

CONSTRUCTION
Training Group

LEARNER GUIDE

Grader

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*National Guidelines for
Occupational Health & Safety
Competency Standards for the
Operation of Loadshifting &
Equipment & Other Types of
Specified Equipment*

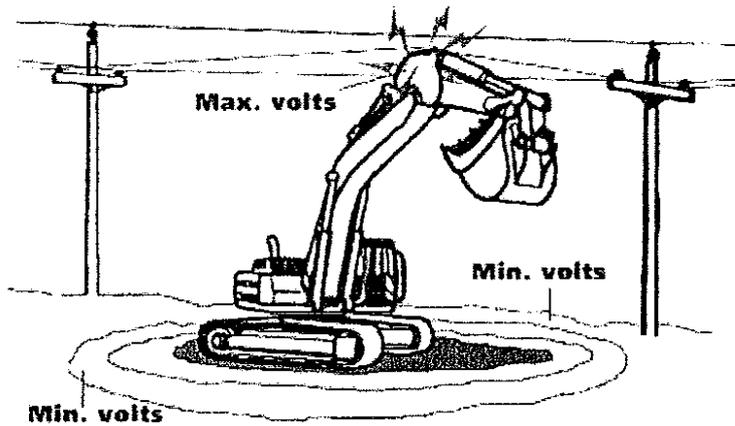
Guidelines for OHS Competency Standards

Loadshftting Equipment Grader

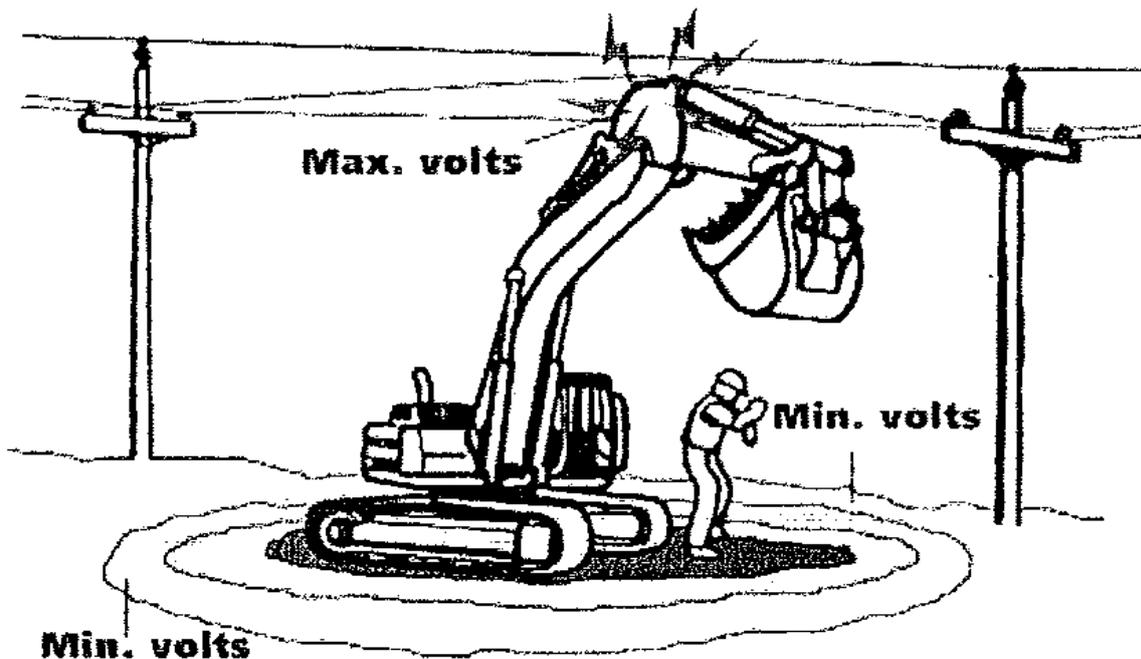
PERFORMANCE ASSESSMENT

July 1994

Diagram 1:



If anything touches a high-voltage power line or if a power line falls to the ground, electricity will flow to the ground, energising the tree or equipment and anything in contact with it. The surrounding ground may be extremely hazardous. The voltage gradually decreases from the point of contact until it reaches zero. The safe distance should be **10 metres** for line voltages up to and including 66 kV (66,000 V).

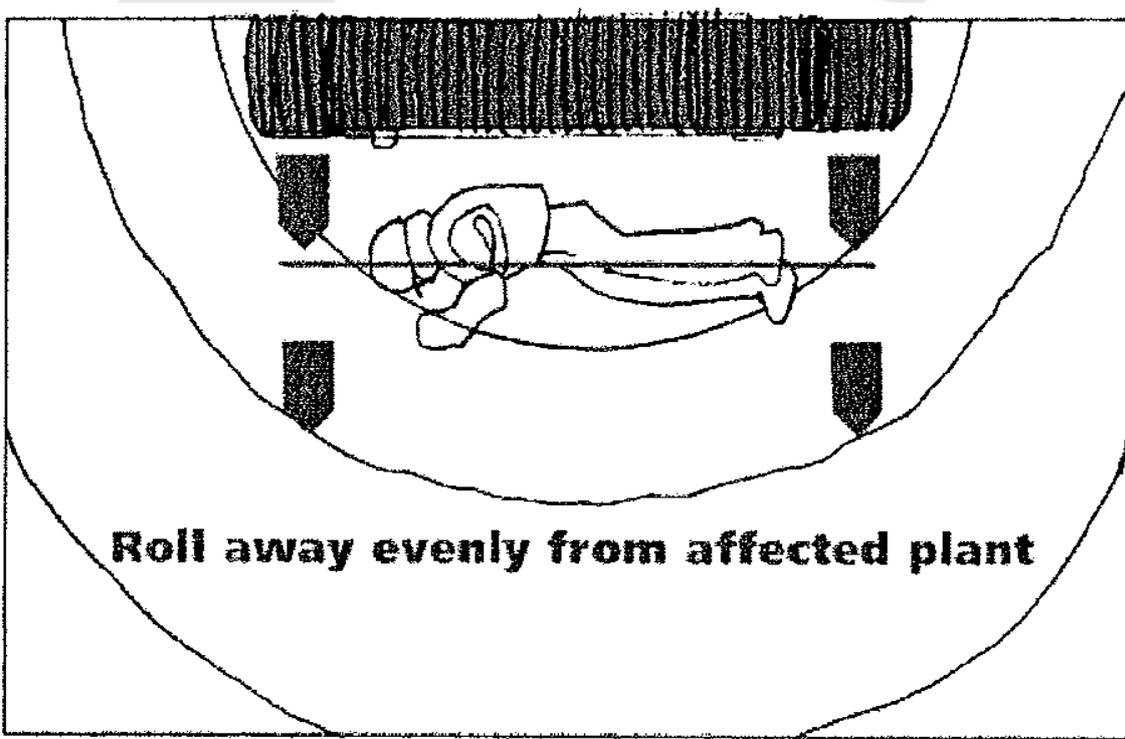
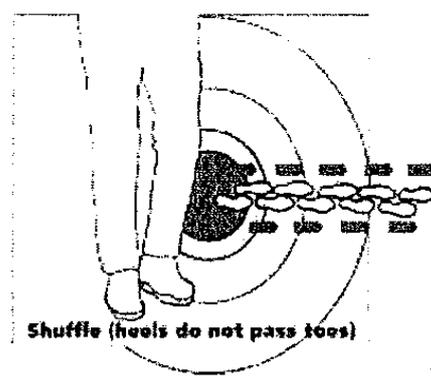
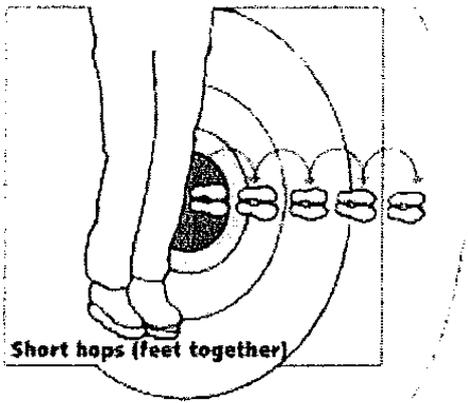


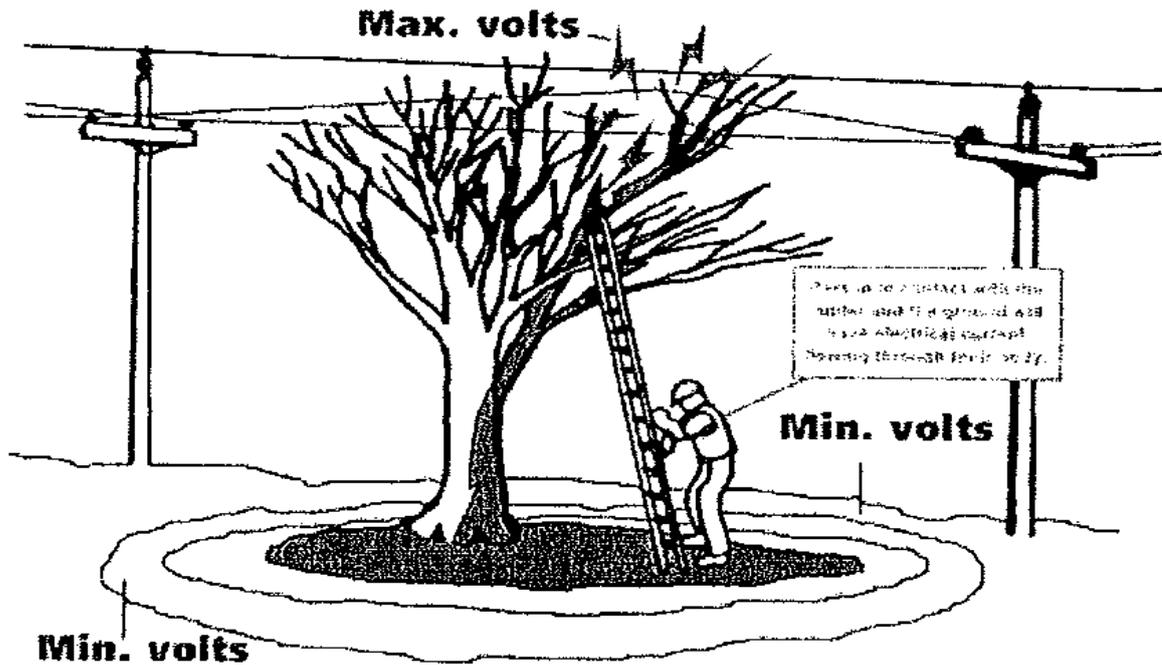
Touch potential

Touch potential is another danger that comes from the difference in voltage. It occurs when you touch something that is energised while standing on the lower voltage ground. For example, if some equipment is in contact with a power line, it will be energised to the same voltage as the power line; the surrounding ground will be energised to a lower voltage. If you touch the energised equipment or tree at the same time as you touch the ground with your feet, electricity will flow through your body from the higher voltage equipment to the lower voltage ground.

Touch potential: Trees and equipment become energised when they contact a power line. Electricity can flow through a worker who touches the energised tree or equipment, often causing serious injury or death.

Currents greater than 75 mA can cause ventricular fibrillation (rapid, ineffective heartbeat) and will cause death in a few minutes.





Step potential

Step potential is the voltage difference between two places that are a step apart on energised ground. For example, if you are standing on energised ground, there could be a significant difference in voltage between where one foot and the other are placed, and an electric current could flow up one leg and down the other.

Step potential. If your feet are spread apart on energised ground, electricity can flow through your body from the area of higher voltage to the area of lower voltage

If your feet are close together and touching, you are fairly safe. Since there is almost no voltage difference between the places your feet stand, there is little reason for electricity to seek a path through your body.

CONDUCT ROUTINE CHECKS:
Performance Criteria 1.1.1. and 1.1.2

1.1 Routine checks on vehicle/equipment:

- Tyre condition and inflation

Checks liquid levels -

- Fuel
 hydraulic oil
 engine oil
 battery
 coolant

Checks equipment for defects -

- damaged, worn or broken parts
 loose nuts, bolts and couplings
 hoses, fittings, hydraulic rams for oil leaks
 connections for missing pins or keepers
 grease holes and grease pins

PLAN WORK AND CHECK EQUIPMENT:
Performance Criteria 1.2.1, 1.2.3 and 1.2.5

1.2 Inspects site and plans work:

Identify Hazards -

- power lines
 phone lines
 service drains
 obstructions

Access and path of movement is indicated -

- to work area
 for work

Appropriate equipment for the task -

- equipment is appropriate for the task

Performance Criteria 1.3.1.
1.3 Conducts pre-operational and post start-up checks in accordance with manufacturer's specifications/operating manual:

- mounts correctly
 adjusts seat secures
 safety belt
 in neutral
 warning device
 starts engine
 gauges
 warm up allowed
 attachment movement
 clear for travel
 foot brake
 holding brake
 steering

SHIFTS LOAD:

Performance criteria 2.1.1 and 2.1.3

1.4 Drives to the work area:

- raises blade and attachments to clear obstructions
 blade stowed within limits of machine
 ensures travel direction clear
 selects appropriate route
 travels at safe speed

1.5 Scarifies, grades, spreads soil and levels surface:

- loosens surface by scarifying
 grades, spreads soil and levels surface
 blade used at correct angle and pitch
 uses sufficient revs and speed for work
 acceptable and safe speed

1.6 Tilts blade and finishes surface with a camber:

- blade used at correct angle and pitch
- soil moves across blade to form windrow
- correct camber formed to requirements

Avoiding hazards –

- parks away from danger areas
- removes keys

Cleans or cuts ditch:

- tilts front wheels to compensate for slope
- blade extended & at correct slope & pitch
- cleans or cuts ditch
- windrow between formed between back wheels

Performance criteria 2.1.1, 2.1.4, 2.1.5 and 2.1.6

General performance of sections 1.4, 1.5, 1.6, 1.7, and 1.8.

- equipment is suitable for the work
- machine suitable for ground conditions
- competently shifts and levels material
- equipment operated at a safe speed
- signals are interpreted & observed
- soil is placed to avoid causing a hazard

SHUTS DOWN EQUIPMENT AND SECURES SITE:

Performance criteria 3.1.1, 3.1.2 and 3.2.1

1.8 Shuts down equipment and secures site:

Parks equipment -

- machine parked in suitable area
- attachments lowered to ground

Shuts down equipment -

- neutralises controls
- sets parking brake
- idles to stop and locks ignition

Guidelines for OHS Competency Standards

Loadshftting Equipment Grader

ORAL/WRITTEN ASSESSMENT

July 1994

Assessor Guidelines – Specific (Knowledge Assessment)

ASSESSMENT INSTRUMENT – SPECIATIONS

The following knowledge assessment covers the Loadshifting Standard elements from [NOHSC: (1992)] which apply to a Grader

1.1, 1.2, 1.3, 2.1, 3.1 & 3.2

1. Knowledge assessment for grader is divided into three units and seventeen sections (performance criteria 1.1.1, 1.1.2 etc).
2. To satisfy the requirements for competency the applicant must correctly answer (either in writing or orally) the specified number of questions in each of the following sections:

Unit 1.0

1.1 Conduct routine checks

1.1.1 (select 4)

1.2 Plan work

1.2.1 (select 2)

1.2.2 (select 3)

1.2.3 (select 1)

1.2.4 (select 1)

1.2.5 (select 1)

1.3 Check controls and equipment

1.3.1 (select 1)

1.3.2 (select 1)

Unit 2.0

2.1 Shift load

2.1.1 (select 1)

2.1.2 (select 1)

2.1.3 (select 3)

2.1.5 (select 1)

2.1.7 (select 2)

Unit 3.0

3.1 Shut down equipment

3.1.1 (select 1)

3.1.3 (select 1)

3.2 Secure site

3.2.1 (select 1)

3. Prior learning and experience: An applicant who holds a scraper, scraper, dozer, front-end loader/backhoe, front-end loader, skid steer loader, excavator or dragline certificate and who answers questions for performance criteria 1.1.1, 1.2.2, 1.3.2 and 2.1.5 satisfactorily, is not required to complete the rest of the assessment.
4. The full knowledge assessment of twenty six questions can take up to thirty minutes.
5. The items in the shaded boxes are of critical importance. Failing to get any of these correct means that competency has not been achieved and the applicant must be failed

CONDUCT ROUTINE CHECKS

Performance criteria 1.1.1 (select 4 including 1 with a shaded box)

1. What precautions must be taken when an inspection or work has to be performed under a raised blade or attachment?

- Provision provided to prevent the bowl from descending.

2. What should be provided on the grader to prevent the operator from being dislodged from the seat of the grader?

- A safety belt

3. Name three defects that you would look for when conducting a routine check on the hydraulic system of the grader.

- Hydraulic oil leaks, loose connections and hoses for splits, fractures or bulges.

4. Why shouldn't the hydraulic oil storage tank be filled above the filled mark?

- Space in the tank is needed for displacement in the system.

5. What problem could be indicated by bubbles or milky engine oil in the sump?

- Water leaking into the sump.

6. When changing a battery which battery clamp should be removed first?

- The grounded battery clamp

7. Briefly describe how you would check the air pressure of water filled tyres on a grader.

- Check with the valve at the top of the wheel

8. Why shouldn't tyres be checked while they are still heated from effect of travelling?

- The pressure in the tyres would be increased by the heat

9. How would you establish the service and the frequency of the service to be carried out on the machine you are required to operate?

- By the service manual provided by the manufacturer.

10. What should be the first check of your machine at the start of your shift?

- Walk around it looking for visual defects.

11. Name five pre-operational checks that should be carried out on the loadshifting equipment before the unit is started.

- Radiator, battery, fuel, oil, hydraulic lines, tyres or tracks, structure etc.

12. To establish if the required service had been conducted what document would you refer to?

- The log book

PLAN WORK

Performance criteria 1.2.1 (select 2)

13. Why should side hill travel be avoided where possible?

- There is a greater risk of turning the machine over with side hill travel

14. In built-up areas what checks should be made under the ground before the soil is cut and removed?

- Checks for power, gas, telephone, water and sewerage services etc.

15. Where a danger exists, what should be posted or positioned to warn persons of a danger?

- Warning signs

16. When grading the edges of a public road where should warning signs be positioned to advise of a potential hazard or condition?

- At the approach to the work area. (Approximately 30M before.

17. What should be erected where a dangerous obstruction is caused by grading?

- Barricades

18. How should the flow of road traffic be controlled where signs and barricades are considered inadequate to control a potential hazard?

- By a flagman Or by police officer*

19. What is the danger of travelling near the edge of fill with a grader?

- The edge fill may collapse.*

**Performance criteria 1.2.2
(select 3 including 1 with a shaded box)**

20. Under what conditions should a grader operator wear respiration equipment?

- Where there is a health risk to the operator from dust or contamination in the air.*

21. When should ear protection be worn?

- Where the noise could contribute to the loss of hearing*

22. If there is a likelihood of the grader being overturned what must be provided on the grader to protect the operator?

- A roll over protective structure and safety belts*

23. When should a person wear a safety helmet?

- Where the person could be struck on the head*

24. What is the minimum type of footwear that an operator should wear to operate loadshifting equipment?

- Non-slip footwear that encloses the foot*

Performance criteria 1.2.3 (select 1)

25. Which is the preferred route of travel, diagonally across or directly down a sloping surface?

- Directly down the sloping surface*

26. What gear should be selected to travel down a steep sloping surface?

- A low gear. The gear required to climb the sloping surface*

Performance criteria 1.2.4 (select 1)

27. In hazardous working areas where permission is required to work what must the operator ensure before the work is commenced?

- That the required permits have been obtained*

28. What is required to be obtained before unregistered rubber tyred grader is driven along a public road?

- An unregistered vehicle permit*

29. What government licence do you require to drive a rubber tyred grader on the road?

- A class licence for plant up to 4.5 tonnes or other jurisdiction as applicable. ie Australian heavy vehicle licence.*

Performance criteria 1.2.5 (select 1)

30. Name three operations that a grader is designed to perform?

- Trimming or grading, spreading soil, cutting a ditch, cleaning a ditch, ripping and scarifying*

31. For what purpose are the scarifiers on a grader used for?

- To loosen or rip up hard surfaces*

32. What safety measure would you adopt before changing a cutting edge and end bits on a raised grader blade?

- Support the raised grader blade*

CHECK CONTROLS AND EQUIPMENT

Performance Criteria 1.3.1 (select 1)

33. What controls would you test to ensure that the grader grades at a constant speed?

- The governor control lever and accelerator*

34. On the post start-up check you notice a bulge form in a hydraulic hose. What action would you take?

- Switch off the machine and have the hose replaced*

35. When should tests, checks and inspections be made by the operator on the loadshifting equipment that is to be operated?

Daily before use

Performance criteria 1.3.2 (select 1)

36. What action would you take with damage and defects found on the machine?

Report the damage and defects to the authorised person or to site requirements and refrain from operating if a danger exists

SHIFT LOAD

Performance criteria 2.1.1 (select 1)

37. Vertically across the grader blade what is the best blade position to perform spreading or dragging of the soil?

Tilted foreword and at a angle

38. Vertically across the grader blade what is the best blade position to cut hardpan clay?

Set back at the top and at a angle

39. Vertically across the grader blade what is the best blade position to perform normal grading?

Set back at the top and at a angle.

40. While grading what action can be taken to avoid an obstruction to the blade which is outside the path of the wheels?

Use the side shift to the blade to avoid the obstruction

Performance criteria 2.1.2 (select 1)

41. Of topsoil and clay which is more cohesive and harder to trim and spread?

Clay

Performance criteria 2.1.3

(select 3 including 1 with a shaded box)

42. When scarifying across a sloping surface where should the blade be positioned to provide some protection against tipping?

On down hill side, crossways and low.

43. Is it permissible to carry a passenger on the grader?

No

44. As an operator would you leave an unattended grader engine running?

No

45. What device should function on the grader to inform other persons that the grader is to travel or is travelling in reverse?

A reverse warning device

46. What is the danger of slipping tyres on shale or rock?

The tyres may be cut and blow out

47. How would you establish the capabilities and limitations of the equipment?

By information provided by the employer and documented by the manufacturer.

48. Before reversing a machine what precaution should be taken?

Ensure the direction of travel is clear

49. What "right of way rule" should be adopted for loaded machinery working in the area?

Always yield right of way to a loaded machine and if in doubt yield right in any case

50. When roading where should the grader blade be positioned?

- High as possible and inside the wheels*

51. For stability where should the grader blade be to grade on side slopes?

- The blade should be extended on the down slope side*

52. When cutting or cleaning out a ditch how should the front tilting wheels of the grader be tilted?

- Top of wheels tilted away from the ditch so that the wheels are vertical*

53. Would you coast the grader downhill?

- No*

54. Which direction should the front tyres be leaned when grading across a sloping surface?

- Towards the uphill side*

55. What direction would you approach and how would you cross a ditch?

- At an angle and slowly*

56. When travelling what would you do before travelling down a steep grade?

- Reduce speed with service brake and select the appropriate gear for the grade.*

Performance criteria 2.1.5 (select 1) (Oral)

57. Applicant to state the meaning of the hand signal of "stop" demonstrated by the examiner.

- Stop*

(Written)

58. State the meaning of the illustrated diagram.

- Stop*

Performance criteria 2.1.7 (select 1)

59. While operating the grader what action would you take if a hydraulic hose sprung a leak?

- Have repairs carried out. (Replace hose.*

60. How would you dismount a machine that contacted live power lines?

- Jump clear ensuring contact with the ground and machine is not at the same time*

61. If the brakes (including holding brake) failed while travelling downgrade what action would you take to stop the grader?

- Lower the blade or rippers to stop the grader.*

SHUT DOWN EQUIPMENT

Performance criteria 3.1.1 (select 1)

62. Name three areas where you would not park the grader.

- Access ways, near overhangs, refuelling sites, tidal or flood areas, adjacent to an excavation*

63. When leaving the loadshifting equipment what should be done with the raised blade or attachments?

- The blade and attachments lowered*

64. Where possible what type of surface should be selected to park the grader on?

- A level surface*

65. Which direction should the grader face if it has to be parked on a sloping surface?

- Across the slope*

Performance criteria 3.1.3 (select 1)

66. How would you remove the radiator filler cap of a grader that has not completely cooled off?

- Slightly loosen cap to release pressure and then slowly remove cap*

67. What post-operational checks should be carried out by the operator on the

loadshifting equipment to prepare it ready to be reoperated?

- Check the structure and equipment for defects and wear and the oil, fuel and water levels*

SECURE SITE

Performance criteria 3.2.1 (select 1)

68. What shall be provided when a grader has to be parked on or protrudes onto an access way?

- Barricades, lights and signs*

69. For what reason should the key be removed from the ignition of the machine?

- To prevent unauthorised movement*

Unit	Form of assessment	Total number of boxes in the assessment	Number of boxes given or NA	Number of boxes required to meet standard	Were all critical boxes given or NA?		Assessment standard requirements achieved *		
					Yes	No	Yes	No	
1	Performance	30		27	Yes	No	Yes	No	
	Knowledge	14		8	Yes	No	Yes	No	
	Assessment completed within time allowed							Yes	No
2	Performance	23		20	Yes	No	Yes	No	
	Knowledge	10		6	Yes	No	Yes	No	
	Assessment completed within time allowed							Yes	No
3	Performance	7		6	Yes	No	Yes	No	
	Knowledge	3		2	Yes	No	Yes	No	
	Assessment completed within time allowed							Yes	No

*Performance standard

= Number of items required to meet standard (including all critical boxes)

Knowledge standard

= Number of questions required to meet standard (including all critical boxes)

Summary

Candidate is:

COMPETENT

NOT YET COMPETENT

Date: _____

Name of Assessor: _____ Signature: _____

Name of Candidate _____ Signature: _____

Comments/feedback:
