HPRXD™ Technology Advancements

- ***Thin stainless steel with HDi technology***
- ***Thick stainless steel piercing technique***
- ***Fine Feature cutting***
- ***Underwater cut charts***
- ***200 A mild steel bevel cut process***

Manual Addendum

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Introduction

Hypertherm has developed a range of cutting techniques designed to extend the capabilities of its existing HPRXD™ suite of plasma cutting systems. The purpose of this document is to assist you in taking advantage of these techniques in order to expand what you are able to achieve with your existing plasma-cutting technology.

This document contains new cut charts specifically designed for the following processes:

- Thin stainless steel 60 A HyDefinition® inox (HDi) process (for both automatic and manual gas consoles)
- Thick stainless steel moving pierce technique using a 400 A process (automatic gas console only) and an 800 A process (both automatic and manual gas consoles)
- Fine Feature mild steel cut charts for 30–260 A processes (automatic gas console only)
- Underwater mild steel cut charts for 80–400 A processes (both automatic and manual gas consoles)
- 200 A bevel cut process for mild steel (both automatic and manual gas consoles)

While a few new consumables are needed for some processes, no system upgrades are required to use these cut charts.

Note: The cut chart values in this document are recommended to provide high quality cuts with minimal dross. Because of differences between installations and material composition, adjustments may be required to obtain desired results.

Safety and operation

CAUTION!

Before operating your HPRXD system, you must read the *Safety* section in your HPRXD Instruction Manual and carefully follow all safety precautions and procedures before cutting or performing any system maintenance.

Refer to the *Operation* section in your HPRXD Instruction Manual for all standard quality cut charts and for more information on computer numerical control (CNC) requirements; consumable selection, installation, and inspection; torch maintenance; and general cutting tips.

Thin stainless steel with HDi technology

Overview

The HPRXD family of plasma cutting systems offers a HyDefinition inox (HDi) 60 A cutting process for thin stainless steel that produces high quality cuts with minimal dross. Specifically, it enables operators to achieve:

- A sharp, top edge of the cut
- A shiny surface finish
- Good cut-edge angularity

You can use these 60 A stainless steel settings with your existing HPRXD system along with the following three new consumables:

- 220814 (nozzle retaining cap)
- 220815 (shield)
- 220847 (nozzle)

The cut charts and consumables for the 60 A stainless steel process can be used with both automatic and manual gas consoles.

Recommendations

Hypertherm develops stainless steel processes using SAE grade 304L. When cutting other grades of stainless steel, you may need to adjust the cut chart parameters to obtain optimal cut quality. In order to reduce the amount of dross, the first recommended adjustment is to adjust the cut speed. Dross can also be reduced by increasing the shield cut flow setting. Both of these adjustments may change the angle of the cut edge.

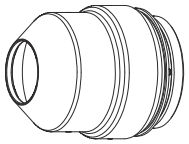
Cut charts

The following cut charts show the consumable parts, cutting speeds, and the gas and torch settings required for each process.

Stainless steel HDi

F5 Plasma / N_2 Shield
60 A – Automatic Gas Console

Flow Rates – lpm/scfh		
	F5	N_2
Preflow	0 / 0	76 / 160
Cutflow	20 / 42	58 / 122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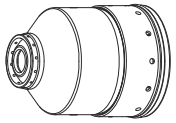
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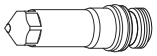
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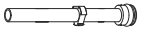
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Metric

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**mm**	Volts	mm	mm/m	mm	Factor %	Seconds	mm
F5	N_2	70	40	90	35	**3**	114	2.0	2770	4.0	200	0.3	1.49
						4	117		2250				1.61
						5	118		1955				1.62
					45	**6**	120		1635			0.5	1.59

English

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**in**	Volts	in	ipm	in	Factor %	Seconds	in
F5	N_2	70	40	90	35	**0.105**	113	0.08	120	0.16	200	0.3	0.062
						0.135	116		95				0.063
						3/16	118		80				0.064
					45	**1/4**	120		60			0.5	0.062

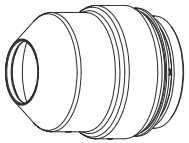
Marking

Select Gases		Set Preflow		Set Cutflow		**Amperage**	Torch-to-Work Distance		Marking Speed		Arc Voltage
						Amps	mm	in	mm/min	ipm	Volts
N_2	N_2	10	10	10	10	**15**	2.5	0.1	6350	250	95
Ar	N_2	90	10	90	10	**8**	2.5	0.1	2540	100	82

Stainless steel HDi

F5 Plasma / N_2 Shield
60 A – Manual Gas Console

Flow Rates – lpm/scfh		
	F5	N_2
Preflow	0 / 0	76 / 160
Cutflow	20 / 42	58 / 122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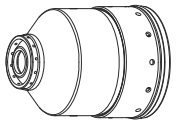
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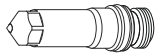
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Metric

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**mm**	Volts	mm	mm/m	mm	Factor %	Seconds	mm
F5	N_2	70	48	84	41	**3**	114	2.0	2770	4.0	200	0.3	1.49
						4	117		2250				1.61
						5	118		1955				1.62
					51	**6**	120		1635			0.5	1.59

English

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**in**	Volts	in	ipm	in	Factor %	Seconds	in
F5	N_2	70	48	84	41	**0.105**	113	0.08	120	0.16	200	0.3	0.062
						0.135	116		95				0.063
						3/16	118		80				0.064
					51	**1/4**	120		60			0.5	0.062

Marking

Select Gases		Set Preflow		Set Cutflow		**Amperage**	Torch-to-Work Distance		Marking Speed		Arc Voltage
						Amps	mm	in	mm/min	ipm	Volts
N_2	N_2	10	10	10	10	**15**	2.5	0.10	6350	250	95
Ar	N_2	90	10	90	10	**8**	2.5	0.10	2540	100	82

Thick stainless steel piercing technique

Overview

Hypertherm has developed a technique for extending the stainless steel piercing capability of the HPR400XD and HPR800XD systems:

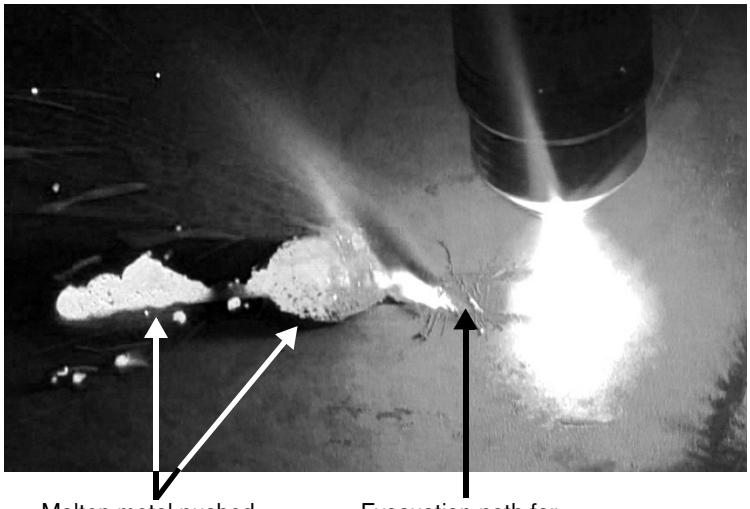
- The HPR400XD can now perform a moving pierce on stainless steel workpieces 75 mm (3 inches) thick.
- The HPR800XD can now perform a moving pierce on stainless steel workpieces 100 mm (4 inches) thick.

The moving pierce technique (sometimes referred to as a “flying pierce” or “running pierce”) enables operators to cut through thick plates using their plasma systems, without having to resort to other methods such as drilling. It starts torch motion immediately after transfer and during the pierce process.

While the parameters for this moving pierce process are built into Hypertherm’s CNC software and nesting software, the information is available to all HPRXD customers and can be used with other compatible CNCs and nesting software programs.

How moving pierce works

The moving pierce method uses a combination of torch height control, table motion, and plasma current adjustments to form a path in the plate through which the molten metal can flow safely away from the torch. This is accomplished through a series of defined segment lengths and speeds that are synchronized with torch lifter motion. In this way, the molten material can be kept as far from the torch as possible while also maintaining a sustainable arc voltage.



Operators should plan the direction of the moving pierce in their part geometry so that this “rooster tail” of molten metal and hot gases does not get directed at themselves or at the gantry, torch lifter, controller, other torches, or other sensitive equipment. As the molten metal is fed to the side of the torch in the opposite direction of the table motion, most of it gets deposited on top of the plate. Once the arc penetrates the plate, operators can use the standard settings for cutting.

Note: Different material chemistries can have an adverse effect on the pierce capability of the system. The moving pierce settings detailed in this document were developed using 304L stainless steel.

For details on the sequencing involved in coordinating the torch height and table motion in order to perform this type of moving pierce, refer to the *Moving Pierce Technique* white paper (part number 807840), which can be found in the “Downloads library” on the Hypertherm website at www.hypertherm.com. There you can also find a *Thick Metal Cutting Techniques* white paper (part number 807850), which contains technical details on other techniques for cutting thick metal, including the dogleg lead-out technique, that Hypertherm offers as enhancements to its HPRXD systems.


WARNING!

The "rooster tail" of molten material and hot gases produced by this moving pierce technique can result in injury, fire, and damage to equipment if appropriate precautions are not taken.

You may be required to use guards to protect operators and to prevent the molten metal from reaching any flammable materials.

Requirements

- This stainless steel moving pierce technique is specific to the HPR400XD and HPR800XD systems.
- Using this technique with the HPR400XD requires an automatic gas console.
- The "pierce complete" (or "pierce control") signal must be turned off for these processes when the shield gas preflow pressure is lower than the shield gas cutflow pressure.
- This moving pierce technique requires a torch height control (THC) system that is controllable through the CNC.

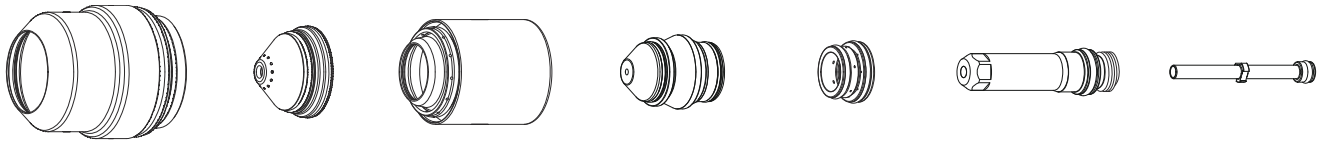
Moving pierce charts

The following charts show the consumable parts, the segment lengths and speeds, and the torch, motion, and plasma current settings that are used to perform the moving pierce for each process.

Once the pierce is complete, cutting can continue with the standard cut chart settings for the 400 A or 800 A stainless steel process as defined in the *Operation* section of your *HPR400XD Instruction Manual* or *HPR800XD Instruction Manual*.

Stainless steel moving pierce

Plasma Gas: H35 and N_2
Shield Gas: N_2
400 A – Automatic Gas Console



220637 220707 220712 220708 220405 220709 220571

Note: For the process parameters not pictured here, refer to the standard 400 A stainless steel (H35 and N_2 Plasma / N_2 Shield) cut chart in the "Operation" section of your HPRXD Instruction Manual.

Moving pierce (MP) parameters – metric

Material Thickness	First Segment	First Speed	Second Segment	Second Speed	Third Segment	Third Speed	Pierce Delay Time	Transfer Height Factor	Moving Delay Factor	Pierce Height Factor	End Height Factor	Torch-to-Work Distance*	Cut Height Delay	MP AVC Delay
mm	mm	mm/m	mm	mm/m	mm	mm/m	sec	% Cut Height	% Pierce Delay	% Cut Height	% Cut Height	mm	sec	sec
50	19.1	1143	10.6	381	38.1	508	4.8	300	50	500	250	6.4	0.5	5.7
75	25.3			508	63.5	254	8.0						3.0	4.0

Moving pierce (MP) parameters – English

Material Thickness	First Segment	First Speed	Second Segment	Second Speed	Third Segment	Third Speed	Pierce Delay Time	Transfer Height Factor	Moving Delay Factor	Pierce Height Factor	End Height Factor	Torch-to-Work Distance*	Cut Height Delay	MP AVC Delay
in	in	ipm	in	ipm	in	ipm	sec	% Cut Height	% Pierce Delay	% Cut Height	% Cut Height	in	sec	sec
2.0	0.75	45	0.42	15	1.50	20	4.8	300	50	500	250	0.25	0.5	5.7
3.0	1.00			20	2.50	10	8.0						3.0	4.0

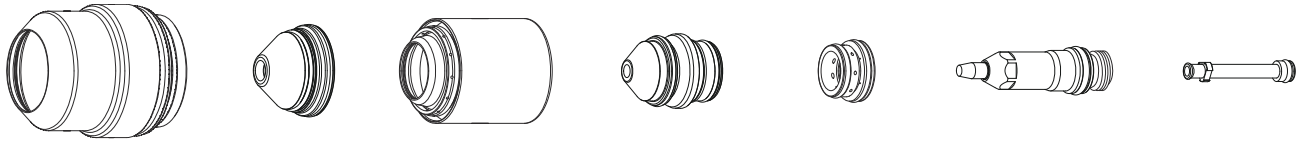
***Note:** Torch-to-work distance is equivalent to cut height.

Stainless steel moving pierce

Plasma Gas: H35

Shield Gas: N_2

800 A – Automatic and Manual Gas Console



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Note: For the process parameters not pictured here, refer to the standard 800 A stainless steel (H35 Plasma / N_2 Shield) cut chart in the "Operation" section of your HPRXD Instruction Manual.

Moving pierce (MP) parameters – metric

Material Thickness	First Segment	First Speed	Second Segment	Second Speed	Third Segment	Third Speed	Pierce Delay Time	Transfer Height Factor	Moving Delay Factor	Pierce Height Factor	End Height Factor	Torch-to-Work Distance*	Cut Height Delay	MP AVC Delay
mm	mm	mm/m	mm	mm/m	mm	mm/m	sec	% Cut Height	% Pierce Delay	% Cut Height	% Cut Height	mm	sec	sec
100	50.8	1016	25.4	152	38.1	279	6.0	150	50	475	275	12.7	8.0	2.0

Moving pierce (MP) parameters – English

Material Thickness	First Segment	First Speed	Second Segment	Second Speed	Third Segment	Third Speed	Pierce Delay Time	Transfer Height Factor	Moving Delay Factor	Pierce Height Factor	End Height Factor	Torch-to-Work Distance*	Cut Height Delay	MP AVC Delay
in	in	ipm	in	ipm	in	ipm	sec	% Cut Height	% Pierce Delay	% Cut Height	% Cut Height	in	sec	sec
4.0	2.00	40	1.00	6	1.50	11	6.0	150	50	475	275	0.50	8.0	2.0

***Note:** Torch-to-work distance is equivalent to cut height.

Fine Feature cutting

Overview

Hypertherm has developed the following processes specifically for cutting mild steel in the 3 mm to 25 mm (0.135 to 1 inch) range of thicknesses. These cut chart settings offer a set of optimal parameters for each thickness and are designed to achieve:

- Minimum angle deviation
- A sharp top edge
- A visibly smooth, low-gloss finish

Note: All of these Fine Feature cut chart processes were developed for the automatic gas console.

Benefits and trade-offs

These Fine Feature processes are ideally suited for jobs in which the greatest importance is placed on achieving the best possible finish on the cut surface, a sharp top edge, and tighter control on angle deviation.

When these factors are not critical, refer to the standard quality cut charts in your HPRXD Instruction Manual, which provide the greatest balance between cut quality and productivity.

In a few cases, two processes are given for a single thickness when performance trade-offs should be considered, such as between the top-edge quality and the angle of the cut. In general, use the lower amperage process for the best edge quality and the higher amperage process for the best dross-free cutting performance.

The Fine Feature processes use standard (straight) cutting consumables designed to work best when the torch is perpendicular to the workpiece. Operators can expect to achieve the same consumable life they currently get using comparable amperage processes with the standard quality cut charts.

Note: The “pierce complete” (or “pierce control”) signal must be turned off when the shield gas preflow pressure is lower than the shield gas cutflow pressure (for example, the 80 A processes in the following cut chart).

Recommendations

- Looping corners can be helpful in achieving sharper corners and in some cases minimizing or eliminating low-speed dross.
- In most cases, these Fine Feature processes employ lower torch-to-work distances than those in the standard quality cut charts, so a flat and properly leveled workpiece will produce optimal results. Pre-piercing and subsequent cleaning of the pierce puddles is recommended, whenever possible.

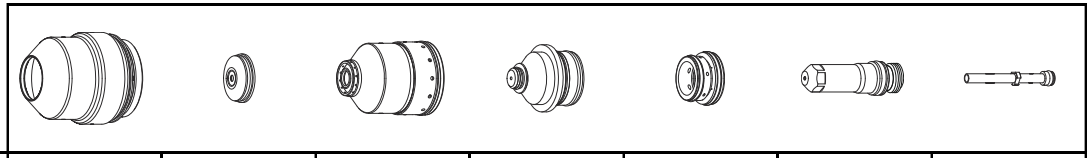
Cut charts

The following Fine Feature cut chart is displayed in two separate tables and is sorted by material thickness: the first table lists the consumable part numbers to use for each process (metric and English); the second table shows the cutting speeds and the gas and torch settings required for each process (metric and English).

Note: The marking parameters for the Fine Feature processes covered in this section will be the same as those detailed in the standard quality mild steel cut charts, which are found in the *Operation* section of your HPRXD Instruction Manual.

Mild steel Fine Feature cutting

30 A to 260 A – Automatic Gas Console



Metric

Material Thickness	Current	Select Gases		Shield Cap	Shield	Nozzle Retaining Cap	Nozzle	Swirl Ring	Electrode	Water Tube
mm	Amps	Plasma gas	Shield gas	Part number						
3	30	O_2	O_2	220747	220194	220754	220193	220180	220192	220340
4										
5										
6										
5	50	O_2	O_2	220747	220555	220754	220554	220553	220552	220340
6										
7	80	O_2	Air	220747	220189	220756	220188	220179	220187	220340
8										
9										
10										
10	130	O_2	Air	220747	220183	220756	220182	220179	220181	220340
12										
15	200	O_2	Air	220637	220761	220757	220354	220353	220352	220340
16										
20										
20	260	O_2	Air	220637	220764	220760	220439	220436	220435	220340
22										
25										

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Mild steel Fine Feature cutting

30 A to 260 A – Automatic Gas Console

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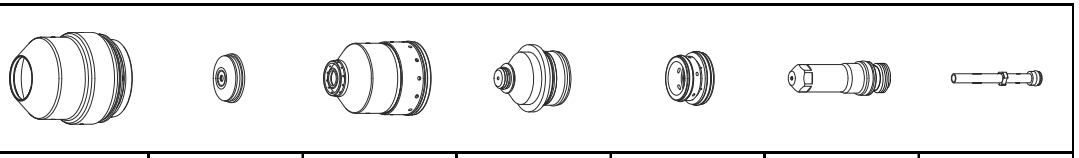

English

Material Thickness	Current	Select Gases		Shield Cap	Shield	Nozzle Retaining Cap	Nozzle	Swirl Ring	Electrode	Water Tube
in	Amps	Plasma gas	Shield gas	Part number						
0.135	30	O_2	O_2	220747	220194	220754	220193	220180	220192	220340
3/16										
1/4	50	O_2	O_2	220747	220555	220754	220554	220553	220552	220340
5/16	80	O_2	Air	220747	220189	220756	220188	220179	220187	220340
3/8										
3/8	130	O_2	Air	220747	220183	220756	220182	220179	220181	220340
1/2										
5/8	200	O_2	Air	220637	220761	220757	220354	220353	220352	220340
3/4										
3/4	260	O_2	Air	220637	220764	220760	220439	220436	220435	220340
7/8										
1										

Mild steel Fine Feature cutting

30 A to 260 A – Automatic Gas Console

Metric

Material Thickness	Current	Select Gases		Set Preflow		Set Cutflow		Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
mm	**Amps**	Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	Volts	mm	mm/m	mm	Factor %	Seconds	mm
3	**30**	O_2	O_2	78	75	94	7	119	1.5	1160	2.7	180	0.5	1.66
4								124		905			0.7	1.65
5								125		744			0.9	1.72
6								128		665			1.0	1.84
5	**50**	O_2	O_2	70	30	81	14	123	1.5	1200	3.0	200	0.4	1.87
6								128	2.0	950	4.0		0.5	2.04
7	**80***	O_2	Air	48	23	78	25	119	1.5	2286	4.1	267	0.4	2.06
8										2240				2.09
9								121		1987			0.5	2.15
10								122		1733				2.22
10	**130**	O_2	Air	32	32	84	27	129	2.3	2437	6.1	267	0.3	2.63
12							25	132	2.5	1935	6.6	260	0.5	2.71
15	**200**	O_2	Air	23	42	74	15	130	2.0	1778	8.1	400	0.6	3.25
16														3.32
20								132	2.3	1678		356	0.8	3.46
20	**260**	O_2	Air	22	49	80	47	157	2.3	2032	8.9	389	0.6	4.28
22							49	162	3.6	1905		250	0.7	4.12
25						84		168		1651			0.8	4.39

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***Note:** The pierce complete signal must be turned off for the 80 A processes.

Mild steel Fine Feature cutting

30 A to 260 A – Automatic Gas Console

English

continued from previous page

Material Thickness	**Current**	Select Gases		Set Preflow		Set Cutflow		Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
in	**Amps**	Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	Volts	in	ipm	in	Factor %	Seconds	in
0.135	**30**	O_2	O_2	78	75	94	7	123	0.06	40	0.11	180	0.5	0.064
3/16								128		30			0.7	0.066
1/4	**50**	O_2	O_2	70	30	81	14	125	0.08	35	0.16	200	0.5	0.080
5/16	**80***	O_2	Air	48	23	78	25	119	0.06	90	0.16	267	0.4	0.080
3/8								121		70			0.5	0.086
3/8	**130**	O_2	Air	32	32	84	27	128	0.09	98	0.24	267	0.3	0.101
1/2							25	132	0.10	70	0.26	260	0.5	0.109
5/8	**200**	O_2	Air	23	42	74	14	130	0.08	70	0.32	400	0.6	0.133
3/4							15		0.09			356	0.8	0.128
3/4	**260**	O_2	Air	22	49	80	47	158	0.09	80	0.35	389	0.6	0.163
7/8							49	166	0.14	75		250	0.7	
1						84		171		65			0.8	0.170

***Note:** The pierce complete signal must be turned off for the 80 A processes.

Underwater cut charts

Overview

Hypertherm has developed underwater cut charts for 80 A, 130 A, 200 A, 260 A, and 400 A mild steel processes. These underwater cut charts are designed to produce optimal results for cutting mild steel up to 75 mm (3 inches) below the surface of the water.

Benefits and trade-offs

Underwater cutting can significantly reduce the level of noise and smoke generated by normal plasma cutting, as well as the glare of the plasma arc. Underwater operation provides the maximum possible noise suppression over the widest possible range of current levels. For example, you can expect noise levels to stay below 70 decibels for many processes when cutting up to 75 mm (3 inches) below the surface of the water. Operators can expect exact noise levels to vary depending on the table design and the cutting application being used.

However, underwater cutting can limit the visual and auditory signals that experienced operators may use while cutting to ensure they are getting a high quality cut and the cutting process is proceeding as it should. Underwater cutting can also affect the cut edge quality, resulting in a rougher surface finish with increased dross levels.

WARNING!

Explosion hazard – underwater cutting with fuel gases or aluminum

Do not cut under water with fuel gases containing hydrogen. Do not cut aluminum under water or with water touching the underside of the aluminum.

Doing so can result in an explosive condition that can detonate during plasma cutting operations.

All underwater processes (80–400 A) use consumables that are designed for standard (straight) cutting, when the torch is perpendicular to the workpiece.

Requirements and restrictions

- These processes are specifically designed for cutting mild steel up to 75 mm (3 inches) below the surface of the water. Do not attempt to cut in water if the surface of the workpiece is deeper than 75 mm (3 inches).
- The True Hole™ process is not compatible with underwater cutting. If you are using a water table with the True Hole process, the water level should be at least 25 mm (1 inch) below the bottom surface of the workpiece.
- Preflow must be on during initial height sense (IHS) for all underwater cutting.
- Ohmic contact cannot be used for underwater cutting.

Operators should disable ohmic contact from the CNC. For example, if you are using a Hypertherm CNC and torch height control (THC) system, you can disable ohmic contact sensing by switching the Nozzle Contact IHS setting to OFF. The system then defaults to stall force sensing as a backup for torch height control.

The use of stall force sensing is not as accurate as ohmic contact sensing, so operators may need to optimize the stall force setting and/or the cut height setting (or torch-to-work distance) to compensate for possible workpiece deflection. That is, the stall force value should be set high enough to avoid false stall detection but not so high that the excess force causes a deflection of the workpiece and inaccurate IHS operation. In this example, the cut height value can be adjusted from the cut chart, while the stall force value can be adjusted from the THC setup parameters.

Refer to the instruction manuals for your Hypertherm CNC and THC systems for more details on setting the stall force threshold or on disabling ohmic contact. Alternative CNCs and THC systems can also be set up for underwater cutting.

Cut charts

The following cut charts show the consumable parts, cutting speeds, and the gas and torch settings required for each mild steel underwater process.

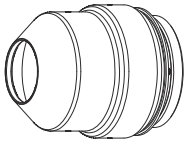
Mild steel underwater cutting

No more than 75 mm (3 in) below the surface of the water

O_2 Plasma / Air Shield

80 A – Automatic Gas Console

Flow Rates – lpm/scfh		
	O_2	Air
Preflow	0 / 0	76 / 161
Cutflow	23 / 48	41 / 87



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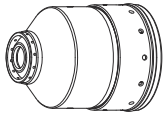

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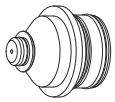

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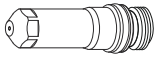

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Note: Preflow must be on during IHS.

Metric

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**mm**	Volts	mm	mm/m	mm	Factor %	Seconds	mm
O_2	Air	48	23	78	23	**4**	116	2.0	3877	4.0	200	0.2	1.39
						5	118		3407			0.3	1.53
						6	122		2746				1.73
						8	125		2162			0.4	1.79
						10	129		1639			0.5	1.91
					10	**12**	132		1271	5.0	250	0.7	2.00
						15	136		922			0.8	2.11

English

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**in**	Volts	in	ipm	in	Factor %	Seconds	in
O_2	Air	48	23	78	23	**0.135**	115	0.10	162	0.15	150	0.2	0.054
						3/16	117	0.08	140	0.16	200		0.056
						1/4	123		99			0.3	0.068
						5/16	125		86			0.4	0.070
						3/8	128		68			0.5	0.075
					10	**1/2**	133		45	0.20	250	0.7	0.080
						5/8	137		33			0.8	0.084

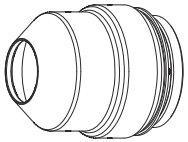
Mild steel underwater cutting

No more than 75 mm (3 in) below the surface of the water

O_2 Plasma / Air Shield

80 A – Manual Gas Console

Flow Rates – lpm/scfh		
	O_2	Air
Preflow	0 / 0	76 / 161
Cutflow	23 / 48	41 / 87



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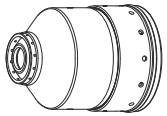

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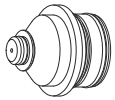

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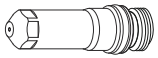

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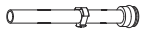

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Note: Preflow must be on during IHS.

Metric

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**mm**	Volts	mm	mm/m	mm	Factor %	Seconds	mm
O_2	Air	50	30	72	30	**4**	116	2.0	3877	4.0	200	0.2	1.39
						5	118		3407			0.3	1.53
						6	122		2746				1.73
						8	125		2162			0.4	1.79
						10	129		1639			0.5	1.91
					15	**12**	132		1271	5.0	250	0.7	2.00
						15	136		922			0.8	2.11

English

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**in**	Volts	in	ipm	in	Factor %	Seconds	in
O_2	Air	50	30	72	30	**0.135**	115	0.10	162	0.15	150	0.2	0.054
						3/16	117	0.08	140	0.16	200		0.056
						1/4	123		99			0.3	0.068
						5/16	125		86			0.4	0.070
						3/8	128		68			0.5	0.075
					15	**1/2**	133		45	0.20	250	0.7	0.080
						5/8	137		33			0.8	0.084

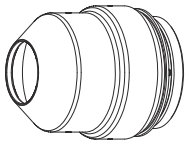
Mild steel underwater cutting

No more than 75 mm (3 in) below the surface of the water

O_2 Plasma / Air Shield

130 A – Automatic Gas Console

Flow Rates – lpm/scfh		
	O_2	Air
Preflow	0 / 0	102 / 215
Cutflow	33 / 70	45 / 96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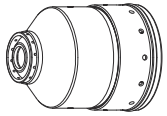
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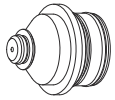
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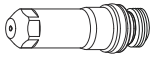
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Note: Preflow must be on during IHS.

Metric

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**mm**	Volts	mm	mm/m	mm	Factor %	Seconds	mm
O_2	Air	32	32	84	28	**5**	127	2.8	4212	5.6	200	0.3	1.77
					22	**8**	129	3.0	2998	6.0			1.92
						10	131		2412				2.04
						12	133	3.3	1980	6.6		0.5	2.11
						15	138	3.8	1497	7.6		0.7	2.22

English

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**in**	Volts	in	ipm	in	Factor %	Seconds	in
O_2	Air	32	32	84	28	**3/16**	127	0.11	171	0.22	200	0.2	0.071
						1/4	126		135			0.3	
					22	**5/16**	129	0.12	119	0.24			0.076
						3/8	130		99				0.080
						1/2	134	0.13	72	0.26		0.5	0.083
						5/8	140	0.15	54	0.30		0.7	0.089
			52			**3/4**	144		41			1.0	0.104

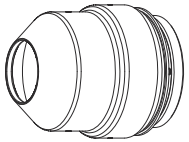
Mild steel underwater cutting

No more than 75 mm (3 in) below the surface of the water

O_2 Plasma / Air Shield

130 A – Manual Gas Console

Flow Rates – lpm/scfh		
	O_2	Air
Preflow	0 / 0	102 / 215
Cutflow	33 / 70	45 / 96



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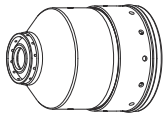

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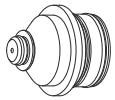

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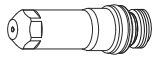

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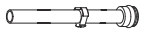

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Note: Preflow must be on during IHS.

Metric

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**mm**	Volts	mm	mm/m	mm	Factor %	Seconds	mm
O_2	Air	35	40	80	35	**5**	127	2.8	4212	5.6	200	0.3	1.77
					28	**8**	129	3.0	2998	6.0			1.92
						10	131		2412				2.04
						12	133	3.3	1980	6.6		0.5	2.11
						15	138	3.8	1497	7.6		0.7	2.22

English

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**in**	Volts	in	ipm	in	Factor %	Seconds	in
O_2	Air	35	40	80	35	**3/16**	127	0.11	171	0.22	200	0.2	0.071
						1/4	126		135			0.3	
					28	**5/16**	129	0.12	119	0.24			0.076
						3/8	130		99				0.080
						1/2	134	0.13	72	0.26		0.5	0.083
						5/8	140	0.15	54	0.30		0.7	0.089
			65			**3/4**	144		41			1.0	0.104

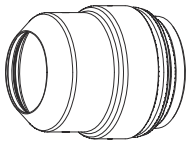
Mild steel underwater cutting

No more than 75 mm (3 in) below the surface of the water

O_2 Plasma / Air Shield

200 A – Automatic Gas Console

Flow Rates – lpm/scfh		
	O_2	Air
Preflow	0 / 0	128 / 270
Cutflow	39 / 82	48 / 101



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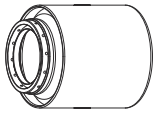

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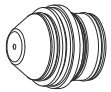

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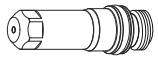

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220340

Note: Preflow must be on during IHS.

Metric

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**mm**	Volts	mm	mm/m	mm	Factor %	Seconds	mm
O_2	Air	23	42	74	18	**8**	126	3.3	3878	6.6	200	0.3	2.09
						10	127		3116				2.20
						12	129		2764			0.5	2.26
						15	133	4.1	2052	8.2		0.6	2.61

English

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**in**	Volts	in	ipm	in	Factor %	Seconds	in
O_2	Air	23	42	74	18	**1/4**	125	0.13	180	0.26	200	0.2	0.078
						5/16	126		154			0.3	0.082
						3/8	127		126				0.086
						1/2	129		104			0.5	0.089
						5/8	135	0.16	72	0.32		0.6	0.108
						3/4	137		59			0.8	0.116

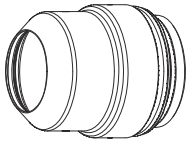
Mild steel underwater cutting

No more than 75 mm (3 in) below the surface of the water

O_2 Plasma / Air Shield

200 A – Manual Gas Console

Flow Rates – lpm/scfh		
	O_2	Air
Preflow	0 / 0	128 / 270
Cutflow	39 / 82	48 / 101



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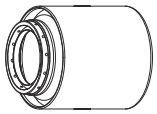

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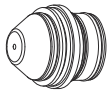

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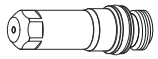

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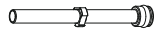


220340

Note: Preflow must be on during IHS.

Metric

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**mm**	Volts	mm	mm/m	mm	Factor %	Seconds	mm
O_2	Air	24	65	69	28	**8**	126	3.3	3878	6.6	200	0.3	2.09
						10	127		3116				2.20
						12	129		2764			0.5	2.26
						15	133	4.1	2052	8.2		0.6	2.61

English

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**in**	Volts	in	ipm	in	Factor %	Seconds	in
O_2	Air	24	65	69	28	**1/4**	125	0.13	180	0.26	200	0.2	0.078
						5/16	126		154			0.3	0.082
						3/8	127		126				0.086
						1/2	129		104			0.5	0.089
						5/8	135	0.16	72	0.32		0.6	0.108
						3/4	137		59			0.8	0.116

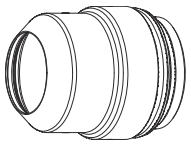
Mild steel underwater cutting

No more than 75 mm (3 in) below the surface of the water

O_2 Plasma / Air Shield

260 A – Automatic Gas Console

Flow Rates – lpm/scfh		
	O_2	Air
Preflow	0 / 0	130 / 275
Cutflow	42 / 88	104 / 220



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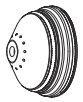

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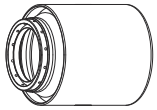

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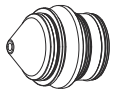

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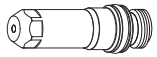
220436



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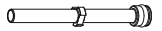


220340

Note: Preflow must be on during IHS.

Metric

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**mm**	Volts	mm	mm/m	mm	Factor %	Seconds	mm
O_2	Air	22	49	76	49	**8**	150	2.8	4889	8.4	300	0.3	2.54
						10			3997				
						12	152		3501			0.4	2.79
				80	49	**15**	156	3.6	2830	9.0	250	0.5	3.43
						20	160		1958			0.6	3.56
						22	162		1750			0.7	3.81
				84		**25**	165		1527			0.8	3.91
						28	170	4.8	1311	9.6	200	0.9	

English

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**in**	Volts	in	ipm	in	Factor %	Seconds	in
O_2	Air	22	49	76	46	**5/16**	150	0.11	194	0.33	300	0.3	0.100
						3/8			162				
						1/2	153		131			0.4	0.110
				80	49	**5/8**	157	0.14	104	0.35	250	0.5	0.115
						3/4	159		81			0.6	0.135
						7/8	162		68			0.7	0.140
				84		**1**	165		59			0.8	0.150
						1-1/8	171	0.19	50	0.38	200	0.9	

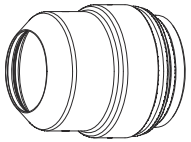
Mild steel underwater cutting

No more than 75 mm (3 in) below the surface of the water

O_2 Plasma / Air Shield

260 A – Manual Gas Console

Flow Rates – lpm/scfh		
	O_2	Air
Preflow	0 / 0	130 / 275
Cutflow	42 / 88	104 / 220



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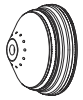

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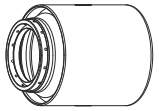

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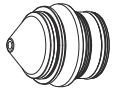

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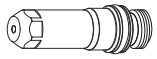
220436



220435

220340

Note: Preflow must be on during IHS.

Metric

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**mm**	Volts	mm	mm/m	mm	Factor %	Seconds	mm
O_2	Air	24	75	70	70	**8**	150	2.8	4889	8.4	300	0.3	2.54
						10			3997				
						12	152		3501			0.4	2.79
				75	75	**15**	156	3.6	2830	9.0	250	0.5	3.43
						20	160		1958			0.6	3.56
						22	162		1750			0.7	3.81
				80		**25**	165		1527			0.8	3.91
						28	170	4.8	1311	9.6	200	0.9	

English

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**in**	Volts	in	ipm	in	Factor %	Seconds	in
O_2	Air	24	75	70	70	**5/16**	150	0.11	194	0.33	300	0.3	0.100
						3/8			162				
						1/2	153		131			0.4	0.110
				75	75	**5/8**	157	0.14	104	0.35	250	0.5	0.115
						3/4	159		81			0.6	0.135
						7/8	162		68			0.7	0.140
				80		**1**	165		59			0.8	0.150
						1-1/8	171	0.19	50	0.38	200	0.9	

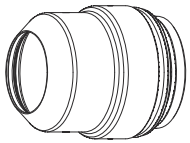
Mild steel underwater cutting

No more than 75 mm (3 in) below the surface of the water

O_2 Plasma / Air Shield

400 A – Automatic Gas Console

Flow Rates – lpm/scfh		
	O_2	Air
Preflow	0 / 0	190 / 400
Cutflow	66 / 140	137 / 290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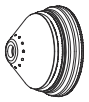
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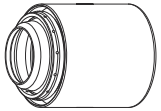
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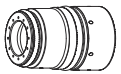
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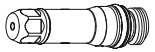
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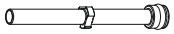

220571

Note: Preflow must be on during IHS.

Metric

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**mm**	Volts	mm	mm/m	mm	Factor %	Seconds	mm
O_2	Air	24	50	60	50	**16**	144	3.6	3398	7.2	200	0.5	3.50
						20	147		2535			0.7	3.68
						22	150	3.8	2311	7.6		0.8	3.73
						25	153	4.0	1997	8.0		0.9	3.76
						30	155	4.6	1624	9.2		1.1	4.06
						40	160		1039	11.5	250	1.9	4.88

English

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**in**	Volts	in	ipm	in	Factor %	Seconds	in
O_2	Air	24	50	60	50	**5/8**	144	0.14	135	0.28	200	0.5	0.140
						3/4	146		104			0.6	0.145
						7/8	150	0.15	90	0.30		0.8	0.147
						1	154	0.16	77	0.32		0.9	0.148
						1-1/4	156	0.18	59	0.36		1.2	0.164
						1-1/2	159		43	0.45	250	1.6	0.183
						1-3/4	162		36			2.5	0.215

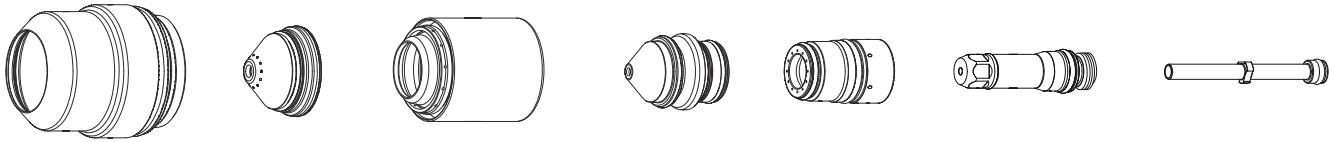
Mild steel underwater cutting

No more than 75 mm (3 in) below the surface of the water

O_2 Plasma / Air Shield

400 A – Manual Gas Console

Flow Rates – lpm/scfh		
	O_2	Air
Preflow	0 / 0	190 / 400
Cutflow	66 / 140	137 / 290



220637 220636 220635 220632 220631 220629 220571

Note: Preflow must be on during IHS.

Metric

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**mm**	Volts	mm	mm/m	mm	Factor %	Seconds	mm
O_2	Air	22	82	55	82	**16**	144	3.6	3398	7.2	200	0.5	3.50
						20	147		2535			0.7	3.68
						22	150	3.8	2311	7.6		0.8	3.73
						25	153	4.0	1997	8.0		0.9	3.76
						30	155	4.6	1624	9.2		1.1	4.06
						40	160		1039	11.5	250	1.9	4.88

English

Select Gases		Set Preflow		Set Cutflow		**Material Thickness**	Arc Voltage	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	**in**	Volts	in	ipm	in	Factor %	Seconds	in
O_2	Air	22	82	55	82	**5/8**	144	0.14	135	0.28	200	0.5	0.140
						3/4	146		104			0.6	0.145
						7/8	150	0.15	90	0.30		0.8	0.147
						1	154	0.16	77	0.32		0.9	0.148
						1-1/4	156	0.18	59	0.36		1.2	0.164
						1-1/2	159		43	0.45	250	1.6	0.183
						1-3/4	162		36			2.5	0.215

200 A mild steel bevel cut process

Overview

The HPR260XD, HPR400XD, and HPR800XD plasma cutting systems now offer a 200 A bevel cutting process for mild steel. The cut charts and consumables for this 200 A mild steel bevel process can be used with both automatic and manual gas consoles.

Bevel cutting (0° to 45°)

As it does for the 80 A, 130 A, and 260 A bevel cutting processes, Hypertherm offers a separate set of consumables for the 200 A bevel cutting process that is specially designed for bevel applications. These consumables have been optimized for PowerPierce™, which uses the tapered design to increase pierce capabilities.

The 200 A bevel process uses the following new consumables:

- 220658 (shield)
- 220659 (nozzle)
- 220662 (electrode)

Consumables for mirror-image cutting

For mirror-image cutting with the 200 A bevel process, replace the usual nozzle retaining cap and swirl ring with the following parts:

- 220350 (swirl ring)
- 220996 (nozzle retaining cap)

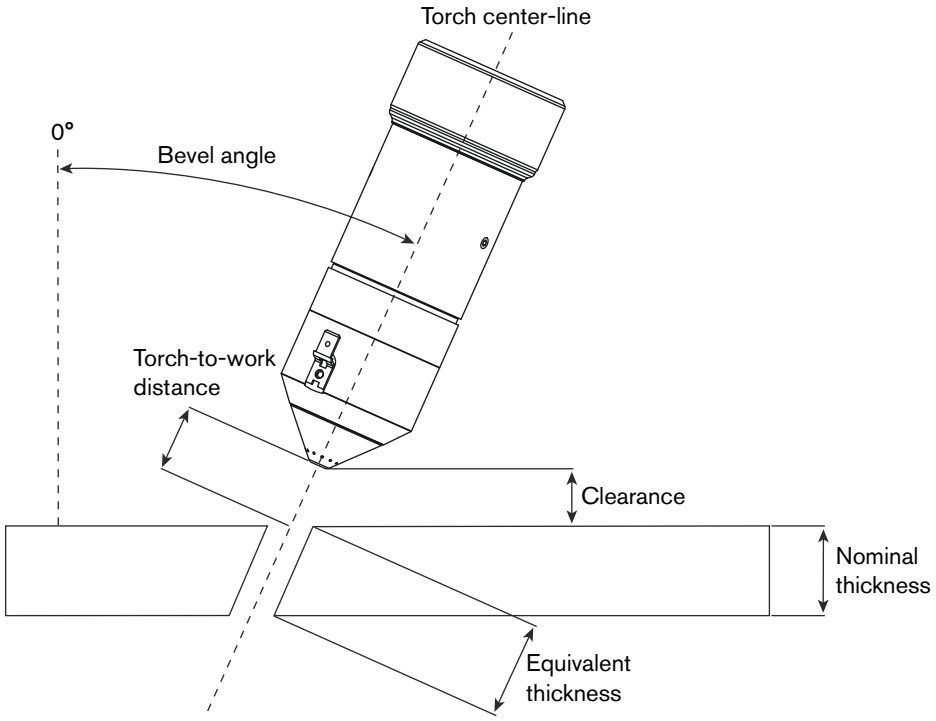
Bevel compensation tables

Customers using bevel heads with an HPRXD plasma-cutting system are now able to use dynamic cut charts (or compensation tables) with compatible CNC and nesting software to achieve more accurate bevel cutting results with mild steel. These specialized cut charts enable operators to retrieve bevel cut settings that are specially tailored for making V cuts, A cuts, and Y Top cuts.

The bevel compensation tables require an HPRXD plasma-cutting system and are intended to be used for cutting mild steel. While these tables are built into Hypertherm's CNC software and nesting software, the information is available to all HPRXD customers and can be used with other compatible CNCs and nesting software programs. For technical details on how to use these compensation tables for mild steel bevel cutting, refer to the *HPRXD Bevel Compensation Cut Charts* white paper (part number 807830), which can be found in the "Downloads library" on the Hypertherm website at www.hypertherm.com.

Bevel cutting definitions

Bevel angle	The angle between the center line of the torch and a line that is perpendicular to the workpiece. If the torch is perpendicular to the workpiece, the bevel angle is zero. The maximum recommended bevel angle is 45°.
Nominal thickness	The vertical thickness of the workpiece.
Equivalent thickness	The length of the cut edge, or the distance the arc travels through the material while cutting. Equivalent thickness is equal to the nominal thickness divided by the cosine of the bevel angle. Equivalent thicknesses are listed in the cut chart.
Clearance	The vertical distance from the lowest point of the torch to the surface of the workpiece.
Torch-to-work distance	The linear distance from the center of the torch outlet to the workpiece surface along the torch center-line. A range of torch-to-work distances are listed in the cut chart. The smallest number is for a straight cut (bevel angle = 0°). The largest number is for a 45° bevel cut with a clearance of 3 mm (0.120 in).
Arc voltage	The arc voltage setting is dependent on the bevel angle and the setup of the cutting system. The arc voltage setting on one system may be different from a second system even if the workpiece is the same thickness. The arc voltages for bevel cutting are not supplied in the bevel cut charts.



Cut charts

The following cut charts show the consumable parts, cutting speeds, and the gas and torch settings required for this 200 A mild steel bevel process.

The bevel cut charts are slightly different from the standard cut charts:

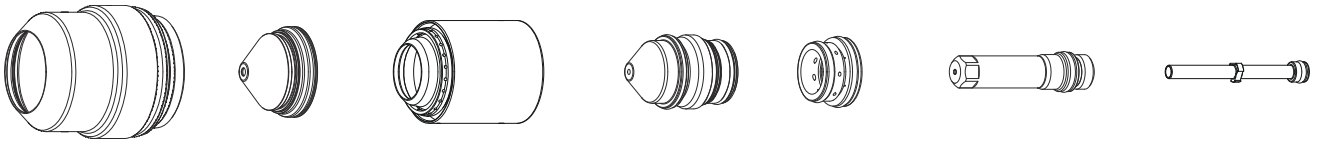
- The torch-to-work distance (or cut height) is a range rather than a single value.
- Material thickness is given as an equivalent value.
- A column for minimum clearance has been added.
- There is no column for arc voltage.

Equivalent thicknesses and the arc voltages will vary depending on the angle of the cut. The angle for bevel cutting can range from 0° to 45°.

Mild steel bevel cutting

O_2 Plasma / Air Shield
200 A – Automatic Gas Console

Flow Rates – lpm/scfh		
	O_2	Air
Preflow	0 / 0	114 / 240
Cutflow	43 / 90	49 / 102



220637 220658 220845 220659 220353 220662 220700

Note: For mirror-image cutting, use 220996 (nozzle retaining cap) and 220350 (swirl ring) instead.

Metric

Select Gases		Set Preflow		Set Cutflow		Minimum Clearance	**Equivalent Material Thickness**	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	mm	**mm**	Range (mm)	mm/m	mm	Factor %	Seconds	mm
O_2	Air	23	83	69	42	2.0	**5**	3.3 – 8.4	5700	6.6	200	0.2	2.83
							6		5250				2.79
							8		4355			0.3	2.85
							10		3460				2.90
							12		3060			0.5	2.94
							15	4.1 – 8.4	2275	8.2		0.6	3.09
							20		1575			0.8	3.40
							25	5.1 – 8.4	1165	10.2		1.0	3.80
							32		750			2.7	4.39
							38		510	Edge start			4.99
							50		255				6.17

Marking

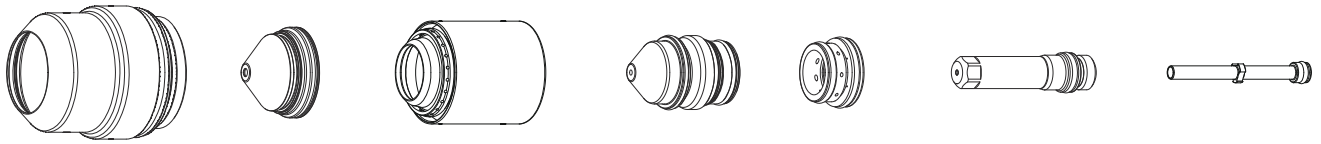
Select Gases		Set Preflow		Set Cutflow		**Amperage**	Torch-to-Work Distance	Marking Speed	Arc Voltage
						Amps	mm	mm/min	Volts
N_2	N_2	10	10	10	10	**15**	2.5	6350	124
Ar	Air	30	10	30	10	**20**	3.0	2540	61

continued on next page

Mild steel bevel cutting

O_2 Plasma / Air Shield
200 A – Automatic Gas Console

Flow Rates – lpm/scfh		
	O_2	Air
Preflow	0 / 0	114 / 240
Cutflow	43 / 90	49 / 102



220637 220658 220845 220659 220353 220662 220700

Note: For mirror-image cutting, use 220996 (nozzle retaining cap) and 220350 (swirl ring) instead.

English

continued from previous page

Select Gases		Set Preflow		Set Cutflow		Minimum Clearance	**Equivalent Material Thickness**	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	in	**in**	Range (in)	ipm	in	Factor %	Seconds	in
O_2	Air	23	83	69	42	0.08	**3/16**	0.13 – 0.33	230	0.26	200	0.2	0.112
							1/4		200				0.109
							5/16		171			0.3	0.112
							3/8		140				0.114
							1/2		115			0.5	0.116
							5/8	0.16 – 0.33	80	0.32		0.6	0.124
							3/4		65			0.8	0.131
							1	0.20 – 0.33	45	0.40		1.0	0.151
							1-1/4		30			2.7	0.172
							1-1/2		20	Edge start			0.197
							2		10				0.246

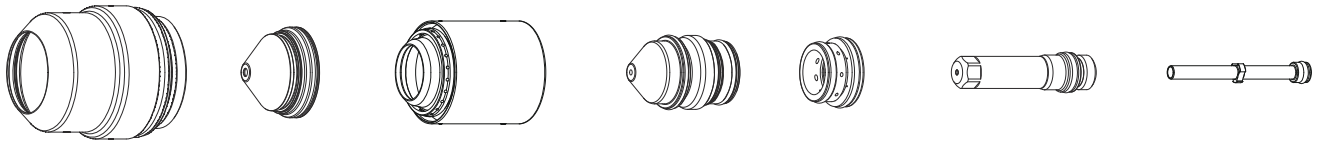
Marking

Select Gases		Set Preflow		Set Cutflow		**Amperage**	Torch-to-Work Distance	Marking Speed	Arc Voltage
						Amps	in	ipm	Volts
N_2	N_2	10	10	10	10	**15**	0.10	250	124
Ar	Air	30	10	30	10	**20**	0.12	100	61

Mild steel bevel cutting

O_2 Plasma / Air Shield
200 A – Manual Gas Console

Flow Rates – lpm/scfh		
	O_2	Air
Preflow	0 / 0	114 / 240
Cutflow	43 / 90	49 / 102



220637 220658 220845 220659 220353 220662 220700

Note: For mirror-image cutting, use 220996 (nozzle retaining cap) and 220350 (swirl ring) instead.

Metric

Select Gases		Set Preflow		Set Cutflow		Minimum Clearance	**Equivalent Material Thickness**	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	mm	**mm**	Range (mm)	mm/m	mm	Factor %	Seconds	mm
O_2	Air	25	62	90	49	2.0	**5**	3.3 – 8.4	5700	6.6	200	0.2	2.83
							6		5250				2.79
							8		4355			0.3	2.85
							10		3460				2.90
							12		3060			0.5	2.94
							15	4.1 – 8.4	2275	8.2		0.6	3.09
							20		1575			0.8	3.40
							25	5.1 – 8.4	1165	10.2		1.0	3.80
							32		750			2.7	4.39
							38		510	Edge start			4.99
							50		255				6.17

Marking

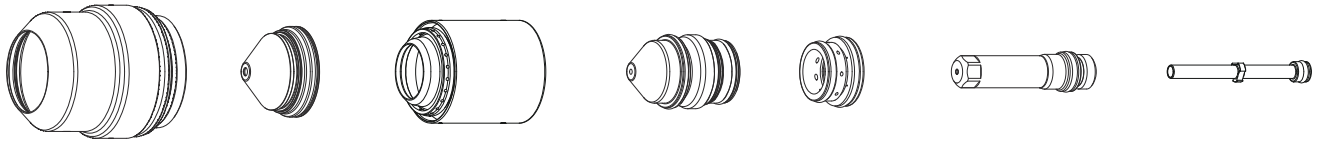
Select Gases		Set Preflow		Set Cutflow		**Amperage**	Torch-to-Work Distance	Marking Speed	Arc Voltage
						Amps	mm	mm/min	Volts
N_2	N_2	10	10	10	10	**15**	2.5	6350	124
Ar	Air	30	10	30	10	**20**	3.0	2540	61

continued on next page

Mild steel bevel cutting

O_2 Plasma / Air Shield
200 A – Manual Gas Console

Flow Rates – lpm/scfh		
	O_2	Air
Preflow	0 / 0	114 / 240
Cutflow	43 / 90	49 / 102



220637 220658 220845 220659 220353 220662 220700

Note: For mirror-image cutting, use 220996 (nozzle retaining cap) and 220350 (swirl ring) instead.

English

continued from previous page

Select Gases		Set Preflow		Set Cutflow		Minimum Clearance	**Equivalent Material Thickness**	Torch-to-Work Distance	Cutting Speed	Initial Pierce Height		Pierce Delay Time	Kerf Width
Plasma gas	Shield gas	Plasma gas	Shield gas	Plasma gas	Shield gas	in	**in**	Range (in)	ipm	in	Factor %	Seconds	in
O_2	Air	25	62	90	49	0.08	**3/16**	0.13 – 0.33	230	0.26	200	0.2	0.112
							1/4		200				0.109
							5/16		171			0.3	0.112
							3/8		140				0.114
							1/2		115			0.5	0.116
							5/8	0.16 – 0.33	80	0.32		0.6	0.124
							3/4		65			0.8	0.131
							1	0.20 – 0.33	45	0.40		1.0	0.151
							1-1/4		30			2.7	0.172
							1-1/2		20	Edge start			0.197
							2		10				0.246

Marking

Select Gases		Set Preflow		Set Cutflow		**Amperage**	Torch-to-Work Distance	Marking Speed	Arc Voltage
						Amps	in	ipm	Volts
N_2	N_2	10	10	10	10	**15**	0.10	250	124
Ar	Air	30	10	30	10	**20**	0.12	100	61