Assessor's Guidelines for the SVQs in Heating and Ventilating and Refrigeration and Air Conditioning

- **Heating and Ventilating Ductwork Installation (G9XD 22)**
- **Heating and Ventilating Industrial and Commercial Installation (G9XC 22)**
- **Maintain Heating and Ventilating Systems (G9XA 22)**
- **SVQ 2 Install and Maintain Refrigeration and Air Conditioning (RAC) Systems SCQF level 5 (GD7M 22)**
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- **Service, Maintain and Commission Building Engineering Services (G9XE 23)**
- **SVQ 3 Install, Commission and Maintain Air Conditioning Systems SCQF level 6 (GD7N 23)**
- **SVQ 3 Install, Commission and Maintain Refrigeration Systems SCQF level 6 (GD7L 23)**

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About this guide

This guide provides some practical examples of how to assess your candidates for the **SVQs in Heating and Ventilating and Refrigeration and Air Conditioning Systems at levels 2 and 3**. You may be able to think of other ways of assessing your candidates and recording your decisions about their competence.

Using assessments based on these examples does not guarantee successful verification — it is still your responsibility to ensure that internal quality assurance procedures are followed.

Introduction

This introduction provides a brief overview of SVQs and how they are assessed in the workplace. If you are already familiar with the concept of SVQs, you may wish to go to the next section.

About SVQs and the SCQF

Scottish Vocational Qualifications (SVQs) are work-based qualifications which set the level of occupational competence for each sector of the economy and are usually delivered in the workplace or in partnership with a college or other training provider. The qualifications have been designed by standards-setting bodies made up of experienced practitioners who represent employers, professional bodies, trade unions, education and voluntary organisations.

Each standards-setting body is responsible for developing national standards which define *what* employees (or potential employees) must be able to do, *how well*, and *in what circumstances*, to show that they are competent in their work.

Each SVQ which a standards-setting body develops has to fit into a broad framework which allows qualifications in the UK and throughout Europe to be compared.

There are SVQs for nearly all occupations in Scotland and they are available at SVQ levels 1–5. SVQs are currently notionally placed in the SCQF as the individual SVQs may be at differing SCQF levels and have differing amount of credit points, depending on the structure and context of the SVQ. SVQs are a means of recognising the skills and knowledge people need in employment, ie job competence. Successful completion of an SVQ provides clear evidence that the learner works to nationally recognised occupational standards.

Each Unit defines one aspect of a job or work-role, and says what it is to be competent in that aspect of the job. To be awarded a full SVQ, learners must achieve each of the SVQ Units which make it up by demonstrating that they are competent in that aspect of the job. The Units which make up the SVQ can also be taken as freestanding awards. Some SVQs or SVQ Units are incorporated into other awards or programmes including HNCs and Modern Apprenticeships.

Explanation of levels

SVQ1 (SCQF level 4)	Competence involves the application of knowledge and skills in the performance of a range of varied work activities, most of which may be routine or predictable.
SVQ2 (SCQF level 5)	Competence involves the application of knowledge and skills in a significant range of varied work activities, performed in a variety of contexts. At this level, there will be activities, which are complex or non-routine and there is some individual responsibility and autonomy. Collaboration with others, perhaps through membership of a work group or team, may often be a requirement.
SVQ3 (either SCQF level 6 or 7)	Competence involves the application of knowledge and skills in a broad range of varied work activities, most of which are complex and non-routine. There is considerable responsibility and autonomy, and control or guidance of others is often present.
SVQ4 (either SCQF level 8 or 9)	Competence involves the application of knowledge and skills in a broad range of complex technical or professional work activities, performed in a wide variety of contexts and with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and the allocation of resources is often present.
SVQ5 (SCQF level 11)	Competence involves the application of skills and a significant range of fundamental principles across a wide and often unpredictable variety of contexts. Very substantial personal autonomy and often significant responsibility for the work of others and for the allocation of substantial resources feature strongly, as do personal accountability.

For further information on SCQF go to **www.scqf.org.uk**.

How are standards defined in SVQs?

All SVQs consist of standards which can be broken down into various parts.

Units define the broad functions carried out in the sector, and are made up of a number of component parts.

- Unit number
- Unit title
- Description of what the Unit is about
- The composition of NOS (National Occupational Standards) contained within the Unit
- The respective Performance Objectives
- The respective Knowledge Requirements

The quality of performance in what people must be able to do — how well they have to perform — is described by **Performance Objectives**. These may also be called **statements of competence** or **what candidates should do**.

The section on **Knowledge Requirements** states what candidates must know and understand, and how this knowledge applies to their jobs.

You may also come across **Schemes of Work** which will contain statements on **scope and range**. These statements could, for example, list the systems and equipment that candidates are expected to be familiar with and use in their occupational area.

Increasingly, you may see changes to this format as standards become more user-friendly and are written in plain English. For example, there may be some standards containing **Range Statements** or **Evidence Requirements**, but over time these should disappear. You may, however, find that information on the context, nature and amount of evidence which is required to prove competence (which used to be given in Range Statements and Evidence Requirements) is now defined in the **assessment guidance** for the qualification. Assessment guidance is drawn up by the awarding body and is packaged along with the standards to form the SVQ.

Who is involved in SVQs?

There are several roles:

- **the candidate:** the person who wants to achieve the SVQ (eg an employee)
- **the assessor*:** the person who assesses the candidates and decides if they are competent (eg supervisor)
- **the internal verifier*:** an individual nominated by the centre (eg a company) who ensures that assessors apply the standards uniformly and consistently (eg supervisor's line manager)
- **the External Verifier*:** an individual appointed by SQA who ensures that standards are being applied uniformly and consistently across all centres offering the SVQ

*Assessors and verifiers in centres will be asked by SQA to prove they have the appropriate occupational competence to assess and verify the SVQ. Occupational competence has been defined by the standards-setting body in the Assessment Strategy for this SVQ(s) — see SQA's website: **www.sqa.org.uk**.

Assessors and verifiers are also expected to obtain an appropriate qualification in assessment and verification — this can be the Assessor/Verifier Units (the national standards for assessment and verification), or an alternative qualification which SQA also recognises.

The steps involved in assessing a candidate for an SVQ

In deciding whether a candidate should achieve an SVQ, you will go through these stages:

- planning for assessment
- generating and collecting evidence of the candidate's competence in the Units
- judging the evidence of the candidate's ability and making an assessment decision based on the evidence
- recording the assessment decision and the candidate's achievement

1 The SVQs in Heating and Ventilating and Refrigeration and Air Conditioning Systems at levels 2 and 3

The SVQs in Heating and Ventilating and Refrigeration and Air Conditioning at levels 2 and 3 have been developed by SummitSkills as the Sector Skills Council for the Building Services Engineering sector and are intended for direct labour and contract operatives serving the Heating and Ventilating and Refrigeration and Air Conditioning sectors.

These people may be working as installers and/or in the service and maintenance sectors. They will require skills and knowledge in Heating and Ventilating and Refrigeration and Air Conditioning systems.

The SVQs are designed to be assessed in the workplace, or in conditions of the workplace. Examples of the settings or centres in which the SVQs are likely to be delivered include: Further education colleges in partnership with employers and candidate training advisors.

Structure of the SVQs

This section lists the Units which form the SVQs in Heating and Ventilating and Refrigeration and Air Conditioning at levels 2 and 3.

SVQ in Heating and Ventilating Ductwork Installation at level 2 (G9XD 22)

Candidates must complete **six** mandatory Units.

Mandatory Units *(All Units in bold should be completed)*

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9H3 04 — Apply Health and Safety Legislation and Working Practices (Mechanical Services)				
			M1	Apply Health Safety Legislation and Working Practices
F9KH 04 — Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)				
			M2	Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)
F9MP 04 — Maintain Effective Working Relationships				
			M3	Maintain Effective Working Relationships
			M4	Provide Relevant People with Technical and Functional Information
F9MR 04 — Prepare Work Locations				
			M7	Prepare to Carry Out Work
			M33	Carry Out Safe Electrical Working Practices on Electrical Control (and Supply) of Mechanical Building Services Systems
F9MT 04 — Install and Inspect Ductwork Systems and Components				
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9MV 04 — Install and Inspect Air Handling and Extraction Units				
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components

SVQ in Heating and Ventilating Industrial and Commercial Installation at level 2 (G9XC 22)

Candidates must complete **six** mandatory Units.

Mandatory Units *(All Units in bold should be completed)*

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9H3 04 — Apply Health and Safety Legislation and Working Practices (Mechanical Services)				
			M1	Apply Health Safety Legislation and Working Practices
F9KH 04 — Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)				
			M2	Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)
F9MP 04 — Maintain Effective Working Relationships				
			M3	Maintain Effective Working Relationships
			M4	Provide Relevant People with Technical and Functional Information
F9MR 04 — Prepare Work Locations				
			M7	Prepare to Carry Out Work
F9N4 04 — Install Hot and Cold Water Systems				
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
F9N5 04 — Install Heating Systems and Associated Plant and Equipment				
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components

Additional Extra Units (Optional)

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9N6 04 — Install Fire Protection Systems				
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
F9N7 04 — Install Warm Air Heating Systems				
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components

SVQ in Maintain Heating and Ventilating Systems at level 2 (G9XA 22)

Candidates must complete **five** mandatory Units and **two** optional Units.

Mandatory Units *(All Units in bold should be completed)*

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9H3 04 — Apply Health and Safety Legislation and Working Practices (Mechanical Services)				
			M1	Apply Health Safety Legislation and Working Practices
F9KH 04 — Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)				
			M2	Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)
F9MP 04 — Maintain Effective Working Relationships				
			M3	Maintain Effective Working Relationships
			M4	Provide Relevant People with Technical and Functional Information
F9MR 04 — Prepare Work Locations				
			M7	Prepare to Carry Out Work
F9N8 04 — Carry Out Safe Electrical Working Practices				
			M33	Carry Out Safe Electrical Working Practices on Electrical Control (and Supply) of Mechanical Building Services Systems

Optional Units *(Candidates must achieve at least two of the following Units which are in bold)*

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9N9 04 — Perform Routine and Planned Maintenance Tasks on Fuel Burning Appliances				
			M12	Service and Maintain Mechanical Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M27	Commission Mechanical Systems

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9NA 04 — Perform Routine and Planned Maintenance Tasks on Water Systems and Components				
			M12	Service and Maintain Mechanical Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M27	Commission Mechanical Systems
F9NC 04 — Perform Routine and Planned Maintenance Tasks on Air System Components				
			M12	Service and Maintain Mechanical Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M27	Commission Mechanical Systems
F9ND 04 — Perform Routine and Planned Maintenance Tasks on H&V Electrical Components				
			M12	Service and Maintain Mechanical Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M27	Commission Mechanical Systems

SVQ 2 Install and Maintain Refrigeration and Air Conditioning (RAC) Systems level 2 (GD7M 22)

To achieve the whole qualification, you must prove competence in all **nine** mandatory Units.

Mandatory Units *(All Units in bold should be completed)*

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9H3 04 — Apply Health and Safety Legislation and Working Practices (Mechanical Services)				
			M1	Apply Health Safety Legislation and Working Practices
F9KH 04 — Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)				
			M2	Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)
F9MP 04 — Maintain Effective Working Relationships				
			M3	Maintain Effective Working Relationships
			M4	Provide Relevant People with Technical and Functional Information
F9MR 04 — Prepare Work Locations				
			M7	Prepare to Carry Out Work
FY1M 04 — Install RAC Systems and Components				
			M16	Fit and Fix Cooling Systems, Equipment and Components
			M18	Decommission Cooling Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
FY1R 04 — Maintain RAC Systems and Components				
			M17	Service and Maintain Cooling Systems, Equipment and Components
			M12	Service and Maintain Mechanical Systems, Equipment and Components
FY1Y 04 — Safe Handling of Refrigerants (Category 1)				
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M18	Decommission Cooling Systems, Equipment and Components

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
FY1W 04 — Prepare and Undertake Pipe Jointing				
			M30	Prepare Resources for Pipe Jointing Activities
			M31	Connect Pipework
FY1F 04 — Carry Out Safe Electrical Working Practices				
			M33	Carry Out Safe Electrical Working Practices on Electrical Control (and Supply) for Mechanical Building Services Systems

SVQ in Heating and Ventilating Ductwork Planning and Installation at level 3 (G9X9 23)

To achieve the whole qualification, you must prove competence in all **eight** mandatory Units.

Mandatory Units *(All Units in bold should be completed)*

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9H3 04 — Apply Health and Safety Legislation and Working Practices (Mechanical Services)				
			M1	Apply Health Safety Legislation and Working Practices
F9KH 04 — Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)				
			M2	Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)
F9MR 04 — Prepare Work Locations				
			M7	Prepare to Carry Out Work
			M8	Identify Systems, Equipment and Components
F7G2 04 — Maintain Working Relationships and Oversee Work Activities				
			M3	Maintain Effective Working Relationships
			M4	Provide Relevant People with Technical and Functional Information
			M5	Oversee the Work Environment
			M6	Organise the Working Environment
F9NE 04 — Install, Test and Pre-commission Ductwork Systems and Components				
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M27	Commission Mechanical Systems

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9NF 04 — Install, Test and Pre-commission Air Handling and Extraction Units				
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M27	Commission Mechanical Systems
F9H7 04 — Carry Out Work on Electrical Systems for the Control (and Supply) of Mechanical Services (Limited Scope)				
			M32	Establish Electrical Control (and Supply) of Mechanical Building Services Systems
F9NG 04 — General Service and Maintenance of Ductwork Systems and Components				
			M24	Service and Maintain Ductwork Systems, Equipment and Components

SVQ in Heating and Ventilating Industrial and Commercial Installation at level 3 (G9X8 23)

To achieve the whole qualification, you must prove competence in all **eight** mandatory Units plus **one of four** optional Units.

Mandatory Units *(All Units in bold should be completed)*

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9H3 04 — Apply Health and Safety Legislation and Working Practices (Mechanical Services)				
			M1	Apply Health Safety Legislation and Working Practices
F9KH 04 — Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)				
			M2	Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)
F9MR 04 — Prepare Work Locations				
			M7	Prepare to Carry Out Work
F7G2 04 — Maintain Working Relationships and Oversee Work Activities				
			M3	Maintain Effective Working Relationships
			M4	Provide Relevant People with Technical and Functional Information
			M5	Oversee the Work Environment
			M6	Organise the Working Environment
F9NH 04 — Install, Test and Commission Hot and Cold Water Systems				
			M8	Identify Systems, Equipment and Components
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M27	Commission Mechanical Systems

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9NJ 04 — Install, Test and Commission Larger Bore Heating Systems and Associated Plant and Equipment				
			M8	Identify Systems, Equipment and Components
			M27	Commission Mechanical Systems
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
F9NK 04 — Install, Test and Commission Chilled Water Services				
			M8	Identify Systems, Equipment and Components
			M27	Commission Mechanical Systems
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
F9H7 04 — Carry Out Work on Electrical Systems for the Control (and Supply) of Mechanical Services (Limited Scope)				
			M32	Establish Electrical Control (and Supply) of Mechanical Building Services Systems

Optional Units ***(Candidates must achieve one of the following four Units which are in bold)***

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9NL 04 — Install, Test and Commission Fuel Supply Systems				
			M7	Prepare to Carry Out Work
			M8	Identify Systems, Equipment and Components
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
			M27	Commission Mechanical Systems
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M12	Service and Maintain Mechanical Systems, Equipment and Components
F9NM 04 — Install, Test and Commission Steam Systems				
			M7	Prepare to Carry Out Work
			M8	Identify Systems, Equipment and Components
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M27	Commission Mechanical Systems
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M12	Service and Maintain Mechanical Systems, Equipment and Components
F9NN 04 — Install, Test and Commission Compressed Air Systems				
			M7	Prepare to Carry Out Work
			M8	Identify Systems, Equipment and Components
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M27	Commission Mechanical Systems
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M12	Service and Maintain Mechanical Systems, Equipment and Components

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9NP 04 — Prepare and Undertake Specialist Pipe Jointing Methods and Proprietary Installation Systems				
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M27	Commission Mechanical Systems
			M30	Prepare Resources for Pipe Jointing Activities
			M31	Connect Pipework

Additional Extra Units (Optional)

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9NR 04 — Install Test and Commission Fire Protection Systems				
			M7	Prepare to Carry Out Work
			M8	Identify Systems, Equipment and Components
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M27	Commission Mechanical Systems
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M12	Service and Maintain Mechanical Systems, Equipment and Components
F9NT 04 — Install Test and Commission Warm Air Heating Systems				
			M7	Prepare to Carry Out Work
			M8	Identify Systems, Equipment and Components
			M21	Install Industrial and Commercial Heating and Ventilating Systems, Equipment and Components

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M27	Commission Mechanical Systems
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M12	Service and Maintain Mechanical Systems, Equipment and Components

SVQ in Service, Maintain and Commission Building Engineering Services at level 3 (G9XE 23)

To achieve the whole qualification, you must prove competence in all **five** mandatory Units plus any **three of five** optional Units.

Mandatory Units *(All Units in bold should be completed)*

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9H3 04 — Apply Health and Safety Legislation and Working Practices (Mechanical Services)				
			M1	Apply Health Safety Legislation and Working Practices
F9KH 04 — Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)				
			M2	Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)
F9MR 04 — Prepare Work Locations				
			M7	Prepare to Carry Out Work
			M8	Identify Systems, Equipment and Components
F7G2 04 — Maintain Working Relationships and Oversee Work Activities				
			M3	Maintain Effective Working Relationships
			M4	Provide Relevant People with Technical and Functional Information
			M5	Oversee the Work Environment
			M6	Organise the Working Environment
F9MW 04 — Diagnose and Rectify Faults on Heating and Ventilating Electrical Systems				
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M28	Identify Faults in Mechanical Systems, Equipment and Components
			M29	Rectify and Modify Mechanical Systems, Equipment and Components
			M27	Commission Mechanical Systems

Optional Units ***(Candidates must achieve three of the following five Units which are in bold)***

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9MX 04 — Diagnose and Rectify Faults on Hot and Cold Water Systems				
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M28	Identify Faults in Mechanical Systems, Equipment and Components
			M29	Rectify and Modify Mechanical Systems, Equipment and Components
			M27	Commission Mechanical Systems
F9MY 04 — Diagnose and Rectify Faults on Heating Systems				
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M28	Identify Faults in Mechanical Systems, Equipment and Components
			M29	Rectify and Modify Mechanical Systems, Equipment and Components
			M27	Commission Mechanical Systems
F9N0 04 — Diagnose and Rectify Faults on Ventilation Systems				
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M28	Identify Faults in Mechanical Systems, Equipment and Components
			M29	Rectify and Modify Mechanical Systems, Equipment and Components
			M27	Commission Mechanical Systems
F9N2 04 — Diagnose and Rectify Faults on Air Conditioning Systems				
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M27	Commission Mechanical Systems

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
			M19	Identify and Rectify Faults in Cooling Systems, Equipment and Components
F9N3 04 — Diagnose and Rectify Faults on Fuel Supply Systems				
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M26	Decommission Heating and Ventilating Systems, Equipment and Components
			M28	Identify Faults in Mechanical Systems, Equipment and Components
			M29	Rectify and Modify Mechanical Systems, Equipment and Components
			M27	Commission Mechanical Systems

SVQ 3 Install, Commission and Maintain Air Conditioning Systems SCQF level 6 (GD7N 23)

To achieve the whole qualification, you must prove competence in all **eleven** mandatory Units.

Mandatory Units *(All Units in bold should be completed)*

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9H3 04 — Apply Health and Safety Legislation and Working Practices (Mechanical Services)				
			M1	Apply Health Safety Legislation and Working Practices
F9KH 04 — Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)				
			M2	Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)
F7G2 04 — Maintain Working Relationships and Oversee Work Activities				
			M3	Maintain Effective Working Relationships
			M4	Provide Relevant People with Technical and Functional Information
			M5	Oversee the Work Environment
FY1P 04 — Maintain Air Conditioning Systems and Components				
			M17	Service and Maintain Cooling Systems, Equipment and Components
			M12	Service and Maintain Mechanical Systems, Equipment and Components
FY1V 04 — Plan and Prepare Work Locations				
			M7	Prepare to Carry Out Work
			M6	Organise the Work Environment
			M8	Identify Systems, Equipment and Components
FY1L 04 — Install Air Conditioning Systems and Components				
			M16	Fit and Fix Cooling Systems, Equipment and Components
			M18	Decommission Cooling Systems, Equipment and Components

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
			M19	Commission Cooling Systems, Equipment and Components
FY1J 04 — Inspect and Test Air Conditioning Systems and Components				
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M20	Identify and Rectify Faults in Cooling Systems, Equipment and Components
FY1X 04 — Safe Handling of Refrigerants				
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M18	Decommission Cooling Systems, Equipment and Components
FY1W 04 — Prepare and Undertake Pipe Jointing				
			M30	Prepare Resources for Pipe Jointing Methods
			M31	Connect Pipework
FY1F 04 — Carry Out Safe Electrical Working Practices				
			M33	Carry Out Safe Electrical Working Practices on Electrical Control (and Supply) for Mechanical Building Services Systems
FY1G 04 — Identify and Rectify Faults in Air Conditioning Systems, Equipment and Components				
			M20	Identify and Rectify Faults in Cooling Systems, Equipment and Components
			M28	Identify Faults in Mechanical Systems, Equipment and Components
			M29	Rectify and Modify Mechanical Systems, Equipment and Components

SVQ 3 Install, Commission and Maintain Refrigeration Systems SCQF level 6 (GD7L 23)

To achieve the whole qualification, you must prove competence in all **eleven** mandatory Units.

Mandatory Units *(All Units in bold should be completed)*

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
F9H3 04 — Apply Health and Safety Legislation and Working Practices (Mechanical Services)				
			M1	Apply Health Safety Legislation and Working Practices
F9KH 04 — Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)				
			M2	Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)
F7G2 04 — Maintain Working Relationships and Oversee Work Activities				
			M3	Maintain Effective Working Relationships
			M4	Provide Relevant People with Technical and Functional Information
			M5	Oversee the Work Environment
FY1V 04 — Plan and Prepare Work Locations				
			M6	Organise the Work Environment
			M7	Prepare to Carry Out Work
			M8	Identify Systems, Equipment and Components
FY1N 04 — Install Refrigeration Systems and Components				
			M16	Fit and Fix Cooling Systems, Equipment and Components
			M18	Decommission Cooling Systems, Equipment and Components
			M19	Commission Cooling Systems, Equipment and Components
FY1T 04 — Maintain Refrigeration Systems and Components				
			M17	Service and Maintain Cooling Systems, Equipment and Components

SQA ref	SCQF level	SCQF credit points	SSC ref	Title
			M12	Service and Maintain Mechanical Systems, Equipment and Components
FY1X 04 — Safe Handling of Refrigerants				
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M18	Decommission Cooling Systems, Equipment and Components
FY1W 04 — Prepare and Undertake Pipe Jointing				
			M30	Prepare Resources for Pipe Jointing Methods
			M31	Connect Pipework
FY1F 04 — Carry Out Safe Electrical Working Practices				
			M33	Carry Out Safe Electrical Working Practices on Electrical Control (and Supply) for Mechanical Building Services Systems
FY1K 04 — Inspect and Test Refrigeration Systems and Components				
			M25	Inspect and Test Mechanical Systems, Equipment and Components
			M20	Identify and Rectify Faults in Cooling Systems, Equipment and Components
FY1H 04 — Identify and Rectify Faults in Refrigeration Systems, Equipment and Components				
			M20	Identify and Rectify Faults in Cooling Systems, Equipment and Components
			M28	Identify Faults in Mechanical Systems, Equipment and Components
			M29	Rectify and Modify Mechanical Systems, Equipment and Components

An Assessment Strategy for the SVQ

As part of their review of the SVQ(s), the standards-setting body SummitSkills as the Sector Skills Council for the Building Services Engineering sector has developed an Assessment Strategy which defines a range of requirements:

- the occupational expertise of assessors and verifiers
- a definition of simulation
- definition of the workplace
- information on a model of independent assessment or external quality control

The relevant parts of the Assessment Strategy are published on SQA's website (**www.sqa.org.uk**), and both SQA and centres must comply with these requirements.

Why would people be interested in the SVQ?

People will take SVQs for a variety of reasons: to gain promotion, to prove their job competence, or for personal development. There will be other reasons too. One of the first things to do is to find out why your candidates want to do the SVQ, and to advise them of the appropriateness of the qualification. If anyone is acting as a coach or mentor to your candidates, they might help you to do this.

How do candidates begin?

Choosing the SVQ

You should make sure that candidates get guidance before starting out on an SVQ — they need advice to ensure that their existing job remit, skills, experience, and their plans for progression, are matched to the SVQ selected. It does not have to be you as the assessor, who carried out the matching process, but whoever has responsibility for this should ensure that the assessment opportunities available to the candidate are also considered.

Example

David had gained employment within the refrigeration and air conditioning sector but had no formal qualifications to support his work-based practical and knowledge skills. His employer in conjunction with the Local Enterprise Company (LEC), ie BEST (Building Engineering Services Training) advised him to consider the SVQ 2 Install and Maintain Refrigeration and Air Conditioning (RAC) Systems at SCQF level 5.

When his employer and the training advisor matched David's job requirements, existing skills and experience with the SVQ, it emerged that in conjunction with formal training at the local college of further education he should be able to generate sufficient evidence to meet the requirements of the following SVQ Units:

- Apply Health and Safety Legislation and Working Practices (Mechanical Services)
- Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)
- Maintain Effective Working Relationships
- Prepare Work Locations
- Install RAC Systems and Components
- Maintain RAC Systems and Components
- Safe Handling of Refrigerants (Category 1)
- Prepare and Undertake Pipe Jointing
- Carry out Safe Electrical Working Practices

The training advisor arranged for David to enroll at an accredited training centre, eg a college of further education, where formal training and guidance will be provided on how to generate, attain and collect evidence and construct a portfolio to achieve these Units.

All these arrangements were agreed by everyone involved and then written up in an assessment plan for David.

2 Preparing to assess the SVQ

This section offers practical advice on how to begin to go about assessing your candidates for the SVQ. This advice is offered as examples of good practice — you may develop your own approaches to assessing your candidates which also work well.

Your role and your candidate's role

Assessing the SVQ will involve several stages. Both you and the candidate should be clear on your roles in the assessment process before you begin.

Your role

- ensure candidates understand what is to be assessed and how it is to be assessed
- ensure the conditions and resources required for assessment are available
- help candidates to identify and gather evidence
- observe and record candidates carrying out the activities described in the standards — records should say what has been observed, how it was carried out, and what it demonstrates
- assess products of the candidate's own work
- question candidates and record results
- help candidates to present evidence
- authenticate the evidence candidates provide
- judge evidence and make assessment decisions
- identify gaps or shortfalls in candidates' competence
- provide feedback to candidates throughout the assessment process
- record achievement

Candidates' role

- prepare for assessment — become familiar with the standards, what is to be assessed and how it is to be assessed
- help to identify sources of evidence and how these could be assessed
- carry out activities, and/or produce products of own work, and/or answer questions
- gather and present evidence
- receive and act on feedback from the assessor

Planning

In planning for assessment, you will find it helpful to meet with your candidate and plan what is to be assessed, in what way, and when and where the assessment is to take place. This discussion can be confirmed in the form of an agreed assessment plan between you and your candidate.

You should treat assessment plans as working documents — they can be updated and changed as you review progress with your candidate.

As you are planning assessment, don't forget to make the most of opportunities to *integrate* assessment. This means planning to assess an activity which draws on the contents of different Units or Elements. It can be a practical and cost-effective way of assessing your candidate's competence.

If you are a new assessor working towards your A/V Units (the national standards in assessment and verification) you will need copies of completed assessment plans as part of your evidence.

To help you plan for assessment, we have produced an assessment plan which covers Unit no 6 (M16, M18, M25) — *Install RAC Systems and Components*.

You will notice that we have included spaces to enter dates when the assessment plan has been reviewed. Any gaps identified during these reviews should be discussed with your candidates and noted for action in the assessment plan.

Assessment plan

Units	Unit no 6 (M16, M18, M25) — Install RAC Systems and Components				
Elements					
Activities	**Performance Objectives**	**Method of assessment/ Sources of evidence**	**Date of assessment**	**Evidence already available**	**Links to other Units (PO and KR)**
The installation of a simple air conditioning system including all connecting pipework and supports. Possible evidence: ♦ Simple split type air conditioning systems, ie one indoor unit and one outdoor unit.	M16 — All	Direct observation, witness testimony, questioning, pictures to support authenticity of evidence.	08/11/2011		Unit no 1, M1 — 1, 2, 3, 4 Unit no 4, M4 — All
Questioning for knowledge and understanding not apparent from performance to be identified from 2nd review	M16 — e, g, I, j, k, l, m, o, p	Written questions			

Assessor's signature *Robert Miller* **1st review due** *10/11/2011*

Candidate's signature *David Peters* **2nd review due** *17/11/2011*

Date of agreement *30/08/2011* **Date of completion** *25/11/2011*

Selecting methods of assessment

The methods of assessment you use should be valid, reliable and practicable.

- By *valid* we mean that the assessment method should be appropriate to the standards
- By *reliable* we mean that the assessment method should ensure consistent results when used with different candidates, different assessors and on different occasions
- By *practicable* we mean that the method ensures that the assessment makes best use of available resources, equipment and time

Before you assess a candidate, you must make sure that the methods of assessment you have chosen to use, along with any assessment materials (such as questions and sample answers) have been agreed within your centre through its system of internal quality assurance. This system is often called *internal verification* — its purpose is to help to ensure that assessment methods are valid, reliable and practicable.

There are both benefits and challenges when you are assessing SVQs in the workplace, or in conditions of the workplace. When you select methods of assessment, you should try to offer the candidate the benefits of workplace assessment and minimise any potential difficulties.

The benefits might be:

- Familiarity with the work area and equipment, so the candidate feels comfortable with the assessment.
- Resources to be used are readable available.
- Performance and product evidence will be valid and can be authenticated.
- Candidate can progress at his or her own pace.
- Down time and assessment cost can be reduced.

The challenges might be:

- Pressures of commercial work.
- Insufficient time to arrange assessment when appropriate opportunity at work arises.
- The performance criteria is not able to be met by the chosen assessment on site.
- Insufficient range of work available at work to meet the complete criteria of the SVQ.
- The difficulty in arranging a qualified assessor to be present at the candidates identified evidence of practical competence.

Example

Candidates conducting installation work will have to consistently demonstrate their practical competence in completing the installation of a simple air conditioning system to the prescribed standards with emphasis on the performance objectives identified in the activity. Compliance can be confirmed by **observation** as and when such situations arise. If you are an assessor who is working alongside the candidate you should be well placed to observe the candidate's performance, perhaps using a prepared checklist, and to question the candidate about the situation afterwards.

Methods of assessment

Assessment may involve a range of assessment methods. For SVQs, some of the most commonly used methods are observation, product evidence, and questioning.

Observation

Observation by an assessor is considered to be the most valid and reliable method of assessment. It can be organised in a variety of ways:

- working alongside the candidate
- arranging to visit when naturally-occurring activities are carried out by the candidate
- arranging for activities to take place

Observation by the assessor can often be supplemented by other types of assessment methods such as questioning. For example, it may be appropriate to ask oral questions of candidates as they carry out naturally-occurring activities.

- Observing a candidate producing evidence of practical competence, eg installation of a simple air conditioning system supplemented by questions regarding the rationale of the chosen pipework routes, the location of both indoor and outdoor units, the use of appropriate equipment, etc.
- Observing a candidate undertake the necessary pre-commissioning checks on the same installed system supplemented by questioning of the required tasks to determine clear evidence of underpinning knowledge and compliance with current regulations.
- Observation of the candidate preparing the work area, communicating with other members of the team and professional conduct with client.

Product evidence

As candidates work towards achieving the SVQ, they will produce evidence in the form of products of their work. The nature of this evidence can vary widely depending on what the candidate's job entails, but examples of product evidence include:

- The installation of a simple air conditioning system
- Written evidence in the form of an assessment
- Authenticated photographic evidence

An example of a simple practical AC installation is illustrated below:

Student guidance and specification:

You are required to complete the installation of a small split AC system. The indoor and outdoor unit have already been mounted in their designated positions.

The installation involves installing the liquid and suction line pipework between the indoor and outdoor unit to the dimensions indicated. The liquid line is to be installed at 120mm centres to the suction line. All piping is to be heavy gauge copper sized in accordance with manufacturer's instructions.

The pipework requires to be bent using a small hand bender with appropriate sized formers.

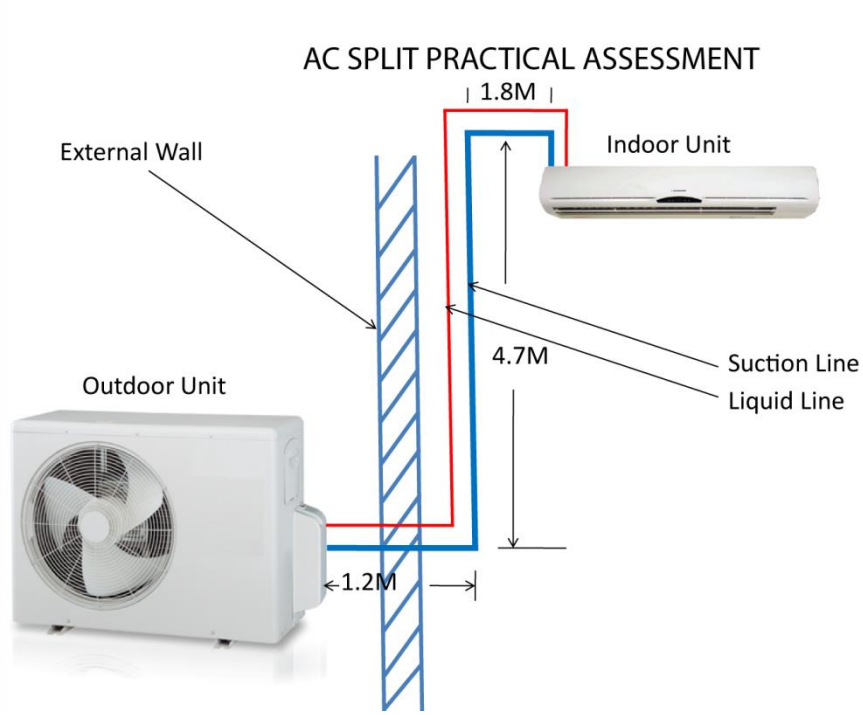
Connections to the indoor and outdoor unit are to be flared in line with manufacturer's instructions. No joints are to be made in the pipework between the flared ends connecting the indoor unit to the outdoor units.

Piping passing through the solid wall requires to be sleeved using larger bore diameter copper pipework.

Pipework bracketing is to be by way of 150mm perforated tray with proprietary angles. Plastic push-fit pipe clips are to be secured to the tray at the fore-noted centres.

On completion, pipework is to be insulated with appropriately sized Armaflex.

Note: Testing of the pipework will form the basis of another assessment.



Questioning

Candidates have to show that they can meet the knowledge specifications for the SVQs. For these SVQs, Knowledge and Understanding is specified for each Unit. Much of a candidate's knowledge and understanding will be apparent from what they do or produce as part of their work, but this will not always be the case, and questioning can be a useful way of confirming what candidates know and understand.

Questions can be asked in a variety of forms, such as oral questions, short answer written questions, and multiple-choice.

You should be careful that the method of questioning does not go beyond the competence required for the SVQ and become a barrier to fair assessment. For example, some candidates will feel more comfortable with oral questions than written.

Q Where would the expansion device be located within the simple DX air conditioning system?

A Between the Condenser and Evaporator.

B Between the Condenser and the Receiver.

C Between the Compressor and the Condenser.

D Between the Evaporator and the Compressor.

A **A** Between the Condenser and Evaporator.

Q What is the purpose of superheat at the evaporator?

A To ensure no refrigerant liquid is present at the compressor inlet.

Other methods of assessment

These methods, like questioning, are often used for authentication. See Section 3 for more about authenticating candidates' evidence.

Personal statements

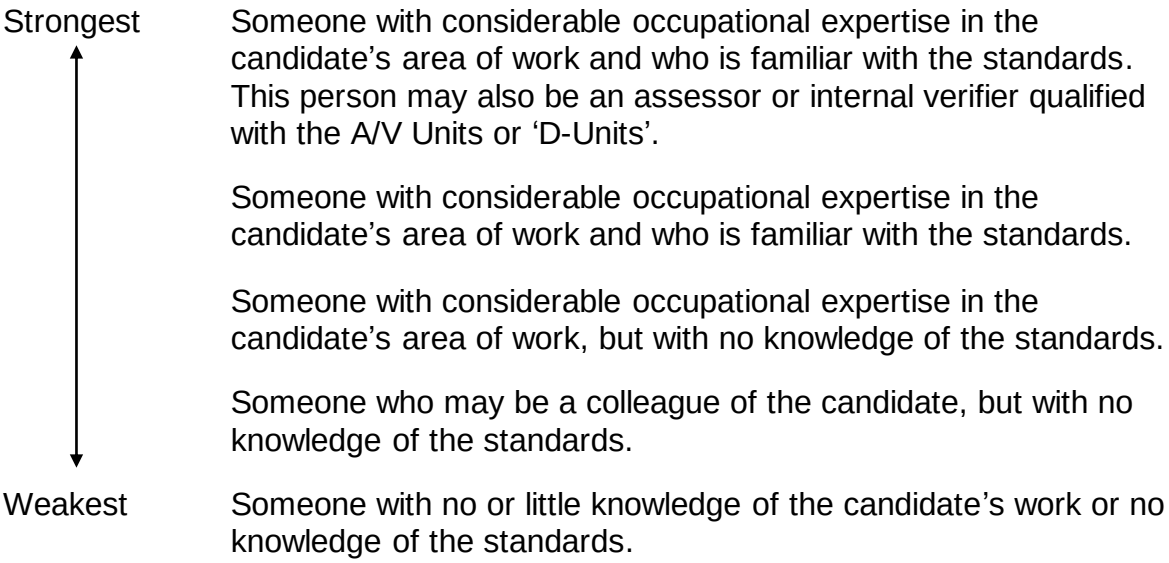
You might sometimes find it helpful to ask a candidate to give an account of why they did an activity in a certain way or how they produced a product of their work. This is often referred to as a *personal statement*. You should take care to ensure that by asking candidates to produce such statements, you are not asking them to demonstrate competence beyond what is required by the standards. You should also be selective in the use of personal statements, and make sure they have not been produced as a substitute to a more valid, reliable and practical method of assessment.

The candidate could use a personal statement in Unit no 6 (M16, M18, M25) — *Install RAC Systems and Components*. You may not have been able to observe the candidate meeting all the Performance Objectives for the installation of a simple air conditioning system. The personal statement would allow the candidate to explain the process and procedures as well as demonstrating their grasp of knowledge and understanding. Obviously such evidence would still be supported by a witness testimony and photographs to authenticate the evidence produced.

Witness testimony

For practical reasons, you may not be able to observe all the activities carried out by your candidates, but might feel that other people may be able to provide a statement on what your candidates have been doing or producing as part of their work. Statements of this kind are called *witness testimony*, and are often used to support other evidence produced by candidates. If witness testimony is used, you should, ideally, identify witnesses and opportunities for using their testimony as part of assessment planning.

You should bear in mind that the weight of the evidence will vary, depending on the knowledge and expertise of the person providing the witness testimony. You will have to take these factors into account as you make your judgement.



Witness testimony is unlikely to be sufficient in itself for a decision about the candidate's competence, and would normally be supplemented by questioning candidates.

An Example

In Unit no 6 (M16, M18, M25) — *Install RAC Systems and Components* the Performance Objectives require the candidate to carry out a number of functions typical in the activity that when supported by a witness testimony from the candidate's supervisor or employer would be useful as it could detail the candidate's abilities to comply with current legislation and good working practices.

Simulation

Simulation is any structured assessment exercise involving a specific task which reproduces real-life situations.

On some occasions, it may not be practical to assess a candidate in real work. Examples might be where the standards require candidates to carry out emergency or contingency procedures, or where client confidentiality is an issue, or where a candidate's job role does not cover all aspects of the qualification.

The standards-setting body SummitSkills as the Sector Skills Council for the Building Services Engineering sector has defined what it regards as simulation, and has specified in the standards when simulation is and is not acceptable. The standards also state when candidates must demonstrate competence in the workplace.

For more details on simulation and what constitutes performance in the workplace, look at the Assessment Strategy on SQA's website: **www.sqa.org.uk**.

Examples where simulation is used:

- Unit no 6 (M16, M18, M25) — *Install RAC Systems and Components* the NOS M25 requires the candidate to carry out pre-commissioning checks to the installed air conditioning system. These are safety critical activities and as such are required to be assessed under simulated conditions, eg strength test, pressure test, system evacuation, etc.
- In instances where the candidate has no access to the range of work that is required within the scope and range of the Unit it is obvious that simulation that reflects the reality of the true working environment with all the attendant constraints and pressures is a viable alternative.

Other sources of evidence

Other sources of evidence can be previous experience or learning, case studies or assignments.

SQA's *Guide to Assessment* (see section 5) has more advice on methods of assessment and how to ensure that your assessment is valid, reliable and practicable.

3 Generating evidence

The methods of assessment you use should generate sufficient evidence to demonstrate the candidate's competence.

We described earlier the circumstances in which you might choose to use different methods of assessment. Starting on the next page, this section gives you examples of forms which you can use to record and present evidence of:

- observation (by the assessor)
- questions and candidate responses
- personal statement (produced by the candidate)
- witness testimony

There are blank forms which you can copy and use in assessment in Appendix 1.

Observation

For observation, note that the form asks you to record the skills and activities observed. This helps you to make a judgement on how the activity was carried out and what it demonstrates.

Observation record

Unit/Element(s)	**Unit no 6 (M16, M18, M25): Install RAC Systems and Components**
Candidate	**David Peters**
Evidence index number	**04**
Date of observation	**08/11/2011**

Skills/activities observed	**Performance Objectives covered**
The installation of a simple air conditioning system including all connecting pipework and supports. David demonstrated organisational skills in preparing the work area and gathering tools and equipment for the installation. David discussed with the client the sequence of the planned work and agreement was reached in the final positioning of both the indoor and outdoor units. Working from drawings, risk assessments, method statements and manufacturer's instructions David assembled, positioned and fixed the system components using methods conforming to industry requirements. During the installation David was competent in the safe use of tools and equipment with particular attention to PPE and the proper procedures, legislation and use of scaffolding in accessing work areas at high level. Once David had established the route of the refrigerant pipework he proceeded to prepare the supports for fixing to the ceiling structure. Once complete the pipework was installed onto the cable tray support from the outdoor unit to the indoor unit. The same pipework was insulated leaving only the brazed connections exposed for future pre-commissioning checks. David connected the pipework to both units in accordance with industry requirements and carried out a final visual check of the installation. David then informed his supervisor that the installation was complete and ready for pre-commissioning to commence at a date to be agreed with the client. David ensured the system could not be operated in its current pre-commissioning state. The work areas were then cleaned and all debris removed	M16 — 3, 4, 5, 6, 7, 8, 9, 10 and 12

from the client's premises. All tools and equipment were taken off site.	

Knowledge and understanding apparent from this observation

a, b, c, d, f, h, n.

Other Units/Elements to which this evidence may contribute

Unit no 1 — Apply Health and Safety Legislation and Working Practices
M1 — 1, 2, 3, 4

Unit no 4 — Prepare Work Locations
M4 — 1, 2, 3, 4, 5, 6, 7, 8, 9

Assessor's comments and feedback to candidate

David, I was particularly pleased to see that you discussed the programme of work with the client and that the installation was carried out in a professional and assured manner, focusing on the need to meet the work specification and adjusting to on-site conditions whilst demonstrating responsibility in the diligent adherence to health and safety issues.

I would ask that you obtain a copy of all non-sensitive documentation you have made reference to or used today, and place them in the supporting evidence section of your portfolio for evidence cross referencing purposes.

Assessor-devised questions to cover the knowledge and understanding not apparent during this observation namely knowledge requirement, eg I, j, k, l, m, o and p will be conducted at our next planned review on 17/11/2011.

I can confirm the candidate's performance was satisfactory.

Assessor's signature Robert Miller **Date** 10/11/2011

Candidate's signature David Peters **Date** 10/11/2011

Questions and candidate responses

This form can be used to record any questions you might ask the candidate to establish what they know and understand. You should note the candidate's responses on this form too.

Note that there is a space near the top of the form for you to record when, where, how and why you asked the questions.

Where you want to give the candidate written questions, this form could also be used.

Record of questions and candidate's answers

Unit	Unit no 6 (M16, M18 M25): Install RAC Systems and Components
Element(s)	M16
Evidence index number	03
Circumstances of assessment	
Following the direct observation of David carrying out the installation of an air conditioning system the following questions were asked to cover the knowledge requirements not confirmed by the observation.	
List of questions and candidate's responses	
Q	Where might you need to connect into existing service systems? And what procedures should be taken? (Knowledge Requirement: e)
A	**When connecting the condensate pipework from the indoor unit to an existing waste water pipe care should be taken to ensure the grading is adequate and that the existing pipe is suitable.**
Q	State three people to whom any inconsistencies found in the installation details should be reported. (Knowledge Requirement: i)
A	***1*** **A more experienced engineer** ***2*** **Your supervisor/manager** ***3*** **The client**
Q	The steps necessary to prepare and pressure test the installed system and where might leaks occur? (Knowledge Requirements: j, k, l)
A	**Ensure all connections in the installation are tight. Ensure you have the correct set of manifold gauges, Oxygen Free Nitrogen including regulator and braided hose, isolated safety devices. Leaks are possible at any joints made during installation.**
Q	What is the function of the condenser and why is it essential to ensure no refrigerant leakage from the system? (Knowledge Requirements: m, n, p)
A	**The condenser is an indirect heat exchanger that allows the high pressure, high temperature refrigerant vapour to reject its heat to the surrounding cooler medium, eg ambient air. Thus the refrigerant rejects sufficient heat to return to its liquid state. It is important to prevent refrigerants from leaving the system as they are identified as contributing factors to both Ozone Depletion and Global Warming.**

Assessor's signature Robert Miller **Date** 17/11/2011

Candidate's signature David Peters **Date** 17/11/2011

Candidate’s personal statement

If a personal statement is being used as evidence, it should be completed by the candidate. The statement should record what they did, how and why they chose to carry out an activity or produce work in a certain way. Where other people may have been present during an activity and they may be able to provide witness testimony, the candidate should record how the statement links to other evidence in the column provided.

Personal statement

Date	Evidence index number	Details of statement	Links to other evidence (enter numbers)	Unit, Performance Objectives, Knowledge Requirements covered
08/11/2011	05	The planned installation of a split type air conditioning system at a new retail unit. I had identified this planned activity as an ideal source of evidence for my SVQ portfolio and having discussed it with my manager arranged to be the responsible engineer under supervision for the works. On 8 November 2011, I along with my observing supervising engineer, Mr John Duthie, reported to the client at the retail unit and proceeded to review the sequence of works with him. I had to decide upon the best location for both indoor and outdoor units taking account of factors that may impede their performance, eg proximity to structures that can impede airflow. Thereafter I had to fabricate and install purpose made supports for both the units and the interconnecting pipework. Their fixing needed access to high level and consequently required scaffolding. The areas in which we were working were cordoned off to ensure no members of the public could accidently enter the working area. There was a site specific problem during the works that impeded the refrigerant pipework installation which required me to re-route the pipes contrary to the initial plan which resulted in me brazing, in	Evidence Number 08: Job Record Sheet (No 102284) Evidence Number 06: Witness Testimony Mr J.Duthie	Unit no 6: NOS: M16 Performance Objectives: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12

		position at high level, two joints. This alteration was approved after I consulted my supervisor, Mr Ian Wilkie.	Evidence Number 07: Witness Testimony Mr I Wilkie	

Candidate's signature David Peters **Date** 08/11/2011

Witness testimony

Remember when you begin to use witness testimony that it must be capable of being authenticated — even if the testimony itself is being used to authenticate a candidate's claim to competence.

To make sure the witness testimony is genuine, you must ensure that you have a record of who is acting as a witness, their relationship to the candidate (eg supervisor, client) address, telephone number and the date. There are spaces for this information in the form.

Witness testimony

SVQ title and level	SVQ 2 Install and Maintain Refrigeration and Air Conditioning (RAC) Systems SCQF level 5
Candidate's name	David Peters
Evidence index no	06
Index no of other evidence which this testimony relates to (if any)	07 and 08
Performance Objectives	Unit no 6: NOS: M16 Performance Objectives: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12
Date of evidence	08/11/2011
Name of witness	Mr J Duthie
Designation/relationship to candidate	Supervising Engineer

Details of testimony

I had been informed by David and our manager Mr Ian Wilkie, that David would be using this planned installation as evidence for his SVQ. As a result David was given more responsibility over this air conditioning system installation and I would take a more observational role, offering guidance only when asked or if the prevailing circumstances demanded so.

David conducted himself well when introducing us to the client and during the initial discussions describing how the works would proceed. David had also arranged in advance the delivery and construction of a mobile scaffold for accessing work at high level and had agreed with the client a safe and secure area to temporarily store tools, material and equipment. David made a reasoned case for the final positioning of both the indoor and outdoor units and instructed me as to how the units would be fixed. Equally David installed the interconnecting refrigerant pipework as per the proposed drawing only deviating when there was an on-site obstruction which David solved after consulting our manager.

I can confirm that David conducted himself in a safe, confident and professional manner, demonstrating his capabilities in the variety of skills required in the installation of a simple air conditioning system. He ensured the system was left in a safe state ready for pre-commissioning and informed the client accordingly. David then made sure the site was cleared of any debris from the installation and completed the works to the specification and within the agreed timescales.

I can confirm the candidate's performance was satisfactory.

Witness's signature *John Duthie* **Date** *08/11/2011*

Witness (please select the appropriate box)**:**

☐ Holds A1/A2 or D32/D33 qualifications

☒ Is familiar with the SVQ standards to which the candidate is working

Filling the gaps

There may come a time when your candidate has provided evidence for most of the Unit (or SVQ), but there are some gaps. For example, you may find that certain situations, such as handling contingencies, have not arisen during assessment. Often these will relate to dealing with health and safety issues, or unexpected problems with workflow like delays in receiving information from another part of the organisation.

In this SVQ, such gaps are likely to occur in generating evidence for:

- Unit no 5: Install RAC Systems and Components: NOS M18, M19
- Unit no 7: Maintain RAC Systems and Components: NOS M18, M19, M25

You may be able to overcome these by simulation within an accredited training centre where the candidate can be given the appropriate training and assessment under controlled observed conditions by a qualified assessor in those areas deemed too safety critical to be carried out in a commercial clients premises. Such assessment under simulated conditions would be supported by direct and written questions.

Guidance and support to candidates

At all times during the assessment process — from planning through to making your assessment decision — feedback should be on-going, clear and constructive. Feedback should be given against the national standards by relating it to the evidence provided, including the knowledge specifications.

Where there are any shortfalls in a candidate's competence, you should discuss these with your candidate and make plans for re-assessment.

Judging candidate evidence and making an assessment decision

In judging candidate evidence, you must be satisfied that your candidates can work consistently to the required standard, and that the evidence they have produced is their own. You must consider whether your candidate understands and applies the knowledge evidence and how this links to performance evidence.

Evidence must:

- be relevant to the SVQ
- be authentic
- show current competence
- be sufficient to help you form a decision about the candidate's competence

Insufficient evidence

You have to judge whether the candidate has produced enough evidence required by the standards for you to reach a decision about their evidence.

Where there is insufficient evidence, you should say this to your candidate. You should tell them that it is not that they are not yet competent — there is simply not enough evidence on which to make a decision.

In this situation, your feedback to your candidates must help them produce more evidence and/or plan for further assessment.

Authenticating candidates' evidence

Authentication is required where you have not observed candidates' performance at first hand.

You can check whether a candidate has produced evidence which they claim shows their competence by questioning them or, if this is appropriate, asking them to produce a personal statement, using witness testimony, or seeking peer reports from other colleagues of the candidate.

Example

Where an assessor is not available to observe a candidate producing evidence at first hand, there must be a well understood procedure in place to authenticate the candidate's work. For example, a candidate may have recognised during an installation of an air conditioning system an ideal opportunity to gain evidence of hard to come by or rarely occurring events. It is more likely that the use of a personal statement, witness testimony, photographs and candidate questioning would be the main methods used to establish authenticity.

4 Recording achievement

You should retain all evidence — clearly referenced — for internal and external verification.

The candidate's evidence is normally kept in a file, often called a *portfolio*. These documents help you and your candidates to collect, present and cross-reference the evidence to the national standards. They are also a means of recording your assessment decisions, and they tell an External Verifier what stage a candidate has reached in achieving the SVQ.

The SQA document 'Candidate Guidance and Portfolio' specific to Mechanical Services SVQs should be used, however should you choose to use your own recording material, this has to be approved by us.

Recording documents do not need to be paper-based — it is possible to use an electronic format for collecting and structuring the evidence. Whatever format you and your candidates choose to use, the documents must show what evidence was generated, the assessment decisions you made, how the evidence meets the standards, and where the evidence can be located. You should avoid photocopying items simply to put them in a portfolio — a clear explanation of where the evidence can be found (for example, in a filing cabinet) may be sufficient for the External Verifier to follow it up and include it in the visit.

There are various reasons why record-keeping is so important:

- it provides a way of tracking a candidate's progress in achieving an SVQ
- it helps candidates to make claims for certification of their competence
- internal verifiers and External Verifiers use the records to sample assessment decisions
- it helps us to monitor the quality assurance of our qualifications

If your candidates' evidence is incomplete, or cannot be located, or if there is inaccurate cross-referencing to the standards, there is a risk that an internal verifier or External Verifier will be unable to confirm your assessment decisions.

To help you and your candidate present evidence and record your assessment decision, we have provided examples of the forms which you and your candidate might use to compile the portfolio.

- Completing the Unit progress record
- Using the evidence index
- Completing the Element achievement record

These forms are also used in SQA's portfolio.

Completing the Unit progress record

You should complete this form each time your candidate achieves a Unit from the SVQ by adding your signature and the date next to the relevant Unit.

At this stage, candidates should make sure they have completed the recording documents correctly and that their evidence can be easily located. Only then should they circle the relevant Unit number at the top of the form. This enables both of you to see at a glance what stage the candidate is at in their SVQ.

Unit progress record

Qualification and level SVQ 2 Install and Maintain Refrigeration and Air Conditioning (RAC) Systems SCQF level 5

Candidate David Peters

To achieve the whole qualification, you must prove competence in **nine mandatory** Units.

Unit Checklist

Mandatory	1	2	3	4	5	6	9	10	11

Mandatory Units achieved

Unit number	**Title**	**Assessor's signature**	**Date**
1	Apply Health and Safety Legislation and Working Practices (Mechanical Services)	*Robert Miller*	*14/01/12*
2	Apply Environmental Legislation, Working Practices and Principles (Mechanical Services)		
3	Maintain Effective Working Relationships		
4	Prepare Work Locations	*Robert Miller*	*17/02/12*
5	Install RAC Systems and Components		
6	Maintain RAC Systems and Components	*Robert Miller*	*17/02/12*
9	Safe Handling of Refrigerants (Category 1)		
10	Prepare and Undertake Pipe Jointing Methods		
11	Carry out Safe Electrical Working Practices		

Using the index of evidence

The purpose of the index of evidence is to help you locate and work through the candidate's evidence. It should give you a summary of what evidence the candidate has collected, and where (eg in a portfolio) it can be found.

The index of evidence should be completed by entering:

- the index number for each piece of evidence
- a description of each piece of evidence
- the place or location where it can be found
- the initials of the internal verifier and the date (if they have sampled the candidate's evidence)

Ideally, it should be candidates themselves (with your support and encouragement) who complete the index.

You must make sure that the information in the evidence index is accurate when your candidates' portfolios are presented for assessment and verification — particularly the information about where the evidence can be located. This is important because we suggest that anything which has been produced as day-to-day work is kept in its normal location, but anything which has been produced through assessment for the SVQ, eg observation checklists, is filed in the candidate's portfolio. In this way, your candidate can avoid having to photocopy work products just for the sake of including them in a portfolio. It also means that evidence produced as a result of assessment is kept safely in a central file.

If the index of evidence is not completed with an accurate description and location of the evidence, there is a risk that an internal verifier or External Verifier might be unable to confirm your assessment decisions.

Index of evidence

SVQ title and level	SVQ 2 Install and Maintain Refrigeration and Air Conditioning (RAC) Systems SCQF level 5

Evidence number	**Description of evidence**	**Included in portfolio (Yes/No) If no, state location**	**Sampled by the IV (initials and date)**
01			
02			
03	Record of questions and candidate answers	Yes	R Gray 25/02/12
04	Observation Checklist	Yes	R Gray 25/02/12
05	Personal statement	Yes	R Gray 25/02/12
06	Witness testimony	Yes	R Gray 25/02/12
07	Witness testimony	Yes	R Gray 25/02/12
08	Job card	Yes	R Gray 25/02/12
09			
10			

Completing the Element achievement record

To help you and your candidates cross-reference the evidence to the standards of the SVQs, we have provided records similar to those produced in the SQA portfolio. Use one record for each Element. The grids should be completed by:

- entering the evidence index number in the first column
- giving a brief description of the evidence in the second
- ticking the relevant boxes for the Performance Criteria (or statements of competence as they are sometimes known)
- entering the areas of knowledge and understanding the piece of evidence covers

If integrated assessment is used (linking PCs or Elements across different Units) the evidence should be cross-referenced back to the relevant Units.

We have provided a completed example to show how to use the record.

Element achievement record

Unit **Unit no 6: Install RAC Systems and Components**

Element **M16 'Fit and fix cooling systems, equipment and components'**

Evidence Index No	Description of Evidence	Performance Objectives												Knowledge Requirements															
		1	2	3	4	5	6	7	8	9	10	11	12	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
03	Performance observation			X	X	X	X	X	X	X	X		X	X	X	X	X				X						X		
04	Record of questions and candidates answers																	X	X	X		X	X	X	X	X		X	X
05	Personal statement	X	X	X	X	X	X	X	X	X	X	X	X																
06	Witness testimony	X	X	X	X	X	X	X	X	X	X	X	X																
07	Witness testimony	X	X									X																	
08	Job card									X	X	X																	

Unit **Unit no 6: Install RAC Systems and Components**

Element **M16 'Fit and fix cooling systems, equipment and components'**

Notes/Comments

David carried out the identified work activities in a confident manner demonstrating the ability to recognise problems and come up with solutions, whilst ensuring the installation conformed to the initial specification. David also produced evidence of good inter-personnel skills demonstrating a professional manner when communicating to the client in connection with the planned works.

His compliance with the Performance Objectives and Knowledge Requirements in the NOS M16 is noted by the following submitted evidence; performance observation, personal statement, direct questioning, witness testimonies and site job card. (Photographic evidence was included also supporting authenticity of the personal statement.)

The candidate has satisfied the assessor and internal verifier that the performance evidence has been met.

Candidate's signature	David Peters	**Date**	17/02/2012
Assessor's signature	Robert Miller	**Date**	17/02/2012
Internal verifier's signature	Robert Gray	**Date**	05/01/2012

5 Further information

What else should I read?

The publications listed here provide additional information on how to implement SVQs. Details of these and other SQA publications are available on our website at **www.sqa.org.uk** on the 'Publications, Sales and Downloads' section. They can be ordered from SQA's Business Development and Customer Support Team — telephone 0303 333 0330. Please note that there may be a charge for some of these publications.

Assessor/Verifier Units: assessment guidance

External Verification: A Guide for Centres

Guide to Assessment

Introduction to Assessment Arrangements for Schools and Colleges

SQA's Quality Framework: a guide for centres

Operational Help Centre

The Operational Guide for Centres has been replaced by the online Operational Help Centre on **www.sqa.org.uk**

Appendix 1: Blank recording forms

Unit progress record

Qualification and level _____

Candidate _____

To achieve the whole qualification, you must prove competence in xx **mandatory** Units and xx **optional** Units.

Unit Checklist

Mandatory									
Optional									

Mandatory Units achieved

Unit number	Title	Assessor's signature	Date

Optional Units achieved

Unit number	Title	Assessor's signature	Date

Index of evidence

SVQ title and level	

Evidence number	Description of evidence	Included in portfolio (Yes/No) If no, state location	Sampled by the IV (initials and date)

Element achievement record

Unit

Element

Evidence Index No	Description of Evidence	PC/performance statements						Areas of knowledge and understanding/scope													

Unit

Element

Notes/Comments

The candidate has satisfied the assessor and internal verifier that the performance evidence has been met.

Candidate's signature _____ **Date** _____

Assessor's signature _____ **Date** _____

Internal verifier's signature _____ **Date** _____

Assessment plan

Units	
Elements	

Activities	**Performance Criteria (PC)**	**Method of assessment/ Sources of evidence**	**Date of assessment**	**Evidence already available**	**Links to other Units (Performance Criteria and Range)**
Questioning for knowledge and understanding not apparent from performance to be identified from 2nd review					

Assessor's signature _____ **1st review due** _____

Candidate's signature _____ **2nd review due** _____

Date of agreement _____ **Date of completion** _____

Personal statement

Date	Evidence index number	Details of statement	Links to other evidence (enter numbers)	Unit, Elements, Performance Criteria, Performance statements, scope covered

Candidate's signature _____ **Date** _____

Observation record

Unit/Element(s) _____
Candidate _____
Evidence index number _____
Date of observation _____

Skills/activities observed	**Performance Criteria covered**

Knowledge and understanding apparent from this observation

Other Units/Elements to which this evidence may contribute

Assessor's comments and feedback to candidate

I can confirm the candidate's performance was satisfactory.

Assessor's signature _____ **Date** _____

Candidate's signature _____ **Date** _____

Witness testimony

SVQ title and level	
Candidate's name	
Evidence index no	
Index no of other evidence which this testimony relates to (if any)	
Element(s)	
Date of evidence	
Name of witness	
Designation/relationship to candidate	
Details of testimony	

I can confirm the candidate's performance was satisfactory.

Witness's signature _____ **Date** _____

Witness (please select the appropriate box)**:**

☐ Holds A1/A2 or D32/D33 qualifications

☐ Is familiar with the SVQ standards to which the candidate is working

Record of questions and candidate's answers

Unit	
Element(s)	
Evidence index number	
Circumstances of assessment	
List of questions and candidate's responses	
Q	
A	
Q	
A	
Q	
A	
Q	
A	
Q	
A	

Assessor's signature _____ **Date** _____

Candidate's signature _____ **Date** _____