

## **Advanced Apprenticeship: Product Design and Development Technician Apprenticeship Standard**

### **Designation of Occupations**

“Product Design and Development Technician” (Level 3)

### **Duration of Apprenticeship**

Typically the duration of this apprenticeship is 36 – 48 months. This duration may be reduced for a candidate with previous relevant experience and/or someone already part qualified.

### **Suggested Entry Requirement**

Individual employers will set the selection criteria for their Apprenticeships. In order to optimise success candidates will typically have 4 GCSE's at Grade C or equivalent, including Mathematics, English and a Science. Employers who recruit candidates without English or Maths at Grade C or above must ensure that the candidate achieves this standard prior to the completion of the Apprenticeship.

### **Role Specific Occupational Requirements**

Product Design & Development Technicians primarily work on all stages of product creation and modification. They support activities ranging from early concept feasibility, design and development stages right through to final preparation for launch and customers. This includes working in concept studios, rapid prototyping, assembly, testing, validating and analysing performance. Typically they work closely with engineers in bring new concepts to life or supporting redesigns of existing products.

**Vocational Skills:** During the foundation stage the apprentice will develop a solid grasp of the core engineering skills. These skills will not only prepare the apprentice for the workplace in demonstrating that they have the required manual dexterity to do their core role, but will build and stretch their transferable competencies over time. The skills required for full competence are:

- How to comply with statutory regulations and stringent organisational safety requirements
- How to effectively use and interpret a range of engineering data sources and documentation
- Organising work efficiently and effectively in engineering resources when completing tasks
- Producing components and prototypes using a wide range of hand fitting techniques
- Preparing and using lathes, milling, as well as other general or specialist high tech
- Producing assemblies and rigs using a range of materials and techniques
- Applying and testing mechanical, electrical and electronic devices and equipment
- Engineering project planning within the prototyping context
- Business improvement planning
- Applying mechanical principles and joining techniques to, products, devices and equipment
- Applying electrical and electronic principles to products devices and equipment
- Maintaining and testing instrumentation within product devices
- Identifying, diagnosing and rectifying design problems through the whole creation process including design studio, workshops, test environments or under laboratory conditions
- Applying latest advanced manufacturing technologies in product creation (such a 3D printing )

During the development stage the apprentice hone these skills working on prototype development activities ranging from products themselves, mechanical, electrical & electronic assembly, experimental / new model rigs, product related fitting instrumentation and testing using a well-planned, logical and systematic approach.

**Academic Knowledge:** The academic learning that is required to underpin the above vocational skills will allow the apprentice to demonstrate a thorough breadth and depth of understanding of relevant principles, appropriate to and in the context of their company's needs. In total, we expect the technician will need to cover around 1080 Guided Learning Hours in order to have a solid grasp of:

- Advanced mathematical and scientific methods and applications for engineers
- Properties, applications and testing of engineering materials
- Engineering drawings/Computer Aided Design (CAD) for technicians
- How to undertake and apply business-led projects
- Advanced mechanical and joining principles, applications and systems
- Advanced electrical, electronic principles, systems and sub-systems
- Measurement, monitoring, testing & diagnostics within engineered systems
- Product-related systems, sub-systems and ancillaries.

**Occupational Behaviours:** Modern high value manufacturing organisations require their apprentices to have a set of occupational behaviours that will ensure success both in their current and future roles and in meeting the overall company objectives. These required behaviours include:

**Safety mindset:** This occupation sits within an industry with a high level of safety critical activities. There has to be strict compliance and a disciplined and responsible approach to manage, mitigate and avoid risk.

**Strong work ethic:** Positive attitude, motivated by engineering; dependable, ethical, responsible and reliable.

**Logical approach:** Able to structure a plan and develop activities following a logical thought process, but also able to quickly “think on feet” when working through them.

**Problem solving orientation:** Identifies issues quickly, enjoys solving complex problems and applies appropriate solutions. Has a strong desire to push to ensure the true root cause of any problem is found and a solution identified which prevents further recurrence.

**Quality focus:** Follows rules, procedures and principles in ensuring work completed is fit for purpose and pays attention to detail / error checks throughout activities.

**Personal responsibility and resilience:** Motivated to succeed accountable and persistent to complete task.

**Clear communicator:** Use a variety of appropriate communication methods to give/receive information accurately, and in a timely and positive manner.

**Team player:** Not only plays own part but able to work and communicate clearly and effectively within a team and interacts/ helps others when required. In doing so applies these skills in a respectful professional manner.

**Applies Lean Manufacturing Principles:** Continuous improvement in driving effectiveness and efficiency.

**Adaptability:** Able to adjust to different conditions, technologies, situations and environments.

**Self-Motivation:** A ‘self-starter’ who always wants to give their best, sets themselves challenging targets, can make their own decisions.

**Willingness to learn:** wanting to drive their continuous professional development

**Commitment:** Able to commit to the beliefs, goals and standards of their own employer and to the wider industry and its professional standards.

### **Training and Development Summary**

There will be two phases of training to ensure that apprentices meet this Apprenticeship standard, in line with specified employer requirements<sup>1</sup>. The foundation phase will be intensive off the job training focused on developing the apprentice's core skills, knowledge and behaviour, allowing them to work effectively with supervision in a largely simulated working environment. This stage will require typically 1400 Vocational Guided Learning Hours, building up from basics to more complex engineering operations and practices. The tasks will be aligned to the job role to develop a range of tailored core engineering techniques so by the end of this phase the apprentice will be able to demonstrate, under independent test conditions, that they can deploy their skills and occupational behaviours.

The development phase will focus on applying the apprentice's on-job vocational competence supported by further guided learning, enabling them to eventually work effectively without the need for close supervision. The competencies gained are sufficiently robust, proven and transferable by the end of this development phase for someone to adapt quickly to function effectively after minimal instruction on new equipment / environments or revised working practices. There will be an employer endorsement as part of the final assessment of this phase to ensure that the apprentice has passed a robust interview to demonstrated full competence against the knowledge, skills and behaviours in this standard. The employer will only then sign off that the apprentice is ‘job ready’ as a fully competent Product Design and Development Technician.

**Professional Recognition and Career Progression:** This standard has been designed to meet the professional standards of the Engineering Council for registration as an Engineering Technician (EngTech) in partnership with the Institution of Mechanical Engineers (IMechE). Professional registration is subject to candidates successfully completing the appropriate learning, developing the appropriate competence, and undergoing professional review. For those deemed capable and ready, further career development / progression opportunities could be considered such as progression to an Apprenticeship as a Product Design and Development Engineer (Level 6).

**Governance & Review date:** March 2017 by existing employer led trailblazer collaboration.

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<sup>1</sup> In order to articulate the specific level of skills, knowledge and behaviours required to be achieved and assessed to demonstrate full occupational competence, the employers on the trailblazer group have developed a more detailed Employer Occupational Brief (EOB). This brief will inform the awarding organisations of the required elements of knowledge, behaviours and vocational skills within this Apprenticeship Standard. It will also provide a clear basis for the development of the assessment of this Apprenticeship and will enable the sector to maintain world class levels of quality and ensure that the credibility and consistency of the Apprenticeship outcome is maintained.