
3. Be able to read and interpret product information
4. Be able to prepare and calibrate the applicator
5. Be able to operate the application equipment
6. Know how to carry out post-operational procedures

Unit 240 Operating a variable geometry boom sprayer without air assistance covering the following learning outcomes:

1. Know the legislative and safety regulations relating to application equipment
2. Be able to assess the environmental factors relating to mixing and application
3. Be able to read and interpret product information
4. Be able to prepare and calibrate the applicator
5. Be able to operate the application equipment
6. Know how to carry out post-operational procedures

General guidance on the requirements for assessment can be found in the Assessor Guidance General guidance on the requirements for assessment can be found in the Assessor Guidance document available on the City & Guilds web site **www.nptc.org.uk**

The assessor must complete the Practical Table mark sheet for each candidate which should be kept by the assessor for a minimum period of twelve months.

Assessment Time

The expected assessment time for this qualification is 1.5 – 3 hours.

Summary of responsibilities in the assessment process

Centre responsibilities	Candidate responsibilities	Assessor responsibilities
A suitable site is made available for the assessment to take place		Ensuring that the site provided is suitable for the assessment to take place
Machinery, equipment and materials are available to enable assessment of all the activities to take place	To be familiar with the machinery/equipment being used for the assessment	Ensuring that the machinery, equipment and materials provided satisfy the assessment requirements
	To bring appropriate Personal Protective Equipment (PPE) to the assessment	Ensuring that candidate's PPE complies with the requirements of the assessment
	To bring relevant training materials (including calibration sheet if applicable)	
	To bring a product label appropriate for the assessment	To ensure that the product label is appropriate for the assessment (or provide a suitable alternative)

This is not an open book assessment, however additional technical information may be sought from the relevant manufacturer's operator manuals or any other appropriate training or safety publication.

Practical observation descriptor table

Unit 238 Operating a broadcast sprayer with air assistance:

Activity number and description from check list		Assessment criteria
1.1	Describe the legal requirements relating to applying pesticides using air assisted broadcast sprayers	May include: • all required guards are in place and equipment complies with legal requirements • comply with all relevant road traffic regulations when operating or transporting on the public highway • comply with The Plant Protection Products (Sustainable Use) Regulations 2012 • the operator must hold the appropriate certification for the equipment they are using
1.2	Describe how to apply pesticides safely using air assisted broadcast sprayers following industry best practice	Operator safety regulation may include: • comply with Pesticide Codes of Practice • adopt industry best practice • be aware of any safety implications imposed by Risk/COSHH Assessment and comply with the requirements Checks to protect self from pesticide contamination: Sealed cab: • fit carbon filter • use of in-cab controls • ensure ventilation system is functional • close all windows • contaminated PPE stored in external locker • awareness of the siting of pressurised components within confines of cab Open cab/canopy/platform: • use of appropriate PPE • awareness of the siting of pressurised components within confines of cab/canopy/platform Checks to protect self from physical danger during operation: • compatibility of prime mover and sprayer • front weights • wheel track width

		• correct tyre pressures • condition of tyres • brake function Safe practice when driving on uneven/sloping terrain: • assess conditions • select four wheel drive • appropriate speed • correct gear selection • effect of changing load on stability • use of weights to stabilise prime mover • correct turning procedure • keep centre of gravity as low as possible Consideration for safe driving on a public highway: • independent brakes coupled together • travelling at high speed makes vehicle unstable
2.1	Identify risks to the environment	May include: • ground conditions • water courses • environmental margins/strips/areas • drains • boreholes • wildlife • non-target plants • sensitive crops/areas • hedgerows • housing • public access • other risks particular to the site
2.2	Explain how to minimise risks to the environment	Explanation may include the following points: • use an appropriate pesticide (minimal environmental impact) • careful timing of application • check and maintain application rate • avoid off target application • observe buffer zones • comply with air assisted LERAP requirements • erect warning signs • notify neighbours Minimising spray drift: • avoidance of contamination to people and the environment Check wind speed and direction:

		• use of anemometer or visual signs at suitable height • wind direction Factors that affect spray drift: • weather conditions • direction of spraying • presence of natural/living windbreaks • nozzle type and size • pressure • fan speed • fan pitch • forward speed • nozzle configuration • target canopy density • use of air deflector(s)
3.1 - 3.2	Read product information Interpret product information	May include the following: • product name • active substance(s) (ingredient(s)) Important information: • field of use • crop/target • maximum individual dose • maximum total dose • maximum number of treatments • specific product precautions/warnings • operator protection • environmental protection • restrictions on use Crop specific information: • crop/target • dose rate • water volume • timing Mixing and spraying: • filling • recommended nozzles • spray quality • additional label information • compatibility
4.1	Identify applicator controls and components	May include all/any of the following: • main spray tank • clean water tank • hand wash tank • pump • pulsation damper • filling control and devices • agitation control • pressure adjustment control

		• pressure gauge • on/off • boom isolators • boom section pressure compensation controls • filters • nozzles • diaphragm check valves • tank wash system • tank drain • fan blades and adjustment (if applicable) • fan speed control • air deflector(s) • trash guard • other components/controls specific to the applicator Nozzle types: • hollow cone – good coverage • hollow cone air inclusion – drift reduction properties
4.2	Carry out pre use checks to the prime mover	May include: • guards in place and in good condition • visual inspection of the wheels and tyres • tyre pressures • fuel level adequate • engine oil level is within acceptable limits • hydraulic oil level is within acceptable limits (if accessible) • transmission oil level is within acceptable limits (if accessible) • coolant level is adequate • engine air filter is clean
4.3	Carry out pre-use and operational checks to the sprayer	May include all/some of the following as applicable to the sprayer/applicator: Security of attachment: • fasteners tight • straps inspected and adjusted if necessary • linkage secure • sideways movement restricted • drawbar pin secured Possible mechanical defects: • seized, worn or damaged controls/components • electrical connector Applicator lubrication:

		• identification of lubrication points • visual inspection of lubrication points • visual inspection of levels Candidate to remove, clean and refit filter: • remove and clean using appropriate method • contain spillage • check for defects, replace if damaged • refit Candidate to remove, clean and refit a nozzle/restrictor: • remove and clean using appropriate method • contain spillage • check for defects replace if worn/damaged • refit Use of control panel may include: • functions of control panel • recognition of malfunctions before and during operation • check accuracy of base settings • switch to manual/test mode where applicable Part fill applicator to include: • suitable site selected • fill by usual on-site method, following approved procedures • clean water supply Check for leaks/spray patterns: • use higher than normal operating pressure • visual check of all nozzles/atomisers for correct spray patterns, absence of blockages, streaking, pulsing • correct alignment • replace defective nozzles/atomisers/discs • lids and seals • liquid pipe work and connections • air pipework • control valves • filters • pressure gauge • diaphragm check valves Action in event of control panel failing: • stop pesticide application • manual operation of controls if possible

4.4	Calibrate the sprayer and record relevant data	Calibration may include the following: • suitable forward speed for crop/target and ground conditions • appropriate gear selected and engine speed established • accurate measurement of distance • accurate measurement of time taken to cover distance • correct use of formula to establish forward speed Calculate required output/volume rate: • correct use of formula Selection of nozzle: • use of manufacturers operators handbook • use of nozzle manufacturers literature • confirm requirements of product label Set operating pressure: • pressure as determined by nozzle chart • pressurise/purge appropriate to the system Sprayer output: • check output • compare with target output • vary pressure to make small adjustments • change nozzles if required • or any other acceptable method Calibration data: • registration number of vehicle • tyre size and pressure • gear selected • engine speed • fan speed • vehicle forward speed • application volume • nozzles fitted • nozzle positions • pressure • flow rate
4.5	Calculate quantities of pesticide and water required	To include: • amount of water required for specified area • amount of pesticide required for specified area • amount of pesticide required for full tank
5.1	Measure the required quantities and add to the sprayer	To include:

		• correct selection and use of PPE/RPE (as required by the product label and/or COSHH Assessment) • observance of pesticide manufacturers instructions for mixing sequence and agitation (or other recommended method) • suitable site selected • clean water supply • accurate measurement of water • accurate measurement of pesticide • use of filling device (if fitted) • avoidance of spillage
5.2	Demonstrate safe and accurate application procedures	Methods to achieve accurate application May include the following: • crop rows • marker poles • GPS Effects of increasing fan speed: • a larger volume of air is produced, which can deliver the pesticide into a larger target with a higher crop density • increased risk of damage to delicate fruits or berries • a larger volume of air could create excessive spray drift Adjusting fan pitch: • a larger volume of air can be produced at lower engine speeds to save fuel and machine wear • a suitable volume of air can be achieved to deliver the pesticide to the target site Explain nozzle use/shut off to include: • crop density may vary at different heights • crop heights may vary Procedure to refill tank part way through application: • mark the point where the tank emptied • measure and mix required quantities • continue application at the marked point Demonstrate safe and accurate application procedures to include: • treatment area clearly identified • operate controls to start and finish application at the beginning and end of each row/bed • forward speed maintained/correct forward speed

		for site conditions • pressure maintained • accurate matching of bouts • obstacles dealt with correctly (if applicable) • area treated maintaining adequate penetration and coverage • area treated minimising overlaps and misses • awareness of changing crop density and appropriate action taken(if applicable) • awareness of changing weather conditions and appropriate action taken (if applicable)
5.3	Carry out all activities protecting human health and the environment	To include: • prevention of personal injury and contamination through correct selection and use of PPE/RPE (as required by the product information and/or COSHH/Risk Assessment) • prevention of public / bystander contamination • safe filling procedure • avoidance of excessive spray drift • avoidance of off-target application/contamination • avoidance of over dosing/under dosing crop/target
5.4	Complete a treatment record	Completion of the treatment record must be: • accurate • legible (if handwritten)
6.1	Explain how to manage surplus pesticide and dispose of waste material	Surplus concentrate pesticide: • return to temporary mobile store • return to fixed store Containers: • triple rinsed • placed in secure storage until disposal • returned to supplier • collected by a licensed waste disposal contractor Packaging: • thoroughly emptied • placed in secure storage until disposal • collected by a licensed waste disposal contractor Surplus dilute pesticide: • back on to site as long as it is below the maximum dose rate

		• use on another approved crop/target • treated by specialist treatment facility on site (e.g. a lined bio bed) • collected by a licensed waste disposal contractor
6.2	Explain how to clean and decontaminate the sprayer and, if applicable, the prime mover	May include: • select and use appropriate PPE • appropriate site • thorough washing with water and suitable additive if required • internal and external surfaces • use of in-built wash systems if provided • care to ensure contamination 'hot-spots' are clean • thorough flushing of systems • safe disposal of contaminated washings • when cleaning should take place • safe procedures followed
6.3	Describe the storage requirements for the sprayer	May include: • ensure the applicator is clean and dry • inspect for wear and damage • replace any worn or damaged parts • ensure system is drained and any valves left in appropriate positions • frost protection/prevention implemented • lubricate as required • store undercover and out of direct sunlight • store in a secure area

Unit 239 Operating a variable geometry boom sprayer with air assistance:

Activity number and description from check list		Assessment criteria
1.1	Describe the legal requirements relating to applying pesticides using air assisted variable geometry boom sprayers	May include: • all required guards are in place and equipment complies with legal requirements • comply with all relevant road traffic regulations when operating or transporting on the public highway • comply with The Plant Protection Products (Sustainable Use) Regulations 2012 • the operator must hold the appropriate certification for the equipment they are using
1.2	Describe how to apply pesticides safely using air assisted variable geometry boom sprayers following industry best practice	Operator safety regulations may include: • comply with Pesticide Codes of Practice • adopt industry best practice • be aware of any safety implications imposed by Risk/COSHH Assessment and comply with the requirements Checks to protect self from pesticide contamination: Sealed cab: • fit carbon filter • use of in-cab controls • ensure ventilation system is functional • close all windows • contaminated PPE stored in external locker • awareness of the siting of pressurised components within confines of cab Open cab/canopy/platform: • use of appropriate PPE • awareness of the siting of pressurised components within confines of cab/canopy/platform Checks to protect self from physical danger during operation: • compatibility of prime mover and sprayer • front weights • wheel track width • correct tyre pressures • condition of tyres • brake function

		Safe practice when driving on uneven/sloping terrain: • assess conditions • select four wheel drive • appropriate speed • correct gear selection • effect of changing load on stability • use of weights to stabilise prime mover • correct turning procedure • keep centre of gravity as low as possible Consideration for safe driving on a public highway: • independent brakes coupled together • travelling at high speed makes vehicle unstable
2.1	Identify risks to the environment	May include: • ground conditions • water courses • environmental margins/strips/areas • drains • boreholes • wildlife • non-target plants • sensitive crops/areas • hedgerows • housing • public access • other risks particular to the site
2.2	Explain how to minimise risks to the environment	Explanation may include the following points: • use an appropriate pesticide (minimal environmental impact) • careful timing of application • check and maintain application rate • avoid off target application • observe buffer zones • comply with air assisted LERAP requirements • erect warning signs • notify neighbours Minimising spray drift: • avoidance of contamination to people and the environment Check wind speed and direction: • use of anemometer or visual signs at suitable height

		• wind direction Factors that affect spray drift: • weather conditions • direction of spraying • presence of natural/living windbreaks • nozzle type and size • pressure • fan speed • fan pitch • air flow direction • forward speed • nozzle configuration • boom geometry • target canopy density • use of air deflector(s)
3.1 - 3.2	Read product information Interpret product information	May include the following: • product name • active substance(s) (ingredient(s)) Important information: • field of use • crop/target • maximum individual dose • maximum total dose • maximum number of treatments • specific product precautions/warnings • operator protection • environmental protection • restrictions on use Crop specific information: • crop/target • dose rate • water volume • timing Mixing and spraying: • filling • recommended nozzles • recommended pressure • spray quality • additional label information • compatibility
4.1	Identify applicator controls and components	May include: • main spray tank • clean water tank • hand wash tank • pump • compressor

		• pulsation damper • filling control and devices • agitation control • pressure adjustment control • pressure gauge • on/off • boom break-backs • boom isolators • boom section pressure compensation controls • filters • nozzles • diaphragm check valves • tank wash system • tank drain • fan blades and adjustment (if applicable) • fan speed control • air deflector(s) • trash guard • other components/controls specific to the applicator Nozzle types: • hollow cone – good coverage • hollow cone air inclusion – drift reduction properties • flat fan – general purpose
4.2	Carry out pre use checks to the prime mover	May include: • guards in place and in good condition • visual inspection of the wheels and tyres • tyre pressures • fuel level adequate • engine oil level is within acceptable limits • hydraulic oil level is within acceptable limits (if accessible) • transmission oil level is within acceptable limits (if accessible) • coolant level is adequate • engine air filter is clean
4.3	Carry out pre-use and operational checks to the sprayer	May include all/some of the following as applicable to the sprayer/applicator: Security of attachment • safe unfolding of booms to avoid personal contamination and contact with Over Head Power Lines (OHPL) and any other overhead hazards • fasteners tight

		• straps inspected and adjusted if necessary • linkage secure • sideways movement restricted • drawbar pin secured Possible mechanical defects: • seized, worn or damaged controls/components • electrical connectors Applicator lubrication: • identification of lubrication points • visual inspection of lubrication points • visual inspection of levels Boom settings, suspension and break-back devices: • boom suspension operational • break-back efficiency • height adjustment Candidate to remove, clean and refit filter: • remove and clean using appropriate method • contain spillage • check for defects, replace if damaged • refit Candidate to remove, clean and refit a nozzle/restrictor: • remove and clean using appropriate method • contain spillage • check for defects replace if worn/damaged • refit Use of control panel may include: • functions of control panel • recognition of malfunctions before and during operation • check accuracy of base settings • switch to manual/test mode where applicable Part fill applicator to include: • suitable site selected • fill by usual on-site method, following approved procedures • clean water supply Check for leaks/spray patterns: • use higher than normal operating pressure

		• visual check of all nozzles/atomisers for correct spray patterns, absence of blockages, streaking, pulsing • correct alignment • replace defective nozzles/atomisers/discs • lids and seals • liquid pipe work and connections • air pipework • air ducting checked for leaks • control valves • filters • pressure gauge • diaphragm check valves Action in event of control panel failing: • stop pesticide application • manual operation of controls if possible
4.4	Calibrate the sprayer and record relevant data	Calibration may include the following: • suitable forward speed for crop/target and ground conditions • appropriate gear selected and engine speed established • accurate measurement of distance • accurate measurement of time taken to cover distance • correct use of formula to establish forward speed Calculate required output/volume rate: • correct use of formula Selection of nozzle: • use of manufacturers operators handbook • use of nozzle manufacturers literature • confirm requirements of product label Operating pressure: • pressure as determined by nozzle chart • pressurise/purge appropriate to the system Sprayer output: • check output • compare with target output • vary pressure to make small adjustments • change nozzles if required • or any other acceptable method Calibration data: • registration number of vehicle • tyre size and pressure

		• gear selected • engine speed • fan speed • vehicle forward speed • application volume • nozzles fitted • nozzle positions • pressure • flow rate
4.5	Calculate quantities of pesticide and water required	To include: • amount of water required for specified area • amount of pesticide required for specified area • amount of pesticide required for full tank
5.1	Measure the required quantities and add to the sprayer	To include: • correct selection and use of PPE/RPE (as required by the product label and/or COSHH Assessment) • observance of pesticide manufacturers instructions for mixing sequence and agitation (or other recommended method) • suitable site selected • clean water supply • accurate measurement of water • accurate measurement of pesticide • use of filling device (if fitted) • avoidance of spillage
5.2	Demonstrate safe and accurate application procedures	Methods to achieve accurate application May include the following: • crop rows • marker poles • GPS Effects of increasing air flow: • a larger volume of air is produced, which can deliver the pesticide into a larger target with a higher crop density • increased risk of damage to delicate fruits or berries • a larger volume of air could create excessive spray drift Adjusting fan pitch: • a larger volume of air can be produced at lower engine speeds to save fuel and machine wear • a suitable volume of air can be achieved to deliver the pesticide to the target site

		Procedure to refill tank part way through application: • mark the point where the tank emptied • measure, mix and fill with required quantities • continue application at the marked point Demonstrate safe and accurate application procedures to include: • treatment area clearly identified • operate controls to start and finish application at the beginning and end of each row/bed • forward speed maintained/correct forward speed for site conditions • pressure maintained • accurate matching of bouts • obstacles dealt with correctly (if applicable) • area treated minimising overlaps and misses • awareness of changing crop density and appropriate action taken(if applicable) • awareness of changing weather conditions and appropriate action taken (if applicable)
5.3	Carry out all activities protecting human health and the environment	To include: • prevention of personal injury and contamination through correct selection and use of PPE/RPE (as required by the product information and/or COSHH/Risk Assessment) • prevention of public / bystander contamination • safe filling procedure • avoidance of excessive spray drift • avoidance of off-target application/contamination • avoidance of over dosing/under dosing crop/target
5.4	Complete a treatment record	Completion of the treatment record must be: • accurate • legible (if handwritten)
6.1	Explain how to manage surplus pesticide and dispose of waste material	Surplus concentrate pesticide: • return to temporary mobile store • return to fixed store Containers: • triple rinsed • placed in secure storage until disposal • returned to supplier

		• collected by a licensed waste disposal contractor Packaging: • thoroughly emptied • placed in secure storage until disposal • collected by a licensed waste disposal contractor Surplus dilute pesticide: • back on to site as long as it is below the maximum dose rate • use on another approved crop/target • treated by specialist treatment facility on site (e.g. a lined bio bed) • collected by a licensed waste disposal contractor
6.2	Explain how to clean and decontaminate the sprayer and, if applicable, the prime mover	May include: • select and use appropriate PPE/RPE • appropriate site • thorough washing with water and suitable additive if required • internal and external surfaces • use of in-built wash systems if provided • care to ensure contamination 'hot-spots' are clean • thorough flushing of systems • safe disposal of contaminated washings • when cleaning should take place • safe procedures followed
6.3	Describe the storage requirements for the sprayer	May include: • ensure the applicator is clean and dry • inspect for wear and damage • replace any worn or damaged parts • ensure system is drained and any valves left in appropriate positions • frost protection/prevention implemented • lubricate as required • store undercover and out of direct sunlight • store in a secure area

Unit 240 Operating a variable geometry boom sprayer without air assistance:

Activity number and description from check list		Assessment criteria
1.1	Describe the legal requirements relating to applying pesticides using variable geometry boom sprayers without air assistance	May include: • all required guards are in place and equipment complies with legal requirements • comply with all relevant road traffic regulations when operating or transporting on the public highway • comply with The Plant Protection Products (Sustainable Use) Regulations 2012 • the operator must hold the appropriate certification for the equipment they are using
1.2	Describe how to apply pesticides safely using variable geometry boom sprayers without air assistance following industry best practice	Operator safety regulations may include: • comply with Pesticide Codes of Practice • adopt industry best practice • be aware of any safety implications imposed by Risk/COSHH Assessment and comply with the requirements Checks to protect self from pesticide contamination: Sealed cab: • fit carbon filter • use of in-cab controls • ensure ventilation system is functional • close all windows • contaminated PPE stored in external locker • awareness of the siting of pressurised components within confines of cab Open cab/canopy/platform: • use of appropriate PPE • awareness of the siting of pressurised components within confines of cab/canopy/platform Checks to protect self from physical danger during operation: • compatibility of prime mover and sprayer • front weights • wheel track width • correct tyre pressures • condition of tyres • brake function

		Safe practice when driving on uneven/sloping terrain: • assess conditions • select four wheel drive • appropriate speed • correct gear selection • effect of changing load on stability • use of weights to stabilise prime mover • correct turning procedure • keep centre of gravity as low as possible Consideration for safe driving on a public highway: • independent brakes coupled together • travelling at high speed makes vehicle unstable
2.1	Identify risks to the environment	May include: • ground conditions • water courses • environmental margins/strips/areas • drains • boreholes • wildlife • non-target plants • sensitive crops/areas • hedgerows • housing • public access • other risks particular to the site
2.2	Explain how to minimise risks to the environment	Explanation may include the following points: • use an appropriate pesticide (minimal environmental impact) • careful timing of application • check and maintain application rate • avoid off target application • observe buffer zones • comply with LERAP requirements • erect warning signs • notify neighbours Minimising spray drift: • avoidance of contamination to people and the environment Check wind speed and direction: • use of anemometer or visual signs at suitable height • wind direction

		Factors that affect spray drift: • weather conditions • direction of spraying • presence of natural/living windbreaks • nozzle type and size • pressure • forward speed • nozzle configuration • boom geometry • target canopy density
3.1 - 3.2	Read product information Interpret product information	May include the following: • product name • active substance(s) (ingredient(s)) important information: • field of use • crop/target • maximum individual dose • maximum total dose • maximum number of treatments • specific product precautions/warnings • operator protection • environmental protection • restrictions on use crop specific information: • crop/target • dose rate • water volume • timing mixing and spraying: • filling • recommended nozzles • recommended pressure • spray quality • additional label information • compatibility
4.1	Identify applicator controls and components	May include: • main spray tank • clean water tank • hand wash tank • pump • pulsation damper • filling control and devices • agitation control • pressure adjustment control • pressure gauge • on/off

		• boom break-backs • boom isolators • boom section pressure compensation controls • filters • nozzles • diaphragm check valves • tank wash system • tank drain • other components/controls specific to the applicator Nozzle types: • hollow cone – good coverage • hollow cone air inclusion – drift reduction properties • flat fan – general purpose
4.2	Carry out pre use checks to the prime mover	May include: • guards in place and in good condition • visual inspection of the wheels and tyres • tyre pressures • fuel level adequate • engine oil level is within acceptable limits • hydraulic oil level is within acceptable limits (if accessible) • transmission oil level is within acceptable limits (if accessible) • coolant level is adequate • engine air filter is clean
4.3	Carry out pre-use and operational checks to the sprayer	May include all/some of the following as applicable to the sprayer/applicator: Security of attachment • safe unfolding of booms to avoid personal contamination and contact with Over Head Power Lines (OHPL) and any other overhead hazards • fasteners tight • straps inspected and adjusted if necessary • linkage secure • sideways movement restricted • drawbar pin secured Possible mechanical defects: • seized, worn or damaged controls/components • electrical connectors Applicator lubrication: • identification of lubrication points

		• visual inspection of lubrication points • visual inspection of levels Boom settings, suspension and break-back devices: • boom suspension operational • break-back efficiency • height adjustment Candidate to remove, clean and refit filter: • remove and clean using appropriate method • contain spillage • check for defects, replace if damaged • refit Candidate to remove, clean and refit a nozzle/restrictor: • remove and clean using appropriate method • contain spillage • check for defects replace if worn/damaged • refit Use of control panel may include: • functions of control panel • recognition of malfunctions before and during operation • check accuracy of base settings • switch to manual/test mode where applicable Part fill applicator to include: • suitable site selected • fill by usual on-site method, following approved procedures • clean water supply Check for leaks/spray patterns: • use higher than normal operating pressure • visual check of all nozzles/atomisers for correct spray patterns, absence of blockages, streaking, pulsing • correct alignment • replace defective nozzles/atomisers/discs • lids and seals • pipe work and connections • control valves • filters • pressure gauge • diaphragm check valves

		Action in event of control panel failing: • stop pesticide application • manual operation of controls if possible
4.4	Calibrate the sprayer and record relevant data	Calibration may include the following: • suitable forward speed for crop/target and ground conditions • appropriate gear selected and engine speed established • accurate measurement of distance • accurate measurement of time taken to cover distance • correct use of formula to establish forward speed Calculate required output/volume rate: • correct use of formula Selection of nozzle: • use of manufacturers operators handbook • use of nozzle manufacturers literature • confirm requirements of product label Operating pressure: • pressure as determined by nozzle chart • pressurise/purge appropriate to the system Sprayer output: • check output • compare with target output • vary pressure to make small adjustments • change nozzles if required • or any other acceptable method Calibration data: • registration number of vehicle • tyre size and pressure • gear selected • engine speed • vehicle forward speed • application volume • nozzles fitted • nozzle positions • pressure • flow rate
4.5	Calculate quantities of pesticide and water required	To include: • amount of water required for specified area • amount of pesticide required for specified area • amount of pesticide required for full tank

5.1	Measure the required quantities and add to the sprayer	To include: • correct selection and use of PPE/RPE (as required by the product label and/or COSHH Assessment) • observance of pesticide manufacturers instructions for mixing sequence and agitation (or other recommended method) • suitable site selected • clean water supply • accurate measurement of water • accurate measurement of pesticide • use of filling device (if fitted) • avoidance of spillage
5.2	Demonstrate safe and accurate application procedures	Methods to achieve accurate application May include the following: • crop rows • marker poles • GPS Procedure to refill tank part way through application: • mark the point where the tank emptied • measure, mix and fill with required quantities • continue application at the marked point Procedure when nozzle/restrictor becomes blocked during an application: • select and use appropriate PPE • care not to walk in contaminated crop • clean or replace nozzle/restrictor as appropriate Demonstrate safe and accurate application procedures to include: • treatment area clearly identified • operate controls to start and finish application at the beginning and end of each row/bed • forward speed maintained/correct forward speed for site conditions • pressure maintained • accurate matching of bouts • obstacles dealt with correctly (if applicable) • area treated minimising overlaps and misses • awareness of changing crop density and appropriate action taken (if applicable)

		• awareness of changing weather conditions and appropriate action taken (if applicable)
5.3	Carry out all activities protecting human health and the environment	To include: • prevention of personal injury and contamination through correct selection and use of PPE/RPE (as required by the product information and/or COSHH/Risk Assessment) • prevention of public / bystander contamination • safe filling procedure • avoidance of spray drift • avoidance of off-target application/contamination • avoidance of over dosing/under dosing crop/target
5.4	Complete a treatment record	Completion of the treatment record must be: • accurate • legible (if handwritten)
6.1	Explain how to manage surplus pesticide and dispose of waste material	Surplus concentrate pesticide: • return to temporary mobile store • return to fixed store Containers: • triple rinsed • placed in secure storage until disposal • returned to supplier • collected by a licensed waste disposal contractor Packaging: • thoroughly emptied • placed in secure storage until disposal • collected by a licensed waste disposal contractor Surplus dilute pesticide: • back on to site as long as it is below the maximum dose rate • use on another approved crop/target • treated by specialist treatment facility on site (e.g. a lined bio bed) • collected by a licensed waste disposal contractor
6.2	Explain how to clean and decontaminate the sprayer and, if applicable, the prime mover	May include: • select and use appropriate PPE/RPE • appropriate site • thorough washing with water and suitable additive if required • internal and external surfaces

		• use of in-built wash systems if provided • care to ensure contamination 'hot-spots' are clean • thorough flushing of systems • safe disposal of contaminated washings • when cleaning should take place • safe procedures followed
6.3	Describe the storage requirements for the sprayer	May include: • ensure the applicator is clean and dry • inspect for wear and damage • replace any worn or damaged parts • ensure system is drained and any valves left in appropriate positions • frost protection/prevention implemented • lubricate as required • store undercover and out of direct sunlight • store in a secure area

Appendix 1 Practical table

Unit 238 Operating a broadcast sprayer with air assistance

All criteria must be achieved.

Activity number and description	Achieved
1.1 Describe the legal requirements relating to applying pesticides using air assisted broadcast sprayers	
1.2 Describe how to apply pesticides safely using air assisted broadcast sprayers following industry best practice	
2.1 Identify risks to the environment	
2.2 Explain how to minimise risks to the environment	
3.1 Read product information	
3.2 Interpret product information	
4.1 Identify applicator controls and components	
4.2 Carry out pre use checks to the prime mover	
4.3 Carry out pre use and operational checks to the sprayer	
4.4 Calibrate the sprayer and record relevant data	
4.5 Calculate quantities of pesticide and water required	
5.1 Measure the required quantities and add to the sprayer	
5.2 Demonstrate safe and accurate application procedures	
5.3 Carry out all activities protecting human health and the environment	
5.4 Complete a treatment record	
6.1 Explain how to manage surplus pesticide and dispose of waste material	
6.2 Explain how to clean and decontaminate the sprayer and, if applicable, the prime mover	
6.3 Describe the storage requirements for the sprayer	

Unit 239 Operating a variable geometry boom sprayer with air assistance

All criteria must be achieved.

Activity number and description	Achieved
1.1 Describe the legal requirements relating to applying pesticides using air assisted variable geometry boom sprayers	
1.2 Describe how to apply pesticides safely using air assisted variable geometry boom sprayers following industry best practice	
2.1 Identify risks to the environment	
2.2 Explain how to minimise risks to the environment	
3.1 Read product information	
3.2 Interpret product information	
4.1 Identify applicator controls and components	
4.2 Carry out pre use checks to the prime mover	
4.3 Carry out pre use and operational checks to the sprayer	
4.4 Calibrate the sprayer and record relevant data	
4.5 Calculate quantities of pesticide and water required	
5.1 Measure the required quantities and add to the sprayer	
5.2 Demonstrate safe and accurate application procedures	
5.3 Carry out all activities protecting human health and the environment	
5.4 Complete a treatment record	
6.1 Explain how to manage surplus pesticide and dispose of waste material	
6.2 Explain how to clean and decontaminate the sprayer and, if applicable, the prime mover	
6.3 Describe the storage requirements for the sprayer	

Unit 240 Operating a variable geometry boom sprayer without air assistance

All criteria must be achieved.

Activity number and description	Achieved
1.1 Describe the legal requirements relating to applying pesticides using variable geometry boom sprayers without air assistance	
1.2 Describe how to apply pesticides safely using variable geometry boom sprayers without air assistance following industry best practice	
2.1 Identify risks to the environment	
2.2 Explain how to minimise risks to the environment	
3.1 Read product information	
3.2 Interpret product information	
4.1 Identify applicator controls and components	
4.2 Carry out pre use checks to the prime mover	
4.3 Carry out pre use and operational checks to the sprayer	
4.4 Calibrate the sprayer and record relevant data	
4.5 Calculate quantities of pesticide and water required	
5.1 Measure the required quantities and add to the boom sprayer	
5.2 Demonstrate safe and accurate application procedures	
5.3 Carry out all activities protecting human health and the environment	
5.4 Complete a treatment record	
6.1 Explain how to manage surplus pesticide and dispose of waste material	
6.2 Explain how to clean and decontaminate the sprayer and, if applicable, the prime mover	
6.3 Describe the storage requirements for the sprayer	

Appendix 2 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with the handbook. To download the documents and to find other useful documents, go to **www.cityandguilds.com** or click on the links below:

Centre handbook: quality assurance standards

This document is for all approved centres and provides guidance to support their delivery of our qualifications. It includes information on

- centre quality assurance criteria and monitoring activities
- administration and assessment systems
- centre-facing support teams at City & Guilds/ILM
- centre quality assurance roles and responsibilities.

The Centre Handbook should be used to ensure compliance with the terms and conditions of the Centre Contract.

Centre assessment: quality assurance standards
Approved centres must have effective quality assurance systems to ensure optimum delivery and assessment of qualifications. Quality assurance includes initial centre approval, qualification approval and the centre's own internal procedures for monitoring quality. Centres are responsible for internal quality assurance and City & Guilds is responsible for external quality assurance. All external quality assurance processes reflect the minimum requirements for verified and moderated assessments, as detailed in the Centre Assessment Standards Scrutiny (CASS), section H2 of Ofqual's General Conditions. For more information on both CASS and City & Guilds Quality Assurance processes visit: the **What is CASS?** and **Quality Assurance Standards** documents on the City & Guilds website.

This document sets out the minimum common quality assurance requirements for our regulated and non-regulated qualifications that feature centre-assessed components. Specific guidance will also be included in relevant qualification handbooks and/or assessment documentation.

It incorporates our expectations for centre internal quality assurance and the external quality assurance methods we use to ensure that assessment standards are met and upheld. It also details the range of sanctions that may be put in place when centres do not comply with our requirements or actions that will be taken to align centre marking/assessment to required standards. Additionally, it provides detailed guidance on the secure and valid administration of centre assessments.

Access arrangements: when and how applications need to be made to City & Guilds

provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **Centre document library** also contains useful information on such things as:

- conducting examinations
- registering learners
- appeals and malpractice.

Useful contacts

Please visit the Contact us section of the City & Guilds website, **Contact us**

City & Guilds

For over 140 years, we have worked with people, organisations and economies to help them identify and develop the skills they need to thrive. We understand the life-changing link between skills development, social mobility, prosperity and success. Everything we do is focused on developing and delivering high-quality training, qualifications, assessments and credentials that lead to jobs and meet the changing needs of industry.

We partner with our customers to deliver work-based learning programmes that build competency to support better prospects for people, organisations and wider society. We create flexible learning pathways that support lifelong employability because we believe that people deserve the opportunity to (re)train and (re)learn again and again – gaining new skills at every stage of life, regardless of where they start.

The City & Guilds community of brands includes Gen2, ILM, Intertrain, Kineo and The Oxford Group.

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