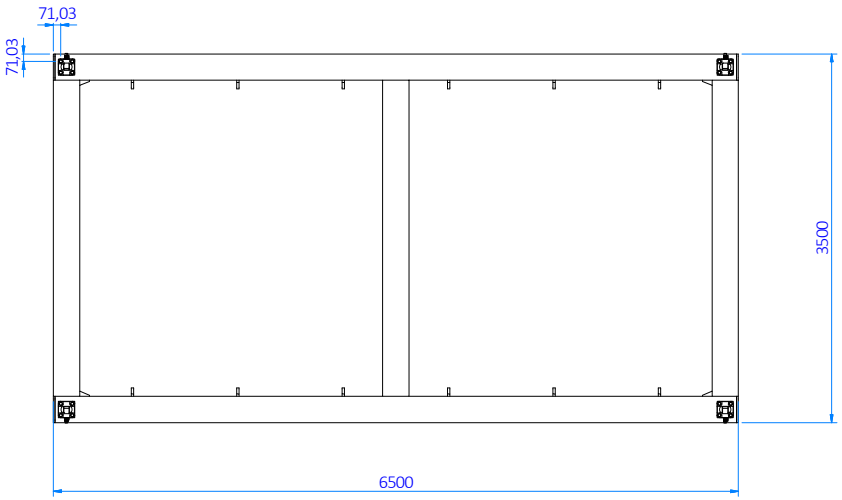
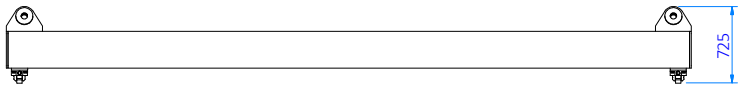
# Vedleggs liste

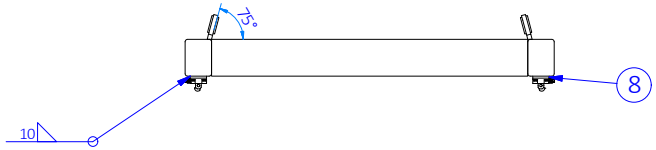
| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|

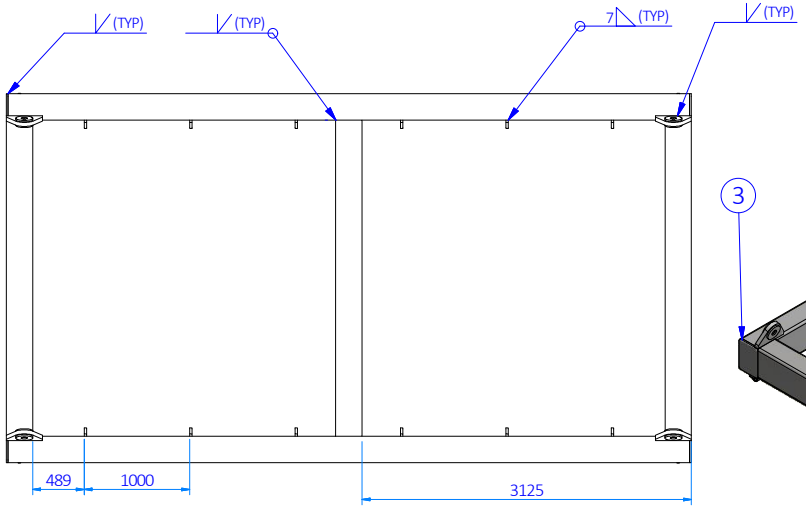
Total weight: 3246,5 kg

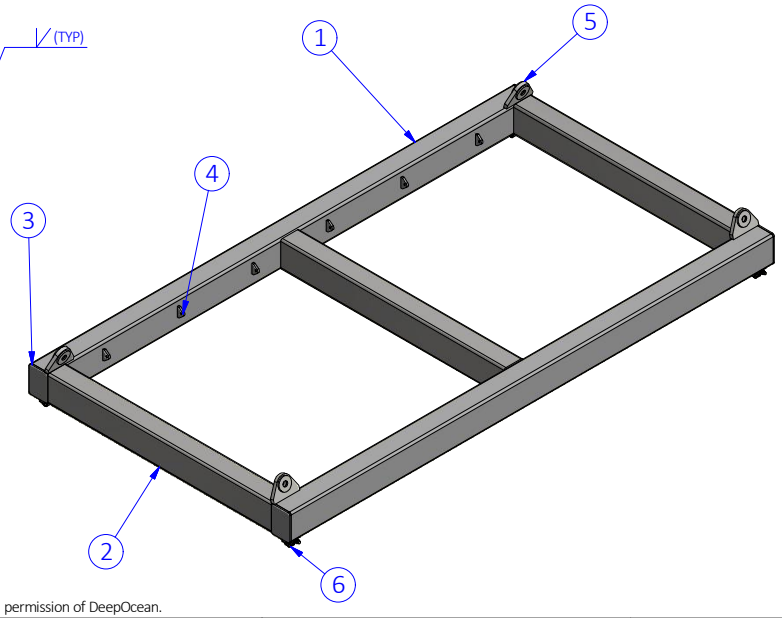
100 % MPI
100 % UT
1 Coat Primer
1 Coat Paint
No System
RAL1003
To be punctured




| Item | Qty | Description | Rev | Material | Mass (kg) |
|---|---|---|---|---|---|
| 1 | 2 | 350x250x16 L=6468 | | Steel, Mild | 1800,3 |
| 2 | 3 | 350x250x16 L=3000 | | Steel, Mild | 1253,1 |
| 3 | 4 | PL 16 x 350 x 250 | 1 | Steel, S355 | 43,7 |
| 4 | 12 | PL 22 x 125 x 80 | 1 | Steel, S355 | 14,1 |
| 5 | 4 | Padeye | 1 | | 85,6 |
| 6 | 4 | VISO clamp Tandemloc | 1 | | 32,2 |
| 7 | 16 | AS 2465 - 3/4 x 2 UNC | | Steel, Mild | 2,9 |
| 8 | 4 | PL 20 x 155 x 155 | 1 | Steel, S355 | 14,6 |

Status: USE - Issued for USE

| Rev.: | Date: | | |
|---|---|---|---|
| A | 27.04.2018 | Approved by: | Anders Vikebø |
| | 26.04.2018 | Checked by: | Ørjan Gloppen |
| | 25.04.2018 | Drawn by: | Nils Olav Hauge |

DEEPOCEAN

Drawing title:
Lifting Frame

Project title:
Bachelor

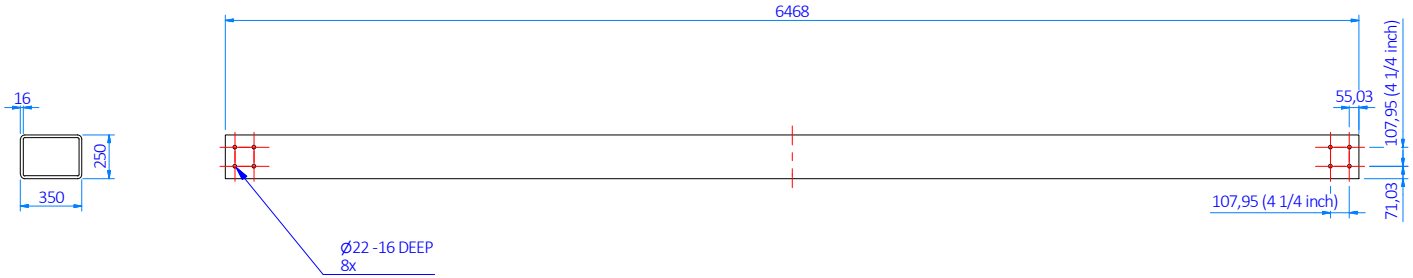
Client:
HVL

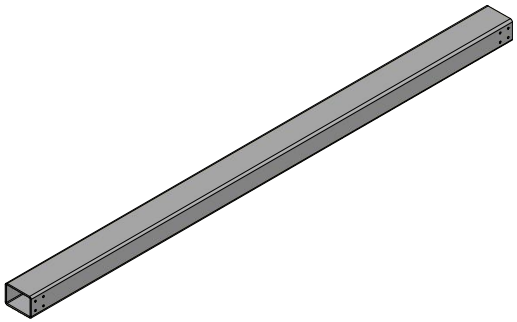
Projection:

Drawing no.:
NO.ENG.DR.18.005 Lifting Frame

Sheet:
1 of 7

| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|



II

| Description | Rev | Material | Mass (kg) |
|---|---|---|---|
| 350x250x16 L=6468 | | Steel, Mild | 900,2 |

Status: USE - Issued for USE

| Rev.: | Date: | | |
|---|---|---|---|
| A | 27.04.2018 | Approved by: | Anders Vikebø |
| | 26.04.2018 | Checked by: | Ørjan Gloppen |
| | 25.04.2018 | Drawn by: | Nils Olav Hauge |

DEEPOCEAN

Drawing title:
Lifting Frame

Project title:
Bachelor

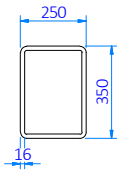
Client:
HVL

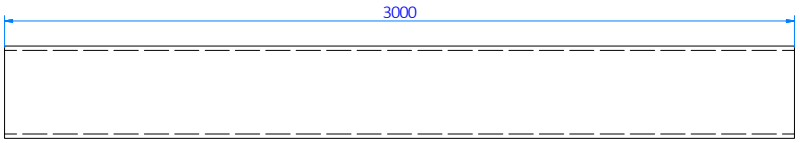
Projection:

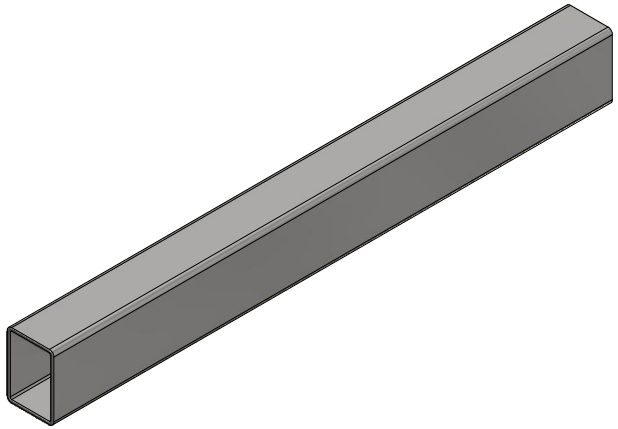
Drawing no.:
NO.ENG.DR.18.005 Lifting Frame

Sheet:
2 of 7

| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|



III

| Description | Rev | Material | Mass (kg) |
|---|---|---|---|
| 350x250x16 L=3000 | | Steel, Mild | 417,7 |

Status: USE - Issued for USE

| Rev.: | Date: | |
|---|---|---|
| A | 27.04.2018 | Approved by: Anders Vikebø |
| | 26.04.2018 | Checked by: Ørjan Gloppen |
| | 25.04.2018 | Drawn by: Nils Olav Hauge |

DEEPOCEAN

Drawing title
Lifting Frame

Project title
Bachelor

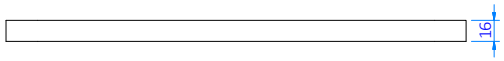
Client
HVL

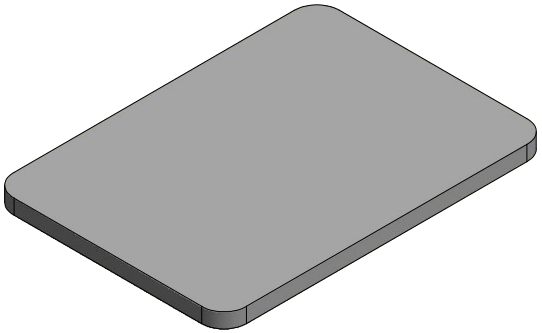
Projection:

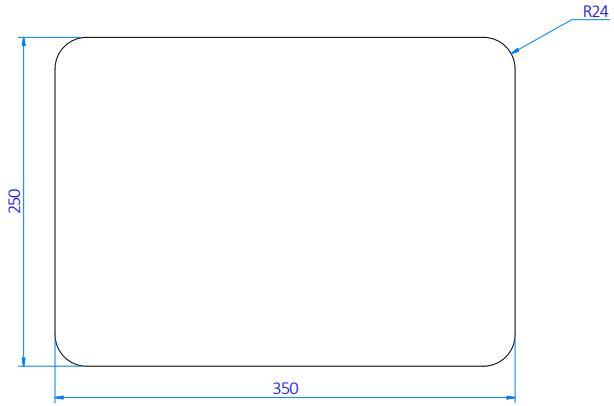
Drawing no.
NO.ENG.DR.18.005 Lifting Frame

Sheet
3 of 7

| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|






| Description | Rev | Material | Mass (kg) |
|---|---|---|---|
| PL 16 x 350 x 250 | 1 | Steel, S355 | 10,9 |

Status: USE - Issued for USE

| Rev.: | Date: | | |
|---|---|---|---|
| A | 27.04.2018 | Approved by: | Anders Vikebø |
| | 26.04.2018 | Checked by: | Ørjan Gloppen |
| | 25.04.2018 | Drawn by: | Nils Olav Hauge |

DEEPOCEAN

Drawing title:
Lifting Frame

Project title:
Bachelor

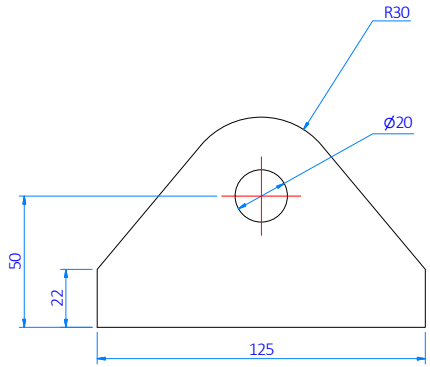
Client:
HVL

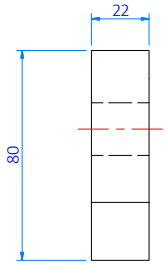
Projection:

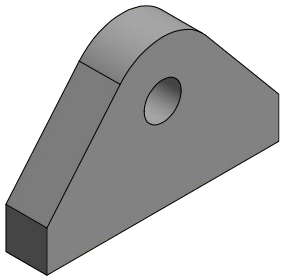
Drawing no.:
NO.ENG.DR.18.005 Lifting Frame

Sheet:
4 of 7

| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|



| Description | Rev | Material | Mass (kg) |
|---|---|---|---|
| PL 22 x 125 x 80 | 1 | Steel, S355 | 1,2 |

Status: USE - Issued for USE

| Rev.: | Date: | | |
|---|---|---|---|
| A | 27.04.2018 | Approved by: | Anders Vikebø |
| | 26.04.2018 | Checked by: | Ørjan Gloppen |
| | 25.04.2018 | Drawn by: | Nils Olav Hauge |

DEEPOCEAN

Drawing title:
Lifting Frame

Project title:
Bachelor

Client:
HVL

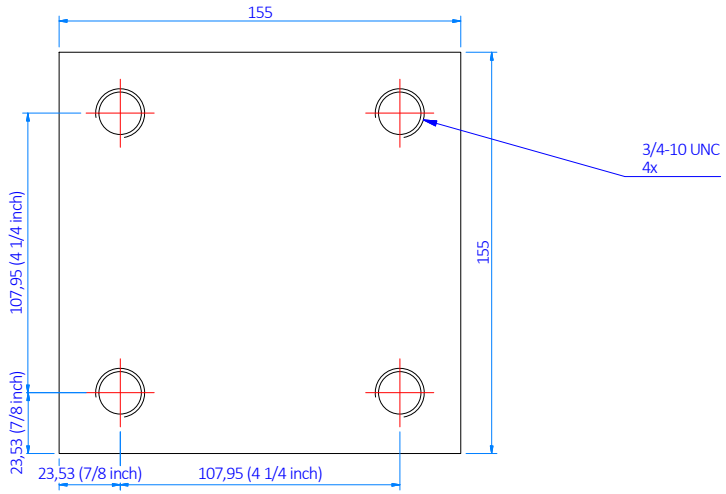
Projection:

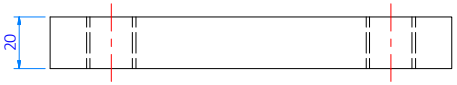
Drawing no.:
NO.ENG.DR.18.005 Lifting Frame

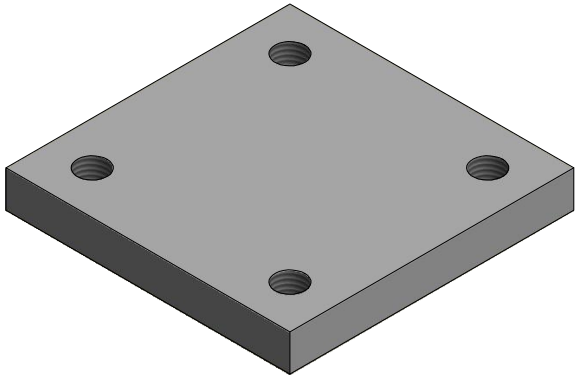
Sheet:
5 of 7

V

| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|



| Description | Rev | Material | Mass (kg) |
|---|---|---|---|
| PL 20 x 155 x 155 | 1 | Steel, S355 | 3,6 |

Status: USE - Issued for USE

| Rev.: | Date: | | |
|---|---|---|---|
| A | 27.04.2018 | Approved by: | Anders Vikebø |
| | 26.04.2018 | Checked by: | Ørjan Gloppen |
| | 25.04.2018 | Drawn by: | Nils Olav Hauge |

DEEPOCEAN

Drawing title:
Lifting Frame

Project title:
Bachelor

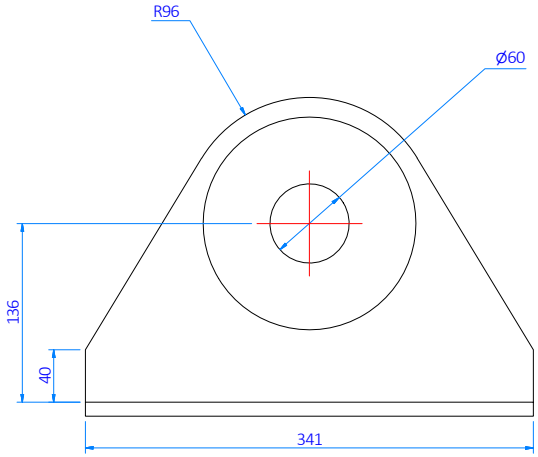
Client:
HVL

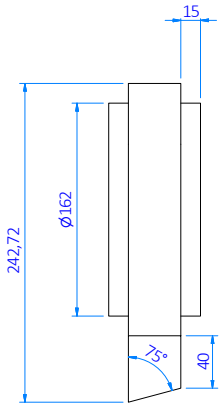
Projection:

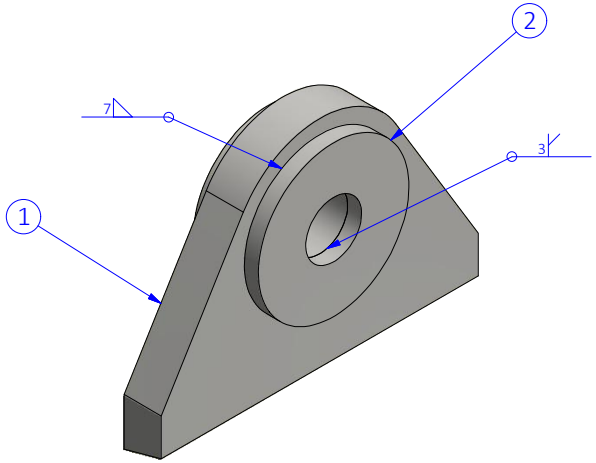
Drawing no.:
NO.ENG.DR.18.005 Lifting Frame

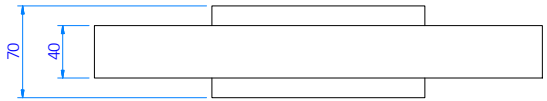
Sheet:
6 of 7

| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|




| Item | Qty | Description | Rev | Material | Mass (kg) |
|---|---|---|---|---|---|
| 1 | 1 | PL 40 x 341 x 243 | 1 | Steel, S355 | 17,2 |
| 2 | 2 | PL 15 x 162 x 162 | 1 | Steel, S355 | 4,2 |

Status: USE - Issued for USE

| Rev.: | Date: | | |
|---|---|---|---|
| A | 27.04.2018 | Approved by: | Anders Vikebø |
| | 26.04.2018 | Checked by: | Ørjan Gloppen |
| | 25.04.2018 | Drawn by: | Nils Olav Hauge |

DEEPOCEAN

Drawing title: Lifting Frame

Project title: Bachelor

Client: HVL

Projection:

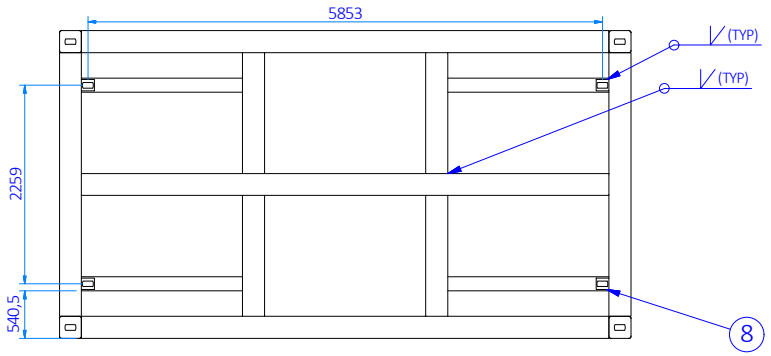
Drawing no.: NO.ENG.DR.18.005 Lifting Frame

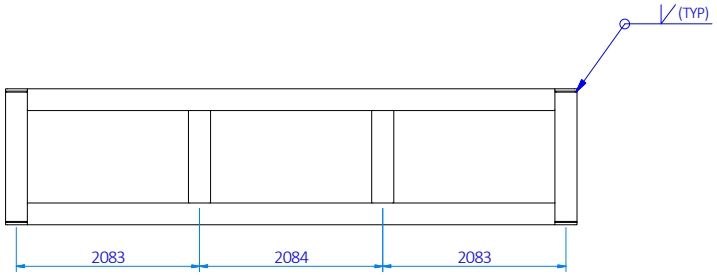
Sheet: 7 of 7

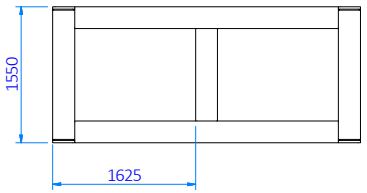
| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|

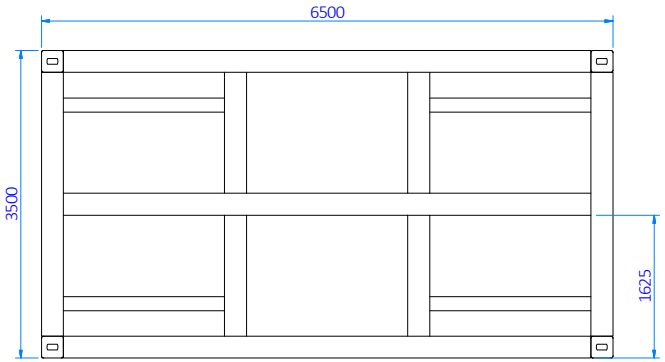
Total weight: 4950,3 kg

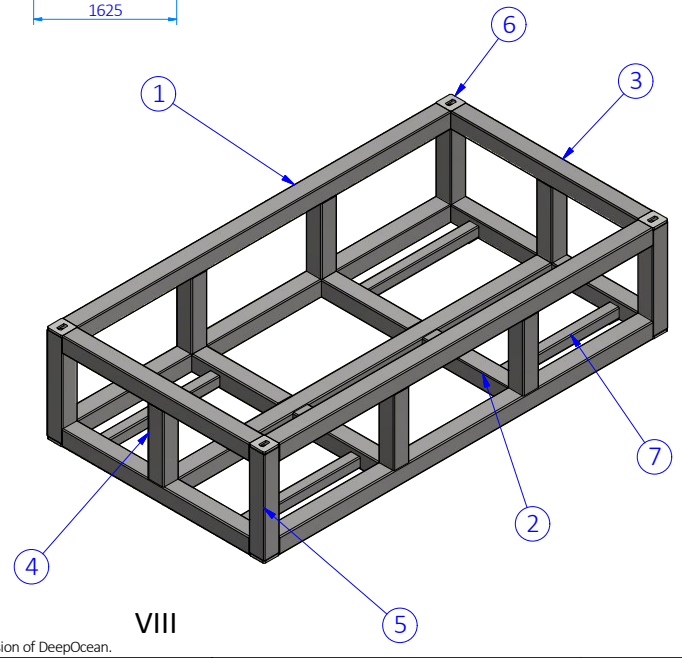
100 % MPI
100 % UT
1 Coat Primer
1 Coat Paint
No System
RAL1003
To be punctured




VIII

| Item | Qty | Description | Rev | Material | Mass (kg) |
|---|---|---|---|---|---|
| 1 | 5 | 250x250x10 L=6000 | | Steel, Mild | 2220,4 |
| 2 | 4 | 250x250x10 L=1375 | | Steel, Mild | 407,1 |
| 3 | 4 | 250x250x10 L=3000 | | Steel, Mild | 888,1 |
| 4 | 6 | 250x250x10 L=1050 | | Steel, Mild | 466,3 |
| 5 | 4 | 250x250x10 L=1470 | | Steel, Mild | 435,2 |
| 6 | 8 | PL 65 x 250 x 250 | 1 | Steel, S355 | 193,4 |
| 7 | 4 | 160x160x10 L=1833 | | Steel, Mild | 329,5 |
| 8 | 4 | PL 29 x 147 x 130 | 1 | Steel, S355 | 10,4 |

Status: USE - Issued for USE

| Rev.: | Date: | | |
|---|---|---|---|
| A | 27.04.2018 | Approved by: | Anders Vikebø |
| | 26.04.2018 | Checked by: | Ørjan Gloppen |
| | 25.04.2018 | Drawn by: | Nils Olav Hauge |

DEEPOCEAN

Drawing title: Basket

Project title: Bachelor

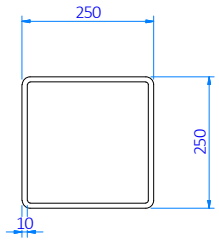
Client: HVL

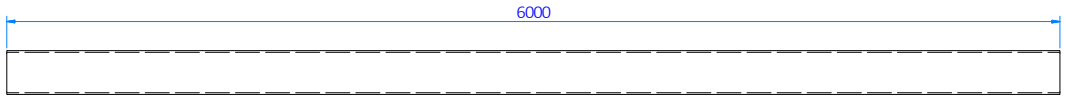
Projection:

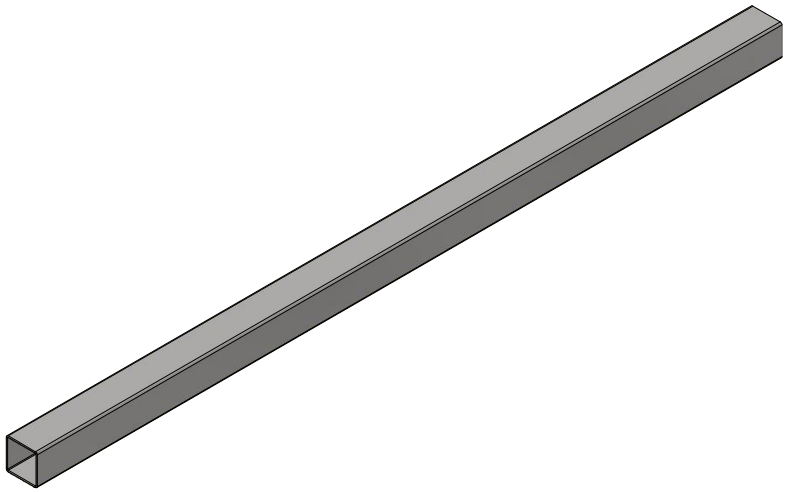
Drawing no.: NO.ENG.DR.18.006 Basket

Sheet: 1 of 9

| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|



| Description | Rev | Material | Mass (kg) |
|---|---|---|---|
| 250x250x10 L=6000 | | Steel, Mild | 444,1 |

Status: USE - Issued for USE

| Rev.: | Date: | | |
|---|---|---|---|
| A | 27.04.2018 | Approved by: | Anders Vikebø |
| | 26.04.2018 | Checked by: | Ørjan Gloppen |
| | 25.04.2018 | Drawn by: | Nils Olav Hauge |

DEEPOCEAN

Drawing title:
Basket

Project title:
Bachelor

Client:
HVL

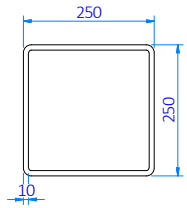
Projection:

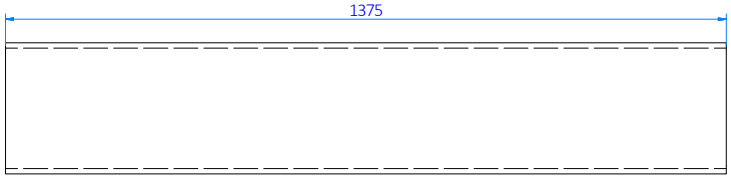
Drawing no.:
NO.ENG.DR.18.006 Basket

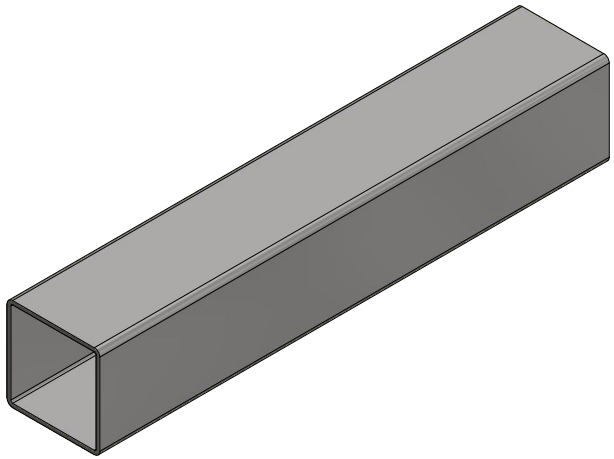
Sheet:
2 of 9

IX

| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|



X

| Description | Rev | Material | Mass (kg) |
|---|---|---|---|
| 250x250x10 L=1375 | | Steel, Mild | 101,8 |

Status: USE - Issued for USE

| Rev.: | Date: | | |
|---|---|---|---|
| A | 27.04.2018 | Approved by: | Anders Vikebø |
| | 26.04.2018 | Checked by: | Ørjan Gloppen |
| | 25.04.2018 | Drawn by: | Nils Olav Hauge |

DEEPOCEAN

Drawing title:
Basket

Project title:
Bachelor

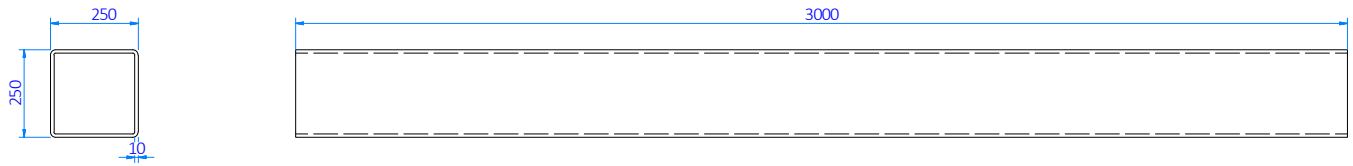
Client:
HVL

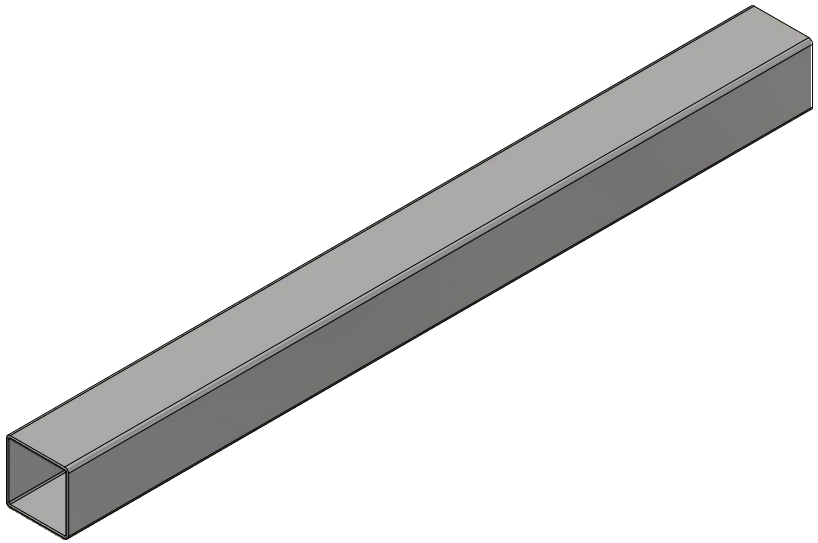
Projection:

Drawing no.:
NO.ENG.DR.18.006 Basket

Sheet:
3 of 9

| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|



| Description | Rev | Material | Mass (kg) |
|---|---|---|---|
| 250x250x10 L=3000 | | Steel, Mild | 222,0 |

Status: USE - Issued for USE

| Rev.: | Date: | | |
|---|---|---|---|
| A | 27.04.2018 | Approved by: | Anders Vikebø |
| | 26.04.2018 | Checked by: | Ørjan Gloppen |
| | 25.04.2018 | Drawn by: | Nils Olav Hauge |

DEEPOCEAN

Drawing title:
Basket

Project title:
Bachelor

Client:
HVL

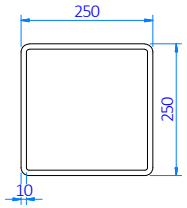
Projection:

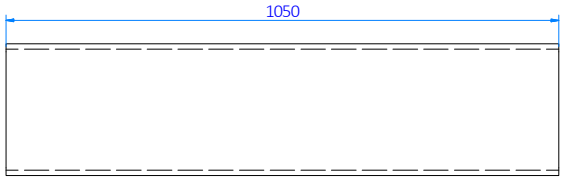
Drawing no.:
NO.ENG.DR.18.006 Basket

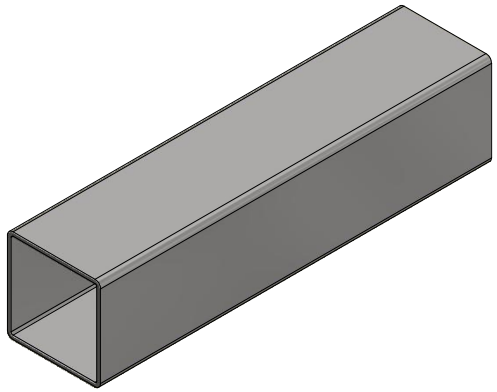
Sheet:
4 of 9

XI

| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|



| Description | Rev | Material | Mass (kg) |
|---|---|---|---|
| 250x250x10 L=1050 | | Steel, Mild | 77,7 |

Status: USE - Issued for USE

| Rev.: | Date: | |
|---|---|---|
| A | 27.04.2018 | Approved by: Anders Vikebø |
| | 26.04.2018 | Checked by: Ørjan Gloppen |
| | 25.04.2018 | Drawn by: Nils Olav Hauge |

DEEPOCEAN

Drawing title.
Basket

Project title.
Bachelor

Client.
HVL

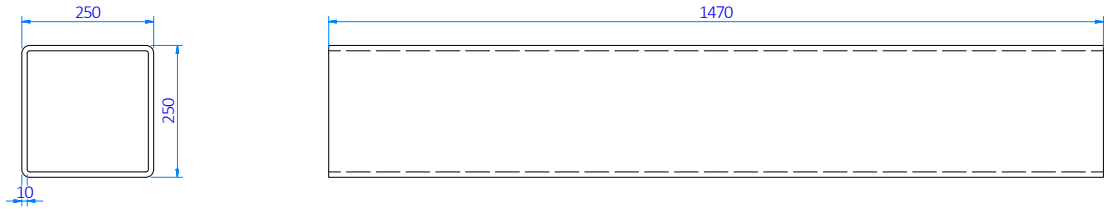
Projection:

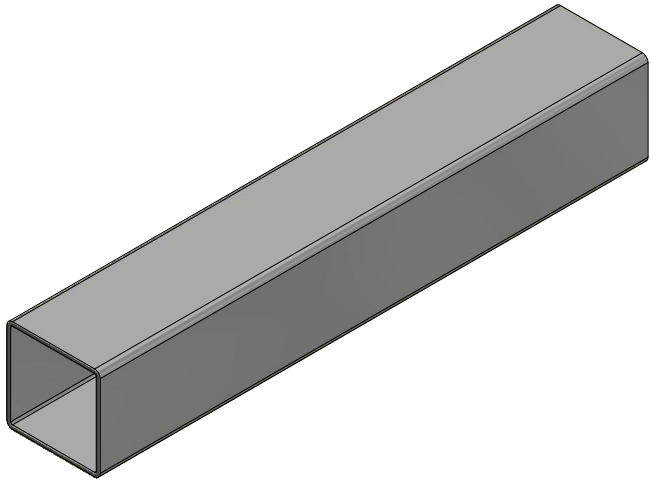
Drawing no.:
NO.ENG.DR.18.006 Basket

Sheet.
5 of 9

XII

| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|



| Description | Rev | Material | Mass (kg) |
|---|---|---|---|
| 250x250x10 L=1470 | | Steel, Mild | 108,8 |

Status: USE - Issued for USE

| Rev.: | Date: | | |
|---|---|---|---|
| A | 27.04.2018 | Approved by: | Anders Vikebø |
| | 26.04.2018 | Checked by: | Ørjan Gloppen |
| | 25.04.2018 | Drawn by: | Nils Olav Hauge |

DEEPOCEAN

Drawing title: Basket

Project title: Bachelor

Client: HVL

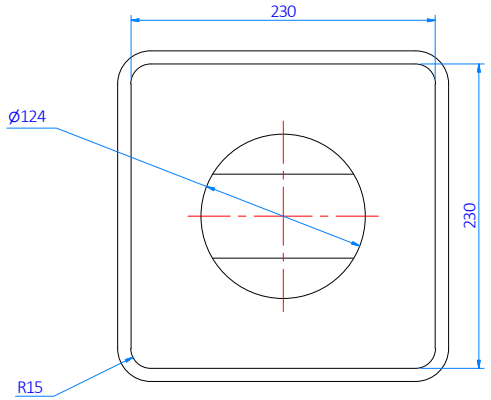
Projection:

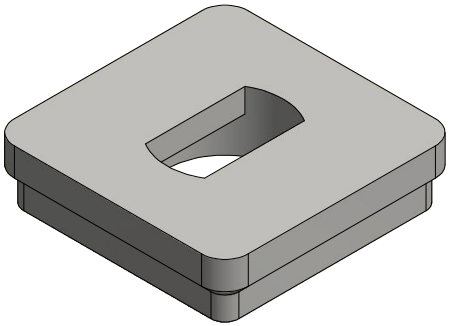
Drawing no.: NO.ENG.DR.18.006 Basket

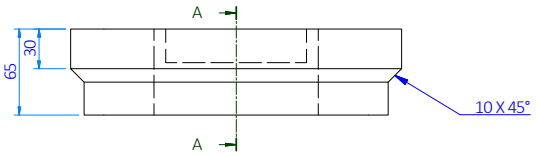
Sheet: 6 of 9

XIII

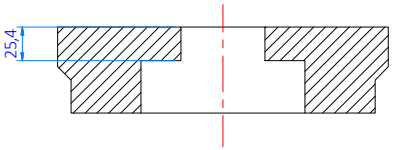
| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|

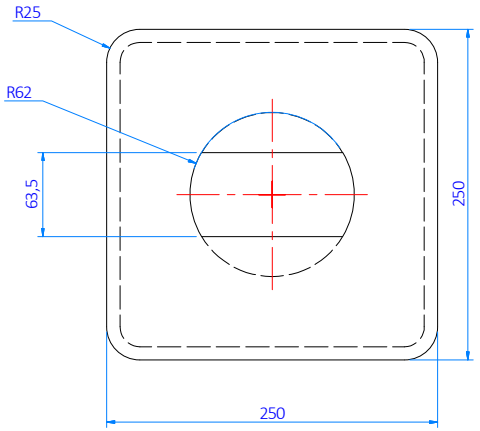





A-A ( 1 : 4 )




| Description | Rev | Material | Mass (kg) |
|---|---|---|---|
| PL 65 x 250 x 250 | 1 | Steel, S355 | 24,2 |

Status: USE - Issued for USE

| Rev.: | Date: | | |
|---|---|---|---|
| A | 27.04.2018 | Approved by: | Anders Vikebø |
| | 26.04.2018 | Checked by: | Ørjan Gloppen |
| | 25.04.2018 | Drawn by: | Nils Olav Hauge |

DEEPOCEAN

Drawing title: Basket

Project title: Bachelor

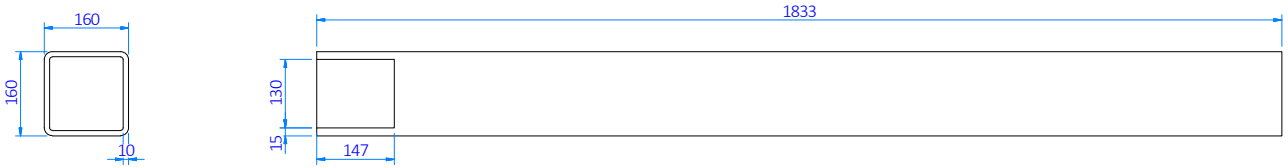
Client: HVL

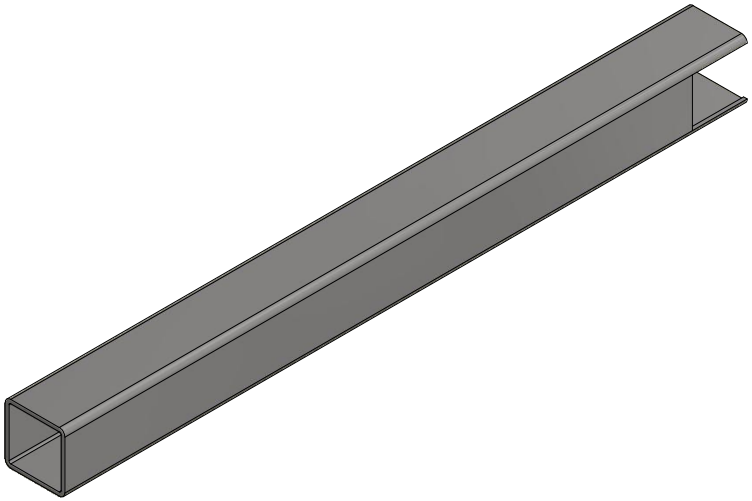
Projection:

Drawing no.: NO.ENG.DR.18.006 Basket

Sheet: 7 of 9

| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|



| Description | Rev | Material | Mass (kg) |
|---|---|---|---|
| 160x160x10 L=1833 | | Steel, Mild | 82,4 |

Status: USE - Issued for USE

| Rev.: | Date: | | |
|---|---|---|---|
| A | 27.04.2018 | Approved by: | Anders Vikebø |
| | 26.04.2018 | Checked by: | Ørjan Gloppen |
| | 25.04.2018 | Drawn by: | Nils Olav Hauge |

DEEPOCEAN

Drawing title: Basket

Project title: Bachelor

Client: HVL

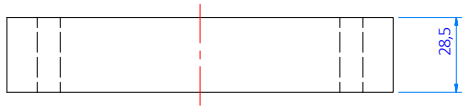
Projection:

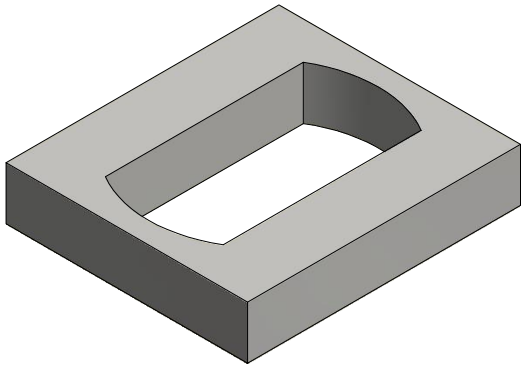
Drawing no.: NO.ENG.DR.18.006 Basket

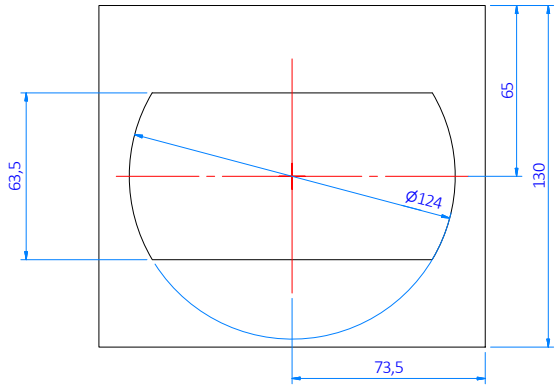
Sheet: 8 of 9

XV

| Gen. Tol. - NS-ISO 2768 U.S.O.: m | Gen. Welding - Tol. NS-EN ISO 13920 U.S.O.: B | Gen. Machined surface - roughness U.S.O.: 6,3 |
|---|---|---|






| Description | Rev | Material | Mass (kg) |
|---|---|---|---|
| PL 29 x 147 x 130 | 1 | Steel, S355 | 2,6 |

Status: USE - Issued for USE

| Rev.: | Date: | |
|---|---|---|
| A | 27.04.2018 | Approved by: Anders Vikebø |
| | 26.04.2018 | Checked by: Ørjan Gloppen |
| | 25.04.2018 | Drawn by: Nils Olav Hauge |

DEEPOCEAN

Drawing title: Basket

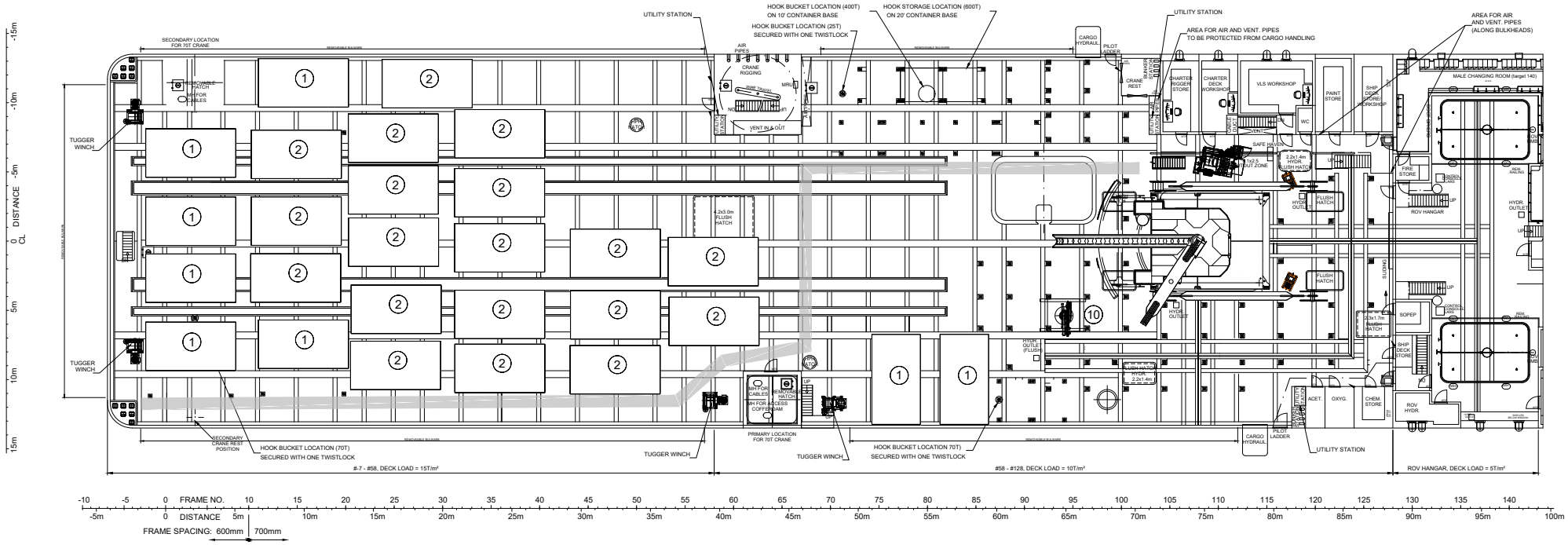
Project title: Bachelor

Client: HVL

Projection:

Drawing no.: NO.ENG.DR.18.006 Basket

Sheet: 9 of 9




Escape route, not to be obstructed.

| Item. | Qty. | Description | Dimensions (L x W x H) | Weight | VCG | Item. | Qty. | Description | Dimensions (L x W x H) | Weight | VCG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | - | - | - | - | - | 18 | - | - | - | - | - |
| 35 | - | - | - | - | - | 17 | - | - | - | - | - |
| 34 | - | - | - | - | - | 16 | - | - | - | - | - |
| 33 | - | - | - | - | - | 15 | - | - | - | - | - |
| 32 | - | - | - | - | - | 14 | 1 | - | - | - | - |
| 31 | - | - | - | - | - | 13 | - | - | - | - | - |
| 30 | - | - | - | - | - | 12 | - | - | - | - | - |
| 29 | - | - | - | - | - | 11 | - | - | - | - | - |
| 28 | - | - | - | - | - | 10 | 1 | Palfinger crane | - | - | - |
| 27 | - | - | - | - | - | 9 | - | - | - | - | - |
| 26 | - | - | - | - | - | 8 | - | - | - | - | - |
| 25 | - | - | - | - | - | 7 | - | - | - | - | - |
| 24 | - | - | - | - | - | 6 | - | - | - | - | - |
| 23 | - | - | - | - | - | 5 | - | - | - | - | - |
| 22 | - | - | - | - | - | 4 | 1 | - | - | - | - |
| 21 | - | - | - | - | - | 3 | 1 | - | - | - | - |
| 20 | 1 | - | - | - | - | 2 | 19 | 2 x Basket on frame | 6500 x 3500 x 3360 mm | 100 Te | - |
| 19 | - | - | - | - | - | 1 | 8 | 2 x Basket | 6500 x 3500 x 3100 mm | 100 Te | - |

ISSUED FOR USE

| Rev. | Date | | |
|---|---|---|---|
| A | 27.04.2018 | Approved by | AVikebø |
| | | Checked by | AHaga |
| | | Drawn by | NHauge |

-



DEEPOCEAN

Sketch title
DECK LAYOUT
EDDA FREYA

Project title
Bachelor

Client
HVL

Sketch no. 1 | Sheet 1 | of 1

# Vedlegg B: Deler som skal bestilles

| Del | Varenavn | Kapasitet | Antall | Pris for en | Total pris |
|---|---|---|---|---|---|
| Sjakkel | "Green Pin standard Schakles" | 3,25 tonn | 12 | 80kr | 960kr |
| Sjakkel | "Green Pin standard Schakles" | 35tonn | 4 | 1 456kr | 5 824kr |
| ROV-krok | "Crosby L320R Eye Hooks" | 5,8tonn | 12 | 5 683kr | 68 196kr |
| Stropper | Perma gule stropper | 3 tonn | 12 | 125kr | 1 500kr |
| "VI-SO Clamp" | "VI-SO Clamp" | 29tonn | 4 | 7 253kr | 29 012kr |
| Konteiner | Konteiner | - | 1 | 371 272kr | 371 272kr |
| Løfteramme | Løfteramme | - | 1 | 243 690kr | 243 690kr |
| Total pris | | | | | 720 454kr |

Da prisene ble beregnet var krusen for en dollar 8,05 NOK.

For å finne pris på løfterammen og konteineren var gruppen i kontakt med A. Olufsen Ship & Offshore. Her fikk gruppen beskjed om at en estimert pris ville være 75,- kr per kg. Som vist i vedlegg A har løfterammen en vekt på 3249,2 kg og konteineren 4950,3kg.

$$Pris = vekt \times 75\frac{kr}{kg} \quad (1)$$

Pris for løfteramme:

$$Pris_{løfteramme} = 3249{,}2kg \times 75\frac{kr}{kg}$$

$$Pris_{løfteramme} = \underline{243\ 690kr}$$

Pris for konteineren:

$$Pris_{konteiner} = 4950{,}3kg \times 75\frac{kr}{kg}$$

$$Pris_{konteiner} = \underline{371\ 272kr}$$

$$Pris_{total} = Pris_{konteiner} + Pris_{løfteramme}$$

$$Pris_{total} = 243\ 690kr + 371\ 272kr \approx \underline{615\ 000kr}$$

Tilsammen for sjakklene, ROV-krokene, stroppene, "VI-SO Clamp"ene, konteineren og løfterammen blir prisen på ca. 720 454kr.

# Vedlegg C: Hydrodynamiske krefter

I DNV 2.7-3 ganges vekten av objektet som skal løftes med 2,5. I denne faktoren ligger det en faktor som tar høyde for at objeketet løftes i vann og vil få en viss strømningsmotstand. Denne faktoren er på 2. I faktoren på 2,5 er det også en faktor på 0,9 som tar høyde for at objektet er nedsenket i vann.

Det regnes ut hydrodynamiske krefter i dette vedlegget for å sammenligne med faktoren som DNV 2.7-3 anbefaler å bruke til undervannsløft.

For å ikke gå for dypt inn i hydrodynamiske krefter blir det forenklet med å ikke se på dragkrefter eller rykklaster. Resultatet vil da mest sannsynlig bli litt mindre, men siden maksverdien av akselerasjon og fart ikke oppstår samtidig blir dette sett på som en grei forenkling.

Situasjonen for løft av en enkelt madrass fra havbunn og i konteineren er tilfellet som blir sammnelignet. Madrassen som skal løftes er av den største typen og veier 20 tonn. Sammenligningen vil likevel være overførbar til situajsonen der hele konteineren løftes.

I dette vedlegget kalles vekten til legemet, nedsenket i vann, for $w$. Tilleggskraften som oppstår på grunn av hydrodynamikk kalles $F_a$. For å finne $F_a$ regnes det først ut en addert masse, $m_a$. I formel (2) antas det at madrassen er en rektangelformet plate, selv om den både har mellomrom mellom de forkjellige betongelementene og vil bøye seg slik at bredden blir mindre.

| Symbol | Definisjon | Numerisk verdi | Enhet |
|---|---|---|---|
| $m_a$ | Ekstra masse | *?* | $kg$ |
| $\rho_{vann}$ | Tetthet til vann | 1 000 | $kg/m^3$ |
| $k$ | Konstant | 0.76 | - |
| B | Lengde | *6* | $m$ |
| A | Bredde | *3* | $m$ |
| $F_a$ | Kraft på grunn av sjøen | *?* | $N$ |
| $a_v$ | Askelrasjon til sjøen | *5,71* | $\frac{m}{s^2}$ |
| $V$ | Volum til betongmadrass | *?* | $m^3$ |
| $m$ | Masse til betongmadrass | *20 000* | $Kg$ |
| $\rho$ | Tetthet | *2 800* | $kg/m^3$ |
| $w$ | Madrassens vekt i vann | *?* | $kg$ |
| $F$ | Total kraft på betongmadrass | *?* | $N$ |

$$m_a = \rho_{vann} \times k \times \pi \times \frac{A^2}{4} \times B \quad (2)$$

| B/A | 1 | 1.5 | 2 | 2.5 | 5 |
|---|---|---|---|---|---|
| k | .58 | .70 | .76 | .80 | .90 |

Men en lengde (B) på 6m og en bredde (A) på 3m blir konstanten k for madrassen 0,76.

$$m_a = \rho_{vann} \times k \times \pi \times \frac{A^2}{4} \times B$$

$$m_a = 1000\,{}^{kg}/_{m^3} \times 0.76 \times \pi \times \frac{3m^2}{4} \times 6m\,[kg]$$

$$m_a = \underline{32232.7kg}$$

For å finne $F_a$ ganges $m_a$ med akselerasjonen som oppstår der hvor kranen befinner seg på skipet, Ref. figur xx og figur xx. Akselerasjonen er beregnet i senter på masten til kranen.

$$F_a = m_a \times a_v \quad (3)$$

$$F_a = 32232{,}7kg \times 5{,}71m/s^2\,[kN]$$

$$F_a = \underline{184kN}$$

Vekten nedsenket i vann, $w$, regnes så ut for å finne den totale vekten av madrassen. For å finne $w$ må først madrassens oppdrift regnes ut. Siden betongmadrassen består av mange små elementer benyttes madrassens vekt i luft og betongens tetthet til å beregne madrassens volum.

$$V = \frac{m}{\rho} \quad (4)$$

$$V = \frac{20000kg}{2800kg/m^3} \qquad [m^3]$$

$$V = \underline{7{,}14m^3}$$

Madrassens vekt i vann, $w$, er gitt ved formel (5).

$$w = vekt\ i\ luft - oppdrift \quad (5)$$

$$w = m \times g - \rho \times g \times V$$

$$w = 20000kg \times 9{,}81m/s^2 - 1000kg/m^3 \times 9{,}81m/s^2 \times 7{,}14m/s^2\,[kN]$$

$$w = \underline{126kN}$$

Kombinerer de to resultatene for å finne den totale vekten til madrassen.

$$F = F_a + W \quad (6)$$

$$F = 184kN + 126kN\ [kN]$$

$$F = \underline{310kN}$$

**Sammenligning av $F$ og $F_{sub}$**

I kapittel 6 brukes det en faktor på 2 for å ta høyde for de hydrodynamiske kreftene. Formel (7) viser hva den totale vekten av madrassen blir med en faktor på 2.

| Symbol | Definisjon | Numerisk verdi | Enhet |
|---|---|---|---|
| $F_{sub}$ | Designkraft | ? | $kg$ |
| $m$ | Massen til betongmadrass | 1 000 | $kg/m^3$ |
| $g$ | Gravitasjonskraften | 9,81 | $\frac{m}{s^2}$ |
| $k_1$ | Designfaktor til hydrodynamiske beregning | ? | - |
| $F$ | Kraften til hydrodynamiske beregning | 310 000 | $N$ |
| $k_2$ | Designfaktor til DNV 2.7-3 | 2 | - |

$$F_{sub} = 2 \times m \times g \quad (7)$$

$$F_{sub} = 2 \times 20000kg \times 9{,}81m/s^2\ [kN]$$

$$F_{sub} = \underline{392kN}$$

$F_{sub}$ er som vist vesentlig høyere enn $F$. $F$ deles på massen og tyngdeakselerasjon for å finne ut hvilken faktor denne vekten svarer til. Denne faktoren kalles for $k_1$.

$$k_1 = \frac{F}{m \times g} \quad (8)$$

$$k_1 = \frac{310000N}{20000kg \times 9{,}81m/s^2}$$

$$k_1 = \underline{1{,}58}$$
$$k_2 = \underline{2}$$

$$k_2 > k_1$$

$k_2$ vil være faktoren fra DNV som er på 2. $k_2$ er betydelig høyere enn $k_1$. Dette kan skyldes at $k_1$ ikke tar høyde for hydrodynamisk demping. DNV oppgir ikke hvordan de har kommet frem til sin faktor på 2, her er det usikkert om den har tatt høyde for hydrodynamisk demping eller

ikke. Når DNV sin faktor på 2,5 brukes ligger det som nevnt inne en faktor på 0,9 som skal ta høyde for at legemet skal ha oppdrift. Denne faktoren er beregnet for å bruke på stål, som har en tetthet på ca 7800 $kg/m^3$. Oppdrift på en betongmadrass, med tetthet på ca 2800 $kg/m^3$, vil ha mye større utslag enn oppdrift på en stålkonstruksjon, og vil derfor være med å forsvare bruken av DNV sin faktor. Nevnte argument legges til grunn for at det er greit å bruke DNV sin faktor på 2,5. Det samme gjelder for løft av hele konteineren da den inneholder en del betongmadrasser med lavere tetthet enn stål. Det er verdt å nevne at beregnignene i dette vedlegget ikke tar høyde for at kranen på Edda Freya har et aktiv hiv-kompenseringsystem.

NAUTICUS Hull

DNV Rules
January 1999
Pt.3 Ch.1 Sec.4B

## ACCELERATIONS
Version 10.5 Hull, Sept. 2006

Ship Id: Edda Freya

Sign:
Time: 14:49
Date: 18.04.16

**INPUT**

**Single point:**

| | | | | | |
|---|---|---|---|---|---|
| L = | 150,000 | m | | | |
| B = | 27,000 | m | x = | 40,00 | Dist. from AP |
| D = | 12,000 | m | y = | 10,00 | Dist. from CL |
| T = | 7,000 | m | z = | 9,10 | Dist. from BL |
| V = | 16,000 | kn | | | |
| $C_B$ = | 0,585 | [ - ] | | *Rule values:* | |
| GM = | 3,000 | m | | *1,89* | |
| $k_r$ = | 10,530 | m | | *10,53* | |

Even transv. distr. of mass — kr
Not Tank or Bulk — GM
Bilge keel — Roll damping
None — Service restriction

**RESULTS**

**PITCH motion (Q = $10^{-8}$)**

| | | | | | |
|---|---|---|---|---|---|
| Period | $T_P$ = | 7,04 | s | | (B500) |
| Angle | θ = | 0,19 | rad = | 10,76 | degrees |
| Rotation axis | $x_p$ = | 67,50 | m from AP | | |

**ROLL motion (Q = $10^{-8}$)**

| | | | | | |
|---|---|---|---|---|---|
| Period | $T_R$ = | 12,16 | s | | (B400) |
| Angle | ϕ = | 0,46 | rad = | 26,57 | degrees |
| Rotation axis | $z_r$ = | 6,00 | m above BL | | |

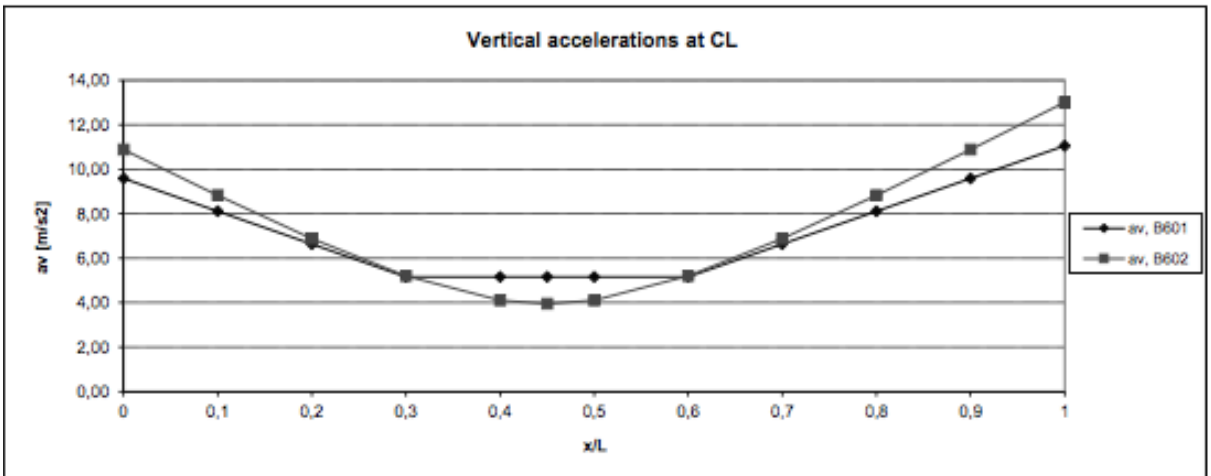
| | | | | |
|---|---|---|---|---|
| | | $a_x$ = | 0,66 | m/s² (B301) |
| Wave coefficient: | $C_W$ = | 8,91 | $a_y$ = | 1,29 m/s² (B302) |
| Acc. parameter: | $a_0$ = | 0,44 | $a_z$ = | 3,95 m/s² (B303) |

**Combined accelerations, al & at:**

| | | At D | Custom: | |
|---|---|---|---|---|
| Dist. above BL | $z_{BL}$ = | 12,00 | 9,10 | m |
| Transv. roll: | (B701) $a_{ry}$ = | 0,74 | 0,38 | m/s² |
| Long. pitch: | (B801) $a_{px}$ = | 0,90 | 0,47 | m/s² |
| Transv. comb: | (B700) $a_t$ = | 5,29 | 4,94 | m/s² |
| Long. comb: | (B800) $a_l$ = | 2,81 | 2,39 | m/s² |

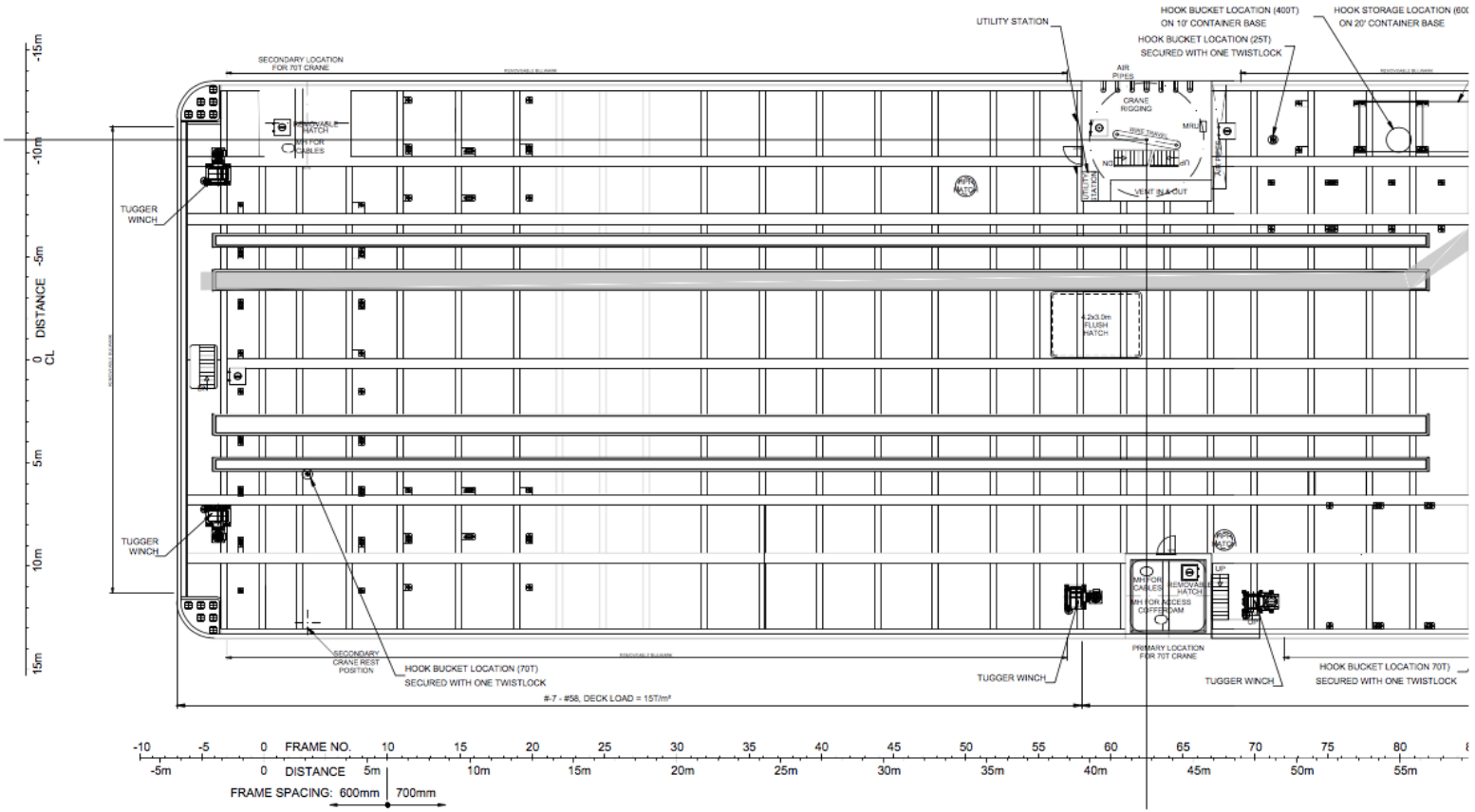
**Combined, vertical accelerations in CL, av:**

| | | B601 | B602 | |
|---|---|---|---|---|
| At AP | | 9,58 | 10,88 | m/s² |
| At L/2 | | 5,16 | 4,10 | m/s² |
| At FP | | 11,06 | 13,01 | m/s² |
| Dist.from AP: $x_{AP}$ = | 40 m | 5,65 | 5,71 | m/s² |
| Dist from CL: $y_{CL}$ = | 10 m | | | m/s² |




**Vertical acceleration, av, at CL [m/s²]**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0,1 | 0,2 | 0,3 | 0,4 | 0,5 | 0,6 | 0,7 | 0,8 | 0,9 | 1 | x/L |
| 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | [m] |
| **9,58** | **8,11** | **6,63** | **5,16** | **5,16** | **5,16** | **5,16** | **6,63** | **8,11** | **9,58** | **11,06** | B601 |
| **10,88** | **8,82** | **6,88** | **5,20** | **4,10** | **4,10** | **5,20** | **6,88** | **8,82** | **10,88** | **13,01** | B602 |


UTILITY STATION
HOOK BUCKET LOCATION (40OT)
ON 10' CONTAINER BASE
HOOK BUCKET LOCATION (25T)
SECURED WITH ONE TWISTLOCK
HOOK STORAGE LOCATION (60
ON 20' CONTAINER BASE
SECONDARY LOCATION
FOR 70T CRANE
AIR
PIPES
CRANE
RIGGING
VENT IN & OUT
TUGGER
WINCH
TUGGER
WINCH
4.2x3.0m
FLUSH
HATCH
SECONDARY
CRANE REST
POSITION
HOOK BUCKET LOCATION (70T)
SECURED WITH ONE TWISTLOCK
#-7 - #58, DECK LOAD = 15T/m²
PRIMARY LOCATION
FOR 70T CRANE
TUGGER WINCH
TUGGER WINCH
HOOK BUCKET LOCATION 70T)
SECURED WITH ONE TWISTLOCK
-15m
-10m
-5m
0
CL
DISTANCE
5m
10m
15m
-10 -5 0 FRAME NO. 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
-5m 0 DISTANCE 5m 10m 15m 20m 25m 30m 35m 40m 45m 50m 55m
FRAME SPACING: 600mm 700mm

# Vedlegg D: ROV dataark

DEEPOCEAN

## CONSTRUCTOR 220 HP

SPECIFICATION SHEET


### WORK CLASS ROV

The new constructor workclass rov is designed and built to support heavy duty operations in rough weather conditions. The robust design allow working in close proximity to subsea structures at high currents with very high regularity on vehicle and the strong hydraulic auxiliary package allow for vehicle to support larger subsea tooling operations

### KEY FEATURES

- THE NEW CONSTRUCTOR IS A HEAVY DUTY WORKROV DESIGNED FOR CARRYING AND OPERATING LARGE TOOLS AND MODULES.
- T160 LITRE/MINUTE HYDRAULIC AUXILIARY SUPPLY FOR LARGE TOOLING OPERATIONS.

## GENERAL

| | |
|---|---|
| DEPTH RATING | Depth rating 3000msw |
| POWER | Constructor 3, 4 ,5 and Constructor 6 have 220hp electric motor / 4150VAC |
| THRUSTERS HORIZONTAL | 4 x Sub Atlantic SA-380 |
| THRUSTERS VERTICAL | 3 x Sub Atlantic SA-380 |
| WEIGHT | 4500kg with Skid and manipulators. |
| PAY LOAD | 600kg |
| THROUGH FRAME LIFT | 3000kg |
| DIMENTIONS L X W X H | 3220mm x 1700mm x 2165mm |

## PERFORMANCE

| | |
|---|---|
| SURFACE PERFORMANCE | |
| FORWARD | 3,1 knots |
| LATERAL | 1,7 knots |
| BOLLARD PULL | |
| FORWARD/AFT | 800kg |
| LATERAL | 540kg |
| VERTICAL UP | 360kg |
| VERTICAL DOWN | 670kg |

## STANDARD EQUIPMENT

- 1 X LOW LIGHT CAMERA
- 1 X NORTH SEEKING GYRO
- 2 X COLOUR ZOOM CAMERA
- 1 X 5 FUNCTION GRABBER
- 1 X 7 FUNCTION MANIPULATOR ARM
- 2 X COLOUR MINI CAMERA
- 1 X EMERGENCY BEACON
- 1 X OBSTACLE AVOIDANCE SONAR
- 2 X HYDRAULIC PAN & TILT
- 1 X HYDRAULIC TILT UNIT
- 10 X 250W LIGHTS, VARIABLE INTENSITY
- TOOL DRAWER: MOUNTED AS STANDARD IN SKID.

## ISOLATED HPU

| | |
|---|---|
| PRESSURE | 210Bar max, adjustable from pilot chairs |
| FLOW | 105LPM@210Bar available<br>Auxiliary System:<br>160 LPM@210bar available |
| LOW FLOW VALVES | 20 x proportional flow 8l/min. Pressure and flow controlled from pilot chairs |
| HIGH FLOW VALVES | 4 x proportional 80l/min. Pressure and flow controlled from pilot chairs |
| FILTERS | Pressure, Return & Water absorbing |

## ERCONOMIC AND FUNCTINAL PILOT INTERFACE

| | |
|---|---|
| INTERFACE | Touch screen<br>Joystick & Computer controlled from pilot chairs<br>Realtime overview system |

## TELEMETREY AND SENSORS CAPACITY

| | |
|---|---|
| SERIAL CONNECTIONS | 36 channels, 115bps |
| ETHERNET | GBit |
| VIDEO | Interface for 8cameras<br>Interface for digital photo camera |
| HD VIDEO | Optional |
| GYRO | FOG is standard / INS is optional |
| ALTIMETER | Standard |
| DEPTH SENSOR | Standard |
| OTHER SENSORS | Connectors: 5 x 115VAC and 4 x 24VDC |
| SPARE OPTICAL FIBERS | 3 |
| LIGHTING | 10-250W dimmable lamp |

## CONTROL CONTAINER

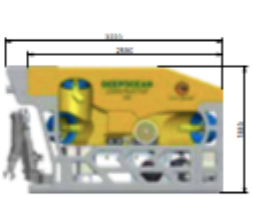
6 x 2,5m A60 Safe area Container, housing power distribution, control consoles and video suites.

## WORKSHOP CONTAINER

6 x 2,5m, A60 Safe area Container, housing extensive spares, consumables, tools, manuals and test equipment.

## TECHNICAL MOBIC TMS

| | |
|---|---|
| ENVELOP DIMENSIONS | |
| LENGTH / WIDTH | Ø2.200mm (Lower frame) |
| HEIGHT | 2.419mm incl. latching unit |
| DEPTH RATING | 3.000msw |
| WEIGHT IN AIR | 3.500kg |
| THROUGH FRAME LIFT (LATCH LOAD) | 10.000kg |
| LIFTING POINT CAPACITY | 12.800kg |
| TETHER DRUM CAPASITY | Ø35mm x 400meter |
| POWER SUPPLY | 3kV/3ph/60Hz |
| TOTAL POWER HPU MOTOR | 15kW |



Revision Date 11.03.16



www.deepoceangroup.com

# Vedlegg E: Edda Freya

DEEPOCEAN

## EDDA FREYA

VESSEL SPECIFICATION SHEET


### OFFSHORE CONSTRUCTION VESSEL

The Edda Freya is a state of the art construction vessel suited for operations worldwide and utilising an environmentally friendly, fuel-saving diesel-electric hybrid propulsion system. Edda Freya was designed with a focus on cable laying operations, offshore construction and inspection, and maintenance and repair (IMR) operations, and also with a focus on redundancy, excellent maneuverability and station keeping.

The vessel has 2300m2 of deck space and is equipped with a 400 T AHC offshore crane that can lift 600 T in double-fall mode, a 70 T AHC offshore crane which is bolted, and can easily be moved to secondary position, a Huisman 150 T dual tensioner VLS located over the main moonpool, a system for quick mobilisation of reels and reel drive systems, an integrated skidding system for modules, two moonpool launch and recovery system for WROVs and a 3000 T carousel is located below deck.

In addition to the hybrid battery system Edda Freya's environmentally friendly credentials are enhanced by the adoption of Siemens' BlueDrive PlusC concept, which was implemented by Siemens in co-operation with Østensjø Rederi. By using variable rotational speed with optimal operation of the diesel generators in combination with the battery system, the system will significantly reduce fuel consumption and the emissions of nitrogen oxides (NOx) and greenhouse gases (CO2 and methane). The use of selective catalytic reduction systems further reduces emissions.

### KEY VESSEL FEATURES

- LENGTH 149,8m
- BEAM 27m
- DP3
- 600T AHC OFFSHORE CRANE
- 70 TE AHC OFFSHORE CRANE
- 150T HUISMAN VLS
- 3000T CAROUSEL BELOW DECK
- 2 OFF 220HP CONSTRUCTOR WROVS MOONPOOL HANDLING, L&R 6-7mHs
- SIEMENS BLUEDRIVE PLUSC POWER MANAGEMENT REDUCING YEARLY FUEL CONSUMPTION WITH 15 - 20%
- ACCOMMODATION FOR 140 PERSONS
- 2300m² DECK AREA
- SCR CATALYTIC REACTORS FOR REDUCED NOX EMITION TO AIR

## GENERAL

| | |
|---|---|
| OPERATOR | Østensjø Rederi<br>Charterer: DeepOcean AS |
| SHIP OWNER | Østensjø Rederi |
| BUILT BY | Kleven verft |
| DELIVERED | 2016 |
| DESIGN | SALT 304 OCV |

## MAIN PARTICULARS

| | |
|---|---|
| LENGTH OVERALL | 149,8 m |
| LENGTH BETWEEN PP. | 138,3 m |
| BREADTH MOULDED | 27 m |
| DEPTH MAIN DECK | 12 m |
| MAX. SCANTLING DRAUGHT | 8,5 |
| CLASS | "+1A1, SF, EO, DYNPOS AUTRO, COMF C(3), Comf V(3), Clean Design, BIS, ICE 1C, DK(+), TMON, CRANE, NAUT OSV(A)-ICS, HELDSK-SH (CAA-N) |
| ACCOMMODATION | 140 persons (64 single cabins and 38 double cabins) |

## CAPACITIES

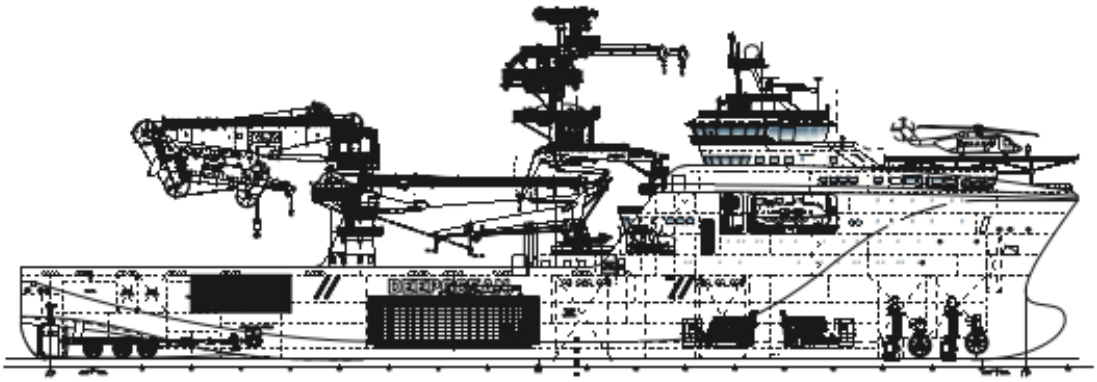
| | |
|---|---|
| CARGO DECK AREA | 2300 m² |
| FUEL OIL | 2200 m³ |
| BALLAST WATER | 6800 m³ |
| FRESH WATER | 1000 m³ |
| DEADWEIGHT (MAX DRAUGHT AND OPEN MOONPOOL) | 10000 t |
| DECK STRENGTH (AFT OF MAIN CRANE) | 15 t/m² |
| DECK STRENGTH (FWD OF MAIN CRANE) | 10 t/m² |
| DECK LOAD CAPACITY | Approx. 6000 t |
| MAIN ENGINES & GENERATOR SET | 2 x MaK 8M32E<br>2 x MaK 6M32E<br>2 x MaK 6M20C |
| ELECTRICAL SYSTEM AND POWER MANAGEMENT | Siemens BlueDrive PlusC<br>4 x 130 kWh Battery banks<br>Integrated EMS System |
| THRUSTERS | 2 x 1500 kW Brunnvoll Retractable Azimuth Thruster<br>4 x 2050 kW Brunnvoll Tunnel Thruster |
| MAIN PROPULSION | Scana Volda CP95/AG TS1000<br>Reduction Gear: 2 x AG TS1000 (Twin input-sigle output)<br>Power: 2 x 4200 kW<br>Propeller speed: 145 rpm<br>Propeller diameter: 4300 mm |
| AUTOMATION | Kongsberg K-Chief 700<br>Siemens RCS for Thrusters and Propulsion |
| MOONPOOL | 2 x ROV moonpool 6,3 m x 4,2 m net opening<br>1 x Work moonpool 7,2 m x 7,2 m net opening |

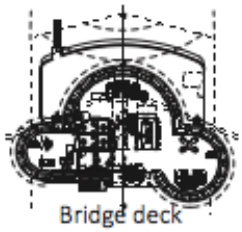
| | |
|---|---|
| DYNPOS, NAVIGATION AND COMMUNICATION | Kongsberg Maritime Dynamic Positioning System<br>1 off KPOS DP-21<br>1 off KPOS DP-II Class 3 Back-up DP<br>1 off cJoy joystick system |
| | Reference systems installed:<br>2 x DPS 232<br>2 x Seapath 330<br>1 x CyScan system<br>1 x RADius 1000<br>2 x KONGSBERG Redundant HiPAP® 502 system |
| OFFSHORE CRANES | Main Crane NOV Knuckle Boom Crane<br>Single Fall lift mode: 400 t @ 20m AHC, 150 t @ 40 m AHC<br>2-Fall Lift Mode: 600 t @ 14 m AHC<br>Special Lift Mode: 400 t @ 18 m AHC<br>Water Depth Main Crane Single fall: 3000 m<br>Main Offshore Crane Aux hook: 25 t @ 43 m AHC |
| | Auxiliary Crane NOV Knuckle Boom Crane<br>Single Fall lift mode: 70 t @ 21 m AHC, 14 t @ 45 m AHC<br>Water Depth Auxiliary Crane: 2000 m<br>Auxiliary Crane Aux Hook 10 t @ 50 m |
| ROV SYSTEM | 2 x 220 Hp Kystdesign Constructor W-ROV 3000 m water depth rating<br>MacGregor AHC Moonpool Launching- and recovery System<br>2 x ROV Handling Cranes<br>Skidding system |
| DECK EQUIPMENT | Deck Tugger Winches: 4 x 10 t CT<br>Shipboard crane: NOV knuckle Jib Crane<br>Single Fall: 10 t @ 15 m; 5 t @ 20 m<br>Helideck 26,1 m - 16 t |
| VLS | 150 t Huisman VLS<br>2 x 75 t 4-track Tensioners<br>Electric Driven Retractable Tensioners<br>185 t Below Deck A&R winch<br>Service Crane 18 t @ 8 m<br>2 x 10 t Hoisting Beams<br>2 x 5 t Moonpool Tugger Winches<br>2 x 2 t Product Handling Winches |
| CAROUSEL | 3000 t IMECA Below Deck Carousel<br>6m Ø Core<br>24, 3m Ø Overall<br>6 m Height<br>Spooling arm 8 t SWL<br>Modular partioning |
| DECK SKID SYSTEM | Prepared for Reel Drive system<br>Deck Skid System<br>6 x 400 t Reel capacity |
| LIFESAVING EQUIPMENT | Life Boats - Life Rafts<br>2 x Covered Lifeboats with capacity 130 persons<br>Life boats and rafts 100% each side<br>MOB Boats<br>1 x Weedo 700 FRC<br>1 x Weedo 17 RB |

## FUEL CONSUMPTIONS

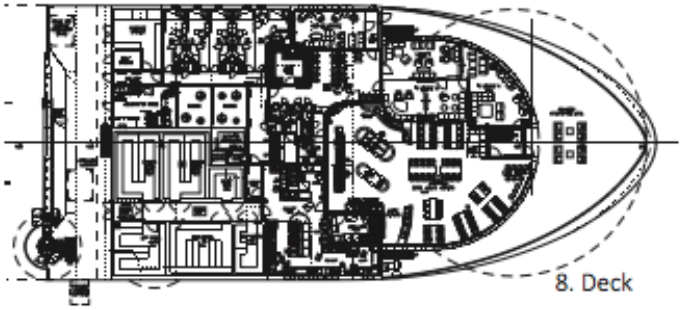
| | |
|---|---|
| MAX SPEED | 15,5 kts |
| SERVICE SPEED | 13 kts. Helideck: D = 22,8 T = 16 |
| DP MODE | Approx. 17 m³/24 hrs |
| HARBOUR MODE | Approx. 7 m³/24 hrs |

# EDDA FREYA

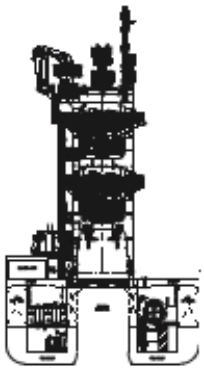




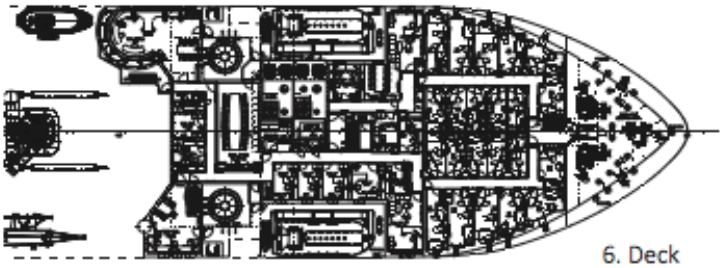
Bridge deck



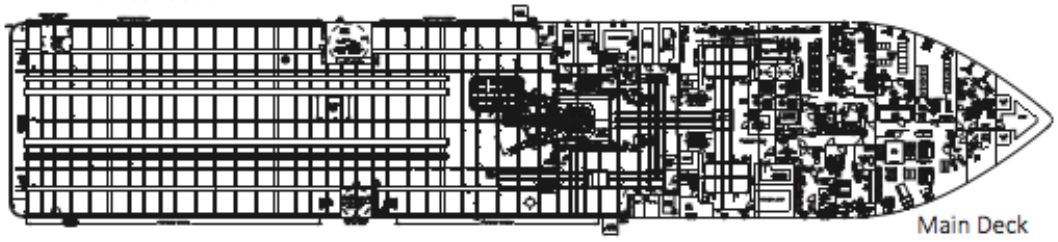
8. Deck



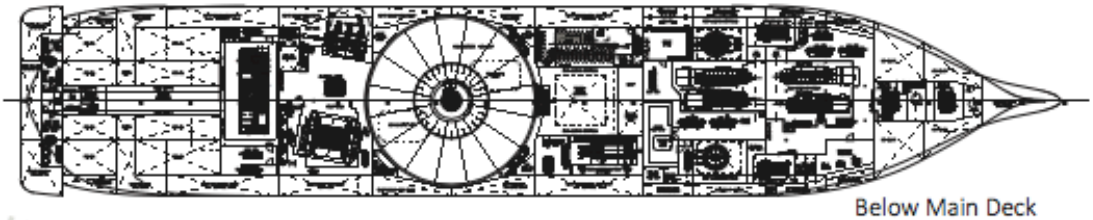
Cross section



6. Deck



Main Deck



Below Main Deck

# Vedlegg F: "Green Pin® Standard Shackles"

To ensure the high and steady quality of our Green Pin® products, Van Beest is certified according to the latest ISO norm, 9001: 2008. This high quality standard is implemented in all aspects of our organization, from the purchase of the raw material to the education of our staff and the quality inspections during the production process.

You can make sure you are using the original Green Pin® product by checking the marking on the body and pin of the shackle. The shackles are marked with the WLL, the steel grade, CE conformity sign and our manufacturer's code. Furthermore our products show a traceability code that enables us to trace any shackle back to the raw material and all the stages of the production process up until its final testing. Please make sure you use genuine Green Pin® products; after all, you would not want to find yourself risking lives and loads using a copy!

GP Green Pin

Member of **Van Beest International**

Manufacturer and supplier of wire rope- and chain accessories, with offices in The Netherlands, Germany, France and the USA.

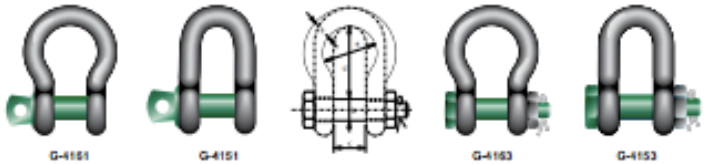
Registered trade name: Green Pin®

E-mail: **sales@vanbeest.com**
Website: **www.vanbeest.com**

Your dealer:

## Green Pin® Standard Shackles

- **Material** : bow and pin high tensile steel, Grade 6, quenched and tempered
- **Safety Factor** : MBL equals 6 x WLL
- **Standard** : EN 13889 and meets performance requirements of US Fed. Spec. RR-C-271 DNV type approved to certification note 2.7-1
- **Finish** : hot dipped galvanized
- **Temperature Range** : -20°C up to +200°C
- **Certification** : at no extra charges this product can be supplied with a works certificate, material certificate, manufacturer test certificate and/or EC Declaration of Conformity

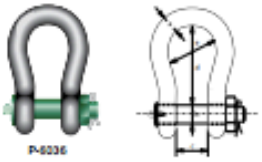


G-4151 G-4151 G-4153 G-4153

| working load limit | diameter bow | diameter pin | width inside | length inside dee type | length inside bow type | width bow | weight each screw pin | weight each safety bolt |
|---|---|---|---|---|---|---|---|---|
| tons | a mm | b mm | c mm | d mm | d mm | e mm | kg | kg |
| 0.33 | 5 | 6 | 9.5 | 19 | 22 | 16 | 0.02 | -- |
| 0.5 | 7 | 8 | 12 | 22 | 29 | 20 | 0.05 | 0.06 |
| 0.75 | 9 | 10 | 13.5 | 26 | 32 | 22 | 0.10 | 0.11 |
| 1 | 10 | 11 | 17 | 32 | 36.5 | 26 | 0.14 | 0.16 |
| 1.5 | 11 | 13 | 19 | 37 | 43 | 29 | 0.19 | 0.22 |
| 2 | 13.5 | 16 | 22 | 43 | 51 | 32 | 0.36 | 0.42 |
| 3.25 | 16 | 19 | 27 | 51 | 64 | 43 | 0.63 | 0.74 |
| 4.75 | 19 | 22 | 31 | 59 | 76 | 51 | 1.01 | 1.18 |
| 6.5 | 22 | 25 | 36 | 73 | 83 | 58 | 1.50 | 1.77 |
| 8.5 | 25 | 28 | 43 | 85 | 95 | 68 | 2.21 | 2.58 |
| 9.5 | 28 | 32 | 47 | 90 | 108 | 75 | 3.16 | 3.66 |
| 12 | 32 | 35 | 51 | 94 | 115 | 83 | 4.31 | 4.91 |
| 13.5 | 35 | 38 | 57 | 115 | 133 | 92 | 5.55 | 6.54 |
| 17 | 38 | 42 | 60 | 127 | 146 | 99 | 7.43 | 8.19 |
| 25 | 45 | 50 | 74 | 149 | 178 | 126 | 12.84 | 14.22 |
| 35 | 50 | 57 | 83 | 171 | 197 | 138 | 18.15 | 19.85 |
| 42.5 | 57 | 65 | 95 | 190 | 222 | 160 | 26.29 | 28.33 |
| 55 | 65 | 70 | 105 | 203 | 260 | 180 | 37.6 | 39.59 |
| 85 | 75 | 83 | 127 | 229 | 329 | 190 | -- | 62 |

## Green Pin® Heavy Duty Shackles

- **Material** : bow and pin alloy steel, Grade 8, quenched and tempered
- **Safety Factor** : MBL equals 5 x WLL
- **Finish** : shackle bow painted silver, pin painted green (120 tons shackle is hot dipped galvanized)
- **Certification** : at no extra charges this product can be supplied with a works certificate, material certificate, manufacturer test certificate, EC Declaration of Conformity and all shackles starting from 150 tons are supplied with a Lloyd's Register of Shipping Certificate on proof load
- **Note** : + 5% forging tolerance on inside width and length



P-6336

| working load limit | diameter bow | diameter pin | width inside | length inside | width bow | weight each |
|---|---|---|---|---|---|---|
| tons | a mm | b mm | c mm | d mm | e mm | kg |
| 120 | 95 | 95 | 144 | 381 | 238 | 110 |
| 150 | 105 | 108 | 165 | 400 | 275 | 160 |
| 200 | 120 | 130 | 175 | 500 | 290 | 235 |
| 250 | 130 | 140 | 200 | 540 | 305 | 285 |
| 300 | 140 | 150 | 200 | 600 | 305 | 340 |
| 400 | 170 | 175 | 225 | 650 | 325 | 560 |
| 500 | 180 | 185 | 250 | 700 | 350 | 685 |
| 600 | 200 | 205 | 275 | 700 | 375 | 880 |
| 700 | 210 | 215 | 300 | 700 | 400 | 980 |
| 800 | 210 | 220 | 300 | 700 | 400 | 1100 |
| 900 | 220 | 230 | 320 | 700 | 420 | 1280 |
| 1000 | 240 | 240 | 340 | 700 | 420 | 1460 |
| 1250 | 260 | 270 | 360 | 750 | 450 | 1990 |
| 1500 | 280 | 290 | 360 | 800 | 450 | 2400 |

# Vedlegg G: "ROV hook"

the Crosby group

## ROV products

### Crosby® ROV Hooks

For efficient handling and attachment by Remote Operating Vehicles to subsea and other hard-to-reach loads. Developed in conjunction with major North Sea subsea operators.

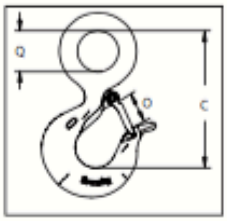
*L320R Eye Hooks (Patented)*

*L562A Shank Hooks (Patented)*

**Crosby® ROV Hooks incorporate the following features:**

- Hook identification code stamped on each hook.
- Quenched and Tempered.
- QUIC-CHECK® angle indicators forged into the top eye; and deformation and angle indicators forged on the hook.
- Fluorescent yellow for high visibility subsea.
- Tip extension allows for easy handling.
- New integrated latch (S-4320) meets the World class standard for lifting.
- Heavy duty stamped latch interlocks with the hook tip.
- High cycle, long life spring.
- Pad eyes are provided on either side of hook as cable guides. The cable is passed through a hole drilled in the latch that assists in allowing the "remotely operated" cable to open latch.
- Cables and drilled latches are not provided by Crosby. They can be fitted by your local Authorized Crosby Dealer. Crosby allows you to modify the latch as required to accomplish the task.

**Crosby® L320R Eye Hooks are available in 10 standard sizes.**

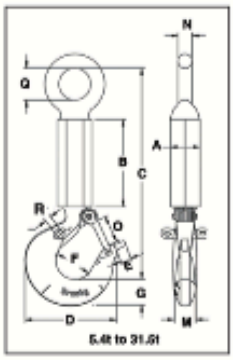



| Stock No. | Working Load Limit (t)* | Weight Each (kg) | Dimensions (mm) | | |
|---|---|---|---|---|---|
| | | | Q | C | O |
| 1298427 | †3.2 | 1.01 | 32 | 119 | 28 |
| 1298497 | †5.4 | 2.04 | 40 | 147 | 35 |
| 1298567 | †8 | 3.92 | 51 | 187 | 41 |
| 1298637 | †11.5 | 7.02 | 62 | 230 | 53 |
| 1298707 | †16 | 10.1 | 72 | 256 | 58 |
| 1298777 | †22 | 18.4 | 89 | 318 | 77 |
| 1298847 | †31.5 | 28.1 | 89 | 357 | 93 |
| 1298857 | 37 | 46.5 | 114 | 402 | 95 |
| 1298867 | 45 | 62.1 | 125 | 511 | 114 |
| 1298877 | 80 | 102 | 145 | 602 | 130 |

* Minimum Ultimate Load is 4 times the Working Load Limit
† Utilizes Crosby S320N style hook.

Hooks are opened remotely by cables (fitted by Authorized Crosby Distributor) and guided by pad eyes on either side of the hook.

Spedial pad eye positioning available upon request.




**Crosby® L562A ROV Shank Hooks, with 250 mm long hexagonal body ror easy handling by ROV manipulators, are available in 11 standard sizes.**

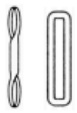
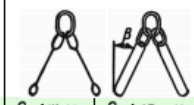
| Working Load Limit (t)* | Hook ID Code | Stock No. | Weight Each (kg) | Dimensions (mm) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F | G | H | M | N | O | Q | R |
| †5.4 | IA | 1297722 | 9.5 | 65 | 250 | 421 | 123 | 9.9 | 51 | 37 | - | 29 | 22 | 35 | 51 | 6.4 |
| †11.5 | KA | 1297792 | 15 | 65 | 250 | 518 | 192 | 30 | 76 | 57 | - | 41 | 32 | 53 | 76 | 9.7 |
| †16 | LA | 1297806 | 18 | 65 | 250 | 560 | 212 | 30 | 83 | 66 | - | 49 | 35 | 58 | 79 | 9.7 |
| †22 | NA | 1297862 | 31 | 85 | 250 | 606 | 263 | 45 | 108 | 76 | - | 60 | 40 | 77 | 91 | 19 |
| †31.5 | OA | 1298042 | 44 | 85 | 250 | 660 | 346 | - | 127 | 92 | 104 | 76 | 48 | 106 | 92 | 19 |
| **37 | PA | 1298049 | 44 | 80 | 235 | 828 | 357 | - | 137 | 116 | 127 | 76 | 47 | 95 | 134 | 19 |
| **45 | SA | 1298057 | 90 | 80 | 235 | 865 | 392 | - | 152 | 129 | 127 | 83 | 47 | 108 | 134 | 19 |
| **80 | TA | 1298087 | 131 | 90 | 215 | 941 | 470 | - | 178 | 152 | 146 | 99 | 53 | 130 | 150 | 19 |
| **85-100 | TA | 1298103 | 303 | 140 | 300 | 1185 | 584 | - | 173 | 218 | 184 | 140 | 69 | 124 | 190 | 19 |
| **150 | TA | 1298117 | 395 | 150 | 230 | 1233 | 619 | - | 171 | 232 | 229 | 152 | 92 | 137 | 309 | 19 |
| **175 | TA | 1298130 | 515 | 170 | 225 | 1326 | 678 | - | 191 | 248 | 254 | 178 | 102 | - | 300 | 19 |

* Minimum Ultimate Load is 4 times the Working Load Limit
** Utilize Crosby G-2140 shackle as eye.
† Utilizes Crosby S319N style hook.

Additional Working Load Limits available for L320R and L562 A upon request.

# Vedlegg H: Stropper

## TABELL FIBERREDSKAP
## RUNDSLING(RS) & BÅNDSTROPP(BS)

| WLL= MAX TILLATT ARBEIDSLAST i TONN | | | | | | Standard sertifisering av flerpartet redskap: Arbeidsvinkel (β) = 45° | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| KAPASITET I TONN | | | RETT STREKK | SNARET | U-LØFT | U-LØFT m/vinkel | | 2-PART | | 3- og 4-PART | |
| Sikkerhets-faktor 7 | ANLEGGS-DIAMETER mm (boltdiameter) | |  |  |  |  | |  | |  | |
| FARGE | RS | BS | | | | β ∠ til 45° | β ∠ 45°- 60° | β ∠ til 45° | β ∠ 45°- 60° | β ∠ til 45° | β ∠ 45°- 60° |
| FIOLETT | 20 | 55-90 | 1,0 | 0,8 | 2,0 | 1,4 | 1,0 | 1,4 | 1,0 | 2,1 | 1,5 |
| GRØNN | 30 | 60-100 | 2,0 | 1,6 | 4,0 | 2,8 | 2,0 | 2,8 | 2,0 | 4,2 | 3,0 |
| GUL | 40 | 70-120 | 3,0 | 2,4 | 6,0 | 4,2 | 3,0 | 4,2 | 3,0 | 6,3 | 4,5 |
| RØD | 50 | 90-140 | 5,0 | 4,0 | 10,0 | 7,0 | 5,0 | 7,0 | 5,0 | 10,5 | 7,5 |
| BLÅ | 90 | 120-180 | 8,0 | 6,4 | 16,0 | 11,2 | 8,0 | 11,2 | 8,0 | 16,8 | 12,0 |
| ORANSJE | 100 | 140-210 | 10,0 | 8,0 | 20,0 | 14,0 | 10,0 | 14,0 | 10,0 | 21,0 | 15,0 |
| FAKTOR | | | 1 | 0,8 | 2 | 1,4 | 1 | 1,4 | 1 | 2,1 | 1,5 |

Størrelser over 10 tonn er som oftest oransje

**TEMPERATUR**

-40° til +100°C = FAKTOR 1
FIBER SKAL IKKE BRUKES VED TEMPERATUR OVER 100°C


**ARBEIDSVINKEL (∠)**
**A:** Toppvinkel
**ß:** Arbeidsvinkel

- Bruk aldri en skadet stropp
- Trekk aldri gods med stoppen
- Ikke kryss eller vri båndstoppen ved last
- Lag aldri en knute
- Når gods har skarpe kanter – bruk mellomlegg
- Plasser stroppen riktig, den skal ikke kunne skli under bruk.
- Bruk sprederbom ved langt gods

Standard sertifisering av flerpartet redskap
Arbeidsvinkel = 45°
OVERSKRID ALDRI TOPPVINKEL 120°

Dersom anleggsdiameteren er mindre enn anbefalt verdi
⇓
BRUK mellomlegg

Stropper produsert i polyester har blå etikett.

Etiketten skal inneholde opplysninger om:
SWL/WLL, Id-nummer, produksjonsmåned og –år
og leverandøridentitet

**KONTROLLER STROPPEN FØR BRUK**

**TOTALLEVERANDØR GIR TOTALGARANTI!**

**Transportutstyr AS**
Tlf.nr. +47 63 87 10 80 Faks: +47 63 87 40 30
www.transportutstyr.no post@transportutstyr.no

# Vedlegg I: Sjekklister

| Sjekkliste før bruk av utstyr | | | |
|---|---|---|---|
| Hva | **Utførelse** | **Utført** | **Sign** |
| **Visuell kontroll** | Sjekke utstyret for deformasjoner, sprekker, slitasje eller annet feil | | |
| **ROV-krok** | Sjekke/smøre låsmekanismen på ROV-krok | | |
| **"VI-SO Clamp"** | Sjekke at boltene til løfterammen er festet med tilstrekkelig moment. Smøre låsmekanismen | | |
| **"Twistlock"** | Sjekke/smøre låsmekanismen | | |
| **Stropper** | Sjekke at riktige stropper er montert | | |

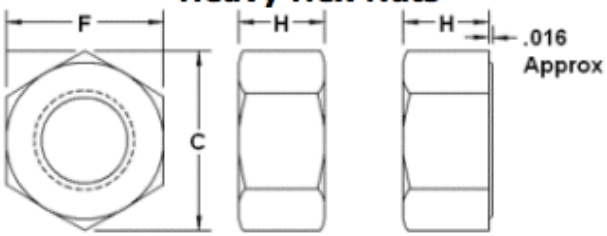
| Kommentar |
|---|
| |

| Sjekkliste etter bruk av utstyr | | | |
|---|---|---|---|
| Hva | **Utførelse** | **Utført** | **Sign** |
| **Visuell kontroll** | Sjekke utstyret for deformasjoner, sprekker, slitasje eller annet feil | | |
| **Løfterammen** | Spyles godt med ferskvann | | |
| **Konteineren** | Spyles godt med ferskvann. Husk inni RHS-bjelker. | | |
| **"VI-SO Clamp"** | Sjekke at boltene til løfterammen er festet med tilstrekkelig moment. Smøre låsmekanismen | | |
| **"Twistlock"** | Sjekke/smøre låsmekanismen | | |

| Kommentar |
|---|
| |

# Vedlegg J: Skruediagram

## Heavy Hex Nuts




Heavy Pattern Nuts

| | | | |
|---|---|---|---|
| SAE J995 Grade 2, ASTM A563 | | Plain = NH020---- | Zinc = NH020----Z1 |
| ASTM A194 GR. 2H | Material: 1045 steel | Plain = NH2H0---- | Zinc = NH2H0----Z1 |
| Hardness 24-38 | | | |
| ASTM A194 GR. 4 | Material: 4042 steel | Plain = NH400---- | Zinc = NH400----Z1 |
| ASTM A194 GR. 7 | Material: 4140 steel | Plain = NH700---- | Zinc = NH700----Z1 |

Note: You can upgrade from Grade 4 to Grade 7, but not vice versa.

Heavy Jam Pattern Nuts

| | | |
|---|---|---|
| SAE J995 Grade 2, ASTM A563 | Plain = NHJ020---- | Zinc = NHJ020----Z1 |

| Nominal Size | Coarse Thread | Fine Thread | F | C | | H | Full Nut Weight Per C | H | Jam Nut Weight Per C |
|---|---|---|---|---|---|---|---|---|---|
| | | | Width Across Flats | Width Across Corners | | Thickness Hex Nut | | Thickness Jam Nut | |
| | | | Basic | Max | Min | | | | |
| 1/4 | 20 | 28 | ½ | 0.577 | 0.556 | 15/64 | 1.16 | 11/64 | .82 |
| 5/16 | 18 | 24 | 9/16 | 0.650 | 0.622 | 19/64 | 1.72 | 13/64 | 1.17 |
| 3/8 | 16 | 24 | 11/16 | 0.794 | 0.763 | 23/64 | 3.14 | 15/64 | 2.02 |
| 7/16 | 14 | 20 | ¾ | 0.866 | 0.830 | 27/64 | 4.16 | 17/64 | 2.61 |
| 1/2 | 13 | 20 | 7/8 | 1.010 | 0.969 | 31/64 | 6.54 | 19/64 | 4.00 |
| 9/16 | 12 | 18 | 15/16 | 1.038 | 1.037 | 35/64 | 8.15 | 21/64 | 4.91 |
| 5/8 | 11 | 18 | 1 1/16 | 1.227 | 1.175 | 39/64 | 11.90 | 23/64 | 6.96 |
| 3/4 | 10 | 16 | 1 ¼ | 1.443 | 1.382 | 47/64 | 19.30 | 27/64 | 11.00 |
| 7/8 | 9 | 14 | 1 7/16 | 1.660 | 1.589 | 55/64 | 29.70 | 31/64 | 16.70 |
| 1 | 8 | 14 | 1 5/8 | 1.876 | 1.796 | 63/64 | 42.50 | 35/64 | 23.50 |
| 1-1/8 | 7 | 12 | 1 13/16 | 2.093 | 2.002 | 1 7/64 | 59.20 | 39/64 | 32.40 |
| 1-1/4 | 7 | 12 | 2 | 2.309 | 2.209 | 1 7/32 | 78.60 | 23/32 | 45.80 |
| 1-3/8 | 6 | 12 | 2 3/16 | 2.526 | 2.146 | 1 11/32 | 102 | 25/32 | 59.30 |
| 1-1/2 | 6 | 12 | 2 3/8 | 2.742 | 2.622 | 1 15/32 | 131 | 27/32 | 74.80 |
| 1-5/8 | 5 | 12 | 2 9/16 | 2.959 | 2.828 | 1 19/32 | 162 | 29/32 | 91.60 |
| 1-3/4 | 5 | 12 | 2 ¾ | 3.175 | 3.035 | 1 23/32 | 204 | 31/32 | 114 |
| 1 7/8 | 5 | 12 | 2 15/16 | 3.392 | 3.242 | 1 27/32 | 241 | 1 1/32 | 134 |
| 2 | 4.5 | 12 | 3 1/8 | 3.608 | 3.449 | 1 31/32 | 299 | 1 3/32 | 165 |
| 2 1/4 | 4.5 | 12 | 3 ½ | 4.041 | 3.862 | 2 13/64 | 419 | 1 13/64 | 227 |
| 2 ½ | 4 | 12 | 3 7/8 | 4.474 | 4.275 | 2 29/64 | 564 | 1 29/64 | 332 |
| 2 ¾ | 4 | 12 | 4 ¼ | 4.907 | 4.688 | 2 45/64 | 738 | 1 37/64 | 429 |
| 3 | 4 | 12 | 4 5/8 | 5.340 | 5.102 | 2 61/64 | 950 | 1 45/64 | 545 |
| 3 ¼ | 4 | 12 | 5 | 5.774 | 5.515 | 3 3/16 | 1194 | 1 13/16 | 651 |
| 3 ½ | 4 | 12 | 5 3/8 | 6.207 | 5.928 | 3 7/16 | 1526 | 1 15/16 | 851 |
| 3 ¾ | 4 | 12 | 5 ¾ | 6.640 | 6.341 | 3 11/16 | 1812 | 2 1/16 | 1005 |
| 4 | 4 | 12 | 6 1/8 | 7.073 | 6.755 | 3 15/16 | 2180 | 2 3/16 | 1200 |

Dimensional specifications per ASME B18.2.2



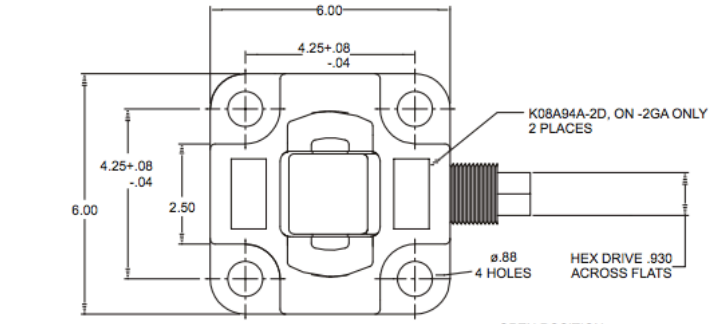
Page 34 of 99

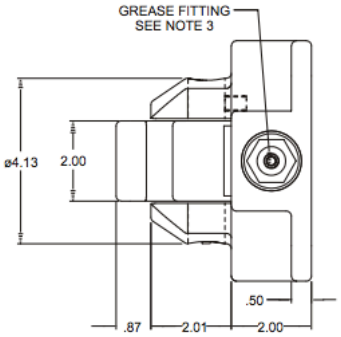
# Vedlegg K: ”VI-SO Clamp”

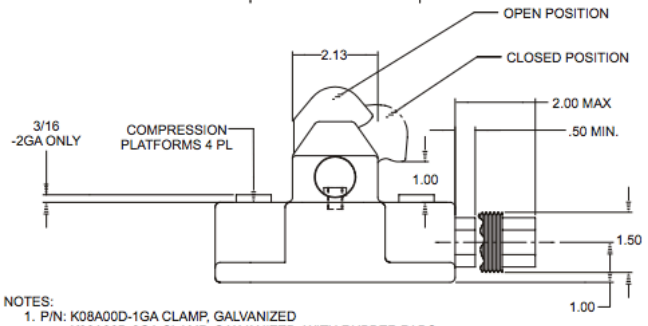
## VI-SO HIGH-STRENGTH VERTICAL CLAMP CONNECTOR (K08A00D)

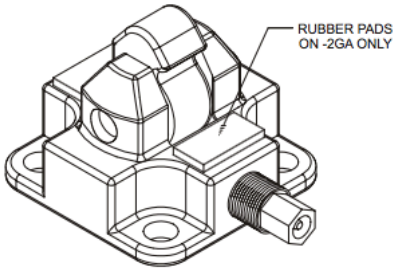
**Cage Code: 65059 | Drawing No: SK08A00D | Revision: A | Sheet: 1 of 2**

SEE ELECTRONIC PARTS LIST FOR BILL OF MATERIALS
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES




NOTES:
1. P/N: K08A00D-1GA CLAMP, GALVANIZED
   K08A00D-2GA CLAMP, GALVANIZED, WITH RUBBER PADS
2. THE GRIP & FORCE EXERTED BY THE CLAMP ARM IS VARIABLE BY ROTATING THE DRIVE STUD
3. STRENGTH RATINGS OF VISO* [AT 50 FT/LB OF TORQUE]:
   MAXIMUM ALLOWABLE LOADS FOR ONE VI-SO. (1.67* SAFETY FACTOR TO ULTIMATE)
   64,000 LB. *RESTRAINT AGAINST UPWARD FORCE
   50,000 LB. TRANSVERSE SHEAR
   200,000 LB. COMPRESSION, TOTAL ON 4 PLATFORMS
4. 3/4" GR. 8 ALLOY STEEL BOLTS IN 4 PLACES ARE REQUIRED FOR ABOVE RATINGS.

*NOTE THAT STANDARD STEEL CORNER FITTINGS USUALLY HAVE MECHANICAL PROPERTIES AT YIELD POINT OF 40,000 TO 45,000 PSI AT ABOUT A 50,000 LB. LOADING, THE CLAMP ARM BEARING AREA WILL START TO LOCALLY DEFORM THE STANDARD STEEL CORNER. IF MORE STRENGTH IS REQUIRED, A HIGHER STRENGTH CORNER IS REQUIRED.

REVISIONS

| REV | DESCRIPTION | DATE | APPROVED |
|---|---|---|---|
| A | ENLARGED HEX DRIVE, AND CLAMP, ADDED DIMS., 1.067, 2.00, 1.50 | 10/5/06 | MD |



TANDEMLOC INC
Email: info@tandemloc.com • www.tandemloc.com
824 Highway 101 • Havelock, NC 28532
TEL: 1.800.258.7324 (252.447.7155)
FAX: 1.800.892.3273 (252.447.5502)

Tandemloc designs, manufactures and tests lifting, securing and mobilizing components for all industries. See our website for details and important safety information.

Read all safety labels and instructions prior to use. Product to be used by qualified personnel only.

# VI-SO HIGH-STRENGTH VERTICAL CLAMP CONNECTOR (K08A00D)

**Cage Code: 65059 | Drawing No: SK08A00D | Revision: A | Sheet: 2 of 2**

SEE ELECTRONIC PARTS LIST FOR BILL OF MATERIALS
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES

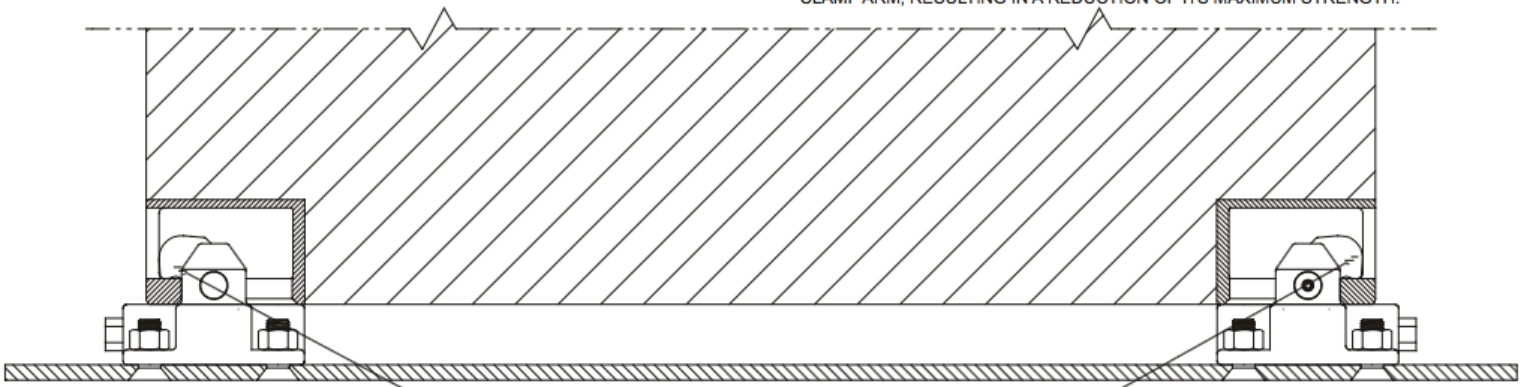
**USE INFORMATION:**

A. USE - FOR A SLACK-FREE, CLAMP-DOWN CONNECTION OF EACH CORNER OF AN ISO 668 TYPE CONTAINER TO A DECK OR OTHER STRUCTURE, LOWER THE CONTAINER SO THAT THE OPEN CONNECTOR ENTERS THE LARGE BOTTOM APERTURE OF EACH ISO 1161 STANDARD CORNER FITTING. THE CLAMP ARM BEARS DOWN ON THE INSIDE OF THE BOTTOM WALL WHEN THE DRIVE STUD IS SCREWED IN.

B. USE CAP SCREWS AND LOCK NUTS TO ASSEMBLE THE CONNECTOR TO A SUITABLE RECEIVING STRUCTURE. LOCATE CONNECTORS PER "MALE FITTING INSTRUCTIONS" ON TANDEMLOC DATA SHEET DF-72047-16 (SHEET 2) FOR STANDARD SIZED STRUCTURES. FOR NON-STANDARD SIZES USE THE PRINCIPLES IMPLIED ON THIS SHEET TO DETERMINE YOUR LOCATION.

C. THE VI-SO IS TO BE BOLTED TO THE DESIRED STRUCTURE USING FOUR 3/4" SAE GRADE 8 STEEL CAP SCREWS. SPECIAL FLAT HEAD CAP SCREWS AND LOCKNUTS ARE AVAILABLE WITH HEX SOCKETS ON BOTH ENDS. THIS PERMITS THE CAP SCREW TO BE HELD FROM THE THREADED END WHILE TURNING THE LOCK NUT (USEFUL WHEN THE HEAD END IS NOT ACCESSIBLE)

D. TO SECURE AN ISO CONTAINER OR SIMILAR STRUCTURE FIRST OPEN THE CONNECTOR FULLY BY TURNING THE DRIVE STUD COUNTERCLOCKWISE UNTIL IT IS WITHIN (SHEET 1) DIMENSION. LOWER CONTAINER SO THAT THE UPWARD PROJECTING PORTIONS OF THE CONNECTOR ENTER THE LARGE APERTURES IN THE BASES OF THE CORNER FITTINGS. TURN THE DRIVE STUD CLOCKWISE TO SECURE. 50 FT.LB OF TORQUE IN THE DRIVE STUD WHEN METAL TO METAL CONTACT IS ACHIEVED IS RECOMMENDED. EXCESSIVE TORQUE PRE-LOADS THE CLAMP ARM, RESULTING IN A REDUCTION OF ITS MAXIMUM STRENGTH.



**AT LEAST TWO OPPOSING VERTICAL CLAMPS ARE REQUIRED TO SECURE**

REVISIONS

| REV | DESCRIPTION | DATE | APPROVED |
|---|---|---|---|
| A | SEE SHEET 1 | 4/25/06 | MD |



TANDEMLOC INC

Email: info@tandemloc.com • www.tandemloc.com
824 Highway 101 • Havelock, NC 28532
**TEL: 1.800.258.7324** (252.447.7155)
**FAX: 1.800.892.3273** (252.447.5502)

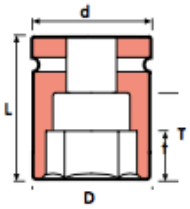
Tandemloc designs, manufactures and tests lifting, securing and mobilizing components for all industries. See our website for details and important safety information.

Read all safety labels and instructions prior to use. Product to be used by qualified personnel only.

# Vedlegg L: Kraftpiper

3/4" □

**Krafthylsor** **Impact sockets** **Kraftsteckschlüssel-Einsätze**




| ⬡ | Part No | D mm | d mm | L mm | t mm | T mm | kg |
|---|---|---|---|---|---|---|---|
| 41 | 2-41L | 61 | 44 | 100 | 23 | 72 | 1,27 |
| 42 | 2-42L | 62 | 44 | 100 | 23 | 72 | 1,23 |
| 43 | 2-43=1 11/16L | 64 | 44 | 100 | 24 | 72 | 1,35 |
| 44 | 2-44L | 65 | 44 | 100 | 24 | 71 | 1,35 |
| 45 | 2-45L | 66 | 44 | 100 | 25 | 71 | 1,35 |
| 46 | 2-46=1 13/16L | 67 | 44 | 100 | 25 | 72 | 1,50 |
| 47 | 2-47L | 68,5 | 44 | 100 | 26 | 76 | 1,46 |
| 48 | 2-48L | 69 | 44 | 100 | 26 | 76 | 1,61 |
| 50 | 2-50L | 70 | 44 | 100 | 28 | 72 | 1,34 |
| 51 | 2-51L | 71 | 44 | 100 | 30 | 76 | 1,40 |
| 52 | 2-52L | 72 | 44 | 100 | 30 | 76 | 1,84 |
| 55 | 2-55L | 76 | 44 | 100 | 30 | 72 | 1,53 |
| 56 | 2-56L | 78 | 44 | 100 | 30 | 76 | 1,65 |
| 60 | 2-60L | 83 | 44 | 125 | 35 | 98 | 2,27 |
| 65 | 2-65=2 9/16L | 88 | 44 | 125 | 35 | 96 | 2,39 |
| 70 | 2-70=2 3/4L | 95 | 44 | 125 | 40 | 95 | 2,77 |
| 75 | 2-75L | 100 | 44 | 125 | 40 | 93 | |
| 95 | 2-95=3 3/4L | 124 | 44 | 125 | 40 | 88 | 4,07 |

| ⬡ | Part No | D mm | d mm | L mm | t mm | T mm | kg |
|---|---|---|---|---|---|---|---|
| 1/2 | 2-1/2 | 24 | 44 | 50 | 8 | 26 | 0,32 |
| 9/16 | 2-9/16 | 26 | 44 | 50 | 10 | 26 | 0,27 |
| 5/8 | 2-5/8 | 27 | 44 | 50 | 10 | 24 | 0,34 |
| 11/16 | 2-11/16 | 30 | 44 | 50 | 10 | 24 | 0,34 |
| 3/4 | 2-19=3/4 | 32 | 44 | 50 | 11 | 24 | 0,38 |
| 13/16 | 2-13/16 | 35 | 44 | 50 | 12 | 24 | 0,40 |
| 7/8 | 2-7/8 | 35 | 44 | 50 | 12 | 24 | 0,38 |
| 15/16 | 2-15/16 | 38,5 | 44 | 50 | 14 | 24 | 0,39 |
| 1 | 2-1 | 39 | 44 | 50 | 14 | 24 | 0,40 |
| 1 1/16 | 2-27=1 1/16 | 42 | 44 | 54 | 16 | 29 | 0,41 |
| 1 1/8 | 2-1 1/8 | 44 | 44 | 54 | 16 | 29 | 0,42 |
| 1 3/16 | 2-30=1 3/16 | 46 | 44 | 54 | 17 | 29 | 0,43 |
| 1 1/4 | 2-1 1/4 | 48,5 | 44 | 56 | 19 | 30 | 0,48 |
| 1 5/16 | 2-1 5/16 | 51 | 44 | 56 | 19 | 30 | 0,52 |
| 1 3/8 | 2-35=1 3/8 | 53 | 44 | 56 | 20 | 30 | 0,52 |
| 1 7/16 | 2-1 7/16 | 56 | 44 | 58 | 21 | 32 | 0,58 |
| 1 1/2 | 2-38=1 1/2 | 57 | 44 | 58 | 21 | 32 | 0,62 |
| 1 9/16 | 2-1 9/16 | 59 | 44 | 58 | 22 | 32 | 0,65 |
| 1 5/8 | 2-1 5/8 | 61 | 44 | 63 | 23 | 34 | 0,68 |

www.momento.se momento 53

# Vedlegg M: ”Torque Tool”

HYTØRC®

**Syclone størrelse 1 :**


**Syclone 1 teknisk:**

- **Moment 50 - 400 nm**
- **Maks 42 o/min**
- **Maks 100 bar arb.trykk**
- **Oljemengde 20 l/min**
- **¾” firkant**
- **Total lengde: 212 mm**
- **Største dia: 63,5 mm**
- **Vekt : 3,3 kg**

**Dette er den minste Syclone verktøyet. Liten av størrelse, men stor hastighet og moment.**

**Leveres med spesial mothold eller håndtak etter ønske.**

# Vedlegg N: Priser

‹ Back to search results for "green pin shackle 35 tons"

Roll over image to zoom in

**Downloads** CAD Models, MSDS, Manuals

The green Pin

## Green Pin GPGHBB50 Standard Bow Shackles with Screw Collar Pin, G-4161, 35 t WLL

Be the first to review this item

Available from these sellers.

**New** (6) from $180.90 & FREE shipping.

**Specifications for this item**

| | |
|---|---|
| Part Number | GPGHBB50 |
| Brand Name | The green Pin |
| EAN | 8718952029971 |
| Height | 4.38 inches |
| Length | 13.03 inches |
| Model Number | GPGHBB50 |
| Number of Items | 1 |
| Width | 10.6 inches |

See more product details

Share

Deliver to Norway

See All Buying Options

Add to List

Have one to sell? Sell on Amazon

Høgskulen på Vestlandet

DEEPOCEAN

‹ Back to search results for "green pin shackle 3,25 tons"

Roll over image to zoom in

Van Beest

## 5/8 in., 3-1/4 ton, Van Beest Green Pin Screw Pin Anchor Shackle

Be the first to review this item

Price: $9.95 + $7.00 shipping

Only 16 left in stock - order soon.

This item does not ship to **Norway**. Please check other sellers who may ship internationally.
Ships from and sold by Trident Supply.

**New** (3) from $9.95 + $7.00 shipping

**Specifications for this item**

| | |
|---|---|
| Part Number | GPGHBB16 |
| UNSPSC Code | 24101641 |

See more product details

XL


Crosby

## Crosby L562A 5.4Tn Rov Shank Hook (1297722)

Be the first to review this item

Price: $706.00 & **FREE Shipping**

In stock.

Usually ships within 3 to 4 days.

This item does not ship to **Norway**. Please check other sellers who may ship internationally.

Ships from and sold by Empire Rigging & Supply.

**New** (1) from $706.00 & FREE shipping.

**Specifications for this item**

| | |
|---|---|
| Part Number | 1297722 |
| Brand Name | Crosby |
| Number of Items | 1 |
| UNSPSC Code | 24101600 |

See more product details

TANDEMLOC INC.
Lifting • Securing • Mobilizing

https://www.tandemloc.com | https://www.tandemlocrentals.com

| | | | |
|---|---|---|---|
| Company Address | 824 Fontana Blvd<br>Havelock, NC 28532<br>US | Created Date | 4/4/2018 |
| | | Expiration Date | 5/4/2018 |
| | | Quote Number | 00002639 |
| FOB | Origin | | |
| Prepared By | Michael Jones | Contact Name | Nils Olav Hauge |
| Phone | 1-866-828-1722 | Email | nhauge@deepoceangroup.com |
| Email | mike@tandemloc.com | | |
| Fax | 1-800-892-3273 | | |
| Bill To Name | DeepOcean | Ship To Name | DeepOcean |
| Bill To | Norway | | |

| Product Code | Product | Item Lead Time | Unit Price | Quantity | Total Price |
|---|---|---|---|---|---|
| K08A00D-1GA | CONNECTOR, VERTICAL CLAMP 64,000 LB HIGH STR. VISO, GALV | In Stock (Subject to Prior Sale or Rental) | $900.95 | 4.00 | $3,603.80 |

| | |
|---|---|
| Subtotal | $3,603.80 |
| Total Price | $3,603.80 |
| Grand Total | $3,603.80 |

**All lifting devices are shipped with load-test certifications and certificate of conformance to ASME B30.20, the Below the Hook industry lifting standard.**

**ALL FOB ORIGIN QUOTATIONS DO NOT INCLUDE TRANSPORTATION CHARGES.**
**ALL FOB DESTINATION CHARGES INCLUDE TRANSPORT TO CUSTOMER'S SHIPPING ADDRESS.**

**Ole Kristian Lund** <olekristianlund@gmail.com>
til knut

Hei, takk for svar. Har du en estimert pris for disse som jeg kan bruke i oppgaven?

Hilsen

...

**2 vedlegg**



**knut Magne**
til meg

Hei
3 tonn 2 meter koster 125 kr + mva.

**Fra:** Ole Kristian Lund [mailto:olekristianlund@gmail.com]
**Sendt:** fredag 4. mai 2018 11.25

...