

## FLN2-4400

**Density:** 7.45 g/cm<sup>3</sup>

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

**Treatment:** Warm Die Compact, Sinter at 1120°C

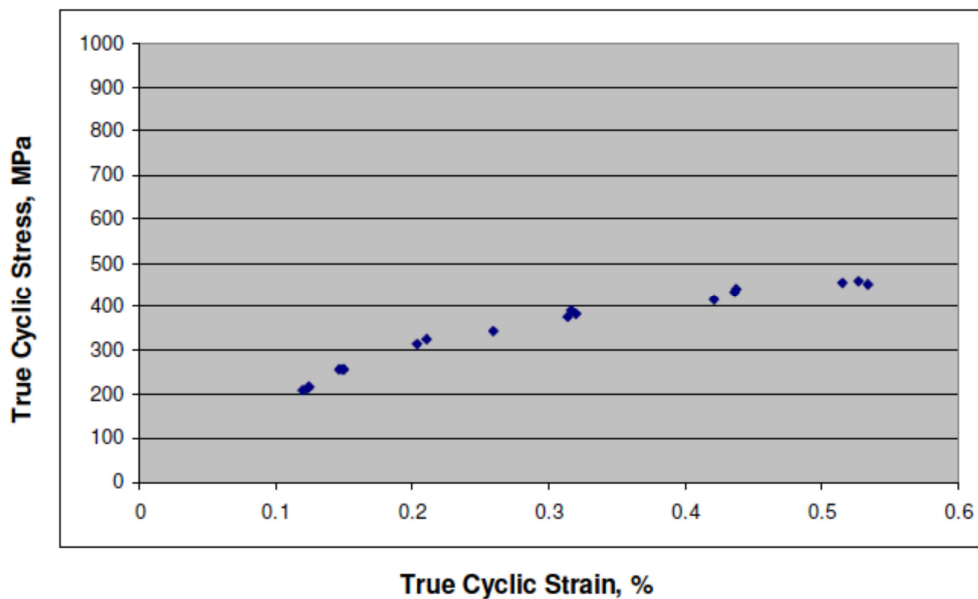
**Table – Strain and Stress Amplitudes vs. Reversals to Failure**

Test # ID	Stress Amplitude (MPa)	TRUE Stress Amplitude (MPa)	Strain Amplitude (%)	TRUE Strain Amplitude (%)	Plastic Strain Amplitude (%)	Elastic Strain Amplitude (%)	Reversals to Failure
8	451	453	0.536	0.534	0.276	0.259	784
9	455	458	0.528	0.527	0.266	0.261	832
5	453	455	0.516	0.515	0.255	0.26	806
7	438	440	0.438	0.437	0.186	0.251	1900
6	431	433	0.437	0.436	0.189	0.247	1460
4	413	415	0.421	0.421	0.184	0.237	2080
3	382	383	0.32	0.32	0.101	0.219	7600
2	388	389	0.317	0.316	0.094	0.222	5600
1	373	374	0.315	0.314	0.1	0.214	7200
17	342	342	0.259	0.259	0	0.259	15602
18	324	325	0.208	0.21	0	0.21	46700
16	314	314	0.204	0.204	0.024	0.18	70976
10	255	256	0.15	0.15	0.004	0.146	445252
13	258	258	0.149	0.149	0.002	0.148	686258
14	254	255	0.147	0.147	0.002	0.145	502314
12	217	217	0.124	0.124	0.001	0.124	*20000000
15	212	212	0.123	0.123	0.002	0.121	*20000000
11	208	208	0.12	0.12	0.001	0.119	*20000000

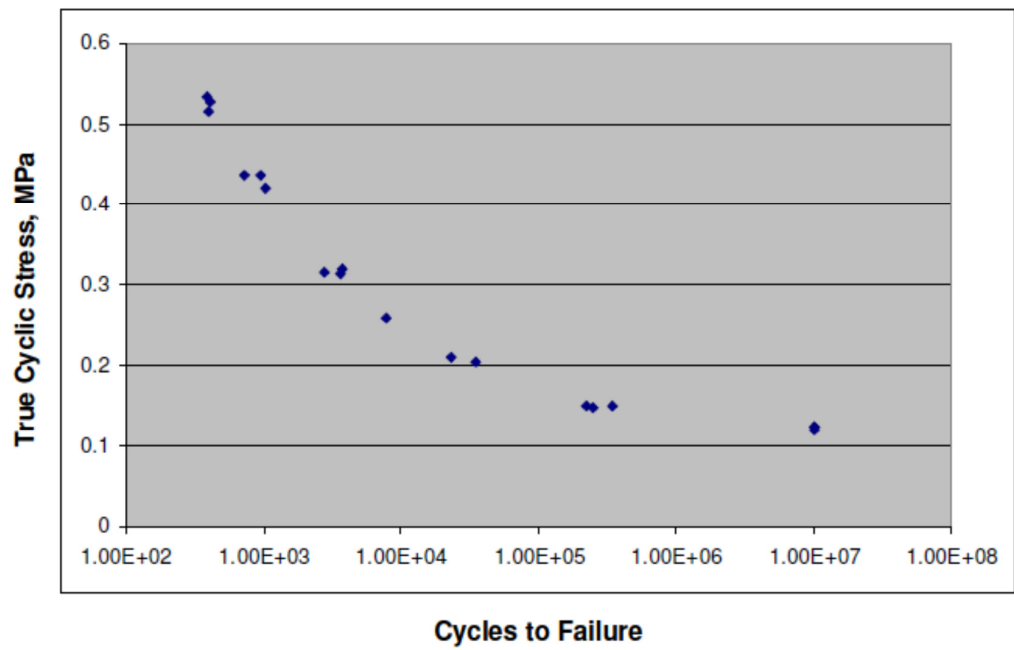
ND – Not Determined

\* – run out

**True Cyclic Stress-Strain Curve**



**Constant amplitude Strain-Life Curve**



**Cyclic Properties (see Row D)**

Material Designation	Cyclic Yield Strength 0.2% offset $K'(0.002)^{1/n'}$ MPa (10 <sup>3</sup> psi)	Cyclic Strength Coefficient $K'$ MPa (10 <sup>3</sup> psi)	Cyclic Strain Hardening Exponent $n'$	Cyclic Elastic Modulus $E_e$ GPa (10 <sup>3</sup> psi)	Fatigue Strength Coefficient $\sigma'_f$ MPa (10 <sup>3</sup> psi)	Fatigue Strength Exponent $b$	Fatigue Ductility Coefficient $\epsilon'_f$	Fatigue Ductility Exponent $c$	Modulus $E$ GPa (10 <sup>3</sup> 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:  $\Delta\epsilon/2 = \sigma'_f/E (2N_f)^b + \epsilon'_f (2N_f)^c$