Guidelines for handling and storage

voestalpine heavy plates and clad plates

1. Scope of document

This guideline defines requirements for handling and storage of heavy plates and clad plates and applies to all shippers and carriers which handle or ship plate material on voestalpine's behalf. Deviate requirements can only be fulfilled within a defined range and only in prior agreement with voestalpine.

This guideline does not supersede relevant codes, best practices, standards, contractual documents, or project specific instructions relating to the work to be performed, except where the requirements herein are more stringent and approved by voestalpine.

2. Handling and storage guidelines for heavy plates

a. Handling at mill

» Within the mill, material is always stored in covered areas and on an even hard surface. The stock-keeping-area is equipped with an integrated warehouse-management-system.

» Plates are stacked without timbers between plates/bundles as only cranes equipped with loading magnets are used for material movement. In general, the weight of each lift has to comply with the maximum rated load of the lifting gear.

» In case the customer requires a defined number of plates or tonnage within one bundle, this information has to be provided with the official purchase order.

» For heavy plates, no bundling with steel strapping and no packing is performed generally.

» During loading of the first means of transport, bundles are separated with appropriate supporting timbers. Furthermore, supporting timbers have to be used as a separator on the ground floor of the means of transportation.

» In case of shipment from the mill's port, the plates are moved to the quay (covered storage and loading area) with internal wagons. When loading the wagons, the bundles are separated with appropriate supporting timbers.

» At the mill's port, plates are moved only by cranes with hooks/clamps. Movement of plates with forklifts is prohibited at the mill's facilities.

b. Loading, unloading and storage of heavy plates

» For handling of heavy plates at the terminal, cranes equipped with load magnets, clamps/hooks or lifting belts are recommended. The use of crowbars or pincer bars is strictly prohibited as well as the use of chains or cables in direct contact with the plate surface / plate edge. The maximum rated load for the lifting gear must be known.

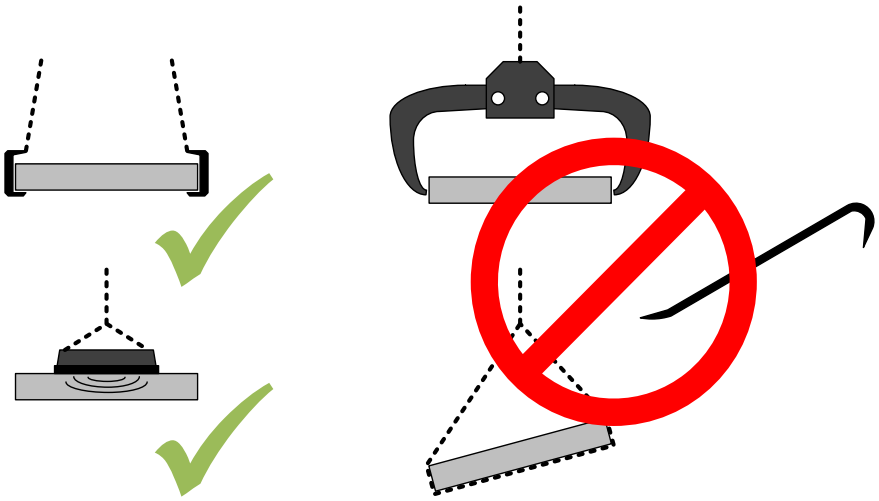

Figure 1: Suitable equipment for handling of heavy plates

» When safety clamps are used, a surface protecting layer (e.g. rubber) has to be applied between gripping jaw and plate surface in order to avoid direct contact.

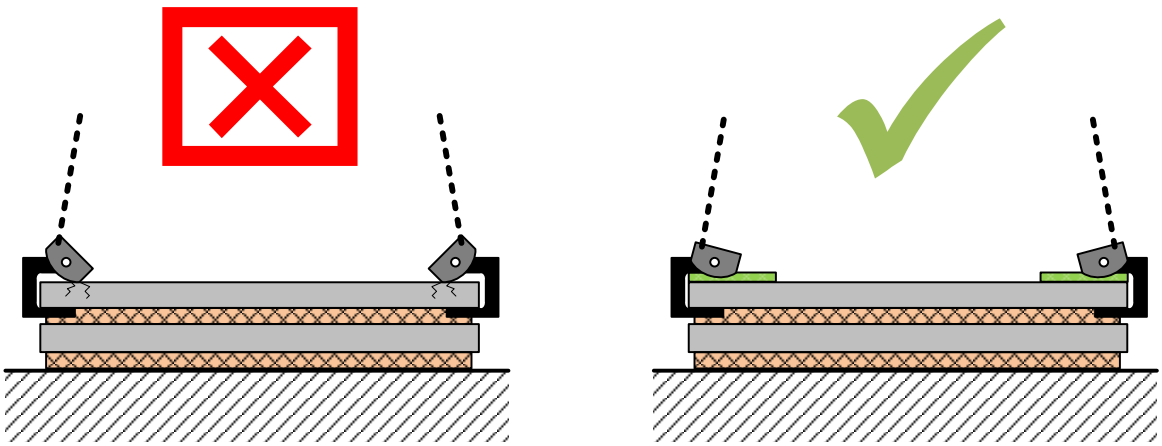

Figure 2: Suitable use of safety clamps for handling of heavy plates

- The use of forklift trucks for handling should be avoided but is possible if the whole heavy plate bundle can be picked up without scratching or damaging the plates. It is prohibited to separate single units with forks.
- The forklift forks must be wrapped with adequate protection (rubber mats or similar) to prevent direct contact between the forklift fork and the plate when manipulating the heavy plates.

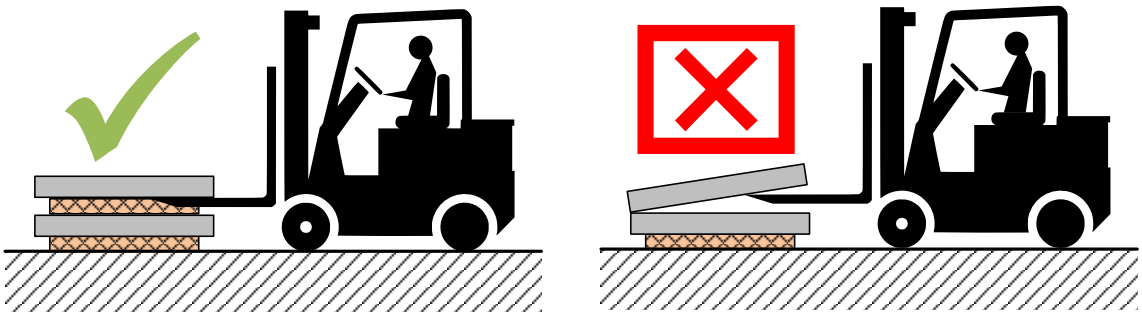

Figure 3: No separation of flat-lying plate bundles within a stack with forklift

- When storing and loading plate bundles, flat unit-on-unit storage is not allowed. Especially when bundles are handled with forklifts or cranes using clamps/hooks, sufficient clearance between each plate bundle must be ensured by placing appropriate supporting timbers. Supporting timbers have to be placed between each bundle and on the ground floor.

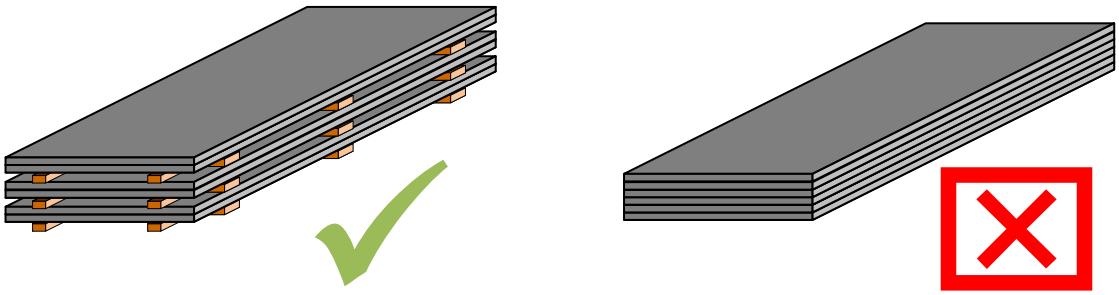

Figure 4: Use of supporting timbers to ensure clearance for loading

» When forming stacks, intermediate timbers must be added to the end face to prevent scratching by any sagging plates.

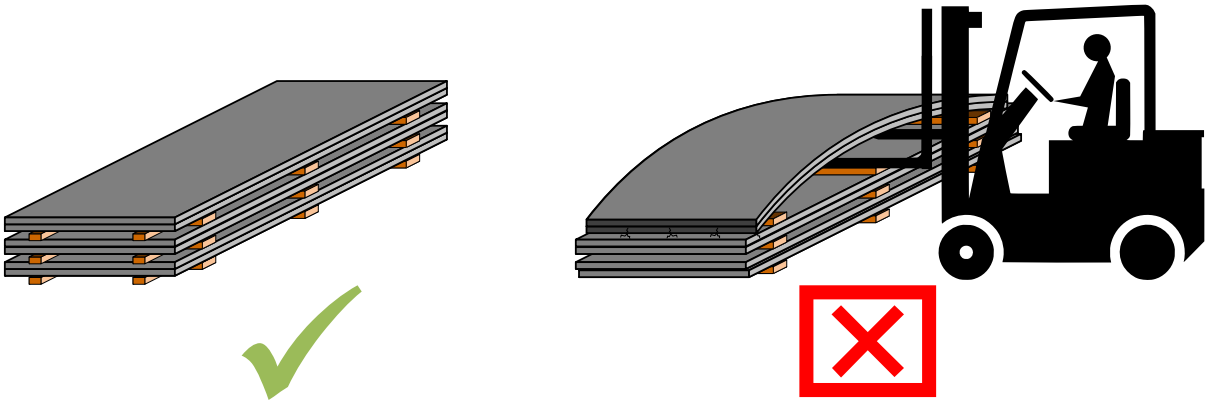

Figure 5: Use of supporting timbers at end faces to prevent damage by sagging plates

» When supporting timbers are placed between plate bundles, these must be arranged in exact vertical alignment all the way from the bottom up to ensure evenness of the plates.

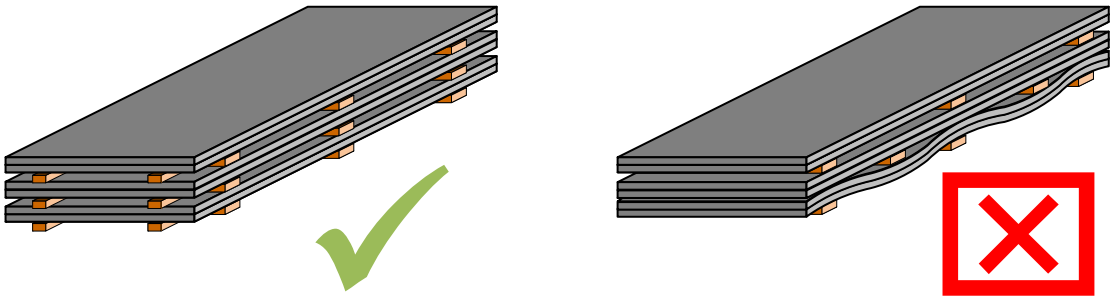

Figure 6: Correct alignment of supporting timbers between plate bundles

» When supporting timbers are placed between plate bundles, these must be fitted with the wider side against the plate.

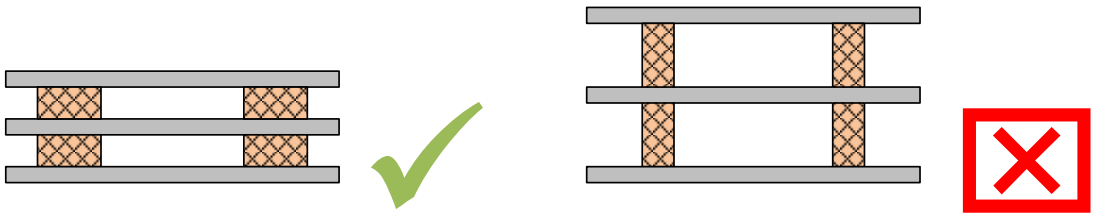

Figure 7: Correct fitting of supporting timbers between plate bundles

» Supporting timbers must be placed transversally to the plates and longitudinally at end faces. Recommended distance between timbers is max. 2.000 mm.

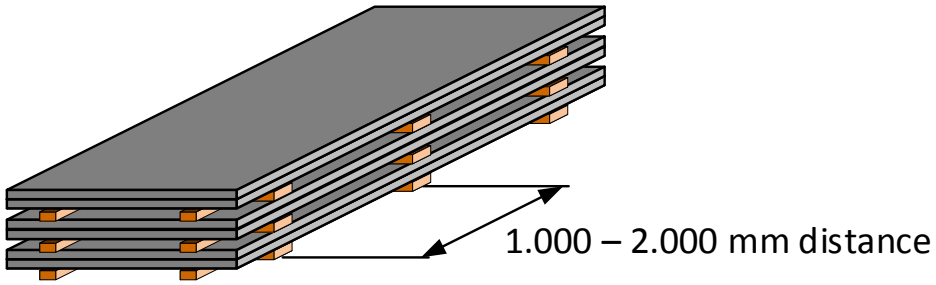

Figure 8: Distance between transversally placed supporting timbers

» Standardized dimensions of wooden supporting timbers used for the separation of plate bundles:
  - » in case of delivery by barge: 50 x 50 x 500 mm
  - » in case of delivery by truck: 50 x 50 x 500 mm
  - » in case of delivery by railway: 50 x 80 x 500 mm

  Deviate requirements can only be fulfilled within a defined range and only in agreement with voestalpine prior to confirmation of the purchase order.

» Number and dimension of supporting timbers used, result from customer's requirement or voestalpine's standard. If bundles cannot be handled at the terminal with the timbers provided by voestalpine, the terminal shall contact the FOB-agent in order to announce its requirements (e.g. due to the size of forks).

c. Non-conformance handling

For the unlikely case that non-conformances are determined for arriving material, please consider following guidelines:

» In case that plate bundles arriving at the terminal are not conform to the dispatch note (e.g. different number of plate bundles, different sizes of units, different data on unit marking), the cargo-forwarding company has to inform LogServ/voestalpine immediately .

» In case plate bundles arriving at the terminal show any visual damage, following procedure has to be followed by the cargo-forwarding agent:

1. Contact the LogServ/voestalpine-representative to clarify the extent and nature of the damage(QS-LogServ@logserv.at).

2. Before unloading affected materials, ensure damages are properly documented (plate numbers and pictures of the affected material need to be included in the documentation) and have been acknowledged by the carrier (truck driver, bargemen, or railway representative).

3. The affected material has to be separated from the other plates in an own stack until Logserv/voestalpine gives further instructions how to handle the affected material.

3. Handling and storage guidelines for clad plates

a. Handling at mill

Clad plates from voestalpine Grobblech are being manufactured to meet highest standards. Especially the grinded alloy clad material surface is vulnerable to mechanical damage and ferritic contamination. At voestalpine mill, clad plates are handled and processed with best possible care to prevent any damage:

- Material is always stored in covered areas and on an even hard surface.
- Clad plates are moved only by cranes equipped with suitable loading magnets or hooks/clamps.
- Clad plates are arranged with the clad side on top. Material is stacked with hardwood timbers between plates. After grinding, each individual plate is covered with corrugated cardboard to protect the grinded side.

To preserve the perfect condition of finished clad plates, these have to be treated and processed with care and caution also after leaving mill's workshop.

b. Packaging of clad plates

The packaging of clad plates is designed considering ecological and economical aspects with the aim to limit required packaging materials to a reasonable extent. Main focus is kept on the protection of the vulnerable grinded alloy clad side. Packaging provides protection against dirtying and minor mechanical impact (e.g. causing skin-deep scratches), but is not suitable to prevent damage from major mechanical impact caused by rough treatment. The packaging is not air- or watertight and thereby not intended as protection against corrosive attack, e.g. caused by corrosive chemicals and/or variable climatic conditions (rain / salt air, sea water, high humidity). Furthermore, the packaging is intended for temporary usage only and not applicable for long-term storage of clad plates.

Clad plates are being arranged in single or multiple bundles for packing. Actual grouping is being performed depending on individual plate size, resulting bundle weights and limitations from lifting gear and means of transport. Grouped clad plate bundles may be fixated with steel strapping according to specific packaging instruction.

c. Loading, unloading and storage of clad plates

In general, clad plates have to be handled and stored in a proper way to avoid damage of material's surface or negative impacts on the plate's evenness. Following conditions have to be fulfilled to preserve perfect condition of the product.

» Clad plates require covered transport in general in order to avoid exposure to variable climatic conditions (e.g. rain / salt air, sea water, high humidity), which could result in corrosive attack. Furthermore clad plates should be unloaded and stored in covered areas.

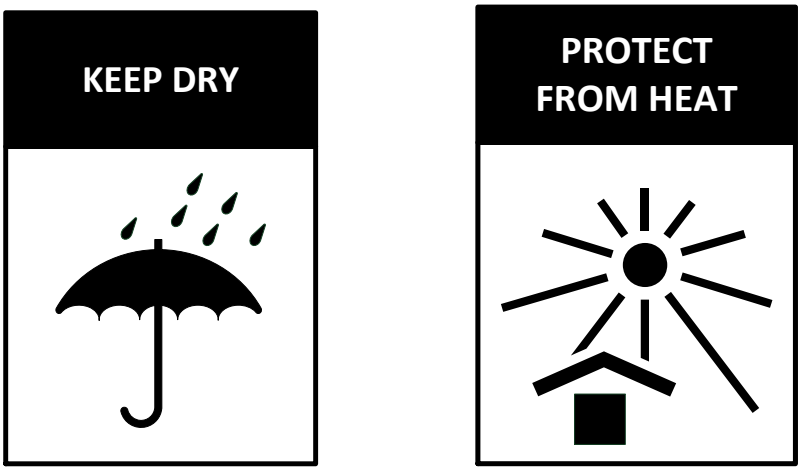

Figure 9: Only covered transport and storage

» Storage area for clad plates has to be on an even and hard surface.

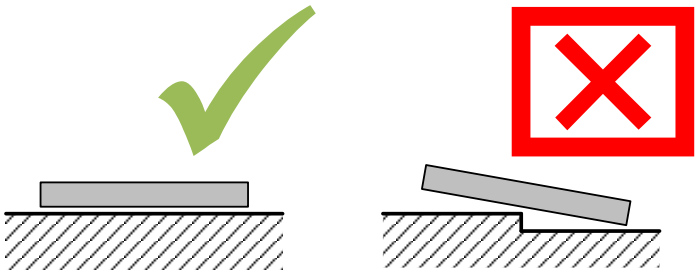

Figure 10: Even and hard storage area

» For handling of packed clad plates at the terminal, cranes equipped with load magnets, clamps/hooks or lifting belts are recommended. The use of crowbars or pincer bars is strictly prohibited as well as the use of chains or cables in direct contact with the plate surface / plate edge. The maximum rated load for the lifting gear must be known.

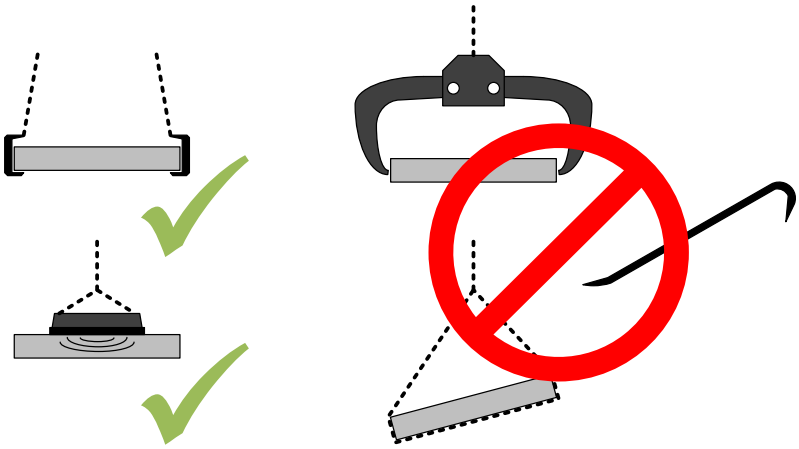

Figure 11: Suitable equipment for handling of clad plates

» During transport of clad plates, no hard parts of required securing devices (e.g. ratchets, hooks, buckles, …) may be in direct contact with vulnerable clad plate surface. Appropriate surface protecting layers (e.g. rubber) shall be used in-between instead. Furthermore, suitable edge protection shall be placed between securing belts and plate edges.

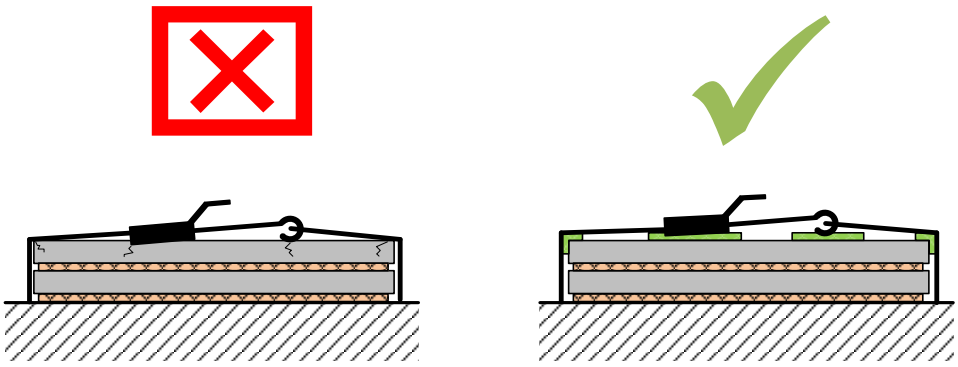

Figure 12: Protection of plate surface and edges from securing devices

» The steel strapping of bundles is only intended for temporary fixation of bundles and the used packaging materials. When handling plates with clamps/hooks, the lowest plate in the bundle must be attached. When plates are handled with load magnets, sufficient field penetration of the lowest plate must be ensured.

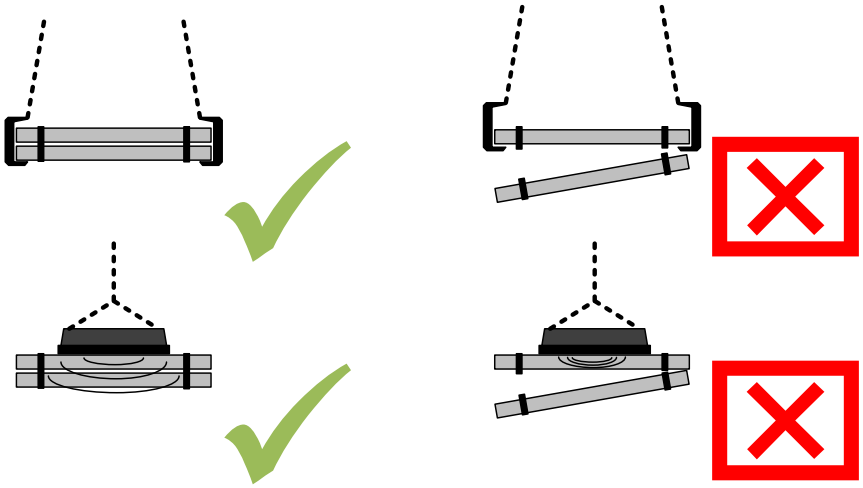

Figure 13: Fixation of lowest plate when loading multiple plate bundles

» The use of forklift trucks for handling should be avoided but is possible if the whole bundled clad plate unit can be picked up without scratching or damaging the plates. It is prohibited to separate single units with forks.
» The forklift forks must be wrapped with adequate protection (rubber mats or similar) to prevent direct contact between the forklift fork and the plate when manipulating the heavy plates.

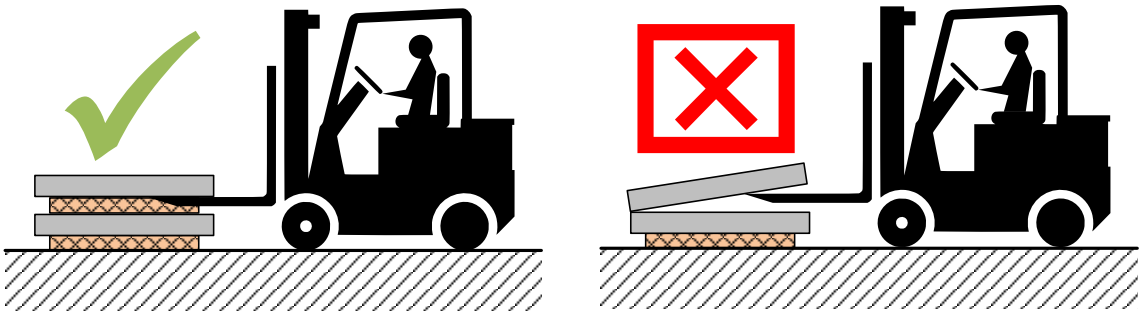

Figure 14: No separation of flat-lying clad plate bundles within a stack with forklift

» When storing and loading clad plate bundles, flat unit-on-unit storage is not recommended. Especially when bundles are handled with forklifts or cranes using clamps/hooks, sufficient clearance between each plate bundle must be ensured by placing appropriate supporting timbers. Supporting timbers have to be placed between each bundle and on the ground floor.

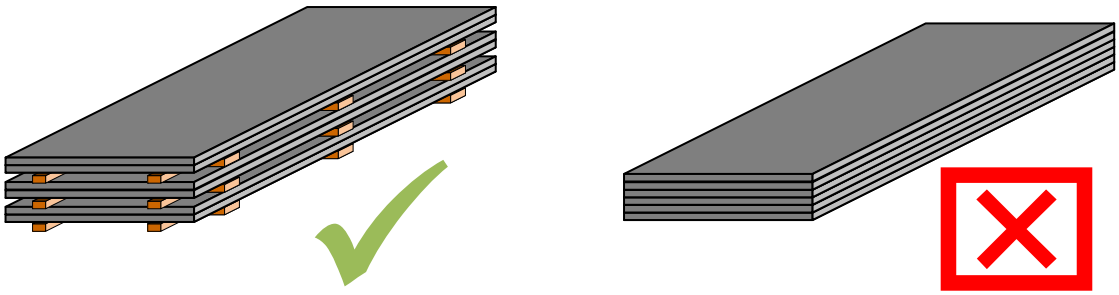

Figure 15: Use of supporting timbers to ensure clearance for loading

» When forming stacks, intermediate timbers must be added to the end face to prevent scratching by any sagging plates.

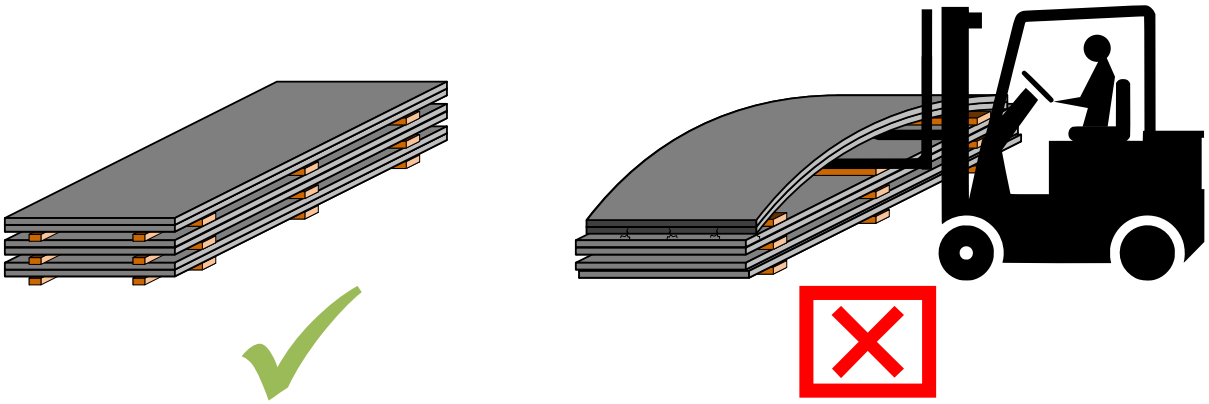

Figure 16: Use of supporting timbers at end faces to prevent damage by sagging plates

» When supporting timbers are placed between clad plate bundles, these must be arranged in exact vertical alignment all the way from the bottom up to ensure evenness of the plates.

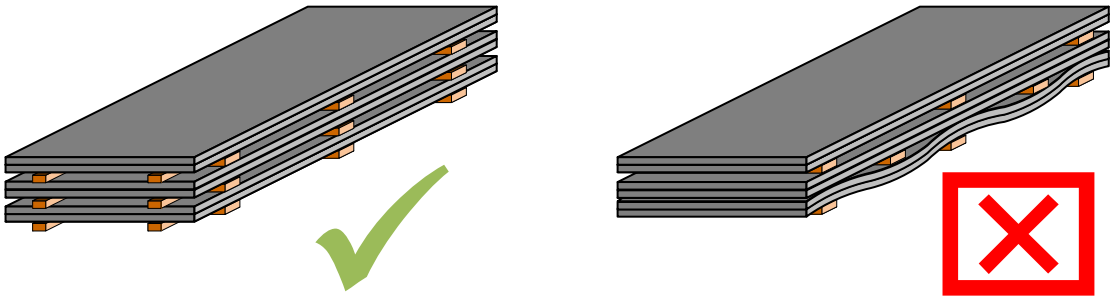

Figure 17: Correct alignment of supporting timbers between plate bundles

» When supporting timbers are placed between clad plate bundles, these must be fitted with the wider side against the plate

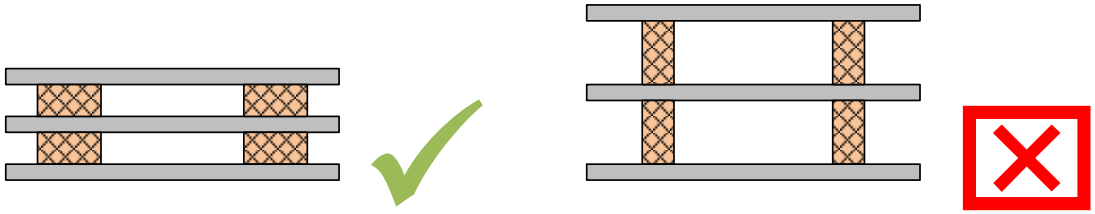

Figure 18: Correct fitting of supporting timbers between plate bundles

» Supporting timbers must be placed transversally to the plates and longitudinally at end faces. Recommended distance between timbers is max. 2.000 mm.

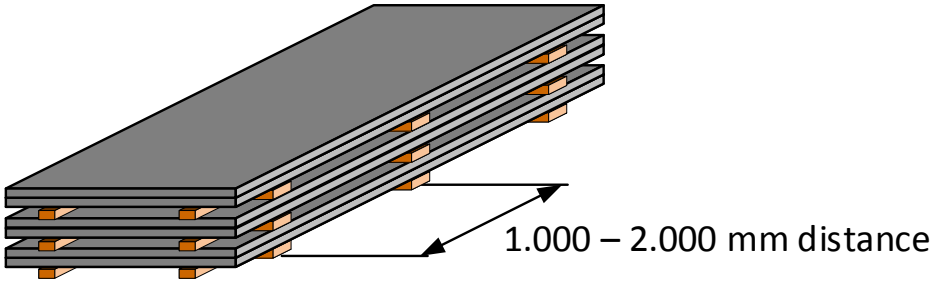

Figure 19: Distance between transversally placed supporting timbers

» Number and dimension of supporting timbers used, result from customer's requirement or voestalpine's standard. If bundles cannot be handled at the terminal with the timbers provided by voestalpine, the terminal shall contact the FOB-agent in order to announce its requirements (e.g. due to the size of forks).

» Bundled clad plate units must not be opened by cargo forwarding companies. Steel strapping must not be cut, and protective films must not be cut or damaged.

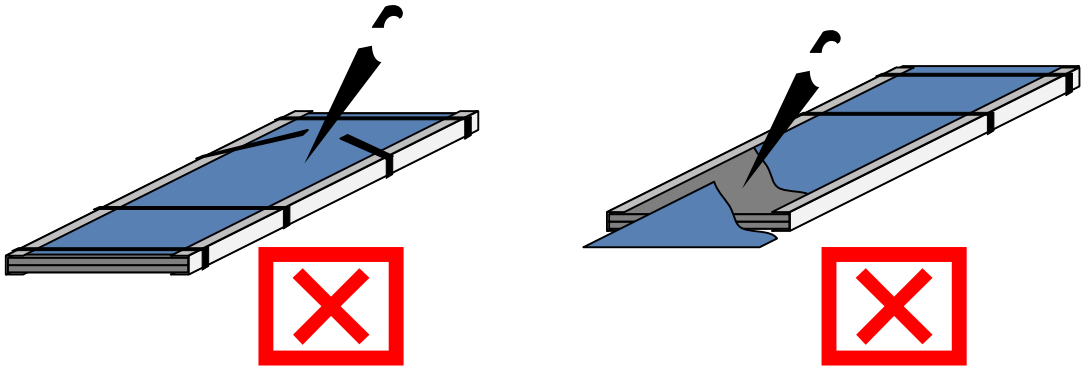

Figure 20: No opening of clad plate bundles; No cutting of protective packaging materials

» Contact with corrosive substances (e.g. chlorides, halogens, etc.) has to be prevented in general. Please note that some permanent markers can contain such corrosion causing chemicals.

Figure 21: Avoid any contact with corrosive substances

» The packaging is intended for temporary usage only and not applicable for long-term storage. Some packaging materials are subject to aging thus resulting in changed material properties.

» In case adhesive LDPE foil is used for protection of the grinded clad surface, it must be removed within 6 month after delivery at the latest in order to ensure desired protective properties and easy peel-off. Exposure to direct sunlight or UV radiation will shorten the time, the film can be removed easily. For optimal peel-off, the temperature should be not less than 10°C / 50°F. At temperature below minus 10°C the foil will get brittle thus losing its protective function.

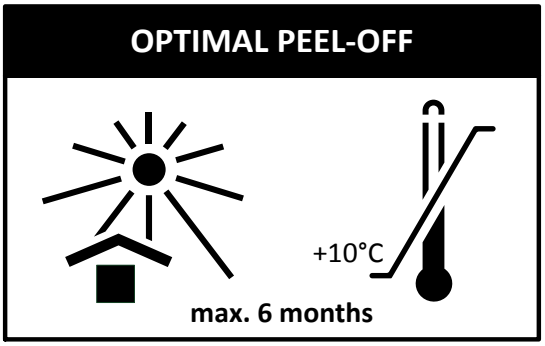

Figure 22: Conditions for optimal adhesive LDPE foil peel-off

» In case plates are transported by truck, specific guidelines for loading and transport must be considered. Observance of requirements has to be documented accordingly. Relevant points are summarized in “Checklist lorry – sheet / clad sheet transport“ which is attached to this instruction. The checklist is handed over to the truck driver at voestalpine Infopoint before entry at voestalpine factory premises. The checklist has to be filled out and signed by truck driver after loading of clad plates and remains at ILL afterwards.

d. Non-conformance handling

For the unlikely case that non-conformances are determined for arriving material, please consider following guidelines:

» In case that clad plate bundles arriving at the terminal are not conform to the dispatch note (e.g. different number of plate bundles, different sizes of units, different data on individual dispatch labels of bundles), the cargo-forwarding company has to inform LogServ/voestalpine immediately.

» In case packed clad plate bundles arriving at the terminal show any visual damage, following procedure has to be followed by the cargo-forwarding agent:

1. Contact the LogServ/voestalpine-representative to clarify the extent and nature of the damage. (QS-LogServ@logserv.at)

2. Before unloading affected materials, ensure damages are properly documented (plate numbers and pictures of the affected material need to be included in the documentation) and have been acknowledged by the carrier (truck driver, bargemen or railway representative).

3. The affected material has to be separated from the other plates in an own stack until Logserv/voestalpine gives further instructions how to handle the affected material.

In case of ambiguities regarding the above stated requirements, please contact LogServ/voestalpine for further clarification!

Checkliste LKW - Tafel / Plattierte Bleche Transport
Checklist lorry - sheet / clad sheet transport

Versandauftrags Nr. Shipping order no.

nach Beladung des LKW in *Linz / after loading lorry in Linz*

	ja/yes	nein/no
1. Ladefläche sauber, trocken und gedeckte Ladung *Cargo area clean, dry and covered cargo* *Bemerkung / Comment:*	☐	☐
2a. Unterlegmatten und Unterleghölzer unter und deckungsgleich zwischen den Blechen *Support mats and wooden supports under and congruent between the sheets* *Bemerkung / Comment:*	☐	☐
2b. Antirutschmatten min. 10 mm zwischen plattiertes Blech und alle metallischen Teile (insbesondere Gurtratsche und Ösen vom Spanngurt) legen um Eindrücke zu vermeiden. *Place anti-slip mats at least 10 mm between the clad plate and all metal parts (especially the belt ratchet and eyelets of the tensioning belt) to avoid indentations.*	☐	☐
3. Mischladung mit Grobbleche (Plattierte Bleche oben laden) *Mixed load (clad sheets load on top)* *Bemerkung / Comment:*	☐	☐
4. Tafelbleche nach VDI Richtlinie gesichert *Sheet metal secured according to VDI guidelines* *Bemerkung / Comment:*	☐	☐
5. Richtlinien für Schrägverladung eingehalten (wenn Schrägverladung) *Guidelines for inclined loading complied with (if inclined loading)* *Bemerkung / Comment:*	☐	☐
6. Andere Gegenstände auf den Blechen gelagert (Fremdmaterial, Paletten, Ladungssicherungsmittel usw.) *Other items stored on sheet metal (Foreign material, pallets, load securing equipment, etc.)* *Bemerkung / Comment:*	☐	☐
7. Verpackung beschädigt / Verschmutzt *packaging damaged / dirty*	☐	☐
Wenn ja, Freigabe durch HTP/GBW: *Bemerkung / Comment:*	☐	☐
8. Verschmutzung am Material und Verpackung *Contamination on the material and packaging*	☐	☐
Wenn ja, freigabe durch HTP/GBW: *Bemerkung / Comment:*	☐	☐

	ja/yes	nein/no
9. Bilddokumentation der Beladung durchgeführt *Image documentation of the loading carried out* *Bemerkung / Comment:*	☐	☐

Allgemeine Hinweise Verlader/LKW Fahrer

General information for the loader / truck driver

Betreten / Begehen des Materiales nur beim Öffnen und Verschließen des Verdecks erlaubt!

Entering / walking on the material is only permitted when opening and closing the top!

Während des Be- oder Entladen dürfen keine Ladungssicherungsmittel (Ratschen, Ketten, Haken, ...) auf die plattierten Bleche geworfen oder gelegt werden!

No load securing devices (ratchets, chains, hooks, ...) may be thrown or placed on the clad metal sheets during loading or unloading!

Bei dem gesamten Transportverlauf darf kein zusätzliches Material auf den Plattierten Blechen gelagert werden.

No additional material may be stored on the clad sheets during the entire transport process.

Plattierte Bleche weisen eine geschliffene Oberfläche auf, welche sehr empfindlich gegenüber Beschädigungen ist/sind. Die werksseitige Verpackung bietet nur einen sehr eingeschränkten Schutz (primär gegen Verschmutzung), weshalb zur Vermeidung von Beschädigungen sowohl Verladung, Transport als auch Entladung mit besonderer Sorgfalt erfolgen müssen!

Clad sheets have a ground surface, which is / are very sensitive to damage. The factory packaging offers only a very limited protection (primarily against contamination), which is why loading, transport and unloading must be carried out with particular care to avoid damage!

Datum/date:	Unterschrift Verlader / signature loader:	Unterschrift LKW Fahrer / Signature truck driver:

Aktivität/Activity: Verantwortlich / Responsible	Checkliste ausfüllen/fill in checklist →	Fahrer/driver	Abgabe ILL / *return* ILL →

voestalpine

ONE STEP AHEAD.