

Ex04. General Power Law	(AFDEX 16)	3
[AFDEX_MAT	]	3
[(Elastic)	]	4
[(Plastic)	]	4
[(Plastic)	]	5
[(Plastic)	]	6
[(Plastic)	]	6
[(Plastic)	]	7
[(Plastic)	(0.1 s⁻¹, 850 °C)]	7
[(Plastic)	(1 s⁻¹, 850 °C)]	9
[(Plastic)	(5 s⁻¹, 850 °C)]	9
[(Plastic)	(10 s⁻¹, 850 °C)]	10
[(Plastic)	(20 s⁻¹, 850 °C)]	11
[(Plastic)	]	12
[(Plastic)	]	13
[(Plastic)	]	14
[(Plastic)	]	15
[(Thermal)	]	16
[AFDEX_MAT	]	17
[	]	18

Ex04. General Power Law (AFDEX 16)

General Power Law 모델

$$\bar{\sigma} = C(\bar{\epsilon}, T) \dot{\bar{\epsilon}}^m(\bar{\epsilon}, T)$$

C : Strength coefficient (강도계수)

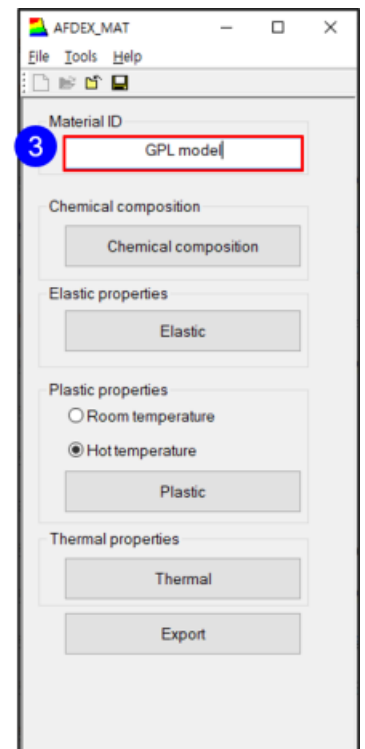
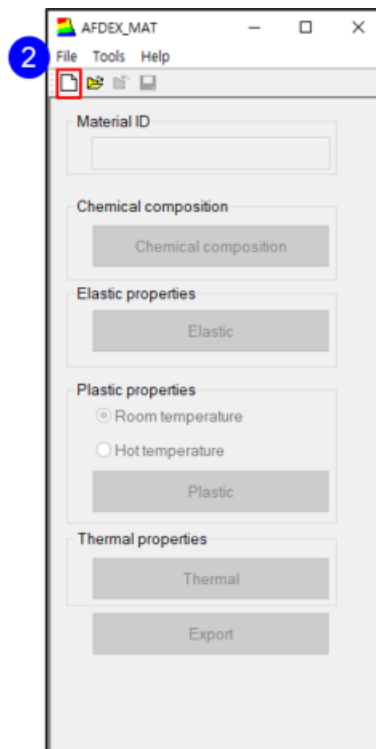
$\dot{\bar{\epsilon}}$: Strain-Rate (변형률 속도)

m : Strain-Rate Sensitivity Index (변형률 속도 민감도 지수)

[AFDEX_MAT]

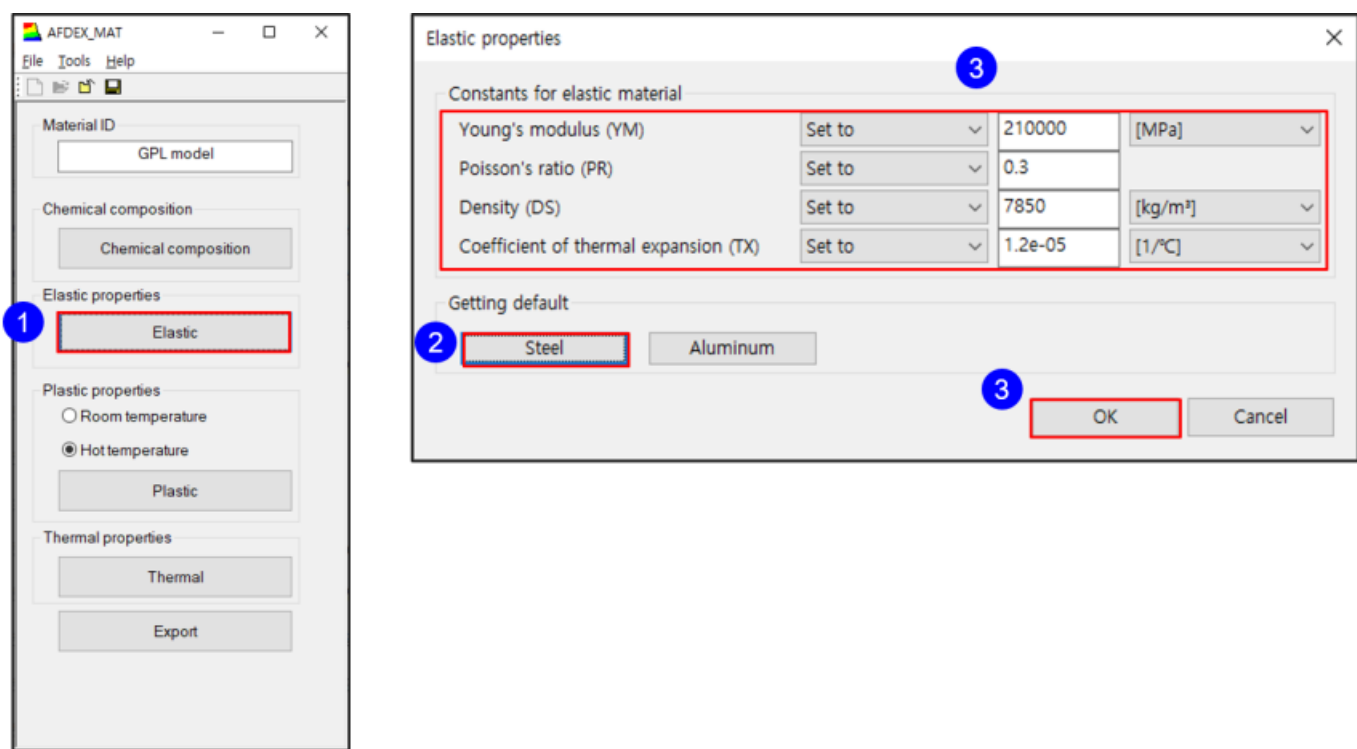


1



1. ADEX_MAT
2. "New"
3. "Material ID"

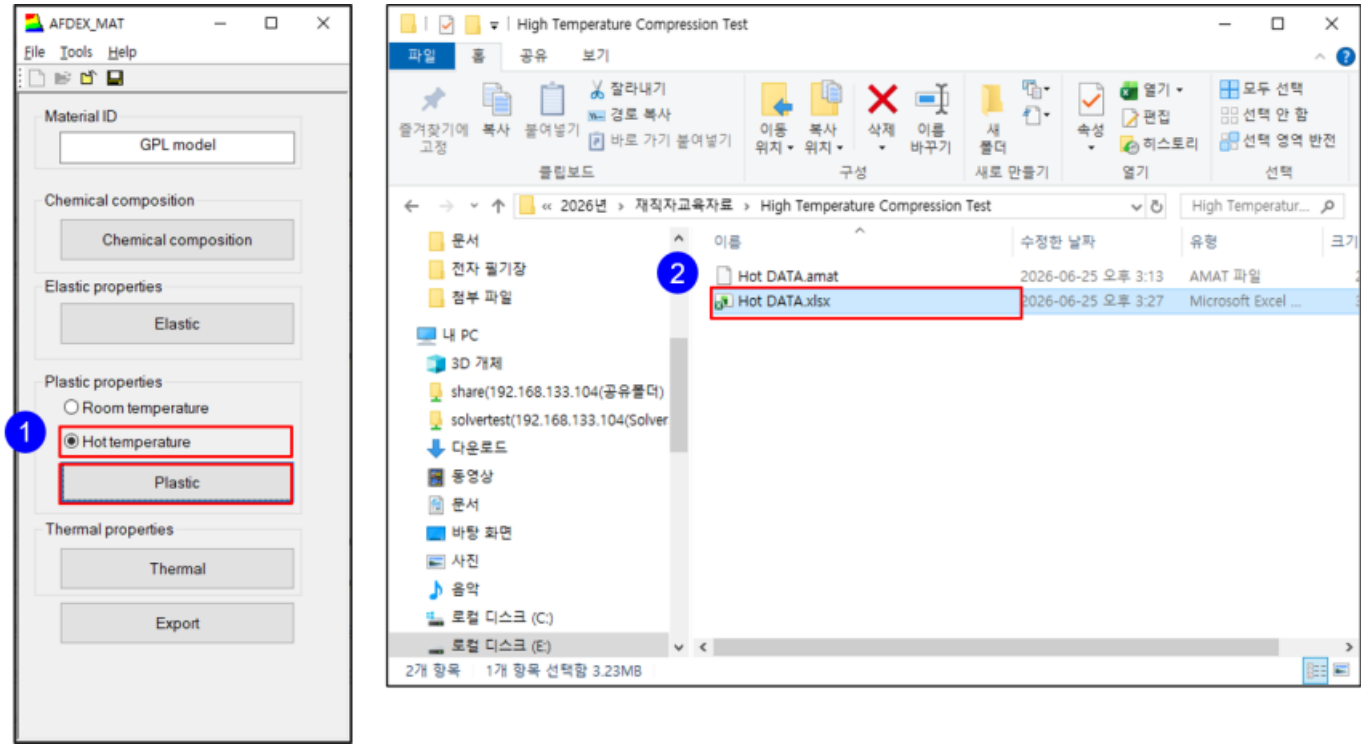
[(Elastic)]



1. "Elastic"
2. "Elastic properties" , "Getting default" "Steel" . (Aluminum)
3. , "Young's modulus", "Poisson's ratio", "Density", "Coefficient of thermal expansion"

가 , 가 .

[(Plastic) _]



1. “Hot temperature” , “Plastic”
2.

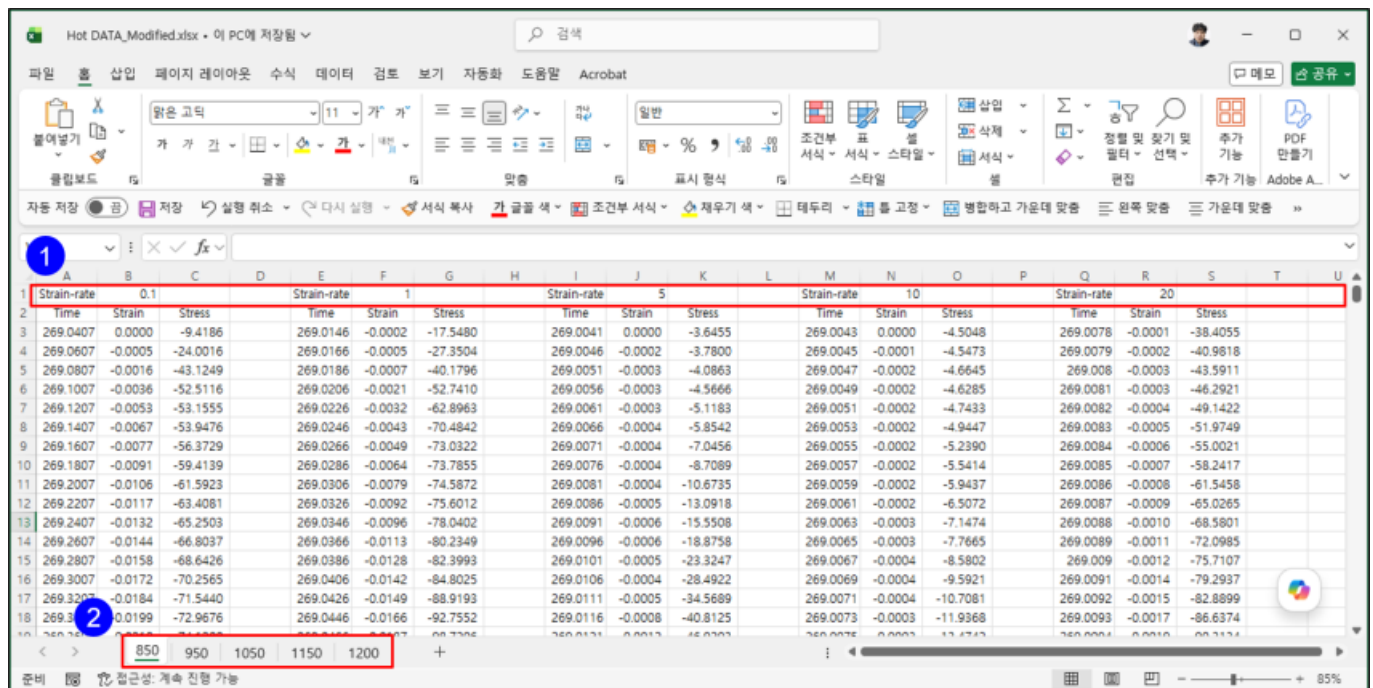
[(Plastic)]

The screenshot shows an Excel spreadsheet with a table of experimental data. The table has columns for Time, Strain-rate, Strain, and Stress. A red box highlights the first 10 rows of data.

Time	Strain-rate	Strain	Stress
0	-0.0129	-29.7546	
1	-0.0122	-14.9943	
2	-0.0001	-5.5614	
3	0.0007	-4.3529	
4	0.0007	-4.0787	
5	0.0008	-3.9769	
6	0.0008	-4.0835	
7	0.0016	-4.5691	
8	0.0020	-4.2456	
9	0.0019	-3.7607	

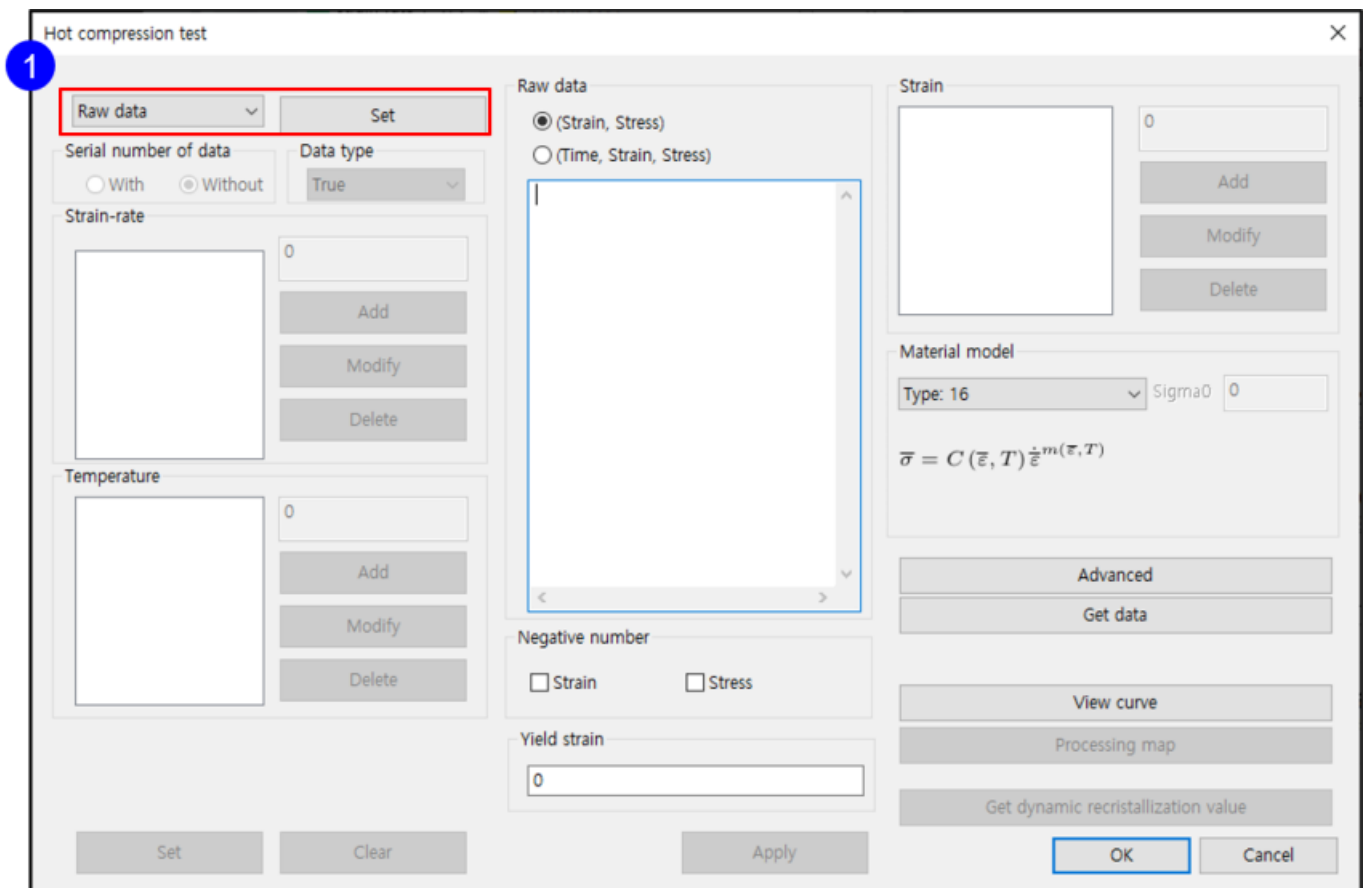
1. “ ” “Strain-rate” , .
- 가 , 'Strain'
- 'Stress' 가

[(Plastic) —



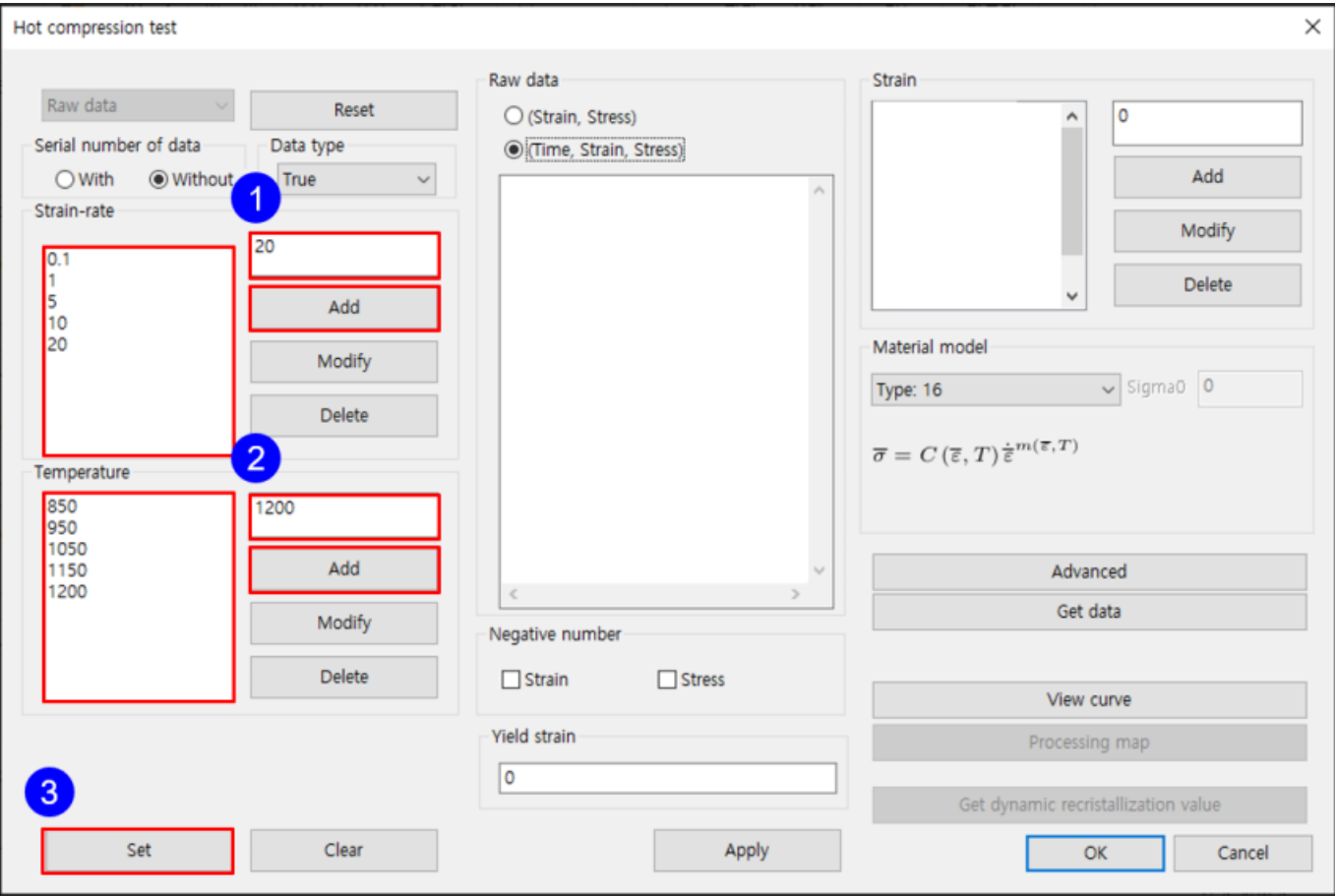
1. "Strain-rate" .(Strain-rate : 0.1, 1.0, 5.0, 10.0, 20.0)
2. "Temperature" .(Temperature : 850, 950, 1050, 1150, 1200)

[(Plastic)



1. “Raw data” , “Set” .

[(Plastic) _]



1. “ (Strain-rate)” , “Add” .

2. “ (Temperature)” , “Add” .

3. , “Set” .

[(Plastic) _ (0.1 s⁻¹, 850 °C)]

Hot compression test

1

Raw data

Serial number of data

With

Without

Strain-rate

0.1

1

5

10

20

Temperature

850

950

1050

1150

1200

Reset

Data type

True

Add

Modify

Delete

Set

Clear

Raw data

(Strain, Stress)

(Time, Strain, Stress)

269.040660

0.000000

9.41860

269.060660

0.000500

24.0016

269.080660

0.001600

43.1249

269.100660

0.003600

52.5116

269.120660

0.005300

53.1555

269.140660

0.006700

53.9476

269.160660

0.007700

56.3729

269.180660

0.009100

59.4139

269.200660

0.010600

61.5923

269.220660

0.011700

63.4081

269.240660

0.013200

65.2503

269.260660

0.014400

66.8037

269.280660

0.015800

68.6426

269.300660

0.017200

70.2565

269.320660

0.018400

71.5440

269.340660

0.019900

72.9676

269.360660

0.021000

74.1200

269.380660

0.022500

75.4628

269.400660

0.023900

76.7923

Negative number

Strain

Stress

Yield strain

0

Apply

Strain

Material model

Type: 16

$\sigma = C(\bar{\epsilon}, T)$

Get d

Hot DATA_Modified.xlsx · 이 PC에 저장

파일 홈 삽입 페이지 레이아웃

맑은 고딕

가 가 간

자동 저장

저장

실행 취소

W13

fx

Strain-rate 0.1

Time Strain Stress

269.0407 0.0000 -9.4186

269.0607 -0.0005 -24.0016

269.0807 -0.0016 -43.1249

269.1007 -0.0036 -52.5116

269.1207 -0.0053 -53.1555

269.1407 -0.0067 -53.9476

269.1607 -0.0077 -56.3729

269.1807 -0.0091 -59.4139

269.2007 -0.0106 -61.5923

269.2207 -0.0117 -63.4081

269.2407 -0.0132 -65.2503

269.2607 -0.0144 -66.8037

269.2807 -0.0158 -68.6426

269.3007 -0.0172 -70.2565

269.3207 -0.0184 -71.5440

269.3407 -0.0199 -72.9676

850 950 1050

준비

접근성: 계속 진행 가능

1. , "Serial number of data"
2. " (Strain-rate)" " (Temperature)"
3.

Hot compression test

1

Raw data

Serial number of data

With

Without

Strain-rate

0.1

1

5

10

20

Temperature

850

950

1050

1150

1200

Reset

Data type

True

Add

Modify

Delete

Set

Clear

Raw data

(Strain, Stress)

(Time, Strain, Stress)

269.040660

0.000000

9.41860

269.060660

0.000500

24.0016

269.080660

0.001600

43.1249

269.100660

0.003600

52.5116

269.120660

0.005300

53.1555

269.140660

0.006700

53.9476

269.160660

0.007700

56.3729

269.180660

0.009100

59.4139

269.200660

0.010600

61.5923

269.220660

0.011700

63.4081

269.240660

0.013200

65.2503

269.260660

0.014400

66.8037

269.280660

0.015800

68.6426

269.300660

0.017200

70.2565

269.320660

0.018400

71.5440

269.340660

0.019900

72.9676

269.360660

0.021000

74.1200

269.380660

0.022500

75.4628

269.400660

0.023900

76.7923

Negative number

Strain

Stress

Yield strain

0

Apply

Strain

Material model

Type: 16

$\sigma = C(\bar{\epsilon}, T)$

Get d

Hot DATA_Modified.xlsx · 이 PC에 저장

파일 홈 삽입 페이지 레이아웃

맑은 고딕

가 가 간

자동 저장

저장

실행 취소

W13

fx

Strain-rate 0.1

Time Strain Stress

269.0407 0.0000 -9.4186

269.0607 -0.0005 -24.0016

269.0807 -0.0016 -43.1249

269.1007 -0.0036 -52.5116

269.1207 -0.0053 -53.1555

269.1407 -0.0067 -53.9476

269.1607 -0.0077 -56.3729

269.1807 -0.0091 -59.4139

269.2007 -0.0106 -61.5923

269.2207 -0.0117 -63.4081

269.2407 -0.0132 -65.2503

269.2607 -0.0144 -66.8037

269.2807 -0.0158 -68.6426

269.3007 -0.0172 -70.2565

269.3207 -0.0184 -71.5440

269.3407 -0.0199 -72.9676

850 950 1050

준비

접근성: 계속 진행 가능

1. "Raw data" "(Time, Strain, Stress)" .
2. "Negative number" "Strain" "Stress" .(,
"Strain" "Stress" 가)
3. "Apply"

[(Plastic) — (1 s⁻¹, 850 °C)]

Hot compression test

1 Raw data

Serial number of data
☐ With ☒ Without
 Strain-rate: 0.1, 5, 10, 20
 Temperature: 850, 950, 1050, 1150, 1200

Data type: True

Raw data
☐ (Strain, Stress)
☒ (Time, Strain, Stress)

Time	Strain	Stress
269.014630	0.000200	17.5480
269.016630	0.000500	27.3504
269.018630	0.000700	40.1796
269.020630	0.002100	52.7410
269.022630	0.003200	62.8963
269.024630	0.004300	70.4842
269.026630	0.004900	73.0322
269.028630	0.006400	73.7855
269.030630	0.007900	74.5872
269.032630	0.009200	75.6012
269.034630	0.009600	78.0402
269.036630	0.011300	80.2349
269.038630	0.012800	82.3993
269.040630	0.014200	84.8025
269.042630	0.014900	88.9193
269.044630	0.016600	92.7552
269.046630	0.018700	98.7206
269.048630	0.021000	102.451
269.050630	0.022900	104.638

Negative number
☒ Strain ☒ Stress

Yield strain: 0

Apply

Material model
 type: 6
 $\bar{\sigma} = C(\bar{\epsilon}, T)$

3

Time	Strain	Stress
269.0146	-0.0002	-17.5480
269.0166	-0.0005	-27.3504
269.0186	-0.0007	-40.1796
269.0206	-0.0021	-52.7410
269.0226	-0.0032	-62.8963
269.0246	-0.0043	-70.4842
269.0266	-0.0049	-73.0322
269.0286	-0.0064	-73.7855
269.0306	-0.0079	-74.5872
269.0326	-0.0092	-75.6012
269.0346	-0.0096	-78.0402
269.0366	-0.0113	-80.2349
269.0386	-0.0128	-82.3993
269.0406	-0.0142	-84.8025
269.0426	-0.0149	-88.9193
269.0446	-0.0166	-92.7552

4

1. , "Serial number of data" .
2. " (Strain-rate)" " (Temperature)" .
3. , .("Raw data"
4. "Apply" .

[(Plastic) — (5 s⁻¹, 850 °C)]

Hot compression test

1 Raw data

Serial number of data
☐ With ☒ Without

Strain-rate
 0.1
 1
 5
 10
 20

Temperature
 850
 950
 1050
 1150
 1200

Data type
 True

Reset

Add

Modify

Delete

Raw data

☐ (Strain, Stress)
☒ (Time, Strain, Stress)

269.004270	0.000000	4.50480
269.004470	0.000100	4.54730
269.004670	0.000200	4.66450
269.004870	0.000200	4.62850
269.005070	0.000200	4.74330
269.005270	0.000200	4.94470
269.005470	0.000200	5.23900
269.005670	0.000200	5.54140
269.005870	0.000200	5.94370
269.006070	0.000200	6.50720
269.006270	0.000300	7.14740
269.006470	0.000300	7.76650
269.006670	0.000400	8.58020
269.006870	0.000400	9.59210
269.007070	0.000400	10.70810
269.007270	0.000300	11.93680
269.007470	0.000300	13.47420
269.007670	0.000300	15.31670
269.007870	0.000300	17.38940

Negative number
☒ Strain ☒ Stress

Yield strain
 0

Apply

Material model
 type: 16

Strain-rate 10

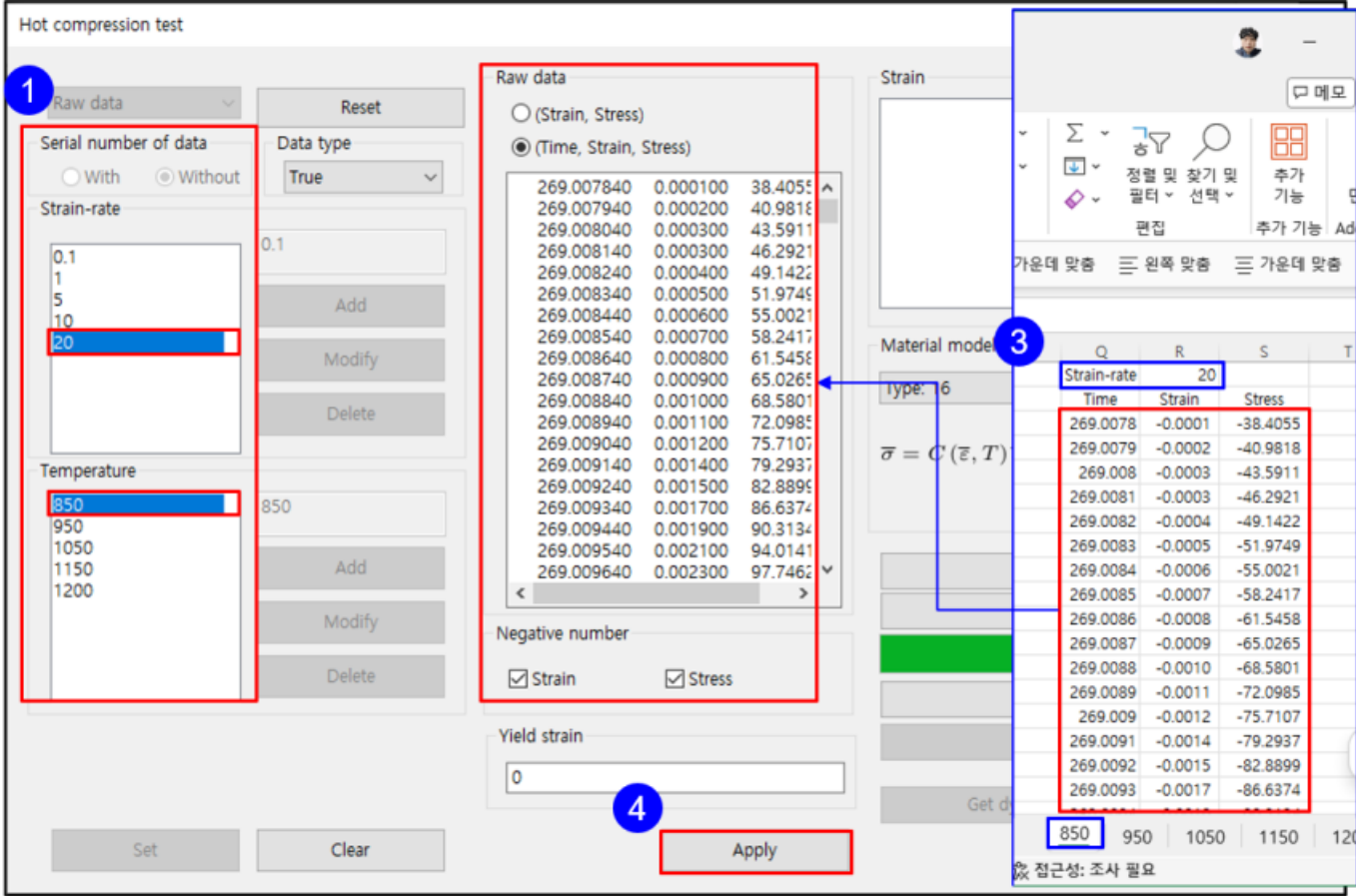
Time	Strain	Stress
269.0043	0.0000	-4.5048
269.0045	-0.0001	-4.5473
269.0047	-0.0002	-4.6645
269.0049	-0.0002	-4.6285
269.0051	-0.0002	-4.7433
269.0053	-0.0002	-4.9447
269.0055	-0.0002	-5.2390
269.0057	-0.0002	-5.5414
269.0059	-0.0002	-5.9437
269.0061	-0.0002	-6.5072
269.0063	-0.0003	-7.1474
269.0065	-0.0003	-7.7665
269.0067	-0.0004	-8.5802
269.0069	-0.0004	-9.5921
269.0071	-0.0004	-10.7081
269.0073	-0.0003	-11.9368

850 950 1050 1150 1200

점근성: 조사 필요

1. , "Serial number of data"
2. " (Strain-rate)" " (Temperature)"
3. , .("Raw data"
4. "Negative number")
 "Apply"

[(Plastic) — (20 s⁻¹, 850 °C)]



1. , “Serial number of data”
2. “ (Strain-rate)” “ (Temperature)”
3. , . (“Raw data”
4. “Negative number”)
4. “Apply” .

[(Plastic) —]

Hot compression test

1 Raw data

Serial number of data

With ☐ Without ☒

Strain-rate

0.1

1

5

10

20

Temperature

850

850

950

1050

1150

1200

Reset

Data type

True

Add

Modify

Delete

Set

Clear

Raw data

(Strain, Stress)

(Time, Strain, Stress)

279.060660 0.000600 20.2845

279.080660 0.002000 32.0614

279.100660 0.003900 35.5777

279.120660 0.005700 37.0457

279.140660 0.006700 38.4166

279.160660 0.008100 40.4084

279.180660 0.009400 42.7898

279.200660 0.010700 44.2658

279.220660 0.012300 45.5104

279.240660 0.013300 46.5512

279.260660 0.014900 47.9224

279.280660 0.016200 49.2762

279.300660 0.017500 49.8331

279.320660 0.018900 50.9291

279.340660 0.020000 51.8738

279.360660 0.021600 52.6809

279.380660 0.022900 53.6087

279.400660 0.024200 54.2932

279.420660 0.025700 55.2039

Negative number

☒ Strain ☒ Stress

Yield strain

0

Apply

Strain

Material model

type 16

$\bar{\sigma} = C(\bar{\epsilon}, T)$

Hot DATA_Modified.xlsx

파일 홈 삽입 페이지 레이아웃

반복

시트 보기

자동 저장 ☒ 저장 실행 취소

A3

Strain-rate	Time	Strain	Stress
0.1	279.0607	-0.0006	-20.2845
	279.0807	-0.0020	-32.0614
	279.1007	-0.0039	-35.5777
	279.1207	-0.0057	-37.0457
	279.1407	-0.0067	-38.4166
	279.1607	-0.0081	-40.4084
	279.1807	-0.0094	-42.7898
	279.2007	-0.0107	-44.2658
	279.2207	-0.0123	-45.5104
	279.2407	-0.0133	-46.5512
	279.2607	-0.0149	-47.9224
	279.2807	-0.0162	-49.2762
	279.3007	-0.0175	-49.8331
	279.3207	-0.0189	-50.9291
	279.3407	-0.0200	-51.8738
	279.3607	-0.0216	-52.6809

850 950 1050 1150 1200

근성: 조사 필요

1.

950, 1050, 1150, 1200

[(Plastic)]

Hot compression test

Raw data

Reset

Serial number of data

With

Without

Data type

True

Strain-rate

0.1

1

5

10

20

0.1

Add

Modify

Delete

Temperature

850

950

1050

1150

1200

850

Add

Modify

Delete

Set

Clear

Raw data

(Strain, Stress)

(Time, Strain, Stress)

279.060660	0.000600	20.2845
279.080660	0.002000	32.0614
279.100660	0.003900	35.5777
279.120660	0.005700	37.0457
279.140660	0.006700	38.4166
279.160660	0.008100	40.4084
279.180660	0.009400	42.7898
279.200660	0.010700	44.2658
279.220660	0.012300	45.5104
279.240660	0.013300	46.5512
279.260660	0.014900	47.9224
279.280660	0.016200	49.2762
279.300660	0.017500	49.8331
279.320660	0.018900	50.9291
279.340660	0.020000	51.8738
279.360660	0.021600	52.6809
279.380660	0.022900	53.6087
279.400660	0.024200	54.2932
279.420660	0.025700	55.2039

Negative number

Strain

Stress

Yield strain

0

Apply

Strain

0.01

0.05

0.1

0.2

0.3

0.4

0.5

0.6

0.7

0.8

0.8

Add

Modify

Delete

Material model

Type: 16

Sigma0 0

$$\bar{\sigma} = C(\bar{\epsilon}, T) \dot{\bar{\epsilon}}^{m(\bar{\epsilon}, T)}$$

Advanced

Get data

View curve

Processing map

Get dynamic recrystallization value

OK

Cancel

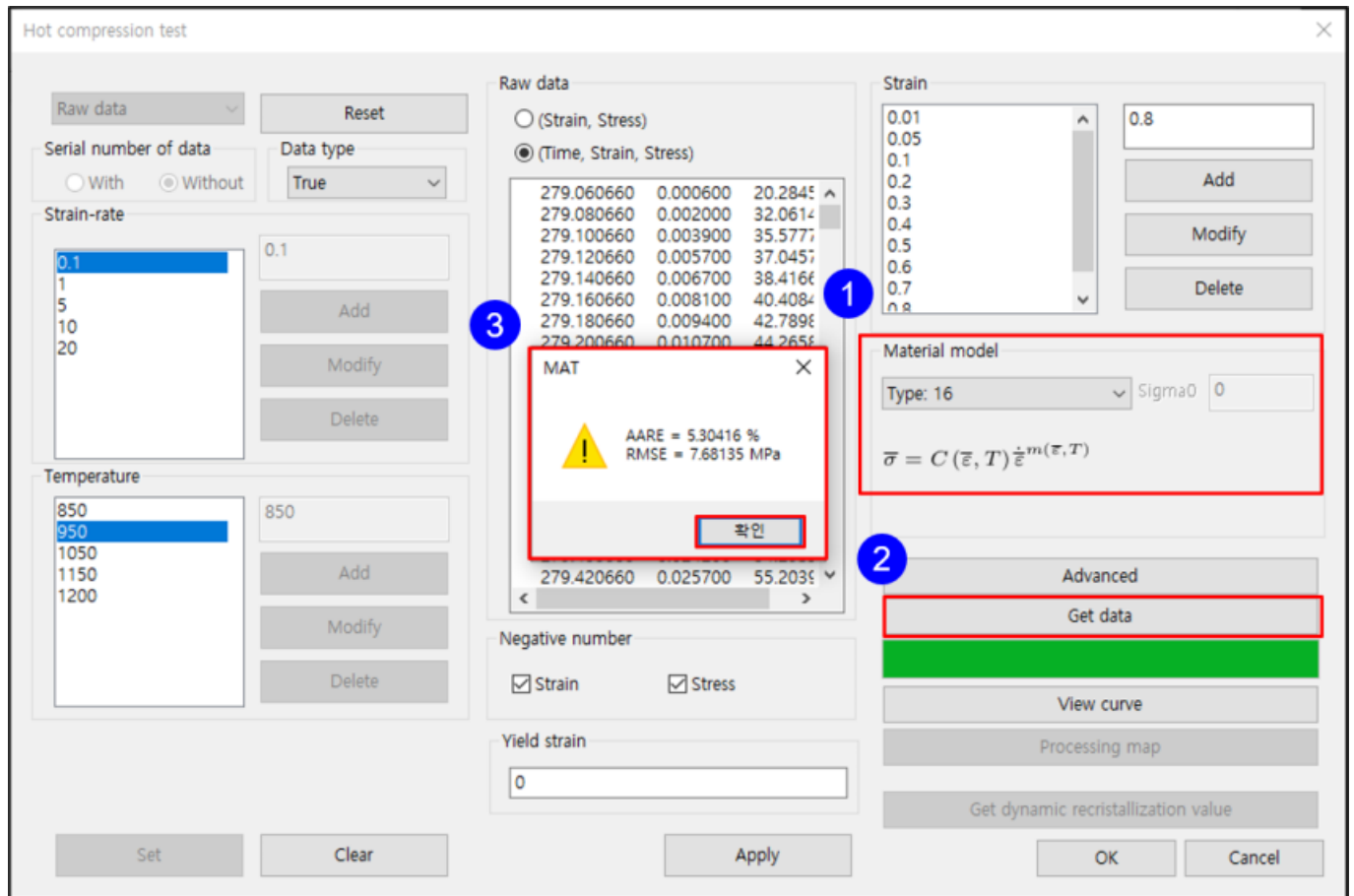
1. "Strain" , "Add" .
2. 가 .(0.01, 0.05, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8
Add)

"Strain" .

[(Plastic) _]

https://edu.afdex.com/

Printed on 2026/07/05 10:25



1. "Material model" "Type: 16"

2. "Get data"

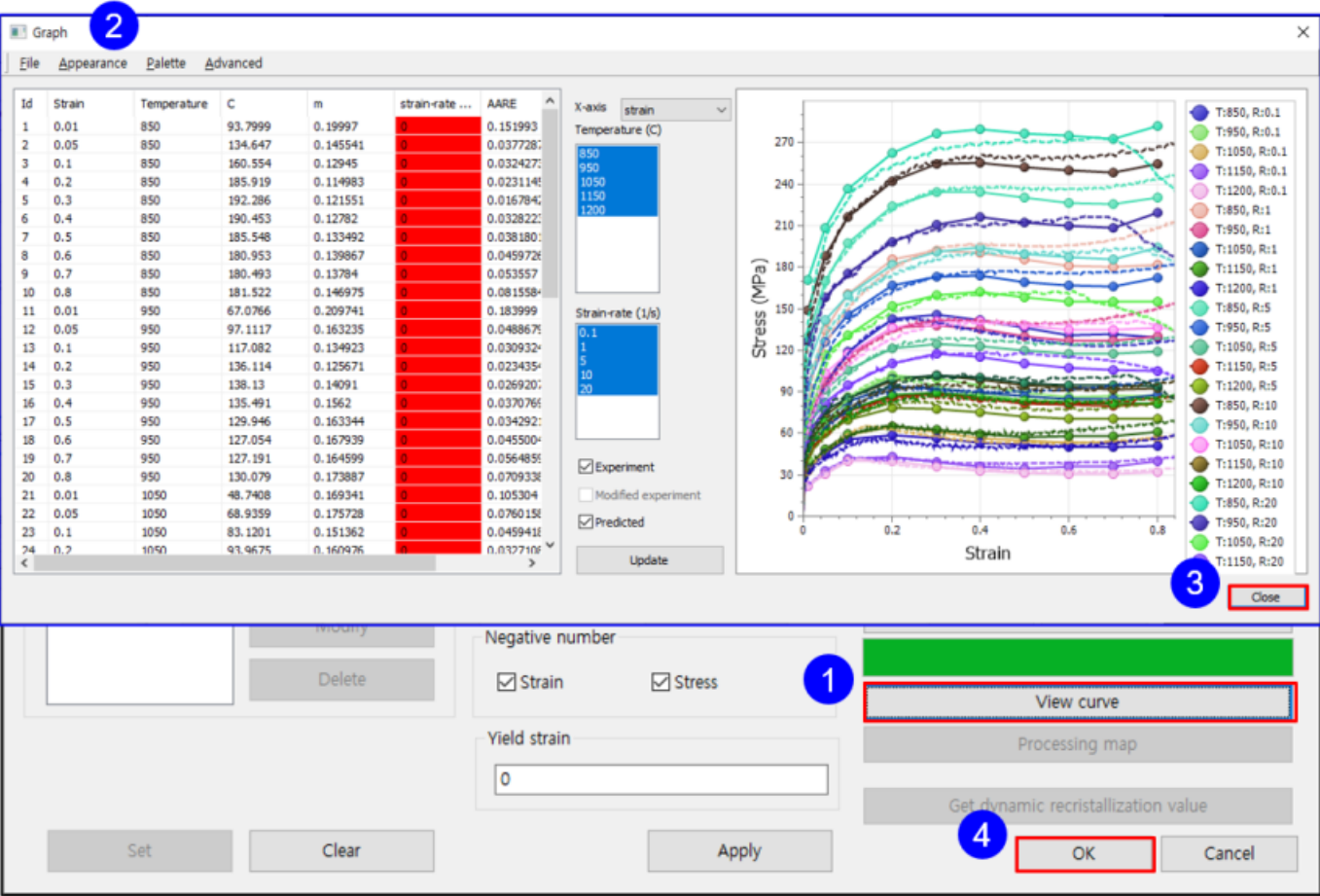
3. "MAT" , "AARE() " "RMSE() " 가

4. " " .

가 "Advanced"

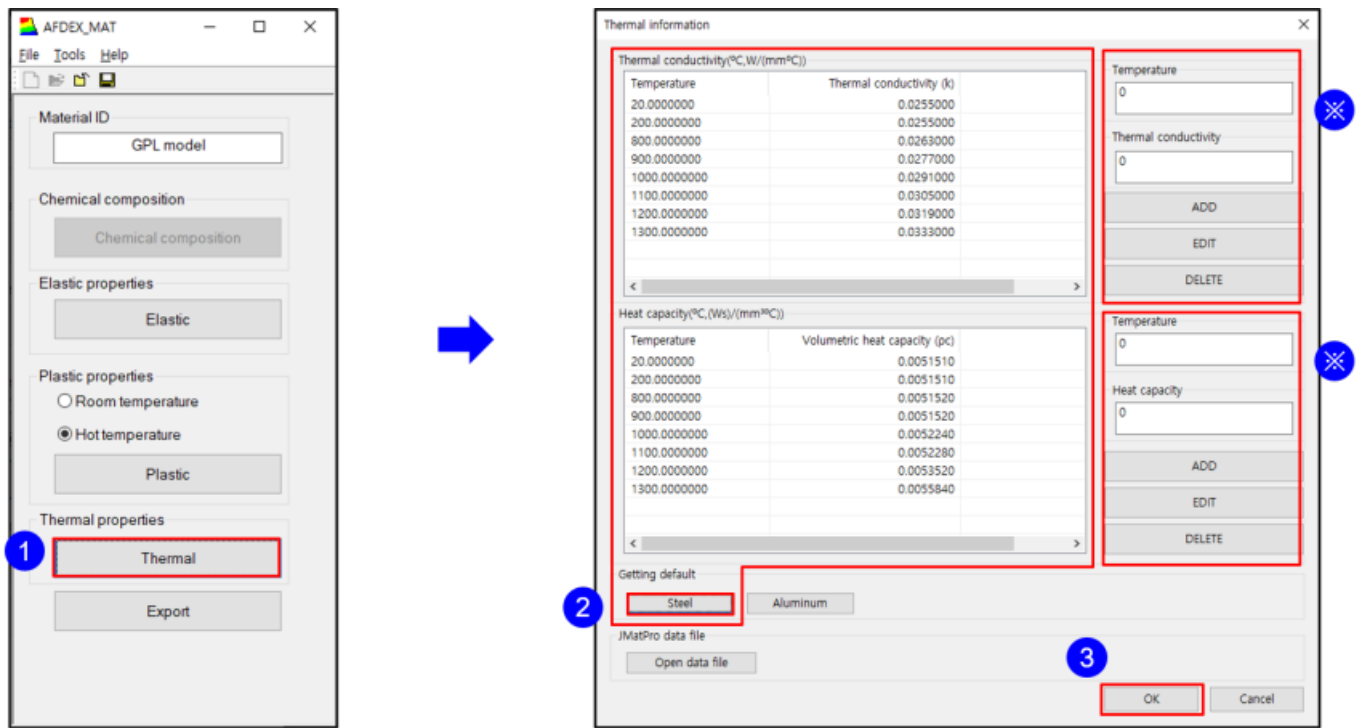
가

[(Plastic) —]



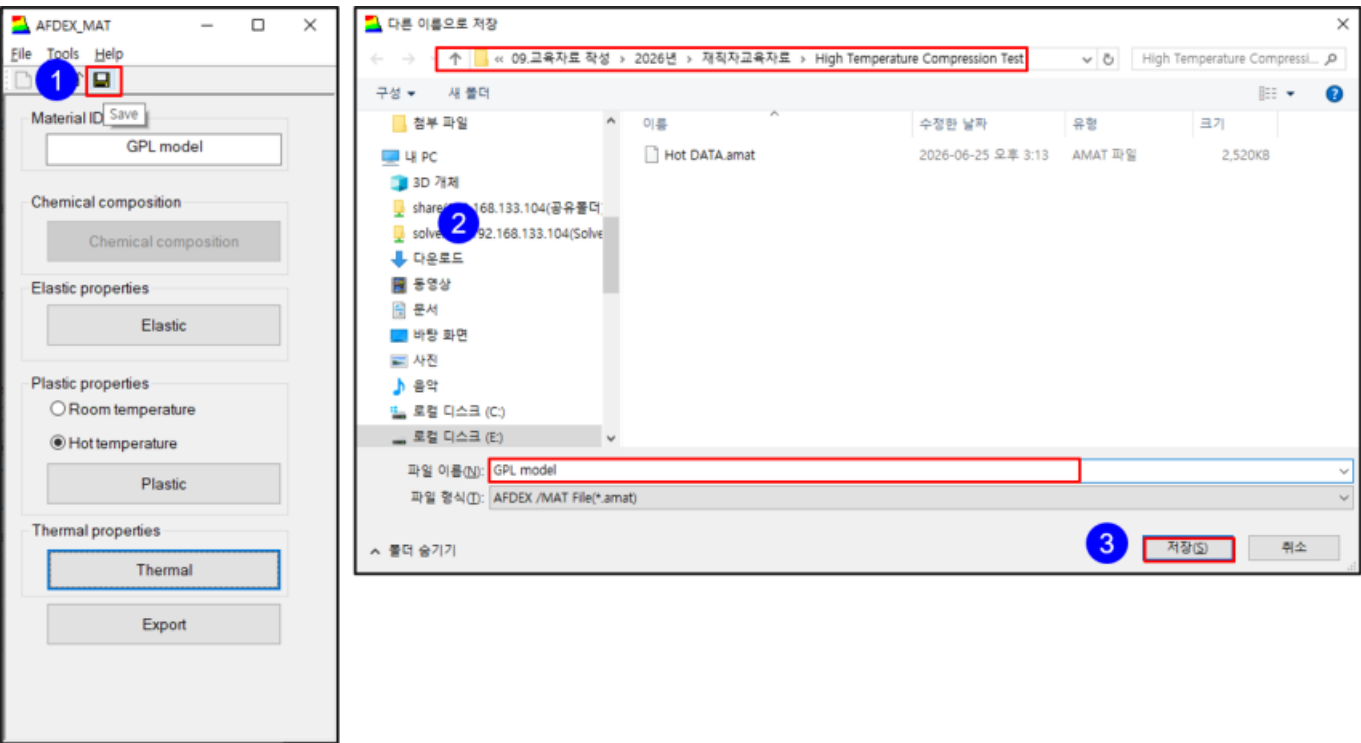
1. "View curve"
2. "Graph"
3. "Close"
4. "OK"

[(Thermal)]



가 . , "ADD" ,

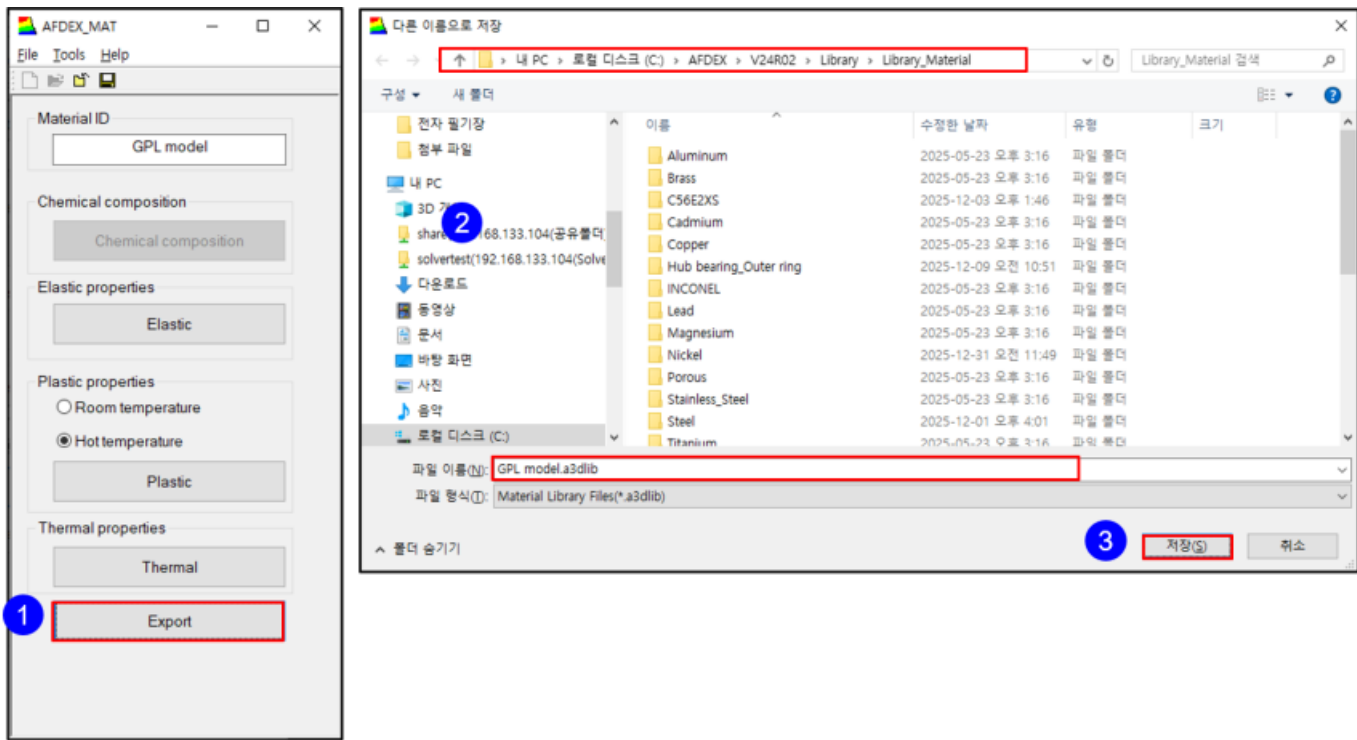
[AFDEX_MAT]



2. “ ” , .
3. “ ” .

☐☐※ “***.amat” AFDEX_MAT
AFDEX_MAT “ ” ,
가 .

[]



1. “Export” .
2. “ ” , .
3. “ ” .

☐☐※ C → AFDEX → V24R02 → Library → Library_Material AFDEX
, “ : 가 ” , .

From:
<https://edu.afdex.com/> - **AFDEX**

Permanent link:
https://edu.afdex.com/doku.php?id=smjang:hot_compression_test_ex04

Last update: **2026/06/29 05:20**