

Industrial design **brief template**

Reference for writing the industrial design brief that sets product form language, ergonomics, materials, finish, and brand alignment — the deliverable that bridges marketing and engineering.

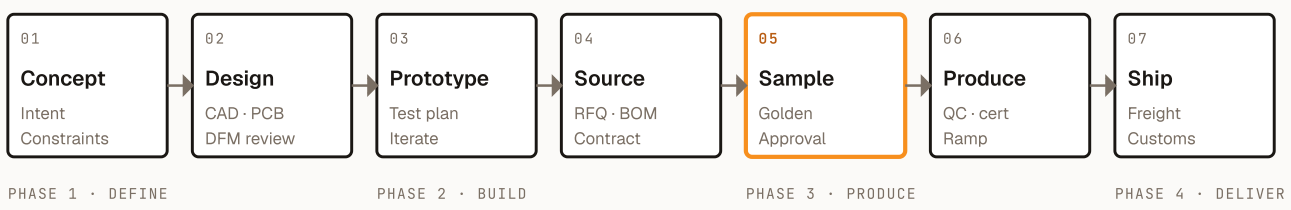
REVISION 1.0	ISSUED May 2026	OWNER Ideambox engineering	COMPANION PDF reference
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ABSTRACT

The industrial design brief is the deliverable that turns "we need a soil moisture sensor" into a designed product form. It captures user posture, interaction, brand language, material+finish intent, and the visual hierarchy that the engineering team will respect during mechanical CAD.

Section 1 covers product context and target user. Section 2 covers form language and brand alignment. Section 3 covers ergonomics and human factors. Section 4 covers materials, finishes, and surface treatments. Section 5 covers the brief structure and sign-off process.

HARDWARE PRODUCT DEVELOPMENT — 7-STAGE PIPELINE



THE INDUSTRIAL DESIGN BRIEF SITS AT THE BOUNDARY OF PHASE 1 (DEFINE) AND PHASE 2 (BUILD). IT PRECEDES MECHANICAL CAD AND ENGINEERING SPECIFICATION.

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1. Product context

The brief opens by anchoring why the product exists, who it serves, and how it fits in the user's environment.

1.1 Defining the user

- **Primary user persona**

Specific. "Outdoor home gardener, age 35–55, weekend hobbyist" — not "garden enthusiast."

- **Secondary users**

Anyone else who interacts with the product (children, professional landscapers, returning customers).

- **Use environment**

Where the product physically lives during use, storage, and transport.

- **User skill level**

First-time, mid-skill, expert. Drives interface complexity.

- **Cultural context**

Country, region, household composition. Affects colour, language, and visual cues.

1.2 Defining the product role

- **Primary task**

What the user does with the product, in plain language.

- **Secondary tasks**

Less-frequent uses.

- **Frequency of interaction**

Daily, weekly, emergency-only.

- **Context**

Where does it live in the user's home / workspace? On a table, in a drawer, mounted to a wall?

- **Lifespan**

How long does the product live with the user?

1.3 Anchoring the position

- **Competitive landscape**

2–4 reference products with strengths and weaknesses.

- **Brand differentiation**

How is this product different from the competition?

- **Price tier**

Premium, mid-market, value. Drives material quality and finish.

- **Channel**

DTC, marketplace, retail, B2B. Affects packaging and presentation.

TIP – WRITE THE USER STORY FIRST

Before any aesthetic discussion, write the user story: - "I'm a [persona]. I want to [task] so I can [outcome]. I'm in [context]."

Example: "I'm a 45-year-old gardener. I want to know when my tomato plants need water so I don't have to manually check them every morning. I'm checking on my balcony before work, with one hand holding coffee."

This story drives everything: form (one-handed operation), brightness (outdoor readability), size (small enough for the balcony), interaction (glance-able).

2. Form language + brand alignment

The visual language of the product. Not just "what it looks like" but "what it signals."

2.1 Form language vocabulary

- **Geometric vs. organic**
Sharp angles + parallel lines vs. flowing curves + biomorphic shapes.

- **Massive vs. light**
Visual weight. Heavy stance vs. floating, hovering.

- **Mechanical vs. emotional**
Industrial / engineered look vs. inviting / human.

- **Honest vs. theatrical**
Materials shown as-is vs. surface that pretends to be something else.

- **Symmetrical vs. asymmetrical**
Balance vs. dynamism.

- **High-contrast vs. monochromatic**
Visual energy.

2.2 Brand alignment

A consistent design language across multiple products signals brand maturity. Define:

- **Brand pillars**
3–5 values the product must embody (e.g., precise, durable, approachable).

- **Heritage**
Visual references from prior products in the line.

- **Anti-references**
Brands or aesthetics to avoid.

- **Mood boards**
Visual references for material, finish, proportion, lighting.

2.3 Visual hierarchy

Every product has primary, secondary, and tertiary visual elements. Decide before CAD:

- **Primary element**
What does the user see first? (Logo, screen, key button)

- **Secondary**
What signals interactive vs. static (handles, switches, indicators)

- **Tertiary**
Labels, branding marks, regulatory marks

- **Hidden**
What should not be visible (screws, vents, manufacturing artifacts)

3. Ergonomics + human factors

The interface between user and product. Often the single largest determinant of perceived quality.

3.1 Anthropometric basics

DIMENSION	5TH PERCENTILE (SMALL ADULT)	50TH PERCENTILE	95TH PERCENTILE (LARGE ADULT)
Hand length	165 mm	180 mm	210 mm
Hand width	75 mm	85 mm	95 mm
Thumb reach	80 mm	90 mm	100 mm
Index finger reach	80 mm	90 mm	100 mm
Grip diameter (comfortable)	30–45 mm	35–50 mm	40–55 mm
Button press force (comfortable)	0.5 N	0.8 N	1.5 N
Slider force (comfortable)	0.5 N	1.0 N	2.0 N

Design for the 5th–95th percentile range. Below 5th = small users excluded; above 95th = large users uncomfortable.

3.2 Interactive element sizing

- **Button minimum**
10 × 10 mm (per ISO 9241); 15 × 15 mm for daily-use buttons.
- **Touch target (capacitive)**
9 mm × 9 mm (ISO 9241); 15 × 15 mm preferred.
- **Slider travel**
20–40 mm for full range; ergonomic for thumb actuation.
- **Switch throw**
6–8 mm for tactile actuation; 2–3 mm for momentary.

3.3 Force + tactile feedback

- **Button activation force**
0.5–1.5 N (light), 1.5–3 N (medium), 3+ N (heavy).
- **Tactile feedback**
Audible click + haptic snap (clicky dome switches or membrane switches).
- **Detent strength**
Slider or rotary detents typically 0.5–2 N.
- **Audio feedback**
Volume 30–55 dB at typical use distance.

3.4 Ergonomic posture

- **One-handed vs. two-handed**
Determines product mass and grip type.
- **Standing vs. sitting**
Affects screen orientation and button placement.
- **Glance vs. focused interaction**
Driving display contrast and brightness needs.
- **Dominant hand consideration**
Right-handed default; ambidextrous if possible.

3.5 Common ergonomic failure modes

- Buttons too small for outdoor / glove use.

- Sliders that require fine fingertip control when context (driving, cycling) precludes it.

- Screens with reflective coating making them unreadable in sun.

- Connectors oriented to be invisible from operator position.

- Cables too stiff to flex during typical motion.

4. Materials, finishes + surface treatments

The tactile + visual layer that the user touches and sees.

4.1 Common consumer-product material choices

MATERIAL	TYPICAL USE	FEEL	COST	FINISH OPTIONS
ABS	Mass-market enclosures	Hard, matte	Low	Painted, textured, plated
PC	Lenses, hard surfaces	Hard, glossy	Mid	Polished, textured, anti-glare
PC + ABS	Premium enclosures	Hard, finer finish	Mid-high	Soft-touch coating possible
PA66 (Nylon)	Structural, hinges	Hard, tough	Mid	Often painted or coated
TPU	Cables, grips	Soft, rubbery	High	Often colour-matched to enclosure
Aluminium	Premium body, frame	Cool, metallic	High	Anodised (Type II, III), brushed, polished
Stainless steel	Structural, premium	Cool, heavy	High	Brushed, mirror polished
Bamboo / wood	Premium accent	Warm, organic	Mid	Oiled, lacquered, brushed
Cork	Premium grip	Soft, warm	Mid	Natural, sealed
Recycled materials	Sustainable	Various	+ 10–30 %	Depends on material

4.2 Surface finishes (plastics)

FINISH	DESCRIPTION	USE
SPI A1 / A2 (polished)	Mirror-smooth	Optical surfaces, premium electronics
SPI A3 (semi-polished)	Smooth, low-sheen	Standard premium enclosures
SPI B1 / B2 (sandblast)	Fine matte	Most consumer enclosures
SPI B3 (medium matte)	Matte	Toys, low-cosmetic
SPI C1–C3 (coarse)	Visible texture	Industrial, no-touch
SPI D1–D3 (rough sand)	Heavily textured	Industrial, grip-only
VDI 18 – 27 (light texture)	Functional grip	Buttons, hinges
VDI 30 – 45 (heavy texture)	Distinctive look	Premium, branded surfaces

4.3 Coating options (plastics)

- **Soft-touch paint**
Adds tactile feel; ~\$0.10–0.30/unit.
- **UV-cured pad print**
For logos, labels.
- **In-mold labelling (IML)**
Print embedded in plastic; durable.
- **In-mold decoration (IMD)**
Decorative film embedded; premium look.
- **Vacuum metallisation (PVD)**
Adds metallic finish to plastic; ~\$0.20–1.50/unit.

- **Hard coat**
Adds scratch resistance.

4.4 Metal finishes

- **Anodising Type II**
Decorative, multi-colour, 5–25 µm thick.

- **Anodising Type III (hard anodise)**
Wear-resistant, 25–75 µm thick, darker.

- **Powder coating**
Inexpensive, durable, many colours.

- **Brushed**
Hides minor scratches; directional grain.

- **Bead-blasted**
Uniform matte; common for premium electronics.

- **PVD plating**
Premium colours (gold, rose, bronze) on stainless or aluminium.

4.5 Colour considerations

- **Pantone reference required**
Not just "black" or "blue."

- **Physical sample chip**
Colour matched in production lighting (5500 K).

- **Material-dependent shift**
Same Pantone code may look different on ABS vs. PC vs. anodise.

- **Cosmetic variance allowance**
Define acceptable delta-E (typically <3) across production batches.

- **Multi-supplier matching**
If using 2+ suppliers, colour-match at golden sample stage.

5. Brief structure + sign-off

The deliverable. Structured for engineering hand-off.

5.1 Brief sections

1. **Product context** — User, role, position, lifespan. 2. **Brand alignment** — Pillars, heritage, anti-references, mood boards. 3. **Form language** — Geometric/organic, mechanical/emotional, references. 4. **Visual hierarchy** — Primary/secondary/tertiary elements; what's visible vs. hidden. 5. **Ergonomic specifications** — Anthropometric data, force, posture, accessibility. 6. **Material + finish specifications** — Per-part material, finish, colour. 7. **Visual sketches + concept drawings** — 5–15 sketches; 2–4 selected for development. 8. **3D concept renders** — 2–4 hero angles; key product detail. 9. **Reference imagery** — Mood boards, material samples, finish references.

5.2 Sign-off process

- **Internal review**

Brand owner, marketing, engineering lead.

- **External review (optional)**

Design consultant, customer panel.

- **Engineering hand-off meeting**

Walk through every section; document open questions.

- **Effective date + revision tracking**

Same as spec sheet.

5.3 Brief revision triggers

- **New target market (region affects colour, accessibility, brand).**

- **Material substitution (PC → PC+ABS changes finish, weight).**

- **New ergonomic learning (user testing reveals issue).**

- **Brand evolution (rebranding triggers visual update).**

6. Common brief failures

The brief fails when it doesn't survive contact with engineering reality.

6.1 Engineering reality checks

- **Form vs. wall thickness**
Sharp corners cause mold sink. Cavity volumes affect cooling.

- **Surface finish vs. process**
Polished surfaces (SPI A1) need premium tooling.

- **Material grade vs. cost**
Premium PC adds \$0.50–2/unit.

- **Painted finish vs. moulded**
Painted is cheaper, more wear-prone.

- **Asymmetric features**
Increase tooling cost and assembly complexity.

- **Optical quality requirements**
May force specific resin grades.

6.2 Brand-engineering trade-offs

- **Brand wants "premium feel" + engineering needs "low cost" → Brief must allocate which features get the premium treatment.**

- **Brand wants single-colour + engineering needs cooling vent → Compromise on vent design or accent panel.**

- **Brand wants soft-touch coating + engineering needs RF transparency → Coating must be RF-friendly (avoid metallic).**

FINAL NOTE. the industrial design brief is the bridge between product vision and engineering execution. A weak brief leaves engineering decisions to chance — typically resulting in "we built what we could, not what we wanted." A strong brief survives contact with engineering reality by being honest about trade-offs and explicit about priorities. The brief is the contract; both sides sign and own it.