Milos. Works better.

2017

Milos M222 truss

BTM, STM, QTM

Original user's manual

PART 2 of 2 „Specific requirements“

Area Four Industries

CONTENTS

1. INTRODUCTION

BEFORE installing and operating a MILOS truss, read this manual carefully and pay attention to the information provided. Use this manual to familiarise yourself with the products, its proper use and safety regulations.

DANGER

DANGER: Indicates a hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

WARNING

WARNING: Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION: Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE: address practices not related to personal injury.

SAFETY INSTRUCTIONS

SAFETY INSTRUCTIONS: is used for lists of steps, procedures or instructions that might otherwise substitute a DANGER, WARNING or CAUTION notification.

This manual shall be inseparably used in conjunction with a PART 2 manual and vice versa. The PART 2 manuals contain product specific requirements regarding legislation, set-up, dismantling, allowable loading and any other information not referred to in Part 1.
PART 2 is always seperseding PART 1.

SAFETY INSTRUCTIONS

Make sure manuals are available at all times for all users, employees.

For the ease of use of this manual trusses, truss element are referred to as „truss“.

2. SCOPE

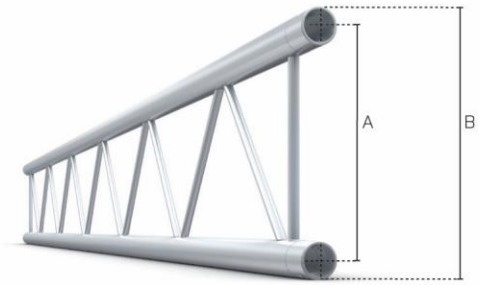
In addition to the scope in the part 1.
The M222 series can be used for a kind of structures, indoor and outdoor. For repetitive use however it is advised to use the heavy version as it is more sturdy and thus has more resistance against the particular use of rental applications.

3. IDENTIFICATION

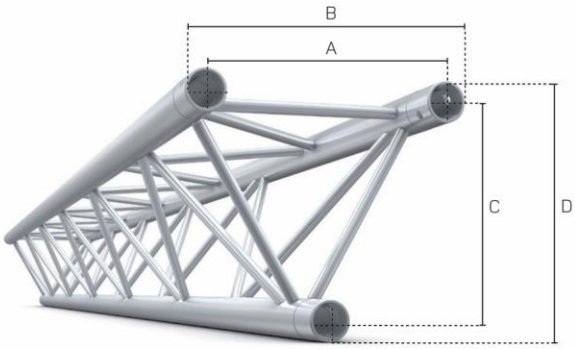
Every truss has an ID tag with the corresponding information. This tag should always be attached to the trusses. Damaged tags shall be replaced. The trusses meant can be recognised by the following dimensions:

NOTICE

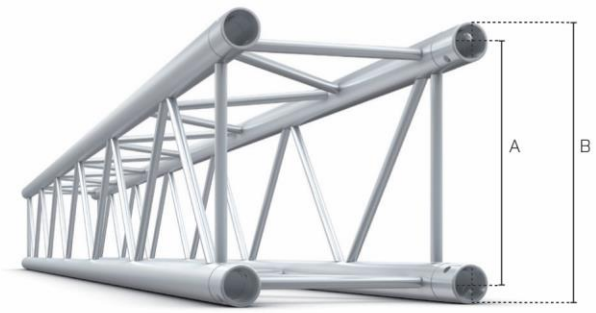
An Identification tags must be inseparately connected to the truss, missing tags shall be replaced. Ask MILOS or its representative for the correct procedural instructions.

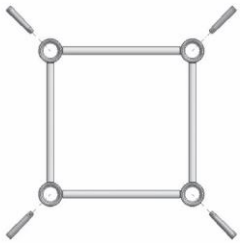


M222 DUO	Main Tubes		Braces		Alloy	A		B		Coupler
BTM	**32x1.5mm**	1.26"x0.06"	**10x1.5mm**	0.39"x0.06"	EN - AW 6060 T66	**190mm**	7.48"	**222mm**	8.74"	CCM



M222 TRIO	Main Tubes		Braces		Alloy	A		B		C		D		Coupler
STM	**32x1.5mm**	1.26"x0.06"	**10x1.5mm**	0.39"x0.06"	EN - AW 6060 T66	**190mm**	7.48"	**222mm**	8.74"	**164mm**	6.46"	**196mm**	7.72"	CCM





M222 QUATRO	Main Tubes		Braces		Alloy	A		B		Coupler
QTM	**32x1.5mm**	1.26"x0.06"	**10x1.5mm**	0.39"x0.06"	EN - AW 6060 T66	**190mm**	7.48"	**222mm**	8.74"	CCM

STANDARD LENGTHS AND WEIGHTS AVAILABLE

	m	ft	**0.50**	1.64	**1.00**	3.28	**1.50**	4.92	**2.00**	6.56	**2.50**	8.20	**3.00**	9.84	**4.00**	13.12
DUO	**kg**	lbs	**0.60**	1.32	**1.10**	2.42	**1.60**	3.53	**2.10**	4.63	**2.40**	5.29	**2.80**	6.17	**3.80**	8.38
TRIO	**kg**	lbs	**1.00**	2.20	**2.00**	4.41	**2.70**	5.95	**3.70**	8.15	**4.50**	9.92	**5.30**	11.68	**7.00**	15.43
QUATRO	**kg**	lbs	**1.40**	3.09	**2.60**	5.73	**3.70**	8.15	**4.80**	10.58	**5.50**	12.12	**6.60**	14.55	**9.40**	20.72

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4. LIMITATION OF USE

4.1 Allowable loading

In addition to the instructions given in manual Part 1 “GENERAL REQUIREMENTS” the truss loadings shall never exceed the values stated in the loading tables bellow.
As per Eurocode 9 all values provided are calculated based on a safetyfactor of 1.1 on the material and 1.5 on the load.

WARNING

Duo truss shall be suspended from the upperchords while loads shall be suspended from the bottom chords. Not doing this will result lower allowable loading as stated below.

M222 BTM DUO																**LOADING CHART**
Span	**m**	ft	**2.00**	6.56	**3.00**	9.84	**4.00**	13.12	**5.00**	16.41	**6.00**	19.69	**7.00**	22.97	**8.00**	26.25
point load	**kg**	lbs	**233.00**	513.77	**172.80**	381.02	**128.80**	284.00	**102.20**	225.35	**84.30**	185.88	**71.40**	157.44	**61.70**	136.05
deflection	**mm**	inch	**2.10**	0.08	**5.20**	0.20	**9.30**	0.36	**14.60**	0.57	**21.20**	0.83	**28.90**	1.13	**38.00**	1.48
two point load	**kg**	lbs	**129.60**	285.77	**118.00**	260.19	**96.60**	213.00	**76.70**	169.12	**63.30**	139.58	**53.60**	118.19	**46.20**	101.87
deflection	**mm**	inch	**2.00**	0.08	**6.10**	0.24	**11.90**	0.46	**18.60**	0.73	**26.80**	1.05	**36.50**	1.42	**47.70**	1.86
three point load	**kg**	lbs	**86.40**	190.51	**86.10**	189.85	**64.40**	142.00	**51.10**	112.68	**42.20**	93.05	**35.70**	78.72	**30.80**	67.91
deflection	**mm**	inch	**1.80**	0.07	**6.20**	0.24	**11.10**	0.43	**17.30**	0.67	**25.00**	0.98	**34.00**	1.33	**44.50**	1.74
four point load	**kg**	lbs	**64.80**	142.88	**64.60**	142.44	**53.70**	118.41	**42.60**	93.93	**32.10**	70.78	**29.80**	65.71	**25.70**	56.67
deflection	**mm**	inch	**1.80**	0.07	**5.90**	0.23	**11.70**	0.46	**18.30**	0.71	**26.40**	1.03	**36.00**	1.40	**47.10**	1.84
distributed load	**kg/m**	lbs/ft	**129.60**	87.09	**86.10**	57.86	**64.30**	43.21	**40.90**	27.48	**28.10**	18.88	**20.40**	13.71	**15.40**	10.35
deflection	**mm**	inch	**1.50**	0.06	**4.90**	0.19	**11.60**	0.45	**18.20**	0.71	**26.20**	1.02	**35.70**	1.39	**46.70**	1.82

DUO figures are based on use in vertical mode nad stabilized every 1 m

Percentage of load compared to loading table	**%**	**100%**	**94%**	**89%**	**84%**	**74%**	**58%**	**38%**	**26%**	**14%**
Free span between horizontal supports	**mm**	950.00	1000.00	1050.00	1100.00	1200.00	1400.00	1800.00	2200.00	3000.00

Percentage of load compared to loading table	**%**	**100%**	**94%**	**89%**	**84%**	**74%**	**58%**	**38%**	**26%**	**14%**
Free span between horizontal supports	**inch**	37.05	39.00	40.95	42.90	46.80	54.60	70.20	85.80	117.00

M222 STM TRIO																**LOADING CHART**
Span	**m**	ft	**2.00**	6.56	**3.00**	9.84	**4.00**	13.12	**5.00**	16.41	**6.00**	19.69	**7.00**	22.97	**8.00**	26.25
point load	**kg**	lbs	**222.00**	489.51	**148.50**	327.44	**110.00**	242.55	**86.60**	190.95	**70.70**	155.89	**59.20**	130.54	**50.30**	110.91
deflection	**mm**	inch	**2.00**	0.08	**4.50**	0.18	**8.10**	0.32	**12.70**	0.50	**18.40**	0.72	**25.30**	0.99	**33.40**	1.30
two point load	**kg**	lbs	**167.00**	368.24	**110.00**	242.55	**82.50**	181.91	**64.90**	143.10	**53.00**	116.87	**44.40**	97.90	**37.70**	83.13
deflection	**mm**	inch	**2.50**	0.10	**5.70**	0.22	**10.20**	0.40	**16.00**	0.62	**23.10**	0.90	**31.50**	1.23	**41.30**	1.61
three point load	**kg**	lbs	**112.30**	247.62	**74.20**	163.61	**55.00**	121.28	**43.30**	95.48	**35.40**	78.06	**29.60**	65.27	**25.20**	55.57
deflection	**mm**	inch	**2.40**	0.09	**5.40**	0.21	**9.50**	0.37	**14.90**	0.58	**21.60**	0.84	**29.50**	1.15	**38.70**	1.51
four point load	**kg**	lbs	**93.60**	206.39	**61.90**	136.49	**45.80**	100.99	**36.10**	79.60	**29.50**	65.05	**24.70**	54.46	**21.00**	46.31
deflection	**mm**	inch	**2.50**	0.10	**5.70**	0.22	**10.10**	0.39	**15.80**	0.62	**22.80**	0.89	**31.10**	1.21	**40.80**	1.59
distributed load	**kg/m**	lbs/ft	**224.50**	150.86	**99.00**	66.52	**55.00**	36.96	**34.60**	23.25	**23.60**	15.86	**16.90**	11.36	**12.60**	8.47
deflection	**mm**	inch	**2.50**	0.10	**5.60**	0.22	**10.00**	0.39	**15.70**	0.61	**22.60**	0.88	**30.90**	1.21	**40.50**	1.58

TRIO figures are based on use in apex up/down orientation

M222 QTM QUATRO																**LOADING CHART**
Span	**m**	ft	**2.00**	6.56	**3.00**	9.84	**4.00**	13.12	**5.00**	16.41	**6.00**	19.69	**7.00**	22.97	**8.00**	26.25
point load	**kg**	lbs	**373.00**	822.47	**290.00**	639.45	**234.00**	515.97	**194.00**	427.77	**163.00**	359.42	**141.00**	310.91	**122.20**	269.45
deflection	**mm**	inch	**1.70**	0.07	**4.40**	0.17	**8.50**	0.33	**14.00**	0.55	**20.60**	0.80	**28.70**	1.12	**38.10**	1.49
two point load	**kg**	lbs	**258.90**	570.87	**188.00**	414.54	**156.00**	343.98	**133.00**	293.27	**116.00**	255.78	**101.00**	222.71	**89.00**	196.25
deflection	**mm**	inch	**2.00**	0.08	**4.90**	0.19	**9.70**	0.38	**16.20**	0.63	**24.70**	0.96	**34.80**	1.36	**46.40**	1.81
three point load	**kg**	lbs	**172.60**	380.58	**144.00**	317.52	**125.00**	275.63	**101.90**	224.69	**83.90**	185.00	**71.00**	156.56	**61.10**	134.73
deflection	**mm**	inch	**1.80**	0.07	**5.20**	0.20	**10.70**	0.42	**17.30**	0.67	**25.00**	0.98	**34.10**	1.33	**44.60**	1.74
four point load	**kg**	lbs	**129.50**	285.55	**119.00**	262.40	**102.00**	224.91	**83.00**	183.02	**69.90**	154.13	**59.10**	130.32	**50.90**	112.23
deflection	**mm**	inch	**1.80**	0.07	**5.40**	0.21	**11.10**	0.43	**18.00**	0.70	**26.40**	1.03	**36.00**	1.40	**47.10**	1.84
distributed load	**kg/m**	lbs/ft	**258.90**	173.97	**171.90**	115.51	**128.40**	86.28	**81.50**	54.77	**56.00**	37.63	**40.60**	27.28	**30.60**	20.56
deflection	**mm**	inch	**1.50**	0.06	**4.90**	0.19	**11.60**	0.45	**18.20**	0.71	**26.20**	1.02	**35.80**	1.40	**46.80**	1.83

4.2 Structural data

All our trusses are calculated to Eurocode 9 (DIN-EN 1999). Eurocodes as so called Load Resistance Factor Design based standards. This implicates that the structural data give below shall be divided by the applicable safety factor. This factor depends on, but not limited to the local legislation, use, required safety level.

Code	TÜV certificate number	Material	Truss dimensions centre to centre		cross-section single tubes						permissble internal forces complete truss (no interaction)					normal force in the single tubes		cross-section complete truss						dead weight		SCIA weight
			height	width	Main chord			diagonals								main chord	diagonals									
			h	b	D	t	A	D	t	A	M_{yyrd}	M_{zyrd}	N_{rd}	V_{zyrd}	Vy_{yrd}	N_{yrd}	N_{yrd}	A	I_y	I_z	I_T	i_y	i_z	g		g
			mm	mm	mm	mm	cm^2	mm	mm	cm^2	kNm	kNm	kN	kN	kN	kN	kN	cm^2	cm^4	cm^4	cm^4	cm	cm	kg/m	lbs/ft	kg/m^3
M222-BTM		6060 T66	190	0	32	1.5	1.44	10	1.5	0.40	1.90	0.00	20.20	1.90	0.00	10.10	2.70	2.87	262.8	3.4		9.6	1.1	1.1	0.7	3832.8
M222-STM	44 780 12 129031	6060 T66	165	190	32	1.5	1.44	10	1.5	0.40	1.70	1.90	30.30	3.30	1.90	10.10	2.70	4.31	264.3	264.5	40.9	7.8	7.8	1.7	1.1	3944.3
M222-QTM	44 780 12 129032	6060 T66	190	190	32	1.5	1.44	10	1.5	0.40	3.80	3.80	40.40	3.80	3.80	10.10	2.70	5.75	525.6	525.6	137.0	9.6	9.6	2.3	1.5	4000.0

WARNING

Structural data provided before January 2016 was based on German DIN 4113 standard. As this standard had a different safety principle the structural values can not compared!

NOTICE

TÜV certificates issued after February 2015 are all based on Eurocode 9.

5. SAFETY INSTRUCTIONS

Refer to manual Part 1 "GENERAL REQUIREMENTS".

6. TRANSPORT AND STORAGE

Refer to manual Part 1 "GENERAL REQUIREMENTS".

7. APPROVED ACCESSORIES

In addition to the approved accessories given Part 1 manual special attention shall be given to the use of lamp hooks and clamps. As the wall thickness is relatively thin these accessories can easily damaged the truss chords. Therefore it is advised to tighten these accessories only by hand.

WARNING

Do not use any mechanical tooling to tighten accessories like lamp hooks or clamps in order to avoid severe damage to the truss chords.

8. COATINGS AND SURFACE TREATMENTS

In addition to the instruction in part 1, do not use abrasion-blasting

9. SLINGING METHODS

Refer to manual Part 1 "GENERAL REQUIREMENTS"

10. ASSEMBLY & DISSASSEMBLY INSTRUCTIONS

Refer to manual Part 1 "GENERAL REQUIREMENTS"

11. INSPECTION

Refer to manual Part 1 "GENERAL REQUIREMENTS"

12. MAINTENACE AND DISCARD

Refer to manual Part 1 "GENERAL REQUIREMENTS"

13. LEGISLATION

Refer to manual Part 1 "GENERAL REQUIREMENTS"

14. DISCLAIMER

Milos has made every effort to ensure the accuracy of this manual, no liability will be accepted for errors. Milos reserves the right to change or alter their products or manuals without prior notice.
No part of this manual may be reproduced in any form or by any means without prior written permission.

In case of a claim under the guarantee, a malfunction or spare part requirements please contact your point of sale or MILOS.

16. ANNEX A: EC DECLARATION OF CONFORMITY

Refer to manual Part 1 "GENERAL REQUIREMENTS".

17. ANNEX B: CE DECLARATION OF PERFORMANCE

Refer to manual Part 1 "GENERAL REQUIREMENTS".

18. TÜV CERTIFICATES

TÜV NORD

ZERTIFIKAT
CERTIFICATE

Hiermit wird bescheinigt, dass die Firma / *This certifies that the company*

Milos s.r.o.
Špindlerova 286
413 01 Roudnice nad Labem
Czech Republic

berechtigt ist, das unten genannte Produkt mit dem abgebildeten Zeichen zu kennzeichnen
is authorized to provide the product mentioned below with the mark as illustrated

Fertigungsstätte / *Manufacturing plant*: **Milos s.r.o. Špindlerova 286 413 01 Roudnice nad Labem Czech Republic**

Beschreibung des Produktes / *(Details s. Anlage 1)* / Description of product / *(Details see Annex 1)*: **Aluminium Traversen System Typ STM**

Geprüft nach / *Tested in accordance with*:
DIN EN 1990:2010-12 (EUROCODE 0)
DIN EN 1991-1-1:2010-12 (EUROCODE 1)
DIN EN 1993-1-1:2010-12 (EUROCODE 3)
DIN EN 1999-1-1:2014-03 (EUROCODE 9)
DIN EN 1090-1:2012
DIN EN 1090-2:2011
DIN EN 1090-3:2008
DIN EN 13814:2004

TÜV NORD CERT GmbH Baumuster geprüft

Registrier-Nr. / *Registered No.* 44 780 12129031
Prüfbericht Nr. / *Test Report No.* 15 780 435457 001
Aktenzeichen / *File reference* 2.4-450/00 / 3514 2861

Gültigkeit / Validity
von / *from* 2015-02-12
bis / *until* 2020-02-11

TÜV NORD CERT GmbH
Zertifizierungsstelle Konsumgüter

Essen, 2015-02-12

TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen www.tuev-nord-cert.de prodcert@tuev-nord.de

Bitte beachten Sie auch die umseitigen Hinweise
Please also pay attention to the information stated overleaf

TÜV NORD

ANLAGE
ANNEX

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Annex 1, page 3 of 3

zum Zertifikat Registrier-Nr. / *to Certificate Registration No.* 44 780 12129031

Belastungsdaten:
Load table:

Länge / Length [m]	Linienlast / Distributed load [kg/m]	Mittige Einzellast / Single point load [kg]	Einzellast in Drittelpunkten / 3rd point load [kg]	Einzellast in Viertels Punkten / 4th point load [kg]	Einzellast in Fünftels Punkten / 5th point load [kg]
2	224,5	222	167,0	112,3	93,6
3	99,0	148,5	110,0	74,2	61,9
4	55,0	110,0	82,5	55,0	45,8
5	34,6	86,6	64,9	43,3	36,1
6	23,6	70,7	53,0	35,4	29,5
7	16,9	59,2	44,4	29,6	24,7
8	12,6	50,3	37,7	25,2	21,0
9	9,6	43,3	32,4	21,6	18,0
10	7,5	37,4	28,1	18,7	15,6

TÜV NORD CERT GmbH
Zertifizierungsstelle Konsumgüter

Essen, 2015-02-12

TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen www.tuev-nord-cert.de prodcert@tuev-nord.de

TÜV NORD

ZERTIFIKAT
CERTIFICATE

Hiermit wird bescheinigt, dass die Firma / *This certifies that the company*

Milos s.r.o.
Špindlerova 286
413 01 Roudnice nad Labem
Czech Republic

berechtigt ist, das unten genannte Produkt mit dem abgebildeten Zeichen zu kennzeichnen
is authorized to provide the product mentioned below with the mark as illustrated

Fertigungsstätte / *Manufacturing plant*: **Milos s.r.o. Špindlerova 286 413 01 Roudnice nad Labem Czech Republic**

Beschreibung des Produktes / *(Details s. Anlage 1)* / Description of product / *(Details see Annex 1)*: **Aluminium Traversen System Typ QTM**

Geprüft nach / *Tested in accordance with*:
DIN EN 1990:2010-12 (EUROCODE 0)
DIN EN 1991-1-1:2010-12 (EUROCODE 1)
DIN EN 1993-1-1:2010-12 (EUROCODE 3)
DIN EN 1999-1-1:2014-03 (EUROCODE 9)
DIN EN 1090-1:2012
DIN EN 1090-2:2011
DIN EN 1090-3:2008
DIN EN 13814:2004

TÜV NORD CERT GmbH Baumuster geprüft

Registrier-Nr. / *Registered No.* 44 780 12129032
Prüfbericht Nr. / *Test Report No.* 15 780 435457 002
Aktenzeichen / *File reference* 2.4-450/00 / 3514 2862

Gültigkeit / Validity
von / *from* 2015-02-12
bis / *until* 2020-02-11

TÜV NORD CERT GmbH
Zertifizierungsstelle Konsumgüter

Essen, 2015-02-12

TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen www.tuev-nord-cert.de prodcert@tuev-nord.de

Bitte beachten Sie auch die umseitigen Hinweise
Please also pay attention to the information stated overleaf

TÜV NORD

ANLAGE
ANNEX

Anlage 1, Seite 3 von 3
Annex 1, page 3 of 3

zum Zertifikat Registrier-Nr. / *to Certificate Registration No.* 44 780 12129032

Belastungsdaten:
Load table:

Länge / Length [m]	Linienlast / Distributed load [kg/m]	Mittige Einzellast / Single point load [kg]	Einzellast in Drittelpunkten / 3rd point load [kg]	Einzellast in Viertels Punkten / 4th point load [kg]	Einzellast in Fünftels Punkten / 5th point load [kg]
2	258,9	373,0	258,9	172,6	129,5
3	171,9	290,0	188,0	144,0	119,0
4	128,4	234,0	156,0	125,0	102,0
5	81,5	194,0	133,0	101,9	83,0
6	56,0	163,0	116,0	83,9	69,9
7	40,6	141,0	101,0	71,0	59,1
8	30,6	122,2	89,0	61,1	50,9
9	23,7	106,6	79,0	53,3	44,4
10	18,8	94,0	70,5	47,0	39,2

TÜV NORD CERT GmbH
Zertifizierungsstelle Konsumgüter

Essen, 2015-02-12

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