AUSTEMPERED DUCTILE IRON

ASTM A897/897M-16 (SI units) TYPICAL PROPERTIES*	900-650-9 GRADE 900	1050-750-7 GRADE 1050	1200-850-4 GRADE 1200	1400-1100-2 GRADE 1400	1600-1300-1 GRADE 1600
MONOTONIC (STATIC) PROPERTIES					
TENSILE STRENGTH (MPa)	900	1050	1200	1400	1600
0.2% OFFSET YIELD STRENGTH (MPa)	650	750	850	1100	1300
ELONGATION (% IN 2 INCH GAGE LENGTH)	9	7	4	2	1
HARDNESS BRINELL HBW (B.I.D. mm)	302 (3.50)	340 (3.30)	387 (3.10)	418 (3.00)	460 (2.85)
REDUCTION IN AREA (%)	10	9	6	4	2
**YOUNG'S MODULUS (GPa)	159.3	157.9	156.5	155.1	153.8
COMPRESSIVE STRENGTH (MPa)	1380	1650	1935	2275	2520
SHEAR STRENGTH (MPa)	870	1025	1180	1370	1490
MODULUS OF RIGIDITY (GPa)	65.1	64.0	63.2	62.4	62.1
POISSON'S RATIO	0.25	0.25	0.25	0.25	0.25
***STRENGTH COEFFICIENT K (MPa)	1503				
***STRAIN HARDENING EXPONENT n	0.143				
***TRUE FRACTURE STRENGTH s_f	1032				
***TRUE FRACTURE DUCTILITY e_f	0.082				
DYNAMIC PROPERTIES					
FATIGUE STRENGTH (@10 MILLION CYCLES):					
-ROTATING BENDING AS MACHINED (MPa)	450	485	415		
-REVERSE BENDING AS MACHINED (MPa)		415	380		
- AXIAL PUSH-PULL		385			
-G-50 MAX. ALLOWABLE CONTACT STRESS (MPa)	1155	1260	1365	1560	1750
-G-50 SINGLE TOOTH BENDING AS MACHINED (MPa)	350	365	350	335	320
-G-50 SINGLE TOOTH BENDING AS SHOT PEENED (MPa)	700	770	700	665	630
-UN-NOTCHED CHARPY IMPACT@ 21°C (JOULES)	120	120	93	80	53
-NOTCHED CHARPY IMPACT @ 21°C (JOULES)	12	10.6	9.3	8.6	8
DYNAMIC ELASTIC MODULUS (GPa)	170	168	167	165	164
EST. DUCTILE/BRITTLE TRANSITION TEMP. (C)	-20	-20	-20	-20	-20
FRACTURE TOUGHNESS (MPa*SQRT(m))	109	85	60	52	44
**STRENGTH COEFFICIENT K' (MPa)	1538				
**STRAIN HARDENING EXPONENT n'	0.1330	0.1376	0.1465	0.1600	
**FATIGUE STRENGTH COEFFICIENT s_f' (Mpa)	1455	2720	3100	5020	
**FATIGUE STRENGTH EXPONENT b	-0.1110	-0.1460	-0.1600	-0.2050	
**FATIGUE DUCTILITY COEFFICIENT e_f'	0.1990	0.1780	0.3960	0.4880	
**FATIGUE DUCTILITY EXPONENT C	-0.6770	-0.6280	-0.7520	-0.8480	
PHYSICAL (INTRINSIC) PROPERTIES					
DENSITY (g/cubic cm)	7.0965	7.0872	7.0779	7.0686	7.0593
COEFF. OF THERMAL EXPANSION (mm/mm/°C) X 10^{-6}	14.6	14.3	14.0	13.8	13.5
WEAR RESISTANCE (AMAX PIN TEST,VOLUME LOSS cu. mm)	10.9	10.8	10.6	10.3	9.8
LINEAR EXPANSION - % (from Ferritic/from Pearlitic)	0.12/0.02	0.18/0.08	0.25/0.13	0.27/0.16	0.28/0.17
THERMAL CONDUCTIVITY (W/M-K)	22.1	21.8	21.5	21.2	20.9
INTERNAL DAMPING (log decr.) X .0001	5.26	5.41	5.69	12.7	19.2

*UTS, YS and %EL are minimums - the remaining properties are not guaranteed minimums. They represent typical properties that one may observe in commercial ADI components.

** Young's modulus data courtesy of Daimler-Chrysler

*** Grade 900 fatigue coefficients & exponents courtesy of Daimler-Chrysler. All other grades courtesy of John Deere.

APPLIED PROCESS INC