

**PAS 6010:2020**

Additive manufacturing – Wire for directed energy deposition (DED) processes in additive manufacturing – Specification



**UK Research  
and Innovation**

**NATIONAL  
CENTRE  
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MANUFACTURING**



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# Foreword

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## Relationship with other publications

PAS 6011, *Additive manufacturing – Non-destructive testing for use in directed energy deposition – Guide*

PAS 6012, *Additive manufacturing – Wire arc – Guide*

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*Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.*

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

## Contractual and legal considerations

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# Introduction

Directed energy deposition (DED) additive manufacturing (AM) can enable reductions in cost, lead time, and material waste compared to other manufacturing techniques. It achieves this through the ability to create parts, by melting and depositing material in layers, with high deposition rates. Reductions in cost, lead time, and material waste have significant impact on manufactured parts.

Different heat sources can be used to melt the material, including arc, electron beam, and laser. Both wire and powder can be used as material.

One challenge facing industrialization of DED AM is a lack of related standards. To date, welding wire specifications are used for wire for DED AM, but these might not be suitable.

It is the intention of this PAS to outline requirements for composition, dimensions, and condition of wire for high-value DED AM in addition to marking, packaging, handling, and storage of the wire. Recommendations for testing methods are also listed. It defines different DED AM processes and specifies different product types that can be used for the processes.

This PAS aims to enhance the understanding of wire for DED AM and wire manufacturing and improve communication between customers and manufacturers or suppliers.

# 1 Scope

This PAS specifies requirements for wire to be used in wire-fed directed energy deposition (DED) additive manufacturing (AM) for manufacturing. It covers dimensions and tolerances, cast/helix, surface condition, internal condition, marking, packaging, materials handling, storage, testing methods and some aspects of material composition.

This PAS is intended for use by wire suppliers, wire material developers and manufacturers, DED machinery developers and manufacturers, DED users and DED component end users.

This specification does not cover use conditions, for example, processing parameters.

***NOTE Units – The values stated in SI units are to be regarded as the standard. No other units of measurement are included in this standard.***

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