

GENERAL HEAT TREATMENT OF UDDEHOLM STEEL GRADES IN STANDARD CODES

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Codes → (only DK) ↓	Steel grades	1		2		3		4		5		Remarks
		Stress relieving	Austinit.-temp. / Holding time	Tempering 2x	Tempering 2x	Tempering 2x	tempering 3x					
		°C	°C / min.	°C / HRC*	°C / HRC*	°C / HRC*	°C / HRC*	°C / HRC*	°C / HRC*	°C / HRC*	°C / HRC*	
ARN	Arne	650	820	200 / 60								Solids >30 mm should be avoided
BAL-G	Balder	550		Gas nitr. ¹⁾								¹⁾ 525°C - hardness 1100 HV
BUR	Bure	650	1030 / 30							560 / 52		
CAL	Caldie	650	1030 / 30			540 / 60				540 / 60		
CAM	Calmax	650	960 / 30	250 / 57								
COR	Corrax	-	-	-		575 / 46						To be tempered 1 x 4 hours
DIE	Dievar	650	1030 / 30			580 / 52				600 / 48		
ELM	Elmax	650	1080 / 30	250 / 58								
FOR	Formvar	650	1030 / 30			580 / 52				600 / 48		
IMP-G	Impax Sup.	550		Gas nitr. ²⁾								²⁾ 525°C - hardness 700 HV
M2	M2	650	1180 / 15							560 / 64		To be tempered 3 x 1 hour
MIR	Mirrax ESR	650	1030 / 30	250 / 50								Contact us by cross sections >100 mm
NIM	Nimax	500		Plasma nitr. ³⁾								³⁾ 480°C – 10 h – hardness 950 HV
OR2	Orvar 2 M	650	1030 / 30			600 / 48	620 / 44	620 / 44				
ORS-A	Orvar Sup.	650	1030 / 30			600 / 48	620 / 44	620 / 44				
ORS-B	Orvar Sup.	650	1030 / 30			580 / 52		580 / 52				
ORS-C	Orvar Sup.	650	1030 / 30			610 / 46		610 / 46				
ORS-D	Orvar Sup.	650	1030 / 30					600 / 48				
Q9S	QRO 90 Sup.	650	1030 / 30			610 / 46		610 / 46				
RIG	Rigor	650	960 / 30	250 / 59								
SLE-A	Sleipner	650	1030 / 30			540 / 61		540 / 61				
SLE-B	Sleipner	650	1060 / 30					540 / 63				
STA	Stavax ESR	650	1030 / 30	250 / 52								
SV3	Sverker 3	650	960 / 30	250 / 62								
SV21-A	Sverker 21	650	1030 / 30	180 / 61								
SV21-B	Sverker 21	650	1060 / 30			525 / 60						
TYR	Tyrax ESR	650	1060 / 30	200 / 57								⁵⁾
UNI	Unimax	650	1030 / 30			525 / 57		525 / 57				
VA4E-A	Vanadis 4 E	650	1030 / 30			525 / 61		525 / 61				Is replaced by VA4E-D
VA4E-B	Vanadis 4 E	650	1100 / 30					540 / 63				
VA4E-C	Vanadis 4 E	650	1150 / 15					540 / 64				
VA4E-D	Vanadis 4 E	650	1060 / 30					540 / 62				
VA8-A	Vanadis 8	650	1060 / 30					540 / 61				To be tempered 3 x 1 hour
VA8-B	Vanadis 8	650	1100 / 30					540 / 63				To be tempered 3 x 1 hour
VA8-C	Vanadis 8	650	1180 / 15					540 / 64				To be tempered 3 x 1 hour
VA10-A	Vanadis 10	650	1150 / 15					540 / 64				
VA23-A	Vanadis 23	650	1100 / 30					560 / 63				To be tempered 3 x 1 hour
VA30-B	Vanadis 30	650	1100 / 30					560 / 65				To be tempered 3 x 1 hour
VA60	Vanadis 60	650	1180 / 10					560 / 68				To be tempered 3 x 1 hour
VANA	Vanax	650	1080 / 30	200 / 60								To be tempered 2 x 2 hours ^{4) 5)}
VANC	Vancron	650	1060 / 30					540 / 62				To be tempered 3 x 1 hour ⁴⁾

*Hardness stated with a tolerance +/- 2 HRC

⁴⁾ Margin for finishing to exact dimensions min. 0,3 mm

⁵⁾ Sub-zero treatment -100°C

Guide:

Select the material and process in the matrix. Example: Sleipner is tempered 2 times at 540°C to 61 HRC. The code will end up as **SLE-A-3**.

Remarks:

Where nothing else is mentioned, the process is done by vacuum heat treatment at 3-6 bar. Step quenching is used by big dimensions (thickness >80 mm) and by difficult geometries.

Stress relieving maximum 25°C below the last tempering temperature from the hardening process. Holding time when fully heated through, 2 hours.

Please contact voestalpine HPM Denmark A/S if there are questions regarding the above, or if the task requires a special heat treatment.