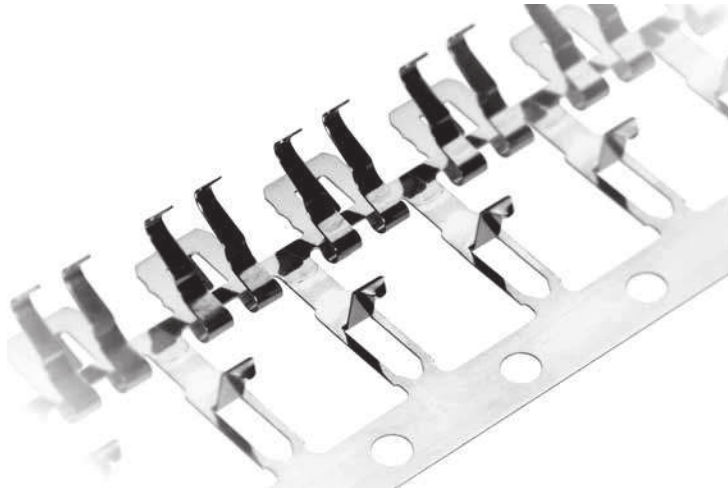


# HIGH STRENGTH CONTACT SPRING MATERIAL DURACON® 17A



## MAIN PROPERTIES (typical values):

High strength:

- tensile strength up to **1800 MPa**
- bending fatigue strength up to **800 MPa**

Excellent bending properties:

- ratio of bending radius to strip thickness < **0.5**

Excellent relaxation behaviour at high temperatures up to

**250 °C**

**Free of beryllium**

Age-hardening optional

## ALLOY

### COMPOSITION (wt. %)

Co	Ni	Fe
17	28	balance

DURACON 17A is an age-hardenable FeNiCo spring alloy characterised by good electrical and thermal conductivity due to phase transition during the cold working production step. The material also features excellent strength values without additions such as beryllium, which are harmful to the environment and pose a health hazard.

Two material states are supplied to meet customers' specifications. When selecting the „hard“ delivery state, age-hardening the spring alloys is recommended in order to attain maximum strength and the highest possible temperature resistance up to 250 °C. The „heat-treated“ delivery state is equivalent to a mill hardened quality. It enables application temperatures up to 200 °C without aging the parts.

Both states of delivery exhibit excellent bending behaviour which is not attained with comparable high strength materials (e.g. CuBe2). This property facilitates extremely small bending radii and opens up new possibilities in economizing on material and space.

## APPLICATIONS:

Contacts, connectors, switches, relays etc, in particular in the very low current range, with maximum requirements on miniaturization and/or temperature behaviour. Miniature contact elements for telecommunications and spring contacts in thermal switches and connectors in the close vicinity of the engine in the automotive industry, are particularly good examples.

## FORMS OF SUPPLY AND DELIVERY STATES:

Strip in thicknesses of 0.05 – 0.3 mm

Standard states of delivery „hard“ and „heat-treated“ (corresponds to mill hardened grade)

Other dimensions and states on request

## MECHANICAL PROPERTIES (typical values)

Property	Unit	State of Delivery	
		heat-treated	hard (before / <b>after</b> age-hardening*)
Tensile strength	$R_m$ (MPa)	1150	1150 / <b>1800</b>
Yield strength	$R_{p0.2}$ (MPa)	1100	1100 / <b>1650</b>
Bending fatigue strength ( $10^7$ load cycles)	$\sigma_B$ (MPa)	> 600	> 600 / > <b>800</b>
Elongation	$A_{L50}$ (%)	1	1 / <b>2</b>
Hardness	HV	330	330 / <b>480</b>
Ratio bending radius: strip thickness ( $\perp$ and $\parallel$ to rolling direction 90 and 180° bending)**	r/d	< 0.5	< 0.5 / -

\*) depending on the age-hardening temperature and duration. Recommended age-hardening conditions 2h, 430 °C

\*\*) evaluated on strip thickness 0.2 mm

## PHYSICAL PROPERTIES (typical values)

Property	Unit	State of Delivery	
		heat-treated	hard (before / <b>after</b> age-hardening*)
Density	$\rho$ (g/cm <sup>3</sup> )	8.3	8.3 / <b>8.3</b>
Thermal expansion Coefficient	$\alpha$ (10 <sup>-6</sup> 1/K)	11	11 / <b>11</b>
Magnetism			ferromagnetic
Young's modulus (parallel to rolling direction)**	E (GPa)	150	150 / <b>180</b>
Shear modulus (parallel to rolling direction)**	G (GPa)	55	55 / <b>70</b>
Electrical conductivity	$\sigma$ (MS/m) (% IACS)	6 10	6 / <b>6</b> 10 / <b>10</b>
Thermal conductivity	$\lambda$ (W/mK)	> 50	> 50 / > <b>55</b>

\*) depending on the age-hardening temperature and duration. Recommended age-hardening conditions 2h, 430 °C

\*\*) perpendicular to rolling direction  
approx. 20% higher.

## TEMPERATURE BEHAVIOUR (typical values)

500 MPa initial stress, 20% relaxation		Unit	heat-treated	State of Delivery hard (before / <b>after</b> age-hardening*)
max.	exposure time	(° C)	200	135 / <b>250</b>
application temp.	1000 h	(° C)	190	120 / <b>225</b>
	3000 h	(° C)	180	110 / <b>220</b>

\*) depending on the age-hardening temperature and duration. Recommended age-hardening conditions 2h, 430 °C

