VESUVIUS PLC

2 March 2023

Full Year Results for the twelve months ended 31 December 2022

Record results and market share gains despite tough markets and inflationary cost pressures

Investment in future growth

Vesuvius plc, a global leader in molten metal flow engineering and technology, announces its audited results for the twelve months ended 31 December 2022.

Financial summary	2022 (£m)	2021 (£m)	Year-on-year change	Underlying change[1]
Revenue	2,047	1,643	25%	18%
Trading Profit [2] (EBITA)	227	142	60%	50%
Return on Sales [2]	11.1%	8.7%	240bps	240bps
Operating Profit	217	133	63%	
Headline Profit Before Tax [2]	217	137	58%	
Profit Before Tax	207	128	62%	
Profit	189	108	75%	
Headline Earnings [2]	152	96	59%	
Headline EPS [2] (pence)	56.5	35.3	60%	
Statutory EPS (pence)	67.2	37.7	78%	
Adjusted operating cash flow [2]	186	46	307%	
Cash generated from operations	268	83	224%	
Net Debt [2]	255	277	-8.0%	
Dividend (pence per share)	22.25p	21.2p	+5.0%	

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

Full Year 2022 Highlights

- Revenue of £2,047m, +18% (underlying) reflecting improved mix and successful execution of pricing strategy to fully recover input cost rises
- Record trading profit and return on sales of £227m (+50% underlying) and 11.1% (+240bps), respectively
- Market share gains alongside price rises in all regions for Flow Control and in most regions for Foundry and Advanced Refractories
- R&D programme and strategic capex to drive volume and margin growth in coming years fully on track:
  - capacity expansion in Flow Control
    - Additional VISO capacity in India and Poland now operational
    - Additional Slide Gate capacity in Poland on track to begin production later in 2023
    - New Flux plant in India to serve India and South-East Asia, operational in 2024
  - Development of new flagship greenfield plant in Vizag, India, to pave the way for the Steel Division long term expansion in Asia
  - + 18% R&D spend in 2022 (fully expensed) to drive technological differentiation and value-add of our products
- Good progress in H2 on reducing inventory levels, in particular raw materials
- Free cash flow of £123m despite £89m spent on capex
- Net debt/EBITDA of 0.9x (31 December 2022), provides flexibility to invest in organic and inorganic opportunities
- Proposed final dividend of 15.75p, bringing the full year dividend to 22.25p, +5%
- Target to achieve net zero carbon by 2050; on track for a20% reduction by 2025 and new detailed plan for a 50% reduction by 2035

Comment from Patrick André, CEO:

"2022 was a record year for Vesuvius despite difficult market conditions in the second half. This performance was made possible by the technological differentiation of our products and solutions, which enabled us to simultaneously compensate for all cost inflation with price increases and gain market share. These record results are higher than those ever achieved pre-pandemic, despite materially lower volumes, in both the Steel and Foundry divisions, as our end markets have not fully recovered since that period. This shows that our objective of a 12.5% return on sales is achievable in the medium-term on normalised volumes.

Looking forward, we expect to continue to successfully achieve market share gains through technological differentiation and new product launches. We are also confident in our ability to cover cost increases with pricing. Steel and Foundry markets have remained weak at the beginning of 2023, and we anticipate the rate of recovery to be slow and only to improve later in the year. We will also be impacted in the first half by a negative fixed cost absorption related to the reduction of our inventory level and by the impact of the cyber incident. Despite this, we are confident that our 2023 results will be in-line with our expectations. Looking beyond 2023, we expect the positive impact of our investment in R&D, long-term growth initiatives, and development of our capacity in fast growing regions, will result in accelerated growth and profitability."

Presentation of Full Year 2022 Results

Vesuvius management will make a presentation to analysts and investors on 2 March 2023 at 08.30 UK time at the London Stock Exchange, 10 Paternoster Square, London EC4M 7LS. For those unable to attend, the event will be livestreamed and can be accessed by clicking here. Participants can also join via an audio conference call. Please click here to register. Once registered, you will be provided with the information needed to join the conference, including dial-in numbers and passcodes. Be sure to save this information in your calendar.

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About Vesuvius plc

Vesuvius is a global leader in molten metal flow engineering and technology principally serving process industries operating in challenging high-temperature conditions.

We develop innovative and customised solutions, often used in extremely demanding industrial environments, which enable our customers to make their manufacturing processes safer, more efficient and more sustainable. 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 cost-efficient 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 they are recognised, developed and properly rewarded.

We think beyond today to create solutions that will shape the future.

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 accounts.

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 UK Listing Rules, the Rules of 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 delivered a record performance in 2022, reflecting full recovery of costs through pricing, alongside market share gains. This was achieved despite the challenges of a declining market, inflationary costs and a second half de-stocking cycle.

£m	2022 Reported	Acquisitions / Disposals	2022 Underlying	2021 Reported	currency	Acquisitions and disposals	2021 Underlying	Reported % Change	Underlying % Change
Revenue	2,047	(37)	2,010	1,643	70	(2)	1,710	25%	18%
Trading Profit	227	(6)	221	142	5	0.2	148	60%	50%
Return on Sales	11.1%		11.0%	8.7%			8.6%	+240bps	+240bps

Group trading performance
In 2022, revenue was £2,047m, an increase of 25% compared to 2021, reflecting underlying revenue growth of 18% (driven by price), FX translation and a contribution from the business acquired from Universal Refractories Inc. Underlying volume in the year was modestly negative versus 2021, which is a material out-performance versus the market. Trading profit (adjusted EBITA) was £227m, an increase of 60% on a reported basis and 50% on an underlying basis. The Group achieved a return on sales of 11.1% in 2022, an increase of 240bps on both an underlying and a reported basis. We have gained market share in most regions, driven by our market-leading flow control products. This strong performance, with pricing achieved to fully compensate for input cost rises while gaining share, demonstrates the strength of our offer to customers, the benefit of improved product mix and the value-added nature of our products and services. Our commercial agility shows the benefit of our decentralised, non-matrix, entrepreneurial organisation, which reacted rapidly to the changing cost environment.

Within the year, H2 was markedly weaker than H1 at the trading profit level, reflecting the volume impact from the sharp decline in underlying markets in H2, combined with the impact of fixed cost absorption as inventory levels started to be reduced.

Market background
The steel market has declined progressively through the year, due to the impact of energy prices, declining end demand, and the de-stocking cycle. Crude steel production in the world excluding China and Iran fell by 7.0% in 2022 vs. 2021, with India the only market that grew across the year as a whole (+5.5%), with the declining trend accelerating in H2. Europe was hardest hit, with double-digit declines, while NAFTA fell 5.5%. (Source: World Steel Association)

The end markets for Foundry were mixed, with growth in NAFTA and a weaker market in Europe and Asia, particularly China which was impacted by contraction in the heavy vehicle market and lower demand with extended Covid shutdowns. Generally, Foundry markets remained, in 2022, well below their pre-pandemic level.

Strategic progress
Vesuvius' core strategic objective is to deliver long-term sustainable and profitable growth. We have a clear strategy to achieve this objective centred around four key execution priorities. We continued to make progress on these priorities in 2022 and have continued to invest for the long term.

- **Reinforce our technology leadership**
    - Increased our industry-leading level of R&D investment to £36m in the year, up 18% versus 2021
- **Develop our technical offering and increase the penetration of our value-creating solutions**
    - Launched 15 new products in 2022
    - Opened our Ghlin centre of excellence for R&D and for Mechatronics, both developing new products and showcasing these with customers
    - Welcomed 25 customer delegations to the Ghlin centre in the first 6 months of opening

- **Capture growth in developing markets**
    - Major acceleration of expansion capex with £53m of total capex (c. 60%) spent on growth projects, particularly in Flow Control, to serve fast growing developing markets
    - Notable market share growth in emerging markets; we are disproportionately outperforming the market in these regions (for example, Flow Control volume growth in India, South-East Asia, Latin America and Turkey / Middle East)
- **Improve our cost leadership and margins**
    - Record return on sales ("RoS") of 11.1%, up 240bps (underlying) versus 2021
    - Higher RoS compared to 2018 while volumes in both Steel and Foundry remain materially lower

Price increases to recover input cost inflation while growing market share
The Group faced substantial cost inflation in the year, due to a combination of material costs, freight, energy and other costs including labour. We have fully recovered these by managing our pricing on an agile basis. We have succeeded in recovering costs while gaining market share, demonstrating the value our products and services bring to our customers.

Integration of the Universal Refractories business
In 2022 we have proceeded with the integration of Vesuvius Penn, the business acquired from Universal Refractories, a specialty refractory producer in the United States, in December 2021. The integration has involved the consolidation of manufacturing of advanced refractory and foundry products at sites regionally (both Penn and legacy Vesuvius) to create centres of excellence and more efficient operations.

Expansion of capacity supports organic growth and margin expansion
In 2021 we announced a number of capex projects to expand our capacity in our higher margin products to support future organic growth and market share gains. Those projects are proceeding well and we are now planning further projects, as set out below.

In 2022, we spent £53m of our total capex on growth capex in particular:
- Significant investment at our Skawina Poland plant
    - +35% expansion in EMEA Viso capacity to serve EMEA and, in particular, fast-growing markets in EEMEA
    - +100% expansion in EMEA Slide gate capacity, to serve EMEA and other regions
- +50% expansion in VISO capacity in Kolkata, India to serve the fast-growing markets of both India and South-East Asia

These projects are on track with Viso production now started in Skawina and India and progressive ramp-up of new slide gate capacity through 2023.

We have also resolved to expand our Flow Control Flux capacity in India and to commence the process of expanding our Advanced Refractories business in India. In total, we anticipate capex of c. £100m in 2023, of which growth projects will again be a similar proportion to that in 2022, at c. 60%. The remainder, "stay-in-business" capex, of c. £40m or c. 2% revenue, reflects the relatively capital-light nature of our business.

Working capital
Our average trade working capital/sales ratio for the trailing 12 months was 23.8% compared to 20.9% at December 2021 and 22.8% at 30 June 2022. This reflects a progressive rise in inventory days (from 76 to 89 (12m average, 31 December 2021 to 2022)), while debtor days remained broadly flat (78 at 31 December 2022(12m average)) and creditor days declined a little (from 67 to 64 (12m average)). The rolling average movement largely masks the reduction in inventory levels by value that has been achieved in H2, with inventory reducing by £43m since 30 June 2022. This reflects a significant management focus on reducing this balance, to end the year marginally below that of the prior year. We intend to continue to reduce our working capital balance in 2023, in particular, finished products inventories.

Balance sheet strength gives flexibility for investment

Net debt fell £22m in the year to £255m at 31 December 2022 and net debt / EBITDA reduced to 0.9x (1.4x at 31 December 2021), despite a step-up in capex expenditure on growth projects in the year. This strong balance sheet position gives us the opportunity for ongoing organic investment in the business and inorganic expansion, should the right opportunities arise.

ESG – Significant progress in our sustainability roadmap

We have already made considerable progress towards achieving our nine intermediate ESG targets.

KPI	Measure	Target	2022 progress vs. 2019
Safety	Lost Time Injury Frequency Rate below 1	<1	1.08 vs 1.54 in 2019
Energy Consumption	By 2025, reduce energy consumption per metric tonne of product packed for shipment (vs 2019)	-10%	-6%
CO_2e Emissions	By 2025, reduce (Scope 1 and Scope 2) energy CO2e emissions per metric tonne of product packed for shipment (vs 2019)	-20%	-19%
Waste Water	By 2025, reduce wastewater per metric tonne of product packed for shipment (vs 2019)	-25%	-9%
Solid Waste	By 2025, reduce solid waste (hazardous and sent to landfill) per metric tonne of product packed for shipment (vs 2019)	-25%	-14%
Recycled Material	By 2025, increase the proportion of recycled materials from external sources used in production	7%	6%
Gender diversity	By 2025, increase female representation in the senior leadership team	25%	20%
Compliance training	Increase the percentage of targeted staff who complete Anti-Bribery and Corruption training annually	Greater than 90%	99%
Supply chain	By the end of 2023, conduct sustainability assessments of raw material suppliers covering at least 50% of Group spend on raw materials	50%	48%

Of the above metrics, there are three we consider to be particularly urgent: operating a safe working environment; reducing our CO_2e emissions; and improving gender diversity among our top management. We have empowered our divisions to deliver in a manner that makes sense for their business and region, and all divisions have a detailed plan for how they will contribute to these changes.

We are also making systematic use of internal carbon pricing to assess capex decisions, integrating carbon pricing into our capex analysis to support the selection of more environmentally friendly production processes. The internal cost of carbon is reviewed annually and has been set at €90/t CO_2 for 2023, unchanged from 2022, based on the traded value of CO_2e.

As a consequence of the progress we have made, we have improved our ESG ratings in 2022, and have recently been upgraded to an ESG rating of 'AA' by MSCI. We also submitted data to the Carbon Disclosure Project for the first time in 2022.

The global effort to reduce carbon emissions is a potential growth driver for Vesuvius. The roll-out of green energy infrastructure globally (in particular wind turbines and solar farms) is highly steel intensive, and in particular requires high tech steel for which our Flow Control products are particularly relevant. In addition, our products improve the efficiency of our customers' processes and the quality of their output, and generally reduce both their carbon footprint and their health and safety risks. In 2022, we once again saw a rise in the proportion of our sales derived from market-leading sustainable products, which reached 18% in 2022, up from 17% in 2021 and 15% in 2019.

Health, safety and product quality

The Board and the entire leadership team of Vesuvius place great emphasis on the importance of health and safety in the workplace. During 2022 we achieved a Lost Time Injury Frequency Rate (LTIFR) of 1.08 per million hours worked, similar to that achieved in 2021 (1.06). Despite much good work at many of our sites, we are profoundly sorry to report that there was a fatality in 2022, in our joint-venture site in Wuhan, China. The incident was investigated fully, in conjunction with the local Chinese authorities, and we will ensure that we learn the necessary lessons to prevent this tragedy repeating. Reliability in product 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.

Dividend

The Board has recommended a final dividend of 15.75 pence, bringing the total dividend for the year to 22.25 pence per share, which is a 5% year on year increase on the total dividend for 2021 of 21.2 pence per share.

The Board has determined that this dividend is appropriate, in order to rebuild dividend cover. 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.

Cyber update

On 6 February 2023 we announced that we had suffered a cyber security incident. In order to contain the threat, we voluntarily shutdown our systems on a precautionary basis. During this period our sites instigated manual procedures and work arounds to maintain production, shipping and invoicing. We have since worked tirelessly on the reinstatement of our systems, and I am pleased to report that the initial period of major disruption has been short, and all sites and significant systems are now operational. As such we expect the impact on trading to be modest, limited to one-off costs of between £3m and £5m.

Outlook

Looking forward, we expect to continue to successfully achieve market share gains through technological differentiation and new product launches. We are also confident in our ability to cover cost increases with pricing. Accordingly, we are confident that our 2023 results will be in-line with our expectations, despite several headwinds:

- As anticipated, the Steel and Foundry markets remain weak, and we anticipate the rate of recovery to be slow and only improve later in the year
- The planned reduction in our own inventory to normalized levels, which is a drag on fixed cost absorption, will continue throughout the first half of 2023
- The negative impact of the cyber security incident incurred at the beginning of the year

Looking beyond 2023, we expect the positive impact of our investment in R&D, long-term growth initiatives, and development of our capacity in fast growing regions, will result in accelerated growth and profitability.

Operational Review

Vesuvius comprises two Divisions, Steel and Foundry. The Steel Division operates as three business lines, Flow Control, Advanced Refractories and Sensors & Probes. Changes described are versus 2021 on an underlying basis, excluding the impact of FX and acquisitions and disposals, unless otherwise noted.

Steel Division

Vesuvius' Steel Division reported revenues of £1,496m in 2022, an increase of 28% compared to 2021 and 19% on an underlying basis, reflecting the benefits of the business acquired from Universal Refractories for the first full year and a particularly strong performance in the key markets of NAFTA, India and South America, where revenue grew by 33%, 31% and 30%, respectively.

These revenue increases were achieved in the context of a declining market. Steel production in the world excluding China and Iran, which accounts for approximately 90% of Vesuvius' sales, declined by 7.0% year-on-year with India the only country among the top-15 global producers to grow year-on-year. Vesuvius also ceased sales to sanctioned customers in Russia in compliance with the sanctions regimes imposed in response to the Ukrainian conflict.

Flow Control significantly outperformed the steel market in all major regions, with overall flat volumes despite the market contraction. In Advanced Refractories, underlying volumes modestly declined, still outperforming the market despite price increases.

Steel Division trading profit improved 69% to £173m (+56% on an underlying basis), with return on sales expanding 280bps to 11.5%, reflecting excellent recovery of input cost rises, product mix benefits and the margin accretion of the acquisition.

Steel Division	**2022 (£m)**	**2021 (£m)**	**Change (%)**	**Underlying change (%)**
Flow Control Revenue	811	649	25%	20%
Advanced Refractories Revenue	645	489	32%	19%
Steel Sensors & Probes Revenue	40	34	19%	12%
Total Steel Revenue	1,496	1,172	28%	19%
Total Steel Trading Profit	173	102	69%	56%
Total Steel Return on Sales	11.5%	8.7%	+280bps	+270bps

Flow Control

The 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. Our colleagues work alongside customers in steel plants to ensure that our products are correctly utilised. The quality, reliability and consistency of these products and services and the associated robotic solutions and 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.

Flow Control Revenue	2022 (£m)	2021 (£m)	Change (%)	Underlying change (%)
Americas	321	217	48%	*34%*
Europe, Middle East & Africa (EMEA)	275	248	11%	*12%*
Asia-Pacific	214	184	16%	*11%*
Total Flow Control Revenue	811	649	25%	*20%*

In 2022, revenues in the Group's Flow Control business increased by 20% year-on-year to £811m, driven by price increases to recover input costs and market share gains in a declining market.

In EMEA, revenues grew 12% compared to 2021, versus declines in steel production of 11.4%, reflecting significant price increases while volume reduced, still outperforming the market by several percent. Turkey was a stand-out performer in the period, continuing to show very substantial volume growth. In the Americas, underlying revenues grew 34%; this outperformance was driven by growth in volumes in both regions, outperforming steel production declines of 5.5% and 5.2% in NAFTA and South America respectively, as well as pricing. In Asia Pacific, revenues grew 11%, versus steel production growth of 5.5% in India, and declines of 2.1% and 8.1% in China and South East Asia, respectively. Our volumes in India grew double-digit and South East Asia grew c.3%.

Advanced Refractories

The Advanced Refractories business unit supplies specialist refractory materials designed to protect the steel-making plant and equipment such as the ladle or tundish from the molten metal. In order to maximise their effectiveness, we offer advanced installation technologies which harness mechatronic solutions, 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) and refractory shapes (e.g. bricks and other larger precast shapes). The service life of the products that Advanced Refractories supplies 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. An integral part of our success depends upon our best-in-class installation technologies which improve the consistency and performance of installed Vesuvius refractories as well as the high level of collaboration with our customers.

Advanced Refractories Revenue	**2022 (£m)**	**2021 (£m)**	**Change (%)**	**Underlying change (%)**
Americas	245	165	48%	*17%*
Europe, Middle East & Africa (EMEA)	231	188	23%	*21%*
Asia-Pacific	170	136	25%	*19%*
Total Advanced Refractories Revenue	645	489	32%	*19%*

Advanced Refractories reported revenues of £645m in 2022, an increase of 19%. Overall, we outperformed the market, with a significant price rise to cover costs, and volumes that were only modestly negative excluding the benefit of the business acquired from Universal Refractories. The business outperformed a market that declined 7.0% overall, regaining some market share lost in 2021 when we prioritised pricing over volume.

Revenues grew 17% in the Americas, with good performance in South America which grew volumes 19%, versus steel production declines of 5.2%. Including the benefit of the business acquired from Universal Refractories (for which this was the first full year of ownership) and other underlying adjustments, revenues in that region grew 48%. In EMEA, revenues grew by 21% during the period reflecting significantly positive pricing, offset by mid-single-digit volume declines, compared to market production declines of 13.1% (EMEA excluding Iran, Source: WSA). In Asia Pacific, revenues grew 19% driven by double-digit pricing increases and a strong outperformance in India (+13% volume growth).

Steel Sensors & Probes

The Steel Sensors & Probes business unit offers products to our customers to enable them to make their underlying processes more efficient and reliable. The business unit focuses on providing a range of products that enhance the control and monitoring of our customers' production processes, complementing Vesuvius' strong presence and expertise in molten metal engineering. This aims to create new technologies that can be integrated into expert process management systems. By using these technologies, customers can focus on critical parameters within their processes, enabling them to refine their production methods to improve quality, lower production costs and maximise efficiency.

Steel Sensors & Probes Revenue	2022 (£m)	2021 (£m)	Change (%)	Underlying change (%)
Americas	29	23	25%	*13%*
Europe, Middle East & Africa (EMEA)	11	10	6%	*8%*
Asia-Pacific	0.4	0.4	(0.2%)	*(3%)*
Total Steel Sensors & Probes Revenue	40	34	19%	*11%*

Revenues in Steel Sensors & Probes were £40m in 2022, representing an underlying increase of 11% year-on-year, reflecting a strong performance in the Americas, in particular South America.

Foundry Division

The Foundry Division is a world leader in the supply of consumable products, technical advice and application support to the global foundry industry to improve the performance and quality of ferrous and non-ferrous castings. Vesuvius operates under the brand FOSECO in the foundry market. The foundry 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 all of these parameters.

Foundry Division	2022 (£m)	2021 (£m)	Change (%)	Underlying change (%)
Foundry Revenue	551	471	17%	13%
Foundry Trading Profit	54	40	35%	32%
Foundry Return on Sales	*9.9%*	8.6%	+130bps	+140bps

The end markets for Foundry remained weak, with growth in the Americas, a broadly flat market in Europe and a mixed picture in Asia, with China impacted by declines in the heavy vehicle market.

Vesuvius' Foundry Division reported revenues of £551m in 2022, an increase of 13%. On a reported basis, including some benefit from the business acquired from Universal Refractories, the Foundry Division revenue was up 17%. The increase in sales reflects pricing increases which successfully offset cost inflation. We also achieved market share gains in most-core regions and products, the only significant exception being Western Europe where we lost some market share due to priority being given to price increases.

The Foundry Division also achieved meaningful margin recovery, with trading profit growing 32% to £54m, as Return on Sales increased 140bps to 9.9%.

Foundry Revenue	2022 (£m)	2021 (£m)	Change (%)	Underlying change (%)
Americas	145	100	45%	27%
Europe, Middle East & Africa (EMEA)	225	199	13%	16%
Asia-Pacific	181	172	5%	3%
Total Foundry Revenue	551	471	17%	13%
Total Foundry Trading Profit	54	40	35%	32%
Total Foundry Return on Sales	9.9%	8.6%	+130bps	+140bps

The Foundry Division grew revenues in all major regions. Foundry revenues in the Americas grew 27% year-on-year, driven by a strong commercial performance and market share gains. In EMEA, underlying revenues increased by 16%, with particularly strong revenue growth in Germany, Spain, France and Turkey, driven primarily by price increases to offset inflation, as well as market share gains in Turkey. In Asia Pacific, our businesses grew in revenue in all major countries except China, reflecting our excellent commercial delivery. Trading profit and return on sales increased substantially demonstrating our overall strong performance.

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 4.1 to the Group Financial Statements for the definition of headline performance.

Introduction

The year 2022 was a record year by the Group in terms of trading profit and return on sales, despite the depressed underlying markets, driven mainly by price increases to recover cost inflation. This has allowed us to pay an attractive dividend to our shareholders, while increasing investments in strategic areas.

2022 performance overview

We are pleased with the performance of the Group in 2022; the Business Units had good success in recovering cost increases on a timely basis whilst gaining market share in most regions, demonstrating the strength of the Group positioning in the market driven by the technological differentiation of our products and solutions. Reported revenue increased by £404m over the prior year (+25%) and by £300m on an underlying basis (+18%).

On a reported basis, the Steel and Foundry Division revenue increased by 28% and 17% respectively in the year. Our volume performance in the Steel Division was broadly flat, compared to a c.7.0% decline in steel production in the world excluding China and Iran. Our resilient performance was driven by market share gains in Flow Control everywhere in the World and market share gains in Advanced Refractories in most regions. Our Foundry division experienced a low single digit volume decline due primarily to still very depressed underlying markets and some limited market share losses due to priority given to pricing.

Thanks to our efficient price increases, a resilient commercial performance and a product mix benefit, we have achieved a record trading profit of £227m, 50% higher than prior year on an underlying basis; and a record return on sales of 11.1%, higher than the prior year by 240 bps on an underlying basis.

Our cash management performance was robust, achieving an 82% cash conversion, thanks to a strong operational performance partially offset by an investment in trade working capital and a continuous investment in strategic capacity expansion. As a result, we have decreased our net debt position and improved our leverage ratio of net debt to EBITDA to 0.9x from 1.4x in December 2021.

Foreign exchange

The net impact of average 2022 exchange rates compared to 2021 averages has been a 2022 tailwind of approximately £11m at a trading profit level, in particular, due to the US Dollar, Brazilian Real and UAE Dirham.

Dividend

The Board has recommended a final dividend of 15.75 pence per share to be paid, subject to shareholder approval, on 31 May 2023 to shareholders on the register at 21 April 2023. When added to the 2022 interim dividend of 6.5 pence per share paid on 16 September 2022, this represents a full-year dividend of 22.25 pence per share. The last date for receipt of elections from shareholders for the Vesuvius Dividend Reinvestment Plan will be 9 May 2023.

It remains the Board's intention to deliver long-term dividend growth, provided this is supported by underlying earnings, cash flows, capital expenditure requirements and the prevailing market outlook.

Key Performance Indicators

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

This is done by:

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

Therefore, for 2022, we have:

- Retranslated 2021 results at the FX rates used in calculating the 2022 results
- Removed the results of Universal, which was acquired during 2021

1. **Objective: Deliver growth**

KPI: Underlying revenue growth

Reported revenue for 2022 was £2,047m, which equated to £2,010m on an underlying basis. Reported revenue for 2021 was £1,643m, which equated to £1,710m on an underlying basis. 2022 underlying revenue increased by 18% year-on-year. The increase in revenue in Steel and Foundry has mainly been driven by price increases to compensate for cost inflation.

£m	2022 Revenue			2021 Revenue				% change	
	As reported	Acquisitions / (disposals)	Underlying	As reported	Currency	Acquisition /Disposals	Underlying	Reported	Underlying
Steel	**1,496**	**(34)**	**1,462**	1,172	58	(2)	1,227	28%	19%
Foundry	**551**	**(3)**	**548**	471	12	-	483	17%	13%
Total Group	**2,047**	**(37)**	**2,010**	1,643	70	(2)	1,710	25%	18%

2. **Objective: Generate sustainable profitability and create shareholder value**

KPI: Trading profit and Return on Sales

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

Trading profit for 2022 was £227m and Return on Sales was 11.1%. On an underlying basis, trading profit increased by 50% and Return on Sales by 240 bps. The increase in trading profit and Return on Sales is primarily due to our product mix, price increases and recovery of the 2021 input cost headwind.

The Steel Division recorded Return on Sales of 11.5%, a 270 bps underlying improvement from 2021. Trading profit increased by 56% on an underlying basis, to £173m during the period. Return on Sales in the Foundry division increased by 140 bps year-on-year on an underlying basis, to 9.9% in 2022. Trading profit was £54m, representing a 32% increase on an underlying basis versus prior year.

£m	2022 Trading profit			2021 Trading profit				% change	
	As reported	Acquisitions / (disposals)	Underlying	As reported	Currency	Acquisition/ Disposals	Underlying	Reported	Underlying
Steel	**173**	**(5)**	**167**	102	5	0.2	107	69%	56%
Foundry	**54**	**(1)**	**54**	40	0	-	41	35%	32%
Total Group	**227**	**(6)**	**221**	142	5	0.2	148	60%	50%

KPI: Headline PBT and Headline EPS

Headline profit before tax (PBT) and headline earnings per share (EPS) are used to measure the underlying financial performance of the Group. The main difference between trading profit and PBT is net finance costs which were £11m in 2022, £5m higher than 2021.

Our Headline PBT was £217m, 58% higher than last year on a reported basis. Including amortisation (£10m) our PBT of £207m was 62% higher than last year. Headline EPS from continuing operations at 56.5p was 60% higher than 2021.

KPI: Return on invested capital (ROIC)

From 2022 onwards, the Group is using ROIC as its key measure of return from the Group's invested capital. The RONA performance measure has been replaced with ROIC which provides a more complete measure of Vesuvius's returns. ROIC is calculated as trading profit less amortisation of acquired intangibles plus share of post-tax profit of joint ventures and associates for the previous 12 months after tax, divided by the average (being the average of the opening and closing balance sheet) invested capital (defined as: total assets excluding cash plus non-interest-bearing liabilities), at the average foreign exchange rate for the year).

Our ROIC for 2022 was 10.7% (2021: 7.5%).

3. 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. The Group generated adjusted operating cash flows of £186m, representing a 307% increase versus 2021. This implies a cash conversion rate in 2022 of 82% (2021: 32%). 2022 cash conversion was driven by strong operational performance partially offset by an investment in trade working capital and an investment in capital expenditure of which c.60% is in growth capex. The majority of the growth capex has been invested in expanding Flow Control capacity in our Poland and India plants. Free cash flow from continuing operations was £123m in 2022 (2021: £(0.3)m).

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 2022 was 23.8% (2021: 20.9%), measured on a 12-month moving average basis. In absolute terms on a constant currency basis trade working capital increased by £35m in 2022.

The decrease in inventory on a constant currency basis versus December 2021 (£2m) was offset by increased debtors (£9m) and reduced creditors (£28m).

KPI: Net debt and interest cover

The Group had committed borrowing facilities of £722m as of 31st December 2022 (2021: £706m), of which £323m was undrawn (2021: £308m).

Net debt on 31 December 2022 was £255m, a £22m decrease from, 31 December 2021, as significantly higher free cash flow of £123m was offset by a foreign exchange adjustment of £21m a £58m dividend payment to shareholders, an increase in leases of £11m, ESOP share purchases of £7m and Bayuquan Magnesium Co acquisition of £4m.

At the end of 2022, the net debt to EBITDA ratio was 0.9x (2021: 1.4x) and EBITDA to interest was 29.8x (2021: 30.5x). These ratios are monitored regularly to ensure that the Group has sufficient financing available to run the business and fund future growth.

The Group's debt facilities have two financial covenants: the ratios of net debt to EBITDA (maximum 3.25x limit) and EBITDA to interest (minimum 4x limit). Certain adjustments are made to the net debt calculations for bank covenant purposes, the most significant of which is to exclude the impact of IFRS 16.

4. 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 2022 we spent £36m on R&D activities (2021: £31m at constant 2022 currency), which represents 1.8% of our revenue (2021: 1.8%).

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. See Note 25 to the Group Financial Statements.

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 liquidity stood at £494m at 31st December 2022. We define liquidity as undrawn committed debt facilities plus our cash on balance sheet, less the cash in China which is used as collateral against an equivalent loan from Standard Chartered.

Taxation

A key measure of tax performance is the Headline 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. The Group's headline ETR, based on the income tax costs associated with headline performance of £57m (2021: £36m), was 26.5% (2021: 26.4%).

The Group's total income tax costs for the period include a credit within separately reported items of £39m (2021: £16m) which primarily relates to a credit of £38m (2021: £16m) following the recognition of certain deferred tax assets.

A tax charge reflected in the Group Statement of Comprehensive Income in the year amounted to £8m (2021: £13m credit) which primarily comprises a £7m charge (2021: £13m credit) in respect of tax on net actuarial gains and losses on employee benefits, inclusive of the buy-in of the UK pension scheme.

We expect the Group's headline effective tax rate on headline profit before tax and before the share of post-tax profits from joint ventures to be between 27% and 28% in 2023.

Capital expenditure

Capital expenditure in 2022 was £104m (2021: £67m) of which £85m was in the Steel Division (2021: £47m) and £19m in the Foundry Division (2021: £20m). Capital expenditure on revenue-generating customer installation assets, primarily in Steel, was £8m (2021: £6m).

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. All of the liabilities in the UK were insured following a buy-in agreement with Pension Insurance Corporation plc ("PIC") in 2021. This buy-in agreement secured an insurance asset from PIC that matches the remaining pension liabilities of the UK Plan, with the result that the Company no longer bears any investment, longevity, interest rate or inflation risks in respect of the UK Plan.

The Group's net pension liability at 31 December 2022 was £56m (2021 full year: £77m liability). There has been a decrease in the liabilities of German and Belgian plans due to an increase in bond yields.

Corporate activity

On 8 October 2022, the Group acquired Bayuquan Magnesium Co (BMC), a world class basic monolithic refractory plant in China with revenues of RMB 120 million (c. £14 million) in 2021. BMC has been a long-standing manufacturing partner of Vesuvius Advanced Refractories and in recent years has supplied us with 100% of its production volumes. The acquisition secures strategically valuable basic monolithic volumes at a plant which benefits from very competitive local raw material access. It will support our further development in China, South-East Asia and North Asia.

Principal Risks and Uncertainties

Risk Management

The Board exercises oversight of the Group's principal risks, undertaking a specific review of the way in which the Group manages those risks. This process provides the Board with a clear understanding of the individuals within the business responsible for the management of each of its principal risks and the mitigation in place to address it. The Board also reviews and, where appropriate, updates the Group's risk appetite for those issues identified as principal risks 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 to identify and review risk. This assessment undergoes a formal review at half-year and at year end. The risks identified by the business are compiled centrally to deliver a coordinated picture of the Group's key operational risks. These risks are then reviewed by the Group Executive Committee. As part of this review, each Non-executive Director contributes their individual view of the top-down strategic risks facing the Group – drawing on the broad commercial and financial experience they have gained both inside and outside the Group – as well as their views of the Group's risk appetite. The results of this assessment are then overlaid on the internal assessment of risks to build a comprehensive analysis of existing and emerging risk. In this way, the Directors' views on each of the Principal Risks and on emerging risks in general, are independently gathered and integrated into the management discussions and actions taken on risk. The process covers 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.

Risk mitigation

The principal risks identified are actively managed in order to mitigate exposure. Senior management 'owners' have been identified for each principal risk, and they manage the mitigations of that specific risk and contribute to the analysis of its likelihood and materiality. This analysis is reported to the Board. The risks are analysed in the context of our business structure which gives protection against a number of principal risks we face with diversified currencies, a widespread customer base, local production matching the diversity of our markets and intensive training of our employees. Additionally, we seek to mitigate risk through contractual measures. Where cost-effective, the risk is transferred to insurers. Our processes are not designed to eliminate risk, but to identify our principal risks and seek to reduce them to a reasonable level in the context of the delivery of the Group's strategy.

Principal risks

The risks identified are those the Board considers to be the most relevant to the Group in relation to their potential impact on the achievement of its Strategic Objectives. All of the risks set out on these pages could materially affect the Group, its businesses, future operations and financial condition, and could cause actual results to differ materially from expected or historical results. The Group continues to focus on risk mitigation, and whilst, as identified above, certain elements of the Group's risks have manifested in 2022 and 2023, the principal risks of the Group remain the same. These risks are not the only ones that the Group faces or will face. Some risks are not yet known and some currently not deemed to be material could become so.

Changes to risk in 2022

In 2022, the Board continued to focus on the Group's existing risks, and the processes to mitigate and manage them, whilst remaining alert to the potential for there to be other emerging risks. The risks posed by the COVID-19 pandemic broadly receded during 2022, other than in China, where we continued to be alert to the potential for disruptions to our operations and limitations on movement around the country. Ahead of the recent cyber incident, the Board had noted the developing trends in cyber threats to business in general, and had reflected this in the principal risks of the business in terms of business continuity. Other emerging risks were assessed, with the Board considering the pressures on the business from inflation and interest rates, and the effects of the increasingly difficult environment for energy pricing and supply, which deteriorated further during the year as a result of the conflict in Ukraine. The Board also considered the continuing work required to ensure that the Group's decentralised management and talent pipeline delivers the Group's profitable growth ambitions, whilst also consistently displaying behaviours in line with the Group's values in the conduct of all business.

Against the more uncertain economic backdrop, broader business continuity risks were highlighted by the Board. With job markets in some jurisdictions becoming increasingly difficult post-pandemic, these focused on people and the need to ensure that the business has the right management with the rights skills in the right places. This has to be coupled with the ability to retain and develop these people and a bench of talent lower down the business to support succession planning. The Board also considered security of supply of raw materials and the geopolitical trends potentially moving away from the drive for globalisation. It was noted that a number of these and other issues were already addressed in the Group's principal risks and by related mitigation activities.

Issues identified in certain of the Group's principal risks materialised during 2022. The Group's existing measures in mitigation were initiated and reviewed to ensure their continuing effectiveness. These were most notably:

Business interruption: In the first half of the year, considerable work was done on security of energy resources in the light of the disruption of the Russian gas supply to Europe. This focused on plans to ensure that our European facilities could continue to operate, and the ability to transfer production in the event of an interruption in gas supply. Our business in Ukraine suffered very significant challenges but continued to operate to the extent possible with the exceptional support of our people based there.

In addition, our business in China continued to experience lockdowns related to the COVID-19 pandemic, and addressing these risks was a clear focus for our regional management in China. In January this year, we also suffered an explosion at our site in South Africa, which damaged some equipment and required the instigation of our business continuity plan to mitigate the impact on our customers.

End-market risk: The global Economic outlook deteriorated significantly in the second half of 2022, with particular concern indicated for the mature European economies. The effects of this did not have a significant impact in 2022 given the sharp focus on commercial performance of our Steel and Foundry Divisions. Whilst the geographic diversity of our business and our presence in developing markets stand as robust mitigation to any regional disruptions or economic decline, the effects of this projected global decline continue to be carefully monitored.

Complex and Changing regulatory environment: The conflict in Ukraine led to a significant increase in sanctions and restrictions relating predominantly to Russia, imposed by the United Kingdom, the European Union and the United States. The Group monitored these developments closely and using our established internal team and processes, took steps to assess and respond to each iteration of these restrictions as they were imposed.

People, Culture and performance: The shift in working patterns to more remote working that come about as a result of the COVID-19 pandemic continues to be in place in the majority of our geographies. Whilst Vesuvius does not have a global policy in this regard, enabling our businesses to tailor their approach as necessary, a concerted effort has been made to bring our people back to the physical workplace where possible. This is considered to be particularly important in the context of instilling new joiners with a sense of the culture and values of Vesuvius, which we believe cannot be adequately transmitted in fully remote working structures.

Despite the aforementioned challenges, the Board did not identify any new principal risks during 2022 or any overall material change to the Group's identified principal risks and uncertainties, albeit that within those risks a number of issues manifested themselves during the year. As such, the Group's statement of Principal Risk and Uncertainties was unchanged in 2022 from 2021.

Cyber Security

The Audit Committee and Board receive regular updates on the Group's activities in regard to cyber security, including general developments and specific actions and activities within the Vesuvius business. A comprehensive plan was established in 2020 to further strengthen Vesuvius' overall IT security. This was progressed in 2021 and continued to be the focus in 2022, with a number of activities undertaken to strengthen and refine our systems and controls during the year. A holistic approach is taken to addressing cyber challenges, focusing on the improvement of the Group's overall IT infrastructure, procedures and framework. The Group continues to run regular training programmes on cyber/IT security.

2023 cyber incident

In February 2023, the Group was the subject of a cyber incident involving unauthorised access to our IT systems. This required the instigation of the Group's Cyber Incident Plan. Our systems were shut down to contain the incident on a precautionary basis, and our sites implemented their business continuity plans to maintain their operations. The investigation is still ongoing and the Board continues to monitor the impact of the incident and receives regular updates on progress to address it, including the actions being taken to mitigate the risk of further incidents. Going forward, consideration will be given to any additional strategic or operational improvements required to the Group's systems and processes, to further reduce the potential for further attacks and further improve the Group's resilience for dealing with such incidents.

Climate change

The Group's overall risk management processes also incorporate consideration of the potential impact of climate-related risks on the Group. The Group does not regard climate change itself to represent a material stand-alone risk for the Group's operations.

Whilst a significant proportion of the Group's revenue is generated from steel manufacture and automotive castings, industries that are under transition as a result of their focus on improving environmental performance, we believe these changes will be positive for the Group. The opportunities in the Group's business strategy, which is founded on helping our customers to improve their manufacturing efficiency and the quality of their products – and therefore reduce their climate impact – will play a critical part in the development of the Group going forward. We also see potential benefits for the Group from the acceleration of the energy transition, as this will create continued demand for the high quality steel produced using Vesuvius' products and solutions.

The Group continues to recognise that climate change could present further uncertainty for the Group in terms of increased regulation, the evolution of the geographical distribution of our customer base and the costs of meeting more onerous disclosure requirements.

The risks we associate with our sustainability performance and our end customers' sustainability transition – badged as ESG – are identified as a separate element of the Group risk register, recognising the work Vesuvius can do to mitigate the environmental impact of our customers' processes. Other elements of this risk are incorporated into the appropriate Principal Risk and Uncertainty that the Group has identified. The Group continues to focus internally on the action we can take to drive our business' sustainability. In 2022, the Group continued its focus on the identified environmental sustainability KPIs, with a particular focus on reducing energy consumption and CO_2e emissions, recycling and waste disposal. Under the Group's Sustainability initiative we seek to drive a lower CO_2e emission intensity reduce normalised energy usage, and take the steps necessary to meet the target set of being absolute CO_2e emissions net zero by 2050 at the latest.

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 • Tax risk management and control framework together with a strong control of inter-company trading

Product quality failure *Vesuvius staff/contractors are injured at work or customers, staff or third parties suffer physical injury or financial loss because of failures in Vesuvius products*	• Injury to staff and contractors • Product or application failures lead to adverse financial impact or loss of reputation as technology leader • Incident at customer plant caused manufacturing downtime or damage to infrastructure	• 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

	• Customer claims from product quality issues	• 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 • Trading restrictions • 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) or other events such as industrial action, cyber attack or global health crises*	• Loss/closure of a major plant temporarily or permanently impairing our ability to serve our customers • Damage to or restriction in our 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 access controls, security systems and training • Cyber risks integrated into wider risk-management structure

		• Well-established global insurance programme • Group-wide safety management programmes • Dual sourcing strategy and development of substitutes
People, culture and performance *Vesuvius is unable to attract and retain the right calibre of staff, fails to instil an appropriate culture or fails to embed the right systems to drive personal performance in pursuit of the Group's long-term growth*	• Organisational culture of high performance is not achieved • Staff turnover in growing economies and regions • Stagnation of ideas and development opportunities • Loss of expertise and critical business knowledge • Reduced management pipeline for succession to senior positions	• Internal focus on talent development and training, with tailored career-stage programmes and clear performance management strategies • Contacts with universities to identify and develop talent • Career path planning and global opportunities for high-potential staff • Internal programmes for the structured transfer of technical and other knowledge • Clearly defined Values underpin business culture • Growing focus on enhancing gender diversity
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 and implementation of a new Sustainability initiative, which includes stretching targets focused on reducing the Group's energy usage, CO_2 emissions, waste and recycled materials

		• R&D focus on products that assist customers to reduce carbon emissions and improve their own sustainability measures • Skilled technical sales force to develop efficient solutions for our customers • Globally disseminated Code of Conduct sets out standards of conduct expected and ABC Policy adopted with a zero tolerance regarding bribery and corruption • Internal Speak up mechanisms to allow reporting of concerns • Extensive use of due diligence to assess existing and potential business partners and customers

Group Income Statement

For the year ended 31 December 2022

	Notes	**2022** (1) Headline performance £m	**2022** (1) Separately reported items £m	**2022** Total £m	2021 (1) Headline performance £m	2021 (1) Separately reported items £m	2021 Total £m
Revenue	2	**2,047.4**	**-**	**2,047.4**	1,642.9	-	1,642.9
Manufacturing costs		**(1,475.9)**	**-**	**(1,475.9)**	(1,222.8)	-	(1,222.8)
Administration, selling and distribution costs		**(344.3)**	**-**	**(344.3)**	(277.7)	-	(277.7)
Trading profit	2	**227.2**	**-**	**227.2**	142.4	-	142.4
Amortisation of acquired intangible assets		**-**	**(10.4)**	**(10.4)**	-	(9.7)	(9.7)
Restructuring charges	3	**-**	-	-	-	-	-
Vacant site remediation costs		**-**	-	-	-	-	-
GMP equalisation charge	10	**-**	**-**	**-**	-	-	-
Operating profit/(loss)		**227.2**	**(10.4)**	**216.8**	142.4	(9.7)	132.7
Finance expense		**(20.8)**	**-**	**(20.8)**	(13.7)	-	(13.7)
Finance income		**9.4**	**-**	**9.4**	7.3	-	7.3
Net finance costs	4	**(11.4)**	**-**	**(11.4)**	(6.4)	-	(6.4)
Share of post-tax income of joint ventures and associates		**1.2**	**-**	**1.2**	1.3	-	1.3
Profit/(loss) before tax		**217.0**	**(10.4)**	**206.6**	137.3	(9.7)	127.6
Income tax (charge)/credits	5	**(57.2)**	**39.1**	**(18.1)**	(35.9)	16.2	(19.7)
Profit/(loss)		**159.8**	**28.7**	**188.5**	101.4	6.5	107.9
Profit/(loss) attributable to:							
Owners of the parent		**152.4**	**28.7**	**181.1**	95.6	6.5	102.1
Non-controlling interests		**7.4**	**-**	**7.4**	5.8	-	5.8
Profit/(loss)		**159.8**	**28.7**	**188.5**	101.4	6.5	107.9
Earnings per share — pence	6						
Total operations — basic				**67.2**			37.7
— diluted				**66.7**			37.5

(1) Headline performance is defined in Note 16.1 and separately reported items are defined in Note 1.5.

The above results were derived from continuing operations. The pre-tax separately reported items would form part of Administration, selling & distribution costs if classified within headline performance, which including these amounts would total £354.7m (2021: £287.4m).

Group Statement of Comprehensive Income

For the year ended 31 December 2022

	2022 £m	2021 £m
Profit	**188.5**	107.9
Items that will not subsequently be reclassified to income statement:		
Remeasurement of defined benefit assets/liabilities	**27.4**	(80.6)
Income tax relating to items not reclassified	**(8.2)**	12.5
Items that may subsequently be reclassified to income statement:		
Exchange differences on translation of the net assets of foreign operations	**96.7**	(31.4)
Exchange differences on translation of net investment hedges	**(20.7)**	14.4
Net change in costs of hedging	**-**	(1.2)
Change in the fair value of the hedging instrument	**8.3**	2.2
Amounts reclassified from the Income Statement	**(7.5)**	(0.7)
Other comprehensive income/(loss), net of income tax	**96.0**	(84.8)
Total comprehensive income	**284.5**	23.1
Total comprehensive income attributable to:		
Owners of the parent	**276.5**	17.7
Non-controlling interests	**8.0**	5.4
Total comprehensive income	**284.5**	23.1

The above results were derived from continuing operations.

Group Statement of Cash Flows

For the year ended 31 December 2022

	Notes	**2022** **£m**	2021 £m
Cash flows from operating activities			
Cash generated from operations	9	**268.3**	82.9
Interest paid		**(15.6)**	(11.9)
Interest received		**6.3**	4.3
Income taxes paid		**(47.9)**	(30.1)
Net cash inflow from operating activities		**211.1**	45.2
Cash flows from investing activities			
Capital expenditure		**(89.2)**	(45.5)
Proceeds from the sale of property, plant and equipment		**3.1**	1.2
Acquisition of subsidiaries and joint ventures, net of cash acquired		**(3.5)**	(43.7)
Dividends received from joint ventures		**1.3**	1.0
Net cash outflow from investing activities		**(88.3)**	(87.0)
Net cash (outflow)/inflow before financing activities		**122.8**	(41.8)
Cash flows from financing activities			
Proceeds from borrowings		**18.7**	89.4
Repayment of borrowings		**(55.7)**	(31.4)
Purchase of ESOP shares		**(6.9)**	(1.1)
Dividends paid to equity shareholders	7	**(58.1)**	(55.5)
Dividends paid to non-controlling shareholders		**(3.2)**	(2.2)
Net cash outflow from financing activities		**(105.2)**	(0.8)
Net increase in cash and cash equivalents	8	**17.6**	(42.6)
Cash and cash equivalents at 1 January		**162.4**	206.8
Effect of exchange rate fluctuations on cash and cash equivalents	8	**(0.2)**	(1.8)
Cash and cash equivalents at 31 December		**179.8**	162.4
Free cash flow from continuing operations (Note 16.11)			
Net cash inflow from operating activities		**211.1**	45.2
Capital expenditure		**(89.2)**	(45.5)
Proceeds from the sale of property, plant and equipment		**3.1**	1.2
Dividends received from joint ventures		**1.3**	1.0
Dividends paid to non-controlling shareholders		**(3.2)**	(2.2)
Free cash flow[1]	16	**123.1**	(0.3)

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

Group Balance Sheet

As at 31 December 2022

	Notes	2022 £m	2021 £m
Assets			
Property, plant and equipment		**417.6**	352.5
Intangible assets		**737.5**	696.8
Employee benefits - net surpluses	10	**26.2**	25.1
Interests in joint ventures and associates		**13.0**	12.8
Investments	15	**0.5**	0.5
Deferred tax assets		**110.6**	104.2
Other receivables		**33.7**	16.2
Derivative financial instruments		**2.7**	-
Total non-current assets		**1,341.8**	1,208.1
Cash and short-term deposits	8	**184.2**	169.1
Inventories		**316.0**	299.4
Trade and other receivables		**476.9**	445.2
Income tax receivable		**15.3**	7.6
Derivative financial instruments	15	**0.1**	0.1
Assets classified as held for sale		**-**	-
Total current assets		**992.5**	921.4
Total assets		**2,334.3**	2,129.5
Equity			
Issued share capital		**27.8**	27.8
Retained earnings		**2,623.8**	2,483.4
Other reserves		**(1,391.4)**	(1,467.6)
Equity attributable to the owners of the parent		**1,260.2**	1,043.6
Non-controlling interests		**59.4**	54.6
Total equity		**1,319.6**	1,098.2
Liabilities			
Interest-bearing borrowings	8	**327.2**	329.9
Employee benefits - net liabilities	10	**82.3**	102.1
Other payables		**13.8**	11.6
Provisions	14	**49.3**	32.6
Deferred tax liabilities		**11.9**	29.6
Derivative financial instruments	15	**-**	2.5
Total non-current liabilities		**484.5**	508.3
Interest-bearing borrowings	8	**114.7**	113.8
Trade and other payables		**378.4**	372.9
Income tax payable		**19.6**	18.1
Provisions	14	**17.4**	18.1
Derivative financial instruments	15	**0.1**	0.1
Total current liabilities		**530.2**	523.0
Total liabilities		**1,014.7**	1,031.3
Total equity and liabilities		**2,334.3**	2,129.5

Group Statement of Changes in Equity

For the year ended 31 December 2022

	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 2021	**27.8**	**(1,451.3)**	**2,502.9**	**1,079.4**	**51.4**	**1,130.8**
Profit	**-**	**-**	**102.1**	**102.1**	**5.8**	**107.9**
Remeasurement of defined benefit liabilities/assets	-	-	(80.6)	(80.6)	-	(80.6)
Income tax relating to items not reclassified	-	-	12.5	12.5	-	12.5
Exchange differences on translation of the net assets of foreign operations	-	(31.0)	-	(31.0)	(0.4)	(31.4)
Exchange differences on translation of net investment hedges	-	14.4	-	14.4	-	14.4
Net change in costs of hedging	-	(1.2)	-	(1.2)	-	(1.2)
Change in the fair value of the hedging instrument	-	2.2	-	2.2	-	2.2
Amounts reclassified from the Income Statement	-	(0.7)	-	(0.7)	-	(0.7)
Other comprehensive (loss), net of income tax	**-**	(16.3)	(68.1)	(84.4)	(0.4)	(84.8)
Total comprehensive income (loss)	**-**	**(16.3)**	**34.0**	**17.7**	**5.4**	**23.1**
Recognition of share-based payments	-	-	3.1	3.1	-	3.1
Purchase of ESOP shares	-	-	(1.1)	(1.1)	-	(1.1)
Dividends paid (Note 7)	-	-	(55.5)	(55.5)	(2.2)	(57.7)
Total transactions with owners	**-**	**-**	**(53.5)**	**(53.5)**	**(2.2)**	**(55.7)**
As at 1 January 2022	**27.8**	**(1,467.6)**	**2,483.4**	**1,043.6**	**54.6**	**1,098.2**
Profit	**-**	**-**	**181.1**	**181.1**	**7.4**	**188.5**
Remeasurement of defined benefit liabilities/assets	-	-	27.4	27.4	-	27.4
Income tax relating to items not reclassified	-	-	(8.2)	(8.2)	-	(8.2)
Exchange differences on translation of the net assets of foreign operations	-	96.1	-	96.1	0.6	96.7
Exchange differences on translation of net investment hedges	-	(20.7)	-	(20.7)	-	(20.7)
Net change in costs of hedging	-	-	-	-	-	-
Change in the fair value of the hedging instrument	-	8.3	-	8.3	-	8.3
Amounts reclassified from the Income Statement	-	(7.5)	-	(7.5)	-	(7.5)
Other comprehensive income/(loss), net of income tax	**-**	76.2	19.2	95.4	0.6	96.0
Total comprehensive income (loss)	**-**	**76.2**	**200.3**	**276.5**	**8.0**	**284.5**
Recognition of share-based payments	-	-	5.1	5.1	-	5.1
Purchase of ESOP shares	-	-	(6.9)	(6.9)	-	(6.9)
Dividends paid (Note 7)	-	-	(58.1)	(58.1)	(3.2)	(61.3)
Total transactions with owners	**-**	**-**	**(59.9)**	**(59.9)**	**(3.2)**	**(63.1)**
As at 31 December 2022	**27.8**	**(1,391.4)**	**2,623.8**	**1,260.2**	**59.4**	**1,319.6**

Notes to the Group Financial Statements

1 Basis of preparation

1.1 Basis of preparation

The financial information in this preliminary announcement has been extracted from the audited Group Financial Statements for the year ended 31 December 2022 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 2 March 2023.

The auditors have reported on the Group Financial Statements for the years ended 31 December 2022 and 31 December 2021 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 2021 have been filed with the Registrar of Companies and those for the year ended 31 December 2022 will be filed following the Company's Annual General Meeting.

The Group financial statements have been prepared in accordance with UK-adopted international accounting standards (IFRS) and with the requirements of the Companies Act 2006 as applicable to companies reporting under those standards. The financial statements have been prepared under the historical cost convention, with the exception of fair value measurement applied to defined benefit pension plans, 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.

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 Group's available committed liquidity stood at £494m at year-end 2022, up from £456m at year-end 2021, as a result of lower borrowings under the Group's committed facilities and an increase in recorded cash balances. The Directors have prepared cash flow forecasts for the Group for the period to 30 June 2024. These forecasts reflect an assessment of current and future end-market conditions, which are expected to be challenging in 2023 and to recover thereafter (as set out in the "outlook" statement in this document), and their impact on the Group's future trading performance.

The Directors have also considered a severe but plausible downside scenario, based on an assumed protracted COVID-19 related demand impact, despite emerging confidence that the worst of the pandemic may be behind us. This downside scenario assumes

- a decline in business activity and profitability in 2023 and 2024 to the level achieved in H2 2020, the period most severely impacted by COVID-19,
- working capital as a percentage of sales in the downside case consistent with that in the base case, and
- dividends not paid in 2023 then reinstated.

On a full-year basis relative to 2022, this implies a 30% decline in sales and a c.57% decline in Trading Profit.

The Group has two covenants; net debt / EBITDA (under 3.25x) and an interest cover requirement of at least 4.0x. In this downside scenario, the forecasts show that the Group's maximum net debt / EBITDA (pre-IFRS 16 in-line with the covenant calculation) does not exceed 1.0x, compared to a leverage covenant of 3.25x, and the minimum interest cover reached is 9x compared to a covenant minimum of 4x.

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 and that there is no material uncertainty in respect of going concern. Accordingly, they continue to adopt a going concern basis in preparing the financial statements of the Group and the Company.

1.4 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"

Columnar presentation

The Group has adopted a columnar presentation for its Group Income Statement, to separately identify headline performance results, as the Directors consider that this gives a useful view of the core results of the ongoing business. As part of this presentation format, the Group 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 users both in a useful understanding of the financial performance achieved for a given year and in making projections of future results.

Separately reported items

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), significant movement in the Group's deferred tax balances such as was, for example, caused by the impact of US tax reform in 2017, 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 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.

2 Segment information

Operating segments for continuing operations

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

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

Revenue from contracts with customers

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

Notes to the Group Financial Statements (continued)

2.1 Income statement

	2022					
	Flow Control	Advanced Refractories	Sensors & Probes	**Steel**	**Foundry**	**Total**
				£m	**£m**	**£m**
Segment revenue	810.9	645.3	40.2	**1,496.4**	**551.0**	**2,047.4**
at a point in time				**1,493.7**	**551.0**	**2,044.7**
Over time				**2.7**	**-**	**2.7**
Segment adjusted EBITDA *				**210.6**	**72.1**	**282.7**
Segment depreciation and amortisation				**(37.9)**	**(17.6)**	**(55.5)**
Segment trading profit				**172.7**	**54.5**	**227.2**
Return on sales margin				*11.5%*	*9.9%*	*11.1%*
Amortisation of acquired intangible assets						**(10.4)**
Operating profit						**216.8**
Net finance costs						**(11.4)**
Share of post-tax profit of joint ventures						**1.2**
Profit before tax						**206.6**
Capital expenditure additions				85.2	18.7	103.9
Inventory				259.6	56.4	316.0
Trade debtors				288.0	92.8	380.8
Trade creditors				(177.2)	(62.3)	(239.5)

	2021					
	Flow Control	Advanced Refractories	Sensors & Probes	**Steel**	**Foundry**	**Total**
				£m	**£m**	**£m**
Segment revenue	648.7	489.1	33.7	**1,171.5**	**471.4**	**1,642.9**
at a point in time				**1,169.9**	**471.4**	**1,641.3**
Over time				**1.6**	**-**	**1.6**
Segment adjusted EBITDA *				**135.9**	**56.3**	**192.2**
Segment depreciation				**(33.9)**	**(15.9)**	**(49.8)**
Segment trading profit				**102.0**	**40.4**	**142.4**
Return on sales margin				*8.7%*	*8.6%*	*8.7%*
Amortisation of acquired intangible assets						**(9.7)**
Operating profit						**132.7**
Net finance costs						**(6.4)**
Share of post-tax profit of joint ventures						**1.3**
Profit before tax						**127.6**
Capital expenditure additions				47.2	20.2	67.4
Inventory				248.1	51.3	299.4
Trade debtors				267.5	84.7	352.2
Trade creditors				(191.3)	(62.5)	(253.8)

* Adjusted EBITDA is defined in note 16.13

3 Restructuring charges

There were no restructuring charges in 2022 (2021: £nil).

Cash costs of £1.5m (2021: £4.0m) (Note 14) were incurred in the year in respect of previously announced restructuring programmes, leaving provisions made but unspent of £3.6m (Note 14) as at 31 December 2022 (2021: £5.0m).

4 Net finance costs

	2022 **£m**	2021 £m
Interest payable on borrowings		
Loans, overdrafts and factoring arrangements	**15.4**	10.7
Interest on lease liabilities	**1.9**	1.5
Amortisation of capitalised borrowing costs	**1.0**	0.8
Total interest payable on borrowings	**18.3**	13.0
Interest on net retirement benefits obligations	**1.4**	(0.3)
Adjustments to discounts on provisions and other liabilities	**1.1**	0.7
Adjustments to discounts on receivables	**(0.6)**	(0.3)
Finance income	**(8.8)**	(6.7)
Total net finance costs	**11.4**	6.4

Within the table above, total finance costs are £20.8m (2021: £13.7m) and total finance income is £9.4m (2021: £7.3m). Net finance costs are £11.4m (2021: £6.4m).

5 Income tax

The Group's headline effective tax rate, based on the income tax costs associated with headline performance of £57.2m (2021: £35.9m), was 26.5% (2021: 26.4%).

The Group's total income tax costs include a credit on separately reported items of £39.1m (2021: £16.2m), comprising a credit of £36.4m (2021: £16.0m) relating to the recognition of previously unrecognised deferred tax assets and a credit of £2.7m (2021: £0.2m credit) relating to the amortisation of intangible assets.

The net tax charge reflected in the Group Statement of Comprehensive Income in the year amounted to £8.2m (2021: £13.0m credit), comprising: A £6.7m charge (2021: £12.5m credit) in respect of tax on net actuarial gains and losses on the employee benefits and a £1.5m charge (2021: £nil) in respect of deferred tax rate changes and £nil (2021 £0.5m credit) in respect of exchange adjustments.

6 Earnings per share ("EPS")

6.1 Earnings for EPS

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

	2022 £m	2021 £m
Profit attributable to owners of the parent	**181.1**	102.1
Adjustments for separately reported items:		
Amortisation of intangible assets	**10.4**	9.7
Restructuring charges	**-**	-
Vacant site remediation costs	**-**	-
GMP equalisation charge	**-**	-
Income tax (credit)/charge	**(39.1)**	(16.2)
Headline profit attributable to owners of the parent	**152.4**	95.6

6.2 Weighted average number of shares

	2022 millions	2021 millions
For calculating basic and headline EPS	**269.6**	270.5
Adjustment for dilutive potential ordinary shares	**1.9**	1.8
For calculating diluted and diluted headline EPS	**271.5**	272.3

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

		2022 pence	2021 pence
Earnings per share	- basic	**67.2**	37.7
	- diluted	**66.7**	37.5
	- headline	**56.5**	35.3
	- diluted headline	**56.1**	35.1

Notes to the Group Financial Statements (continued)

7 Dividends

	2022 £m	2021 £m
Amounts recognised as dividends and paid to equity holders during the period		
Final dividend for the year ended 31 December 2020 of 14.3p per ordinary share	**-**	38.7
Interim dividend for the year ended 31 December 2021 of 6.2p per ordinary share	**-**	16.8
Final dividend for the year ended 31 December 2021 of 15.0p per ordinary share	**40.5**	-
Interim dividend for the year ended 31 December 2022 of 6.5p per ordinary share	**17.6**	-
	58.1	55.5

A proposed final dividend for the year ended 31 December 2022 of £42.3m (2021: £40.5m), equivalent to 15.75 pence (2021: 15.0 pence) per ordinary share, is subject to approval by shareholders at the Company's Annual General Meeting on 18 May 2023 and has not been included as a liability in these financial statements. If approved by shareholders, the dividend will be paid on 31 May 2022 to holders of ordinary shares on the register on 21 April 2023.

8 Reconciliation of movement in net debt

	Balance as at 1 Jan 2022 £m	Foreign exchange adjustments £m	Fair value gains/ (losses)	Non-cash movements[1] £m	Cash flow £m	Balance as at 31 Dec 2022 £m
Cash and cash equivalents						
Cash at bank and in hand	**169.1**	**0.1**	**-**	**-**	**15.0**	**184.2**
Short term deposits	**-**	**-**	**-**	**-**	**-**	**-**
Bank overdrafts	**(6.7)**	**(0.3)**	**-**	**-**	**2.6**	**(4.4)**
	162.4	**(0.2)**	**-**	**-**	**17.6**	**179.8**
Borrowings, excluding bank overdrafts	**(440.3)**	**(25.4)**	**-**	**(11.5)**	**37.0**	**(440.2)**
Capitalised borrowing costs	**3.3**	**-**	**-**	**(0.6)**	**-**	**2.7**
Derivative financial instruments	**(2.5)**	**-**	**5.2**	**-**	**-**	**2.7**
Net debt	**(277.1)**	**(25.6)**	**5.2**	**(12.1)**	**54.6**	**(255.0)**

(1) £11.5m (2021: £17.1m) of new leases were entered into during the year.

9 Cash generated from operations

	2022	2021
	£m	£m
Operating profit	**216.8**	132.7
Adjustments for:		
Amortisation of intangible assets	**10.4**	9.7
Restructuring charges	**-**	-
Vacant site remediation costs	**-**	-
GMP equalisation charge	**-**	-
Trading Profit	**227.2**	142.4
(Profit)/Loss on disposal of non-current assets	**(0.1)**	0.4
Depreciation and amortisation	**55.5**	49.8
Defined benefit retirement plans net charge	**5.6**	6.4
Net decrease/(increase) in inventories	**2.2**	(113.5)
Net increase in trade receivables	**(9.2)**	(53.5)
Net (decrease)/increase in trade payables	**(28.0)**	70.6
Net decrease/(increase) in other working capital	**24.7**	(5.5)
Outflow related to restructuring charges	**(1.5)**	(4.0)
Defined benefit retirement plans cash outflows	**(6.3)**	(7.2)
Vacant site remediation costs paid	**(1.8)**	(3.0)
Cash generated from operations	**268.3**	82.9

10 Employee benefits

The net employee benefits liability as at 31 December 2022 was £56.1m (2021: £77.0m) derived from an actuarial valuation of the Group's defined benefit pension and other post-retirement obligations as at that date. There has been a decrease in the liabilities of German and Belgian plans due to an increase in bond yields.

All the liabilities in the UK were insured following a buy-in agreement with Pension Insurance Corporation plc ("PIC") in 2021. This buy-in agreement secured an insurance asset from PIC that matches the remaining pension liabilities of the UK Plan, with the result that the Company no longer bears any investment, longevity, interest rate or inflation risks in respect of the UK Plan.

As disclosed in note 26 of the 2021 Annual Report and Financial Statements, the above amounts may materially change in the next 12 months if there is a change in assumptions.

	2022 £m	2021 £m
Employee benefits — net surpluses		
UK defined benefit pension plans	**24.5**	23.7
ROW defined benefit pension plans	**1.7**	1.4
Net surpluses	**26.2**	25.1
Employee benefits — net liabilities		
UK defined benefit pension plans	**(1.1)**	(1.6)
US defined benefit pension plans	**(22.5)**	(21.9)
Germany defined benefit pension plans	**(38.4)**	(53.3)
ROW defined benefit pension plans	**(10.9)**	(18.3)
Other post-retirement benefit plans	**(9.4)**	(7.0)
Net liabilities	**(82.3)**	(102.1)
Total liabilities	**(56.1)**	(77.0)

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

		2022 £m	2021 £m
In arriving at trading profit	— within other manufacturing costs	**1.7**	1.8
(as defined in Note 16)	— within administration, selling and distribution costs	**3.9**	4.6
In arriving at profit before tax	— within net finance costs	**1.4**	(0.3)
Total net charge		**7.0**	6.1

11 Contingent liabilities

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

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

As the settlement of many of the obligations for which reserve is made is subject to legal or other regulatory process, the timing and amount of the associated outflows is subject to some uncertainty (see Note 30 of the 2021 Annual Report and Financial Statements for further information). The amount paid, including costs in relation to this litigation, has not had a material effect on Vesuvius' financial position or results of operations in the current period.

12 Related parties

The nature of related party transactions in 2022 are in line with those transactions disclosed in Note 34 of the 2022 Annual Report and Financial Statements. All transactions with related parties are conducted on an arm's length basis and in accordance with normal business terms. Transactions with joint ventures and associates are consistent with those disclosed in Note 34 of the 2022 Annual Report and Financial Statements. Transactions between related parties that are Group subsidiaries are eliminated on consolidation.

Transactions with joint ventures and associates	**2022** **£m**	2021 £m
Sales to joint ventures	**5.3**	4.8
Purchases from joint ventures	**32.3**	31.5
Purchases from associates	**-**	-
Dividends received from joint ventures	**1.3**	1.0
Trade payables owed to joint ventures	**6.7**	10.3
Trade receivables from joint ventures	**0.7**	1.3

13 Acquisitions and divestments

Universal Refractories

On 6 December 2021, Vesuvius plc acquired the trade and assets of Universal Refractories Inc. (URI), a specialty refractory producer based in Pennsylvania, USA, which is focused on tundish (steel continuous casting) applications as well as consumable products for the foundry industry. It has become part of the Group's Steel Advanced Refractories business unit, with the exception of the ladle liners business which has been absorbed by our Foundry Division (<10% of sales). The transaction valued URI at an enterprise value of $57.1m (£42.6m) on a cash and debt-free basis and was funded from Vesuvius' internal resources.

The fair values of the assets and liabilities recognised as a result of the acquisition have been updated during the year ended 31 December 2022.There was a decrease of £1.1m to net identifiable assets acquired, largely due to a reduction in non-compete intangible assets of £0.9m. There was also a decrease of £0.5m to consideration.

	Book value	Fair value adjustments	Adjusted value
	£m	**£m**	**£m**
Property, plant and equipment	4.5	6.9	11.4
Intangible asset (customer relationships and know-how)	-	11.3	11.3
Inventories	5.0	1.3	6.3
Receivables	5.5	-	5.5
Payables	(1.9)	(0.6)	(2.5)
Borrowings	(5.4)	-	(5.4)
Deferred tax	-	(2.8)	(2.8)
Net identifiable assets acquired	7.7	16.1	23.8
Goodwill			13.9
Consideration			**37.7**

The goodwill is attributable to URI's reputation in the marketplace and the synergies that Vesuvius expects to gain from its integration It is expected to be tax deductible.

Included within the property, plant and equipment acquired were right of use leased assets of £0.2m.

The decision to acquire URI was driven by its long-standing customer relationships and know-how. The identifiable intangible assets acquired are customer relationships and know-how. A deferred tax liability of £2.8m has been provided in relation to these fair value adjustments.

On acquisition, URI was subsumed into the Steel Advanced Refractories activities business unit and the Foundry Division and goodwill is monitored at the level of the Steel Advanced Refractories operating segment.

The net cash outflow on acquisition was £43.1m, including related excess working capital payment, the business was acquired on a cash and debt-free basis. In accordance with IFRS3, we disclose above consideration of £37.7m and borrowings repaid immediately prior to acquisition of £5.4m.

The Group did not acquire any material interests in any companies during the year ended 31 December 2022.

There was no contingent consideration paid during the year ended 31 December 2022. Contingent consideration of £0.1m was paid during 2021 in respect of the previous acquisition of Ecil Met Tec.

14 Provisions

	Disposal and closure costs £m	Restructuring charges £m	Other £m	Total £m
As at 1 January 2021	**42.2**	**9.2**	**5.4**	**56.8**
Exchange adjustments	0.3	(0.2)	-	0.1
Charge to Group Income Statement – trading profit	7.4	-	9.2	16.6
Adjustment to discount	0.7	-	-	0.7
Cash spend	(8.9)	(4.0)	(10.6)	(23.5)
As at 31 December 2021	**41.7**	**5.0**	**4.0**	**50.7**

	Disposal and closure costs £m	Restructuring charges £m	Other £m	Total £m
As at 1 January 2022	**41.7**	**5.0**	**4.0**	**50.7**
Exchange adjustments	5.0	0.6	0.3	5.9
Charge to Group Income Statement – trading profit	16.7	-	11.4	28.1
Adjustment to discount	1.1	-	-	1.1
Cash spend	(6.8)	(1.5)	(10.3)	(18.6)
Transferred (to)/from other balance sheet accounts	-	(0.5)	-	(0.5)
As at 31 December 2022	**57.7**	**3.6**	**5.4**	**66.7**

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

15 Financial instruments

The Group's financial assets and liabilities are measured as appropriate either at amortised cost or at fair value through other comprehensive income or 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:

	2022		2021	
	Assets £m	**Liabilities £m**	Assets £m	Liabilities £m
Investments (Level 2)	**0.5**	**-**	0.5	-
Derivatives not designated for hedge accounting purposes (level 2)	**0.1**	**(0.1)**	0.1	(0.3)
Derivatives designated for hedge accounting purposes (level 2)	**2.7**	**-**	-	(2.3)

All of the derivative financial instruments not designated for hedge accounting purposes 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 25 of the 2022 Annual Report and 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 condensed financial statements do not include all financial risk management information and disclosures required in the annual financial statements; they should be read in conjunction with the Group's 2022 Annual Report and Financial Statements, in which further details of these financial risks were disclosed in Note 25. There have been no changes in the risk management policies since year-end.

In June 2020 the Group executed a $86.0m Cross currency interest rate swap (‘CCIRS’). The effect of this is to convert the $86.0m Private Placement Notes issued in June 2020 into €76.6m. The timing and amount of the US Dollar cashflows under the CCIRS exactly mirror those of the Private Placement Notes and the maturity date of the CCIRS also matches the repayment date of the Notes. The CCIRS would by default be revalued through the Income Statement; however as it is in a designated hedging relationship it is instead revalued through Other Comprehensive Income. More specifically, the US Dollar exposure is designated as a cashflow hedge of the underlying Private Placement Notes and the Euro exposure is designated as a net investment hedge of part of the Group’s foreign operations. The CCIRS is presented as a non-current asset or liability as it is expected to be settled more than 12 months after the end of the reporting period.

With the exception of the CCIRS the fair value of Derivatives outstanding at 31 December 2022 has been booked through the Income Statement. All of the fair values shown in the table above are classified under IFRS 13 as Level 2 measurements which have been calculated using quoted prices from active markets, where similar contracts are traded and the quotes reflect actual transactions in similar instruments. All of the derivative assets and liabilities not designated for hedge accounting purposes reported in the table above will mature within a year of the balance sheet date.

As at 31 December 2022, €246.0m and $60.0m of borrowings were designated as hedges of net investments in €246.0m and $60.0m worth of overseas foreign operations. In addition, the €76.6m CCIRS liability has been designated as a net investment hedge of a further €76.6m worth of overseas foreign operations.

As the value of the borrowings and the CCIRS liability exactly matches the designated hedged portion of the net investments, the relevant hedge ratio is 1:1. The net investment hedges are therefore highly effective. It is noted that hedge ineffectiveness would arise in the event there were insufficient euro-denominated overseas foreign operations to be matched against the €76.6m CCIRS liability.

As at 31 December 2022, the Group had $146.0m, €198.0m and £28.0m (£323.9m in total) of US Private Placement Loan Notes (USPP) outstanding, which carry a fixed rate of interest, representing 81% of the Group’s total borrowings outstanding at that date. The interest rate profile of the Group’s borrowings is detailed in the tables below.

	Fixed rate £m	Floating rate £m	Total £m
Sterling	**28.0**	**33.3**	**61.3**
US dollar	**120.7**	**1.9**	**122.6**
Euro	**175.2**	**44.8**	**220.0**
Capitalised arrangement fees	**(0.9)**	**(1.8)**	**(2.7)**
As at 31 December 2022	**323.0**	**78.2**	**401.2**
Sterling	28.0	76.4	104.4
US dollar	107.9	1.2	109.1
Euro	166.4	27.2	193.6
Capitalised arrangement fees	(1.2)	(2.1)	(3.3)
As at 31 December 2021	301.1	102.7	403.8

In July 2022 the Group exercised its option to request a one year extension to the maturity of its £385m committed bank facility. Following this request £346.5m of the facility matures in August 2026 with £38.5m maturing in July 2025.

As at 31 December 2022, the Group had committed borrowing facilities of £721.9m (2021: £706.3m), of which £322.5m (2021: £308.1m) were undrawn. 90% of these undrawn facilities are due to expire in August 2026. The Group's borrowing requirements are met by USPP, a multi-currency committed syndicated bank facility of £385.0m (2021: £385.0m) and a bilateral bank facility of £13.0m (2021: £21.0m) which is fully collateralised against a portion of the Group's cash balance in China.

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

As at 31 December 2022	**Within one year £m**	**Between 1-2 years £m**	**Between 2-5 years £m**	**Over 5 years £m**	**Total contractual cash flows £m**	**Carrying amount**
Trade payables	**239.5**	**-**	**-**	**-**	**239.5**	**239.5**
Loans & overdrafts	**52.6**	**9.2**	**255.3**	**133.4**	**450.5**	**403.9**
Lease liabilities	**12.3**	**9.2**	**13.2**	**13.5**	**48.2**	**40.8**
Capitalised arrangement fees	**-**	**-**	**-**	**-**	**-**	**(2.7)**
Derivative liability	**0.1**	**-**	**-**	**-**	**0.1**	**0.1**
Total financial liabilities	**304.5**	**18.4**	**268.5**	**146.9**	**738.3**	**681.6**

As at 31 December 2021	Within one year £m	Between 1-2 years £m	Between 2-5 years £m	Over 5 years £m	Total contractual cash flows £m	Carrying amount
Trade payables	253.8	-	-	-	253.8	253.8
Loans & overdrafts	37.4	9.6	178.2	235.0	460.2	407.1
Lease liabilities	11.6	9.2	13.4	13.2	47.4	39.9
Capitalised arrangement fees	-	-	-	-	-	(3.3)
Derivative liability	(0.6)	(0.6)	(0.6)	0.2	(1.6)	2.6
Total financial liabilities	302.2	18.2	191.0	248.4	759.8	700.1

16 **Alternative Performance Measures**

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

16.1 Headline performance

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

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

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

16.3 Return on sales ('ROS')

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

16.4 Trading profit/adjusted EBITA

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

16.5 Headline profit before tax

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

16.6 Headline effective tax rate ('ETR')

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

16.7 Headline earnings

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

16.8 Headline earnings per share

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

16.9 Adjusted operating cash flow

Adjusted operating cash flow is cash generated from operations before restructuring and vacant site remediation costs but after deducting capital expenditure net of asset disposals. It is used in calculating the Group's cash conversion.

	2022 £m	2021 £m
Cash generated from operations	**268.3**	82.9
Add: Outflows relating to restructuring charges	**1.5**	4.0
Less: Capital expenditure	**(89.2)**	(45.5)
Add: Vacant site remediation costs	**1.8**	3.0
Add: Proceeds from the sale of property, plant and equipment	**3.1**	1.2
Adjusted operating cash flow	**185.5**	45.6
Trading Profit	**227.2**	142.4
Cash Conversion	**82%**	32%

16.10 Cash conversion

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

16.11 Free cash flow

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

16.12 Average trade working capital to sales ratio

The average trade working capital to sales ratio is calculated as the percentage of average trade working capital balances to the total revenue for the previous 12 months, at constant currency. Average trade working capital (comprising inventories, trade receivables and trade payables) is calculated as the average of the 13 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.

	2022 £m	2021 £m
Average trade working capital	**487.3**	344.2
Total revenue	**2,047.4**	1,642.9
Average trade working capital to sales ratio	**23.8%**	20.9%

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

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

Notes to the Group Financial Statements (continued)

16.14 Net interest payable on borrowings

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

	2022	2021
	£m	£m
Total interest payable on borrowings (note 4)	**18.3**	13.0
Finance income (note 4)	**(8.8)**	(6.7)
Net interest payable on borrowings	**9.5**	6.3

16.15 Interest cover

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

	2022	2021
	£m	£m
Adjusted EBITDA (note 2)	**282.7**	192.2
Net interest payable on borrowings	**9.5**	6.3
Interest cover	**29.8x**	30.5x

16.16 Net debt

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

16.17 Net debt to adjusted EBITDA

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

	2022	2021
	£m	£m
Net debt (note 8)	**255.0**	277.1
Adjusted EBITDA (note 2)	**282.7**	192.2
Net debt to adjusted EBITDA	**0.9x**	1.4x

16.18 Return on invested capital (ROIC)

The Group has adopted ROIC as its key measure of return from the Group's invested capital. The RONA performance measure has been replaced with ROIC which provides a more complete measure of Vesuvius's returns. ROIC is calculated as trading profit less amortisation of acquired intangibles plus share of post-tax profit of joint ventures and associates for the previous 12 months after tax, divided by the average (being the average of the opening and closing balance sheet) invested capital (defined as: total assets excluding cash plus non-interest-bearing liabilities), at the average foreign exchange rate for the year.

	2022 **£m**	2021 £m
Average invested capital	**1,503.6**	1,329.1
Trading profit (note 16.4)	227.2	142.4
Amortisation of acquired intangible assets	(10.4)	(9.7)
Share of post-tax profit from joint ventures and associates	1.2	1.3
Tax on trading profit and amortisation of acquired intangible assets	(57.5)	(35.1)
	160.5	98.9
ROIC	**10.7%**	7.5%

16.19 Constant currency

Figures presented at constant currency represent 2021 amounts retranslated at average 2022 exchange rates.

16.20 Liquidity

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

	2022 **£m**	2021 £m
Cash	**184.2**	169.1
Undrawn committed debt facilities	**322.5**	308.1
Cash used as collateral on loans	**(13.0)**	(21.0)
Gross up of cash in notional pools	**(0.1)**	(0.5)
Liquidity	**493.6**	455.7

16.21 Last twelve months ('LTM')

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

17 Exchange rates

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

	Income and expense Average rates			**Assets and liabilities Year-end rates**		
	2022	2021	**Change**	**2022**	2021	**Change**
US Dollar	1.24	1.38	**(10.1%)**	1.21	1.35	**(10.4%)**
Euro	1.17	1.16	**0.9%**	1.13	1.19	**(5.0%)**
Chinese Renminbi	8.31	8.87	**(6.3%)**	8.37	8.61	**(2.8%)**
Japanese Yen	161.86	151.06	**7.1%**	158.60	155.69	**1.9%**
Brazilian Real	6.38	7.42	**(14.0%)**	6.39	7.54	**(15.3%)**
Indian Rupee	96.99	101.67	**(4.6%)**	100.06	100.75	**(0.7%)**
South African Rand	20.16	20.32	**(0.8%)**	20.57	21.64	**(4.9%)**

18 Events after the Balance Sheet date

Cyber incident

We informed the market on 6 February 2023 that we had suffered a cyber security incident. In order to contain the threat, we voluntarily shutdown our systems on a precautionary basis. During this period our sites instigated manual procedures and work arounds to maintain production, shipping and invoicing which minimised the disruption. The initial period of disruption has been short, and all significant systems are now fully operational. There has been no impact on the financial results reported for the year ended 31 December 2022 and we expect that the impact on the 2023 financial results will not be material.