ZOP Co. Ltd FORGING PLANT

Zakład Obróbki Plastycznej Sp. z o.o.

ul. Kuźnicza 13, 21-045 Świdnik, POLAND

Tel. +48 81 751 50 09
Fax. +48 81 468 09 11

www.kuznia-zop.pl

COMPANY

- Plant establishment 1954 (forging dep. W-300)
- Set up a ZOP company 1st April 2000

- Capital 3 800 000 PLN
- Employees < 40

COMPANY

Mission Statement

Quality is our most valued asset. It declares our purpose as a company and serves as the standard against which we weigh our actions and decisions. Our company is committed to being an innovative, customer-oriented and the best supplier of forging products, offering high quality solutions and excellent service to customers.

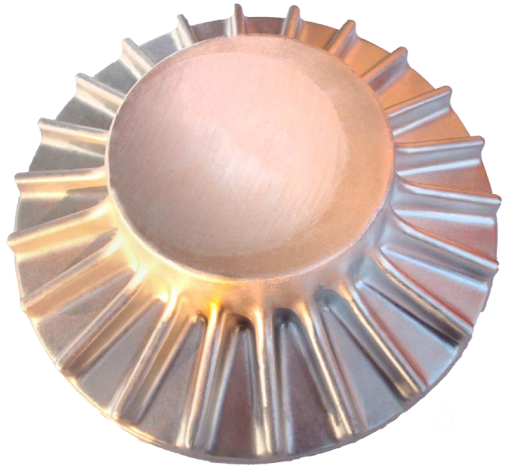
Vision Statement

Our vision is to become a world class manufacturer in our main activity areas with innovative approaches built on the core values of experience, development, efficiency and effectiveness, teamwork and integrity among others.

MAIN ACTIVITY

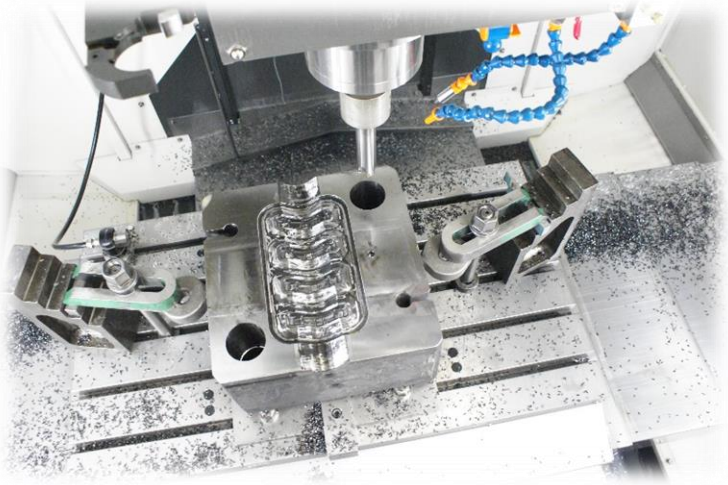
Hot/cold forging processes of alloys:

- Aluminium alloys
- Cooper alloys (brass, bronze, cooper)
- ESR/VAR remelted steel
- Titanium alloys
- Magnesium alloys (in the development process)



CNC machining processes:

- CNC pre-machining of forgings
- CNC final machining of parts
- In-house tooling department



MATERIAL MAIN SUPPLIERS

Approved Material Suppliers:

Aubert & Duval Holding, France

LIBERTY STEEL Aerospace, UK

Grupa Kęty S.A, Poland

ALERIS Aluminium Duffel BVBA, Belgium

BOHLER UDDEHOLM

BGH Edelstahl, Germany

VALBRUNA, Italy

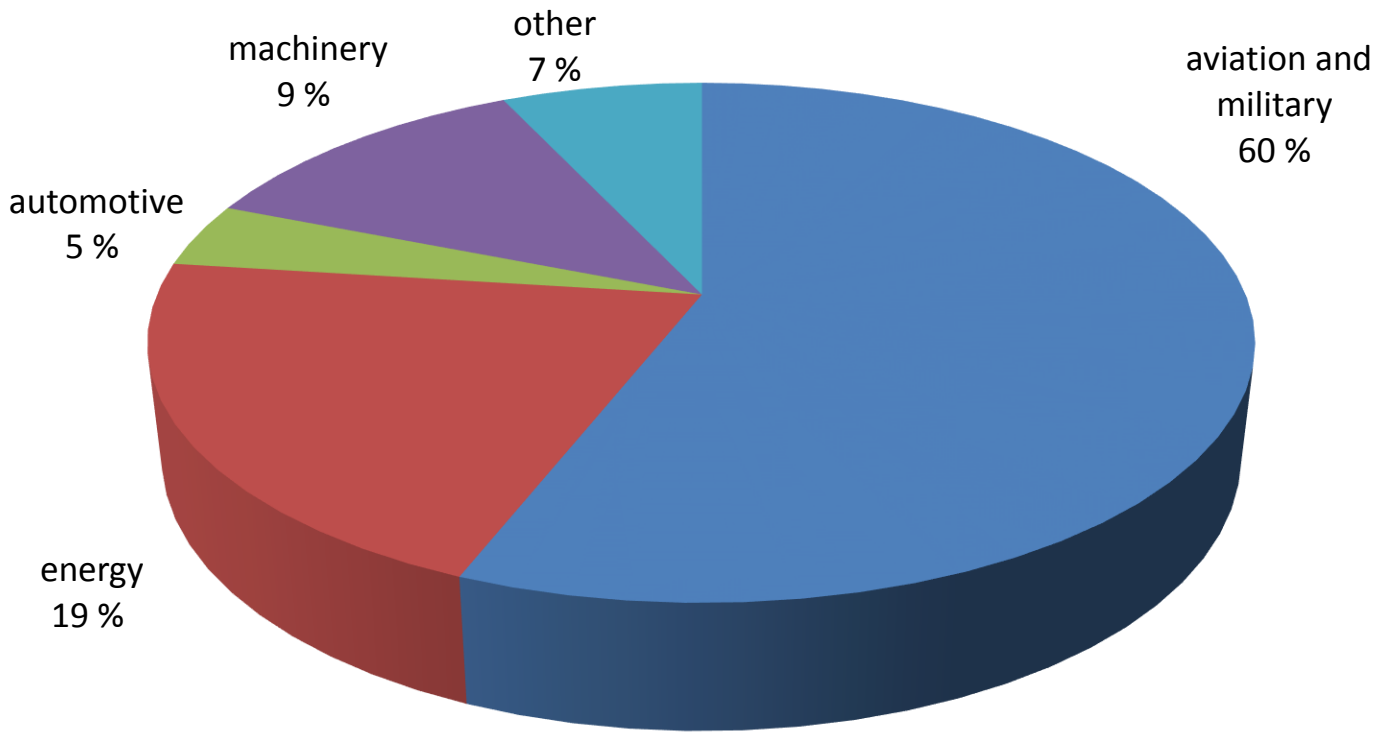
VSMPO, Russia

FORGING MAIN PARTNERS

PZL-Świdnik S.A./Leonardo Helicopters - Poland
Safran Transmission Systems - France, Poland
PZL-Mielec/Sikorsky/Lockheed Martin Group
Pratt&Whitney Rzeszów - Poland
GE Aviation - Czech Republic
Federal Mogul - Poland
ABB High Voltage – Germany, Sweden
GE Power/Alstom - Poland, Switzerland
Trench - Italy
CENTA Power Transmission – Germany
Siemens - Germany

ALSTOM
ABB
PZL-ŚWIDNIK a LEONARDO HELICOPTERS company
LEONARDO HELICOPTERS
Pratt & Whitney A United Technologies Company Pratt & Whitney Rzeszów
PZL Mielec
GE Aviation
FEDERAL MOGUL Federal Mogul Gorzyce SA

SALES ACCORDING TO BRANCH OF INDUSTRY



Q1-Q4 2018

FORGING MAIN PARTNERS

FORGINGS FROM Al, Ti and Fe ALLOYS FOR STRUCTURES AND AIRCRAFT COMPONENTS
(approx. more than 2000 different items)

PZL-ŚWIDNIK
a LEONARDO HELICOPTERS company

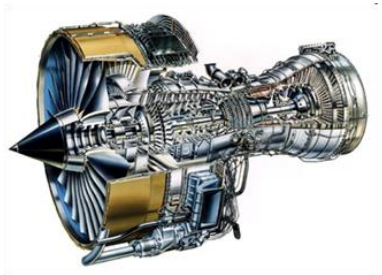
application in helicopters
W-3, SW-4, Mi-2, Kania,
and planes M-18, M-28

PZL Mielec

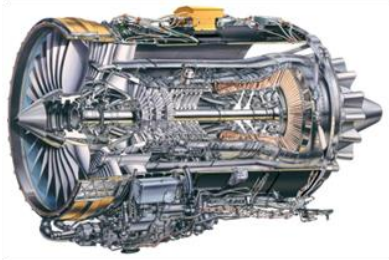
FORGING MAIN PARTNERS

AIRCRAFT ENGINE COMPONENTS - Safran Transmission Systems
(45 differenent items – steel pre-machined forgings)

pre-machined forgings for accessory gear boxes (AGB) in turbofan aircraft engines family CFM56-5/CFM56-7 found in planes **Airbus A320/A340** i **Boeing 737** – Safran Group cooperation



pre-machined forgings for accessory gear boxes (AGB) in turbofan aircraft engines family TRENT 700/TRENT 800 found in planes **Airbus A330** i **Boeing 777** – Safran Group cooperation

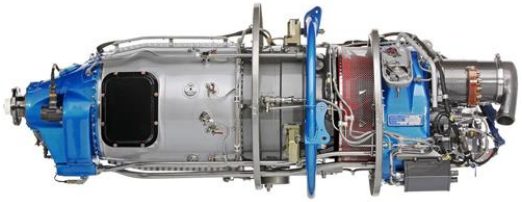


pre-machined forgings for accessory gear boxes (AGB) in turbofan aircraft engines family BR710/BR725 found in planes **Bombardier Global Express**, **Boeing 717** i **Gulfstream G650** – Safran Group cooperation

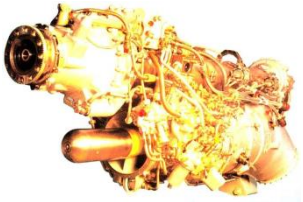
FORGING MAIN PARTNERS

AIRCRAFT ENGINE COMPONENTS
(approx. more than 200 different items)

Titanium, steel and aluminium forgings for turboshaft engine **GTD-350** and **PZL-10W** – Pratt&Whitney Rzeszów



Steel forgings for turboprop engine **M601-E11/H80** – GE Aviation Czech (GEAC)



Titanium, steel and aluminium forgings for turboprop engine **TWD-10B/PZL-10S** – Pratt&Whitney Rzeszów

Aluminium piston forgings **ASz-62-IRm-M18** and Textron Lycoming piston engines

FORGING MAIN PARTNERS

New projects

pre-machined forgings for AGB in turbofan aircraft engines family

LEAP-1A, LEAP-1B i LEAP-1C

– SAFRAN Group and BMT Aerospace

final application in

LEAP-1A - Airbus A320neo

LEAP-1B - Boeing 737 Max

LEAP-1C – Comac C919

PEARL-15

– SAFRAN TRANSMISSION SYSTEMS

FORGING MAIN PARTNERS

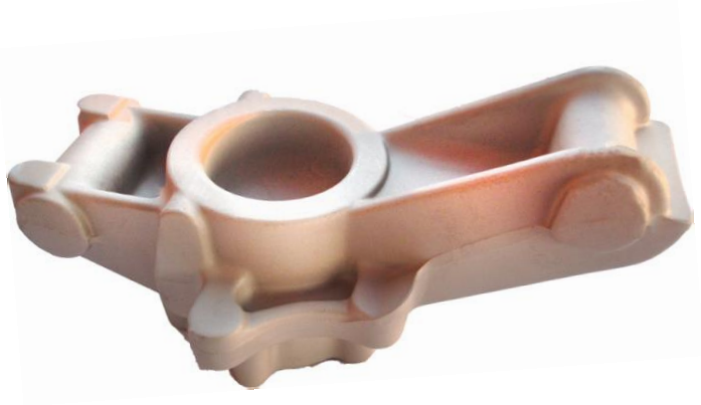
ENERGY INDUSTRY COMPONENTS
(approx. more than 300 different items)

Pre and fully machined forgings for energy industry:

- aluminium forged fan blades
- cooper, bronze and brass forged high voltage contact clamps, discs, etc.

FORGINGS – ALUMINIUM ALLOYS

- technology – hot forging
- alloys EN AW-2xxx, EN AW-3xxx, EN AW-4xxx, EN AW-5xxx, EN AW-6xxx and EN-AW-7xxx series
- die forgings from 0.05 to 20.00 kg
- open die/hand forging up to 50.00 kg
- largest projected area up to 750 cm^2
- delivery condition: precipitation hardened T4/T6/T73



FORGINGS – ALUMINIUM ALLOYS

Material number EN AW	Material code type EN AW	Heat treatment condition	Tensile Strength Rm [Mpa] min.	Yieled Strength $R_{p0,2}$ [Mpa] min.	Elongation A5 [%] min.	Hardness HB 5/250 min.	Electrical conductivity [MS/m]
EN AW-2014	EN AW-Al Cu4SiMg	T6	440	380	10	120	20,0-23,2
EN AW-2017A	EN AW-Al Cu4MgSi	T4	380	230	10	95	17,8-20,3
EN AW-2024	EN AW-Al Cu4Mg1	T4	420	280	10	105	16,5-19,0
EN AW-2618A	EN AW-Al Cu2Mg1,5Ni	T6	400	260	5	105	20,0 – 23,2
EN AW-3103	EN AW-Al Mn1	H112	max. 170	-	20	max. 40	-
EN AW-4032	EN AW-Al Si12,5MgCuNi	T6	320	280	3	110	18,0-22,0
EN AW-5251	EN AW-Al Mg2,5	H112	max. 230	-	15	max. 50	-
EN AW-6061	EN AW-Al Mg1SiCu	T6	280	230	8	90	25,0-30,0
EN AW-6082	EN AW-Al Si1MgMn	T6	310	260	6	90	25,0-30,0
EN AW-6182	EN AW-Al Si1MgZr Alforge 82	T6	380	340	10	100	25,0-30,0
EN AW-7022	EN AW-Al Zn5Mg3Cu	T6	480	410	6	130	17,7-20,3
EN AW -7075	EN AW-Al Zn5,5MgCu	T6	510	430	7	135	17,7-20,3
EN AW-7075	EN AW-Al Zn5,5MgCu	T73	445	375	6	110	22,5-24,0

FORGINGS – COPPER ALLOYS

- technology – hot and cold forging
- copper and copper alloys (brass, bronze).
- die forgings from 0.05 to 20.00 kg
- open die/hand forging up to 50.00 kg
- largest projected area up to 350 cm^2
- delivery condition: raw, annealed

FORGINGS – COPPER ALLOYS

Forged products are manufactured from the cooper and cooper alloys listed in all standard delivery conditions. Further alloys can be quoted on request.

Material designation according to EN standard		Density [g/cm^3]	Electrical conductivity [%IACS]	Chemical Composition
Symbol	Number			
CW004A	Cu-ETP	8,90	56,0	Cu - 99,90%
CW008A	Cu-OF	8,90	58,0	Cu - 99,95%
CW612N	CuZn39Pb2	8,40	25,0	Cu - 59,0-60,0%, Pb – 1,6-2,5%, Zn – remainder
CW614N	CuZn39Pb3	8,40	25,0	Cu - 57,0-59,0%, Pb – 2,5-3,5%, Zn – remainder
CW617N	CuZn40Pb2	8,40	25,0	Cu – 57,0-59,0%, Pb – 1,6-2,5%, Zn – remainder
CW602N	CuZn36Pb2As	8,40	25,0	Cu – 61,0-63,0%, Pb – 1,7-2,8%, Zn – remainder
CW713R	CuZn37Mn3Al2PbSi	8,10	12,0	Cu – 57,0-59,0%, Al – 1,3-2,3%, Zn – remainder
CW303G	CuAl8Fe3	7,70	9,0	Al – 6,5-8,5%, Fe – 1,5-3,5%, Cu – remainder
CW306G	CuAl10Fe3Mn2	7,60	9,0	Al – 9,0-11,0%, Fe – 2,0-4,0%, Cu – remainder

FORGINGS – STEEL

- technology – hot and cold forging
- all steel grades
- die forgings from 0.05 to 15.00 kg
- open die/hand forging up to 50.00 kg
- largest projected area up to 350 cm^2
- delivery condition: normalized, tempered, solution h.t., etc.

S355J2	30HGSAŻ	H17N2A	X2CrNi18-9	253MA
16MnCr5	30HGSNAŻ	E16NCD13	X5CrNi18-10	Marval 18H
14NiCrMo13-4	40HNMAŻ	E30CD12	X6CrNiTi18-10	X18PA
42CrMo4	18H2N4WAŻ	X17CrNi16-2	X2CrNi19-11	Jethete M152
51CrV4	12H2N4AŻ	X6CrNiMoTi17-12-2	X2CrNiMo17-12-2	17-4PH/AMS 5643

FORGINGS – TITANIUM ALLOYS

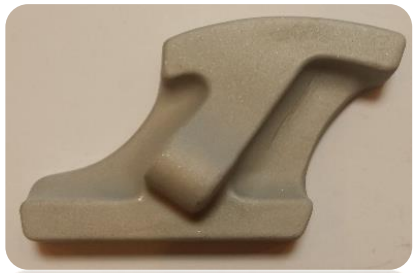
- technology – hot forging
- die forgings from 0.05 to 5.00 kg
- open die/hand forging up to 10.00 kg
- largest projected area up to 200 cm^2
- delivery condition: isothermal annealed

Material code	Chemical composition (%)								
	Al	Mn	Mo	V	Cr	Sn	Si	Fe	Ti
BT3-1	5,5-7,2	-	2,0-3,0	-	0,8-2,0	-	0,15-0,2	0,2-0,7	balance
BT1-0	0,7 max	-	-	-	-	-	-	-	balance
BT1-00	0,3 max	-	-	-	-	-	-	-	balance
BT-22	4,4-5,7	-	4,0-5,5	4,0-5,5	0,5-1,5	-	-	0,5-1,5	balance
OT4	3,5-5,0	0,8-2,0	-	-	-	-	-	-	balance
OT4-0	0,4-1,4	0,5-1,3	-	-	-	-	-	-	balance
OT4-1	1,5-2,5	0,7-2,0	-	-	-	-	-	-	balance

FORGINGS – MAGNESIUM ALLOYS

- technology – screw press die forging process
- die forgings from 0.01 to 3.00 kg
- delivery condition: annealed
- grade of material AZ31, AZ61 and MA2



QUALITY MANAGEMENT

Quality Certificate:
EN/AS 9100 rev. D

AS 9100
BUREAU VERITAS
Certification

Forgings and parts can be delivered with all specified and required tests:

- metallographic tests (micro and macrostructure)
- tensile properties and hardness
- chemical composition
- NDT tests (FPI, MPI and electrical conductivity)
- geometric measurement


BUREAU VERITAS
Certification

Certificate of Approval

This is to certify that the Quality Management System of:

ZAKŁAD OBRÓBKI PLASTYCZNEJ SP. Z O.O.

Forging Plant, 13, Kuznicza, 21-045 Swidnik, Poland

has been audited in accordance with the requirements of EN 9104-001:2013 by Bureau Veritas Certification and conforms to the following Quality Management Systems Standards detailed below

Standards

BS EN ISO 9001:2015
EN 9100:2016
(Technically equivalent to AS9100D)

Scope of certification

DESIGN, PRODUCTION AND MACHINING OF FORGINGS MADE FROM Al, Mg, Fe, Cu AND Ti ALLOYS

Certification Structure: Single Site

This certificate forms part of the approval identified by certificate number: UK1492017-1

Original ISO Approval: 26 MAY 2009

Original AS/CB Approval: 26 MAY 2009

Certificate Issue Date: 11 JUNE 2019

Certification Expiry Date: 10 JUNE 2021

Trevor W Douce
Authorised Signatory

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organization.

Certification Body: Bureau Veritas Certification Holding SAS-UK Branch, 3rd Floor, 66 Prescot Street, London, E1 8HG, United Kingdom.

Page 1 of 1


APPROVED LR

Certificate No : MD00/4303/0802/4a

ZAKLAD OBROBKI PLASTYCZNEJ Sp. z o.o.
ul. Kuznicza 13
21- 045 Swidnik
Poland

has been approved as a manufacturer in accordance with the requirements of Lloyd's Register for :-

Aluminium Alloy Forgings*

This approval is subject to compliance with the Rules for the Manufacture, Testing and Certification of Materials. The full details of the processes and grades to which this approval applies are given in the Appendix of this certificate.

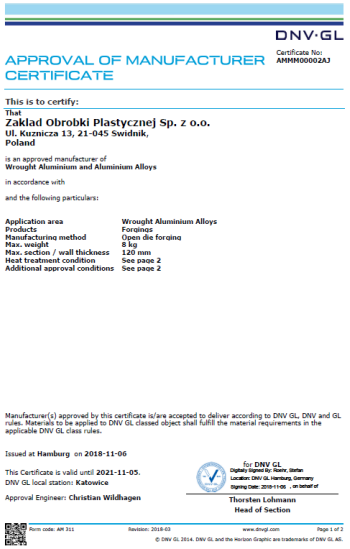
Lloyd's Register is to be notified of any change that may affect the validity of this Certificate.

This Certificate is issued to the above manufacturer and is valid until the date given below.

Valid Until : 30 April 2020
Date of Issue : 07 July 2017

Colin Waylen
Principal Specialist to Lloyd's Register EMEA
A member of the Lloyd's Register group

A member of the Lloyd's Register group. Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as 'Lloyd's Register'. Lloyd's Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.


DNV·GL

APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No: AMHM00002AJ

This is to certify:

That
Zaklad Obrobki Plastycznej Sp. z o.o.
Ul. Kuznicza 13, 21-045 Swidnik,
Poland

is an approved manufacturer of
Wrought Aluminium and Aluminium Alloys

in accordance with

and the following particulars:

Application area	Wrought Aluminium Alloys
Products	Forgings
Manufacturing method	Open die forging
Max. weight	5 kg
Max. section / wall thickness	120 mm
Heat treatment condition	See page 2
Additional approval conditions	See page 2

Manufacturer(s) approved by this certificate is/are accepted to deliver according to DNV GL, DNV and GL rules. Materials to be applied to DNV GL classed object shall fulfill the material requirements in the applicable DNV GL class rules.

Issued at Hamburg on 2018-11-06

This Certificate is valid until 2021-11-05.
DNV GL local station: Katowice

Approval Engineer: Christian Wildhagen

for DNV GL
Digitally Signed By: Roehr, Stefan
Location: DNV GL Hamburg, Germany
Signing Date: 2018-11-06 , on behalf of

Thorsten Lohmann
Head of Section

Form code: AM 311 Revision: 2018-03 www.dnvgl.com Page 1 of 2

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WOJSKOWE CENTRUM NORMALIZACJI, JAKOŚCI I KODYFIKACJI
Military Center for Standardization, Quality and Codification
ODDZIAŁ KODYFIKACJI WYROBÓW OBRONNYCH
Codification Branch for Defence Products
43 KRAJOWE BIURO KODYFIKACYJNE
43 National Codification Bureau

ZAŚWIADCZENIE
CERTIFICATE

Zaświadcza się, że na podstawie złożonego wniosku jednostka organizacyjna o nazwie:
This is to certify that:

ZAKŁAD OBRÓBKI PLASTYCZNEJ
Spółka z o.o.

z siedzibą w:
located in:

21-045 ŚWIDNIK UL. KUŹNICZA 13

otrzymała
was given

Natowski Kod Podmiotu Gospodarki Narodowej:
NATO Commercial and Government Entity Code NCAGE:

1902H

Warszawa, dnia 9 marca 2010 r.

ZOP Co. Ltd Forging Plant
50 years of experience and professionalism

QUALITY

- FAI procedures for critical parts
- Process approval by Customer (forging, heat treatment, etc.)
- Special processes approval (NDT tests and laboratory)

SAFRAN

Attestation de Qualification des Procédés Spéciaux

Special Processes Qualification Certificate

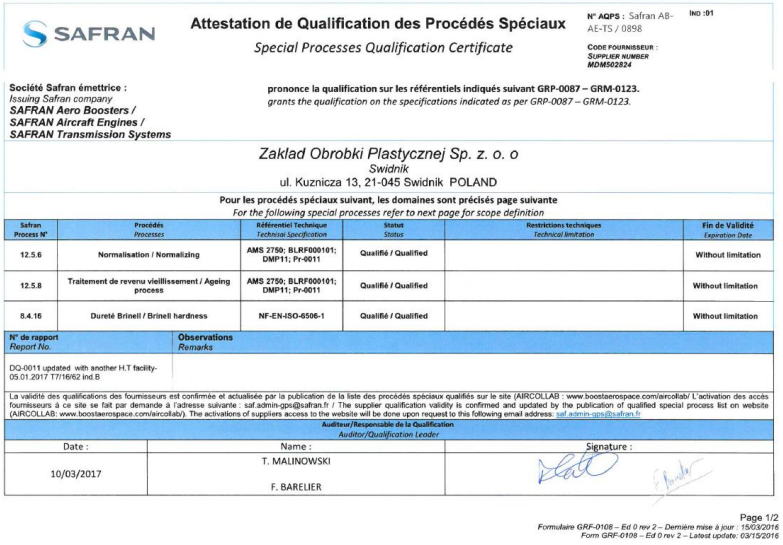
N° AQPS : 1004

CODE FOURNISSEUR : *SUPPLIER NUMBER* MDM 502701

GQAO : 711300

Société Safran émettrice : SAFRAN Transmission Systems

Prononce la qualification du fournisseur suivant la GRP-0087 *Approval on the supplier qualification according to GRP-0087*



SAFRAN

Attestation de Qualification des Procédés Spéciaux

Special Processes Qualification Certificate

N° AQPS : Safran AB-AE-TS / 0898 IND :01

CODE FOURNISSEUR : *SUPPLIER NUMBER* MDM502824

Société Safran émettrice : *Issuing Safran company* ***SAFRAN Aero Boosters / SAFRAN Aircraft Engines / SAFRAN Transmission Systems***

prononce la qualification sur les référentiels indiqués suivant GRP-0087 – GRM-0123. *grants the qualification on the specifications indicated as per GRP-0087 – GRM-0123.*

Zaklad Obrobki Plastycznej Sp. z. o. o *Swidnik* ul. Kuznicza 13, 21-045 Swidnik POLAND

Pour les procédés spéciaux suivant, les domaines sont précisés page suivante *For the following special processes refer to next page for scope definition*

Safran Process N°	Procédés *Processes*	Référentiel Technique *Technical Specification*	Statut *Status*	Restrictions techniques *Technical limitation*	Fin de Validité *Expiration Date*
12.5.6	Normalisation / Normalizing	AMS 2750; BLRF000101; DMP11; Pr-0011	Qualifié / Qualified		Without limitation
12.5.8	Traitement de revenu vieillissement / Ageing process	AMS 2750; BLRF000101; DMP11; Pr-0011	Qualifié / Qualified		Without limitation
8.4.16	Dureté Brinell / Brinell hardness	NF-EN-ISO-6506-1	Qualifié / Qualified		Without limitation

N° de rapport *Report No.*	Observations *Remarks*
DQ-0011 updated with another H.T facility-05.01.2017 17716/62 ind.B	

La validité des qualifications des fournisseurs est confirmée et actualisée par la publication de la liste des procédés spéciaux qualifiés sur le site (AIRCOLLAB : www.boostaerospace.com/aircollab/ L'activation des accès fournisseurs à ce site se fait par demande à l'adresse suivante : saf.admin-gps@safran.fr / The supplier qualification validity is confirmed and updated by the publication of qualified special process list on website (AIRCOLLAB: www.boostaerospace.com/aircollab/). The activations of suppliers access to the website will be done upon request to this following email address: saf.admin-gps@safran.fr

Auditeur/Responsable de la Qualification *Auditor/Qualification Leader*

Date :	Name :	Signature :
10/03/2017	T. MALINOWSKI F. BARELIER	

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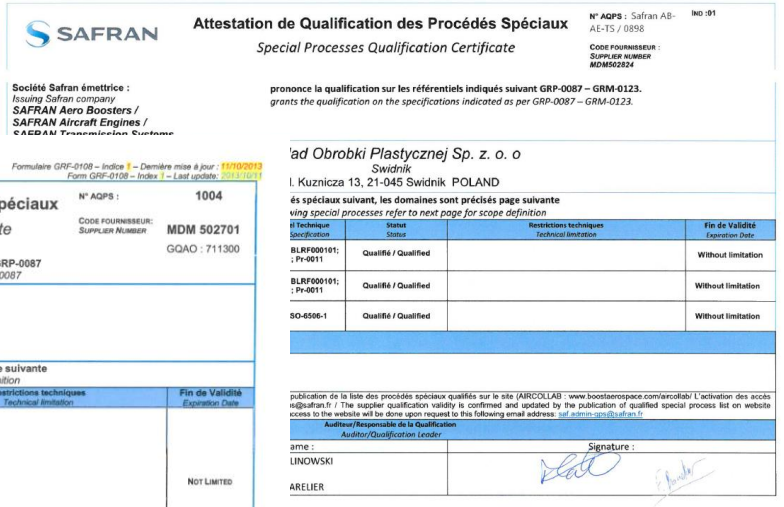
Formulaire GRF-0108 – Ed 0 rev 2 – Dernière mise à jour : 15/03/2016
Form GRF-0108 – Ed 0 rev 2 – Latest update: 03/15/2016

t précisés page suivante
for scope definition

Restrictions techniques *Technical limitation*	Fin de Validité *Expiration Date*
	NOT LIMITED



SAFRAN

Attestation de Qualification des Procédés Spéciaux

Special Processes Qualification Certificate

N° AQPS : Safran AB-AE-TS / 0898 IND :01

CODE FOURNISSEUR : *SUPPLIER NUMBER* MDM502824

Société Safran émettrice : *Issuing Safran company* ***SAFRAN Aero Boosters / SAFRAN Aircraft Engines / SAFRAN Transmission Systems***

prononce la qualification sur les référentiels indiqués suivant GRP-0087 – GRM-0123. *grants the qualification on the specifications indicated as per GRP-0087 – GRM-0123.*

ad Obrobki Plastycznej Sp. z. o. o *Swidnik* l. Kuznicza 13, 21-045 Swidnik POLAND

és spéciaux suivant, les domaines sont précisés page suivante *ving special processes refer to next page for scope definition*

t Technique *Specification*	Statut *Status*	Restrictions techniques *Technical limitation*	Fin de Validité *Expiration Date*
BLRF000101; ; Pr-0011	Qualifié / Qualified		Without limitation
BLRF000101; ; Pr-0011	Qualifié / Qualified		Without limitation
SO-6506-1	Qualifié / Qualified		Without limitation

publication de la liste des procédés spéciaux qualifiés sur le site (AIRCOLLAB : www.boostaerospace.com/aircollab/ L'activation des accès s@safran.fr / The supplier qualification validity is confirmed and updated by the publication of qualified special process list on website ccess to the website will be done upon request to this following email address: saf.admin-gps@safran.fr

Auditeur/Responsable de la Qualification *Auditor/Qualification Leader*

ame :	Signature :
LINOWSKI ARELIER	

Page 1/2

Formulaire GRF-0108 – Ed 0 rev 2 – Dernière mise à jour : 15/03/2016
Form GRF-0108 – Ed 0 rev 2 – Latest update: 03/15/2016

QUALITY

New quality investment in quality assurance

- Q3 2018 - new Magnaflux MAG-50/6FR/15 6000A defectoscope for **MPI** magnetic inspcection
- Q1 2019 - new semi-automatic line for **FPI** fluorescent penetrant inspection
- Q4 2019 - **NADCAP** accreditation for heat treatment

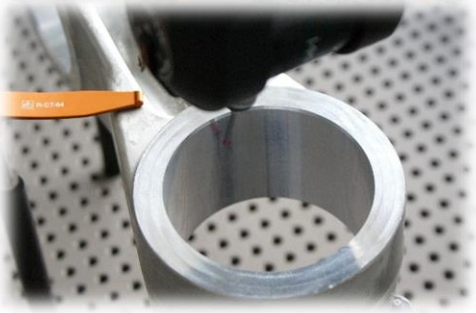
FORGING FACILITIES

- die hammers type MPM 3 150, MPM 6 300 and MPM 10 000
- forging screw presses
  pressure from 1,6 MN to 4 MN
- trimming presses
  pressure from 0,63 MN to 4 MN
- furnaces for pre-heating: Al, Cu, Fe and Ti alloys

MACHINING FACILITIES

In-house tooling and forging machining department

- CNC 3-axis milling center MIKRON VCE 800
- CNC 3-axis milling center RAMBAUDI Rammil E-1
- CNC 5-axis milling center MIKRON UCP 800 Duro
- CNC 5-axis milling center FEELER U-600
- CNC turning machine TUR 560 MN x 2000
- CNC turning center DOOSAN Puma 2600M
- CNC CMM Mitutoyo Euro C-776
- conventional tool machines



SUMMARY

GE Aviation Czech

imagination at work

Supplier Long Term Reliable Performance Acknowledgement Award

Presented to ZAKLAD OBROBKI PLASTYCZNEJ Sp. z o.o.
for outstanding reliable performance in deliveries to GE Aviation Czech
during the last 12 months

Jim Stoker, President

Marek Nykles, Sourcing Leader

Prague, May 29, 2014

GE Aviation Czech

New Supplier Acknowledgement Award

Presented to ZOP Co Ltd. Forging Plant
for outstanding start in cooperation with GE Aviation Czech
during the year 2012

Prague, May 13, 2013

Jim Stoker, President

Marek Nykles, Sourcing Leader

imagination at work

THANK **YOU** FOR YOUR ATTENTION

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