Engineered solutions for Green Steel

Partnering the industry through the transition to sustainable steel



- Compressors and fans operating in over 20 Direct Reduced Iron Plants globally
- Hydrogen compression for production or storage feeding the first green steel plants
- Complete gas handling units for green steel plants
- Source point carbon capture systems
- Water treatment plants for electrolyzer feed
- Heat exchangers with cooling fans where air cooling is deployed

From hydrogen production to steel manufacturing based on Direct Reduced Iron, we support the complete green steel value chain with a portfolio of highly engineered products.

The combination of Howden high performance air and gas handling equipment with parent company Chart's cryogenic products, offers developers a unique partner able to support projects from concept to reality.

Direct Reduced Iron Steelmaking

Often found as a core method of low carbon steelmaking, Direct Reduced Iron (DRI) replaces the high carbon emitting coke fuel with gas. Using hydrogen produced by renewable sources (green hydrogen) achieves optimal sustainability.

Whole Plant Process

As a longstanding provider of critical process equipment to conventional metal mills and DRI plants, our equipment supports the wider process requirements involved in green steel. Howden fans and compressors are found in different DRI technologies. Fans are also integral to air and gas applications within the wider process.

Hydrogen - Integrated or Supplied

Chart's technology range enables plant developers to meet the demand for captive hydrogen production, with everything except the electrolyzer in scope.

Where the intention is to source liquid hydrogen for onsite storage and use, Chart's transportation, storage and regasification capabilities are key.

With the addition of Howden's compressors, proven in over a century of hydrogen duties, we provide a fully functioning solution.



Gas compressors play a vital role in process gas provision within DRI steelmaking

KK&K multistage centrifugal compression technology

Howden and Chart capabilities:

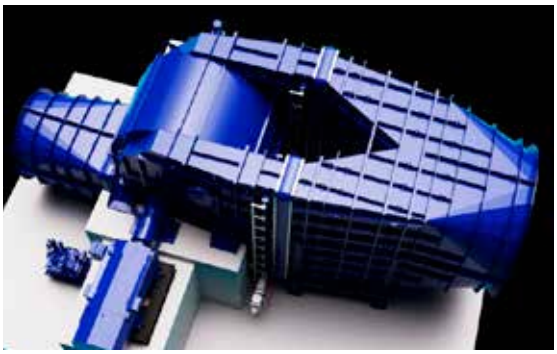
Our equipment and plant systems are proven across the global metals manufacturing industry and those requiring industrial gas supply.

Equipment for DRI steelmaking:

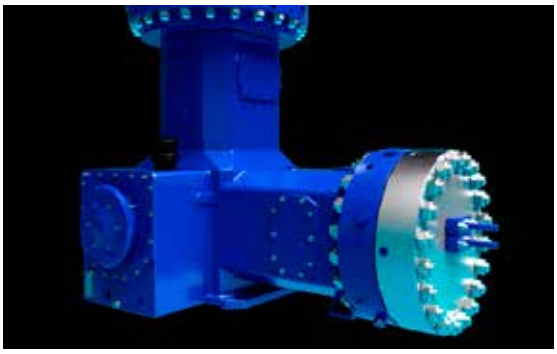
- Single stage and multistage integrally geared compressors (API 617) from Kühnle, Kopp & Kausch and CKD – transferring process gas and cooling gas (depending on the process design). Adaptable operation with variable gases e.g. natural gas, hydrogen or mixture
- Oil free screw compressors (API 619) – compressing gas within pneumatic transport systems
- Centrifugal/axial fans – providing main air and flue gas handling within the core process and supporting auxiliary air and gas applications

Equipment for hydrogen production, storage and usage:

- Water purification system – ensuring required water purity for feed to electrolyzers
- Diaphragm compressors - for high pressure transfer of hydrogen gas to storage
- Liquid gas storage and vaporization systems - for oxygen, nitrogen, LNG and hydrogen
- Horizontal and vertical storage systems – safe, efficient and economical storage of liquid hydrogen
- Regasification/Vaporization - efficient conversion of liquid hydrogen to gas for process use (e.g. injection into H_2-DRI shaft furnace for iron ore carburizing)



Centrifugal fans processing a wide range of air and gas quantities and mixtures



Hydrogen compressors providing high pressure contaminant free hydrogen gas to storage or process



Chart cryogenic technology for storage and vaporization

For further information contact our team today:

www.chartindustries.com/metals

CHART® Cooler By Design®

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