



Spheroidal Graphite Cast Irons Technical Data

	Standard	Material designation																					
		EN-GJS- 350-22 LT (EN-JS1015)	EN-GJS- 400-18 LT (EN-JS1025)	EN-GJS- 400-18 (EN-JS1020)	EN-GJS- 400-15 (EN-JS1030)	EN-GJS- 450-10 (EN-JS1040)	EN-GJS- 500-7 (EN-JS1050)	EN-GJS- 600-3 (EN-JS1060)	EN-GJS- 700-2 (EN-JS1070)	EN-GJS- 800-2 (EN-JS1080)													
Spheroidal Graphite Cast Irons	BS EN 1563 (1997)																						
Characteristic	SI unit																						
Tensile strength R_m (min)	N/mm ²	350	400	400	400	450	500	600	700	800	not specified												
0,2 % proof stress $R_{p0.2}$ (min)	N/mm ²	220	240	250	250	310	320	370	420	480	not specified												
Elongation A (min)	%	22	18	18	15	10	7	3	2	2	not specified												
Brinell hardness (typical)	HB	max 163	max 179	max 187	max 201	160/221	170/241	192/269	229/302	248/352	not specified												
Impact resistance values (min)	J	12 ¹⁾ (g ²⁾																					
at (-40 ± 2) °C	J																						
at (-20 ± 2) °C	J		12 ¹⁾ (g ²⁾																				
Compression strength σ_{db}	N/mm ²	—	—	700	700	700	800	870	1000	1150	not specified												
Shear strength σ_{dB}	N/mm ²	315	360	360	360	405	450	540	630	720	not specified												
Torsional strength τ_{dB}	N/mm ²	315	360	360	360	405	450	540	630	720	not specified												
Modulus of elasticity E (tension and compression)	GN/m ² (kN/mm ²)	169	169	169	169	169	169	174	176	176	not specified												
Poisson's ratio ν	-	0,275	0,275	0,275	0,275	0,275	0,275	0,275	0,275	0,275	not specified												
Fatigue limit (Wöhler) (rotating bending) unnotched (dia 10,6 mm)	N/mm ²	180	195	195	195	210	224	248	280	304	not specified												
Fatigue limit (Wöhler) (rotating bending) notched (dia 10,6 mm)	N/mm ²	114	122	122	122	128	134	149	168	182	not specified												
Fracture toughness K_{1c}	Mpa $\sqrt{m}^{1/2}$	31	30	30	30	23	25	20	15	14	not specified												
Density ρ	g/cm ³	7,1	7,1	7,1	7,1	7,1	7,1	7,2	7,2	7,2	not specified												
Specific heat capacity c between 20°C and 500°C	J/(kg.K)	515	515	515	515	515	515	515	515	515	not specified												
Linear expansion coefficient α between 20°C and 400°C	$\mu m/(m.K)$	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	not specified												
Thermal conductivity λ at 300°C	W/(m.K)	36,2	36,2	36,2	36,2	36,2	35,2	32,5	31,1	31,1	not specified												
Resistivity ρ	$\mu\Omega.m$	0,50	0,50	0,50	0,50	0,50	0,51	0,53	0,54	0,54	not specified												
Maximum permeability μ	$\mu H/m$	2136	2136	2136	2136	2136	1596	866	501	501	not specified												
Hysteresis losses at B = 1 T	J/m ³	600	600	600	600	600	1345	2248	2700	2700	not specified												

1) Mean value from 3 tests
2) Individual value

Austempered Ductile Cast Irons (ADI) Technical Data

Austempered Ductile Cast Irons (ADI)	Standard	Material designation: symbol and (number)			
	BS EN 1564 (1997)	EN-GJS-800-8 (EN-JS1100)	EN-GJS-1000-5 (EN-JS1110)	EN-GJS-1200-2 (EN-JS1120)	EN-GJS-1400-1 (EN-JS1130)
Characteristic	SI unit	Minimum values for properties ¹⁾ normative			
Tensile strength R_m (min)	N/mm ²	800	1000	1200	1400
0.2% proof stress $R_{p0.2}$ (min)	N/mm ²	500	700	850	1100
Elongation A (min)	%	8	5	2	1
Impact resistance values (min) Charpy (notched) at (23±5)°C	J	10 ²⁾ (9 ³⁾)	2) mean value of 3 tests 3) individual value		
Compression strength σ_{db} 0.2% proof	N/mm ²	1300	1600	1900	2200
Shear strength σ_{db}	N/mm ²	620	770	1040	1220
Torsional strength τ_{db} 0.2% proof	N/mm ²	720	900	1080	1260
Impact resistance values Charpy unnotched, at (23±5)°C	J	100	80	60	30
Fracture toughness K_{1c}	Mpa·m ^{1/2}	62	58	54	50
Fatigue limit (Wöhler) (rotating bending) unnotched (dia. 10.6 mm)	N/mm ²	375	425	450	375
Fatigue limit (Wöhler) (rotating bending) notched ⁴⁾ (dia. 10.6 mm)	N/mm ²	225	260	280	275
		Typical values			
Brinell hardness	HB	260-320	300-360	340-440	380-480
Modulus of elasticity E (tension and compression)	kN/mm ²	170	168	167	165
Possion's ratio ν	-	0.27	0.27	0.27	0.27
Shear modulus	kN/mm ²	65	64	63	62
Density ρ	kg/dm ³	7.1	7.1	7.1	7.1
Linear expansion coefficient α	$\mu\text{m}/(\text{m}\cdot\text{K})$	14.6	14.3	14	13.8
Thermal conductivity λ	W/(m.K)	22.1	21.8	21.5	21.2
Note 1: The minimum values can be obtained on wall thickness up to 50 mm. For heavier section agreement between purchaser and manufacturer is recommended.					
Note 4: Notched after heat treatment.					



Grey Cast Irons

Technical Data

Grey Cast Irons	Standard	Material designation			
	BS EN 1561 (1997)	EN-GJL-150 (EN-JL1020)	EN-GJL-200 (EN-JL1030)	EN-GJL-250 (EN-JL1040)	EN-GJL-300 (EN-JL1050)
Characteristic	SI unit				
Tensile strength R_m	N/mm ²	150-250	200-300	250-350	300-400
0,1 % proof stress $R_{p0,1}$	N/mm ²	98-165	130-195	165-228	195-260
Elongation A	%	0,8 to 0,3	0,8 to 0,3	0,8 to 0,3	0,8 to 0,3
Compression strength $\sigma_b B$	N/mm ²	600	720	840	960
0,1 % compression yield point $\sigma_{d0,1}$	N/mm ²	195	260	325	390
Bending strength $\sigma_b B$	N/mm ²	250	290	340	390
Shear strength $\sigma_a B$	N/mm ²	170	230	290	345
Torsional strength $\tau_t B$	N/mm ²	170	230	290	345
Modulus of elasticity E	kN/mm ²	78-103	88-113	103-118	108-137
Poisson's ratio ν	-	0,26	0,26	0,26	0,26
Bending fatigue strength $\sigma_b W$	N/mm ²	70	90	120	140
Fatigue limit under reversed tension-compression stresses $\sigma_{zd} W$	N/mm ²	40	50	60	75
Fracture toughness K_{Ic}	N/mm ^{3/2}	320	400	480	560
Density ρ	g/cm ³	7,10	7,15	7,20	7,25
Specific heat capacity c between 20°C and 200°C	J/(kg.K)	460	460	460	460
between 20°C and 600°C		535	535	535	535
Linear expansion coefficient α between -100°C and +20°C	mm/(m.K)	10,0	10,0	10,0	10,0
between 20°C and 200°C		11,7	11,7	11,7	11,7
between 20°C and 400°C		13,0	13,0	13,0	13,0
Thermal conductivity λ at 100°C	W/(m.K)	52,5	50,0	48,5	47,5
at 200°C		51,0	49,0	47,5	46,0
at 300°C		50,0	48,0	46,5	45,0
at 400°C		49,0	47,0	45,0	44,0
at 500°C		48,5	46,0	44,5	43,0
Resistivity ρ	$\Omega \cdot \text{mm}^2/\text{m}$	0,80	0,77	0,73	0,70
Coercivity H_0	A/m	560 to 720	560 to 720	560 to 720	560 to 720
Maximum permeability μ	$\mu\text{H}/\text{m}$	220 to 330	220 to 330	220 to 330	220 to 330
Hysteresis losses at $B = 1\text{T}$	J/m ³	2500 to 3000	2500 to 3000	2500 to 3000	2500 to 3000

Malleable Cast Irons

Technical Data

Malleable Iron	Grades	Tensile Strength N/mm ²	0.2% proof stress Rp0.2 N/mm ²	Elongation %
BS EN 1562: 1997				
Blackheart Malleable	EN-GJMB-300-6	300	—	6
	EN-GJMB-350-10	350	200	10
Pearlitic Malleable, Grades	EN-GJMB-450-6	450	270	6
	EN-GJMB-500-5	500	300	5
	EN-GJMB-550-4	550	340	4
	EN-GJMB-600-3	600	390	3
Whiteheart Malleable	EN-GJMW-400-5	400	220	5

