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Aerospace Life Cycle Assessment (LCA)

Dataset Recommendations for Aerospace LCAs

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Version 01

This document is released for purpose of providing a shared vision of the environmental datasets specifically needed by the aerospace sector when conducting LCAs.

It is intended for aerospace sector actors as well as for environmental data providers looking to have a vision of inputs most commonly used throughout the sector.

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1 Introduction

IAEG seeks to develop voluntary leading-edge solutions across the value chain to promote a responsible and sustainable aerospace industry.

As pertains to LCAs within the aerospace sector, primary data, data measured by the reporting company, is to be prioritized whenever possible in order to allow for the most accurate assessment of environmental impacts.

However, standardized secondary data may be used for activities that do not meet the cut-off criteria, or where primary data is not available or assessed to be less representative than secondary data.

1.1 Purpose

Owing to the elevated technical requirements that are characteristic of the aerospace industry, there is often a necessity for the use of specialised materials and manufacturing processes.

Available databases for conducting life cycle assessments still have a number of gaps in this area. Either no data can be found, or the data available does not reflect the specific requirements of the aviation industry.

The aim of this document is therefore to make this shared expression available to environmental dataset providers that are looking to contribute to the progress of aerospace sector sustainability.

1.2 Scope of v1

The working group, which comprises all the relevant parties involved in the process along the value chain, has collected, prioritised and compared the data sets required for conducting a life cycle assessment with those that are already available.

A broader list of materials, processes & components has been established through the collection process. However, this first version of the document focuses on a limited set of 100 items that have the highest level of priority for the aerospace sector.

Further versions of this document will come to complete the list with complementary items.

2 Datasets for Aerospace

2.1 Introduction

In the context of advancing sustainable development within the aerospace sector, establishing a comprehensive list of materials and associated manufacturing processes for which environmental data is required is an essential step. This list serves as the foundation for conducting Life Cycle Analyses (LCA) on products developed across the aerospace sector.

By prioritizing key materials such as aluminium, steel, titanium, composites, and superalloys, we aim to ensure that environmental impacts are systematically assessed and managed throughout the product lifecycle—from raw material extraction to end-of-life treatment. Such an approach supports informed decision-making, enables transparent communication on sustainability performance, and fosters continuous improvement in ecodesign across the sector.

2.2 Methodology

A preliminary list has been established using existing IAEG references.

The scope has then been complemented by a survey conducted among aerospace companies in order to identify possible missing data and establish priorities for needed data.

Priorities for the initial shortlist are defined based on an assessment of both the level of interest and the representativeness for the aerospace sector, particularly in terms of mass.

2.3 Priority Materials & Processes

2.3.1 Aluminium

Aluminium is widely used in the aerospace industry due to its excellent strength-to-weight ratio, corrosion resistance, and ease of fabrication.

Its principal applications include airframe structures, fuselage panels, wing components, and various interior systems. Aluminium alloys, such as the 2xxx, 6xxx, and 7xxx series, are selected according to specific mechanical and thermal requirements within the aircraft. The material's low density directly contributes to fuel efficiency by reducing the overall weight of the aircraft.

Assessing the environmental footprint of aluminium in aerospace requires detailed data on the various grades and nuances, as well as the processes involved in casting, extrusion, rolling, forging, and surface treatments.

2.3.2 Steel

Steel remains a fundamental material within aerospace, especially for components that require high strength, substantial fracture toughness, and good ductility.

It is commonly used in landing gear, engine parts, fasteners, and structural reinforcements. Various steel types, including carbon steels, stainless steels, and ultra high strength steels are deployed depending on the performance requirements of each application.

Environmental assessment necessitates consideration of a spectrum of steel grades and the associated manufacturing processes such as forging, machining, heat treating, and surface finishing

2.3.3 Titanium

Titanium is selected in aerospace primarily for its exceptional strength-to-weight ratio, corrosion resistance, and compatibility with high-temperature environments.

Typical uses include airframe parts, engine components, and fasteners, especially where both weight reduction and high mechanical performance are critical.

Common alloys, such as Ti-6Al-4V, offer an optimal balance of mechanical properties and processability.

Titanium's unique attributes demand specialized processing, including forging, machining, and additive manufacturing.

For robust environmental analyses, data must be gathered for the specific titanium grades and the processes by which they are shaped and treated within aerospace applications.

2.3.4 Composites

Composite materials, especially those reinforced with carbon fibers, have revolutionized aerospace engineering by offering significant weight reductions while maintaining high structural integrity.

Their primary applications include fuselage sections, wing skins, tail assemblies, and interior components.

The variability in resin matrices and reinforcement fibers allows tailoring of mechanical properties to exacting performance criteria. However, composite fabrication processes such as layup, autoclave curing, resin transfer molding, and out-of-autoclave techniques introduce distinct environmental challenges that must be carefully evaluated.

The diversity in composite formulations and production methods requires comprehensive data for accurate life cycle assessments.

2.3.5 Superalloys

Superalloys—typically nickel, cobalt, or iron-based—play a critical role in aerospace due to their ability to retain mechanical strength and resist oxidation at exceptionally high temperatures.

They are predominantly used in engine components such as turbine blades, discs, and combustion chambers, where operating conditions are extreme.

The complexity of superalloy compositions, such as those found in Inconel, Hastelloy, and Rene alloys, necessitates specialized casting, forging, and advanced surface treatment processes.

Environmental data collection must encompass the full range of nuances and process routes specific to these advanced materials to accurately assess their impact throughout the aircraft lifecycle.

By compiling detailed data on these priority materials and their associated manufacturing processes, companies from the aerospace sector will be empowered to perform more precise and relevant life cycle analyses, ultimately supporting the advancement of environmentally responsible aerospace solutions.

2.4 Aerospace dataset recommended list

The list established of the aerospace recommended dataset is provided in this Appendix of the document.

3 Dataset Recommendations

The following are recommendations for datasets to be compatible with the guidance recommended in the IAEG Aerospace Life Cycle Assessment Voluntary Framework Document.

The IAEG Aerospace Life Cycle Assessment Voluntary Framework Document is available here:

https://www.iaeg.com/binaries/content/assets/iaeg/2025/wg12/wg12-lca-frmwk-document-v1_final.pdf

3.1 Lifecycle Impact Assessment Methods

It is recommended that the elementary flows in datasets are sufficient to enable the calculation of all EF LCIA categories.

See Section 3.5.1 of the IAEG Voluntary Framework document.

Completeness of a dataset's elementary flows must be sufficient to calculate at least the following impact categories

1. **Climate Change:** GHG emission reduction is a clear priority of the aerospace industry in support of the IATA commitment to Fly Net Zero by 2050.
2. **Resource Use (EF categories: Minerals and Metals & Fossils):** better understanding of resource use impacts can be used to build aerospace supply chains that are more sustainable and resilient and reduce the amount of natural resources used.
3. **Photochemical Ozone Formation (Summer Smog):** focus on this impact will help drive continued improvement of air quality at and around airports and reduce environmental impacts for those communities.
4. **Acidification:** reduction of sulfur oxides (SOx) and nitrous oxides (NOx) are an important part of overall aerospace and airline impact reduction.
5. **Particulate matter:** reduction in particulate matter emissions is an important part of overall aerospace and airline impact reduction both from an air quality and a cloud formation perspective.

See Section 3.5.3 of the IAEG Voluntary Framework Document

3.2 Exclusion Criteria

It is appropriate to use cut-off rules only when the data is unavailable, and no other assumption or allocation can be made.

For all approaches, the database provider must document, report and justify any cut-off decisions.

See Section 3.3.5 of the IAEG Voluntary Framework document

3.3 End of life Methods

The cut-off method is the easiest to use and is recommended. Database providers may provide any information relevant to specific end-of-life scenarios, such as dismantling, recycling rates, etc

See Section 3.3.6.3 of the IAEG Voluntary Framework document

3.4 Allocation Rules

Where processes are multifunctional, the process for solving the issue must be conducted in accordance with the ISO 14044:2006 LCA standard. The practitioner must provide details of the allocation approach used to produce the dataset.

See Section 3.4.6 of the IAEG Voluntary Framework document

3.5 Data Quality

The following attributes of data quality must be available in the dataset documentation

- Technical Representativeness
- Geographical Representativeness
- Temporal Representativeness
- Completeness
- Reliability

It is recommended to use aerospace specific activity data.

It is recommended that global values be used initially until specific regions of interest are defined. For region-specific datasets, only values from the region where the activity is located may be used. Values from a different region may not be used as a substitute.

Data older than 5 years may not be used unless the data series over time is needed and therefore a longer period of data collection is needed.

See Section 3.4.7 of the IAEG Voluntary Framework document

3.6 Aggregation

It is recommended that material datasets be aggregated based on weighted average supply, while processes datasets remain disaggregated so regional utilities can be applied.

The corresponding recommendation is indicated per line item in the datasets recommendation list provided in the appendix.

APPENDIX

Aerospace Recommended Dataset

Name	Alternative Names	Aggregated/ Disaggregated	Parametrisation / other specificity	Comments
ALUMINIUM				
High Priority				
Aluminum_Recycled_Primary_Unspecified_Sheet	Aluminium_Recycled_Primary_Unspecified_Sheet	Aggregated		
Low Priority				
Aluminum_Primary_Extrusion_Hot_Cold	Aluminium_Primary_Extrusion_Hot_Cold	Aggregated		
Aluminum_Primary_Forging_Open-Die	Aluminium_Primary_Forging_Open-Die	Aggregated		
Aluminum_Primary_Casting_Hot Chamber Die_Sheet	Aluminium_Primary_Casting_Hot Chamber Die_Sheet	Aggregated		
Aluminum_Primary_Rolling_Cold_Sheet	Aluminium_Primary_Rolling_Cold_Sheet	Aggregated		
Aluminum_Primary_Rolling_Hot_Sheet	Aluminium_Primary_Rolling_Hot_Sheet	Aggregated		
Aluminum_Secondary_Drilling_Sheet	Aluminium_Secondary_Drilling_Sheet	Aggregated		
Aluminum_Secondary_Stamping_Sheet	Aluminium_Secondary_Stamping_Sheet	Aggregated		
Aluminum_Secondary_Welding	Aluminium_Secondary_Welding	Disaggregated		
AL2000_Primary_Unspecified_Sheet	Al2000_Primary_Unspecified_Sheet, Aluminium, Series 2000	Aggregated		Ex. AMS4028 (AL2014-0 SHEET,PLATE)
AL5000_Primary_Unspecified_Sheet	Al5000_Primary_Unspecified_Sheet	Aggregated		Ex. AMS4016 (AL5052-H32 SHEET,PLATE)
AL6000_Primary_Forging_Rings	Al6000_Primary_Forging_Rings	Aggregated		Ex. AMS4127 (AL6061-T6 FORGING)
AL7000_Primary_Rolling_Cold_Bar	Al7000_Primary_Rolling_Cold_Bar	Aggregated		Ex. AMS4122 (AL7075-T6 BAR,ROD,WIRE)
Aluminum_Secondary_Cold Spray	Aluminium_Secondary_Cold Spray	Disaggregated		
Aluminum_Secondary_Turning	Aluminium_Secondary_Turning	Disaggregated		
Aluminum_Secondary_Anodising_Sulfuric Acid	Aluminium_Secondary_Anodising_Sulfuric Acid	Disaggregated		
STEEL				

Name	Alternative Names	Aggregated/ Disaggregated	Parametrisation / other specificity	Comments
High Priority				
Iron_Material	Iron_Cast Part	Aggregated		
Stainless Steel_Material_100% Recycled_Coil_Cold Rolled	Stainless Steel_Material_Coil_Cold Rolled High Alloy Chromium Steel_Material_Coil_Cold Rolled Corrosion Resistant Steel(CRES)_Material_Coil_Cold Rolled	Aggregated	Various Recycled Content	
Medium Priority				
Steel_Material_50% Recycled_Electrolytic Chrome-Coated	Steel_Material_ECCS	Aggregated	Various Recycled Content	
Steel_Material_50% Recycled_Hot Drip Galvanized	Steel_Material_Hot Drip Galvanized	Aggregated	Various Recycled Content	
Steel_Material_50% Recycled_ Organic Coated	Steel_Material_ Organic Coated	Aggregated	Various Recycled Content	
Steel_Material_Tin Plated		Aggregated	Various Recycled Content	
Steel_Material_50% Recycling_Wire Rod	Steel_Material_Wire Rod	Aggregated	Various Recycled Content	
Steel_Process_Remelting		Disaggregated		
Low Priority				
Stainless Steel_Process_Surface Finishing_Sheet_Scouring	Stainless Steel_Process_Sheet_Deburring High Alloy Chromium Steel_Process_Sheet_Deburring Corrosion Resistant Steel(CRES)_Process_Sheet_Deburring	Disaggregated		
Steel_Process_Heat Treatment_Precipitation Hardening		Disaggregated		
Steel_Process_Secondary Shaping_Brazing		Disaggregated		
Steel_Process_Secondary Shaping_Assembly		Disaggregated		
Steel_Process_Surface Treatment_Chemical Conversion Coating		Disaggregated		
Steel_Process_Surface Treatment_Electro-Polishing		Disaggregated		
Steel_Process_Surface Treatment_Shot Peening		Disaggregated		

Name	Alternative Names	Aggregated/ Disaggregated	Parametrisation / other specificity	Comments
Stainless Steel_Process_Primary Shaping_Metal Atomisation	Stainless Steel_Process_Primary Shaping_Metal Atomisation High Alloy Chromium Steel_Process_Primary Shaping_Metal Atomisation Corrosion Resistant Steel(CRES)_Process_Primary Shaping_Metal Atomisation	Disaggregated		
Steel_Process_Primary Shaping_Metal Atomisation		Disaggregated		
Stainless Steel_Process_Secondary Shaping_Part Turning	Stainless Steel_Process_Secondary Shaping_Part Turning High Alloy Chromium Steel_Process_Secondary Shaping_Part Turning Corrosion Resistant Steel(CRES)_Process_Secondary Shaping_Part Turning	Disaggregated		
NICKEL ALLOYS				
Medium Priority				
Nickel alloy, Inconel718	Super alloy Inconel718 Alloy718 N07718 WL2.4668 NiCr19Fe19Nb5Mo3	aggregated		Examples AMS5663 AMS5589 AMS5962 AMS5596 AMS5662
Nickel alloy, Inconel625	Super alloy Inconel625 Alloy625 N06625 WL2.4856 NiCr22Mo9Nb	aggregated		Examples AMS5666 AMS5599 AMS5581
Low Priority				
Nickel alloy, forged part	Super alloy, forged part	aggregated		
Nickel alloy, forging	Super alloy, forging	disaggregated		
Nickel alloy, casted part	Super alloy, casted part	aggregated		

Name	Alternative Names	Aggregated/ Disaggregated	Parametrisation / other specificity	Comments
Nickel alloy, casting	Super alloy, casting	disaggregated		
Nickel alloy, cold rolling	Super alloy, cold rolling	disaggregated		
Nickel alloy, hot rolling	Super alloy, hot rolling	disaggregated		
Nickel alloy, drilling	Super alloy, drilling	disaggregated		
TITANIUM				
High Priority				
Titanium Alloy - Material - Recycled Ti-6Al-4V		aggregated		
Medium Priority				
Titanium - Forging		disaggregated		
Titanium - Process - Primary Shaping - Casting		disaggregated		
Titanium - Process - Secondary Shaping - Rolling, cold		disaggregated		
Titanium - Process - Secondary Shaping - Rolling, hot		disaggregated		
Titanium - Process - Secondary Shaping - Drilling		disaggregated		
Titanium - Process - Secondary Shaping - Sheet stamping		disaggregated		
Titanium - Process - FFC electrowinning		disaggregated		
Titanium - Process - Kroll process		disaggregated		
Titanium - Process - Primary Shaping - AM - Plasma Powder		disaggregated		
Titanium - Ti-6Al-4V	TA6v	aggregated		
Titanium - Secondary Shaping - Brazing		disaggregated		
Titanium - Secondary Shaping - Welding		disaggregated		
Titanium - Secondary Shaping - Assembly		disaggregated		
Titanium - Coating - Chemical conversion		disaggregated		
Titanium - Secondary Shaping - Electro-polishing		disaggregated		
Titanium - Secondary Shaping - Turning		disaggregated		
Low Priority				

Name	Alternative Names	Aggregated/ Disaggregated	Parametrisation / other specificity	Comments
Titanium - Process - Inspection - Eddy current		disaggregated		
Titanium - Process - Surface Finishing - Chemical Degreasing		disaggregated		
Titanium - Process - Surface Finishing - Etching				
Titanium - Process - Surface Finishing - Shot Peening		disaggregated		
Titanium - Process - Surface Finishing - Anodizing		disaggregated		
Titanium - Process - Secondary Shaping - AM - Metal atomisation		disaggregated		
Titanium - Process - Surface Finishing - Electroless coating		disaggregated		
FIBERS AND TEXTILES				
High Priority				
S-Glass fiber	Glass fiber, high strength S-Glass fibre	aggregated		
Carbon fiber NCF dry tape production	Dry carbon fiber tape production (NCF) Carbon fibre tape (NCF) production NCF tape production	disaggregated	if possible for different areal weights (50 to 250g per square meter)	Material input parameter: Carbon fiber tow
Carbon fiber fabric dry tape production	Dry carbon fiber tape production (Fabric) Carbon fibre tape (fabric) production Carbon fabric tape production	disaggregated	if possible for different areal weights (50 to 250g per square meter)	Material input parameter: Carbon fiber tow
Carbon fiber UD dry tape production	Dry carbon fiber tape production (UD) Carbon fibre tape (UD) production UD tape production	disaggregated	if possible for different areal weights (50 to 125g per square meter)	Material input parameter: Carbon fiber tow
Carbon fiber woven fabric production	Carbon fibre woven fabric, plain weave	disaggregated	if possible for different areal weights (125 to 400g per square meter)	Material input parameter: Carbon fiber tow
Carbon fiber, unidirectional fabric production	Carbon fibre UD fabric	disaggregated	if possible for different areal weights (50 to 125g per square meter)	
Medium Priority				
Carbon fiber tow, intermediate modulus (IM)	Carbon fibre, IM	aggregated		

Name	Alternative Names	Aggregated/ Disaggregated	Parametrisation / other specificity	Comments
Carbon fiber tow, standard modulus (SM)	Carbon fibre, SM carbon fiber, high density (HT) carbon fibre, HT	aggregated		
Carbon fiber tow, high modulus (HM)	Carbon fibre, HM	aggregated		usually also required
Carbon fiber non-woven fabric production	Carbon fiber felt Carbon fiber mat carbon fibre felt carbon fibre mat	disaggregated	if possible for different areal weights (125 to 600g per square meter)	Material input parameter: Carbon fiber tow
Carbon fiber non-crimp fabric (NCF) production	Carbon fibre non-crimp fabric production	disaggregated	if possible for different areal weights (125 to 400g per square meter)	Material input parameter: Carbon fiber tow
Carbon fiber yarn production	carbon fibre yarn production	disaggregated		Material input parameter: Carbon fiber tow
Aramid fiber	Aramid fibre	aggregated		
Low Priority				
RESINS & OTHER THERMOSETS				
High Priority				
Polyether ether ketone granulate (PEEK)	PEEK granulate CAS 29658-26-2	aggregated		
Medium Priority				
Polyetherimide granulate (PEI)	PEI granulate CAS 061128-46-9	aggregated		
Bismaleimide Resin (MDA-BMI)	4,4'-Bismaleimidodiphenylmethane (MDA-BMI) resin CAS 13676-54-5	aggregated		
Low Priority				
Polyamide 12 granulate (PA12)	PA12 granulate CAS 24937-16-4	aggregated		
Polymethylmethacrylate granulate (PMMA)	PMMA granulate CAS 9011-14-7	aggregated		

Name	Alternative Names	Aggregated/ Disaggregated	Parametrisation / other specificity	Comments
Polyoxymethylene granulate (POM)	POM granulate CAS 9002-81-7	aggregated		
Polyethersulfone granulate (PESU)	PESU granulate CAS 25608-63-3	aggregated		
Thermoplastic film production, 300°C melting temperature		disaggregated	If possible for different melting temperatures (300 to 400°C)	Either one parametrized dataset set adaptable for different temperatures or two different datasets Main material input: Thermoplastic granulate
Thermoplastic film production, 400°C melting temperature		disaggregated		
COMPOSITE PROCESSING				
Medium Priority				
Composites, bonding	CFRP, bonding GRFP, bonding ARFP, bonding Bonding of fiber reinforced plastics Bonding of FRP	disaggregated		Functional unit: 1m bonding length
Composites, painting	CFRP, painting GRFP, painting ARFP, painting Painting of fiber reinforced plastics Painting of FRP	disaggregated		Functional unit: 1m ² painted surface
Thermoset prepreg production	Thermoset prepreg production tow, hot-melt Thermoset prepreg production tape, hot-melt Thermoset prepreg production tow, solvent Thermoset prepreg production tape, solvent Thermoset prepreg production tow, powder Thermoset prepreg production tape, powder Thermoset prepreg production tow, film impregnation Thermoset prepreg production tape, film impregnation	disaggregated	if possible for different areal weights (125 to 300g per square meter) and fiber volume content (50 to 60%)	Material input parameter: Fiber and resin in form of liquid resin, powder or film
Thermoplastic prepreg production, melting temperature 300°C	Organosheet production, film stacking, melting temperature 300°C Organosheet production, melt, melting temperature 300°C Organosheet production, powder, melting temperature 300°C	disaggregated	if possible for different areal weights (125 to 300g per square meter) and fiber volume content (50 to 60%) If possible for different melting temperatures (280 to 400°C), otherwise two separate datasets for different temperatures	Material input parameter: Fiber and thermoplastic as film, granulate or powder

Name	Alternative Names	Aggregated/ Disaggregated	Parametrisation / other specificity	Comments
Thermoplastic prepreg tape production, melting temperature 300°C		disaggregated		Material input parameter: Fiber and thermoplastic as film, granulate or powder
Thermoplastic prepreg production, melting temperature 400°C	Organosheet production, film stacking, melting temperature 400°C Organosheet production, melt, melting temperature 400°C Organosheet production, powder, melting temperature 400°C	disaggregated		Material input parameter: Fiber and thermoplastic as film, granulate or powder
Thermoplastic prepreg tape production, melting temperature 400°C		disaggregated		Material input parameter: Fiber and thermoplastic as film, granulate or powder
Composites, assembly	CFRP, assembly GRFP, assembly ARFP, assembly Assembly of fiber reinforced plastics Assembly of FRP	Disaggregated		Functional unit: 1h assembly time
Low Priority				
Composites, machining	CFRP, machining GRFP, machining ARFP, machining Machining of fiber reinforced plastics Machining of FRP	Disaggregated	if possible for different amount of cut-offs during machining (5 to 50%)	
Composite, autoclave curing, 120°C cycle	CFRP, autoclave curing GRFP, autoclave curing ARFP, autoclave curing Curing of fiber reinforced plastics in an autoclave Curing of FRP in an autoclave	Disaggregated	if possible for different autoclave loads (utilization) (0.5 to 5kg/m ³), cycle times (4 to 12h), pressures (1 to 10 bar),temperatures (100° to 180°C)	Either one parametrized dataset (parametrized for cycle temperature, pressure, duration and load) or three average data sets for different temperature cycles
Composite, autoclave curing, 140°C cycle	CFRP, autoclave curing GRFP, autoclave curing ARFP, autoclave curing Curing of fiber reinforced plastics in an autoclave Curing of FRP in an autoclave	Disaggregated	if possible for different autoclave loads (utilization) (0.5 to 5kg/m ³), cycle times (4 to 12h), pressures (1 to 10 bar),temperatures (100° to 180°C)	

Name	Alternative Names	Aggregated/ Disaggregated	Parametrisation / other specificity	Comments
Composite, autoclave curing, 180°C cycle	CFRP, autoclave curing GRFP, autoclave curing ARFP, autoclave curing Curing of fiber reinforced plastics in an autoclave Curing of FRP in an autoclave	Disaggregated	if possible for different autoclave loads (utilization) (0.5 to 5kg/m ³), cycle times (4 to 12h), pressures (1 to 10 bar),temperatures (100° to 180°C)	
PREPREG, FINISHED PARTS, & OTHER				
Medium Priority				
Carbon fiber reinforced part (CFRP), epoxy resin	Carbon fibre reinforced part (CFRP), epoxy resin	Aggregated	if possible for different fiber volume contents (50 to 60%)	
Carbon fiber reinforced part (CFRP), PEEK	Carbon fibre reinforced part (CFRP), PEEK	Aggregated		
Carbon fiber reinforced part (CFRP), PEKK	Carbon fibre reinforced part (CFRP), PEKK	Aggregated		
Aramid fiber reinforced part (AFRP), phenolic resin	Aramid fibre reinforced part (AFRP), phenolic resin	Aggregated		
Glass fiber reinforced part (GFRP), epoxy resin	Glass fibre reinforced part (GFRP), epoxy resin	Aggregated		
Glass fiber reinforced part (GFRP), phenolic resin	Glass fibre reinforced part (GFRP), phenolic resin	Aggregated		
Honeycomb, phenol-impregnated aramid paper	Nomex honeycomb	Aggregated		