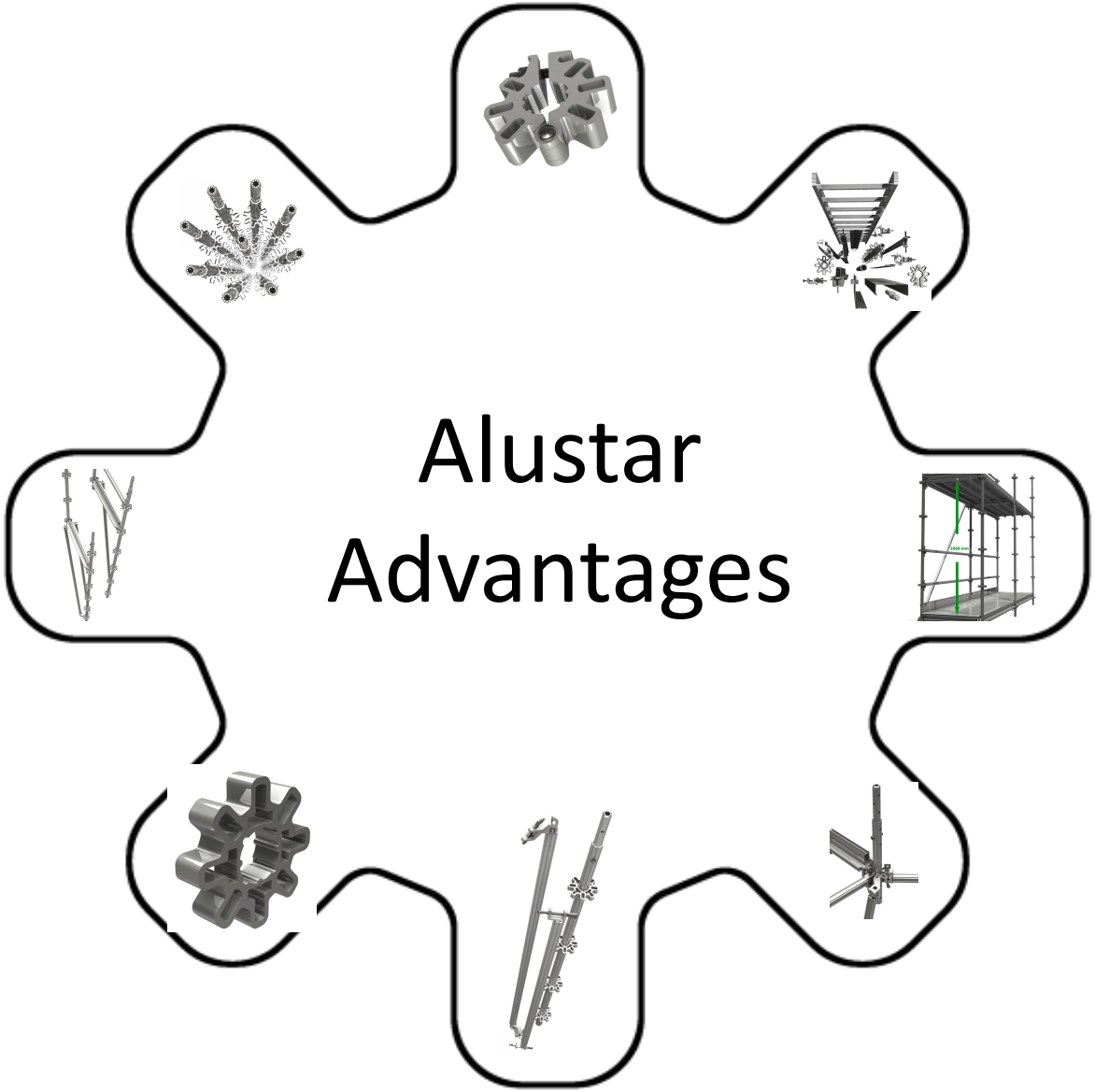
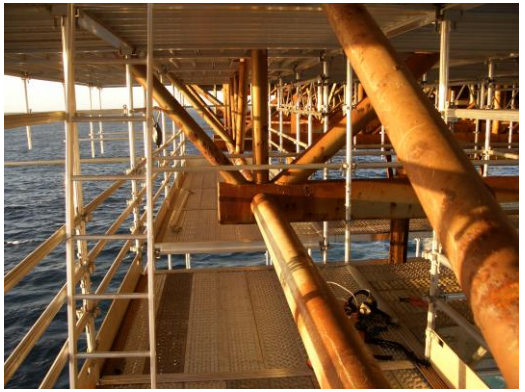
Alustar Advantages



www.alustar.no

Scaffolding Worldwide

- There are 3 distinct generations in use today supporting mechanical constructions and maintenance on Offshore productions platforms and Onshore refineries/LNG plants.
- **Tube and fittings**: Has been in use and remained unchanged for 60 years +**.**
- **Steel system scaffolding**: First introduced in the 1960's, fundamentally unchanged since then.
- **Aluminium system scaffolding**: Developed in Norway in mid 1990's



Aluminium system - Alloy

- **ALUSTAR aluminium scaffold system is made of quality 6082 T6.** Supplied and extruded by Hydro Aluminium in Norway. Aluminium alloy 6082 has excellent corrosion resistance and **self repairing** surface coating.
- The fact that aluminium is recyclable, and that mainly hydro-energy is the main source for energy used in the extrusion and production of the scaffold components, emphasise that **aluminium is the green metal.**

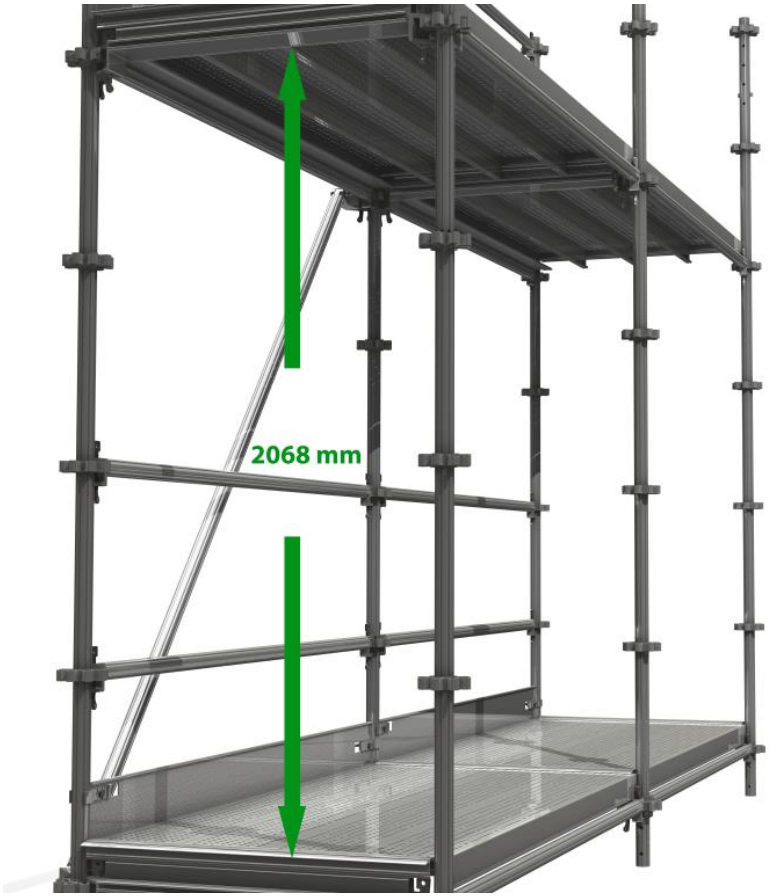
HSE in all Dimensions

- **Health**: Workforce stay longer in jobs, less injuries as a result of strain
- **Safety**: Unique profile that gives a good grip, safe workplace with good height between lifts, wedge system that ensure that locks are not by accident left in open position.
- **Environment**: Alustar components are not surface treated or exposed to chemicals. The alloy we use in our components has a self-repairing ceramic surface that protects it from corrosion. Besides being the green metal, we take pride in manufacturing without welding to ensure that it's safe to manufacture and easy to maintain and repair.

- **Total is that Alustar greatly increase HSE in the organisations that has adapted to Alustar Aluminium Scaffold system.**

Height between lifts

- The distance between each crown is 550 mm which give the user a **working height of 2068 mm**. This effectively eliminates the risk of injuries related to hitting obstacles from lift above when walking in a scaffold with several bays.
- Another advantage is that if you need to build 5 lifts or, you only need 5 lifts to reach to the same level and not 6 as with other systems. **This reduces the total weight, material cost, material to handle and time** needed to build.

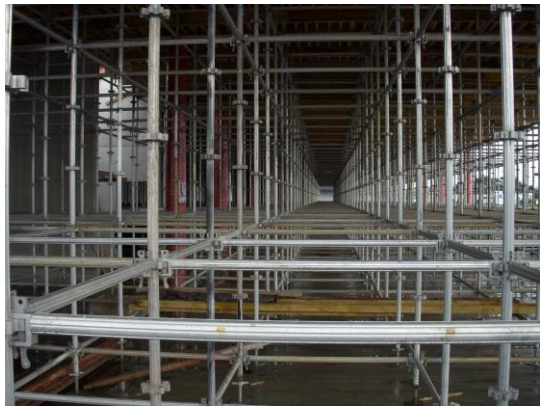


Handling

- Alustar tube profile does not only give our components our unique strength, but also makes it better to handle.
- The grooved profile ensures safer handling when passing the components up or down when erecting or dismantling a scaffold.
- Another advantage with our profile, is that tests show that it takes more force to make a coupling slide on it compared to steel tube.

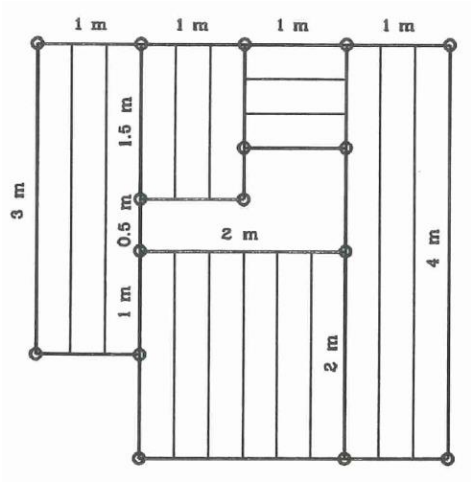
Product Development

- **ALUSTAR scaffold** was especially designed for the offshore and heavy industry market, but has, because of its strength and flexibility, been proven as an all-around system. The strength combined with light weight has established Alustar as a provider of solutions in the heavy support system market.



Metric design

- The design of Alustar scaffold is built on a set of interchangeable parts in metric measures from 25cm up to 4 meter for the most common components.
- All lengths can be combined into a new and the transom has a slot that enables the scaffolder to narrow the width, or length, of the bay size which makes the system very flexible and easy to build and adapt to complex constructions.
- Both transom and ledgers share this feature.

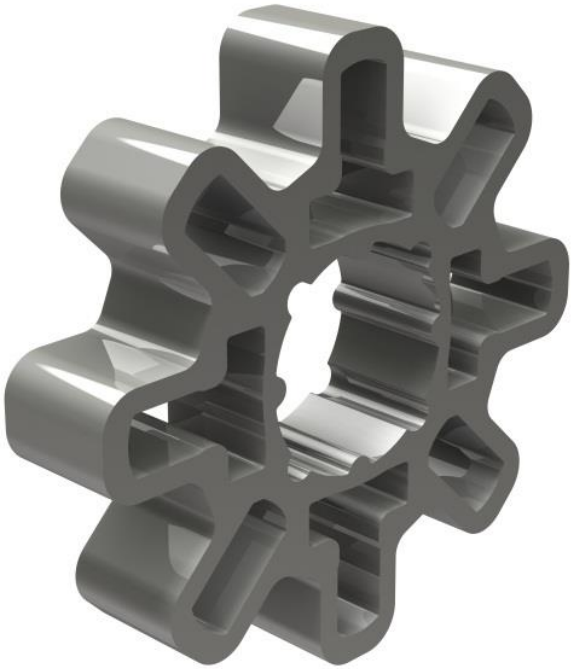


Load bearing brace

- The Alustar brace is a load bearing component that can be used for cantilevered scaffolds.
- If needed it can be doubled to allow more load on the cantilevered lift.

The Crown

- **The unique Alustar crown makes it easy to climb and stand on**
- The crown is strong enough to endure a minimum of two ton on any part of it, making it safe to attach safety harness to it. Total load capacity is 46 kN which makes it **the strongest aluminium crown in the market**.



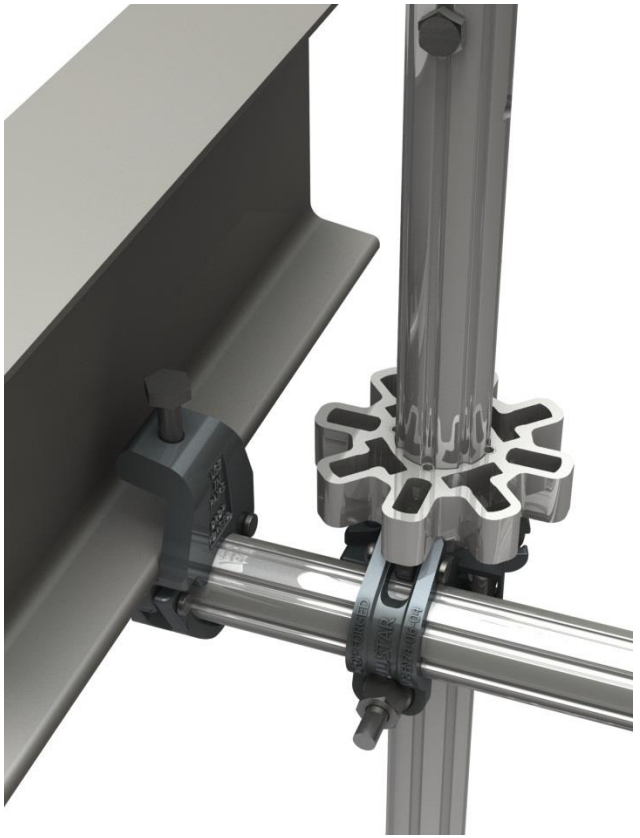
The Crown

- The Crown has 8 anchor points giving the scaffolder more flexibility when building in complex areas like offshore. Normal is 4 anchor points.

Strength

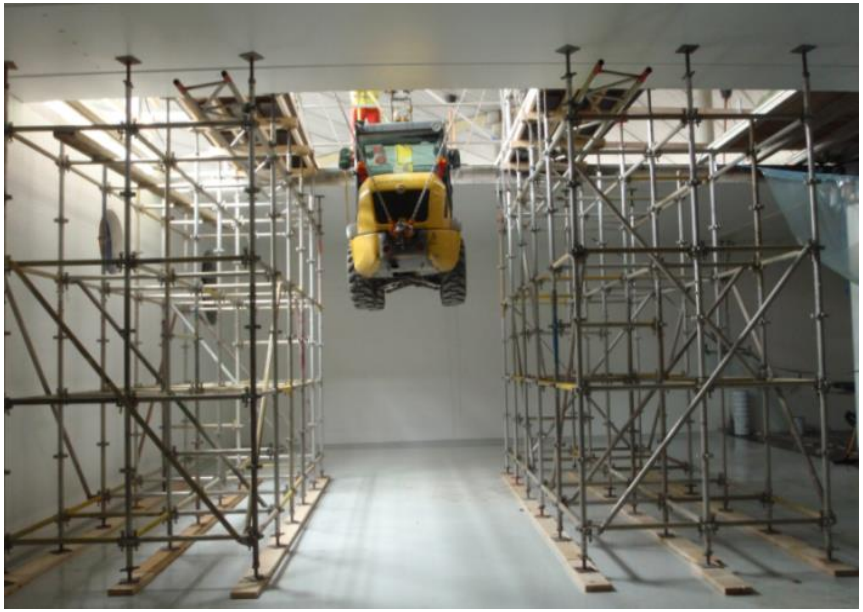
- Alustar system can be built class 6. Its unique and patented tube profile have a **bending moment 0,8 kN/m** and can have a maximum of 132 kN axial load. (LB on each crown and load factor 1)
- This makes Alustar standard suitable for heavy support framework.
- Some of the properties of Alustar aluminium are:

Density	2,710 g/cm^3
Yield Strength	260 N/mm^2
Ultimate tensile strength	310 N/mm^2



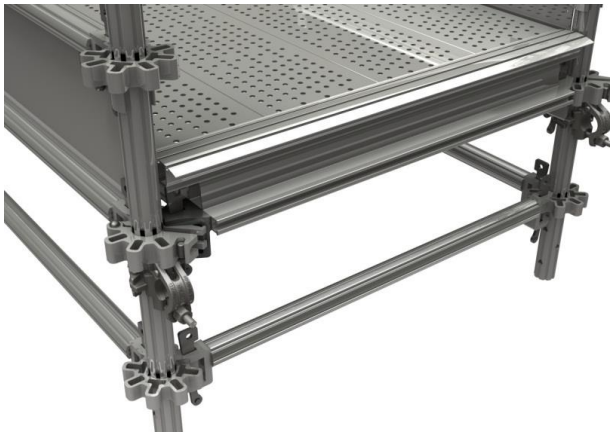
Strength

- Not only a scaffold solution. Alustar can also be used as heavy support framework and rigging solutions.



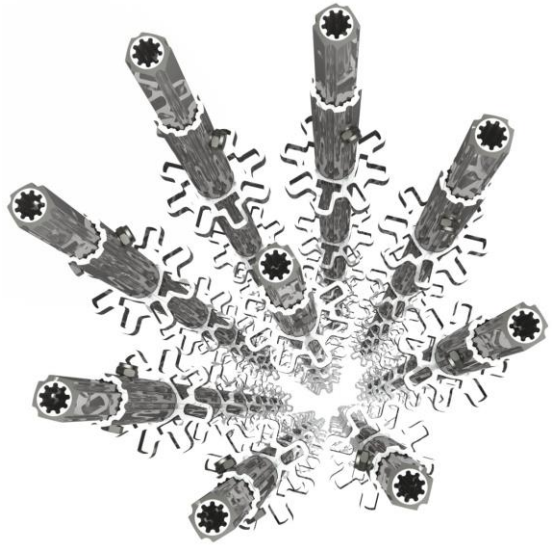
Universal Crown

- The universal crown adds to the great flexibility Alustar system.
- This permits the scaffolder to mount railing or staggered landing.



Alustar Standard

- The Alustar standard is strong and have a total axial load capacity of 132 kN (13,2 tonnes) using load factor 1 and with ledgers on each crown. This opens for new areas of usage like heavy support scaffolds.
- The table show capacity calculations where length is distance between each crown.



Length	Axial capacity with load factor 1,0	Axial capacity with load factor 1,5
550 mm	132 kN	88 kN
1100 mm	63 kN	42 kN
2200 mm	18 kN	12 kN
3000 mm	10 kN	6,7 kN

Wedge

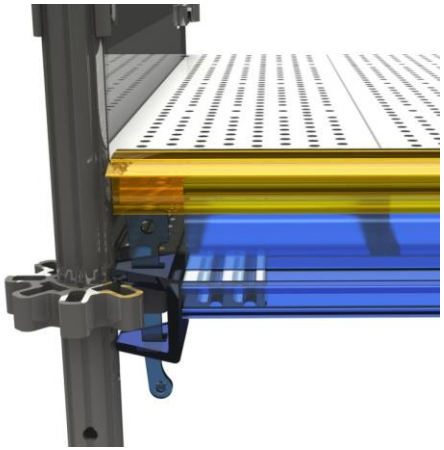
- The design team decided that the new scaffold solution should have a wedge locking system. This for several reasons where main is that Alustar wanted to ensure that **locking device was not accidently detached or set in open position**. The wedge also made the scaffold more “robust” during construction since joints was tighten during mounting. This helps the scaffolder during building and prevents accidents due to inconstant construction.

Transom

- The Alustar transom is not only used for boarding.
- Its special profile can also be utilized to lock on various components.
- On top and on both sides there is a slot that can be used to mount system ladder, adjustable bolt and ordinary hex bolts.

Board and board lock

- Alustar board is 80 mm tall, which makes it strong and very robust.
- The board is a cut profile without any additional part. This makes it easy to cut down to shorter length in those cases where a board has been damaged.
- The board fits between the transoms and when in place, a board lock is attached to the top of the transom and locks the boards to the transom.



Flexibility

- Alustar has a special ledger that can be attached to the bottom of the scaffold. It has been approved as allowed over gangway in the North sea due to its low profile.
- The scaffolder can reduce the width of the scaffold using adjustable bolt that fits the top of our transom.

The Productivity

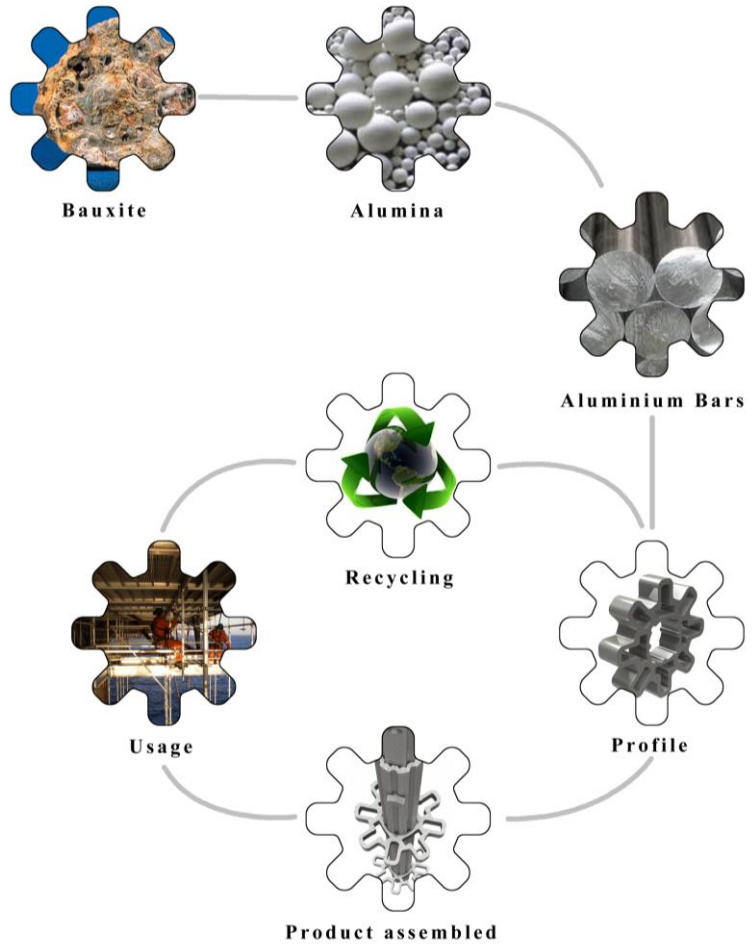
- Alustar is about 50 % of the weight compared to any steel solution. Even more compared to tube and fittings. The features described above ensure its safe to use, quickly to build with and strong enough to take on any task.
- The metric capabilities, which Alustar is alone to offer, ensure that the scaffolder can with ease build around obstacles and by using the adjustable bolt on the transom he can build around obstacles vertically. If needed the universal crown can be used to build staggered landing.

Coverage

- Alustar standards has 550 mm between each crown, this because we wanted to be able to offer more height between the lifts.
- Another benefit with this is that it requires less equipment when building tall scaffolds. A scaffold with 6 lifts where top level is 11 meter will require 6 lifts with Alustar or 7 lifts with competing systems.
- This feature will very important in high constructions. Like in the 62 meter tower to the left, a staircase at Mongstad.

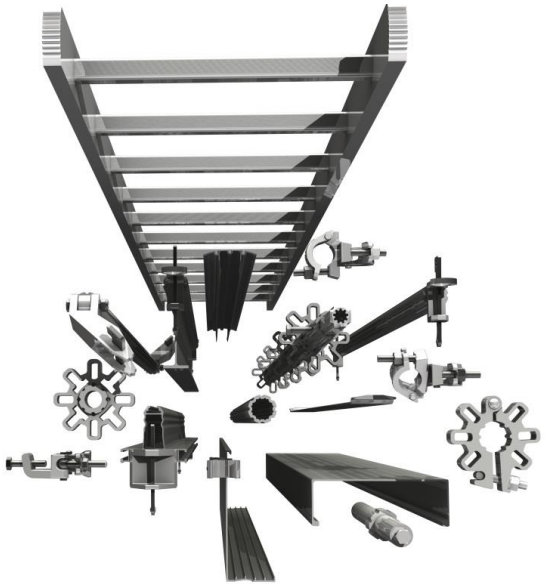
Life span

- Alustar uses only 6082-T6 in our production. This is the a robust and corrosion resistant aluminium.
- We can offer **25 years +** life span on our equipment.
- If maintained correctly the life span has no limit.

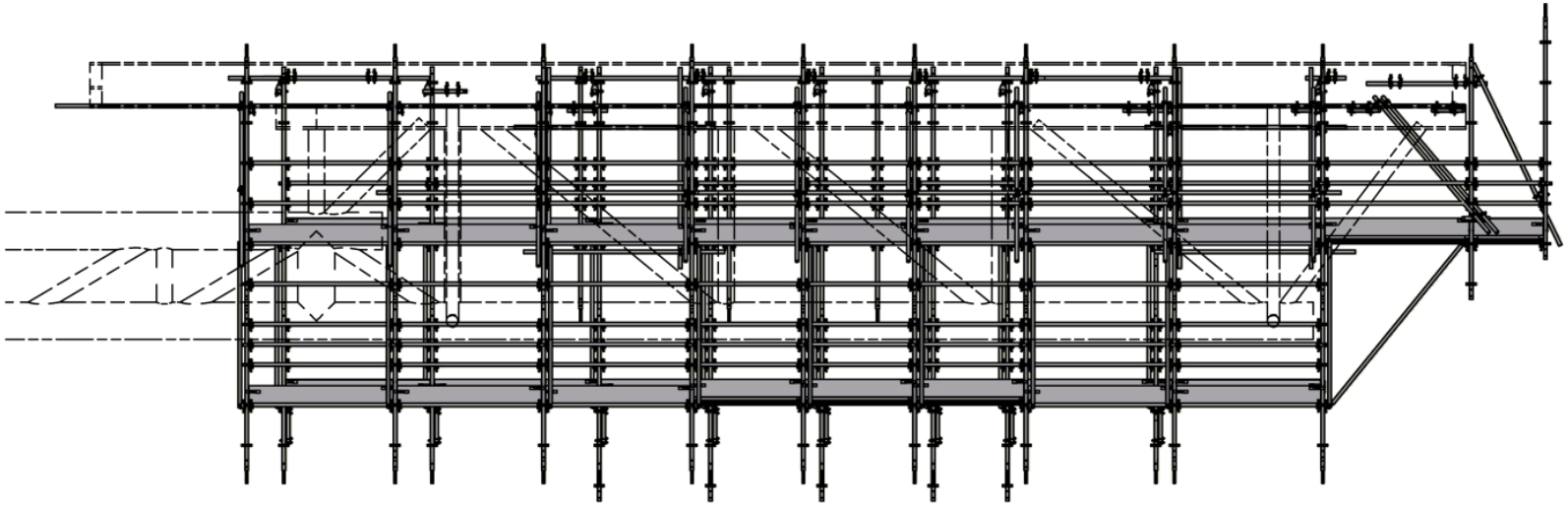


Engineering & Design

- **Alustar have two solutions**
- 3D library with parts for Inventor that are available for our customers and partners for free.
- Alustar also offer a specialized version of PonCAD a plugin for AutoCad and BricsCAD
- Over the last years Alustar has engineered solutions for project both national and international and we work hard to improve and expand our tools every day



Engineering & Design



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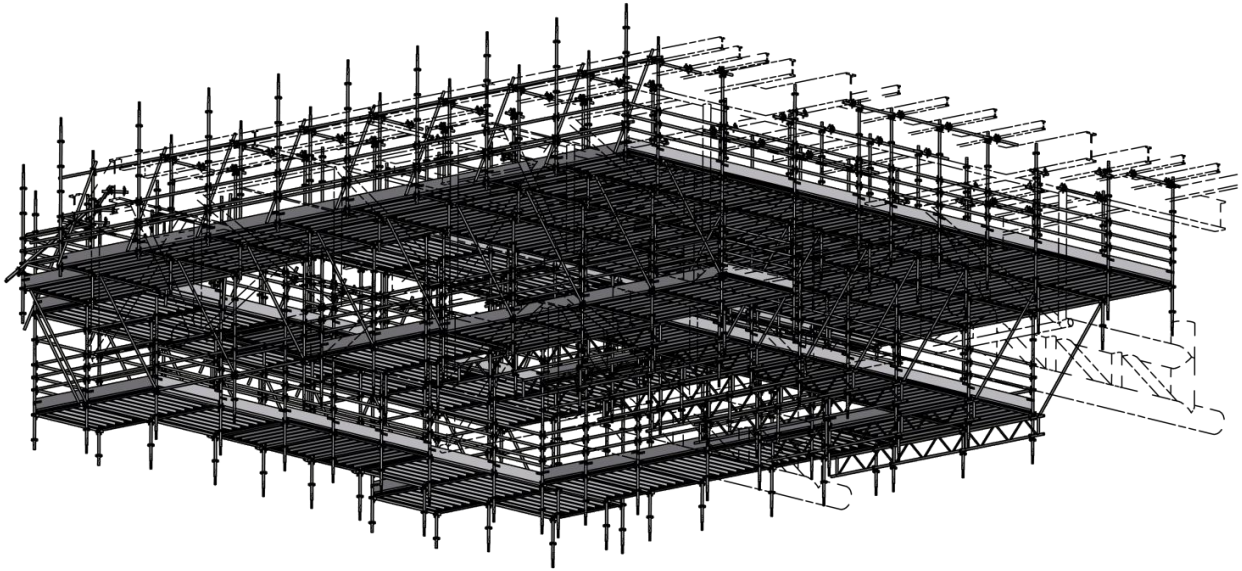

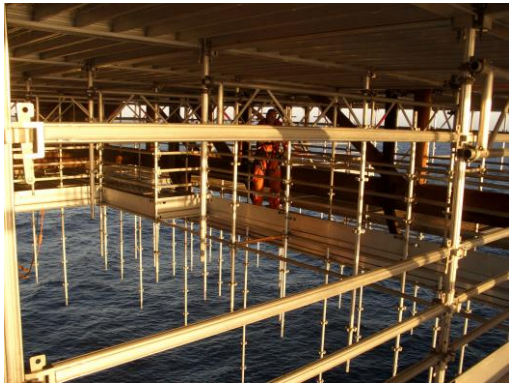

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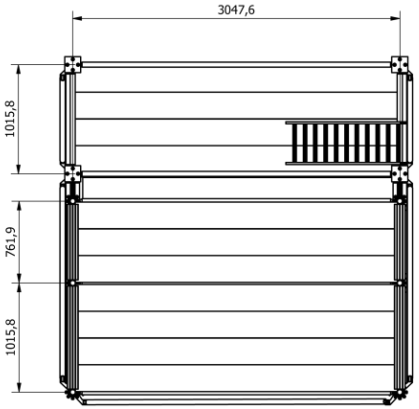

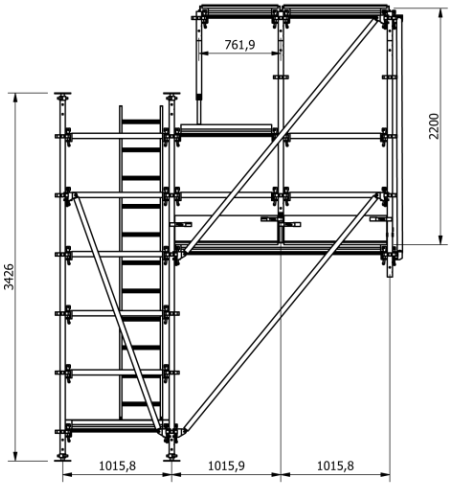

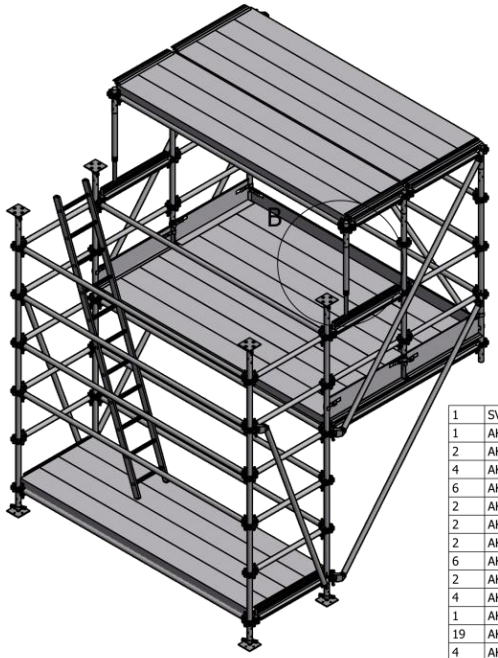

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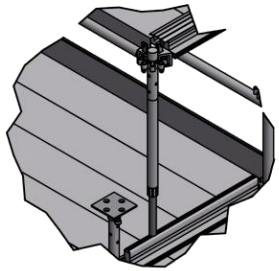


111 items
588,94 Kg

Item	Partnumber	Description	Weight
1	SV ZST 0 03080	Zarges Ladder 3,08m	6 kg
1	AK DG8 0 03520	Diagonal Brace 8 3,00 x 2,20 m	8,5 kg
2	AK DG5 0 02283	Diagonal brace 5 1,00 x 2,20 m	6,2 kg
4	AK FLK 0 00958	Toe board 1,00 m	3,1 kg
6	AK LLI 0 00958	Board lock 1,00 m	1,2 kg
2	AK LLI 0 00704	Board lock 0,75 m	0,9 kg
2	AK ROR 0 00550	Tube 0,55 m	1 kg
2	AK TBJ 2 00714	Transom 0,75 m	3,7 kg
6	AK SPI 0 00270	Standard 0,27 m	0,9 kg
2	AK SPI 0 01650	Standard 1,65 m	4,9 kg
4	AK JSB 0 00500	Adjustable Base Plate Bolt With Nut	1 kg
1	AK FLK 0 02990	Toe board 3,00 m	8,7 kg
19	AK SP1 0 03000	Scaffold Board 3,00 m	11,3 kg
4	AK DG7 0 02790	Diagonal brace 7 2,00 x 2,20 m	7,2 kg
2	AK SPI 0 02200	Standard 2,20 m	6,3 kg
2	AK TBJ 2 01984	Transom 2,00 m	8,5 kg
17	AK LBJ 0 03000	Ledger 3,00 m	6,2 kg
16	AK LBJ 0 00968	Ledger 1,00 m	2,4 kg
6	AK TBJ 2 00968	Transom 1,00 m	4,6 kg
8	SV JFS S 00700	Adjustable Base Plate In Steel 0,60m	3,3 kg
4	AK SPI 0 03300	Standard 3,30 m without spigot	8,6 kg

Designer: TRH
Date: 30.10.2011
Size: A3
Status: Released

ALUSTAR AS

Client:
Drawing No. AP-2011-109
Rev. 1
Project: Comparison
Project No: Comparison

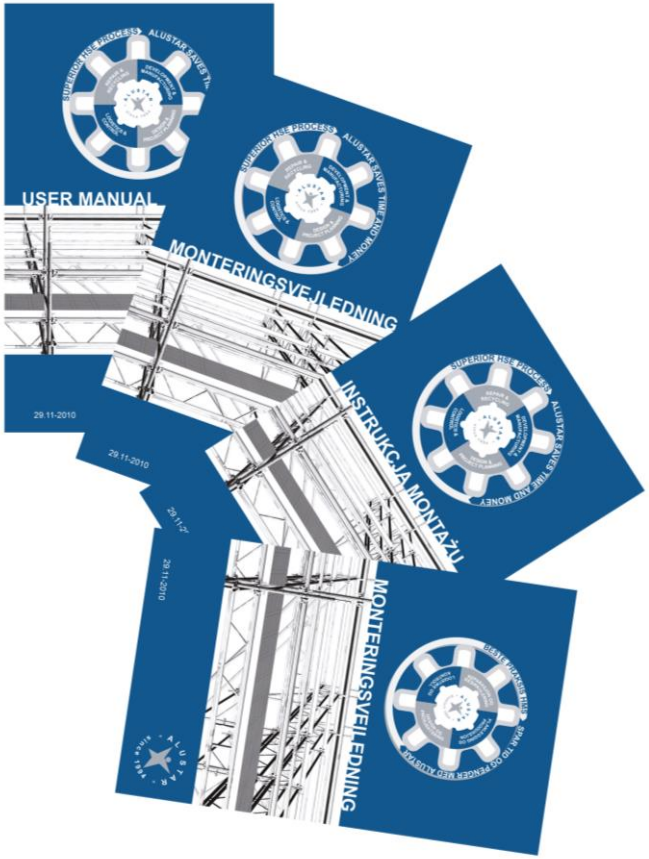
Total Weight: 588,9 kg

Standards

- Alustar scaffold system is the only Norwegian scaffold solution that has been type approved according to the newest European standards.
  - EN 12810-1:2003: Facade scaffolds made of prefabricated components. Product specifications
  - BS EN 12811-1:2003: Temporary works equipment. Scaffolds. Performance requirements and general design
  - BS EN 12811-2:2004: Temporary works equipment. Information on materials
  - BS EN 12811-3:2002: Temporary works equipment. Load testing

Documentation

- Alustar's user guide is always available online on our website http://www.alustar.no
- In addition we offer a pocket size user manual that is resistant to water. Our user guide is filled with tips and hints and is considered to be both users friendly and helpful.
- The user manual is a live document that constantly is being revised. Latest edition can always be found at our website.



Repair and recycling

- Aluminium is, with justification, described as the “green” metal. The fact that we don’t weld our components has made it easy to repair broken or damaged parts.
- ALUSTAR has process for repair and recycling. Minor damaged equipment is repaired at ALUSTAR production site. Scrap is recycled to new products at Hydro aluminium.
- **NO WASTE OF ENERGY AND MATERIALS!**