

Claims

1. A hot work tool steel for hot forging, press hardening, die casting or hot extrusion consisting of in weight % (wt.%):

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	C	0.5 - 0.9
	Si	0.03 - 0.8
	Mn	0.1 - 1.8
	Cr	4.0 - 6.6
10	Mo	1.8 - 3.5
	V	1.3 - 2.3
	Al	≤ 0.1
	N	≤ 0.12
	Ni	≤ 1
15	W	≤ 1
	Co	≤ 5
	Cu	≤ 1
	Nb	≤ 0.1
	Ti	≤ 0.05
20	Zr	≤ 0.05
	Ta	≤ 0.05
	B	≤ 0.01
	Ca	≤ 0.01
	Mg	≤ 0.01
25	REM	≤ 0.2
	balance Fe and impurities.	

2. A hot work tool steel according to claim 1, wherein the steel fulfils at least one of the following requirements:

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C	0.6 - 0.8
Si	0.05 - 0.6

	Mn	0.2 - 0.8
	Cr	4.4 – 5.6
	Mo	2.0 – 2.5
	V	1.5 - 1.9
5	Al	≤ 0.05
	N	≤ 0.08
	Ni	≤ 0.5
	W	≤ 0.5
	Co	≤ 2
10	Cu	≤ 0.5
	Nb	≤ 0.05
	Ti	≤ 0.01
	Zr	≤ 0.01
	Ta	≤ 0.01
15	B	≤ 0.006
	Ca	≤ 0.005
	Mg	≤ 0.005
	REM	≤ 0.1

- 20 3. A hot work tool steel according to claim 1 or 2, wherein the steel fulfils at least one of the following requirements:

	C	0.65 - 0.75
	Si	0.15 - 0.5
25	Mn	0.4 - 0.5
	Cr	4.9 – 5.1
	Mo	2.2 – 2.3
	V	1.5 - 1.7
	Al	≤ 0.03
30	N	≤ 0.05
	Ni	0.25
	W	≤ 0.2

	Co	≤ 1
	Cu	≤ 0.2
	Nb	≤ 0.005
	Ti	≤ 0.005
5	Zr	≤ 0.005
	Ta	≤ 0.005
	REM	≤ 0.05

4. A hot work tool steel according to any of the preceding claims, wherein the steel
 10 comprises carbides having a size of $\geq 1 \mu\text{m}$ and fulfils at least one of the following requirements concerning the amounts of carbides in volume %:

	VC	0.2 – 4
	M ₆ C	≤ 2
15	M ₇ C ₃	≤ 2

5. A hot work tool steel according to claim 4, wherein the steel comprises carbides
 having a size of $\geq 1 \mu\text{m}$ and fulfils at least one of the following requirements
 concerning the amounts of carbides in volume %:

20	VC	0.5 – 3
	M ₆ C	≤ 0.5
	M ₇ C ₃	≤ 0.5

- 25 6. A hot work tool steel according to claim 5, wherein the steel comprises carbides
 having a size of $\geq 1 \mu\text{m}$ and fulfils at least one of the following requirements
 concerning the amounts of said carbides in volume %:

	VC	1.5 – 2.3
30	M ₆ C	≤ 0.1
	M ₇ C ₃	≤ 0.1

7. A hot work tool steel according to any of the preceding claims, wherein the steel after hardening and tempering has a hardness of 55-57 HRC and wherein the steel fulfils at least one of the following requirements:

5	Rp0.2	≥ 1750 MPa
	Rm	≥ 2100 MPa
	A5	≥ 6 %
	Z	≥ 20 %

- 10 a cleanliness fulfilling the following maximum requirements with respect to micro-slag according to ASTM E45-97, Method A, Plate I-r:

A	A	B	B	C	C	D	D
T	H	T	H	T	H	T	H
1.0	0	1.5	1.0	0	0	1.5	1.0

8. A hot work tool steel according to any of the preceding claims, wherein the steel fulfils at least one of the following requirements:

	C	0.66 - 0.75
	Si	0.15 - 0.25
	Mo	2.2 - 2.3
20	V	1.52 - 1.68
	Al	0.001 - 0.03
	N	≤ 0.05
	W	≤ 0.1
	Co	≤ 1
25	Cu	≤ 0.15
	Nb	≤ 0.005
	Ti	≤ 0.005
	Zr	≤ 0.005

9. A steel according to any of claims 1-3, wherein the steel is soft annealed and has a mean hardness of ≤ 360 HBW, and wherein the steel has a thickness of at least 100 mm and the maximum deviation from the mean Brinell hardness value in the thickness direction measured in accordance with ASTM E10-01 is less than 10 %, preferably less than 5 %, and wherein the minimum distance of the centre of the indentation from the edge of the specimen or edge of another indentation shall be at least two and a half times the diameter of the indentation and the maximum distance shall be no more than 4 times the diameter of the indentation.
10. Use of a steel according to any of the preceding claims as a tool for hot forging, press hardening, die casting, high pressure die casting or hot extrusion.