

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

Projectnaam: **EOS Hoogveld-Zuid, Uden**

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- ➡ 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, bullet 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 opdrachtverlening EPC-partij (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 opdracht EPC-partij
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 competentie-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 afgesteld 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 afb. 15
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
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	Details	Certificate	Remarks
Purchase	MW 1				BESS (total)	Basis of the following measures are the following guidelines: law; best practice; good housekeeping; craftsmanship	M2 IEC 62933-5-2 (EOS als geheel)	
Purchase	M 2	Minimale veiligheidseisen EOS en energiedrager	Minimal safety requirements EOS and energy carrier	1,2,3,4,5	Battery (speci	Overspanning, Overstroom, Koortsluit etc	M2 NEN-EN-IEC 62619 (energiedragers)	
Purchase	M 3	Traceerbaarheid	Traceability	1,2,3,4,5	Battery (speci	Battery cells (also Packs, Racks and so on) must be traceable (registered)		
Installation	M 4	Procedure omgang met mogelijk beschadigde er	Handling of possibly damaged energy carriers	1,2,3,4,5	Document	Sitemanager must have plan to handle a BESS that arrives damaged after transport (usually provided by manufacturer)		
Purchase	M 5	Bescherming tegen omgevingsinvloeden	Protection against influence from outside	1,2,3,4	BESS (total)	BESS must be suitable for environment (can be achieved by suitable IP protection)	IP 55 (?)	
Installation	M 6	Plaatsing EOS	Placing EOS	1,2,3,4,5	BESS (total)	BESS must be placed on suitable foundation		
Engineering	M 7	Koppelen EOS 'en met energiedragers met versc	Coupling of EOS and energy carriers of another m	2,3	BESS (total)	If BESS of different kinds (also: different states of health) are combined, suitable converters must be used		
Purchase	M 8	Klimatbeheersing	Climate control	1,2,3,4,5	Battery (speci	climate within the Battery must be controlled. If insulation is used, this must comply be fire protection certificate	(partly) NEN-EN 13501-1 of gelijkwaardig	
Purchase/Enginee	M 9	Brandwerendheid	Fire resilience	1,2,3,5,6	BESS (total)	Fire resistance between BESS and other inflammable 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)		
Purchase/Enginee	M 10	Brandwerendheid - doorvoeringen	Fire resilience - procedures	1,2,3,5,6	BESS (total)	Cable tunnels and sealings must not reduce fire resistance of the BESS. Openings for ventilation must have fire dampening lids or comply by	NEN-EN 1366-3; NEN-EN 1366-1:2014+A1:2020	
Purchase/Enginee	M 10	Brandwerendheid - doorvoeringen	Fire resilience - procedures	1,2,3	BESS (total)	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 62933-5-2 of UL 9540A	
Purchase/Enginee	M 11	Gestapelde EOS 'en	EOS piled on top of each other	2,3	Container	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	M 50, M 51, M 52; NEN-EN-IEC 62933-5-2, UL 9540A	
Engineering	M 12	Overkapping van EOS	Roofing of EOS	2,3	Container	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.		
Purchase/Enginee	M 13	Brandwerendheid - inpandig	fire resilience - indoor BESS	5,6	BESS (total)	BESS placed indoors must have a fire resistance of 120 m if they are placed higher than 12 m (4th or 5th floor)		
Purchase/Enginee	M 14	Compartmentering inpandig EOS	placind of EOS - indoors	5	BESS (total)	Max capacity of indoor BESS: 4,8 MWh total in one room, max 100 MWh in building. Must be compartmented: max capacity of compartment: 600 kWh. Min distance between compartments: 1m, except when fire protection of 30 min is installed between compartments	NEN 6069, NE	Deze maatregel is gebaseerd op NFPA 855 en UL 9540A.
Purchase/Enginee	M 15	Brandwerendheid energiedragercompartment -	fire resilience of hybride Systems	1, 2, 3, 4,	BESS (total)	In hybrid BESS the electrical storage compartment must be separated from the fuel holding compartment by intersection which is fire resistant for 30 min.		
Engineering	M 16	Compartmentering EOS	Placing of rack systems - indoors	1, 2, 4, 6	BESS (total)	If accessible BESS is compartmentalized, the electricity storing compartment must be separated from other compartments by non-flammable walls	A1, A2 of B uit NEN-EN 13501-1	
Engineering	M 17	Verbod op leidingen door EOS-ruimte	No cabling in rooms, where EOS are placed - indo	5	Surrounding	No water or waste water pipes are allowed in the area of the BESS (only inside installed BESS)		
Purchase/Enginee	M 18	Integriteit EOS	Integrity EOS	1,2,4,5,6	BESS (total)	If BESS is not certified accordingly, it needs pressure relief installations on the sides of the container (housing)	NEN-EN-IEC 62933-5-2 of UL 9540A	
Purchase	M 19	Ventilatiesysteem	Ventilation system	1,2,4,5,6	Container	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)		
Purchase/Enginee	M 20	Ventilatie - inpandig	Ventilation - indoors	5	Container and building	additionally to M 19: ventilation must not guide gas to other rooms, chimney 2m higher than roof line, system separated from ventilation of building		
Purchase	M 21	Noodventilatie	Emergency ventilation	1,2,4,5,6	Container	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		
Engineering	M 22	Locatiekeuze en anrijdbeveiliging	Placind and safety of transport road	1	Surrounding	An outside BESS must be placed in a way that there is no danger of it being hit by a car.		
Engineering	M 23	mobiel EOS - Locatiekeuze en anrijdbeveiliging	mobile EOS - Placing and safety of transport road	4	Surrounding	A mobile BESS must also be safeguarded against accidents with cars. DETAILS		
Engineering	M 24	inpandig EOS - Locatiekeuze en anrijdbeveiliging	indoor EOS - Placing and safety of transport road	6	Surrounding	BESS placed inside of buildings must not border on space dedicated to traffic		
Engineering	M 25	Locatiekeuze - vluchtweg verblijfsgebouw	Placing - emergency exit routes	5	Surrounding	BESS may not obstruct the escape route in a building.		
Engineering	M 26	Locatiekeuze - bedrijfsterren	Placing - industrial site	1,4,6	Surrounding	BESSs may not be placed in the reach of cranes. If that is not possible, the BESS must be protected against falling objects.		
Engineering	M 27	Locatiekeuze - windturbine	Placing - wind turbine	1,2,3,4	Surrounding	BESS must be placed outside the area of ice coming of windturbines		
Engineering	M 28	Beveiliging tegen onbevoegden	Security against trespassing	1,4	Surrounding	BESS must be protected against unauthorised access. This can be done by a container (!), physical means (fence) or cameras.		
Engineering	M 29	Fysieke afscherming - merdere EOS 'en	physical protection - several EOS	2,3	Surrounding	More than two containers, placed in the open, must be protected against unauthorised access by physical means, maybe also a camera		
Engineering	M 30	Eisen an en camerasystem	Features of camera system	1,2,3,4	Surrounding	If a camera is installed (M 29 and M 63), then it must be outside the reach of third parties. In case of vandalism it must be replaced within 48 hours.		
Installation	M 31	Ingebreeknamekeuring	Commissioning	1,2,3,4,5	BESS (total)	A BESS can only put into use after passing a commissioning inspection of the whole system and all functions . A quality management system is needed.	NEN-EN-ISO 9001	
Purchase	M 32	Gasdetectie (CO en H2)	Gas detection (CO and H2)	1,2,5,6	BESS (total)	Accessible BESS must be equipped with gas detection systems (CO and H2). More details...	NEN-EN 45544-4	
Purchase	M 33	Monitoring EOS	Monitoring EOS	1,2,3,4,5	BESS (total)	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.		

	Purchase /Engineer	M 34	Preventief afschakelen op basis van alarmering	preventive switching off on the basis of alarm sign	1,2,3,4,5	BESS (total)	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 off 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 60204-1.	
	Purchase	M 35	Afschakelen op basis van detectie	Switching off on the basis of detectors	1,2,3,4,5	BESS (total)	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 NEN 2654-1+C1	
	Purchase	M 36	Noodstopvoorziening	Emergency stop installations	1,2,3,4,5	BESS (total)	BESS must have an emergency stop switch. Details...		
	Operation	M 37	Verwijderen energiedrager na thermal runaway o	Removal of energy carriers after thermal runaway	1,2,3,4,5	BESS (total)	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.		
	Engineering/Instal	M 38	Toegang tot het EOS	Access to the EOS	1,2,3,4,5	BESS (total)	Access to an BESS must be secured with a lock. Details...		
	Operation	M 39	Vervanging energiedrager	Replacement energy carriers	1,2,3,4,5	BESS (total)	A replacement cell or rack must be tested before installed.		
	Installation	M 40	Actuele handleiding	Updated manuals	1,2,3,4,5	BESS (total)	Close to the BESS an up to date manual must be placed. It must contain contact details of the supplier.		
	Maintenance	M 41	Ventilatiesysteem - controle en onderhoude	Ventilation systems - inspection and operation	1,2,4,5,6	BESS (total)	Ventilation system will be checked according to operation manual of manufacturer		
	Maintenance	M 42	Periodieke controle	Periodic inspection	1,2,4,5,6	BESS (total)	BESS must be routinely inspected at least once a year by a expert person. Details of inspection...		
	Installation	M 43	Controle mobiel EOS na plaatsind	Inspection mobile EOS	4	BESS (total)	After placing, a mobile BESS must be inspected for damage by transport, correct electrical connection		
	Engineering/Operi	M 44	Algemene documentatie-eisen - registratiesyste	General requirements of documentation - registra	1,2,3,4,5	BESS (total)	Every BESS needs a registration system according to Art. 3,4 of the Arbo decision. Also a repairation and inspection log book is essential. A copy of Art. 3,4 of the Arbo decision this is placed with the installation responsible person. Details...	Art. 3,4 of the Arbo decision	
	Operation	M 45	Algemene documentatie-eisen - bewaartermijn	General requirements of documentation - retentic	1,2,3,4,5	BESS (total)	registration system must be kept until BESS is completely demolished, until the consequences of an incident occurring during operation or demolishing are not completely overcome		
	People	M46	Competentie-eisen conform NEN 3140	Competence - requirements	1,2,3,4,5	BESS (total)	People working in installation of BESS must have following certificates WEB-niveau 3 (Wet educatie en beroepsonderwijs) + NEN 3140	NEN 3140	0
	People	M 47	Instructie personeel	Instruction of personel	1,2,3,4,5	BESS (total)	People working on BESS must be educated about the danger of Lithium-ion batteries. They must be educated about the emergency plan		
	Purchase/Engineer	M 48	Bliksembewiliging en beveiliging elektrotechnis	Lightning protection and safety of electrotechnic	1,2,3,4,5	BESS (total)	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 62305-2, NEN-EN-IEC 62305-3 en NEN-EN-IEC 62305-4.	
	Purchase/Engineer	M 49	Veiligheid	Safety	1,2,3,4,5	BESS (total)	Lightning protection complies by NEN-EN-IEC 62561	NEN-EN-IEC 62561	
	Purchase/Engineer	M 50	Veiligheidsafstanden	Safety distances	1,2,3,5,6	Surrounding	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.		
	Purchase/Engineer	M 51	Onderlinge veiligheidsafstanden - max 6 EOS 'er	Safety distances - max EOS	2,3	Surrounding	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.		
	Purchase/Engineer	M 52	Onderlinge veiligheidsafstanden - groot EOS park	Safety distances - large EOS parks	2,3	Surrounding	Minimum distances for EOS-parks (DETAILS and ILLUSTRATION)		
	Engineering	M 53	Veiligheidsafstanden - tussen EOS parken	Safety distances - between EOS parks	2,3	Surrounding	Shortest distance between EOS parks is 5m		
	Purchase/Engineer	M 54	Onderlinge veiligheidsafstanden - inside placed	Safety distances - indoor BESS	6	Surrounding	Several BESS placed in one room must have a distance at minimum 1 m		
	Purchase/Engineer	M 55	Voorkomen van brandpropagatie	Prevention of fire propagation	1,2,3,4,5	Surrounding	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 62933-5-2 of UL9540A	
	Purchase/Engineer	M 56	Bluswatearaansluiting	Extinguishing water connection	1,2,4	Surrounding	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		
	Purchase/Engineer	M 57	Brandbeheersysteem	Fire retention system	5,6	Surrounding	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		
	Operation	M 58	Eisen UPD	Requirements UPS	5,6	BESS (total)	UPD: uitgangspuntendocument is the basis for the design, fabrication, operation and inspection of the fire protection system . DETAILS		
	Operation	M 59	Vijfjaarlijkse beoordeling UPS	5 year review of UPS	5,6	BESS (total)	Every 5 years the UPS has to be reviewed. DETAILS of the REVIEW	NEN-EN-ISO/IEC 17020 als type A	
	Operation	M 60	Bewaren gegevens UPD	Date rentention UPS	5,6	BESS (total)	Date retention UPS		
	Purchase/Engineer	M 61	Bereikbaarheid EOS	Accessibility EOS	1,2,3,4,5	Surrounding	BESS must always be accessible for emergency services according to the brochure Handreiking Bluswatervorziening en bereikbaarheid		
	Purchase/Engineer	M 62	Bereikbaarheid - inpanding EOS	Accessibility EOS - indoors EOS	5	Surrounding	DETAILS für indoor placed BESS		
	Purchase/Engineer	M 63	Toegankelijkheid EOS park	Accessibility EOS park	2,3	Surrounding	EOS park must be accessible by two entrances completely apart from each other according to Handreiking Bluswatervorziening en bereikbaarheid		
	Operation	M 64	Noodplan	Emergency plan	1,2,3,4,5	BESS (total)	An emergency plan is established (attachment E as an example) DETAILS OF EMERGENCY PLAN		
	Operation	M 65	Noodplan - beproeven	Emergency plan - reviews	1,2,3,4,5	BESS (total)	The emergency plan must be reviewed every three years		
	Operation	M 66	Pictogrammen EOS	Pictograms EOS	1,2,3,4,5	BESS (total)	There must be emergency drawings on the outside of the BESS (Question: One, several, every container...??)		
	Operation	M 67	Markering hybride EOS	Marking of hybrid EOS	1,2,3,4,5	BESS (total)	If the BESS is hybrid, then this must be displayed and clearly visible		