

## STEEL GRADE

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C55 All

## General Information

C55 is a carbon steel for general purposes found in three variants in EN ISO 683-1.

510A is an ingot casted steel. High hardness (approx. 60HRC) and high strength can be achieved after hardening due to the relatively high carbon content. The steel is suitable for various type of applications where high strength is needed

056K is a low alloyed steel for quench and tempering. Used for machine parts etc. Can be induction or flame hardened

8665 is a continuous casted variant meeting all three of the EN ISO standards.

For additional Heat Treatment Data, please visit the Heat Treatment Guide.

## Similar designations

C54, C55E - 1.1203, C55R - 1.1209, 070M55 (BS970), ASTM/SAE 1055, SS 1655, C55R, Cf53, 1.1213

## Chemical composition

Variant	Cast	Weldability		C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	V %	DI %
510A	IC	CEV 0.86 <sub>max</sub>	Min	0.48	0.15	0.60	-	-	-	-	-	-	1.30
		Pcm 0.66 <sub>max</sub>	Max	0.55	0.35	0.80	0.035	0.025	0.30	0.30	0.10	0.100	2.30
056K	IC	CEV 0.77 <sub>max</sub>	Min	0.52	0.20	0.50	-	0.015	0.15	-	-	-	-
		Pcm 0.64 <sub>max</sub>	Max	0.56	0.30	0.60	0.025	0.025	0.25	0.25	0.06	-	-
8665	CC	CEV 0.71 <sub>max</sub>	Min	0.52	0.15	0.60	-	0.020	-	-	-	-	-
		Pcm 0.6 <sub>max</sub>	Max	0.57	0.40	0.80	0.030	0.035	0.40	0.40	0.10	-	-
C55 EN ISO 683-1	Std	CEV 0.83 <sub>max</sub>	Min	0.52	0.10	0.60	-	-	-	-	-	-	-
		Pcm 0.65 <sub>max</sub>	Max	0.60	0.40	0.90	0.045	0.045	0.40	0.40	0.10	-	-

Cr+Ni+Mo ≤ 0.63

## Mechanical Properties

Variant	Condition <sup>i</sup>	Format	Dimension [mm]	Yield strength min [MPa]	Tensile strength [MPa]	Elongation A <sub>5</sub> [%]	Reduction of area Z <sub>min</sub> [%]	Hardness
510A	+QT	Round bar	25 < 40	420	700-850	15	40	-
056K	+QT	Round bar	15 < 40	520	800-950	13	30	-
8665	+AR	Round bar	16 < 25	-	-	-	-	220-257 HB
		Round bar	16 < 25	-	-	-	-	241 HB typical
		Round bar	26 < 85	-	-	-	-	220-250 HB
		Round bar	26 < 85	-	-	-	-	237 HB typical
		Flat bar	5 < 15	-	-	-	-	225-285 HB
		Flat bar	5 < 15	-	-	-	-	252 HB typical
		Flat bar	16 < 60	-	-	-	-	225-265 HB
		Flat bar	16 < 60	-	-	-	-	248 HB typical
C55 EN ISO 683-1	+QT	Round bar	< 16	550*	800-950	12	30	-
		Round bar	16.1 < 40	490*	750-900	14	35	-
		Round bar	40.1 < 100	420*	700-850	15	40	-
		Flat bar	< 8	550*	800-950	12	30	-
		Flat bar	8.1 < 20	490*	750-900	14	35	-

*R<sub>p0.2</sub> \* R<sub>eh</sub>, \*\* R<sub>el</sub>*

## Transformation temperatures

	Temperature °C
MS	270
AC1	720
AC3	750

## Heat treatment recommendations

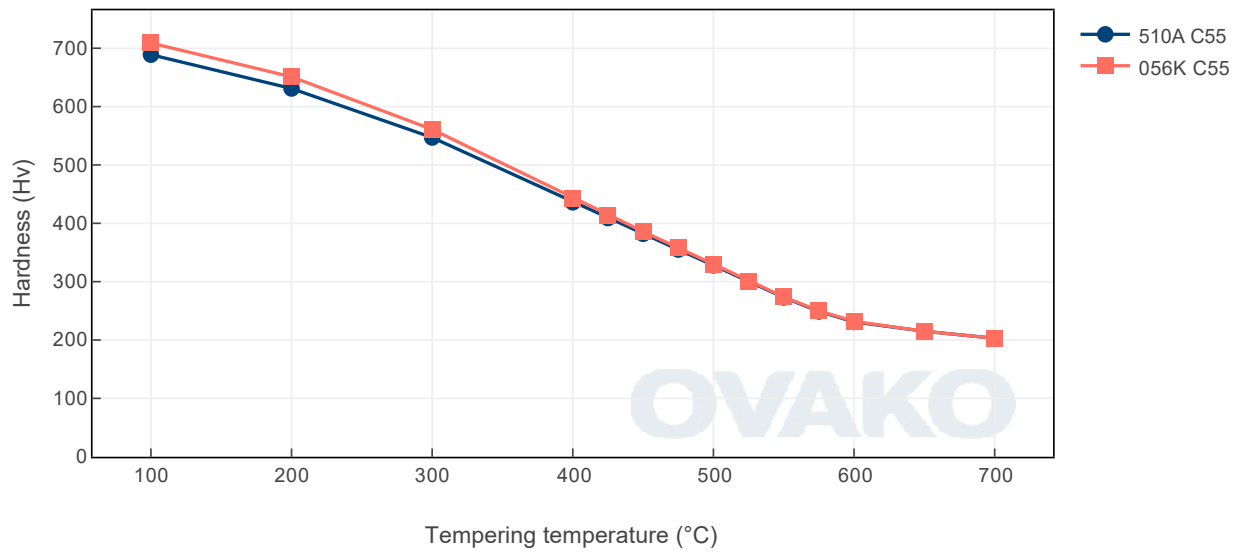
Treatment	Condition <sup>i</sup>	Temperature cycle	Cooling/quenching
Hot forging	+AR	850-1100°C	In air
Normalizing	+N	790-820°C	In still air
Soft annealing	+SA	680-710°C 2-4h, 15°C/h to 600°C	In still air
Hardening	+QT	790-820°C	In oil, temper immediately
Tempering	+QT	150-650°C 1h see tempering diagram	In still air

Data valid for Ovako 510A.

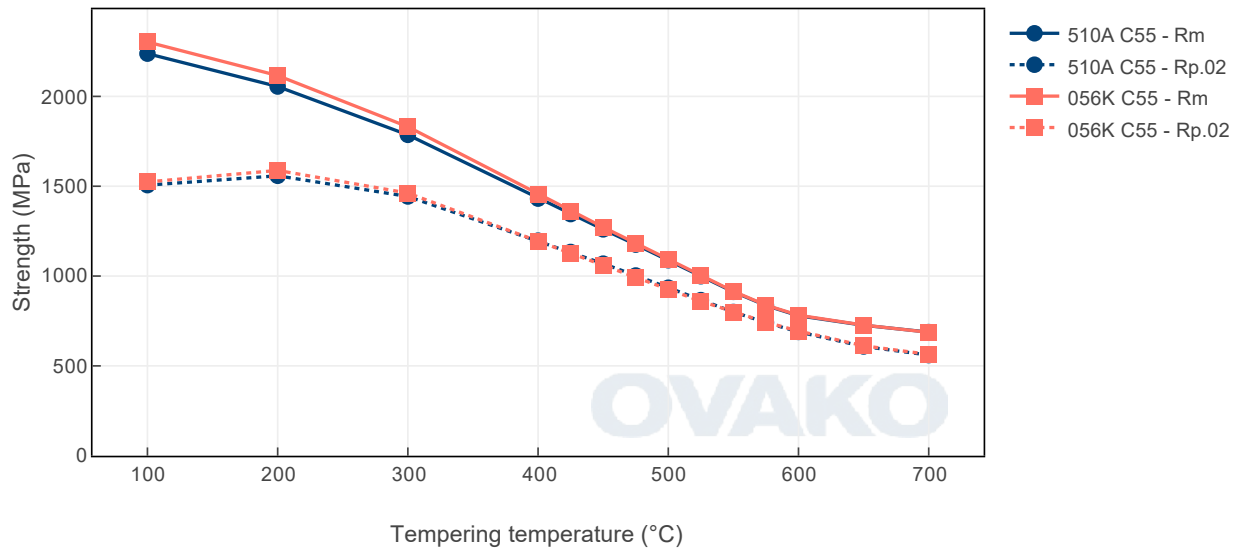
## Heat Treatment Guide generated Graphs

The following graphs are generated from a theoretical model. For further info see the Heat treatment guide module. Select a specific grade version for individual display.

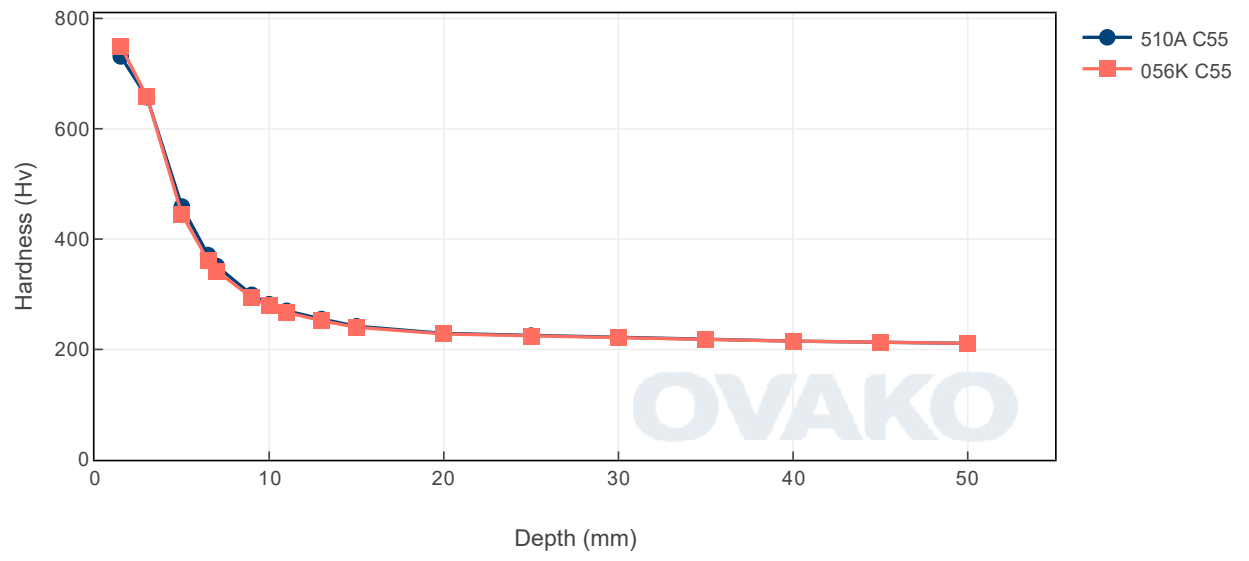
Tempering Diagram (hardness)



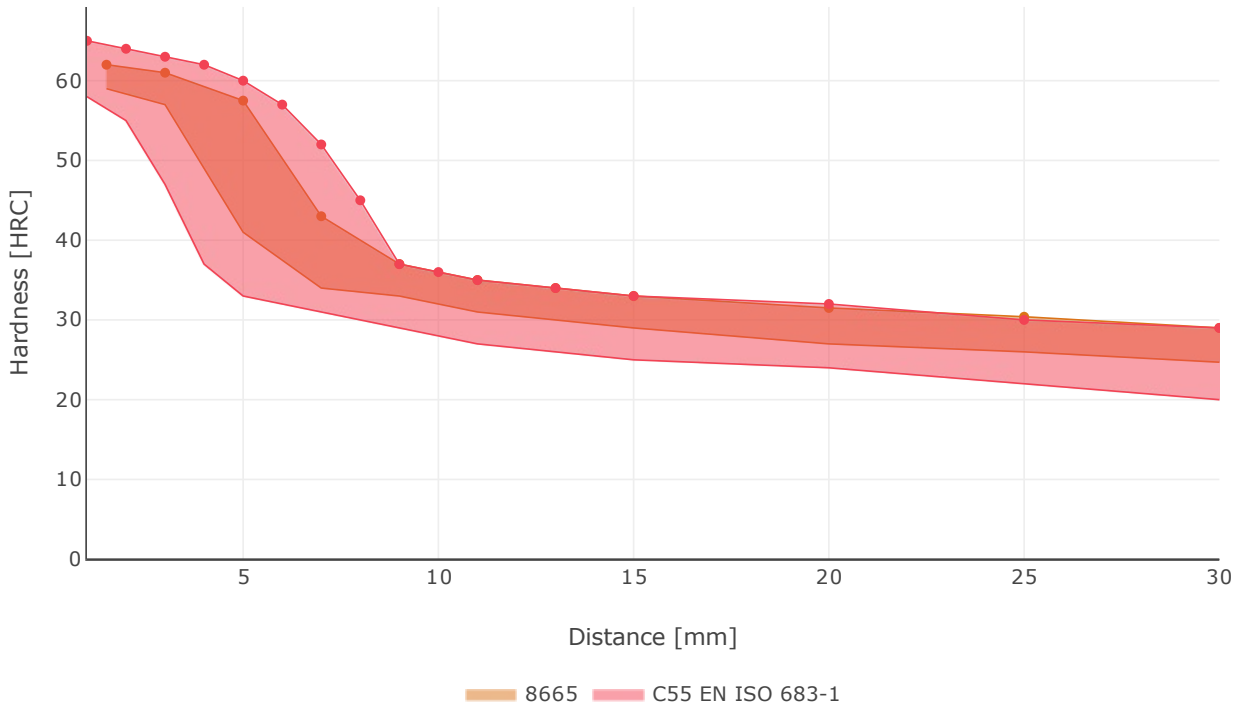
Tempering Diagram (strength)



# Jominy



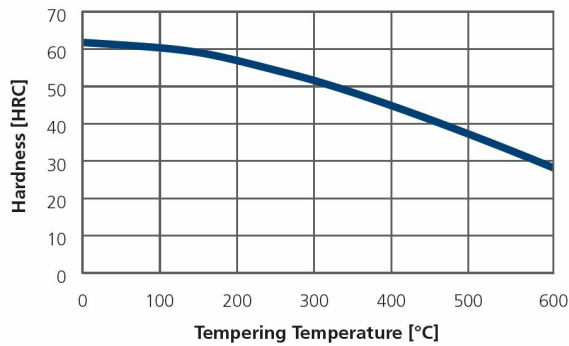
## Hardenability



C55 ISO 683-1 shows the Jominy band for C55E/C55R +H

## 510A

### Tempering response



## Steel cleanliness

Micro inclusions - 510A									Macro inclusions - 510A	
Applied standard	ASTM E45								Applied standard	ISO 3763 (Blue fracture)
Sampling	ASTM A295								Sampling	Statistical testing on billets
Maximum average limits	A		B		C		D		Limits	< 5 mm/dm <sup>2</sup>
	Th	He	Th	He	Th	He	Th	He		
	2.5	1.5	1.5	0.5	0	0	1.0	0.5		

## SUSTAINABILITY-ENVIRONMENTAL IMPACT DATA

At Ovako sustainability and reduction of our environmental impact is a major focus in everything we do.

Further information is found [here](#).

Steel works	Hofors	Smedjebacken	Imatra
CO2e/kg	120	62	76

To get the full picture of our products environmental impact we have to look at all of our CO<sub>2</sub> emission sources.

Not only the steel work Scope 1-2 itself, but all operations downstream in our production, heating and heat treatment furnaces etc (full scope 1-2) as well as all the emission from input material, eg. alloys, scope 3.

Steel Grade	Format	Condition	Scope 1-3 (CO2e kg /1000 kg steel)
510A	Round bar	+AR	570
510A	Round bar	+QT	575
510A	Tube,wall	+AR	589
510A	Tube,wall	+QT	597
056K	Round bar	+AR	568
056K	Round bar	+QT	573
056K	Tube,wall	+AR	587
056K	Tube,wall	+QT	595
SBC55	Flat bar	+AR	405

All above data are to be seen as typical values for the specified format and condition. Detailed information about your specific product please contact your sales contact.

### Other properties (typical values)

Youngs module (GPa)	Poisson ´s ratio (-)	Shear module (GPa)	Density (kg/m3)
210	0.3	80	7800
Average CTE 20-300°C (µm/m°K)	Specific heat capacity 50/100°C (J/kg °K)	Thermal conductivity Ambient temperature (W/m°K)	Electrical resistivity Ambient temperature (µΩm)
12	460 - 480	40 - 45	0.20 - 0.25

### Contact us

Would you like to know more about our offers? Don´t hesitate to contact us:

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For more detailed information please visit <http://www.ovako.com/en/Contact-Ovako/>

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