



ND MARITECH
INTERNATIONAL FZE

Marine Safety Provider Internationally



MOORING SOLUTION

BOLLARD CATALOG

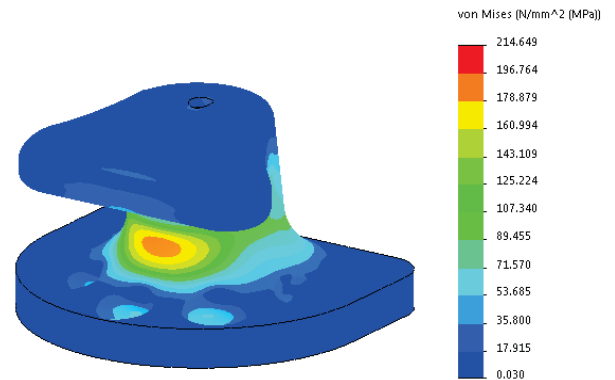


INTRODUCTION

The shape of **NJ Maritech** bollards has been refined with Finite Element Analysis to optimize the geometry & suitable anchor layout.

Our Bollards are also physically tested from time to time to ensure the product exceeds our design expectations.

Even at full working loads & greater rope angles, our bollards remain highly stable and provide a safe & secure mooring.



We carry a substantial stock of Grade 8.8 round bars, Heavy Hex Nuts, Washers & MS plates. All our accessories are supplied with a material mill certificate and upon special request a third party or an independent laboratory test certificate.

This catalogue contains the details of our latest proven & versatile designs of mooring bollard designs.

Should you require additional information or technical support for unique mooring solutions, please contact us by email or phone.



DESIGN STANDARDS

NJ Maritech's Bollards are designed based on **BS 6349, Part 2:1998 Marine structures & PIANC 2002.**

Detailed FEA & calculations can be provided with each Technical submittal.

BOLLARD SELECTION

Bollards should be selected and arranged according to local authorities & standards. When finalizing any type of Bollard, it is suggested to consider below points.

- Mooring pattern
- Changes in draft due to loading and discharge
- Wind and current forces
- Swell, wave and tidal forces
- Mooring line types, sizes and angles
- Ice forces (where relevant)



A general guidelines to mooring loads can be followed from the below table. We do however recommend mooring loads to be calculated at all times.

DISPLACEMENT	BOLLARD RATING (Approx.)
Up to 2,000 T	10 T
2,000-10,000 T	30 T
10,000-20,000 T	60 T
20,000-50,000 T	80 T
50,000-1,00,000 T	100 T
1,00,000-2,00,000 T	150 T
Over 2,00,000 T	200 T



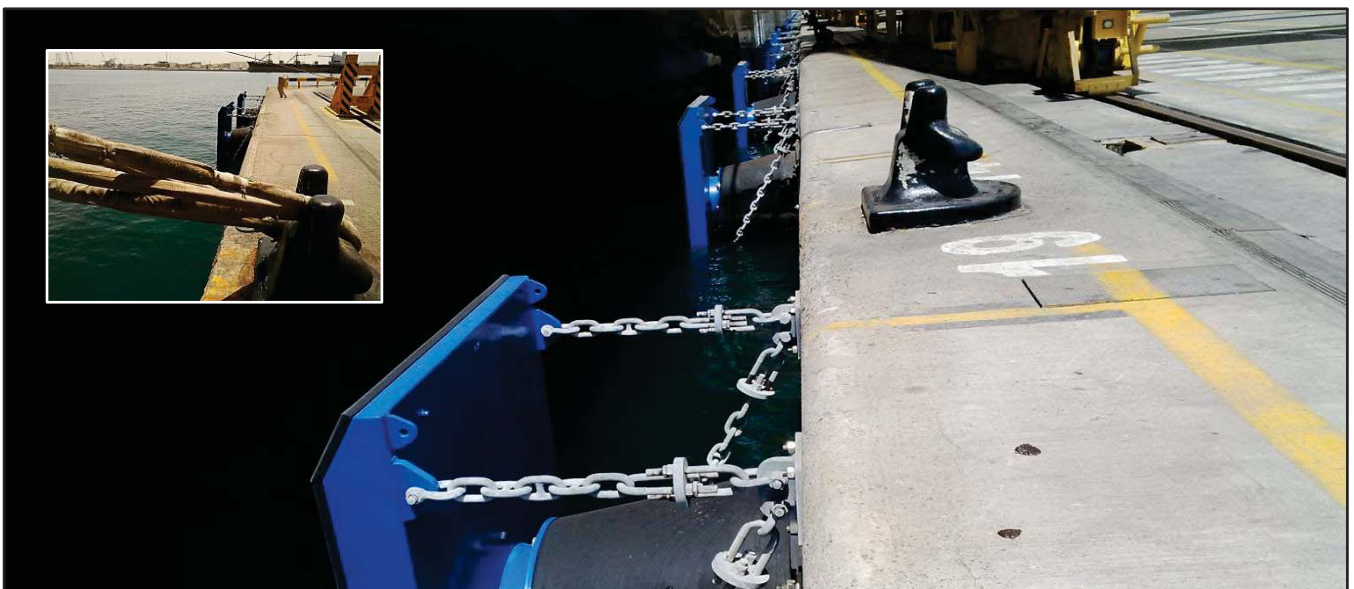
BOLLARD MATERIAL

CAST STEEL (For CS Series Bollard)

	ASTM SPECIFICATION				ISO SPECIFICATION		
	A27 Gr. 65-35	A27 Gr. 70-36	A27 Gr. 70-40	A148 Gr. 80-50	3755 Gr. 230-450	3755 Gr. 270-480	3755 Gr. 340-560
TENSILE STRENGTH	450 MPa	485 MPa	485 MPa	550 MPa	450 MPa	480 MPa	550 MPa
YIELD STRENGTH	240 MPa	250 MPa	275 MPa	345 MPa	230 MPa	270 MPa	340 MPa
ELONGATION IN 50mm, Min. %	24 %	22 %	22 %	22 %	22 %	18 %	15 %
REDUCTION OF AREA, Min. %	35 %	30 %	30 %	35 %	31 %	25 %	21 %

CAST IRON (For CI Series Bollard)

	ASTM SPECIFICATION		ISO SPECIFICATION	
	A536 Gr. 65-45-12	A536 Gr. 80-55-06	1083 Gr. 45-310	1083 Gr. 550-350
TENSILE STRENGTH	448 MPa	552 MPa	450 MPa	550 MPa
YIELD STRENGTH	320 MPa	379 MPa	310 MPa	350 MPa
ELONGATION IN 50mm, Min. %	12 %	6 %	10 %	5 %
REDUCTION OF AREA, Min. %	N/A	N/A	N/A	N/A



ANCHOR MATERIAL

Bollard anchors are usually supplied as partially threaded.
 Bars with each end of the anchor must have enough threaded length.
 All carbon steel anchors and associated nuts and plate washers are supplied with Hot Dip Galvanized to ASTM A123 or A153 Standards.



It is also possible for NJ Maritech to supply anchorages in Standard 316 Stainless Steel, Duplex Stainless Steel, and Super Duplex Stainless Steel.

Please contact NJ Maritech for specific information when considering Stainless Steel anchors.

MATERIAL	GRADE	STANDARD
ANCHOR ROD/BOLT	Gr. 8.8	ISO 898
HEAVY HEX NUT	Gr. 8.0	ISO 898
ROUND WASHER	S235, S275, A36	EN 10025
SQUARE PLATE	S235, S275, A36	EN 10025



NTB

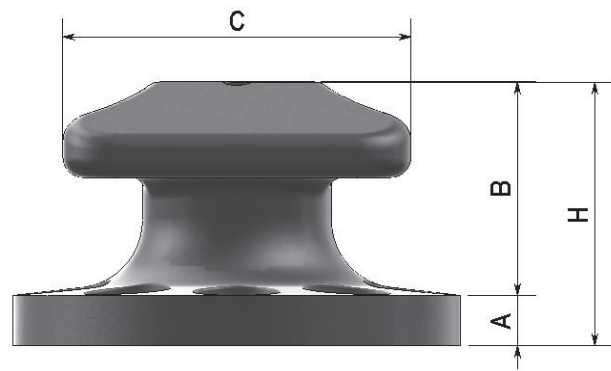
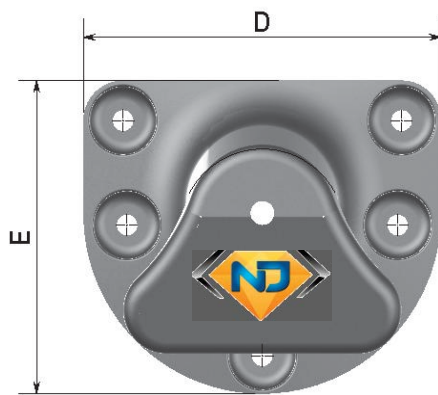
T-HEAD BOLLARD

- Suitable for Steeper Rope Angles.
- Custom Design & safety factors can be adjusted to user requirements.



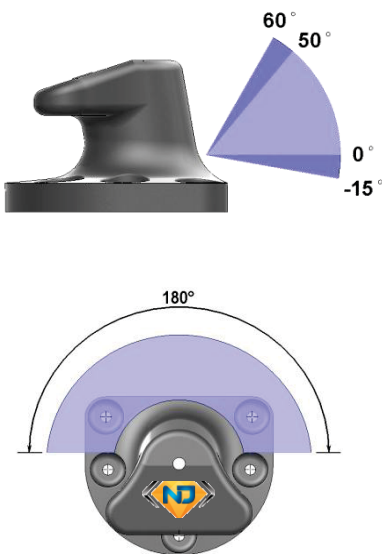
NTB BOLLARD

DIMENSION



SPECIFICATION

LOAD ANGLE RECOMMENDATIONS



	A	B	C	D	E	H	BOLT SIZE	BOLT LENGTH	QTY.
NTB5	40	175	230	330	265	215	M20	400	04
NTB10	45	205	280	410	335	250	M24	400	05
NTB15	50	210	320	420	360	260	M24	450	05
NTB20	50	230	340	440	380	280	M24	450	05
NTB30	60	250	365	450	380	310	M30	450	05
NTB50	70	300	450	560	480	370	M36	600	05
NTB75	85	340	515	640	560	425	M42	600	06
NTB100	90	400	605	785	640	490	M42	600	07
NTB125	100	450	670	840	730	535	M48	750	07
NTB150	100	425	700	900	780	525	M48	750	07
NTB200	120	500	760	950	830	620	M56	920	08

NOTE : Standard Bollard Capacity are in Tones.

NSB

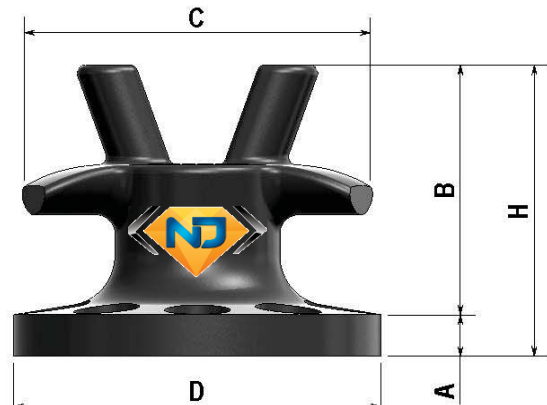
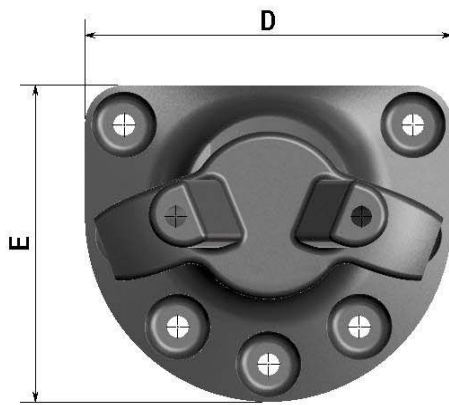
STAGHORN BOLLARD

- Suitable for multiple mooring lines from one or two vessels.
- Custom Design & safety factors can be adjusted to user requirements.
- General purpose applications up to 250 Tones.



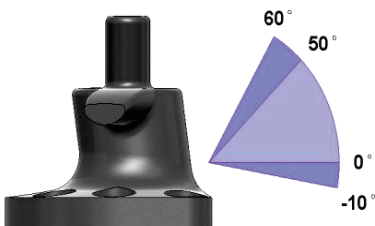
NSB BOLLARD

DIMENSION



SPECIFICATION

LOAD ANGLE RECOMMENDATIONS



	A	B	C	D	E	H	BOLT SIZE	BOLT LENGTH	QTY.
NSB10	45	255	345	380	330	300	M24	400	05
NSB15	45	295	390	420	360	340	M24	450	05
NSB20	50	345	425	440	380	395	M24	450	05
NSB30	60	340	480	480	405	400	M30	450	05
NSB50	70	420	515	525	455	490	M36	600	05
NSB75	80	485	625	640	555	565	M42	600	06
NSB100	90	540	715	735	635	630	M42	600	07
NSB125	90	600	785	815	695	690	M48	750	07
NSB150	100	600	862	890	760	700	M48	750	07
NSB200	115	695	895	920	795	810	M56	920	08
NSB250	125	700	900	950	800	825	M60	1000	08

NOTE : Standard Bollard Capacity are in Tones.

NPB

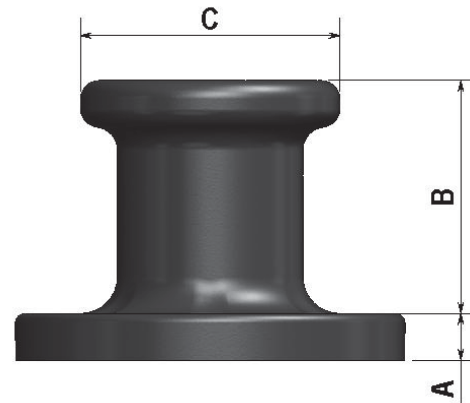
PILLAR BOLLARD

- Suitable for warping operations.
- Custom Design & safety factors can be adjusted to user requirements.
- General purpose applications up to 200 tonnes.



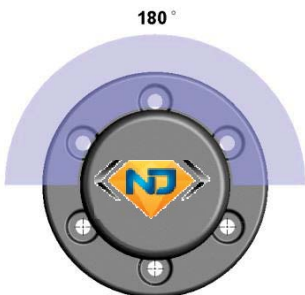
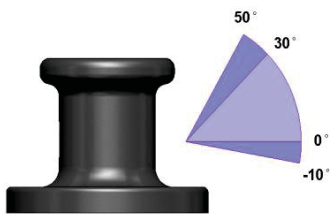
NPB BOLLARD

DIMENSION



SPECIFICATION

LOAD ANGLE RECOMMENDATIONS



	A	B	C	D	BOLT SIZE	BOLT LENGTH	QTY.
NPB05	30	150	160	300	M20	400	04
NPB10	40	210	220	350	M24	400	04
NPB20	40	230	240	440	M24	450	06
NPB30	60	325	330	495	M30	450	06
NPB50	70	310	330	525	M36	600	06
NPB75	80	420	500	640	M42	600	08
NPB100	90	460	500	735	M42	600	08
NPB125	100	525	610	815	M48	750	08
NPB150	100	550	610	880	M48	750	10
NPB200	120	650	740	920	M56	920	10

NOTE : Standard Bollard Capacity are in Tones.

NKB

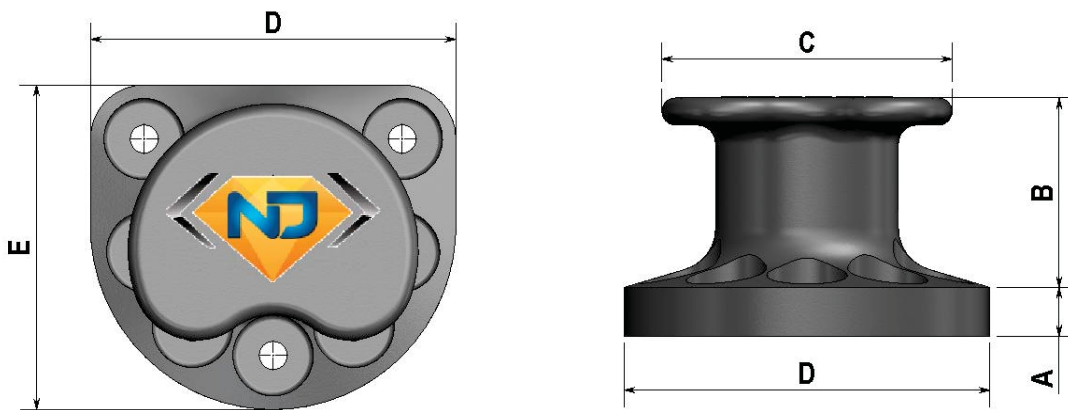
KIDNEY BOLLARD

- Suitable for warping operations.
- Custom Design & safety factors can be adjusted to user requirements.
- General purpose applications up to 200 tonnes.



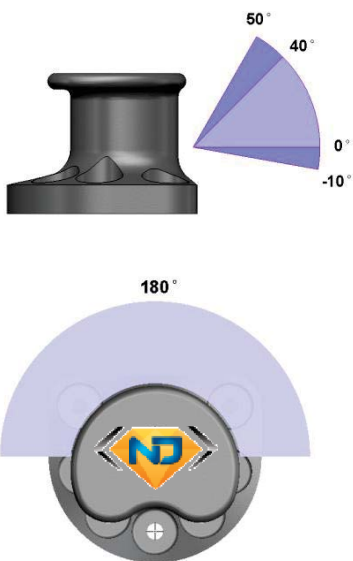
NKB BOLLARD

DIMENSION



SPECIFICATION

LOAD ANGLE RECOMMENDATIONS



	A	B	C	D	E	BOLT SIZE	BOLT LENGTH	QTY.
NKB15	40	195	270	320	285	M24	450	04
NKB20	50	215	340	380	340	M24	450	05
NKB30	55	250	390	450	400	M30	450	05
NKB50	70	260	410	485	430	M36	600	06
NKB75	85	300	480	570	500	M42	600	07
NKB100	90	340	560	650	570	M42	600	07
NKB125	100	370	600	715	630	M48	750	07
NKB150	100	410	650	775	690	M48	750	07
NKB200	120	450	765	900	790	M56	920	08

NOTE : Standard Bollard Capacity are in Tones.

NSBB

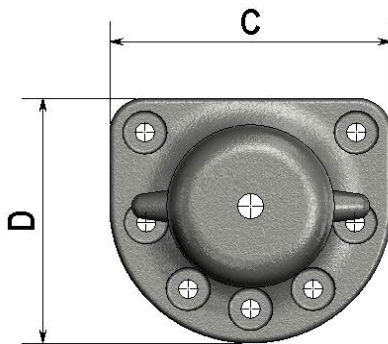
SINGLE BITT BOLLARD

- Custom Design & safety factors can be adjusted to user requirements.
- General purpose applications up to 200 tones.



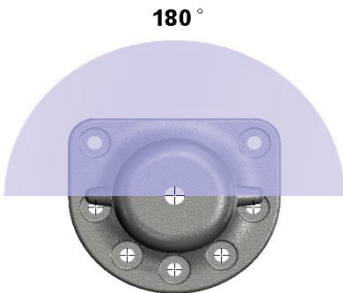
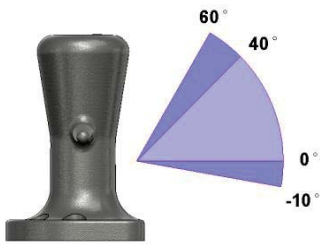
NSBB BOLLARD

DIMENSION



SPECIFICATION

LOAD ANGLE RECOMMENDATIONS



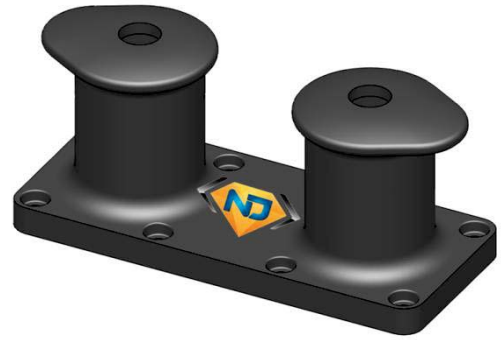
	A	B	C	D	BOLT SIZE	BOLT LENGTH	QTY.
NSBB10	45	385	320	280	M24	400	04
NSBB15	50	425	350	310	M24	450	05
NSBB20	50	450	355	320	M24	450	05
NSBB30	60	535	415	370	M30	450	05
NSBB50	70	680	530	480	M36	600	06
NSBB75	85	825	640	580	M42	600	07
NSBB100	90	920	760	680	M48	650	07
NSBB125	100	1030	820	740	M48	800	07
NSBB150	100	1130	890	800	M56	920	07
NSBB200	120	1250	990	890	M56	920	08

NOTE : Standard Bollard Capacity are in Tones.

NDBB

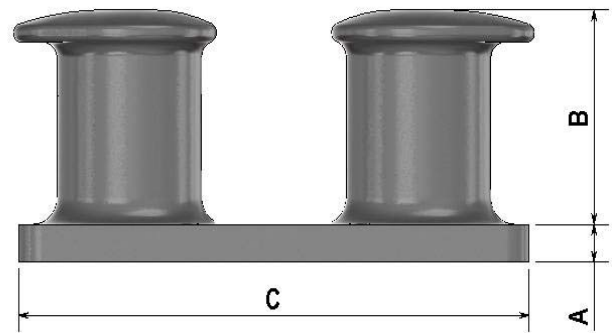
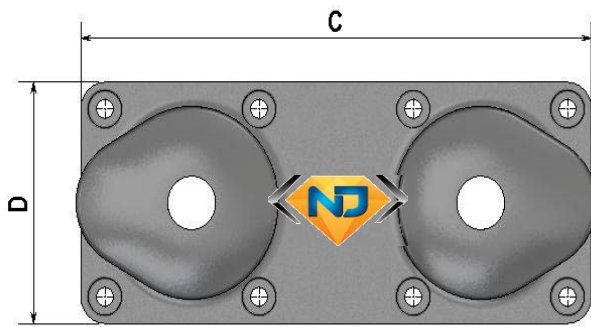
DOUBLE BITT BOLLARD - 01

- Custom Design & safety factors can be adjusted to user requirements.
- General purpose applications up to 150 tones.



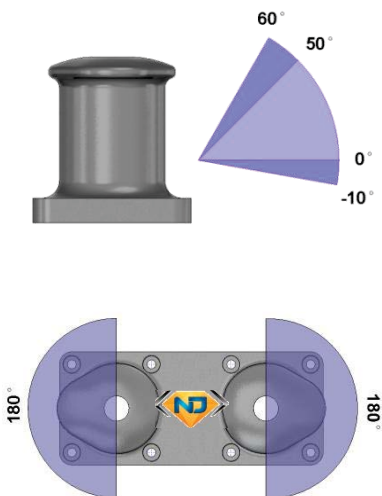
NDBB BOLLARD TYPE 01

DIMENSION



SPECIFICATION

LOAD ANGLE RECOMMENDATIONS



	A	B	C	D	BOLT SIZE	BOLT LENGTH	QTY.
NDBB30	40	250	680	320	M24	500	06
NDBB40	50	290	870	400	M30	500	08
NDBB60	55	360	1060	450	M30	500	08
NDBB80	65	470	1340	520	M36	600	08
NDBB100	70	500	1500	600	M42	650	10
NDBB120	80	580	1700	650	M42	650	10
NDBB150	90	660	1900	750	M48	650	10

NOTE : Standard Bollard Capacity are in Tones.

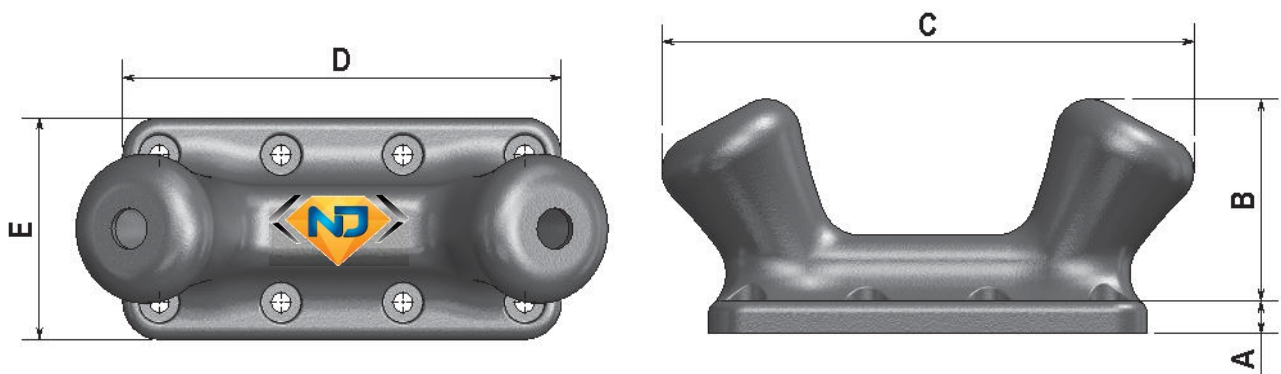
NDBB

DOUBLE BITT BOLLARD - 02

- Custom Design & safety factors can be adjusted to user requirements.
- General purpose applications up to 200 tones.

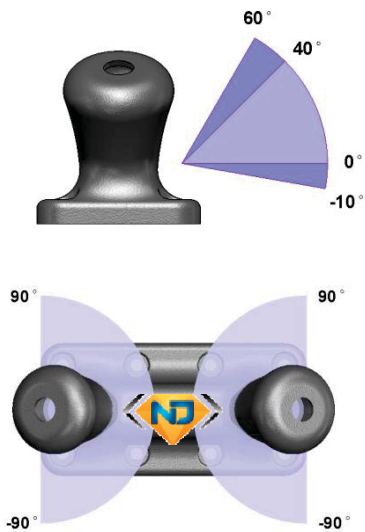


DIMENSION



SPECIFICATION

LOAD ANGLE RECOMMENDATIONS



	A	B	C	D	E	BOLT SIZE	BOLT LENGTH	QTY.
NDBB10	25	230	610	500	250	M20	400	08
NDBB15	30	250	635	520	265	M24	500	08
NDBB20	40	270	670	530	270	M24	500	08
NDBB30	45	300	780	600	300	M24	500	08
NDBB50	55	320	940	710	350	M30	600	08
NDBB80	65	400	1275	900	440	M36	650	10
NDBB100	70	450	1340	1010	500	M42	650	10
NDBB125	80	500	1545	1160	585	M42	650	10
NDBB150	90	600	1680	1270	630	M48	750	10
NDBB200	115	697	1762	1430	700	M56	920	10

NOTE : Standard Bollard Capacity are in Tones.

NCL

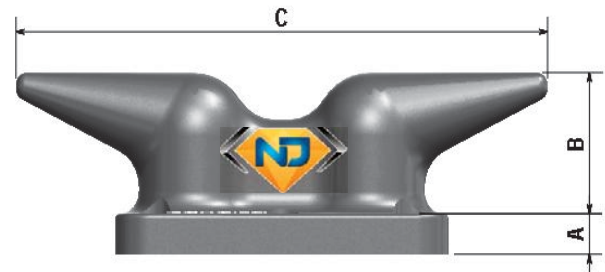
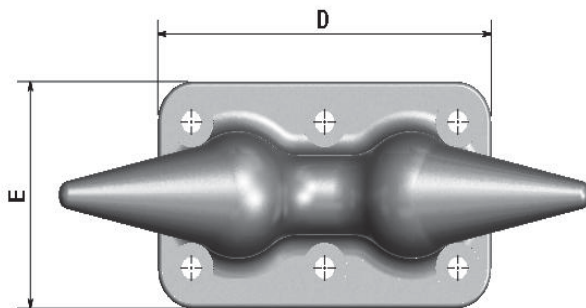
MOORING CLEAT

- Custom Design & safety factors can be adjusted to user requirements.
- Specially used for offshore structure.
- Can be installed Horizontally or Vertically.
- General purpose applications up to 150 tones.



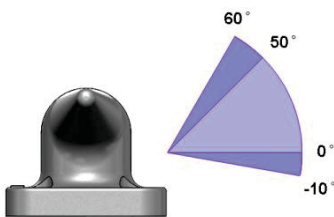
NCL CLEAT

DIMENSION

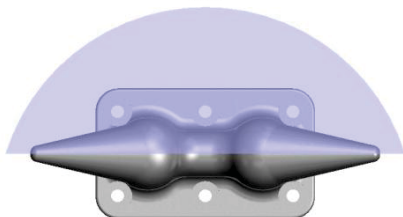


SPECIFICATION

LOAD ANGLE RECOMMENDATIONS



180°



	A	B	C	D	E	BOLT SIZE	BOLT LENGTH	QTY.
NCL24	45	160	600	400	200	M20	450	06
NCL30	51	178	762	482	284	M24	500	06
NCL36	55	200	900	610	300	M24	500	06
NCL42	65	230	1060	660	330	M24	600	08
NCL54	64	342	1372	834	410	M30	650	08

NOTE : Standard Mooring Cleat's Capacity are in Tones.

FINISH DETAILS

Bollard Finishing are an essential part of the system as it prevents excessive corrosion that can weaken a bollard. NJ Maritech's Bollards are supplied with Blasting & Painting according to the specification given below.

BLASTING		<p>Shot Blast to SA2.5 according to ISO 12944</p>
PRIMER		<p>Zinc Primer (50-75 Microns)</p>
PAINTING		<p>Black Bitumen OR Coal Tar Epoxy according to Class C5M (350-375 Microns)</p>



INSTALLATION METHODS

Always follow installation procedures supplied by NJ MARITECH when installing our bollards as each installation may be unique and require special instructions.

Particular attention should be paid to the torque values recommended for each installation.



RETRO FIT



THROUGH BOLT



CAST-IN SURFACE



CAST-IN RECESSED





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