

A close-up, profile view of a man's face, looking towards the right. He is wearing dark sunglasses with a blue and orange reflection. The background is a blurred server room with green and blue lighting.

GUIDELINES
ON THE MEANING OF
RESEARCH &
DEVELOPMENT
FOR TAX
PURPOSES

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RESEARCH & DEVELOPMENT FOR TAX PURPOSES

"The following document is issued by The Department for Science, Innovation & Technology.

Its purpose is to provide a detailed description of what qualifies for R&D for the purpose of R&D tax relief claims. It identifies and defines the various terminology that's used in the description of qualifying R&D activities.

They define the types of R&D and the subsequent activity the Government wants to incentivise through the tax system, but not how the R&D tax relief claims work or what costs can be claimed.

The aim has always been to promote investment in innovation, giving companies the opportunity to invest in their own development, growth and people, and subsequently grow the UK economy itself.

The guidelines and terminology used has always been broad, capturing a vast array of industrial sectors. However, this does mean they can be open to interpretation and misunderstanding.

Our TC Group R&D and Innovation Tax Reliefs team aims to ensure our clients fully understand the guidelines and use them to their advantage to explore all areas of expertise and innovation. We'll help you understand how they relate to your business and guide you through the legislation to ensure you maximise the value of a correctly submitted R&D claim.

We ask all our clients to read these guidelines carefully, as they form an important part of the R&D identification process and in doing so, enable us to apply them to both your business and sector effectively."

On behalf of the TC Group team.



VIC

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DIRECTOR -
HEAD OF INNOVATION
TAX RELIEFS

VIC
ULFIK

UNLOCKING THE POTENTIAL: MEET OUR INDUSTRY-LEADING R&D AND INNOVATION TAX RELIEFS TEAM

In the fast-paced and ever-evolving world of research and development (R&D) tax reliefs, having a competent and skilled team is crucial to navigate the complexities and maximise benefits. R&D and Innovation Tax Reliefs team is a group of exceptional individuals with diverse expertise, experience, and knowledge across a wide range of industries, making them industry specialists in their own right.

DEALING WITH UNCERTAINTY

HMRC have introduced a number of changes to the R&D scheme, but don't let these put you off. We can provide excellent advice to guide you in determining if you have a valid claim. We can also provide robust support for your claim throughout the whole process once submitted.

EXPERIENCE ACROSS DIVERSE INDUSTRIES:

One of the key strengths of our R&D and Innovation Tax Reliefs team is their extensive experience across various industry sectors. From the built environment to engineering, IT to manufacturing, composite materials and even the highly specialised automotive and aerospace industries, our team members have a proven track record of assisting companies in these domains to identify and claim the R&D tax reliefs they deserve.

UNPARALLELED R&D TAX RELIEFS SPECIALISTS:

Each member of our team is a dedicated specialist in R&D tax reliefs, possessing in-depth knowledge of the legislation, guidelines, and criteria set by HMRC (His Majesty's Revenue and Customs). Their expertise ensures they can efficiently and effectively identify qualifying R&D activities within your organisation, helping you to meet HMRC's criteria and secure the maximum tax relief benefits available.

ROBUST PROCESS AND EFFICIENT SUPPORT:

Navigating the world of tax reliefs can be daunting, but our team's robust and streamlined process ensures that you receive the support you need at every step of the way. From initial assessments to compiling necessary documentation and preparing your claim, our team's efficiency guarantees a hassle-free experience for your company. We can even track your claim progress within HMRC's system to keep you updated on progress.

HOLISTIC TAX SPECIALISTS:

Whilst our primary focus is on R&D tax reliefs, our team is not limited to just that area. We're well-versed in various tax reliefs for the creative industries, including film, TV, theatre, and video games. This broad understanding allows us to provide a comprehensive approach, helping you identify and claim any applicable tax reliefs to optimise your financial benefits.

COLLABORATIVE AND CLIENT-FOCUSED:

At the heart of our TC Group Innovation Tax Reliefs team's success is our commitment to collaboration and client-focused service. We understand that each organisation is unique, and we take the time to comprehend your specific needs, challenges, and objectives. By tailoring our approach to suit your requirements, we ensure that you receive personalised solutions that yield the best results for your business.

In conclusion, our R&D and Innovation Tax Reliefs team brings together a wealth of industry specialists, expertise in diverse sectors, and a deep understanding of the intricacies of tax reliefs. With our robust process and holistic approach, we are well-equipped to guide your organisation through the complex landscape of R&D tax reliefs, helping you unlock its full potential and secure the financial benefits you rightfully deserve. Partner with us and embark on a journey of innovation and growth with confidence.

SO WHAT'S CHANGED?

FOR ACCOUNTING PERIOD COMMENCING 1ST APRIL 2023 – 1ST APRIL 2024

There have been significant changes to R&D tax relief that took effect for accounting periods starting on or after 1 April 2023, with further changes since April 1, 2024.

In summary, the 2023 adjustments rebalanced the rates: businesses under the R&D SME scheme now receive a lower rate of tax relief, while those claiming R&D Expenditure Credit (RDEC) enjoy more generous rates. These changes aim to combat abuse and improve compliance. The 2024 changes focused on simplifying R&D relief in the UK, aligning it more closely with international standards by merging the two existing schemes into a single RDEC-like R&D tax relief scheme for all qualifying businesses.

RATES OF RELIEF FOR THE SME R&D SCHEME FROM APRIL 2023:

- For expenditure starting on or after April 1, 2023, the additional deduction for SMEs decreased from 130% to 86%, and the SME credit rate reduced from 14.5% to 10%.
- These changes apply pro rata for accounting periods crossing April 1, 2023. For example, if your period ended on 30 June 2023, the old rates apply up to 31 March 2023, and the new rates from 1 April 2023, to 30 June 2023.
- Although the relief is less generous, the 2023 changes should be viewed holistically. For instance, Corporation Tax increased to 25% for companies with profits over £250,000, resulting in a £3.20 difference in R&D Tax Credits per £100 spent.

RATES OF RELIEF FOR RDEC FROM APRIL 2023:

For expenditure starting on or after 1 April 2023, the RDEC rate increased from 13% to 20%. This must also be applied pro rata if the accounting period extends beyond 1 April 2023.

RATES OF RELIEF FOR THE MERGED R&D SCHEME FROM APRIL 2024:

For accounting periods starting on or after 1 April 2024, the merged credit rate will be 20% on all qualifying expenditure, applicable to all qualifying businesses regardless of size, except for loss-making 'R&D intensive' SMEs.

RELIEF RATES FOR THE R&D INTENSIVE SCHEME:

- From 1 April 2023, SMEs are considered 'R&D intensive' if their qualifying R&D spending makes up at least 40% of their total expenditure. From 1 April 2024, this threshold will lower to 30%.
- Companies not meeting this threshold due to unexpected circumstances will receive a one-year grace period, allowing them to claim the benefit if they met the threshold in the previous year. Loss-making SMEs meeting the R&D intensity threshold can claim R&D Tax Credits at a rate of 14.5% for qualifying expenses. This rate is expected to remain through 2024.



WHY IS R&D RELIEF CHANGING?

The UK Government aims to ensure that public money is spent effectively and best supports innovation, addressing fraudulent claims and increasing private investment and economic growth.

Several changes were announced in the 2022 Autumn Budget to improve protection against fraud and errors in R&D claims, including:

1. Digital submission of all R&D claims.
2. Additional information requirements for claims.
3. Claims must be supported by a named officer of the company.
4. Inclusion of details of any associated agents.
5. Pre-notification for first-time claimants or those who haven't claimed in the previous three accounting periods.
6. Expanded categories of qualifying expenditure.

ADDITIONAL CHANGES FOR R&D TAX CREDITS FROM APRIL 2024:

1. Discontinuation of the qualifying bodies list.
2. R&D tax credits will be received by the company that conducts the research and development instead of the subcontracted company (although, the subcontracted company can potentially claim R&D costs for any resulting R&D that isn't connected to the client's initial project).
3. Removal of subsidised expenditure rules.
4. New restrictions on overseas R&D expenditure.
5. Credits will be paid directly to the claimant.
6. The credit will be 'above the line', making it taxable income and positively affecting financial KPIs like EBITDA.

UNDERSTANDING "FOR ACCOUNTING PERIODS BEGINNING ON OR AFTER":

This phrase means the changes apply from the start of the accounting period beginning on or after 1 April 2024. For example, if your current accounting period ends on 30 June 2024, the new rules apply from 1 July 2024, onwards. Before this date, the previous rules still apply.

R&D AND INNOVATION TAX RELIEFS TEAM



RESEARCH & DEVELOPMENT ALLOWANCES

Research and Development (R&D) tax reliefs supports companies that work on innovative projects in science and technology.



PATENT ALLOWANCES

Patent allowances are capital allowances given on capital expenditure incurred on the purchase of patent rights.



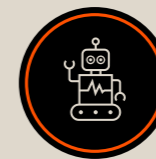
TV TAX RELIEF

Aimed at Television Production Companies, this incentive offers rebates for pre-production, principal photography, and post-production expenses related to TV content.



KNOW HOW ALLOWANCES

Tax relief in the form of capital allowances may be available for businesses who have capital expenditure in relation to the acquisition of Know-How.



ANIMATION TAX RELIEF

Beneficial for UK animation production entities, this relief offers a tax rebate for expenditures in pre-production, principal photography, and post-production of animation projects.



THEATRE TAX RELIEF

Theatre Tax Relief allows Theatre Production Companies (TPCs) to reclaim a portion of expenditures from producing theatrical productions.



PATENT BOX

Designed for companies holding patents on their intellectual property, the Patent Box facilitates a reduced rate of Corporation Tax for profits stemming from patented inventions.



FILM TAX RELIEF

Created for companies with patents, this initiative allows for a reduced Corporation Tax rate on profits generated from patented inventions, even if the patents were purchased from others.



VIDEO GAMES TAX RELIEF

For UK game developers, Video Games Tax Relief (VGTR) offers rebates for expenditures during development, promoting innovation and competitiveness within the gaming industry.

WHY DO YOU NEED TO USE DEDICATED EXPERTS?

Engaging the dedicated R&D tax experts at TC Group ensures that companies can navigate the complex landscape of tax regulations and compliance with precision. Tax laws are intricate and frequently updated, making it challenging for non-specialists to keep up. Our team at TC Group stay informed about the latest changes and can interpret how these apply to specific business circumstances, minimising the risk of costly errors and penalties.

Moreover, our experts can identify additional opportunities for tax savings that might be overlooked by those without specialised knowledge. We can advise on the best tax strategies tailored to the company's structure and operations, ensuring that businesses take full advantage of available reliefs and incentives. This proactive approach can result in significant financial benefits and improved cash flow.

Lastly, we at TC Group can provide peace of mind by handling all aspects of tax compliance, from compiling the claim, filing your return and managing communications with HRMC as well as tracking progress of your claim. This allows you, as business owners and management, to focus on your core activities without the distraction and stress of R&D tax-related issues. By ensuring that all R&D tax claims are dealt with and managed accurately and efficiently to help protect the company's reputation and financial health.

SO, WHAT DO YOU NEED TO CONSIDER?...

INDUSTRY SECTORS

Many industry sectors could be eligible for R&D tax relief – from engineering, software and pharmaceuticals, to food & drink or farming. If in doubt, [get in touch](#) with someone on our R&D and Innovation Tax Reliefs team to explore the possibilities.

ADVANCE IN SCIENCE & TECHNOLOGY

This phrase often dissuades companies from claiming as they don't believe they qualify. In our experience, we've seen commercial developments qualify, even when improving an already existing product.

TECHNOLOGICAL UNCERTAINTY

Your project has to be scientifically or technologically complex in developing your product, process, device or service. Additionally, there has to be uncertainty in how you're going to achieve the final solution. In reality, we often find the answer lies in the difficult areas you've tackled and overcome, or even in areas where you've failed to find a solution! This can all still be valuable and qualify as eligible R&D activity.

COMPETENT PROFESSIONAL

This is someone who may have a degree in their chosen field, a successful track record or has a significant number of years' experience in the sector to which your project relates.

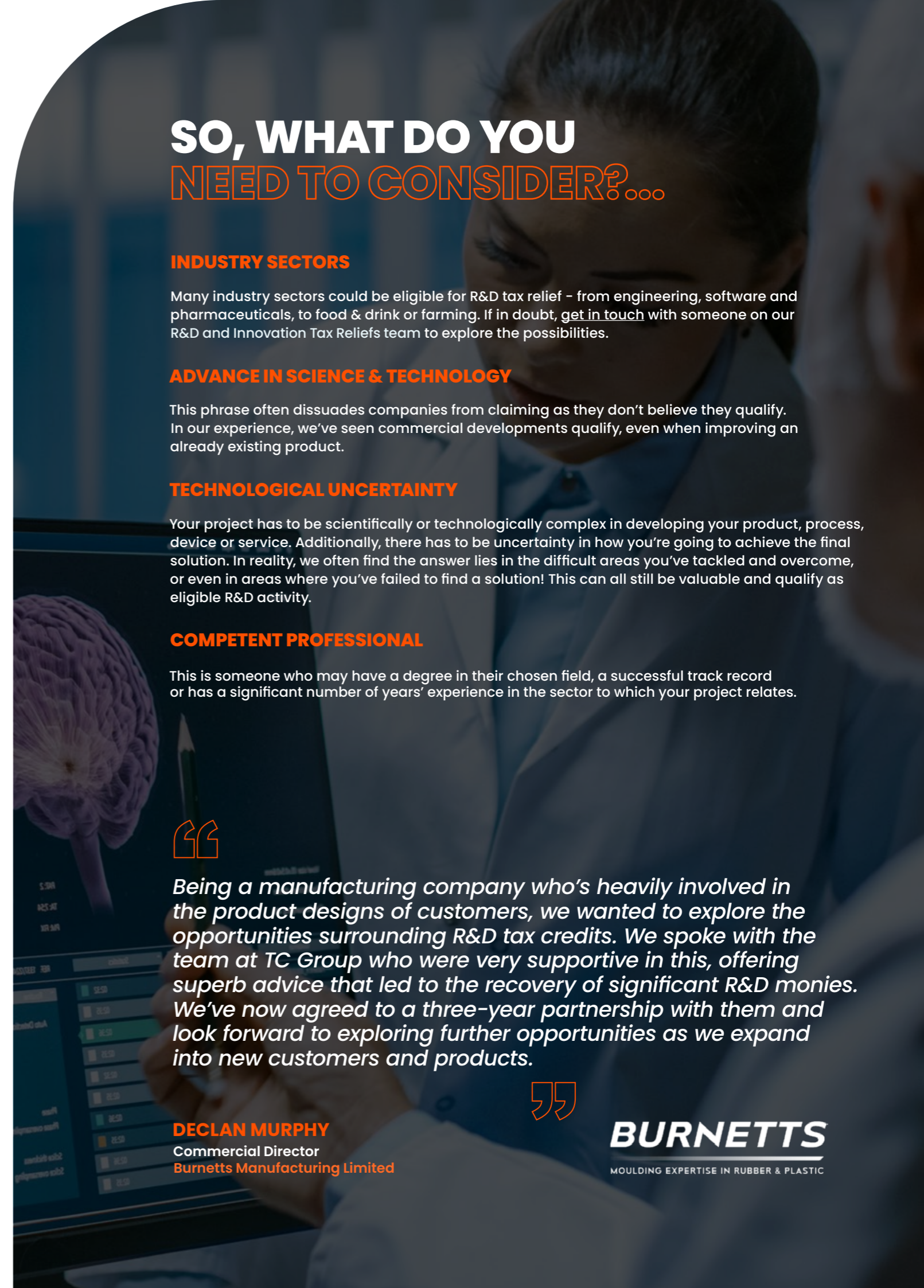


Being a manufacturing company who's heavily involved in the product designs of customers, we wanted to explore the opportunities surrounding R&D tax credits. We spoke with the team at TC Group who were very supportive in this, offering superb advice that led to the recovery of significant R&D monies. We've now agreed to a three-year partnership with them and look forward to exploring further opportunities as we expand into new customers and products.

DECLAN MURPHY
Commercial Director
Burnetts Manufacturing Limited



BURNETTS
MOULDING EXPERTISE IN RUBBER & PLASTIC



R&D AND INNOVATION TAX RELIEFS TEAM

Our TC Group R&D and Innovation Tax Reliefs team is made up of qualified tax advisors and technical specialists from a wide range of industry sectors, ensuring we fully understand your business. We'll help you through the entire claim process, guiding you to identify qualifying projects, the boundaries around those projects and the activities that qualify for R&D relief. We'll then compile and write the supporting technical report for your claim, helping you identify the costs surrounding your projects and calculate the final relief amount, leaving you to get on with the all-important tasks of day-to-day business activity.

We look forward to exploring your R&D and as a result, fully unlocking your company's growth potential.



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GUIDELINES ON THE MEANING OF RESEARCH & DEVELOPMENT FOR TAX PURPOSES

Issued 5 March 2004, Updated 7 March 2023

THESE GUIDELINES ARE ISSUED BY THE SECRETARY OF STATE FOR THE PURPOSES OF SECTION 1006 INCOME TAX ACT 2007. THEY REPLACE THE PREVIOUS GUIDELINES ISSUED 5 MARCH 2004, UPDATED 6 DECEMBER 2010.

01. Research and development ('R&D') is defined for tax purposes in Section 1006 Income Tax Act 2007¹. This says the definition of R&D for tax purposes follows generally accepted accounting practice. The accountancy definition is then modified for tax purposes by these Guidelines, which are given legal force by Parliamentary Regulations. These Guidelines explain what is meant by R&D for a variety of tax purposes, but the rules of particular tax schemes may restrict the qualifying expenditure².
02. In these Guidelines a number of terms are used which are intended to have a special meaning for the purpose of the Guidelines. Such terms are highlighted on first appearance and defined later.

THE DEFINITION OF RESEARCH & DEVELOPMENT

03. R&D for tax purposes takes place when a project seeks to achieve an advance in science or technology.
04. The activities which directly contribute to achieving this advance in science or technology through the resolution of scientific or technological uncertainty are R&D.
05. Certain qualifying indirect activities related to the project are also R&D. Activities other than qualifying indirect activities which do not directly contribute to the resolution of the project's scientific or technological uncertainty are not R&D.

1. For the purposes of research and development allowances (Part 6 Capital Allowances Act 2001) this definition is extended to include oil and gas exploration and appraisal as defined in Section 1003 of Income Tax Act 2007. These Guidelines apply to this extended definition as well.

2. The original footnotes 2 and 3 to the 2004 Guidelines (which were not themselves part of the Guidelines) have been removed. This is because those footnotes stated that the qualifying indirect activities (QIAs) listed in para 31 are R&D, but do not attract R&D tax credits. In fact, whether or not expenditure on the QIAs qualifies for R&D tax relief depends on a number of factors, but there is no blanket exclusion. For further explanation see, for example, HMRC guidance: [Corporate Intangibles Research and Development Manual](#).

These revised footnotes are not part of the Guidelines. Revised footnote prepared by Department for Business, Innovation and Skills in consultation with HMRC December 2010.

3. See footnote 2.

ADVANCE IN SCIENCE OR TECHNOLOGY

06. An advance in science or technology means an advance in overall knowledge or capability in a field of science or technology (not a company's own state of knowledge or capability alone). This includes the adaptation of knowledge or capability from another field of science or technology in order to make such an advance where this adaptation was not readily deducible.
07. An advance in science or technology may have tangible consequences (such as a new or more efficient cleaning product, or a process which generates less waste) or more intangible outcomes (new knowledge or cost improvements, for example).
08. A process, material, device, product, service or source of knowledge does not become an advance in science or technology simply because science or technology is used in its creation. Work which uses science or technology but which does not advance scientific or technological capability as a whole is not an advance in science or technology.
09. A project which seeks to, for example,
 - (a) extend overall knowledge or capability in a field of science or technology; or
 - (b) create a process, material, device, product or service which incorporates or represents an increase in overall knowledge or capability in a field of science or technology; or
 - (c) make an appreciable improvement to an existing process, material, device, product or service through scientific or technological changes; or
 - (d) use science or technology to duplicate the effect of an existing process, material, device, product or service in a new or appreciably improved way (e.g. a product which has exactly the same performance characteristics as existing models, but is built in a fundamentally different manner)will therefore be R&D.
10. Even if the advance in science or technology sought by a project is not achieved or not fully realised, R&D still takes place.
11. If a particular advance in science or technology has already been made or attempted but details are not readily available (for example, if it is a trade secret), work to achieve such an advance can still be an advance in science or technology.
12. However, the routine analysis, copying or adaptation of an existing product, process, service or material, will not be an advance in science or technology.

SCIENTIFIC OR TECHNOLOGICAL UNCERTAINTY

- 13. Scientific or technological uncertainty exists when knowledge of whether something is scientifically possible or technologically feasible, or how to achieve it in practice, is not readily available or deducible by a competent professional working in the field. This includes system uncertainty. Scientific or technological uncertainty will often arise from turning something that has already been established as scientifically feasible into a cost-effective, reliable and reproducible process, material, device, product or service.
- 14. Uncertainties that can readily be resolved by a competent professional working in the field are not scientific or technological uncertainties. Similarly, improvements, optimisations and fine-tuning which do not materially affect the underlying science or technology do not constitute work to resolve scientific or technological uncertainty.

OTHER DEFINITIONS

Science

- 15a. Science is the systematic study of the nature and behaviour of the physical and material universe. Work in the arts, humanities and social sciences, including economics, is not science for the purpose of these Guidelines.
- 15b. Mathematical techniques are frequently used in science. From April 2023 mathematical advances in themselves are treated as science for the purposes of these Guidelines, whether or not they are advances in representing the nature and behaviour of the physical and material universe.
- 16. These Guidelines apply equally to work in any branch or field of science.

Technology

- 17. Technology is the practical application of scientific principles and knowledge, where 'scientific' is based on the definition of science above.
- 18. These Guidelines apply equally to work in any branch or field of technology.

Project

- 19. A project consists of a number of activities conducted to a method or plan in order to achieve an advance in science or technology. It is important to get the boundaries of the project correct. It should encompass all the activities which collectively serve to resolve the scientific or technological uncertainty associated with achieving the advance, so it could include a number of different sub-projects. A project may itself be part of a larger commercial project, but that does not make the parts of the commercial project that do not address scientific or technological uncertainty into R&D.

Overall knowledge or capacity

- 20. Overall knowledge or capability in a field of science or technology means the knowledge or capability in the field which is publicly available or is readily deducible from the publicly available knowledge or capability by a competent professional working in the field. Work which seeks an advance relative to this overall knowledge or capability is R&D.
- 21. Overall knowledge or capability in a field of science or technology can still be advanced (and hence R&D can still be done) in situations where:
 - several companies are working at the cutting edge in the same field, and are doing similar work independently; or
 - work has already been done but this is not known in general because it is a trade secret, and another company repeats the work; or
 - it is known that a particular advance in science or technology has been achieved, but the details of how are not readily available.
- 22. However, the routine analysis, copying or adaptation of an existing process, material, device, product or service will not advance overall knowledge or capability, even though it may be completely new to the company or the company's trade.

Appreciable Improvement

- 23. Appreciable improvement means to change or adapt the scientific or technological characteristics of something to the point where it is 'better' than the original. The improvement should be more than a minor or routine upgrading, and should represent something that would generally be acknowledged by a competent professional working in the field as a genuine and non-trivial improvement. Improvements arising from the adaptation of knowledge or capability from another field of science or technology are appreciable improvements if they would generally be acknowledged by a competent professional working in the field as a genuine and non-trivial improvement.
- 24. Improvements which arise from taking existing science or technology and deploying it in a new context (e.g. a different trade) with only minor or routine changes are not appreciable improvements. A process, material, device, product or service will not be appreciably improved if it simply brings a company into line with overall knowledge or capability in science or technology, even though it may be completely new to the company or the company's trade.
- 25. The question of what scale of advance would constitute an appreciable improvement will differ between fields of science and technology and will depend on what a competent professional working in the field would regard as a genuine and non-trivial improvement.

Directly contribute

- 26. To directly contribute to achieving an advance in science or technology, an activity (or several activities in combination) must attempt to resolve an element of the scientific or technological uncertainty associated with achieving the advance.



27. Activities which directly contribute to R&D include:
- (a) activities to create or adapt software, materials or equipment needed to resolve the scientific or technological uncertainty, provided that the software, material or equipment is created or adapted solely for use in R&D;
 - (b) scientific or technological planning activities; and
 - (c) scientific or technological design, testing and analysis undertaken to resolve the scientific or technological uncertainty.

28. Activities which do not directly contribute to the resolution of scientific or technological uncertainty include:

- (a) the range of commercial and financial steps necessary for innovation and for the successful development and marketing of a new or appreciably improved process, material, device, product or service;
- (b) work to develop non-scientific or non-technological aspects of a new or appreciably improved process, material, device, product or service;
- (c) the production and distribution of goods and services;
- (d) administration and other supporting services;
- (e) general support services (such as transportation, storage, cleaning, repair, maintenance and security); and
- (f) qualifying indirect activities.

29. System uncertainty is scientific or technological uncertainty that results from the complexity of a system rather than uncertainty about how its individual components behave. For example, in electronic devices, the characteristics of individual components or chips are fixed, but there can still be uncertainty about the best way to combine those components to achieve an overall effect. However, assembling a number of components (or software sub-programs) to an established pattern, or following routine methods for doing so, involves little or no scientific or technological uncertainty.

30. Similarly, work on combining standard technologies, devices, and/or processes can involve scientific or technological uncertainty even if the principles for their integration are well known. There will be scientific or technological uncertainty if a competent professional working in the field cannot readily deduce how the separate components or sub-systems should be combined to have the intended function.

Qualifying indirect activity

31. These are activities which form part of a project but do not directly contribute to the resolution of the scientific or technological uncertainty. They are:
- (a) scientific and technical information services, insofar as they are conducted for the purpose of R&D support (such as the preparation of the original report of R&D findings);
 - (b) indirect supporting activities such as maintenance, security, administration and clerical activities, and finance and personnel activities, insofar as undertaken for R&D;
 - (c) ancillary activities essential to the undertaking of R&D (e.g. taking on and paying staff, leasing laboratories and maintaining research and development equipment including computers used for R&D purposes);
 - (d) training required to directly support an R&D project;
 - (e) research by students and researchers carried out at universities;
 - (f) research (including related data collection) to devise new scientific or technological testing, survey, or sampling methods, where this research is not R&D in its own right; and
 - (g) feasibility studies to inform the strategic direction of a specific R&D activity.

32. Activities not described in paragraph 31 are not qualifying indirect activities.

COMMENTARY ON PARTICULAR QUESTIONS WHICH ARISE

Start and end of R&D

33. R&D begins when work to resolve the scientific or technological uncertainty starts, and ends when that uncertainty is resolved or work to resolve it ceases. This means that work to identify the requirements for the process, material, device, product or service, where no scientific or technological questions are at issue, is not R&D.
34. R&D ends when knowledge is codified in a form usable by a competent professional working in the field, or when a prototype or pilot plant with all the functional characteristics of the final process, material, device, product or service is produced.
35. Although the R&D for a process, material, device, product or service may have ended, new problems which involve scientific or technological uncertainty may emerge after it has been turned over to production or put into use. The resolution of these problems may require new R&D to be carried out. But there is a distinction to be drawn between such problems and routine fault fixing.

Planning as part of R&D

36. Scientific or technological planning activities associated with a project directly contribute to resolving the scientific or technological uncertainty associated with the project, and are therefore R&D. These include defining scientific or technological objectives, assessing scientific or technological feasibility, identifying particular scientific or technological uncertainties, estimating development time, schedule, and resources of the R&D, and high-level outlining of the scientific or technical work, as well as the detailed planning and management of the work.



	37.	Elements of a company's planning activity relating to a project but not directly contributing to the resolution of scientific or technological uncertainty, such as identifying or researching market niches in which R&D might benefit a company, or examination of a project's financial, marketing, and legal aspects, fall outside the category of scientific or technological planning, and are therefore not R&D.
Abortive projects	38.	Not all projects succeed in their aims. What counts is whether there is an intention to achieve an advance in science or technology, not whether ultimately the associated scientific or technological uncertainty is completely resolved, or resolved to the degree intended. Scientific or technological planning activities associated with projects which are not taken forward (e.g. because of insurmountable technical or commercial challenges) are still R&D.
Prototypes, pilot plants	39.	A prototype is an original model on which something new or appreciably improved is patterned, and of which all things of the same type are representations or copies. It is a basic experimental model possessing the essential characteristics of the intended process, material, device, product or service. The design, construction, and testing of prototypes generally fall within the scope of R&D for tax purposes. But once any modifications necessary to reflect the test findings have been made to the prototypes, and further testing has been satisfactorily completed, the scientific or technological uncertainty has been resolved and further work will not be R&D.
	40.	Similarly the construction and operation of pilot plants while assessing their operations is R&D until the scientific or technological uncertainty associated with the intended advance in science or technology has been resolved.
Design	41.	When achieving design objectives requires the resolution of scientific or technological uncertainty within a project, work to do this will be R&D. Design activities which do not directly contribute to the resolution of scientific or technological uncertainty within a project are not R&D.
Cosmetic and aesthetic effects	42.	Cosmetic and aesthetic qualities are not of themselves science or technology, and so work to improve the cosmetic or aesthetic appeal of a process, material, device, product or service would not in itself be R&D. However, work to create a desired cosmetic or aesthetic effect through the application of science or technology can require a scientific or technological advance, and resolving the scientific or technological uncertainty associated with such a project would therefore be R&D.
Content delivered through science or technology	43.	Information or other content which is delivered through a scientific or technological medium is not of itself science or technology. However, improvements in scientific or technological means to create, manipulate and transfer information or other content can be scientific or technological advances, and resolving the scientific or technological uncertainty associated with such projects would therefore be R&D.

EXAMPLES/ILLUSTRATIONS

Examples in these Guidelines are illustrative, designed to cast light on the principles explained in the Guidelines, and should be read in that context.

A. The R&D process

- A1. A company conducts extensive market research to learn what technical and design characteristics a new DVD player should have in order to be an appealing product. This work is not R&D (paragraph 37). However, it does identify a potential project to create a DVD player incorporating a number of technological improvements which the company's R&D staff (who are competent professionals) regard as genuine and nontrivial. This project would be seeking to develop an appreciably improved DVD player (paragraphs 23-25) and would therefore be seeking to achieve an advance in science or technology (paragraph 9(c)).
- A2. The company then decides on a detailed specification for the desired new product, and devises a plan for developing it. Some elements of this plan involve planning of activities which directly contribute to resolving the project's scientific or technological uncertainties (such as the system uncertainty associated with an improved control mechanism for the laser that 'reads' the DVD). This element of planning is R&D (paragraph 36), as are the activities themselves (paragraph 4). Other elements of the plan focus on obtaining intellectual property protection or cosmetic design decisions, for example, which do not directly contribute to resolving the project's scientific or technological uncertainties and are not qualifying indirect activities (paragraph 31) and are therefore not R&D. Neither this planning (paragraph 37) nor these activities (paragraph 28) are R&D.
- A3. The scientific or technological work culminates in the creation of a series of prototype DVD players, and ultimately a 'final' prototype is produced and tested which possesses the essential characteristics of the intended product (circuit board design, performance characteristics, etc.). All the activities which directly contributed to resolving the scientific or technological uncertainty of creating the DVD player up to this point (such as the testing of successive prototypes) are R&D (paragraphs 34 and 39).
- A4. Several copies of this prototype are made (not R&D; paragraphs 4-5 and 26-28) and distributed to a group of consumers to test their reactions (not R&D; paragraph 28((a))). Some of these consumers report concerns about the noise level of the DVD player in operation. Additional work is done to resolve this problem. If this involves a routine adjustment of the existing prototype (i.e. no scientific or technological uncertainty) then it will not be R&D (paragraph 14); if it involves more substantial changes (i.e. there is scientific or technological uncertainty to resolve) then it will be R&D.



B. Equal applicability in any branch or field of science or technology	B1.	The Guidelines apply equally to work in any branch or field of science or technology (paragraphs 15-18). This means that work in software engineering, for example, is subject to the same fundamental criteria for being R&D as work in textile science, or nanotechnology, or anything else.	E2.	In order to achieve this advance, a programme of investigation by computer to pick likely ingredients and the systematic testing of possible ingredients and products based on those 'trial' ingredients is undertaken. The work involves the adaptation of existing software to tackle the specific problem, and product formulation and testing using established methods. This investigation and testing evaluates the weed-killing performance and other relevant characteristics of the formulations (for example, toxicity to humans and wildlife, water solubility, adhesion to weeds, damage done to other plants). All of these activities would	
	B2.	This equality also applies to the methods used to resolve scientific or technological uncertainty. For example, it is sometimes possible to implement functionality in a product or process by means of software or of hardware. As long as the scientific or technological uncertainty cannot readily be resolved by a competent professional working in the field, hardware and software methods are both equally R&D in these circumstances.		E3.	The company also does work to assess what characteristics a new weed-killing product should have in order to appeal to consumers. This activity does not directly contribute to the resolution of scientific or technological uncertainty (paragraph 28(a)) and is not a qualifying indirect activity (paragraph 31), and is therefore not R&D (paragraph 4).
C. Abortive projects	C1.	Not all projects achieve the advance in science or technology they are seeking. For example, work to insert a particular gene into a gene sequence may simply fail, while an attempt to appreciably increase the life of a battery may only yield a marginal improvement. In both cases, the project seeks to achieve an advance in science or technology and work to resolve the scientific or technological uncertainty would be R&D (paragraph 10).	F. Direct contribution to the resolution of scientific or technological uncertainty	F1.	Work to compare the effectiveness of two possible designs for controlling part of a new manufacturing process would directly contribute to resolving the scientific or technological uncertainty inherent in the new process, and hence the activity would be R&D (paragraphs 4,26). But work to raise finance for the project, while indirectly contributing to the resolution of scientific or technological uncertainty (e.g. by paying for work) does not of itself help resolve the uncertainty, and hence is not R&D (paragraph 28(a)). Human Resources work to support the R&D is a qualifying indirect activity (paragraph 31) and hence is also R&D (paragraph 5), though it does not directly contribute to the resolution of scientific or technological uncertainty
D. Advance in science or technology	D1.	Searching for the molecular structures of possible new drugs would be an advance in science or technology, because it applies existing knowledge of science (which compounds are known to cause particular physiological effects) in search of new or improved active compounds (paragraph 9(b)). This is true even if the method used to search for those molecular structures (e.g. running a computer programme on a particular set of data) is itself entirely routine; the activity directly contributes to the resolution of scientific or technological uncertainty (paragraph 27(c)) and so would be R&D (paragraph 4). Work to identify new uses of existing compounds would also be creative work in science or technology, because it seeks new scientific knowledge about those molecules (paragraph 9(a)).	G. Testing as part of R&D	G1.	Scientific or technological testing and analysis which directly contributes to the resolution of scientific or technological uncertainty is R&D (paragraph 26). So for example if testing work is carried out as part of the development of a pilot plant, this would be R&D, but once the design of the 'final' pilot plant had been finalised and tested, any further testing would not be R&D (paragraph 39). However, if flaws in the design became apparent later on, then work to remedy them would be R&D if they could not readily be resolved by a competent professional working in the field (in other words, if there was scientific or technological uncertainty around
	D2.	However, the development of software intended for the analysis of market research data (which is not scientific or technological knowledge; paragraphs 15-18) which was not expected to result in the development of a scientific or technological advance in the field of software as a whole (such as an algorithm which extends overall knowledge or capability in the field of software) would not be R&D (paragraph 8). Work to adapt such software to analyse, say, customer spending patterns would also not be R&D.	H. Cosmetic and aesthetic effects	H1.	A company is seeking to make a water-breathable fabric for use in hiking gear. A test fabric with the required physical characteristics is produced through R&D. This new fabric is then produced in small quantities (not R&D) and market tested with a number of trial users. The user tests are not R&D, because they are concerned with testing the commercial potential of the new material and assessing its appeal to users (paragraph 42).
	D3.	An advance in science or technology need not imply an absolute improvement in the performance of a process, material, device, product or service. For example, the existence of high-fidelity audio equipment does not prevent a project to create lower-performance equipment from being an advance in science or technology (for instance, if it incorporated technological improvements leading to lower cost through more efficient circuit design or speaker construction) (paragraph 9(d)).	H2.	One of the results of these tests is that users do not like the feel of the new fabric against their skin, and dislike its shiny appearance. The company decides to investigate variants of its new fabric, which require significant changes to the material's weave and physical structure, to overcome these problems. Because there is scientific and technological uncertainty around whether a material with the desired physical characteristics can be made, the R&D continues.	
E. Scientific or technological uncertainty	E1.	A firm's project involves finding a new active ingredient for weed-killer (an advance in overall knowledge or capability in the particular field of science or technology; paragraphs 6, 20), and developing a formula incorporating the new active ingredient for use in a commercial product (paragraph 9(b) or (c)). Both of these would constitute an advance in science or technology.	J. Project, prototype and end of R&D	J1.	A company develops new spark plugs for use in an existing petrol engine. The scientific or technological uncertainty associated with this work is resolved once prototype plugs have been fully tested in the engine. The activities directly contributing to this work, including the construction of prototypes and their testing in the engine, would be R&D.
				J2.	The same company decides to design a new engine to incorporate the new spark plugs, involving a new combustion chamber design, lighter materials and other improvements such that the overall engine is appreciably improved (it uses less petrol to achieve slightly greater power output performance, and generates less pollution than current models). The activities directly contributing to this work, including the design of the separate components (not all of which need be different from those used in previous models) and their integration into a new engine, are R&D. The uncertainty associated with this work is resolved, and R&D is complete.

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