

The Redesigned AFMAT

Crack Growth Rate Database



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New Features

- I. Expanded test profile search criteria
- II. New favorites tab
- III. Updated crack growth rate plot
- IV. New crack growth rate data
- V. Downloadable tabular look up material data files

Expanded Search Criteria For The Test Profile

Test Profile

ALLOY STEELS

AND

Alloy EqualTo 0.22MO

Alloy

Property Type

Environment

Data Source

Condition Heat Treatment

ID

Orientation

Type

Thickness

Form

on Heat Treatment
1650F/3HR;HT/1650F/1HR;WQ;HT/126C
1650F/3HR;HT/1650F/1HR;WQ;HT/126C

- Users can now search for data by orientation

New Search Format

AND

AND

- And
- Or
- Not And
- Not Or

AND

AND

Property Type EqualTo Fatigue Crack Growth Rate (da/dN vs delta K)

- Alloy
- Property Type
- Environment
- Data Source
- Condition Heat Treatment
- ID
- Orientation
- Specimen Type
- Thickness
- Form
- Temperature

Data Source	Condition Heat Treatment	Property Type
FORCE	T3	Fa
FORCE	T3	Fa
FORCE	T3	Fa
FORCE	T3	Fa
FORCE	T3	Fa
FORCE	T3	Fa

AND

Alloy EqualTo 0.22MO

- EqualTo
- NotEqualTo
- GreaterThan
- LessThan
- GreaterThanOrEqualTo
- LessThanOrEqualTo
- Between
- NotBetween
- IsNull
- NotNull

- ALLOY S
- Aluminu
- BERYLL
- BRASS
- BRONZE
- COPPER
- IRON AL

Performing a Typical Database Search

[AF Mat](#) > Test Profile

Searching for Fatigue crack growth rate data for materials 2024 and 2024(ALCLAD)

Test Profile

- ALLOY STEELS
- Aluminum
- BERYLLIUM/BERYLLIUM ALLOYS
- BRASS
- BRONZE
- COPPER/COPPER ALLOYS
- IRON ALLOYS
- MANGNESIUM ALLOYS
- MOLYBDENUM/MOLYBDENUM ALLOYS
- NICKEL BASED SUPER ALLOYS
- NIOBIUM/NIOBIUM ALLOYS
- SOLDERS
- STAINLESS STEELS
- TITANIUM ALLOYS
- ZINC ALLOYS

Add expression

AND + \equiv + \equiv x

Property Type EqualTo Fatigue Crack Growth Rate (da/dN vs delta K) x

Apply

Id	Alloy	Property Name
20241	18NI(200)(MAR)	Fatigue Crack Growth Rate (da/dN vs delta K)
20242	2024	Fatigue Crack Growth Rate (da/dN vs delta K)
12248	7175	Fatigue Crack Growth Rate (da/dN vs delta K)
12249	7175	Fatigue Crack Growth Rate (da/dN vs delta K)
12250	7175	Fatigue Crack Growth Rate (da/dN vs delta K)
12251	7050	Fatigue Crack Growth Rate (da/dN vs delta K)
12252	7050	Fatigue Crack Growth Rate (da/dN vs delta K)
12253	7050	Fatigue Crack Growth Rate (da/dN vs delta K)
12254	7050	Fatigue Crack Growth Rate (da/dN vs delta K)
12255	7050	Fatigue Crack Growth Rate (da/dN vs delta K)
12256	7050	Fatigue Crack Growth Rate (da/dN vs delta K)

Add Group

AND + - x

Property Type EqualTo Fatigue Crack Growth Rate (da/dN vs delta K) x

Apply

This screenshot shows a search filter interface. At the top, there is a blue box containing the text 'AND', a plus icon, a minus icon, and an 'x' icon. Below this box is a single filter expression: 'Property Type EqualTo Fatigue Crack Growth Rate (da/dN vs delta K)'. Below the filter expression is a blue button labeled 'Apply'. A red arrow points from the text 'Add Group' to the plus icon in the top blue box.

Test Profile

New Group

AND + - x

Property Type EqualTo Fatigue Crack Growth Rate (da/dN vs delta K) x

OR + - x

This screenshot shows the search filter interface with two groups. The top group is an 'AND' group containing one expression: 'Property Type EqualTo Fatigue Crack Growth Rate (da/dN vs delta K)'. Below it is a new 'OR' group, which is currently empty. A red arrow points from the text 'New Group' to the 'OR' group box.

Test Profile

Add Expression

AND + - x

Property Type EqualTo Fatigue Crack Growth Rate (da/dN vs delta K) x

OR + - x

Alloy EqualTo 2024 x

Alloy EqualTo 2024(ALCLAD) x

This screenshot shows the search filter interface with two groups. The top group is an 'AND' group containing one expression: 'Property Type EqualTo Fatigue Crack Growth Rate (da/dN vs delta K)'. Below it is an 'OR' group containing two expressions: 'Alloy EqualTo 2024' and 'Alloy EqualTo 2024(ALCLAD)'. A red arrow points from the text 'Add Expression' to the second expression in the 'OR' group.

Apply

Select Apply

Test Profile

AND + - ×

Property Type EqualTo Fatigue Crack Growth Rate (da/dN vs delta K) ×

OR + - ×

Alloy EqualTo 2024 ×

Alloy EqualTo 2024 (ALCLAD) ×

Aluminum

id	Alloy	Data Source	Condition Heat Treatment	Property Type	Orientation	Specimen Type	Specimen Thickness	Product Form	Environment	Temperature
6899	2024	AIR FORCE	T3	Fatigue Crack Growth Rate (da/dN vs delta K)	L-T	Center Cracked Panel (CCP) (Max Load Specified)	0.039	Sheet	LAB AIR	70
6900	2024	AIR FORCE	T3	Fatigue Crack Growth Rate (da/dN vs delta K)	L-T	Center Cracked Panel (CCP) (Max Load Specified)	0.128	Sheet	HHA	70
6901	2024	AIR FORCE	T3	Fatigue Crack Growth Rate (da/dN vs delta K)	L-T	Center Cracked Panel (CCP) (Max Load Specified)	0.125	Sheet	LAB AIR	75
6902	2024	AIR FORCE	T3	Fatigue Crack Growth Rate (da/dN vs delta K)	L-T	Center Cracked Panel (CCP) (Max Load Specified)	0.126	Sheet	LAB AIR	75
6903	2024	AIR FORCE	T3	Fatigue Crack Growth Rate (da/dN vs delta K)	L-T	Center Cracked Panel (CCP) (Max Load Specified)	0.1		DRY AIR	72
6904	2024	AIR FORCE	T3	Fatigue Crack Growth Rate (da/dN vs delta K)	T-L	Center Cracked Panel (CCP) (Max Stress Specified)	0.09	Sheet	LAB AIR	70
6905	2024	AIR FORCE	T3	Fatigue Crack Growth Rate (da/dN vs delta K)	T-L	Center Cracked Panel (CCP) (Max Stress Specified)	0.09	Sheet	LAB AIR	70
6906	2024	AIR FORCE	T3	Fatigue Crack Growth Rate (da/dN vs delta K)	T-L	Center Cracked Panel (CCP) (Max Stress Specified)	0.09	Sheet	LAB AIR	70
6907	2024	AIR FORCE	T3	Fatigue Crack Growth Rate (da/dN vs delta K)	T-L	Center Cracked Panel (CCP) (Max Stress Specified)	0.09	Sheet	LAB AIR	140
6908	2024	AIR FORCE	T3	Fatigue Crack Growth Rate (da/dN vs delta K)	L-T	Center Cracked Panel (CCP) (Max Stress Specified)	0.25	Plate	LAB AIR	70
6909	2024	AIR FORCE	T3	Fatigue Crack Growth Rate (da/dN vs delta K)	L-T	Center Cracked Panel (CCP) (Max Load Specified)	0.09	Sheet	LAB AIR	70
6910	2024	AIR FORCE	T3	Fatigue Crack Growth Rate (da/dN vs delta K)	L-T	Center Cracked Panel (CCP) (Max Load Specified)	0.09	Sheet	LAB AIR	70

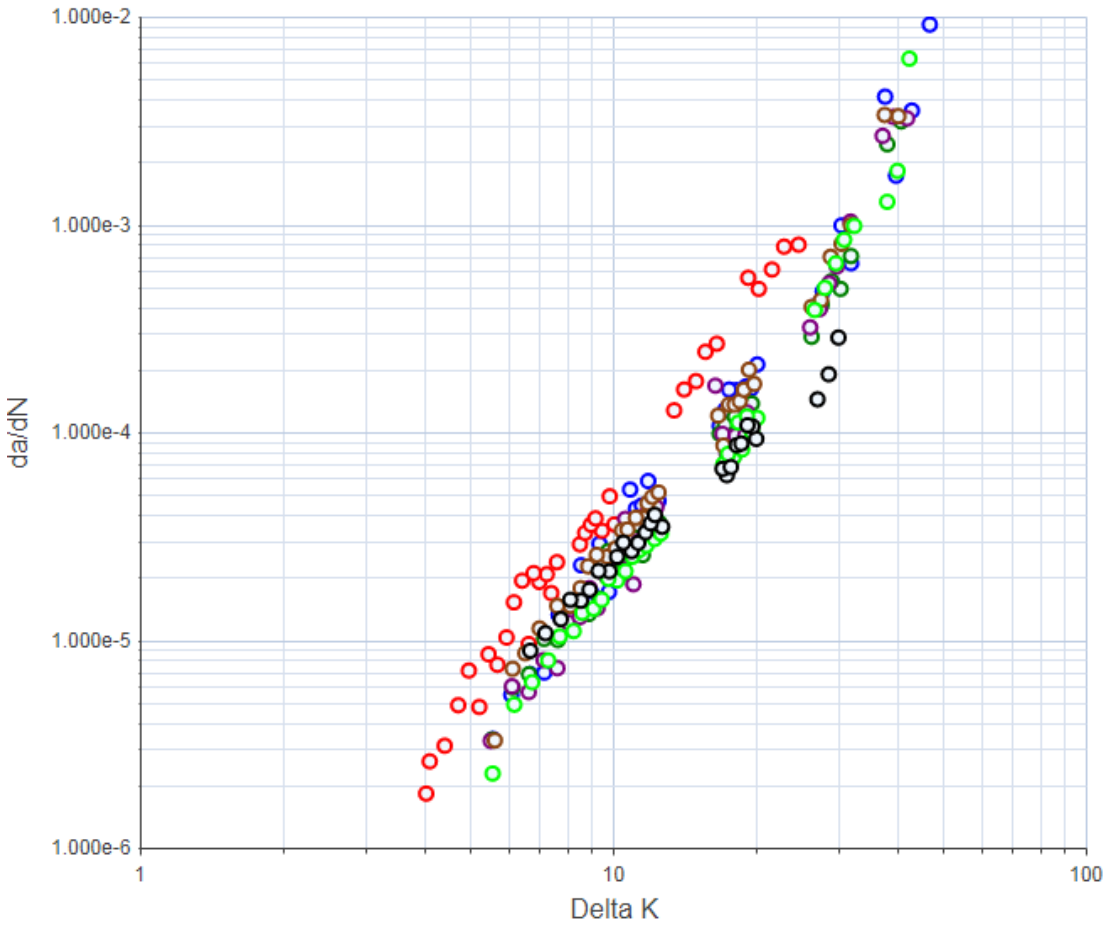
New Favorites Tab

The screenshot shows a software interface with a 'Favorites' tab selected in the left-hand 'Materials' tree. An orange arrow points to the 'Favorites' sub-tab. The main content area has a 'General' tab selected, and a 'Favorite' checkbox is checked. Below this is a 'Basic Information' table with the following data:

Basic Information	
Data Source:	NASA
Property Type:	Fatigue Crack Growth Rate (da/dN vs delta K)
Alloy:	2024
Environment:	AIR
Date:	Heat Nbr:
Humidity:	Unknown
K _{1c} (Plain Strain) Low:	K _{1c} (Plain Strain) High:
R _{cl} : 0.7	R _{ch} :
Ultimate Strength: 58	Temperature:
Yield Strength High:	Yield Strength Low: 57
condition Heat Treatment:	

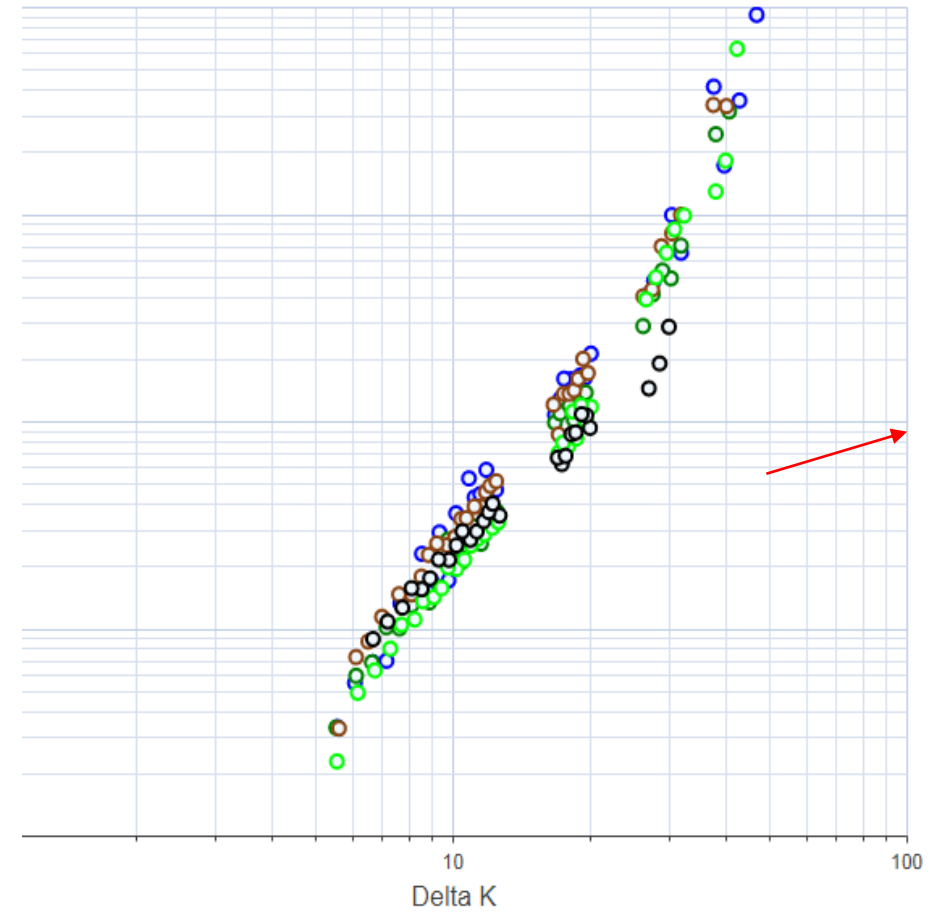
New Plots

Fatigue Crack Growth Rate (da/dN vs delta K): 7075



- R=[0] a7dn_5365
- R=[0] a7dn_5366
- R=[0.5] a7dn_5367
- R=[-1] a7dn_5368
- R=[0] a7dn_5371
- R=[0] a7dn_5372
- R=[0] a7dn_5373

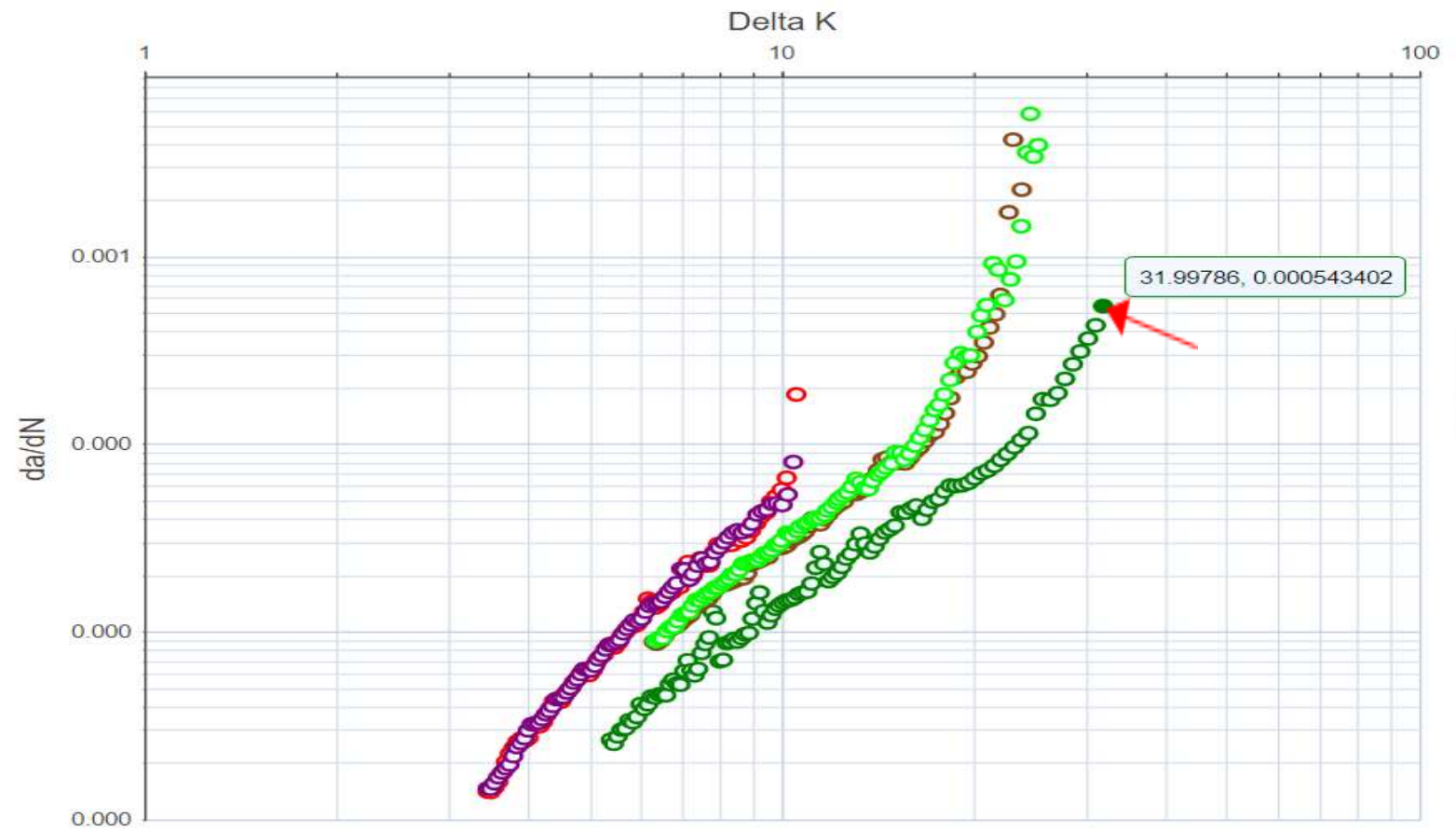
Fatigue Crack Growth Rate (da/dN vs delta K): 7075



- R=[0] a7dn_5365
- R=[0] a7dn_5366
- R=[0.5] a7dn_5367
- R=[-1] a7dn_5368
- R=[0] a7dn_5371
- R=[0] a7dn_5372
- R=[0] a7dn_5373

Favorite

Fatigue Crack Growth Rate (da/dN vs delta K): 7075



- R=[0.1] C-T-1
- R=[0.1] C-T-2
- R=[0.8] C-T-3
- R=[0.8] C-T-4
- R=[0.5] C-T-5
- R=[0.5] C-T-6

New Test Data

- Over 2,200 test sets have been added to the online crack growth rate data base
- Including materials:
 - 7249 Provided by NRC
 - AMS 6526 and 2224-T3511 Provided by T-38 & A-10

Test Profile

Materials

ALUMINUM 2000/6000 ALLOYS

- ▶ 2014
- ▶ 2014(2319 FM)
- ▶ 2014(4043 FM)
- ▶ 2020
- ▶ 2020(ALCLAD)
- ▶ 2021
- ▶ 2024
- ▶ 2024(ALCLAD)
- ▶ 2024(CLAD)
- ▶ 2024-T3
- ▶ 2048
- ▶ 2090
- ▶ 2090-IN(EXP)
- ▶ 2091

General | Specimen | Reference | Product | Test and Data | Plot

[Tabular Lookup Curve Fit to Existing Material da/dN Data](#)

Basic Information			
Data Source:	Additional NASA Data		
Property Type:	Fatigue Crack Growth Rate (da/dN vs delta K)		
Alloy:	2324		
Environment:	LAB AIR		
Date:		Heat Nbr:	
Humidity:			
K _{IC} (Plain Strain) Low:		K _{IC} (Plain Strain) High:	
R _{cl} :		R _{ch} :	
Ultimate Strength:	70.6	Temperature:	
Yield Strength High:		Yield Strength Low:	
Condition Heat Treatment:	T39		

Link to Tabular data

2014-T6 L-T lab air Plate	2090-T86 T-L LAB AIR TEE EXTRUSION	7010-T73651 L-T LAB AIR PLLATE	7050-T73651 L-T LAB AIR PLATE	7075-T76511 L-T LHA EXTRUSION	7475-T7351 L-T LAB AIR PLATE	PH13-8Mo-H1000 L-T Dry air
2020-T651 L-T Lab air Plate	2091-T8 T-L HHA	7049-T7352	7050-T74511 L-T LAB AIR EXTRUSION	7079-T6 L-T LAB AIR SHEET	X7091-T7E70 S-T GN2 Plate	PH13-8Mo-H1050 L-T Lab air Forging
2024-T3 Lab air L-T	2124-T851 L-T LAB AIR PLATE	7050-T74 L-T LAB AIR FORGING	7050-T76511 L-T LAB AIR EXTRUSION	7150-T7751 L-T Lab Air Plate	A356-T6 Lab Air	TI-6AL-4V L-T Lab Air
2024-T3 Lab air T-L	2219-T87 T-L	7050-T74 T-L LAB AIR FORGING	7050-T76511 L-T STW EXTRUSION	7150-T77511 L-T Lab air Extrusion	A357-T6 Lab air Casting	TI-6AL-4V ST(1775F;1hr)
2024-T42 Lab air L-T	2219-T851 L-T DRIY AIR PLATE	7050-T7451 L-T HHA P;ATE	7075-T76 L-T LHA	7175-T74 L-T Lab air Forging	10NI STEEL	TI-6AL-4V(ELI)-RA L-T LAB AIR
2024-T851 Lab air L-T	2324-T39 L-T LAB AIR PLATE	7050-T7451 L-T LAB AIR	7075-T651 L-T Lab Air Plt & Ext	7178-T6 L-T Lab air Sheet	17-7PH RH1100 L-T LAB AIR SHEET	
2024-T351 L-T Lab air Plate	2618-T851 T-L HHA PLATE	7050-T7452 FORGING LAB AIR L-T	7075-T7651 L-T LHA Plate	7249-T76511 Lab Air L-T Extrusion	4130 L-T Lab Air	
2024-T3511 L-T Lab air Plate		7050-T73511 L-T HHA EXTRSION	7075-T73511 L-T Lab air EXTRUSION	7475-T7351 L-T HHA PLATE	4340 L-T Lab air Temp 650	

Tabular Lookup Page

AF Mat > Tabular Lookup da/dN Data

Tabular Lookup da/dN Data

AND

Apply

- Materials
 - ALLOY STEELS
 - Aluminum
 - STAINLESS STEELS
 - TITANIUM ALLOYS

Material Name	Ultimate Strength	Young's Modulus	Coefficient of Thermal Expansion	Poisson's Ratio	Upper limit on da/dN	Lower limit on da/dN	Plane Stress Fracture Toughness	Yield Strength	Plane Strain Fracture Toughness	Lower limit on R shift	Delta K Threshold value	Upper limit on R shift	Units
2324-T30 Lab Air & HHA L-T	70	10600	1.24E-05	0.33	0.1	1E-09	78	55	39	-0.33	2.6488	0.7	English
2324-T3011 L-T Lab Air Extrusion	70	10600	1.23E-05	0.33	0.1	1E-09	65	52	30	-0.33	2.7865	0.75	English
PH13-8Mo-H1050 L-T Lab Air Forging	190	30000	7E-06	0.33	0.01	1E-09	201	180	115	-0.33	5.486	0.7	English
7010-T72651 L-T Pkt Lab Air	73	10000	1.31E-05	0.33	0.1	1E-09	62	63	34	-0.33	2.5057	0.8	English
7150-T7751 L-T Lab Air Plate	85	10400	1.31E-05	0.33	0.1	1E-09	62	79	30	-0.33	1.9589	0.75	English
Ti-6Al-4V L-T Lab Air	140	16000	4.9E-06	0.32	0.1	1E-09	95	130	57	-0.33	4.3051	0.7	English
7050-T7451 L-T HHA Plate	75	10400	1.34E-05	0.33	0.01	1E-09	72	65	36	-0.33	2.1351	0.75	English
Ti-6Al-4V C-R LAB AIR DISC	160	16000	4.0E-06	0.31	0.01	1E-09	95	150	45	-0.33	3.1208	0.7	English
7475-T7251 L-T HHA Plate	72	10400	1.31E-05	0.33	0.1	1E-09	100	62	45	-0.33	2.5626	0.75	English
4340 L-T 160-180 UTS Pkt-Frg Lab Air Temp 650	150	30000	7E-06	0.33	0.01	1E-09	165	120	120	-0.333	4.3829	0.75	English
7178-T6 L-T Lab Air Sheet	89	10400	1.31E-05	0.33	0.1	1E-09	48	80	25	-0.33	2.2306	0.72	English
2024-T3 Lab Air L-T	67	10600	1.29E-05	0.33	0.1	1E-09	80	49	35	-0.33	2.475	0.75	English
2618-T651 T-L HHA PLATE	53	10600	1.24E-05	0.33	0.1	1E-09	52	42	30	-0.33	2.7	0.75	English
2024-T3511 Lab Air L-T	70	10600	1.29E-05	0.33	0.1	1E-09	55	52	25	-0.33	2.794	0.75	English
3000-T651 L-T Lab Air Plate	83	10600	1.28E-05	0.33	0.1	1E-09	44	77	22.9	-0.4	2.8	0.75	English

Tabular Lookup da/dN Data - 2324-T39 lab air & HHA L-T

- Materials
 - ALLOY STEELS
 - Aluminum
 - ALUMINUM 2000/6000 ALLOYS
 - 2014
 - 2020
 - 2024
 - 2090
 - 2091
 - 2124
 - 2219
 - 2224
 - 2324
 - 2324-T39 lab air & HHA L-T
 - 2618
 - ALUMINUM 7000/8000 ALLOYS
 - ALUMINUM CASTING ALLOYS
 - STAINLESS STEELS
 - TITANIUM ALLOYS

Download Tabular Lookup file

General Plot

Res ID	R	Orientation	Condition Heat Treatment
nsM2JA11AB01D1	0.1	L-T	T39
nsM2JA11AB01E1	0.1	L-T	T39
nsM2JA11AB01A1	0.1	L-T	T39
nsM2JA11AB01C1	0.1	L-T	T39
nsM2JA11AB01B1	0.1	L-T	T39
a2dn_4664	0.33	L-T	T39
a2dn_4665	0.33	L-T	T39
a2dn_4666	0.33	L-T	T39

Tabular Lookup Parameter Data			
Name:	2324-T39 lab air & HHA L-T	Units:	English
Ultimate Strength:	70	Young's Modulus:	10600
Coefficient of Thermal Expansion:	1.24E-05	Poisson's Ratio:	0.33
Upper limit on da/dN:	0.1	Lower limit on da/dN:	1E-09
Plane Stress Fracture Toughness:	78	Yield Strength:	55
Plane Strain Fracture Toughness:	39	Lower limit on R shift:	-0.33

Tabular Lookup da/dN Data - 2091-T8 T-L HHA PLT&SHT

Materials

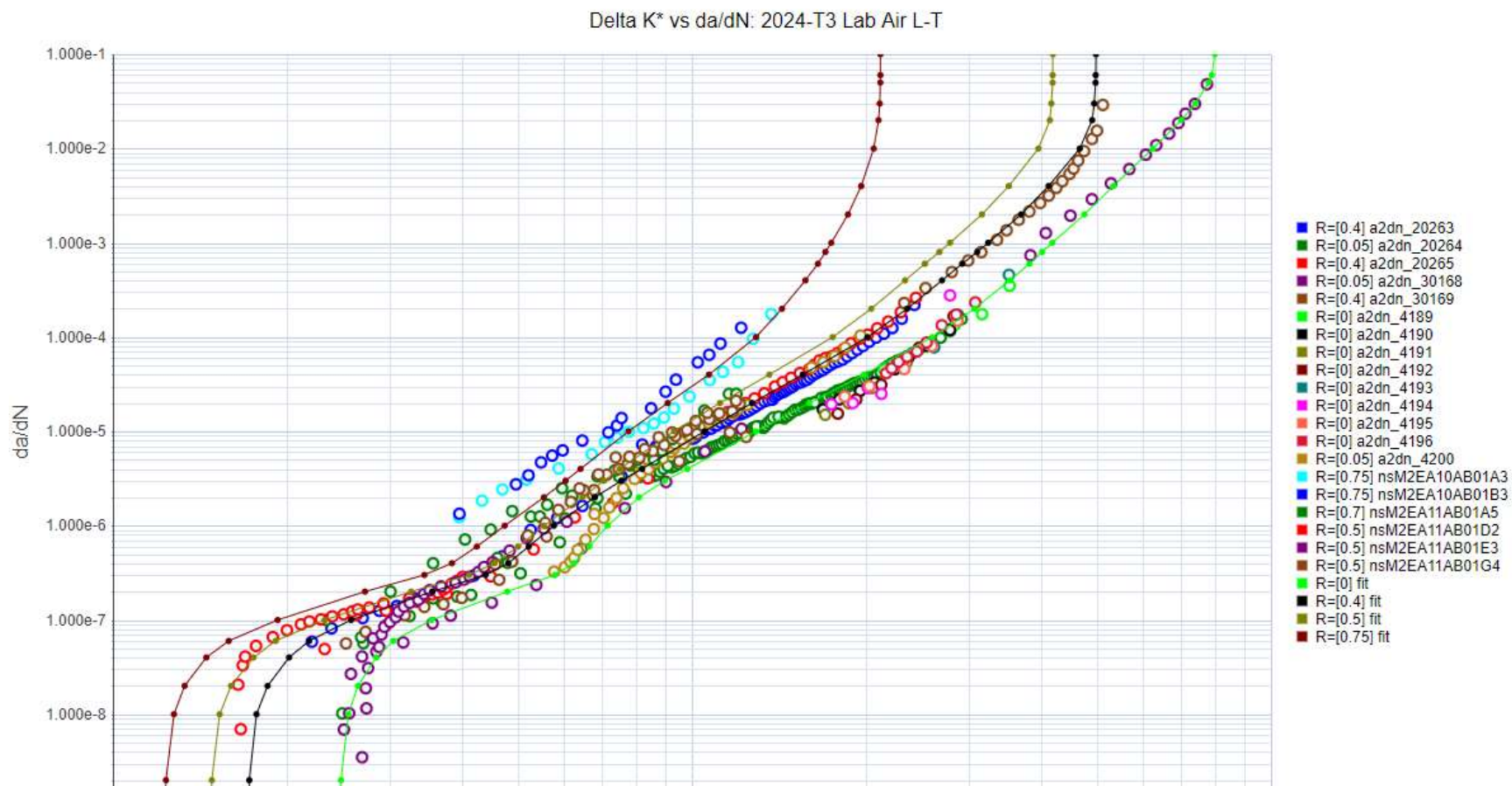
- ALLOY STEELS
- Aluminum
 - ALUMINUM 2000/6000 ALLOYS
 - 2014
 - 2020
 - 2024
 - 2090
 - 2091
 - 2091-T8 T-L HHA PLT&SHT
 - 2124
 - 2219
 - 2224
 - 2324
 - 2618
 - ALUMINUM 7000/8000 ALLOYS
 - ALUMINUM CASTING ALLOYS
- STAINLESS STEELS
- TITANIUM ALLOYS

a2dn_20016	0.5	T-L	T8;HT/275F/12HR
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Tabular Lookup Parameter Data			
Name:	2091-T8 T-L HHA PLT&SHT	Units:	English
Ultimate Strength:	85	Young's Modulus:	10600
Coefficient of Thermal Expansion:	1.24E-05	Poisson's Ratio:	0.33
Upper limit on da/dN:	0.1	Lower limit on da/dN:	1E-09
Plane Stress Fracture Toughness:	66	Yield Strength:	75
Plane Strain Fracture Toughness:	33	Lower limit on R shift:	-0.33
Delta K threshold value:	3.55	Upper limit on R shift:	0.7

Tabular Lookup da/dN* data	R1 = 0	R2 = 0.5
1E-09	3.55	2.07
2E-09	3.551	2.075
1E-08	3.56	2.095
2E-08	3.6	2.17
4E-08	3.75	2.48
6E-08	3.98	2.8
1E-07	4.41	3.275
2E-07	5.28	4

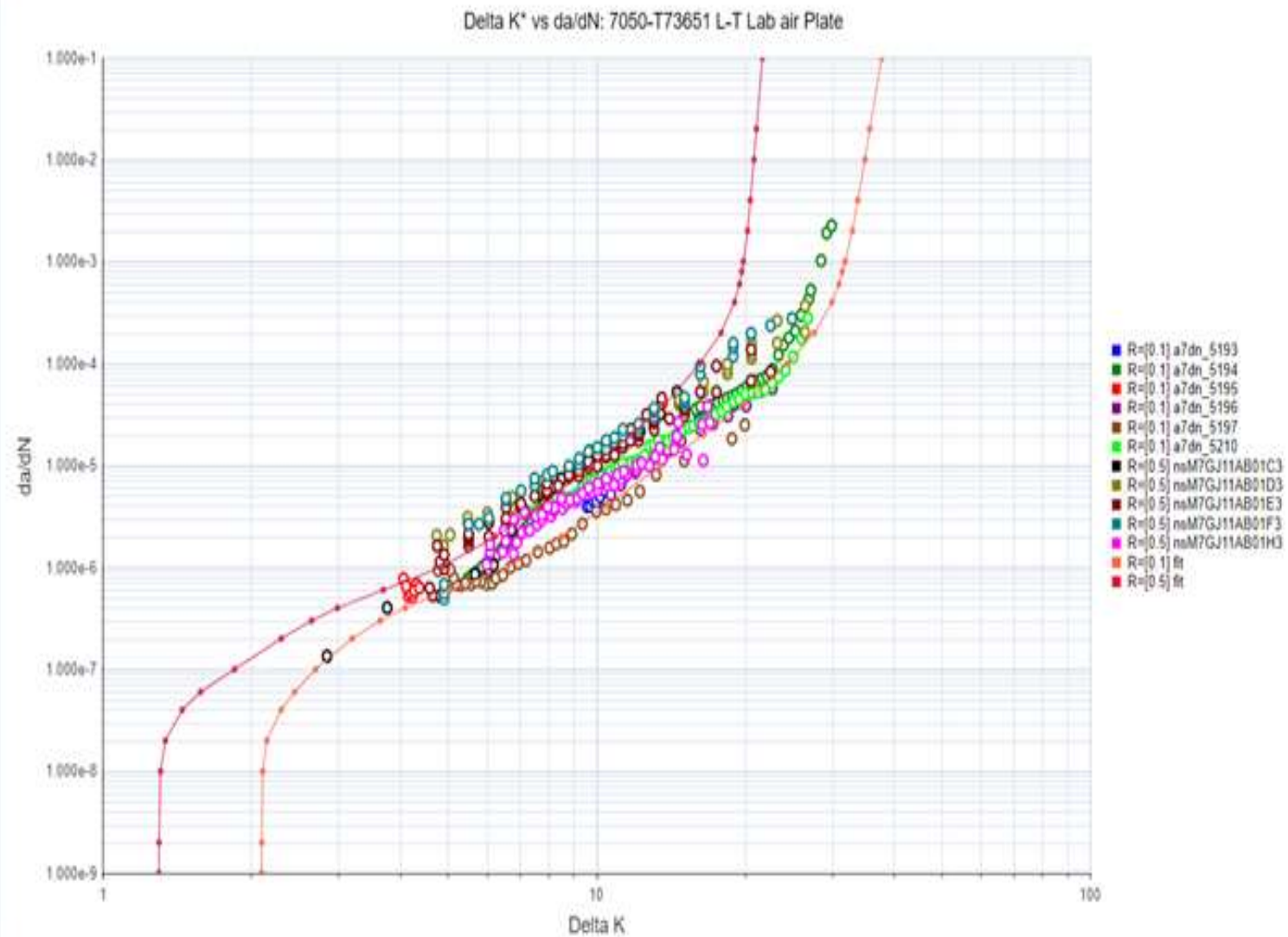
Tabular look-up data



Tabular Lookup da/dN Data - 7050-T73651 L-T Lab air Plate

Materials

- ALLOY STEELS
- Aluminum
 - ALUMINUM 2000/6000 ALLOYS
 - ALUMINUM 7000/8000 ALLOYS
 - 7010
 - 7049
 - 7050
 - 7050-T7451 L-T HHA Plate
 - 7050-T76511 L-T STW Extrusion
 - 7050-T7452 L-T Lab air Forging
 - 7050-T74 T-L Lab Air Forging
 - 7050-T74511 L-T lab-air Extrusion
 - 7050-T74 L-T Lab air Forging
 - 7050-T76511 L-T lab-air Extrusion
 - 7050-T73511 L-T HHA Extrusion
 - 7050-T73651 L-T Lab air Plate
 - 7050-T7451 L-T Lab Air Plate
 - 7075
 - 7079
 - 7150
 - 7175
 - 7178



Delta K* vs da/dN: 7050-T7452 L-T Lab air Forging

