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**Vulcan Expert calibration datasheets**

January 2017

**VULCAN**



## Aluminium alloys

Element	Mg	Al	Si	Cr	Mn	Fe	Ni	Cu	Zn	Zr	Pb
Calibration range	0 - 10.2	79.7 - 100	0 - 18.7	0 - 0.5	0 - 1.3	0 - 1.2	0 - 1.8	0 - 8.0	0 - 8.0	0 - 0.3	0 - 1.1
Error, wt. %	0.15	0.48	0.33	0.03	0.03	0.06	0.08	0.20	0.15	0.03	0.03

## Magnesium alloys

Element	Mg	Al	Mn	Cu	Zn
Calibration range	82.4 - 100	0 - 12.4	0 - 1.8	0 - 2.9	0 - 6.8
Error, wt. %	0.90	0.44	0.21	0.05	0.48

**Error %:** Typical difference between measured value and certified reference value when large set of test samples are measured with multiple production instruments. Notice that performance of individual instrument may differ slightly.

**Calibration range:** Concentration range of the standards used in calibration.

## Stainless steels

Element	Al	Si	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Nb	Mo
Calibration range	0 - 1.2	0 - 4.0	0 - 2.2	0 - 0.5	0 - 27.4	0 - 9.7	36 - 88.7	0 - 17.0	0 - 37.4	0 - 3.4	0 - 1.5	0 - 6.2
Error, wt. %	0.03	0.23	0.03	0.04	0.45	0.14	0.96	0.23	0.44	0.07	0.06	0.17

## Low alloy steels

Element	Al	Si	Ti	V	Cr	Mn	Fe	Ni	Cu	Nb	Mo
Calibration range	0 - 1.0	0 - 1.4	0 - 0.3	0 - 0.8	0 - 8.8	0 - 2.2	88.7 - 100	0 - 5.3	0 - 0.6	0 - 0.1	0 - 1.3
Error, wt. %	0.04	0.11	0.03	0.02	0.18	0.04	0.27	0.09	0.02	0.04	0.11

## Tool steels

Element	Si	V	Cr	Mn	Fe	Co	Ni	Cu	Mo	W
Calibration range	0 - 2.1	0 - 4.9	0 - 12.0	0 - 2.3	69.6 - 95.8	0 - 8.0	0 - 1.5	0 - 0.3	0 - 9.4	0 - 18.1
Error, wt. %	0.21	0.08	0.20	0.08	1.13	0.26	0.12	0.05	0.15	0.75

**Error %:** Typical difference between measured value and certified reference value when large set of test samples are measured with multiple production instruments. Notice that performance of individual instrument may differ slightly.

**Calibration range:** Concentration range of the standards used in calibration.



## Nickel alloys

Element	Al	Si	Ti	Cr	Mn	Fe	Co	Ni	Cu	Nb	Mo	W
Calibration range	0 - 6.0	0 - 3.9	0 - 5.2	0 - 29.5	0 - 1.8	0 - 46.0	0 - 19.0	31.3 - 100	0 - 33.0	0 - 5.1	0 - 26.5	0 - 14.1
Error, wt. %	0.09	0.25	0.15	0.93	0.08	1.04	0.37	1.35	0.32	0.07	0.82	0.53

## Copper alloys

Element	Be	Al	Si	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ag	Sn	Pb	Bi
Calibration range	0 - 1.9	0 - 13.5	0 - 3.6	0 - 0.7	0 - 3.0	0 - 4.1	0 - 2.2	0 - 30.2	60.0 - 100.0	0 - 39.3	0 - 0.7	0 - 12.6	0 - 11.7	0 - 6.5
Error, wt. %	0.02	0.23	0.23	0.03	0.07	0.20	0.12	0.22	1.04	0.45	0.02	0.44	0.46	0.36

## Titanium alloys

Element	Al	Ti	V	Cr	Mn	Fe	Zr	Nb	Mo	Sn
Calibration range	0 - 6.3	73.8 - 100	0 - 15.0	0 - 6.3	0 - 2.0	0 - 1.2	0 - 4.1	0 - 6.9	0 - 6.2	0 - 3.1
Error, wt. %	0.22	0.97	0.14	0.14	0.20	0.10	0.16	0.46	0.23	0.71

**Error %:** Typical difference between measured value and certified reference value when large set of test samples are measured with multiple production instruments. Notice that performance of individual instrument may differ slightly.

**Calibration range:** Concentration range of the standards used in calibration.



## Zinc alloys

Element	Al	Fe	Cu	Zn	Sn	Pb
Calibration range	0 - 4.5	0 - 0.5	0 - 1.5	94.7 - 100	0 - 0.1	0 - 1.0
Error, wt. %	0.18	0.12	0.02	0.78	0.03	0.08

## Cobalt alloys

Element	Si	Ti	Cr	Mn	Fe	Co	Ni	Nb	Mo	W
Calibration range	0 - 0.8	0 - 3.0	19 - 30.6	0 - 1.9	0 - 15.2	23.4 - 63.8	0 - 25.7	0 - 2.4	0 - 7.9	0 - 15.1
Error, wt. %	0.15	0.08	1.05	0.08	0.24	1.43	0.51	0.16	0.18	0.77

**Error %:** Typical difference between measured value and certified reference value when large set of test samples are measured with multiple production instruments. Notice that performance of individual instrument may differ slightly.

**Calibration range:** Concentration range of the standards used in calibration.



## Lead alloys

Element	Sn	Sb	Pb
Calibration range	0 - 10.1	0 - 9.6	89.9 - 100
Error, wt. %	0.17	0.20	0.29

## Tin alloys

Element	Cu	Ag	Sn	Sb	Pb	Bi
Calibration range	0 - 8.0	0 - 4.0	83.1 - 100	0 - 8.3	0 - 0.3	0 - 1.1
Error, wt. %	0.40	0.09	0.81	0.24	0.09	0.02

## Lead + Tin alloys

Element	Ag	Sn	Pb
Calibration range	0 - 2.0	30.9 - 62.4	35.7 - 68.4
Error, wt. %	0.04	1.52	1.54

**Error %:** Typical difference between measured value and certified reference value when large set of test samples are measured with multiple production instruments. Notice that performance of individual instrument may differ slightly.

**Calibration range:** Concentration range of the standards used in calibration.