CRITICAL MATERIALS FOR
THE NEW MILLENNIUM
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AMG Overview
GLOBAL VIEW

- Need to contain CO\textsubscript{2} emissions
- Operation growth and increasing affluence need a technology counterbalance

Demand
- Material science-based solutions for energy efficiency (lighter, stronger, temperature resistant)

Supply
- AMG sources, processes, and supplies the materials which are critical because of market demands

AMG is a critical materials company
AMG: MITIGATING TECHNOLOGIES
Products and processes saving raw materials, energy and CO₂ emissions during manufacturing
(i.e., recycling of Ferrovanadium)

AMG: ENABLING TECHNOLOGIES
Products and processes saving CO₂ emissions during use
(i.e., light-weighting and fuel efficiency in the aerospace and automotive industries)

AMG has developed into a leader in enabling technologies
EXCELLENT PLATFORM FOR ORGANIC AND ACQUISITION LED GROWTH

MISSION STATEMENT
To increase long-term value through industry leadership, operational expertise and efficient deployment of capital

STRATEGIC OBJECTIVE
Identifying long-term trends and leveraging those trends through technological excellence and innovations in the indispensable areas of critical materials and vacuum technologies

GROWTH OBJECTIVES

A
Routine organic growth of existing business lines

B
Non-routine expansion of existing business lines

C
Transformational projects

AMG Core Business + A + B + C ≥ $200M * EBITDA in 5 years or less

* EBITDA target assumes current metal prices and no major acquisitions
LEVERAGING A STABLE PORTFOLIO OF INDUSTRY-LEADING BUSINESSES

Routine organic growth of existing business lines

Non-routine expansion of existing business lines

Transformational projects

PORTFOLIO OF CRITICAL MATERIAL AND RELATED PROCESS TECHNOLOGY BUSINESSES...

AMG CRITICAL MATERIALS

AMG VACUUM TECHNOLOGIES

...TAKING ADVANTAGE OF SECULAR GROWTH IN KEY END MARKETS (PRIMARILY CO₂ REDUCTION)

TRANSPORTATION (40%)

SPECIALTY METALS AND CHEMICALS (23%)

INFRASTRUCTURE (24%)

ENERGY (13%)

Example: AMG Graphite, ongoing expansion of heat insulation materials business
OPPORTUNISTIC INVESTMENTS IN “NON-ROUTINE” EXPANSION PROJECTS

Routine organic growth of existing business lines

Non-routine expansion of existing business lines

Transformational projects

“Non-routine” project characteristics:

- Capex intensive
- Stepping up growth across the portfolio
- Solidifying segment leadership
- Process innovation

Example: AMG Titanium Alloys & Coatings, ongoing expansion of industry leading Titanium Aluminides business
IDENTIFYING AND EXECUTING ON TRANSFORMATIONAL PROJECTS

Routine organic growth of existing business lines

Non-routine expansion of existing business lines

Transformational projects

- Big impact
- Long-cycle / long-lead-time projects
- Large investment, in terms of both human and financial capital

Example: Execution of AMG’s transformational lithium project
AMG’S CORE KNOW-HOW

PROCUREMENT
Sourcing material from remote origins

OPERATIONS
World leader in advanced metallurgical & mineral processing

MARKETS
Operating in volatile oligopolistic niche markets

CUSTOMERS
Intense interaction with global industrial leaders
Financial Highlights
AMG AT A GLANCE

Q2 2017 REVENUE

BY SEGMENT:
- 77% Critical Materials
- 23% Engineering

BY END MARKET:
- 43% Transportation
- 22% Specialty Metals & Chemicals
- 25% Infrastructure
- 10% Energy

BY REGION:
- 45% Europe
- 32% North America
- 18% Asia
- 5% ROW

AMG IS A GLOBAL SUPPLIER OF CRITICAL MATERIALS TO:
- ENERGY
- TRANSPORTATION
- INFRASTRUCTURE
- SPECIALTY METALS AND CHEMICALS

Market leading producer of highly engineered specialty metals and vacuum furnace systems

~3,000 Employees
~$1 billion Annual Revenues
At the forefront of CO₂ Reduction
Q2 2017 AT A GLANCE

<table>
<thead>
<tr>
<th>AMOUNTS IN $M (EXCEPT EARNINGS PER SHARE)</th>
<th>Q2 2017</th>
<th>Q2 2016</th>
<th>% CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>$262.0</td>
<td>$248.3</td>
<td>6%</td>
</tr>
<tr>
<td>Gross Profit *</td>
<td>$54.3</td>
<td>$53.3</td>
<td>2%</td>
</tr>
<tr>
<td>Gross Margin %</td>
<td>20.7%</td>
<td>21.5%</td>
<td>(4%)</td>
</tr>
<tr>
<td>Profit Before Income Taxes</td>
<td>$20.8</td>
<td>$15.6</td>
<td>33%</td>
</tr>
<tr>
<td>EBITDA</td>
<td>$31.9</td>
<td>$26.0</td>
<td>23%</td>
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<tr>
<td>EBITDA Margin %</td>
<td>12.2%</td>
<td>10.5%</td>
<td>16%</td>
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<tr>
<td>Net Debt</td>
<td>$7.3</td>
<td>$5.5</td>
<td>33%</td>
</tr>
<tr>
<td>Return On Capital Employed (ROCE)</td>
<td>23.9%</td>
<td>17.8%</td>
<td>34%</td>
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<tr>
<td>Net Income Attributable To Shareholders</td>
<td>$13.1</td>
<td>$13.4</td>
<td>(2%)</td>
</tr>
<tr>
<td>Earnings Per Share</td>
<td>0.42</td>
<td>0.48</td>
<td>(13%)</td>
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</tbody>
</table>

• Q2 ‘17 EBITDA up 23% versus Q2 ‘16 due to improved profitability within both AMG Critical Materials and AMG Engineering

• Annualized ROCE increased to 23.9% in Q2 2017 versus 17.8% for Q2 2016

Net Debt Reduction of $80.5 million since December 2014

* Gross Profit has been restated to include restructuring expenses and asset impairment expenses, in order to take into consideration ESMA’s latest recommendations.
# Financial Highlights

## Revenue (in millions of US Dollars)

<table>
<thead>
<tr>
<th>Quarter</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2</td>
<td>$248.3</td>
<td>$262.0</td>
</tr>
<tr>
<td>Q3</td>
<td>$247.5</td>
<td>$237.9</td>
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<tr>
<td>Q4</td>
<td>$237.9</td>
<td>$258.0</td>
</tr>
<tr>
<td>Q1</td>
<td>$258.0</td>
<td>$30.0</td>
</tr>
<tr>
<td>Q2</td>
<td>$30.0</td>
<td>$31.9</td>
</tr>
</tbody>
</table>

*Gross Profit has been restated to include restructuring expenses and asset impairment expenses, in order to take into consideration ESMA’s latest recommendations.*

## Gross Profit (in millions of US Dollars)

<table>
<thead>
<tr>
<th>Quarter</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2</td>
<td>$53.3</td>
<td>$54.3</td>
</tr>
<tr>
<td>Q3</td>
<td>$46.3</td>
<td>$52.5</td>
</tr>
<tr>
<td>Q4</td>
<td>$43.0</td>
<td>$52.5</td>
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<tr>
<td>Q1</td>
<td>$52.5</td>
<td>$54.3</td>
</tr>
<tr>
<td>Q2</td>
<td>$54.3</td>
<td>$54.3</td>
</tr>
</tbody>
</table>

*6% YoY, 2% YoY*

## EBITDA (in millions of US Dollars)

<table>
<thead>
<tr>
<th>Quarter</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2</td>
<td>$26.0</td>
<td>$31.9</td>
</tr>
<tr>
<td>Q3</td>
<td>$23.4</td>
<td>$33.0</td>
</tr>
<tr>
<td>Q4</td>
<td>$30.0</td>
<td>$31.9</td>
</tr>
<tr>
<td>Q1</td>
<td>$33.0</td>
<td>$31.9</td>
</tr>
<tr>
<td>Q2</td>
<td>$31.9</td>
<td>$31.9</td>
</tr>
</tbody>
</table>

*22% YoY, 2% YoY*

## Order Intake (in millions of US Dollars)

<table>
<thead>
<tr>
<th>Quarter</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2</td>
<td>$92.8</td>
<td>$76.9</td>
</tr>
<tr>
<td>Q3</td>
<td>$68.1</td>
<td>$61.7</td>
</tr>
<tr>
<td>Q4</td>
<td>$61.7</td>
<td>$81.8</td>
</tr>
<tr>
<td>Q1</td>
<td>$81.8</td>
<td>$76.9</td>
</tr>
<tr>
<td>Q2</td>
<td>$76.9</td>
<td>$76.9</td>
</tr>
</tbody>
</table>

*17% YoY*
FINANCIAL DATA: ROCE & EBITDA

- Q2 ‘17 EBITDA up 22% versus Q2 ‘16 due to improved profitability within both AMG Critical Materials and AMG Engineering

- Q2 2017 annualized ROCE improved to 23.9% from 17.8% in Q2 2016

- ROCE improvements are the result of efficient use of capital and improved profitability
FINANCIAL DATA: NET DEBT & NET CASH FROM OPERATIONS

- **Net debt:** $7.3 million
  - $186.9 million reduction of net debt since December 31, 2012

- AMG’s primary debt facility is a $400 million multicurrency term loan and revolving credit facility
  - 5 year term (until 2021) with an accordion feature that allows the Company, subject to certain conditions, to increase the commitment amount by up to $100 million
  - In compliance with all debt covenants

- AMG generated cash from operating activities of $28.5 million for the first half of 2017, $8.5 million higher than the first half of 2016
### AMG GROUP FINANCIAL PERFORMANCE – 2016 v 2015 ANNUAL

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2015</th>
<th>% CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Profit ($M)</td>
<td>$186.8</td>
<td>$160.0</td>
<td>17%</td>
</tr>
<tr>
<td>EBITDA ($M)</td>
<td>$100.7</td>
<td>$75.6</td>
<td>33%</td>
</tr>
<tr>
<td>Operating Cash Flow ($M)</td>
<td>$79.2</td>
<td>$76.3</td>
<td>4%</td>
</tr>
<tr>
<td>ROCE</td>
<td>18.8%</td>
<td>12.0%</td>
<td>57%</td>
</tr>
<tr>
<td>Earnings per Share</td>
<td>$1.32</td>
<td>$0.40</td>
<td>230%</td>
</tr>
<tr>
<td>Dividend per Share</td>
<td>€0.27</td>
<td>€0.21</td>
<td>29%</td>
</tr>
</tbody>
</table>

Note: OCF metric is prior to one-time $23m pension funding payment
5 YEAR TREND – EBITDA & ROCE

EBITDA (IN MILLIONS OF US DOLLARS)

<table>
<thead>
<tr>
<th>Year</th>
<th>EBITDA (Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>$83.5</td>
</tr>
<tr>
<td>2013</td>
<td>$72.6</td>
</tr>
<tr>
<td>2014</td>
<td>$85.7</td>
</tr>
<tr>
<td>2015</td>
<td>$75.6</td>
</tr>
<tr>
<td>2016</td>
<td>$100.7</td>
</tr>
</tbody>
</table>

FY ‘16 EBITDA UP 33% VERSUS FY ‘15

Annualized ROCE

<table>
<thead>
<tr>
<th>Year</th>
<th>ROCE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>9.2%</td>
</tr>
<tr>
<td>2013</td>
<td>7.4%</td>
</tr>
<tr>
<td>2014</td>
<td>11.9%</td>
</tr>
<tr>
<td>2015</td>
<td>12.0%</td>
</tr>
<tr>
<td>2016</td>
<td>18.8%</td>
</tr>
</tbody>
</table>

FY ‘16 ROCE IMPROVED TO 18.8% FROM 12.0% IN FY ‘15

- 2016 EBITDA is up 33% due to product mix and operational improvements in Critical Materials as well as a very strong performance by Engineering due to an increase in demand for furnaces from the aerospace industry.
- FY 2016 annualized ROCE improved to 18.8% from 12.0% in FY 2015.
- ROCE improvements are the result of efficient use of capital and improved profitability.
5 YEAR TREND – NET DEBT & OPERATING CASH FLOW

**Net Debt:** $7.3 million
- $186.9 million reduction of net debt since December 31, 2012
- Net Debt to LTM EBITDA: 0.07x

**AMG’s primary debt facility** is a $400 million multicurrency term loan and revolving credit facility
- 5 year term (until 2021) with an accordion feature that allows the Company, subject to certain conditions, to increase the commitment amount by up to $100 million
- In compliance with all debt covenants

**FY ‘16 net cash from operating activities** of $56.2 million, which included voluntary cash contributions to the Company’s pension plans of $23.1 million made during the year
AMG’S INTEGRATED LITHIUM STRATEGY

Lithium I

Upstream (Spodumene)

Spodumene Plant 1
90k MT per annum of spodumene production

Status: Under construction

Lithium II

Upstream (Spodumene)

Spodumene Plant 2
Increase spodumene production to 180k MT per annum

Status: Engineering & due diligence

Lithium III

Downstream (Lithium Chemicals)

Lithium Chemical Plant
Participation in lithium value chain downstream

Potential Joint Venture structure with existing producer and/or consumer of lithium chemicals

Status: Feasibility study & due diligence
AMG LITHIUM – PROJECT STRENGTHS

1) Existing management and mining infrastructure – not a new mine project
2) Strong understanding of the mine geology
3) Mining infrastructure already in place and operational
4) Ore extraction and crushing costs absorbed by profitable tantalum operation
5) Spodumene plant will be fed via lithium deposits in existing tailings, as well as incremental lithium-bearing tailings generated via tantalum production
   • 2.8 million metric tons of spodumene plant feed stock already extracted in the form of on-site tailings
6) AMG has operated a spodumene pilot plant since 2010
7) Strategic flexibility to further develop operational scope
Lithium Concentrate (Spodumene) Project

OBJECTIVE
Monetization of substantial lithium mineral deposits currently residing in AMG Mineração’s tailings ponds and tailing stockpiles
Production facility to be co-located with AMG Mineração’s tantalum mine and upgrading plant in Brazil

TARGETED PRODUCTION
180,000 MT per year of lithium concentrate

STATUS
Plant 1 (90,000 MT per annum) capital investment of approximately $50m was approved by the AMG Supervisory Board on July 19th, 2016. Production to commence mid-2018
Plant 2 (expansion to 180,000 MT per year) final investment decision expected Q4 2017

AMG’s objective is to be the low-cost producer of spodumene globally
SPODUMENE PROJECT STATUS

- **Resource Expansion**: Updated resource statement published 3 April 2017 – estimated life of the mineral resource is approximately 20 years, based upon targeted production level of 180k MT of lithium concentrate starting 2020

- **Construction Approval**: AMG approved construction of lithium concentrate plant at the AMG Mibra mine, with annual production of 90,000 tons

- **Offtake Agreement Established**: AMG announced a multi-year contract to supply 90,000 tons per year of lithium concentrate; deliveries commencing mid-2018.

- **EPC Contract Awarded**: AMG awarded EPC contract to Outotec (Finland) for turnkey delivery of lithium concentrate plant

- **Increased Production**: Targeted increase in annual lithium concentrate production, to a capacity of 180,000 tons, by end of 2019

**Status**

- Complete
- Complete
- Complete
- Engineering work in progress

**Full offtake agreement established & production expected to commence mid-2018**
AMG COST POSITION – LITHIUM CONCENTRATE (SPODUMENE)

Source: Roskill 2016, Ehren Gonzalez Ltda, Hatch; Note – Operating costs only, not including transportation
Note: AMG cost estimates per Outotec of $127/MT; includes production costs and SG&A costs; does not include cost of transportation to port

1 Greenbushes cost includes G&A but excludes selling expenses
2 Pilbara Minerals figure includes credits from tantalite production; includes transport and loading costs of $37/t concentrate

Estimate of AMG operating cost of $127/MT (excl. transportation)
LITHIUM: CAPTURING THE VALUE DOWNSTREAM

AMG MINERAÇÃO
AMG Mibra Mine, Brazil
Raw Material Spodumene

CONVERTCO JV
Lithium Chemical Plant
Conversion of Spodumene to Lithium Hydroxide

LCE BUYER
Cathode Producer
Purchase of LiOH
LITHIUM RESOURCE MAP

Volta Grande A
17.7M tons

Volta Grande C
6.6M tons

Tailings
The EU identified 20 critical raw materials* to the European economy in 2014, focusing on two determinants: economic importance and supply risk. The US identified 30 critical materials* which are vital to national defense, primarily through assessing supply risk. AMG has a unique critical materials portfolio comprising:

- 5 EU critical raw materials
- 4 US critical raw materials
- Highly engineered Titanium Alloys for the aerospace industry
- High value added Aluminum Master Alloys
- Vanadium, Nickel and Molybdenum from recycled secondary raw materials

CRITICAL MATERIALS PRICES: 10 YEAR PERSPECTIVE

- Metal prices are measured on a scale of 0 to 10, with 0 and 10 representing the minimum and maximum average quarterly prices occurring during the past 10 years.
- The positions demonstrate the current price level of each metal with respect to their various historical price points over the past 10 years.

AMG’s relevant prices have started to move into the second quartile.

Note: Metal Positions are measured on a scale of 0 to 10, with 0 being the minimum price and 10 being the maximum price. They are calculated using the formula \([(\text{Jun '07 month avg} - \text{min. monthly avg}) / (\text{max. monthly avg} - \text{min. monthly avg}) \times 10]\) where maximum and minimum monthly averages are measured over the period 1 Jun '07 through 30 Jun '17.
### CRITICAL MATERIALS – MARKET TRENDS

<table>
<thead>
<tr>
<th>CRITICAL MATERIALS</th>
<th>MAJOR END MARKETS</th>
<th>MARKET TRENDS</th>
<th>MAJOR CUSTOMERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG ANTIMONY</td>
<td>FLAME RETARDANTS</td>
<td>PLASTICS</td>
<td>Dupont</td>
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<tr>
<td>ANTIMONY TRIOXIDE</td>
<td></td>
<td></td>
<td>Firelli</td>
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<td>ANTIMONY MASTERBATCHES</td>
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<tr>
<td>AMG BRAZIL</td>
<td>MICRO CAPACITORS, SUPERALLOYS</td>
<td>COMMUNICATIONS &amp; ELECTRONICS</td>
<td>H.C. Starck</td>
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<td>TANTALUM &amp; NIOBIUM</td>
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<td>FUEL EFFICIENCY</td>
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<td>AMG LITHIUM</td>
<td>BATTERIES</td>
<td>RENEWABLE ENERGY</td>
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<td>LITHIUM CONCENTRATE (SPODUMENE)</td>
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<td>COMMUNICATIONS &amp; ELECTRONICS</td>
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<tr>
<td>AMG GRAPHITE</td>
<td>EXPANDED POLYSTYRENE (EPS), BATTERY ANODES</td>
<td>ENERGY SAVING</td>
<td>Sunpor</td>
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<td>NATURAL GRAPHITE</td>
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<td>ENERGY STORAGE</td>
<td>Höganas</td>
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<td>AMG SILICON</td>
<td>ALUMINUM ALLOYS, SOLAR</td>
<td>FUEL EFFICIENCY</td>
<td>Aleris</td>
</tr>
<tr>
<td>SILICON METAL</td>
<td></td>
<td>CLEAN ENERGY</td>
<td>AMAG Austria Metall</td>
</tr>
</tbody>
</table>

**End Markets:**
- Plastics
- Communications & Electronics
- Fuel Efficiency
- Renewable Energy
- Clean Energy

**Major Customers:**
- Dupont
- Firelli
- H.C. Starck
- Sunpor
- Höganas
- Aleris
- AMAG Austria Metall
CRITICAL MATERIALS – MARKET TRENDS

<table>
<thead>
<tr>
<th>CRITICAL MATERIALS</th>
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<tbody>
<tr>
<td>AMG ALUMINUM</td>
<td>AEROSPACE, AUTOMOTIVE</td>
<td>FUEL EFFICIENCY</td>
<td>Constellium, RioTinto, Alcoa</td>
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<td>ALUMINUM MASTER ALLOYS</td>
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<tr>
<td>AMG VANADIUM</td>
<td>INFRASTRUCTURE</td>
<td>INFRASTRUCTURE GROWTH</td>
<td>Nucor, Go, Gerdau</td>
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<tr>
<td>AMG TITANIUM ALLOYS &amp; COATINGS</td>
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<td>FUEL EFFICIENCY</td>
<td>Safran, Sncma, GE</td>
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<td>TITANIUM MASTER ALLOYS &amp; COATINGS</td>
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<td>ENERGY SAVING</td>
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<tr>
<td>AMG SUPERALLOYS UK</td>
<td>AEROSPACE</td>
<td>FUEL EFFICIENCY</td>
<td>Pcc, Ati</td>
</tr>
<tr>
<td>CHROMIUM METAL</td>
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</table>

ENERGY
TRANSPORTATION
INFRASTRUCTURE
SPEC. METALS & CHEM.
ENGINEERING – MARKET TRENDS

PRODUCTS & SERVICES | MAJOR END MARKETS | MARKET TRENDS | MAJOR CUSTOMERS
---|---|---|---
AMG ENGINEERING CAPITAL GOODS (VACUUM FURNACES) | AEROSPACE, AUTOMOTIVE | FUEL EFFICIENCY ELECTRONICS | CARPENTER, ThyssenKrupp, Rolls-Royce
AMG ENGINEERING VACUUM HEAT TREATMENT SERVICES | AEROSPACE, AUTOMOTIVE | FUEL EFFICIENCY | GM, BOSCH, CHRYSLER, VW, HONDA

ENERGY | TRANSPORTATION | INFRASTRUCTURE | SPEC. METALS & CHEM.
SPODUMENE PRODUCTION PROCESS OVERVIEW

PEGMATITE ORE
AMG Mibra Mine

CRUSHING, GRINDING, SEPARATION AND CONCENTRATION

FLOTATION

PRODUCTS AND MARKETS

PRODUCTS
Ta₂O₅ Concentrate & Tin

MARKETS
Electronics

PRODUCTS
Lithium Concentrate (Spodumene)

MARKETS
Energy Storage
Ceramics

MIBRA MINE IS A PROVEN RESOURCE PROVIDING MULTIPLE PRODUCT STREAMS
HEALTH AND SAFETY FOCUS

LEADING SAFETY INDICATORS

- The number of safety improvement items reported in Q2 2017 was 3% lower than in Q2 2016. These are essential in order to avoid potential injuries.

- Safety training hours increased 4% in Q2 2017 compared to Q2 2016.

- At the end of Q2 2017, lost time incident rate was 48% lower and total incident rate and incident severity rate were down 41% and 36%, respectively, from Q2 2016.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>LOST TIME INCIDENT RATE</th>
<th>INCIDENT SEVERITY RATE</th>
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<tbody>
<tr>
<td>2013</td>
<td>1.76</td>
<td>0.21</td>
</tr>
<tr>
<td>2014</td>
<td>1.20</td>
<td>0.19</td>
</tr>
<tr>
<td>2015</td>
<td>1.03</td>
<td>0.17</td>
</tr>
<tr>
<td>2016</td>
<td>1.04</td>
<td>0.11</td>
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<tr>
<td>2017*</td>
<td>0.69</td>
<td>0.09</td>
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</tbody>
</table>

* Indicates rolling LTM basis

Rigorous commitment to safety reflected in continually improving safety records