

Mechanical Engineer

FF13 Engineering, maintenance and production · ISCO-08 2144 · CBS 0712 Engineers (excluding electrical engineering) · seniority senior · Also known as: Design Engineer Mechanical, ME Engineer

Designs and calculates mechanical systems and structures, and substantiates choices with strength and lifespan calculations.

The mechanical engineer designs mechanical systems and substantiates that design with technical calculations. Unlike a design draughtsman, who works the design out into drawings, the emphasis here lies on the engineering rationale itself. Selection often tests the numerical substantiation of a design, while the ability to align that design with the shop floor that must build it is rarely tested.

Key figures for this profile

23 skills · 5 competencies to measure · 5 knockout skills · centre of gravity: Professional knowledge domains 33%, Execution, craft, safety and sustainability 20%, Cognitive ability and problem solving 19%

1 Competencies to measure

These are the behavioural and ability constructs in this profile. Each one shows which hrmforce questionnaire measures it.

Competencies to measure	Target level	hrmforce instrument	Assessment method	Behavioural anchor at target level
Safety awareness Competency (50-framework): Discipline Knockout	■■■■■ N5	Big Fifty, Competency Check	Situational Judgement Test	Sets the safety standard for the organisation, makes safety discussable at every level and steers behaviour and culture.

Competencies to measure	Target level	hrmforce instrument	Assessment method	Behavioural anchor at target level
Discipline and keeping commitments Competency (50-framework): Discipline		Big Fifty, 15PF, 360 Feedback	Personality questionnaire	Commits only to what is feasible, tracks own commitments and informs those involved as soon as a deadline comes under pressure.
Spatial ability		Ability Scan	Cognitive ability test	Derives the build up of the end product from a two dimensional drawing and reports where parts do not fit.
Demonstrating ownership Competency (50-framework): Results-Orientation		Big Fifty, 360 Feedback, Competency Check	360-degree feedback	Repairs mistakes in own process unprompted, informs stakeholders and adjusts the working method to prevent a repeat.
Managing workload pressure Competency (50-framework): Stress resilience		Big Fifty, Competency Check, Pulse Survey	Structured interview	Cuts or shifts tasks independently when busy on the basis of importance, records this and discusses consequences with clients.

2 Full skill profile

Every skill in this profile, sorted by weight. The behavioural anchor under each skill belongs to the target level.

T	Skill	Target level	Weight	Knockout	Assessment method	hrmforce instrument
K	Technical understanding Develops technical guidelines for the field and is consulted internally and externally on design and failure questions.	 N5	5	yes	Knowledge test	Ability Scan, Knowledge test (client-specific)
V	Mechanical design engineering Sets the company's design standards, reviews complex structural designs and promotes design methods within the field.	 N5	5	yes	Portfolio or evidence	Portfolio, Knowledge test (client-specific)
G	Safety awareness Sets the safety standard for the organisation, makes safety discussable at every level and steers behaviour and culture.	 N5	5	yes	Situational Judgement Test	Big Fifty, Competency Check
V	Mechanical maintenance Independently diagnoses a machine fault, replaces the defective parts and sets the machine within tolerance.	 N4	5	yes	Work sample test	Work sample test, Knowledge test (client-specific)
V	Recognising and resolving machine faults Traces the cause of a fault systematically, resolves recurring defects personally and records the solution found.	 N4	5	yes	Work sample test	Work sample test, Knowledge test (client-specific)

T	Skill	Target level	Weight	Knockout	Assessment method	hrmforce instrument
V	Modelling and abstraction Develops models that several departments use, states their limits of validity and manages their versions and changes.	■■■■■ N5	4	no	Work sample test	Work sample test, Portfolio
V	Problem analysis Splits a recurring complaint into possible causes, tests these with own data and names the most likely cause.	■■■■■ N4	4	no	Assessment centre	Competency Check, Ability Scan
V	Quality control Draws up a control plan for the own process, measures the quality and discusses the outcomes with those involved.	■■■■■ N4	4	no	Work sample test	Competency Check, Work sample test
G	Discipline and keeping commitments Commits only to what is feasible, tracks own commitments and informs those involved as soon as a deadline comes under pressure.	■■■■■ N4	4	no	Personality questionnaire	Big Fifty, 15PF, 360 Feedback
V	Electrical engineering work Independently locates a fault in a control system, measures voltage and continuity and repairs it within the safety standard.	■■■■■ N4	4	no	Certificate or diploma	Knowledge test (client-specific), Work sample test
V	Reading and applying technical drawings Independently derives the correct dimensions from several drawings, spots contradictions and puts them to the designer.	■■■■■ N4	4	no	Knowledge test	Knowledge test (client-specific), Work sample test

T	Skill	Target level	Weight	Knockout	Assessment method	hrmforce instrument
V	Performing preventive maintenance Executes the full maintenance schedule of an installation, adapts frequency to wear and reports emerging defects.	 N4	4	no	On-the-job observation	Work sample test, Knowledge test (client-specific)
A	Spatial ability Derives the build up of the end product from a two dimensional drawing and reports where parts do not fit.	 N4	3	no	Cognitive ability test	Ability Scan
V	working in teams Divides work with colleagues, shares information others need without being asked, and adjusts own planning to fit team goals.	 N4	3	no	360-degree feedback	Big Fifty, 360 Feedback, Competency Check
G	Demonstrating ownership Repairs mistakes in own process unprompted, informs stakeholders and adjusts the working method to prevent a repeat.	 N4	3	no	360-degree feedback	Big Fifty, 360 Feedback, Competency Check
V	Working with digital devices and applications Selects the appropriate device and application for each task and fixes common disruptions without support from others.	 N4	3	no	Work sample test	Knowledge test (client-specific), Work sample test
V	Writing technical documentation Writes complete documentation for a system or process, tests it with an unfamiliar reader and maintains versions.	 N4	3	no	Work sample test	Work sample test, Portfolio

T	Skill	Target level	Weight	Knockout	Assessment method	hrmforce instrument
V	Measurement and calibration Independently selects the right instrument for a tolerance requirement, weighs measurement uncertainty and passes or rejects the product.	 N4	3	no	Work sample test	Work sample test, Knowledge test (client-specific)
G	Managing workload pressure Cuts or shifts tasks independently when busy on the basis of importance, records this and discusses consequences with clients.	 N4	2	no	Structured interview	Big Fifty, Competency Check, Pulse Survey
V	Professional currency and specialist literature Tracks sources and guidelines structurally, weighs their quality and adapts the own working method to new insights.	 N4	2	no	Portfolio or evidence	Portfolio, Knowledge test (client-specific)
V	Guiding on the job Agrees with the person guided which tasks go solo, observes purposefully and discusses two concrete learning points afterwards.	 N3	2	no	On-the-job observation	360 Feedback, Competency Check
V	Applying workplace organisation and 5S Applies the five steps of 5S at own workplace, makes deviations visible and sustains the standard reached.	 N3	2	no	On-the-job observation	Work sample test

T	Skill	Target level	Weight	Knockout	Assessment method	hrmforce instrument
V	Business reporting Builds a report from question to conclusion, separates fact from interpretation and phrases recommendations with a named owner.	 N3	1	no	Work sample test	Work sample test, Competency Check

3 Levels per seniority

The same profile with the job family seniority adjustment applied. Target levels are clamped to 1 to 5.

Skill	medior	senior	lead
Technical understanding	N4	N5	N5
Mechanical design engineering	N5	N5	N5
Safety awareness	N4	N5	N5
Mechanical maintenance	N3	N4	N4
Recognising and resolving machine faults	N3	N4	N4
Modelling and abstraction	N4	N5	N5
Problem analysis	N3	N4	N4
Quality control	N3	N4	N4
Discipline and keeping commitments	N3	N4	N4
Electrical engineering work	N3	N4	N4
Reading and applying technical drawings	N3	N4	N4
Performing preventive maintenance	N3	N4	N4
Spatial ability	N3	N4	N4
working in teams	N3	N4	N4
Demonstrating ownership	N3	N4	N4
Working with digital devices and applications	N3	N4	N4
Writing technical documentation	N3	N4	N4
Measurement and calibration	N3	N4	N4
Managing workload pressure	N3	N4	N4
Professional currency and specialist literature	N3	N4	N4
Guiding on the job	N2	N3	N3
Applying workplace organisation and 5S	N2	N3	N3
Business reporting	N2	N3	N3

4 The proficiency scale

Level	Label	Autonomy	Complexity	Scope	Depth of knowledge
N1	Guided	works under supervision and follows instruction	routine, one variable at a time	own task	basic understanding of terminology
N2	Applying	works independently within set frameworks	familiar situations with limited variation	own role	working knowledge, applies standard approach
N3	Proficient	sets own approach and seeks input proactively	several variables, some ambiguity	own team or process	thorough knowledge, weighs alternatives
N4	Advanced	directs others and decides on the approach	complex, with conflicting interests	several teams or a department	in-depth knowledge, advises others
N5	Leading	sets the standard and the policy	strategic, under high uncertainty	organisation, value chain or profession	authority, advances the profession

5 Behavioural anchors per skill

Anchors sit at N1, N3 and N5. N2 and N4 are deliberately not anchored: raters interpolate between them, following the O*NET convention.

Skill	N1	N3	N5
Technical understanding Understands how machines, structures and installations work, recognises causes of failure and explains them using technical and physical principles.	Names the parts of a simple machine and explains, using the manual, what function each part has.	Independently explains the behaviour of an installation during a fault and traces the problem back to a technical principle.	Develops technical guidelines for the field and is consulted internally and externally on design and failure questions.
Mechanical design engineering Designs parts and structures using calculation, material choice and drawing, and tests the design against function, strength and manufacturability.	Works out an existing design into drawings under guidance, applying the specified dimensions and materials.	Independently designs a part, substantiates material choice and strength calculation and consults production on manufacturability.	Sets the company's design standards, reviews complex structural designs and promotes design methods within the field.

Skill	N1	N3	N5
Safety awareness Continuously watches for unsafe situations and actions at work, addresses others about them and chooses the safe working method even under time pressure.	Follows the safety rules of the workplace and checks back when in doubt about an operation.	Recognises unsafe situations in own process, intervenes and addresses colleagues without bringing the work to a halt.	Sets the safety standard for the organisation, makes safety discussable at every level and steers behaviour and culture.
Mechanical maintenance Carries out preventive and corrective maintenance on machines and tools, adjusts or replaces parts and records the work done.	Carries out a maintenance round under supervision using a checklist and reports deviations to the maintenance technician.	Independently diagnoses a machine fault, replaces the defective parts and sets the machine within tolerance.	Develops the maintenance concept for the machine park, sets intervals based on failure data and trains technicians.
Recognising and resolving machine faults Establishes where the cause of a fault lies, resolves simple defects personally and calls in maintenance for more complex failures.	Reports a fault together with its visible characteristics and shuts down the machine according to instruction.	Traces the cause of a fault systematically, resolves recurring defects personally and records the solution found.	Analyses fault patterns across installations, structurally improves the design or setting and trains fault teams in this.
Modelling and abstraction Turns a real situation into a simplified representation, such as a diagram, formula or flow chart, with explicit assumptions and limits.	Fills in an existing diagram or template and names which part of the work belongs where.	Builds a diagram of a work process independently, names the assumptions and tests the model against real cases.	Develops models that several departments use, states their limits of validity and manages their versions and changes.
Problem analysis Breaks a problem into parts, separates causes from effects and states which information is needed to move forward.	States precisely what deviates in a malfunction and which data are missing, and puts this to the supervisor.	Splits a recurring complaint into possible causes, tests these with own data and names the most likely cause.	Traces persistent organisational problems back to a few root causes and sets the analysis method that other teams will use.
Quality control Tests products, data or services against defined requirements, records deviations and sets corrections or improvements in motion.	Checks a product or file on the prescribed points according to instruction and records deviations.	Draws up a control plan for the own process, measures the quality and discusses the outcomes with those involved.	Sets up the quality system for several departments, chooses the measurement standards and accounts for results to client and regulator.

Skill	N1	N3	N5
Discipline and keeping commitments Sticks to agreements, procedures and commitments even without supervision, and reports in good time when a commitment turns out to be unachievable.	Arrives at the agreed time with the agreed work and reports any delay to the supervisor.	Commits only to what is feasible, tracks own commitments and informs those involved as soon as a deadline comes under pressure.	Anchors the standard for reliable follow through in working agreements and addresses anyone at any level who lets that standard slip.
Electrical engineering work Installs, measures and repairs electrical installations and control systems according to diagrams and safety rules, and makes the installation safe to work on.	Installs electrical components under supervision according to the diagram and uses the prescribed protective equipment.	Independently locates a fault in a control system, measures voltage and continuity and repairs it within the safety standard.	Draws up the company's electrical work instructions and safety rules and reviews installation designs for compliance with standards.
Reading and applying technical drawings Reads construction and installation drawings with dimensions and symbols and translates them into workable operations or production instructions.	Points out on a drawing the dimensions, symbols and views that belong to the own work.	Independently derives the correct dimensions from several drawings, spots contradictions and puts them to the designer.	Sets drawing conventions and information standards for projects and judges whether delivered drawing sets are workable.
Performing preventive maintenance Carries out scheduled cleaning, lubrication, inspections and replacements on machines and records the findings and the actions completed.	Carries out a fixed maintenance point according to the checklist and then signs off the completion.	Executes the full maintenance schedule of an installation, adapts frequency to wear and reports emerging defects.	Designs maintenance policy for the machine park, sets intervals based on data and accounts for the costs.
Spatial ability Imagines how objects, spaces or drawings look after rotating, folding or assembling them and uses that mental image in the work.	Points out the right route on a floor plan and names which side lies left or right of the entrance.	Derives the build up of the end product from a two dimensional drawing and reports where parts do not fit.	Thinks complex three dimensional set ups through in advance, predicts clashes between parts and sets the drawing conventions for the field.

Skill	N1	N3	N5
working in teams Contributing to a team result by dividing tasks, sharing information, keeping agreements and involving colleagues in the work at hand.	Carries out an own task within the team as agreed and reports to the team lead when something does not work.	Divides work with colleagues, shares information others need without being asked, and adjusts own planning to fit team goals.	Designs collaboration agreements for several teams in the organisation, evaluates them against results and revises them on the basis of data.
Demonstrating ownership Takes on the outcome of own work, does not point at circumstances or others and initiates repair actions when something falls short.	Reports an own mistake to the supervisor and asks which repair step should be taken first.	Repairs mistakes in own process unprompted, informs stakeholders and adjusts the working method to prevent a repeat.	Takes public responsibility for outcomes across the chain and organises that mistakes are used organisation wide to improve.
Working with digital devices and applications Uses computers, mobile devices and standard applications to carry out work tasks, adjusts settings and resolves simple usage problems without help.	Opens and uses the prescribed applications for own tasks and asks for help whenever an unfamiliar message appears.	Selects the appropriate device and application for each task and fixes common disruptions without support from others.	Defines organisation wide which digital workplace facilities are used and guides their introduction across all teams.
Writing technical documentation Writes manuals, support documentation and decision records that a reader without prior knowledge can follow step by step and that stay current.	Completes a documentation template with the steps of a task and has the text checked by a colleague.	Writes complete documentation for a system or process, tests it with an unfamiliar reader and maintains versions.	Sets the organisation's documentation standard and ensures documentation is part of every delivery.
Measurement and calibration Takes measurements with measuring equipment, judges whether results fall within tolerance and keeps equipment calibrated and traceable.	Measures with calliper and dial gauge under supervision and notes the result on the measurement form.	Independently selects the right instrument for a tolerance requirement, weighs measurement uncertainty and passes or rejects the product.	Sets up the organisation's calibration management, writes measurement instructions and accounts for traceability during external audits.

Skill	N1	N3	N5
Managing workload pressure Keeps an overview when the volume of work rises, chooses what goes ahead and what does not, and puts the consequences to stakeholders.	Tells the supervisor that the work does not fit the available time and follows the choice that is made.	Cuts or shifts tasks independently when busy on the basis of importance, records this and discusses consequences with clients.	Redistributes work and capacity across departments in cases of structural overload and sets norms for sustainable workload distribution.
Professional currency and specialist literature Follows developments in the own profession through literature, guidelines and networks and works relevant new insights into own practice.	Reads the professional information received and names which part matters for the own work.	Tracks sources and guidelines structurally, weighs their quality and adapts the own working method to new insights.	Assesses the state of the field, weighs conflicting research and determines which guidelines the organisation will follow from now on.
Guiding on the job Guides a colleague or trainee during real work, gives targeted feedback on what was observed and builds up independence step by step.	Works alongside a new colleague, points out deviations in the operation and reports progress to the practice trainer.	Agrees with the person guided which tasks go solo, observes purposefully and discusses two concrete learning points afterwards.	Sets up workplace guidance for the organisation, trains the guides and keeps the quality of their coaching in view.
Applying workplace organisation and 5S Arranges the workplace so that material, tools and information have fixed places, maintains that state and improves the layout step by step.	Tidies tools and material to the designated place after the shift and keeps the workplace clean.	Applies the five steps of 5S at own workplace, makes deviations visible and sustains the standard reached.	Rolls out workplace organisation across departments, links it to improvement goals and sustains compliance through audits.
Business reporting Bringing findings, figures and recommendations together in a report that leads the reader to a decision or next step in one reading.	Fills in an existing report template with the correct figures and describes per section what has been done.	Builds a report from question to conclusion, separates fact from interpretation and phrases recommendations with a named owner.	Sets the reporting line for the whole organisation, tests the quality of steering information and accounts for outcomes to board and regulator.

6 Assessment methods and validity

The validities are the corrected meta-analytic estimates from Sackett, Zhang, Berry and Lievens (2022) in the Journal of Applied Psychology, which replace the older Schmidt and Hunter (1998) figures. The spread matters as much as the mean: with a high SD, validity varies strongly by context.

Assessment method	rho	SD	What it is
Knowledge test	0.40	0.13	Test of declarative job knowledge, usually assembled per client.
Portfolio or evidence	-	-	A collection of prior work or results, assessed against fixed criteria.
Situational Judgement Test	0.12	0.11	Scenario with response options, scored on knowledge or behavioural tendency.
Work sample test	0.33	0.09	The candidate performs a representative work sample under standardised conditions.
Assessment centre	0.29	0.09	Multiple exercises, multiple assessors, dimension-wise scoring.
Personality questionnaire	0.40	0.15	Self-report of behavioural preferences. At hrmforce the Big Fifty and the 15PF.
Certificate or diploma	-	-	Formal proof of completed education or examination.
On-the-job observation	-	-	Structured workplace observation with a form based on behavioural anchors.
Cognitive ability test	0.41	0.14	Standardised test of verbal, numerical or abstract reasoning.
360-degree feedback	-	-	Multiple raters around the person rate behaviour against behavioural anchors.
Structured interview	0.42	0.19	Behaviour-based interview with fixed questions and a rating scale per question.

7 Assessment instruments for this job

hrmforce instrument	Skills	What it measures
Work sample test	12	Representative work sample under standardized conditions
Knowledge test (client-specific)	10	Professional knowledge test, customized for each client
Competency Check	8	Behavioral-Level Competency Assessment

hrmforce instrument	Skills	What it measures
Big Fifty	5	Personality questionnaire, 150 items, 25 factors
Portfolio	4	Evaluation of prior work against fixed criteria
360 Feedback	4	Multiple assessments based on behavioral anchors
Ability Scan	3	Aptitude Test: Verbal, Numerical, and Abstract Reasoning Skills
15PF	1	Personality Profile, a shorter alternative to the Big Fifty
Pulse Survey	1	Periodic measurement at the team and organizational levels

8 How to use this profile

1. Agree the profile with the hiring manager before the first candidate is measured. Weights shifted afterwards make the outcome indefensible.
2. Choose the assessment method per skill from the Assessment method column. Combine at most three methods per candidate.
3. Calibrate the assessors in a two-hour session using the anchors in chapter 5. Anchors without rater training deliver little.
4. Fill in the match calculator and discuss the gaps in the development conversation. Type A and type G are selection criteria, not one-quarter development goals.

Source: hrmforce Skills Framework 2.0, version 2.0.0, built 2026-09-08. Crosswalks to ESCO v1.2.1, O*NET 31.0, Lightcast Open Skills, SFIA 9, DigComp 3.0, EntreComp, LifeComp, GreenComp, AILit, WEF Future of Jobs 2025, ISCO-08 and the Dutch CBS occupational classification BRC 2014 edition 2025. This profile is a starting point, not a standard: align it with your own organisation before selecting on it.