



Carrs
toolsteel technologies

**Extreme High
Performance
Powder Metallurgy
Tool Steels**

Tel 0121 522 6789

www.carrs-tool.co.uk



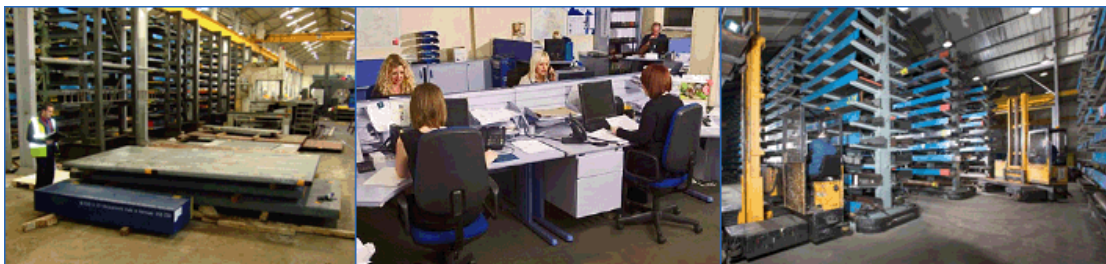
Carrs Tool Steel.

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Typical Analysis

C	0.80	Cr	6.20
Mo	3.00	V	1.10
Co	3.00	Nb	1.00

Colour Code



Characteristics

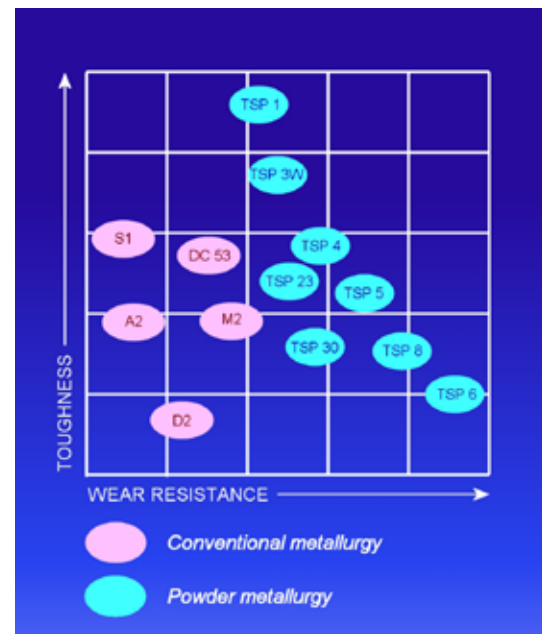
TSP1 is a member of a family of powder metallurgy steel qualities, each of which is specifically tailored to optimise one or more properties. Selection of the appropriate TSP grade for any given application may be assisted by reference to the chart to the right.

Stock

Stock is held in a comprehensive range of sizes. Please enquire for your requirements.

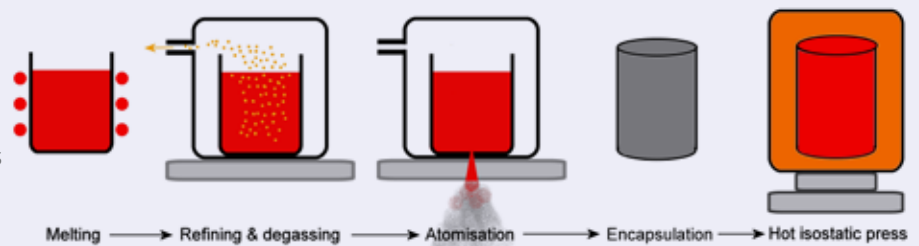
Typical Applications

TSP 1 is the toughest member of the TSP family and is ideally suited for cold-work applications requiring excellent toughness and high resistance to compression such as: punches, blanking dies, slitting dies and calibration tools. TSP 1 has good hot work hardness and can therefore be used for applications such as warm forging.



Manufacturing

TSP 1 is manufactured by ThyssenKrupp Materials France using arguably the most advanced powder metallurgy production process. The process route ensures fully isotropic material of the highest quality and consistency.



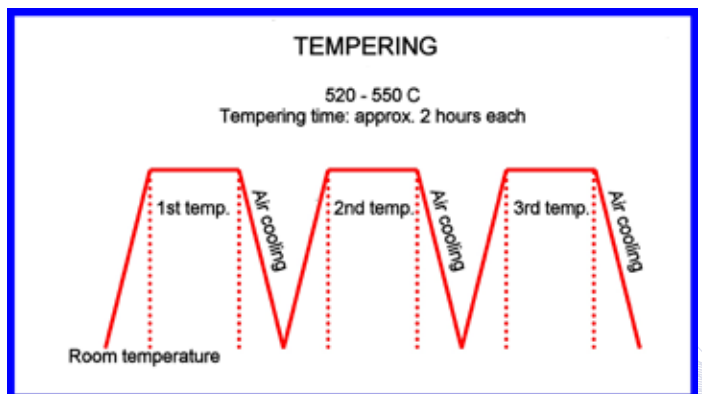
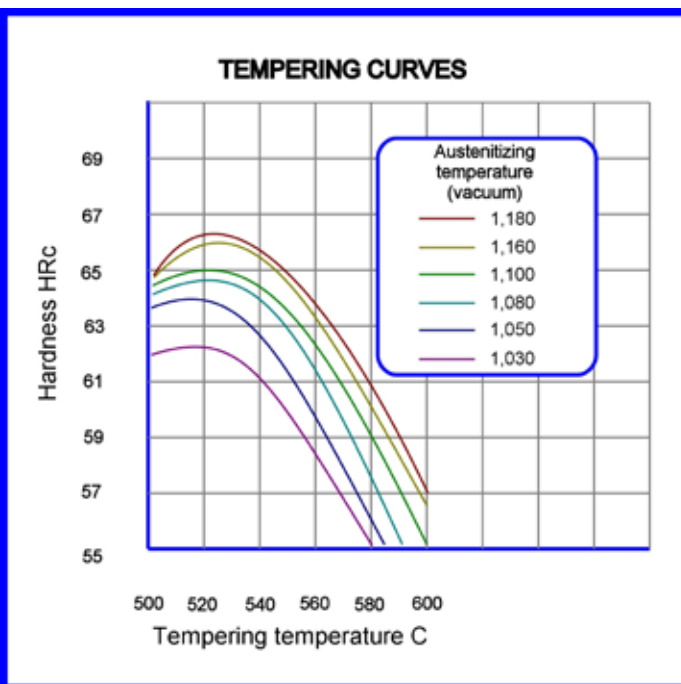
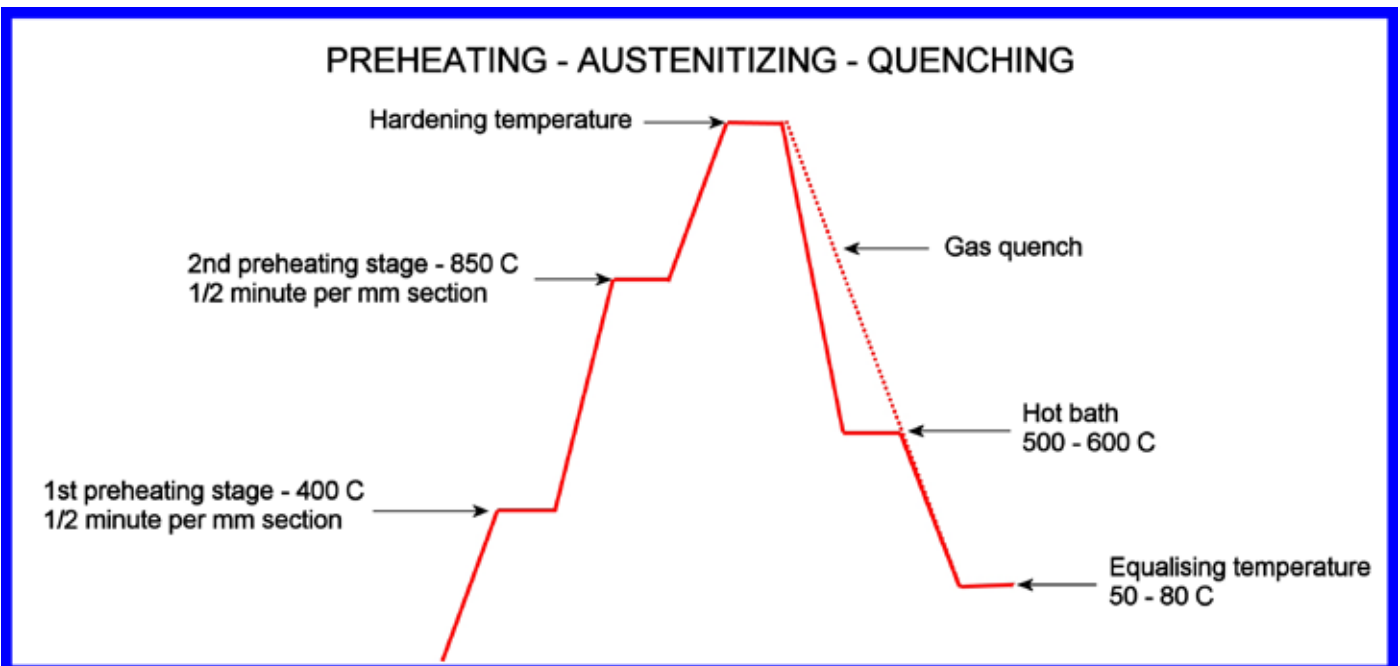
READYMILLED.COM

Rectangular sections from 25mm³ up to 430 X 430 X 150mm can be delivered fine milled on all six faces to $-0+0.1$ mm and with squareness guaranteed to 0.1mm/m.



HEAT TREATMENT CHARTS

Austenitize	Tempering	
1,030 / 1,040 C	520 C	61/63 HRc
	540 C	60/62 HRc
	550 C	59/61 HRc



Thyssenkrupp Materials France

Typical Analysis

C	1.10	Cr	7.75
Mo	1.60	V	2.35
W	1.10		

Colour Code



Characteristics

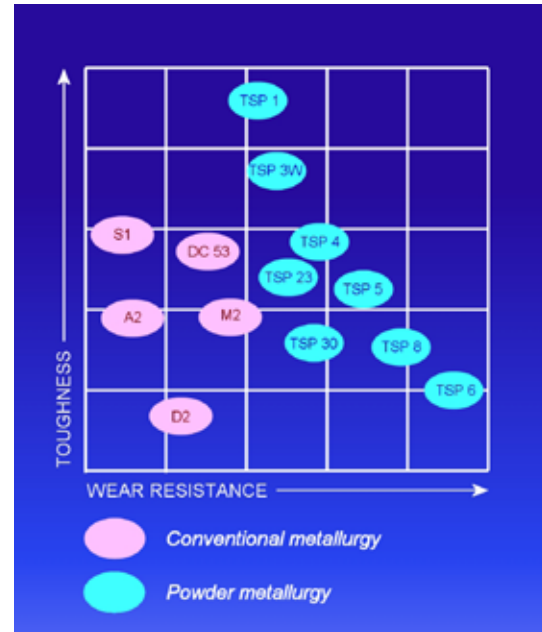
TSP3W is a member of a family of powder metallurgy steel qualities, each of which is specifically tailored to optimise one or more properties. Selection of the appropriate TSP grade for any given application may be assisted by reference to the chart to the right.

Stock

Stock is held in a comprehensive range of sizes. Please enquire for your requirements.

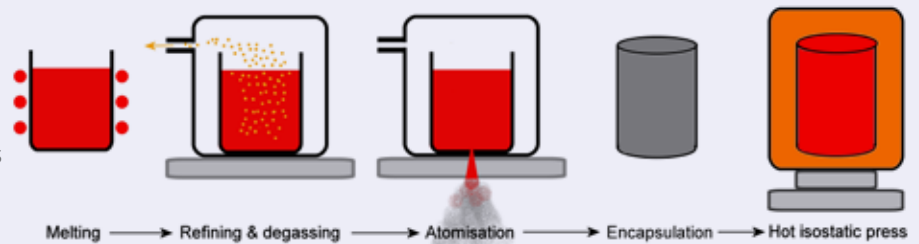
Typical Applications

TSP3W combines high wear resistance and toughness. Its fine and uniform structure enhances its toughness and ensures reproducibility in heat treatment. The wear resistance comes from the carbide formation in V, Cr and Mo alloying elements.



Manufacturing

TSP3W is manufactured by ThyssenKrupp Materials France using arguably the most advanced powder metallurgy production process. The process route ensures fully isotropic material of the highest quality and consistency.



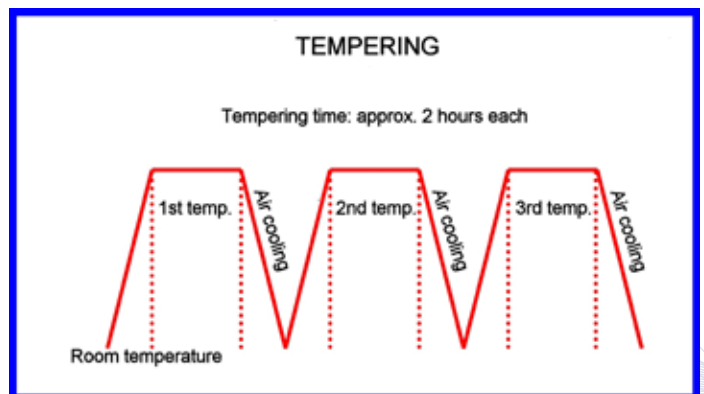
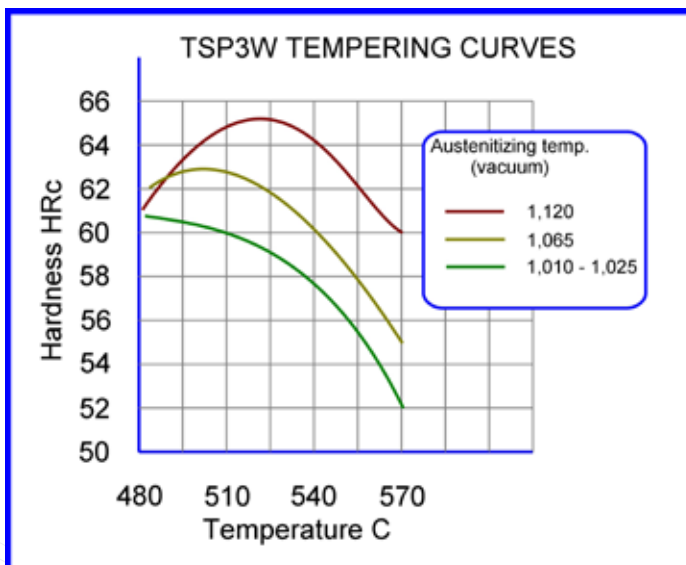
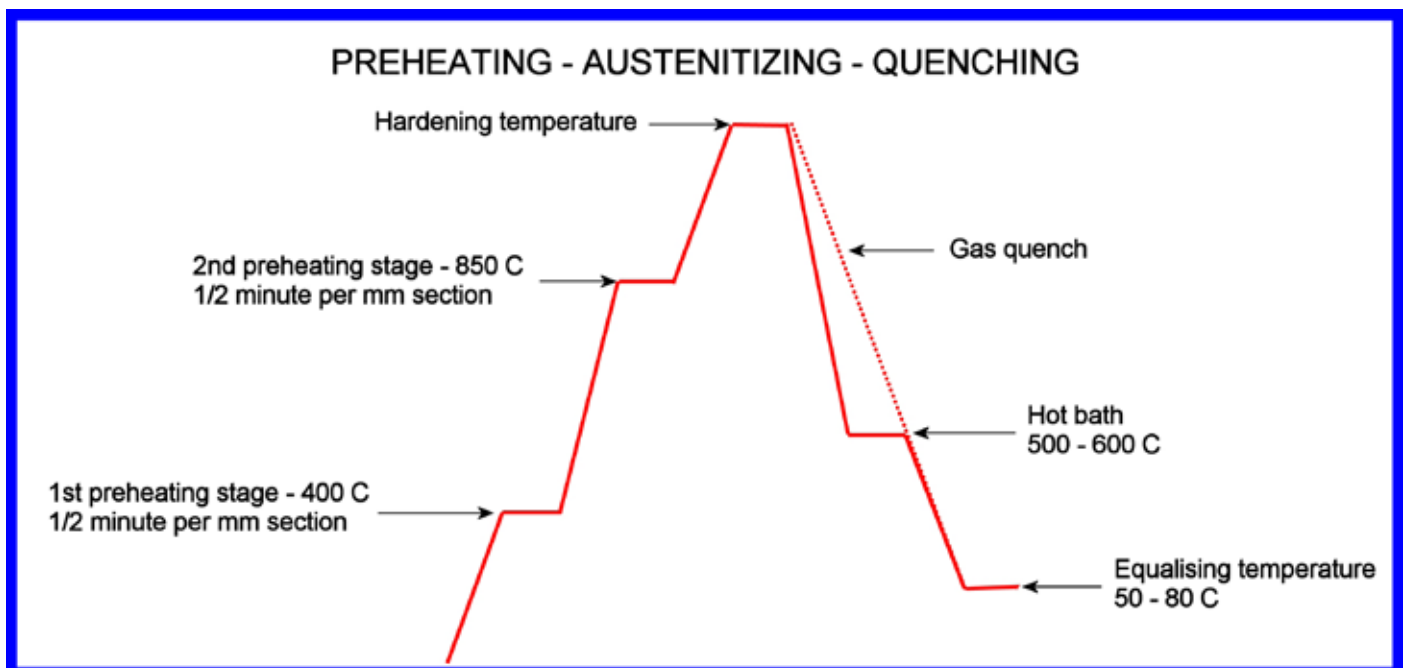
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Rectangular sections from 25mm³ up to 430 X 430 X 150mm can be delivered fine milled on all six faces to $-0+0.1$ mm and with squareness guaranteed to 0.1mm/m.



HEAT TREATMENT CHARTS

Austenitize	Tempering	
1,030 / 1,040 C	500 C	58/60 HRc
	510 C	59/61 HRc
	525 C	60/62 HRc



Thyssenkrupp Materials France

Typical Analysis

C	1.30	Cr	4.30
Mo	4.80	V	4.10
W	5.40		

Colour Code



Characteristics

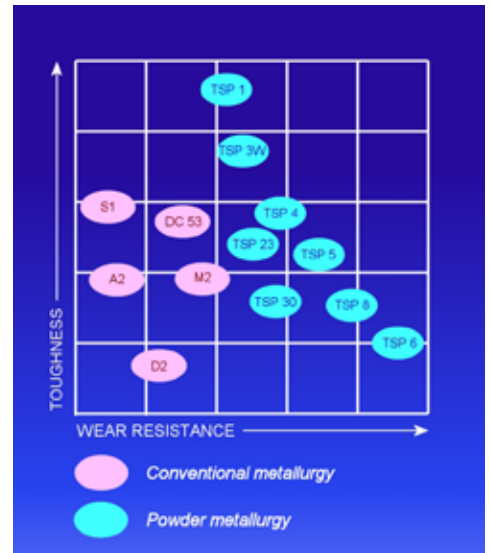
TSP4 is a member of a family of powder metallurgy steel qualities, each of which is specifically tailored to optimise one or more properties. Selection of the appropriate TSP grade for any given application may be assisted by reference to the chart to the right.

Stock

Stock is held in a comprehensive range of sizes. Please enquire for your requirements.

Typical Applications

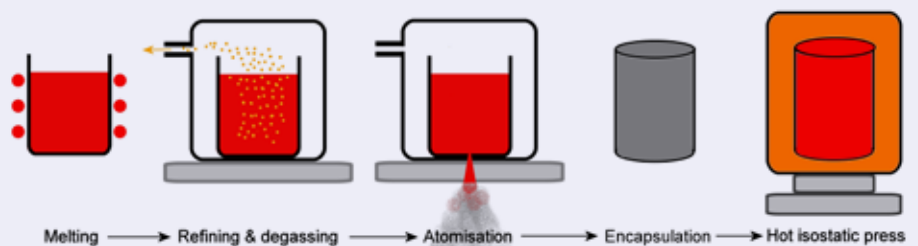
TSP4 is a high speed steel made from powder metallurgy which differs from standard grades because of its high Vanadium content. It is extremely tough and its wear resistance



is much higher than M3/2 types of alloys. The powder metallurgy ensures that TSP4 retains exceptional dimensional stability after heat treatment. TSP 4 is specifically used to manufacture tools for cold work applications such as shearing, deep drawing and threading. It is also widely used for dies and punches. Other uses include cutting tools such as: master drills, broaches, cutting wheels and special drills.

Manufacturing

TSP4 is manufactured by ThyssenKrupp Materials France using arguably the most advanced powder metallurgy production process. The process route ensures fully isotropic material of the highest quality and consistency.



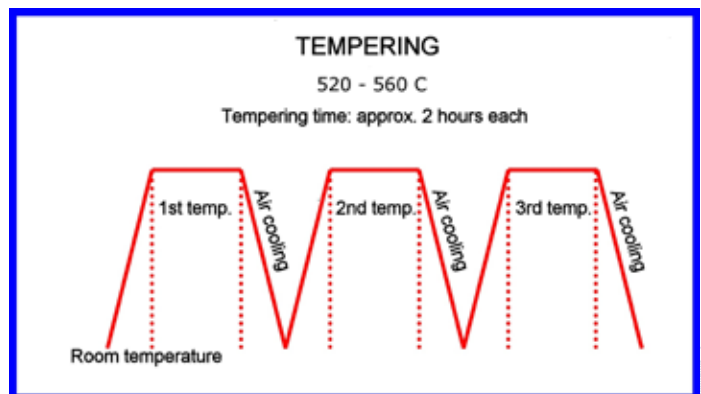
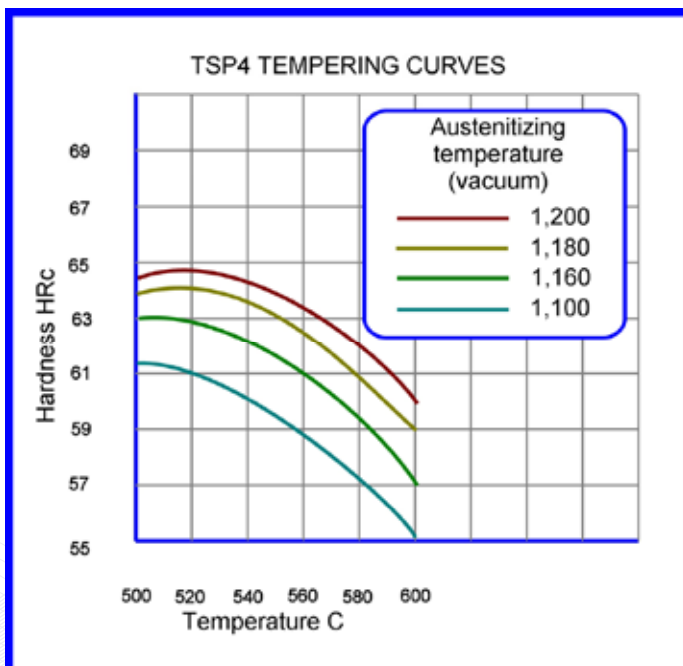
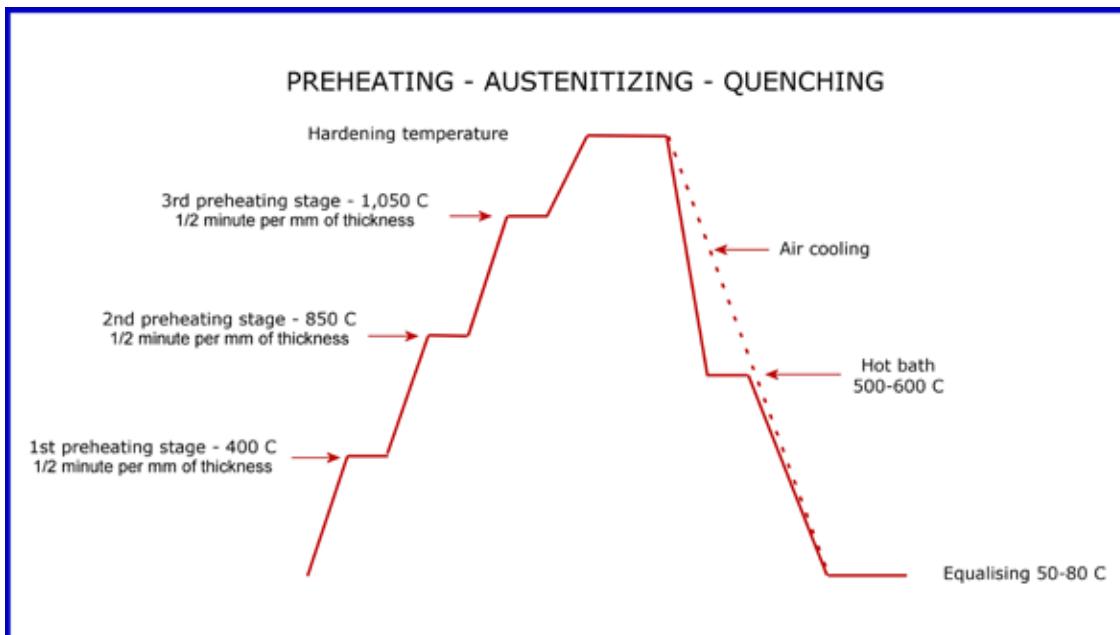
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Rectangular sections from 25mm³ up to 430 X 430 X 150mm can be delivered fine milled on all six faces to -0+0.1mm and with squareness guaranteed to 0.1mm/m.



HEAT TREATMENT CHARTS

Austenitize	Tempering	
1,160 / 1,180 C	520 C	63/65 HRc
	550 C	62/64 HRc
	570 C	61/63 HRc



Thyssenkrupp Materials France

Typical Analysis

C	1.60	Cr	4.80
Mo	2.30	V	5.10
W	10.0	Co	7.90

Colour Code



Characteristics

TSP5 is a member of a family of powder metallurgy steel qualities, each one of which is specifically tailored to optimise one or more qualities. Selection of the appropriate TSP grade for any given application may be assisted by reference to the chart to the right.

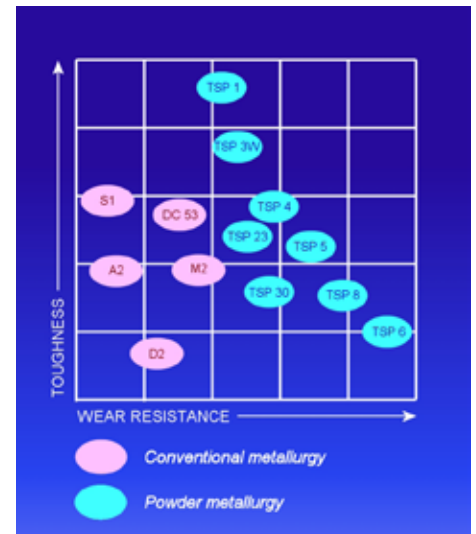
Stock

Stock is held in a comprehensive range of sizes. Please enquire for your requirements.

Typical Applications

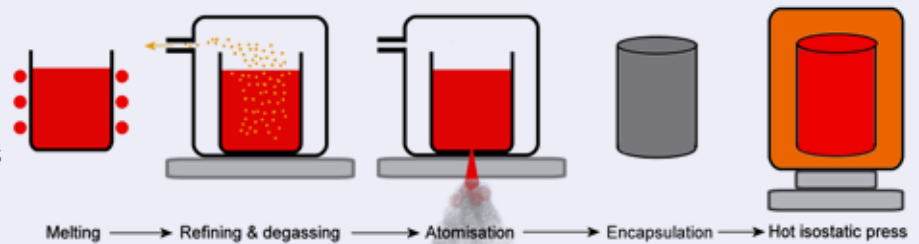
TSP5 is a carburised high speed steel made by powder metallurgy. It is extremely wear resistant and tough. The chemical analysis and the generated carbides make TSP5 harder than conventional high speed

steels. The powder metallurgy process ensures that it retains an exceptional dimensional stability after heat treatment. TSP5 is specifically used to manufacture cutting tools for hard and abrasive materials, such as broaches and master drills. It is also used in cold work applications requiring high resistance to wear and compressive stress such as punches, dies and metal spinning tools.



Manufacturing

TSP4 is manufactured by ThyssenKrupp Materials France using arguably the most advanced powder metallurgy production process. The process route ensures fully isotropic material of the highest quality and consistency.



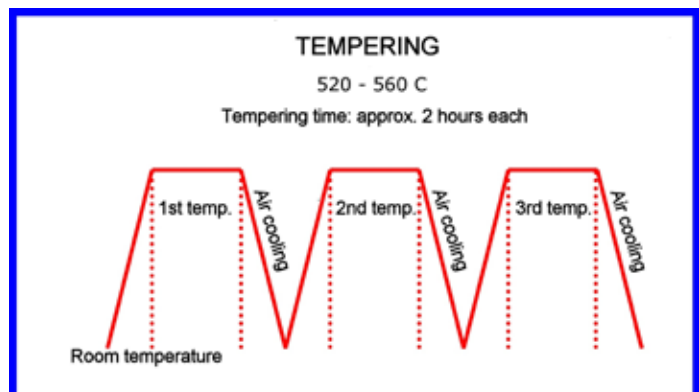
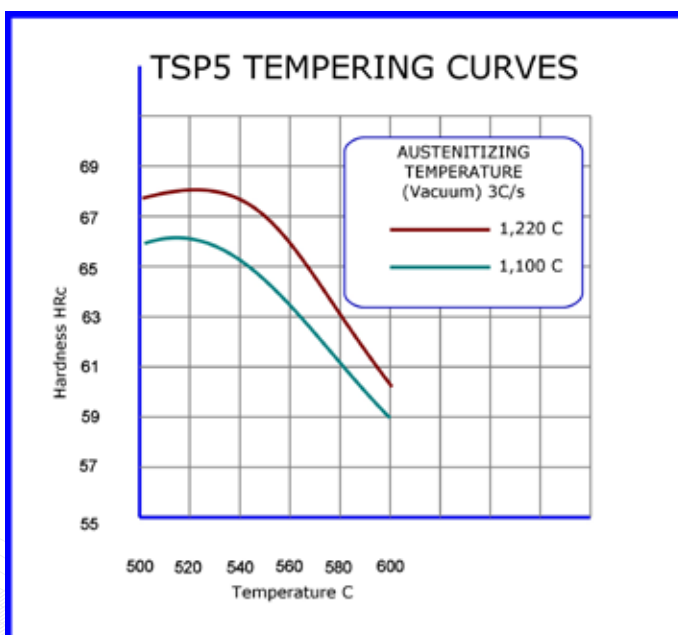
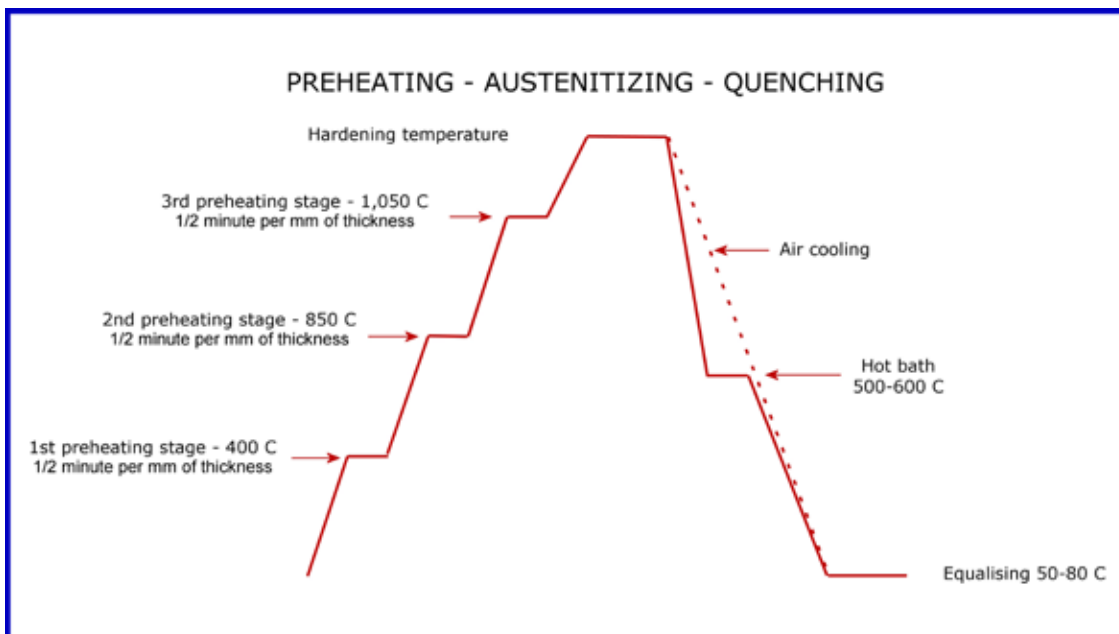
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Rectangular sections from 25mm³ up to 430 X 430 X 150mm can be delivered fine milled on all six faces to $-0+0.1$ mm and with squareness guaranteed to 0.1mm/m.



HEAT TREATMENT CHARTS

Austenitize	Tempering	
1,160 / 1,180 C	520 C	65/67 HRc
	550 C	64/66 HRc
	560 C	63/65 HRc



Thyssenkrupp Materials France

Typical Analysis

C	1.85	Cr	4.80
Mo	4.80	V	6.30
W	18.50	Co	5.80

Colour Code



Characteristics

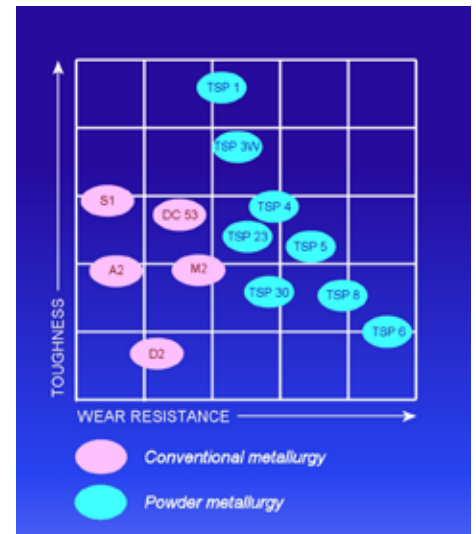
TSP6 is a member of a family of powder metallurgy steel qualities, each one of which is specifically tailored to optimise one or more qualities. Selection of the appropriate TSP grade for any given application may be assisted by reference to the chart to the right.

Stock

Stock is held in a comprehensive range of sizes. Please enquire for your requirements.

Typical Applications

TSP6 is a high speed steel made by powder metallurgy with high levels of Carbon, carbide elements and Cobalt. It is extremely wear resistant and responds well to sawing. Its hardness also

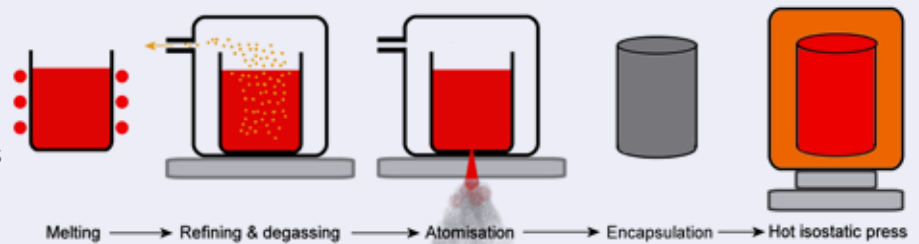


stays high in hot work applications. Its toughness is comparable to conventional carbide high speed steels although the hardness levels are higher due to the type of carbides generated. It is very suitable for grinding.

TSP6 is specifically used to manufacture cutting tools for hard and abrasive materials, such as broaches and master drills. It is also used in cold work applications requiring high resistance to wear and compressive stress.

Manufacturing

TSP6 is manufactured by ThyssenKrupp Materials France using arguably the most advanced powder metallurgy production process. The process route ensures fully isotropic material of the highest quality and consistency.



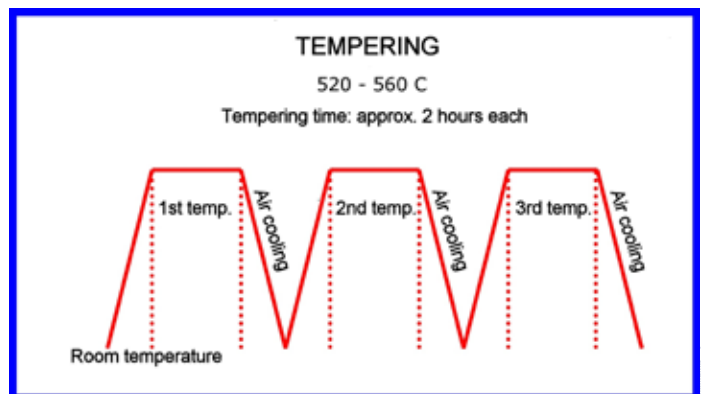
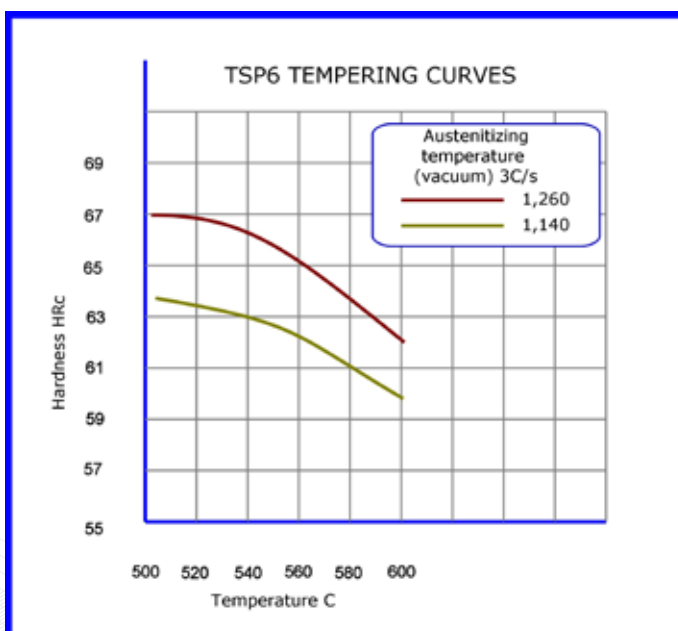
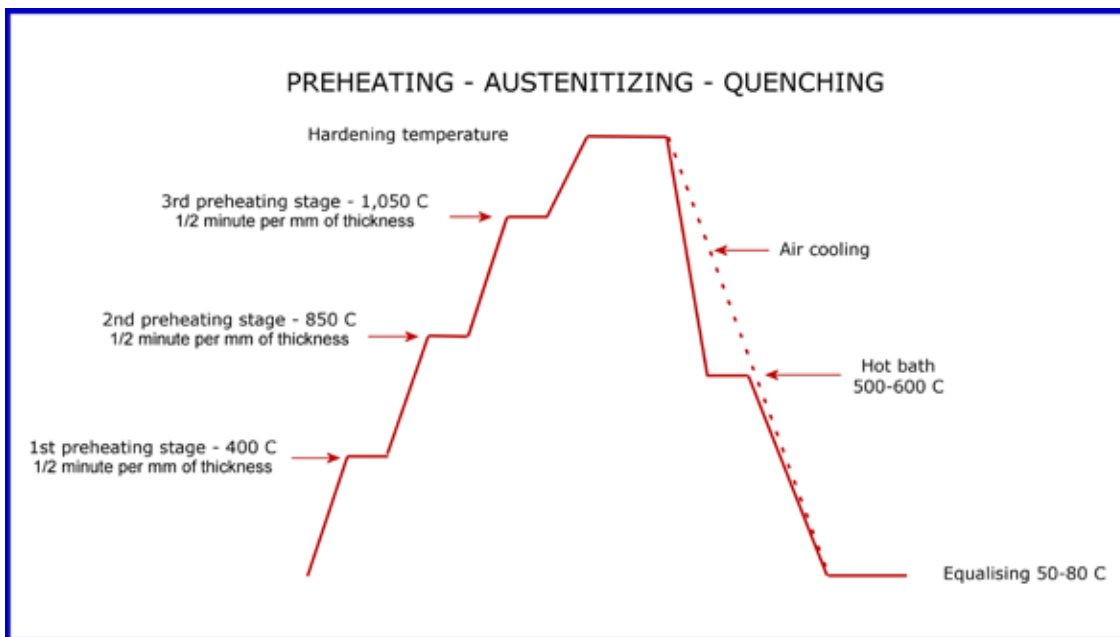
READYMILLED.COM

Rectangular sections from 25mm³ up to 430 X 430 X 150mm can be delivered fine milled on all six faces to $-0+0.1$ mm and with squareness guaranteed to 0.1mm/m.



HEAT TREATMENT CHARTS

Austenitize	Tempering	
1,160 / 1,180 C	520 C	65/67 HRc
	550 C	64/66 HRc
	560 C	63/65 HRc



Thyssenkrupp Materials France

Typical Analysis

C	2.40	Cr	6.20
Mo	3.00	V	8.00
Nb	1.80		

Colour Code



Characteristics

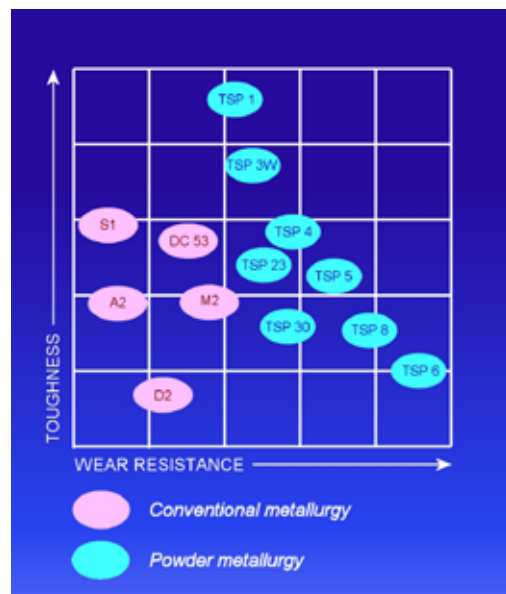
TSP8 is a member of a family of powder metallurgy steel qualities, each one of which is specifically tailored to optimise one or more qualities. Selection of the appropriate TSP grade for any given application may be assisted by reference to the chart to the right.

Stock

Stock is held in a comprehensive range of sizes. Please enquire for your requirements.

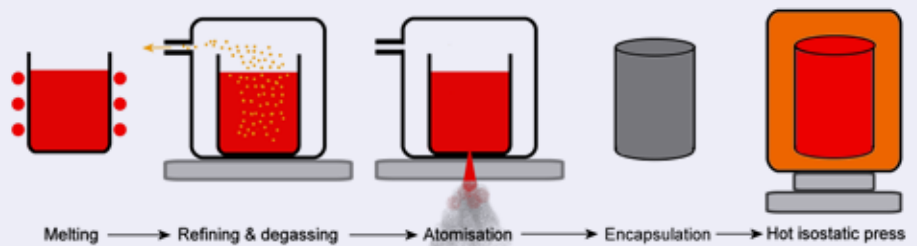
Typical Applications

TSP8 is a tool steel produced by powder metallurgy. Its performance level is between that of TSP4 and that of hard metals. It combines exceptional wear resistance with excellent toughness. TSP8 is the basic grade for the manufacture of compacting tools for powders in the area of powder metallurgy. It is also a perfect choice for cutting abrasive materials such as: paper, card and plastic coated materials.



Manufacturing

TSP8 is manufactured by ThyssenKrupp Materials France using arguably the most advanced powder metallurgy production process. The process route ensures fully isotropic material of the highest quality and consistency.



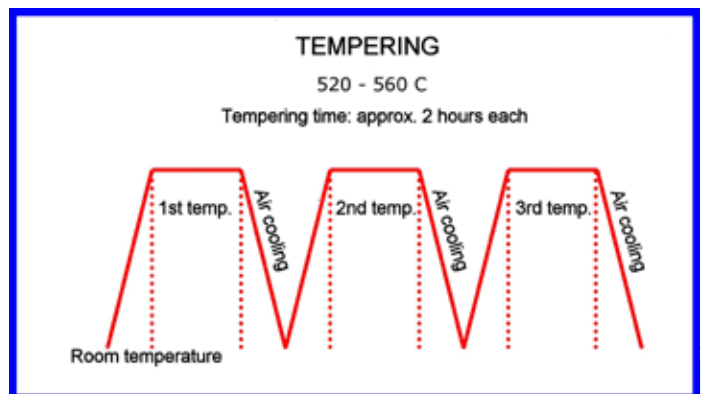
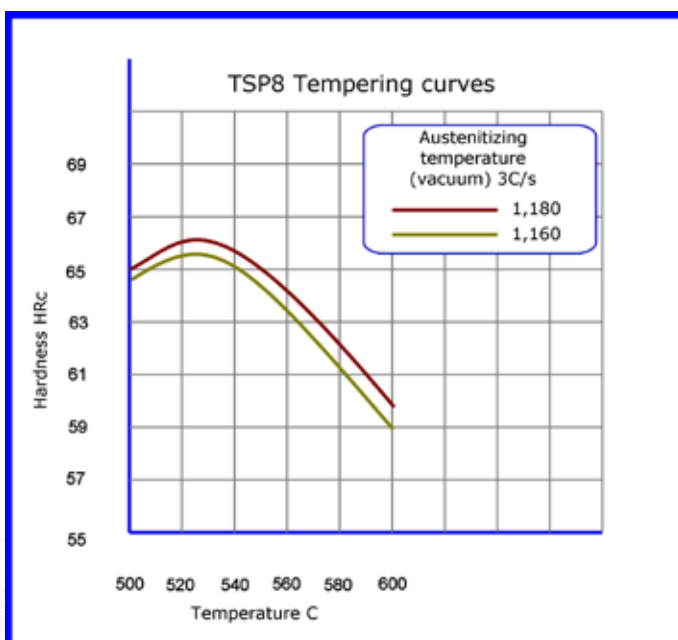
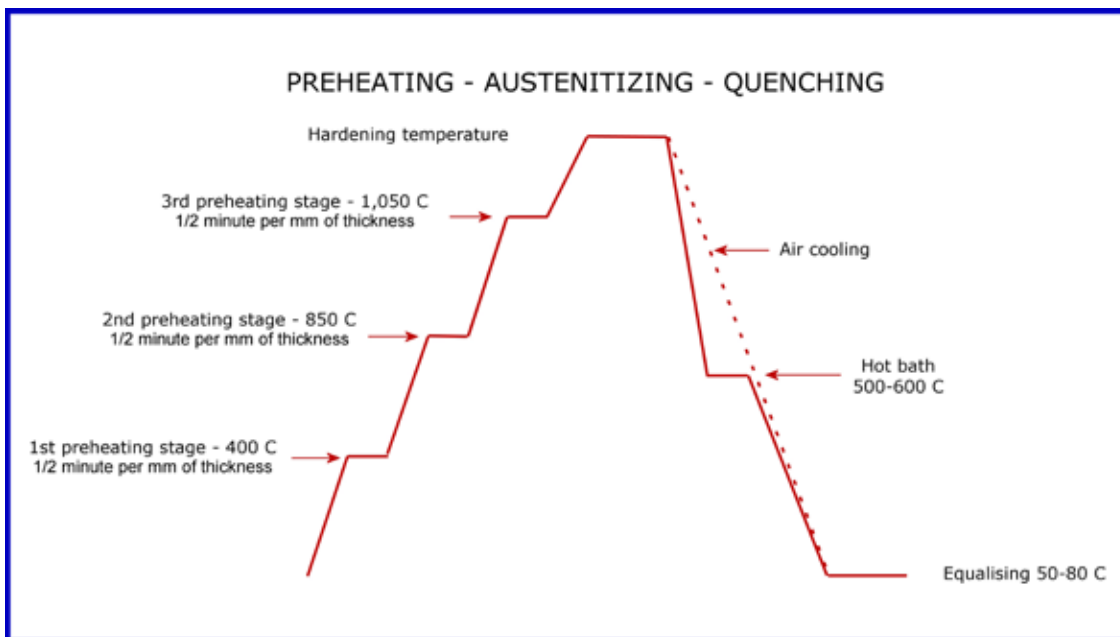
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Rectangular sections from 25mm³ up to 430 X 430 X 150mm can be delivered fine milled on all six faces to -0+0.1mm and with squareness guaranteed to 0.1mm/m.



HEAT TREATMENT CHARTS

Austenitize	Tempering	
1,160 / 1,180 C	520 C	64/66 HRC
	550 C	62/64 HRC
	560 C	60/62 HRC

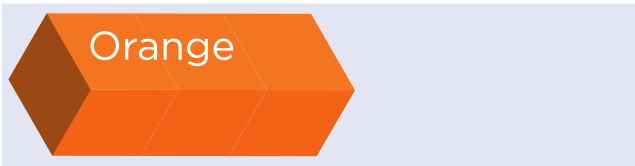


Thyssenkrupp Materials France

Typical Analysis

C	1.28	Cr	4.25
Mo	5.00	V	3.10
W	6.40		

Colour Code



Characteristics

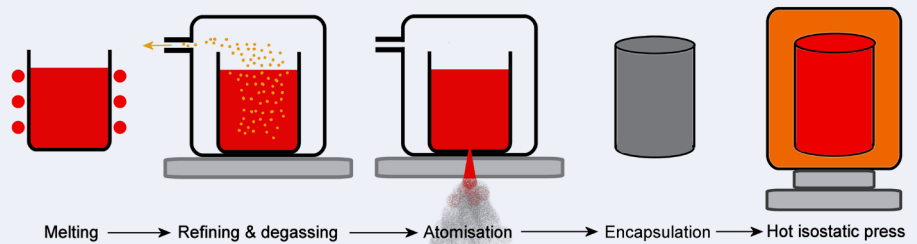
TSP23 is a member of a family of powder metallurgy steel qualities, each one of which is specifically tailored to optimise one or more qualities. Selection of the appropriate TSP grade for any given application may be assisted by reference to the chart to the right.

Stock

Stock is held in a comprehensive range of sizes. Please enquire for your requirements.

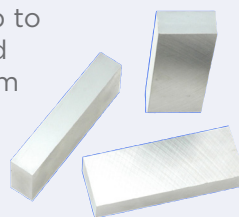
Manufacturing

TSP23 is manufactured by ThyssenKrupp Materials France using arguably the most advanced powder metallurgy production process. The process route ensures fully isotropic material of the highest quality and consistency.



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Rectangular sections from 25mm³ up to 430 X 430 X 150mm can be delivered fine milled on all six faces to $-0+0.1$ mm and with squareness guaranteed to 0.1mm/m.

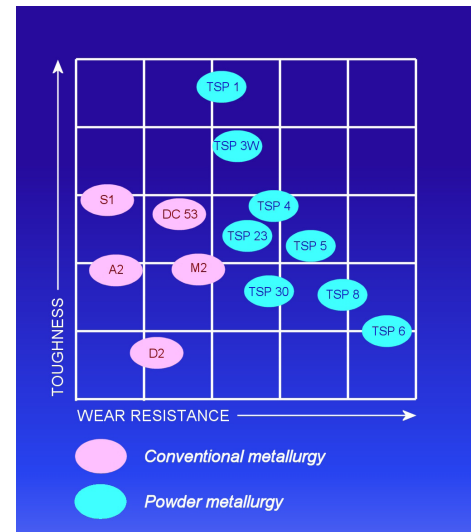


Typical Applications

TSP 23 provides an excellent balance between toughness and wear resistance. It is very stable in heat treatment and has good machinability. TSP23

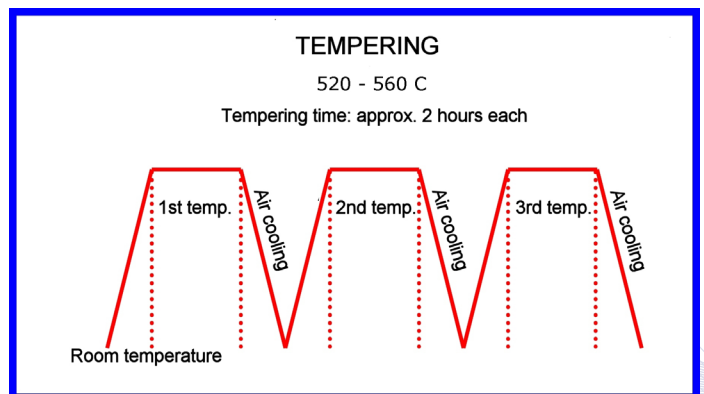
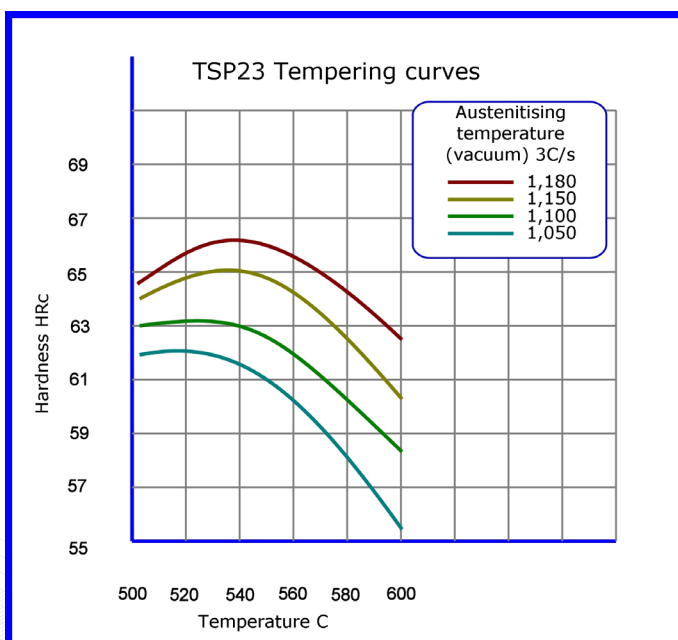
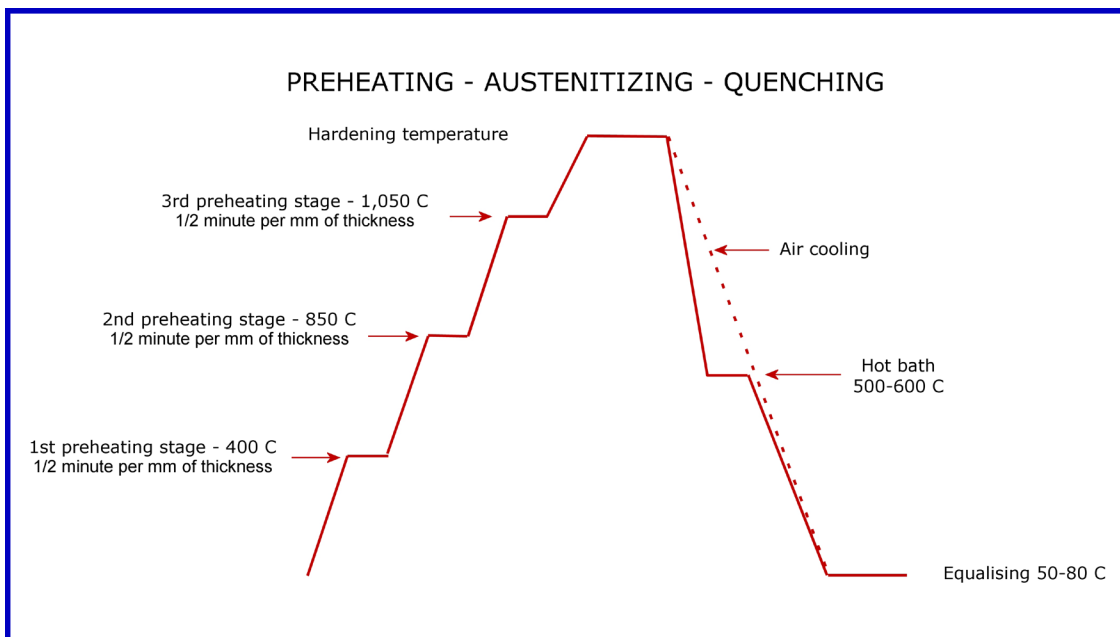
has a high tempering temperature

which makes it very suitable for higher temperature surface coatings such as PVD. TSP is eminently suitable for: blanking harder steel types, producing cutting tools such as broaches and taps, plastic moulds subject to high abrasive wear and plastic injection moulding machine parts.



HEAT TREATMENT CHARTS

Austenitize	Tempering	
1,140 / 1,150 C	520 C	63/65 HRc
	550 C	63/65 HRc
	560 C	62/64 HRc

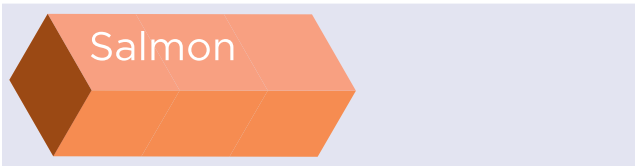


Thyssenkrupp Materials France

Typical Analysis

C	1.30	Cr	4.30
Mo	5.00	V	3.20
W	6.30	Co	8.50

Colour Code



Characteristics

TSP30 is a member of a family of powder metallurgy steel qualities, each one of which is specifically tailored to optimise one or more qualities. Selection of the appropriate TSP grade for any given application may be assisted by reference to the chart to the right.

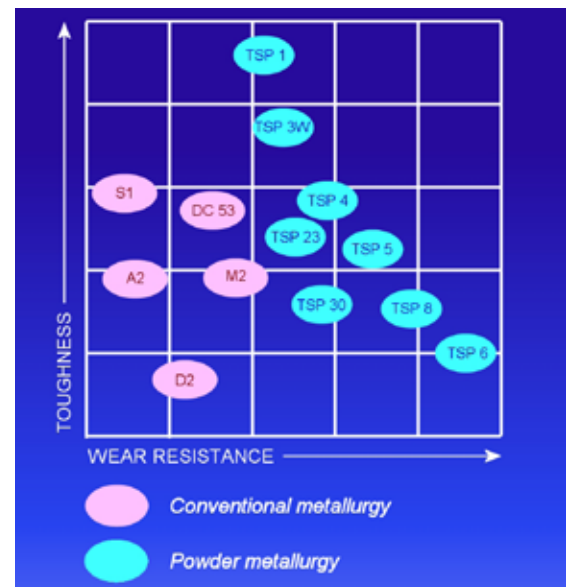
Stock

Stock is held in a comprehensive range of sizes. Please enquire for your requirements.

Typical Applications

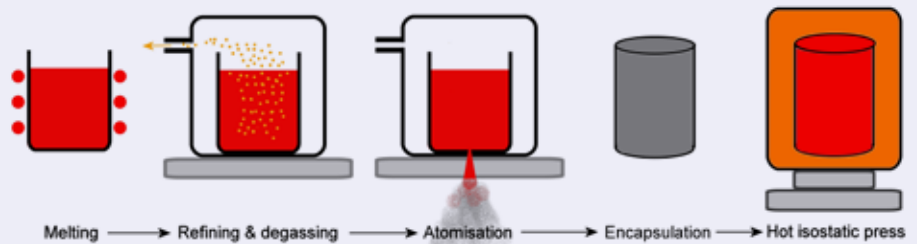
TSP 30 is a Tungsten, Molybdenum, Cobalt, carburised high speed steel made from powder metallurgy. It is very wear resistant and extremely tough. It is very stable and compatible with grinding.

TSP30 is suitable for: master drills, cutting wheels, broaches, screw taps, special drills, helicoidal drills, lathe wheels and sawing tools. TSP30 can also be used for cold work punches and dies.



Manufacturing

TSP30 is manufactured by ThyssenKrupp Materials France using arguably the most advanced powder metallurgy production process. The process route ensures fully isotropic material of the highest quality and consistency.



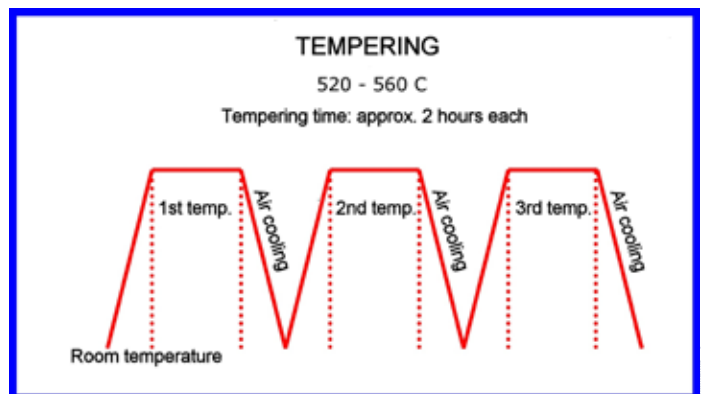
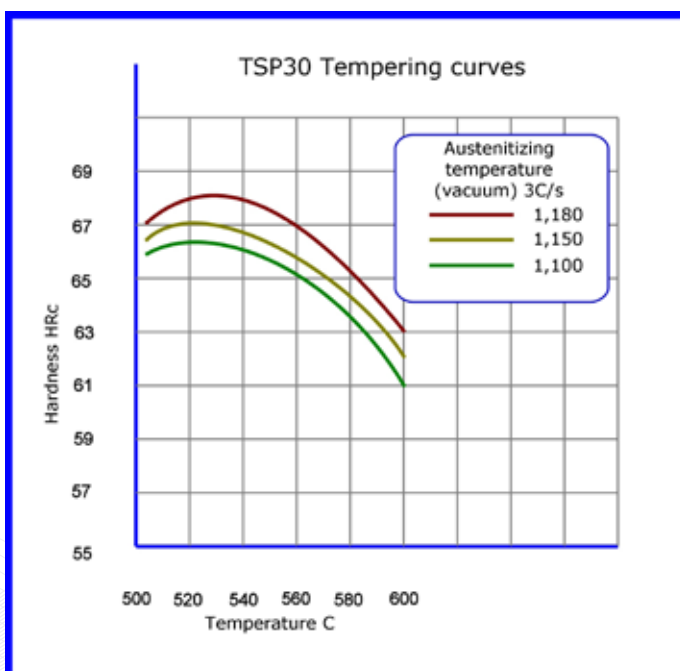
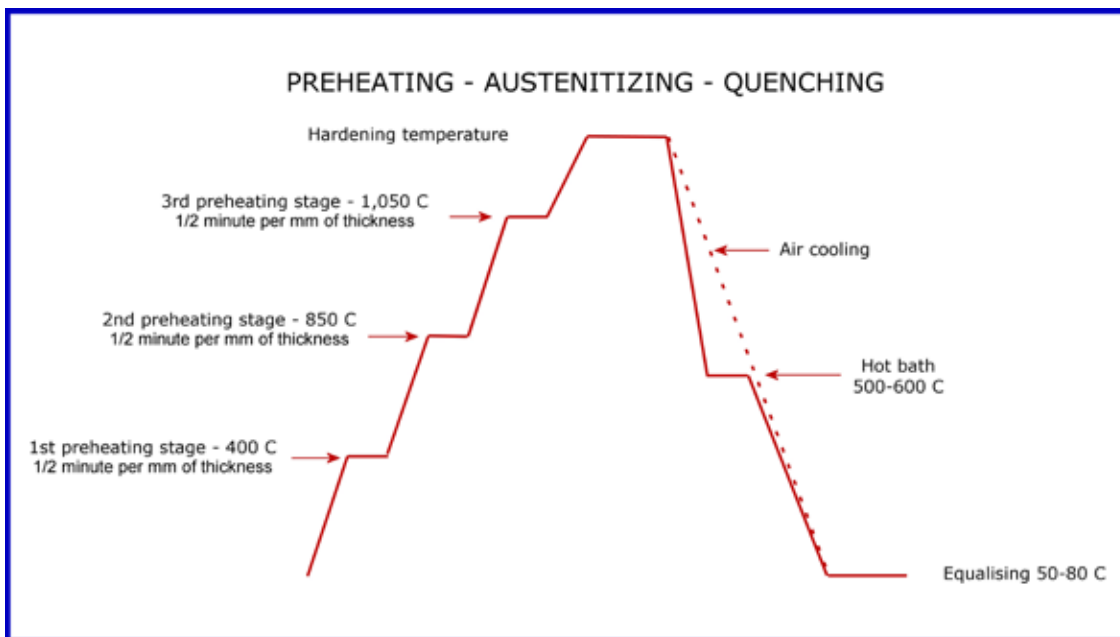
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Rectangular sections from 25mm³ up to 430 X 430 X 150mm can be delivered fine milled on all six faces to $-0+0.1$ mm and with squareness guaranteed to 0.1mm/m.



HEAT TREATMENT CHARTS

Austenitize	Tempering	
1,140 / 1,150 C	520 C	65/67 HRc
	550 C	64/66 HRc
	560 C	63/65 HRc



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