



TAX PROJECTS GROUP

Research and Development Tax Credits and Continuous Improvement

Significant cash refunds and future tax savings are available through the Research and Development Tax Credit. In an effort to increase domestic R&D spending, and thus stimulate the jobs marketplace, final IRS regulations have been issued which have opened the door for many more companies to qualify for the R&D credit through their development activities. These activities include not only the development or improvement of products but may include efforts around *process development and continuous improvement*. These new regulations, which are retroactive to prior years, allow companies to recover significant federal & state income taxes previously paid.

The most significant change has been the elimination of the discovery requirement or the need to be creating a new scientific principal. Today, many day-to-day operations of companies may qualify for the R&D credit. If a company is involved in manufacturing products, developing prototypes, designing tools, jigs, molds and dies, performing certification or environmental testing, automating and/or streamlining internal process, developing software, attempting to use new materials or using outside resources to perform these activities, they are likely a good candidate to claim the R&D credit.

How is an Activity Defined?

Activities included in the definition of research and development under the new IRS guidelines must meet specific criteria discussed in the new regulations. The criteria are broken out into four tests:

- **Business Component Test:** The first test is to identify whether a **business component** is being developed or improved. A **business component** is defined as a product, process, technique, software, formula or invention. Improvements that can qualify must be functional in nature rather than aesthetic.



- **Elimination of Technical Uncertainty:** In order to meet this criteria, **technical uncertainty** must exist at the beginning of the activity and efforts to eliminate these uncertainties (around the capability, method or final design) be conducted.
- **Process of Experimentation:** A **process of experimentation** is required that can evaluate one or more alternatives to achieve a result where the capability, method or final design is uncertain at the beginning of the activity (note the connection to the Technical Uncertainty test above).
- **Use of Scientific Principles:** The process of experimentation must rely fundamentally on the use of principles of the physical or biological sciences, engineering or computer sciences.

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How does Continuous Improvement meet the IRS Guidelines for the R&D Tax Credit?

It is logical to conclude, that certain continuous improvement activity such as Lean Manufacturing, Six Sigma, ISO 9001:2000 and AS 9100 can qualify for the R&D credit. A natural link exists between the definition of R&D issued by the IRS and the proper implementation of these continuous improvement activities. Continuous improvement has a focus of on-going improvements to a product, process, technique, software and formula in the interest of streamlining operations and reducing unnecessary processes. Data driven improvements in quality, cost and time that are based on Industrial Engineering principles are the foundation of support for passing the four tests required to qualify for the R&D credit.



There are various continuous improvement techniques and a list of innovators that have pushed the envelope of achieving World Class status in the endless pursuit of manufacturing perfection. The common thread of all these techniques is the Plan-Do-Check-Act cycle invented by Walter Shewhart and popularized by Dr. W. Edwards Deming. The PDCA cycle utilizes an iterative four step problem solving process that is linked directly to meeting the criteria under the four tests of the R&D tax credit.

- **Plan** defines the current state, goals and areas of uncertainty as well as perceived path to reaching the desired future state. This process of improvement often includes Value Stream Mapping that identifies the current state of a product or process flow and creates a desired future state to be achieved. Because this step identifies the desired future state, it inherently identifies the critical new business components required in the first R&D test (**Business Component Test**). Data is collected on cycle time, quality, inventory and number of people required to see if there is a favorable change after the desired future state ideas are implemented. This data measurement links directly to the level of uncertainty inherent in changing these mission critical processes. By defining both the current state and desired future state, technical uncertainties are identified and can be eliminated during the process (**Technical Uncertainty**).
- **Do** - implements change ideas with practices like Kaizen rapid improvement workshops with a focus on a series of experiments on the product and process to achieve the desired future state and overcome uncertainty (**Process of Experimentation**). The most common leap of faith is designing, developing and implementing a pull production system specific to the company's products and industry from a traditional push system most common in US manufacturing.
- **Check** measures the results in cycle time, quality, inventory and people as a result of the change experiments to see if the results are favorable to the product or process. Because the changes implemented in the second phase ("Do" phase) rely on the fundamental principles of industrial engineering and physical sciences, the Use of Scientific Principles criteria are met (**Use of Scientific Principles**).

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- **Act** on the next improvement ideas identified by the plan and driven by the results of experimentation. This continuous improvement activity is intended to mature the product and process in the best interest of quality, cost and time as it relates to the company's goals, market and business plan.

Beyond the Manufacturing Floor

Continuous improvement techniques are traditionally implemented in operations on the shop floor. The second generation of the Toyota Production System takes these initiatives into the office and extended supply chain where the PDCA cycle is used with Value Stream Mapping and Kaizen activity on the sales process, new product development, design for manufacturability, purchasing, supplier development and integration.

In industries like Aerospace and Defense there has been a significant shift from vertically-integrated manufacturing to systems-integration. This core shift changes the traditional means of production within one organization to the assembly of sub-systems provided by an integrated supply chain. Today, commercial and military aircraft as well as ships and submarines are being produced on a production line as Henry Ford intended. This shift has pushed the risk and cost of value-added-engineering and inventory to the extended supply chain made up largely of small and medium sized manufacturers.



Now more than ever, continuous improvement is required to survive in a global economy. Congress and the IRS have changed the R&D credit to help combat outsourcing and drive innovation in US manufacturing. These tax law changes are designed to reward companies focused on innovation, improvement and cost reduction without sacrificing quality.