PGS37-1 Checklist Typical 3: niet-betreedbare behuizingen in de open lucht

Projectnaam: EOS Vluchtoord, Uden

Laatste update: 05-06-2025

- Maatregelcodes die ontbreken zijn maatregelen die niet gelden voor deze Typical
- Status 'J' (groen) betekent dat aan de maatregel wordt voldaan
- Status 'Actie' (geel) betekent dat de maatregel is voorbereid, maar pas in later stadium kan worden uitgevoerd
- Status 'N' (rood) betekent dat deze maatregel nog niet is geïmplementeerd of voorbereid

Maatregelcode uit PGS37-1	Maatregel	STATUS Voldaan? J/N/Actie	Invulling maatregel
M2	Minimale veiligheidseisen	J	Systeem voldoet aan IEC 62933-5-2 (2.1) en IEC 62619 (4.1.2, bullit 8)
M3	Traceerbaarheid	Actie	Overzicht energiedragers op bouwtekening zetten zodra componenten op locatie worden geïnstalleerd
M4	Procedure beschadigde energiedrager	Actie	Procedure opvragen bij leverancier bij bestelling apparatuur (onderdeel RFQ)
M5	Omgevingsinvloeden	J	Systeem voldoet aan IP55 (tabel 4-1)
M6	Plaatsing EOS i.v.m. waterstand	J	Plaatsing >10 cm boven maaiveld, geen overstromingsrisico in gebied
M7	Koppelen verschillende energiedragers	J	Er wordt één type energiedrager toegepast en uitsluitend nieuwe componenten
M8	Klimaatbeheersing	J	EOS is voorzien van intelligente luchtkoeling
M9	Brandwerendheid	J	Systeem voldoet aan UL9540-A (2.1)
M10	Brandwerendheid doorvoeringen	J	Systeem voldoet aan UL9540-A (2.1)
M29	Fysieke afscherming	J	EOS staat binnen gesloten en beveiligd hekwerk van het zonnepark
M30	Camerasysteem	J	Het camerasysteem wordt 24/7 gemonitord en is beveiligd tegen vandalisme
M31	Ingebruiknamekeuring	J	Ingebruiknamekeuring wordt verricht voorafgaand aan oplevering
M33	Monitoring	J	Statuslampsysteem is onderdeel van EPC (onderdeel RFQ)
M34	Preventief afschakelen remote	J	Systeem is via redundante internetverbinding aangesloten voor monitoring en interventie
M35	Afschakelen na detectie	J	Het sensorgestuurd BMS kan op moduleniveau autonoom afschakelen bij afwijkingen in temperatuur en heeft doormelding
M36	Noodstopvoorziening	Actie	Het aanbrengen van een noodstopvoorziening is onderdeel van EPC (indien niet standaard)
M37	Verwijdering na thermal runaway	Actie	Geldt alleen bij incidenten, procedure is bekend
M38	Toegang tot EOS	J	Door beveiliging van het zonnepark is geregeld dat er geen toegang is voor onbevoegden
M39	Vervanging energiedrager	Actie	Geldt alleen bij onderhoud, procedure is bekend
M40	Actuele Handleiding	Actie	Zal aanwezig zijn op locatie
M42	Jaarlijkse inspectie	Actie	Jaarlijkse inspectie is onderdeel van het servicecontract (onderdeel RFQ)
M44	Registratie/logboek	Actie	Zal aanwezig zijn op locatie en worden bijgehouden
M45	Bewaartermijn	Actie	Het logboek zal tot de definitieve ontmanteling van het EOS op locatie aanwezig zijn
M46	Competentie-eisen	Actie	De compententie-eisen zijn onderdeel van opdracht EPC-partij (onderdeel RFQ)
M47	Instructie	Actie	De installatieverantwoordelijke zal voor veiligheidsinstructies zorgen
M48	Bliksembeveiliging	Actie	Bliksembeveiliging is onderdeel van de opdracht aan EPC-partij (onderdeel RFQ)
M49	Onderdelen bliksembeveiliging	Actie	Met EPC-partij wordt afgestemd dat relevante componenten aan NEN-EN-IEC 62561 voldoen (onderdeel RFQ)
M50	Veiligheidsafstanden	J	Er zijn geen brandbare objecten of gebouwen binnen 10 meter van het EOS
M51	Onderlinge veiligheidsafstanden (klein)	J	De installatie heeft acht batterijbehuizingen en moet dus voldoen aan M52
M52	Onderlinge veiligheidsafstanden (groot)	J	De installatie voldoet aan UL9540A en IEC62619, NPFA68 en heeft acht batterijbehuizingen, opgesteld conform ontwerp
M55	Brandpropagatie	J	Systeem voldoet aan UL9540-A (2.1)
M61	Bereikbaarheid	J	Het terrein is altijd bereikbaar voor hulpdiensten, poortslot kan 24/7 op afstand worden geopend
M63	Toegankelijkheid	J	In overleg met de Veiligheidsregio is de toegankelijkheid vastgesteld (twee inritten)
M64	Noodplan	Actie	Er is een standaard noodplan van TPStorage, dat voor de bouw met de veiligheidsregio wordt gedeeld
M65	Noodplan actualiseren	J	Beoordeling/actualisatie van het noodplan is onderdeel van de jaarlijkse inspectie
M66	Pictogrammen	Actie	Aanbrengen juiste markeringen voor oplevering en ingebruiknamekeuring (onderdeel RFQ)

Typicals op basis van behuizing:

Typical 1	Zelfstandig EOS in (aangepaste) container
Typical 2	Energieopslagpark van aangepaste, betreedbare containers
Typical 3	EOS-park met niet-betreedbare behuizingen in de openlucht

Typicals op basis van plaatsing:

Typical 4	Mobiel EOS
Typical 5	Inpandig EOS met eigen ruimte
Typical 6	Inpandig EOS in een gecombineerde ruimte

	Phase	M...	Title	Title in English	Typical	Topic
	Purchase	MW 1				BESS (total)
	Purchase	M 2	Minimale veiligheidseisen EOS en energiedrage	Minimal safety requirements EOS and energy car	1,2,3,4,5	Battery (specif
	Purchase	M 3	Traceerbarheid	Tracebility	1,2,3,4,5	Battery (specif
	Installation	M 4	Procedure omgang met mogelijk beschadigde e	Handling of possibly damaged energy carriers	1,2,3,4,5	Document
	Purchase	M 5	Bescherming tegen omgevingsinvloeden	Protection agains influence from outside	1,2,3,4	BESS (total)
	Installation	M 6	Plaatsing EOS	Placing EOS	1,2,3,4,5	BESS (total)
	Engineering	M 7	Koppelen EOS´en met energiedragers met vers	Coupling of EOS and energy carriers of another m	2,3	BESS (total)
	Purchase	M 8	Klimatbeheersing	Climate control	1,2,3,4,5	Battery (specif
	Purchase/Enginee	M 9	Brandwerenheid	Fire resilience	1,2,3,5,6	BESS (total)
	Purchase/Enginee	M 10	Brandwerendheid - doorvoeringen	Fire resilience - procedures	1,2,3,5,6	BESS (total)
	Purchase/Enginee	M 10	Brandwerendheid - doorvoeringen	Fire resilience - procedures	1,2,3	BESS (total)
	Purchase/Enginee	M 11	Gestapelde EOS´en	EOS piled on top of each other	2, 3	Container

	Engineering	M 12	Overkapping van EOS	Roofing of EOS	2, 3	Container
	Purchase/Enginee	M 13	Brandwerendheid - inpanding	fire resilience - indoor BESS	5, 6	BESS (total)
	Purchase/Enginee	M 14	Compartmentering inpandig EOS	placind of EOS - indoors	5	BESS (total)
	Purchase/Enginee	M 15	Brandwerendheid energiedragercompartiment -	fire resilience of hybride Systems	1, 2, 3, 4,	BESS (total)
	Engineering	M 16	Compartimentering EOS	Placing of rack systems - indoors	1, 2, 4, 6	BESS (total)
	Engineering	M 17	Verbod op leidingen door EOS-ruimte	No cabling in rooms, where EOS are placed - indo	5	Surrounding
	Purchase/Enginee	M 18	Integriteit EOS	Integrity EOS	1,2,4,5,6	BESS (total)
	Purchase	M 19	Ventilatiesystem	Ventilation system	1,2,4,5,6	Container
	Purchase/Enginee	M 20	Ventilatie - inpandig	Ventilation - indoors	5	Container and
	Purchase	M 21	Noodventilatie	Emergency ventilation	1,2,4,5,6	Container
	Engineering	M 22	Locatiekeuze en anrijdbeveiliging	Placind and safety of transport road	1	Surrounding
	Engineering	M 23	mobiel EOS - Locatiekeuze en anrijdbeveiliging	mobile EOS - Placing and safety of transport road	4	Surrounding
	Engineering	M 24	inpanding EOS - Locatiekeuze en anrijdbeveiligi	indoor EOS - Placing and safety of transport road	6	Surrounding
	Engineering	M 25	Locatiekeuze - vluchtweg verblijfsgbouw	Placing - emergency exit routes	5	Surrounding
	Engineering	M 26	Locatiekeuze - bedrijfsterrien	Placing - industrial site	1,4,6	Surrounding
	Engineering	M 27	Locatiekeuze - windturbine	Placing - wind turbine	1,2,3,4	Surrounding
	Engineering	M 28	Beveiliging tegen onbevoegden	Security against trespassing	1,4	Surrounding
	Engineering	M 29	Fysieke afscherming - merdere EOS´en	physical protection - several EOS	2,3	Surrounding

	Engineering	M 30	Eisen an en camerasystem	Features of camera system	1,2,3,4	Surrounding
	Installation	M 31	Ingebreuknamekeuring	Commissioning	1,2,3,4,5	BESS (total)
	Purchase	M 32	Gasdetectie (CO en H2)	Gas detection (CO and H2)	1,2,5,6	BESS (total)
	Purchase	M 33	Monitoring EOS	Monitoring EOS	1,2,3,4,5	BESS (total)
	Purchase /Engine	M 34	Preventief afschakelen op basis van alarmering	preventive switching off on the basis of alarm sig	1,2,3,4,5	BESS (total)
	Purchase	M 35	Afschakelen op basis van detectie	Switching off on the basis of detectors	1,2,3,4,5	BESS (total)
	Purchase	M 36	Noodstopvoorziening	Emergency stop installations	1,2,3,4,5	BESS (total)
	Operation	M 37	Verwijderen energiedrager na thermal runaway	Removal of energy carriers after thermal runaway	1,2,3,4,5	BESS (total)
	Engineering/Instal	M 38	Toegang tot het EOS	Access to the EOS	1,2,3,4,5	BESS (total)
	Operation	M 39	Vervanging energiedrager	Replacement energy carriers	1,2,3,4,5	BESS (total)
	Installation	M 40	Actuele handleiding	Updated manuals	1,2,3,4,5	BESS (total)
	Maintenance	M 41	Ventalatiesysteem - controle en onderhoude	Ventilation systems - inspection and operation	1,2,4,5,6	BESS (total)
	Maintenance	M 42	Periodieke controle	Periodic inspection	1,2,4,5,6	BESS (total)
	Installation	M 43	Controle mobiel EOS na plaatsind	Inspection mobile EOS	4	BESS (total)
	Engineering/Oper	M 44	Algemene documentatie-eisen - registratiesyste	General requirements of documentation - registr	1,2,3,4,5	BESS (total)
	Operation	M 45	Algemene documentatie-eisen - bewaartermijn	General requirements of documentation - retenti	1,2,3,4,5	BESS (total)
	People	M46	Competentie-eiesen conform NEN 3140	Competence - requirements	1,2,3,4,5	BESS (total)

	People	M 47	Instructie personeel	Instruction of personel	1,2,3,4,5	BESS (total)
	Purchase/Enginee	M 48	Bliksembeveiliging en beveiliging elektrotechnis	Lightning protection and safety of electrotechnic	1,2,3,4,5	BESS (total)
	Purchase/Enginee	M 49	Veiligheid	Safety	1,2,3,4,5	BESS (total)
	Purchase/Enginee	M 50	Veiligheidsafstanden	Safety distances	1,2,3,5,6	Surrounding
	Purchase/Enginee	M 51	Onderlinge veiligheidsafstanden - max 6 EOS ´e	Safety distances - max EOS	2,3	Surrounding
	Purchase/Enginee	M 52	Onderlinge veiligheidsafstanden -groot EOS par	Safety distances - large EOS parks	2,3	Surrounding
	Engineering	M 53	Veiligheidsafstanden - tussen EOS parken	Safety distances - between EOS parks	2,3	Surrounding
	Purchase/Enginee	M 54	Onderlinge veiligheidsafstanden - inside placed	Safety distances - indoor BESS	6	Surrounding
	Purchase/Enginee	M 55	Voorkomen van brandpropagatie	Prevention of fire propagation	1,2,3,4,5	Surrounding
	Purchase/Enginee	M 56	Bluswateraansluiting	Extinguishing water connection	1,2,4	Surrounding
	Purchase/Enginee	M 57	Brandbeheersystem	Fire retention system	5,6	Surrounding
	Operation	M 58	Eisen UPD	Requirements UPS	5,6	BESS (total)
	Operation	M 59	Vijfjaarlijkse beoordeling UPS	5 year review of UPS	5,6	BESS (total)
	Operation	M 60	Bewaren gegevens UPD	Date rentention UPS	5,6	BESS (total)
	Purchase/Enginee	M 61	Bereikbaarheid EOS	Accessibility EOS	1,2,3,4,5	Surrounding
	Purchase/Enginee	M 62	Bereikbaarheid - inpanding EOS	Accessibility EOS - indoors EOS	5	Surrounding
	Purchase/Enginee	M 63	Toegangelijkheid EOS park	Accessibility EOS park	2,3	Surrounding

	Operation	M 64	Noodplan	Emergency plan	1,2,3,4,5	BESS (total)
	Operation	M 65	Noodplan - beproeven	Emergency plan - reviews	1,2,3,4,5	BESS (total)
	Operation	M 66	Pictogrammen EOS	Pictograms EOS	1,2,3,4,5	BESS (total)
	Operation	M 67	Markering hybride EOS	Marking of hybrid EOS	1,2,3,4,5	BESS (total)

Details	Certificate
Basis of the following measures are the following guidelines: law; best practice; good housekeeping; craftsmanship	M2 IEC 62933-
Overspanning, Overstroom, Koortsluit etc	M2 NEN-EN-IE
Battery cells (also Packs, Racks and so on) must be traceble (registered)	
Sitemanager must have plan to handle a BESS that arrives damaged after transport (usually provided by manufacturer)	
BESS must be suitable for environment (can be achieved by suitable IP protection)	IP 55 (?)
BESS must be placed on suitable foundation	
If BESS of different kinds (also: different states of health) are combined, suitable converters must be used	
climate within the Battery must be controlled. If insulation is used, this must comply be fire protection certificate	(partly) NEN-E
Fire resistance between BESS and other inflamable objects must according to NEN 6069 be 60 min at least. Casing of BESS must be made of class A fire resisting materials. Fire resistance can also be achieved by M50 (differences)	
Cable tunnels and sealings must not reduce fire resistance of the BESS. Openings for vetilation must have fire dampening lids or comply by	NEN-EN 1366-
Typicals 1,2,3 must not comply by M10 if they comply by NEN-EN-IEC 62933-5-2 of UL 9540A	NEN-EN-IEC 6
BESS Containers can only be piled if they are not enterable. Piling without extra construction: max height 4,5m. With piling construction: more than 4,5 m possible, but only two layers. Min horizontal distances multiplied by factor 1,5	

Roofing over containers must be: open on all sides, non-flammable. Roofing must not intercede with fire extinguishing. Roof must be 3 m higher than top of container.	
BESS placed indoors must have a fire resinstance of 120 m if they are placed higher than 12 m (4th or 5th floor)	
Max capacity of indoor BESS: 4,8 MWh total in one room, max 100 MWh in building. Must be compartemented: max capacity of compartment: 600 kWh. Min distance between compartements: 1m, except when fire protection of 30 min is installed between compartements	NEN 6069, NE
In hybrid BESS the electrical storage compartment must be seperated from the fuel holding compartement by intersection which is fire resistant for 30 min.	
If accessible BESS is compartmentalized, the electricity storing compartment must be seperated from other compartments by non-flammable walls	A1, A2 of B uit
No water or waste water pipes are allowed in the area of the BESS (only inside installed BESS)	
If BESS is not certified accordingly, it needs pressure relief installations on the sides of the container (housing)	NEN-EN-IEC 6
Ventilation is necessary to keep the accessible parts of the BESS free of CO. Also an alarm or a lock (until CO concentration is below 20 ppm)	
additionally to M 19: ventilation must not guide gas to other rooms, chimney 2m higher than roof line, system separated from ventilation of building	
If smoke or CO are detected, ventilation must go to maximum. Ventilation must be switched of automatically, when fire suppression is activated, fire department must be able to switch off ventilation, exceptions of M 21 are possible under special circumstances	
An outside BESS must be placed in a way that there is no danger of it being hit by a car.	
A mobile BESS must also be safeguarded against accidents with cars. DETAILS	
BESS placed inside of buildings must not border on space dedicated to traffic	
BESS may not obstruct the escape route in a building.	
BESSs may not be placed in the reach of cranes. If that is not possible, the BESS must be protected against falling objects.	
BESS must be placed outside the area of ice coming of windturbines	
BESS must be protected against unauthorised access. This can be done by a container (!), phyiscal means (fence) or cameras.	
More than two containers, placed in the open, must be protected against unauthorised access by physical means, maybe also a camera	

If a camera is installed (M 29 and M 63), than it must be outside the reach of third parties. In case of vandalism it must be replaced within 48 hours.	
A BESS can only put into use after passing a comissioning inspection of the whole system and all functions . A quality management system is needed.	NEN-EN-ISO 9
Accessible BESS must be equipped with gas detection systems (CO and H2). More details...	NEN-EN 4554
A BESS must be equipped with a monitoring system regarding: function, rise of temperature, levels of temperature, gas and smoke. In case of loss of connection to the system, the installation responsible person is alarmed. Monitoring must comply with NEN-EN-IEC 60204. M 34: Monitoring must work if BESS is switched off to avoid an accident.	
It must be possible to remotely switch off BESS. Installation responsible party must then verify malfunctions and if necessary call fire department. If installation responsible person does not switch of in time, EMS or BMS must be able to switch off BESS automatically. BESS must not be switched on again, until safety of operation is secured. EMS and BMS must both be able to automatically disconnect of cell or rack.	NEN-EN-IEC 6
A not accessible BESS must be equipped with fire detection that alarms an emergency service (24 h). Detection system must comply with NEN 2535 and NEN 2654-1+C1. More details...	NEN 2535 and
BESS must have an emergency stop switch. Details...	
If there has been a thermal runaway or a fire limited to party of the BESS, these must be removed within 24 h after system regained stability.	
Access to an BESS must be secured with a lock. Details...	
A replacement cell or rack must be tested before installed.	
Close to the BESS an up to date manual must be placed. It must contain contact details of the supplier.	
Ventilation system will be checked according to operation manual of manufacturer	
BESS must be routinely inspected at least once a year by a expert person. Details of inspection...	
After placing, a mobile BESS must be inspected for damage by transport, correct electrical connection	
Every BESS needs a registration system according to Art. 3,4 of the Arbo decision. Also a reparation and inspection log book is essential. A copy ofArt. 3,4 of the Arbo decision this is placed with the installation responsible person. Details...	Art. 3,4 of the A
registration system must be kept until BESS is completely demolished, until the consequences of an incident occuring during operation or demolishing are not completely overcome	
People working in installation of BESS musst have following certificates WEB-niveau 3 (Wet educatie en beroepsonderwijs) + NEN 3140	NEN 3140

People working on BESS must be educated about the danger of Lithium-Ion batteries. They must be educated about the emergency plan	
Obligatory lightning protection must comply by NEN-EN-IEC 62305-2, NEN-EN-IEC 62305-3 en NEN-EN-IEC 62305-4.	NEN-EN-IEC 6
Lightning protection complies by NEN-EN-IEC 62561	NEN-EN-IEC 6
If the distance of the BESS to fence, building or other combustible objects is between 5-10m, the fire resilience must be 30 min or less. If the distance is 10m or more, there is no regulation on fire resilience.	
For the placing of a maximum 6 containers: shortest distance between sideways placed BESS is 1m, unless they have ventilation openings that are not safeguarded against fire, then it is 2,5m (from container to container, not counting the ventilation hatch. Shortest distance between BESS placed lengthwise after to each other is 2,5 m. For not accessible cotainers, complying by EC 62933-5-2 of UL 9540A, IEC 62619 en NFPA 68, the distances on the image apply.	
Minimum distances for EOS-parks (DETAILS and ILLUSTRATION)	
Shortest distance between EOS parks is 5m	
Several BESS placed in one room must have a distance at minimum 1 m	
BESS should comply by NEN-EN-IEC 62933-5-2 of UL9540A. If they do not, M 56 and M57 apply.BESS placed inside must always comply by these regulations	NEN-EN-IEC 6
If the BESS is not verifiably complying by M 55, the container must have a extinguishing water connection with a capacity of at least 1000l a minute. Requirements of the fire department must be obliged by (Storz connection). The connection must be placed between 0,5 and 1m over the ground level. MORE DETAILS	
The room in which an inside BESS is installed, needs a fire protection system conforming to the CCV certification. For typical 5 this always applies, for typical 6 it applies, when it is not complying to M 55 and the BESS is > 100 kWh. The BESS is designed, fabricated, installed accordint to M 58. A yearly inspection has to be done by people certified according to NEN-EN-ISO/IEC 17020 als type A	
UPD: uitgangspuntendocument is the basis for the design, fabrication, operation and inspection of the fire protection system . DETAILS	
Every 5 years the UPS has to be reviewed. DETAILS of the REVIEW	NEN-EN-ISO/I
Date retention UPS	
BESS must always be accessible for emergency services according to the brochure Handreiking Bluswatervorziening en bereikbaarheid	
DETAILS für indoor placed BESS	
EOS park must be accessible by two entrances completely apart from each other according to Handreiking Bluswatervorziening en bereikbaarheid	

An emergency plan is established (attachment E as an example) DETAILS OF EMERGENCY PLAN	
The emergency plan must be reviewed every three years	
There must be emergency drawings on the outside of the BESS (Question: One, several, every container…??)	
If the BESS is hybrid, then this must be displayed and clearly visible	

Remarks
-5-2 (EOS als geheel)
C 62619 (energiedragers)
N 13501-1 of gelijkwaardig
-3; NEN-EN 1366-1:2014+A1:2020
2933-5-2 of UL 9540A
M 50, M 51, M 52; NEN-EN-IEC 62933-5-2, UL 9540A

Deze maatregel is gebaseerd op NFPA 855 en UL 9540A.

NEN-EN 13501-1

2933-5-2 of UL 9540A

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4-4
0204-1.
NEN 2654-1+C1
Arbo decision
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2305-2, NEN-EN-IEC 62305-3 en NEN-EN-IEC 62305-4.

2561
62933-5-2 of UL9540A
EC 17020 als type A