## Typ K

Temperaturbereich

-270°C bis 0°C

$$E = \sum_{i=1}^{n} a_i \, (t_{90})^i \mu V$$

mit

$a_1 = 3{,}945\,012\,802\,5 \times 10^{1}$
$a_2 = 2{,}362\,237\,359\,8 \times 10^{-2}$
$a_3 = -3{,}285\,890\,678\,4 \times 10^{-4}$
$a_4 = -4{,}990\,482\,877\,7 \times 10^{-6}$
$a_5 = -6{,}750\,905\,917\,3 \times 10^{-8}$
$a_6 = -5{,}741\,032\,742\,8 \times 10^{-10}$
$a_7 = -3{,}108\,887\,289\,4 \times 10^{-12}$
$a_8 = -1{,}045\,160\,936\,5 \times 10^{-14}$
$a_9 = -1{,}988\,926\,687\,8 \times 10^{-17}$
$a_{10} = -1{,}632\,269\,748\,6 \times 10^{-20}$

0°C bis 1372°C

$$E = b_0 + \sum_{i=1}^{n} b_i (t_{90})^i + c_0 \exp[c_1 (t_{90} - 126.9686)^2] \mu V$$

mit

$b_0 = -1{,}760\,041\,368\,6 \times 10^{1}$
$b_1 = 3{,}892\,120\,497\,5 \times 10^{1}$
$b_2 = 1{,}855\,877\,003\,2 \times 10^{-2}$
$b_3 = -9{,}945\,759\,287\,4 \times 10^{-5}$
$b_4 = 3{,}184\,094\,571\,9 \times 10^{-7}$
$b_5 = -5{,}607\,284\,488\,9 \times 10^{-10}$
$b_6 = 5{,}607\,505\,905\,9 \times 10^{-13}$
$b_7 = -3{,}202\,072\,000\,3 \times 10^{-16}$
$b_8 = 9{,}715\,114\,715\,2 \times 10^{-20}$
$b_9 = -1{,}210\,472\,127\,5 \times 10^{-23}$

$c_0 = 1{,}185\,976 \times 10^{2}$
$c_1 = -1{,}183\,432 \times 10^{-4}$

## Typ T

Temperaturbereich

-270°C bis 0°C

$$E = \sum_{i=1}^{n} a_i (t_{90})^i \mu V$$

mit

$a_1 = 3{,}874\,810\,636\,4 \times 10^{1}$
$a_2 = 4{,}419\,443\,434\,7 \times 10^{-2}$
$a_3 = 1{,}184\,432\,310\,5 \times 10^{-4}$
$a_4 = 2{,}003\,297\,355\,4 \times 10^{-5}$
$a_5 = 9{,}013\,801\,955\,9 \times 10^{-7}$
$a_6 = 2{,}265\,115\,659\,3 \times 10^{-8}$
$a_7 = 3{,}607\,115\,420\,5 \times 10^{-10}$
$a_8 = 3{,}849\,393\,988\,3 \times 10^{-12}$
$a_9 = 2{,}821\,352\,192\,5 \times 10^{-14}$
$a_{10} = 1{,}425\,159\,477\,9 \times 10^{-16}$
$a_{11} = 4{,}876\,866\,228\,6 \times 10^{-19}$
$a_{12} = 1{,}079\,553\,927\,0 \times 10^{-21}$
$a_{13} = 1{,}394\,502\,706\,2 \times 10^{-24}$
$a_{14} = 7{,}979\,515\,392\,7 \times 10^{-28}$

0°c bis 400°C

$$E = \sum_{i=1}^{n} a_i (t_{90})^i \mu V$$

mit

$a_1 = 3{,}874\,810\,636\,4 \times 10^{1}$
$a_2 = 3{,}329\,222\,788\,0 \times 10^{-2}$
$a_3 = 2{,}061\,824\,340\,4 \times 10^{-4}$
$a_4 = -2{,}188\,225\,684\,6 \times 10^{-6}$
$a_5 = 1{,}099\,688\,092\,8 \times 10^{-8}$
$a_6 = -3{,}081\,575\,877\,2 \times 10^{-11}$
$a_7 = 4{,}547\,913\,529\,0 \times 10^{-14}$
$a_8 = -2{,}751\,290\,167\,3 \times 10^{-17}$

## Typ J

Temperaturbereich

-210°C bis 760°C

$$E = \sum_{i=1}^{n} a_i \, (t_{90})^i \mu V$$

mit

$a_1 = 5{,}038\,118\,781\,5 \times 10^{1}$
$a_2 = 3{,}047\,583\,693\,0 \times 10^{-2}$
$a_3 = -8{,}568\,106\,572\,0 \times 10^{-5}$
$a_4 = 1{,}322\,819\,529\,5 \times 10^{-7}$
$a_5 = -1{,}705\,295\,833\,7 \times 10^{-10}$
$a_6 = 2{,}094\,809\,069\,7 \times 10^{-13}$
$a_7 = -1{,}253\,839\,533\,6 \times 10^{-16}$
$a_8 = 1{,}563\,172\,569\,7 \times 10^{-20}$

760°C bis 1200°C

$$E = \sum_{i=0}^{n} a_i \, (t_{90})^i \mu V$$

mit

$a_0 = 2{,}964\,562\,568\,1 \times 10^{5}$
$a_1 = -1{,}497\,612\,778\,6 \times 10^{3}$
$a_2 = 3{,}178\,710\,392\,4$
$a_3 = -3{,}184\,768\,670\,1 \times 10^{-3}$
$a_4 = 1{,}572\,081\,900\,4 \times 10^{-6}$
$a_5 = -3{,}069\,136\,905\,6 \times 10^{-10}$

## Typ N

Temperaturbereich

-270°C bis 0°C

$$E = \sum_{i=1}^{n} a_i (t_{90})^i \mu V$$

mit

$a_1 = 2{,}615\,910\,596\,2 \times 10^{1}$
$a_2 = 1{,}095\,748\,422\,8 \times 10^{-2}$
$a_3 = -9{,}384\,111\,155\,4 \times 10^{-5}$
$a_4 = -4{,}641\,203\,975\,9 \times 10^{-8}$
$a_5 = -2{,}630\,335\,771\,6 \times 10^{-9}$
$a_6 = -2{,}265\,343\,800\,3 \times 10^{-11}$
$a_7 = -7{,}608\,930\,079\,1 \times 10^{-14}$
$a_8 = -9{,}341\,966\,783\,5 \times 10^{-17}$

0°C bis 1300°C

$$E = \sum_{i=1}^{n} a_i (t_{90})^i \mu V$$

mit

$a_1 = 2{,}592\,939\,460\,1 \times 10^{1}$
$a_2 = 1{,}571\,014\,188\,0 \times 10^{-2}$
$a_3 = 4{,}382\,562\,723\,7 \times 10^{-5}$
$a_4 = -2{,}526\,116\,979\,4 \times 10^{-7}$
$a_5 = 6{,}431\,181\,933\,9 \times 10^{-10}$
$a_6 = -1{,}006\,347\,151\,9 \times 10^{-12}$
$a_7 = 9{,}974\,533\,899\,2 \times 10^{-16}$
$a_8 = -6{,}086\,324\,560\,7 \times 10^{-19}$
$a_9 = 2{,}084\,922\,933\,9 \times 10^{-22}$
$a_{10} = -3{,}068\,219\,615\,1 \times 10^{-26}$

## Typ E

Temperaturbereich

-270°C bis 0°C

$$E = \sum_{i=1}^{n} a_i (t_{90})^i \mu V$$

mit

$a_1 = 5{,}866\,550\,870\,8 \times 10^{1}$
$a_2 = 4{,}541\,097\,712\,4 \times 10^{-2}$
$a_3 = -7{,}799\,804\,868\,6 \times 10^{-4}$
$a_4 = -2{,}580\,016\,084\,3 \times 10^{-5}$
$a_5 = -5{,}945\,258\,305\,7 \times 10^{-7}$
$a_6 = -9{,}321\,405\,866\,7 \times 10^{-9}$
$a_7 = -1{,}028\,760\,553\,4 \times 10^{-10}$
$a_8 = -8{,}037\,012\,362\,1 \times 10^{-13}$
$a_9 = -4{,}397\,949\,739\,1 \times 10^{-15}$
$a_{10} = -1{,}641\,477\,635\,5 \times 10^{-17}$
$a_{11} = -3{,}967\,361\,951\,6 \times 10^{-20}$
$a_{12} = -5{,}582\,732\,872\,1 \times 10^{-23}$
$a_{13} = -3{,}465\,784\,201\,3 \times 10^{-26}$

0°C bis 1000°C

$$E = \sum_{i=1}^{n} a_i (t_{90})^i \mu V$$

mit

$a_1 = 5{,}866\,550\,871\,0 \times 10^{1}$
$a_2 = 4{,}503\,227\,558\,2 \times 10^{-2}$
$a_3 = 2{,}890\,840\,721\,2 \times 10^{-5}$
$a_4 = -3{,}305\,689\,665\,2 \times 10^{-7}$
$a_5 = 6{,}502\,440\,327\,0 \times 10^{-10}$
$a_6 = -1{,}919\,749\,550\,4 \times 10^{-13}$
$a_7 = -1{,}253\,660\,049\,7 \times 10^{-15}$
$a_8 = 2{,}148\,921\,756\,9 \times 10^{-18}$
$a_9 = -1{,}438\,804\,178\,2 \times 10^{-21}$
$a_{10} = 3{,}596\,089\,948\,1 \times 10^{-25}$

## Typ R

Temperaturbereich

-50°C bis 1064,18°C

$$E = \sum_{i=1}^{n} a_i (t_{90})^i \mu V$$

mit

$a_1 = 5{,}289\,617\,297\,65$
$a_2 = 1{,}391\,665\,897\,82 \times 10^{-2}$
$a_3 = -2{,}388\,556\,930\,17 \times 10^{-5}$
$a_4 = 3{,}569\,160\,010\,63 \times 10^{-8}$
$a_5 = -4{,}623\,476\,662\,98 \times 10^{-11}$
$a_6 = 5{,}007\,774\,410\,34 \times 10^{-14}$
$a_7 = -3{,}731\,058\,861\,91 \times 10^{-17}$
$a_8 = 1{,}577\,164\,823\,67 \times 10^{-20}$
$a_9 = -2{,}810\,386\,252\,51 \times 10^{-24}$

1064,18°C bis 1664,5°C

$$E = \sum_{i=0}^{n} a_i (t_{90})^i \mu V$$

mit

$a_0 = 2{,}951\,579\,253\,16 \times 10^{3}$
$a_1 = -2{,}520\,612\,513\,32$
$a_2 = 1{,}595\,645\,018\,65 \times 10^{-2}$
$a_3 = -7{,}640\,859\,475\,76 \times 10^{-6}$
$a_4 = 2{,}053\,052\,910\,24 \times 10^{-9}$
$a_5 = -2{,}933\,596\,681\,73 \times 10^{-13}$

1664,5°C bis 1768,1°C

$$E = \sum_{i=0}^{n} a_i (t_{90})^i \mu V$$

mit

$a_0 = 1{,}522\,321\,182\,09 \times 10^{5}$
$a_1 = -2{,}688\,198\,885\,45 \times 10^{2}$
$a_2 = 1{,}712\,802\,804\,71 \times 10^{-1}$
$a_3 = -3{,}458\,957\,064\,53 \times 10^{-5}$
$a_4 = -9{,}346\,339\,710\,46 \times 10^{-12}$

## Typ S

Temperaturbereich

-50°C bis 1064,18°C

$$E = \sum_{i=1}^{n} a_i (t_{90})^i \mu V$$

mit

$a_1 = 5{,}403\,133\,086\,31$
$a_2 = 1{,}259\,342\,897\,40 \times 10^{-2}$
$a_3 = -2{,}324\,779\,686\,89 \times 10^{-5}$
$a_4 = 3{,}220\,288\,230\,36 \times 10^{-8}$
$a_5 = -3{,}314\,651\,963\,89 \times 10^{-11}$
$a_6 = 2{,}557\,442\,517\,86 \times 10^{-14}$
$a_7 = -1{,}250\,688\,713\,93 \times 10^{-17}$
$a_8 = 2{,}714\,431\,761\,45 \times 10^{-21}$

1064,18°C bis 1664,5°C

$$E = \sum_{i=0}^{n} a_i (t_{90})^i \mu V$$

mit

$a_0 = 1{,}329\,004\,440\,85 \times 10^{3}$
$a_1 = 3{,}345\,093\,113\,44$
$a_2 = 6{,}548\,051\,928\,18 \times 10^{-3}$
$a_3 = -1{,}648\,562\,592\,09 \times 10^{-6}$
$a_4 = 1{,}299\,896\,051\,74 \times 10^{-11}$

1664,5°C bis 1768,1°C

$$E = \sum_{i=0}^{n} a_i (t_{90})^i \mu V$$

mit

$a_0 = 1{,}466\,282\,326\,36 \times 10^{5}$
$a_1 = -2{,}584\,305\,167\,52 \times 10^{2}$
$a_2 = 1{,}636\,935\,746\,41 \times 10^{-1}$
$a_3 = -3{,}304\,390\,469\,87 \times 10^{-5}$
$a_4 = -9{,}432\,236\,906\,12 \times 10^{-12}$

## Typ B

Temperaturbereich

0°C bis 630,615°C

$$E = \sum_{i=1}^{n} a_i (t_{90})^i \mu V$$

mit

$a_1 = -2{,}465\,081\,834\,6 \times 10^{-1}$
$a_2 = 5{,}904\,042\,117\,1 \times 10^{-3}$
$a_3 = -1{,}325\,793\,163\,6 \times 10^{-6}$
$a_4 = 1{,}566\,829\,190\,1 \times 10^{-9}$
$a_5 = -1{,}694\,452\,924\,0 \times 10^{-12}$
$a_6 = 6{,}299\,034\,709\,4 \times 10^{-16}$

630,615°C bis 1820°C

$$E = \sum_{i=0}^{n} a_i (t_{90})^i \mu V$$

mit

$a_0 = -3{,}893\,816\,862\,1 \times 10^{3}$
$a_1 = 2{,}857\,174\,747\,0 \times 10^{1}$
$a_2 = -8{,}488\,510\,478\,5 \times 10^{-2}$
$a_3 = 1{,}578\,528\,016\,4 \times 10^{-4}$
$a_4 = -1{,}683\,534\,486\,4 \times 10^{-7}$
$a_5 = 1{,}110\,979\,401\,3 \times 10^{-10}$
$a_6 = -4{,}451\,543\,103\,3 \times 10^{-14}$
$a_7 = 9{,}897\,564\,082\,1 \times 10^{-18}$
$a_8 = -9{,}379\,133\,028\,9 \times 10^{-22}$