



unlock a moment in time

Rafter Radiocarbon dating



qualified & experienced

Rafter Radiocarbon offers a complete radiocarbon dating service for a range of materials such as sediments, textiles, bone, wood, leather, charcoal, water foraminifera, and peat used in archaeology, geology, environmental and atmospheric studies.

Who we are

Rafter Radiocarbon has over fifty years of experience in research and scientific consultation for radiocarbon applications in archaeology, antiquities, geology, environmental and atmospheric studies. Rafter Radiocarbon is a section of GNS Science, New Zealand's principal earth and isotope research organisation. Our highly qualified team of scientists and technicians are engaged in research on a range of topics including paleodietary studies, soil carbon dynamics, paleoenvironmental reconstruction, pollen dating, and problems related to marine shell dating to name a few. Rafter Radiocarbon is committed to an ongoing programme of research to ensure we offer optimum levels of scientific accuracy. We provide consultancy services in research design and data interpretation, and we welcome collaborative research proposals.

Radiocarbon dating

Radiocarbon dating determines the age of an object or material containing carbon by measuring the proportion of the carbon-14 (^{14}C) isotope it contains. While plants and animals are alive, the proportion of the three isotopes of carbon (^{12}C , ^{13}C and ^{14}C) inside them remains

the constant. Once the organism dies or is harvested, the amount of ^{14}C slowly decreases at a known rate (radioactive decay) relative to the 2 other non-radioactive, or stable isotopes of carbon in the material. Radiocarbon dating provides an objective method of determining the time ranges within which an object may be placed. Since it dates the material, and not necessarily the process by which the object was fashioned (e.g the carving of wood, the weaving of a textile) the age measured must be interpreted in light of all available evidence, especially the expert knowledge of the collector or art historian.

AMS method

To determine the age of a carbon-containing material, Rafter Radiocarbon operates the only Accelerator Mass Spectrometry (AMS) laboratory in New Zealand housing the newest AMS in Australasia. The main advantage of AMS is that it allows milligram size samples to be dated. This is significantly less material than is required for the conventional decay counting method. Tiny samples such as otoliths, phytoliths, or pollen, once considered too small for radiocarbon dating, can now be analysed.



complete dating service

Suitable materials for dating

Most materials that contain carbon are suitable for this process. For example, objects made from wool, silk, cotton, plant material, bone, horn, hoof, leather, animal hair, parchment, shell, wood, seed and even lacquers may be dated. If you have an object which you are unsure about, we offer a free consultation service to determine your analysis needs.

Our services

Our analytical services includes:

- physical and chemical pre-treatment of samples
- $\delta^{13}\text{C}$ measurement by stable isotope mass spectrometry
- $\delta^{14}\text{C}$ measurement by our own Compact AMS

Clients receive a clear and concise summary of the sample treatment process, a calibrated sample age, and assistance with the interpretation of the results. All analyses are performed within our facilities so that we retain full supervision of the process.

Accuracy and reliability

For ages less than 10,000 years the error is typically as low as ± 30 years. This includes counting statistics and instrumental error. Rafter Radiocarbon regularly participates in international comparisons among radiocarbon laboratories, such as those sponsored by the International Radiocarbon Intercomparisons, with published results. Our modern facilities are operated to stringent quality assurance standards.

Delivery time

Our standard reporting time is eight weeks from receipt of the sample, and clients are fully informed of progress at appropriate stages. We understand that reports, grants and contracts are dependent on timely reporting of data and we are committed to the prompt delivery of results. We also offer an intermediate (6 week) and express (3 week) service for a premium charge. For large volume submissions please contact us for delivery timing.

Sample sizes

Samples should yield about 1mg of carbon after processing. The corresponding amounts of sample material required are detailed as follows:

Material	Optimum Amount Required
Bone	150 – 3000 mg
Charcoal	30 – 100 mg
Peat	1 – 3 gm*
Soil & Sediments	1 – 3 gm*
Shell & forams	30 mg
Textiles	30 mg
Wood	50 – 300 mg

*Depending on carbon content

We are often able to process sample quantities smaller than the minimum indicated. If unsure of the carbon content or minimum size of the sample, please contact the laboratory before submission so that we can assist you in determining size and treatment procedures.

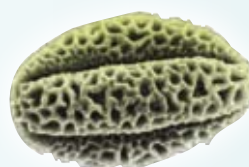
Fees

Rafter Radiocarbon fees have simple structure and are highly competitive. Fees can be quoted for special requirements or volume submissions, or you may visit our website for a current schedule of fees.

www.rafterradiocarbon.co.nz/prices.htm

Import permit

A sample submission form and an import permit from MAF (Ministry of Agriculture and Forestry) can be downloaded from our website and must accompany the submission www.rafterradiocarbon.co.nz/samples.htm Documented authorisation must accompany any human remains sent for radiocarbon dating.



Pictured from left: foraminifera, seashell, and pollen grains of willow and dandelion

contact us



To know more about benefiting from the expertise of Rafter Radiocarbon dating laboratory, please visit

www.rafterradiocarbon.co.nz

or call us on

+64 4 570 1444

or email us at

radiocarbon@gns.cri.nz

Matau (fish hook):
Museum of New Zealand Te Papa Tongarewa (OL000105)

Radiocarbon Location

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