

Armcor Recommended Lifting Instructions



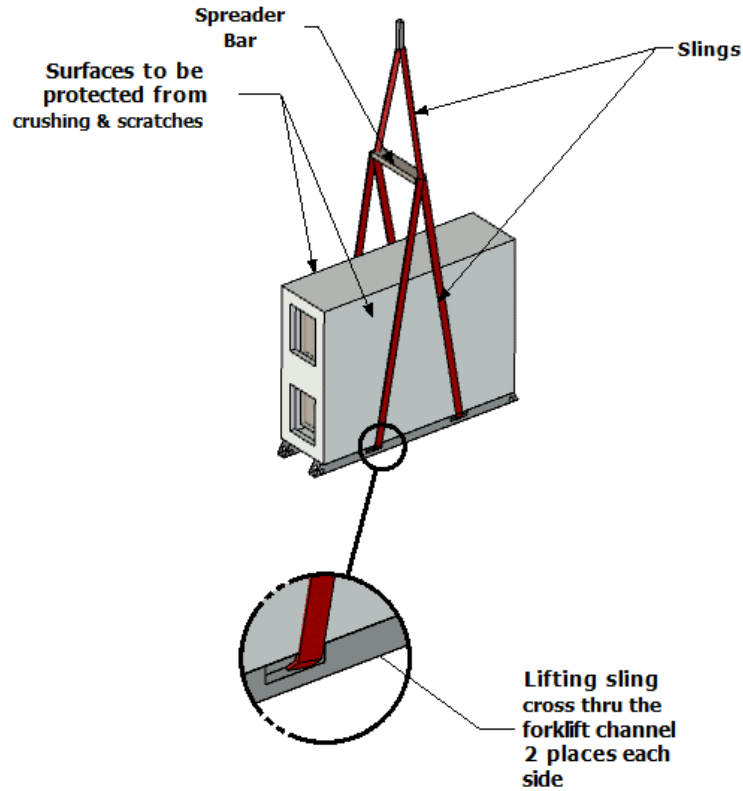
This document details recommended lifting instructions for all Armcor units.

Instructions:

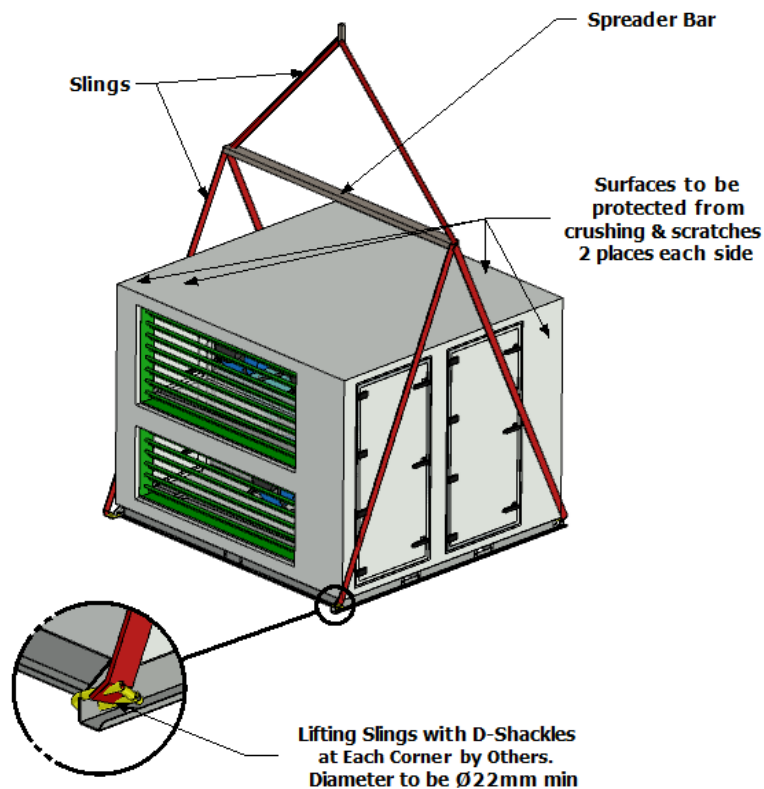
- Always use spreader bar.
- DO NOT lift in dangerous or windy conditions.
- Shackles to comply with AS2741-1192 table 6.
- Shackles to be proof tested to 5 times W.L.L.
- Never stand under the unit.
- Test the unit for balance and support when 100mm off the ground.
- DO NOT use chains. ALWAYS use slings. (Warranty void if chains are used).

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1.0 Sheet Metal Rail

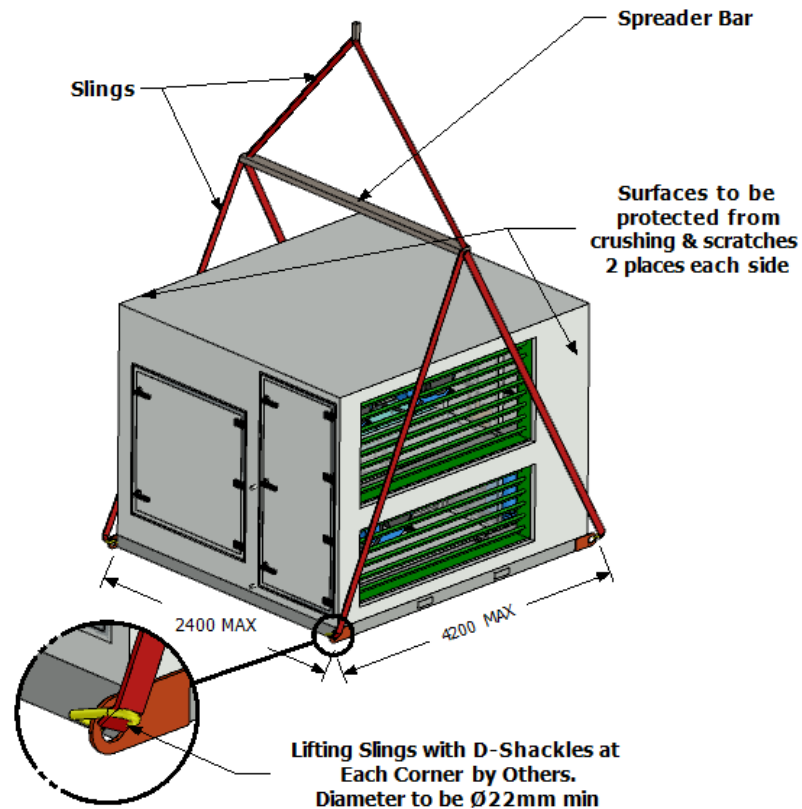


2.0 Sheet Metal Base

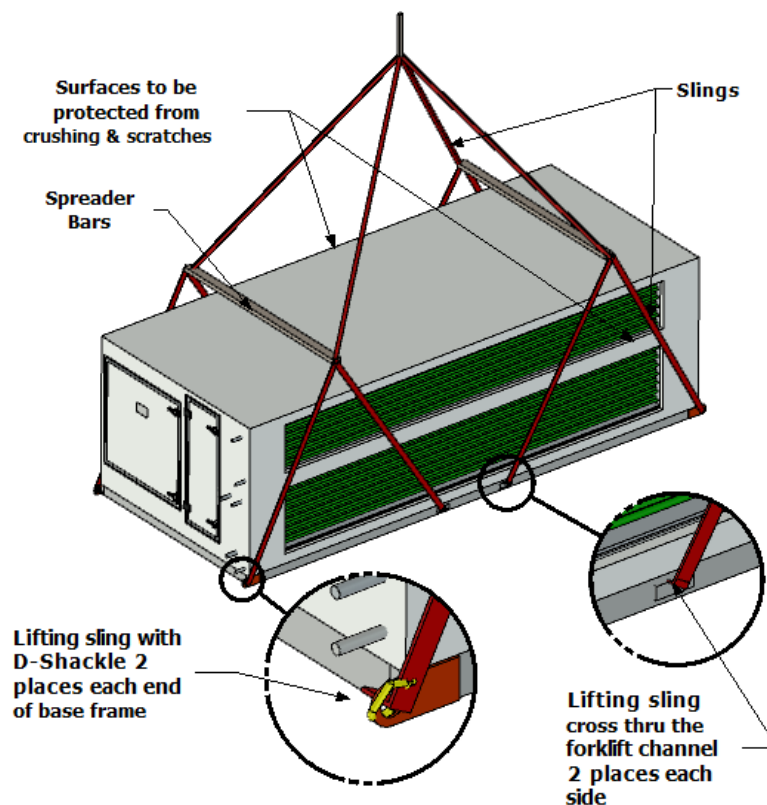


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3.0 RHS Base for units up to 5000 L/s



4.0 RHS Base for units above 5000 L/s



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Design Certification and Computation

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P.O.Box 6028, DONCASTER VIC 3108

Building Act 1993

Building Regulations 2006

REGULATION 1507: CERTIFICATE OF COMPLIANCE—DESIGN

To: The Relevant Building Surveyor

From CEC Design Group Pty Ltd

Building practitioner: Wei Chen

Category and class: Civil Engineer Registration No: EC 25100

Postal address: 4 Finn Court, Lower Templestowe Postcode: VIC 3107

Property details (if applicable)

Number: 60

Street/road: Barrie Road

Suburb: Tullamarine

Compliance

I did prepare the design and I certify that the part of the design described as: Lifting Lug Design for Armcor Air Solutions at 60 Barrie Road, Tullamarine.

Complies with the following provisions of the Regulations:

The relevant sections of the Building Code of Australia, 2012 Volume 1&2 and relevant standards stated therein.

AS/NZS 1170.1 Permanent, Imposed and Other Actions - 2002

AS 4100 Steel Structures - 1998

Design documents

Drawing Nos: Drawings 1401 – SK1 (B1) & SK2 (B1)

Prepared by: CEC Design Group

Date: 22 January 2014

Computation: Page 1

Prepared by: CEC Design Group

Date: 23 January 2014

Signature

Signed:

Date: 23 January 2014

Armcor Recommended Lifting Instructions

LIFTING LUG DESIGN

DATE 23-Jan-14 12:00 AM JOB No. 1401 Version 9 Updated on 5 June 2003

PROJECT Armco Lifting Lug Design Check LOAD FACTOR = 5

ITEM

LIFTING (WORKING) LOAD(KN) =	7.5
ANGLE OF LIFT (DEG) (FROM HORIZ.)=	60
DIA. OF HOLE (MM) d =	40
SUGGESTED SHACKLE DIA (mm) df =	22
ADOPTED SHACKLE DIA (mm) df =	22
EDGE DISTANCE (MM) e =	40
WIDTH OF LUG AT BASE (MM) w =	80
DIST FROM CL HOLE TO BASE OF LUG (MM)	60
SIDE DISTANCE (MM) a =	40.0
LUG PLATE THICK. (MM) t =	8
LUG STEEL ULT. STRENGTH (MPA) fu=	410
LUG STEEL YIELD STRENGTH (MPA) fy=	250

REFERENCE

AS4100 1998 American Inst of Steel Construction
 $.9 \cdot Ag \cdot fy$
 $.9 \cdot .85 \cdot Kl \cdot An \cdot fu$

COMBINED SHEAR & TENSION CHECK
 $(Pt^*/\Phi Pu)^2 + (Pv^*/\Phi Vu)^2 \leq 1.0$ **O.K.**

TENSION FAILURE CHECK

PHI Pt (KN) = 72
 PHI Vu (KN) = 43.20
O.K. Pt* (KN) = 32.48
O.K. Pv* (KN) = 18.75

SHACKLE OK

PLATE CRUSHING FAILURE CHECK

P allow (KN) = 20
 PHI Pu (KN) = 208
 $.9 \cdot 3.2 \cdot df \cdot t \cdot fup$
 $1.67 \cdot Fb \cdot t \cdot e^2/d$
 P (KN) = 7.5
O.K. P* (KN) = 37.5
 d = dia of hole
 e = width of plate from edge of hole to edge of plate

PLATE SHEARING / TEAR OUT STRENGTH CHECK

P allow (KN) = 32
 PHI Pu (KN) = 59
 $.9 \cdot a \cdot t \cdot fup$
 $2 \cdot 4 \cdot fy \cdot e \cdot t$
 P (KN) = 8
O.K. P* (KN) = 37.5
 a = dist from edge of hole to edge of plate

PLATE FLEXURE CHECK

PHI Ms (kNm) = 2.88
 M* (kNm) = 1.13 **O.K.**

COMBINED TENSION & SHEAR & FLEXURE CHECK.

.75 Phi Ms = 1.19 AS 4100 Clause 8.3.2
 Phi Vv (kN) = 43.20 **O.K.** AS 4100 Clause 5.12.3

PLATE GEOMETRY CHECK

AS4100-1998 Clause 7.5
 $t \geq .25 \cdot (e-b/2)$ **O.K.** (prevents dishing)
 Net area past pin = Net area for member **O.K.** (prevents tearing on reaction side)
 Net area perp to axis of member = $1.33 \cdot$ Net area of member **O.K.**
 (allows for stress concentration effects)

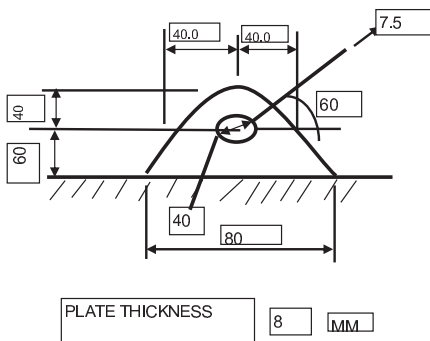


PLATE THICKNESS 8 MM

Shackle capacities listed are those for Alloy Bow shackles Quality Grade S (ref: AS 2741 -1192 Table 6)
 Min ult tensile strength = 630 MPa for shackle body
 Min ult tensile strength = 800 MPa for pin
 Shackles are proof tested to 5 times WLL

Load factor:

- 1.5 LL
- 1.35 Dynamic
- 1.90 Unexpected Load Distribution
- 1.3 Wear and Tear
- Total = $1.5 \times 1.35 \times 1.9 \times 1.3 = 5.0$

NOTE:
 PHI Pu \geq Load Factor * P(working)
 Ref: Design & Const. of lifting beams (David T. Ricker)
 (American Inst. of Steel Construction)

SHACKLES

ALPHA = 56.31
 P = 72.11
 gamma = 56.31
 beta = 0.00

American Institute of Steel Construction
 $a \text{ clear} \geq d/2$ **O.K.** (Tension failure at side of hole)
 $a \text{ clear} \geq 2t$ **O.K.** (Tension failure at side of hole)
 $e \text{ clear} < .67 \cdot d$ **n.g.** (Tearing failure of plate above pin)
 $t < 0.25 \cdot \text{hole dia or } < 12 \text{mm, N.G.}$ (Prevents dishing)



Fresh Air Indoors

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