



# DOUBLE END STUDS

## with reduced shank and with hexagon nuts

**Material quality:** low temperature resistant, high temperature resistant, high-pressure hydrogenation, corrosion resistant and anti-magnetic (permeability  $\leq 1,05G/Oe$ ).

**High requirements:** by means of annealed, normalized, carbide-solution, quenched and tempered, warm-cold formed and precipitation hardened.

**Quality:** double end studs are manufactured by approval of TÜV and also acc. to AD regulation WO and TRD sheet 100. When ordering double end studs please mention always the material code (see markingsigns table below), the associated hexagon nuts are supplied separately. The packaging and packinglist are only mentioned by the material code of the bolts. For applications and calculations of double end studs at pressure vessels see AD-Merkblatt B7 from "Arbeitsgemeinschaft Druckbehälter".

**Application:** double end studs are generally applied in the stringent construction sectors like nuclear reactors and -technology, turbines, boilers, high-pressure tanks, high-capacity chemical vessels, chemical apparatus, shipbuilding, oil industry, petrochemistry, refrigeration plants, pipelines, instruments, motor construction and offshore technics.

**Certificates:** upon special request the inspection certificates 3.1 A, 3.1 B and 3.1 C can be delivered acc. to DIN 50049 ( $\approx$  EN 10204).

### OPERATION TEMPERATURE RANGES AND BOLT/NUT COMBINATIONS

SPECS.	STANDARD VALUES	MATERIALNUMBERS AND MARKINGSIGNS			
		BOLTS		NUTS	
DIN 267-13 / AD MERKBLATT W 7 / DIN 17240	+ 700°C	2.4952	SB	2.4952	SB
	+ 650°C	1.4986	S	1.4986	S
		1.4980	SD	1.4980	SD
	+ 580°C	1.4923	V	1.4923	V
		1.4913	VW	1.4923	V
	+ 540°C	1.7709	GA	1.7709	GA
	+ 500°C	1.7709	<b>GA</b>	1.7258	<b>G</b>
		1.7711	GB	1.7709	GA
	+ 400°C	1.7258	G	1.7258	G
		1.7258	<b>G</b>	1.1181	<b>YK</b>
+ 350°C	1.1181	<b>YK</b>	1.1181	<b>YK</b>	
	1.1181	YK	1.0501	Y	
DIN 267-13 / ISO 898-1	+ 300°C	8.8			
	- 10°C	5.6			
		4.6-2			
DIN 267-13 / AD MERKBLATT W 10 / DIN 17280	- 60°C	1.7219	KA	1.7219	KA
	- 120°C	1.5680	KB	1.5680	KB
	- 196°C	1.6906	-	1.6909	-

### MATERIAL PROPERTIES ①

Marking-sign	Designation	Important elements				Max.continu temperature	Tensile N/mm <sup>2</sup>	Yield min. N/mm <sup>2</sup>	Stretch % min.	Notched bar process Joule
		C	Cr	Mo	V					
<b>YK</b>	C 35	0,32-0,39	-	-	-	+ 350°C ②	500-650	280	22	55
<b>G</b>	24 CrMo 5	0,20-0,28	0,90-1,20	0,20-0,35	-	+ 400°C ③	660-750	440	18	103
<b>GA</b>	21 CrMoV 57	0,17-0,25	1,20-1,50	0,65-0,80	0,25-0,35	+ 540°C	700-850	550	16	69

① Material properties of double end studs and nuts acc. to DIN 267-13 and DIN 17240.

② For hexagon nuts the normal limit for application in continuous operation can be 50°C higher.

③ Divergent to DIN 17240 the standard DIN 2507, permits higher temperatures for pipelines.

For technical data concerning certificates, see section 15.