

Manufacturing

Business Scenario

Wino Incorporated (Wino) is a specialist in the field of wine cellar refrigeration. In 2012, Wino was approached by a vineyard to create a solution that would allow them to reduce their operating cellar temperatures from about 15°C to about 12°C.

A solution was devised to use the cold liquid CO₂ from a CO₂ recovery plant by vaporizing the liquid and processing it through the cooling units in the cellar to lower cellar temperatures to 12°C.

Wino needed to determine the eligibility of its proposed R&D activities in order to know if it qualified for the R&D Tax Incentive. Once it identified the specific activities that qualified as R&D, it needed to assess whether each activity was a core or supporting R&D activity. After self-assessing, Wino decided to register two core activities and two supporting activities with AusIndustry.

Wino's Core R&D Activities:

Design and development of a series of prototypes to achieve the technical objectives and prove the hypothesis (design development and initial testing of the solution to reduce cellar temperatures via a CO₂ system).

Trials and analysis of data to achieve results that can be reproduced to a satisfactory standard and to test the hypothesis (testing and assessment of the practical performance revised solution).

The hypothesis for this core activity questioned whether cellar temperatures could be reduced by 3°C through the use of CO₂.

At an attempt to prove its hypothesis, Wino conducted the following R&D activities:

- Practical design by in-depth analysis of possible issues
- Constant refinement of system design over a period of months to improve system performance
- Updating of technical drawings and design calculations
- Implementation of solution onsite for testing and further development

Wino proved that the system was a failure as too many variables which were beyond its control did not allow the system to operate in a consistent manner. With all these factors influencing performance, the system was too complicated for stable operation of the cellars.

Although Wino was unsuccessful in finding a solution to lower the overall temperature in the wine cellar, it was still able to claim the following tests and assessment activities as R&D:

- A complete change in design was necessary using CO₂ as a conventional refrigerant to reduce the cellar temperature.
- Redesign of the system as a standalone plant using two new compressors and pump recirculation of liquid CO₂ to larger evaporators in the cellars.
- A new evaporator in each cellar was added to the existing evaporators.



Commentary

Identifying Core R&D Activities

There are two types of core R&D activities:

1. Experimental activities whose outcome can not be determined in advance on the basis of current knowledge, information or experience, but can only be known by exercising a systematic progression of work that follows the principles of established science, proceeding from hypothesis to experiment, observation and evaluation, and lead to logical conclusions.
2. Experimental activities that are conducted for the purpose of creating new knowledge.

Hypothesis Defined

AusIndustry recognises a hypothesis as a statement or proposition about what result is expected if certain conditions are put in place and certain actions are carried out in an experiment. It can range from an assumption or proposition to a theory, but it must establish the experimental activity and form part of a broader systematic progression of work undertaken by the company. It must be evident that the claimed experiment has been designed to test the hypothesis.

If the outcome of an activity can be obtained without a hypothesis, then the activity will not be considered R&D.

Wino's Supporting R&D Activities:

Background research to evaluate current knowledge gaps and determine feasibility (background research for the design of a solution to reduce the cellar temperatures).

Wino's background research was focused on identifying issues, designing a potential solution using CO2 recovery tanks and liaising with the client for design development.

Design development included:

- Client meetings, submission of typical designs and the undertaking to provide refined designs.
- Internal design development and the development of sketches and calculations.
- Discussions with the site operators on system practicality.
- Design submission to the client for their review and acceptance.

These background research activities were necessary to support the core activities because they assisted in identifying the key elements of the research project.

Ongoing analysis of customer or user feedback to improve the prototype design (feedback R&D of the solution to reduce cellar temperatures via a CO2 system).

Wino conducted the following activities during its analysis:

- Development and modification to interpret the experimental results/observations and draw conclusions that served as starting points for the development of new hypotheses; i.e. solutions to observed inefficiencies or problems
- Assessment of client feedback to improve on design of system
- Client inspection on completion of construction stage
- Validation of the design inputs on operation and testing of the new system

These activities were directly related to Wino's core activities because the feedback was necessary to evaluate the performance capabilities of the new design in the field and to improve any flaws in the design.

Commentary

Identifying Supporting R&D Activities

Activities that do not form part of the core experimental activities may still be eligible as supporting R&D activities. Supporting R&D activities are directly related to an eligible core R&D activity. They must have been performed for the primary purpose of supporting a qualified R&D activity.

What records and specific documentation did Wino keep?

To meet the R&D Tax Incentive requirements, Wino had to save documents that outlined what it did in its core R&D activities, including experimental activities and documents to prove that the work took place in a systematic manner.

Wino saved the following documentation:

- Progress of project (e.g. meeting notes, minutes, emails, reports)
- Conceptual sketches and technical drawings
- Photographs of completed models
- Testing protocols
- Results or records of analysis from testing / trial runs
- Tax invoices

By having these records on file, Wino confirmed that it was 'compliance ready' - meaning if it was audited by the ATO, it could present documentation to show the progression of its R&D work.