

Section Z - Material Catalogue

ES54 Z1

Concrete Products, Hardware, Accessories

- Z1-01.01 1232 Box, Three-Phase Pull/Splice/Junction Box
- Z1-01.02 332 Box, Single-Phase Service/Junction Box
- Z1-01.03 632 Box, Single-Phase Pull/Splice/Service Junction Box
- Z1-01.04 555 Box, Service Box
- Z1-01.05 832 Box, Three-Phase Pull/Splice/Service/Junction Box
- Z1-01.06 Lightweight Service Box, Non Traffic Duty
- Z1-01.07 Lightweight Service Box, Sidewalk/Off-Roadway Duty
- Z1-02.01 Precast Concrete Vault, Through Type
- Z1-02.02 Precast Concrete Vault, Pull/Splice Type
- Z1-02.03 Precast Concrete Vault, T-Type
- Z1-02.04 Precast Concrete Vault, 4-Way Type
- Z1-03 Single- and Three-Phase Junction Kiosk Pads
- Z1-04.01 Switchgear Pads, Frames and Vaults - Above Ground Switchgear
- Z1-04.02 Switchgear Pads, Frames and Vaults - Subsurface Switchgear
- Z1-04.03 Switchgear Pads, Frames and Vaults - Below Ground Switchgear
- Z1-05.01 Transformer Pad, Single-Phase
- Z1-05.02 Transformer Pad, Three-Phase
- Z1-05.03 Three-Phase Submersible Transformer Vault 2018 Vault
- Z1-05.04 Three-Phase Submersible Transformer Vault 1617 Vault
- Z1-06 Civil Hardware and Associated Materials

ES54 Z2

Duct and Accessories

- Z2-01 Duct and Accessories

ES54 Z3

Grounding

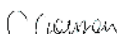
- Z3-01 Grounding Assemblies
- Z3-02 Connectors for Grounding

ES54 Z8

Terminal Pole Hardware

- Z8-01 Pilasters, Guards, Adapters and Pole Mounting Hardware

REVISIONS: R3: Z1-01.07 ADDED, OCT '18 CC

DESIGNED  C. CROWSON	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2018-10-30	MATERIAL CATALOGUE TABLE OF CONTENTS		
DISTRIBUTION STANDARDS 		ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: NOV 1979				PAGE 1 OF 1

1232 Precast Concrete Box, Pull/Splice/Junction Box

Item	Approximate Weight (kg)	Catalogue ID
Type "A" roof slab	75	400-0960
Type "B" roof slab	84	400-0961
Sidewalk Duty collar c/w frame type 1232	1,500	400-0916
Riser type 1232	400	400-0984
Precast concrete box type 1232	3,500	400-0915

Refer to the following standards for 1232 precast box installations:

ES54 B4-01 1232 Pull/Splice Box, Non-Traffic Duty

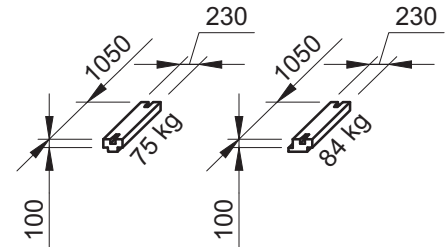
ES54 B4-02 1232 Pull/Splice/Junction Box, Sidewalk Duty

Precast concrete box supplied with concrete roof slabs is for Non-Traffic Duty loading only.

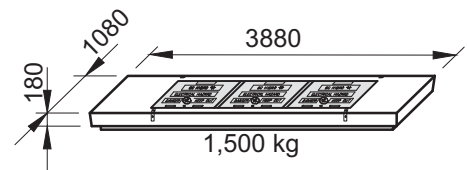
Sidewalk Duty collar c/w frame for sidewalk installations is sized for three Sidewalk Duty lids, catalogue ID 96007598.

Sump knockout is sized for one round sump cover, catalogue ID 400-0426.

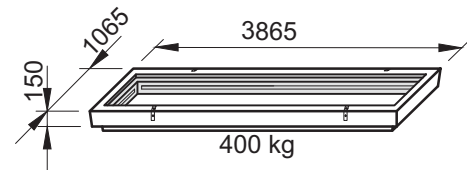
Refer to Design Load standard ES54 U1-02 for Application Duties.



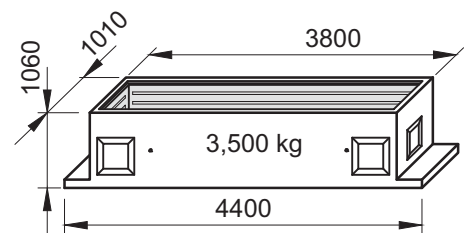
Roof Slabs Type "A" & "B"
Non-Traffic Duty



Collar c/w Frame Type 1232
Sidewalk Installation

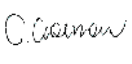


Riser Type 1232



Box Type 1232

REVISIONS: R.5 - REDRAWN AND REVISED. MAR '16 CC | R.6 - PAGE 6 TITLE REVISED, PAGE 7 ADDED. OCT '18 CC

DESIGNED  C. CROWSON	RECOMMENDED  L. STEVANOVIĆ	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  C. E. CROWSON #45713 BRITISH COLUMBIA ENGINEER 2018-10-30	1232 BOX THREE-PHASE PULL/SPLICE/ JUNCTION BOX	
DISTRIBUTION STANDARDS 	ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981	PAGE 1 OF 7		ES54 Z1-01.01	R 6

332 Precast Concrete Box, Service/Junction Box

Item	Approximate Weight (kg)	Catalogue ID
Lane Duty collar c/w frame type 332	600	96016177
Sidewalk Duty collar c/w frame type 332	300	400-0999
Riser type 332	200	400-0989
Roadway Duty collar type 332	400	400-0983
Precast concrete box type 332	1,000	400-0998

Refer to the following standards for 332 precast box installations:

- ES54 B7-01 332 Service/Junction Box, Sidewalk Duty
- ES54 B7-02 332 Service/Junction Box, Access Lane Duty
- ES54 B7-03 332 Service Box, Roadway Duty

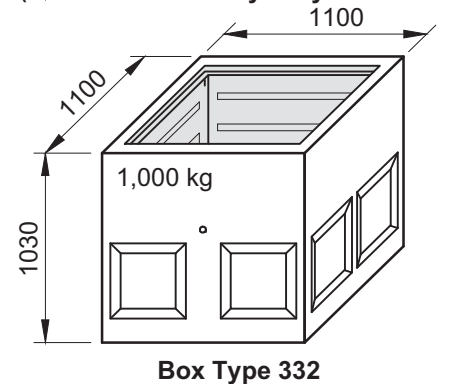
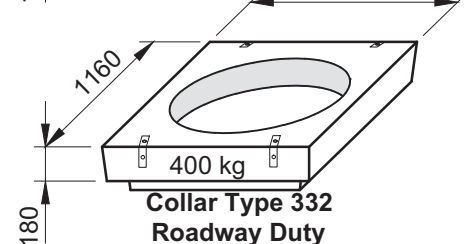
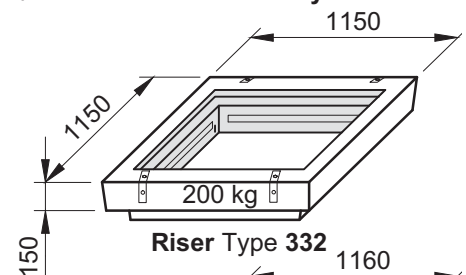
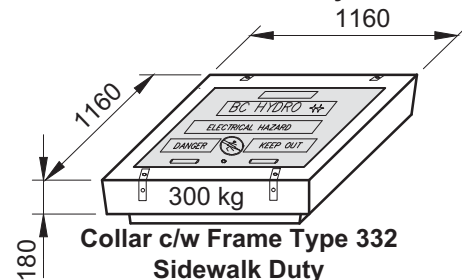
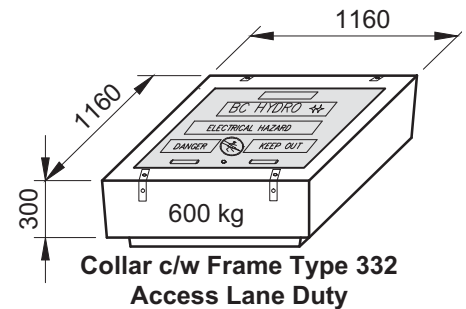
Lane Duty collar c/w frame type 332 for access lane installations is sized for one Lane Duty lid, catalogue ID 96016176.

Sidewalk Duty collar c/w frame type 332 for sidewalk installations is sized for one Sidewalk Duty lid, catalogue ID 96007598.

Roadway Duty collar type 332 is sized for Roadway Duty frame, catalogue ID 400-0401, and cover, catalogue ID 400-0411.

Sump knockout is sized for one round sump cover, catalogue ID 400-0426.

Refer to Design Load standard ES54 U1-02 for Application Duties.



REVISIONS: R.5 - REDRAWN AND REVISED. MAR '16 CC | R.6 - PAGE 6 TITLE REVISED, PAGE 7 ADDED. OCT '18 CC

DESIGNED <i>C. Crowson</i> C. CROWSON	RECOMMENDED <i>L. Stevanovic</i> L. STEVANOVIC	ACCEPTED <i>F. Dennert</i> F. DENNERT	ENGINEER OF RECORD  C. E. CROWSON #45713 BRITISH COLUMBIA ENGINEER 2018-10-30	332 BOX SINGLE-PHASE SERVICE/JUNCTION BOX	
DISTRIBUTION STANDARDS 		ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981		PAGE 2 OF 7	ES54 Z1-01.02
				R	6

632 Precast Concrete Box, Pull/Splice/Service/Junction Box

Item	Approximate Weight (kg)	Catalogue ID
Type "A" roof slab	75	400-0960
Type "B" roof slab	84	400-0961
Lane Duty collar c/w frame type 632	1,000	96016178
Sidewalk Duty collar c/w frame type 632	400	400-0996
Riser type 632	300	400-0988
Roadway Duty collar type 632	1,500	400-0997
Precast concrete box type 632	1,700	400-0995

Refer to the following standards for 632 precast box installations:

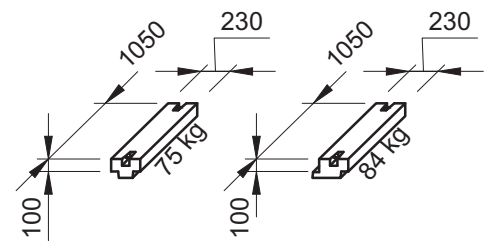
- ES54 B6-01 632 Pull/Splice Box, Non-Traffic Duty
- ES54 B6-02 632 Pull/Splice/Service/Junction Box, Sidewalk Duty
- ES54 B6-03 632 Service/Junction Box, Access Lane Duty
- ES54 B6-04 632 Service Box, Roadway Duty

Precast concrete box supplied with concrete roof slabs is for Non-Traffic Duty loading only.

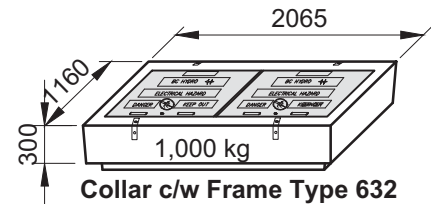
Lane Duty collar c/w frame type 632 for access lane installations is sized for two Lane Duty lids, catalogue ID 96016176. Sidewalk Duty collar c/w frame type 632 for sidewalk installations is sized for two Sidewalk Duty lids, catalogue ID 96007598.

Roadway Duty collar type 632 is sized for Roadway Duty frame, catalogue ID 400-0401, and cover, catalogue ID 400-0411.

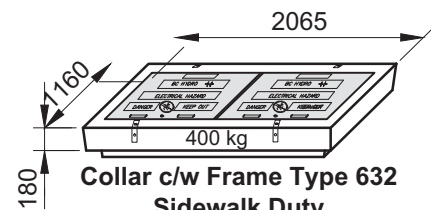
Sump knockout is sized for one round sump cover, catalogue ID 400-0426.



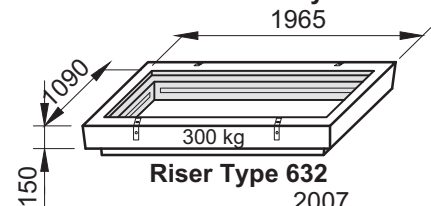
Roof Slabs Type "A" & "B"
Non-Traffic Duty



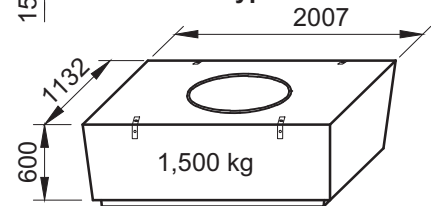
Collar c/w Frame Type 632
Access Lane Duty



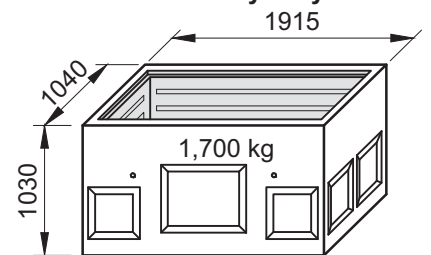
Collar c/w Frame Type 632
Sidewalk Duty



Riser Type 632



Collar Type 632
Roadway Duty



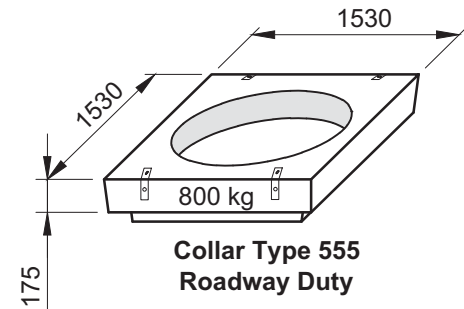
Box Type 632

REVISIONS: R.5 - REDRAWN AND REVISED. MAR '16 CC | R.6 - PAGE 6 TITLE REVISED, PAGE 7 ADDED. OCT '18 CC

DESIGNED  C. CROWSON	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  C. E. CROWSON #45713 BRITISH COLUMBIA ENGINEER 2018-10-30	632 BOX SINGLE-PHASE PULL/SPLICE/SERVICE/ JUNCTION BOX	
DISTRIBUTION STANDARDS 	ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981			PAGE 3 OF 7	ES54 Z1-01.03
				R 6	

555 Precast Concrete Box, Service Box

Item	Approximate Weight (kg)	Catalogue ID
Precast concrete box and collar type 555	2,500	400-0955



Refer to the following standard for 555 precast box installations:

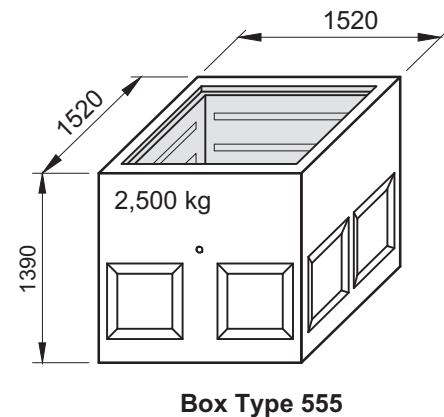
ES54 B2-04 555 Service Box, Roadway Duty

555 precast service box is designed for Roadway Duty loading.

Collar type 555 is sized for Roadway Duty frame, catalogue ID 400-0401, and cover, catalogue ID 400-0411.

Sump knockout is sized for one round sump cover, catalogue ID 400-0426.

Refer to Design Load standard ES54 U1-02 for Application Duties.



REVISIONS: R.5 - REDRAWN AND REVISED. MAR '16 CC | R.6 - PAGE 6 TITLE REVISED, PAGE 7 ADDED. OCT '18 CC

DESIGNED <i>C. Crowson</i> C. CROWSON	RECOMMENDED <i>L. Stevanovic</i> L. STEVANOVIC	ACCEPTED <i>F. Dennert</i> F. DENNERT	ENGINEER OF RECORD  C. E. CROWSON #45713 BRITISH COLUMBIA ENGINEER 2018-10-30	555 BOX SERVICE BOX	
DISTRIBUTION STANDARDS  BC Hydro	ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981	PAGE 4 OF 7		ES54 Z1-01 .04	R 6

832 Precast Concrete Box, Pull/Splice/Service/ Junction Box

Item	Approximate Weight (kg)	Catalogue ID
Type "A" roof slab	75	400-0960
Type "B" roof slab	84	400-0961
Lane Duty collar c/w frame type 831	1,200	96016179
Sidewalk Duty collar c/w frame type 832	1,000	400-0993
Riser type 832	400	400-0992
Precast concrete box type 832	2,000	400-0990

Refer to the following standards for 832 precast box installations:

- ES54 B5-01 832 Pull/Splice Box, Non-Traffic Duty
- ES54 B5-02 832 Pull/Splice/Junction Box, Sidewalk Duty
- ES54 B5-03 832 Pull/Splice/Junction Box, Access Lane Duty

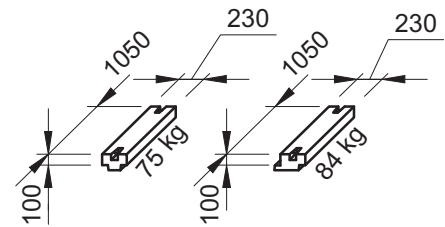
Precast concrete box supplied with concrete roof slabs is for Non-Traffic Duty loading only.

Lane Duty collar c/w frame for access lane installations is sized for three Lane Duty lids, catalogue ID 96016176.

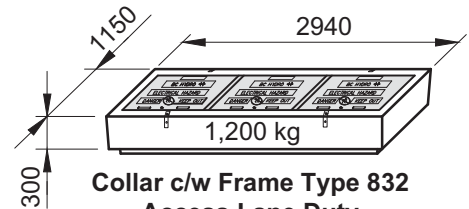
Sidewalk Duty collar c/w frame type 832 for sidewalk installations is sized for three Sidewalk Duty lids, catalogue ID 96007598.

Sump knockout is sized for one round sump cover, catalogue ID 400-0426.

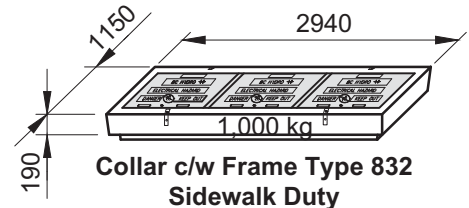
Refer to Design Load standard ES54 U1-02 for Application Duties.



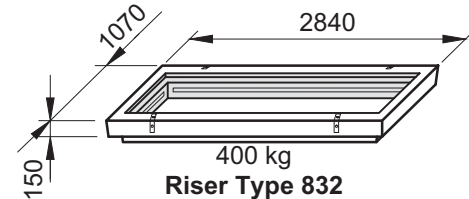
**Roof Slabs Type "A" & "B"
Non-Traffic Duty**



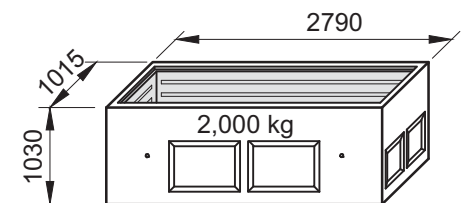
**Collar c/w Frame Type 832
Access Lane Duty**



**Collar c/w Frame Type 832
Sidewalk Duty**



Riser Type 832



Box Type 832

REVISIONS: R.5 - REDRAWN AND REVISED. MAR '16 CC | R.6 - PAGE 6 TITLE REVISED, PAGE 7 ADDED. OCT '18 CC

DESIGNED <i>C. Crowson</i> C. CROWSON	RECOMMENDED <i>H. Stevanovic</i> L. STEVANOVIC	ACCEPTED <i>F. Dennert</i> F. DENNERT	ENGINEER OF RECORD  C. E. CROWSON #45713 BRITISH COLUMBIA ENGINEER 2018-10-30	832 BOX THREE-PHASE PULL/SPLICE/SERVICE/ JUNCTION BOX	
DISTRIBUTION STANDARDS 		ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981		PAGE 5 OF 7	ES54 Z1-01 .05 R 6

Lightweight Service Boxes, Non-Traffic Duty

Item	Approximate Weight (kg)	Catalogue ID
Small lightweight service box	N/A	400-0485
Small lightweight riser	N/A	400-0481
Small concrete collar	40	400-0484
Large lightweight service box	N/A	400-0486
Large lightweight riser	N/A	400-0482
Large high-strength concrete collar	65	400-0494

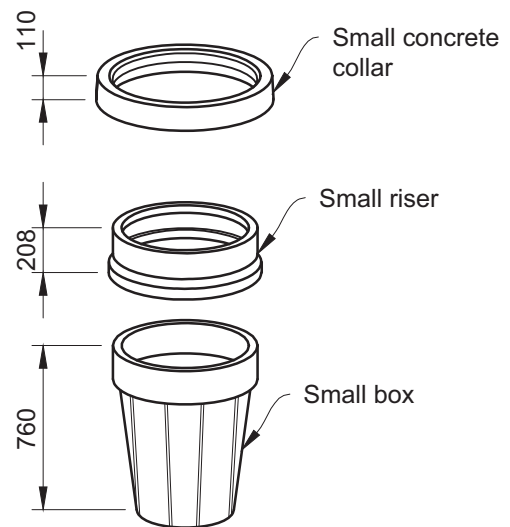
Refer to the following standards for lightweight service box installations:

ES54 B3-01 Small Lightweight Service Box, Non-Traffic Duty

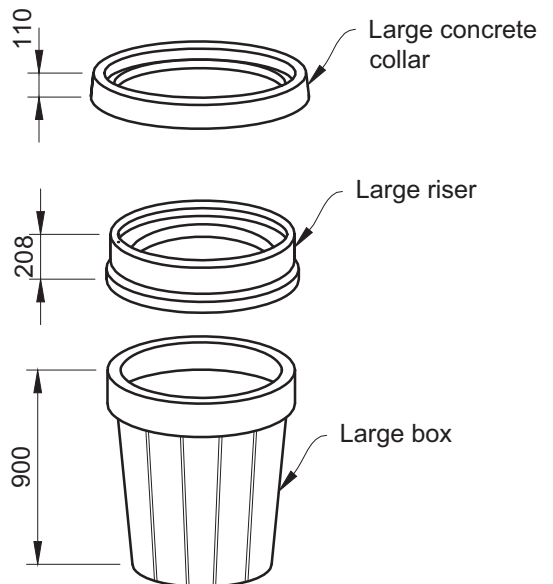
ES54 B3-02 Large Lightweight Service Box, Non-Traffic Duty

Lightweight service boxes are designed for Non-Traffic Duty loading as per ES54 U1-02 Design Loads.

Cast iron covers should be used for cover replacements.



Small Lightweight Service Box



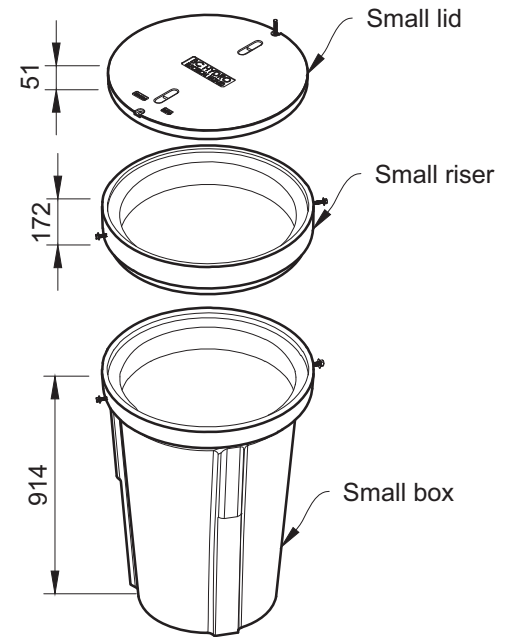
Large Lightweight Service Box

REVISIONS: R.5 - REDRAWN AND REVISED. MAR '16 CC | R.6 - PAGE 6 TITLE REVISED, PAGE 7 ADDED. OCT '18 CC

DESIGNED  C. CROWSON	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  C. E. CROWSON # 45713 BRITISH COLUMBIA ENGINEER 2018-10-30	LIGHTWEIGHT SERVICE BOX NON-TRAFFIC DUTY	
DISTRIBUTION STANDARDS 		ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981		PAGE 6 OF 7	ES54 Z1-01 .06
				R	6

Lightweight Service Boxes, Sidewalk Duty

Item	Approximate Weight (kg)	Catalogue ID
Small sidewalk duty lightweight service box	78	97002910
Small sidewalk duty lightweight riser	30	97003109
Small sidewalk duty polymer concrete cover	39	97002912
Large sidewalk duty lightweight service box	102	97002911
Large sidewalk duty lightweight riser	38	97003110
Large sidewalk duty polymer concrete collar	65	97002913



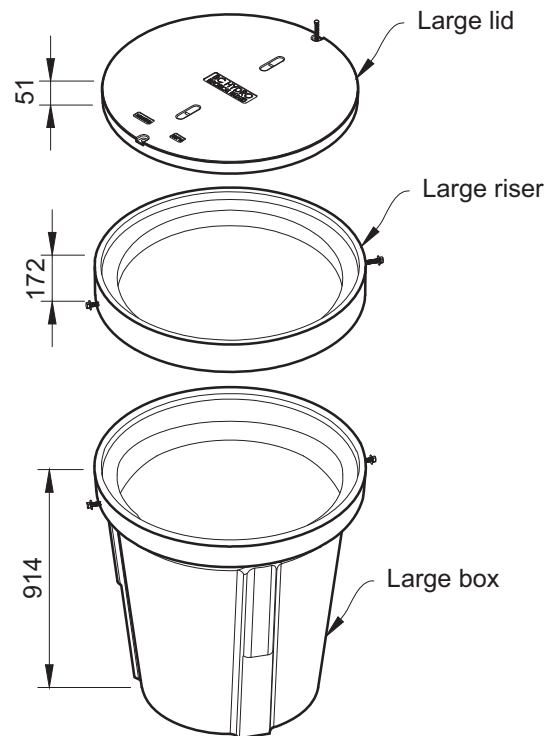
**Small Lightweight Service Box
Sidewalk Duty**

Refer to the following standards for lightweight service box installations:

- ES54 B3-03 Small Lightweight Service Box, Sidewalk Duty
- ES54 B3-04 Large Lightweight Service Box, Sidewalk Duty

Polymer concrete lightweight service boxes installed with polymer concrete risers and covers are designed for Sidewalk Duty loading as per ES54 U1-02 Design Loads.

Polymer concrete lightweight service boxes installed with polymer concrete risers and cast-iron covers are designed for Off-Roadway Duty loading as per ES54 U1-02 Design Loads.



**Large Lightweight Service Box
Sidewalk Duty**

DESIGNED <i>C. Crowson</i> C. CROWSON	RECOMMENDED <i>L. Stevanovic</i> L. STEVANOVIC	ACCEPTED <i>F. Dennert</i> F. DENNERT	ENGINEER OF RECORD  2018-10-30	LIGHTWEIGHT SERVICE BOX SIDEWALK/ OFF ROADWAY DUTY		
DISTRIBUTION STANDARDS 		ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981				PAGE 7 OF 7

Through Type Precast Vaults

Item	Approximate Weight (kg)		Catalogue ID
	Top	Bottom	
Through type, single access precast vault	10,000	8,500	400-0478
Through type, double access precast vault	15,000	15,000	96022513

Refer to the following standards for through type precast vault installations:

ES54 C1-01 Through Type Precast Vault, Single Access

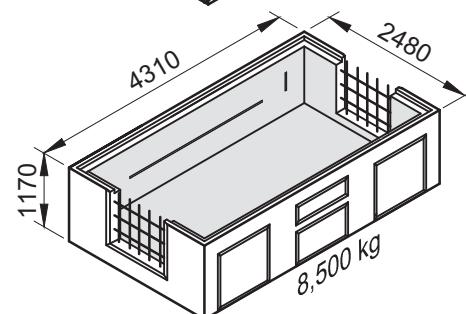
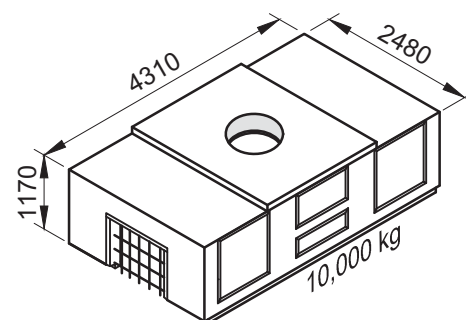
ES54 C1-05 Through Type Precast Vault, Double Access

Through type precast concrete vaults are designed for Roadway Duty loading.

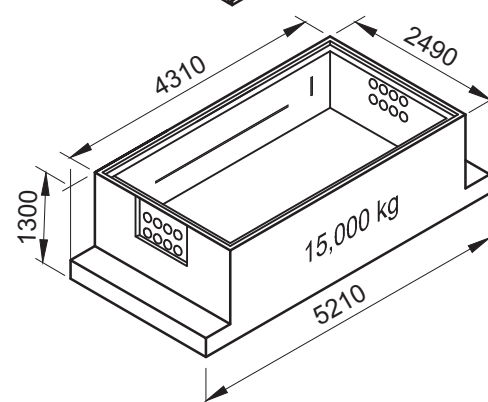
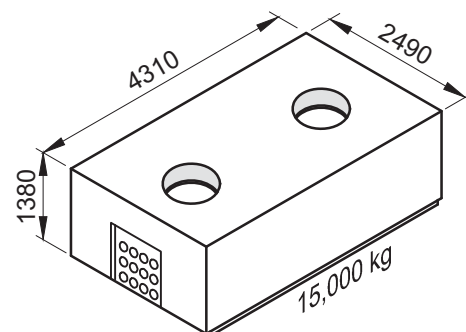
Roof openings are sized for Roadway Duty frame, catalogue ID 400-0401, and cover, catalogue ID 400-0411.

Sump knockout is sized for one round sump cover, catalogue ID 400-0426.

Refer to Design Load standard ES54 U1-02 for Application Duties.



Through Type Single Access Vault



Through Type Double Access Vault

DESIGNED  C. CROWSON	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  G. E. CROWSON #45713 BRITISH COLUMBIA ENGINEER 2018-10-30	PRECAST CONCRETE VAULT THROUGH TYPE	
DISTRIBUTION STANDARDS 	ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981	PAGE 1 OF 4		ES54 Z1-02.01	R 6

REVISIONS: R.5 - REDRAWN AND REVISED. T-TYPE AND 4-WAY ADDED. SWITCHGEAR VAULT MOVED TO Z1-04. MAR'16 CC | R.6 - DIMENSIONS ON THROUGH TYPE DOUBLE ACCESS VAULT AMENDED. OCT '18 CC

Pull/Splice Type Precast Vault

Item	Approximate Weight (kg)		Catalogue ID
	Top	Bottom	
Pull/splice type precast vault	3,000	3,000	400-0479

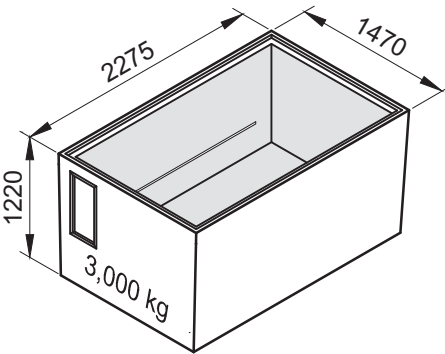
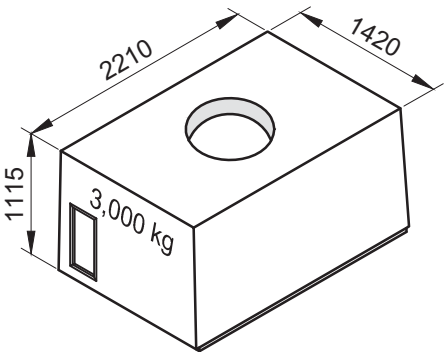
Refer to ES54 C1-02 for pull/splice type precast vault installations.

Pull/splice type precast concrete vaults are designed for Roadway Duty loading.

Roof opening is sized for Roadway Duty frame, catalogue ID 400-0401, and cover, catalogue ID 400-0411.

Sump knockout is sized for one round sump cover, catalogue ID 400-0426.

Refer to Design Load standard ES54 U1-02 for Application Duties.



Pull and Splice Type Vault

DESIGNED  C. CROWSON	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD 	PRECAST CONCRETE VAULT PULL/SPLICE TYPE	
DISTRIBUTION STANDARDS 	ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981	PAGE 2 OF 4		ES54 Z1-02 .02	R 6

REVISIONS: R.5 - REDRAWN AND REVISED. T-TYPE AND 4-WAY ADDED. SWITCHGEAR VAULT MOVED TO Z1-04. MAR'16 CC | R.6 - DIMENSIONS ON THROUGH TYPE DOUBLE ACCESS VAULT AMENDED. OCT '18 CC

T-Type Precast Vault

Item	Approximate Weight (kg)		Catalogue ID
	Top	Bottom	
T-Type double access precast vault	14,500	14,000	96019852

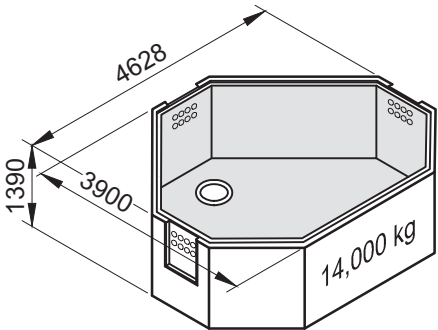
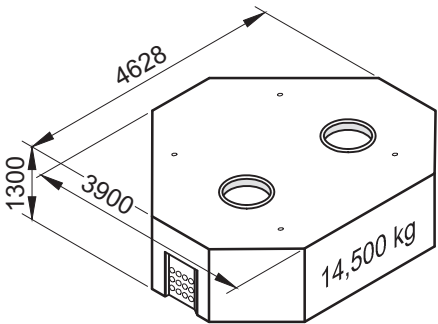
Refer to ES54 C1-03 for T-Type precast vault installations.

T-Type precast concrete vaults are designed for Roadway Duty loading.

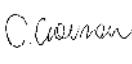
Roof openings are sized for Roadway Duty frame, catalogue ID 400-0401, and cover, catalogue ID 400-0411.

Sump knockout is sized for one round sump cover, catalogue ID 400-0426.

Refer to Design Load standard ES54 U1-02 for Application Duties.



T-Type Double Access Vault

DESIGNED  C. CROWSON	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2018-10-30	PRECAST CONCRETE VAULT T-TYPE	
DISTRIBUTION STANDARDS 		ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981		PAGE 3 OF 4	ES54 Z1-02 .03
					R 6

REVISIONS: R.5 - REDRAWN AND REVISED. T-TYPE AND 4-WAY ADDED. SWITCHGEAR VAULT MOVED TO Z1-04. MAR'16 CC | R.6 - DIMENSIONS ON THROUGH TYPE DOUBLE ACCESS VAULT AMENDED. OCT '18 CC

4-Way Type Precast Vault

Item	Approximate Weight (kg)		Catalogue ID
	Top	Bottom	
4-Way type double access precast vault	15,000	14,000	96019862

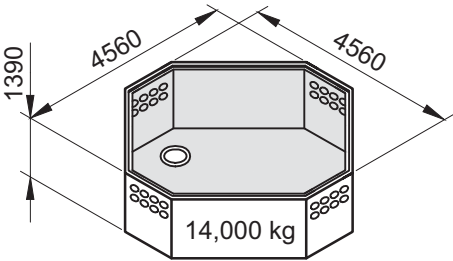
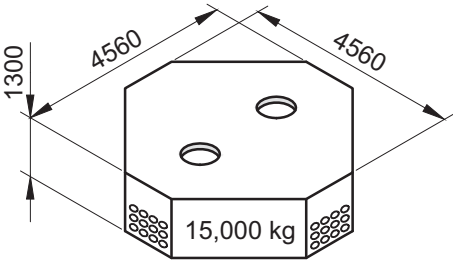
Refer to ES54 C1-04 for 4-Way type precast vault installations.

4-Way type precast concrete vaults are designed for Roadway Duty loading.

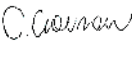
Roof openings are sized for Roadway Duty frame, catalogue ID 400-0401, and cover, catalogue ID 400-0411.

Sump knockout is sized for one round sump cover, catalogue ID 400-0426.

Refer to Design Load standard ES54 U1-02 for Application Duties.

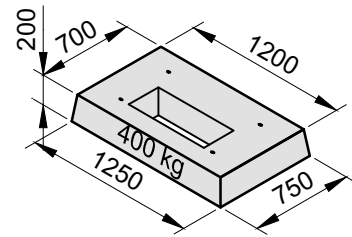


4-Way Type Double Access Vault

DESIGNED  C. CROWSON	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD 	PRECAST CONCRETE VAULT 4-WAY TYPE	
DISTRIBUTION STANDARDS 	ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981	PAGE 4 OF 4		ES54 Z1-02 .04	R 6

Junction Kiosk Precast Concrete Pads

Item	Approximate Weight (kg)	Catalogue ID
Single-phase precast concrete junction kiosk pad	400	400-0840
Three-phase precast concrete junction kiosk pad	2,000	400-0850



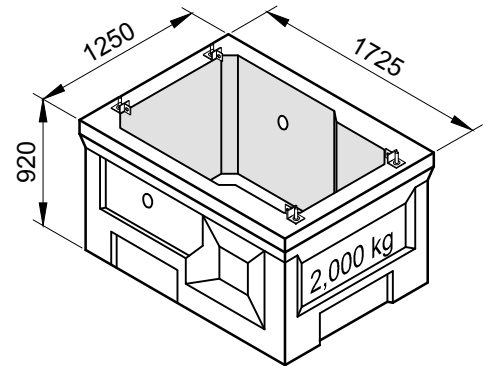
Single-Phase Junction Kiosk Pad

For precast junction kiosk pad installations refer to the following standards:

ES54 D1-02 Single-Phase Junction Kiosk Pad

ES54 D3-01 Three-Phase Junction Kiosk Pad

Three-phase junction kiosk pad supplied with four lifting lugs and two pulling irons.



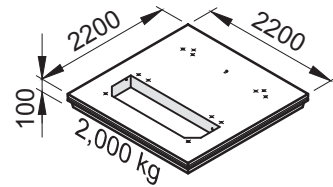
Three-Phase Junction Kiosk Pad

REVISIONS: R.5 - REDRAWN AND REVISED. JUNCTION BOXES MOVED TO Z1-01. MAR '16 CC

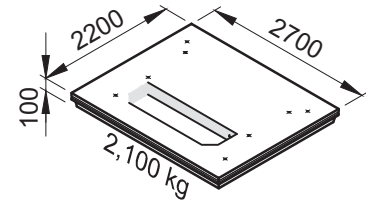
DESIGNED  C. CROWSON	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT		SINGLE- AND THREE-PHASE JUNCTION KIOSK PADS		
DISTRIBUTION STANDARDS 						
ISSUED: MAR 2016 REPLACES: JUN 2003 ORIGINALLY ISSUED: OCT 1981			PAGE 1 OF 1	ES54 Z1-03		R 5

Above Ground Switchgear

Item	Approximate Weight (kg)		Catalogue ID
4-way VISTA switchgear precast concrete collar	2,000		350-8536
5-way VISTA switchgear precast concrete collar	2,100		96016084
Precast concrete vault for above ground switchgear (4-way and 5-way over vault)	Top	Bottom	350-8540
	9,000	7,000	



4 Way VISTA Switchgear Precast Collar



5 Way VISTA Switchgear Precast Collar

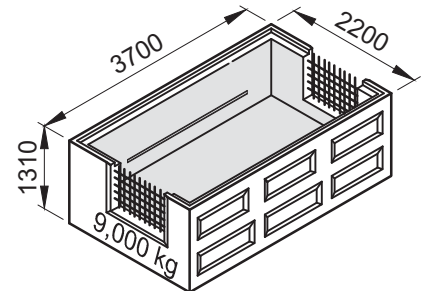
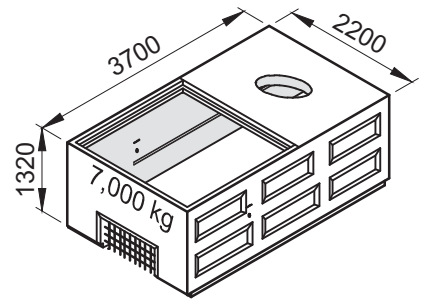
Refer to the following standards for above ground switchgear vault and pad installations:

ES54 E4-01 Above Ground Switchgear, 4-Way Over Vault

ES54 E4-03 Above Ground Switchgear, 5-Way Over Vault

Sump knockout is sized for round sump cover, catalogue ID 400-0426.

Above ground switchgear vault is sized for medium duty frame, catalogue ID 400-0403, and cover, catalogue ID 400-0412.



Above Ground Switchgear Vault

REVISIONS: R.4 - REDRAWN AND REVISED. NEW PRODUCTS ADDED. MAR '16 CC | R.5 - DIMENSIONS AMENDED ON BELOW GROUND SWITCHGEAR PRECAST VAULT. OCT '18 CC

DESIGNED C. CROWSON	RECOMMENDED L. STEVANOVIĆ	ACCEPTED F. DENNERT	ENGINEER OF RECORD C. E. CROWSON #45713 BRITISH COLUMBIA ENGINEER 2018-10-30	SWITCHGEAR PADS, FRAMES AND VAULTS ABOVE GROUND SWITCHGEAR	
DISTRIBUTION STANDARDS 	ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981	PAGE 1 OF 3		ES54 Z1-04 .01	R 5

REVISIONS: R.4 - REDRAWN AND REVISED. NEW PRODUCTS ADDED. MAR '16 CC | R.5 - DIMENSIONS AMENDED ON BELOW GROUND SWITCHGEAR PRECAST VAULT. OCT '18 CC

Below Ground Switchgear, Subsurface Vaults

Item	Approximate Weight (kg)	Catalogue ID
Precast concrete vault for below ground switchgear (subsurface 4-way) c/w collar, frame, cover and gratings	12,000	350-8535
Precast concrete vault for below ground switchgear (subsurface 4-Way and 5-Way) c/w collar, frame and lids	19,000	96005803

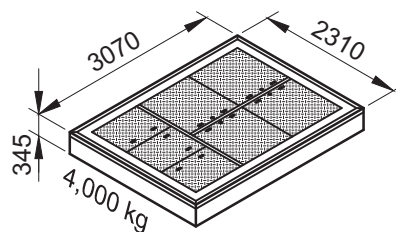
Refer to the following standards for below ground, subsurface switchgear vault installations:

ES54 E3-01 Below Ground Switchgear, Subsurface 4-Way

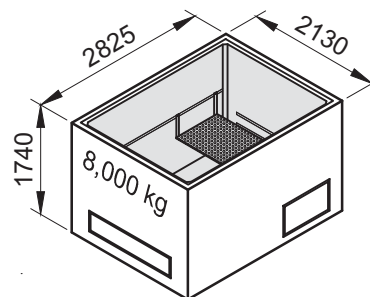
ES54 E3-02 Below Ground Switchgear, Subsurface 4-Way or 5-Way

Sump knockouts are sized for round sump cover, catalogue ID 400-0426.

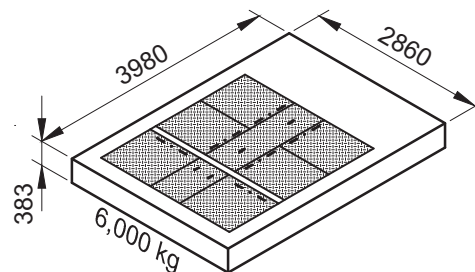
4-Way precast concrete collars are sized for four lids, catalogue ID 96007598, and hardware, catalogue ID 412-0042.



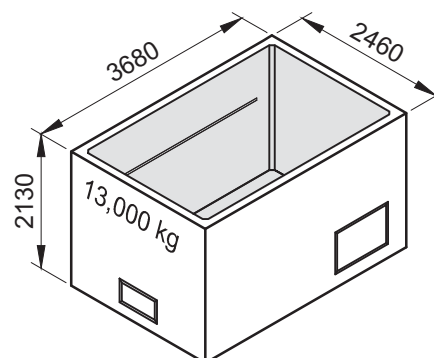
4-Way Collar c/w Frame



4-Way Precast Vault



4 & 5-Way Collar c/w Frame



4 & 5-Way Precast Vault

DESIGNED  C. CROWSON	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  C. E. CROWSON #45713 BRITISH COLUMBIA ENGINEER 2018-10-30	SWITCHGEAR PADS, FRAMES AND VAULTS SUBSURFACE SWITCHGEAR		
DISTRIBUTION STANDARDS 		ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981		PAGE 2 OF 3	ES54 Z1-04 .02	^R 5

Below Ground Switchgear, In Vault

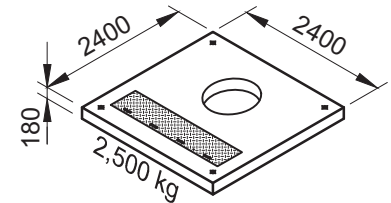
Item	Approximate Weight (kg)		Catalogue ID
	Top	Bottom	
Precast concrete in-vault switchgear vault c/w riser, collar and frame	13,300	11,000	97000433
Control gear pedestal	2,000		96019917

Refer to the following standard for below ground, in vault switchgear installations:

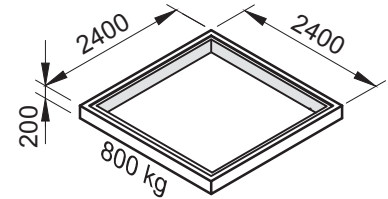
ES54 E3-03 Below Ground Switchgear, In Vault

Sump knockout is sized for round sump cover, catalogue ID 400-0426.

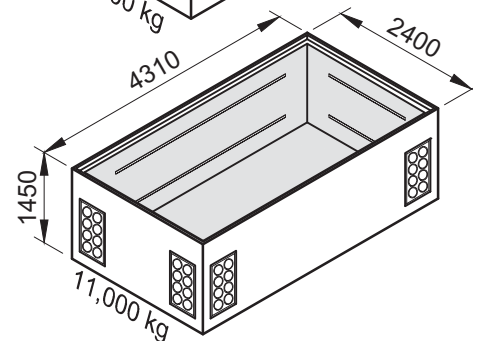
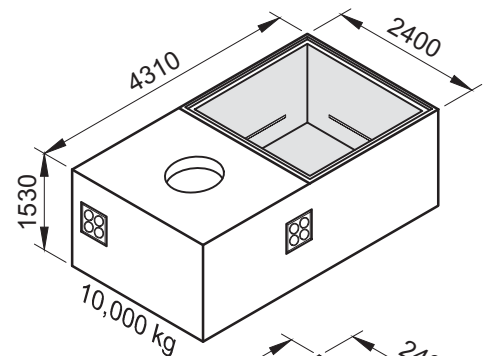
Roof opening is sized for roadway duty frame, catalogue ID 400-0401, and cover, catalogue ID 400-0411.



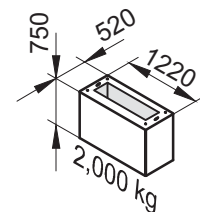
Precast Concrete Collar c/w Frame



Precast Concrete Riser



Below Ground Switchgear Precast Vault



Controlgear Pedestal

REVISIONS: R.4 - REDRAWN AND REVISED. NEW PRODUCTS ADDED. MAR '16 CC | R.5 - DIMENSIONS AMENDED ON BELOW GROUND SWITCHGEAR PRECAST VAULT. OCT '18 CC

DESIGNED C. CROWSON	RECOMMENDED L. STEVANOVIĆ	ACCEPTED F. DENNERT	ENGINEER OF RECORD C. E. CROWSON #45713 BRITISH COLUMBIA ENGINEER 2018-10-30	SWITCHGEAR PADS, FRAMES AND VAULTS BELOW GROUND SWITCHGEAR	
DISTRIBUTION STANDARDS 	ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981	PAGE 3 OF 3	ES54 Z1-04 .03		R 5

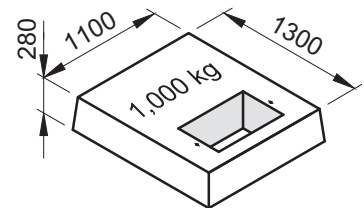
REVISIONS: R.4 - REDRAWN AND REVISED. CONVERSION, ALCOVE AND FLOTATION PADS REMOVED. MAR '16 CC| R.5 - THREE-PHASE TRANSFORMER PAD WEIGHT AMENDED. OCT '18 CC

Single-Phase Low-Profile Transformer Pad

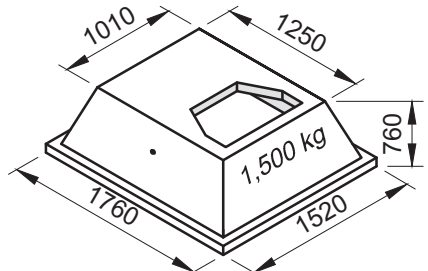
Item	Approximate Weight (kg)	Catalogue ID
LPT precast concrete flat pad	1,000	400-0852
LPT precast concrete pyramid pad	1,500	400-0851

Refer to the following standards for single-phase low profile transformer pad installations:

- ES54 F1-02 Single-Phase Low-Profile Transformer Flat Pad
- ES54 F1-03 Single-Phase Low-Profile Transformer Pyramid Pad



LPT Precast Concrete Flat Pad



LPT Precast Concrete Pyramid Pad

DESIGNED <i>C. Crowson</i> C. CROWSON	RECOMMENDED <i>L. Stevanovic</i> L. STEVANOVIC	ACCEPTED <i>F. Dennert</i> F. DENNERT	ENGINEER OF RECORD  C. E. CROWSON #45713 BRITISH COLUMBIA ENGINEER	TRANSFORMER PADS SINGLE-PHASE	
DISTRIBUTION STANDARDS 		ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981		PAGE 1 OF 4	ES54 Z1-05 .01
					R 5

REVISIONS: R.4 - REDRAWN AND REVISED. CONVERSION, ALCOVE AND FLOTATION PADS REMOVED. MAR '16 CC| R.5 - THREE-PHASE TRANSFORMER PAD WEIGHT AMENDED. OCT '18 CC

Three-Phase Transformer Pad

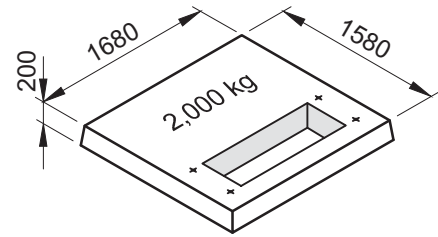
Item	Approximate Weight (kg)	Catalogue ID
Precast concrete pad for 500 kVA and smaller	2,000	400-0853
Precast concrete pad for 500 kVA and larger	3,000	400-0854

Refer to the following standards for three-phase pad-mounted dead-front transformer pad installations:

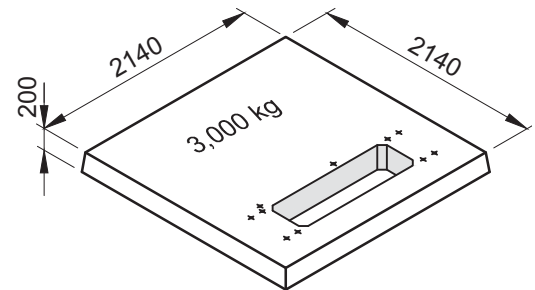
- ES54 F3-04 Three-Phase Transformer Pad, 500 kVA and Smaller
- ES54 F3-05 Three-Phase Transformer Pad, 500 kVA and Larger

Refer to the following standards for cast-in place concrete conversion pad installations:

- ES54 F5-01 Cast-in-Place Conversion Pad, 1000 kVA and Smaller
- ES54 F5-02 Cast-in-Place Conversion Pad, 1500 kVa and Larger



PMT Precast Concrete Pad for 500 kVA and Smaller



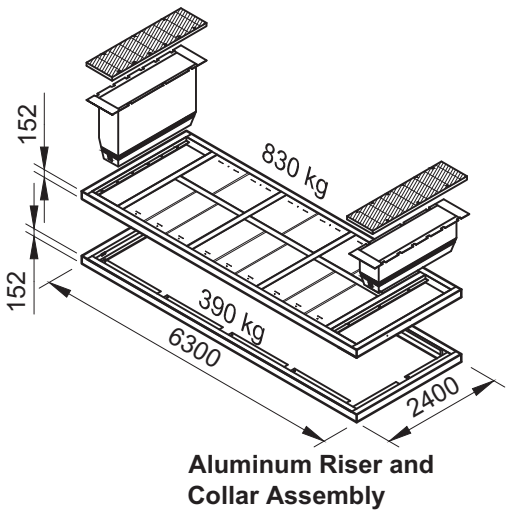
PMT Precast Concrete Pad for 500 kVA and Larger

DESIGNED	RECOMMENDED	ACCEPTED	ENGINEER OF RECORD	TRANSFORMER PADS THREE-PHASE		
						
C. CROWSON	L. STEVANOVIC	F. DENNERT				
DISTRIBUTION STANDARDS 	ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981			PAGE 2 OF 4	ES54 Z1-05 .02	^R 5

REVISIONS: R.4 - REDRAWN AND REVISED. CONVERSION, ALCOVE AND FLOTATION PADS REMOVED. MAR '16 CC| R.5 - THREE-PHASE TRANSFORMER PAD WEIGHT AMENDED. OCT '18 CC

Three-Phase Submersible Transformer Vault, 1500 kVA

Item	Approximate Weight (kg)		Catalogue ID
	Top	Bottom	
1500 kVA submersible precast concrete transformer vault	15,000	17,000	96018201
Aluminum riser	390		96018200
Aluminum collar c/w lid and assembly	830		96018199

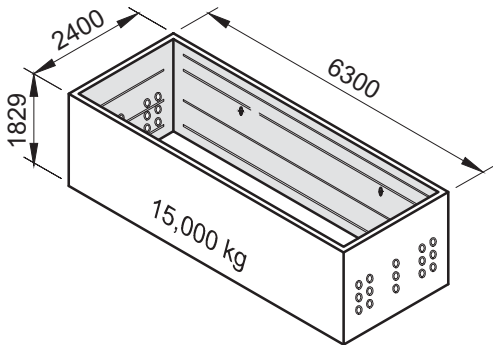


Refer to the following standard for precast concrete submersible transformer vault installations:

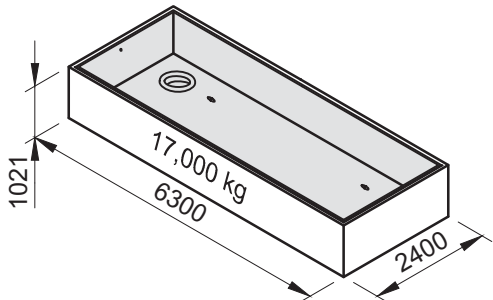
ES54 F6-01 Three-Phase Submersible Transformer Vault, 3 x 500 kVA Street Vault

Submersible transformer vaults are designed for Sidewalk Duty loading. Refer to Design Load standard ES54 U1-02 for Application Duties.

Aluminum collars come complete with ventilation louvres, transformer and personnel access lids, and nuts and bolts.



Precast Concrete Chamber Top



Precast Concrete Chamber Bottom

DESIGNED C. CROWSON	RECOMMENDED L. STEVANOVIC	ACCEPTED F. DENNERT
C. CROWSON	L. STEVANOVIC	F. DENNERT
DISTRIBUTION STANDARDS BC Hydro	ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981	



THREE-PHASE SUBMERSIBLE TRANSFORMER VAULT 2018 VAULT		
PAGE 3 OF 4	ES54 Z1-05 .03	R 5

Three-Phase Submersible Transformer Vault, 1000 kVA

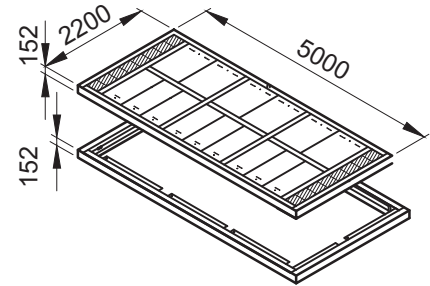
Item	Approximate Weight (kg)		Catalogue ID
	Top	Bottom	
1000 kVA submersible precast concrete transformer vault	13,000	15,000	96021201
Aluminum riser	320		96021268
Aluminum collar c/w lid and assembly	700		96021269

Refer to the following standard for precast concrete submersible transformer vault installations:

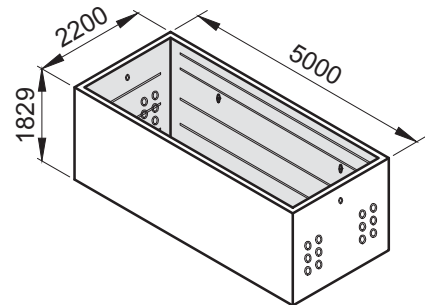
ES54 F6-02 Three-Phase Submersible Transformer Vault, 3 x 333 kVA Street Vault

Submersible transformer vaults are designed for Sidewalk Duty loading. Refer to Design Load standard ES54 U1-02 for Application Duties.

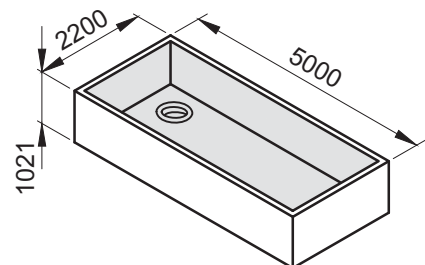
Aluminum collars come complete with ventilation louvres, transformer and personnel access lids, and nuts and bolts.



Aluminum Riser and Collar Assembly



Precast Concrete Chamber Top



Precast Concrete Chamber Bottom

REVISIONS: R.4 - REDRAWN AND REVISED. CONVERSION, ALCOVE AND FLOTATION PADS REMOVED. MAR '16 CC| R.5 - THREE-PHASE TRANSFORMER PAD WEIGHT AMENDED. OCT '18 CC

DESIGNED <i>C. Crowson</i> C. CROWSON	RECOMMENDED <i>L. Stevanovic</i> L. STEVANOVIC	ACCEPTED <i>F. Dennert</i> F. DENNERT	ENGINEER OF RECORD  C. E. CROWSON #45713 BRITISH COLUMBIA ENGINEER	THREE-PHASE SUBMERSIBLE TRANSFORMER VAULT 1617 VAULT	
DISTRIBUTION STANDARDS 		ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: OCT 1981		PAGE 4 OF 4	ES54 Z1-05 .04
				R	5

Revision Notes

Added *Revision Notes* and *References* sections. Updated diameters of precast concrete riser rings in Table 1. Edited Table 1 note 1 to change one locknut to two locknuts. Added new Figure 2. Changed sump cover diameter in Table 2 from 60 mm to 600 mm. Updated Figure 5. Updated pulling iron descriptions in Table 6. Added new Figure 9. Added description to stanchion and added precast bollard. Substantive changed content is marked by green vertical revision lines in the left margin. This revision released concurrently with Standards and Equipment Advisory Information Bulletin 2024-037 *Revised ES54 Z1-06 Civil Hardware and Associated Materials*.

References

BC Hydro Distribution Standards

ES54 U2-01 Concrete Pad Protection General Notes

Frames, Covers, and Risers

Table 1 – Frames, covers, and risers

Item	Diameter (mm)	Approx weight (kg)	Material no.
Roadway-duty cast iron frame	762	240	400-0401
Roadway-duty cast iron cover	762	175	400-0411
Medium-duty cast-iron frame	685	45	400-0403
Medium-duty cast-iron cover	685	80	400-0412
Non-traffic-duty concrete cover (small)	675	50	400-0483
Non-traffic-duty cast-iron cover (small)	680	30	9600-8858
Non-traffic-duty concrete cover (large)	860	60	400-0493
Non-traffic-duty cast-iron cover (large)	875	50	9600-8857
300 mm precast concrete riser ring	940 / 1140	600	9700-0965
150 mm precast concrete riser ring	940 / 1140	300	9700-0964

Table notes:

- Roadway-duty cover is supplied with two locknuts.
- Roadway-duty frame and cover are for use with 555, 332, and 632 boxes in vaults and road installations.
- Medium-duty frame and cover are for use with above- and below-ground switchgear vaults.
- Non-traffic-duty covers are for use with lightweight service boxes. Cast-iron covers should be used for cover replacements.

Designed: E. Eliasov, P. Eng		Professional of Record  2024-11-26 Permit to Practice 1002449	Material Catalogue Civil Hardware and Associated Materials	
Checked: L. Stevanovic, P. Eng			DISTRIBUTION STANDARDS 	ES54 Z1-06 R6
Reviewed: L. Stevanovic, P. Eng				
Approved: H. Giesbrecht, P. Eng	 2024-11-21	Issued: 2024-11-20 Effective: 2024-11-20		

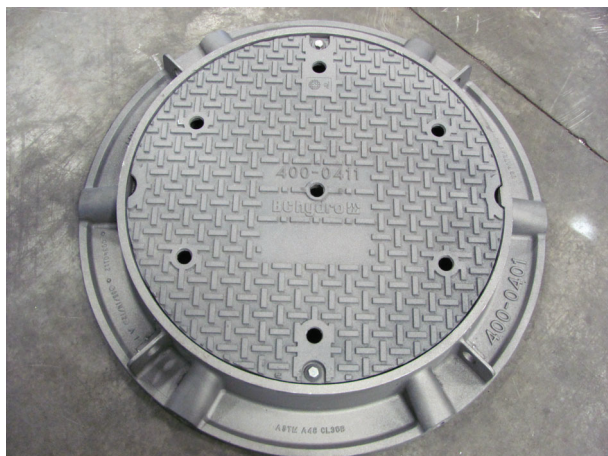


Figure 1 – Roadway-duty frame and cover



Figure 2 – Medium-duty frame and cover

Drainage Assemblies

Table 2 – Drainage assemblies

Item	Diameter (mm)	Material no.
Sump cover	600	400-0426
Backwater valve with P-trap	75	400-0780



Figure 3 - Sump cover



Figure 4 - Backwater valve

Lightweight Lids

Table 3 – Lightweight lids

Item	Dimensions (mm)	Approx weight (kg)	Material no.
Sidewalk-duty lid	880 x 890 x 67	35	9600-7598
Access lane-duty lid	880 x 890 x 90	35	9601-6176

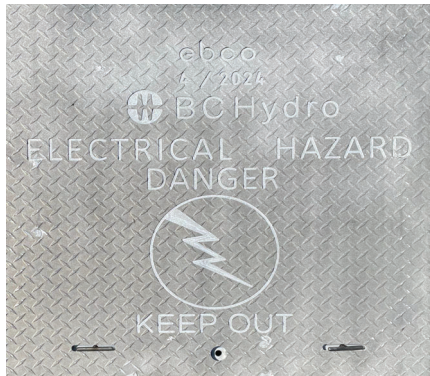


Figure 5 - Lightweight lid

Use the lightweight lid hardware package (material no. 412-0042) for both sidewalk- and access lane-duty lids. The hardware package contains the components in Table 4.

Table 4 – Lightweight lid hardware package components

Item	Quantity	Material no.
Capscrew fastener	1	9600-5174
Cotter pin	2	102-5155
12 mm hinge pin	2	400-0500
End cap	1	400-0985
½" nut	1	9600-5404

Security Fasteners

Table 5 – Security fasteners

Item	Material no.
½" x 4" stainless steel puzzle bolt	9600-5174
½" x 3" stainless steel puzzle bolt	9600-5248
½" x 2¼" stainless steel puzzle bolt	9600-5249
½" x 1¾" stainless steel puzzle bolt	9600-5250
½" puzzle head socket wrench	9600-5175
Puzzle bolt cap	9600-5355
Recycled pentabolt head	9700-0514



Figure 6 - Puzzle bolt

Fasteners

Table 6 –Fasteners

Item	Material no.
Shoulder eye bolt, comes with galvanized nut	420-1184
Pulling iron, removable	420-0918
Pulling iron, cast-in-place	420-0916
Cable terminator bracket	420-2004
C-channel	350-8552
25 mm threaded eye bolt	9700-2787



Figure 7 - Threaded eye bolt



Figure 8 - Removable pulling iron

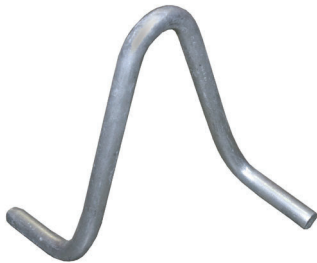


Figure 9 - Cast-in-place pulling iron

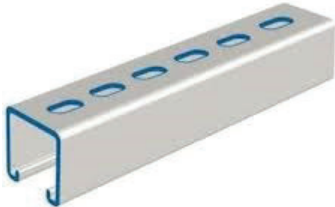


Figure 10 - C-channel

Vault Joint Sealant

Material number 141-1346

Cast-in-Place Stanchion

Galvanized steel pipe, 100 mm inner diameter, material number 400-0059. See ES54 U2-01 for installation instructions.

Precast Bollard

Material number 9700-2788.

Ducting is used to protect buried cable. DB2 duct is for use with URD/UD and concrete encased feeder ducts. Schedule 40 is for use with direct-buried feeder ducts. Reinforced thermosetting resin conduit (RTRC) (previously FRE) is most commonly used for bridge crossings or when a high pulling tension is required.

For installation instructions, refer to ES54 Section H – Ducts.

Straight Duct

Diameter (mm)	Duct Type	Length	Catalogue ID
75	DB2	6 m	400-4011
75	Schedule 40	6 m	96021463
100	DB2	6 m	96021357
100	Schedule 40	6 m	96021464
125	DB2	6 m	96021360
125	Schedule 40	6 m	96021465
125	RTRC (NOM WT 3mm)	6 m	400-4105



Straight Duct

Duct Elbows

90 Degree Bends

Diameter (mm)	Duct Type	Min Bending Radius (mm)	Catalogue ID
75	DB2	914	400-4021
75	Schedule 40	914	96021472
75	RTRC	914	96001123
100	DB2	914	96021350
100	Schedule 40	914	96021473
100	RTRC	914	96001124
125	DB2	1050	96021351
125	Schedule 40	1050	96021474



90 Degree Bend

45 Degree Bends

Diameter (mm)	Duct Type	Min Bending Radius (mm)	Catalogue ID
75	DB2	914	96021344
75	Schedule 40	914	96021469
100	DB2	914	96021347



45 Degree Bend

REVISIONS: R.2 - RTRC DUCT ELBOWS, TRANSITION COUPLINGS AND EPOXY ADDED; TRANSITE COUPLINGS DELETED. OCT '18 CC

DESIGNED <i>C. Crowson</i> C. CROWSON	RECOMMENDED <i>L. Stevanovic</i> L. STEVANOVIC	ACCEPTED <i>F. Dennert</i> F. DENNERT	ENGINEER OF RECORD  C. E. CROWSON #45713 PROFESSIONAL ENGINEER 2018-10-30	DUCT AND ACCESSORIES	
DISTRIBUTION STANDARDS 		ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: JUL 2003			
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100	Schedule 40	914	96021470
125	DB2	1050	96021348
125	Schedule 40	1050	96021471
125	RTRC (NOM WT 2mm)	1828	96013296

22 ½ Degree Bends

Diameter (mm)	Duct Type	Min Bending Radius (mm)	Catalogue ID
75	DB2	914	97003049
75	Schedule 40	914	97003052
100	DB2	914	97003050
100	Schedule 40	914	97003055
125	DB2	1050	97003051
125	Schedule 40	1050	97003054
125	RTRC (NOM WT 2mm)	1828	96013294

FRE Duct Bend



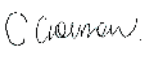
30 Degree Bends

Diameter (mm)	Duct Type	Min Bending Radius (mm)	Catalogue ID
125	RTRC (NOM WT 2mm)	1828	96013295

11¼ Degree Bends

Diameter (mm)	Duct Type	Min Bending Radius (mm)	Catalogue ID
75	DB2	914	96021447
75	Schedule 40	914	96021466
100	DB2	914	96021460
100	Schedule 40	914	96021467

REVISIONS: R.2 - RTRC DUCT ELBOWS, TRANSITION COUPLINGS AND EPOXY ADDED; TRANSITE COUPLINGS DELETED. OCT '18 CC

DESIGNED  C. CROWSON	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  C. E. CROWSON #45713 PROFESSIONAL ENGINEER BRITISH COLUMBIA	DUCT AND ACCESSORIES		
DISTRIBUTION STANDARDS 		ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: JUL 2003				PAGE 2 OF 5

125	DB2	1050	96021462
125	Schedule 40	1050	96021468
125	RTRC (NOM WT 2mm)	1219	97003571

Couplings

Straight Couplings

Diameter (mm)	Duct Type	Catalogue ID
75	Schedule 40	96021475
75	Supply Lines Red	96021491
100	DB2	96021355
100	Schedule 40	96021476
100	Supply Lines Red	96021492
125	DB2	96021362
125	Schedule 40	96021477
125	Supply Lines Red	96021493
125	RTRC (NOM WT 3mm)	400-4121



FRE Coupling

Deflection Couplings

Diameter (mm)	Duct Type	Catalogue ID
75	Schedule 40	96021479
100	DB2	96021449
100	Schedule 40	96021480
125	DB2	96021450
125	Schedule 40	96021481
125	RTRC (NOM WT 3mm)	400-4131



Transition Coupling

Transition Couplings

Diameter (mm)	Transition	Catalogue ID
125	RTRC (NOM WT 3mm) to Schedule 40	400-4111
125	RTRC (NOM WT 2mm) to DB2	97003572

Transition Coupling

REVISIONS: R.2 - RTRC DUCT ELBOWS, TRANSITION COUPLINGS AND EPOXY ADDED; TRANSITE COUPLINGS DELETED. OCT '18 CC

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DISTRIBUTION STANDARDS 		ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: JUL 2003				PAGE 3 OF 5

Duct Caps

Diameter (mm)	Material	Catalogue ID
75	DB2	401-0173
75	Schedule 40	96021482
100	DB2	96021451
100	Schedule 40	96021483
125	DB2	96021452 (previously 401-0175)
125	Schedule 40	96021484



Duct Cap

Bell Ends

Diameter (mm)	Material	Catalogue ID
75	DB2	401-0183
75	Schedule 40	96021485
100	DB2	96021454
100	Schedule 40	96021486
125	DB2	96021455
125	Schedule 40	96021487
125	RTRC (NOM WT 3mm)	400-4151



Bell End

Duct Plugs

Diameter (mm)	Material	Catalogue ID
75	DB2	401-0197
75	Schedule 40	96021488
100	DB2	96021457
100	Schedule 40	96021489
125	DB2	96021459
125	Schedule 40	96021490



Duct Plug

Duct Shields

Type	Catalogue ID
100 mm duct cable shield	401-1002
125 mm duct cable shield	401-1003



Duct Shield

REVISIONS: R.2 - RTRC DUCT ELBOWS, TRANSITION COUPLINGS AND EPOXY ADDED; TRANSITE COUPLINGS DELETED. OCT '18 CC

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DISTRIBUTION STANDARDS BC Hydro		ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: JUL 2003



DUCT AND ACCESSORIES

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2

REVISIONS: R.2 - RTRC DUCT ELBOWS, TRANSITION COUPLINGS AND EPOXY ADDED; TRANSITE COUPLINGS DELETED. OCT '18 CC

Duct Accessories

Type	Catalogue ID
125 mm (5") duct spacer	96022508
Duct sleeve expansion coupling	400-4141
Duct twine #8 polypropylene 500 m spool	106-0420
PVC adhesive, brushtop container	141-1044
Epoxy adhesive, 2 part, RTRC, 21 degree ambient curing temperature	97003828
Epoxy adhesive, 2 part, RTRC, 4 degree ambient curing temperature	97003829
Epoxy adhesive, 2 part, RTRC, -7 degree ambient curing temperature	97003830
Safety tape (Caution Buried Electric Line Below) 300-400 m rolls 150 mm wide	394-0680
Warning board (Caution Electric Cable Below)	97000676
Cast-iron warning plate	96017849



Duct Spacer



Duct Sleeve Expansion Coupling



Cast-Iron Warning Plate



PVC Adhesive



Warning Board

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DISTRIBUTION STANDARDS 	ISSUED: OCT 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: JUL 2003		PAGE 5 OF 5	ES54 Z2-01 .05	R 2

Grounding Package #1

(previously catalogue ID 420-1170)

This grounding package is for use with the following civil products:

- Concrete LPT pads (flat and pyramid)
- Concrete pads for three-phase junction kiosk*
- Concrete PMT pads
- Concrete pads for primary voltage conversions (1000 kVA and smaller)



Item	Components	Quantity	Catalogue ID
Ground rod	-	2	420-1093
Counterpoise, 18 m	-	1	412-0014
Grounding kit 412-0015	Connector, counterpoise 19 mm to ground rod 15 mm, galvanized	2	420-1157
	Clamp, wire rope, 19 mm counterpoise mechanical restraint	1	420-0965
	Cap, wire/cable, heat or cold shrink	2	394-0605

Note: Grounding package for three-phase junction kiosks is supplies with an additional two ground rods and two connectors.

Grounding Package #2

(previously catalogue ID 420-1171)

This grounding package is for use with the following civil products:

- Concrete pads for single-phase junction kiosk

Item	Components	Quantity	Catalogue ID
Ground rod	-	2	420-1093
Counterpoise, 14 m	-	1	412-0013
Grounding kit 412-0015	Connector, counterpoise 19 mm to ground rod 15 mm, galvanized	2	420-1157
	Clamp, wire rope, 19 mm counterpoise mechanical restraint	1	420-0965
	Cap, wire/cable, heat or cold shrink	2	394-0605

REVISIONS: R.6 - MASTIC TAPE REMOVED FROM GROUNDING PACKAGE #4 - AUG '16 CC

DESIGNED  C. CROWSON	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  L. STEVANOVIC	GROUNDING ASSEMBLIES	
DISTRIBUTION STANDARDS 	ISSUED: AUG 2016 REPLACES: JUL 2003 ORIGINALLY ISSUED: OCT 1981	PAGE 1 OF 3		ES54 Z3-01 .01	R 6

Grounding Package #3

(previously catalogue ID 420-1172)

This grounding package is for use with the following civil products:

- Concrete pads and vaults for above ground switchgear

Item	Components	Quantity	Catalogue ID
Ground rod	-	4	420-1093
Counterpoise, 25 m	-	1	412-0017
Connector, counterpoise or ground rod to grounding conductor, galvanized	-	2	420-1158
Grounding kit 412-0015	Connector, counterpoise 19 mm to ground rod 15 mm, galvanized	2	420-1157
	Clamp, wire rope, 19 mm counterpoise mechanical restraint	1	420-0965
	Cap, wire/cable, heat or cold shrink	2	394-0605

Grounding Package #4

(previously catalogue ID 420-1173)

This grounding package is for use with the following civil products:

- Concrete junction boxes
- Concrete pull/splice boxes
- Concrete and lightweight service boxes
- Concrete vaults for below ground switchgear

Item	Components	Quantity	Catalogue ID
Ground rod	-	1	420-1093
Grounding kit 412-0022	Connector, counterpoise or ground rod to grounding conductor, galvanized	1	420-1158
	Wire/cable, #2 AWG, 4 m	1	380-0256

REVISIONS: R.6 - MASTIC TAPE REMOVED FROM GROUNDING PACKAGE #4 . AUG '16 CC

DESIGNED  C. CROWSON	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  L. STEVANOVIC PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA Feb. 20 2017	GROUNDING ASSEMBLIES	
DISTRIBUTION STANDARDS 		ISSUED: AUG 2016 REPLACES: JUL 2003 ORIGINALLY ISSUED: OCT 1981		PAGE 2 OF 3	ES54 Z3-01 .02
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Grounding Package #5

(previously catalogue ID 420-1174)

This grounding package is for use with the following civil products:

- Concrete pads for primary voltage conversions (1500 kVA and larger)

Item	Components	Quantity	Catalogue ID
Ground rod	-	2	420-1093
Counterpoise, 20 m	-	1	412-0016
Grounding kit 412-0015	Connector, counterpoise 19 mm to ground rod 15 mm, galvanized	2	420-1157
	Clamp, wire rope, 19 mm counter- poise mechanical restraint	1	420-0965
	Cap, wire/cable, heat or cold shrink	2	394-0605

For further information on grounding refer to ES54/43 Section R – Grounding.

Grounding Items for High-Corrosion Areas

Item	Catalogue ID
Counterpoise, 2/0 AWG MHD copper	380-0155
Connector, copper/bronze, 2/0 AWG counterpoise or #4 – 2/0 AWG ground connector to 15 mm ground rod	420-1159
Copper clad steel ground rod	420-1104
Connector, tinned bronze, two bolt	388-0353

REVISIONS: R.6 - MASTIC TAPE REMOVED FROM GROUNDING PACKAGE #4 . AUG '16 CC

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DISTRIBUTION STANDARDS  BC Hydro		ISSUED: AUG 2016 REPLACES: JUL 2003 ORIGINALLY ISSUED: OCT 1981		PAGE 3 OF 3	ES54 Z3-01 .03
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Connectors for Grounding

Item	Catalogue ID
Connector, counterpoise 19 mm to ground rod 15 mm, galvanized	420-1157
Connector, counterpoise or ground rod 15 mm – 19 mm to grounding conductor #4 AWG to 2/0 AWG, galvanized	420-1158
Connector, copper/bronze, 2/0 AWG counterpoise or #4 - 2/0 AWG ground conductor to 15 mm ground rod	420-1159
Split stud connector for #8 to #2 bonding conductor	388-2103
Clamp, tinned copper ground wire #6 - 4/0 AWG and 1/0 - 4/0 AWG for mechanical restraint of 2/0 AWG copper counterpoise	388-0353
Clamp, wire rope, 19 mm counterpoise mechanical restraint	420-0965



Connector - Counterpoise to Ground Rod



Connector - Counterpoise or Ground Rod to Grounding Conductor



Clamp - Wire Rope, Tinned Copper



Clamp - Wire Rope, Galvanized

REVISIONS: R.4 - NEW CONNECTORS ADDED. MAR '16 CC

DESIGNED  C. CROWSON	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT		CONNECTORS FOR GROUNDING		
DISTRIBUTION STANDARDS  BC Hydro						
			ISSUED: MAR 2016 REPLACES: JUL 2004 ORIGINALLY ISSUED: AUG 2003			PAGE 1 OF 1

Pilasters and Guards

Item	Catalogue ID
Small guard	400-0532
Small pilaster for 1-100 mm or 1-125 mm duct	400-0533
Large guard	400-0542
Large pilaster for 3-75 mm, 2-100 mm or 2-125 mm ducts	400-0543

For installation of pilasters refer to ES54 Section M – Pilasters, Terminal Poles.



Pilaster and Guard

Adapters

Item	Catalogue ID
Large guard to small cover	400-0545
Small guard to 1-phase cover	400-0546



Adapters

REVISIONS: R.6 - STAINLESS STEEL BANDING REMOVED. MAR '16 CC

DESIGNED  C. CROWSON	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  L. STEVANOVIC PROFESSIONAL ENGINEER BRITISH COLUMBIA Feb. 20 2017	TERMINAL POLE HARDWARE PILASTERS, GUARDS, ADAPTERS AND POLE MOUNTING HARDWARE	
DISTRIBUTION STANDARDS 	ISSUED: MAR 2016 REPLACES: NOV 2002 ORIGINALLY ISSUED: OCT 1981	PAGE 1 OF 1	ES54 Z8-01		R 6