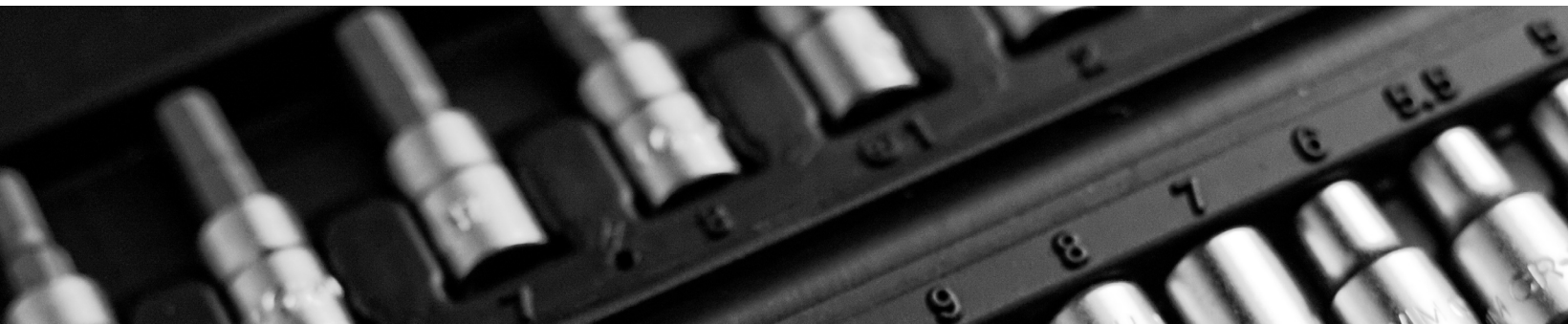




# PLM ESSENTIALS

## 7. ENGINEERING DRAWINGS



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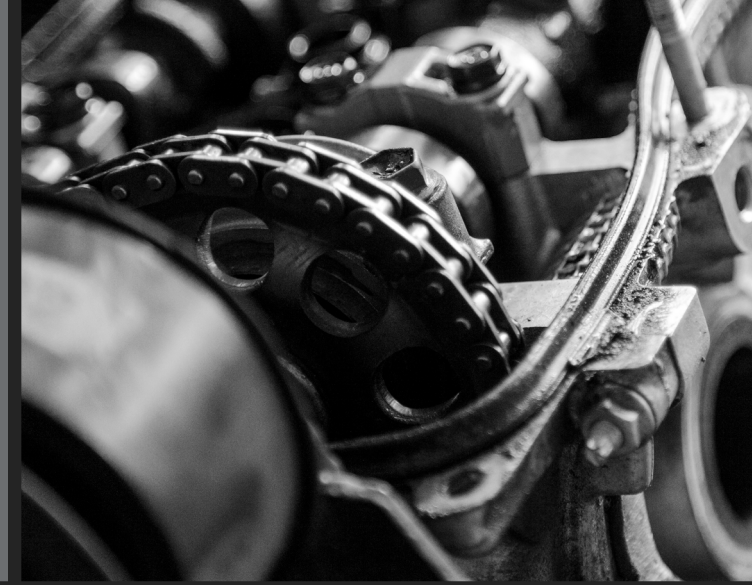
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# 7 ENGINEERING DRAWINGS



At the heart of all complex engineering and associated manufacturing processes is Product Data Management (PDM) - the business function that organises, maintains and reports all product data.

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PLM captures and tracks information on the individual parts, components and modules that constitute a finished product throughout its lifecycle, including changes made during development.

This includes part numbers, supplier details, CAD drawings and more, with everything stored in databases easily accessible to the likes of project managers, engineers, salespeople, purchasing and QA teams.

Efficient management of product data enables faster product development, getting them to market more quickly while also driving down costs.

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## ENGINEERING DRAWINGS

*A TECHNICAL SNAPSHOT OF ENGINEERING DESIGNS*

Most product and part designs in automotive manufacturing are highly complex. But even simple components can only be created with a standardised set of instructions. Engineering drawings form that standard, allowing engineers to communicate designs to each other, clients and suppliers.

These drawings convey essential information needed for construction and specify the geometry needed using consistent language and symbols.

To show you what a robust engineering drawing structure looks like, we have put together a detailed case study of one we created for a London-based electric vehicle manufacturer.

# WHAT IS AN ENGINEERING DRAWING?

An engineering drawing is a document that transfers the technical information of an engineering design to or from a supplier or client. It details all requirements of a particular design so that ideas can be turned into a reality. The manufacturer uses engineering drawings to communicate engineering designs to suppliers and vice versa.

The engineering drawing document is also a legal instrument, which forms part of the procurement contract, along with any supporting documents such as engineering change documentation.

If the resulting product is incorrect, the worker or manufacturer is protected from liability as long as they have followed the instructions conveyed in the drawing. If those instructions were wrong, the fault lies with the engineer.

## WHO USES ENGINEERING DRAWINGS?

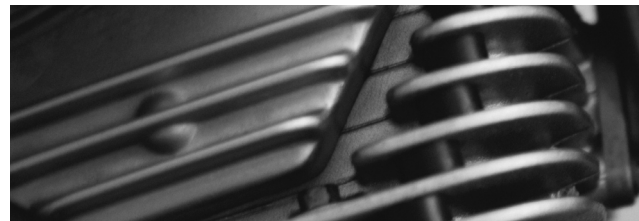
The engineering drawing will be produced by engineers at the manufacturer, or the supplier, but it will be distributed to other areas of the business and used by several departments:

- **Engineering**
- **Purchasing**
- **Homologation**
- **R&D**
- **Manufacturing/Production**
- **Styling/Concept**
- **Suppliers**
- **Quality**

## ENGINEERING DRAWINGS AT A LEADING AUTOMOTIVE MANUFACTURER

Drawings produced by the manufacturer currently contain:

- **Reference Border**
  - Bottom-to-Top capital letters
  - Right-to-left numerical figures
- **Change Log**
  - Revision Number
  - Description of modification
  - Name of engineer who made modification
  - Date of modification
  - - Date modification was approved

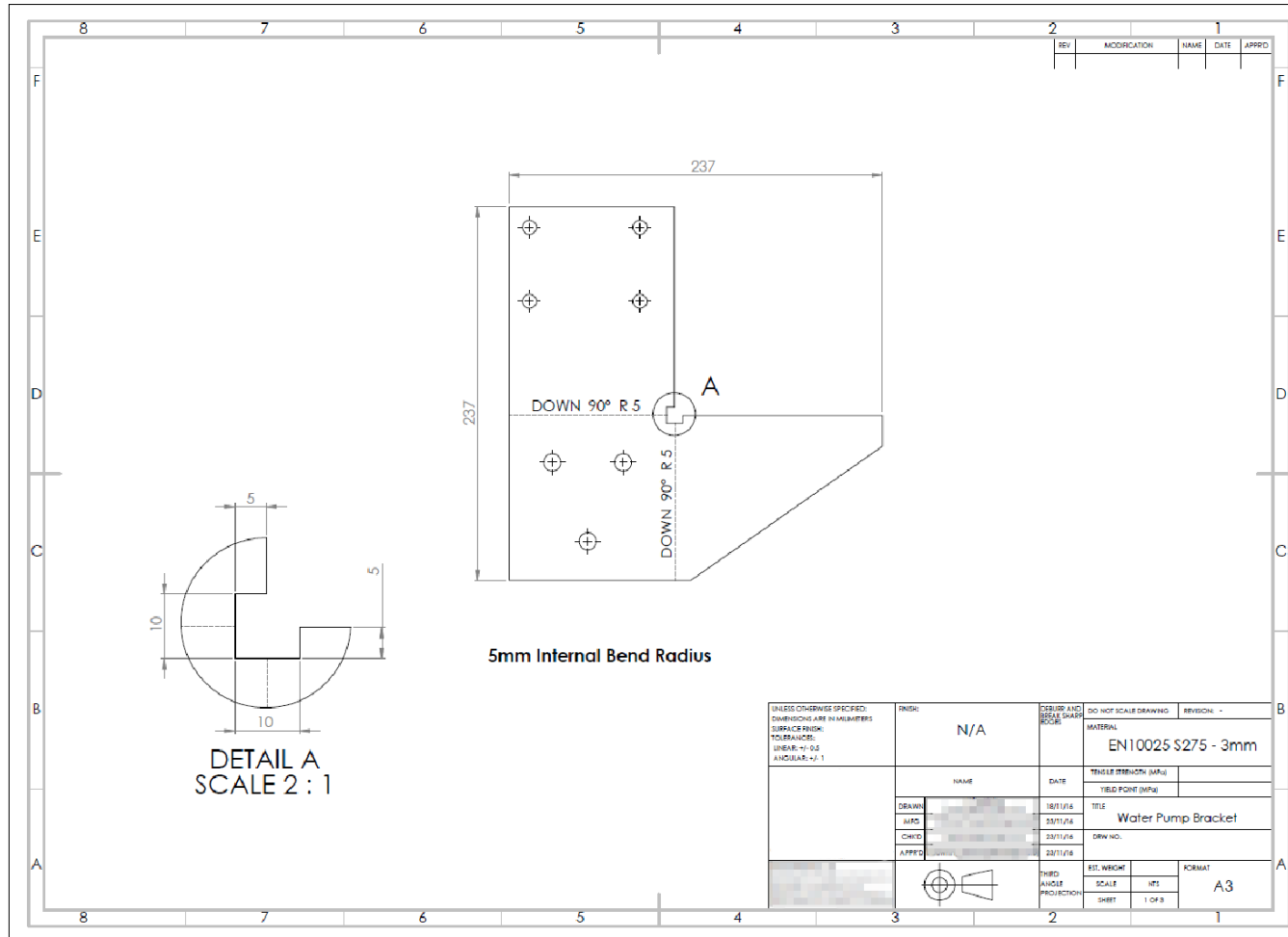


## ENGINEERING DRAWINGS

- **Title Block**
  - Dimensional specification
  - Product/material finish
  - Scaling
  - Revision Number
  - Title
  - Drawing Number
  - Material
  - Technical specification:
    - Tensile strength
    - Yield Point
  - Approval Name/Date
    - Drawn
    - Manufacturing Feasibility
    - Checked
    - Approved
  - Company information
  - Copyright information
  - Projection information
  - Estimated weight
  - Scale
  - Sheet count (# of #)
  - Format/print size



An example drawing is shown below.



## BRITISH AND INTERNATIONAL STANDARDS

A set of standards (British Standard [BS] and International, both European Normal [EN] and International Organization for Standardisation [ISO]), have been created to help with the workings and understanding of intercompany and international technical documents, including engineering drawings.

The top-level standard for the production of technical documentation for automotive drawings is **BS8888**. This standard incorporates other EN/ISO documentation. The scope of these standards is listed below.

### **BS8888: TECHNICAL PRODUCT DOCUMENTATION AND SPECIFICATION.**

This standard specifies the requirements for technical product documentation and specification, mainly for manufacturing industries and organisations associated with engineering disciplines (such as mechanical, electrical, nuclear, automotive and aerospace).

### **BS EN ISO 5457: TECHNICAL PRODUCT DOCUMENTATION - SIZES AND LAYOUT OF DRAWING SHEETS.**

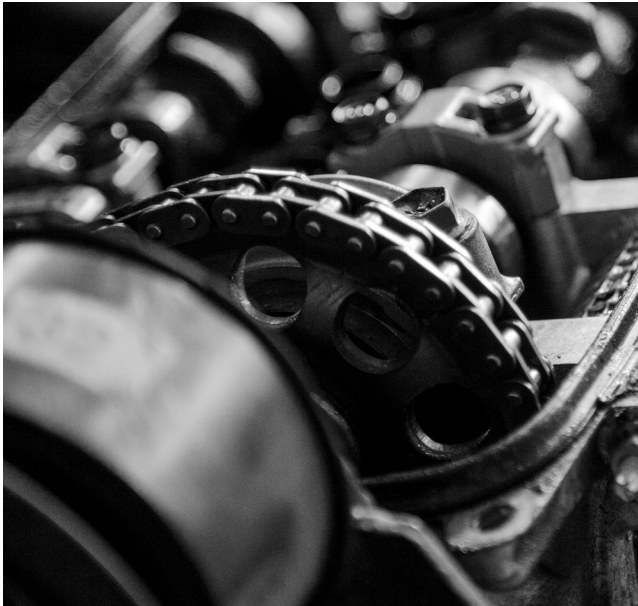
This standard specifies the size and layout of pre-printed sheets for technical drawings in any field of engineering, including those produced by computer.

### **BS EN ISO 7200: TECHNICAL PRODUCT DOCUMENTATION - DATA FIELDS IN TITLE BLOCKS AND DOCUMENT HEADERS.**

This standard specifies the data fields used in the title blocks and headers of technical product documents. It is used in the exchange of documents to make field names, contents and length consistent.

# INDUSTRY EXAMPLES

All examples of engineering drawings capture similar information in a variety of different layouts, some of which conform to the standards above.

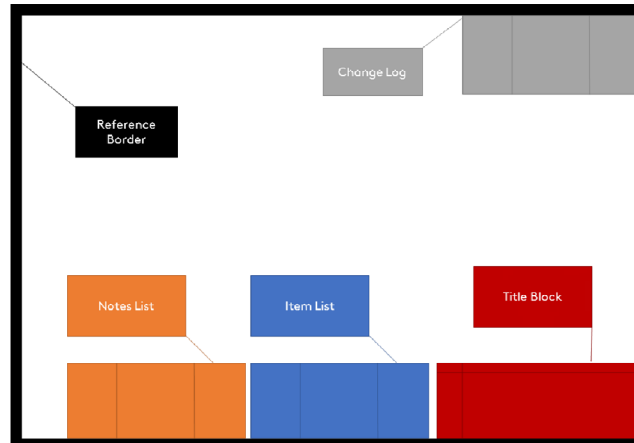


## CONTENTS

The contents of example engineering drawings capture four areas:

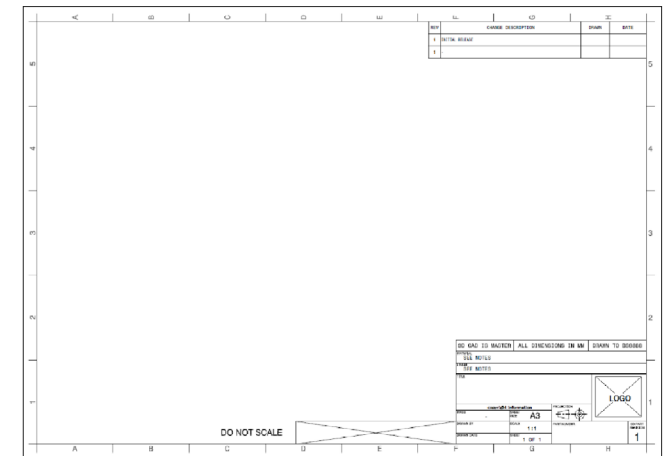
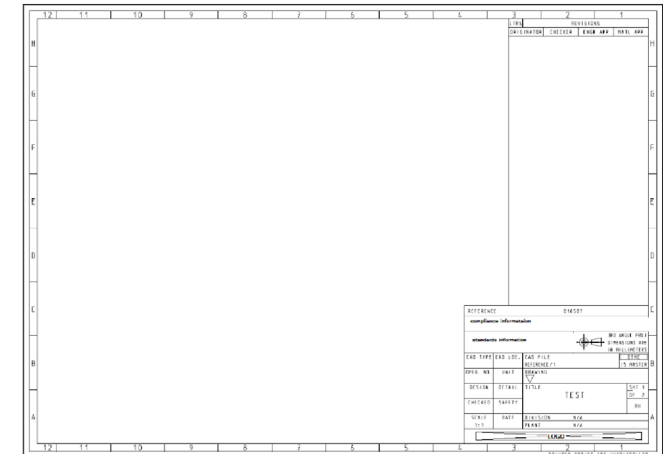
- **Reference Border**
- **Title Block**
- **Change Log**
- **Item & Notes List**

The general layout of the documents is shown below.



## ENGINEERING DRAWINGS

## EXAMPLE DRAWINGS



# DECISION CRITERIA FOR THE NEW ENGINEERING DRAWING'S STRUCTURE

- **Compliant** - must conform to standards
- **Ease of use** - must be easy to create and quickly interpret



## DECISION ATTRIBUTES

To meet the standards laid out in **BS8888**, the engineering drawing must contain the following attributes:

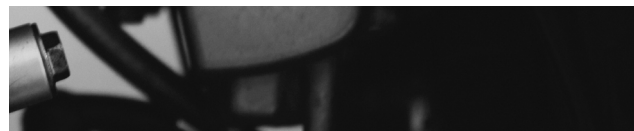
- **Reference Border**

- Top-to-bottom letters (excluding I & O)
- Left-to-right numeral figures
- Set number of fields per document size

Designation	A0	A1	A2	A3	A4
Long side	24	16	12	8	6
Short side	16	12	8	6	4

- **Title Block – Identifying Data**

- Legal owner: i.e. the manufacturer
- Copyright & standards: details on patents or copyright of document and details of standards relating to the document (e.g. BS8888)
- Identification number: reference to the document (otherwise known as a document number)
- Revision Index: revision status of the document
- Date of issue: date when the document was officially released for the first time and that of every subsequent release
- Language code: the language the document is presented in, based on ISO 639 (e.g. [EN] – English, [RU] – Russian)



- **Title Block – Descriptive Data**

- Title: the content of the document (e.g. Apparatus Plate)
- Supplementary title: further information on the object (e.g. Complete with Brackets)
- Responsible department
- Creator: name of the person who prepared or revised the document
- Approver: name of the person who approved the document
- Document type: the role of the document with respect to its content (e.g. sub-assembly drawing)
- Document status: status of the document lifecycle (e.g. "In preparation", "Under approval", "Approved", "Released", "Withdrawn")
- Sheet number: number of sheets by total of sheets (e.g. 1/2)
- Paper size: size of original document (e.g. A4)
- Scale: scale of drawing (e.g. 1:2)
- Orthographic projection: information pertaining to the projection of the drawing (e.g. Third Angle Projection)
- Drawing dimensions: detail on dimensions used for drawing

- **Change Log**

- Revision Index: list of all previous revisions
- Description: list of the brief descriptions of change
- Change number: reference number to the change document requesting the change
- Creator: name of the person creating the document or creating the revision

- Approver: name of the person approving the document creation of revision
- Date: date the change is released (First entry will have description "Initial Release")

- **Item List**

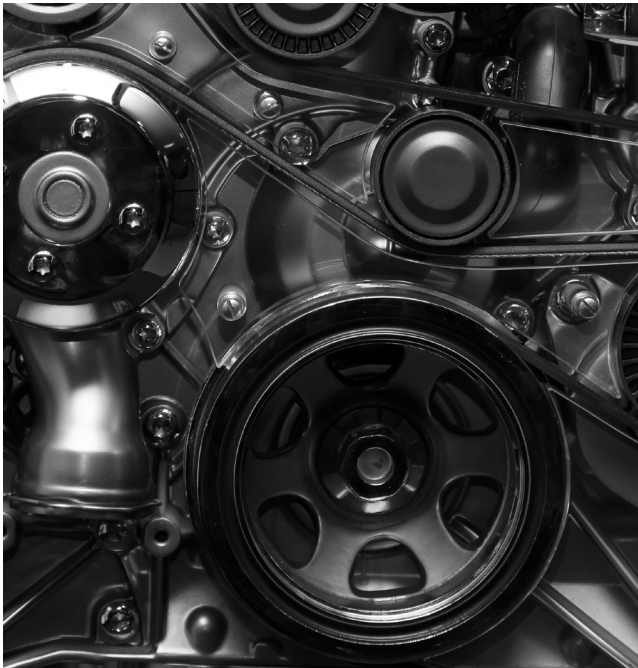
For item-specific detail

- Reference: numerical reference to item noted on drawing (optional fields for detailed description): (e.g. Part Number, Description, Quantity, Material, Material Finish, etc.)

- **Notes List**

For general notes or detail affecting all parts

- Reference: numerical reference
- Detail of note (e.g. tolerances for drawing, finishes, etc.)



# JUSTIFICATION & EVIDENCE FOR THE NEW STRUCTURE

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The attributes and layout of the engineering drawing document are those defined by the standard BS8888. This includes mandatory fields and optional fields as standard practice within the industry.

Maintaining a standard title block and keeping differing attributes outside of the title block within the item list enables all documents to have the same layout. Maintaining the same document layout ensures that engineers creating/ approving documents will become familiar with the layout and know where to place the necessary information.

Having a standard layout ensures that all document users are familiar with its format and where information is contained within it. The item and notes list also allow for additional information to be displayed and documented consistently.

## RISKS OF THE NEW PROCESS

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This document captures the information needed within the engineering drawing.

Contents of the drawing, or how it should be drawn are not included in this document. **BS8888** should be referenced for further information and guidance.





## ABOUT QUICK RELEASE\_

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Quick Release\_ is the leading Product Lifecycle Management consultancy. QR\_ has 350+ professionals across three continents working alongside some of the largest, most innovative and prestigious vehicle manufacturers, aerospace technologists and Tier 1 suppliers.

Our mission is to enhance competitive advantage by bringing products to market faster and more efficiently. We do this by improving product data quality and flow through every part of a business from concept to manufacture, working with senior management teams to tackle the biggest blockers of productivity; we release engineers to focus on the product, not the data.

Leveraging bespoke tools, methodologies and benchmarking, our professionals offer the full spectrum of PLM services designed to guide start-ups through the unknown unknowns, take businesses looking to scale to the next level, and facilitate transformation in established manufacturing and technology OEMs. Read more: [Why does PDM matter?](#)

## RESOURCES TO DRAW ON

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If you'd like to know more about engineering drawings, or any other aspect of PLM, we'd love to hear from you.

QR\_ have advised on and implemented engineering drawings for EV start-ups, specialist, volume, and commercial vehicle manufacturers.

Our SMEs would love to hear your engineering drawing headaches and explore quick, unobtrusive solutions that deliver lasting, whole-business value.

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