VESUVIUS PLC

04 March 2021

Results for the year ended 31 December 2020

Decisive response and strong cash generation during the COVID-19 crisis

Vesuvius plc, a global leader in molten metal flow engineering and technology, announces its preliminary audited results for the year ended 31 December 2020.

Financial summary	**2020 (£m)**	**2019 (£m)**	**Year-on-year change**	**Underlying change[1]**
Revenue	1,458.3	1,710.4	-14.7%	-12.7%
Trading Profit[2] (Adjusted EBITA)	101.4	181.4	-44.1%	-43.3%
Return on Sales[2]	7.0%	10.6%	-360 bps	-370 bps
Operating Profit	74.3	127.5	-41.7%	
Headline Profit Before Tax[2]	91.6	171.4	-46.6%	
Profit Before Tax	64.5	118.6	-45.6%	
Headline Earnings[2]	62.7	121.4	-48.4%	
Profit	45.8	86.5	-47.1%	
Headline EPS[2] (pence)	23.2	45.1	-48.6%	
Statutory EPS (pence)	15.3	29.8	-48.7%	
Cash generated from operations	193.7	240.7	-19.5%	
Adjusted operating cash flow[2]	175.2	217.7	-19.5%	
Net Debt[2]	175.1	245.8	-28.8%	
Dividend (pence)	17.4	6.2	180.6%	

[1] Underlying basis is at constant currency and excludes separately reported items and the impact of acquisitions and disposals
[2] For definitions of non-GAAP measures, refer to Note 16 in the financial statements

Key Points

- Negative impact of the Covid-19 crisis on our revenues, which declined by £252.1m to £1,458.3m
- Our Steel division's market outperformance in India, Vietnam, Turkey, Russia, Ukraine and South America, positions the Group well in these high-growth markets
- Successful delivery of £39.0m of temporary Covid-related savings to mitigate the impact of the crisis on the Group, made possible by our entrepreneurial and decentralised business model
    - More than £8m of savings are expected to recur in 2021 based on permanent changes in working practices and reduced operating expenses
- Delivered recurring restructuring savings of £20.6m, ahead of the planned £19.4m for the year. Further recurring restructuring savings of £4.3m will be realised in 2021, as we benefit from the full year impact of restructuring actions taken during 2020
- Maintained industry-leading R&D investment, supporting future new product launches and top-line growth, leaving the Group ideally positioned for recovery
- Our recently completed restructuring programme has resulted in an optimised manufacturing network geared for growth
- Trading profit of £101.4m (down £80m versus 2019), with Return on Sales of 7.0%, reflecting the impact of the pandemic
- Strong cash performance with £175.2m of adjusted operating cash flow (173% cash conversion), demonstrating our ability to generate positive cash flow across the cycle
- Strong working capital performance, with working capital / sales improving to 23.2% versus 24.0% at the end of 2019
- Net debt reduced to £175.1m compared to £245.8m in 2019, with net debt/EBITDA of 1.2x
- Proposed final dividend of 14.3p, bringing full year dividend to 17.4p, supported by strong cash flow
- Launch of a new Group Sustainability Initiative, with positive momentum on our intermediate ESG targets and commitment to reach a net zero carbon footprint at the latest by 2050

Patrick André, Chief Executive of Vesuvius, commented:

"Vesuvius' decisive response and strong cash generation during the COVID-19 crisis resulted from the excellent performance of all my Vesuvius colleagues, of whom I am proud and would like to thank. Clear signs of recovery are now apparent in both our Steel and Foundry end markets and we believe that this recovery should accelerate in the second half of 2021, supported by the lifting of most pandemic-related restrictions by then. Vesuvius is emerging from this difficult period stronger than before. We have low leverage and an optimised manufacturing footprint resulting from our successfully completed restructuring programmes. We also benefit from our flexible and low capital intensive, entrepreneurial and decentralised business model, which has proven its value during 2020. We are confident that the Group will deliver a meaningful improvement in financial performance in 2021."

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The management of Vesuvius will be presenting the Group's results for the full year 2020 at 09:30 GMT today. The presentation will be broadcast live and an archive version of the presentation will be made available on the Group's website. To participate, please register here.

About Vesuvius plc

Vesuvius is a global leader in molten metal flow engineering and technology principally serving the steel and foundry industries.

We develop innovative and customised solutions, often used in extremely demanding industrial environments, which enable our customers to improve their manufacturing processes, enhance product quality and reduce costs. These include flow control solutions, advanced refractories and other consumable products and increasingly, related technical services including data capture.

We have a worldwide presence. We serve our customers through a network of low-cost manufacturing plants located close to their own facilities, and embed our industry experts within their operations, who are all supported by our global technology centres.

Our core competitive strengths are our market and technology leadership, strong customer relationships, well established presence in developing markets and our global reach, all of which facilitate the expansion of our addressable markets.

Our ultimate goal is to create value for our customers, and to deliver sustainable, profitable growth for our shareholders giving a superior return on their investment whilst providing each of our employees with a safe workplace where he or she is recognised, developed and properly rewarded.

Forward looking statements

This announcement contains certain forward-looking statements which may include reference to one or more of the following: the Group's financial condition, results of operations, cash flows, dividends, financing plans, business strategies, operating efficiencies or synergies, budgets, capital and other expenditures, competitive positions, growth opportunities for existing products, plans and objectives of management and other matters.

Statements in this announcement that are not historical facts are hereby identified as "forward looking statements". Such forward looking statements, including, without limitation, those relating to the future business prospects, revenue, working capital, liquidity, capital needs, interest costs and income, in each case relating to Vesuvius, wherever they occur in this announcement, are necessarily based on assumptions reflecting the views of Vesuvius and involve a number of known and unknown risks, uncertainties and other factors that could cause actual results, performance or achievements to differ materially from those expressed or implied by the forward looking statements. Such forward looking statements should, therefore, be considered in light of various important factors that could cause actual results to differ materially from estimates or projections contained in the forward-looking statements. These include without limitation: economic and business cycles; the terms and conditions of Vesuvius' financing arrangements; foreign currency rate fluctuations; competition in Vesuvius' principal markets; acquisitions or disposals of businesses or assets; and trends in Vesuvius' principal industries.

The foregoing list of important factors is not exhaustive. When considering forward looking statements, careful consideration should be given to the foregoing factors and other uncertainties and events, as well as factors described in documents the Company files with the UK regulator from time to time including its annual reports and financial statements.

You should not place undue reliance on such forward-looking statements which speak only as of the date on which they are made. Except as required by the Rules of the UK Listing Authority and the London Stock Exchange and applicable law, Vesuvius undertakes no obligation to update publicly or revise any forward-looking statements, whether as a result of new information, future events or otherwise. In light of these risks, uncertainties and assumptions, the forward-looking events discussed in this announcement might not occur.

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Vesuvius plc

Results for the year ended 31 December 2020

Vesuvius' decisive response and strong cash generation during the COVID-19 crisis demonstrates the resilience of our flexible, low capital intensive, entrepreneurial and decentralised business model. Vesuvius reacted rapidly to the unprecedented downturn brought on by the Covid-19 pandemic. By the end of the first quarter, we had established and implemented an action plan with three key priorities: preserving the health and morale of our employees; maintaining the security of supply for our customers worldwide; and preserving the cash and liquidity of the Group. As part of this plan, we rapidly implemented all the changes to the layouts of our manufacturing network that were necessary to protect our staff and where permitted, to keep all our manufacturing sites open, operating and delivering to our customers safely.

According to the World Steel Association (WSA), steel production in the World ex-China & Iran fell 8.8% in 2020. Foundry end markets were also negatively impacted, with global light vehicle production and mining and construction down 16.7%, and 8.0% year-on-year, respectively, according to IHS data.

£m	**2020 Reported**	**Acquisitions / Disposals**	**2020 Underlying**	2019 Reported	Currency	Acquisitions / Disposals	2019 Underlying	**Reported % Change**	**Underlying % Change**
Revenue	1,458.3	-22.1	1,436.2	1,710.4	-41.7	-23.6	1,645.1	-14.7%	-12.7%
Trading Profit	101.4	-4.0	97.5	181.4	-7.0	-2.5	171.9	-44.1%	-43.3%
Return on Sales	7.0%		6.8%	10.6%			10.5%	-360 bps	-370 bps

Group trading performance

Group revenue in 2020 was £1,458.3m, a decrease of 14.7% versus 2019 on a reported basis. Underlying Group revenue, adjusted for the effects of currency translation, acquisitions and disposals, decreased by 12.7%. Trading profit (Adjusted EBITA) was £101.4m, a 44.1% reduction on a reported basis and 43.3% on an underlying basis. The decline in volumes and profits led to return on sales contracting by 360bps to 7.0% during the year.

In addition to currency translation, underlying performance is adjusted for the acquisition of CCPI, completed on 1 March 2019.

Demand in our end markets started to improve in both our Steel and Foundry divisions during Q3 2020 and these trends continued into Q4. The like-for-like decline in steel production volume in the world excluding China slowed to 2.9% in H2 2020 versus H2 2019, following the 14.3% decline in H1 2020 versus H1 2019. Despite the recovery in H2 2020, steel production in NAFTA and Europe (EU 27 + UK), remained well below 2019 levels. The story was similar in the end markets of our Foundry division. Despite a rebound in H2 2020 versus H2 2019 of 1.6% for global production of light vehicles and 19.3% for heavy commercial vehicles, full year outputs were still down by 16.7% and 11.2%, respectively.

These end-market trends are reflected in our Group performance, with the decline in revenue slowing to 10.1% in H2 2020 versus H2 2019, following a 19.0% decline in H1 2020 vs H1 2019.

Strategic progress

Vesuvius' core strategic objective is to deliver long-term sustainable and profitable growth. We have a clear strategy to achieve this objective centred around four key execution priorities. We continued to make progress on these priorities during the year, despite significant disruption to our operations caused by the pandemic, and we remain confident in our ability to achieve a sustainable return on sales level of 12.5% when end markets return to their 2018 levels.

- **Reinforce our technology leadership**
  - Commissioning of our new VISO Research Centre in Belgium
  - Completion of the expansion and modernisation of our centre-of-excellence for mechatronics in Belgium
  - Maintained our industry-leading level of R&D investment, with R&D spend as a percentage of revenues at 1.9% in 2020
- **Develop our technical service offering and increase the penetration of our value-creating solutions**
  - Launched 10 new products in 2020, with 22 launches planned for 2021
    - Flow Control: launch of Duraflex L, a breakthrough generation of ladle shroud
    - Advanced Refractories: roll-out of CE-certified Next Generation Tundish Smart Robot
    - Foundry: launch of Diamant, a new suite of degassing consumables
  - We installed three mechatronics systems during the year at customer locations in Asia and have five further active projects for customers in the pipeline

- **Capture growth in developing markets**
  - The sales volume of the Steel division outperformed steel production in the world (excluding China and Iran) by 1.1% in 2020, with particularly strong performance in the growing markets of India, Vietnam, Turkey, Russia, Ukraine and South America
  - In China, underlying revenue in our Foundry division grew by 10.5% during the year, continuing our track record of growth in this important market
- **Improve our cost leadership and margins**
  - During the year, the Group delivered an additional £20.6m of recurring savings from our recently-completed restructuring programmes
  - Further restructuring savings of £4.3m will be realised in 2021, as we benefit from the full year impact of restructuring actions taken during 2020
  - We also expect to deliver additional recurring annual savings of more than £8m in 2021 as we retain some of the efficiencies from changes to working practices that were achieved during the pandemic, plus savings from a permanent reduction in operating expenses

Foreign exchange
The net impact of average 2020 exchange rates compared to 2019 averages has been a 2020 headwind of £7.0m at the trading profit level, in particular due to a weakening of the domestic currencies in Brazil, India, Turkey and South Africa relative to sterling.

Mitigating actions in response to Covid-19
In response to the pandemic, the Company enacted a series of measures to preserve cash, reduce costs and protect the business. The temporary cost reduction measures amounted to £39.0m for the full year 2020 (£18.6m in Q2, £20.3m in H2), and included a reduction of £15.9m in employment costs, £11.8m of savings in discretionary spend, together with an £11.3m reduction in planned employee incentives.

In light of the unprecedented uncertainty at the beginning of 2020, the Group decided to preserve cash by reducing net capex by £21m when compared to 2019, prioritising strategic growth investments without taking any risks in the ongoing overall maintenance and safety of our operations. In addition, the Board also took the decision to withdraw its recommendation for the payment of a final dividend for 2019 as part of the Group's cash preservation measures.

Restructuring
Despite the significant disruption in activities due to the pandemic, in 2020, we successfully completed our planned restructuring programmes and achieved £20.6m of recurring restructuring savings, ahead of the £19.4m we had targeted for the year. Further recurring restructuring savings of £4.3m will be realised in 2021, as we benefit from the full year impact of restructuring actions taken during 2020.

At the same time as concentrating our manufacturing footprint on a reduced number of manufacturing locations, we have preserved our production capacity through targeted investments and de-bottlenecking initiatives at our remaining plants. As a result, we are confident that our current manufacturing footprint is more than sufficient for the economic rebound from the pandemic and ensuing structural growth we expect in our end markets over the coming years.

Additional recurring cost savings to benefit 2021 and thereafter
In 2021, we expect to deliver additional recurring annual savings of more than £8m as we retain some of the efficiencies from changes to working practices that were achieved during the pandemic, plus savings from a reduction in operating expenses in EMEA, which we undertook in Q4 2020.

Operating cash flow
Vesuvius was free cash flow positive[1] in every quarter of 2020, even before taking into account the positive cash flows from reduced working capital. We achieved an adjusted operating cash flow of £175.2m, with a cash conversion rate of 173%, up significantly from 120% in 2019.

Working Capital
Over the year, £37.5m of cash was released from trade working capital and £23.8m from other working capital due to the decline in business activity and our strong focus on cash management. Inventory was down £21.7m in December 2020 versus December 2019 as we made progress in reducing raw material levels as well as finished goods across the Group.

[1] on both adjusted and statutory basis

Our ability to adjust production to respond to the rapid deterioration in volumes without building excess inventories is a reflection of the flexibility we have built into our manufacturing network through the recent restructuring programmes. As a result of our strong cash management focus, our 12-month average working capital to sales ratio improved to 23.2% from 24.0% at the end of 2019.

Tax

A key measure of tax performance is the Effective Tax Rate ("ETR"), which is calculated on the income tax associated with headline performance, divided by the headline profit before tax and before the Group's share of post-tax profit of joint ventures (2020: £90.5m, 2019: £170.4m). The Group's ETR, based on the income tax costs associated with headline performance of £24.4m (2019: £43.8m), was 26.9% (2019: 25.7%).

The actual ETR of 26.9% for the year ended 31 December 2020 is slightly lower than the 27.2% reported for H1 2020 and is primarily driven by changes in the geographic mix of realised profits and the impact of withholding taxes as a proportion of the reduced total Group profits. The ETR for the full year 2020 is in line with the original guidance issued at the time of the 2019 results for a rate between 26% and 27%.

We expect the Group's effective tax rate on headline profit before tax and before the share of post-tax profits from joint ventures to be between 26% and 27% in 2021.

Financial position

Net debt at 31 December 2020 decreased to £175.1m, compared to £245.8m at year-end 2019. Our adjusted operating cash flow of £175.2m was offset by £8.4m of dividends, £13.7m of net finance costs, £27.5m income taxes and £16.7m of cash restructuring costs. Our year-end net debt implies a net debt/LTM EBITDA ratio of 1.2x compared to 1.1x at year-end 2019. Excluding IFRS 16 lease liabilities, which is consistent with the calculation under our debt covenants, net debt / LTM EBITDA was 1.0x at 31 December 2020, broadly in-line with the level at year-end 2019.

In September 2020, we repaid the £200m of debt issued to us in April 2020 through the Bank of England's Covid Corporate Financing Facility (CCFF), which we took to reinforce our liquidity in light of the uncertainty at the beginning of the pandemic. In August 2020, we also repaid early the US$140m 2010 USPP Notes maturing in December 2020. The redemption of these USPP Notes was funded from the proceeds of a new USPP of the same size which was issued earlier in the year. The redemption of the 2010 USPP Notes raises our debt covenant limit from 3.0x to 3.25x net debt/LTM EBITDA.

Following the above debt repayments, our liquidity stood at £437.3m on 31 December 2020, compared to £354.4m at the end of December 2019. The average maturity of our committed debt facilities now stands at approximately six years.

Final dividend

The Board has recommended a final dividend of 14.3 pence, bringing the total dividend for the year to 17.4 pence per share (2019: 6.2 pence per share, following the cancellation of the 14.3p proposed final 2019 dividend).

The Board has determined that this level of dividend is appropriate for the level of business activity in 2020, while also considering the strong cash flow generation, and that the Company has sufficient liquidity and overall balance sheet strength to justify payment, whilst also maintaining flexibility to fund both organic and inorganic growth, as opportunities arise.

The decision not to pay a final dividend for 2019 was taken in April 2020, due to the unprecedented uncertainty in the business environment at that time. This decision was not taken lightly and we fully recognise the importance of dividend payments to shareholders. We reinstated dividend payments at the earliest opportunity with the announcement of an interim dividend in October 2020.

If approved at the Annual General Meeting on 12 May 2021, the final dividend will be paid on 21 May 2021 to shareholders on the register at the close of business on 16 April 2021. The last date for receipt of elections from shareholders for the Vesuvius Dividend Reinvestment Plan will be 29 April 2021.

Health & Safety

Our priority remains the health and safety of our employees and other stakeholders, and we have taken all necessary actions during the pandemic to maintain a safe working environment for our people. The Group continues to support c.2,000 of its employees working remotely, in line with applicable government and state guidance. Since April 2020, all of our plants have been operational with re-configured layouts and processes to prioritise the safety of our employees.

Within our production activities, our Lost Time Injury Frequency Rate (LTIFR) in 2020 was 1.1 LTIs per million hours worked versus 1.5 in 2019 and 1.3 in 2018. We remain committed to continuing our journey towards our ultimate goal of zero accidents and will carry this aspiration into 2021 with the further development of our safety programmes.

Group Sustainability Initiative

In 2020, Vesuvius launched a new Sustainability Initiative to accelerate our efforts in contributing to the fight against climate change, championing our people, and contributing to the well-being and development of our surrounding communities.

Sustainability is central to our identity, our strategy and the way we conduct business.

We are embarking on a journey which will progressively transform many aspects of the way we run our business, including investment decisions, product development priorities, supplier management, communication, and engagement with our people and communities – thereby incorporating sustainability more deeply into the strategy and business model of Vesuvius.

As a company, we do not have a significant environmental footprint due to the low energy intensity of our manufacturing processes and our strategy of not being integrated upstream in mining. We , however, have a significant opportunity to help our steel and foundry customers drive improvements in their environmental performance.

Our environmental objectives revolve around fighting climate change by reducing our own CO_2 emissions and helping our customers reduce their own CO_2 footprint. In particular we have set ourselves the goal of reaching a net zero carbon footprint at the latest by 2050.

We will also renew our focus on achieving best-in-class safety and well-being at work, both for our employees and for our customers. We have set a new gender diversity target and will invest further in the development of our employees and ensuring ethical business conduct at all times.

For 2020, we have set ourselves eight intermediate targets across all areas of the sustainability agenda (with a ninth added for 2021) against which we will monitor and report our progress. We are also measuring a significantly larger number of sustainability indicators on an ongoing basis. With the full support of the Board, we have established a governance structure constituting a Sustainability Council with membership drawn from across the business to oversee our performance and support our efforts. Furthermore, we have signed up to the United Nations Global Compact as a demonstration of our commitment to support the Ten Principles on human rights, labour, environment and anti-corruption, as well as the UN Sustainable Development Goals.

Vesuvius Group Sustainability Targets

Percentage changes are targeted by 2025 against a 2019 base year where relevant, unless otherwise stated

1. Energy Consumption. 10% reduction in energy consumption per metric tonne of product packed for shipment
2. Energy CO_2e emission. 10% reduction in energy CO_2e emissions per metric tonne of product packed for shipment
3. Waste Water. 25% reduction in waste water per metric tonne of product packed for shipment
4. Solid waste. 25% reduction in solid waste[1] per metric tonne of product packed for shipment
5. Recovered and Recycled Material. 7% of recovered or recycled materials from external sources
6. Safety. Lost Time Injury Frequency Rate (LTIFR) below 1
7. Gender diversity. 30% female representation in Top Management[2]
8. Compliance training. At least 90% of targeted staff to complete ABC (anti-bribery and corruption) training annually
9. Supply chain. Conduct sustainability assessments of suppliers covering at least 50% of Group spend by the end of 2023

Changes to the Board of Directors and Executive Management

As announced on the 30th of November 2020, the Group appointed **Kath Durrant** as a Non-executive Director of the Company effective 1 December 2020, serving on the Audit, Remuneration and Nomination Committees. Kath will succeed Jane Hinkley as Remuneration Committee Chair at the close of the 2021 AGM, following which, Jane Hinkley will remain as an Independent Non-executive Director of the Company.

In addition, **Holly Koeppel** and **Hock Goh** will be stepping down from the Board of Directors at the close of the 2021 AGM, following 4 years and 6 years of service as Non-executive Directors, respectively. The Nomination Committee will continue to address succession issues in 2021 in line with director rotation requirements, including the Senior Independent Director commencing a process for the appointment of a new Chairman. The Company is committed to ensuring that the Board membership continues to reflect the diversity, breadth of skills and experience required to drive and support the business strategy going forward.

In early 2021, we further strengthened our senior management team with the addition of **Pascal Genest** as President of the Group's Flow Control Business. Pascal's experience spans international leadership roles in different sectors, including 15 years' experience in the steel industry working for some of our largest customers.

[1] Solid waste: hazardous and sent to landfill
[2] Top management: Group Executive Committee and their key direct reports

Outlook

Clear signs of recovery are now apparent in both our Steel and Foundry end markets. We believe that this recovery should accelerate in the second half of 2021, supported by the lifting of most pandemic-related restrictions by then.

Vesuvius is emerging from this difficult period stronger than before. We have low leverage and an optimised manufacturing footprint as a result of our successfully completed restructuring programmes. We also benefit from our flexible and low capital intensive, entrepreneurial and decentralised business model, which has proven its value during 2020.

We are confident that the Group will deliver a meaningful improvement in financial performance in 2021.

Operational Review

Vesuvius comprises two Divisions, Steel and Foundry. The Steel Division operates as three business lines, Steel Flow Control, Steel Advanced Refractories and Sensors & Probes.

Steel Division

The Covid-19 crisis led to sharp declines in steel production volumes across the world in 2020. Steel production in the world excluding China and Iran , which accounts for approximately 90% of Vesuvius' sales, fell 8.8 % year-on-year according to the World Steel Association (WSA). Including China and Iran, global production was down 0.9% during the year. Steel production fell 11.8% in Europe (EU 27 + UK), 8.6% in South America, and 15.5% in NAFTA. China was one of very few countries where production grew despite the pandemic.

The table below presents the change in steel production in 2020 vs. 2019 and also H1 2020 and H2 2020 vs. the equivalent periods of 2019. The bulk of the impact of Covid-19 is reflected in the steep declines in H1, with world ex-China crude steel production falling 14.3% compared to H1 2019.

The like-for-like decline in steel production volume in the world excluding China slowed to 2.9% in H2 2020 versus H2 2019. Despite the recovery in H2 2020, steel production in NAFTA and Europe (EU 27 + UK) remained well below 2019 levels.

WSA Steel Production Growth (YoY Change)	H1 2020	H2 2020	FY 2020
China	1.4%	9.5%	5.2%
India	-24.2%	1.9%	-10.6%
NAFTA	-17.6%	-13.7%	-15.5%
South America	-19.9%	3.3%	-8.6%
EEMEA ex. Iran	-7.3%	5.9%	-0.5%
Europe (EU 27 + UK)	-18.7%	-5.0%	-11.8%
World	-6.0%	3.9%	-0.9%
World ex-China	-14.3%	-2.9%	-8.2%
World ex-China & Iran	-15.0%	-3.5%	-8.8%

The Group's Steel Division reported revenues of £1,045.4m for 2020, a 12.5% decline from the prior year, reflecting the negative impact of Covid-19 on steel production volumes across the world. However, sales volume of the Steel division in 2020 outperformed steel production in the world excluding China and Iran by 1.1% in 2020, with particularly strong performance in the growing markets of India, Vietnam, Turkey, Russia, Ukraine and South America. Sales in China progressed by only 0.4% in volume, as priority was given to profitability over volumes in the Advanced Refractory Business Unit. No sales were made in Iran as we retreated from this market in 2019. The steel division revenues incorporate a negative price impact of 1.7% in 2020, mostly in the Advanced Refractory Business Unit, as raw material price decline was passed through to customers.

Trading profit in the Steel Division declined 36.4% year-on-year to £76.4m. Return on Sales contracted 270 bps to 7.3% during the year as the cost savings from the restructuring programme and from the temporary measures we put in place during the pandemic only partially offset the negative volume impact from the Covid-19 crisis.

Steel Division	2020 (£m)	2019 (£m)	Change (%)	Underlying change (%)
Steel Flow Control Revenue	561.3	626.3	-10.4%	-8.0%
Steel Advanced Refractories Revenue	458.6	539.8	-15.0%	-13.6%
Steel Sensors and Probes Revenue	25.5	29.2	-12.9%	-4.2%
Total Steel Revenue	1,045.4	1,195.3	-12.5%	-10.4%
Total Steel Trading Profit	76.4	120.1	-36.4%	-36.2%
Total Steel Return on Sales	7.3%	10.0%	-270 bps	-290 bps

Steel Flow Control

The Steel Flow Control business unit supplies the global steel industry with consumable ceramic products, systems, robotics, digital services and technical services. These products are used to contain, control and monitor the flow of molten steel in the continuous casting process. The consumable ceramic products that Vesuvius supplies have a short service life (often a matter of a few hours) due to the significant wear caused by the extremely demanding environment in which they are used. These products must withstand extreme temperature changes, whilst resisting liquid steel and slag corrosion. In addition, the ceramic parts in contact with the liquid steel must not in any way contaminate it. The quality, reliability and consistency of these products and the associated digital services we provide are therefore critical to the quality of the finished metal being produced and the productivity, profitability and safety of our customers' processes.

Steel Flow Control Revenue	2020 (£m)	2019 (£m)	Change (%)	Underlying change (%)
Americas	182.9	214.8	-14.9%	-9.1%
Europe, Middle East & Africa (EMEA)	204.7	229.5	-10.8%	-10.6%
Asia-Pacific	173.7	182.0	-4.6%	-3.5%
Total Steel Flow Control Revenue	561.3	626.3	-10.4%	-8.0%

Steel Flow Control revenues were down 10.4% on a reported basis to £561.3m. On an underlying basis, Flow Control revenues were down 8.0% during the year, with sales volume outperforming total steel production in the world excluding China and Iran.

In EMEA, Steel Flow Control revenues declined 10.8% to £204.7m in 2020 on a reported basis, with strong performance against the market in EU 27 + UK, Russia, Ukraine and Turkey, partially offsetting the weaker performance in the rest of the region, and in particular the absence of sales to Iran in 2020.

Our Flow Control revenues fell 14.9% to £182.9m in the Americas. In NAFTA, we outperformed the market, posting a decline of 14.0% versus the 15.5% market decline. In South America, we also significantly outperformed the market, generating growth of 8.4% versus a general market decline of 8.6%.

In Asia Pacific, our Flow Control revenues declined 4.6% to £173.7m in 2020 versus a 1.5% growth in steel production. We recorded a slightly below market volume growth of 3.2% in China (versus general steel market growth of 5.2%) due largely to temporary changes in steel product mix, where the crisis temporarily drove greater growth in long steel, which is typically used in construction and is benefitting from fiscal stimuli to support the economy. Long steel typically uses less of our products per tonne than higher quality flat steel.

Steel Advanced Refractories

The Steel Advanced Refractories business unit supplies complete value-added solutions to its customers including specialist refractory materials, advanced installation technologies (including robots), computational fluid dynamics capabilities and lasers. The specialist refractory materials are subject to extreme temperatures, corrosion and abrasion, and are in the form of powder mixes, which are spray-applied or cast onto the vessel to be lined ('monolithics') and refractory shapes (e.g. bricks, pads, dams and other larger precast shapes). The service life of the products that Advanced Refractories supplies into the steel making process can vary (some a matter of hours and others for a period of years) based upon the type of refractory and the level of wear caused by the demanding environment in which they are used. An integral part of our success depends upon our best-in-class installation technologies (including robots) and lasers to track the performance of installed Vesuvius refractories as well as the high level of collaboration with our customers.

Steel Advanced Refractories Revenue	2020 (£m)	2019 (£m)	Change (%)	Underlying change (%)
Americas	153.0	180.6	-15.3%	-14.6%
Europe, Middle East & Africa (EMEA)	187.8	236.3	-20.5%	-19.2%
Asia-Pacific	117.9	122.9	-4.1%	-1.4%
Total Steel Advanced Refractories Revenue	458.6	539.8	-15.0%	-13.6%

Our Steel Advanced Refractories business recorded revenues of £458.6m in 2020, a decrease of 15.0% compared to 2019 on a reported basis (-13.6% on an underlying basis), with performance relative to the steel markets varying across regions.

In the Americas, Advanced Refractories revenue declined 15.3% to £153.0m (-14.6% on an underlying basis). In the USA, our Advanced Refractories revenues declined by 16.3% against domestic steel production which declined by 17.2%. This outperformance was supported by increased penetration of products into Electric Arc Furnaces (EAF), in addition to increased sales to traditional core integrated mills, which were more negatively impacted by the pandemic. In South America, we recorded a limited revenue decline of 3.1%, versus the 8.6% decline in steel production in the region.

In EMEA, our Advanced Refractories revenue declined by 20.5% to £187.8m during the year (-19.2% on an underlying basis). Our sales volume outperformed the underlying steel market in EU 27 + UK, Turkey, Russia, South Africa and Ukraine, partially compensating for weakness in other areas, and in particular the absence of sales to Iran in 2020.

In Asia Pacific, revenue from Advanced Refractories was £117.9m, a decrease of 4.1% compared to the previous year, underperforming steel production in the region, which grew 1.5%. The underperformance was driven almost entirely by China, where our sales volume declined by 11.8% due to our strategy of prioritising profitability over volumes in Advanced Refractories. In the rest of the region, our Advanced Refractories business outperformed the underlying steel market, in particular in the key growth countries of India and Vietnam.

Steel Sensors & Probes

The Steel Sensors and Probes business unit offers digital measurement solutions to our customers to enable them to make their underlying processes more efficient and reliable. The business unit focuses on providing a range of sensors and probes that enhance the control and monitoring of our customers' production processes, complementing Vesuvius' strong presence and expertise in molten metal engineering. These products include temperature sensors, oxygen, hydrogen and sublance probes, iron oxide and metal sampling for the steel, aluminium and foundry industries. By using these technologies, customers can focus on critical parameters within their processes, enabling them to refine their production methods to improve quality, lower production costs and maximise efficiency.

Steel Sensors & Probes Revenue	2020 (£m)	2019 (£m)	Change (%)	Underlying change (%)
Americas	16.4	19.4	-15.3%	-1.1%
Europe, Middle East & Africa (EMEA)	8.9	9.7	-8.6%	-9.8%
Asia-Pacific	0.2	0.1	26.6%	28.7%
Total Steel Sensors & Probes Revenue	25.5	29.2	-12.9%	-4.2%

The slowdown in global steel production as well as the significant market uncertainty faced by steel producers negatively impacted our Steel Sensors and Probes business unit, where revenues fell 12.9% (-4.2% on an underlying basis), driven mostly by lower steel production in the Americas and EMEA. However, sales evolution in both regions outperformed the general steel market decline, due to market share gains over competition.

Foundry Division

The Foundry Division is a world leader in the supply of consumable products, technical advice and application support to improve the performance and quality of ferrous and non-ferrous castings. Vesuvius operates under the brand FOSECO in the foundry market. The casting process is highly sequential and is critically dependent on consistency of product quality and productivity optimisation. Working alongside customers at their sites, our engineers provide on-site technical expertise in addition to advanced computational fluid dynamics capabilities to develop the best customised solutions. The conditioning of molten metal, the nature of the mould used and, especially, the design of the way metal flows into the mould are key parameters in a foundry, determining both the quality of the finished castings and the labour, energy and metal usage efficiency of the foundry. Vesuvius' products and associated services to foundries improve these parameters.

Foundry Division	2020 (£m)	2019 (£m)	Change (%)	Underlying change (%)
Foundry Revenue	412.9	515.1	-19.8%	-17.9%
Foundry Trading Profit	25.0	61.3	-59.2%	-57.1%
Foundry Return on Sales	6.1%	11.9%	-580 bps	-560 bps

As a result of the Covid-19 crisis, Foundry end markets declined significantly across all regions. Production output in vehicle (light, medium and heavy vehicles) and mining and construction equipment sectors, which together make up approximately 53% of our Foundry end-markets, fell 16.5% and 8.0% respectively during 2020. Although the auto industry saw a significant rebound in H2 2020, global light vehicle production was still down 16.7% from the previous year, whilst heavy vehicle production was down 11.2%, according to IHS data. On the back of these trends, revenues in the Foundry Division fell 19.8% year-on-year to £412.9m in 2020, with the rate of decline broadly consistent across most regions except in China and South America, where we significantly outperformed key end-markets.

Foundry Revenue	2020 (£m)	2019 (£m)	Change (%)	Underlying change (%)
Americas	85.6	115.4	-25.9%	-20.3%
Europe, Middle East & Africa (EMEA)	177.0	224.3	-21.1%	-20.5%
Asia-Pacific	150.3	175.4	-14.3%	-13.2%
Total Foundry Revenue	412.9	515.1	-19.8%	-17.9%

In the Americas, our Foundry revenues fell 25.9% during the year. Our Foundry revenues in NAFTA decreased 27.3%, broadly in-line with the declines in production output in light vehicles and heavy commercial vehicles of 20.5% and 34.3% respectively. Our Foundry business in South America remained stable during the year, as strong market share gains led to significant outperformance of end markets in the region, where light vehicle production output fell 31.3% and heavy commercial vehicle production fell 22.8%.

Foundry revenues declined 21.1% in EMEA, in line with the weak trends across end markets. In EU27 + UK, our Foundry revenues fell 22.1% against a light vehicle production decline of 23.8% and heavy commercial vehicle production decline of 27.2%. Likewise in the rest of EMEA, the results from our Foundry division were in-line to slightly ahead of vehicle production declines, with our revenues declining 10.7%, compared to a 15.9% decline in light vehicle production and an 8.6% decline in heavy commercial vehicle production. Overall, results from our Foundry business in EMEA reflect the general economic conditions in the region, where the pandemic significantly curtailed industrial production, and consumer demand remained depressed.

Our Foundry revenue in Asia Pacific decreased by 14.3%, despite revenue growth of 10.5% in China, which was supported by increased market penetration and higher relative levels of business activity. In India, our Foundry business was negatively impacted by plant shutdowns in H1, posting a 25.1% decline during the year, whilst production of light vehicles and heavy commercial vehicles was down 24.7% and 57.7% respectively.

Underlying Foundry trading profit fell 57.1% during the year, implying a 560 bps contraction in Return on Sales. The contraction reflects the extent, as well as the speed of volume declines in Foundry end-markets and in particular the automotive market, resulting in reduced capacity utilisation at our plants.

Financial Review

The following review considers a number of our financial KPIs and sets out other relevant financial information.

Basis of Preparation

All references in this financial review are to headline performance unless stated otherwise. See Note 16.1 for the definition of headline performance.

Introduction

In a period of unprecedented global disruption, the Group's overall performance reflects its resilience, founded on its market leading positions, flexible business model and strong balance sheet. The Group was able to quickly implement cost savings measures, in addition to the planned savings from our restructuring programme, ensuring that we were able to limit the negative impact of the Covid pandemic on our results. At the same time, strong cash flow generation, a conservative balance sheet and various cash preservation measures taken enabled us to maintain high liquidity and significant covenant headroom. Reflecting the Group's performance and strong financial position, the Board felt comfortable declaring an interim dividend in October 2020.

2020 performance overview

The Group performance in 2020 was inevitably affected by the global outbreak of Covid which has materially disrupted our key end markets for both Steel and Foundry Divisions and led to a 12.7% fall in underlying revenue. Reported revenue decreased by £252.1m over the prior year and by £208.9m on an underlying basis. Against this challenging backdrop, the Group was quick to implement decisive cash preservation and cost savings measures to mitigate the impact of the disruption caused by the pandemic. These decisive measures included, cost savings of £39.0m, efficient management of inventories and receivables and reduction of capital expenditure. At the same time, we continued to deliver on our planned restructuring programme, with a total of £20.6m incremental savings reported. Trading profit for the year was £101.4m, 44.1% lower than the prior year. Return on sales for 2020 on a reported basis was 7.0%, lower than the prior year by 360bps. The Group's improving discipline in aligning working capital with sales and managing capital expenditure delivered a strong 173% cash conversion ratio.

The achievement of our 2020 results involved an outstanding effort by all our employees, and I want to join our Chairman and Chief Executive in thanking them for their hard work, dedication and professionalism during this challenging year.

Dividend

The Board considers the dividend to be an important component of shareholder returns. However, in April 2020, the Board took the difficult decision to withdraw its recommendation to pay the final dividend of 14.3 pence per share announced with the publication of the full year 2019 results due to uncertain trading conditions and the need to preserve financial flexibility. Reflecting the Group's 2020 performance and strong financial position, the Board declared in October 2020 an interim dividend of 3.1 pence per share. The Board has recommended a final dividend of 14.3 pence, bringing the total dividend for the year to 17.4 pence per share (2019: 6.2 pence per share, following the cancellation of the 14.3p proposed final 2019 dividend). If approved at the Annual General Meeting on 12 May 2021, the final dividend will be paid on 21 May 2021 to shareholders on the register at the close of business on 16 April 2021. It remains the Board's intention to deliver long-term dividend growth, provided this is supported by underlying earnings, cash flows, capital expenditure requirements and the prevailing market outlook.

Key Performance Indicators

We have identified a number of KPIs against which we have consistently reported. As with prior years, we measure our results on an underlying basis, where we adjust to ensure appropriate comparability between periods, irrespective of currency fluctuations and any business acquisitions and disposals.

This is done by:

- Restating the previous period's results at the same foreign exchange (FX) rates used in the current period
- Removing the results of disposed businesses in both the current and prior years
- Removing the results of acquired businesses in both the current and prior years

Therefore, for 2020, we have:

- Retranslated 2019 results at the FX rates used in calculating the 2020 results
- Removed the results of CCPI, which was acquired during 2019

Objective: Deliver growth

KPI: Underlying revenue growth

Reported revenue for 2020 was £1,458.3m, which equated to £1,436.2m on an underlying basis. Reported revenue for 2019 was £1,710.4m, which equated to £1,645.1m on an underlying basis. 2020 underlying revenue decreased by 12.7% year-on-year, almost entirely as a result of steep volume declines due to the Covid pandemic.

£m	2020 Revenue			2019 Revenue				% change	
	As reported	Acquisition /Disposals	Underlying	As reported	Currency	Acquisition /Disposals	Underlying	Reported	Underlying
Steel	**1,045.4**	**(22.1)**	**1,023.3**	1,195.3	(29.8)	(23.6)	1,141.9	(12.5%)	(10.4%)
Foundry	**412.9**	**-**	**412.9**	515.1	(11.9)	-	503.2	(19.8%)	(17.9%)
Total Group	**1,458.3**	**(22.1)**	**1,436.2**	1,710.4	(41.7)	(23.6)	1,645.1	(14.7%)	(12.7%)

Objective: Generate sustainable profitability and create shareholder value

KPI: Trading profit and Return on Sales

We continue to measure underlying trading profit of the Group as well as trading profit as a percentage of sales, which we refer to as our Return on Sales or RoS.

Trading profit for 2020 was £101.4m and Return on Sales was 7.0%. On an underlying basis, trading profit decreased by 43.3% and Return on Sales by 370bps. The significant decline in trading profit was driven by the steep decline in revenues due to the pandemic, partially mitigated by cost savings measures and the ongoing delivery of benefits from the restructuring programmes.

The Steel Division recorded Return on Sales of 7.3%, a 270bps contraction year-on-year, as underlying trading profit fell 36.2% to £72.4m during the period. Return on Sales in the Foundry division declined 580 bps year-on-year to 6.1% in 2020 on the back of a 57.1% reduction in underlying trading profit.

£m	2020 Trading profit			2019 Trading profit				% change	
	As reported	Acquisition/ Disposals	Underlying	As reported	Currency	Acquisition/ Disposals	Underlying	Reported	Underlying
Steel	**76.4**	**(4.0)**	**72.4**	120.1	(4.1)	(2.5)	113.5	(36.4%)	(36.2%)
Foundry	**25.0**	**-**	**25.0**	61.3	(2.9)	-	58.4	(59.2%)	(57.1%)
Total Group	**101.4**	**(4.0)**	**97.5**	181.4	(7.0)	(2.5)	171.9	(44.1%)	(43.3%)

KPI: Headline PBT and Headline EPS

Headline profit before tax (PBT) and headline earnings per share (EPS) are used to measure the underlying financial performance of the Group. The main difference between trading profit and PBT is net finance costs which were £10.9m in 2020, £0.1m lower than 2019.

Our Headline PBT was £91.6m, 46.6% below last year on a reported basis. Including amortisation (£9.9m), restructuring charges (£6.1m), GMP equalisation charges (£0.8m) and vacant site remediation costs (£10.3m), our PBT of £64.5m was 45.6% lower than 2019. Headline EPS from continuing operations at 23.2p was 48.6% lower than 2019.

KPI: Return on net assets (RONA)

RONA is our principal measure of capital efficiency. We do not exclude the results of businesses acquired and disposed from this calculation, as capital efficiency is an important consideration in our portfolio decisions. It is calculated as trading profit plus share of post-tax profit of joint ventures and associates for the previous 12 months, divided by average net operating assets, at constant currency (being the average over the previous 13 months of property, plant and equipment, trade working capital, interests in joint ventures and associates, investments, other operating receivables, payables and provisions).

As with most of our KPIs, we measure this on a moving average basis at average exchange rates for the period to ensure that we focus on sustainable underlying improvements. Our RONA for 2020 was 16.0% (2019: 26.4%).

Objective: Maintain strong cash generation and an efficient capital structure

KPI: Free cash flow and working capital

Robust cash management was set as one of the top priorities for the Group with comprehensive cash preservation actions being successfully implemented in each Division. As a result of these strong cash management initiatives and a reduction in capital expenditure versus 2019, the Group was able to generate adjusted operating cash flow of £175.2m (2019: £217.7m), and a cash conversion rate of 173% (2019: 120%) in the period. Free cash flow was £113.5m in 2020 (2019: £121.5m).

We measure working capital both in terms of actual cash flow movements, and as a percentage of sales revenue. Trade working capital as a percentage of sales in 2020 was 23.2% (2019: 24.0%), measured on a 12-month moving average basis. In absolute terms on a constant currency basis trade working capital decreased by £37.5m in 2020 following the decline in sales and an efficient management of inventories and receivables.

KPI: Net debt and interest cover

During the first half of 2020, the Group accessed the Bank of England's Covid Corporate Financing Facility (CCFF) as a precautionary measure whilst the full impact of the pandemic remained uncertain. We want to thank the Bank of England for their support during this challenging year. We also successfully launched a new USPP note to cover an older tranche that was going to mature in December 2020. In September, we repaid the £200m of debt issued through the CCFF and in August, we repaid the US$140m USPP Notes maturing in December 2020. As at 31 December 2020, the Group had committed borrowing facilities of £586.6m (2019: £609.7m), of which £246.5m was undrawn (2019: £174.2m).

Net debt at 31 December 2020 was £175.1m, a £70.7m decrease from 31 December 2019, including the free cash flow of £113.5m, derivative and foreign exchange adjustments of £17.5m, an increase in leases of £15.7m and £8.4m dividend paid to shareholders.

At the end of 2020, the net debt to EBITDA ratio was 1.2x (2019: 1.1x) and EBITDA to interest was 14.5x (2019: 22.9x). These ratios are monitored regularly to ensure that the Group has sufficient financing available to run the business and fund future growth.

The Group's debt facilities have two financial covenants: the ratios of net debt to EBITDA and EBITDA to interest. The net debt to EBITDA covenant has been raised from 3.0x to 3.25x, following redemption of the USPP notes in August 2020. The EBITDA to interest covenant is a minimum of 4x. Certain adjustments are made to the net debt calculations for bank covenant purposes, the most significant of which is to exclude the impact of IFRS 16.

Objective: Be at the forefront of innovation

KPI: R&D Spend

We believe that our market-leading product technology and services deliver fundamental value to our customers and that the primary mechanism to deliver that value is to invest significantly in research and development. In 2020, while the major focus was naturally on cost reduction, we protected our investment in R&D and continued to develop market-leading products. In 2020 we spent £27.9m on R&D activities (2019: £28.9m at constant 2020 currency), which represents 1.9% of our revenue (2019: 1.7%).

Financial Risk Factors

The Group undertakes regular risk reviews and, as a minimum, a full risk assessment process twice a year. As in previous years this included input from the Board in both the assessment of risk and the proposed mitigation. We consider the main financial risks faced by the Group as being those posed by a decline in our end-markets, leading to reduced revenue and profit as well as potential customer default. We also monitor carefully the challenges that come from broader financial uncertainty, which could bring lack of liquidity and market volatility. Important but lesser risk exists in interest rate movements, foreign exchange rate movements and cost inflation, but these are not expected to have a material impact on the business after considering the controls we have in place.

Our key mitigation of end-market risk is to manage the Group's exposure through balancing our portfolio of business geographically and to invest in product innovation. We do so through targeted capital investment in new and growing businesses and a combination of capital and human resource in emerging markets. When considering other financial risks, we mitigate liquidity concerns by financing, using both the bank and private placement markets. The Group also seeks to avoid a concentration of debt maturities in any one period to spread its refinancing risk. In April 2020, Vesuvius took steps to boost its liquidity, through borrowing £200m from the CCFF programme and raising c.£115m (US$140m) from the US private placement

("USPP") market. In August, we repaid in advance, the US$140m USPP Notes maturing in December 2020 and in September, we repaid the debt issued through the CCFF. As at 31 December 2020, our liquidity stood at £437.3m (2019: £354.4m). See Note 16.20.

Restructuring

Despite the significant disruption associated with the Covid pandemic, we successfully progressed with the finalisation of our previously announced restructuring programmes, with £20.6m of incremental recurring savings delivered in 2020 relative to 2019. During the period, we reported £6.1m of restructuring costs (2019: £39.8m) within separately reported items that all related to finalisation of programmes announced in previous years and were predominantly made up of redundancy, plant closure costs and asset write-offs. We are carrying forward into 2021 a restructuring provision of £9.2m, which will be utilised by end of 2022.

Mitigation actions in response to the Covid pandemic

In response to the pandemic, we implemented several temporary cost reduction measures that delivered savings of £39.0m for the full year 2020 (£18.6m in Q2, £20.3m in H2). These measures included a reduction of £15.9m in employment costs and £11.8m in discretionary spend, as well as £11.3m reduction in planned employee incentives.

During the year, we also suspended some of our planned capital expenditures and we prioritised strategic growth investments, resulting in capex spend of £59.0m (including additions of right of use assets of £15.7m), a reduction of 21% versus 2019.

In the last quarter of 2020, the Group initiated an opex restructuring programme in EMEA, to ensure that it is better positioned for long-term growth and consistent outperformance. This programme has impacted all business units and central functions with a total cost of £5.1m, which was fully incurred during the months of November and December in 2020.

Thanks to changes to working practices which will be maintained beyond the end of the pandemic, and together with opex reductions undertaken in Q4 2020, we expect more than £8m of savings to become permanent.

Vacant site remediation

The Group owns a number of disused properties in the US, which do not form part of our trading operations. Costs are being incurred at one of these sites to address the significant increase in the volume of water run-off occurring from 2019. We have engaged waste management specialists, who are taking actions to reduce the level of water (including hydrological studies), improving treatment processes and are in contact with the relevant regulatory authorities. We estimate that it will take a further 18 months to finalise initial works and that there will then be a period for which unavoidable associated and ongoing running costs will be incurred. The charges related to remediation and unavoidable associated and ongoing running costs have been recorded in 2020 and are £10.3m (2019: £4.1m).

Taxation

A key measure of tax performance is the Effective Tax Rate ("ETR"), which is calculated on the income tax associated with headline performance, divided by the headline profit before tax and before the Group's share of post-tax profit of joint ventures (2020: 90.5m, 2019: £170.4m). The Group's ETR, based on the income tax costs associated with headline performance of £24.4m (2019: £43.8m), was 26.9% (2019: 25.7%).

Our ETR in H1 2020 was 27.2%. The actual ETR of 26.9% for the year ended 31 December 2020 is slightly lower than that reported at H1 2020 and is primarily driven by changes in the geographic mix of realised profits and the impact of withholding taxes as a proportion of the reduced total Group profits. The ETR for the full year 2020 is in line with the original guidance issued at the time of the 2019 results for a rate between 26% and 27%.

We expect the Group's effective tax rate on headline profit before tax and before the share of post-tax profits from joint ventures to be between 26% and 27% in 2021.

Capital expenditure

Capital expenditure in 2020 was £59.0m (2019: £74.7m) of which £45.9m was in the Steel Division (2019: £53.6m) and £13.1m in the Foundry Division (2019: £21.1m). Capital expenditure on revenue-generating customer installation assets, primarily in Steel, was £8.7m (2019: £7.8m).

Pensions

The total gross defined benefit obligations at 31 December 2020 are £610.0m funded (2019: £590.5m funded) and £88.3m unfunded (2019: £79.3m unfunded). After asset funding there is a net deficit of £2.1m (2019: £8.5m) representing an improvement of £6.4m.

The Group has a limited number of historical defined benefit plans located mainly in the UK, USA, Germany and Belgium. The main plans in the UK and USA are largely closed to further benefits accrual and 56.4% of the liabilities in UK have already been insured.

The improvement is driven by £9.0m from cash contributions and payments of unfunded benefits and £7.7m from changes to actuarial assumptions (attributable to reducing discount rates; updated mortality assumptions and pension membership data). These were offset by additional accrual & administrative expenditure paid for the year of £7.4m and £2.9m from foreign exchange movements.

The majority of the ongoing pension plans are defined contribution plans, where our only obligation is to make contributions, with no further commitments on the level of post-retirement benefits. During 2020, cash contributions of £9.7m (2019: £11.3m) were made into the defined contribution plans and charged to trading profit.

Principal Risks and Uncertainties

Risk Management in 2020

The Board's oversight of principal risks involves a specific review of the processes by which the Group manages those risks. This establishes a clear understanding at Board level of the individuals and groups within the business formally responsible for the management of specific risks and the mitigation in place to address them. The Board also establishes the Group's risk appetite, considering the nature and extent of the principal risks that the Group should take and the associated adequacy of the steps being taken to mitigate them.

The Board has overall responsibility for establishing and maintaining a system of risk management and internal control, and for reviewing its effectiveness. The Group undertakes a continuous process of risk identification and review, which includes a formal process, conducted annually for mapping risks from the bottom up, with each major business unit and key operational, senior functional and senior management staff identifying their principal risks. This assessment undergoes a formal review at half-year. The results are compiled centrally to deliver a coordinated picture of the key operational risks identified by the business. These are further reviewed by the Group Executive Committee. In conjunction with this process, each Director contributes their individual view of top-down strategic risks facing the Group – drawing on the broad commercial and financial experience gained both inside and outside the Group. The results of this assessment are then overlaid on the internal assessment of risks to build a comprehensive analysis of existing and emerging risk. This review process extends to cover both financial and non-financial risks, and considers the risks associated with the impact of the Group's activities on employees, customers, suppliers, the environment, local communities and society more generally. As in previous years, in 2020 the Group's assessment of principal risks was also reviewed and considered against any emerging risks and uncertainties that were identified through our Board review process.

The Board continues to monitor the implications of certain other emerging 'macro' trends such as automation in manufacturing and increasing digitalisation and electrification, which could act as disruptors to industry. The Board also continued to monitor the developing issues posed by cyber threats, receiving regular reports on relevant issues in this area, including general developments and concerns specific to the Vesuvius business. Work on maintaining and where appropriate, improving the integrity of our system security remains an area of focus. In 2020, work was undertaken to engage with the workforce, and to ensure that Vesuvius fosters an appropriate culture that embeds Vesuvius' values throughout the Group. This reflects the Board's recognition of the challenges that could arise from a failure by the Group to support the retention of appropriate talent and to foster the correct culture for success. Whilst the travel restrictions imposed in 2020 curtailed the Board's face to face engagement with staff around the world, they continued where possible to solicit feedback to ensure that the Group was taking the necessary steps to mitigate risk in this area.

The Directors' views on each of the above issues, and on emerging risks in general, were independently gathered and integrated into the management discussions and actions taken on risk. Risk remains an integrated part of all business unit presentations to the Board, informing the Board of the operational approach taken to risk management on a day-to-day basis.

Risk Mitigation

The principal risks identified are actively managed in order to mitigate exposure. Senior management 'owners' have been identified for each principal risk, and they manage the mitigations of that specific risk and contribute to the analysis of its likelihood and materiality. This analysis is reported to the Board. The risks are analysed in the context of our business structure which gives protection against a number of principal risks we face with diversified currencies, a widespread customer base, local production matching the diversity of our markets and intensive training of our employees. Additionally, we seek to mitigate risk through contractual measures. Where cost-effective, the risk is transferred to insurers.

Principal Risks

The risks identified are those the Board considers to be the most relevant to the Group in relation to their potential impact on the achievement of its strategic objectives. All of the risks set out on these pages could materially affect the Group, its businesses, future operations and financial condition, and could cause actual results to differ materially from expected or historical results. As a result of Covid-19 there is heightened focus on risks and their mitigation, but the Principal risks remain the same. These risks are not the only ones that the Group will face. Some risks are not yet known and some currently not deemed to be material could become so.

Changes to Risk in 2020

As with most companies, the Covid pandemic impacted the Group's staff, customers, shareholders and suppliers as well as the Group's financial performance. With the economic and social pressures brought about by Covid-19 during 2020, the Board continued to focus on the Group's existing and emerging risks, and the processes to mitigate and manage them. A key mitigant

in 2020 was our devolved decision-making structure and empowered regional managers, who responded swiftly to issues as they arose, relying both on Group processes and resources, and acting to respond to specific local circumstances.

Issues identified by certain of the Group's Principal Risks materialised during the year. The Group's existing measures in mitigation were initiated and additional actions taken specific to the challenges posed by the Covid-19 pandemic. These were most notably:

- End Market Risk: Vesuvius experienced a drop in demand for its products, with an associated impact on revenue, driven by the impact of Covid-19 on the Group's end markets. Our geographic diversification shielded us from an acute impact on revenue, and we flexed our cost base to respond to the drop in demand. Other mitigating factors came into play, with our focus on working capital management and credit control, and close monitoring of manufacturing performance. The Group also accessed government initiatives around the world to ease the financial impact, taking advantage of Tax Deferral schemes, and temporarily seeking additional Government Financing, and furlough financial support.

- People, Culture and Performance: The Values of Vesuvius have never been more at the fore. At the start of the crisis, across the world our staff worked tirelessly to provide support for travel/repatriation, changes to office and site working conditions, the provision of increased PPE, IT connectivity, and staying connected with a significantly increased body of remote workers. The Group strengthened its internal communication with weekly interactive calls from the CEO and GEC, a Bi-weekly Newsletter, regular CEO messages and the sharing of best practices, successes and news from around the Group. The focus on values was maintained, involving employee family initiatives, and continuing our Living the Values Awards competition. Where physical meetings had been expected, these were moved online, including the Group's annual Senior Leaders conference.

- Business interruption: Whilst the Group suffered some disruption in its manufacturing processes, driven predominantly by government shutdowns, management responded swiftly and effectively to reduce this impact, minimising plant closures and downtime, and maintaining our ability to supply customers safely. Our management's responsiveness has also resulted in other risks not being manifest, with product quality remaining at its high level, our safety culture driving key responses to protect employees and our continued investment in R&D and market-leading research. Finally, the Group's IT function supported the transition of around 2,000 employees to work from home, increasing server capacity, rolling out technology and expanding, as appropriate, the Group's programme of cyber security and controls.

- Health & Safety: Our very strong focus on health and safety and the consistency of its application across the Group placed us extremely well to respond to the pandemic's challenges. We adapted production layouts to allow for social distancing, implemented site by site safety plans, ensured the availability of appropriate PPE and were able to respond to the government requirements on a country by country basis while keeping our sites operating. We established weekly group-wide reporting on instances of Covid-19, supporting our staff who were affected, or who needed to self-isolate.

The Board also monitored the effect of the pandemic on other risks, where it considered it could have a specific or longer-term effect. Whilst the Group saw the beginnings of a recovery towards the end of 2020, there still remains uncertainty about the longer-term economic effects of the pandemic. Similarly, further protectionism remains possible, though this has not specifically been manifested in the Group's business as a result of the pandemic. Finally, the social impact of the pandemic remains at the forefront of the Board's concerns, both in terms of the impact on our communities and workforce and in the individual health – both mental and physical – of our staff as we continue to adapt to different ways of working.

Overall, the Board has not identified any material change to the Group's principal risks and uncertainties during the year and the Covid-19 pandemic did not give rise to any change in the Principal Risks previously identified by the Group. As such, the Group's statement of Principal Risk and Uncertainties was unchanged in 2020 from 2019.

Climate Change

The Group's risk management processes also incorporate consideration of the potential impact of climate-related risks on the Group. The Group does not regard climate change itself to represent a material standalone risk for the Group's operations. However, a significant proportion of the Group's revenue is generated from Steel manufacture and automotive castings, industries that are under transition as a result of their focus on improving environmental performance. As such, the opportunities in the Group's business strategy, which is founded on helping our customers to improve their manufacturing efficiency and the quality of their products – and therefore reduce their climate impact – will play a critical part in the development of the Group going forward. The Group recognises that climate change could present further uncertainty for the Group in terms of increasing climate change-related regulations, evolution of the geographical distribution of our customer base and the costs of meeting more onerous disclosure requirements. ESG is identified as a separate element of the Group risk register – recognising the work Vesuvius can do to mitigate the environmental impact of our customers' processes. Other elements of this risk are incorporated into the appropriate Principal Risk and Uncertainties that the Group has identified. The

Group continues to focus internally on the action we can take to drive our business' sustainability. In 2020, the Group adopted a new Sustainability initiative, which sets out the Group's approach to environmental issues, sets targets in specific areas and as such seeks to mitigate issues such as the increasing costs of energy, and the potential reduction in capital accessibility as investor sentiment focuses on environmentally-conscious companies.

Brexit

As we have previously noted, for our customers located in the EU27 countries, most of our products are manufactured by Vesuvius outside the UK, so we did not envisage a material impact from Brexit after the expiry of the Transition Period. To date this has been borne out in our experience. For those customers located in the UK or located in the EU27 and supplied from our UK plants, we have contingency plans and we continue to work with these customers to meet their needs in a cost-efficient way.

Principal risks and uncertainties:

Risk	Potential impact	Mitigation
End market risks *Vesuvius suffers an unplanned drop in demand, revenue and/ or margin because of market volatility beyond its control*	• Unplanned drop in demand and/or revenue due to reduced production by our customers • Margin reduction • Customer failure leading to increased bad debts • Loss of market share to competition • Cost pressures at customers leading to use of cheaper solution	• Geographic diversification of revenues • Product innovation and service offerings securing long-term revenue streams and maintaining performance differential • Increase in service and product lines by the development of the Technical Services offering • R&D includes assessment of emerging technologies • Manufacturing capacity rationalisation and flexible cost base • Diversified customer base: no customer is greater than 10% of revenue • Robust credit and working capital control to mitigate the risk of default by counterparties
Protectionism and globalisation *The Vesuvius business model cannot adapt or respond quickly enough to threats from protectionism and globalisation*	• Restricted access to market due to enforced preference of local suppliers • Increased barriers to entry for new businesses or expansion • Increased costs from import duties, taxation or tariffs • Loss of market share • Trade restrictions	• Highly diversified manufacturing footprint with manufacturing sites located in 26 countries • Strong local management with delegated authority to run their businesses and manage customer relationships • Cost flexibility • Tax risk management and control framework together with a strong control of inter-company trading
Product quality failure *Vesuvius staff/contractors are injured at work or customers, staff or third parties suffer physical injury or financial loss because of failures in Vesuvius products*	• Injury to staff and contractors • Product or application failures lead to adverse financial impact or loss of reputation as technology leader • Incident at customer plant caused manufacturing downtime or damage to infrastructure • Customer claims from product quality issues	• Quality management programmes including stringent quality control standards, monitoring and reporting • Experienced technical staff knowledgeable in the application of our products and technology • Targeted global insurance programme • Experienced internal legal function controlling third-party contracting
Complex and changing regulatory environment	• Revenue reduction from reduced end-market access	• Compliance programmes and training across the Group • Internal Audit function

Risk	Potential impact	Mitigation
Vesuvius experiences a contracting customer base or increased transaction and administrative costs due to compliance with changing regulatory requirements	• Disruption of supply chain and route to market • Increased internal control processes • Increased frequency of regulatory investigations • Reputational damage	• Experienced internal legal function including dedicated compliance specialists • Global procurement category management of strategic raw materials
Failure to secure innovation *Vesuvius fails to achieve continuous improvement in its products, systems and services*	• Product substitution by customers • Increased competitive pressure through lack of differentiation of Vesuvius offering • Commoditisation of product portfolio through lack of development • Lack of response to changing customer needs • Loss of intellectual property protection	• Enduring and significant investment in R&D, with market-leading research • A shared strategy for innovation throughout the Group, deployed via our R&D centres • Stage gate process from innovation to commercialisation to foster innovation and increase alignment with strategy • Programme of manufacturing and process excellence • Quality programme, focused on quality and consistency • Stringent intellectual property registration and defence
Business interruption *Vesuvius loses production capacity or experiences supply chain disruption due to physical site damage (accident, fire, natural disaster, terrorism), industrial action, cyber attack or global health crisis*	• Loss/closure of a major plant temporarily or permanently impairing our ability to serve our customers • Damage to or restriction in ability to use assets • Denial of access to critical systems or control processes • Disruption of manufacturing processes • Inability to source critical raw materials	• Diversified manufacturing footprint • Disaster recovery planning • Business continuity planning with strategic maintenance of excess capacity • Physical and IT control systems security, access and training • Cyber risks integrated into wider risk-management structure • Well-established global insurance programme • Group-wide safety management programmes • Dual sourcing strategy and development of substitutes
People, culture and performance *Vesuvius is unable to attract and retain the right calibre of staff, fails to instil an appropriate culture or fails to embed the right systems to drive personal performance in pursuit of the Group's long-term growth*	• Organisational culture of high performance is not achieved • Staff turnover in growing economies and regions • Stagnation of ideas and development opportunities • Loss of expertise and critical business knowledge • Reduced management pipeline for succession to senior positions	• Internal focus on talent development and training, with tailored career-stage programmes and clear performance management strategies • Contacts with universities to identify and develop talent • Career path planning and global opportunities for high-potential staff • Internal programmes for the structured transfer of technical and other knowledge • Clearly elucidated Values underpin business culture
Health and safety *Vesuvius staff or contractors are injured at work because of failures in Vesuvius' operations, equipment or processes*	• Injury to staff and contractors • Health and safety breaches • Manufacturing downtime or damage to infrastructure from incident at plant	• Active safety programmes, with ongoing wide-ranging monitoring and safety training • Independent safety audit team • Quality management programmes including stringent manufacturing

Risk	Potential impact	Mitigation
	• Inability to attract the necessary workforce • Reputational damage	process control standards, monitoring and reporting
Environmental, social and governance (ESG) criteria *Vesuvius fails to capitalise on the opportunity to help its customers significantly reduce their carbon emissions as environmental pressure grows on the Steel Industry or Vesuvius fails to meet the expectations of its various stakeholders including employees and investors*	• Loss of opportunity to grow sales • Loss of opportunity to increase margin • Loss of stakeholder confidence including Investors • Reputational damage	• Development and implementation of a new Sustainability initiative, which includes stretching targets focused on reducing the Group's Energy usage, CO_2 emissions, waste and recycled materials • R&D focus on products that assist customers to reduce carbon emissions and improve their own sustainability measures • Skilled technical sales force to develop efficient solutions for our customers • Globally disseminated Code of Conduct sets out standards of conduct expected and ABC Policy adopted with a zero tolerance regarding bribery and corruption • Internal Speak up mechanisms to allow reporting of concerns • Extensive use of due diligence involving existing and potential investments, business partners and customers

Group Income Statement

For the year ended 31 December 2020

	Notes	**2020**			2019		
		[1] Headline performance £m	**[1] Separately reported items £m**	**Total £m**	[1] Headline performance £m	[1] Separately reported items £m	Total £m
Continuing operations							
Revenue	2	**1,458.3**	**-**	**1,458.3**	1,710.4	-	1,710.4
Manufacturing costs		**(1,084.7)**	**-**	**(1,084.7)**	(1,233.5)	-	(1,233.5)
Administration, selling and distribution costs		**(272.2)**	**-**	**(272.2)**	(295.5)	-	(295.5)
Trading profit	2	**101.4**	**-**	**101.4**	181.4	-	181.4
Amortisation of acquired intangible assets		**-**	**(9.9)**	**(9.9)**	-	(10.0)	(10.0)
Restructuring charges	3	**-**	**(6.1)**	**(6.1)**	-	(39.8)	(39.8)
Vacant site remediation costs	1	**-**	**(10.3)**	**(10.3)**	-	(4.1)	(4.1)
GMP equalisation charge	10	**-**	**(0.8)**	**(0.8)**	-	-	-
Operating profit/(loss)		**101.4**	**(27.1)**	**74.3**	181.4	(53.9)	127.5
Finance expense		**(18.8)**	**-**	**(18.8)**	(19.5)	-	(19.5)
Finance income		**7.9**	**-**	**7.9**	8.5	-	8.5
Net finance costs	4	**(10.9)**	**-**	**(10.9)**	(11.0)	-	(11.0)
Share of post-tax income of joint ventures and associates		**1.1**	**-**	**1.1**	1.0	1.1	2.1
Profit/(loss) before tax		**91.6**	**(27.1)**	**64.5**	171.4	(52.8)	118.6
Income tax (charge)/credits	5	**(24.4)**	**5.7**	**(18.7)**	(43.8)	11.7	(32.1)
Profit/(loss)		**67.2**	**(21.4)**	**45.8**	127.6	(41.1)	86.5
Profit/(loss) attributable to:							
Owners of the parent		**62.7**	**(21.4)**	**41.3**	121.4	(41.1)	80.3
Non-controlling interests		**4.5**	**-**	**4.5**	6.2	-	6.2
Profit/(loss)		**67.2**	**(21.4)**	**45.8**	127.6	(41.1)	86.5
Earnings per share — pence	6						
Total operations — basic				**15.3**			29.8
— diluted				**15.2**			29.6

(1) Headline performance is defined in Note 16.1 and separately reported items are defined in Note 1.4.

The above results were derived from continuing operations. The separately reported items would form part of Administration, selling & distribution costs if classified within headline performance, which including these amounts would total £299.3m (2019: £349.4m).

Group Statement of Comprehensive Income

For the year ended 31 December 2020

	2020 £m	2019 £m
Profit	**45.8**	86.5
Items that will not subsequently be reclassified to income statement:		
Remeasurement of defined benefit assets/liabilities	**7.7**	(3.6)
Income tax relating to items not reclassified	**(3.2)**	1.9
Items that may subsequently be reclassified to income statement:		
Exchange differences on translation of the net assets of foreign operations	**(14.9)**	(73.4)
Reclassification of foreign currency translation reserve on disposal of share in joint venture	**-**	(1.1)
Exchange differences on translation of net investment hedges	**(9.7)**	14.1
Net change in costs of hedging	**0.4**	-
Change in the fair value of the hedging instrument	**(8.1)**	-
Amounts reclassified from the Income Statement	**6.3**	-
Other comprehensive income/(loss), net of income tax	**(21.5)**	(62.1)
Total comprehensive income	**24.3**	24.4
Total comprehensive income attributable to:		
Owners of the parent	**22.0**	20.6
Non-controlling interests	**2.3**	3.8
Total comprehensive income	**24.3**	24.4

The above results were derived from continuing operations.

Group Statement of Cash Flows

For the year ended 31 December 2020

	Notes	**2020 £m**	2019 £m
Cash flows from operating activities			
Cash generated from operations	9	**193.7**	240.7
Interest paid		**(18.9)**	(17.3)
Interest received		**5.2**	5.2
Net interest paid		**(13.7)**	(12.1)
Income taxes paid		**(27.5)**	(44.5)
Net cash inflow from operating activities		**152.5**	184.1
Cash flows from investing activities			
Capital expenditure		**(40.5)**	(65.4)
Proceeds from the sale of property, plant and equipment		**1.1**	3.7
Proceeds from the sale of assets classified as held for sale		**-**	1.8
Acquisition of subsidiaries and joint ventures, net of cash acquired		**(1.4)**	(32.7)
Disposal of joint ventures, net of cash disposed		**-**	6.8
Dividends received from joint ventures		**2.3**	0.1
Net cash outflow from investing activities		**(38.5)**	(85.7)
Net cash inflow before financing activities		**114.0**	98.4
Cash flows from financing activities			
Proceeds from borrowings		**320.4**	154.6
Repayment of borrowings		**(438.6)**	(169.8)
Settlement of derivatives		**1.4**	(5.1)
Purchase of ESOP shares		**-**	-
Dividends paid to equity shareholders	7	**(8.4)**	(53.9)
Dividends paid to non-controlling shareholders		**(1.9)**	(2.8)
Net cash outflow from financing activities		**(127.1)**	(77.0)
Net (decrease)/increase in cash and cash equivalents	8	**(13.1)**	21.4
Cash and cash equivalents at 1 January		**222.1**	213.4
Effect of exchange rate fluctuations on cash and cash equivalents	8	**(2.2)**	(12.7)
Cash and cash equivalents at 31 December		**206.8**	222.1
Free cash flow from continuing operations (Note 16.11)			
Net cash inflow from operating activities		**152.5**	184.1
Capital expenditure		**(40.5)**	(65.4)
Proceeds from the sale of property, plant and equipment		**1.1**	3.7
Proceeds from the sale of assets classified as held for sale		**-**	1.8
Dividends received from joint ventures		**2.3**	0.1
Dividends paid to non-controlling shareholders		**(1.9)**	(2.8)
Free cash flow[1]	16	**113.5**	121.5

(1) *For definitions of non-GAAP measures, refer to Note 16*

Group Balance Sheet

As at 31 December 2020

	Notes	**2020 £m**	2019 £m
Assets			
Property, plant and equipment		337.5	337.7
Intangible assets		696.1	708.5
Employee benefits - net surpluses	10	117.1	102.6
Interests in joint ventures and associates		12.1	12.7
Investments	15	0.7	0.8
Income tax receivable		-	-
Deferred tax assets		96.1	94.9
Other receivables		18.6	22.1
Derivative financial instruments	15	-	0.5
Total non-current assets		1,278.2	1,279.8
Cash and short-term deposits	8	209.7	229.2
Inventories		187.3	212.9
Trade and other receivables		369.9	379.6
Income tax recoverable		3.7	2.9
Derivative financial instruments	15	0.2	0.1
Assets classified as held for sale		0.9	-
Total current assets		771.7	824.7
Total assets		2,049.9	2,104.5
Equity			
Issued share capital		27.8	27.8
Retained earnings		2,502.9	2,463.1
Other reserves		(1,451.3)	(1,427.5)
Equity attributable to the owners of the parent		1,079.4	1,063.4
Non-controlling interests		51.4	51.0
Total equity		1,130.8	1,114.4
Liabilities			
Interest-bearing borrowings	8	333.1	303.2
Employee benefits - net liabilities	10	119.2	111.1
Other payables		13.2	15.1
Provisions	14	34.0	31.1
Deferred tax liabilities		43.9	43.6
Derivative financial instruments	15	7.0	-
Total non-current liabilities		550.4	504.1
Interest-bearing borrowings	8	45.0	171.7
Trade and other payables		288.7	273.6
Income tax payable		12.2	14.3
Provisions	14	22.8	25.7
Derivative financial instruments	15	-	0.7
Total current liabilities		368.7	486.0
Total liabilities		919.1	990.1
Total equity and liabilities		2,049.9	2,104.5

Group Statement of Changes in Equity

For the year ended 31 December 2020

	Issued share capital £m	Other reserves £m	Retained earnings £m	Owners of the parent £m	Non-controlling interests £m	Total equity £m
As at 1 January 2019	**27.8**	**(1369.5)**	**2,433.9**	**1,092.2**	**50.0**	**1,142.2**
Profit	**-**	**-**	**80.3**	**80.3**	**6.2**	**86.5**
Remeasurement of defined benefit liabilities/assets	-	-	(3.6)	(3.6)	-	(3.6)
Income tax relating to items not reclassified	-	-	1.9	1.9	-	1.9
Exchange differences on translation of the net assets of foreign operations	-	(71.0)	-	(71.0)	(2.4)	(73.4)
Exchange differences on translation of net investment hedges	-	(1.1)	-	(1.1)	-	(1.1)
Income tax relating to items that may be reclassified	-	14.1	-	14.1	-	14.1
Other comprehensive (loss), net of income tax	**-**	**(58.0)**	**(1.7)**	**(59.7)**	**(2.4)**	**(62.1)**
Total comprehensive income (loss)	**-**	**(58.0)**	**78.6**	**20.6**	**3.8**	**24.4**
Recognition of share-based payments	-	-	4.5	4.5	-	4.5
Dividends paid (Note 7)	-	-	(53.9)	(53.9)	(2.8)	(56.7)
Total transactions with owners	**-**	**-**	**(49.4)**	**(49.4)**	**(2.8)**	**(52.2)**
As at 1 January 2020	**27.8**	**(1,427.5)**	**2,463.1**	**1,063.4**	**51.0**	**1,114.4**
Profit	**-**	**-**	**41.3**	**41.3**	**4.5**	**45.8**
Remeasurement of defined benefit liabilities/assets	-	-	7.7	7.7	-	7.7
Income tax relating to items not reclassified	-	-	(3.2)	(3.2)	-	(3.2)
Exchange differences on translation of the net assets of foreign operations	-	(12.7)	-	(12.7)	(2.2)	(14.9)
Exchange differences on translation of net investment hedges	-	(9.7)	-	(9.7)	-	(9.7)
Net change in costs of hedging	-	0.4	-	0.4	-	0.4
Change in the fair value of the hedging instrument		(8.1)		(8.1)		(8.1)
Amounts reclassified from the Income Statement	-	6.3	-	6.3	-	6.3
Other comprehensive income/(loss), net of income tax	**-**	(23.8)	4.5	(19.3)	(2.2)	(21.5)
Total comprehensive income (loss)	**-**	**(23.8)**	**45.8**	**22.0**	**2.3**	**24.3**
Recognition of share-based payments	-	-	2.4	2.4	-	2.4
Dividends paid (Note 7)	-	-	(8.4)	(8.4)	(1.9)	(10.3)
Total transactions with owners	**-**	**-**	**(6.0)**	**(6.0)**	**(1.9)**	**(7.9)**
As at 31 December 2020	**27.8**	**(1,451.3)**	**2,502.9**	**1,079.4**	**51.4**	**1,130.8**

Notes to the Group Financial Statements

1 Basis of preparation

1.1 Basis of preparation

The financial information in this preliminary announcement has been extracted from the audited Group Financial Statements for the year ended 31 December 2020 and does not constitute statutory accounts within the meaning of section 434 of the Companies Act 2006. The Group Financial Statements and this preliminary announcement were approved by the Board of Directors on 3 March 2021.

The auditors have reported on the Group Financial Statements for the years ended 31 December 2020 and 31 December 2019 under section 495 of the Companies Act 2006. The auditors' reports are unqualified and do not contain a statement under section 498(2) or (3) of the Companies Act 2006. The Group's statutory financial statements for the year ended 31 December 2019 have been filed with the Registrar of Companies and those for the year ended 31 December 2020 will be filed following the Company's Annual General Meeting.

The Group Financial Statements have been prepared in accordance with International Accounting Standards in conformity with the requirements of the Companies Act 2006 (IFRS) and the applicable legal requirements of the Companies Act 2006. In addition to complying with International Accounting Standards in conformity with the requirements of the Companies Act 2006, the Group financial statements also comply with International Financial Reporting Standards adopted pursuant to Regulation (EC) No 1606/2002 as it applies in the European Union. The financial statements have been prepared under the historical cost convention, with the exception of fair value measurement applied to defined benefit pension plans, certain provisions, investments and derivative financial instruments.

The same accounting policies, presentation and computation methods are followed in this preliminary announcement as in the preparation of the Group Financial Statements. The accounting policies have been applied consistently by the Group.

Basis of consolidation

The Group Financial Statements incorporate the financial statements of the Company and entities controlled by the Company (its 'subsidiaries'). Control exists when the Company has the power to direct the relevant activities of an entity that significantly affect the entity's return so as to have rights to the variable return from its activities. In assessing whether control exists, potential voting rights that are currently exercisable are taken into account. The results of subsidiaries acquired or disposed of during the year are included in the Group Income Statement from the effective date of acquisition or up to the effective date of disposal, as appropriate.

The principal accounting policies applied in the preparation of these Group Financial Statements are set out in the Notes. These policies have been consistently applied to all of the years presented, unless otherwise stated. Where necessary, adjustments are made to the financial statements of subsidiaries to bring their accounting policies into line with those detailed herein to ensure that the Group Financial Statements are prepared on a consistent basis. All intra-Group transactions, balances, income and expenses are eliminated on consolidation.

Non-controlling interests in the net assets of consolidated subsidiaries are identified separately from the Group's interest therein. Non-controlling interests consist of the amount of those interests at the date of the original business combination together with the non-controlling interests' share of profit or loss and each component of other comprehensive income, and dividends since the date of the combination. Total comprehensive income is attributed to the non-controlling interests even if this results in the non-controlling interests having a deficit balance.

1.2 Going concern

The Covid-19 pandemic has had a significant impact on business activity in all of Vesuvius' end markets. The World Steel Association reported that in 2020, steel production in the world (excluding China) declined 8.2% year-on-year. The impact on our Foundry division has been even greater, primarily as a result of significant declines in automotive production.

The impacts of Covid-19 on the Group have included:

- A c.15% decline in revenues in 2020 compared with the same period in 2019; and
- The temporary and short-lived closure of our plants in South Africa, Malaysia, Argentina and India due to national lockdowns. As of 1 May 2020, all operations had been reopened

In response to the sudden and significant decline in business activity, the Group took the following actions:

- Significant cost reduction and cash preservation initiatives, in addition to the £20.6m of recurring savings from our restructuring programmes which we delivered during the year;
- Temporary cost reduction measures delivered savings of £39.0m in 2020 (£15.9m in reduced employment costs, £11.8m in reduced discretionary spend and a reduction in planned employee incentives of £11.3m). The savings resulted from:
    - restricting all discretionary expenses
    - a hiring freeze on all non-critical roles
    - accessing government programmes to reduce labour costs, in line with available local regulatory options, together with other flexible workforce solutions
    - the Board and the Group Executive Committee voluntarily reduced their fees and salary by 20% for 6 months
- c.£21m (c.34%) reduction in our net capital expenditures in 2020 compared to 2019;
- c.£38m saving from withdrawal of the final dividend for 2019;
- Deferral of tax and social security payments whenever possible in accordance with local legislation

In April 2020, Vesuvius also took steps to boost its liquidity, borrowing £200m from the Bank of England's Covid Corporate Financing Facility ("CCFF") programme and raising c.£115m (US$140m) from the US private placement ("USPP") market.

The £200m borrowed from the Bank of England was due to mature in March 2021, but was repaid early in September 2020, as a result of our positive free cash flow generation in the preceding months and early signs of marginally improving levels of business activity. The funds had been drawn down as a liquidity buffer in case of an extreme and prolonged downturn.

The USPP fundraising raised an amount equivalent to the existing US$140m USPP which was due to mature in December 2020, which we repaid early in August 2020. As a result, our net debt / EBITDA covenant increased to 3.25x from 3.0x previously. Excluding IFRS 16 lease liabilities, which is consistent with the calculation under our debt covenants, net debt / LTM EBITDA was 1.0x at 31 December 2020, broadly in-line with the level at year-end 2019.

The Group's available committed liquidity stood at £437m at year-end 2020, up from £354m at year-end 2019, as a result of the Group's cash flow generation, which benefited from a reduction in working capital due to the decline in business activity.

The Directors have prepared cash flow forecasts for the Group for a period in excess of 12 months from the date of approval of the financial statements. These forecasts reflect an assessment of current and future end-market conditions and their impact on the Group's future trading performance. The analysis undertaken includes a plausible and severe downside scenario based on an assumed protracted Covid related demand impact, despite current markets showing emerging confidence in relation to vaccine roll out. This downside case is the 'low' case from a strategic planning exercise which we undertook in October 2020, which was approved by the board, since when the outlook has improved. In this downside scenario, average revenue is 6% lower than the Group's base case, and the forecasts show

that the Group has significant headroom in terms of both available committed liquidity and required compliance with financial covenants.

On the basis of the exercise described above and the Group's available committed liquidity, the Directors consider that the Group and the Company have adequate resources to continue in operational existence for a period of at least 12 months from the date of signing of these Financial Statements and that there is no material uncertainty in respect of going concern. Accordingly, they continue to adopt a going concern basis in preparing the financial statements of the Group and the Company.

1.3 Functional and presentational currency

The financial statements are presented in millions of pounds sterling, which is the functional currency of the Company, and rounded to one decimal place.

1.4 Disclosure of "separately reported items"

IAS 1 Presentation of Financial Statements encourages the disclosure of additional line items and the reordering of items presented on the face of the income statement when appropriate for a proper understanding of the entity's financial performance. The Company has adopted a columnar presentation for its Group Income Statement, to separately identify headline performance results (as defined in Note 16), as the Directors consider that this gives a better view of the underlying results of the ongoing business. As part of this presentation format, the Company has adopted a policy of disclosing separately on the face of its Group Income Statement, within the column entitled 'Separately reported items', the effect of any components of financial performance for which the Directors consider separate disclosure would assist both in a better understanding of the financial performance achieved and in making projections of future results.

Both materiality and the nature of the components of income and expense are considered in deciding upon such presentation. Such items may include, inter alia, the financial effect of exceptional items which occur infrequently, such as major restructuring activity, (which may require more than one year to complete), and significant movement in the Group's deferred tax balances such as was, for example, caused by the impact of US tax reform in 2017, together with items reported separately for consistency, such as amortisation charges relating to acquired intangible assets, profits or losses arising on the disposal of continuing or discontinued operations and the taxation impact of the aforementioned exceptional items and other items reported separately.

The amortisation charge in respect of intangible assets recognised on business combinations is excluded from the trading results of the Group since they are non-cash charges and are not considered reflective of the core trading performance of the Group.

In its adoption of this policy, the Company applies an even-handed approach to both gains and losses and aims to be both consistent and clear in its accounting and disclosure of such items.

The Group owns a number of disused properties in the US, which do not form part of our trading operations. Costs are being incurred at one of these sites to address the significant increase in the volume of water run-off occurring from 2019. We have engaged waste management specialists, are taking actions to reduce the level of water (including hydrological studies), improving treatment processes and are in contact with the relevant regulatory authorities. We estimate that it will take a further 18 months to finalise initial works and that there will then be a period for which unavoidable associated and ongoing running costs will be incurred. The charges related to remediation and unavoidable associated and ongoing running costs have been recorded in 2020 and are £10.3m (2019: £4.1m). These non-recurring charges have been treated as a separately reported item. There has been no impact upon performance.

1.5 New and revised IFRS

Certain new accounting standards and interpretations have been published that are not mandatory for 31 December 2020 reporting periods and have not been early adopted by the Group. These new or amended standards or interpretations are not expected to have a significant impact on the Group's financial statements.

Notes to the Group Financial Statements (continued)

2 Segment information

Operating segments for continuing operations

The Group's operating segments are determined taking into consideration how the Group's components are reported to the Group's Chief Executive Officer, who make the key operating decisions and are responsible for allocating resources and assessing performance of the component. Taking into account the Group's management and internal reporting structure, the operating segments are Steel Flow Control, Steel Advanced Refractories, Steel Sensors & Probes and Foundry division. The principal activities of each of these segments are described in the Operational Review.

Steel Flow Control, Steel Advanced Refractories and Steel Sensors & Probes operating segments are aggregated into the Steel reportable segment. In determining that aggregation is appropriate, judgement is applied which takes into account the economic characteristics of these operating segments which include a similar nature of products, customers, production processes and margins.

Revenue from contracts with customers

Revenue comprises the fair value of the consideration received or receivable for goods supplied and services rendered to customers after deducting rebates, discounts and value-added taxes, and after eliminating sales within the Group. Revenue from contracts with customers is recognised when control of the goods or services are transferred to the customer, upon the completion of specified performance obligations, at an amount that reflects the considerations to which the Group expects to be entitled to in exchange for these consumable products and associated services.

2.1 Income statement

	2020					
	Flow Control	Advanced Refractories	Sensors & Probes	**Steel**	**Foundry**	**Total**
				£m	**£m**	**£m**
Segment revenue	561.3	458.6	25.5	**1,045.4**	**412.9**	**1,458.3**
at a point in time				**1,035.7**	**412.9**	**1,448.6**
Over time				**9.7**	**-**	**9.7**
Segment adjusted EBITDA *				**110.6**	**41.4**	**152.0**
Segment depreciation				**(34.2)**	**(16.4)**	**(50.6)**
Segment trading profit				**76.4**	**25.0**	**101.4**
Return on sales margin				*7.3%*	*6.1%*	*7.0%*
Amortisation of acquired intangible assets						**(9.9)**
Restructuring charges						**(6.1)**
Vacant site remediation costs						**(10.3)**
GMP equalisation charge						**(0.8)**
Operating profit						**74.3**
Net finance costs						**(10.9)**
Share of post-tax profit of joint ventures						**1.1**
Profit before tax						**64.5**
Capital expenditure additions				**45.9**	**13.1**	**59.0**

Notes to the Group Financial Statements (continued)

	2019					
	Flow Control	Advanced Refractories	Sensors & Probes	**Steel**	**Foundry**	**Total**
				£m	**£m**	**£m**
Segment revenue	626.3	539.8	29.2	**1,195.3**	**515.1**	**1,710.4**
at a point in time				**1,188.9**	**515.1**	**1,704.0**
Over time				**6.4**	**-**	**6.4**
Segment adjusted EBITDA *				**153.4**	**77.7**	**231.1**
Segment depreciation				**(33.3)**	**(16.4)**	**(49.7)**
Segment trading profit				**120.1**	**61.3**	**181.4**
Return on sales margin				*10.0%*	*11.9%*	*10.6%*
Amortisation of acquired intangible assets						**(10.0)**
Restructuring charges						**(39.8)**
Vacant site remediation costs						**(4.1)**
Operating profit						**127.5**
Net finance costs						**(11.0)**
Share of post-tax profit of joint ventures						**2.1**
Profit before tax						**118.6**
Capital expenditure additions				**53.6**	**21.1**	**74.7**

* Adjusted EBITDA is defined in note 16.13

3 Restructuring charges

As explained in the Financial review, the 2020 restructuring charges were £6.1m (2019: £39.8m) and relate to the completion of the programme first announced in March 2018, which was predominantly focused on rationalising our manufacturing footprint, consolidating production and streamlining various back office functions. The charges reflect redundancy costs of £2.7m (2019: £24.8m), plant closure costs of £1.8m (2019: £4.4m), asset write-offs of £1.5m (2019: £8.9m) and consultancy fees and travel of £0.1m (2019: £1.7m).

The net tax credit attributable to the total restructuring charges was £1.1m (2019: £9.2m).

Cash costs of £16.7m (2019: £30.0m) (Note 9) were incurred in the year in respect of the restructuring programme, leaving provisions made but unspent of £9.2m (Note 14) as at 31 December 2020 (2019: £19.1m).

4 Net finance costs

	2020 £m	2019 £m
Interest payable on borrowings		
Loans, overdrafts and factoring arrangements	**15.6**	15.7
Interest on lease liabilities	**1.8**	1.6
Amortisation of capitalised borrowing costs	**0.5**	0.6
Total interest payable on borrowings	**17.9**	17.9
Interest on net retirement benefits obligations	**(0.1)**	0.3
Adjustments to discounts on provisions and other liabilities	**1.0**	1.3
Adjustments to discounts on receivables	**(0.5)**	(0.7)
Finance income	**(7.4)**	(7.8)
Total net finance costs	**10.9**	11.0

Within the table above, total finance costs are £18.8m (2019:£19.5m) and total finance income is £7.9m (2019: £8.5m). Net finance costs are £10.9m (2019: £11.0m).

5 Income tax

The Group's effective tax rate, based on the income tax costs associated with headline performance of £24.4m (2019: £43.8m), was 26.9% (2019: 25.7%).

The Group's total income tax costs include a credit on separately reported items of £5.7m (2019: £11.7m), comprising a credit of £2.3m relating to the amortisation of intangible assets (2019: £2.5m), a credit of £1.1m relating to restructuring charges (2019: £9.2m) and a credit of £2.3m related to vacant site remediation costs (2019: £nil).

The net tax debit reflected in the Group Statement of Comprehensive Income in the year amounted to £3.2m (2019: £1.9m credit), comprising a £2.8m debit (2019: £1.9m credit) related to tax on net actuarial gains and losses on the employee benefits plan and a debit of £0.4m (2019: £nil) relating to other temporary timing differences.

As referenced in the forward looking statement on page 8, the Covid-19 Pandemic continues to pose a risk of future economic uncertainty for the Group. The Group has reviewed the impact of Covid-19 on those future taxable profits and concluded that the current recognition of deferred tax assets is appropriate based on the information available.

6 Earnings per share ("EPS")

6.1 Earnings for EPS

Basic and diluted EPS from continuing operations are based upon the profit attributable to owners of the parent, as reported in the Group Income Statement. The table below reconciles these different profit measures.

	2020 £m	2019 £m
Profit attributable to owners of the parent	**41.3**	80.3
Adjustments for separately reported items:		
Amortisation of intangible assets	**9.9**	10.0
Restructuring charges	**6.1**	39.8
Gain on disposal of share in joint venture	**-**	(1.1)
Vacant site remediation costs	**10.3**	4.1
GMP equalisation charge	**0.8**	-
Income tax (credit)/charge	**(5.7)**	(11.7)
Headline profit attributable to owners of the parent	**62.7**	121.4

6.2 Weighted average number of shares

	2020 millions	2019 millions
For calculating basic and headline EPS	**269.9**	269.1
Adjustment for dilutive potential ordinary shares	**1.7**	1.9
For calculating diluted and diluted headline EPS	**271.6**	271.0

For the purposes of calculating diluted and diluted headline EPS, the weighted average number of ordinary shares is adjusted to include the weighted average number of ordinary shares that would be issued on the conversion of all potentially dilutive ordinary shares expected to vest, relating to the Company's share-based payment plans. Potential ordinary shares are only treated as dilutive when their conversion to ordinary shares would decrease EPS or increase loss per share.

6.3 Per share amounts

		2020 pence	2019 pence
Earnings per share	- basic	15.3	29.8
	- headline	23.2	45.1
	- diluted	15.2	29.6
	- diluted headline	23.1	44.8

Notes to the Group Financial Statements (continued)

7 Dividends

	2020 **£m**	2019 £m
Amounts recognised as dividends and paid to equity holders during the period		
Final dividend for the year ended 31 December 2018 of 13.80p per ordinary share	-	37.2
Interim dividend for the year ended 31 December 2019 of 6.20p per ordinary share	-	16.7
Final dividend for the year ended 31 December 2019 of 0.00p per ordinary share	-	-
Interim dividend for the year ended 31 December 2020 of 3.1p per ordinary share	**8.4**	-
	8.4	53.9

In light of the Covid-19 trading situation, the Directors withdrew their recommendation to pay the final dividend of 14.3p per ordinary share, announced with the publication of the 2019 financial results, (2018: £37.2m, equivalent to 13.8 pence per ordinary share). An interim dividend in respect of the year-ended 31 December 2020 of £8.4m (2019:16.7m), equivalent to 3.1 pence per ordinary share, (2019: 6.2 pence per ordinary share) was paid in September 2020 (September 2019).

A proposed final dividend for the year ended 31 December 2020 of £38.6m, equivalent to 14.3 pence per ordinary share, is subject to approval by shareholders at the Company's Annual General Meeting and has not been included as a liability in these financial statements. If approved by shareholders, the dividend will be paid on 21 May 2021 to ordinary shareholders on the register at 16 April 2021.

8 Reconciliation of movement in net debt

	Balance as at 1 Jan 2020 £m	**Foreign exchange adjustments £m**	**Fair value gains/ (losses)**	**Non-cash movements[1] £m**	**Cash flow £m**	**Balance as at 31 Dec 2020 £m**
Cash and cash equivalents						
Cash at bank and in hand	**229.2**	**(2.2)**	-	-	**(57.3)**	**169.7**
Short term deposits	-	-	-	-	**40.0**	**40.0**
Bank overdrafts	**(7.1)**	-	-	-	**4.2**	**(2.9)**
	222.1	**(2.2)**	-	-	**(13.1)**	**206.8**
Borrowings, excluding bank overdrafts	**(469.0)**	**(10.0)**	-	**(15.7)**	**118.2**	**(376.5)**
Capitalised borrowing costs	**1.2**	-	-	**0.2**	-	**1.4**
Derivative financial instruments	**(0.1)**	-	**(5.3)**	-	**(1.4)**	**(6.8)**
Net debt	**(245.8)**	**(12.2)**	**(5.3)**	**(15.5)**	**103.7**	**(175.1)**

(1) £15.7m (2019:£9.2m) of new leases were entered into during the year.

9 Cash generated from operations

	2020	2019
	£m	£m
Operating profit	**74.3**	127.5
Adjustments for:		
Amortisation of intangible assets	**9.9**	10.0
Restructuring charges	**6.1**	39.8
Vacant site remediation costs	**10.3**	4.1
GMP equalisation charge	**0.8**	-
Trading Profit	**101.4**	181.4
(Profit)/Loss on disposal of non-current assets	**1.3**	(0.3)
Depreciation	**50.6**	49.7
Defined benefit retirement plans net charge	**6.7**	4.8
Net decrease/(increase) in inventories	**21.7**	24.9
Net decrease/(increase) in trade receivables	**3.4**	54.4
Net increase/(decrease) in trade payables	**12.4**	(15.2)
Net decrease/(increase) in other working capital	**23.8**	(17.3)
Outflow related to restructuring charges	**(16.7)**	(30.0)
Defined benefit retirement plans cash outflows	**(9.0)**	(9.9)
Vacant site remediation costs paid	**(1.9)**	(1.8)
Cash generated from operations	**193.7**	240.7

10 Employee benefits

The net employee benefits liability as at 31 December 2020 was £2.1m (2019: £8.5m) derived from an actuarial valuation of the Group's defined benefit pension and other post-retirement obligations as at that date.

The improvement in the balance sheet position has been driven primarily by a decrease in UK bond yields resulting in gains in the value of UK assets. As disclosed in note 26 of the 2020 Annual Report and Financial Statements, the above amounts may materially change in the next 12 months if there is a change in assumptions.

	2020 **£m**	2019 £m
Employee benefits — net surpluses		
UK defined benefit pension plans	**116.4**	101.5
ROW defined benefit pension plans	**0.7**	1.1
Net surpluses	**117.1**	102.6
Employee benefits — net liabilities		
UK defined benefit pension plans	**(1.8)**	(1.9)
US defined benefit pension plans	**(25.9)**	(28.6)
Germany defined benefit pension plans	**(63.1)**	(54.5)
ROW defined benefit pension plans	**(21.4)**	(19.2)
Other post-retirement benefit plans	**(7.0)**	(6.9)
Net liabilities	**(119.2)**	(111.1)
Total liabilities	**(2.1)**	(8.5)

The expense recognised in the Group Income Statement in respect of the Group's defined benefit retirement plans and other post-retirement benefit plans is shown below.

		2020 **£m**	2019 £m
In arriving at trading profit	— within other manufacturing costs	**1.7**	1.7
(as defined in Note 16)	— within administration, selling and distribution costs	**5.0**	3.1
In arriving at profit before tax	— guaranteed minimum pension equalisation charge	**0.8**	0.3
	— within net finance costs	**(0.1)**	-
Total net charge		**7.4**	5.1

11 Contingent liabilities

Guarantees given by the Group under property leases of operations disposed of amounted to £nil (2019: £0.3m). Details of guarantees given by the Company, on behalf of the Group, are given in Note 11 to the Company Financial Statements.

Vesuvius has extensive international operations and is subject to various legal and regulatory regimes, including those covering taxation and environmental matters.

Certain of Vesuvius' subsidiaries are subject to legacy matter lawsuits, predominantly in the US, relating to a small number of products containing asbestos manufactured prior to the acquisition of those subsidiaries by Vesuvius. These suits usually also name many other product manufacturers. To date, Vesuvius is not aware of there being any liability verdicts against any of these subsidiaries. Each year a number of these lawsuits are withdrawn, dismissed or settled. The amount paid, including costs, in relation to this litigation has not had a material adverse effect on Vesuvius' financial position or results of operations.

As the settlement of many of the obligations for which reserve is made is subject to legal or other regulatory process, the timing and amount of the associated outflows is subject to some uncertainty.

12 Related parties

All transactions with related parties are conducted on an arm's length basis and in accordance with normal business terms. Transactions between related parties that are Group subsidiaries are eliminated on consolidation.

13 Acquisitions and divestments

There were no acquisitions or divestments in the period.

On 1 March 2019, Vesuvius plc acquired 100% of the share capital of CCPI Inc ("CCPI"), a specialty refractory producer focused on tundish (steel continuous casting) applications (65% of sales) and aluminium (35% of sales). CCPI is based in Ohio, USA, and has become part of the Group's Advanced Refractories business unit. The transaction valued CCPI at US$43.4 million (£33.3 million) on a cash and debt free basis and was funded from Vesuvius' internal resources. The acquisition increased Vesuvius' share of the tundish market and gives the Group an entry to the aluminium market.

The fair values of the assets and liabilities recognised as a result of the acquisition were as follows:

	£m
Cash and cash equivalents	0.9
Property, plant and equipment	5.2
Intangible asset (customer relationships)	13.8
Inventories	4.2
Receivables	5.1
Payables	(3.1)
Finance lease obligations	(1.5)
Deferred tax	(2.8)
Net identifiable assets acquired	21.8
Goodwill	11.5
Consideration	**33.3**

The goodwill is attributable to CCPI's competitive reputation in the marketplace and the synergies that Vesuvius expects to gain from the integration of its tundish business into the Steel Advanced Refractories business unit and is expected to be tax deductible.

Included within the property, plant and equipment acquired were right of use leased assets of £1.5m.

The decision to acquire CCPI was driven by its long-standing customer relationships and these are the identifiable intangible assets acquired. A deferred tax liability of £3.4m has been provided in relation to these fair value adjustments.

On acquisition, CCPI was subsumed into Steel Advanced Refractories activities and goodwill is monitored at the level of the Steel Advanced Refractories operating segment. The net cash outflow on acquisition was £32.4m, being cash consideration of £33.3m less cash and cash equivalents acquired of £0.9m. Acquisition-related costs of £0.7m were included in administrative expenses in the income statement.

Joint venture disposal

In June 2019 Vesuvius completed the sale of its 50% interest in Angang Vesuvius Refractory Company, Ltd. The value of the investment was £6.9m. The consideration received (in early July 2019) was cash of £6.8m resulting in a profit after foreign currency adjustments of £1.1m.

Other acquisitions

The group did not acquire any material interests in any companies in the year ended 31 December 2020. Contingent consideration of £1.4m was paid during the year in respect of the previous acquisition of Ecil Met Tec.

The Group did not acquire any material interests in any companies other than CCPI during the year ended 31 December 2019, however contingent consideration of £0.3m was paid during 2019 in respect of the previous acquisition of Process Metrix.

14 Provisions

	Disposal and closure costs £m	Restructuring charges £m	Other £m	Total £m
As at 1 January 2020	34.8	19.1	2.9	56.8
Exchange adjustments	(1.7)	0.7	-	(1.0)
Charge to Group Income Statement – separately reported items	10.3	6.1	-	16.4
Charge to Group Income Statement – trading profit	4.8	-	11.8	16.6
Unused amounts released to Group Income Statement	-	-	-	-
Adjustment to discount	1.0	-	-	1.0
Cash spend	(7.0)	(16.7)	(9.3)	(33.0)
Transferred to other balance sheet accounts	-	-	-	-
As at 31 December 2020	**42.2**	**9.2**	**5.4**	**56.8**

In assessing the probable costs and realisation certainty of provisions, or related assets, reasonable assumptions are made. Changes to the assumptions used could significantly alter the Directors' assessment of the value, timing or certainty of the costs or related amounts.

15 Financial instruments

The Company's financial assets are measured at amortised cost with the exception of certain investments in debt and equity, which are measured at fair value through other comprehensive income. Financial liabilities are measured at amortised cost with the exception of certain derivative instruments, which are measured at fair value through profit and loss.

IFRS 13 Fair Value Measurement requires classification of financial instruments within a hierarchy that prioritises the inputs to fair value measurement. The three levels of the fair value hierarchy are:

Level 1 – Unadjusted quoted prices in active markets for identical assets or liabilities;
Level 2 – Inputs other than quoted prices that are observable for the asset or liability, either directly or indirectly;
Level 3 – Inputs that are not based on observable market data.

The following table summarises Vesuvius' financial instruments measured at fair value, and shows the level within the fair value hierarchy in which the financial instruments have been classified:

	2020		2019	
	Assets £m	**Liabilities £m**	Assets £m	Liabilities £m
Investments (Level 2)	**0.7**	**-**	0.8	-
Derivatives not designated for hedge accounting purposes (level 2)	**0.2**	**-**	0.6	(0.7)
Derivatives designated for hedge accounting purposes (level 2)	**-**	**(7.0)**	-	-

The Group uses Derivatives, in the form of forward foreign currency contracts to manage the effects of its exposure to foreign exchange risk on trade receivables, trade payables and cash. Derivatives are only used for economic hedging purposes and not as speculative investments.

In June 2020 the Group executed a $86m Cross currency interest rate swap ('CCIRS') with 3 of its relationship banks. The effect of this is to convert the $86m Private Placement Notes issued in June 2020 into €76.6m. The timing and amount of the US Dollar cashflows under the CCIRS exactly mirror those of the Private Placement Notes and the maturity date of the CCIRS also matches the repayment date of the Notes. The CCIRS would by default be revalued through the Income Statement; however as it is in a designated hedging relationship it is instead revalued through Other Comprehensive Income. More specifically, the US Dollar exposure is designated as a cashflow hedge of the underlying Private Placement Notes and the Euro exposure is designated as a net investment hedge of part of the Group's foreign operations. The CCIRS is presented as a non-current asset or liability as it is expected to be settled more than 12 months after the end of the reporting period.

With the exception of the CCIRS the fair value of Derivatives outstanding at the year-end has been booked through the Income Statement in 2020. All of the fair values shown in the table above are classified under IFRS 13 as Level 2 measurements which have been calculated using quoted prices from active markets, where similar contracts are traded and the quotes reflect actual transactions in similar instruments. All of the derivative assets and liabilities not designated for hedge accounting purposes reported in the table above will mature within a year of the balance sheet date.

As at 31 December 2020, the Group had $146m and €180m (£267.7m in total) of US Private Placement Loan Notes (USPP) outstanding, which carry a fixed rate of interest, representing 78% of the Group's total borrowings outstanding at that date. The interest rate profile of the Group's borrowings is detailed in the tables below.

	Fixed rate £m	**Floating rate £m**	**Total £m**
Sterling	**-**	**43.3**	**43.3**
US dollar	**106.8**	**0.3**	**107.1**
Euro	**160.8**	**31.5**	**192.3**
Other	**-**	**0.5**	**0.5**
Capitalised arrangement fees	**(1.3)**	**(0.1)**	**(1.4)**
As at 31 December 2020	**266.3**	**75.5**	**341.8**
Sterling	-	66.2	66.2
US dollar	150.8	0.9	151.7
Euro	109.9	113.4	223.3
Other	-	1.5	1.5
Capitalised arrangement fees	(1.2)	-	(1.2)
As at 31 December 2019	259.5	182.0	441.5

The maturity analysis of the Group's non-derivative financial liabilities is shown in the tables below.

As at 31 December 2020	**Within one year £m**	**Between 1-2 years £m**	**Between 2-5 years £m**	**Over 5 years £m**	**Total contractual cash flows £m**	**Carrying amount**
Trade payables	**185.7**	**-**	**-**	**-**	**185.7**	**185.7**
Loans & overdrafts	**44.7**	**84.2**	**80.5**	**187.4**	**396.8**	**343.2**
Lease liabilities	**11.2**	**9.1**	**11.1**	**12.9**	**44.3**	**36.3**
Capitalised arrangement fees	**-**	**-**	**-**	**-**	**-**	**(1.4)**
Derivative liability	**(0.5)**	**(0.4)**	**2.7**	**1.4**	**3.2**	**7.0**
Total financial liabilities	**241.1**	**92.9**	**94.3**	**201.7**	**630.0**	**570.8**

As at 31 December 2019	Within one year	Between 1-2 years	Between 2-5 years	Over 5 years	Total contractual cash flows	Carrying amount

	£m	£m	£m	£m	£m	
Trade payables	173.8	-	-	-	173.8	173.8
Loans & overdrafts	171.8	17.4	157.0	134.9	481.1	442.8
Finance leases	12.0	9.9	9.2	9.3	40.4	33.3
Capitalised arrangement fees	-	-	-	-	-	(1.2)
Derivative liability	0.8	-	-	-	0.8	0.7
Total financial liabilities	358.4	27.3	166.2	144.2	696.1	649.4

16 Alternative Performance Measures

The Company uses a number of alternative performance measures (APMs) in addition to those reported in accordance with IFRS. The Directors believe that these APMs, listed below, are important when assessing the underlying financial and operating performance of the Group and its divisions, providing management with key insights and metrics in support of the ongoing management of the Group's performance and cash flow. A number of these align with KPIs and other key metrics used in the business and therefore are considered useful to also disclose to the users of the financial statements. The following APMs do not have standardised meaning prescribed by IFRS as adopted by the EU and therefore may not be directly comparable with similar measures presented by other companies.

16.1 Headline performance

Headline performance, reported separately on the face of the Group Income Statement, is from continuing operations and before items reported separately on the face of the Group Income Statement.

16.2 Underlying revenue, underlying trading profit and underlying return on sales

Underlying revenue, underlying trading profit and underlying return on sales are the headline equivalents of these measures after adjustments to exclude the effects of changes in exchange rates, business acquisitions and disposals. Reconciliations of underlying revenue and underlying trading profit can be found in the Financial Summary. Underlying revenue growth is one of the Group's key performance indicators and provides an important measure of organic growth of Group businesses between reporting periods, by eliminating the impact of exchange rates, acquisitions, disposals and significant business closures.

16.3 Return on sales ('ROS')

ROS is calculated as trading profit divided by revenue. It is one of the Group's key performance indicators and is used to assess the trading performance of Group businesses. A reconciliation of ROS is included in Note 2.

16.4 Trading profit/adjusted EBITA

Trading profit/adjusted EBITA is defined as operating profit before separately reported items. It is one of the Group's key performance indicators and is used to assess the trading performance of Group businesses. It is also used as one of the targets against which the annual bonuses of certain employees are measured.

16.5 Headline profit before tax

Headline profit before tax is calculated as the net total of trading profit, plus the Group's share of post-tax profit of joint ventures and total net finance costs associated with headline performance. It is one of the Group's key performance indicators and is used to assess the financial performance of the Group as a whole.

16.6 Effective tax rate ('ETR')

The Group's ETR is calculated on the income tax costs associated with headline performance, divided by headline profit before tax and before the Group's share of post-tax profit of joint ventures.

16.7 Headline earnings

Headline earnings is profit after tax before separately reported items attributable to owners of the parent.

16.8 Headline earnings per share

Headline earnings per share is calculated by dividing headline profit before tax less associated income tax costs, attributable to owners of the parent by the weighted average number of ordinary shares in issue during the year. It is one of the Group's key performance indicators and is used to assess the underlying earnings performance of the Group as a whole. It is also used as one of the targets against which the annual bonuses of certain employees are measured. Headline earnings per share is disclosed in Note 6.

16.9 Adjusted operating cash flow

Adjusted operating cash flow is cash generated from continuing operations before restructuring and net retirement benefit obligations but after deducting capital expenditure net of asset disposals. It is used in calculating the Group's cash conversion.

	2020 **£m**	2019 £m
Cash generated from continuing operations	**193.7**	240.7
Add: Outflows relating to restructuring charges	16.7	30.0
Add: Net retirement benefit obligations	2.3	5.1
Less: Capital expenditure	(40.5)	(65.4)
Add: Vacant site remediation costs	1.9	1.8
Add: Proceeds from the sale of property, plant and equipment	1.1	3.7
Add: Proceeds from the sale of assets classified as held for sale	-	1.8
Adjusted operating cash flow	**175.2**	217.7
Trading Profit	**101.4**	181.4
Cash Conversion	**173%**	120.0%

16.10 Cash conversion

Cash conversion is calculated as adjusted operating cash flow divided by trading profit. It is useful for measuring the rate at which cash is generated from trading profit. It is also used as one of the targets against which the annual bonuses of certain employees are measured. The calculation of cash conversion is detailed in Note 16.9 above

16.11 Free cash flow

Free cash flow is defined as net cash flow from operating activities after net outlays for the purchase and sale of property, plant and equipment, dividends from joint ventures and dividends paid to non-controlling shareholders. It is one of the Group's KPIs and is used to assess the underlying cash generation of the Group and is one of the measures used in monitoring the Group's capital. A reconciliation of free cash flow is included underneath the Group Statement of Cash Flows.

The definition of free cash flow has been amended such that it includes additional funding contributions to Group pension plans. The prior year free cash flow has been restated accordingly. The impact of the restatement to the 2019 free cash flow is immaterial.

16.12 Average trade working capital to sales ratio

The average trade working capital to sales ratio is calculated as the percentage of average trade working capital balances to the total revenue for the previous 12 months, at constant currency. Average trade working capital (comprising inventories, trade receivables and trade payables) is calculated as the average of the 12 previous month-end balances. It is one of the Group's key performance indicators and is useful for measuring the level of working capital used in the business and is one of the measures used in monitoring the Group's capital.

	2020 **£m**	2019 £m
Average trade working capital	**337.8**	410.2
Total revenue	**1,458.3**	1,710.4
Average trade working capital to sales ratio	**23.2%**	24.0%

16.13 Adjusted earnings before interest, tax, depreciation and amortisation (adjusted EBITDA)

Adjusted EBITDA is calculated as the total of trading profit before depreciation and amortisation of non-acquired intangibles charges. It is used in the calculation of the Group's interest cover and net debt to adjusted EBITDA ratios. A reconciliation of adjusted EBITDA is included in Note 2.

16.14 Net interest payable on borrowings

Net interest payable on borrowings is calculated as total interest payable on borrowings less finance income, excluding interest on net retirement benefit obligations, adjustments to discounts and any item separately reported. It is used in the calculation of the Group's interest cover ratio.

	2020 **£m**	2019 £m
Total interest payable on borrowings (note 4)	**17.9**	17.9
Finance income (note 4)	**(7.4)**	(7.9)
Net interest payable on borrowings	**10.5**	10.1

16.15 Interest cover

Interest cover is the ratio of adjusted EBITDA to net interest payable on borrowings for the last 12 months. It is one of the Group's key performance indicators and is used to assess the financial position of the Group and its ability to fund future growth. This measure is also a component of the Group's covenant calculations.

	2020 **£m**	2019 £m
Adjusted EBITDA (note 2)	**152.0**	231.1
Net interest payable on borrowings	**10.5**	10.1
Interest cover	**14.5x**	22.9x

16.16 Net debt

Net debt comprises the net total of current and non-current interest-bearing borrowings (including IFRS16 lease liabilities), cash and short-term deposits and derivative financial instruments. Net debt is a measure of the Group's net indebtedness to banks and other external financial institutions. A reconciliation of the movement in net debt is included in Note 8.

16.17 Net debt to adjusted EBITDA

Net debt to adjusted EBITDA is the ratio of net debt at the year-end to adjusted EBITDA for the last 12 months. It is one of the Group's key performance indicators and is used to assess the financial position of the Group and its ability to fund future growth and is one of the measures used in monitoring the Group's capital.

	2020 **£m**	2019 £m
Net debt (note 8)	**175.1**	245.8
Adjusted EBITDA (note 2)	**152.0**	231.1
Net debt to adjusted EBITDA	**1.2x**	1.1x

16.18 Return on net assets ('RONA')

RONA is calculated as trading profit plus share of post-tax profit of joint ventures for the previous 12 months, divided by average net operating assets, at constant currency (being the average over the previous 13 months of property, plant and equipment, trade working capital, interests in joint ventures and associates, investments and other operating receivables, payables and provisions). It is one of the Group's key performance indicators and is used to assess the financial performance and asset management of the Group and is one of the measures used in monitoring the Group's capital.

	2020 **£m**	2019 £m
Average net operating assets (at constant currency)	**642.0**	690.2
Trading profit	101.4	181.4
Share of post-tax profit from joint ventures and associates	1.1	1.0
	102.5	182.4
RONA	**16.0%**	26.4%

16.19 Constant currency

Figures presented at constant currency represent 2019 amounts retranslated at average 2020 exchange rates.

16.20 Liquidity

Liquidity is the Group's cash and short term deposits plus undrawn committed debt facilities less cash used as collateral on loans.

	2020 **£m**	2019 £m
Cash and short term deposits	**209.7**	229.2
Undrawn committed debt facilities	246.6	174.2
Cash used as collateral on loans	(19.0)	(49.0)
Liquidity	**437.3**	354.4

16.21 Last twelve months ('LTM')

Some results are presented or calculated using data from the last twelve months from the reference date.

17 Exchange rates

The Group reports its results in pounds sterling. A substantial portion of the Group's revenue and profits are denominated in currencies other than pounds sterling. It is the Group's policy to translate the income statements and cash flow statements of its overseas operations into pounds sterling using average exchange rates for the year reported (except when the use of average rates does not approximate the exchange rate at the date of the transaction, in which case the transaction rate is used) and to translate balance sheets using year-end rates. The principal exchange rates used were as follows:

	Income and expense Average rates			Assets and liabilities Year-end rates		
	2020	2019	**Change**	**2020**	2019	**Change**
US Dollar	**1.28**	1.28	**0.0%**	**1.37**	1.33	**3.0%**
Euro	**1.12**	1.14	**(1.8)%**	**1.12**	1.18	**(5.1)%**
Chinese Renminbi	**8.85**	8.82	**0.3%**	**8.89**	9.23	**(3.7)%**
Japanese Yen	**137.01**	139.22	**(1.6)%**	**141.16**	144.01	**(2.0)%**
Brazilian Real	**6.61**	5.04	**31.2%**	**7.1**	5.33	**33.2%**
Indian Rupee	**95.1**	89.87	**5.8%**	**99.86**	94.60	**5.6%**
South African Rand	**21.08**	18.43	**14.4%**	**20.08**	18.55	**8.2%**