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Industrie Service

EU-Design Examination Certificate

According to Annex XI, Clause 3.3 of Directive 2014/33/EU

Certificate No.:	Schindler EU-DE 003
Certification Body of the Notified Body:	TÜV SÜD Industrie Service GmbH Westendstr. 199 80686 München - Germany Identification No. 0036
Certificate Holder:	Inventio AG Seestraße 55 6052 Hergiswil - Switzerland
Manufacturer:	MEGADYNE s.r.l Via Trieste, 16 10075 Mathi, Torino - Italy
Product:	STM-PV30-1.73S-PU-42 (with steel cords) STM-PV40-1.73S-PU-56 (with steel cords) STM-PV50-1.73S-PU-70 (with steel cords) STM-PV60-1.73S-PU-84 (with steel cords) as suspension- and traction means for traction drive lifts
Type:	STM-PV
Deviation:	EN 81-20:2014 (D), number 5.5.1.1
Test Report:	Schindler EU-DE 003 dated 2018-06-05
Directive:	2014/33/EU
Outcome:	The STM-PV30/40/50/60-1.73S-PU (with steel cords) as suspension - and traction means conforms to the essential safety requirements of the Directive for the respective scope of application stated on the annex to this design examination certificate, keeping the mentioned conditions.
Date of Issue:	2018-06-05
Validity:	2021-06-04

TÜV SÜD Industrie Service GmbH 00 36 Notified Body

Bernd Gründling
Certification Body "lifts and cranes"

TÜV®

Annex to EU Design Examination Certificate
No. Schindler EU-DE 003 dated 2018-06-05

Industrie Service

1 Scope of application

STM-PV with strength steel cords, types STM-PV-PV30/40/50/60 as suspension- and traction means for traction drive lifts (Passengers- and goods/passenger lifts) with or without machine room which fall within the scope of validity of 2014/33/EU Lifts Directive.

1.1 Deviations

Contrary to the EN 81-20 clause 5.5.1.1 instead of steel wire ropes or chains – multirib Poly-V STM-PV with steel cords are installed as suspension means for cars and counterweights resp. balancing weights.

1.2 Technical Data

Manufacturer of the “STM-PV”	MEGADYNE			
Width of the “STM-PV” [mm]	30	40	50	60
Schindler ID-Number	59101391	59101392	59101393	59101394
Thickness of the “STM-PV” [mm]	4,4 mm			
Plastics (material of the “STM-PV”)	TPU			
Back material of the “STM-PV”	TPU			
Min. number of STM-PV	2			
Number of steel cords	12	16	20	24
Diameter of the steel cords [mm]	1.73			
Structure of the steel cords	8x7+1x19			
Lay form of the steel cords	sZ			
Wire strength [N/mm²]	> 2500			
Minimum breaking load [kN]	42	56	70	84
Maximum speed of the STM-PV	2.5 m/s in case of a diameter of the drive shaft (reference diameter) of at least 72 mm 8.0 m/s in case of a diameter of the drive shaft (reference diameter) of at least 87 mm			
Maximum travel height	30 m in case of a diameter of the drive shaft (reference diameter) of at least 72 mm 180 m in case of a diameter of the drive shaft (reference diameter) von min. 87 mm			
Suspension	1:1 or 2:1			

Manufacturer of the strength steel cords: N.V. Bekaert SA

For the material TPU the following is qualified:

Estane 58887 NAT 0375888 with identical material properties as Elastollan 1185A

1.3 Drive shaft / diverter pulleys

Shape of the drive shaft grooves	V-grooves (V-grooves with groove angle of 90 degrees)	
Material of the drive shaft	Steel	
Bending diameter (Radial cord position)	At least 72 mm Only diverter pulleys	At least 87 mm Drive shaft and diverter pulleys
Angle of wrap [°]	120 – 180	
Shape of diverter pulley grooves	V-grooves (V-grooves with groove angle of 90 degrees) or Cylindrical sheaves or convex sheaves (r=800 mm) with centring function	
Material of the diverter pulleys	Steel	

Note: The English text is a translation of the German original. In case of any discrepancy, the German version is valid only.

1.4 Reference values of the friction factors for the traction calculation (informative)

Load cases	Friction factor μ
When loading	0,25
Emergency stop	μ = 0,2
Car-stalled conditions	μ = 0,6

1.5 “STM-PV”-termination:

“STM-PV”-terminations which are certified in the context of the EC design examination Schindler EPR 003/9, are:

- wedge-type connectors: casing angle 20 degrees, groove angle 21.5 ... 22 degrees
- sling-type socket (double wrapped): suspension means wrapped round 2 diverter bolts with a diameter of 25 mm. Securing the dead STM-PV end, occurs via a pulley in wedge-shaped surroundings with defined preload of the pulley

Additional “STM-PV“-terminations which have been classified to be equally good, may be installed. For this, in each case a written confirmation with regard to the extension of the EPR will be necessary.

1.6 Safety calculation of suspension means

Different from EN 81-20:2014, clause 5.5.2.2 the suspension means safety factor shall not be less than $\nu = 12$ in case of two STM-PV.
Different from annex N of EN 81-50:2014 clause 5.12, a static rope safety calculation is carried out.

2 Conditions

2.1 The lift shall be installed in environments protected from the weather. In case of outdoor erection, the environmental conditions and their influences on the installation must be examined separately.

2.2 To install the lift in a building, the requirements of the member states with regard to the structural measures - fire protection or specific national laws must be met.

2.3 To guarantee safety of the installation in another way, the following conditions must be kept:

- Use of at least 2 STM-PV per each lift. Analogous to EN 81-20:2014, clause 5.5.5.3 in case of the use of only 2 STM-PV, an electric safety device according to EN 81-20:2014, clause 5.11.2 must cause the lift to stop in case of abnormal relative extension of a STM-PV-PV.
- Slip (traction) must be monitored by the control system.

2.4 The use of a diameter of the drive shaft (reference diameter) less than 87 mm, is only allowed in systems without reversed bend.

2.5 For the suspension means used, the following criterions according to which they have to be discarded apply:

- Limitation of the bending cycles resp. number of travels
- Limitation of the operational application period to 15 years after production of the suspension means
- Visual criterions of discarding the suspension means (twists of the suspension means, high degree of pollution, damages etc.) see maintenance instructions
- "Cords" (strands) or wires, leaving the plastic sheath (visual detection or permanent electrical detection by “ECM”-system)

The maximum number of travels or number of bending cycles, depending on the monitoring concept 1 up to 6 - are specified in the following table. At the lift installation is installed a counter (e.g. integrated in the control system) which counts the number of travels or the number of bending cycles and which only can be reset by an intentional process. The limiting value of bending cycles of the STM-PV to which the factor of exploitation relates to – within the scope of application which is taken for basis – amounts to 18 Mio single bends (diameter of the drive shaft / DD≥87 mm) or 6 Mio single bends (diameter of the drive shaft / DD<87 mm, but ≥72 mm). The correlation factor of the influence of deterioration between single bend and reversed bend is defined with the factor 4. Therefore one reversed bend has the same damaging effect as 4 single bends.

Layouts with DD≥ 87mm, only single bends – no reversed bend

Draft	Extent of the Monitoring						Degree of utilization of the limiting value of bending cycles [%]	Permissible number of single bends [Mio]	Permissible number of travels in case of systems with 3 single bends per travel [Mio]	Permissible number of travels in case of systems with 2 single bends per travel [Mio]
	BCC	TC	TM	ECM	VC	STM-PV-MD		DD ≥ 87 mm	DD ≥ 87 mm	DD ≥ 87 mm
Draft 1		x*	x*		x		50	9,0	3,0	4,5
Draft 2		x	x		x		60	10,8	3,6	5,4
Draft 3		x	x	x	x		70	12,6	4,2	6,3
Draft 4	x		x		x		60	10,8	3,6	5,4
Draft 5	x		x	x	x		70	12,6	4,2	6,3
Draft 6		x*	x*		x	x	70	12,6	4,2[1]	6,3[2]

[1]: After 3.0, 3.5 and 4 Mio travels - checking of the condition of the suspension means with STM-PV-MD. At 4.2 Mio travels: discard suspension means

[2]: After 4.5, 5.25 and 6.0 Mio travels - checking of the condition of the suspension means with STM-PV-MD. At 6.3 Mio travels: discard suspension means

Layouts with DD≥ 72mm, only single bends – no reversed bends

Draft	Extent of the Monitoring						Degree of utilization of the limiting value of bending cycles [%]	Permissible number of single bends [Mio]	Permissible number of travels in case of systems with 3 single bends per travel [Mio]	Permissible number of travels in case of systems with 2 single bends per travel [Mio]
	BCC	TC	TM	ECM	VC	STM-PV-MD		DD≥ 72 mm	DD≥ 72 mm	DD≥ 72 mm
Draft 1		x*	x*		x		50	3,0	1,0	1,5
Draft 2		x	x		x		60	3,6	1,2	1,8
Draft 3		x	x	x	x		70	4,2	1,4	2,1
Draft 4	x		x		x		60	3,6	1,2	1,8
Draft 5	x		x	x	x		70	4,2	1,4	2,1
Draft 6		x*	x*		x	x	70	4,2	1,4[1]	2,1[2]

[1]: After 1.0 and 1.2Mio travels - checking of the condition of the suspension means with STM-PV-MD. At 1.4Mio travels: to discard suspension means

[2]: After 1.5 and 1.8Mio travels - checking of the condition of the suspension means with STM-PV-MD. At 2.1Mio travels: to discard suspension means

Layouts with DD≥ 87mm, single bends and reversed bends

Draft	Extent of the Monitoring						Degree of utilization of the limiting value of bending cycles [%]	Permissible number of single bends [Mio]	Permissible number of travels in case of systems with 2 reversed and 1 single bends per travel [Mio]	Permissible number of travels in case of systems with 2 reversed and 2 single bends per travel [Mio]
	BCC	TC	TM	ECM	VC	STM-PV-MD		DD ≥ 87 mm	DD ≥ 87 mm	DD ≥ 87 mm
Draft 1		x*	x*		x		50	9,0	1	0.9
Draft 2		x	x		x		60	10,8	1.2	1.1
Draft 3		x	x	x	x		70	12,6	1.4	1.3
Draft 4	x		x		x		60	10,8	1.2	1.1
Draft 5	x		x	x	x		70	12,6	1.4	1.3
Draft 6		x*	x*		x	x	100	18	2.0[1]	1.8[2]

[1]: After 1.0, 1.3, 1.6 and 1.9Mio travels - checking of condition of suspension means with STM-PV-MD. At 2.0 Mio travels: discard suspension means

[2]: After 0.9, 1.2 and 1.5 Mio travels - checking of condition of suspension means with STM-PV-MD. At 1.8 Mio travels: discard suspension means

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Legend:
BCC: Bending cycle counter (permanent and automatic detection of the moment when the suspension means have to be discarded)
ECM: Electrical conductivity measurement (permanent and automatic detection of the moment when the suspension means have to be discarded)
TC: Trip-counter (permanent and automatic detection when the suspension means have to be discarded)
TM: Time measurement (permanent and automatic detection of the moment when the suspension means have to be discarded)
VC: Visual check (during maintenance)
* No automatic detection of the moment when the suspension means have to be discarded and no automatic intervention in the control system
STM-PV-MD: Suspension Traction Media Monitoring Device – after expiration of the regular operating period of draft 1, by the use of the STM-PV-MD, the life time of the STM-PV may be further extended. Measuring with the STM-PV-MD must be carried out in distances based on the travels and depending on the respective lift system.

2.6 The STM-PV must not be used in outdoor installations (only in environments protected from weather). The use in enclosed glass wells is allowed.

2.7 STM-PV of different manufacturers or different types shall not be used on one and the same drive shaft.

2.8 Twisting at most 180 degree, with minimum pulley/pulley distance:

Suspension	With minimum pulley/pulley distance
PV 30	1,5 m
PV 40	2,0 m
PV 50	2,5 m
PV 60	3,0 m

Lateral offset: pulley/pulley at most 1.7 % (V-profile to V-profile) or at most 0.5 % V-shaped to cylindrical or convex

In case of several STM-PV on one and the same shaft: maximum twisting 5 degrees

2.9 During the examinations and tests before the lift is put into service for the first time, for the checking of the traction EN 81-20:2014 clause 6.3.3 applies.

2.10 Possibly required equivalent measures in case of too high traction (non-compliance with EN 81-20, clause 6.3.3) have not been considered in the context of this EU design examination and require separate examinations ant tests by a notified body (e. g. in the context of an EU type examination of a model lift according to annex IV letter B of Directive 2014/33/EU).

2.11 The STM-PV may only be installed, serviced and inspected – by specially trained installation- and maintenance personnel. In the event of maintenance by third parties, the responsible maintenance company must also insure that the maintenance instructions are observed.

2.12 The STM-PV must not come in contact with oil or other lubricants.

2.13 Condensation water must not occur on the drive shaft in such a quantity as to reduce the traction below the allowed level.

2.14 The conditions of the installation instructions and maintenance instructions must be observed.

2.15 This certificate may be used until 05th of Jun. 2021.

3 Notices

3.1 Precondition concerning validity of the certificate is that the installer has a comprehensive quality management system in accordance with Directive 2014/33/EU, Annex XI, (Module H1).

3.2 This certificate may only be used in connection with the pertinent annex and the list of the authorized manufacturers (according to enclosure). This enclosure shall be updated and re-edited following information of the certificate holder.

3.3 In case of alterations or deviations from the version which is documented in this certificate, verification by the notified body and if necessary an adaptation of the compensatory measures will be required.

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3.4 The product shall be clearly labelled with the name of the manufacturer and the type specification, to be able to check the conformity of the examined product with the series production.

3.5 The test results only relate to the equipment under test and to the design examination involved with it.

3.6 The ambient temperature in the machine room and around the lift machine is being presupposed with values between 5 degrees and 40 degrees. If the ambient temperature in the machine room and around the lift machine could fall below or could exceed the range of temperature of values between 5 degrees and 40 degrees (e. g. in glass wells), the temperature must be monitored.

3.7 Operation beyond the range of temperature between - 5°C and + 60°C is not allowed.
In case of firemans lifts according to EN 81-72, a short-time use of at least 2 hours at 65°C is allowed.

In case of firemans lifts outside influences can cause a contamination of the traction system.
The rope traction remains guaranteed with the expected contamination (according to performed tests) in operation as a firemans lift.

3.8 The statement of conformity also refers to the previous EN 81-1/2+A3:2009.
This test report replaces the EC design examination certificate Schindler EPR 003/9 dated 2015-11-13.

3.9 This test report is based on the present state of the art which is documented by the harmonised standards valid at present. It is also based on the current state of development of this system of suspension. Should experience with operation of the system result in new knowledge, as well as in case of amendments and additions to the applicable standards, or further developments in the state of the art, a revision of this test report may become necessary.

Enclosure of the EU Design Examination Certificate
No. Schindler EU-DE 003 dated 2018-06-05

Industrie Service

Authorized manufacturers – production sites (stated: 2018-05-24):

Company	**MEGADYNE s.r.l**
Address	Via Trieste, 16 10075 Mathi, Torino - Italy
Company	**Megadyne China**
Address	Na Ge Hou Jie Village Longshau Office Jimo Qingdao 26600 PR China
Company	**Schindler India Pvt. Ltd.**
Address	Manohar, Plot No. 2, Survey No. 47/1B/1, Taware Colony, Pune – 411 009 - India

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Base: letter of Co. Inventio AG dated 2018-05-24

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