PFLN2-4408

Density: 7.86 g/cm^3

Material: Prealloyed Steel (0.85% Mo, 0.20% Mn, balance Fe) + mixed additions of 2% Fine Ni, 0.8%Graphite (core composition) and 0.75% lubricant.

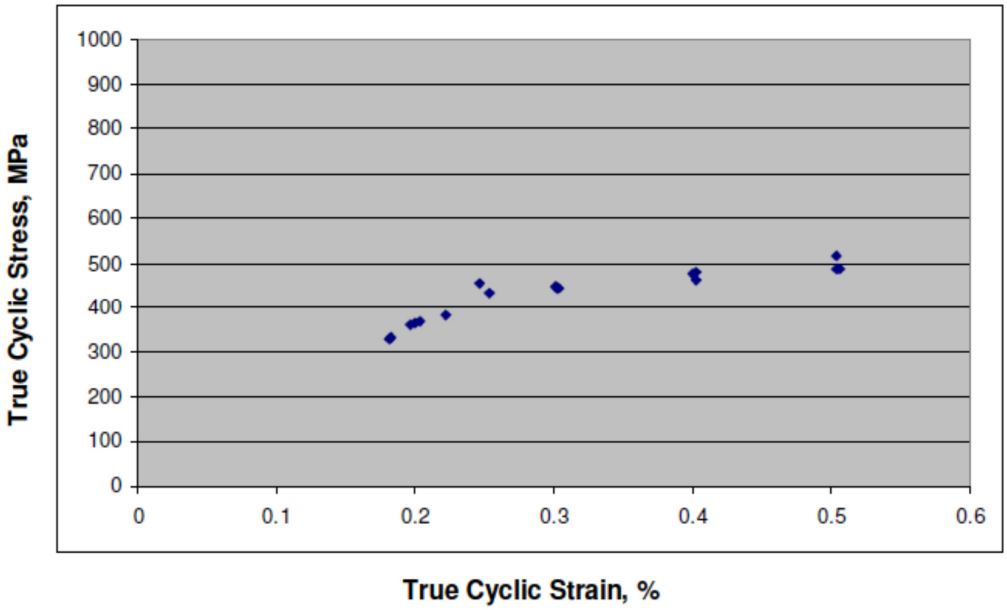
Treatment: Compact, Delube, Sinter at 1175°C, Powder Forge at 1230°C

Table – Strain and Stress Amplitudes vs. Reversals to Failure

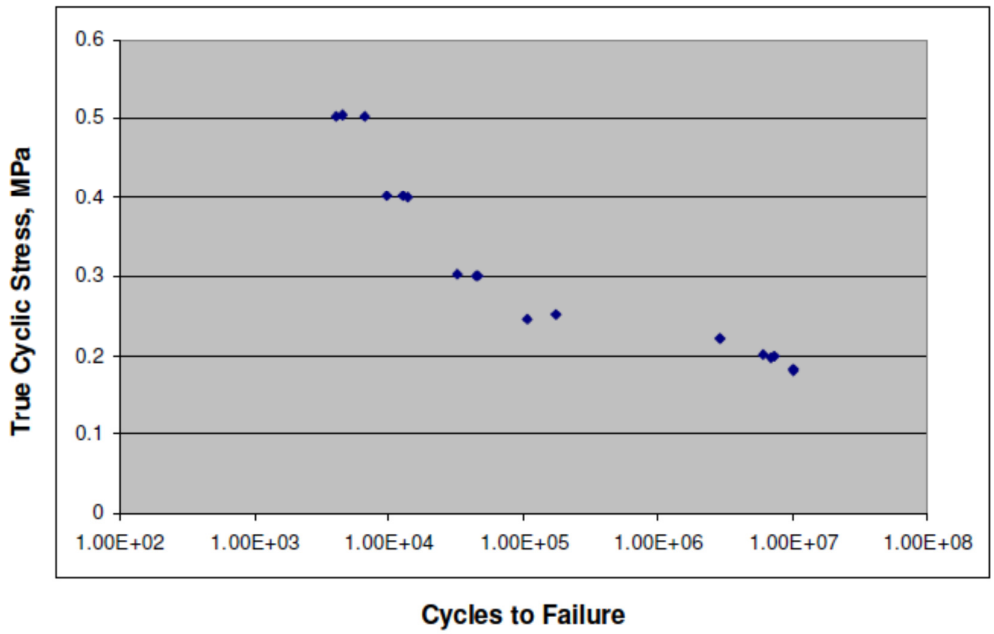
Test # ID	Stress Amplitude (MPa)	TRUE Stress Amplitude (MPa)	Strain Amplitude (%)	TRUE Strain Amplitude (%)	Plastic Strain Amplitude (%)	Elastic Strain Amplitude (%)	Reversals to Failure
2	485	487	0.507	0.506	0.239	0.267	9180
1	484	486	0.505	0.504	0.238	0.266	13380
3	512	515	0.505	0.504	0.222	0.282	8096
4	479	481	0.403	0.402	0.139	0.263	19600
5	459	461	0.403	0.402	0.15	0.252	25800
6	475	477	0.401	0.4	0.139	0.261	27600
10	443	445	0.305	0.304	0.061	0.243	64830
7	443	444	0.303	0.302	0.059	0.243	90050
8	447	448	0.302	0.301	0.056	0.245	92948
15	432	433	0.253	0.253	0.016	0.237	351910
20	452	454	0.247	0.247	0	0.247	211372
17	383	384	0.222	0.222	0.012	0.21	5730980
13	368	368	0.204	0.203	0.002	0.202	12018170
9	364	365	0.2	0.2	0	0.2	14721918
11	361	362	0.197	0.197	-0.001	0.198	13751086
14	333	333	0.183	0.183	0	0.182	*20000000
16	329	329	0.181	0.181	0.001	0.18	*20000000

ND = Not Determined * = run out

True Cyclic Stress-Strain Curve



Constant amplitude Strain-Life Curve



Cyclic Properties (see Row F)

Material Designation	Cyclic Yield Strength 0.2% offset $K'(0.002)^{n'}$ MPa (10^3psi)	Cyclic Strength Coefficient K' MPa (10^3psi)	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: $\Delta\varepsilon/2 = \Delta\sigma/2E + (\Delta\sigma/2K')^{1/n'}$
Constant amplitude fatigue life curve: $\Delta\varepsilon/2 = \sigma'_f/E\,(2N_f)^b + \varepsilon'_f\,(2N_f)^c$