

FLN2-4400

Density: 7.46 g/cm³

Material: Prealloyed Steel (0.85% Mo, 0.20% Mn, balance Fe) + mixed additions of 2% Regular Ni, 0.25% Graphite (core composition) and 0.75% Acrawax.

Treatment: Warm Die Compact, Sinter at 1290°C, Carburised (954°C (1750°F), 45 min. boost at 1.2% Cpot, 6.5 hrs. diffusion at 1.0% Cpot, Equalize at 870°C (1600°F) for 30 Min. (1% Cpot), Oil quench – 65°C (150°F))

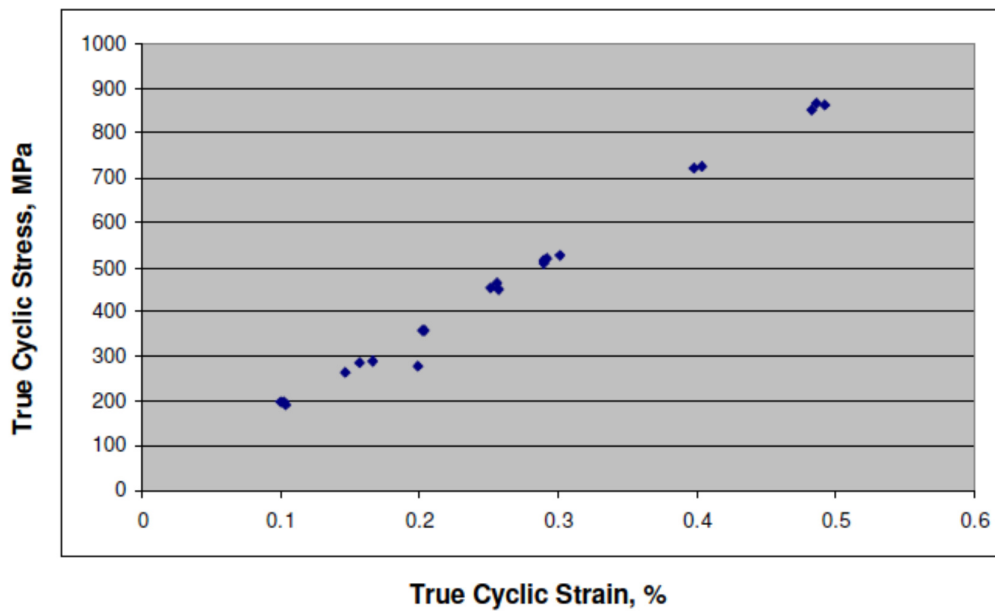
Table – Strain and Stress Amplitudes vs. Reversals to Failure

Test # ID	Stress Amplitude (MPa)	TRUE Stress Amplitude (MPa)	Strain Amplitude (%)	TRUE Strain Amplitude (%)	Plastic Strain Amplitude (%)	Elastic Strain Amplitude (%)	Reversals to Failure
1	ND	863	ND	0.492	0.000	0.492	450
2	ND	868	ND	0.486	0.000	0.486	314
3	ND	851	ND	0.483	0.000	0.483	524
4	ND	725	ND	0.404	0.000	0.404	5,472
5	ND	721	ND	0.398	0.000	0.398	5,170
6	MD	528	MD	0.301	0.000	0.301	85,018
7	ND	520	ND	0.292	0.000	0.292	87,938
8	ND	510	ND	0.29	0.000	0.29	95,420
9	ND	515	ND	0.289	0.000	0.289	674
10	ND	451	ND	0.257	0.000	0.257	62,206
11	ND	465	ND	0.256	0.000	0.256	33,940
12	ND	455	ND	0.251	0.000	0.251	40,446
13	ND	357	ND	0.203	0.000	0.203	560,418
14	ND	359	ND	0.202	0.000	0.202	460,700
15	ND	277	ND	0.199	0.000	0.199	414,724
16	ND	289	ND	0.186	0.000	0.186	2,912,062
17	ND	285	ND	0.157	0.000	0.157	2,361,590
18	ND	265	ND	0.147	0.000	0.147	*20000000
19	ND	191	ND	0.104	0.000	0.104	*20000000
20	ND	197	ND	0.102	0.000	0.102	*20000000
21	ND	199	ND	0.1	0.000	0.1	*20000000

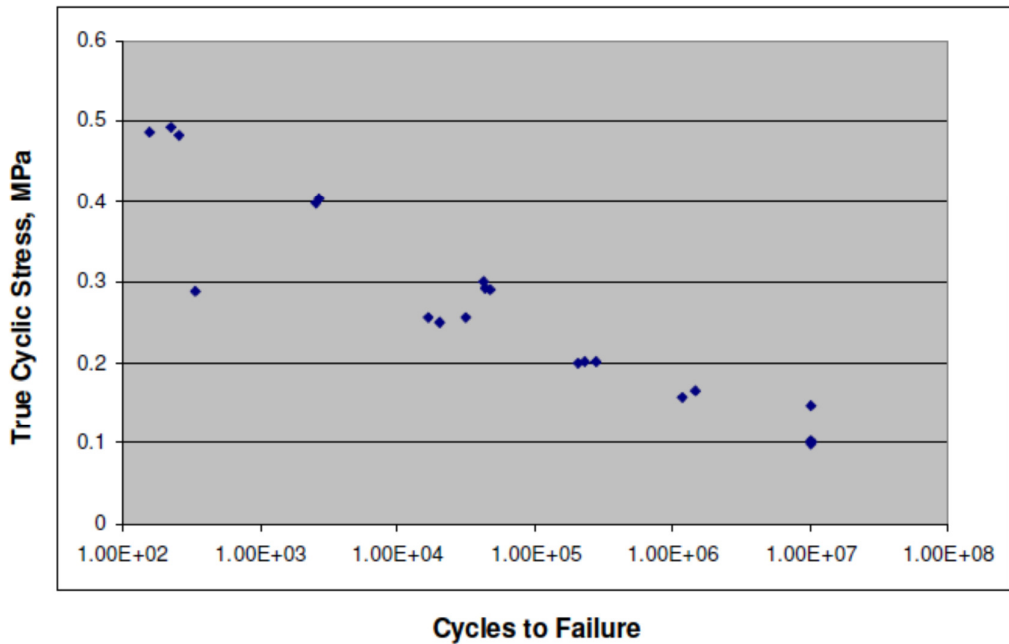
ND – Not Determined

* – run out

True Cyclic Stress-Strain Curve



Constant amplitude Strain-Life Curve



Cyclic Properties (see Row B)

Material Designation	Cyclic Yield Strength 0.2% offset K' (0.002) ^a MPa (10 ³ psi)	Cyclic Strength Coefficient K' MPa (10 ³ psi)	Cyclic Strain Hardening Exponent n'	Cyclic Elastic Modulus E_c GPa (10 ³ psi)	Fatigue Strength Coefficient σ'_f MPa (10 ³ psi)	Fatigue Strength Exponent b	Fatigue Ductility Coefficient ϵ'_f	Fatigue Ductility Exponent c	Modulus E GPa (10 ³ psi)
A	NPD	NPD	NPD	180 (26107)	2561 (371.4)	-0.136	NPD	NPD	ND
B	432 (62.7)	1299 (188.4)	0.177	ND	819 (118.8)	-0.089	0.063	-0.5	175 (25.4)
C	NPD	NPD	NPD	180 (26107)	1610 (233.5)	-0.188	NPD	NPD	ND
D	455 (66.0)	1141	0.148	ND	928 (134.6)	-0.091	0.078	-0.5	179 (26.0)
E	NPD	NPD	NPD	180 (26107)	2225 (322.7)	-0.144	NPD	NPD	ND
F	483 (70.1)	776 (112.5)	0.074	ND	725 (105.2)	-0.042	1.110	-0.7	183 (26.5)

NPD – No Plastic Deformation
ND – Not Determined

Cyclic stress-strain curve: $\Delta\epsilon/2 = \Delta\sigma/2E + (\Delta\sigma/2K')^{1/n'}$
Constant amplitude fatigue life curve: $\Delta\epsilon/2 = \sigma'_f/E (2N_f)^b + \epsilon'_f (2N_f)^c$