VESUVIUS PLC

27 February 2020

Results for the year ended 31 December 2019

Strategic progress and strong cash conversion despite challenging end markets

Vesuvius plc, a global leader in molten metal flow engineering and technology, announces its preliminary audited results for the year ended 31 December 2019.

Financial summary

	2019 (£m)	2018 (£m)	Year-on-year change	Underlying change[1]
Revenue	1,710.4	1,798.0	-4.9%	*-5.7%*
Trading Profit[2] (EBITA)	181.4	197.2	-8.0%	*-9.0%*
Return on Sales	*10.6%*	*11.0%*	-40bps	*-40bps*
Operating Profit	127.5	164.5	-22.5%	
Headline Profit Before Tax	171.4	188.9	-9.3%	
Profit Before Tax	118.6	156.2	-24.1%	
Profit	86.5	145.1	-40.4%	
Headline Earnings[2]	121.4	133.7	-9.2%	
Headline EPS[2] (pence)	45.1	49.6	-9.1%	
Statutory EPS (pence)	29.8	51.3	-41.9%	
Adjusted operating cash flow[2]	217.7	179.4	+21.3%	
Net Debt[3]	216.3	247.8	-12.7%	
Dividend (pence)	20.5	19.8	+3.5%	

[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 17 in the financial statements
[3] Net debt excluding IFRS lease adjustment which is not included in the calculation of net debt under our debt covenants

Key Points

- £87.6m drop in revenue, reflecting a significant deterioration in both our main end markets of Steel and Foundry after a strong 2018
- Decline of trading profit (EBITA) limited to £15.8m due to the acceleration of our restructuring efforts
- Resilient return on sales at 10.6% (2018: 11.0%) despite lower revenue
- Acceleration and intensification of our restructuring programmes with £16.4m of recurring savings delivered and eight plant closures in 2019 without reducing overall production capacity
- Strong cash conversion of 120% versus 91% in 2018 and adjusted operating cash flow up 21.3%, demonstrating our strength as a flexible, technology-led, low capital intensity business, capable of generating consistently strong free cash flow across the cycle
- We accelerated our R&D efforts, launching more than 10 new products and new products as a percentage of sales increased to 16.3%, from 15.4% in 2018
- Net debt reduced to £216.3m (2018: £247.8m) (net debt/EBITDA of 1.0x), on a like-for-like basis excluding IFRS 16 lease adjustment, despite cash utilisation for the CCPI acquisition, restructuring costs, modernisation capex and increased dividend payments
- Full year dividend increased by 3.5% to 20.5 pence per share (2018: 19.8p)

Patrick André, Chief Executive of Vesuvius, commented:

"We delivered a robust operational performance in 2019, despite challenging conditions. Key end markets were especially weak during the fourth quarter of 2019 and we expect this abnormally low level of activity to continue at least in Q1 2020 and to weigh on performance in H1 2020. The potential impact of the Covid-19 health crisis is difficult to assess at this time but is likely to have a temporary negative impact on our end-markets. However, there are some signals indicating that the destocking phase experienced in H2 2019 is maturing and may shortly be coming to an end. Thanks to our restructuring efforts, our reinforced emphasis on innovation in the service of our customers and our dedicated workforce, Vesuvius is ideally positioned to benefit from the normalisation in our end markets as this occurs."

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Vesuvius management will make a presentation to analysts and investors on 27 February 2020 at 10.00 (GMT) at Grocers' Hall, Princes Street, London EC2R 8AD. For those unable to attend in person, an audio webcast and conference call will also be available. Please register for the call via the following URL: https://edge.media-server.com/mmc/p/pbidikvr (Dial in details: UK participant dial in +44(0)20 3009 5710; US participant dial in +1 917 720 0178; confirmation code 6768305). The presentation will be broadcast live on Vesuvius' website: https://www.vesuvius.com/en/investors.html and an archive version of the presentation will be available on the website later that day.

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 2019

Vesuvius made further strategic progress in 2019 in line with our objectives, despite the challenging end market environment.

Crude steel production declined 1.7% year-on-year in the world excluding China (as reported by the World Steel Association). The decline in production worsened during the year, with steel volumes increasing slightly in H1 2019 by 0.6% year-on-year in the world excluding China before declining by 3.8% in H2 2019.

In addition, we experienced a challenging environment in Foundry end markets in 2019, which also worsened through the year. Our Foundry Division was impacted by weakness in light vehicle production in all regions and a decline in the construction and agricultural equipment markets in NAFTA, India, South America and North Asia. There was also a reduction in activity in general engineering and mining in EMEA, India and North Asia and a decline in medium/heavy commercial vehicle production in most regions.

This deterioration of our markets was amplified by a general destocking throughout the supply chain, affecting both our products and our customers' products and by the external regulatory environment which disrupted trade flows.

£m	2019 Reported	Acquisitions / Disposals	2019 Underlying	2018 Reported	Currency	Acquisitions / Disposals	2018 Underlying	Reported % change	Underlying % change
Revenue	1,710.4	-23.8	**1,686.6**	1,798.0	+9.8	-18.3	1,789.5	-4.9%	*-5.7%*
Trading Profit	181.4	-2.5	**178.9**	197.2	+0.1	-0.7	196.6	-8.0%	*-9.0%*
Return on Sales %	*10.6%*		***10.6%***	11.0%			11.0%	-40bps	*-40bps*

Group trading performance

Group revenue was £1,710.4m, a decrease of 4.9% versus 2018 on a reported basis. Underlying Group revenue, adjusted for the effects of currency translation, acquisitions and disposals, decreased by 5.7%. Trading profit (EBITA) was £181.4m (2018: £197.2m), down 8.0% on a reported basis and down 9.0% on an underlying basis. Our return on sales was resilient at 10.6% in 2019 as compared with 11.0% in 2018, despite lower sales.

In addition to currency translation, underlying performance is adjusted for the divestment, in October 2018, of BMI, an Advanced Refractories installation business; and the acquisition of CCPI, completed on 1 March 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 five key execution priorities. We made further progress on each of these execution priorities in 2019 and we remain confident in our ability to achieve a sustainable return on sales level of 12.5% when our end markets normalise.

- **Reinforce our technology leadership**
  - Expansion of our Advanced Refractories' R&D centre in Vizag, India
  - Opening of Flow Control's new R&D centre in Suzhou, China
  - Expansion of our mechatronics technology centre in Ghlin, Belgium
- **Increase the penetration of our value-creating solutions**
  - We accelerated our R&D efforts and launched more than 10 new products in the Steel and Foundry Divisions, including the following highlights by business unit:
    - Flow Control: new generation of ladle slide gate plates and systems and new high performance tundish slide gates
    - Advanced Refractories: optimised monolithic refractory formulations
    - Foundry: new coating helping automotive foundries meet the quality level of the next generation engines and a new unique feeding system technology for casting aluminium
  - The percentage of our sales comprising products which didn't exist five years ago rose again in 2019 to 16.3% as compared with 15.4% in 2018
  - More than 15 new product launches are planned for 2020
- **Capture the growth in developing markets**
  - 7.9% sales growth in China for our Steel Division

- 4.7% sales growth in EEMEA (Eastern Europe, Middle-East (including Turkey) and Africa) for our Foundry Division (excluding Fused Silica)

- **Improve our cost leadership and margins**
  - In 2019 we delivered an incremental £16.4m of recurring restructuring savings
  - In July 2019, we announced a further set of initiatives focused on our manufacturing network in NAFTA and EMEA
- **Develop our Technical Service offering**
  - Our mechatronics activity is developing rapidly and during 2019 we gained our first important mechatronics customer in China. We now have more than nine active projects and our mechatronics technology centre in Ghlin, Belgium is being expanded to respond to the growing demand

Foreign exchange

As envisaged at the time of our H1 2019 results, the net impact of average 2019 exchange rates compared to 2018 averages has been broadly neutral, with a positive £0.1m impact at trading profit (EBITA) level.

Restructuring

Confronted with the significant deterioration of our main markets, we decided early in the year to expand and accelerate our restructuring programmes. During 2019 we delivered an incremental £16.4m of recurring cash savings. These savings were delivered according to plan with the exception of £1.2m due to some delays experienced in the Foundry EMEA and Advanced Refractories NAFTA restructuring projects. This is expected to be recovered in 2020.

The restructuring programmes are predominantly focused on rationalising our manufacturing footprint, consolidating production and streamlining various back office functions. During 2019 we successfully closed six plants in EMEA and two in the United States, without reducing our overall production capacity, and maintaining our proximity to customers in our regional markets. We acquired two plants in the United States through the CCPI acquisition of which Blanchester has already been closed and we opened a new Foundry manufacturing facility in Mexico. The net reduction of five plants in 2019 reduces our total manufacturing footprint from 59 in 2018 to 54 in 2019, with one further closure in 2020 in the United States already announced.

The restructuring programmes are now expected to deliver incremental recurring annual savings of £19.4m in 2020, £6.2m in 2021 and £1.9m in 2022, which is an increase of £3.0m in comparison to previously announced targets. This increase in recurring cash savings will be delivered at an additional one-off cash cost of £7.2m, of which £5.1m has already been charged and £2.1m will be incurred by 2021.

Changes to the Group Executive Committee ("GEC")

After the reinforcement of our regional P&L leadership teams in 2018 and early 2019, we decided to appoint new entrepreneurial minded business unit presidents, with a combination of external hires and internal promotions.

Karena Cancilleri joined Vesuvius as President of the Foundry Division in October 2019. Karena joined Vesuvius from Beaulieu International Group where she was Vice President engineered products. Prior to Beaulieu, she held various international leadership roles in companies such as Shell Chemicals, Kraton and FiberVisions**.**

Thiago da Costa Avelar, previously Vesuvius' regional Vice President for Steel Division South America, was appointed President of the Advanced Refractories business unit, effective 1 January 2020. Thiago joined Vesuvius in February 2019 and his experience working for companies such as ArcelorMittal and RHI-Magnesita spans various technical and commercial roles across geographies.

Tanmay Ganguly, previously President of the Advanced Refractories business unit, has been appointed President of the Flow Control business unit with effect from 1 April 2020.

With these changes, we now have seven nationalities represented in our Group Executive Committee and have 25% female representation, up from 0% two years ago.

Changes to the Board of Directors

As previously announced on the 4 December, Christer Gardell, Managing Partner of Cevian Capital, Vesuvius' largest shareholder, stepped down as a non-executive Director, following seven years of service on the Board. Providing continuity of representation for Cevian, the Board appointed Friederike Helfer, who is also a Partner of Cevian Capital.

Ms Helfer, who is a non-executive director of the Supervisory Board of thyssenkrupp joined Cevian in 2008. Prior to joining Cevian, Ms Helfer worked at McKinsey & Company. She holds degrees from Massachusetts Institute of Technology and from Vienna University of Technology and is a CFA charterholder.

With this change we now have six nationalities represented on the Board with 37.5% female representation.

Working Capital

Our adjusted operating cash flow was up 21.3% having benefitted from a £64.1m reduction in trade working capital during 2019, driven by an ongoing management focus and aided by lower sales volumes.

Our average working capital / revenue for the prior 12 months was maintained at 24.0% at the end of 2019, broadly in-line with the position at year-end 2018 despite the market slowdown. This was particularly due to strong discipline in the manufacturing network to adjust production to sales without building excess inventories.

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 (2019: £170.4m, 2018: £186.1m). The Group's ETR, based on the income tax costs associated with headline performance of £43.8m (2018: 48.4m), was 25.7% (2018: 26.0%).

The guidance issued at the H1 2019 results forecast an ETR of 28.0% for the full year. The actual ETR for the 2019 year was impacted by: the reduction in the Indian corporate income tax rate announced in September 2019; a reduction in our Mexican corporate income tax as a result of taxable foreign exchange losses; and changes in the geographic mix of realised profits.

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 2020.

Financial position

Our net debt / LTM EBITDA ratio (excluding IFRS lease adjustment) has remained constant between 2019 and 2018 at 1.0x. Net debt at 31 December 2019 decreased to £216.3m, versus £247.8m at year-end 2018 as the higher adjusted operating cash flow of £217.7m was partially used for the £53.9m of dividend payments; the £32.4m acquisition of CCPI; and restructuring costs of £30.0m. This calculation of net debt excludes the adjustment of £29.5m to reflect the reclassification of leases under IFRS 16 at 31 December 2019, which is aligned with the calculation of net debt under our debt covenants. Including the IFRS 16 lease adjustment the net debt / LTM EBITDA is 1.1x at 31 December 2019.

The weighted average maturity of Vesuvius' committed debt facilities now stands at approximately four years. Our 2010 US$140m USPP will mature in December 2020 and we plan to refinance this during the course of the year.

Quality, health and safety

We are committed to rapidly evolve towards a global best in class organisation in terms of safety. Several new initiatives were launched in 2019 to enable us to reach this objective. In particular, our new independent Group safety audit team is now fully operational, auditing each of our locations at least once a year. Reliability in quality and delivery is vital to our customers as they use Vesuvius' products in critical areas of their own processes. The level of risk attached to a catastrophic failure is often such that, for people and equipment, no compromise can be accepted.

Despite our focus in this area, we are not satisfied with our safety results in 2019. Our Lost Time Injury Frequency Rate increased in 2019 to 1.5 LTIs per million hours worked versus 1.3 in 2018, although it remains lower than the 2017 and 2016 level of 1.6 and 1.7, respectively. Our LTI Severity rate has increased slightly in 2019 to 78 Lost Days per million hours worked versus 77 in 2018.

We will strive to make significant progress in 2020 and resume our journey towards our goal of zero accidents.

Environment and sustainability

Our environmental footprint is limited due to the low energy intensity of our manufacturing processes, the low percentage of bricks in our product mix and our strategy of not being integrated upstream in mining.

However, for many years now we have been an active contributor, to the extent of our ability, in the fight against climate change. In 2011, the Vesuvius Energy Conservation Plan was launched with the objective of reducing our normalised energy consumption (per metric tonne). In 2015, the Group set a target to reach a 10% improvement by 2018, which was surpassed with a 10.2% improvement. The Board has now agreed a further objective, targeting an additional 10% improvement by 2024.

In 2019 we achieved a 12.0% reduction in global Greenhouse Gas ('GHG') emissions (kg of CO_2e). In 2018 we achieved a reduction of 6.6%. Our GHG emissions are limited to CO_2, with no material emissions of other GHGs. In reporting GHG emissions, we have used the GHG Protocol Corporate Accounting and Reporting Standard (revised edition) methodology to identify our GHG inventory of Scope 1 (direct) and Scope 2 (indirect) CO_2e. We report in kg of CO_2 equivalent ('CO_2e').

Managing our energy intensity not only has an environmental benefit but is also part of our long-term strategy to enhance our cost-competitiveness.

Our biggest contribution to reducing global emissions comes from the work we do with our customers to develop products and solutions to improve their productivity, driving efficiency and reducing the environmental impact of their operations. We also assist our customers in developing solutions that support their ability to use recycled materials and to manufacture components and finished goods that utilise thinner, lighter materials thus reducing the environmental footprint of their products.

The Group also meets all its obligations in relation to the Carbon Reduction Commitment Energy Efficiency Scheme, the Producer Responsibility Packaging Waste regulations and the Energy Saving Opportunity Scheme by which the UK has implemented the EU Energy Efficiency Directive.

Final dividend

The Board has recommended a final dividend of 14.3 pence per share (2018: 13.8 pence per share), a 3.6% increase on the final dividend paid in 2018, reflecting confidence in our trajectory. This will result in a total dividend for the year of 20.5 pence per share (2018: 19.8 pence per share) and represents a 3.5% increase to the full year dividend. The Board remains committed to delivering long-term dividend growth, provided that this is supported by underlying earnings, cash flows and is justified in the context of capital expenditure requirements and the prevailing market outlook. If approved at the Annual General Meeting on 13 May 2020, the final dividend will be paid on 22 May 2020 to shareholders on the register at the close of business on 17 April 2020. The last date for receipt of elections from shareholders for the Vesuvius Dividend Reinvestment Plan will be 1 May 2020.

Corporate activity

In March 2019 the Group completed the acquisition of CCPI Inc, a specialist refractory producer based in Ohio, USA, focused on tundish (steel continuous casting) applications and aluminium. The transaction valued the company at £33.3m on a cash and debt free basis. The integration of CCPI is proceeding as planned and during the year we closed CCPI's main facility at Blanchester and absorbed its production volume into our existing North American manufacturing footprint. The transaction is highly synergistic and these synergies are included in the announced restructuring savings targets.

In June 2019, the Group disposed of its 50% interest in Angang Vesuvius Refractory Company Ltd for a cash consideration of £6.8m, resulting in a profit after foreign currency adjustments of £1.1m.

Outlook

Our two main end markets of Steel and Foundry were especially weak during the fourth quarter of 2019 and we expect this abnormally low level of activity to continue at least in Q1 2020 and to weigh on performance in H1 2020.

The potential impact of the Covid-19 health crisis is difficult to assess at this time but is likely to have a temporary negative impact on our end markets.

However, there are some signals indicating that the destocking phase experienced in H2 2019 is maturing and may shortly be coming to an end.

Thanks to our restructuring efforts, our reinforced emphasis on innovation in the service of our customers, and our dedicated workforce, Vesuvius is ideally positioned to benefit from the normalisation in our end markets as this occurs.

Operational Review

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

Steel Division

According to the World Steel Association, global steel production in 2019 increased by 3.4% compared with 2018, however, global steel production excluding China declined by 1.7%. On a regional basis, crude steel production contracted in all regions except in Asia and the Middle East (incl. Turkey). Production in China, India, the Middle East (incl. Turkey) and South East Asia increased by 8.3%, 1.8%, 5.1% and 9.7%, respectively. Production decreased in Europe (EU27+UK), NAFTA and South America by 4.9%, 0.8% and 8.3%, respectively.

Vesuvius' Steel Division reported revenues of £1,195.3m in 2019, a decrease of 3.3% compared to 2018. On an underlying basis, Steel Division revenue was down 4.4%. Markets deteriorated in the majority of regions during the course of 2019 after a strong 2018. The 'high technology' segment of the steel market, key for the Flow Control business unit, suffered in 2019 proportionately more than the more commoditised construction steel market, due in particular to weakness in light vehicle volumes. This deterioration of our markets was amplified by a general destocking throughout the supply chain, particularly in EMEA. Our sales were also affected by the external regulatory environment, which disrupted trade flows.

On a reported basis, Steel Division trading profit decreased 6.5% year-on-year. On an underlying basis, trading profit decreased only 7.7%, with the decrease in return on sales limited to 40 basis points thanks to restructuring savings. Those savings were delivered according to plan with the exception of Advanced Refractories in NAFTA where some delays were experienced. This is expected to be recovered in 2020.

Steel Division	**2019 (£m)**	**2018 (£m)**	**Change (%)**	**Underlying change (%)**
Steel Flow Control Revenue	626.3	662.6	-5.5%	-5.8%
Steel Advanced Refractories Revenue	539.8	541.1	-0.3%	-2.3%
Steel Digital Services Revenue (Sensors & Probes)	29.2	33.0	-11.2%	-9.6%
Total Steel Revenue	**1,195.3**	**1,236.7**	**-3.3%**	**-4.4%**
Total Steel Trading Profit	**120.1**	**128.3**	**-6.5%**	**-7.7%**
Total Steel Return on Sales	***10.0%***	***10.4%***	***-40bps***	***-40bps***

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	**2019 (£m)**	**2018 (£m)**	**Change (%)**	**Underlying change (%)**
Americas	214.8	216.2	-0.6%	-2.1%
Europe, Middle East & Africa (EMEA)	229.5	266.2	-13.8%	-13.0%
Asia-Pacific	182.0	180.2	+1.0%	+0.4%
Total Steel Flow Control Revenue	**626.3**	**662.6**	**-5.5%**	**-5.8%**

Steel Flow Control reported revenue of £626.3m in 2019, a decrease of 5.5% compared to 2018 on a reported basis, whilst underlying revenue decreased 5.8%. Underlying regional performance was mixed, with Americas and EMEA revenue decreasing by 2.1% and 13.0% respectively, and Asia-Pacific revenue increasing by 0.4%.

In NAFTA, Steel Flow Control's underlying revenue decreased by 4.3% due to unfavourable customer mix. In South America, Steel Flow Control's underlying revenue was stable, as the decrease in revenue due to steel market weakness was offset by market share gains. Steel Flow Control's underlying revenue in EMEA decreased by 13.0%, contributed to by steel market weakness and destocking at steel plants. Underlying revenue in Asia-Pacific was up 0.4% with revenue in China increasing by 4.6%, continuing our track record of growth in this important region.

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, they 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	**2019 (£m)**	**2018 (£m)**	**Change (%)**	**Underlying change (%)**
Americas	180.6	171.1	+5.5%	-0.5%
Europe, Middle East & Africa (EMEA)	236.3	254.4	-7.1%	-6.7%
Asia-Pacific	122.9	115.6	+6.3%	+4.7%
Total Steel Advanced Refractories Revenue	**539.8**	**541.1**	**-0.3%**	**-2.3%**

Our Steel Advanced Refractories business unit reported revenues of £539.8m in 2019, a decrease of 0.3% compared to 2018 on a reported basis, whilst underlying revenue decreased 2.3%. This resilient performance, despite a challenging market environment, was supported by market share gains in China and the CCPI acquisition.

Underlying regional performance was mixed, with Asia-Pacific revenue increasing by 4.7% and Americas and EMEA revenue decreasing by 0.5% and 6.7%, respectively. The strong revenue growth in Asia-Pacific was due to increased penetration of our value-creating solutions in China, Vietnam, Malaysia and Indonesia. In NAFTA, the positive impact of the CCPI acquisition partially offset weaker end markets and an unfavourable customer mix, whilst the revenue decrease in South America was due to weak market conditions. In EMEA revenue decreased on the back of unfavourable market conditions as well as on priority being given to return on sales.

Steel Digital Services (Sensors & Probes)

At the beginning of 2018, the activities which used to belong to the Technical Services business unit, and which have strong synergies with our consumable sales, were integrated into our Flow Control and Advanced Refractories business units. The part of Technical Services related to discrete sensors and probes was maintained in the Steel Digital Services (Sensors & Probes) business unit, which now offers products to our customers to enable them to measure certain key characteristics of the molten metal during the steel-making process and make their underlying processes more efficient and reliable. The products supplied by Steel Digital Services (Sensors & Probes) 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 Digital Services (Sensors & Probes) Revenue	2019 (£m)	2018 (£m)	Change (%)	Underlying change (%)
Americas	19.4	20.5	-5.2%	-2.9%
Europe, Middle East & Africa (EMEA)	9.7	12.3	-20.7%	-20.0%
Asia-Pacific	0.1	0.2	-43.2%	-42.8%
Total Steel Digital Services (Sensors & Probes) Revenue	**29.2**	**33.0**	**-11.2%**	**-9.6%**

Steel Digital Services (Sensors & Probes) generated revenue of £29.2m, a decrease of 11.2% year-on-year on a reported basis. On an underlying basis, revenue decreased 9.6%. This decline in revenue reflects the challenging market environment particularly in EMEA.

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	2019 (£m)	2018 (£m)	Change (%)	Underlying change (%)
Foundry Revenue	515.1	561.3	-8.2%	-8.7%
Foundry Trading Profit	61.3	68.9	-11.0%	-11.3%
Foundry Return on Sales	***11.9%***	***12.3%***	***-40bps***	***-40bps***

There was a challenging environment in Foundry end-markets during 2019, with weakness in light vehicle production in all regions. There were also declines in the construction and agricultural equipment markets in NAFTA, India, South America and North Asia, a reduction in activity in general engineering and mining in EMEA, India and North Asia and a decline in medium/heavy commercial vehicle production in most regions.

Consequently, revenue in the Foundry division decreased 8.2% to £515.1m in 2019 on a reported basis, whilst underlying revenue decreased by 8.7%. Underlying trading profit and return on sales decreased by 11.3% and 40 basis points, respectively.
Our performance in 2019 was also impacted by delays in the realisation of restructuring savings in EMEA. These are expected to be achieved in 2020.

However, against this backdrop, we were successful in increasing prices where necessary to compensate for the historic raw material and other cost inflation, which we highlighted in our 2018 results.

Foundry Revenue	2019 (£m)	2018 (£m)	Change (%)	Underlying change (%)
Americas	115.4	119.2	-3.2%	-5.3%
Europe, Middle East & Africa (EMEA)	224.3	253.6	-11.6%	-10.2%
Asia-Pacific	175.4	188.5	-6.9%	-8.9%
Total Foundry Revenue	**515.1**	**561.3**	**-8.2%**	**-8.7%**

In the Americas, underlying revenue decreased by 5.3% due to weak end markets in both NAFTA and South America. Underlying revenue in EMEA decreased by 10.2% year-on-year as a result of the challenging market environment, with weakness in the light, commercial vehicle production and general engineering end-markets. In Asia-Pacific, underlying revenue decreased by 8.9%. In

North Asia and India, Foundry Division revenue was down 11.1% and 11.5%, respectively due to weakness in all Foundry end-markets.

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 17.

Introduction

Our resilient operating performance and cash conversion enabled capital allocation across all or our priority areas. We invested in both organic and inorganic growth, while also paying an attractive dividend to our shareholders. This was possible despite a backdrop of challenging end markets and while at the same time further reducing our net debt.

2019 Performance Overview

A challenging market environment in 2019 has resulted in reduced demand in our key end-markets for both Steel and Foundry and led to a decline in our results. Reported revenue decreased by £87.6m over the prior year and by £102.9m on an underlying basis. The restructuring programmes continued to deliver during 2019 with a total of £16.4m of incremental benefits reported. The impact of the reduction in revenue was partially mitigated by the restructuring benefits with an overall reduction in trading profit to £181.4m, 8.0% lower than prior year. Return on sales for 2019 on a reported basis at 10.6% was lower than the prior year by 40bps. In a year of reduced sales growth, and a focus on working capital management, our cash management performance was strong, achieving a 120% cash conversion.

Dividend

The Board has recommended a final dividend of 14.3 pence per share to be paid, subject to shareholder approval, on 22 May 2020 to shareholders on the register at 17 April 2020. When added to the 2019 interim dividend of 6.2 pence per share paid on 20 September 2019, this represents a full-year dividend of 20.5 pence per share.

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.

Capital allocation

We believe that the ideal leverage ratio for Vesuvius is in the range of 1.25x - 1.75x net debt to EBITDA. This gives us a reasonable comfort zone to be able to cater for any potential economic downcycles. However, given we are currently below this range at approximately 1.1x net debt to EBITDA, it is increasingly relevant to consider our capital allocation priorities. In order of priority these are:

1. **Organic growth**. We have capital expenditure and restructuring programmes that we believe deliver the best possible returns to our shareholders.
2. **Inorganic growth**. We review acquisition opportunities against a strict set of assessment criteria, including: strategic fit; margin relative to Group target return on sales of 12.5%; and return on capital.
3. **Return cash to shareholders**. In the event that our organic and inorganic growth opportunities leave us with residual cash, we will seek to return that to our shareholders.

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, which 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 businesses acquired in both the current year and prior years

Therefore, for 2019, we have:

- Retranslated 2018 results at the FX rates used in calculating the 2019 results
- Removed the results of the BMI refractory installation business, which was disposed of during 2018
- Removed the results of CCPI which was acquired during 2019

Objective: Deliver growth

KPI: Underlying revenue growth

Reported revenue for 2018 was £1,798.0m, which after FX translation effects and removing the impact of disposed businesses, equates to £1,789.5m on an underlying basis. The reported revenue in 2019 of £1,710.4m, when adjusted for disposals and acquisitions, is £1,686.6m on an underlying basis, which is a decrease of 5.7% year-on-year. The decline has been as a result of weaker end markets across all divisions.

	2019 Revenue			2018 Revenue				% change	
£m	**As reported**	**Acquisitions/ (Disposals)**	**Underlying**	As reported	Currency	Acquisitions/ (Disposals)	Underlying	Reported	Underlying
Steel	**1,195.3**	**(23.8)**	**1,171.5**	1,236.7	6.9	(18.3)	1,225.3	(3.3%)	(4.4%)
Foundry	**515.1**	**–**	**515.1**	561.3	2.9	–	564.2	(8.2%)	(8.7%)
Group	**1,710.4**	**(23.8)**	**1,686.6**	1,798.0	9.8	(18.3)	1,789.5	(4.9%)	(5.7%)

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 of £181.4m decreased by 9.0% on an underlying basis versus last year whilst RoS on an underlying basis was 40 basis points lower. The reduction in trading profit follows the decline in revenues, partially mitigated by the ongoing delivery of benefits from the restructuring programmes.

In a weakening market environment, our Steel and Foundry Divisions reported reduced volumes which were only partially offset by cost savings measures and the ongoing delivery of benefits from the restructuring programme. As a result, the Steel Division recorded RoS of 10.0% this year, a decrease from 10.4% in 2018 whilst Foundry reported a 11.9% RoS, a decrease from 12.3% in 2018.

	2019 Trading profit			2018 Trading profit				% change	
£m	**As reported**	**Acquisitions/ (Disposals)**	**Underlying**	As reported	Currency	Acquisitions/ (Disposals)	Underlying	Reported	Underlying
Steel	**120.1**	**(2.5)**	**117.6**	128.3	(0.2)	(0.7)	127.4	(6.5%)	(7.7%)
Foundry	**61.3**	**–**	**61.3**	68.9	0.3	–	69.2	(11.0%)	(11.3%)
Group	**181.4**	**(2.5)**	**178.9**	197.2	0.1	(0.7)	196.6	(8.0%)	(9.0%)

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 headline PBT is net finance costs.

Net finance costs in 2019 of £11.0m were £0.1m below 2018. Movement in finance costs includes a £1.4m increase in interest on lease liabilities following transition to IFRS 16, offset by a £1.4m gain resulting from interest on an indirect tax rebate in Brazil.

Our headline PBT was £171.4m, 9.3% lower than last year on a reported basis. Including amortisation of acquired intangibles of £10.0m (2018: £12.9m), restructuring charges of £39.8m (2018: £15.3m) and vacant site remediation costs of £4.1m (2018: nil), our PBT of £118.6m was 24.1% lower than 2018. Headline EPS at 45.1p was 9.1% lower than 2018. Statutory EPS at 29.8p was 41.9% lower than 2018.

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 by dividing trading profit plus our share of post-tax profits from joint ventures by our average operating assets (property, plant and equipment, trade working capital, interests in joint ventures and associates, investments, and other operating receivables, payables, and provisions).

As with most of our KPIs, we measure this on a 12-month moving average basis at average exchange rates for the year to ensure that we focus on sustainable underlying improvements. Our RONA for 2019 was 26.4% (2018: 30.4%) and reflects the reduction in profits, partially offset by the underlying reduction in working capital.

Objective: Maintain strong cash generation and an efficient capital structure

KPI: Free cash flow and working capital

Fundamental to ensuring that we have adequate capital to execute our corporate strategy is converting our profits into cash, partly through strict management of our working capital. Free cash flow from continuing operations was £126.6m for the year, £20.5m higher than last year on a reported basis due to a reduction in working capital, partially offset by additional capital expenditure during the year. Our cash conversion in 2019 was 120% (2018: 91%). Excluding the impact of the IFRS 16 adjustment to adjusted operating cash flows, cash conversion in 2019 would have been 113%.

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 2019 was 24.0% (2018: 23.9%), measured on a 12-month moving average basis. In absolute terms on a constant currency basis, trade working capital decreased by £54.4m, reflecting continued management focus, and assisted by the reduction in sales.

KPI: Interest cover and net debt

As at 31 December 2019, the Group had committed borrowing facilities of £609.7m (2018: £573.7m), of which £174.2m was undrawn (2018: £119.2m).

Net debt at 31 December 2019 was £245.8m, a £2.0m decrease from 2018. The decrease was a result of strong cash conversion partially offset by restructuring costs, acquisition costs for CCPI, shareholder dividends, and the impact of adoption of IFRS 16.

The Group's debt facilities have two financial covenants: the ratios of net debt to EBITDA (maximum three times limit) and EBITDA to interest (minimum four times limit). These ratios are monitored regularly to ensure that the Group has sufficient financing available to run the business and fund future growth. At the end of 2019, the net debt to EBITDA ratio was 1.1x (2018: 1.0x) and EBITDA to interest was 21.8x (2018: 22.8x). Excluding the impact of the IFRS 16 adjustment to net debt in 2019, the net debt to EBITDA ratio was 1.0x, in line with 2018.

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 2019, we spent £29.1m (2018: £33.6m on a constant currency basis) on R&D activities, slightly lower than 2018 due to a timing lag between the restructuring of certain activities and the subsequent relocation and expansion of our R&D centres.

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. The Group's undrawn committed bank facilities at 31 December 2019 were £174.2m. Counterparty risk and customer default are mitigated by our relatively widespread customer base – with no customer being greater than 10% of revenue – and credit control procedures.

Other Relevant Financial Information

Restructuring

Confronted with the significant deterioration of our main markets, we decided early in the year to expand and accelerate our restructuring programmes. During 2019 we delivered an incremental £16.4m of recurring cash savings. These savings were delivered according to plan with the exception of £1.2m due to some delays experienced in the Foundry EMEA and Advanced Refractories NAFTA restructuring projects. This is expected to be recovered in 2020.

The restructuring programmes are predominantly focused on rationalising our manufacturing footprint, consolidating production and streamlining various back office functions. During 2019 we successfully closed six plants in EMEA and two in the United States, without reducing our overall production capacity, and maintaining our proximity to customers in our regional markets. We acquired two plants in the United States through the CCPI acquisition of which Blanchester has already been closed and we opened a new Foundry manufacturing facility in Mexico. The net reduction of five plants in 2019 reduces our total manufacturing footprint from 59 in 2018 to 54 in 2019, with one further closure in 2020 in the United States already announced.

The restructuring programmes are now expected to deliver incremental recurring annual savings of £19.4m in 2020, £6.2m in 2021 and £1.9m in 2022, which is an increase of £3.0m in comparison to previously announced targets. This increase in recurring cash savings will be delivered at an additional one-off cash cost of £7.2m, of which £5.1m has already been charged and £2.1m will be incurred by 2021.

In 2019, we reported £39.8m of restructuring costs (2018: £15.3m) within separately reported items that were predominantly made up of redundancy, plant closure costs, and asset write downs. The cash costs in 2019 were £32.8m (2018: £19.3m). We are carrying forward into 2020 a restructuring provision of £19.1m (2018: £17.4m).

Vacant site remediation costs

The Group owns a disused property in the US, which does not form part of our trading operations. Costs are being incurred at this site to address the significant increase in the volume of water run-off occurring in 2019. We have engaged waste management specialists, are taking actions to reduce the level of water (including hydrological studies) and are in contact with the relevant regulatory authorities. We estimate that it will take 18 months to finalise remediation. The costs for this remediation are estimated to be £4.1m. These have been treated as a separately reported item due to the materiality and one-off nature of the costs. There has been no impact upon headline performance.

Financial Reporting Council review of the 2018 Group Financial Statements

The 2018 Group Financial Statements are subject to an ongoing review by the FRC's Corporate Reporting Review team as part of the usual cycle of reviews of listed Company's accounts. Further details of the scope of the FRC review are provided in note 1.1. This has resulted in us making a number of enhancements to our disclosures in the 2019 Group Financial Statements. As part of that enquiry, we have also reconsidered our application of IAS 36, Impairment of Assets. Previously, the Group identified cash generating units as Steel and Foundry. We have now performed goodwill impairment testing at an operating segment level which are Steel Advanced Refractories, Steel Flow Control, Steel Digital Services (Sensors & Probes) and Foundry. This has shown that the carrying value of the goodwill and certain tangible assets held in the Steel Digital Services (Sensors & Probes) operating segment could not be supported by value in use calculations as at 31 December 2017. Therefore the goodwill has been fully impaired at that date, resulting in an impairment of £17.4m. We have also identified an impairment of tangible fixed assets of £10.2m. The effect of these impairments is a decrease in net assets of £27.6m as at 31 December 2017, 31 December 2018 and 31 December 2019. There is no material impact on the reported profit or cash flow for the years ended 31 December 2018 and 31 December 2019. Further details are provided in note 10.

Taxation

A key measure of tax performance is the effective tax rate, 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 (2019: £170.4m, 2018: £186.1m). The Group's effective tax rate, based on the income tax costs associated with headline performance of £43.8m (2018: 48.4m), was 25.7% (2018: 26.0%).

The utilisation of our US tax losses and other temporary differences has increased the headline tax charge in 2019 by £7.4m (2018: £7.8m), increasing the effective rate of tax on headline profit before tax and share of post-tax profits from joint ventures by 4.3% (2018: 4.2%). The utilisation of US tax losses and other temporary differences includes the impact of the Global Intangible Low-Taxed Income ('GILTI') rules which were introduced as part of US tax reform. The GILTI rules have increased the headline tax charge by £1.2m (2018: £2.4m).

The Group's effective tax rate is sensitive to changes in the geographic mix of profits and level of profits and reflects a combination of higher rates in certain jurisdictions such as Brazil, China, Germany, India, Mexico and the US, a nil effective rate in the UK due to the availability of unutilised tax losses, and rates that lie somewhere in between.

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 2020.

The income tax credit on separately reported items of £11.7m (2018: £36.8m credit) comprises £2.5m non-cash deferred tax movements relating to the amortisation of a deferred tax liability mainly arising from the 2008 acquisition of Foseco plc (2018: £2.8m), £9.2m tax credits relating to restructuring charges (2018: £1.8m), and a net increase in the deferred tax asset recognised in respect of US tax losses and certain other temporary differences of £nil (2018: £32.2m increase).

The net tax credit reflected in the Group Statement of Comprehensive Income in the year amounted to £1.9m (2018: £6.0m credit), comprising a £1.9m credit (2018: £1.3m charge) related to tax on net actuarial gains and losses on the employee benefits plan and in 2018 there was a £7.3m credit for additional recognition of US pension deferred tax assets.

Capital Expenditure

Capital expenditure in 2019 of £74.7m (2018: £48.4m) comprised £53.6m in the Steel Division (2018: £34.4m) and £21.1m in the Foundry Division (2018: £14.0m). The increased spend in 2019 reflects investment in infrastructure to support our restructuring activities and includes the addition of £9.2m of right of use assets, now classified as capital expenditure under IFRS 16. Capital expenditure on revenue-generating customer installation assets, primarily in Steel, was £7.8m (2018: £7.7m).

Pensions

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 58.4% of the liabilities in UK have already been insured. The total net deficit attributed to these defined benefit obligations at 31 December 2019 was £8.5m (2018: £15.3m), representing an improvement of £6.8m.

The improvement is driven by £9.8m from cash contributions and payments of unfunded benefits and £5.7m from foreign exchange movements. These were offset by £3.6m from changes to actuarial assumptions (attributable to reducing discount rates; updated mortality assumptions and pension membership data) and; additional accrual and administrative expenditure paid for the year of £5.1m.

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 2019, cash contributions of £11.3m (2018: £11.4m) were made into the defined contribution plans and charged to trading profit.

Corporate Activity

In March 2019 the Group completed the acquisition of CCPI Inc, a specialist refractory producer based in Ohio, USA, focused on tundish (steel continuous casting) applications and aluminium. The transaction valued the company at £33.3m on cash and debt free basis. The integration of CCPI is proceeding as planned, and during the year we have closed CCPI's main facility at Blanchester and absorbed its production volume into our existing North American manufacturing footprint. The transaction is highly synergistic, and these synergies are included in the restructuring savings targets.

In June 2019, the Group disposed of its 50% interest in Angang Vesuvius Refractory Company Ltd for a cash consideration of £6.8m, resulting in a profit after foreign currency adjustments of £1.1m.

Principal Risks and Uncertainties

Risk Management
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 views 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 overlayed 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 2019 the Group's assessment of principal risks was also reviewed and considered against this group of emerging risks and uncertainties identified through our Board review process.

Risk Mitigation
The risks identified are actively managed in order to mitigate exposure. Senior management 'owners' are identified for each principal risk to manage the mitigations of that specific risk and contribute to the analysis of its likelihood and materiality. This 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 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. 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 2019
The Board believes that there has been no material change to the Group's principal risks and uncertainties during the year.

During 2019, the Board continued to focus on specific, identifiable risks where those arose during the year – the challenges of the global economic situation, particularly the slowdown in our underlying markets, the supply of quality raw materials and the potentially disruptive effects on global trade from increasing geopolitical tensions – which we note in the table of Principal risks and uncertainties. End-market risks, protectionism and globalisation, and the changing regulatory environment were identified as key areas for attention and mitigation.

As issues of climate change climb up the global agenda, the Board has examined how this may affect our internal processes and our external environment - understanding both the drivers of sustainability at our customers and focusing on increased analysis of our operating performance.

As a result the Board resolved to identify ESG risks as a separate element of the Group risk register - recognising the work Vesuvius can do to mitigate the pressure our end customers experience to drive energy efficiency and reduce their carbon footprint, together with the need to focus internally on the action the Group can take to drive business sustainability. This risk also encompasses social and governance issues that were already incorporated into the Group's risk analysis.

In addition, the Board continues to monitor the implications of certain other emerging 'macro' trends such as automation in manufacturing and increasing digitalisation, both of which could act as disruptors to industry. During 2019 the Board has engaged with the workforce to ensure that Vesuvius fosters an appropriate culture and that Vesuvius' values are embedded throughout

the Group, reflecting 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.

The Board has discussed the potential impact of Covid-19 on the business, and in particular the actions being taken to respond given the Group's operations in China. This remains a matter of close attention for the Board.

Finally, the Board continued to monitor the developing issues posed by cyber threats. Further focused work was undertaken during the year on analysing and increasing the integrity of our system security. The Board received reports from the Group's multi-disciplinary committee appointed to assess the Group's controls in this area as well as from external experts to enhance the Board's understanding of and respond to emerging cyber trends.

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.

Brexit

Following the exit of the UK from the EU on 31 January 2020 under the Withdrawal Agreement the UK is currently subject to a Transition Period which will run until the end of 2020 (unless extended). During the Transition Period the UK remains in the Single Market and the Customs Union of the EU while the terms of a new trade agreement are negotiated. If those negotiations are not completed and ratified before the end of the Transition Period, World Trade Organisation rules may apply.

Vesuvius has analysed the potential challenges posed by Brexit, including the possibility of a 'no trade deal' situation occurring at the end of 2020, and identified mitigation strategies to address those challenges.

For our customers located in the EU27 countries, most of our products are manufactured by Vesuvius outside the UK, so we would not envisage a material impact from Brexit after the Transition Period. For those customers located in the UK or located in the EU27 and supplied from our UK plant, we have contingency plans and we are working 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 solutions	• 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	• 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

Risk	Potential impact	Mitigation
	• Trade restrictions	• 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 causes 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 *Vesuvius experiences a contracting customer base or increased transaction and administrative costs due to compliance with changing regulatory requirements*	• Revenue reduction from reduced end-market access • Disruption of supply chain and route to market • Increased internal control processes • Increased frequency of regulatory investigations • Reputational damage	• Compliance programmes and training across the Group • Internal Audit function • 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	• Organisational culture of high performance is not achieved	• Internal focus on talent development and training, with tailored career-stage

Risk	Potential impact	Mitigation
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	• 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	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 • Inability to attract the necessary workforce • Reputational damage	• Active safety programmes, with ongoing wide-ranging monitoring and safety training • Independent safety audit team • Quality management programmes including stringent manufacturing 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 of appropriate ESG measures for the business • Investment in R&D to develop products to assist our customers in reducing their carbon emissions and improve their own ESG measures • Skilled technical sales force to develop efficient solutions for our customers • The group wide Code of Conduct, ABC Policy 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 2019

	Notes	2019			2018		
		[(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	**1,710.4**	**-**	**1,710.4**	1,798.0	-	1,798.0
Manufacturing costs		**(1,233.5)**	**-**	**(1,233.5)**	(1,291.2)	-	(1,291.2)
Administration, selling and distribution costs		**(295.5)**	**-**	**(295.5)**	(309.6)	-	(309.6)
Trading profit	2	**181.4**	**-**	**181.4**	197.2	-	197.2
Amortisation of acquired intangible assets		**-**	**(10.0)**	**(10.0)**	-	(12.9)	(12.9)
Restructuring charges	3	**-**	**(39.8)**	**(39.8)**	-	(15.3)	(15.3)
Vacant site remediation costs	1	**-**	**(4.1)**	**(4.1)**			
GMP equalisation charge	1	**-**	**-**	**-**	-	(4.5)	(4.5)
Operating profit/(loss)		**181.4**	**(53.9)**	**127.5**	197.2	(32.7)	164.5
Finance expense		**(19.5)**	**-**	**(19.5)**	(16.7)	-	(16.7)
Finance income		**8.5**	**-**	**8.5**	5.6	-	5.6
Net finance costs	4	**(11.0)**	**-**	**(11.0)**	(11.1)	-	(11.1)
Share of post-tax income of joint ventures		**1.0**	**1.1**	**2.1**	2.8	-	2.8
Profit/(loss) before tax		**171.4**	**(52.8)**	**118.6**	188.9	(32.7)	156.2
Income tax (charge)/credits	5	**(43.8)**	**11.7**	**(32.1)**	(48.4)	36.8	(11.6)
Profit/(loss) from:							
Continuing operations		**127.6**	**(41.1)**	**86.5**	140.5	4.1	144.6
Discontinued operations					-	0.5	0.5
Profit/(loss)		**127.6**	**(41.1)**	**86.5**	140.5	4.6	145.1
Profit/(loss) attributable to:							
Owners of the parent		**121.4**	**(41.1)**	**80.3**	133.7	4.6	138.3
Non-controlling interests		**6.2**	**-**	**6.2**	6.8	-	6.8
Profit/(loss)		**127.6**	**(41.1)**	**86.5**	140.5	4.6	145.1
Earnings per share — pence	6						
Continuing operations — basic				**29.8**			51.1
— diluted				**29.6**			50.8
Total operations — basic				**29.8**			51.3
— diluted				**29.6**			51.0

(1) Headline performance is defined in Note 17.1 and separately reported items are defined in Note 1.5.

Group Statement of Comprehensive Income

For the year ended 31 December 2019

	2019 **£m**	2018 £m
Profit	**86.5**	145.1
Items that will not subsequently be reclassified to income statement:		
Remeasurement of defined benefit assets/liabilities	**(3.6)**	5.1
Income tax relating to items not reclassified	**1.9**	6.0
Items that may subsequently be reclassified to income statement:		
Exchange differences on translation of the net assets of foreign operations	**(73.4)**	11.1
Reclassification of foreign currency translation reserve on disposal of share in joint venture	**(1.1)**	-
Exchange differences on translation of net investment hedges	**14.1**	(11.5)
Income tax relating to items that may be reclassified	**-**	-
Other comprehensive income/(loss), net of income tax	**(62.1)**	10.7
Total comprehensive income	**24.4**	155.8
Total comprehensive income attributable to:		
Owners of the parent	**20.6**	149.3
Non-controlling interests	**3.8**	6.5
Total comprehensive income	**24.4**	155.8
Total comprehensive income attributable to owners of the parent arises from:		
Continuing operations	**20.6**	148.8
Discontinued operations	**-**	0.5
Total comprehensive income attributable to owners of the parent	**20.6**	149.3

Group Statement of Cash Flows

For the year ended 31 December 2019

	Notes	2019 £m	2018 £m
Cash flows from operating activities			
Cash generated from operations	9	**240.7**	195.2
Interest paid		**(17.3)**	(16.3)
Interest received		**5.2**	4.8
Net interest paid		**(12.1)**	(11.5)
Income taxes paid		**(44.5)**	(41.8)
Net cash inflow from operating activities		**184.1**	141.9
Cash flows from investing activities			
Capital expenditure		**(65.4)**	(41.2)
Proceeds from the sale of property, plant and equipment		**3.7**	2.6
Proceeds from the sale of assets classified as held for sale		**1.8**	-
Acquisition of subsidiaries and joint ventures, net of cash acquired		**(32.7)**	(1.0)
Disposal of joint ventures, net of cash disposed		**6.8**	-
Dividends received from joint ventures		**0.1**	1.2
Net cash outflow from investing activities		**(85.7)**	(38.4)
Net cash inflow before financing activities		**98.4**	103.5
Cash flows from financing activities			
Proceeds from borrowings	8	**154.6**	34.9
Repayment of borrowings	8	**(169.8)**	(1.6)
Settlement of derivatives		**(5.1)**	1.8
Purchase of ESOP shares		**-**	(13.4)
Dividends paid to equity shareholders	7	**(53.9)**	(50.0)
Dividends paid to non-controlling shareholders		**(2.8)**	(1.9)
Net cash outflow from financing activities		**(77.0)**	(30.2)
Net increase in cash and cash equivalents	8	**21.4**	73.3
Cash and cash equivalents at 1 January		**213.4**	140.0
Effect of exchange rate fluctuations on cash and cash equivalents	8	**(12.7)**	0.1
Cash and cash equivalents at 31 December		**222.1**	213.4
Free cash flow from continuing operations (Note 17.10)			
Net cash inflow from operating activities		**184.1**	142.0
Net retirement benefit obligations		**5.1**	3.4
Capital expenditure		**(65.4)**	(41.2)
Proceeds from the sale of property, plant and equipment		**3.7**	2.6
Proceeds from the sale of assets classified as held for sale		**1.8**	-
Dividends received from joint ventures		**0.1**	1.2
Dividends paid to non-controlling shareholders		**(2.8)**	(1.9)
Free cash flow from continuing operations	17	**126.6**	106.1
Discontinued operations		**-**	(0.1)
Free cash flow	17	**126.6**	106.0

2018 Free cash flow does not reflect the transition to IFRS 16 Leases.

Group Balance Sheet

As at 31 December 2019

	Notes	2019 £m	31 Dec 2018 Restated(*) £m	1 Jan 2018 Restated(*) £m
Assets				
Property, plant and equipment		**337.7**	303.7	301.1
Intangible assets		**708.5**	724.0	725.6
Employee benefits - net surpluses	11	**102.6**	90.8	92.4
Interests in joint ventures and associates		**12.7**	19.1	17.5
Investments		**0.8**	1.0	1.4
Income tax receivable		**-**	-	0.4
Deferred tax assets		**94.9**	94.5	61.0
Other receivables		**22.1**	30.1	30.9
Derivative financial instruments	16	**0.5**	0.7	0.2
Total non-current assets		**1,279.8**	1,263.9	1,230.5
Cash and short-term deposits	8	**229.2**	236.9	161.9
Inventories		**212.9**	244.3	222.8
Trade and other receivables		**379.6**	440.4	422.2
Income tax recoverable		**2.9**	2.8	5.2
Derivative financial instruments	16	**0.1**	0.1	0.1
Assets classified as held for sale		**-**	1.7	-
Total current assets		**824.7**	926.2	812.2
Total assets		**2,104.5**	2,190.1	2,042.7
Equity				
Issued share capital		**27.8**	27.8	27.8
Retained earnings		**2,463.1**	2,432.4	2,342.7
Other reserves		**(1,427.5)**	(1,369.5)	(1,369.4)
Equity attributable to the owners of the parent		**1,063.4**	1,090.7	1,001.1
Non-controlling interests		**51.0**	50.0	45.4
Total equity		**1,114.4**	1,140.7	1,046.5
Liabilities				
Interest-bearing borrowings	8	**303.2**	455.5	410.5
Employee benefits - net liabilities	11	**111.1**	106.1	108.9
Other payables		**15.1**	16.1	17.3
Provisions	15	**31.1**	38.8	34.4
Deferred tax liabilities		**43.6**	38.7	42.7
Total non-current liabilities		**504.1**	655.2	613.8
Interest-bearing borrowings	8	**171.7**	29.4	25.7
Trade and other payables		**273.6**	311.8	292.6
Income tax payable		**14.3**	29.3	34.3
Provisions	15	**25.7**	23.1	29.8
Derivative financial instruments	16	**0.7**	0.6	-
Total current liabilities		**486.0**	394.2	382.4
Total liabilities		**990.1**	1,049.4	996.2
Total equity and liabilities		**2,104.5**	2,190.1	2,042.7

**Restated – see Note 10 of the Group financial statements for an explanation and analysis of the prior year adjustments made in respect of the Balance Sheet as at 31 December 2018 and 1 January 2018.*

Group Statement of Changes in Equity

For the year ended 31 December 2019

	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 2018 – as reported	27.8	(1,369.4)	2,370.3	1,028.7	45.4	1,074.1
Restatement upon impairment of tangible and intangible assets (note 10)	-	-	(27.6)	(27.6)	-	(27.6)
As at 1 January 2018 - restated	27.8	(1,369.4)	2,342.7	1,001.1	45.4	1,046.5
Profit	-	-	138.3	138.3	6.8	145.1
Remeasurement of defined benefit liabilities/assets	-	-	5.1	5.1	-	5.1
Income tax relating to items not reclassified	-	-	6.0	6.0	-	6.0
Exchange differences on translation of the net assets of foreign operations	-	11.4	-	11.4	(0.3)	11.1
Exchange differences on translation of net investment hedges		(11.5)	-	(11.5)	-	(11.5)
Income tax relating to items that may be reclassified	-	-	-	-	-	-
Other comprehensive income/(loss), net of income tax	-	(0.1)	11.1	11.0	(0.3)	10.7
Total comprehensive income (loss)	-	(0.1)	149.4	149.3	6.5	155.8
Recognition of share-based payments	-	-	3.7	3.7	-	3.7
Purchase of ESOP shares	-	-	(13.4)	(13.4)	-	(13.4)
Dividends paid (Note 7)	-	-	(50.0)	(50.0)	(1.9)	(51.9)
Total transactions with owners	-	-	(59.7)	(59.7)	(1.9)	(61.6)
As at 1 January 2019 – as reported	**27.8**	**(1,369.5)**	**2,432.4**	**1,090.7**	**50.0**	**1,140.7**
Restatement upon adoption of IFRIC 23	**-**	**-**	**1.5**	**1.5**	**-**	**1.5**
As at 1 January 2019 – restated	**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)
Reclassification of foreign currency translation reserve on disposal of share in joint venture	-	(1.1)	-	(1.1)	-	(1.1)
Exchange differences on translation of net investment hedges	-	14.1	-	14.1	-	14.1
Income tax relating to items that may be reclassified	-	-	-	-	-	-
Other comprehensive income/(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 31 December 2019	**27.8**	**(1,427.5)**	**2,463.1**	**1,063.4**	**51.0**	**1,114.4**

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 2019 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 27 February 2020.

The auditors have reported on the Group Financial Statements for the years ended 31 December 2019 and 31 December 2018 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 2018 have been filed with the Registrar of Companies and those for the year ended 31 December 2019 will be filed following the Company's Annual General Meeting.

The Group Financial Statements have been prepared in accordance with International Financial Reporting Standards ('IFRS') and interpretations issued by the IFRS Interpretations Committee ('IFRS IC') as adopted by the European Union and with the Companies Act 2006 applicable to companies reporting under IFRS. 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.

The 2018 Group Financial Statements are subject to an ongoing review by the FRC's Corporate Reporting Review team as part of the usual cycle of reviews of listed Company's accounts. This has resulted in us making a number of enhancements to our disclosures in the 2019 Group Financial Statements. As part of that enquiry, we have also reconsidered our application of IAS 36, Impairment of Assets. Previously, the group identified cash generating units as Steel and Foundry. We have now performed goodwill impairment testing at an operating segment level which are Steel Advanced Refractories, Steel Flow Control, Steel Digital Services (Sensors & Probes) and Foundry. This has shown that the carrying value of the goodwill and certain tangible assets held in the Steel Digital Services (Sensors & Probes) operating segment could not be supported by value in use calculations as at 31 December 2017. Therefore the goodwill has been impaired at that date, resulting in an impairment of £17.4m. We have also identified an impairment of tangible fixed assets of £10.2m. The effect of these impairments is a decrease in net assets of £27.6m as at 31 December 2017, 31 December 2018 and 31 December 2019. There is no material impact on reported profit or cash flow for the years ending 31 December 2018 and 31 December 2019. Further details are provided in note 10. When reviewing the Company's 2018 Annual Report and Financial Statements, the FRC has made clear to us the limitations of its review is as follows:

- its review is based on the 2018 Annual Report and Financial Statements only and does not benefit from a detailed knowledge of the Group's business or an understanding of the underlying transactions entered into;
- communications from the FRC provide no assurance that the Company's 2018 Annual Report and Financial Statements are correct in all material respects and are made on the basis that the FRC (and its officers, employees and agents) accepts no liability for reliance on them by the Company or any third party, including but not limited to investors and shareholders; and
- the FRC's role is not to verify information provided but to consider compliance with reporting requirements.

1.2 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.

1.3 Going concern

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 2019 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 forecasts show that the Group will be able to operate within the current committed debt facilities and show continued compliance with the Company's financial covenants. On the basis of the exercise described above and the Group's available committed debt facilities, 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. Accordingly, they continue to adopt a going concern basis in preparing the financial statements of the Group and the Company.

1.4 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.

1.5 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 17), 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.

2019

The Group owns a disused property in the US, which does not form part of our trading operations. Costs are being incurred at this site to address the significant increase in the volume of water run-off occurring in 2019. We have engaged waste management specialists, are taking actions to reduce the level of water (including hydrological studies) and are in contact with the relevant regulatory authorities. We estimate that it will take 18 months to finalise remediation. The costs for this remediation are estimated to be £4.1m. These non-recurring costs have been treated as a separately reported item. There has been no impact upon headline performance.

2018
Following a period of sustained profitability of the Group's US business, for 2018 the Board decided to substantially increase the amount reflected on the Group's balance sheet in respect of the previously unrecognised value of US tax losses and other temporary differences.

A UK High Court judgement was made on 26 October 2018 in respect of the gender equalisation of guaranteed minimum pensions ("GMPs") for occupational pension schemes. The increase in pension liabilities resulting from this judgement has been treated for IAS 19 purposes as a plan amendment and has resulted in an increase in the pension deficit in the balance sheet and a corresponding past service cost in the income statement. This has been treated as a separately reported item so that there has been no impact upon Headline performance. We are working with the trustees of our UK pension plan and our actuarial and legal advisers to understand the extent to which the judgement crystallises additional liabilities for the UK pension plan. We estimated the impact of GMP equalisation as at 31 December 2018 to be £4.5m.

1.6 Changes in accounting policies

Initial adoption of IFRS 16 Leases

The Group has adopted IFRS 16 Leases from 1 January 2019 and, in accordance with the simplified approach, has not restate comparatives on transition. The reclassifications and adjustments arising from the new lease accounting rules are therefore recognised in the opening balance sheet on 1 January 2019.

The Group has recognised lease liabilities in relation to leases which had previously been classified as operating leases and taken the practical expedient provided for leases of low-value assets and short-term leases (shorter than twelve months). For leases that had been classified as operating leases in accordance with IAS 17 the lease liability was recognised at the present value of the remaining lease payments, discounted using the interest rate implicit in the lease if that rate could be readily determined. If that rate could not be readily determined the lessee's incremental borrowing rate was used, calculated as the local government bond rate plus an interest rate spread. The weighted average lessee's incremental borrowing rate applied to the lease liabilities on 1 January 2019 was 4.4%.

Net debt rose accordingly due to the increase in lease liabilities, as shown in Note 8. In cases where there was an option to terminate or extend a lease, the duration of the lease assumed for this purpose reflected the Group's existing intentions regarding such options.

Lease liabilities include the net present value of the following lease payments:

- fixed payments (including in-substance fixed payments), less any lease incentives receivable
- variable lease payments that are based on an index or a rate
- amounts expected to be payable by the lessee under residual value guarantees
- the exercise price of a purchase option if the lessee is reasonably certain to exercise that option, and
- payments of penalties for terminating the lease, if the lease term reflects the lessee exercising that option.

For leases previously classified as finance leases the entity recognised the carrying amount of the lease asset and lease liability immediately before transition as the carrying amount of the right of use asset and the lease liability at the date of initial application. In determining the right of use assets, the Group has taken the practical expedient in respect of placing reliance on previous assessments on whether leases are onerous. This has resulted in adjustment of the onerous lease provision of £2.5 million against the right of use assets upon transition and recognition of a lease liability. The measurement principles of IFRS 16 are only applied after that date.

The right of use asset was measured at the amount equal to the lease liability, adjusted by the amount of any prepaid or accrued lease payments relating to that lease recognised in the balance sheet as at 31 December 2018. The right-of-use asset is depreciated over the shorter of the asset's useful life and the lease term on a straight-line basis. The recognised right of use assets relate to the following assets.

	31 December 2019 £m	1 January 2019 £m	As reported 31 December 2018 £m
Leasehold property	20.7	22.3	-
Plant and equipment	13.7	15.7	4.4
	34.4	**38.0**	**4.4**

The change in accounting policy affected the following items in the balance sheet on 1 January 2019.

	As reported 31 December 2018 £m		1 January 2019 £m
Property, plant and equipment – increase	313.9	33.6	**347.5**
Trade and other receivables – decrease	470.5	(3.3)	**467.2**
Provisions – decrease	(61.9)	2.5	**(59.4)**
Lease liabilities – increase	(3.9)	(32.8)	**(36.7)**

The operating lease commitment disclosed in the Group's 2018 consolidated accounts can be reconciled to the lease liability as at 1 January 2019 as follows.

	£m
Operating lease commitment disclosed as at 31 December 2018	39.3
Add finance lease liabilities recognised already as at 31 December 2018	3.9
Less short-term and low-value leases still treated as operating leases	(6.0)
Less the effect of discounting upon the lease liability as at 1 January 2019	(4.4)
Lease liability recognised as at 1 January 2019	**32.8**

In contrast with the previous presentation of operating lease expenses within operating profit, the Group now recognises depreciation charges on right of use assets and interest expense from unwinding of the discount on the lease liabilities. If IFRS 16 had been applied for the 2018 Annual Report and Financial Statements, operating profit and interest expense would both have been approximately £1m higher, with an insignificant impact on net profit, and cash generated from operations would have been approximately £9m higher with a compensating £9m additional financing cash outflow so there would have been no impact on the net cash flow.

IFRIC 23 Uncertainty over Income Tax Treatments

IFRIC 23 has been applied from 1 January 2019 and clarified how the recognition and measurement requirements of IAS 12 'Income taxes' are to be applied where there is uncertainty over income tax treatments. At transition, an adjustment has been made to reduce tax liabilities and to increase opening reserves in respect of tax provisions by £1.5m.

1.7 New and revised IFRS

Certain new accounting standards and interpretations have been published that are not mandatory for 31 December 2019 reporting periods and have not been early adopted by the Group. These include the new insurance standard IFRS 17 Insurance Contracts which was issued in 2017 with the effective date of 1 January 2021. These new or amended standards or interpretations are not expected to have a significant impact on the Group's financial statements.

The 2018 Group Financial Statements are subject to an ongoing review by the FRC's Corporate Reporting Review team as part of the usual cycle of reviews of listed Company's accounts. This has resulted in us making a number of enhancements to our disclosures in the 2019 Group Financial Statements. As part of that enquiry, we have also reconsidered our

application of IAS 36, Impairment of Assets. Previously, the group identified cash generating units as Steel and Foundry. We have now performed goodwill impairment testing at an operating segment level which are Steel Advanced Refractories, Steel Flow Control, Steel Digital Services (Sensors & Probes) and Foundry. This has shown that the carrying value of the goodwill and certain tangible assets held in the Steel Digital Services (Sensors & Probes) operating segment could not be supported by value in use calculations as at 31 December 2017. Therefore the goodwill has been fully impaired at that date, resulting in an impairment of £17.4m. We have also identified impairment of tangible fixed assets of £10.2m. The effect of these impairments is a decrease in net assets of £27.6m as at 31 December 2017, 31 December 2018 and 31 December 2019. There is no material impact on the reported profit or cash flow for the years ended 31 December 2018 and 31 December 2019. Further details are provided in Note 10.

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 Executive Directors of the Board, 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 Digital Services (Sensors & Probes) and Foundry. The principal activities of each of these segments are described in the Operational Review.

The Flow Control, Advanced Refractories and Digital Services operating segments are aggregated into the Steel reportable segment reflecting the similar production processes and inputs each of them have into the production of Steel for a particular customer.

Segment revenue represents revenue from external customers (inter-segment revenue is not material). Trading profit includes items directly attributable to a segment as well as those items that can be allocated on a reasonable basis.

2.1 Income statement

	2019					
	Flow Control	Advanced Refractories	Digital Services (Sensors & Probes)	**Steel**	**Foundry**	**Continuing operations**
				£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 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**

	2018					
	Flow Control	Advanced Refractories	Digital Services (Sensors & Probes)	**Steel**	**Foundry**	**Continuing operations**
				£m	**£m**	**£m**
Segment revenue	662.6	541.1	33.0	**1,236.7**	**561.3**	**1,798.0**
at a point in time				**1,225.7**	**561.3**	**1,787.0**
Over time				**11.0**	**-**	**11.0**
Segment EBITDA				**155.3**	**82.9**	**238.2**
Segment depreciation				**(27.0)**	**(14.0)**	**(41.0)**
Segment trading profit				**128.3**	**68.9**	**197.2**
Return on sales margin				*10.4%*	*12.3%*	*11.0%*
Amortisation of acquired intangible assets						**(12.9)**
Restructuring charges						**(15.3)**
GMP equalisation charge						**(4.5)**
Operating profit						**164.5**
Net finance costs						**(11.1)**
Share of post-tax profit of joint ventures						**2.8**
Profit before tax						**156.2**
Capital expenditure additions				**34.4**	**14.0**	**48.4**

3 Restructuring charges

The 2019 restructuring charges were £39.8m and relate to the programme first announced in March 2018, which is predominantly focused on rationalising our manufacturing footprint, consolidating production and streamlining various back office functions. The charges reflect redundancy costs of £24.8m (2018: £8.3m), plant closure costs of £4.4m (2018: £4.7m), consultancy fees of £1.6m (2018: £0.5m), asset write-offs of £8.9m (2018: £1.7m) and travel of £0.1m (2018: £0.1m).

The net tax credit attributable to the total restructuring charges was £9.2m (2018: £1.8m).

Cash costs of £30.0m (2018: £19.3m) (Note 9) were incurred in the year in respect of the restructuring programme, leaving provisions made but unspent of £19.1m (Note 15) as at 31 December 2019 (2018: £17.4m), of which £nil (2018: £4.3m) relates to future costs in respect of leases expiring between one and six years.

4 Net finance costs

Total net finance costs for the period of £11.0m is analysed in the table below.

	2019 £m	2018 £m
Interest payable on borrowings		
Loans, overdrafts and factoring arrangements	**15.7**	14.5
Interest on lease liabilities	**1.6**	0.2
Amortisation of capitalised borrowing costs	**0.6**	0.6
Total interest payable on borrowings	**17.9**	15.3
Interest on net retirement benefits obligations	**0.3**	0.1
Adjustments to discounts on provisions and other liabilities	**1.3**	1.3
Adjustments to discounts on receivables	**(0.7)**	(0.8)
Finance income	**(7.8)**	(4.8)
Total net finance costs	**11.0**	11.1

5 Income tax

The Group’s effective tax rate, based on the income tax costs associated with headline performance of £43.8m (2018: 48.4m), was 25.7% (2018: 26.0%).

The utilisation of our US tax losses and other temporary differences has increased the headline tax charge in 2019 by £7.4m (2018: £7.8m), increasing the effective rate of tax on headline profit before tax and share of post-tax profits from joint ventures by 4.3% (2018: 4.2%). The utilisation of US tax losses and other temporary differences includes the impact of the Global Intangible Low-Taxed Income (‘GILTI’) rules which were introduced as part of US tax reform. The GILTI rules have increased the headline tax charge by £1.2m (2018: £2.4m).

The Group’s total income tax costs include a credit on separately reported items of £11.7m (2018: £36.8m credit), comprising £2.5m non-cash deferred tax movements relating to the amortisation of a deferred tax liability mainly arising from the 2008 acquisition of Foseco plc (2018: £2.8m), £9.2m tax credits relating to restructuring charges (2018: £1.8m) and no net increase in the deferred tax asset recognised in respect of US tax losses and certain other temporary differences (2018: £32.2m increase).

The net income tax credit reflected in the Group Statement of Comprehensive Income in the year amounted to £1.9m (2018: £6.0m credit), comprising a £1.9m credit (2018: £1.3m charge) related to tax on net actuarial gains and losses on the employee benefits plans worldwide and no additional recognition of a US pension deferred tax asset (2018: £7.3m credit).

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, of £80.3m (2018: £137.8m), being the profit for the year of £86.5m (2018: £144.6m) less non-controlling interests of £6.2m (2018: £6.8m); basic and diluted EPS from total operations are based on the profit attributable to owners of the parent of £80.3m (2018: £138.3m); headline and diluted headline EPS are based upon headline profit from continuing operations attributable to owners of the parent of £121.4m (2018: £133.7m). The table below reconciles these different profit measures.

	2019 **£m**	2018 £m
Profit attributable to owners of the parent	**80.3**	137.8
Adjustments for separately reported items:		
Amortisation of intangible assets	**10.0**	12.9
Restructuring charges	**39.8**	15.3
Gain on disposal of share in joint venture	**(1.1)**	-
Vacant site remediation costs	**4.1**	-
GMP equalisation charge	**-**	4.5
Income tax (credit)/charge	**(11.7)**	(36.8)
Headline profit attributable to owners of the parent	**121.4**	133.7

6.2 Weighted average number of shares

	2019 **millions**	2018 millions
For calculating basic and headline EPS	**269.1**	269.8
Adjustment for dilutive potential ordinary shares	**1.9**	1.4
For calculating diluted and diluted headline EPS	**271.0**	271.2

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

	Continuing operations pence	**Discontinued operations pence**	**2019 total pence**	Continuing operations pence	Discontinued operations pence	2018 total pence
Earnings per share - basic	**29.8**	**-**	**29.8**	51.1	0.2	51.3
- headline	**45.1**			49.6		
- diluted	**29.6**	**-**	**29.6**	50.8	0.2	51.0
- diluted headline	**44.8**			49.3		

7 Dividends

	2019 £m	2018 £m
Amounts recognised as dividends and paid to equity holders during the period		
Final dividend for the year ended 31 December 2017 of 12.50p per ordinary share	-	33.8
Interim dividend for the year ended 31 December 2018 of 6.00p per ordinary share		16.2
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**	-
	53.9	50.0

A final dividend for the year ended 31 December 2018 of £37.2m (2017: £33.8m), equivalent to 13.8 pence (2017: 12.5 pence) per ordinary share, was paid in May 2019 (May 2018) and an interim dividend for the year ended 31 December 2019 of £16.7m (2018: £16.2m), equivalent to 6.2 pence (2018: 6.0 pence) per ordinary share, was paid in September 2019 (September 2018).

A proposed final dividend for the year ended 31 December 2019 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 22 May 2020 to ordinary shareholders on the register at 17 April 2020.

8 Reconciliation of movement in net debt

	Balance as at 1 Jan 2019 £m	Transition to IFRS 16 on 1 Jan 2019 £m	Foreign exchange adjustments £m	Non-cash movements £m	Cash flow £m	Balance as at 31 Dec 2019 £m
Cash and cash equivalents						
Cash at bank and in hand	**236.9**	**-**	**(12.9)**	**-**	**5.2**	**229.2**
Bank overdrafts	**(23.5)**	**-**	**0.2**	**-**	**16.2**	**(7.1)**
	213.4	**-**	**(12.7)**	**-**	**21.4**	**222.1**
Borrowings, excluding bank overdrafts						
Current	**(6.5)**	**-**	**(8.1)**	**(105.5)**	**(44.5)**	**(164.6)**
Non-current	**(456.7)**	**(32.8)**	**29.1**	**96.3**	**59.7**	**(304.4)**
	(463.2)	**(32.8)**	**21.0**	**(9.2)**	**15.2**	**(469.0)**
Capitalised arrangement fees	**1.8**	**-**	**-**	**(0.6)**	**-**	**1.2**
Derivative financial instruments	**0.2**	**-**	**(5.4)**	**-**	**5.1**	**(0.1)**
Net debt	**(247.8)**	**(32.8)**	**2.9**	**(9.8)**	**41.7**	**(245.8)**

	Balance as at 1 Jan 2018 £m	Foreign exchange adjustments £m	Non-cash movements £m	Cash flow £m	Balance as at 31 Dec 2018 £m
Cash and cash equivalents					
Cash at bank and in hand	**161.9**	**0.5**	**-**	**74.5**	**236.9**
Bank overdrafts	**(21.9)**	**(0.4)**	**-**	**(1.2)**	**(23.5)**
	140.0	**0.1**	**-**	**73.3**	**213.4**
Borrowings, excluding bank overdrafts					
Current	**(4.3)**	**-**	**-**	**(2.2)**	**(6.5)**
Non-current	**(412.1)**	**(14.4)**	**-**	**(30.2)**	**(456.7)**
	(416.4)	**(14.4)**	**-**	**(32.4)**	**(463.2)**
Capitalised borrowing costs	**2.1**	**-**	**0.6**	**(0.9)**	**1.8**
Derivative financial instruments	**0.3**	**1.7**	**-**	**(1.8)**	**0.2**
Net debt	**(274.0)**	**(12.6)**	**0.6**	**38.2**	**(247.8)**

9 Cash generated from operations

	Continuing operations £m	**Discontinued operations £m**	**2019 total £m**	Continuing operations £m	Discontinued operations £m	2018 total £m
Operating profit	**127.5**	**-**	**127.5**	164.5	0.5	165.0
Adjustments for:						
Amortisation of intangible assets	**10.0**	**-**	**10.0**	12.9	-	12.9
Restructuring charges	**39.8**	**-**	**39.8**	15.3	-	15.3
Vacant site remediation costs	**4.1**	**-**	**4.1**	-	-	-
GMP equalisation charge	**-**	**-**	**-**	4.5	-	4.5
(Profit)/Loss on disposal of non-current assets	**(0.3)**	**-**	**(0.3)**	-	-	-
Depreciation	**49.7**	**-**	**49.7**	41.0	-	41.0
	230.8	**-**	**230.8**	238.2	0.5	238.7
Net decrease/(increase) in inventories	**24.9**	**-**	**24.9**	(20.7)	-	(20.7)
Net decrease/(increase) in trade receivables	**54.4**	**-**	**54.4**	(4.9)	-	(4.9)
Net (decrease)/increase in trade payables	**(15.2)**	**-**	**(15.2)**	3.6	-	3.6
Net decrease/(increase) in other working capital	**(19.1)**	**-**	**(19.1)**	1.8	(0.6)	1.2
Outflow related to restructuring charges	**(30.0)**	**-**	**(30.0)**	(19.3)	-	(19.3)
Net retirement benefit obligations	**(5.1)**	**-**	**(5.1)**	(3.4)	-	(3.4)
Cash generated from operations	**240.7**	**-**	**240.7**	195.3	(0.1)	195.2

10 Impairment of Tangible and Intangible Assets

A prior year restatement was recognised relating to the year ended 31 December 2017 following a review of the Group's accounting policy for the impairment of tangible and intangible assets. Further to correspondence with the Financial Reporting Council ("FRC") it was identified that, in previous years, the Group's goodwill impairment test had not been performed in accordance with the requirements of IAS 36, Impairment of Assets.

Previously the group identified two reportable segments: Steel and Foundry, to represent the lowest level at which goodwill was monitored. In contrast, paragraph 80(b) of IAS 36 does not permit goodwill to be tested at a level higher than the level of an operating segment. The Group's operating segments are Steel Advanced Refractories, Steel Flow Control, Steel Digital Services (Sensors & Probes) and Foundry Divisions.

To ensure compliance with this aspect of IAS 36, the Group has determined the impact of performing goodwill impairment testing at the appropriate operating segment level on the 2017 and 2018 accounts. This has shown that the carrying value of goodwill and certain tangible assets allocated to the Steel Digital Services (Sensors & Probes) operating segment could not be fully supported by this segment's recoverable amount as at 31 December 2017. Therefore goodwill has been fully impaired at that date.

Goodwill arising in relation to the acquisitions of ECIL Met Tec in 2014 and the Sidermes Group in 2015 was allocated to the Steel Digital Services (Sensors & Probes) segment. Goodwill of £4.6m and £12.8m respectively was recognised on these acquisitions. The growth of this operating segment has been slower than initially expected due to end market weakness resulting in a recoverable amount of the segment that was £27.6m lower than its carrying value as at 31 December 2017. This difference has been recognised as an impairment loss against goodwill allocated to the segment (£17.4m) and property, plant and equipment (£10.2m).

The overall effect of this impairment is a decrease in net assets of £27.6m as at 31 December 2017, 31 December 2018 and 31 December 2019. There is no material impact on reported profit and cash flow for the years ended 31 December 2018 and 31 December 2019.

	2019 **£m**	2018 Restated £m
Steel Flow Control	**277.5**	291.1
Steel Advanced Refractories	**131.1**	125.0
Foundry	**211.6**	221.0
Total goodwill	**620.2**	637.1

11 Employee benefits

The net employee benefits balance as at 31 December 2019 of £8.5m (2018: £15.3m) in respect of the Group's defined benefit retirement plans and other post-retirement benefits plans results from an actuarial valuation of the Group's defined benefit pension and other post-retirement obligations as at that date. As analysed in the following table, the net balance comprised net surpluses/(assets) of £102.6m (2018: £90.8m), relating largely to the Group's main defined benefit pension plan in the UK, together with net liabilities/(deficits) of £111.1m (2018: £106.1m).

	2019 £m	2018 £m
Employee benefits — net surpluses		
UK defined benefit pension plans	**101.5**	89.7
ROW defined benefit pension plans	**1.1**	1.1
Net surpluses	**102.6**	90.8
Employee benefits — net liabilities		
UK defined benefit pension plans	**(1.9)**	(1.8)
US defined benefit pension plans	**(28.6)**	(32.5)
Germany defined benefit pension plans	**(54.5)**	(47.8)
ROW defined benefit pension plans	**(19.2)**	(16.7)
Other post-retirement benefit plans	**(6.9)**	(7.3)
Net liabilities	**(111.1)**	(106.1)
Total liabilities	**(8.5)**	(15.3)

The total net charge of £5.1m (2018: £9.8m) recognised in the Group Income Statement in respect of the Group's defined benefit pension plans and other post-retirement benefits plans is recognised in the following lines.

		2019 £m	2018 £m
In arriving at trading profit	— within other manufacturing costs	**1.7**	1.5
(as defined in Note 17)	— within administration, selling and distribution costs	**3.1**	3.7
In arriving at profit before tax	— GMP equalisation charge	**-**	4.5
	— within net finance costs	**0.3**	0.1
Total net charge		**5.1**	9.8

12 Contingent liabilities

Guarantees given by the Group under property leases of operations disposed of amounted to £0.3m (2018: £0.8m).

Vesuvius has extensive international operations and is subject to various legal and regulatory regimes, including those covering taxation and environmental matters. Several of Vesuvius' subsidiaries are parties to legal proceedings, certain of which are insured claims arising in the ordinary course of the operations of the company involved, and the Directors are aware of a number of issues which are, or may be, the subject of dispute with tax authorities. Provisions are made for the expected amounts payable in respect of known or probable costs resulting both from legal or other regulatory requirements, and from third-party claims.

Certain of Vesuvius' subsidiaries are subject to 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.

A number of lawsuits have been withdrawn, dismissed or settled and 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.

13 Related parties

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

In June 2019 Vesuvius completed the sale of 50% interest in Angang Vesuvius Refractory Company Ltd.

14 Acquisitions and divestments

CCPI

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 Steel 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.

Final valuations have not all been completed but the provisional fair values of the assets and liabilities recognised as a result of the acquisition are 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.

In the period since acquisition, CCPI has contributed £23.8m to revenue, £2.5m to trading profit and £1.8m to operating profit. If the acquisition had occurred on the first day of the financial year, it is estimated that the revenue, trading profit and operating profit from the acquisition would have been £28.9m, £3.0m and £2.3m respectively. 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 are included in administrative expenses in the income statement.

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 the year (2018: £1.1m) in respect of the previous acquisition of Process Metrix.

Joint venture disposal

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

15 Provisions

	Disposal and closure costs £m	Restructuring charges £m	Other £m	Total £m
As at 1 January 2018	39.8	17.4	4.7	61.9
Exchange adjustments	(1.2)	(1.0)	(0.1)	(2.3)
Charge to Group Income Statement	4.1	39.8	8.4	52.3
Unused amounts released to Group Income Statement	(0.2)	-	-	(0.2)
Adjustment to discount	1.3	-	-	1.3
Cash spend	(9.0)	(30.0)	(10.1)	(49.1)
Transferred to other balance sheet accounts	-	(7.1)	-	(7.1)
As at 31 December 2019	**34.8**	**19.1**	**2.9**	**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.

16 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:

	2019		2018	
	Assets £m	**Liabilities £m**	Assets £m	Liabilities £m
Investments (Level 2)	**0.8**	**-**	1.0	-
Derivatives not designated for hedge accounting purposes	**0.6**	**(0.7)**	0.8	(0.6)

All of the derivative financial instruments reported in the table above will mature within a year of the balance sheet date. There were no transfers between fair value hierarchies during the period. The method for determining the hierarchy and for valuing the financial instruments is consistent with that used at year-end, as disclosed in Note 26 of the 2018 Group Financial Statements. Fair value disclosures have not been made in respect of other financial assets and liabilities on the basis that the carrying amount is deemed to be a reasonable approximation of fair value.

The Group's Treasury department, acting in accordance with policies approved by the Board, is principally responsible for managing the financial risks faced by the Group. The Group's activities expose it to a variety of financial risks, the most significant of which are market risk and liquidity risk.

The currency and interest rate profile of the Group's borrowings is detailed in the tables below.

	Financial liabilities (gross borrowings)		
	Fixed rate	**Floating rate**	**Total**
	£m	**£m**	**£m**
Sterling	**-**	**66.2**	**66.2**
United States dollar	**150.8**	**0.9**	**151.7**
Euro	**109.9**	**113.4**	**223.3**
Other	**-**	**1.5**	**1.5**
Capitalised costs	**(1.2)**	**-**	**(1.2)**
As at 31 December 2019	**259.5**	**182.0**	**441.5**
Sterling	-	73.0	73.0
United States dollar	156.8	10.4	167.2
Euro	116.9	121.2	238.1
Other	-	8.4	8.4
Capitalised costs	(1.8)	-	(1.8)
As at 31 December 2018	271.9	213.0	484.9

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

As at 1 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 lease liabilities	**12.0**	**9.9**	**9.2**	**9.3**	**40.4**	**33.3**
Capitalised arrangement fees	**-**	**-**	**-**	**-**	**-**	**(1.2)**
Total interest-bearing borrowings	**183.8**	**27.3**	**166.2**	**144.2**	**521.5**	**474.9**
Total non-derivative financial liabilities	**357.6**	**27.3**	**166.2**	**144.2**	**695.3**	**648.7**

As at 31 December 2018	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	197.3	-	-	-	197.3	197.3
Loans & overdrafts	28.2	109.7	217.9	127.0	482.8	482.8
Finance leases	1.7	1.2	1.0	-	3.9	3.9
Capitalised arrangement fees	-	-	-	-	-	(1.8)
Total interest-bearing borrowings	29.9	110.9	218.9	127.0	486.7	484.9
Total non-derivative financial liabilities	227.2	110.9	218.9	127.0	684.0	682.2

17 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.

17.1 Headline

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.

17.2 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.

17.3 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.

17.4 Trading profit/EBITA

Trading profit/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.

17.5 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.

17.6 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.

17.7 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.

17.8 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.

	2019 £m	2018 £m
Cash generated from continuing operations	**240.7**	195.3
Add: Outflows relating to restructuring charges	30.0	19.3
Add: Net retirement benefit obligations	5.1	3.4
Less: Capital expenditure	(65.4)	(41.2)
Add: Vacant site remediation costs	1.8	-
Add: Proceeds from the sale of property, plant and equipment	3.7	2.6
Add: Proceeds from the sale of assets classified as held for sale	1.8	-
Adjusted operating cash flow	**217.7**	179.4
Trading Profit	**181.4**	197.2
Cash Conversion	**120.0%**	91%

17.9 Cash conversion

Cash conversion is calculated as 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.

17.10 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, but before additional funding contributions to Group pension plans. It is one of the Group's key performance indicators 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.

17.11 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 year, 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.

	2019 £m	2018 £m
Average trade working capital	**410.2**	429.3
Total revenue	**1,710.4**	1,797.0
Average trade working capital to sales ratio	**24.0%**	23.9%

17.12 Earnings before interest, tax, depreciation and amortisation ('EBITDA')

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 EBITDA ratios. A reconciliation of EBITDA is included in Note 2.

17.13 Net interest

Net interest is calculated as interest payable on borrowings less interest receivable, excluding any item separately reported. It is used in the calculation of the Group's interest cover ratio.

17.14 Interest cover

Interest cover is the ratio of EBITDA to net interest. 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.

17.15 Net debt

Net debt comprises the net total of current and non-current interest-bearing borrowings and cash and short-term deposits. 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.

17.16 Net debt to EBITDA

Net debt to EBITDA is the ratio of net debt at the year-end to EBITDA for that year. 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.

17.17 Return on net assets ('RONA')

RONA is calculated as trading profit plus share of post-tax profit of joint ventures, divided by average net operating assets, at constant currency (being the average over the previous 12 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.

	2019 **£m**	2018 £m
Average net operating assets (at constant currency)	**690.2**	658.9
Trading profit	181.4	197.2
Share of post-tax profit from joint ventures	1.0	2.8
	182.4	200.0
RONA	**26.4%**	30.4%

17.18 Constant currency

Constant currency is the average 2019 exchange rates.

18 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**		
	2019	2018	Change	**2019**	2018	Change
US Dollar	**1.28**	1.34	(4.5%)	**1.33**	1.28	3.9%
Euro	**1.14**	1.13	0.9%	**1.18**	1.11	6.3%
Chinese Renminbi	**8.82**	8.82	-	**9.23**	8.77	5.2%
Japanese Yen	**139.22**	147.36	(5.5%)	**144.01**	139.77	3.0%
Brazilian Real	**5.04**	4.87	3.5%	**5.33**	4.95	7.7%
Indian Rupee	**89.87**	91.18	(1.4%)	**94.60**	88.74	6.6%
South African Rand	**18.43**	17.63	4.5%	**18.55**	18.30	1.4%

5-year history at constant currency

	2015	2016	2017	2018	2019
Revenue (£m)	**1,514.3**	**1,477.1**	**1,643.0**	**1,807.8**	**1,710.4**
Steel	1,023.0	971.6	1,121.6	1,243.6	1,195.4
Foundry	491.3	475.5	521.4	564.2	515.1
Trading Profit (£m)	**142.5**	**137.0**	**159.8**	**197.3**	**181.4**
Steel	89.9	81.1	97.3	128.1	120.1
Foundry	52.6	55.9	62.5	69.2	61.3
Return on Sales	**9.4%**	**9.3%**	**9.7%**	**10.9%**	**10.6%**
Steel	8.8%	8.3%	8.7%	10.3%	10.0%
Foundry	10.7%	11.8%	12.0%	12.3%	11.9%