

GENERAL HEAT TREATMENT OF UDDEHOLM STEEL GRADES IN STANDARD CODES

EDITED ENGLISH VERSION NO. 24 - 2021.11.09

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*	
ARN	Arne	650	820	200 / 60				Solids >30 mm should be avoided
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
ORS-A	Orvar Sup./2 M	650	1030 / 30		600 / 48	620 / 44	620 / 44	
ORS-B	Orvar Sup./2 M	650	1030 / 30		580 / 52		580 / 52	
ORS-C	Orvar Sup./2 M	650	1030 / 30		610 / 46		610 / 46	
ORS-D	Orvar Sup./2 M	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-A	Tyrax ESR	650	1060 / 30	200 / 57				⁵⁾
TYR-B	Tyrax ESR	650	1060 / 30	250 / 55				⁵⁾ ⁶⁾
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

⁶⁾ In connection with subsequent low temperature PVD-coating

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 minimum 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.