

## Pendulum test ISO 14120:2015

(C.2.5.1 Resistance of guards against impact from outside the hazard zone)

**Date:** 2018 – 01 – 26 and 2018 – 02 – 02

**Location:** Arion Sweden AB

**Test performed by:** Mats Brindeland, Johan Hannerfors & Anton Persson

	1	2	3	4	5	6
	E=115J, 0.4m ProSafe	E=280J, 0.95m ProSafe	E=115J, 0.4m SmartSafe	E=280J, 0.95m SmartSafe	E=115J, 0.4m OptiSafe	E=280J, 0.95m Optisafe
a)	Small bend	Medium bend	Small bend	Large bend	Scratch	Small bend
b)	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing
c)	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing
d)	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing
e)	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing
f)	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing

Weight of body=30kg.

Body size: L=141mm, Ø223mm

115J simulates a body with the weight of 90kg crashing into the fence at 1.6m/s (5.76km/h).

280J simulates a body with the weight of 90kg crashing into the fence at 2.5m/s (8.99km/h).

From ISO 14120:2015 C.2.5.1:

*“a) buckling/bulging (permanent deformation without crack);*

*b) incipient crack (visible only on one surface);*

*c) through crack (crack visible from one surface to the other);*

*d) penetration (hard or soft body penetrating the material);*

*e) guard window or infill material being loosened from its fixing;*

*f) guard loosened from guard support.*

*The test is passed if*

*— the deformations or cracks do not exceed values specified to avoid harm,*

*— there is no penetration, and*

*— damages e) and f) above are not observed.”*

## Final result:

The test have showed that all the fences are holding and were stronger than expected, not even a weld was loose after the 280J tests. Biggest weakness in our test was the footplates. Without any support behind the fences that was tested, the posts and footplates was bending back and didn't show how strong the fence were. Therefore we decided to make some support to test only the panels in the fence during rest of the strength test (See picture below).


## Equipment that was used in the crash rig and test:

- 4X Post 2100 with adjustable foot
- 2X Post 2700 with adjustable foot
- 2X Panel T10 1900x200 for support
- 1X Custom made swinging arm
- 6X Weight 5kg
- 2X Support console

All the posts was bolted by 4 expander bolts on each foot.

All the panels was bolted by 3 bolts on each side.

Hjo 2018-02-06



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## Pictures of the crash rig.



*Crash setup front perspective*



*Crash setup with support*



*Crash setup weight 30kg*

## Smartsafe - 115J result



## Smartsafe - 280J result

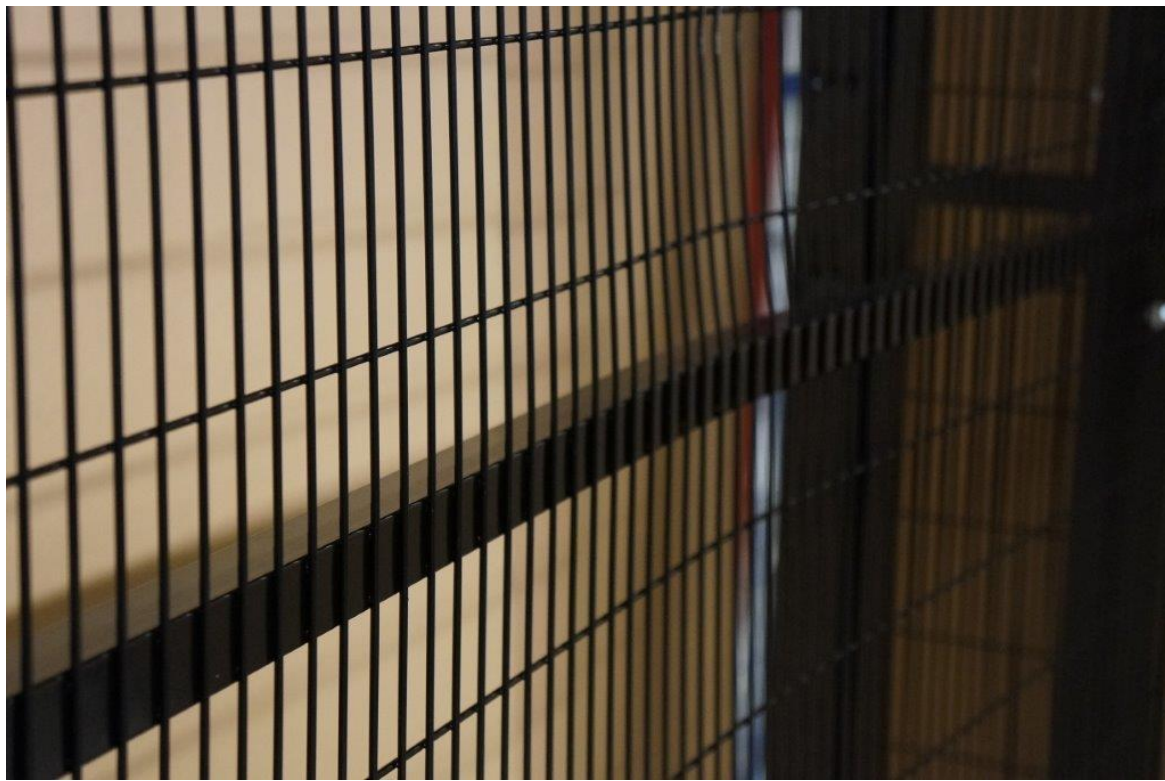


## Prosafe – 180J result





## Prosafe – 280J result



## Optisafe – 115J result



## Optisafe – 280J result

