SUPREME
METAL COMPONENT SOLUTIONS

TELARC REGISTERED Quality ISO 9001

We enhance performance of equipment by optimising design and manufacture of metal components and assemblies by:

• Reducing weight, system cost and time to market

• Improving functionality and aesthetics

Supreme Metal Component Solutions Limited is one of the foremost precision casting and metal component manufacturing companies in Australasia.

We specialise in fabrication and machining conversions as well as 'designed for investment casting' components.

We utilise our metallurgical and mechanical design expertise in Design for Manufacturability and Assembly (DFMA). DFMA is the general engineering art of designing products in such a way that they are easy to manufacture while enhancing design efficiency.

We have successfully converted over 3,000 different designs creating value for customers by enhancing their products and lowering total system cost.

As well as metallurgical and mechanical expertise we have experience in strategic and critical work and can provide ready-to-install components as well as complete assemblies or parts kits.

Our culture:

- *Agility and responsiveness*
- *Co-creating, collaborative, partnering*
- *Metallurgical and mechanical expertise*
- *Ethical and professional behaviour*
- *Delight the customer, let's grow together.*

Our capabilities include:

- *Solid Modelling, Finite Element Analysis and Design Verification*
- *Design For Manufacturability and Assembly (DFMA)*
- *Investment Casting*
- *Prototype Validation - Laser Scanning, Co-ordinate Measuring Machine (CMM)*
- *Heat Treatment*
- *Machining - Conventional (milling, turning and grinding) and Non-conventional (EDM and 3D Laser Cut)*
- *Gear Cutting*
- *Surface Treatments and Coating*
- *Assembly, Destructive and Non-destructive Testing*
- *Magnetic Permeability Testing*
- *Full Certification and Verification for Traceability*
- *Project Management.*

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We enhance performance of your systems and platforms by optimising design and manufacturability of metal components and assemblies by:

- **Reducing weight, system cost and time to market**
- **Improving functionality and aesthetics**

Supreme has for many years produced metal component solutions for the defence industry.

Supreme is a licensed firearms dealership endorsed to manufacture and sell military components.

We have experience in manufacturing:

- *Small Arms parts including:*
  - *Receivers*
  - *Pistol frames*
  - *Gas blocks*
  - *Bolt carriers*
- *Weapon Mounting Systems*
- *Turret parts*
- *Hardware components for Armoured Personnel Carriers*
- *Track components for Tracked Vehicles*
- *Handcuffs*
- *Hardware components for ANZAC Frigates*
- *Sighting Mounts and Locknuts*

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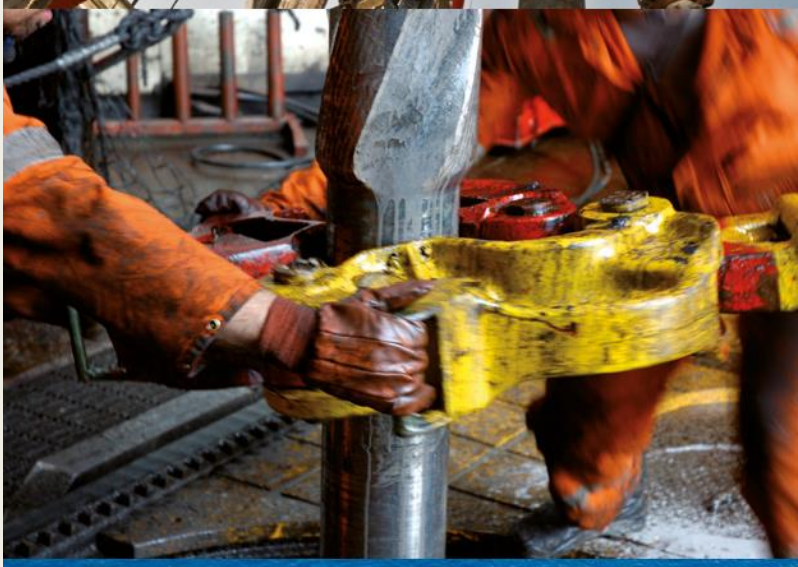

We enhance performance of equipment by optimising design and manufacture of metal components and assemblies by:

- **Reducing weight, system cost and time to market**
- **Improving functionality and aesthetics**

Supreme has for many years produced metal component solutions for the oil field services sector.

We have experience in manufacturing:

- ***Down hole:***
  - ***Sleeves***
  - ***Roller Centralizers***
  - ***PCD Drill Heads***
  - ***Wireline Components***
- ***ESP Pump Components***
  - ***Impellers***
  - ***Diffusers***
- ***Rig***
  - ***Power Tong - Clamps / Jaws***
  - ***Top Drive Components***
- ***Production***
  - ***Hydro - Cyclone Components***
  - ***Filters and Screening Components***
  - ***Valve and Manifold Components***
  - ***Fire Safe Valve Components***

Our culture:

- ***Agility and responsiveness***
- ***Co-creating, collaborative, partnering***
- ***Metallurgical and mechanical expertise***
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Why choose investment casting

Due to increased awareness over the past few decades, the mainstream engineering design fraternity have realized the cost benefits and versatility of investment castings. As a result, the sector is growing as more and more users move away from costly machining of components from expensive bar stock. Moreover, some of the more complex designs do not lend themselves to the traditional manufacturing processes. This is where the sophistication of the investment casting process offers enhanced benefits such as: cost savings, design flexibility, close tolerances, better finishes, wide alloy selection, savings in machining time and assembly.

Wide choice of metal alloys

Supreme pours dozens of ferrous and non ferrous alloys regularly. Some of the most popular alloys are included under Alloy Selection in this brochure.

Investment Casting uses a ceramic mould which withstands extremely high temperatures and negates fusion and the wash and mould binder gas problems associated with sand moulds. For this reason the investment casting process is often the only choice for high melting point alloys such as stainless steels, alloy steels, heat resistant steels and stellites, where the component requires fine detail capture.

Reduced metal forming costs

As investment casting can produce complex and near net shape components, the process offers significant opportunities to reduce costs. Investment casting can produce complex single piece components, eliminating the need for machining, fabrication, and welding.

It can often be beneficial for to cast machining blanks, thereby drastically reducing bar stock material and machining time. This becomes particularly important for expensive or difficult to machine alloys.

Low initial tooling cost

Expendable patterns are made by low-pressure injection of wax into a die. Aluminium/epoxy resin composite dies can be very cost effective for runs up to 5000 off or for very complex shapes. Rapid prototype patterns can be used for product evaluation without the need for investing in tooling, significantly reducing the lead time from drawing to sample delivery. Automatic aluminium dies are generally used for runs of 5000 or more.

Design flexibility and capability

You have wide alloy choice and unlimited design flexibility for external and internal configurations. Unlike other casting methods there is usually no draft requirement for investment casting. Investment casting reproduces fine details such as your company logo, part numbers, lettering, splines, holes and threads. Undercuts can also be achieved.

Close tolerances

Investment casting produces the closest tolerances of any casting process over a range of alloys. Typically tolerances as per the table below are achievable:

Recommended linear tolerances
± 0.5% on linear length

The process delivers a reliable and consistent product within batches and from batch to batch.

Surface finish improvement

A surface finish of 125RMS is typical for investment castings. Shot blast, fine sandblast, glass bead blast, vibro polished or hand polished are available.

Comparison of a welded prototype to an accurate, aesthetically pleasing casting in 17-4pH stainless steel

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Supreme pours dozens of different ferrous and non-ferrous alloys. You have extensive design flexibility with alloy choice because of the high temperature properties of ceramic moulds. Some of the most popular metal casting alloys are listed.

- *Carbon Steel*
- *Stainless steel*
- *Brass*
- *Cobalt Alloys*
- *Low alloy steel*
- *Tool steel*
- *Bronze*
- *Nickel Alloys*

STAINLESSSTEEL

Wrought	Cast	Condition	Tensile Strength Mpa	0.2%Yield Strength Mpa	% Elongation	Hardness Range or Max
303	CF-16F[1]	Annealed	418-517	207-241	35-45	90 Rb
304	CF-8[1]	Annealed	483-586	276-345	35-50	90 Rb
304L	CF-3[1]	Annealed	483-586	276-345	35-50	90 Rb
309	CH-20[1]	Annealed	483-552	207-276	30-45	90 Rb
310	CK-20[1]	Annealed	414-517	207-276	35-45	90 Rb
316	CF-8M[1]	Annealed	483-586	276-345	35-50	90 Rb
316L	CF-3M[1]	Annealed	483-586	276-345	35-50	90 Rb
316F	IC 316F	Annealed	483-586	276-345	35-50	90 Rb
HK	HK	Annealed	418-517	241-310	10-20	100 Rb
410	CA-15[1]	Hardened	655-1394	517-1103	5-12	94 Rb-45 Rc
416	IC 416[1]	Hardened	655-1394	517-1103	3-8	94 Rb-45 Rc
420	CA-40[1]	Hardened	1394-1551	896-1448	0-5	30-52 Rc
431	IC 431[1]	Hardened	759-1103	517-724	5-20	20-40 Rc
440A	IC 440A[1]	Hardened	-	-	-	35-56 Rc
440C	IC 440C[1]	Hardened	-	-	-	40-60 Rc
440F	IC 440F[1]	Hardened	-	-	-	40-60 Rc
15-5-PH	IC 15-5[1]	Hardened	931-1172	759-1000	5-15	26-38 Rc
17-4-PH	IC 17-4[1]	Hardened	1034-1310	965-1103	6-20	34-44 Rc
253MA	C253MA[2]	Annealed	600 Min	310 Min	40 Min	91 Rb
2205	ASTM A890 4A[2]	Annealed	620 Min	415 Min	25 Min	-
2507	ASTM A890 5A[2]	Annealed	690 Min	515 Min	18 Min	-
CD-4MCu	CD-4MCu	Annealed	690-793	517-586	20-30	94-100 Rb

CARBON AND LOW ALLOY STEELS

Wrought	Cast	Condition	Tensile Strength Mpa	0.2%Yield Strength Mpa	% Elongation	Hardness Range or Max
1010	IC1010[1]	Annealed	345-414	207-241	30-35	50-55 Rb
1020	IC1020[1]	Annealed	414-483	276-310	25-40	80 Rb
1030	IC1030[1]	Hardened	586-1034	414-1034	0-15	20-50 Rc
1035	IC1035[1]	Hardened	621-1034	586-1034	0-15	25-52 Rc
1050	IC1050[1]	Hardened	862-1241	690-1241	0-10	30-60 Rc
1060	IC1060[1]	Hardened	827-1379	690-1241	0-5	30-60 Rc
1090	IC1090[1]	Hardened	896-1241	876-1241	0-3	37-50 Rc
4130	IC4130[1]	Hardened	896-1172	690-896	5-20	23-49 Rc
4140	IC4140[1]	Hardened	876-1394	690-1069	5-20	29-57 Rc
4340	IC4340[1]	Hardened	876-1394	690-1241	5-20	20-55 Rc
4620	IC4620[1]	Hardened	758-1034	621-896	10-20	20-32 Rc
6150	IC6150[1]	Hardened	965-1394	827-1241	5-10	30-60 Rc
8620	IC8620[1]	Hardened	690-896	552-758	10-20	20-45 Rc
8630	IC8630[1]	Hardened	827-1172	690-896	7-20	25-50 Rc

BRASS AND BRONZE

UNS Designation	Alloy Designation BS1400	Tensile Strength Mpa Min	0.2% Yield Strength Mpa Min	% Elongation Min
C83600A	LG2[3]	200	100	13
C85400	SCB3[3]	190	70	11
C90710	PB1[3]	220	130	3
C90810	PB2[3]	220	130	5
C95210	AB1[3]	450	170	20
C95810	AB2[3]	590	240	15
C86500	HTB1[3]	450	170	20
C86300	HTB3[3]	760	415	12

TOOLSTEEL

Wrought	Cast	Annealed with Slow Cool Max	Cycle Anneal Max	Hardened Range
A6	CA-6[1]	100Rb	-	48-59 Rc
D2	CD-2[1]	-	35 Rc	50-59 Rc
D3	CD-3[1]	-	35 Rc	47-61 Rc
H-13	CH-13[1]	100Rb	-	45-53 Rc
S7	CS-7[1]	-	100 Rb	35-57 Rc

COBALT ALLOY

Wrought	Cast	As Cast Hardness
	Cobalt 3[1]	48-53 Rc
Stellite 6	Cobalt 6[1]	37-45 Rc
HS25	Cobalt 25[1]	20-25 Rc

ALUMINIUM ALLOYS

Cast	Tensile Strength Mpa	0.2%Yield Strength Mpa	%Elongation
355[1]	241-345	193-269	1-8
356[1]	221-276	152-207	3-7
A-357[1]	228-345	186-276	3-9

References

1 - Investment Casting Handbook

2 - ASTM A890; 1999

3 - AS1565; 1996

Note: Values indicated in tables are for reference only.

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