

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% lubricant.

Treatment: Warm Die Compact, Sinter at 1120°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))

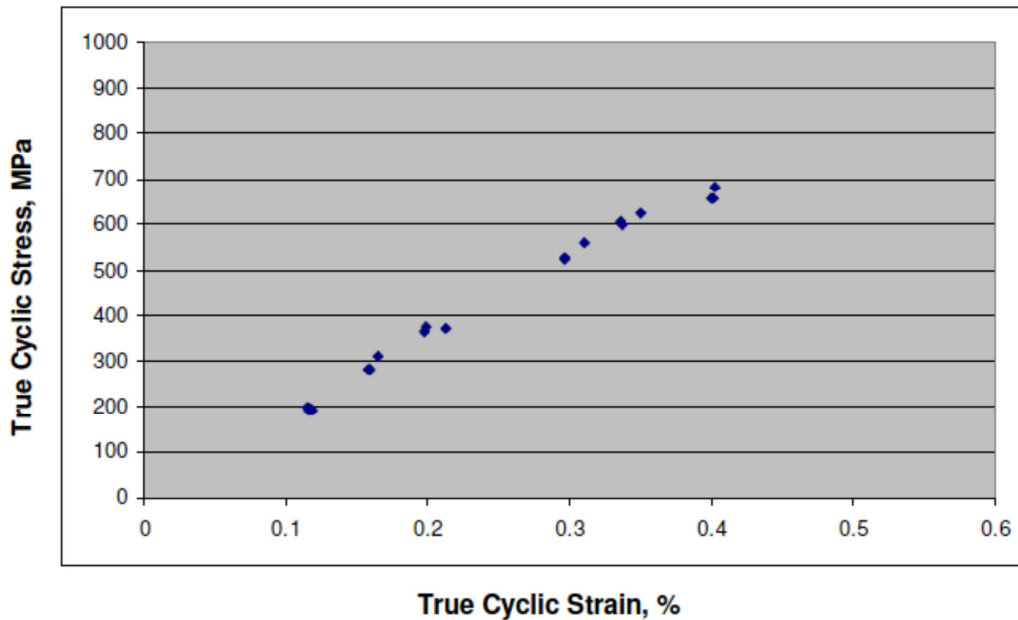
Table – Strain and Stress Amplitudes vs. Reversals to Failure

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	681	ND	0.402	0.000	0.402	974
2	ND	658	ND	0.401	0.000	0.401	272
3	ND	658	ND	0.4	0.000	0.4	900
4	ND	626	ND	0.35	0.000	0.35	30,554
5	ND	601	ND	0.337	0.000	0.337	16,426
6	ND	605	ND	0.336	0.000	0.336	3,718
7	ND	558	ND	0.311	0.000	0.311	13,600
8	ND	524	ND	0.297	0.000	0.297	4,116
9	ND	527	ND	0.297	0.000	0.297	1,640
10	ND	371	ND	0.213	0.000	0.213	488,972
11	ND	375	ND	0.199	0.000	0.199	514,440
12	ND	366	ND	0.198	0.000	0.198	441,314
13	ND	312	ND	0.165	0.000	0.165	1,910,938
14	ND	283	ND	0.159	0.000	0.159	2,086,194
15	ND	281	ND	0.158	0.000	0.158	2,607,488
16	ND	193	ND	0.119	0.000	0.119	*20,000,000
17	ND	196	ND	0.117	0.000	0.117	*20,000,000
18	ND	193	ND	0.116	0.000	0.116	*20,000,000
19	ND	197	ND	0.115	0.000	0.115	*20,000,000

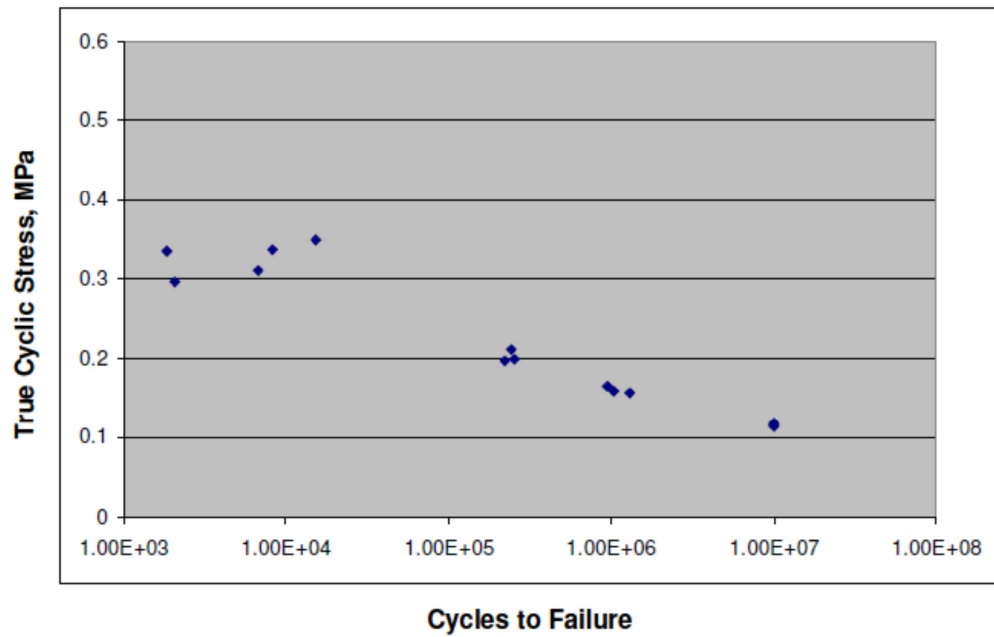
ND – Not Determined

* – run out

True Cyclic Stress-Strain Curve



Constant amplitude Strain-Life Curve



Cyclic Properties (see Row C)

Material Designation	Cyclic Yield Strength 0.2% offset $K'(0.002)^{n'}$ 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: $\Delta\epsilon/2 = \sigma'_f/E (2N_f)^b + \epsilon'_f (2N_f)^c$