

PARAENG

PARA-RAIOS

SOLDA EXOTÉRMICA



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É um método de soldagem de alta temperatura para união permanente de cabos de cobre, aço carbono, aço inox e bronze. Metais em forma de pó são depositados no interior de um molde de grafite no qual estão inseridos os condutores a serem unidos. Os condutores a serem unidos. Após a ignição o pó de solda, transforma-se em mental líquido de solda para união dos condutores.

Componentes principais



Pó Exotérmico: Composto químico responsável pela solda;



Molde de Grafite: É nele que ocorre a soldagem. Varia conforme o tipo de conexão e dura em média 50 utilizações;



Alicate: Acessório para manuseio seguro do molde;

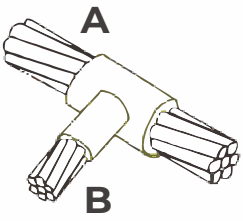


Palito Ignitor: Atinge a temperatura necessária à ignição do pó, fósforo comum.



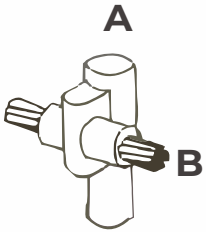
Disco de Retenção: Disco metálico posicionado no fundo do molde

IDENTIFICAÇÃO DOS MOLDES:



TA - 50.35.B — CLASSE DO MOLDE (IDENTIFICA ALICATE)

- SEÇÃO CABO DERIVAÇÃO (B)
- SEÇÃO CABO PASSANTE (A)
- TIPO DE CONEXÃO

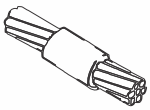


GY - 5/8".50.C — CLASSE DO MOLDE (IDENTIFICA ALICATE)

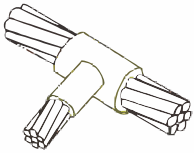
- SEÇÃO CABO DERIVAÇÃO (B)
- SEÇÃO HASTE PASSANTE (A)
- TIPO DE CONEXÃO



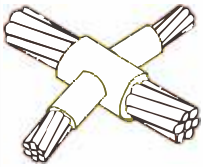
CONEXÃO CABO-CABO



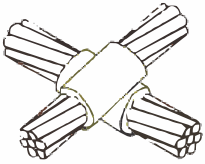
SS.....07



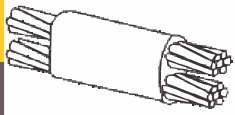
TA.....08



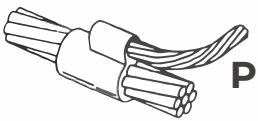
XA.....09



XB.....10

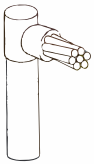


PT.....11

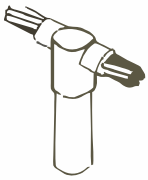


PC.....12

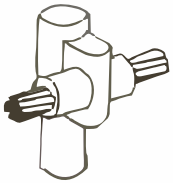
CONEXÃO CABO-HASTE



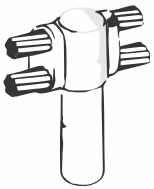
GR.....13



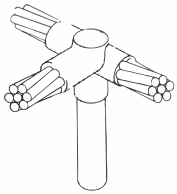
GT.....14



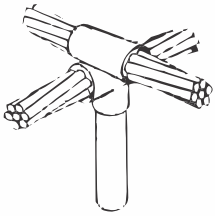
GY.....15



ND.....16



NT.....17

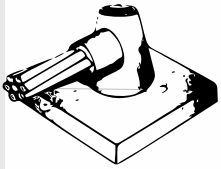


GX.....18

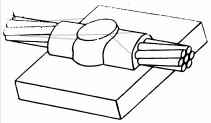
CONEXÃO CABO-CHAPA METÁLICA



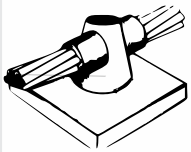
HA.....19



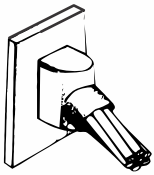
HS.....19



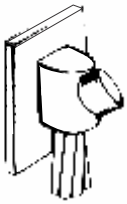
HC.....20



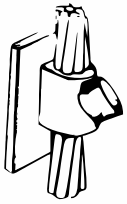
HT.....20



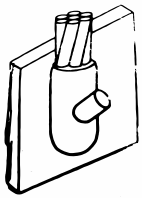
VS.....21



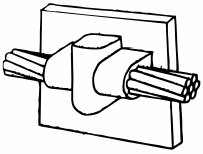
VB.....22



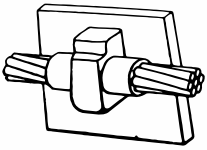
VV.....22



VF.....22

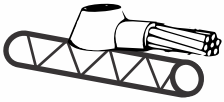


VG.....23

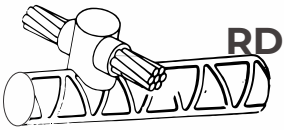


VT.....23

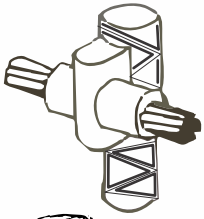
CONEXÃO CABO-FERRO DE CONSTRUÇÃO



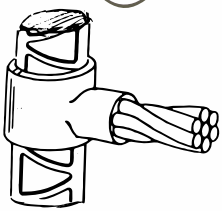
RR.....24



RD.....25

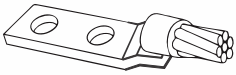


RC.....26



RJ.....27

CONEXÃO CABO-TERMINAL

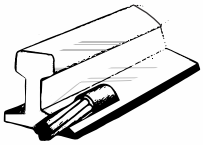


GL.....28

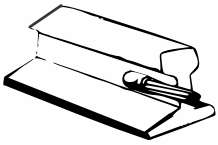


LA.....29

CONEXÃO CABO-TRILHO

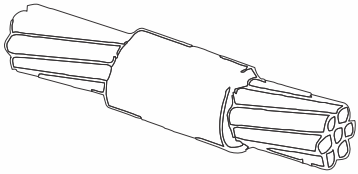


JA.....30



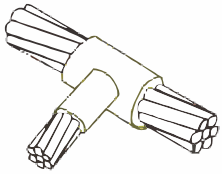
VR.....30

CABO RETO - SS



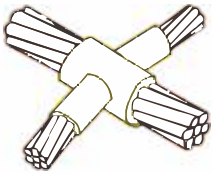
CABO	MOLDE	CARTUCHO	ALICATE
16	SS-16	25	P
25	SS-25	25	P
35	SS-35	25	P
50	SS-50	32	P
70	SS-70	45	P
95	SS-95	90	G
120	SS-120	115	G

CABO EM T - TA



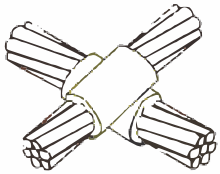
PASSANTE	DERIVAÇÃO	MOLDE	CARTUCHO	ALICATE
25	25	TA-25.25	25	P
35	35	TA-35.35	32	P
35	25	TA-35.25	32	P
50	50	TA-50.50	90	G
50	35	TA-50.35	32	P
50	25	TA-50.25	32	P
70	70	TA-70.70	90	G
70	50	TA-70.50	90	G
70	35	TA-70.35	32	P
70	25	TA-70.25	32	P
95	95	TA-95.95	115	G
95	70	TA-95.70	90	G
95	50	TA-95.50	90	G
95	35	TA-95.35	32	P
95	25	TA-95.25	32	P
120	120	TA-120.120	150	G
120	95	TA-120.95	150	G
120	70	TA-120.70	90	G
120	50	TA-120.50	90	G
120	35	TA-120.35	90	G
120	25	TA-120.25	90	G

CABO EM X PLANO - XA



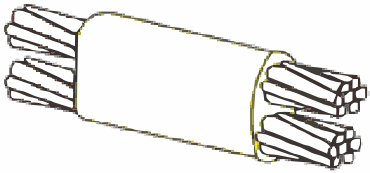
PASSANTE	DERIVAÇÃO	MOLDE	CARTUCHO	ALICATE
25	25	XA-25.25	32	P
35	35	XA-35.35	45	P
35	25	XA-35.25	45	P
50	50	XA-50.50	90	G
50	35	XA-50.35	90	G
50	25	XA-50.25	90	G
70	70	XA-70.70	115	G
70	50	XA-70.50	115	G
70	35	XA-70.35	115	G
95	95	XA-95.95	150	G
95	70	XA-95.70	150	G
95	50	XA-95.50	115	G
95	35	XA-95.35	115	G
120	120	XA-120.120	200	G
120	95	XA-120.95	200	G
120	70	XA-120.70	150	G
120	50	XA-120.50	150	G
120	35	XA-120.35	115	G

CABO EM X SOBREPOSTO - XB



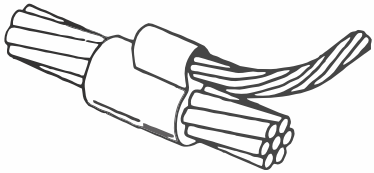
PASSANTE	DERIVAÇÃO	MOLDE	CARTUCHO	ALICATE
25	25	XB-25.25	45	P
35	35	XB-35.35	90	G
35	25	XB-35.25	45	P
50	50	XB-50.50	150	G
50	35	XB-50.35	115	G
50	25	XB-50.25	115	G
70	70	XB-70.70	200	G
70	50	XB-70.50	200	G
70	35	XB-70.35	150	G
95	95	XB-95.95	250	G
95	70	XB-95.70	200	G
95	50	XB-95.50	200	G
95	35	XB-95.35	150	G
120	120	XB-120.120	2X150	G
120	95	XB-120.95	2X150	G
120	70	XB-120.70	250	G
120	50	XB-120.50	250	G
120	35	XB-120.35	150	G

CABO PARALELO - PT



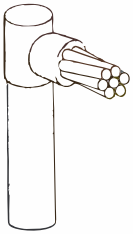
PASSANTE	DERIVAÇÃO	MOLDE	CARTUCHO	ALICATE
25	25	PT-25.25	25	P
35	35	PT-35.35	45	P
35	25	PT-35.25	45	P
50	50	PT-50.50	90	G
50	35	PT-50.35	45	P
50	25	PT-50.25	45	P
70	70	PT-70.70	115	G
70	50	PT-70.50	115	G
70	35	PT-70.35	90	G
70	25	PT-70.25	90	G
95	95	PT-95.70	150	G
95	70	PT-95.70	150	G
95	50	PT-95.50	115	G
95	35	PT-95.35	115	G
95	25	PT-95.25	115	G
120	120	PT-120.120	250	G
120	95	PT-120.95	200	G
120	70	PT-120.70	150	G
120	50	PT-120.50	150	G
120	35	PT-120.35	150	G

CABO PARALELO COM DERIVAÇÃO - PC



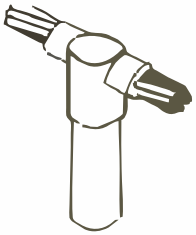
PASSANTE	DERIVAÇÃO	MOLDE	CARTUCHO	ALICATE
16	16	PC-16.16	25	P
25	25	PC-25.25	25	P
25	16	PC-25.16	25	P
35	35	PC-35.35	45	P
35	25	PC-35.25	32	P
35	16	PC-35.16	25	P
50	35	PC-50.35	45	P
50	25	PC-50.25	45	P
50	16	PC-50.16	32	P
70	35	PC-70.35	90	G
70	25	PC-70.25	45	P
70	16	PT-70.16	45	P

CABO DERIVAÇÃO - HASTE - GR



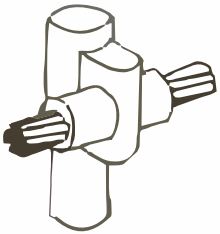
HASTE	CABO	MOLDE	CARTUCHO	ALICATE
1/2"	25	GR-1/2.25	65	P
1/2"	35	GR-1/2.35	65	P
1/2"	50	GR-1/2.50	90	G
1/2"	70	GR-1/2.70	90	G
1/2"	95	GR-1/2.90	90	G
1/2"	120	GR-1/2.120	90	G
5/8"	25	GR-5/8.25	65	P
5/8"	35	GR-5/8.35	65	P
5/8"	50	GR-5/8.50	90	G
5/8"	70	GR-5/8.70	90	G
5/8"	95	GR-5/8.95	90	G
5/8"	120	GR-5/8.120	90	G
3/4"	25	GR-3/4.25	90	G
3/4"	35	GR-3/4.35	90	G
3/4"	50	GR-3/4.50	90	G
3/4"	70	GR-3/4.70	90	G
3/4"	95	GR-3/4.95	90	G
3/4"	120	GR-3/4.120	90	G

HASTE CABO NO TOPO - GT



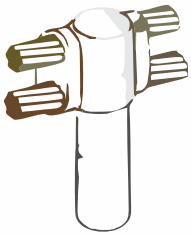
HASTE	CABO	MOLDE	CARTUCHO	ALICATE
1/2"	25	GT-1/2.25	65	P
1/2"	35	GT-1/2.35	65	P
1/2"	50	GT-1/2.50	65	P
1/2"	70	GT-1/2.70	90	G
1/2"	95	GT-1/2.95	115	G
1/2"	120	GT-1/2.120	150	G
5/8"	25	GT-5/8.25	65	P
5/8"	35	GT-5/8.35	65	P
5/8"	50	GT-5/8.50	90	G
5/8"	70	GT-5/8.70	115	G
5/8"	95	GT-5/8.95	115	G
5/8"	120	GT-5/8.120	150	G
3/4"	25	GT-3/4.25	90	G
3/4"	35	GT-3/4.35	90	G
3/4"	50	GT-3/4.50	115	G
3/4"	70	GT-3/4.70	115	G
3/4"	95	GT-3/4.95	115	G
3/4"	120	GT-3/4.120	150	G

HASTE CABO NA LATERAL - GY



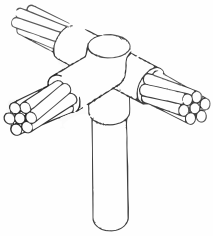
HASTE	CABO	MOLDE	CARTUCHO	ALICATE
1/2"	25	GY-1/2.25	90	G
1/2"	35	GY-1/2.35	90	G
1/2"	50	GY-1/2.50	115	G
1/2"	70	GY-1/2.70	115	G
1/2"	95	GY-1/2.95	150	G
1/2"	120	GY-1/2.120	150	G
5/8"	25	GY-5/8.25	90	G
5/8"	35	GY-5/8.35	90	G
5/8"	50	GY-5/8.50	115	G
5/8"	70	GY-5/8.70	115	G
5/8"	95	GY-5/8.95	150	G
5/8"	120	GY-5/8.120	150	G
3/4"	25	GY-3/4.25	90	G
3/4"	35	GY-3/4.35	90	G
3/4"	50	GY-3/4.50	115	G
3/4"	70	GY-3/4.70	115	G
3/4"	95	GY-3/4.95	150	G
3/4"	120	GY-3/4.120	200	G

HASTE CABO EM PARALELO - ND



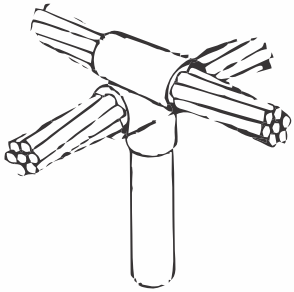
HASTE	CABO	MOLDE	CARTUCHO	ALICATE
1/2"	25	ND-1/2.25	115	G
1/2"	35	ND-1/2.35	115	G
1/2"	50	ND-1/2.50	150	G
1/2"	70	ND-1/2.70	200	G
1/2"	95	ND-1/2.95	250	G
5/8"	25	ND-5/8.25	115	G
5/8"	35	ND-5/8.35	150	G
5/8"	50	ND-5/8.50	200	G
5/8"	70	ND-5/8.70	250	G
5/8"	95	ND-5/8.95	2X150	G
5/8"	120	ND-5/8.120	2X200	G
3/4"	25	ND-3/4.25	115	G
3/4"	35	ND-3/4.35	150	G
3/4"	50	ND-3/4.50	200	G
3/4"	70	ND-3/4.70	250	G
3/4"	95	ND-3/4.95	2X150	G
3/4"	120	ND-3/4.120	2X200	G

HASTE CABO EM T - NT



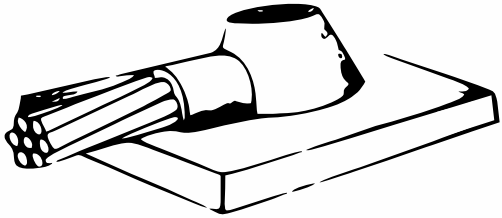
HASTE	CABO	MOLDE	CARTUCHO	ALICATE
1/2"	25	NT-1/2.25	90	G
1/2"	35	NT-1/2.35	90	G
1/2"	50	NT-1/2.50	115	G
1/2"	70	NT-1/2.70	115	G
1/2"	95	NT-1/2.95	150	G
1/2"	120	NT-1/2.120	150	G
5/8"	25	NT-5/8.25	90	G
5/8"	35	NT-5/8.35	115	G
5/8"	50	NT-5/8.50	150	G
5/8"	70	NT-5/8.70	150	G
5/8"	95	NT-5/8.95	200	G
5/8"	120	NT-5/8.120	250	G
3/4"	25	NT-3/4.25	90	G
3/4"	35	NT-3/4.35	115	G
3/4"	50	NT-3/4.50	150	G
3/4"	70	NT-3/4.70	200	G
3/4"	95	NT-3/4.95	250	G
3/4"	120	NT-3/4.120	250	G

HASTE CABO EM X SOBREPOSTO - GX



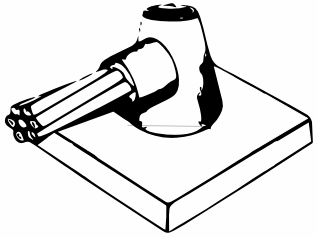
HASTE	CABO	MOLDE	CARTUCHO	ALICATE
5/8"	35	GX-5/8.35	150	G
5/8"	50	GX-5/8.50	200	G
5/8"	70	GX-5/8.70	250	G
5/8"	95	GX-5/8.95	250	G
5/8"	120	GX-5/8.120	250	G
3/4"	35	GX-3/4.35	150	G
3/4"	50	GX-3/4.50	200	G
3/4"	70	GX-3/4.70	250	G
3/4"	95	GX-3/4.95	250	G
3/4"	120	GX-3/4.120	250	G

CABO CHAPA APOIADO HORIZONTAL - HA



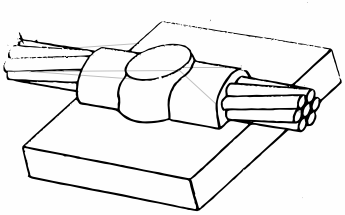
CABO	MOLDE	CARTUCHO	ALICATE
16	HA-16	45	P
25	HA-25	45	P
35	HA-35	45	P
50	HA-50	90	G
70	HA-70	90	G
95	HA-95	115	G
120	HA-120	115	G

CABO CHAPA AFASTADO NA HORIZONTAL - HS



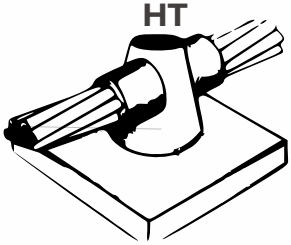
CABO	MOLDE	CARTUCHO	ALICATE
50	HS-50	90	G
70	HS-70	90	G
95	HS-95	115	G
120	HS-120	115	G

CABO-CHAPA APOIADO PASSANTE NA HORIZONTAL HC



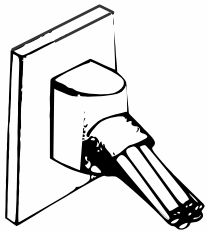
CABO	MOLDE	CARTUCHO	ALICATE
16	HC-16	45	P
25	HC-25	45	P
35	HC-35	45	P
50	HC-50	90	G
70	HC-70	115	G
95	HC-95	115	G
120	HC-120	150	G

CABO CHAPA AFASTADO PASSANTE NA HORIZONTAL HT



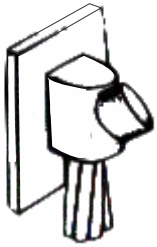
CABO	MOLDE	CARTUCHO	ALICATE
50	HT-50	90	G
70	HT-70	115	G
95	HT-95	115	G
120	HT-120	150	G

CABO-CHAPA INCLINADO NA VERTICAL - VS



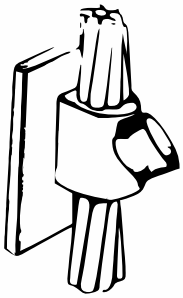
CABO	MOLDE	CARTUCHO	ALICATE
16	VS-16	45	P
25	VS-25	45	P
35	VS-35	45	P
50	VS-50	90	G
70	VS-70	90	G
95	VS-95	115	G
120	VS-120	115	G

CABO CHAPA VERTICAL - VB



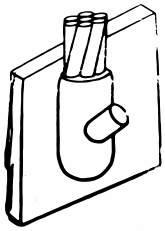
CABO	MOLDE	CARTUCHO	ALICATE
25	VB-25	65	G
35	VB-35	65	G
50	VB-50	115	G
70	VB-70	115	G
95	VB-95	150	G
120	VB-120	200	G

CABO CHAPA PASSANTE NA VERTICAL - VV



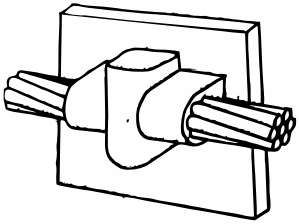
CABO	MOLDE	CARTUCHO	ALICATE
25	VV-25	90	G
35	VV-35	115	G
50	VV-50	200	G
70	VV-70	200	G
95	VV-95	250	G
120	VV-120	250	G

CABO-CHAPA DESCIDA VERTICAL - VF



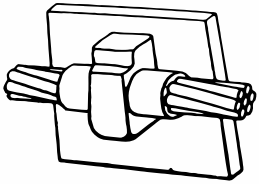
CABO	MOLDE	CARTUCHO	ALICATE
25	VF-25	65	G
35	VF-35	65	G
50	VF-50	150	G
70	VF-70	150	G
95	VF-95	200	G
120	VF-120	200	G

CABO CHAPA PASSANTE APOIADO - VG



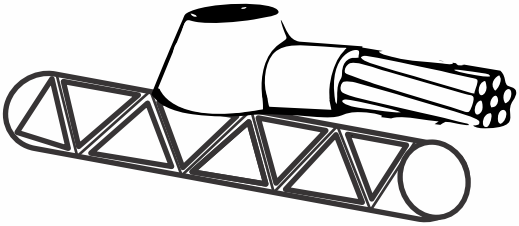
CABO	MOLDE	CARTUCHO	ALICATE
16	VG-16	45	P
25	VG-25	45	P
35	VG-35	45	P
50	VG-50	115	G
70	VG-70	115	G
95	VG-95	150	G
120	VG-120	150	G

CABO-CHAPA PASSANTE AFASTADO - VT



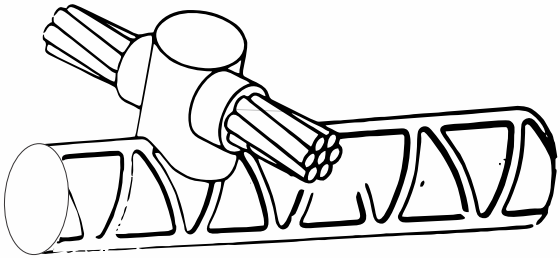
CABO	MOLDE	CARTUCHO	ALICATE
16	VT-16	65	P
25	VT-25	65	P
35	VT-35	65	P
50	VT-50	115	G
70	VT-70	115	G
95	VT-95	150	G
120	VT-120	150	G

FERRO HORIZONTAL CABO DERIVAÇÃO - RR



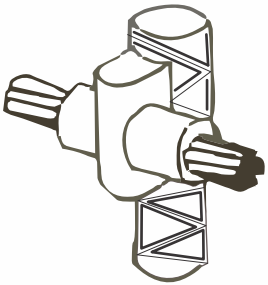
FERRO CONSTRUÇÃO	CABO	MOLDE	CARTUCHO	ALICATE
3/8"	25	RR-3/8.25	32	P
3/8"	35	RR-3/8.35	45	P
3/8"	50	RR-3/8.50	90	G
3/8"	70	RR-3/8.70	90	G
3/8"	95	RR-3/8.95	115	G
1/2"	25	RR-1/2.25	32	P
1/2"	35	RR-1/2.35	45	P
1/2"	50	RR-1/2.50	90	G
1/2"	70	RR-1/2.70	90	G
1/2"	95	RR-1/2.95	115	G
5/8"	25	RR-5/8.25	32	P
5/8"	35	RR-5/8.35	45	P
5/8"	50	RR-5/8.50	90	G
5/8"	70	RR-5/8.70	90	G
5/8"	95	RR-5/8.95	115	G
3/4"	25	RR-3/4.25	32	P
3/4"	35	RR-3/4.35	45	P
3/4"	50	RR-3/4.50	90	G
3/4"	70	RR-3/4.70	90	G
3/4"	95	RR-3/4.95	115	G

CABO-FERRO "X" SOBREPOSTO - RD



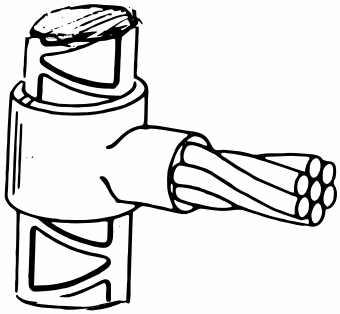
FERRO CONSTRUÇÃO	CABO	MOLDE	CARTUCHO	ALICATE
3/8"	25	RD-3/8.25	65	G
3/8"	35	RD-3/8.35	90	G
3/8"	50	RD-3/8.50	115	G
3/8"	70	RD-3/8.70	150	G
3/8"	95	RD-3/8.95	150	G
1/2"	25	RD-1/2.25	65	G
1/2"	35	RD-1/2.35	90	G
1/2"	50	RD-1/2.50	115	G
1/2"	70	RD-1/2.70	150	G
1/2"	95	RD-1/2.95	150	G
5/8"	25	RD-5/8.25	65	G
5/8"	35	RD-5/8.35	90	G
5/8"	50	RD-5/8.50	115	G
5/8"	70	RD-5/8.70	150	G
5/8"	95	RD-5/8.95	150	G
3/4"	25	RD-3/4.25	65	G
3/4"	35	RD-3/4.35	90	G
3/4"	50	RD-3/4.50	115	G
3/4"	70	RD-3/4.70	150	G
3/4"	95	RD-3/4.95	150	G

FERRO VERTICAL CABO LATERAL - RC



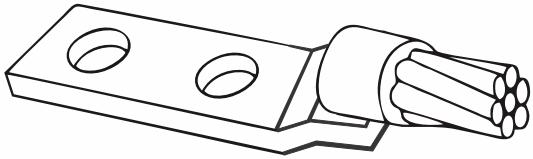
FERRO CONSTRUÇÃO	CABO	MOLDE	CARTUCHO	ALICATE
3/8"	25	RC-3/8.25	90	G
3/8"	35	RC-3/8.35	90	G
3/8"	50	RC-3/8.50	115	G
3/8"	70	RC-3/8.70	115	G
3/8"	95	RC-3/8.95	150	G
1/2"	25	RC-1/2.25	65	G
1/2"	35	RC-1/2.35	90	G
1/2"	50	RC-1/2.50	115	G
1/2"	70	RC-1/2.70	115	G
1/2"	95	RC-1/2.95	150	G
5/8"	25	RC-5/8.25	90	G
5/8"	35	RC-5/8.35	90	G
5/8"	50	RC-5/8.50	115	G
5/8"	70	RC-5/8.70	150	G
5/8"	95	RC-5/8.95	150	G
3/4"	25	RC-3/4.25	90	G
3/4"	35	RC-3/4.35	90	G
3/4"	50	RC-3/4.50	115	G
3/4"	70	RC-3/4.70	115	G
3/4"	95	RC-3/4.95	150	G

CABO-FERRO DERIVAÇÃO - RJ



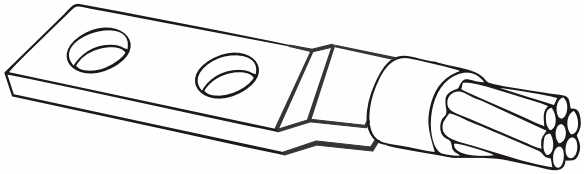
FERRO CONSTRUÇÃO	CABO	MOLDE	CARTUCHO	ALICATE
3/8"	25	RJ-3/8.25	65	G
3/8"	35	RJ-3/8.35	65	G
3/8"	50	RJ-3/8.50	115	G
3/8"	70	RJ-3/8.70	115	G
3/8"	95	RJ-3/8.95	150	G
1/2"	25	RJ-1/2.25	65	G
1/2"	35	RJ-1/2.35	65	G
1/2"	50	RJ-1/2.50	115	G
1/2"	70	RJ-1/2.70	115	G
1/2"	95	RJ-1/2.95	150	G
5/8"	25	RJ-5/8.25	65	G
5/8"	35	RJ-5/8.35	65	G
5/8"	50	RJ-5/8.50	115	G
5/8"	70	RJ-5/8.70	115	G
5/8"	95	RJ-5/8.95	150	G
3/4"	25	RJ-3/4.25	65	G
3/4"	35	RJ-3/4.35	65	G
3/4"	50	RJ-3/4.50	115	G
3/4"	70	RJ-3/4.70	115	G
3/4"	95	RJ-3/4.95	150	G

CABO SOBREPOSTO NO TERMINAL - GL



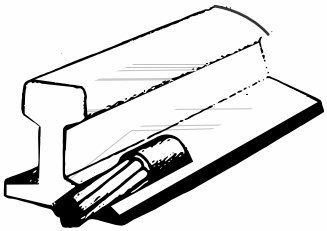
CABO	TERMINAL	MOLDE	CARTUCHO	ALICATE
25	3X25	GL-3X25.25	32	G
35	3X25	GL-3X25.35	32	G
50	3X25	GL-3X25.50	45	G
70	3X25	GL-3X25.70	45	G
95	3X25	GL-3X25.25	65	G
120	3X25	GL-3X25.120	65	G

CABO NO TOPO DO TERMINAL - LA



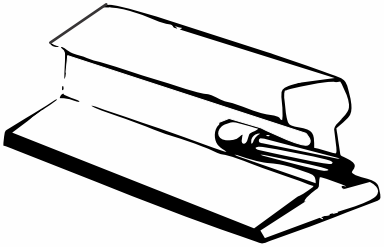
CABO	TERMINAL	MOLDE	CARTUCHO
25	3X25	LA-3X25.25	45
35	3X25	LA-3X25.35	45
50	3X25	LA-3X25.50	45
50	5X25	LA-5X25.50	65
50	6X25	LA-6X25.50	65
70	3X25	LA-3X25.70	65
70	5X25	LA-5X25.70	65
70	6X25	LA-6X25.70	65
95	3X25	LA-3X25.95	65
95	5X25	LA-5X25.95	90
95	6X25	LA-6X25.95	90
120	5X25	LA-5X25.120	90
120	6X25	LA-6X25.120	90
120	6X40	LA-6X40.120	90
120	6X50	LA-6X50.120	90
120	6X80	LA-6X80.120	90

CABO-TRILHO NO PATIM - JA



CABO	MOLDE	CARTUCHO	ALICATE
35	JA-35	45	G
50	JA-50	45	G
70	JA-70	45	G
95	JA-95	65	G
120	JA-120	90	G
150	JA-150	115	G

CABO-TRILHO NA ALMA - WR



CABO	MOLDE	CARTUCHO	ALICATE
25	WR-25	65	G
35	WR-35	90	G
50	WR-50	90	G
70	WR-70	90	G
95	WR-95	90	G
120	WR-120	115	G
150	WR-150	115	G

ACESSÓRIOS



PPR-0428 - G
PPR-0427 - P
Alicate para manuseio dos moldes nos tamanhos "P" e "G", conforme indicação na tabela das conexões



PPR-0432 - Escova Plana para uso geral
PPR-0443 - Escova "V" para limpeza de condutores cilíndricos



PPR-0433
Palito Ignitor para ignição do pó exotérmico



PPR-0434
Disco de Retenção para reter o pó exotérmico, antes da ignição.



PPR-0532 Limpador de Molde para limpeza do cadinho após a soldagem exotérmica



PPR-0531
Massa de Vedação 1Kg



PPR-0435
Batedor para cravar haste até 3/4"



PPR-0556
Acendedor para acender o palito ignitor



PPR-0655 - Lâmina de ajuste para aumentar o diâmetro do condutor

TABELAS TÉCNICAS

CABOS DE COBRE NU CLASSE 2A - NBR-6524			
SEÇÃO NOMINAL MM²	**NÚMERO DE FIOS**	**DIÂMETRO NOMINAL DOS FIOS MM**	**DIÂMETRO NOMINAL DO CABO MM**
10	7	1,36	4,08mm
16	7	1,70	5,10mm
25	7	2,06	6,18mm
35	7	2,50	7,50mm
50	7	3,00	9,00mm
70	7	3,45	10,35mm
95	7	4,12	12,36mm
120	19	2,90	14,50mm
150	19	3,25	16,75mm
185	19	3,55	17,75mm
240	19	4,00	20,00mm

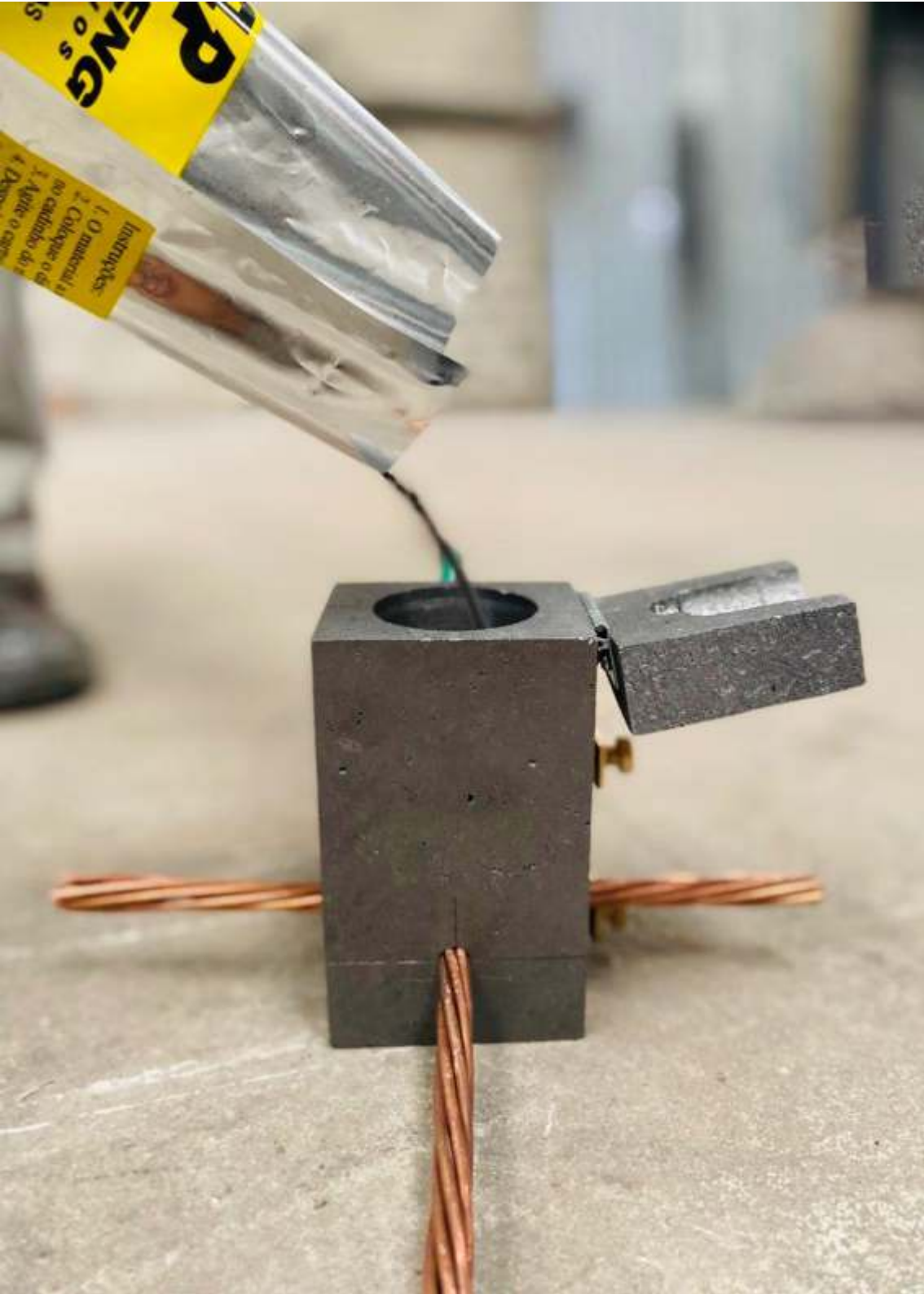
HASTES DE ATERRAMENTO DE AÇO COBREADO COPPERWELD ALTA CAMADA 254 MICRONS	
DIÂMETRO NOMINAL POLEGADAS	**DIÂMETRO NOMINAL MM**
1/2"	12,8mm
5/8"	14,3mm
3/4"	17,3mm

VERGALHÃO DE AÇO GALVANIZADO À FOGO RE-BAR P/ USO ESTRUTURAL	
SEÇÃO NOMINAL MM² OU POLEGADAS	**DIÂMETRO NOMINAL MM**
50mm² - 1/2"	9mm
80mm² - 5/8"	10mm
70mm² - 3/8"	9,5mm

VERGALHÃO DE AÇO CA-25 E CA-50 NBR-7480	
DIÂMETRO NOMINAL	**SEÇÃO NOMINAL MM²**
6,3	31,2
8,0	50,3
10,0	78,5
12,5	122,7
16,0	201,1
20,0	314,2
25,0	490,9
32,0	804,2

CORDOALHA DE AÇO GALVANIZADA À FOGO TIPO SM/HS/EHS		
DIÂMETRO NOMINAL POLEGADA	**NÚMERO DE FIOS**	**DIÂMETRO NOMINAL MM**
5/16"	7	7,94mm
3/8"	7	9,53mm
7/16"	7	11,11mm
1/2"	7	12,70mm

COMPARAÇÃO ENTRE ESCALAS AWG/MCM E SÉRIE MÉTRICA PARA CONDUTORES		
AWG/MCM	**MM²**	**SÉRIE MÉTRICA**
8 AWG	8,367	6
7 AWG	10,35	10
6 AWG	13,30	10
5 AWG	16,77	16
4 AWG	21,15	16
3 AWG	26,57	25
2 AWG	33,62	25
1 AWG	42,41	35
1/0 AWG	53,49	50
2/0 AWG	67,42	50
3/0 AWG	85,01	70
250 MCM	127	120
300 MCM	152	150
400 MCM	203	185



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