

## MCE 45

Mini electric cylinder MCE is a mini linear drive with a piston rod. By using an integrated precision ball screw drive, the rotary motion (rotation) of the drive shaft is converted to the linear motion (translation) of the piston rod with high mechanical efficiency and low internal friction.

A preassembled standard motor (in-line with a motor adapter and a coupling or in-parallel with a motor sidedrive and a timing belt) together with the standard drive, makes the system plug and play ready. Compact dimensions and optimally selected motor combinations cover a wide range of applications.

The aluminium cylinder profile includes T-slots on the bottom for fixing the electric cylinder, as well as side slots for clamping fixtures and magnetic field sensors.

Options, such as female piston rod end and extended piston rod, together with a wide range of accessories make this product highly flexible. There is also an option of the mini electric cylinder without the preassembled motor if an individual motor is required.

For applications, where higher resistance to lateral loads or torsional moments is required, a guiding unit GUC can be used. By using the guiding unit, which offers high precision guiding and positioning, the mini electric cylinders can easily be combined to the multi-axis systems.

Each MCE is optimally pre-lubricated and ready for a maintenance-free operating process.

### Note!

All the data of the dynamic load capacities (ball screw drive) stated in the tables are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety and service life.

We recommend a minimum dynamic safety factor of 5,0 or more. Please refer to the Ball screw drive section, where calculation of the safety factor of the ball screw drive and how the applied load affects the service life are presented.

Dimensions in mm.

Contact us for further information.

**Axial Backlash (mm):**  $\leq 0.06$

**Max. Acceleration (m/s):** 20

**Protection class:** IP40

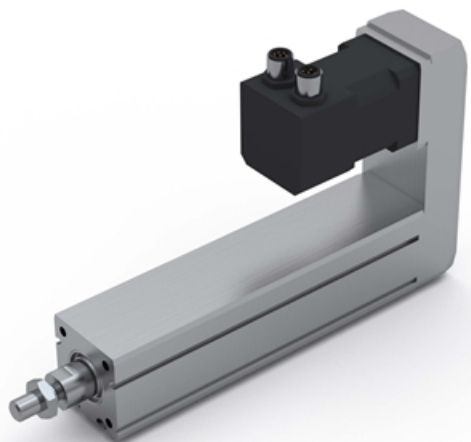
**Ambient Temperature (°C):** 0 – +50

**Duty cycle:** 100%

**Maintenance:** Life-time pre-lubricated



## MCE 45



## Variant Data

Designation	Description	Ball screw (d x l)	Max. Drive Torque $M_p$ (Nm)	Max. Travel Speed $V_{max}$ (m/s)	Max. Rotational Speed $n_{max}$ ( $min^{-1}$ ) (rev/min)
<b>MCE 45 - 10x3</b>	Without motor	10x3 mm	0,37	0,23	4500
<b>MCE 45 - 10x10</b>	Without motor	10x10 mm	1,23	0,75	4500
<b>MCE 45 - VK - 42 - 10x3</b>	With motor size 42 and motor adapter VK	10x3 mm	-	0,15	3000
<b>MCE 45 - VK - 42 - 10x10</b>	With motor size 42 and motor adapter VK	10x10 mm	-	0,49	2950
<b>MCE 45 - VK - 56 - 10x3</b>	With motor size 56 and motor adapter VK	10x3 mm	-	0,15	3000
<b>MCE 45 - VK - 56 - 10x10</b>	With motor size 56 and motor adapter VK	10x10 mm	-	0,50	3000
<b>MCE 45 - MSD - 42 - 10x3</b>	With motor size 42 and motor side drive MSD	10x3 mm	-	0,15	2960
<b>MCE 45 - MSD - 42 - 10x10</b>	With motor size 42 and motor side drive MSD	10x10 mm	-	0,48	2860
<b>MCE 45 - MSD - 56 - 10x3</b>	With motor size 56 and motor side drive MSD	10x3 mm	-	0,15	3000
<b>MCE 45 - MSD - 56 - 10x10</b>	With motor size 56 and motor side drive MSD	10x10 mm	-	0,50	3000

Designation	No Load Torque M <sub>0</sub> (Nm)	Axial Dynamic Load Capacity Ca (N)	Max. angle of piston rod rotation	Max. Repeatability (mm)	Max. Permissible Axial Load Fpa (N)	Absolute stroke
MCE 45 - 10x3	0,07	3500	≤ ±1 °	±0.015	695	25, 50, 75, 100, 125, 150, 175, 200
MCE 45 - 10x10	0,09	3200	≤ ±1 °	±0.015	695	25, 50, 75, 100, 125, 150, 175, 200
MCE 45 - VK - 42 - 10x3	-	3500	≤ ±1 °	±0.015	465	25, 50, 75, 100, 125, 150, 175, 200
MCE 45 - VK - 42 - 10x10	-	3200	≤ ±1 °	±0.015	135	25, 50, 75, 100, 125, 150, 175, 200
MCE 45 - VK - 56 - 10x3	-	3500	≤ ±1 °	±0.015	695	25, 50, 75, 100, 125, 150, 175, 200
MCE 45 - VK - 56 - 10x10	-	3200	≤ ±1 °	±0.015	580	25, 50, 75, 100, 125, 150, 175, 200
MCE 45 - MSD - 42 - 10x3	-	3500	≤ ±1 °	±0.015	400	25, 50, 75, 100, 125, 150, 175, 200
MCE 45 - MSD - 42 - 10x10	-	3200	≤ ±1 °	±0.015	120	25, 50, 75, 100, 125, 150, 175, 200
MCE 45 - MSD - 56 - 10x3	-	3500	≤ ±1 °	±0.015	695	25, 50, 75, 100, 125, 150, 175, 200
MCE 45 - MSD - 56 - 10x10	-	3200	≤ ±1 °	±0.015	450	25, 50, 75, 100, 125, 150, 175, 200

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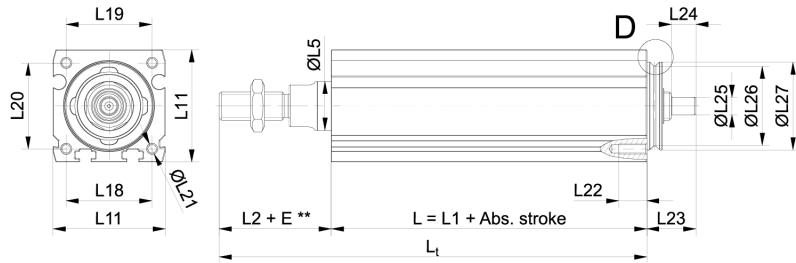
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## Variant Data

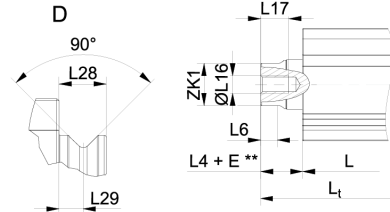
Designation	Max. Permissible Payload Horizontal mph (kg)	Max. Permissible Payload Vertical mpv (kg)	Max. Permissible Radial Load on Shaft Fpr (N)	Motor type	Motor size (mm)
MCE 45 - 10x3	233	58	100	-	-
MCE 45 - 10x10	233	58	100	-	-
MCE 45 - VK - 42 - 10x3	156	39	-	Stepper	42
MCE 45 - VK - 42 - 10x10	21	11	-	Stepper	42
MCE 45 - VK - 56 - 10x3	233	58	-	Stepper	56
MCE 45 - VK - 56 - 10x10	133	49	-	Stepper	56
MCE 45 - MSD - 42 - 10x3	134	33	-	Stepper	42
MCE 45 - MSD - 42 - 10x10	20	10	-	Stepper	42
MCE 45 - MSD - 56 - 10x3	233	58	-	Stepper	56
MCE 45 - MSD - 56 - 10x10	133	38	-	Stepper	56

# Dimensions

## MCE without a motor

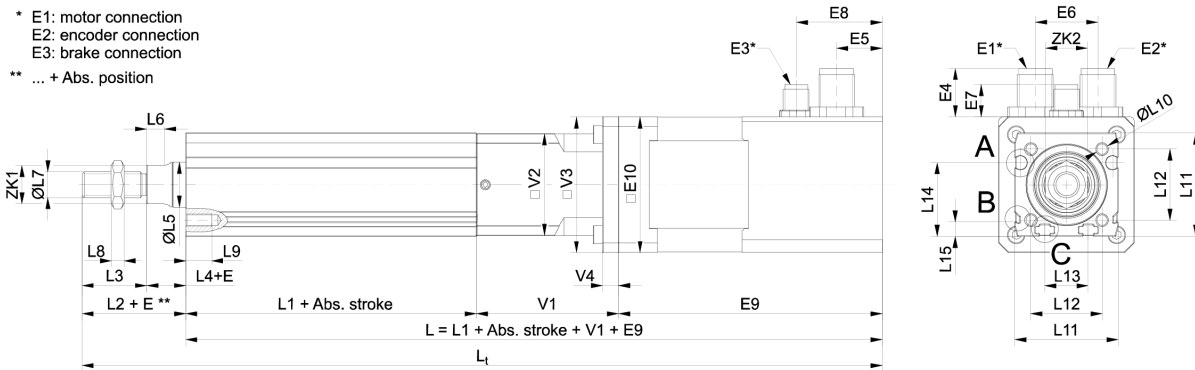


## Female thread

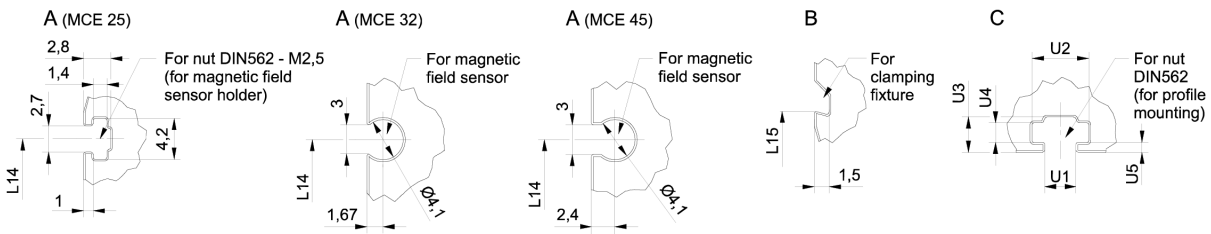


## MCE with motor adapter VK

- \* E1: motor connection
- E2: encoder connection
- E3: brake connection
- \*\* ... + Abs. position

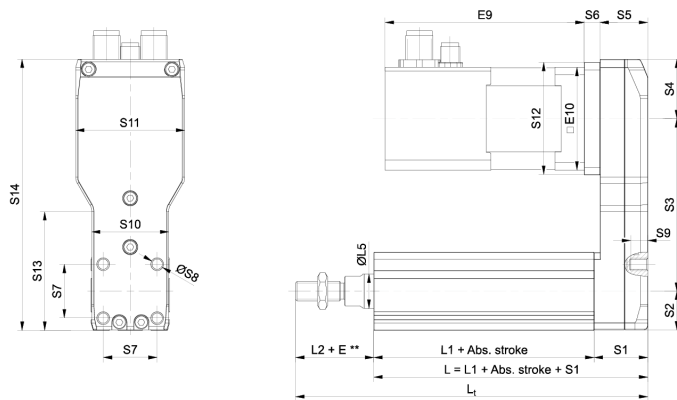


## MCE with motor adapter VK



## Dimensions

### MCE with motor side drive MSD



Designation	L1	L2	L3	L4	L5	L6	L7	L8	ZK1
MCE 45 - 10x3	80	38	22	16	Ø 18	7	Ø M10 x 1.25	5	16
MCE 45 - 10x10	80	38	22	16	Ø 18	7	Ø M10 x 1.25	5	16
MCE 45 - VK - 42 - 10x3	80	38	22	16	Ø 18	7	Ø M10 x 1.25	5	16
MCE 45 - VK - 42 - 10x10	80	38	22	16	Ø 18	7	Ø M10 x 1.25	5	16
MCE 45 - VK - 56 - 10x3	80	38	22	16	Ø 18	7	Ø M10 x 1.25	5	16
MCE 45 - VK - 56 - 10x10	80	38	22	16	Ø 18	7	Ø M10 x 1.25	5	16
MCE 45 - MSD - 42 - 10x3	80	38	22	16	Ø 18	7	Ø M10 x 1.25	5	16
MCE 45 - MSD - 42 - 10x10	80	38	22	16	Ø 18	7	Ø M10 x 1.25	5	16
MCE 45 - MSD - 56 - 10x3	80	38	22	16	Ø 18	7	Ø M10 x 1.25	5	16
MCE 45 - MSD - 56 - 10x10	80	38	22	16	Ø 18	7	Ø M10 x 1.25	5	16

Designation	ZK2	V1	V2	V3	V4	L9	L10	L11	L12	L13
MCE 45 - 10x3	17	-	-	-	-	12	Ø M6	45	32	20
MCE 45 - 10x10	17	-	-	-	-	12	Ø M6	45	32	20
MCE 45 - VK - 42 - 10x3	17	42	44,50	44,50	0	12	Ø M6	45	32	20
MCE 45 - VK - 42 - 10x10	17	42	44,50	44,50	0	12	Ø M6	45	32	20
MCE 45 - VK - 56 - 10x3	17	46	44,50	56,40	9,50	12	Ø M6	45	32	20
MCE 45 - VK - 56 - 10x10	17	46	44,50	56,40	9,50	12	Ø M6	45	32	20
MCE 45 - MSD - 42 - 10x3	17	42	44,50	44,50	0	12	Ø M6	45	32	20
MCE 45 - MSD - 42 - 10x10	17	42	44,50	44,50	0	12	Ø M6	45	32	20
MCE 45 - MSD - 56 - 10x3	17	46	44,50	56,40	9,50	12	Ø M6	45	32	20
MCE 45 - MSD - 56 - 10x10	17	46	44,50	56,40	9,50	12	Ø M6	45	32	20

## Dimensions

Designation	L14	L15	L16	L17	L18	L19	L20	L21	L22	L23
MCE 45 - 10x3	30,50	4,40	Ø M6	12	34	34	34	Ø M4	10	16
MCE 45 - 10x10	30,50	4,40	Ø M6	12	34	34	34	Ø M4	10	16
MCE 45 - VK - 42 - 10x3	30,50	4,40	Ø M6	12	34	34	34	Ø M4	10	16
MCE 45 - VK - 42 - 10x10	30,50	4,40	Ø M6	12	34	34	34	Ø M4	10	16
MCE 45 - VK - 56 - 10x3	30,50	4,40	Ø M6	12	34	34	34	Ø M4	10	16
MCE 45 - VK - 56 - 10x10	30,50	4,40	Ø M6	12	34	34	34	Ø M4	10	16
MCE 45 - MSD - 42 - 10x3	30,50	4,40	Ø M6	12	34	34	34	Ø M4	10	16
MCE 45 - MSD - 42 - 10x10	30,50	4,40	Ø M6	12	34	34	34	Ø M4	10	16
MCE 45 - MSD - 56 - 10x3	30,50	4,40	Ø M6	12	34	34	34	Ø M4	10	16
MCE 45 - MSD - 56 - 10x10	30,50	4,40	Ø M6	12	34	34	34	Ø M4	10	16

Designation	L24	L25	L26	L27	L28	L29	U1	U2	U3	U4
MCE 45 - 10x3	8	Ø 8 (h7)	Ø 31.6	Ø 34 (h7)	4,50	2,30	4,20	7,50	4,70	2,50
MCE 45 - 10x10	8	Ø 8 (h7)	Ø 31.6	Ø 34 (h7)	4,50	2,30	4,20	7,50	4,70	2,50
MCE 45 - VK - 42 - 10x3	8	Ø 8 (h7)	Ø 31.6	Ø 34 (h7)	4,50	2,30	4,20	7,50	4,70	2,50
MCE 45 - VK - 42 - 10x10	8	Ø 8 (h7)	Ø 31.6	Ø 34 (h7)	4,50	2,30	4,20	7,50	4,70	2,50
MCE 45 - VK - 56 - 10x3	8	Ø 8 (h7)	Ø 31.6	Ø 34 (h7)	4,50	2,30	4,20	7,50	4,70	2,50
MCE 45 - VK - 56 - 10x10	8	Ø 8 (h7)	Ø 31.6	Ø 34 (h7)	4,50	2,30	4,20	7,50	4,70	2,50
MCE 45 - MSD - 42 - 10x3	8	Ø 8 (h7)	Ø 31.6	Ø 34 (h7)	4,50	2,30	4,20	7,50	4,70	2,50
MCE 45 - MSD - 42 - 10x10	8	Ø 8 (h7)	Ø 31.6	Ø 34 (h7)	4,50	2,30	4,20	7,50	4,70	2,50
MCE 45 - MSD - 56 - 10x3	8	Ø 8 (h7)	Ø 31.6	Ø 34 (h7)	4,50	2,30	4,20	7,50	4,70	2,50
MCE 45 - MSD - 56 - 10x10	8	Ø 8 (h7)	Ø 31.6	Ø 34 (h7)	4,50	2,30	4,20	7,50	4,70	2,50

Designation	U5	S1	S2	S3	S4	S5	S6	S7	S8	S9
MCE 45 - 10x3	1,20	-	-	-	-	-	-	-	-	-
MCE 45 - 10x10	1,20	-	-	-	-	-	-	-	-	-
MCE 45 - VK - 42 - 10x3	1,20	27,50	22,50	81	24,75	24,50	6,50	32	Ø M6	7
MCE 45 - VK - 42 - 10x10	1,20	27,50	22,50	81	24,75	24,50	6,50	32	Ø M6	7
MCE 45 - VK - 56 - 10x3	1,20	27,50	22,50	88,50	33,25	24,50	6	32	Ø M6	7
MCE 45 - VK - 56 - 10x10	1,20	27,50	22,50	88,50	33,25	24,50	6	32	Ø M6	7
MCE 45 - MSD - 42 - 10x3	1,20	27,50	22,50	81	24,75	24,50	6,50	32	Ø M6	7
MCE 45 - MSD - 42 - 10x10	1,20	27,50	22,50	81	24,75	24,50	6,50	32	Ø M6	7
MCE 45 - MSD - 56 - 10x3	1,20	27,50	22,50	88,50	33,25	24,50	6	32	Ø M6	7
MCE 45 - MSD - 56 - 10x10	1,20	27,50	22,50	88,50	33,25	24,50	6	32	Ø M6	7

Designation	S10	S11	S12	S13	S14	E1	E2	E3	E4	E5
MCE 45 - 10x3	-	-	-	-	-	-	-	-	-	-
MCE 45 - 10x10	-	-	-	-	-	-	-	-	-	-
MCE 45 - VK - 42 - 10x3	44,50	44,50	46	0	128,25	M12 5-pole	M12 8-pole	– (with brake: M8 3-pole)	14 ± 1	14 ± 0.3
MCE 45 - VK - 42 - 10x10	44,50	44,50	46	0	128,25	M12 5-pole	M12 8-pole	– (with brake: M8 3-pole)	14 ± 1	14 ± 0.3



## Dimensions

Designation	S10	S11	S12	S13	S14	E1	E2	E3	E4	E5
<b>MCE 45 - VK - 56 - 10x3</b>	44,50	59,50	59,50	64,50	144,25	M12 5-pole	M12 8-pole	– (with brake: M8 3-pole)	14 ± 1	13.4 ± 0.3
<b>MCE 45 - VK - 56 - 10x10</b>	44,50	59,50	59,50	64,50	144,25	M12 5-pole	M12 8-pole	– (with brake: M8 3-pole)	14 ± 1	13.4 ± 0.3
<b>MCE 45 - MSD - 42 - 10x3</b>	44,50	44,50	46	0	128,25	M12 5-pole	M12 8-pole	– (with brake: M8 3-pole)	14 ± 1	14 ± 0.3
<b>MCE 45 - MSD - 42 - 10x10</b>	44,50	44,50	46	0	128,25	M12 5-pole	M12 8-pole	– (with brake: M8 3-pole)	14 ± 1	14 ± 0.3
<b>MCE 45 - MSD - 56 - 10x3</b>	44,50	59,50	59,50	64,50	144,25	M12 5-pole	M12 8-pole	– (with brake: M8 3-pole)	14 ± 1	13.4 ± 0.3
<b>MCE 45 - MSD - 56 - 10x10</b>	44,50	59,50	59,50	64,50	144,25	M12 5-pole	M12 8-pole	– (with brake: M8 3-pole)	14 ± 1	13.4 ± 0.3

Designation	E6	E7	E8	E9	E10
<b>MCE 45 - 10x3</b>	-	-	-	-	-
<b>MCE 45 - 10x10</b>	-	-	-	-	-
<b>MCE 45 - VK - 42 - 10x3</b>	19,50	– (with brake: 9 ± 1)	– (with brake: 27 ± 0.3)	70.4 ± 1 (with brake: 106.4 ± 0.3)	42,30
<b>MCE 45 - VK - 42 - 10x10</b>	19,50	– (with brake: 9 ± 1)	– (with brake: 27 ± 0.3)	70.4 ± 1 (with brake: 106.4 ± 0.3)	42,30
<b>MCE 45 - VK - 56 - 10x3</b>	23	– (with brake: 9 ± 1)	– (with brake: 12 ± 0.3)	98 ± 1 (with brake: 138 ± 0.3)	56,40
<b>MCE 45 - VK - 56 - 10x10</b>	23	– (with brake: 9 ± 1)	– (with brake: 12 ± 0.3)	98 ± 1 (with brake: 138 ± 0.3)	56,40
<b>MCE 45 - MSD - 42 - 10x3</b>	19,50	– (with brake: 9 ± 1)	– (with brake: 27 ± 0.3)	70.4 ± 1 (with brake: 106.4 ± 0.3)	42,30
<b>MCE 45 - MSD - 42 - 10x10</b>	19,50	– (with brake: 9 ± 1)	– (with brake: 27 ± 0.3)	70.4 ± 1 (with brake: 106.4 ± 0.3)	42,30
<b>MCE 45 - MSD - 56 - 10x3</b>	23	– (with brake: 9 ± 1)	– (with brake: 12 ± 0.3)	98 ± 1 (with brake: 138 ± 0.3)	56,40
<b>MCE 45 - MSD - 56 - 10x10</b>	23	– (with brake: 9 ± 1)	– (with brake: 12 ± 0.3)	98 ± 1 (with brake: 138 ± 0.3)	56,40

## Mass and mass moment of inertia

### Mass and mass moment of inertia

Additional mass of an electric cylinder when combining the motor with the motor adapter VK or the motor side drive MSD

Designation	Motor		Motor without a brake		Motor with a brake	
	Type	Size □ [mm]	Mass of the motor and motor adapter VK $m_{VK+m}$ [kg]	Mass of the motor and motor side drive MSD $m_{MSD+m}$ [kg]	Mass of the motor and motor adapter VK $m_{VK+m}$ [kg]	Mass of the motor and motor side drive MSD $m_{MSD+m}$ [kg]
MCE 25	Stepper	28	Available soon			
MCE 32	Stepper	28	Available soon			
MCE 32	Stepper	42	0,52	0,62	0,65	0,75
MCE 45	Stepper	42	0,57	0,71	0,70	0,84
MCE 45	Stepper	56	1,31	1,49	1,50	1,68

### Planar moment of inertia

Designation	Cylinder profile	
	$I_y$ [cm <sup>4</sup> ]	$I_z$ [cm <sup>4</sup> ]
MCE 25	2,10	1,98
MCE 32	6,42	6,58
MCE 45	25,37	25,16

### Holding torque of a motor brake

Type	Motor	Holding torque (brake) [Nm]
	Size □ [mm]	
Stepper	28	Available soon
Stepper	42	0,4
Stepper	56	1,0

□ = Square cross section

Designation	Moved Mass (kg)	Mass of the Mini Electric Cylinder mMCE (kg)	Mass moment of inertia JMCE
<b>MCE 45 - 10x3</b>	$0.20 + 0.0010 \times \text{Abs. stroke} + 0.0010$ $\times E$	$0.67 + 0.0043 \times \text{Abs. stroke} + 0.0010$ $\times E$	" $2.77 + 0.0057 \times \text{Abs. stroke} + 0.00022 \times E + 0.2280 \times \text{mload}$ (10&#x207B;&#x00B2 kg cm&#x00B2)"
<b>MCE 45 - 10x10</b>	$0.20 + 0.0010 \times \text{Abs. stroke} + 0.0010$ $\times E$	$0.67 + 0.0043 \times \text{Abs. stroke} + 0.0010$ $\times E$	" $3.23 + 0.0081 \times \text{Abs. stroke} + 0.00249 \times E + 2.5330 \times \text{mload}$ (10&#x207B;&#x00B2 kg cm&#x00B2)"
<b>MCE 45 - VK - 42 - 10x3</b>	-	-	-
<b>MCE 45 - VK - 42 - 10x10</b>	-	-	-
<b>MCE 45 - VK - 56 - 10x3</b>	-	-	-
<b>MCE 45 - VK - 56 - 10x10</b>	-	-	-
<b>MCE 45 - MSD - 42 - 10x3</b>	-	-	-
<b>MCE 45 - MSD - 42 - 10x10</b>	-	-	-
<b>MCE 45 - MSD - 56 - 10x3</b>	-	-	-
<b>MCE 45 - MSD - 56 - 10x10</b>	-	-	-

