BASIC INFORMATION

- First activities began in 1665 with a lead mine
- Production of batteries started in 1965
- Established in 1965 as a subsidiary of Rudnik Mežica Holding
- First 15 years a licence partner of Tudor, Sweden
- Nowadays producing a wide range of lead acid flooded, VRLA-AGM and VRLA-Gel batteries on 3 different locations

1 **FIRST LOCATION** (Slovenia, Žerjav):
   - Recycling plant: producing approx. 33,000 t of soft lead and different alloys from 60,000 t of scrap
   - Factory for industrial batteries: annual capacity 1,8 mio pieces of TAB branded traction and stationary cells

2 **SECOND LOCATION** (Slovenia, Črna na Koroškem):
   - Factory for starter batteries of TAB, Topla, Vesna and VolThor brands with annual capacity of 3,3 mio pieces

3 **THIRD LOCATION** (Macedonia, Probishtip):
   - Recycling plant: producing approx. 10,000 t of soft lead and different alloys from 18,000 t of scrap
   - Factory for industrial batteries: annual capacity 0,4 mio pieces of TAB branded traction cells
   - Factory for starter batteries of TAB, Topla, Vesna and VolThor brands with annual capacity of 2,2 mio pieces
HISTORY OF THE COMPANY

1665 Beginnings of mining and metalurgical activity in this area (MPI – RECIKLZA d.o.o. is a result of this tradicional activity)

1906 Establishment of a smeltery in Žerjav

1965 Establishment of TAB company within Lead Mine Mežica Holding

1965 Licence agreement with Tudor, Sweden

1972 Beginning of starter batteries supply to Fiat, Simca, Citroën, Peugeot and Renault

1991 Termination of primary lead production and transition to recycling of waste batteries and other lead containing waste

1995 Implementation of ISO 9001, certificated by Bureau Veritas Certification

1998 Implementation of ISO 14001, certificated by Bureau Veritas Certification

2000 Production of starter batteries with Ca/Ca expanded metal technology

2007 Implementation of ISO/TS 16949, certificated by Bureau Veritas Certification

2009 Production of industrial batteries with VRLA Gel technology

2011 ATEX certificate

2012 Acquisition of VESNA SAP in Macedonia
SALES
TURNOVER FROM YEAR 2000 TO 2018 IN MIO €

INDUSTRIAL BATTERIES 49 %
STARTER BATTERIES 51 %
SALES OF STARTER BATTERIES FROM YEAR 2000 TO 2018 IN PCS

STARTER BATTERIES present app. 8% of European market (12V BATTERIES)
SALES
OF INDUSTRIAL CELLS FROM YEAR 2000 TO 2018 IN PCS

INDUSTRIAL BATTERIES
present app. 20 %
of European market
(2V CELLS)
MARKETS
AND SALES BY REGIONS IN PERCENTS FOR YEAR 2018

EUROPEAN UNION
FROM WHICH SLOVENIA 3%
71%
CIS COUNTRIES
5%
REST OF THE WORLD
24%

Europe (Germany, Italy, Spain, France, UK, etc.), Russia, Middle East, South America (Chile, Brazil, Argentina etc.), North America, South African Republic, etc.
TAB GROUP
Total number of employees: approx. 1350

Parent company
TAB d.d., Mežica established in 1965

Subsidiary companies in Slovenia
MPI-RECIKLAVA d.o.o., Žerjav established in 1990
GRADBENI MATERIALI d.o.o., Žerjav established in 1994
TAB-IPM d.o.o., Žerjav established in 2004
PODZEMLJE PECE d.o.o., Mežica established in 2009

Subsidiary companies abroad
TAB Poland Sp. z o.o., Warszawa, Poland established in 2001
BATERIJA-TAB Hrvatska d.o.o., Zagreb, Croatia established in 2005
TAB Spain s.l., Barcelona, Spain established in 2005
TAB Italia S.p.A., Zanica, Italy established in 2010
TAB Baterije d.o.o., Belgrade, Serbia established in 2010
TAB-MAK d.o.o., Probishtip, Macedonia established in 2012
SUBSIDIARY COMPANIES ABROAD

- TAB Italia S.p.A., Italy
- TAB Poland Sp. z o.o., Poland
- TAB Spain s.l., Spain
- Baterija-TAB Hrvatska d.o.o., Croatia
# REFERENCE LIST

## INDUSTRIAL

### FORKLIFT PRODUCERS
- AIXAM
- CATERPILLAR
- CROWN
- DAEWOO
- Goupil
- HYSTER
- Hubtex
- Jungheinrich
- LINDE
- ROCLA
- STÖCKLIN
- TCM
- TOYOTA
- YALE

### INDUSTRIAL CUSTOMERS
- Airbus
- Audi
- BMW AG
- Daimler
- Liebherr
- Volkswagen
- ZF Friedrichshafen AG

### SMALL TRACTION
- fiorentini
- Tennant

## STARTER

### OEM
- GINAF Trucks, Netherlands
- Ingersoll Rand, Ireland
- Massey Ferguson, France
- Vanhool, Belgium
- Volvo, Saudi Arabia
- Volkswagen, Germany

### OES
- PSA Peugeot Citroën, France
PRODUCTION PROGRAM

STARTER BATTERIES
- TAB
- TOPLA
- VESNA
- VOLTHOR

INDUSTRIAL BATTERIES
- TRACTION
- MONOBLOCK
- STATIONARY

Starter & Industrial Batteries
TRACTION BATTERIES

WE PRODUCE BATTERIES / CELLS IN WELDED AND BOLTED VERSION

BOTH VERSIONS ARE BEING MANUFACTURED IN DRY-CHARGED AND ELECTROLYTE-CHARGED

STANDARD DIN 100 Ah-1860 Ah
STANDARD BS 46 Ah-1188 Ah
STANDARD BCI 170 Ah-1320 Ah

BATTERIES ARE KNOWN BY THEIR:
• High capacity
• Long life time
• Resistance to vibrations
• Low consumption of distilled water
• Simple maintenance
• Short charging times, etc.
TAB PzV and PzVB VRLA GEL TRACTION BATTERIES

MAINTENANCE FREE TAB PzV GEL BATTERIES ARE NEW HIGHLY SOPHISTICATED TRACTION BATTERIES IN THE FAMILY OF TAB MOTIVE POWER PRODUCTS.

SEALED TAB EPzV AND EPzVB GEL BATTERIES ARE PRODUCED IN VRLA GEL TECHNOLOGY (Valve Regulated Lead Acid batteries with electrolyte in the form of gel). They can be used in all kind of electrical appliances like: forklift trucks, electric road vehicles, cleaning machines, etc.

DUE TO ITS HIGH OPERATIONAL SAFETY AND HIGH DEGREE OF ENVIRONMENTAL FRIENDLINESS TAB EPzV GEL BATTERY IS PARTICULARLY SUITABLE FOR APPLICATIONS IN PHARMACEUTICAL, FOOD, CHEMICAL AND SIMILAR INDUSTRIES.

ADVANTAGES
- Maintenance free
- Lower energy consumption
- Incorporated valves in exhaust tubes
- Prevent gas release
- Extremely low selfdischarge
- Extremely low gassing during operation
- Maintenance errors are minimised
- No electrolyte leakage in case of cell damage
- No contamination or corrosion due to leaking electrolyte, etc.
ADVANTAGES
- Water refill interval is efficiently prolonged
- Reduced water consumption
- Low maintenance and reduced operational costs
- Reduced charging factor
- 50 to 80% reduced gas release and ventilation requirements
- 20 to 30% less charging time
- Cost saving due to lower energy consumption from 10-20%
- Reduced operating temperatures

TAB AQUALESS TRACTION BATTERIES

Cell design with proven PzS technology using tubular plates in combination with an adjusted charging regime results in extended watering intervals. TAB PzRM cells are manufactured and tested according to EN60254-1 and IEC254-1.

<table>
<thead>
<tr>
<th></th>
<th>Aqua 1</th>
<th>Aqua 2</th>
<th>Aqua 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Refilling Interval</td>
<td>4 weeks</td>
<td>8 weeks</td>
<td>12-13 weeks</td>
</tr>
<tr>
<td>Charger</td>
<td>50 Hz</td>
<td>HF</td>
<td>HF + Air Matic</td>
</tr>
<tr>
<td>Charging Factor</td>
<td>1.2</td>
<td>1.10 - 1.11</td>
<td>1.07 - 1.08</td>
</tr>
<tr>
<td>Electrolyte Level indicator</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Central Water Filling System</td>
<td>optional</td>
<td>optional</td>
<td>optional</td>
</tr>
<tr>
<td>Air Matic</td>
<td>-</td>
<td>×</td>
<td></td>
</tr>
</tbody>
</table>

Condition: water refilling intervals are based on 80% DOD - 1 cycle per day, 5 days per week.

Water Refilling Intervals
- HF CHARGER WITH AIR MATIC, 12-13 weeks
- HF CHARGER, 8 weeks
- 50Hz CHARGER, 4 weeks

SPECIFICATIONS
- Water refilling interval up to 12-13 weeks (at normal duty applications with 80% DOD C5, 1 cycle per day; 5 days per week, Electrolyte T=30°C)
- For these batteries proper chargers must be used
- Cells are equipped with Electrolyte Mixing system (using charger with integrated air pump) to prevent electrolyte stratification and to ensure optimized charging
- Batteries are assembled with Central Water Filling system
- Each battery has an Electrolyte Level Sensor (length according manufacturer specifications). With its red light it gives signal to the user when water refilling is needed.
AQUAMATIC
CENTRAL WATER FILLING SYSTEM
Each cell is equipped with aquamatic plugs, combined with tubes and water drums. At the same time enables central water filling for whole the battery. Enables quick and precise service of whole battery under any working conditions.

AIRMATIC
ELECTROLYTE MIXING SYSTEM
Each cell is equipped with special airmixing tube. Tubes are combined together with PVC tubes and connected trough connector to air compressor. Air compressor is already built in charger or can be installed additionally into ordinary charger with charging principle IU; WoWa.
Air consumption per hour is 60 litres/cell by operational pressure 0.2 Bars system is operating all the time during the charging system allows an electric vehicle to be in operation for 16 hours without changing the battery.

ADVANTAGES
- Reduction of charging time for 30 %
- Reduction of charging factor from 1.20 to 1.05
- Reduction of charging energy by app. 15 %
- Lower working temperature
- Reduction of water consumption by 75 %, etc.
CAPACITIVE BATTERY ELECTROLYTE LEVEL SENSOR

which with green light indicates electrolyte at proper specified level. Flashing red light indicates that the electrolyte level is below minimum and battery needs to be refilled with demineralised water to avoid permanent damage.

BATTERY MONITORING SYSTEM

allows you to see real time status of your batteries.

OUR BATTERY MONITORING SYSTEM IS ABLE TO PROVIDE:
• Full statistical analysis of battery’s performance (capacity, load levels, charging and discharging characteristics)
• Breakdown of each machine’s performance. (When and how it was used, when it was charged and how exactly it was used)
• Real time information and alerts via email or phone.
TRACTION ACCESSORIES
CABLES AND PLUGS

1. Plugs with basket and transport plug
2. End connectors
3. Lead connectors
4. Cable connectors
MONOBLOCK BATTERIES

MOTION
TUBULAR
PASTED
VRLA GEL
VRLA AGM
STATIONARY BATTERIES
CELLS AND BLOCKS

OPzS
OGi
UPS
OPzV
TOPzS
STARTER BATTERIES

produced using Ca/Ca expanded metal technology designed for vehicles with entry level of electric equipment with demand of superior starting, performance and reliability. Battery is real all rounder offering excellent power, capacity, cold start performance and reliability. SMF lid/cover provides complete roll over spill protection and is entirely maintenance free throughout the batteries life. This is high quality product for vehicles of every class.

- High starting capabilities
- Sealed cover construction
- Explosion protection prevents flame brake-in into the battery
- Reliable starting at extreme climatic conditions
SEALLED BATTERIES WITH MAGIC EYE

utilises the latest innovations in Ca/Ca manufacturing technology, providing for the highest cold start performance and superior reliable power as demanded by the latest generation of cars with high energy drain. The SMF lid provides complete roll over spill protection and is entirely maintenance free.

- Higher number of plates ensure 30 % better starting capabilities
- The level indicator (magic eye) provides an instant status check
- Explosion protection prevents flame brake-in into the battery
MAGIC EYE
IS LEVEL INDICATOR
which allows for instant
battery condition status.

LABIRINTH SYSTEM
ENHANCES THE LOW
ELECTROLYTE CONSUMPTION
by using a condensing
system, while providing
environmental benefits.
TRUCK STARTER BATTERIES

produced using Sb/Ca expanded metal technology - designed for vehicles with entry level of electric equipment but with demand of superior starting, performance and reliability.

- Heavy Duty (HD): from 135Ah
- Super Heavy Duty (SHD): from 180 Ah and 225 Ah
TRUCK SEALED BATTERIES

utilises the latest innovations in Ca/Ca manufacturing technology, providing for the highest cold start performance and superior reliable power as demanded by the latest generation of cars with high energy drain. The SMF lid provides complete roll over spill protection and is entirely maintenance free throughout the batteries life.

- Higher number of plates ensure better starting capabilities
- Explosion protection prevents flame brake-in into the battery
Truck batteries in B and C box with Electrolyte Mixing System (EMS)

Designed to provide the energy to meet the huge increases in electrical demand from today’s commercial vehicle market. Additional comfort and safety features demand a powerful energy supply. Frequent and irregular stops require a power source with enough starting power reserve plus the ability to charge in a very short time.

Our unique cell design, provides vertical agitation of the electrolyte, which improves the overall efficiency of the active material. The current path optimised providing increased starting power.

Benefits
- Suitable for commercial vehicles with high energy demand
- 15% higher starting power reserve
- Considerably improved lifespan, reducing real life costs
- Cycle life increased 30%
- Enhanced resilience to incomplete charging caused by frequent stops or low charging voltage
- Deep discharge resistance increased
- Eliminates acid stratification, a major cause of premature battery failure
- Highest vibration resistance
- Very low maintenance (hybrid technology) for flat lid battery and 100% maintenance free for SMF battery (Ca/Ca technology)
1 Electrolyte level indicator — Magic Eye
2 Top SMF lid with central degassing and flame arrestors (Battery manufactured by using Sb/Ca technology is fitted with a Flat lid with M27 plugs, for easy access)
3 Main SMF lid with labyrinth for additional safety and very low water loss
4 Robust plate connectors with large surface inter cell welds, increasing cranking power
5 Negative plate with additives for increased charging abilities. Permanent sulfation is severely restricted
6 Positive plates with thick casted grids. High-density active mass increases cycle life plus enhanced resistance to deep discharge
7 Integrated flexible ribs which generate adequate pressure to the plate stack in all states of charge
8 New cell design promotes acid motion in vertical direction, eliminating stratification
9 Impact resistant polypropylene container
Stop & Go EFB batteries are so called Enhanced Flooded Batteries intended for use in vehicles with entry level Start/Stop function. EFB batteries utilize the latest innovations in Ca/Ca flooded battery manufacturing technology, providing for the superior reliable power as demanded by the latest generation of cars with entry level Start/Stop system.

- MFW fleece on positive plates, preventing active material shedding boast twice as much cyclic capability as standard batteries and can be more discharged without any loss of functionality
- improved charge acceptance for recovering energy more quickly during driving phase using special expander with carbon
- the expanded metal technology results in better corrosion resistance providing a longer life time
- sealed cover construction, roll over proof
- maintenance free
- the level indicator (magic eye) provides an instant status check
- explosion protection with flame arrester
STOP & GO AGM BATTERIES

- very low water consumption due to internal oxygen combination
- preventing active material shedding boast more than three times as much cyclic capability as standard batteries and can be more discharged without any loss of functionality
- increased cranking power due to better utilization of cell volume by more than 30%
- high rate charge acceptance for recovering energy more quickly during driving phase
- both side pasting of plates provides better corrosion resistance providing a longer life time
- no acid stratification like in flooded cells
- explosive safe - minimum explosive gasses are produced
- vibration resistance
- no leakage in case of crash

Stop & Go AGM batteries are Valve Regulated Lead Acid batteries intended for use in vehicles with enhanced level Start-Stop function with break energy recuperation. VRLA AGM battery is improved lead acid battery to its maximum performance. The battery cells are closed by a pressure relief valve and electrolyte is immobilized in absorbed glass mat (AGM). Plate stacks are kept in the cells under pressure.
EcoMotion is TAB’s completed lifelong cycle of a battery; from its production to the recycling. It means TAB is selling new batteries and with its own smeltery collecting the old (used) batteries through its own (commercial/selling/...) network.

TAB is not only a producer of high quality Pb batteries but it is also taking care of ecological removal and decomposition-recycling of used batteries. With participation in the process of EcoMotion the consumer of the battery can be sure that all returned batteries to TAB and their lead content will be reused and that all procedures required by law will be respected.
Thank you for your time.