National Qualifications Framework Levels 1–3, 2007

Technology

National Moderator's Report

The purpose of external moderation is to provide reassurance that assessor judgments are at the national standard and are made on the basis of assessment materials that are fair and valid.
All assessment materials are expected to:

- give the learner the opportunity to meet the requirements of the standard
- have an assessment schedule that gives evidence of appropriate learner responses and clear judgments at all levels.

The Ministry of Education contracted subject experts to write assessment resources for achievement standards. These are not pre-moderated. The intention is that they are modified to suit teaching programmes and learner needs. They do not provide "rules" but suggest different ways of assessing to the nationally registered standard.

General Overall Comment

Assessors are encouraged to submit for moderation, all learner evidence produced for assessment against a standard(s), as well as any assessor material that was used to support their judgement to award learners an achievement grade(s).

Assessor material may include such things as:

- assessor notes on learners achievement that justify the achievement grade awarded to them
- documented reflections on assessor discussions undertaken with learners, and
- assessor notes/recordings that were placed in a learner's portfolio which were used to guide their technological practice and/or presentation of evidence.

Learner evidence may include such things as:

- 'planning' that informed the undertaking of their technological practice
- photographic and/or digital images of mock-ups, models and/or prototypes that were created as an outcome of their undertaking technological practice
- documentation of the technological practice they undertook
- results of tests and trials that demonstrate that their developed technological outcome(s) was 'fit for purpose', according to the expectations of the standard it is assessed against. *For example if the standard required learners to demonstrate through implementation, that their prototype was 'fit for purpose', then evidence of testing and trialling of the prototype within the environment for which it was designed needs to be submitted as a part of the learners evidence presented for moderation. If the standard required a model of a conceptual design, then evidence of testing the model to demonstrate the conceptual design's potential 'fitness for purpose' in addressing the identified issue should be submitted.*

In 2007 there was a noticeable improvement in the overall quality of the assessment material that assessors provided their learners. Assessors who used the generic templates as guidelines to write assessment material for the internal Level 1, 2 and 3 achievement standards, generally presented their learners with material that guided them to demonstrate competencies at the level expected for award of the standard(s). Assessors need to take care that the correct version of the generic template is matched

to the registered achievement standard being used, to ensure that their learners are not disadvantaged. The correct match in 2007 was;

	Achievement Standard	***Generic Template***
Level 1	Version 2 (AS90050 version 3)	Version 4 (Version 1)
Level 2	Version 2	Version 4
Level 3	Version 2	Version 2

In 2007, assessors were once again requested to submit 2006 learner evidence, along with their assessment material for moderation when learner evidence had not been assessed prior to the due moderation date. Assessors who did this were provided by moderators with a more informative Moderation Report than those who sent in assessment material only. Care needs to be taken by assessors when adopting this practice that they correctly identify the version of the achievement/unit standard(s) that the evidence they submit for moderation was assessed against. They also need to provide a copy of the assessment schedule that was used to inform assessor judgements.

Those assessors who wrote detailed unit outlines on how they intended to teach technology units, assessed against achievement and/or unit standard(s), appeared to provide better support to learners on the nature and quality of the evidence they needed to present for assessment than those who didn't. Assessors in 2008 are once again encouraged to submit unit outline(s) for moderation along with their assessment material and learner evidence.

The alternative assessment schedules published on the Techlink website (www.techlink.org.nz) were used by a number of teachers (assessors) in 2007. These schedules were designed to allow assessors (and learners) to record when learner evidence that matched assessment criteria expectations was observed. They also provide a place where the quality of this evidence observed can be described. They were not designed as a sheet to simply tick-off the occurrence of evidence. Used formatively with learners, these alternative assessment schedules can provide learners guidance on the standard of the competencies they have demonstrated to-date and indicate areas of focus that require further development.

AS 90045: Develop a technological solution to address a given brief

Achievement of this standard requires learners to develop a technological solution that addresses the requirements of a given brief through using planning to inform their undertaking of technological practice. The given brief may be one that a learner has developed themselves, as part of a unit of work that was previously assessed against AS 90046 and/or one given by the assessor. Where a learner-developed brief is used, assessors are encouraged to check that it provides sufficient challenge to allow learners to present evidence at the national standard (refer to *explanatory note 7* for AS 90045) within the time that is available.

Learners need to fully explore the situation surrounding the given brief as part of the technological practice they undertake to develop their technological solution. This exploration may identify a need for further refinement of the conceptual statement and/or the specifications of the given brief due to new knowledge or insight being gained from within practice. This refinement may also be necessary to ensure that the brief specifications enable the 'fitness for purpose' of the developed technological solution to be measured. Where the need for alterations and/or additions to the given brief is identified, assessors should oversee this to ensure that the rigour expected at Level 1 is not lost.

Planning should be used to inform learner practice from the onset of the brief through to completion of the finished technological solution. Planning needs to be seen as something that is dynamic, ongoing and forward looking, in order to ensure that the developed technological solution has the potential to be 'fit for purpose'. Planning is **not** simply a diary of the events that took place when the technological solution was developed. For further information about planning refer to *explanatory note 4*.

Learners are encouraged to consult with stakeholders regularly throughout their undertaking of technological practice to resolve the given brief. Such consultation may require learners to interact not only with stakeholders who have an immediate vested interest in the issue, but also with wider community stakeholders who may be affected by the development of the technological solution(s) and or the placement of the solution(s) in its intended location. Consultation with stakeholders that occurs only at the beginning and/or end of their practice **does not** constitute sound technological practice.

Learners need to clearly show evidence of how their developed solution addresses the requirements of the given brief (and any amendments which are made to this brief through their undertaking of technological practice). Evaluation of their developed solution against the final brief specifications with supporting evidence such as stakeholder feedback, photographic evidence of the solution *in situ* will assist in demonstrating that the developed solution addresses the brief.

AS 90046: Formulate a Brief to address a given Issue

Achievement of this standard requires learners to undertake technological practice to formulate a brief that addresses a given issue. To enable learners to consider a variety of different views or opinions, the given issue needs to be one that is shared by a range of stakeholders, (one of whom may be the learner themselves). Identification of stakeholders to the issue and explorations of their needs and/or the opportunities this presents should be included as part of the technological practice undertaken by learners when they are assessed against AS 90046.

To ensure learners are able to complete all of the requirements of AS 90046, assessors need to ensure that an appropriate issue(s) is provided or negotiated with learners. A number of learners were disadvantaged in 2007 due to the issue provided to them either not being one which was shared and/or it being considered by the learner at a personal level only – see *explanatory note 5* for further clarification of what is expected of a given issue for assessment against AS 90046.

In formulating a brief, learners should be encouraged to investigate key factors (see *explanatory note 6,* AS 90046) and explore likely conceptual designs, in order to confirm that their developing brief (conceptual statement and specifications) allows a potential technological outcome(s) to be developed which will satisfy the given issue. As a part of this exploration, learners may need to test potential conceptual solutions against their developing briefs specifications and consult with identified stakeholders to ensure that the conceptual statement and specifications address the given issue. Mocking-up and modelling of conceptual designs may also be required to ensure that the specifications written into the brief will allow the 'fitness for purpose' of a technological solution, should it later be developed, to be measured.

AS 90047: Develop a Technological Solution by widening the use of an existing technology

Achievement of this standard requires learners to provide evidence that they have identified possible needs or opportunities and considered key factors to widen the use of an existing technology. As part of a learners technological practice, they are required to formulate a brief that provides a clear description of both the desirable outcome(s) sought, and the constraints to be met by a successful solution. Potential future impacts of the developed solution should also be explored and where necessary minimised as constraining and/or identified as desirable specifications within the brief.

When 'widening the use of an existing technology' learners are required to adapt, modify or incorporate an existing technology(ies) in order to create a new technological solution (product, system or environment). This adaptation, modification and/or integration must change the purpose and/or the performance characteristics of the existing technology(ies). Such changes may include;

- extending the performance characteristics of an existing technology so that it achieves specifications beyond those that it was originally designed to achieve and/or
- taking an existing technology and incorporating it into a different context in order that it may perform a different function.

The selection of an existing technology(ies) that provides an opportunity for learners to widen its use is key for learner achievement of AS 90047. Assessors are encouraged to work with their learners to select appropriate existing technology(ies). Examples of successful technological solutions that were developed by widening an existing technology in 2007 included a robotic golf trolley that followed voice commands, an electric bike, a tee-shirt that transformed into an inflatable travel pillow but was capable of being worn as a tee-shirt.

AS 90048: Develop a means for ongoing production of a technological solution

Achievement of this standard requires learners to identify key factors that contribute to the suitable ongoing production of a technological solution, and formulate a brief and propose a means for ongoing production of the solution.

Learners may use a technological solution that they have developed as part of working towards achievement of AS 90045 or AS 90047 as their technological solution.

Where this occurs learners may need to review the design of their solution to establish its suitability for ongoing production, and where necessary adapt it to enable ongoing production to be undertaken. Alternatively learners may;

- use an existing product and suggest adaptations to it, where necessary, to allow for its ongoing production or
- use a conceptual design of a potential technological solution that they have designed, that has taken into account the needs for ongoing production within its design.

For AS 90048 learners are expected to explore the nature of ongoing production and the general principles that apply, including such things as quality control procedures, application of safety laws, stock control etc. Key factors identified by learners need to relate to the ongoing production of the technological solution and should consider such things as the needs and/or expectations of the technological solution that is to be produced as well as its means for ongoing production.

The proposal can be presented using any media (eg written, electronic, graphic media) that clearly communicates the proposed process, and explains the stages of production and how these address the requirements of the brief.

AS 90050: Present a technological solution that addresses the requirements of the brief

Achievement of this standard requires learners to provide evidence that they have presented a technological solution that addresses the requirements of a brief through undertaking technological practice. Evidence which may demonstrate that a technological solution has been developed that addresses the requirements of a brief includes such things as;

- taking account of on-going stakeholder considerations/opinion
- ongoing testing and evaluation of the developing solution (concept ideas, models, mock-ups etc.)
- taking account of environmental factors that impinge on the development of the solution, including where the solution is finally located
- taking account of codes of practice that impact on the successful development of the solution
- presenting evaluations of the solution that demonstrate that is ‘fit for purpose’ when implemented within its intended environment/location.

Assessors are encouraged to present in the assessment material submitted for moderation, comments that justify the achievement grade awarded to individual learners. The focus of these comments should be on describing the ‘quality’ of the technological solution that was developed by the learner in terms of how it addresses the requirements of the brief. It is recommend that where the technological solution is a material artefact (eg constructed out of wood, metal, fabric, food, etc) annotated photographic evidence is presented for moderation that clearly describes the ‘quality’ of the technological solution which was developed. Where an assessor judges the quality of the technological solution through observation alone, then the means by which this judgement was made, including the level of competency observed, needs to be communicated by the assessor when a learner’s evidence is submitted for moderation.

AS 90338 – 90344: Develop and model a conceptual design in <area specific> technology

Achievement of these standards requires learners to identify an issue, formulate a brief to address the issue, and to develop and use planning to guide the development and modelling of a conceptual design within a specific technological area.

Learners are encouraged for assessment, to present all of the evidence they produce of undertaking technological practice to develop and model their conceptual design. This includes presenting evidence of how their research findings and planning impacted on the nature of the technological practice they undertook to;

- formulate their brief and
- develop and model a conceptual design that has the potential to satisfy the issue.

Proof of ongoing evaluation of design ideas, as well as, an endpoint evaluation is expected from learners in the evidence presented for assessment. Testing ideas using such things as mock-ups, models, sketches, surveys (including evidence of obtaining stakeholder feedback) should be presented as part of this assessment evidence. Learners need to demonstrate through testing and trialling that their model of a conceptual design has the potential to address their identified issue. Ongoing consultation with, and consideration of identified stakeholder(s) needs is an important aspect of technological practice at Level 2.

Learners should be encouraged to identify in their planning any constraints that impact on the technological practice they intend to undertake to develop and model their conceptual design. Evidence of how these constraints are addressed in the learner's technological practice should be presented as evidence for assessment.

Key factors identified by learners should relate to the issue that is to be resolved and the technological practice that can be undertaken to do this. They should consider such things as the environment in which the technological practice can take place, the resources available to undertake the practice and the qualities required in the design concept to resolve the issue – see *explanatory note 10* for further guidance. On-going prioritisation of key factors is likely to be needed throughout learners undertaking of technological practice as new information is identified and recognised as being important to the resolution of the issue. As such, brief refinement particularly to polish the brief specifications into statements that can measure the potential success or otherwise of the conceptual designs 'fitness for purpose' is also likely to be required.

Learners should also be encouraged to undertake ongoing evaluation of their concept ideas as they evolve. An important part of this evaluation is the testing, evaluation and modification of ideas as new information comes to light through undertaking technological practice. Planning to allow testing to occur as well as modifications to planning, which take into account test findings, should be apparent in the evidence learners present for assessment. Planning can be evidenced throughout learners practice using such communication tools as audio, written, diagrammatic, computer based, video and/or modelling tools.

Assessors need to ensure that the context or setting presented to learners in units of work that incorporates AS 90338 – 90344, are broad enough to allow learners to identify their own issue. They should also ensure the learning environment provides learners with the opportunity to;

- interact with stakeholders,
- access materials,
- access specialist equipment and necessary expertise and
- develop and model a conceptual design within the time available.

AS 90345 – 90351: Develop and implement a one-off solution in <area specific> technology

Achievement of these standards requires learners to identify an issue, formulate a brief to address the issue, and to develop and use planning to develop and implement a one-off solution within a specific technological area.

Learners are encouraged to present all of their evidence of undertaking technological practice, to develop and implement a one-off solution for assessment. This includes presenting evidence of how their research findings and planning impacted on the nature of the technological practice they undertook to:

- formulate their brief and
- develop and implement a one-off solution that satisfies the issue.

Evidence of ongoing evaluation of design ideas as well as an endpoint evaluation is expected from learners presenting assessment evidence for these achievement standards. Testing ideas using such things as mock-ups, models, sketches, and stakeholder interviews and surveys should be presented as part of the learner's evidence submitted for assessment. Ongoing consultation with, and consideration of identified stakeholder(s) needs is an important aspect of technological practice at Level 2.

Learners should be encouraged to identify in their planning any constraints that impact on the technological practice they intend to undertake to develop their one-off solution. Evidence of how these constraints are addressed in the learner's technological practice should be presented as evidence for assessment. Learners also should be encouraged to undertake ongoing reflection of their design ideas and the technological practice used to develop them. An important part of this reflection is the testing, evaluation and modification of ideas as new information comes to light through their undertaking technological practice. Planning to allow testing to occur as well as modifications to planning, which take into account test findings, should be apparent in the evidence learners present for assessment. Planning can be evidenced throughout learners practice using such communication tools as audio, written, diagrammatic, computer based, video and modelling tools.

Key factors identified by learners should relate to the issue that is to be resolved and the technological practice that can be undertaken to do this. They should consider such things as the environment in which the technological practice can take place, the resources available to undertake the practice and develop a one-off solution to resolve the issue – see *explanatory note 9* for further guidance.

On-going prioritisation of key factors is likely to be needed throughout learners undertaking of technological practice as new information is identified and recognised as being important to the resolution of the issue. As such, brief refinement particularly to polish the brief specifications into statements that can measure the success or otherwise of the developed one-off solutions 'fitness for purpose' is also likely to be required.

Evidence that learners implemented their one-off solution was again not well documented in the material presented for moderation in 2007. Evidence of implementing a one-off solution(s) should demonstrate that it was 'fit for purpose' in its intended location. Where a one-off solution cannot be implemented within its intended environment, due to such things as direct access to its intended end user and/or the environment where it will be placed (eg a one-off garment that is designed to be worn on a ski slope but it is completed outside the ski season) then a simulation that tests and demonstrates the one-off solutions suitability can be used as a substitute to actual implementation.

Assessors need to ensure that the context or setting presented to learners in units of work that incorporate AS 90338 – 90344, are broad enough to allow learners to identify their own issue. They should also ensure that the learning environment provides learners with opportunity to;

- interact with stakeholders,
- access materials,
- access specialist equipment and necessary expertise and
- develop and implement a one-off solution in the time available.

The issue that learners select can be a community based issue or one that is personal to them. If a personal issue is selected, it is still expected that learners will identify and consider the potential impact of their one-off solution and its development on other stakeholders, as part of the technological practice they undertake.

AS 90352: Develop a means for multi-unit production of a technological outcome

Assessment using 90352 requires learners to formulate a brief that considers the needs of a technological solution that is to be produced using multi-unit production and develop a means for the production of the solution to occur. In doing so, it is expected that learners will identify and outline any design adaptations that are necessary to the technological solution to allow it to be manufactured using multi-unit production.

Consideration of key factors that contribute directly and indirectly to the means of multi-unit production being developed need to be explored by learners and presented as evidence for assessment against 90352 – see *explanatory note 4* for further explanation.

In 2007, learner submissions often failed to explain the process stages of their selected means of production. They also presented little evidence to justify their estimated key resources beyond the material costs associated with component parts of the technological solution itself - see *explanatory notes 7 and 8* for further explanation on the evidence learners are required to present for assessment.

AS 90362, 90364, 90366, 90368, 90370 and 90372: Demonstrate skills in <specific technological area>

Achievement of these standards requires learners to demonstrate that they can perform skills in undertaking technological practice, to develop a technological outcome(s) that addresses an issue identified by the learner.

Evidence that **clearly** illustrates the skills undertaken to develop a technological outcome(s) needs to be presented as evidence for assessment. This evidence may be presented in a one-off solution, as photographic or video evidence that illustrates where skills have been applied. Testing ideas by developing and using such things as mock-ups, models and prototypes are included as skills that may be presented for assessment of these achievement standards.

Safe and responsible learner practices in performing skills to develop a technological outcome(s) should be clearly demonstrated. The means by which learners communicate evidence of being able to perform skills safely and responsibly to the level of competency expected at Level 2 will depend on the context in which their technological practice is undertaken, the learning environment and learner's individual strengths. Where skills used are not obvious to an assessor (and/or moderators) then an explanation of the skill(s) and how they were conducted safely should be presented in the evidence submitted for assessment/moderation.

Where an assessor judges a learners competency in a skill(s) through observation, then the means by which this judgement was made and the level of competency observed, needs to be communicated by the assessor when learner evidence is submitted for moderation. Other evidence that may be used to demonstrate learners ability to perform skills include such things as photographs of technological outcomes (models, prototypes, one-off solutions) that are notated to describe the skill level being shown and how these were used to enhance the technological practice undertaken and/or the technological outcome itself, video clips of learners undertaking technological practice, the solutions/mock-ups/prototypes themselves and/or documentation that describes how the skills were performed including safety practices that were considered by a learner. For learners to be awarded an achievement with excellence grade they need to demonstrate skills within **different** applications (see *explanatory note 3* for further explanation) and show how they **applied** these skills to enhance the technological practice undertaken when developing a technological outcome or the technological outcome itself.

Evidence for this achievement standard must be situated within valid technological practice.

AS 90613: Develop a conceptual design to address a client issue

Achievement of this standard requires learners to use project management tools to develop a brief, model, test and evaluate a conceptual design that has the potential to resolve a client issue.

Learners are encouraged to present all of the evidence they produce of undertaking technological practice to develop and model a conceptual design, for assessment.

This includes presenting evidence of how their research findings impacted on the nature of the technological practice they undertook:

- to formulate their brief to resolve the client issue
- to identify and use appropriate project management tools to structure and guide their practice and
- to develop and model a conceptual design that has the potential to resolve the client issue.

Evidence of ongoing evaluation of design ideas, including evidence of using such things as mock-ups, models, sketches and interviews should be presented as part of this evidence presented for assessment (and moderation), as well as an endpoint evaluation. Ongoing consultation with, and consideration of identified client and wider stakeholder(s) needs is an important aspect of the technological practice undertaken at Level 3.

Evidence of the developed model of the conceptual design being tested to determine its potential 'fitness for purpose' as a solution, and it being demonstrated to the client and other key stakeholders is required to award an achievement grade for 90613. This evidence was often not apparent in the learner evidence submitted for moderation in 2007.

Key factors identified by learners should relate to the client issue that is to be resolved and the technological practice that can be undertaken to do this. They should consider such things as the environment in which the technological practice will take place, the resources available to undertake this practice and the qualities required in the design concept to resolve the issue – see *explanatory note 3* for further guidance. On-going prioritisation of key factors is likely to be needed throughout learners undertaking of technological practice as new information is identified and recognised as being important to the resolution of the client issue. As such, brief refinement particularly to polish the brief specifications into statements that can measure the potential success or otherwise of the conceptual designs 'fitness for purpose' is also likely to be required.

Assessors need to ensure that the client issue presented in material that is used for assessment against 90613 will allow opportunity for learners to demonstrate, through undertaking technological practice, the competencies expressed in the achievement standard assessment criteria. This includes ensuring that any constraints on resources such as access to an authentic client and other key stakeholders, the time available to complete the assessment and material availability to develop and model a conceptual design are adequate and at a level acceptable for assessment at Level 3.

AS 90620: Develop a one-off solution to address a client issue

Achievement of these standards requires learners to formulate a brief to address a client issue, and use project management tools to develop and implement a one-off solution that addresses a client issue.

Learners are encouraged to present all of the evidence they produce of undertaking technological practice to develop and implement a one-off solution, for assessment. This includes presenting evidence of how their research findings impacted on the nature of the technological practice they undertook;

- to formulate their brief to resolve the client issue
- to identify and use appropriate project management tools to structure and guide their practice, and
- to develop and implement a one-off solution that satisfies the client issue.

Evidence of ongoing evaluation of design ideas, as well as an endpoint evaluation, including evidence of testing ideas using such things as mock-ups, models, sketches interviews and prototypes should be presented as part of this evidence. Ongoing consultation with, and consideration of identified client and wider stakeholder(s) needs is an important aspect of technological practice undertaken at Level 3.

Key factors identified by learners should relate to the client issue that is being resolved and the technological practice that can be undertaken to do this. They should consider such things as the environment in which the technological will take place, the resources available to undertake the practice and the qualities required in the one-off solution to resolve the client issue – see *explanatory note 3* for further guidance. On-going prioritisation of key factors is likely to be needed throughout learners undertaking of technological practice as new information is identified and recognised as being important to the resolution of the client issue. As such, brief refinement particularly to polish the brief specifications into statements that can measure the success or otherwise of the developed one-off solutions 'fitness for purpose' is also likely to be required.

Evidence of implementing the developed one-off solution to demonstrate its 'fitness for purpose' in terms of addressing the client issue and needs of other key stakeholders (or not) is required to award an achievement grade for AS 90613. This evidence was often not apparent in the learner evidence submitted for moderation in 2007. Where a one-off solution cannot be implemented within its intended environment due to such things as direct access to its intended end user and/or the environment (eg the solution developed is intended to be used during overseas travel but the client has not undertaken this travel at the time that the assessment takes place), then a simulation that tests and demonstrates the one-off solutions suitability can be used as a substitute to actual implementation.

Assessors need to ensure that the client issue presented in material that is used for assessment against AS 90620 will allow opportunity for learners to demonstrate, through undertaking technological practice, the competencies expressed in the achievement standard assessment criteria. This includes ensuring that any constraints on resources such as access to the client and other key stakeholders, the time available to complete the assessment and material availability to develop a one-off solution are adequate and at a level acceptable for assessment at Level 3.

AS 90792: Develop a proposal for a production process for a client

Achievement of this standard requires learners to develop a proposal for a production process for multi-unit production of a client's one-off solution(s). The proposal needs to include justifications that the client's one-off solution(s) is suitable for multi-unit production, a mode of production, and an estimation of resource requirements, availability, costs and benefits. Learners also need to provide a description of a means for production management of multiple units of the client's one-off solution(s),

and a description of the potential impacts of the production process on key stakeholders, including the immediate environment where the production process will be located.

Learners are encouraged to present all of their evidence of undertaking technological practice, to develop a proposal for the production process. This includes presenting evidence of how their research findings impacted on the nature of the technological practice they undertook to:

- identify the suitability of the design of the clients one-off solution(s)
- make necessary design modifications to the solution where required
- identify a suitable mode of production
- estimate major resources, and
- describe a realistic means for production management.

The client one-off solution(s) may be one that a learner developed as part of a unit of work that was previously assessed against another standard and/or one given by a client (refer to *explanatory note 3* for further explanation). Where a learner developed and/or client outcome is used, assessors need to check to ensure that it is of a sufficient challenge, to allow learners to present evidence at the standard expected and that it is achievable within the available time.

Learners need to present evidence that demonstrates their understandings of quality control protocols, legislative requirements, formats and other conventions that are used by technologists that work in a similar context to that of their proposed production process in the evidence they present for assessment.

Analysis of an existing production process(es) for products similar in context to the client one-off solution(s) that learners are working with is encouraged to assist in informing the design of a suitable production process. This analysis also assists learners to justify the production process they propose as suitable for the multi-unit production of their client's technological outcome. In 2007 a number of learners submitted evidence for moderation that described a production process for the multi-unit production of a client's one-off solution(s) but provided no evidence to support why their proposal was realistic and/or suitable.

AS 90679, 90681, 90683, 90685 and 90687: Demonstrate techniques in <area specific> technology

Achievement of these standards requires learners to demonstrate that they can perform techniques in undertaking technological practice, to develop a technological outcome(s) within a specific technological area.

Learners need to demonstrate techniques that have been operationalised during their undertaking of technological practice to develop a technological outcome(s). The explanatory notes provide an indication of what constitutes techniques specific to the focus technological area. Skill in undertaking ongoing evaluation of design ideas through testing using trials, mock-ups and models, as well as an endpoint evaluation, using models and prototypes should be presented as evidence to support the award of achievement grades for these standards.

Techniques should be demonstrated safely and responsibly within accepted codes of practice. The means by which learners communicate evidence of being able to perform techniques safely and responsibly within accepted codes of practice will depend on the context in which their technological practice is undertaken, the learning environment and learner's individual strengths.

Where an assessor judges a learner's competency in a technique through observation, then the means by which this judgement was made and the level of competency observed, needs to be communicated by the assessor when learner evidence is submitted for moderation. Other evidence that may be used to demonstrate learners ability to perform techniques include such things as photographs of technological outcomes (models, prototypes, one-off solutions) that are notated to indicate the techniques which are being shown, video clips of learners undertaking technological practice, the solutions/mock-ups/prototypes themselves and/or documentation that describes how the techniques were performed including safety practices that were considered by a learner. For learners to be awarded an achievement with excellence grade they need to demonstrate a **combination** of complex techniques that lead to a high quality technological outcome(s) - see *explanatory note 4* for further explanation.

Evidence for this achievement standard must be situated within valid technological practice.

Unit Standards in Technology

A suite of unit standards is registered that assessors may use to assess specific learner competencies in technology. These include unit standards that were written for Technology in the New Zealand Curriculum (1389 - 13413, 14374 - 14375) as well as those registered for the previous Design and Technology curriculum. The majority of these standards focus on assessing specific skills and knowledge. The importance of learners possessing competencies in these skills and an understanding of this knowledge in Technology is dependent upon the technological area(s) and contexts that learners are provided opportunity to study in.

Many of these unit standards were originally written to allow learner competencies to be assessed through the use of one-off assessment activities. When these unit standards are used to assess student competency in Technology they should be embedded into a unit that requires learners to undertake technological practice to develop technological outcome(s).

Selection of a unit standard(s), used to assess learner competencies, should match the skills that learners are expected to perform when undertaking technological practice. While assessors can often select the specific unit standards that will be used for assessment when planning Technology units, confirmation of the standards appropriateness for assessment purposes, can only really be validated once learners actually engage in the unit.

In technology the actual technological practice that learners undertake and therefore the types of skills/understanding of knowledge that they exhibit, most often can only be determined once learners determine the actual technological practice they will undertake. Assessors who strictly adhere to using only unit standards that they have

pre-selected at the time of planning a technology unit have been shown to often later penalise learners, whose technological practice does not demonstrate the exact skills/understanding of knowledge prescribed in the selected unit standard(s)

The embedding of a mixture of achievement and unit standards in a technology unit to enable assessment of learner competencies was again evident in 2007. While this practice is supported, assessors who do this need to ensure that learners are provided with an opportunity to display all of the competencies required for achievement of these standards. In a number of instances in 2007, it was evident that learners were disadvantaged when the assessment material provided to learners constrained the types of the evidence that they could produce or disallowed learners presenting the evidence required for award of an achievement grade for a specific standard(s).

Where skill-based unit standards are used to assess learners then photographs of the results of these skills and/or video evidence of the skills being performed with documentation that describes how the skills were performed within accepted safety practices should be submitted for moderation. Alongside such evidence, assessor notes that describe the learner's skill level also need to be submitted for moderation where an assessor has awarded an achievement grade to a learner based on the observation of a technique(s).