

Risk assessment pursuant to sections 5 and 6 of the German Health and Safety at Work Act (incl. measures and documentation)				Legend										Document: Index no.: Date of last revision:		QM V 045-KMR 0 01/04/2020					
Type of work: after-sales service, erection and overhaul activities				Life phases		Risk assessment										Drawn up and revised annually by the industrial safety expert: Michael Kreppold / Harald Görres Released by the head of department: Wolfgang Braun Released by the board of directors: Hans Peter Holl				On: 01/04/2020 In: 01/04/2020 In: 01/04/2020	
Occupational category/persons: erection supervisors and erectors (leased staff and employees)				AS: after-sales service ER: erection OH: overhaul		PB: probability SV: severity		H = high risk; urgent need for action; action must be taken immediately. M = medium risk; devise an action plan and implement measures promptly. L = low risk; action plan recommended.													
Tasks: erection/overhaul of components for combustion and dry digestion systems																					
No.:	Potential hazards associated with tasks performed and description thereof	Ordinances/ regulations/ information	Hazard location/workplace	Life phases			According to MARTIN risk matrix				Measures that can be taken to eliminate the hazard or reduce its probability and severity	Responsible	To be carried out	Measures taken (mark with cross)	Carried out	Result of measures taken Risk assessment				Refer to notes in appendix	
				K	M	OH	PB	SV	Total	Risk						PB	SV	Total	Risk		
1	Mechanical hazards																				
1.1	Unguarded machine parts in motion																				
	- Crushing hazard, e.g. when lifting into place and positioning the individual components	BetrSichV	Entire working area	X	X	D	B	DB	H	H	Keep at a safe distance from sources of danger	Employee	Before work begins	X	When work begins	E	C	EC	L		
	- Shearing hazard, e.g. when lifting into place and positioning individual components	DIN ISO 13857	Entire working area	X	X	D	B	DB	H	H	Secure/mark hazard zones adequately	Erection supervisor	Before work begins	X	When work begins	E	C	EC	L		
	- Bumping hazard due to protruding and poorly fit parts (scaffolding bars, etc.)	DGUV Vorschrift 1	Entire working area	X	X	D	B	DB	H	H	Ensure that unavoidable danger zones are easy to recognize, e.g. by marking them and by providing adequate lighting and using appropriate	Erection supervisor	Before work begins	X	When work begins	E	C	EC	L		
	- Catching points on drilling machines/hydraulic pre-assembly devices for piping		Entire working area	X	X	E	D	ED	L	L	warnings/safety signs and safety colours	Erection supervisor	Before work begins	X	When work begins	E	C	EC	L		
	- Mechanical/electrical hazards when working with angle grinders/saws		Entire working area	X	X	C	C	CC	M	M	Provide adequate lighting					C	C	CC	M	1	
											- Work must be coordinated (between crane operator and erection supervisor) BEFORE combustion system components are lifted into place	Crane operator/erection supervisor	Before work on site begins	X	When work on site begins						
											- Wear suitable personal protective equipment (hard hat, sign lifting clothing, etc.)	Employee	Before work begins	X	When work begins						
											- Instruct staff	Erection supervisor	Before work begins	X	When work begins						
											- All parts of the body must always be kept out of movable/unsecured machinery and plant components	Employee	Continuously	X	Continuously						
1.2	Parts with hazardous surfaces																				
	- Sharp-edged grate bars	BetrSichV	Entire working area	X	X	D	D	DD	M	M	- Instruct staff	Erection supervisor	Before work begins	X	When work begins	E	E	EE	L		
	- Sheet metal edges which have not been deburred	DGUV Vorschrift 1	Entire site/plant area	X	X	D	D	DD	M	M	- Provide adequate lighting	Erection supervisor	Before work begins	X	When work begins	E	E	EE	L		
	- Protruding corners/edges		Entire site/plant area	X	X	X	D	D	DD	M	- Wear suitable personal protective equipment (protective gloves, hard hat, etc.)	Employee	Before work begins	X	When work begins	E	E	EE	L		
											- If possible, ensure sufficient freedom of movement at the workplace										
1.3	Transport and work equipment in motion																				
	- Unexpected starting of site vehicles, forklifts, etc.	BetrSichV	Entire site/plant area	X	X	E	A	EA	H	H	- Only use suitable transport and lifting equipment, taking the weight of the respective parts and components	Crane company/erection supervisor	Before work on site begins	X	When work on site begins	E	C	EC	L		
	- People are run over by site vehicles, lifting platforms, forklift trucks, cranes, lorries	ArbStättV	Entire site/plant area	X	X	E	A	EA	H	H	- Only use transport and work equipment that is safe to operate and functions properly	Transport company/erection supervisor	Before work on site begins	X	When work on site begins	E	C	EC	L		
	- Overturning of p/everyone's stackers, cranes, lifting platforms, forklift trucks, lorries, etc.	DGUV Vorschrift 52	Entire site/plant area	X	X	E	A	EA	H	H	- NEVER exceed load bearing capacity of transport equipment	Employee/transport company	Before work begins	X	When work begins	E	C	EC	L		
	- Falling from site vehicles, lifting platforms, forklift trucks, lorries, etc.	DGUV Vorschrift 68	Entire site/plant area	X	X	E	A	EA	H	H	- Check on a regular basis whether transport and work equipment functions properly and is safe to use	Erection supervisor	Before work on site begins	X	When work on site begins	E	C	EC	L		
		DGUV Vorschrift 70									- Ensure adequate load bearing capacity and stability on transport routes	Operator	Before work on site begins	X	When work on site begins						
		SIVZO									- Check the technical equipment of vehicles for completeness, e.g. anti-roll system, climbing aids, first aid kit	Crane company	Before work on site begins	X	When work on site begins						
											- Transport equipment may only be operated by suitable and trained staff holding the relevant licenses, e.g. for forklift trucks and cranes	Erection supervisor/crane company	Before work begins	X	When work begins						
											- Regular medical check-ups for leased staff and MARTIN employees performing driving, operating and monitoring tasks (G25)	Industrial safety expert	Before work on site begins	X	When work on site begins						
											- Area must be cordoned off adequately if necessary	Erection supervisor	Before work begins	X	When work begins						
											- Transport routes must be kept clear of obstructions	Everyone	Continuously	X	Continuously						
											- Transport routes must be marked and adequately lit	Operator	Before work on site begins	X	When work on site begins						
											- Transport routes must be kept separate from pedestrian traffic to the extent possible	Operator	Continuously	X	Continuously						
											- Keep at a safe distance from adjoining escape and transport routes	Employee	Continuously	X	Continuously						
											- Secure movable transport equipment against unintentional starting/swinging	Everyone/supplier	Continuously	X	Continuously						
											- Secure cargo adequately	Crane company/employee	Continuously	X	Continuously						
											- Ensure that the driver's field of vision is not restricted; where this is not possible, a second person must assist in reversing the vehicle	Transport company/employee	Continuously	X	Continuously						
											- Instruct the suppliers/employees	Site manager/erection supervisor	Before work begins	X	When work begins						
											- Define crane areas (location, slewing range) in consultation with the operator/senior site manager before commencement of work	Site manager/erection supervisor/project management department	Before work on site begins	X	When work on site begins						
1.4	Parts moved in an uncontrolled (incorrect) manner																				
	- Improperly attached parts	BetrSichV	Entire site/plant area	X	X	C	A	CA	H	H	- Store tools and equipment in a stable position, observing their centre of gravity, so as to ensure that they will not topple over or start unexpectedly	Erection supervisor/employee	Continuously	X	Continuously	E	E	EE	L		
	- Improper handling of cargo	DGUV Vorschrift 1	Entire site/plant area	X	X	C	A	CA	H	H						E	E	EE	L		
	- Improper securing of cargo	DGUV Vorschrift 38	Entire site/plant area	X	X	C	A	CA	H	H						E	E	EE	L		
	- Unexpected starting of the drives for the combustion system, feed chute damper, primary air dampers, hydraulic cylinders (test runs)	DGUV Regel 100-500	Entire combustion system area	X	X	D	C	DC	M	M	- Use adequate safety equipment to prevent rolling and sliding or stop rolling and sliding parts (protection against unintentional start, anti-roll systems, wedges, supports, etc.)	Erection supervisor/employee	Continuously	X	Continuously	E	E	EE	L		
	- Equipment and tools are not stored properly		Entire site/plant area	X	X	B	B	BB	H	H	- Use suitable load bearing equipment that is tested/inspected on a regular basis	Erection supervisor	Continuously	X	Continuously	E	D	ED	L		
	- Large chunks of encrusted bottom ash may fall from furnace ceiling or walls		Entire combustion system area	X	X	D	A	DA	H	H	- Loads must be attached correctly by suitable and trained staff	Erection supervisor/employee	Continuously	X	Continuously	E	D	ED	L		
	- Effect of wind on parts with large surfaces		Entire site/plant area	X	X	E	E	EE	L	L	- Secure/mark hazard zones adequately	Erection supervisor	Continuously	X	Continuously	E	E	EE	L		
	- Heavy-duty rollers used to transport cargo start rolling unexpectedly		Combustion system/boiler area	X	X	E	A	EA	H	H	- Shut off the hydraulic system and secure it to ensure that it cannot be switched on again	Erection supervisor	Continuously	X	Continuously	E	E	EE	L		
	- Unsecured doors and manholes		Combustion system/boiler area	X	X	E	D	ED	L	L	- Weld on end stops if required	Erection supervisor	Continuously	X	Continuously	E	E	EE	L		
	- Objects falling down or over due to unexpected release of blockages		Entire site/plant area	X	X	X	C	CC	M	M	- Use suitable fall arrest equipment (e.g. nets) where necessary	Erection supervisor	Continuously	X	Continuously						
											- Lateral pull on attached loads must be avoided	Employee	Continuously	X	Continuously						
											- Use a tag line or rod to stabilize the load	Erection supervisor	Continuously	X	Continuously						
											- Wear suitable personal protective equipment (hard hat, etc.)	Employee	Continuously	X	Continuously						
											- Instruct staff	Erection supervisor	Before work begins	X	When work begins						
											- Perform visual inspections before entering the furnace	Erection supervisor/customer	Before work begins	X	When work begins						
											- If necessary, remove large chunks of encrusted bottom ash from a safe distance from above using a rod.	Customer	Before work begins	X	When work begins						
											- Intensely cleaning of the boiler during shutdown using the appropriate cleaning facilities.										
											- Take due note of wind speeds when lifting components into place	Crane company	Continuously	X	Continuously						
											- All parts of the body must always be kept out of the danger zone if crushing hazards occur, for example due to the uncontrolled movement of components	Employee	Continuously	X	Continuously						
											- All parts of the body must always be kept out of the danger zones of blocked items.										
											- Blockages must be released in a suitable manner, while taking appropriate safety precautions.										
1.5	Falls on level ground, slipping, tripping, spraining, misstepping																				
	- Surfaces soiled with hydraulic oils/greases	ArbStättV	Entire plant	X	X	X	C	D	CD	M	- Wear suitable footwear/personal protective equipment	Employee	Continuously	X	Continuously	E	E	EE	L		
	- Grate covered with dust and ash	DGUV Vorschrift 1	Grate area	X	X	X	C	D	CD	M						E	E	EE	L		
	- Wet or icy surfaces	DGUV Regel 108-003	Entire site/plant area	X	X	C	D	D	CD	M	- If risk of falling cannot be eliminated, the following measures must be taken: provide adequate lighting, mark hazardous areas with colours or fit warning signs in a clearly visible position to make the hazard obvious	Erection supervisor	Before work begins	X	When work begins	E	E	EE	L		
	- Grate without surface (carrier beams)		Grate area	X	X	C	D	D	CD	M	- Fit sufficiently large and adequately shaped tread surfaces where possible	Scaffolding erector/erection supervisor	Before work begins	X	When work begins	E	E	EE	L		
	- Feeder (different feed ram positions)		Feeder area	X	X	X	C	D	CD	M	- Grating must be secured immediately against lifting and displacement	Boiler manufacturer/operator	Before work begins	X	When work begins	E	E	EE	L		
	- Missing walkway parts, or walkways and plant components that have not yet been fully installed		Entire site/plant area	X	X	E	A	EA	H	H	- Cables and pipes must be laid in such a way as to prevent tripping	Employee	Continuously	X	Continuously	E	E	EE	L		
	- Unlabeled workplace (e.g. due to equipment, work pieces, waste, etc. from other companies)		Entire plant																		

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Type of work:	after-sales service, erection and overhaul activities			AS: after-sales service	PB: probability		H = high risk; urgent need for action; action must be taken immediately.						Released by the head of department:		Wolfgang Braun	In:	01/04/2020			
Occupational category/persons:	erection supervisors and erectors (leased staff and employees)			ER: erection	SV: severity		M = medium risk; devise an action plan and implement measures promptly.						Released by the board of directors:		Hans Peter Holl	In:	01/04/2020			
Tasks:	erection/overhaul of components for combustion and dry digestion systems			OH: overhaul			L = low risk; action plan recommended.													
No.:	Potential hazards associated with tasks performed and description thereof	Ordinances/ regulations/ information	Hazard location/workplace	Life phases			According to MARTIN risk matrix				Measures that can be taken to eliminate the hazard or reduce its probability and severity	Responsible	To be carried out	Measures taken (mark with cross)	Carried out	Result of measures taken Risk assessment				Refer to notes in appendix
				K	M	OH	PB	SV	Total	Risk						PB	SV	Total	Risk	
2.	Electrical hazards																			
2.1	Shock currents	BetrSichV ArbStättV DGUV Vorschrift 3 DGUV Information 203-001 DGUV Information 203-004 DGUV Information 203-005	Entire site/plant area Entire site/plant area Refuse pit area Combustion system/boiler area Vessels and enclosures spaces	X X X X X	X X X X X		C C E C C	A A E E A	CA CA L L CA	H H L L H	- Choose and operate equipment and systems in accordance with operating conditions, regulations, external influences, electrotechnical rules (P/mechanical protection) - Only permitted and intact electrical devices (lamps, electrical tools) may be used, e.g. devices with safety separation or safety extra-low voltage facilities - Defects in electrical systems/equipment must be eliminated immediately by a qualified electrician - Check electrical systems and equipment before start-up, after repair work and at regular intervals - Residual current device must be installed everywhere and effective (provides protection against indirect contact by switching off equipment, issuing a message, etc.) - Protective measures required for areas of increased electrical hazard must be implemented and checked for effectiveness (safety separation/safety extra-low voltage facilities, residual current device IΔNs 30 mA) - Isolating transformers must be used in closed vessels - The equipment must be disconnected from the power supply and secured before work starts - The power supply must not be switched on until installation work has been completed - The applicable safety distances from live systems must be complied with - Wear suitable personal protective equipment - Instruct staff - Persons who have suffered an electric shock must see a doctor or go to hospital. The superior must be informed immediately.	Erection supervisor Employee/erection supervisor Erection supervisor Erection supervisor Erection supervisor Erection supervisor Site manager/operator Site manager/operator Employee Employee Erection supervisor Employee	Before work on site begins Before work on site begins Continuously Before work on site begins On a daily basis Before work on site begins Continuously Before work begins Before work on site begins Continuously Continuously Before work begins Continuously	X X X X X X X X X X X X	When work on site begins When work on site begins Continuously When work on site begins On a daily basis When work on site begins Continuously When work begins When work on site begins Continuously Continuously When work begins ---	E E E E E E E E E E E E	E E E E E E E E E E E E	EE EE EE EE EE EE EE EE EE EE EE EE	L L L L L L L L L L L L	
2.2	Electric arcs		Entire site/plant area Entire site/plant area	X X	X X		C C	A A	CA CA	H H	See measures specified in section 2.1 "Shock currents"					E E	E E	EE EE	L L	
3.	Hazardous substances (inhaling, swallowing, exposure of skin, mucous membranes and eyes)																			
3.1	Gases		Entire site/plant area Entire site/plant area Refuse pit area Combustion system/boiler area Vessels and enclosures spaces	X X X X X	X X X X X		C A E C C	A AA E E A	CA H L L CA	H H L L H	- Use welding gases properly and professionally; extract welding smoke - Avoid, replace hazardous substances wherever possible or use alternative processes - Limit periods of exposure to a minimum - If hazardous substances are used, the relevant safety data sheets must be available on site - Keep a list of hazardous substances used - Mark hazardous substances and mixtures - Define protection levels for hazardous substances and take necessary precautions, in particular for their storage - Prevent potentially explosive atmospheres by installing suitable extraction/ventilation facilities - An extraction facility is required for major welding work - Observe prescribed hygiene measures (smoking, eating and drinking ban) - Medical check-ups of exposed persons must be performed on a regular basis; additional check-ups as per G39 (welding smoke) are recommended for leased staff - Wear suitable personal protective equipment, e.g. dust/filter masks when performing welding work, or protective gloves when handling liquids, waste, etc.) - Instruct staff - Analyze air in vessels and confined spaces to ensure that there are no harmful substances - Ensure adequate ventilation - Personal gas detectors must be worn if necessary	Erection supervisor Employee Erection supervisor Industrial safety expert/erection supervisor Industrial safety expert Supplier Operator Erection supervisor/operator Erection supervisor/employee Employee Industrial safety expert Employee Erection supervisor Erection supervisor Employee	Continuously Before work on site begins Continuously Before work on site begins Before work on site begins Before work on site begins Before work on site begins Before work on site begins Continuously Continuously At regular intervals Continuously Before work begins Before work on site begins When work begins Continuously	X X X X X X X X X X X X	Continuously When work on site begins Continuously When work on site begins When work on site begins When work on site begins When work on site begins When work on site begins Continuously Continuously At regular intervals Continuously When work begins When work begins When work begins Continuously	E E E E E E E E E E E E	E E E E E E E E E E E E	EE EE EE EE EE EE EE EE EE EE EE EE	L L L L L L L L L L L L	
3.2	Fumes	BGI 565 Safety For biogas plants	Vessels and Confined spaces Entire plant	X X X	X X X		D A E	A A D	DA DA ED	H H L	See measures specified in section 3.1 "Gases"					E E E	D D E	ED ED EE	L L L	
3.3	Aerosols		Entire combustion system area Entire combustion system area	X X	X X		E E	D D	ED ED	L L	See measures specified in section 3.1 "Gases"					E E	E E	EE EE	L L	
3.4	Liquids		Entire plant Hydraulically-operated systems Entire combustion system area Entire combustion system area Entire combustion system area Entire site Combustion system/boiler area FeCl3 storage area	X X X X X X X	X X X X X X X		C C C C C E A	E E E E E EA CA	CE CE CE CE CE L CA	L L L L L L H	See measures specified in section 3.1 "Gases"					E E E E E E E	E E E E E E E	EE EE EE EE EE EE EE	L L L L L L L	
3.5	Solids		Water circuits installed everywhere outdoors Refuse pit area Refuse pit/combustion system area Combustion system/boiler area Combustion system/boiler area Combustion system/boiler area Combustion system/boiler area Combustion system/boiler area	X X X X X X X X	X X X X X X X X		D C C A A C C D A	D A A A A A DA DA DA DA	DD CA CA CA CA CA CA CA CA CA	M H H H H H H H H H	- Always wear protective goggles when working on the system - Wear gloves - Employees must be instructed with respect to toxic and irritating effects - Instruct employees with respect to dangers (do not swallow or breath in; wash off carefully) - Provide eye bath - See measures specified in section 3.1 "Gases" - Regular medical check-ups of leased staff and MARTIN employees as per G2 (lead or its compounds), G9 (mercury or its compounds), G15 (chrome (IV) compounds) and G32 (cadmium and its compounds) - The customer must remove all uncombusted waste on the grate, feeder and chute before work begins - Provide adequate lighting - It is recommended that suitable personal protective equipment should be worn when other companies/lot contractors are performing insulation work - Do not work with substances, materials, dusts, etc. containing asbestos. This also applies to materials and substances whose composition is unknown to us. If necessary, the operator must hire a specialized company to remove and dispose of such materials or substances - Wear suitable personal protective equipment such as safety goggles (preferably full-seal) or P3 dust masks. Wear suitable respiratory equipment, e.g. a self-contained breathing apparatus, when working in high dust environments	Employee Employee Erection supervisor Erection supervisor / operator Industrial safety expert/staffing agency Operator Operator/erection supervisor Erection supervisor Operator Employee/erection supervisor	Continuously Continuously Before work on site begins Before work on site begins Before work on site begins Before work on site begins Before work on site begins Before work on site begins Before work on site begins Continuously	X X X X X X X X	Continuously Continuously When work on site begins When work on site begins When work on site begins When work on site begins When work on site begins When work on site begins When work on site begins Continuously	E E E E E E E E	E E E E E E E E	EE EE EE EE EE EE EE EE	L L L L L L L L	
3.6	Runaway reactions																			
4.	Biohazards																			
4.1	Infection hazard due to microorganisms, viruses, biological agents	DGUV Information 209-054 BioStoffV TRBA 500	Refuse pit/combustion system area Refuse pit/combustion system area Refuse pit/combustion system area, delivery area of biogas plant Refuse pit/combustion system area Refuse pit/combustion system area	X X X X X	X X X X X		C C C C C	A A C A A	CA CA CA CA CA	H H H H H	- If possible, avoid contact (skin, eyes, inhalation) with biological agents - If necessary, restrict access or cordon off area - Before work begins, the working areas must be cleaned to the extent possible and waste and bottom ash must be removed - Wear suitable protective clothing (dust masks, protective gloves, safety footwear with anti-puncture steel sole, etc.) - Avoid contact with these substances to the extent possible (e.g. wear gloves) - Wash off contaminations immediately - Carry out medical check-ups and necessary vaccinations (e.g. Hepatitis A and B) on a regular basis - Wear suitable protective clothing (dust masks, protective goggles)	Employee Erection supervisor / Operator Operator Employee Employee Head of division / company physician / staffing agency Employee	Continuously Before work begins Before work on site begins Continuously Continuously Before work on site begins Continuously	X X X X X X X	Continuously When work begins When work on site begins When work on site begins Continuously When work on site begins Continuously	E E E E E D E	E E E E E D E	EE EE EE EE EE DD EE	L L L L L M L	
4.2	Genetically modified substances		Entire biogas plant Delivery area of biogas plant Refuse pit/combustion system area, delivery area of biogas plant	X X X	X X X		C C C	C A A	CC CA CA	M H H						E E E	C D E	EC DD EE	G M L	
4.3	Everydayergens and toxic substances from organisms		Refuse pit/combustion system area Refuse pit Areas for delivery and storage of organic Refuse pit area	X X X X	X X X X		C C E E	A A C C	CA CA EC L	H H L L	- Observe general hygiene rules - Regular medical check-ups are recommended for leased staff and MARTIN employees who perform work involving a risk of infection (G42). Determine the risk of infection during work-related medical check-ups. Ensure that staff receives advice on available vaccines (immunization) - Instruct staff	Industrial safety expert/staffing agency Erection supervisor	Before work on site begins Before work begins	X X	When work on site begins When work begins	E E E	E E E	EE EE EE	L L L L	

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8.	Hazards related to work environment																						
8.1	Climate																						
	- Non-compliance with prescribed room temperatures and air humidity levels (not possible due to construction site activities)	ASR 5	Entire site/plant area	X	X	X	A	E	AE	L	-Wear protective clothing suitable for prevailing room temperatures and air humidity levels	Employee	Continuously	X	Continuously	A	E	AE	L				
	- Draughts (if induced draught fan is in operation)	ArbStättV	Combustion system/boiler area	X	X	X	A	E	AE	L	-Make sure workers take sufficient breaks	Employee	Continuously	X	Continuously	A	E	AE	L				
	- Inadequate ventilation due to closed plant doors	DGUV Vorschrift 6	Entire site/plant area	X	X	X	A	E	AE	L	-Make sure workers are not exposed to draughts (optimize function of induced draught fan, erect separation walls)	Operator/erection supervisor	Before work begins	X	When work begins	A	E	AE	L				
	- Exposure to heat and cold when working outdoors (under any weather conditions)		Entire site/plant area	X	X	X	A	E	AE	L	-Ensure adequate ventilation/fresh air supply, for example by opening gates and windows or using extraction facilities/fans	Operator/erection supervisor	Continuously	X	Continuously	A	E	AE	L				
											-Instruct staff	Erection supervisor	Before work begins	X	When work begins								
8.2	Lighting																						
	- Inadequate lighting (no daylight during overhaul work), poor luminance distribution	ArbStättV DGUV Vorschrift 1	Entire site/plant area		X	X	B	B	BB	H	-Provide adequate lighting	Operator/erection supervisor	Before work begins	X	When work begins	E	E	EE	L				
	- Dazzling caused by incorrectly positioned halogen lights or similar	ASR 7	Entire site/plant area		X	X	C	D	CD	M	-Position lights and lamps such that they do not dazzle	Employee	Continuously	X	Continuously	E	E	EE	L				
	- There are no emergency and safety lights in parts of the site	ASR 41	Entire site/plant area		X	X	C	D	CD	M	-Provide adequate emergency and safety lighting (especially in the vicinity of rescue and escape routes and in particularly hazardous workplaces).	Operator	Before work on site begins	X	When work on site begins	E	E	EE	L				
	- Dazzling due to solar radiation		Entire site/plant area		X	X	C	D	CD	M	-Equip staff with flashlights where this is not possible, e.g. in the combustion system area	Employee	Continuously	X	Continuously	E	E	EE	L				
											-Shade workplace if necessary	Employee	Continuously	X	Continuously								
											-Prevent sun dazzle, e.g. by wearing sunglasses	Employee	Continuously	X	Continuously								
8.3	Space constraints/transport and escape routes																						
	- Restricted freedom of movement due to local conditions	ArbStättV ASR 10	Combustion system/boiler area		X	X	A	A	AA	H	-Discuss possible escape routes before starting work (if freedom of movement is restricted during work)	Erection supervisor	Before work begins	X	When work begins	C	C	CC	M				
	- Rescue, escape and transport routes do not exist, are difficult to access or poorly marked	ASR 17	Entire site/plant area		X	X	A	A	AA	H	-Allow enough space for rescue, escape and transport routes and mark them adequately	Operator	Before work on site begins	X	When work on site begins	C	C	CC	M				
		DGUV Vorschriften 208-010									-Keep escape routes and emergency exits clear of obstructions and do not narrow them	Operator/employee	Continuously	X	Continuously								
		DGUV Vorschriften 68									-Draw up an escape and rescue plan	Operator/health and safety coordinator	Before work on site begins	X	When work on site begins								
											-Instruct staff	Erection supervisor	Before work begins	X	When work begins								
8.4	Ergonomics																						
	- Back, shoulder or neck pain due to incorrect arrangement of individual pieces of equipment such as desk, screen, height of machine/plant component, etc.	ArbSchG BildscharbV ArbStättV	Office workplace	X	X	X	D	C	DC	M	-Screen off workplaces adequately if working in draughty areas cannot be avoided	Everyone for themselves	Continuously	X	---	E	E	EE	L				
	- Lighting and room climate in office, container and at building site		Entire site/plant area	X	X	X	E	E	EE	L	-Equip offices/containers such that staff can adapt to local conditions, for example by providing adequate lighting, heating, air conditioning units, sanitary facilities, etc.	Superior/project manager	Before work begins	X	Before work begins	E	E	EE	L				
	- Poor concentration due to noise		Office, site/plant area	X	X	X	D	C	DC	M	-Use ear protection if necessary	Everyone for themselves	Continuously	X	---	E	E	EE	L				
											-Provide workplace with adequate lighting	Everyone for themselves	Continuously	X	---								
											-Instruct staff with regard to workplace ergonomics	Superior	Once a year	X	Once a year								
											Inspection of the offices at MARTIN's premises as part of industrial safety committee meetings	Industrial safety committee team	Continuously	X	---								
9.	Physical stress/heavy work																						
9.1	Heavy dynamic work (dynamic whole-body work)																						
	- Heavy and dynamic whole-body work when handling grate surface elements (performed temporarily)	BetrSichV	Combustion system area		X	X	C	C	CC	M	-Keep work requiring large groups of muscles (arm, leg and torso muscles) to the minimum absolutely necessary (use conveyor belt)	Erection supervisor	Before work begins	X	When work begins	C	C	CC	M				
	- Use of personal protective equipment			X	X	X	C	E	CE	L	-Make sure workers take short breaks when performing physical work in strenuous climatic conditions	Erection supervisor	Continuously	X	Continuously	C	E	CE	L				
	- Work in strenuous climatic conditions	DGUV Information 208-006			X	X	A	E	AE	L	-Make sure workers take sufficient breaks when working with respiratory equipment	Erection supervisor	Continuously	X	Continuously	A	E	AE	L				
											-Ensure that individual workers rotate tasks if possible	Erection supervisor	Continuously	X	Continuously								
											-Use lifting equipment/conveyor belt if required	Erection supervisor	Before work begins	X	When work begins								
											-Instruct staff	Erection supervisor	Before work begins	X	When work begins								
9.2	One-sided dynamic work																						
	- Handling of grate bars	BetrSichV	Combustion system area		X	X	C	C	CC	M	-Make sure workers take short breaks when performing physical work in strenuous climatic conditions	Employee	Continuously	X	Continuously	C	C	CC	M				
		DGUV Information 208-006									-Make sure workers take sufficient breaks when working with respiratory equipment	Erection supervisor	Continuously	X	Continuously								
											-Make sure that individual workers rotate tasks if possible	Erection supervisor	Continuously	X	Continuously								
											-Instruct staff	Erection supervisor	Before work begins	X	When work begins								
9.3	Static work																						
	- Forced posture due to space constraints when performing welding/installation work in the undergrate hopper, discharger, feeder, siltings removal system, etc.	DGUV Information 208-006	Combustion system area		X	X	A	E	AE	L	-Avoid performing static work without changing posture	Employee	Continuously	X	Continuously	A	E	AE	L				
		BetrSichV									-Avoid tasks involving strong bending or twisting of the torso	Employee	Continuously	X	Continuously								
											-Make sure that workers take sufficient breaks	Erection supervisor	Continuously	X	Continuously								
											-Ensure that individual workers rotate tasks if possible	Erection supervisor	Continuously	X	Continuously								
											-Optimize workplace, equipment, etc.	Erection supervisor	Before work begins	X	When work begins								
											-Provide auxiliary and body support equipment such as knee pads, supports, etc.	Erection supervisor	Before work begins	X	When work begins								
											-Change posture, e.g. alternate between sitting and standing	Employee	Continuously	X	Continuously								
											-Instruct staff	Erection supervisor	Before work begins	X	When work begins								
9.4	Combination of static and dynamic work																						
	- Handling weights of 20 kg and above (e.g. grate surface elements = 20 to 35 kg) during dismantling and installation work (twisting/bending the torso, turning the torso sideways)	DGUV Information 208-006 BetrSichV	Combustion system area		X	X	C	C	CC	M	-Involve other persons	Erection supervisor	If required	X	If required	C	C	CC	M				
											-Work more slowly	Employee	If required	X	If required								
											-Reduce distances over which heavy parts have to be carried	Erection supervisor	Before work begins	X	When work begins								
											-Ensure that individual workers rotate tasks if possible	Erection supervisor	Continuously	X	Continuously								
											-Make sure that workers take sufficient breaks	Erection supervisor	Continuously	X	Continuously								
											-Avoid tasks involving strong bending or twisting of the torso	Employee	Continuously	X	Continuously								
											-Instruct staff	Erection supervisor	Before work begins	X	When work begins								
											-Regular medical check-ups of the musculoskeletal system (G46); not absolutely necessary for MARTIN employees but check-ups are performed at the employees' request. This type of check-up is recommended for leased workers.	Industrial safety expert	Before work on site begins	X	When work on site begins								
10.	Perception; handling of equipment																						
10.1	Perception of information																						
	- Warning signals in the furnace/digester/vessels are difficult to hear	BetrSichV	Working area	X	X	X	E	A	EA	H	-Employees outside the combustion system area who can hear the warning signal must inform people working inside said area immediately	Employee	Continuously	X	Continuously	E	C	EC	L				
10.2	Scope of perception																						
	- Not applicable										-Instruct staff	Erection supervisor	Before work begins	X	When work begins								
10.3	Difficulty in handling equipment																						
	- Not applicable																						
11.	Other hazards																						
11.1	Unsuitable personal protective equipment																						
	- Improper use of personal protective equipment	Personal protective equipment, operating instructions DGUV Vorschrift 1 DGUV Vorschriften 6 DGUV Regel 112-189 DGUV Regel																					

