

<http://www.matsuura.co.jp/>



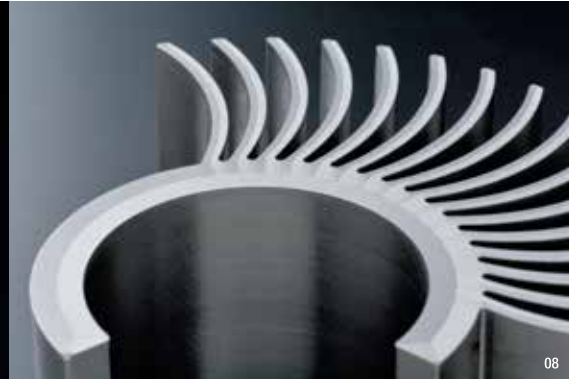
Source of **QUALITY**
Source of **POWER**
Source of **the FUTURE**
HYBRID METAL 3D PRINTER



04



06



08



10



12



14



16



18

Index

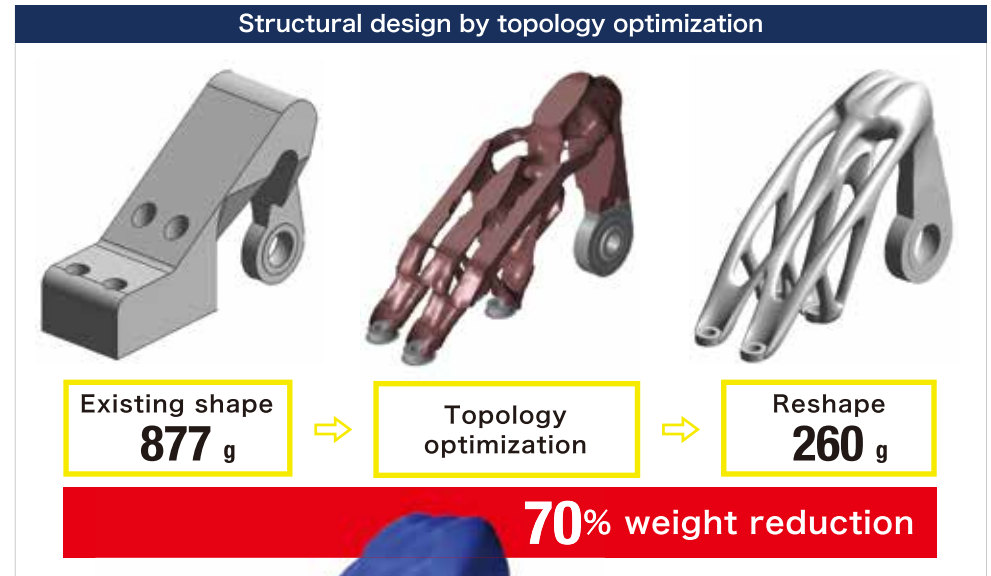
| | | | |
|----------------------------------|------------------------------|---------------------------|----------------------|
| Aircraft Bracket NEW — 02 | Blisk — 04 | Jet Engine Nozzle — 06 | Cooling Fin — 08 |
| Digital Camera — 10 | Electric Driver — 12 | Waterproof Connector — 14 | V8 Engine block — 16 |
| Accessory Gear Box — 18 | Hybrid Metal 3D Printer — 20 | | |

Topology Optimization

Aircraft Bracket



Structural design and Weight reduction by topology optimization Milling finish of mounting surface



Function check by FEM analysis



Machine

LUMEX Avance-25

- Spindle speed : 45,000min⁻¹
- Laser output : 500W

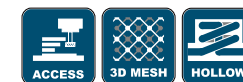
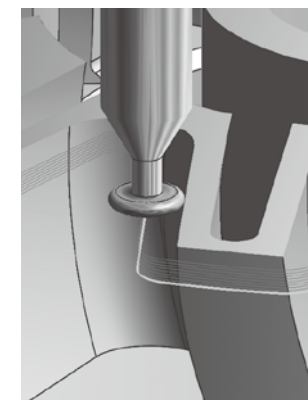
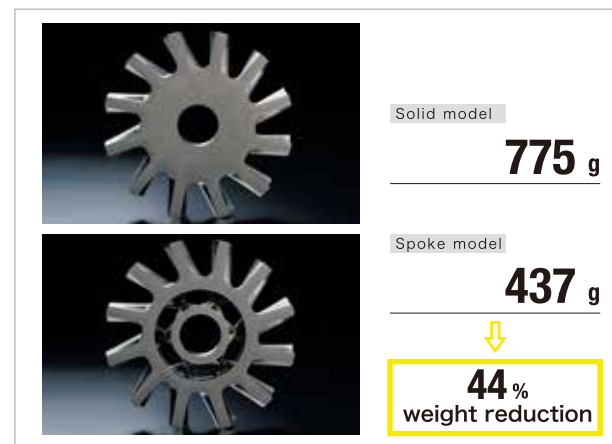
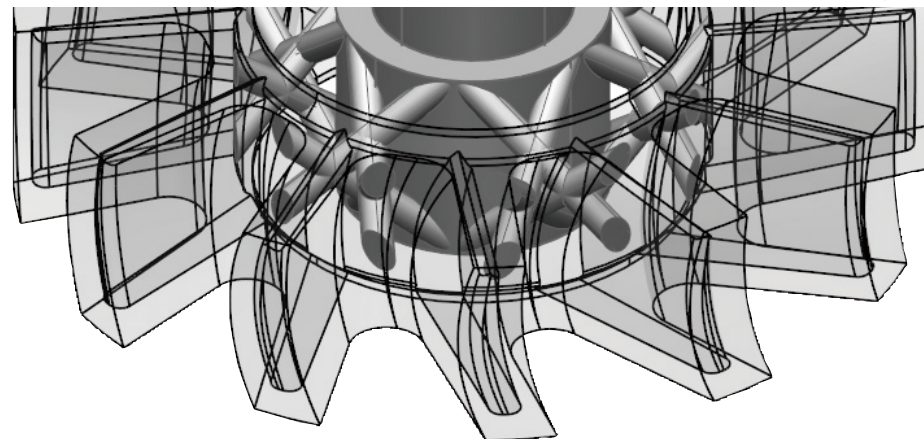
D A T A

| | |
|-----------------|---|
| Material powder | Matsuura Maraging Cobalt Free |
| Weight | 260g(excluding the base plate and supports) |
| Machining time | Sintering : 16h Milling : 12h Total : 28h |

Weight Reduction

Blisk

Back taper machining of Blisk
 Weight reduction using spoke structure and hollow blade design
 with required rigidity



Machine

LUMEX Avance-25

- Spindle speed : 45,000min⁻¹
- Laser output : 500W

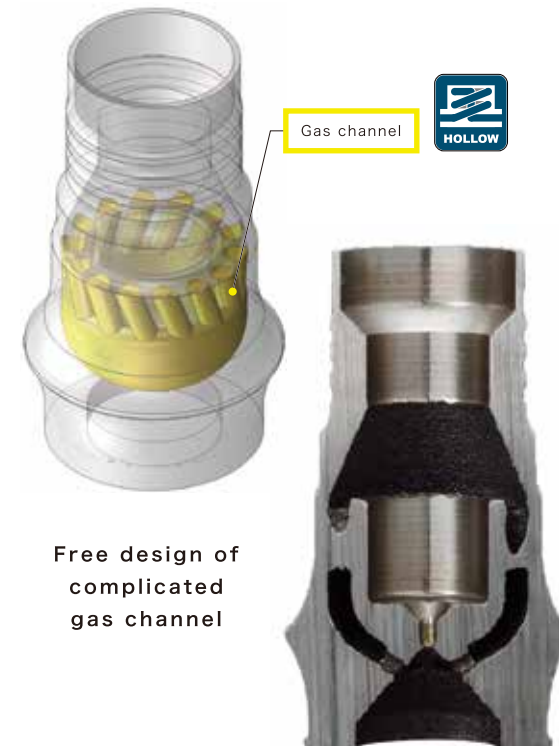
DATA

| | |
|-----------------|--|
| Material powder | Matsuura Stainless 630 |
| Weight | 437g |
| Machining time | Sintering : 09h30m Milling : 15h50m Total : 25h20m |
| Hardness | HRC 32±1 (After Aging Treatment HRC 42±1) |

Freedom of Design

Jet Engine Nozzle

Offer high value products



Free design of complicated gas channel

Under cut part machining



Machine

LUMEX Avance-25

- Spindle speed : 45,000min⁻¹
- Laser output : 500W

D A T A

Material powder Matsaura Nickel Alloy 718 (Inconel 718)

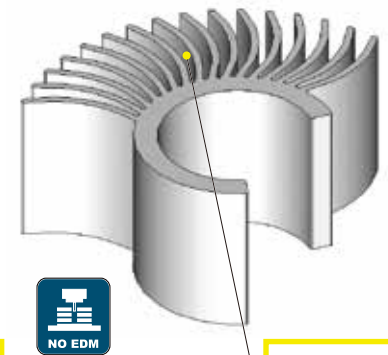
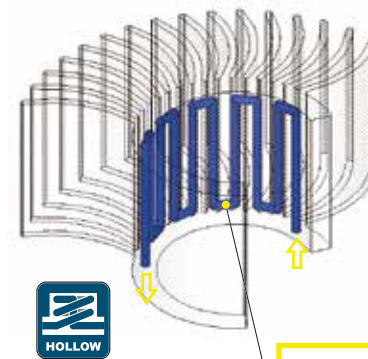
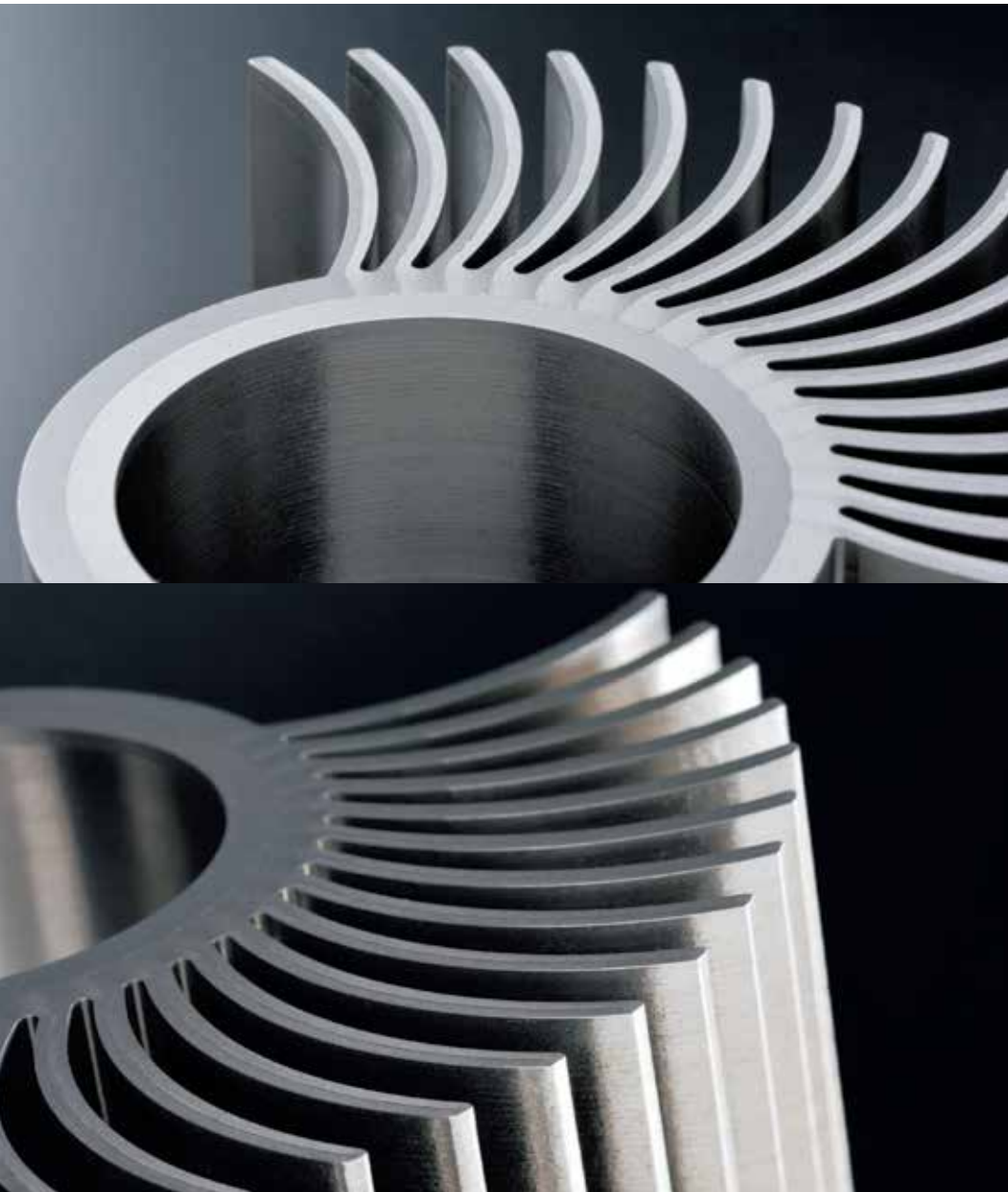
Machining time Sintering : 02h40m
 Milling : 13h15m
 Total : 15h55m

Hardness HRC 27±1 (After Aging Treatment HRC 44±1)

No EDM & High Functionality

Cooling Fin

Corner R0.5mm x height 40mm Connected wall



Machine

LUMEX Avance-25

- Spindle speed : 45,000min⁻¹
- Laser output : 500W

D A T A

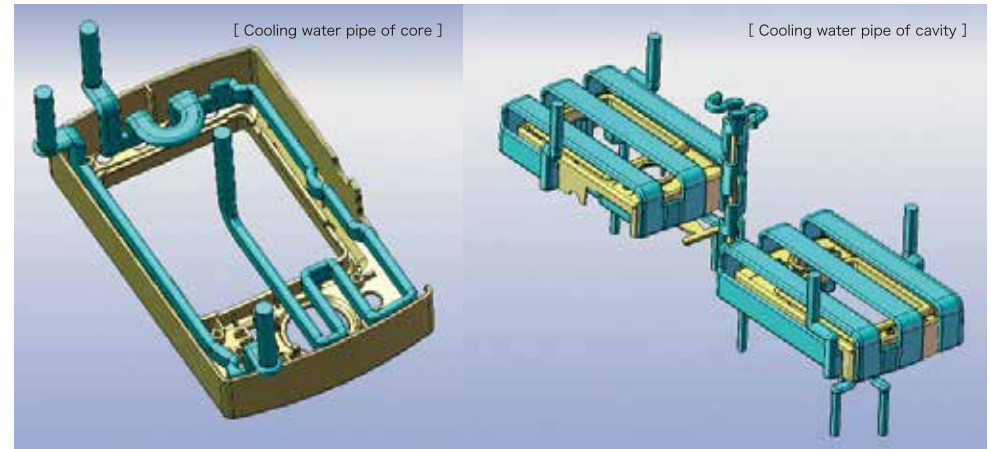
| | |
|-------------------|--|
| Material powder | Matsuura Maraging II |
| Weight | 500g |
| Machining time | Sintering : 11h50m Milling : 23h40m Total : 35h30m |
| Hardness | HRC 36±1 (After Aging Treatment HRC 53±1) |
| Surface roughness | Rz 7.36μm (outer periphery) |

High Cycle Molding & Quality Improvement

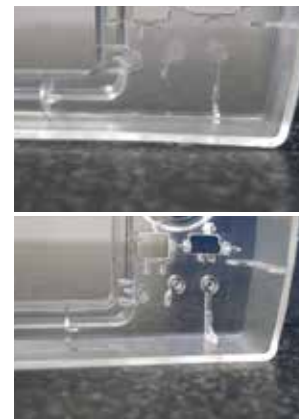
Digital Camera



High cycle molding & Prevention of shrinkage & Warping of thin walled injection molded parts



3D cooling water pipe along with product wall



Conventional water pipe
 Cooling time : **13**sec
 Molding cycle : **25**sec
 Camber : Max. **0.4**mm



3D water pipe
 Cooling time : **9**sec
 Molding cycle : **21**sec
 Camber : Max. **0.03**mm



Machine

LUMEX Avance-25

- Spindle speed : 45,000min⁻¹
- Laser output : 500W

D A T A

| Model | Cavity | Core |
|-----------------|--|--|
| Material powder | Matsuura Maraging II | |
| Machining time | Sintering : 30h45m Milling : 24h55m Total : 55h40m | Sintering : 14h30m Milling : 25h00m Total : 39h30m |
| Hardness | HRC 36±1 (After Aging Treatment HRC 53±1) | |
| Aging Treatment | Heating at 485deg. For 3hours | |

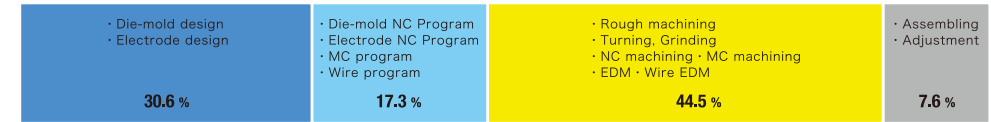
Process Reduction

Electric Driver

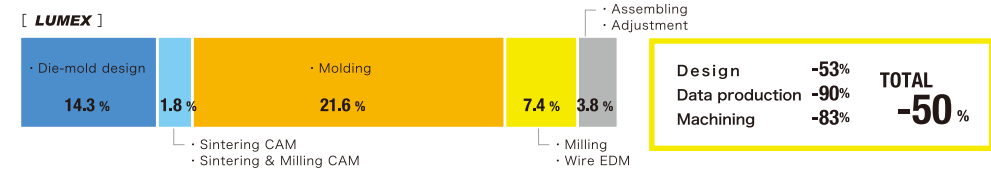
High cycle molding achieved by reducing cycle time while maintaining product quality



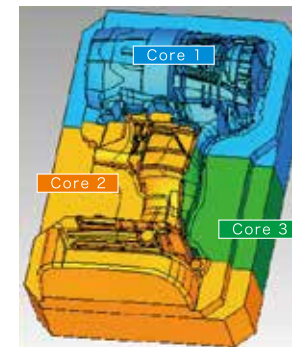
[Conventional manufacturing]



[LUMEX]



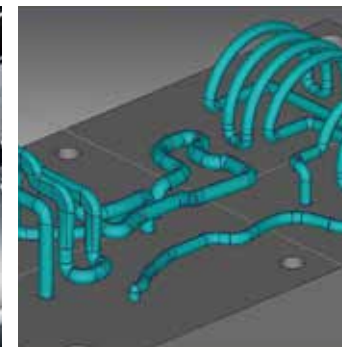
50% process reduction from design to finish



Reduced number of core parts
 (Here 3 core parts are used to allow design changes)



High aspect features without EDM



3D water cooling channels



Machine

LUMEX Avance-25

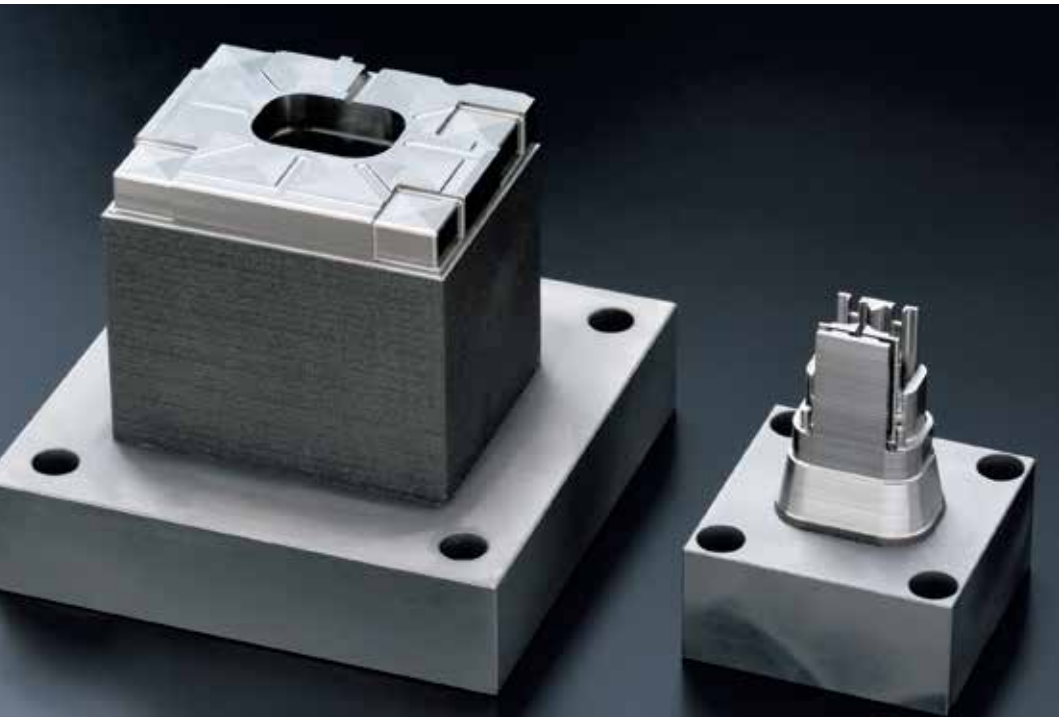
- Spindle speed : 45,000min⁻¹
- Laser output : 500W

D A T A

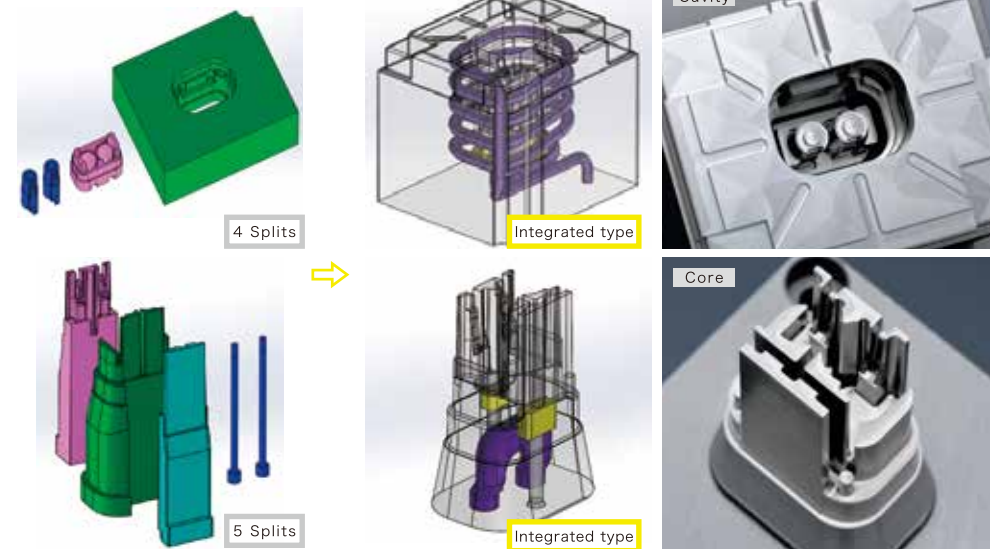
| Model | Core 1 | Core 2 | Core 3 |
|-----------------|---|--------------------|--------------------|
| Material powder | Matsuura Maraging II | | |
| Machining time | Sintering : 10h30m | Sintering : 18h05m | Sintering : 03h15m |
| | Milling : 59h50m | Milling : 42h00m | Milling : 03h40m |
| | Total : 70h20m | Total : 60h05m | Total : 06h55m |
| Hardness | HRC 36±1 (After Aging Treatment HRC 53±1) | | |
| Aging Treatment | Heating at 485deg. For 3hours | | |

High Cycle Molding & High Aspect Features

Waterproof Connector



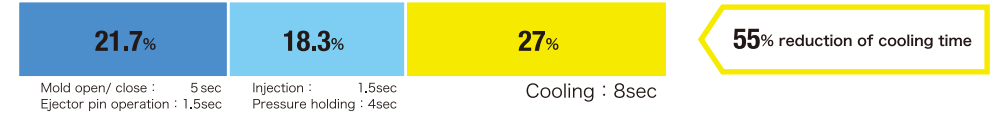
Deep ribs, Porous & 3D water cooling channels created in both core and cavity



[Conventional water pipe]



[3D cooling water pipe]



33% reduction of injection molding cycle



Machine

LUMEX Avance-25

- Spindle speed : 45,000min⁻¹
- Laser output : 500W

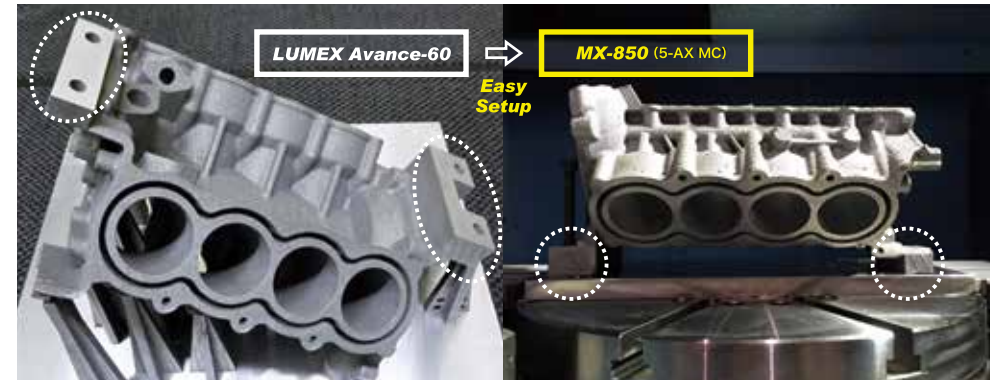
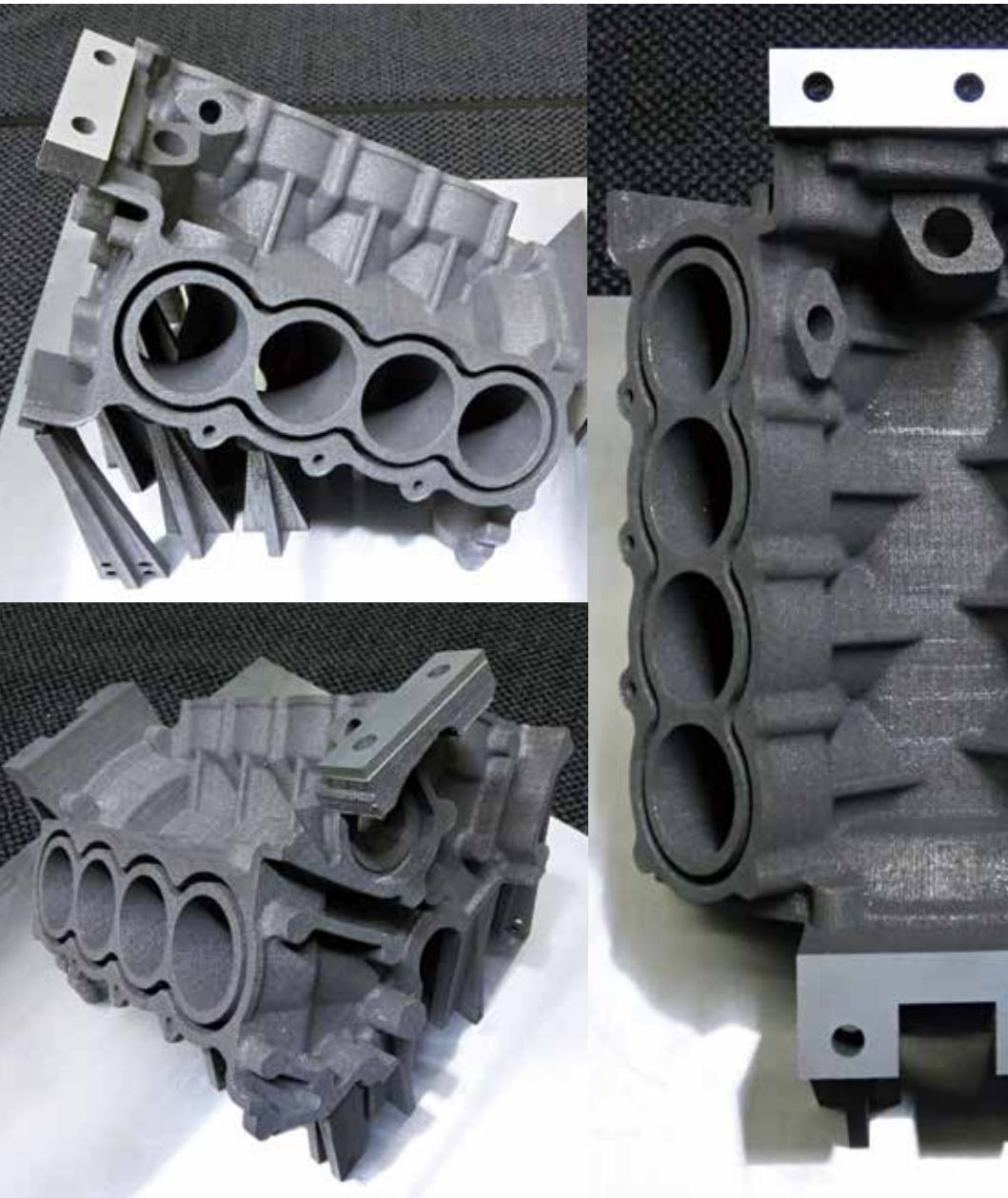
D A T A

| Model | Cavity | Core |
|-----------------|---|--------------------|
| Material powder | Matsuura Maraging II | |
| Machining time | Sintering : 35h50m | Sintering : 06h45m |
| | Milling : 36h25m | Milling : 24h20m |
| | Total : 72h15m | Total : 31h05m |
| Hardness | HRC 36±1 (After Aging Treatment HRC 53±1) | |
| Aging Treatment | Heating at 485deg. For 3hours | |

Upsizing & Speeding up

V8 Engine Block

Shorten delivery time for test production
 Upsizing and Speeding up



Reference surfaces and fixing block

Upsizing & Speeding up

Work volume : 3590cc Build speed : 40cc/h

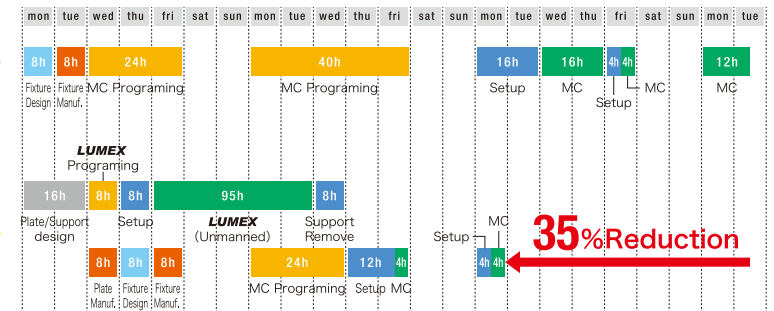
Reference surfaces can be machined
 on the **LUMEX** for post processing

Reduce setup time of post processing
 Minimize stock material for finishing

Comparison

5-AX MC (From Solid) **22.5** days

LUMEX Avance-60 15 days



Machine

LUMEX Avance-60

- Spindle speed : 45,000min⁻¹
- Laser output : 1KW

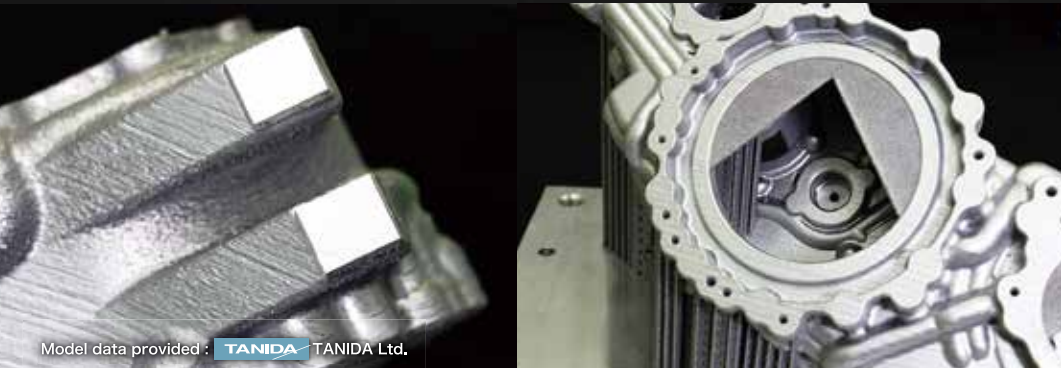
D A T A

| | |
|-----------------|--|
| Model | V8 Engine Block+Support (W424xD317xH339mm) |
| Material powder | Matsuura Aluminum Si10Mg |
| Weight | 9.6kg |
| Machining time | Sintering : 90h Milling : 5h Total : 95h |

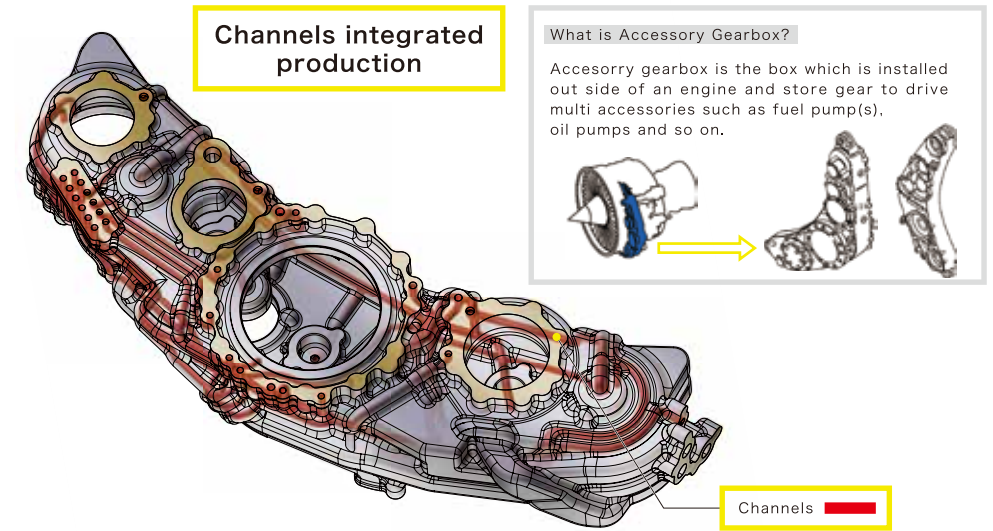
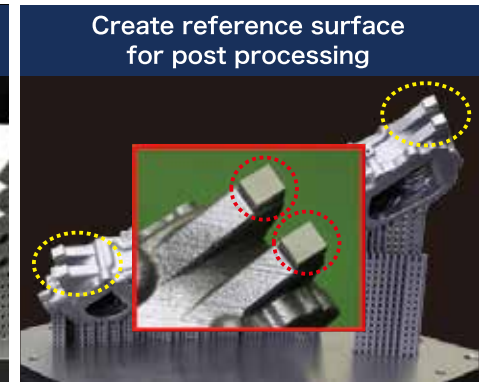
Channels integrated production

Accessory Gear Box

Complex cutting die production process achieved by one-process



Model data provided : **TANIDA** TANIDA Ltd.



What is Accessory Gearbox?

Accessory gearbox is the box which is installed out side of an engine and store gear to drive multi accessories such as fuel pump(s), oil pumps and so on.

| Machine | D A T A | |
|---|-----------------|--|
| LUMEX Avance-60 | Material powder | Matsuura Aluminum Si10Mg |
| — Spindle speed : 45,000min ⁻¹ — Laser output : 1KW | Weight | 5.0kg |
| | Machining time | Sintering : 124h30m Milling : 21h00m Total : 145h30m |
| | Hardness | HBW99±3 |

Hybrid Metal 3D Printer

LUMEX Avance-25

| | | |
|------------------------|-------------------|--|
| Travel : X/Y/Z | mm(in.) | 260 / 260 / 100 (10.23 / 10.23 / 3.93) |
| Travel : U/W | mm(in.) | 185 / 522 (7.28 / 20.55) |
| Max. Work Size | mm(in.) | W256 × D256 × H185 (W10.08 × D10.08 × H7.28) |
| Loading Capacity | kg(lb.) | 90 (198) |
| Spindle Speed | min ⁻¹ | 45,000 |
| Rapid Traverse : X/Y/Z | m/min(ipm) | 60 / 60 / 30 (2,362.20 / 2,362.20 / 1,181.10) |
| Laser Type | | Yb Fiber Laser |
| Laser Power | w | 500 <input type="checkbox"/> Standard 1,000 <input type="checkbox"/> Option |
| Number of Tools | | 20 |
| NC System | | I-Tech Avance |

| Option | | |
|---|---------|--|
| U-Axis Travel Extended | | |
| U-Axis Travel | mm(in.) | 300 (11.81) |
| Loading Capacity | kg(lb.) | 150 (330.69) |
| Max. Work Size | mm(in.) | W256 × D256 × H300 (W10.08 × D10.08 × H11.81) |
| APR System (Automatic Powder Recovery System) | | |
| Equipment for Titanium and Aluminum Powder | | |

LUMEX Avance-25



LUMEX Avance-60



LUMEX Avance-60

| | | |
|------------------|---------|--|
| Travel : X/Y/Z | mm(in.) | 610 / 610 / 100 (24.01 / 24.01 / 3.93) |
| Travel : U/W | mm(in.) | 500 / 990 (19.68 / 38.97) |
| Max. Work Size | mm(in.) | W600 × D600 × H500 (W23.62 × D23.62 × H19.68) |
| Loading Capacity | kg(lb.) | 1,300 (2,860) |

| | | |
|------------------------|-------------------|--|
| Spindle Speed | min ⁻¹ | 45,000 |
| Rapid Traverse : X/Y/Z | m/min(ipm) | 60 / 60 / 30 (2,362.20 / 2,362.20 / 1,181.10) |
| Laser Type | | Yb Fiber Laser |
| Laser Power | w | 1,000 <input type="checkbox"/> Standard 500 <input type="checkbox"/> Option |
| Number of Tools | | 20 |
| NC System | | I-Tech Avance |