

Memo to: Offshore container and Portable offshore unit manufacturers and owners	Memo No: 2018-06 From: Container governance unit Date: 2018-07-17 Prep. By: O-UO
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Copied to:
Offshore container and Portable offshore unit lifting set manufacturers and owners
DNV GL Offshore container and Portable offshore unit certification offices

Offshore Containers - wear in Padeye Holes, recommended acceptance criteria.

Localised wear in lifting points (padeyes) may occur during the lifetime of an offshore container.

With reference to DNVGL-ST-E271 Section 2.5:

To maintain the validity of the offshore container certificate, the container shall be inspected annually as described in Sec.9.

Such periodic inspection may be carried out by DNV GL or by other inspection bodies recognized by national authorities to carry out such inspections. However, major repairs or modifications which may alter the certificate shall be approved by DNV GL.

And Section 9.2.2.4:

All pad eyes and lashing points shall be visually inspected for distortion, mechanical damage or any other sign of distress or overload.

Close pin to padeye hole tolerance is essential, to ensure optimum shackle performance.

From Section 4.4.1:

The diameter of holes in pad eyes shall match the shackle used, clearance between shackle pin and pad eye hole shall not exceed 6% of the shackle pin diameter.

This is a design requirement for all new offshore containers. Some new containers will be manufactured with 6% padeye clearance, however it should be noted that in such cases any wear experienced over time could mean that this initial value is soon exceeded.

The padeye hole diameter should be carefully selected to accommodate the necessary shackle pin diameter. For the purposes of strength and longevity, the difference in hole and pin diameter should be as small as possible. At the same time, the shackle pin maximum diameter (including tolerance) and padeye hole tolerance/coatings should be considered to ensure that the pin will enter the hole by hand.

With reference to Appendix D:

shackle pins shall have a tolerance of -0/+3% on the diameter.


Recommended acceptance criteria for padeye wear

Type / Description	Comment	Recommended acceptance criteria at periodic inspections	
Internal wear through the padeye thickness, i.e. oval holes.	Mostly resulting from contact stresses. Such deformation should not significantly affect tear out strength	Maximum clearance at centerline of padeye thickness	7% ¹⁾
Increased ovalization near the surface of the padeye or cheek plates	Likely caused by repeated out-of-plane loads. More likely if the inside width of the shackle (jaw width) is at or near the upper allowable limit, often in combination with ovalization	Maximum clearance at 'edges' measured 10% of total padeye thickness in from outer face	8%
Any other damage such as elongated / bent plate, cracks, significant gouges or dents at the hole, significant corrosion in the hole or between padeye plate and cheek plates, cracked cheek plate welds etc.		Not acceptable	

Notes

- 1) When a container is new, clearances between shackle pin and padeye shall comply with Section 4.4.1, i.e. not exceeding 6% clearance.

This guidance is provided on the basis that the influence of any wear on the padeye strength and shackle performance is negligible. It shall always be ensured that design stresses, including wear if applicable, remain within the allowable limit. Simple methods for calculating padeye stresses are included in DNVGL-ST-E271 Appendix D.



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If the above criteria are exceeded, detailed FEA may be undertaken to verify the padeye strength, this shall be provided for verification by DNV GL. If adopted, repair may include drilling out the padeye hole and inserting a steel sleeve. Sleeves are in general not to be considered part of the cross section for the purpose of calculating tear out strength. Other repair methods may be considered. If required, such repairs are considered major and shall be approved by DNV GL.

If you have any further questions or comments on this, please do not hesitate to contact us at:
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