



# PLASMATERM SA

## — Capability Statement —

Precision Investment Casting • Plasma Nitriding • In-House Material Testing

**Plasmaterm is the only Romanian precision steel foundry offering investment casting, plasma nitriding and in-house material testing as a single integrated process — under one quality management system, with one point of contact.**

|                                |                                                                                                                                                                                                                                                                                                                          |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Headquarters</b>            | <b>Târgu Mureș, Romania</b>                                                                                                                                                                                                                                                                                              |
| <b>Core Technology Weight</b>  | <b>Lost wax precision investment casting — alloy steels</b>                                                                                                                                                                                                                                                              |
| <b>Range</b>                   | <b>5 g – 2 kg (optimum: 15 g – 500 g)</b>                                                                                                                                                                                                                                                                                |
| <b>Max Part Dimension</b>      | <b>300 mm (longest axis)</b>                                                                                                                                                                                                                                                                                             |
| <b>Casting Standard</b>        | <b>P690 D1 / D2</b>                                                                                                                                                                                                                                                                                                      |
| <b>Production Capacity</b>     | <b>4–5 tonnes of cast parts per month</b>                                                                                                                                                                                                                                                                                |
| <b>Series Size</b>             | <b>Prototype-to-medium series — up to approx. 10,000 pcs</b>                                                                                                                                                                                                                                                             |
| <b>Current Headcount</b>       | <b>49 employees</b>                                                                                                                                                                                                                                                                                                      |
| <b>Full-Capacity Headcount</b> | <b>60 employees (planned)</b>                                                                                                                                                                                                                                                                                            |
| <b>Certifications</b>          | <b>ISO 9001:2015 • EN 10204 3.1 / 3.2 • P690 D1/D2</b>                                                                                                                                                                                                                                                                   |
| <b>Founded</b>                 | <b>1965 (Materials Research Center) → 1993 (Plasmaterm SA)</b>                                                                                                                                                                                                                                                           |
| <b>Industries Served</b>       | <b>Defence • Industrial Machinery • Oil &amp; Gas (Energy extraction) • Automotive • Construction • Railway • Food processing industry • Sport equipment • Textile machinery • High Security lock parts • Hand tools and accessories • Hydraulics, pumps &amp; valves • Counter drone systems • External prosthetics</b> |

## 1 Company Overview

Plasmaterm SA traces its origins to a materials science and surface engineering research centre founded in 1965 in Târgu Mureș, Romania. By 1993 the organization had evolved into a dedicated precision foundry, continuously expanding its in-house capabilities since then.

The company occupies a unique position in the region: it is the only Romanian supplier combining lost wax precision casting with plasma nitriding and in-house material testing under a single quality management system. This integration eliminates the coordination overhead, traceability gaps and interface risks that arise when these processes are split across multiple suppliers.

Plasmaterm does not operate as a mass producer. Its core competence lies in small-to-medium series of complex alloy steel components — projects that require both engineering flexibility and documented, repeatable quality.

**One partner. One quality system. From drawing to surface-treated, certified component.**

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## 2 Core Capabilities

### 2.1 Lost Wax Casting — Investment Casting

Investment casting enables the production of complex alloy steel geometries — internal cavities, thin walls, undercuts and intricate profiles — that would be impractical or expensive to achieve through CNC machining from raw material. Downstream machining requirements are reduced by 30–40% compared to machined alternatives.

|                              |                                                                                                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Manufacturing Parameters     | P690 D1 / D2 — accepted in defence and industrial qualification frameworks Per                                                                                      |
| Casting Standard Dimensional | VDG P690 — detailed tolerance tables available on request                                                                                                           |
| Surface Quality (Ra)         | As cast - Ra 3.2 - 6.4 $\mu\text{m}$ ; As machined Ra 0.8 $\mu\text{m}$                                                                                             |
| Weight Range                 | 5 g – 2 kg (optimum range: 15 g – 500 g)                                                                                                                            |
| Max Part Dimension           | 300 mm maximum                                                                                                                                                      |
| Monthly Capacity             | 4–5 tonnes of cast components                                                                                                                                       |
| Series Flexibility           | Minimum order quantity is determined by melt capacity and part geometry. One casting run fills one melt charge. Quantity per run is specified in each RFQ response. |
| Tooling Cost                 | EUR 2,500–3,500 (complexity and cavity count dependent — one-time investment)                                                                                       |
| Tooling Lead Time            | 20–30 days                                                                                                                                                          |
| Tooling Payment Terms        | In advance                                                                                                                                                          |
| Series Lead Time             | 2–3 weeks at full production capacity (4–6 weeks at current production level).                                                                                      |
| RFQ Requirements             | 3D model (STEP / IGES preferred) — or physical sample for reverse engineering                                                                                       |

**NOTE** Detailed tolerance tables, Ra surface finish values and tooling/series lead times are available on request.

#### CeramicCoreCapability

Internal cores are produced in-house, enabling the casting of components with blind holes, long internal channels and bearing housing geometries — without post-machining of the internal features.

#### Reverse Engineering

Projects can be initiated from a physical sample where no 3D drawing exists. The feasibility and complexity scope are assessed case by case.

### 2.2 Plasma Nitriding / Plasma Nitrocarburizing

Plasma nitriding improves surface hardness, tribological performance, and fatigue durability while maintaining excellent dimensional stability. Operating at significantly lower temperatures than conventional thermochemical treatments, the process minimizes distortion — a key advantage for precision-engineered components with strict post-treatment tolerances. In addition to its technical benefits, plasma nitriding is a more sustainable surface engineering technology, with optimized gas utilization, reduced energy demand, and the elimination of hazardous salt-bath chemicals commonly associated with traditional heat-treatment processes.

Plasma nitrocarburizing produces a thinner compound layer with improved sliding friction characteristics — suited to moving, rotating and sliding contact surfaces.



**Plasmaterm is the only Romanian supplier offering precision casting and plasma nitriding as a single integrated service — eliminating a supplier interface, a traceability handover and a coordination risk.**

|                                           |                                                                               |
|-------------------------------------------|-------------------------------------------------------------------------------|
| <b>Process</b>                            | <b>Lower process temperature than gas nitriding — minimal part distortion</b> |
| <b>Nitriding temperature</b>              | <b>480 - 530 °C</b>                                                           |
| <b>Nitriding Hold Time</b>                | <b>4-72 hours (depending on required diffusion layer depth)</b>               |
| <b>Surface Hardness Low Alloy Steels</b>  | <b>500 - 750 HV</b>                                                           |
| <b>Surface Hardness High Alloy Steels</b> | <b>800 - 1200 HV</b>                                                          |
| <b>Surface Hardness Low Alloy Steels</b>  | <b>Up to .60 mm (diffusion layer)</b>                                         |
| <b>Surface Hardness High Alloy Steels</b> | <b>Up to 0.30-0.40 mm (diffusion layer)</b>                                   |
| <b>Nitrocarburizing temperature</b>       | <b>560 - 600 °C</b>                                                           |
| <b>Nitrocarburizing Hold Time</b>         | <b>2-6 hours (typical)</b>                                                    |
| <b>Compound Layer (White Layer)</b>       | <b>5 - 20 µm measured from surface</b>                                        |
| <b>Temperature Advantage</b>              | <b>Lower process temperature than gas nitriding — minimal part distortion</b> |
| <b>Compound Layer Profile</b>             | <b>Dense, uniform, controllable in depth profile</b>                          |
| <b>Selective Treatment</b>                | <b>Partial nitriding by masking — available</b>                               |
| <b>Internal Geometries</b>                | <b>Internal profiles, cavities and complex surfaces are treatable</b>         |

## Documented Nitriding Performance — Test Report T11 (04.02.2025)

|                                               |                                                     |
|-----------------------------------------------|-----------------------------------------------------|
| <b>Component</b>                              | <b>Pinion Z=21</b>                                  |
| <b>Material</b>                               | <b>39MoCrAl15 (high alloy nitriding steel)</b>      |
| <b>Customer</b>                               | <b>SC Mecsudprod SRL, Floreşti, Cluj</b>            |
| <b>Treatment</b>                              | <b>Plasma Nitriding</b>                             |
| <b>Surface Hardness (measured at 0.05 mm)</b> | <b>1208 HV 0.1/5</b>                                |
| <b>Hardness at 0.10 mm depth</b>              | <b>1161 HV 0.1/5</b>                                |
| <b>Hardness at 0.15 mm depth</b>              | <b>1019 HV 0.1/5</b>                                |
| <b>Hardness at 0.20 mm depth</b>              | <b>740 HV 0.1/5</b>                                 |
| <b>Core Hardness</b>                          | <b>315 – 328 HV 0.1</b>                             |
| <b>Nitriding Hardness Depth</b>               | <b>0.35 mm (at 100 HV threshold above core)</b>     |
| <b>Test Instrument</b>                        | <b>Falcon 400G204 — Vickers HV 0.1, 5 sec dwell</b> |
| <b>Operator</b>                               | <b>ing. Szabo B. Levente</b>                        |

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## 2.3 In-House Supporting Processes

|                                |                                                                     |
|--------------------------------|---------------------------------------------------------------------|
| <b>Wax Press Tooling</b>       | Designed and manufactured in-house — no external tooling dependency |
| <b>Machining</b>               | Holes, threads, critical dimensions and surfaces — in-house         |
| <b>Heat Treatment</b>          | Normalizing, annealing, quenching & tempering, stress relieving     |
| <b>EDM (Electro-Discharge)</b> | Available in-house                                                  |
| <b>Passivation</b>             | Stainless steel components — in-house                               |
| <b>Assembly</b>                | Component assembly available                                        |
| <b>Reverse Engineering</b>     | From physical sample — feasibility assessed per project             |
| <b>Prototyping</b>             | Supported — automotive small series experience                      |

## 2.4 Supply Chain & Material Sourcing

|                                         |                                                                                                                            |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>Lead Time — Common Alloy Grades</b>  | Up to 5 days from order placement to receipt                                                                               |
| <b>Lead Time — Special Alloy Grades</b> | Up to 30 days from order placement to receipt                                                                              |
| <b>Single-Source Dependency</b>         | None — multiple qualified suppliers for all alloy grades                                                                   |
| <b>Permanently Stocked Grades</b>       | C45, S235J, W4301 — always in stock                                                                                        |
| <b>Special Grade Stocking Policy</b>    | Buffer held for recurring customer demand only                                                                             |
| <b>Buffer Stock Level</b>               | 3–6 months of demand for most frequently used grades                                                                       |
| <b>Supply Disruptions (24 months)</b>   | Zero — no material-related delivery disruptions in the last 24 months                                                      |
| <b>Alternative Sourcing</b>             | Multiple suppliers available. If primary supplier fails: alternative supplier or in-foundry production for special grades. |

## 3 Alloy Grade Portfolio

Plasmaterm processes steel alloys exclusively. The following grades represent the principal materials in current production. The complete processed alloy list covers over 50 EN/DIN grades.

### Stainless & Heat-Resistant Steels

| EN Number       | Common Designation     | Typical Application                                     |
|-----------------|------------------------|---------------------------------------------------------|
| 1.4301          | AISI 304 / X5CrNi18-10 | General industrial, food & beverage, marine             |
| 1.4307          | X2CrNi18-9             | Low-carbon austenitic — corrosion-critical applications |
| 1.4308          | GX5CrNi19-10           | Cast grade — valves, pumps, housings                    |
| 1.4401 / 1.4404 | AISI 316 / 316L        | Oil & gas, chemical, defence                            |
| 1.4418          | Z8CND 17-04            | Martensitic — high strength + corrosion resistance      |

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|        |                          |                                          |
|--------|--------------------------|------------------------------------------|
| 1.4525 | GX5CrNiCu16-4            | Precipitation-hardened cast grade        |
| 1.4541 | AlSi 321 / X6CrNiTi18-10 | High-temperature stabilised              |
| 1.4542 | X5CrNiCuNb16-4           | 17-4 PH equivalent — aerospace/defence   |
| 1.4828 | X15CrNiSi20-12           | Heat-resistant up to ~1050°C             |
| 1.4848 | GX40CrNiSi25-20          | High-temp furnace components             |
| 1.4845 | X8CrNi25-21              | Extreme temperature resistance           |
| 1.4057 | X17CrNi16-2              | Martensitic stainless — wear + corrosion |
| 1.4122 | G-X35CrMo17              | Martensitic, hardenable                  |
| 1.4125 | X102CrMo17               | High-carbon martensitic — cutting edges  |

#### Tool Steels

| EN Number | Common Designation | Typical Application                        |
|-----------|--------------------|--------------------------------------------|
| 1.2080    | X210Cr13 / C120    | High wear resistance — tooling, blades     |
| 1.2379    | Cr12MoV            | Cold work tool steel — dies, cutting tools |
| 1.2631    | X50CrMoW9-1-1      | Hot work — elevated temp tooling           |
| 1.2767    | X45NiCrMo4         | Tough tool steel — moulds, dies            |
| 1.2842    | 90MnCrV8           | Cold work — gauges, cutting tools          |
| 1.3401    | X120Mn12 100Cr6    | Hadfield manganese — high impact/wear      |
| 1.3505    |                    | Bearing steel — rolling contact fatigue    |

#### Structural & Engineering Steels

| EN Number | Common Designation    | Typical Application                        |
|-----------|-----------------------|--------------------------------------------|
| 1.7131    | 16MnCr5 / AISI 5115   | Case-hardening — gears, shafts             |
| 1.7225    | 42CrMo4 / AISI 4140   | High-strength structural — defence,        |
| 1.7227    | 42CrMo54              | automotive Free-cutting variant of 4140    |
| 1.7220    | 34CrMo4               | Pressure vessels, structural               |
| 1.7218    | 25CrMo4               | Medium strength — shafts, fasteners Case-  |
| 1.6523    | 21NiCrMo2 / AISI 8620 | hardening — gears, cams                    |
| 1.6511    | 35NiCrMo6             | High toughness — heavy engineering         |
| 1.0503    | C45 / XC48            | General structural — shafts, machine parts |
| 1.0401    | C15 / AISI 1018       | Low-carbon structural                      |
| 1.0037    | S235JR / ST37-2       | General construction steel                 |

#### Cast Irons

| EN Number        | Common Designation                | Typical Application               |
|------------------|-----------------------------------|-----------------------------------|
| EN-GJS-400-15    | Ductile iron — toughness priority | Structural components, brackets   |
| EN-GJS-450-10    | Ductile iron — strength/toughness | Industrial machinery              |
| EN-GJS-500-7     | Ductile iron — higher strength    | Gears, housings, wear components  |
| EN-GJS-XSiMo4.05 | Si-Mo ductile iron                | Elevated temperature applications |



Complete processed alloy list with full EN/DIN designations, AISI equivalents and application notes

## 4 Quality Management & Certifications

### 4.1 Current Certifications

| CERTIFICATION        | STATUS                                                                                                                                                   |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| ISO 9001:2015        | Valid — Certificate expiry: 28 June 2027                                                                                                                 |
| EN 10204 — 3.1 / 3.2 | Material test certificates issued per lot — full material traceability. Types 2.1, 2.2, 3.1 and 3.2 available.                                           |
| P690 D1 / D2         | Casting manufacturing standard — accepted in defence and industrial supplier qualification                                                               |
| AQAP 2110 / 2120     | Not currently pursued. Plasmaterm is prepared to pursue AQAP 2110 or AQAP 2120 qualification where required by a specific programme or customer request. |

### 4.2 Material Testing & Inspection

In-house testing capabilities support full material traceability from melt to finished component. Testing is performed per lot and documented in the material certificate issued with each delivery. Material test records are archived per production lot and retained for a minimum of 10 years.

The in-house laboratory operates as an internal quality control facility. It is not accredited to ISO/IEC 17025. Test results support production quality assurance and EN 10204 certification.

|                                |                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chemical Composition Analysis  | Foundry Master Smart optical emission spectrometer — Fe, Cu, Al base alloys. Full elemental composition per lot.                                                                                                                                                                                                                                    |
| Metallography                  | Microstructure analysis — cross-section, grain size, layer structure                                                                                                                                                                                                                                                                                |
| Hardness Testing               | Rockwell, Vickers, Brinell — surface and depth profile                                                                                                                                                                                                                                                                                              |
| Nitriding Profile Verification | Hardness gradient vs. depth — documented per treated lot. Reference: Test Report T11 — Pinion Z=21, 39MoCrAl15: surface 1208 HV, NHD 0.35 mm, core 315–328 HV (04.02.2025).                                                                                                                                                                         |
| Dimensional Inspection         | Critical dimensions verified — as-cast and post-machining                                                                                                                                                                                                                                                                                           |
| First Article Inspection (FAI) | Tooling design and manufacture: according to tooling complexity and customer approval of the design.<br>First Article Inspection (FAI) samples: approximately 2 weeks after tooling completion.<br>Customer approval: timing depends on the customer's review and approval process.<br>First production run: typically 4–6 weeks after FAI approval |
| Traceability                   | Material origin documented per lot through EN 10204 certification chain. Full traceability from heat number to delivered component. Records retained 10 years minimum.                                                                                                                                                                              |
| NDT (Non-Destructive Testing)  | Not available in-house. NDT can be arranged on a project-specific basis upon customer request.                                                                                                                                                                                                                                                      |
| Customer Complaint Process     | 8D methodology. Initial response: within 24 hours of receipt. Full investigation report with corrective actions: typically within 48 hours.                                                                                                                                                                                                         |

**NOTE** Full testing scope documentation available on request.

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## 5 Industries & Typical Applications

### 5.1 Industries Served

|                                  |                                                                                                         |
|----------------------------------|---------------------------------------------------------------------------------------------------------|
| Defence                          | P690compliant.                                                                                          |
| Industrial Machinery             | Complex components in small and medium series — machine parts, wear components                          |
| Oil & Gas<br>(Energy extraction) | Valve bodies, pump components — EN 10204 3.1/3.2 available. Certificate types 2.1, 2.2, 3.1, 3.2.       |
| Automotive                       | Prototype and small series — documented experience                                                      |
| Construction                     | Gas system components, locking hardware, fasteners — stainless and alloy steel                          |
| Railway                          | Internal components, fixings — under development                                                        |
| Marine                           | Internal components, fixings — under development                                                        |
| Food processing industry         | Complex geometry + wear resistance — well-suited profile                                                |
| Sport equipment                  | Fatigue resistance, wear performance, cyclic load durability                                            |
| Textile machinery                | High abrasion resistance, reduced maintenance intervals                                                 |
| High security lock parts         | Surface hardness, wear resistance, precision components                                                 |
| Hand tools and accessories       | Edge retention, hardness, impact and wear resistance                                                    |
| Hydraulics, pumps & valves       | Wear resistance, friction reduction, pressure-cycle durability and complex geometries                   |
| Counter drone systems            | High reliability, dynamic load resistance, wear performance                                             |
| External prosthetics             | Fatigue strength, durability, long-term cyclic loading resistance (external structural components only) |

### 5.2 Ideal Component Profile

**Plasmaterm is most effective where complex geometry, small-to-medium series, alloy steel and surface treatment requirements are present simultaneously. This is the combination that no other single supplier in the region covers end-to-end.**

- Complex geometry that would be impractical or uneconomical to machine from raw material
- Weight range 5 g – 2 kg, maximum dimension 300 mm
- Alloy steel material with documented material origin (EN 10204)
- Small to medium series — prototype through approx. 10,000 pcs
- Surface hardness or corrosion resistance requirement (nitriding, passivation)
- Defence, oil & gas or industrial applications requiring full traceability

## 6 Value Proposition

The core question for any procurement or engineering team qualifying a new supplier is not which foundry produces the best single sample — it is which supplier removes the most operational risk over the lifetime of the programme. The table below addresses this directly.



| TYPICAL CUSTOMER RISK                                                                           | WHAT PLASMATERM PROVIDES                                                                                                           |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Coordinating multiple suppliers across casting, machining, heat treatment and surface treatment | Complete process under one roof — one contract, one contact, one quality record                                                    |
| Material traceability gaps at supplier handover points                                          | EN 10204 3.1/3.2 — fully documented material origin, single traceability chain                                                     |
| Complex geometry not achievable with conventional machining                                     | P690 D1/D2 — internal cavities, thin walls, undercuts produced directly in casting                                                 |
| High tooling investment risk                                                                    | EUR 2,500–3,500 tooling — competitive one-time cost, amortised across series                                                       |
| Surface treatment adding a separate supplier, interface and lead time                           | Plasma nitriding in-house — no handover, no traceability break, no additional lead time                                            |
| Small series uneconomical for the supplier                                                      | Prototype through ~10,000 pcs — flexible capacity, not structured for mass production.                                             |
| Supplier outside EU supply chain                                                                | Romania — EU member state. Stable supply chain: no material disruptions in 24 months, multiple qualified suppliers for all grades. |
| No drawing available for legacy or MRO components                                               | Reverse engineering from physical sample — feasibility assessed per project                                                        |

## 7 Enquiry & Quotation Process

To prepare a quotation, Plasmaterm requires the following information. Where 3D documentation is not available, the process can be initiated from a physical sample.

|                        |                                                                     |
|------------------------|---------------------------------------------------------------------|
| 3D Model               | STEP or IGES preferred                                              |
| Material Specification | Alloy grade or specification — or left to Plasmaterm recommendation |
| Quantity & Series      | Prototype, initial series and annual volume estimate                |
| Surface Requirements   | Machining, heat treatment, nitriding, passivation — as applicable   |
| Quality Requirements   | EN 10204 certificate type required (2.1 / 2.2 / 3.1 / 3.2)          |
| Delivery Requirement   | Target lead time or delivery date                                   |

### Tooling & Production Initiation

Before the first production, a wax press die is required. This is a one-time investment designed and manufactured in-house, amortised across the production series. Tooling cost: EUR 2,500–3,500 depending on complexity and number of cavities.

- Tooling design and manufacture: according to tooling complexity and customer approval of the design.
- First Article Inspection (FAI) samples: approximately 2 weeks after tooling completion.
- Customer approval: timing depends on the customer's review and approval process.
- First production run: typically 4–6 weeks after FAI approval

First Article Inspection (FAI) is available for new components.

### White-Label / OEM Production

[TO BE COMPLETED — White-Label / OEM Production Policy — Awaiting CEO confirmation]



## R E F E R E N C E S

### References & Documented Experience

Plasmaterm has supplied components to customers in the defense, industrial machinery, oil & gas, automotive, construction, railway, marine, food processing industry, sport equipment, textile machinery, high security lock parts, hand tools and accessories, hydraulics, pumps & valves, counter drone systems, and external prosthetics.

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Detailed references, component examples and relevant project experience are available upon request.