Technical Literature B-01

Thermal Decomposition Properties of AURUM®

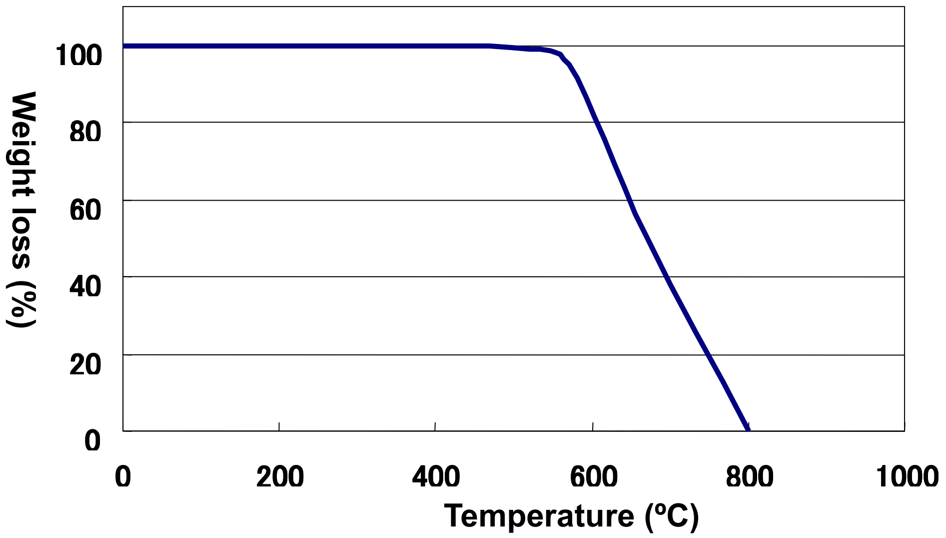
AURUM® is very thermally stable, showing the thermal decomposition properties that are better than those of PEEK, a representative high-performance resin. A thermal decomposition curve (DTG) is shown in Fig. 1.

In a short time, AURUM® suffers little or no weight loss up to a temperature level of approximately 500ºC - 1% weight loss (Td1) at 520ºC and 5% weight loss (Td5) at 570ºC - exhibiting the best thermal decomposition properties out of all heat resistant resins.

(ºC)

	Td1	Td5	Td50
AURUM®	520	570	670
PEEK	480	520	610

Fig. 1 Thermal Decomposition Curve of AURUM®



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Technical Literature B-02

Kinematic Viscoelasticity of AURUM®

Kinematic viscoelasticity is used as a measure for evaluating the thermal properties of a material.

The modulus of elasticity of a material changes substantially in the vicinity of the glass transition temperature. Fig. 1 shows the way the viscoelasticity of AURUM® changes in comparison with other representative crystalline engineering plastics (PEEK, PAm 6,6 and PTFE) and a non-crystalline engineering plastic (PES).

With the conventional crystalline engineering plastics, the glass transition temperature of all of them is lower by over 100ºC than that of AURUM®, and therefore their flexural modulus declines sharply in the low temperature range (RT: up to 200ºC).

On the other hand, the characteristic of a non-crystalline engineering plastic (PES) is that it is higher in glass transition temperature than a crystalline engineering plastic. In spite of that, however, its modulus of elasticity falls very sharply at a temperature a little higher than 200ºC.

As described above, AURUM® has those excellent thermal properties which even non-crystalline engineering plastics, not to mention the conventional crystalline engineering plastics, do not have. Because of this, AURUM® can be applied to various moving parts requiring high performance.

Fig. 1 Kinetic Viscoelasticity

	Tg	Tm	
(A) AURUM®	250	388	Crystalline
(B) PEEK	143	334	Crystalline
(C) PES	225	-	Non-crystalline
(D) PAm 6,6	80	265	Crystalline
(E) PTFE	-110, 30, 130	327	Crystalline

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Technical Literature B-03

Temperature Dependence of Tensile Strength and Flexural Modulus of AURUM®

The short-term heat resistance of a resin basically depends greatly on the glass transition temperature of the resin.

The glass transition temperature of AURUM® is as high as 250ºC, or considerably higher than that of the conventional non-crystalline and crystalline engineering plastics. Consequently, AURUM® retains high strength and stiffness up to a temperature range exceeding 200ºC, and therefore AURUM® can be applied to various engineering parts requiring excellent mechanical properties in a high-temperature atmosphere. Refer to Table 1.

Fig. 1 shows the temperature dependence of the flexural modulus of AURUM® in a non-crystalline state, a representative non-crystalline engineering plastic PES and a crystalline engineering plastic PEEK. AURUM® shows better heat resistance than PES and PEEK.

Fig. 1 Temperature Dependence of Flexural Modulus of Various Engineering Plastics

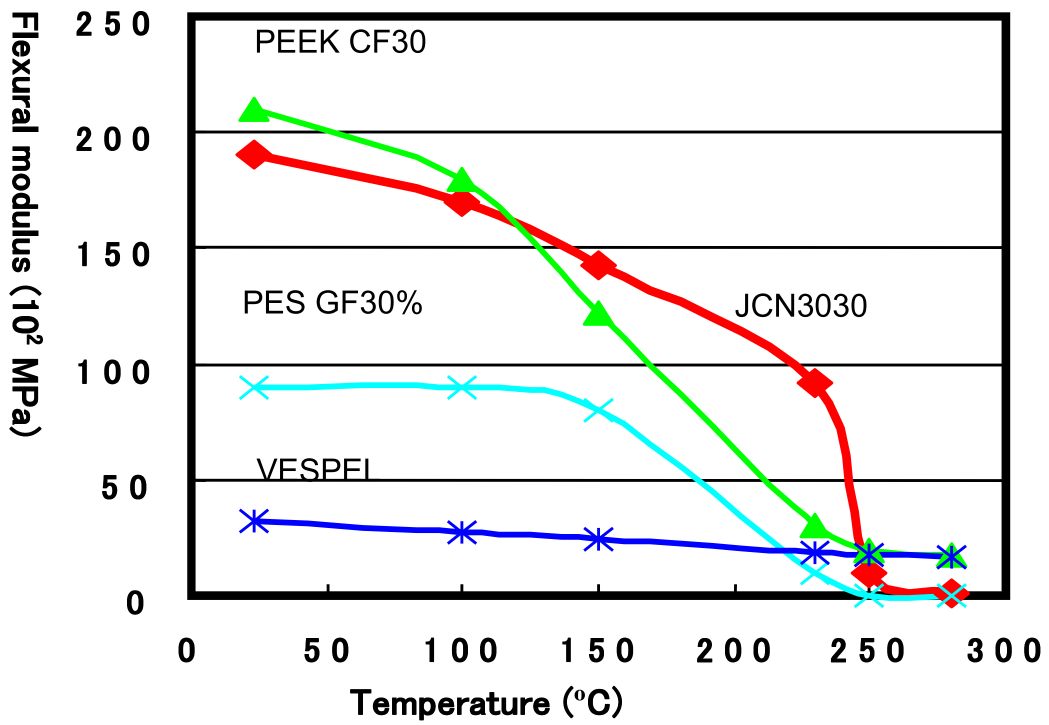

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Table 1 Temperature Dependence of Mechanical Strength of AURUM® (RT up to 230ºC)

• Temperature dependence of tensile strength (kg/cm^2)

	R.T.	100ºC	150ºC	200ºC	230ºC
JGN3030	1680	1270	1080	890	640
JCN3030	2330	1780	1440	1110	870

• Temperature dependence of flexural strength (kg/cm^2)

	R.T.	100ºC	150ºC	200ºC	230ºC
JGN3030	2460	2020	1760	1310	850
JCN3030	3260	2690	2200	1610	1090

• Temperature dependence of flexural modulus (kg/cm^2)

	R.T.	100ºC	150ºC	200ºC	230ºC
JGN3030	97000	84000	82000	78000	69000
JCN3030	194000	171000	171000	164000	143000

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Technical Literature B-04

Long-term Thermal Stability of AURUM®

One of the characteristics of AURUM® is excellent long-term thermal stability at high temperatures.

The long-term thermal stability of a resin is usually evaluated by the changes with time in its properties (such as mechanical and electrical properties, for example) which will take place when a test specimen of the resin is exposed to a high-temperature atmosphere.

Fig. 1 shows changes in the tensile strength of AURUM® at 230ºC.

In addition, Fig. 2 shows changes in the Izod impact strength of AURUM® in comparison with ULTEM, another thermoplastic polyimide.

Fig. 1 Changes with Time in Tensile Strength at 230ºC

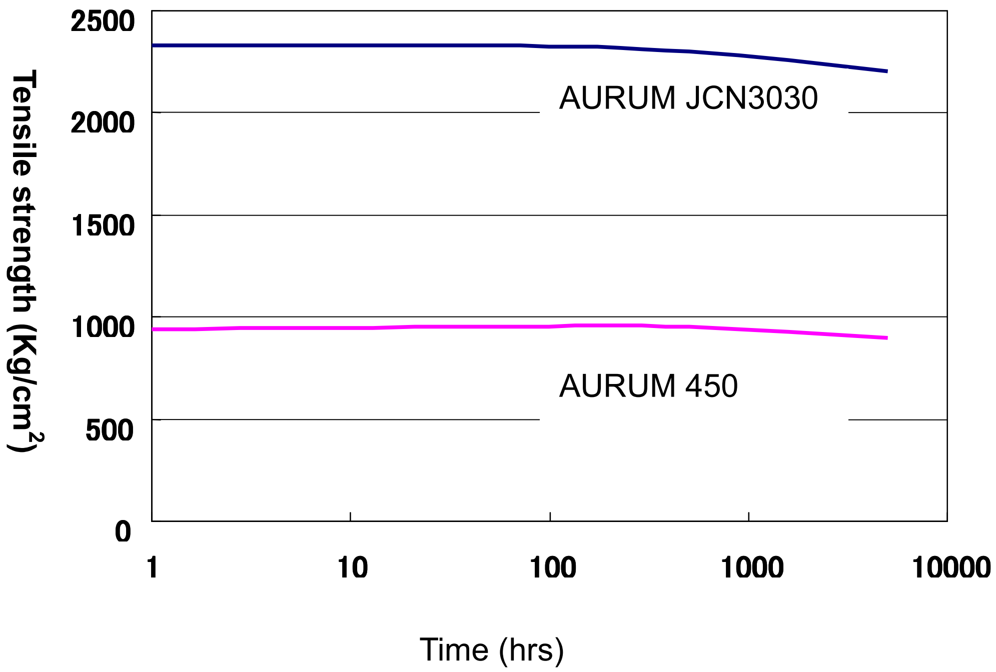

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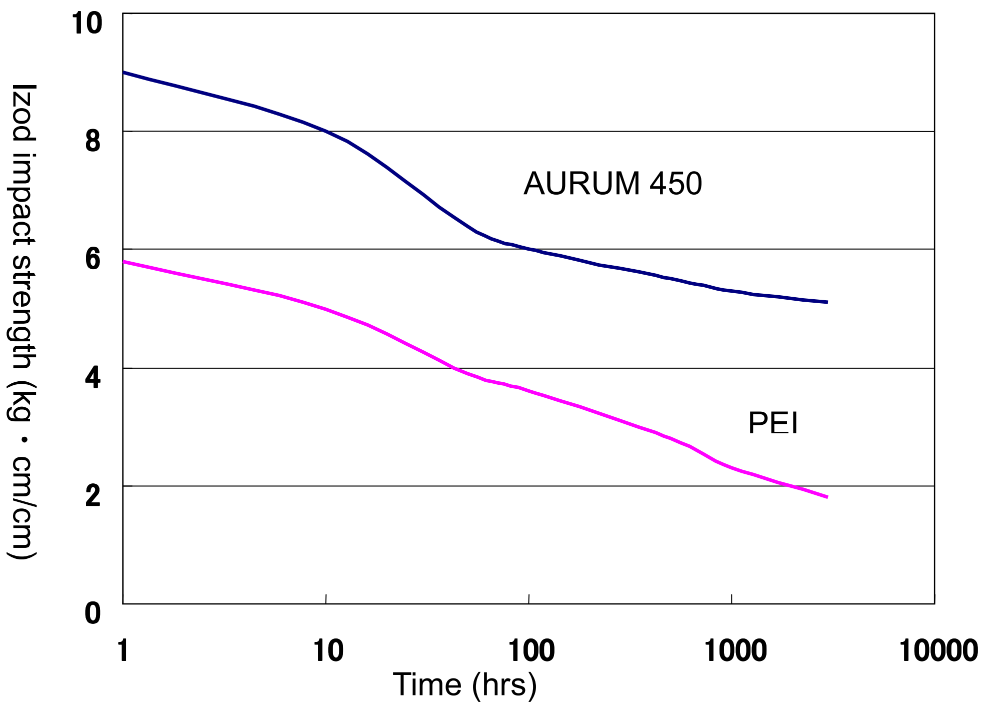
Fig. 2 Changes with Time in Izod Impact Strength at 220ºC



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Technical Literature B-06

Short-term Heat Resistance of AURUM®

The short-term heat resistance of a resin basically depends greatly on the glass transition temperature of the resin.

The glass transition temperature of AURUM® is as high as 250ºC, or considerably higher than that of the conventional non-crystalline and crystalline engineering plastics. Consequently, AURUM® retains high strength and stiffness up to a temperature range exceeding 200ºC, and therefore AURUM® can be applied to various engineering parts requiring excellent mechanical properties in a high-temperature atmosphere.

The temperature dependence of tensile strength, flexural strength, and flexural modulus of AURUM® in a non-crystalline state is shown below.

Temperature dependece of tensile strength (kg/cm^2)

	Room temp	100˚C	150℃	200˚C	250℃
JGN3030	1,680	1,270	1,080	890	640
JCN3030	2,330	1,780	1,440	1,110	870

Temperature dependence of flexural strength (kg/cm^2)

	Room temp	100˚C	150℃	200˚C	250℃
JGN3030	2,460	2,020	1,760	1,310	850
JCN3030	3,260	2,690	2,200	1,610	1,090

Temperature dependence of flexural mudulus (kg/cm^2)

	Room temp	100˚C	150℃	200˚C	250℃
JGN3030	97,000	84,000	82,000	78,000	69,000
JCN3030	194,000	171,000	171,000	164,000	143,000

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