TG Steels

2842 PRIME

Very high toughness cold work tool steel with simple heat treatment

2842 PRIME;

- Is a medium-alloyed, oil-hardenable, cold-worked steel with low deformability and 2% manganese.
- Has a good wear resistance associated with a good toughness
- Has a good dimensional stability during heat treatment

Applications

2842 PRIME can be used for blanking and forming dies, back plates, punches and pins for forming steel parts up to 6mm thick.

2842 PRIME can also be used for industrial knives for the wood, paper and metal industry.

2842 PRIME can be used for cold cutting shear blades for shear steel plates up to 6mm thick.

2842 PRIME can be used for the manufacture of cutting and punching tools up to 6mm thick. It can also be used for the manufacture of taps, slides, gauges, guide columns, as well as for highly abrasive plastic mould cavities and gates.

Main properties

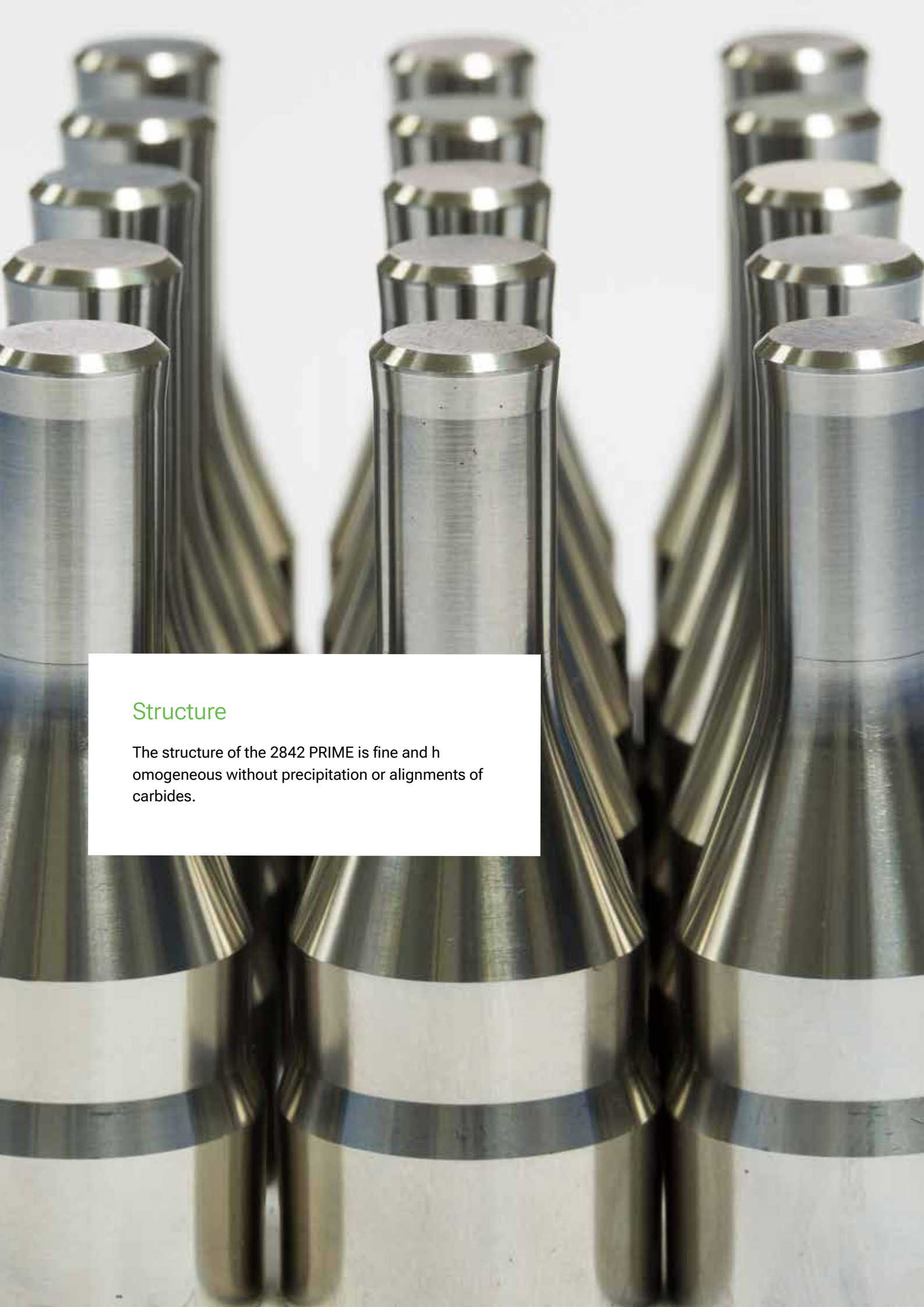
- Good toughness and good wear resistance
- High resistance to cracking
- Very good machinability
- Simple heat treatment with high dimensional stability
- Suitable for surface treatments

Chemical composition *(typical)*

C	Mn	Si	P	S	Cr	Mo	V
0.80 1.0	1.90 2.10	0.20 0.30	≤0.030	≤0.005	0.30 0.40	NA	0.10 0.20

Designation

Werkstoff Nr	ISO	China GB	JIS Japan	UK	AISI USA	Russia Gost	AFNOR	Other / Special
1,2842	90MnCrV8	9Mn2V	-	-	O2	-	-	-



Structure

The structure of the 2842 PRIME is fine and h omogeneous without precipitation or alignments of carbides.

Hardness at the time of delivery

Annealed for 230 HB max.

Physical properties

Temperature	20°C	300°C	600°C
Volumic mass kg/m³	7700	7680	--
Young Modulus N/mm²	210 000	187 000	--
Thermal conductivity W/m.K	33	32	31
Coefficient of linear expansion 10^{-6}/K	12	13.9	15

Heat treatment

SOFT ANNEALING

Temperature: 690 - 720°C, duration 1h + 1h for 25mm thickness. slow cooling in the furnace *(10 to 20°C / h)*. The atmosphere in the furnace must be reducing to avoid decarburization of the steel.

STRESS RELIEVING

After machining, it is recommended to perform stress relieving at 600-650°C *(always at temperature never exceeding 50°C below the tempering temperature)* for a minimum of 2 hours, followed by slow cooling in the furnace to 450°C.

AUSTENITIZATION

In order to avoid any risk of cracking it is recommended to preheat in 1 step.

- 1st preheating step: temperature: 550°C time: 30s / mm of thickness

Recommended austenitizing temperature: 800-820°C. The holding time should not be too long to avoid a risk of grain coarsening and a loss of toughness. It is recommended to keep the part at the austenitizing temperature 30 minutes per inch of thickness as soon as the temperature of the surface reach the austenitization temperature

QUENCHING MEDIUM

Oil at 80°C, vacuum *(pressure> 6 Bars)*, salt bath 500-550°C.
To ensure good toughness, treatment with oil or salt bath is preferable.
After quenching the hardness is 60-63 HrC

SUB ZERO TREATMENT

For parts that need to have high dimensional stability and to increase wear resistance without reducing toughness, it is recommended to perform a subzero treatment at a temperature between -70°C and -120°C for 1 hour for 25mm of thickness of the part. The temperature range from -70°C up to -120°C *(named cold treatment of steel)* leads to the complete transformation of austenite into martensite and as a consequence to a better stability associated with an improved hardness and a better wear resistance.

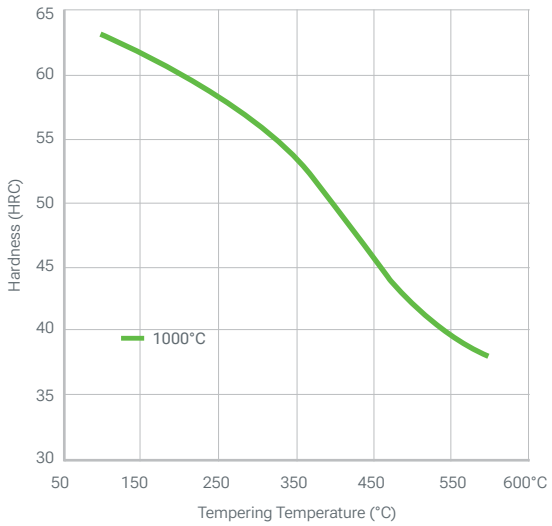
This treatment is optional for common applications.

TEMPERING

To ensure a minimum residual austenite rate as well as greater tool stability, it is essential to perform a double *(triple is better)* tempering. Each tempering is followed by a cooling under 100°C.

Each tempering time must be at least equal to 1h + 1h for 25mm of thickness of the treated part *(equivalent thermal thickness)*.

TEMPERING CURVE



Surface treatment

PVD, CVD

2842 PRIME is suitable for all kinds of PVD and CVD treatment as soon as the treatment temperature is 30°C lower than the last tempering temperature.

Polishing

2842 PRIME is perfectly suitable for polishing in the treated state and can be used for applications requiring a sufficiently high polish level for translucent - transparent parts *(Rt ≤ 20µm, CNOMO level 2, Rugotest N7)*.

Optimal polishing is achieved by performing consecutive steps of fairly close roughness and stopping each step as soon as the last scratch of the previous step disappears

Machining

The machining parameters below are given for information only and must be adapted according to the equipment and usual machining conditions.

Note: the cutting parameters are similar to those of the 2510 PRIME but since there is no tungsten in the composition of the 2842 PRIME the wear of the tools used for machining 2842 PRIME is less important than for machining 2510 PRIME.

TURNING

	Carbide insert		HSS tool
	Rough turning	Finishing	Turning
Cutting speed m/ min	150 - 200	200 - 250	20 - 25
Feed mm/r	0.2 – 0.4	0.1 – 0.2	0.1 – 0.2
Depth of cut mm	2 - 4	0.5 – 2	0.5 - 2

MILLING: SURFACING

	Carbide tools		Solid tool
	Rough machining	½ finishing	Finishing
Cutting speed m/ min	160 - 230	260 - 280	160 -180
Feed mm/r	0.2 – 0.4	0.1 – 0.2	0.02 – 0.2
Depth of cut mm	2 - 4	1 – 2	

DRILLING: CARBIDE DRILL

	Carbide type		
	Indexable insert	Solid carbid	Carbide tip
Cutting speed m/min	200 - 230	105 - 135	65 - 85
Feed mm / r	0.05 – 0.15	0.10 – 0.25	0.15 – 0.25

HSS TWIST DRILL

Drill diameter mm	Cutting speed m/min	Feed mm/r
< 5	14 - 16	0.10 – 0.20
5 - 10	14 - 16	0.20 – 0.30
10 - 15	14 - 16	0.30 – 0.35
15 - 20	14 - 16	0.35 – 0.40

FINE GRINDING

General indications for grinding wheels to be used on 2842 PRIME in the heat treated condition
Usually, rather soft vitrified aluminum oxide grinding wheels *(grades G for plane grinding to K for cylindrical grinding)* are used.

Particular attention will be paid to effective cooling of the surface during grinding to prevent degradation of the material surface.

ELECTRO-DISCHARGE MACHINING

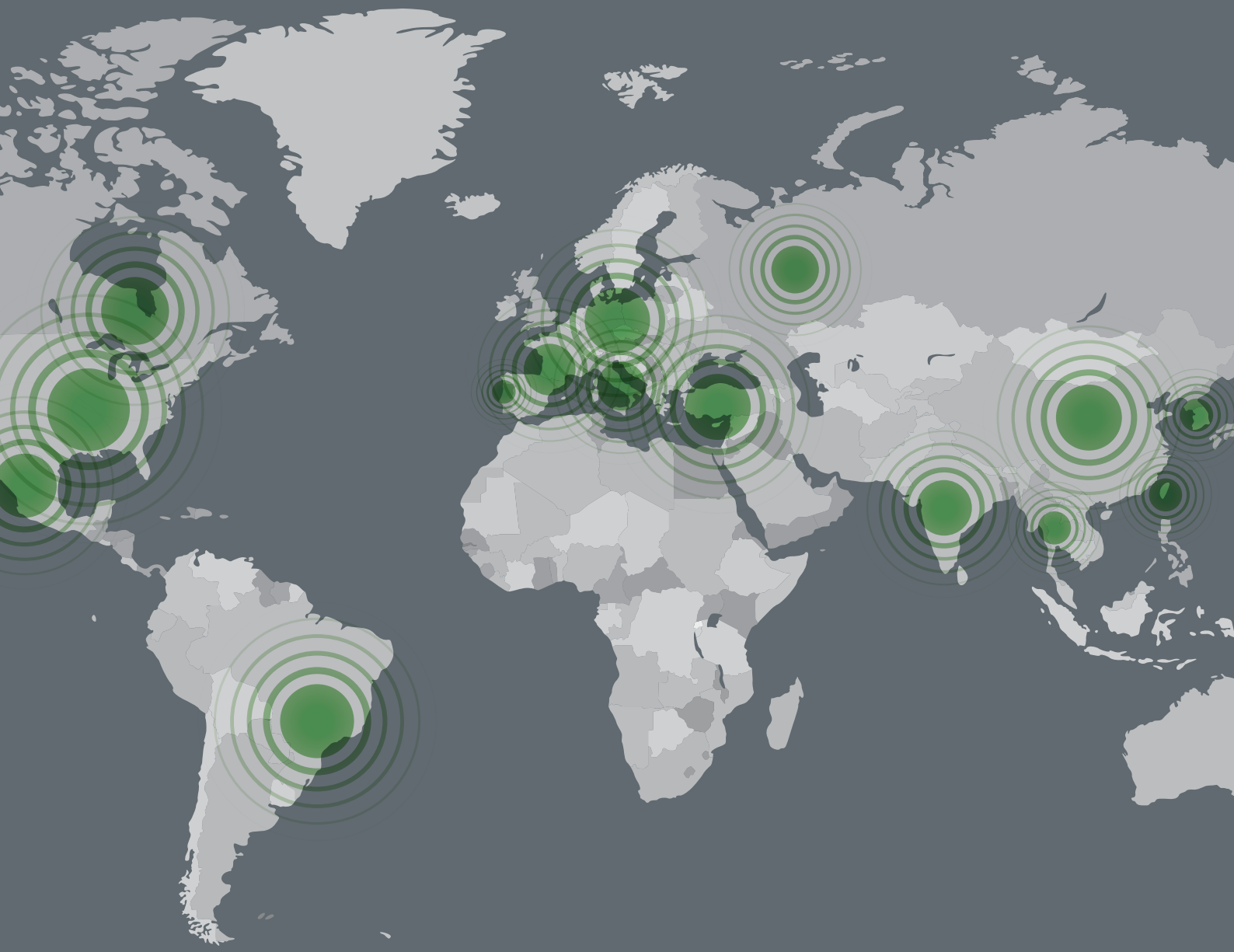
2842 PRIME is also suitable for EDM machining *(wire or electrode).* Preferably, the machining will be carried out with a low current density and a high frequency in order to limit the thickness of the white layer as much as possible.

Then it is necessary to carry out a stress relieving at 25°C below the last tempering in order to reduce the level of residual stresses *(which could lead to a risk of cracking)* and to carry out a polishing to completely remove the white layer formed during the discharge machining process.

Welding

2842 PRIME could be welded either in the annealed condition *(better)* or in the heat treated condition.

- Method: TIG
- Feeder wire: AISI O2 or AWS312
- Preheating: 250°C. hold at 200°C during the welding operation
- Post treatment :
  - In the treated state: tempering for a minimum of 2 hours at 20°C below the initial tempering temperature
  - In the annealed state: carry out a soft annealing under the usual conditions: temperature: 740 - 770°C, duration 1h + 1h for 25mm of thickness. slow cooling in the furnace *(10 to 20°C / h)*



TG Steels

E info@tgsteels.com **W** www.tgsteels.com

Atlas Special Steels, s.l.
Avinguda de Can Sucarrats, 88-92,
08191 Rubí, Barcelona, Spain
+34 938 233 590
info@atlassteels.eu

Atlas Special Steels Unipessoal, Lda
Rua do Antuã, nr. 64 pavilhão A e B
3720-558 Travanca – OAZ, Portugal
+351 256 245 497
info@atlassteels.eu

Five Star Special Steel Europe srl
Via Glenn Curtiss, 9, 25018
Montichiari BS, Italy
+39 030 524 3724
info@fssseurope.com

GNG Consultoria
Rua Ituporanga, 210 – Bom Retiro
Joinville – SC – 89222-430
+55 47 99669-5557
marcus@gngconsultoria.com.br

OSS Canada Special Steel Inc
2384 Speers Rd, Oakville,
ON, Canada L6L 5M2
905-827-5888
sales@oss-material.ca

OSS Special Steel Inc.
2015 Mitchell Blvd Suite C
Schaumburg, IL 60193
(618) 426 – 6158
sales@oss-material.com

TG Steels s.r.o.
Libušina 850, Dubí 272 03
Kladno, Czech Republic
info@tgsteels.com

TG Middle East
Kocaeli KOBİ OSB, Köseler Mh.,
3. Cd., No: 15 Dilovası, Kocaeli, Türkiye
+90 262 728 11 67 (pbx)
info@tgme.com.tr