

# Structure and use guidance debris chute

Edition September 2003



## Constructional requirements

### 1. Construction components

m+ba debris chutes consist of:

- cones blunt well-behaved pipes from plastic or galvanized steel sheet with connections by chains, hooks and eyes.
- carrying frame for hand winch and for debris tubing connection. Fastening takes place at window attachments or at scaffolds.
- window attachments, which embrace force-like the window breast and which take up carrying frame
- hand winch with support frames only for the assembly and disassembly of the debris pipes (the drop line coupled at the ground from single pipes pulls).

For the debris chutes only original construction units may be used.

### 2. Entirely arrangement, generally

the maximum height (overall length) of the debris chutes may amount to:

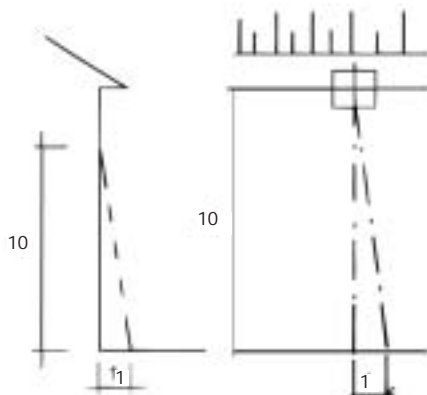
- pipes from plastic: 40 m
- pipes from galvanized steel sheet: 30 m
- pipes from plastic or galvanized steel sheet at buildings of brick-work: 25 m



The debris chutes are to be pulled vertically and attached in the operating condition vertically.

The construction units of m+ba debris chutes are limited for:

Max. diagonal course with the up and dismantling as well as max. turning in the operating condition 10:1.



In the stability proof are considered:

- dead loads of the construction
- 2 m debris filling for the consideration of blockages
- wind loads (static test) according to DIN 1055 part of 4
- horizontal of forces from diagonal course and turning 10:1

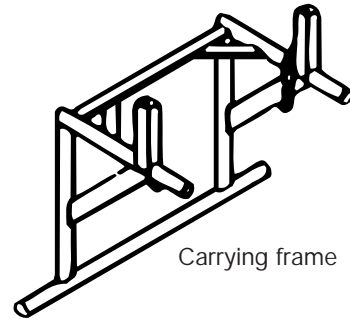
**The rules for the prevention of accidents must be kept**

# Part A

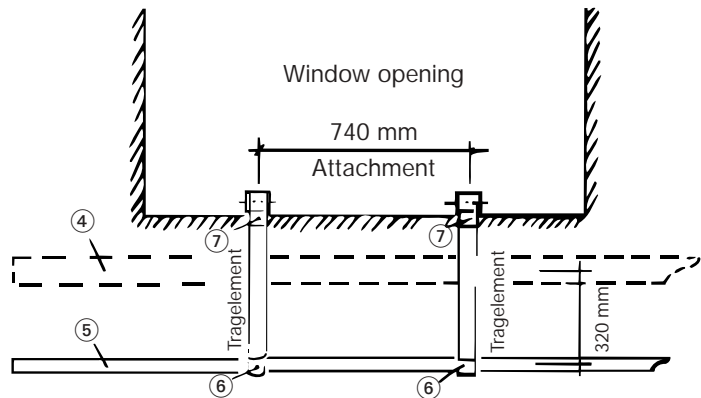
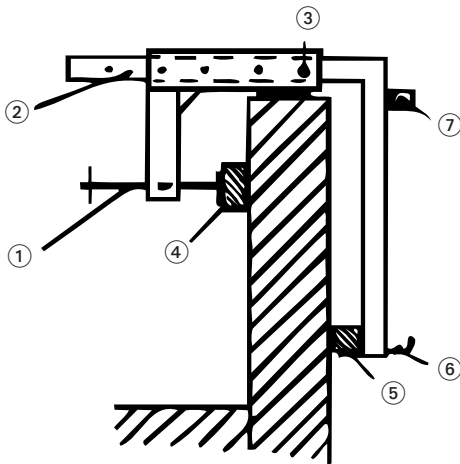
## 3. Mounting at window attachment

Window attachments consist of two carrying elements with 740 mm distance.

- 1 - Support spindle
- 2 - Telescope arm
- 3 - Pin mapping
- 4 - distribution of load (inside)
- 5 - Distribution of load (outside)
- 6 - Supports for carrying frame
- 7 - Coupling for carrying frame



Carrying frame



The carrying frame is fastened into the carrying elements placed (6) and mounted with couplers (7).

The force derivative into the walls is in each individual case of the using enterprise to prove (see part of B "static requirements").

### Assembling instructions for masonry constructions:

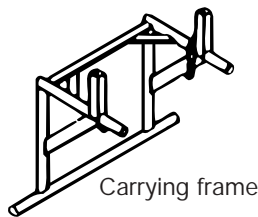
The maximum structure height of debris chutes with brick-work amounts to 25 m.  
 The excerpt length of the internal support spindle (1) and the pin mapping (3) in the telescope arm (2) depend on the wall thickness.  
 The tracking forces of the supports at the interior and exterior of the brick-work (parapet wall) must be transferred into the coming up, at least 36 cm strong walls on the right of and on the left of the parapet wall.  
 To the fact it is necessary that inside (4) and outside (5) sufficiently measured transmission elements (e.g. square timbers) as distribution of load in necessary length are used.  
 These must become secured against shifting and falling down.

### Instructions for buildings of concrete:

For the maximum structure height with concreted and sufficiently reinforced wall parts amounts to 30 m with debris pipes from galvanized steel sheet and/or. 40 m with debris pipes from plastic.  
 The assembly of the window attachments consisting of two carrying elements takes place as transmission with masonry constructions through elements for distribution of load.  
 These can be void, if the proof is led in individual cases that the concreted wall parts can take up the resulting forces alone.

## 4. Mounting at scaffolds

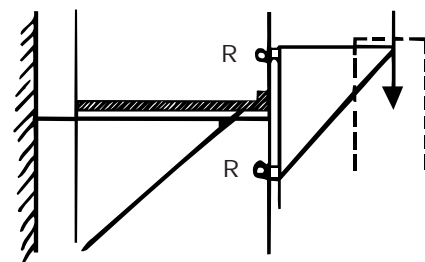
The mounting of the carrier racks takes place at latch plates R, which must lie in the height symmetrically to the scaffold situation (floor).



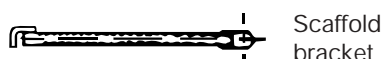
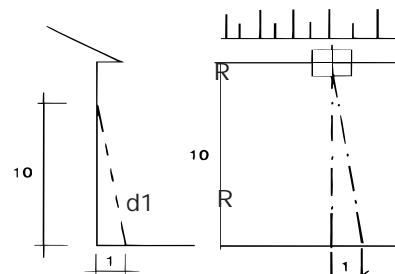
Carrying frame

The scaffolds in the exchange area (A, B, C, and/or A, B, in accordance with sketch representation) are in the scaffold situation to embody in which the carrier racks are fastened, with the building. If for it existing scaffold anchorages are used, the anchorage forces from the debris chute are to be considered additionally to those from the scaffold system.

The scaffold brackets are to be fastened to the interior and external scaffolds. Mounting only at the interior scaffolds is permissible, if the derivative of horizontal forces is guaranteed parallel to the scaffold level by other measures - e.g. horizontal struts -.

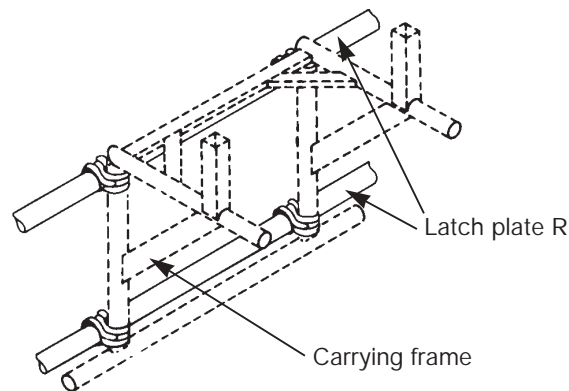


Scaffold situation (floor)

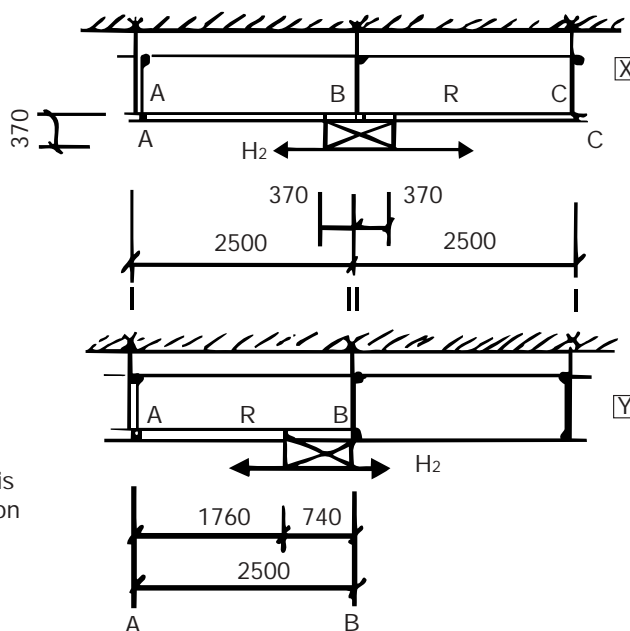


Scaffold bracket

In the case of mounting of the debris chute in accordance with  $\boxtimes$  symmetrically to a pair of scaffolds II and scaffold field lengths to 2.50 m scaffold latch plates R made of pipe 48.3 - 4.05 - ST 37 are necessary. They must be not pushed and are with normal couplings with test character B to the scaffolds to be fastened.



During one-sided arrangement in accordance with  $\boxtimes$  latch plates from pipe 60.3 - 5.0 - ST 37 are necessary, which are to be attached with reduction couplings. For other kinds of latch plates a static proof is in individual cases necessary.



Normal couplers with test characters, with nut with collar 22 mm, SW galvanized.



The admission of the loads by the scaffold and its anchorages is in the individual case to prove (deviations from the rule execution to DIN 4420 and/or licence notices).

Notes for the static analyst see part of B "static requirements".

## 5. Intermediate anchorings

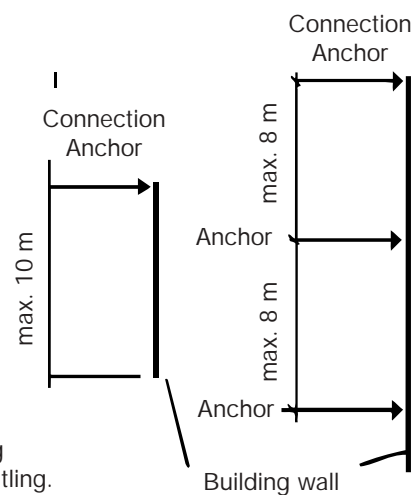
Debris chutes with a height to H max. 10 m may be arranged without intermediate anchorings.

With larger heights intermediate anchorings are in the distance from max. 8 m necessarily.

These depends constructionally on the structural conditions and can be specified therefore only in individual cases.

The proof of stability is to be led likewise in individual cases.

Notes for the static analyst see part of B "static requirements".



## 6. References for the use

- pulling and discharging of the debris chute are permissible only to wind force 6 (inclusively). (connections of the debris pipes at the carrying frame).
- the operating attachments by couplers are to be attached immediately after reaching the final installation condition and be solved only directly before beginning of dismantling.
- in the operating condition the debris chute may not hang on the hoist. The hoist serves only for pulling up and discharging when assembling and/or disassembly of the debris pipes.
- when discharging at least 2 turns of the rope on the rope drum of the hoist must remain.
- pulling and discharging should take place vertically. If the attachments as seen in BOARD 1 and 2 for the indicated loads are limited, exceptionally a diagonal course up to an inclination of 10:1 is permissible (1 m horizontal ever 10 m height).
- in the operating condition the debris chute should be vertically arranged. Turnings to 10:1 are exceptionally permissible, if also for the operating condition the support loads indicated for it are taken up after BOARD 1 and 2 by the building and/or scaffold and its anchorages.
- into the debris chutes no parts may be thrown in, which are longer than the smallest diameter (400 mm).
- with blockages further entering of debris is to be stopped immediately and forwards continues working the blockage to eliminate.
- after blockages the load-bearing construction units are in particular chains, snap hook, shackle, upper carrier racks, to examine window and scaffold attachments for damage and lasting deformations and if necessary to change against intact parts.

# Part B

BOARD 1

## Static requirements

(Notes for the static analyst)

1. Construction units: no requirements
2. Entire arrangement, generally: no requirements
3. Mounting at window attachment

Proofs of the building are to be led for the following loads: (load figure in KN for each of the 2 carrying disks)

- 1) Maximum length for buildings of brick-work
- 2) Special load case, with that 1,15-fache permissible tensions and resistances of the load case HZ could be used.
- 3) The inclination 10:1 corresponds in the static proof  $\tan = 0,10$ . The H-loads may be interpolated for  $0 < \tan 0,10$  straight-lined.

Part of 5 contains data concerning intermediate anchorings of the debris chutes.

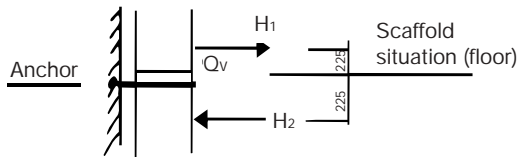
Conduit length (m)	Mounting	Loads with <sup>2)</sup> pipe blockage		
		Q <sub>v</sub>	H <sub>1</sub>	H <sub>2</sub>
max.	vertically	4,60	6,90	-6,00
40	10:1 bent <sup>3)</sup>	4,60	7,60	-6,30
25 <sup>1)</sup>	vertically	4,15	6,30	-5,40
	10:1 bent <sup>3)</sup>	4,15	7,00	-5,70

BOARD 2

## 7. Mounting at scaffolds

Proofs for the scaffold and its anchorages are to be led for the following loads:

(load figures in KN for each of the 2 carrying disks)



Conduit length (m)	Mounting	Loads with <sup>2)</sup> pipe blockage		
		Q <sub>v</sub>	H <sub>1</sub>	H <sub>2</sub>
max.	vertically	4,60	4,80	-3,90
40	10:1 bent <sup>3)</sup>	4,60	5,25	-3,95
25 <sup>1)</sup>	vertically	4,15	4,45	-3,55
	10:1 bent <sup>3)</sup>	4,15	4,90	-3,60

- 1) Maximum length for buildings of brick-work
- 2) Special load case, with which 1.15 fold permissible tensions and resistances of the load case cycles per second in the scaffold construction may be used. That corresponds with proofs under x-several loads after Th. II.0.  $\varphi = 1,30$ . All other loads (dead load, traffic, wind and horizontal substitute load) are to be considered interactively. For the pegs of the anchorages these reductions of the safety factors are inadmissible.
- 3) The inclination 10:1 corresponds in the static proof  $\tan \varphi = 0,10$ .  
H-loads may be interpolated for  $0 < \tan \varphi 0,10$  straight-lined.

The vertical loads Q<sub>v</sub> and horizontal loads H<sub>1</sub> /H<sub>2</sub> indicated in BOARD 2 scaffold level may be distributed during arrangement from latch plates to A as follows:

Arrangement	X				Y		
	I	II	I	Σ	A	B	Σ
Part of	0,05	1,90	0,05	2,00 <sup>1)</sup>	0,30	1,70	2,00 <sup>1)</sup>

1) results from 2 carrying disks

At height of the scaffold situation, in which the mounting of the debris chute takes place, additional horizontal loads affect the scaffold level. These amount to:

- in vertical connection = 1,80 KN
- with mounting under 10:1 ( $\tan \varphi = 0,10$ ) = 2,60 KN

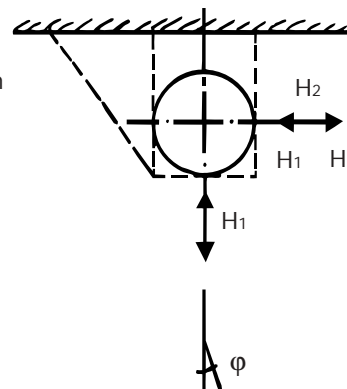
Intermediate values  $0 < \tan \varphi \leq 0,10$  should be interpolated straight-lined.

## 8. Intermediate anchoring

Wind loads on the debris pipes result independently from the incident-flow direction to  $W = 0,41 q$

In the case of it are "W" = windload in KN/m, "q" the stagnation pressure dependent on the height over areas according to DIN 1055 (part of 4) in KN/m<sup>2</sup>.

The intermediate anchorings are to be proven for the effects H<sub>1</sub> und H<sub>2</sub> around scaffold and/or building level. On changes of the inclination by turnings the resulting horizontal drift forces must be considered. These may be set simplified with:



Scaffold and/or building level

H<sub>1</sub> = 4,70 KN · tan φ  
H<sub>2</sub> = 7,90 KN · tan φ  
H<sub>1</sub> = without pipe blockage  
H<sub>2</sub> = with pipe blockage

H<sub>1</sub> and H<sub>2</sub> work depending upon sketch situation of the change of inclination between the border situations H<sub>1</sub> und H<sub>2</sub>. tan φ is to be referred to the angle of inclination to the vertical one.

Technical subjects to change 09/ 03

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