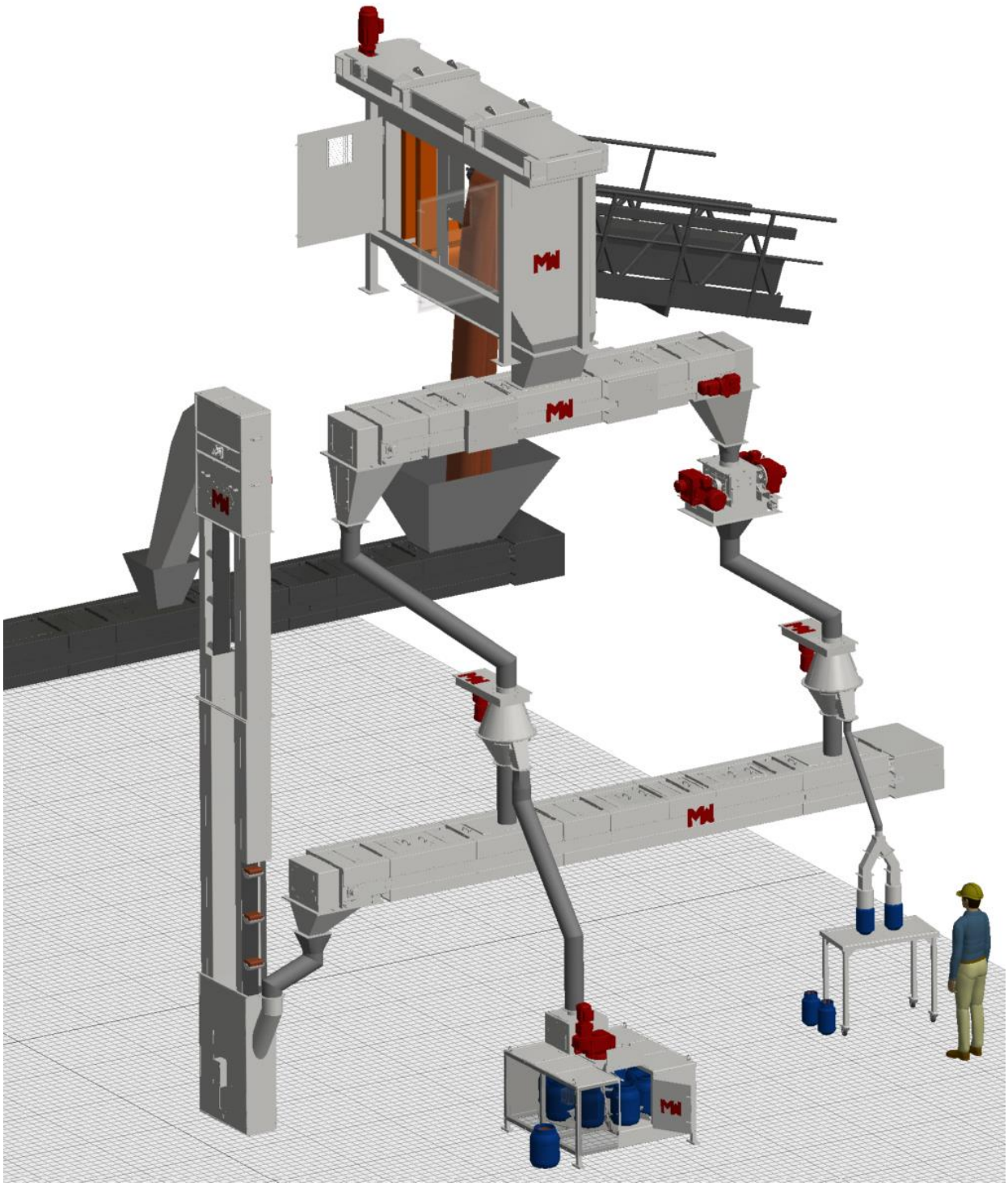
M&W JAWO Sampling Solutions

3 examples of JAWO multi-stage sampling systems including different variants of primary samplers



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Introducing M&W JAWO Sampling Solutions.

On the following pages you will find some practical examples of JAWO Sampling Systems including different types of primary samplers for various technical plant layouts in 3D.

The technical plant example layouts are:

A. Sampling of free fall material in a duct.

B. Sampling of material transported on a conveyor belt.

C. Sampling of free fall material at the discharge point of a conveyor belt.

In addition to the 3D-layout we have also added information about the flow of some typical sampled materials.

M&W JAWO Sampling is building the bridge between the Theory Of Sampling (TOS) and a complete sampling solution for any customer who requires a high-quality representative sampling system.

Our sampling systems comprise several individual customized products which are engineered, constructed, and positioned together. This ensures a solution which meets international standards or even exceed them.

What is the standard?

M&W JAWO Sampling equipment and sampling systems operate in accordance with approved international material standards such as ISO, ASME, GOST, EN as well as DS3077 (2013). All sampling equipment and solutions aim for compliance with the principles laid down in the Theory of Sampling (TOS) and gives our customers reliable knowledge of the material properties such as moisture content, particle size distribution, mineral proportions, and content grade essential for commercial, operational, and technical characterization.

JAWO Sampling Solution

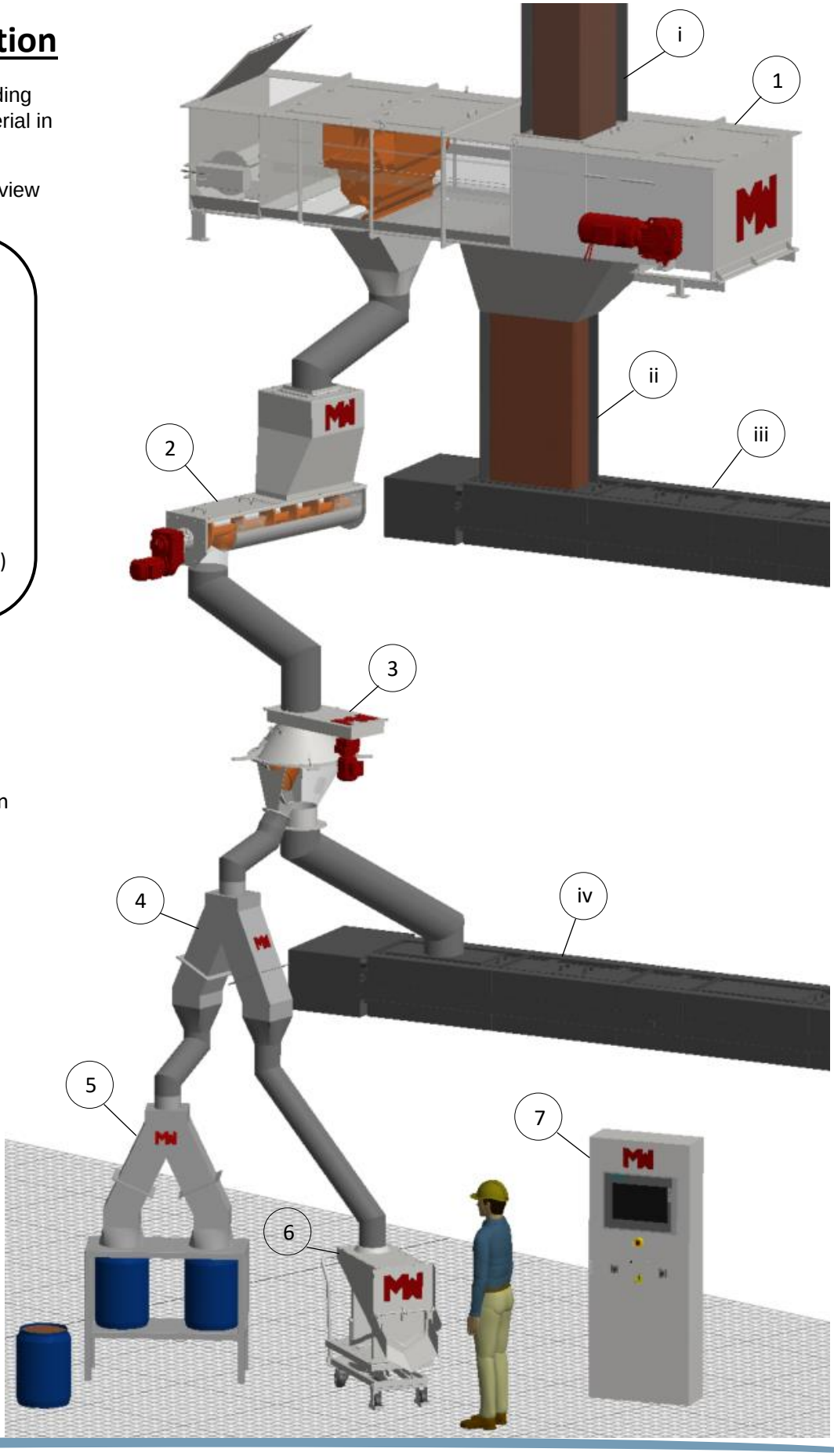
Example A - Sampling system including **Bucket Sampler** for free-falling material in a duct.

- **Illustration 1** - General overview

i) Main Inlet Duct
ii) Main Outlet Duct
iii) Main Outlet Conveyor
iv) Reject Conveyor

1) Bucket Sampler (BS)
2) Screw Conveyor (SC)
3) Rotary Tube Divider (RTD-12)
4) Divider Gate (DG)
5) Dual Splitter (DS)
6) Mobile Sampling Container (MSC)
7) Control Cabinet (CC)

- M&W products
- Chutes
- Sampling cutter/transportation
- Driving motors
- Sampling buckets
- Material
- Main ducts



JAWO Sampling Solution – Bucket Sampler

Example A: Sampling system including Bucket Sampler for free-falling material in a duct.

Solution description

1. The Bucket Sampler (BS) is designed to extract increments/cuts from a free-falling flow of bulk material in a vertical duct. Representativity is ensured since a complete cross section of the material is collected.

   The sampling outlet of the BS is connected to a Screw Conveyor by a chute.

2. The Screw Conveyor (SC) is used to transport and/or dispense the bulk material by rotation of a screw.

   The SC dispenses the material into a chute, which is connected to a Rotary Tube Divider.

3. The Rotary Tube Divider (RTD) is designed for representative division of bulk material. The RTD splits the material stream into A) a sub-sample and B) a reject stream. By a chute the reject stream is transported to a reject conveyor.

   The sub-sample outlet of the RTD is connected to a Divider Gate by a chute.

4. The Divider Gate (DG) is used for directing the representative material either to the Dual Splitter (5) or the Mobile Sampling Container (6) by chutes. The position of a dual-direction flap leads the material flow to either (5) or (6).

5. The Dual Splitter (DS) is used for splitting the bulk material into two buckets. The material can be split in the ratio 25-75% or directed 100% to either the left or the right bucket. The position of a dual-direction flap splits or leads the material flow to the buckets.

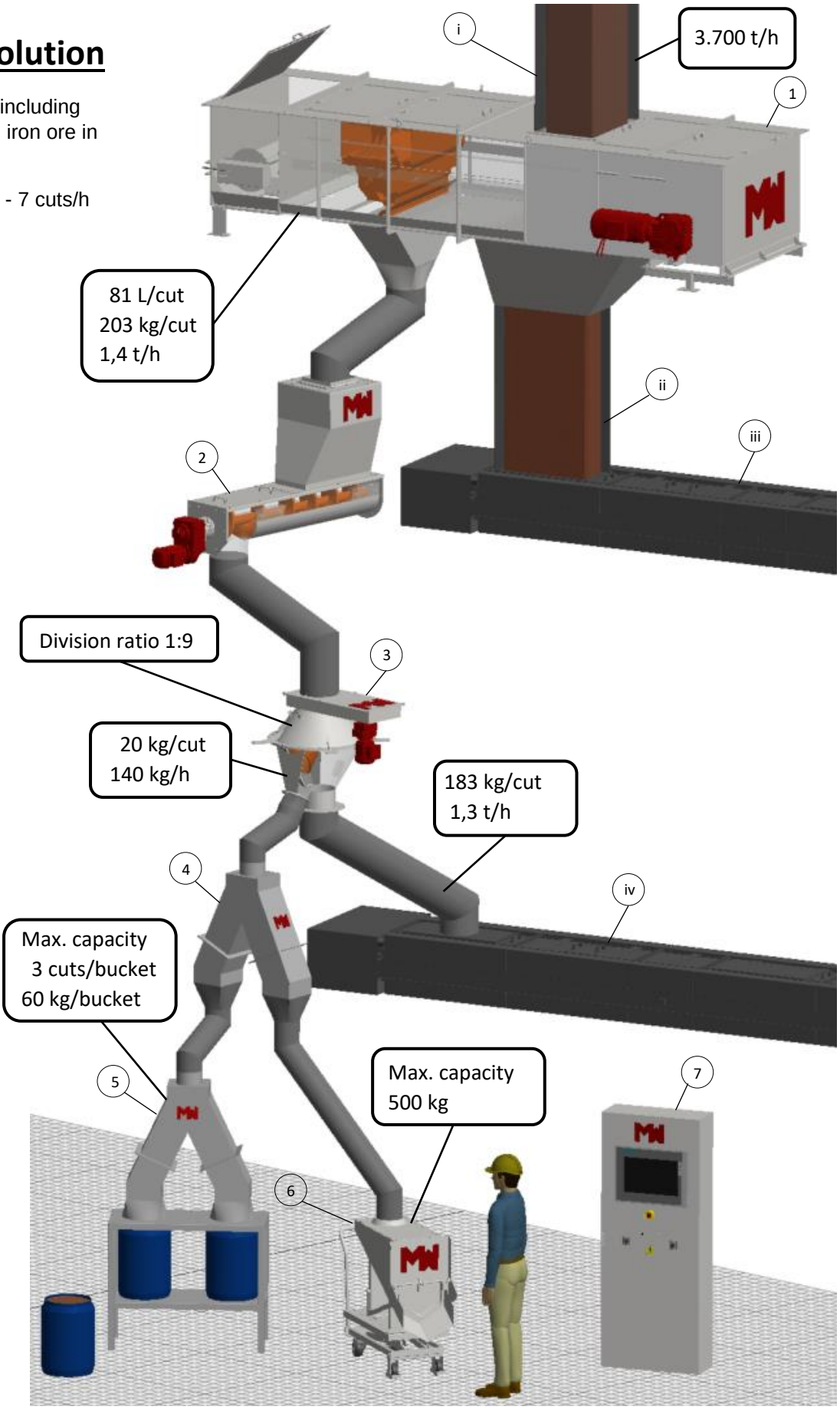
6. The Mobile Sample Container (MSC) is designed to receive up to 200L of representative sampled material. Without any manual lifting the representative sample is easy to move around and unload.

7. All the above equipment requires a Control Cabinet (CC) that controls, powers and protects the JAWO Sampling machines. The CC is also the interface for the operator and can serve as a junction box for all power and signal cables.

JAWO Sampling Solution

Example A - Sampling system including **Bucket Sampler** for free-falling iron ore in a duct.

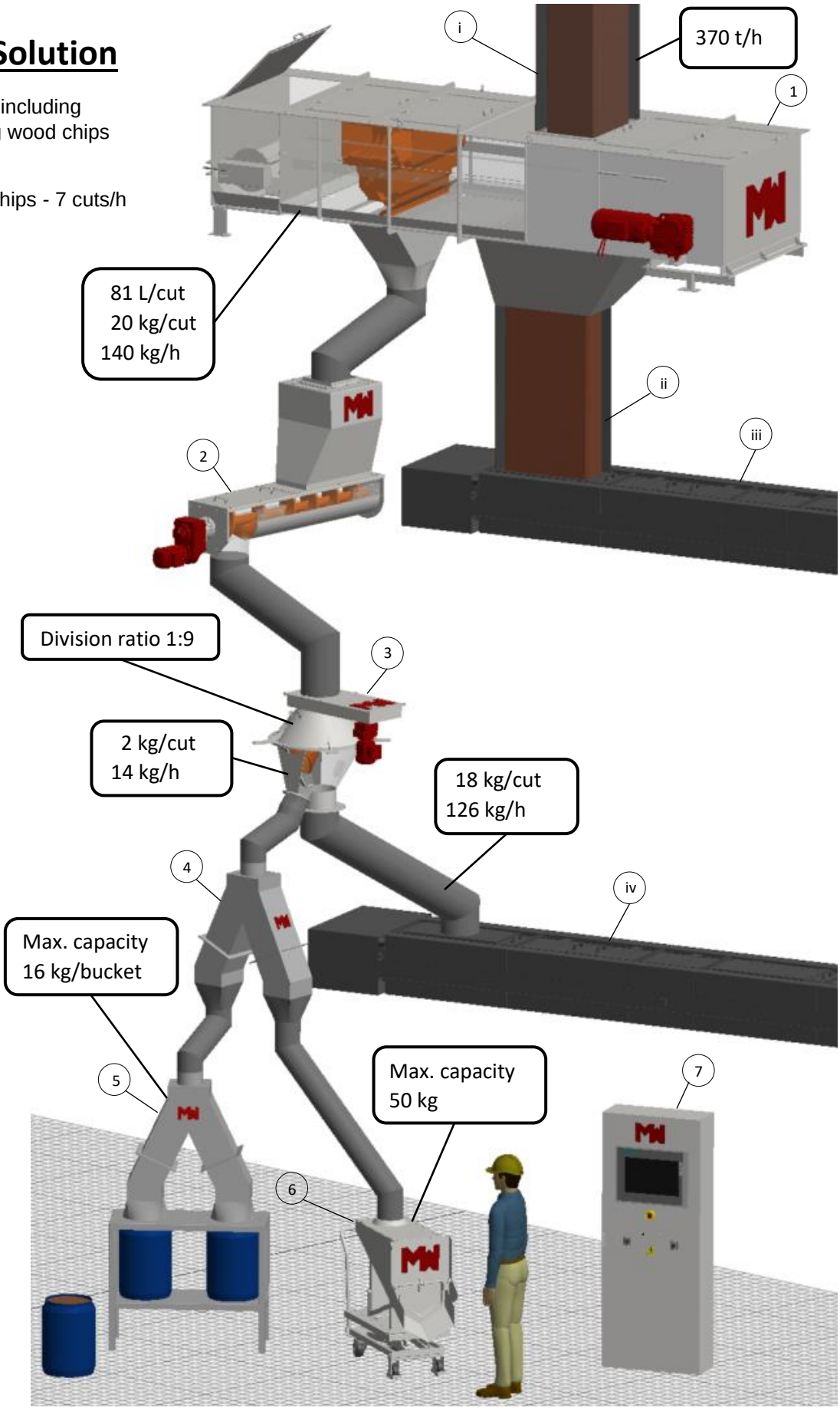
- **Illustration 2** - Iron ore - 7 cuts/h



JAWO Sampling Solution

Example A - Sampling system including **Bucket Sampler** for free-falling wood chips in a duct.

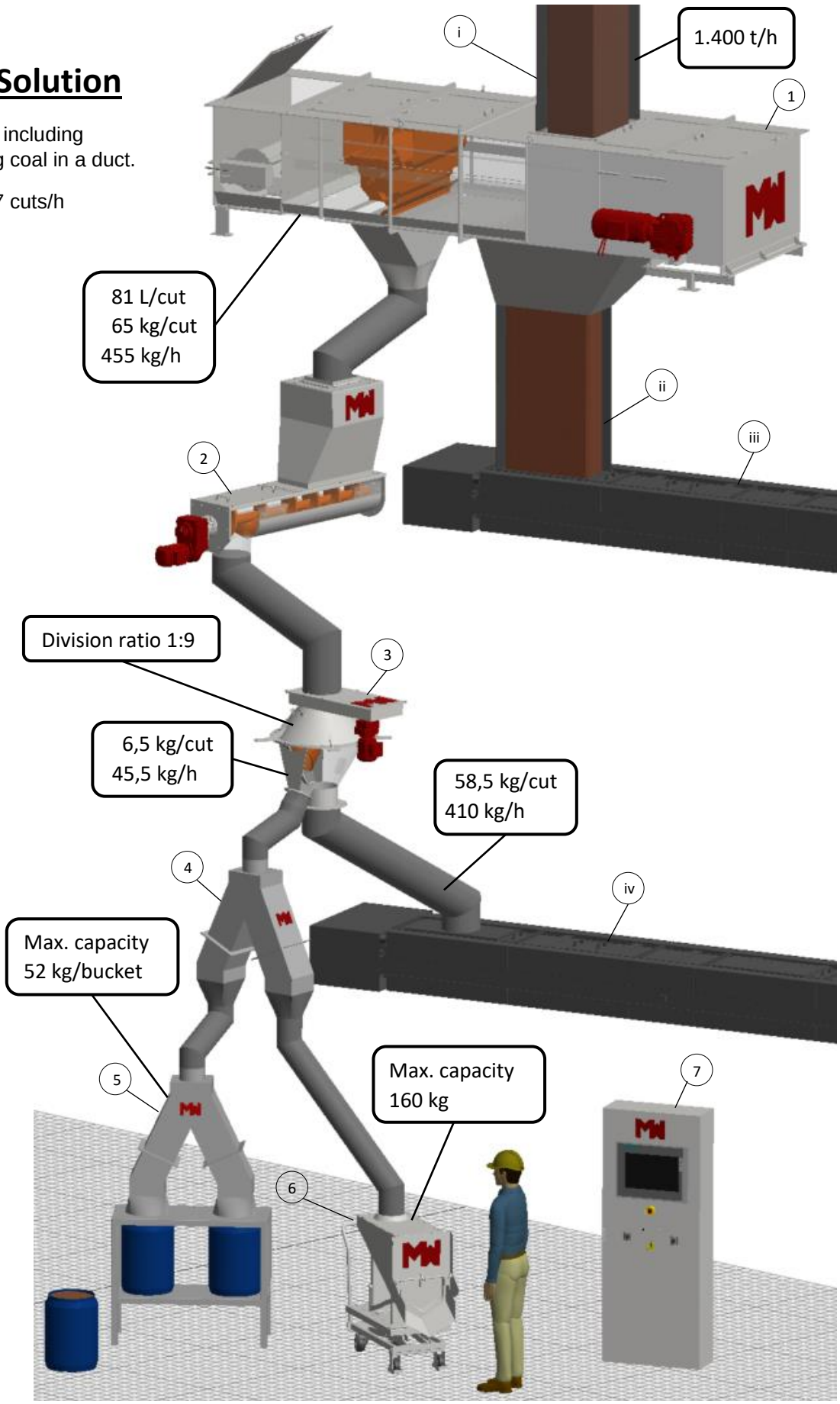
- **Illustration 3** - Wood chips - 7 cuts/h



JAWO Sampling Solution

Example A - Sampling system including
Bucket Sampler for free-falling coal in a duct.

- **Illustration 4** - Coal - 7 cuts/h



JAWO Sampling Solution

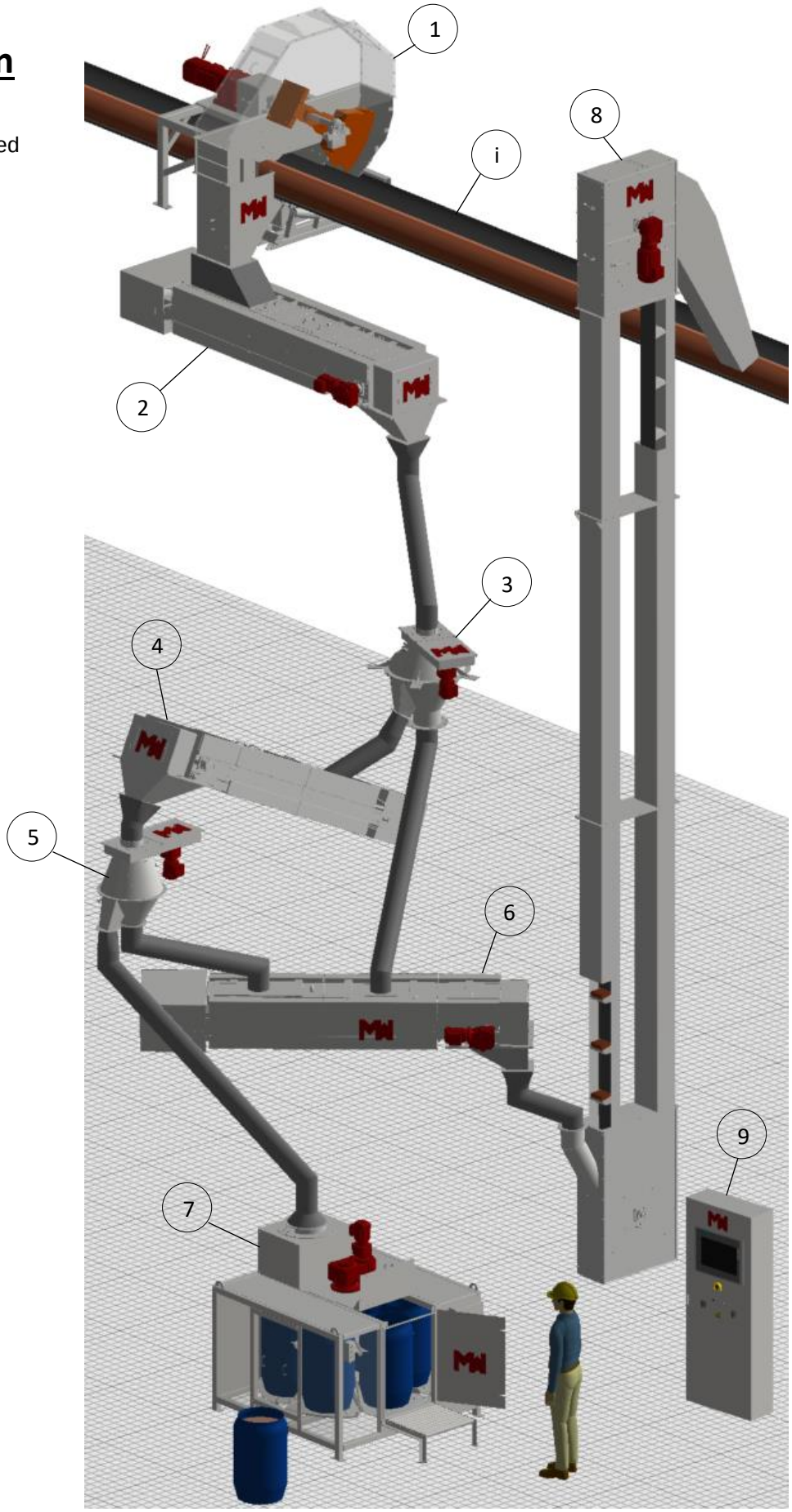
Example B - Sampling system including **Cross Belt Sampler** for material transported on a conveyor belt.

- **Illustration 1** - General overview

i) Main Conveyor Belt

1) Cross-Belt Sampler (CBS)
2) Dosing Conveyor 1 (DoC)
3) Rotary Tube Divider 1 (RTD-12)
4) Dosing Conveyor 2 (DoC)
5) Rotary Tube Divider 2 (RTD-8)
6) Dosing Conveyor 3, Reject (DoC)
7) Sample Magazine (SM)
8) Bucket Belt Elevator (BBE)
9) Control Cabinet (CC)

- M&W products
- Chutes
- Sampling cutter
- Driving motors
- Sampling buckets
- Material
- Main Conveyor Belt



JAWO Sampling Solution – Cross Belt Sampler

Example B: Sampling system including Cross Belt Sampler for material transported on a conveyor belt.

Solution description

1. The Cross Belt Sampler (CBS) is designed to extract increments/cuts from bulk material being transported on a conveyor belt. A representative increment is scooped into the sampling outlet from the conveyor belt in a circular motion by rotation of a sample cutter.

   The sampling outlet of the CBS is connected to a Dosing Conveyor by a chute.

2. The Dosing Conveyor 1 (DoC) is used to transport and/or dispense the bulk material by a belt. The DoC has a design which ensures minimum spillage of the material and a correct dosing.

   The DoC dispenses the material into a chute, which is connected to a Rotary Tube Divider.

3. The Rotary Tube Divider 1 (RTD-12) is designed for a representative division of bulk material. The RTD splits the material stream into A) a sub-sample and B) a reject stream. The reject stream is connected to a DoC (6) by a chute.

   The sub-sample outlet of the RTD is connected to a second Dosing Conveyor by a chute.

4. The Dosing Conveyor 2 (DoC) transports and/or dispenses the sub-sample outlet from the RTD-12 (3) to a second Rotatry Tube Divider by a chute.

5. The Rotary Tube Divider 2 (RTD-8) divides the sub-sample from RTD-12 even further with the same representative division mechanism as for the RTD-12. The reject stream is connected to the DoC (6) by a chute.

   The sub-sample outlet of the RTD is connected to a Sample Magazine by a chute.

6. The Dosing Conveyor 3 (DoC) transports and/or dispenses the reject stream of bulk material from the RTD-12 (3) and RTD-8 (5) to the Bucket Belt Elevator by a chute.

7. The Sample Magazine (SM) is designed to automatically fill sample buckets with representative samples of bulk material thereby ensuring a composite sample. The SM acts as a storage device since it has multiple buckets installed inside on a carousel. The SM is designed to prevent contamination and moisture gain and loss of the gathered samples.

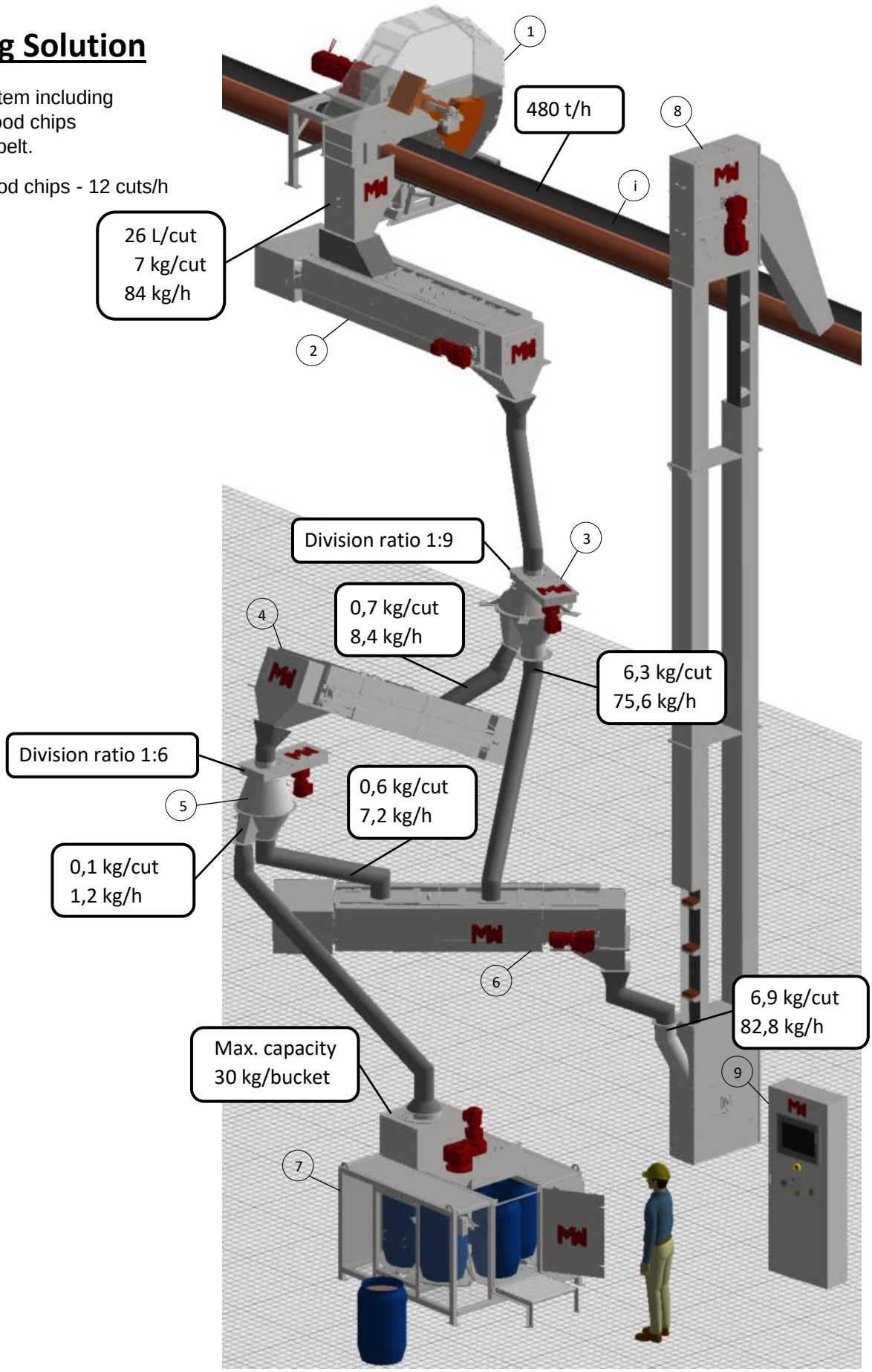
8. The Bucket Belt Elevator (BBE) lifts the reject stream back to the main conveyor belt by means of buckets. The buckets are attached to a belt, which pulls them around.

9. All the above equipment requires a Control Cabinet (CC) that controls, powers and protects the JAWO Sampling machines. The CC is also the interface for the operator and can serve as a junction box for all power and signal cables.

JAWO Sampling Solution

Example B - Sampling system including **Cross Belt Sampler** for wood chips transported on a conveyor belt.

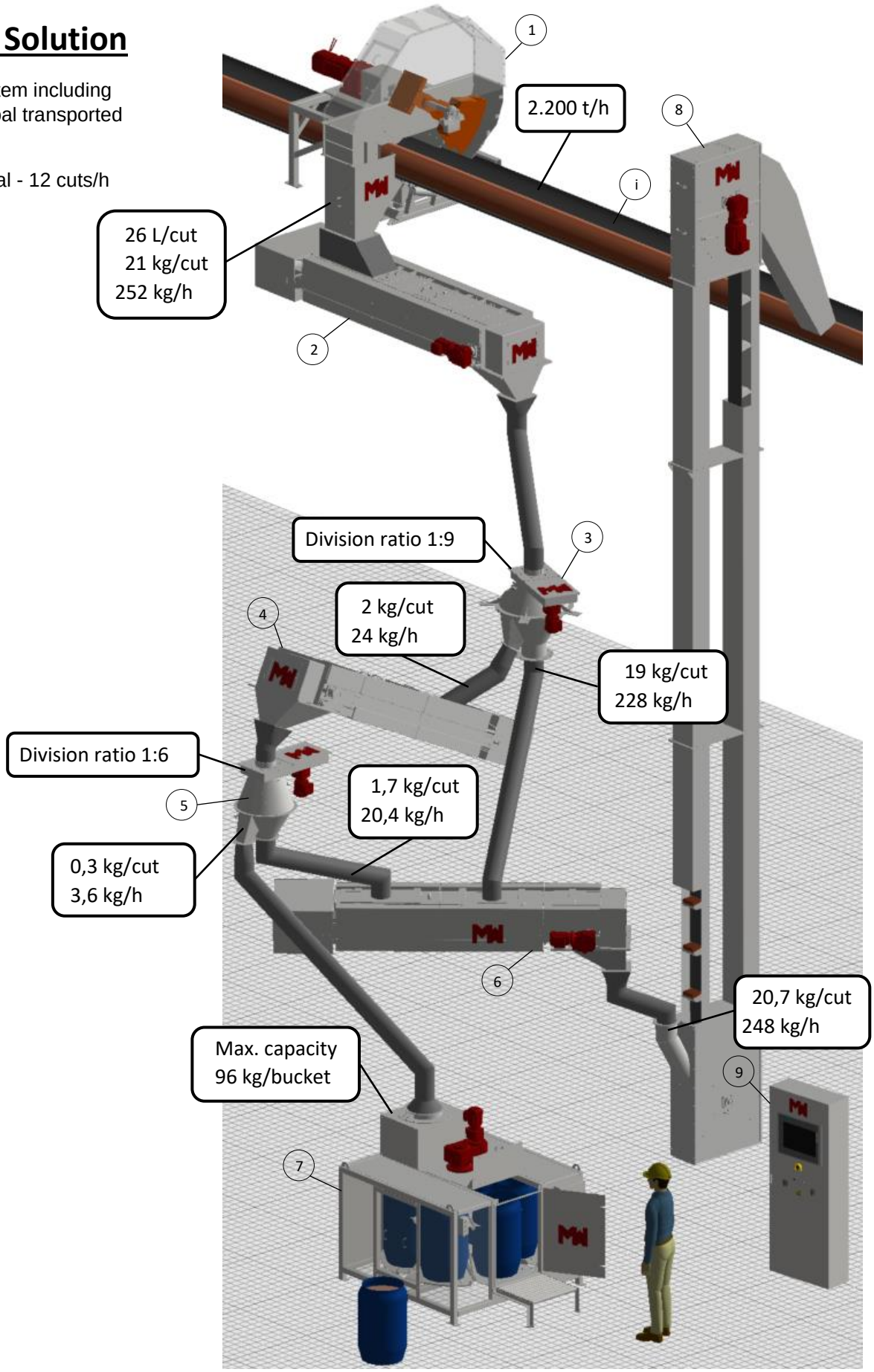
- **Illustration 2** - Wood chips - 12 cuts/h



JAWO Sampling Solution

Example B: Sampling system including **Cross Belt Sampler** for coal transported on a conveyor belt.

1. **Illustration 3** - Coal - 12 cuts/h



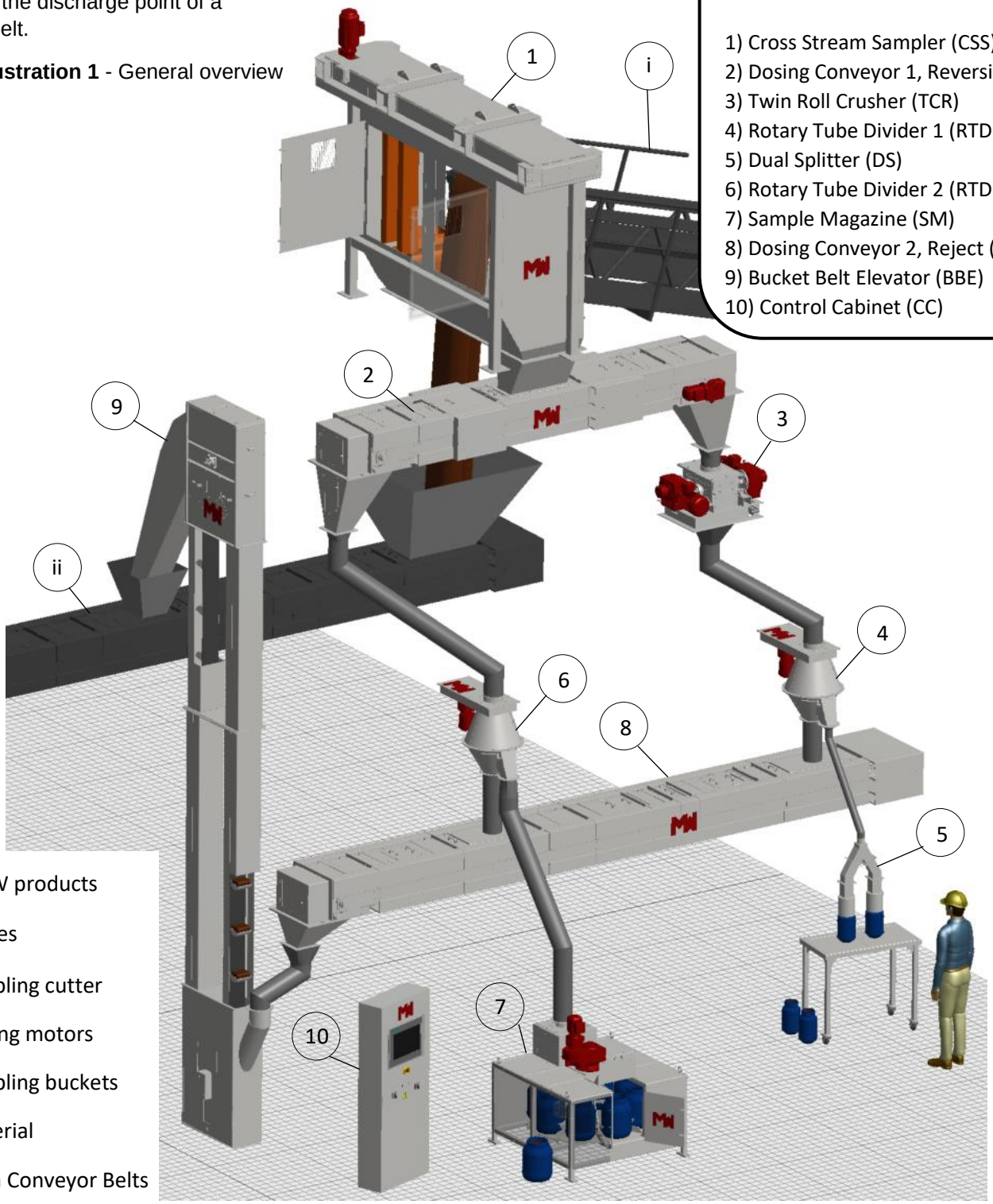
JAWO Sampling Solution

Example C: Sampling system including **Cross Stream Sampler** for free fall material at the discharge point of a conveyor belt.

- **Illustration 1** - General overview

i) Main Inlet Conveyor Belt
ii) Main Outlet Conveyor Belt

1) Cross Stream Sampler (CSS)
2) Dosing Conveyor 1, Reversible (DoC)
3) Twin Roll Crusher (TCR)
4) Rotary Tube Divider 1 (RTD-8)
5) Dual Splitter (DS)
6) Rotary Tube Divider 2 (RTD-8)
7) Sample Magazine (SM)
8) Dosing Conveyor 2, Reject (DoC)
9) Bucket Belt Elevator (BBE)
10) Control Cabinet (CC)



JAWO Sampling Solution – Cross Stream Sampler

Example C: Sampling system including Cross Stream Sampler for free fall material at the discharge point of a conveyor belt.

Solution description

1. The Cross Stream Sampler (CSS) extracts a representative increment/cut of bulk material from a free-falling stream at the discharge point of a conveyor belt. Representativity of the increment is ensured by extraction of a complete cross section of the material stream.

   The sampling outlet of the CSS is connected to a Reversible Dosing Conveyor.

2. The Reversible Dosing Conveyor (DoC) is used to transport and/or dispense the bulk material by a belt. Depending on the usage of the representative sample of the material the DoC dispenses to either the Twin Roll Crusher (3) or the Rotary Tube Divider (6), which are connected by chutes. The DoC has a design that ensures a minimum of spillage and a correct dosing.

   The DoC dispenses the material into a chute, which is connected to a Rotary Tube Divider.

3. The Twin Roll Crusher (TCR) is designed for particle size reduction of bulk material by crushing the material. The crushing characteristics can be adjusted by changing the distance between the rolls.

   The outlet of the TCR is connected to a Rotary Tube Divider by a chute.

4. The Rotary Tube Divider 1 (RTD) is designed for a representative division of bulk material. The RTD splits the material stream into A) a sub-sample and B) a reject stream. The reject stream is connected to a DoC (8) by a chute.

   The sub-sample outlet of the RTD is connected to a Dual Splitter by a chute.

5. The Dual Splitter (DS) is used for splitting the bulk material into two buckets. The material can be split in the ratio 25-75% or directed 100% to either the left or the right bucket. The position of a dual-direction flap splits or leads the material flow to the buckets.

6. A second Rotary Tube Divider (RTD) is used to make a representative division of the bulk material and leads it into a Sample Magazine. The reject stream is led to the DoC (8) by a chute.

7. The Sample Magazine (SM) is designed to automatically fill sample buckets with representative samples of bulk material thereby ensuring a composite sample. The SM acts as a storage device since it has multiple buckets installed inside on a carousel. The SM is designed to prevent contamination and moisture gain and loss of the gathered samples.

8. The Dosing Conveyor (DoC) transports and/or dispenses the reject stream of bulk material from the RTD (4) and RTD (6) into a chute which is connected to a Bucket Belt Elevator.

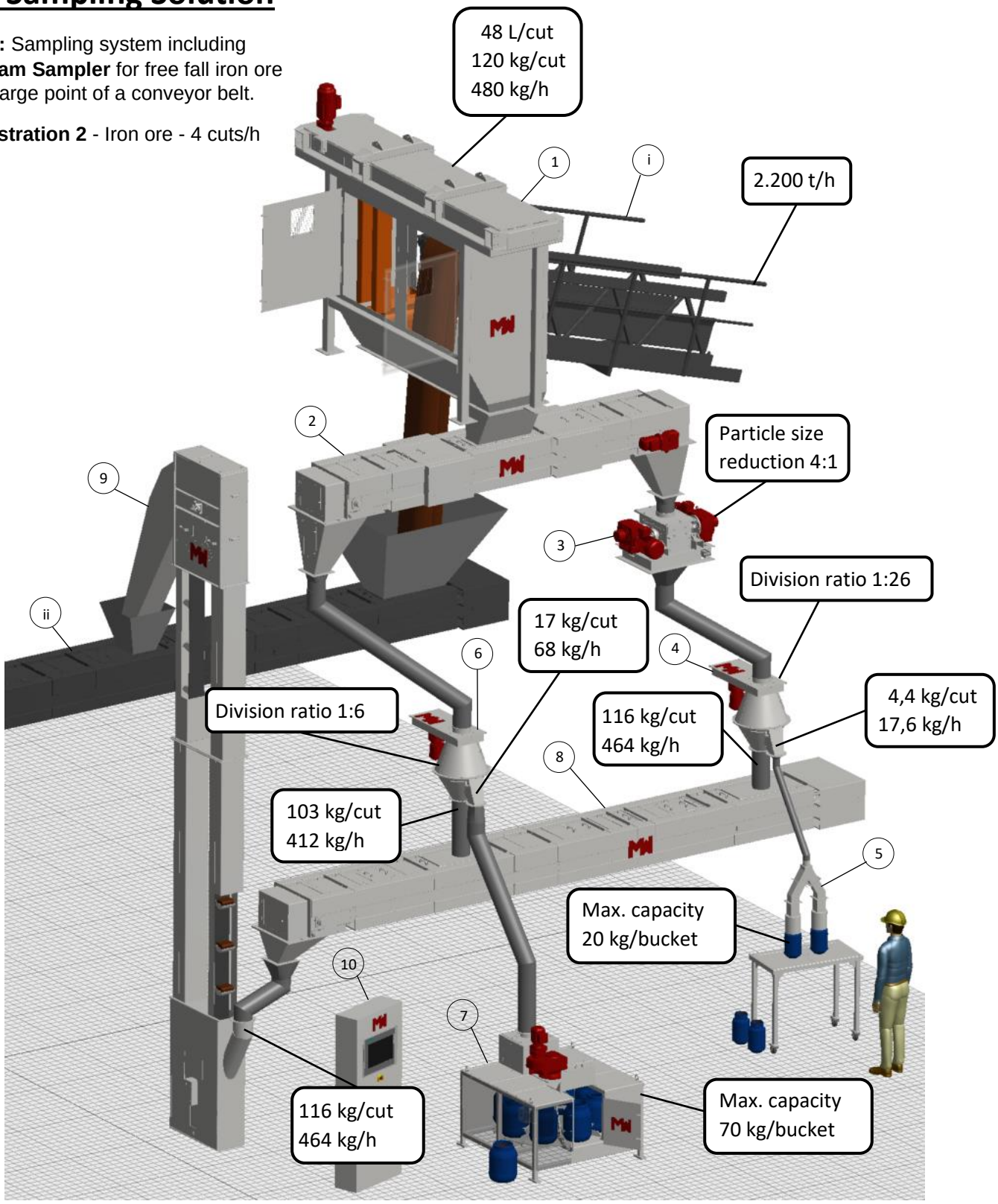
9. The Bucket Belt Elevator (BBE) lifts the reject stream to the main outlet conveyor belt by means of buckets. The buckets are attached to a belt, which pulls them around.

10. All the above equipment requires a Control Cabinet (CC) that controls, powers and protects the JAWO Sampling machines. The CC is also the interface for the operator and can serve as a junction box for all power and signal cables.

JAWO Sampling Solution

Example C: Sampling system including **Cross Stream Sampler** for free fall iron ore at the discharge point of a conveyor belt.

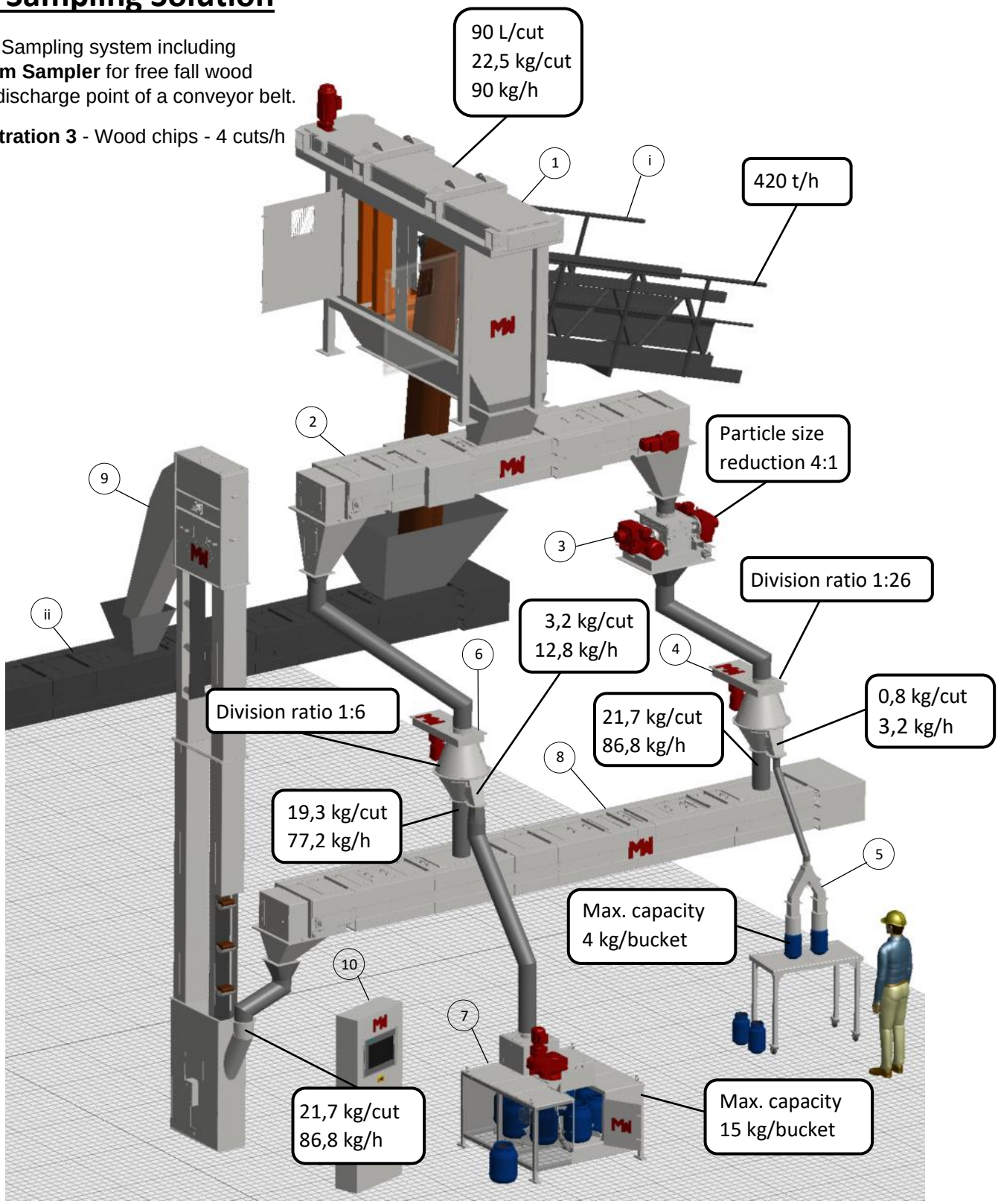
2. **Illustration 2** - Iron ore - 4 cuts/h



JAWO Sampling Solution

Example C: Sampling system including **Cross Stream Sampler** for free fall wood chips at the discharge point of a conveyor belt.

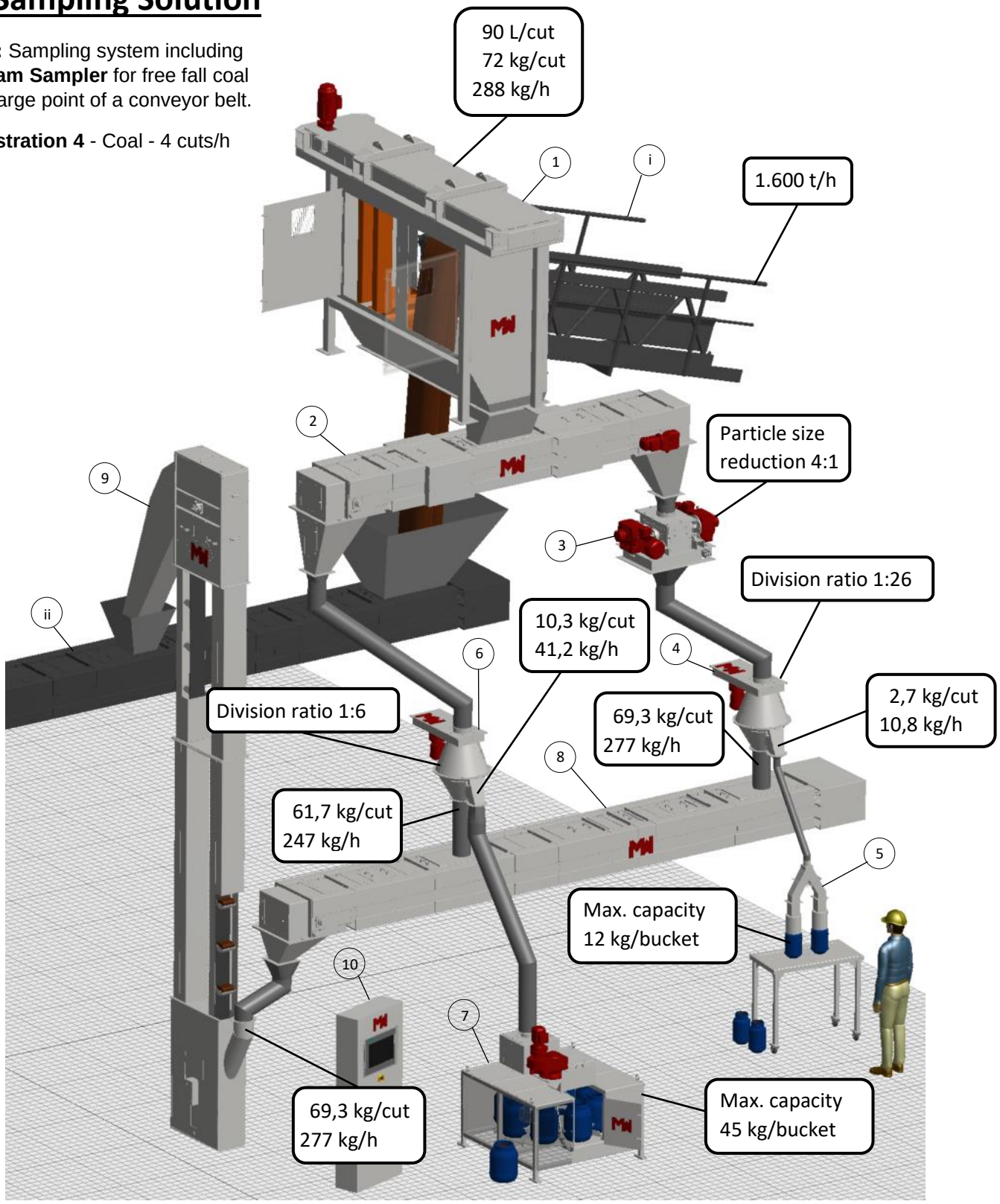
- **Illustration 3** - Wood chips - 4 cuts/h



JAWO Sampling Solution

Example C: Sampling system including **Cross Stream Sampler** for free fall coal at the discharge point of a conveyor belt.

- **Illustration 4** - Coal - 4 cuts/h



MARK & WEDELL

About M&W.

Mark & Wedell A/S (M&W) is a global mechanical/electrical engineering and manufacturing company. M&W serves a solid and growing international customer base within the global mining-, minerals-, metals-, power generation- and big science markets.

We develop, engineer, and produce high quality mechanical and electrical machines, instruments, and solutions. Our brand JAWO and unique know-how is well recognized in our markets and among our customers due to more than 40 years of experience.

Contact us directly.

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