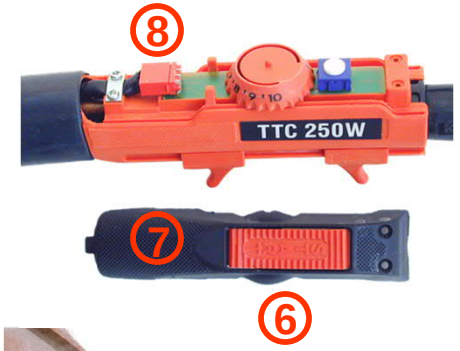
Sales arguments & Training material for TTC TIG torches

TTC TIG torches

- **Flexible cable package**
  - Minimize stress in hand
  - Easy to weld in all positions
- **New ergonomic handle**
  - Excellent grip with low press / holding force
  - Patented, adjustable finger grips improves handle grip
  - Easy start due to large trigger size
- **New TIG torch remote options: RCT 10, RCT 20**
  - Easy Current regulation during welding
  - Electrically and mechanically protected
- **Improved torch back end connection**
  - Increased back end durability
  - Electrically and mechanically protected
  - Assembly with out tools
- **All torch models in standard lengths 4, 8 and 16 m**
- **Full fills norm EN 50078 requirements, CE marked**

TTC TIG torches

- **Standard torch consumables**
- **Flexible handle rubber elbow design (Patented) ①**
- **360º rotating welding head (Gas / Water cooled) ②**
- **30 mm extra length of torch body inside handle ③**
- **Correct electrode angle 90º, 105º or variable ④**
- **S-neck allows welding also in negative angles ⑤**
- **New torch trigger design with sound effect ⑥**
- **Roughened handles surface on grip areas ⑦**
- **TIG torch remote controls are easy to assemble ⑧**



Allows welding with various different grips

Flexible neck

S-neck

TTC TIG torches technical data

	TTC 130	TTC 130F	TTC 160	TTC 160S	TTC 220	TTC 200W	TTC 250W	TTC 250WS
Length / Order number								
4,0 m	627013004	627013104	627016004	627016204	627022004	627020504	627025504	627025704
8,0 m	627013008	627013108	627016008	627016208	627022008	627020508	627025508	627025708
16,0 m	627013016	627013116	627016016	627016216	627022016	627020516	627025516	627025716
Loading capacity								
DC- 40 % ED	130 A	130 A	160 A	160 A	220 A	-	-	-
100 % ED	-	-	-	-	-	200 A	250 A	200 A
Neck angle	90º	90º / Flex	105º	Variable	105º	90º	105º	Variable
Electrode size (mm)	1,0 - 2,4	1,0 - 2,4	1,0 - 2,4	1,0 - 2,4	1,0 - 3,2	1,0 - 3,2	1,0 - 4,0	1,0 - 4,0
- Delivery state (mm)	2,4	2,4	2,4	2,4	2,4	2,4	2,4	2,4
Cooling principle	Air	Air	Air	Air	Air	Liquid	Liquid	Liquid
TIG unit connection								
Gas / Current	R 1/4	R 1/4	R 1/4	R 1/4	R 1/4	R 1/4	R 1/4	R 1/4
Water	-	-	-	-	-	Snap connector	Snap connector	Snap connector

TTM 15 V Gas cooled
Scratch TIG torch

- Code 6271432
- 4,0 meters in length
- Equipped with gas valve
- Equipped with small Current connector
- For all machines which has small Current connector
    - Minarc seria machines

Gas cooled Scratch TIG torches
TTM 15 BC and TTC 220 GV

TTM 15 V BC
150 A / 35 %

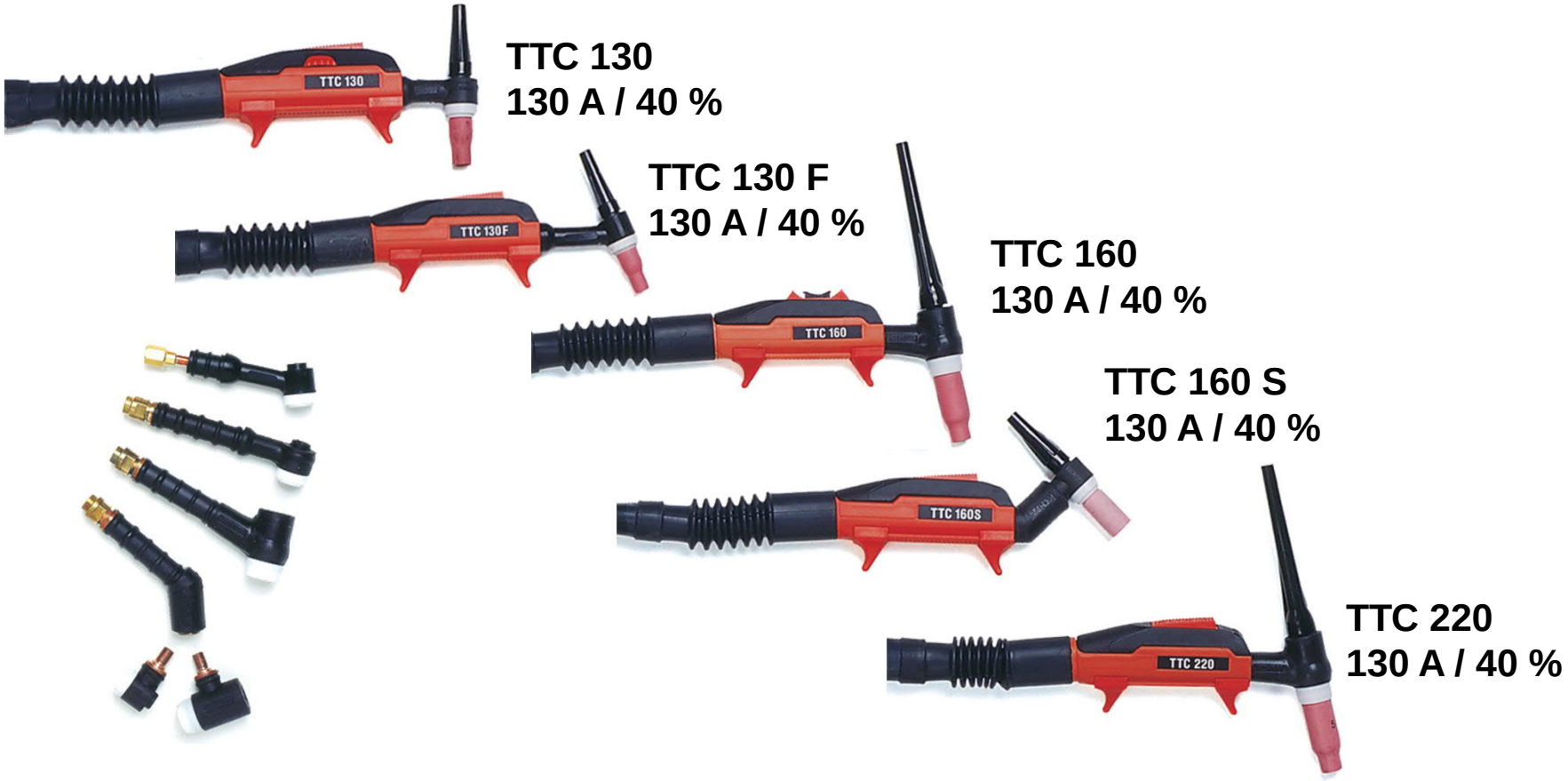
- Code 627143201
- 4 meters in length
- Equipped with large Current connector
- For all machines which has large Current connector
  - Master 2200, Master 2850

TTC 220 GV
220 A / 40 %

- Code 627022304
- 4 meters in length
- Equipped with large current connector
- For Master 2500 MLS and Master 3500 MLS machines
  - Electrode has voltage only when trigger is pressed
  - Current remote regulation in torch handle

Gas cooled TTC TIG torches

- **GAS COOLED TIG TORCHES**



TTC 130
130 A / 40 %

TTC 130 F
130 A / 40 %

TTC 160
130 A / 40 %

TTC 160 S
130 A / 40 %

TTC 220
130 A / 40 %

Water cooled TTC TIG torches

- **WATER COOLED TIG TORCHES**

TTC 200 W
200 A / 100 %

TTC 250 WS
200 A / 100 %

TTC 250 W
250 A / 100 %

TTC TIG torch remotes

- Standard TTC TIG torches start switch can be replaced by optional torch remote units
- High quality switch and potentiometer stands wet and dirty environment
- Selected torch components have long life time
    - Start switch > 2 million times, potentiometer > 200 000 turns
- Plastic components stands heat and welding spatter

- **RTC 10 (6185477):**
- Allows easy welding current regulation with potentiometer
- Ergonomically designed regulation knob
- Mechanically well protected
- Easy to use and regulate with various different grips also during welding

- **RTC 20 (6185478):**
- Welding Current Up and Down regulation (+ / -)
- Can be used also for selecting MEMORY channels
- Start switch is in the middle, can be used on 2T / 4T
- Ergonomically designed switch
- Regulation can be done during welding with various different grips

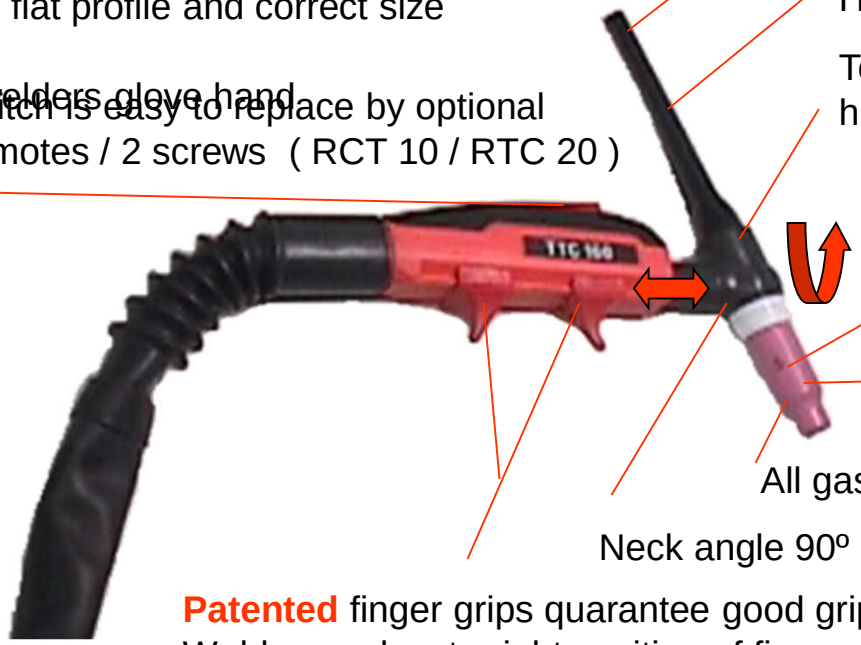
TTC Benefits and features

Handle material stand heat and mechanical stress

Handle temperature is low due to handle and cable package constructions ➡ Comfortability

Handles flat profile and correct size ➡ Fits to welders glove hand

Start switch is easy to replace by optional torch remotes / 2 screws (RCT 10 / RTC 20)



Three different models ➡
Right size according welding application

Standard 30 mm torch body extension ➡
Hand / fingers overheating is eliminated

Torch body insulation is heat resistant high quality silicon rubber ➡ Durability

Torch body rotates 360° ➡
Correct / wanted grip

W-type consumables ➡
Standard spare parts

Gas lenses as option ➡
Better gas shielding

All gas nozzles ➡ Right size according application

Neck angle 90º or 105° ➡ Correct angle for hand welding

Patented finger grips quarantee good grip of handle by light touch
Welder can locate right position of finger grips without tools ➡ Improved grip

- TTC torch: Quality according Kemppi standard:
- Torches are full filling all promised values
- Torches are safe to use ➡ Insulation full fills norm requirements
- Torches meet all requirements of EN 50078 ➡ **CE marking**

CE marked ; Norm EN 50078

TTC Benefits and features

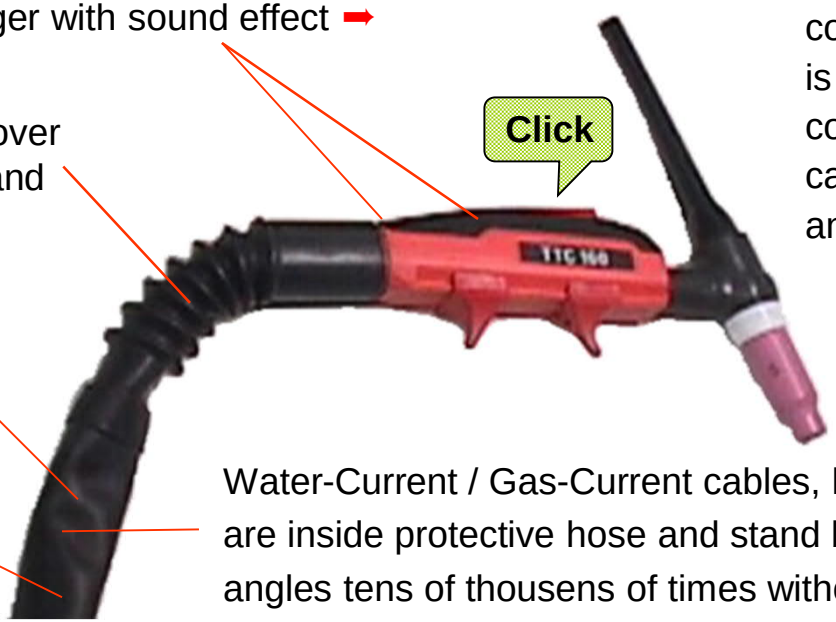
Flexible cable package is easy to turn to all directions right from back of handle. Hose packages twisting stiffnes is very low ➡ Welders hand and wrist stress is low ➡ Ergonomic for welders hand with different grips

Trigger and trigger cover surfaces are roughened ➡ Good grip ➡ Large sensitive trigger with sound effect ➡ Easy start with different grips

Patented rubber elbow reaches over torch handle ➡ Less slipery in hand

Protective hose stands heat, spatter and mechanical wearing and tearing ➡ Long life time

Standard lenghts 4, 8 and 16m, construction allows to make >16 m torches, gas or water cooled (2m long water-current cable)



Kemppi TTC TIG torches copper cable cross section is bigger than many of competitors under sized cables ➡ Longer life time and low temperature

Water-Current / Gas-Current cables, hoses and wiring are inside protective hose and stand bending in sharp angles tens of thousens of times without cracks. Hoses can stand high temperatures ➡ Longer life time

- TTC torch: Quality according Kemppi standard:
- Torches are full filling all promised values
- Torches are safe to use ➡ Insulation full fills norm requirements
- Torches meet all requirements of EN 50078 ➡ **CE marking**

CE marked ; norm EN 50078

New TTC TIG torches

- **CE EN 50078**

Extra protection cover over the control leads
➡ Less sensitive for mechanical damages

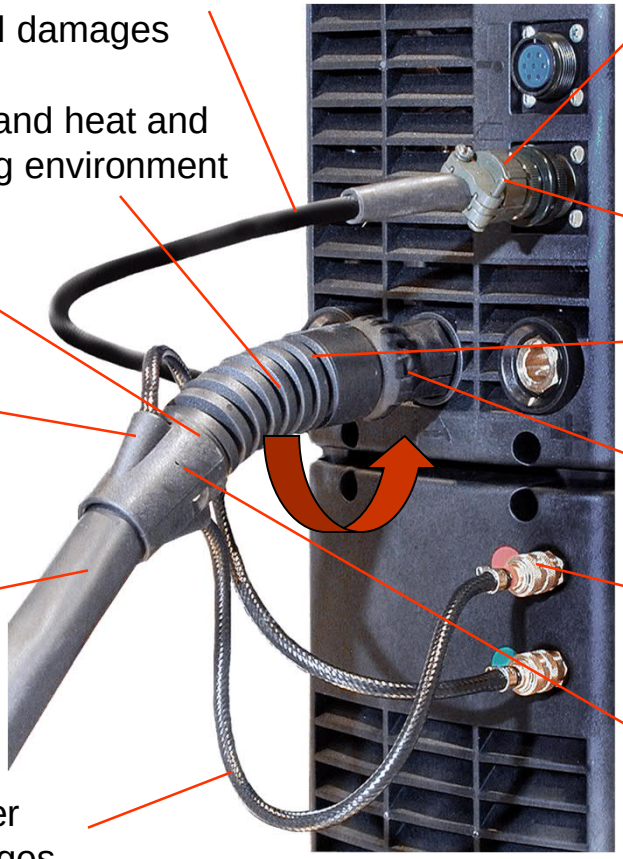
Connector plastic components stand heat and spatter ➡ More reliable in welding environment

All Current bearing components are plastic coated ➡ Safety

Smooth lead-through of hoses
➡ No blocks on water hoses

Protective hose is mechanically locked inside of plastic part ➡ Protective hose has higher pulling strength ➡ Less risk of mechanical damages

High quality braided gas and water hoses ➡ Less sensitive for damages in welding environment



High quality MIL standard connector
➡ Works also in wet conditions
➡ Good mechanical strength
➡ Service free, reliable connection

Properly locked wiring ➡
Less damages and down time

Connector part is made of two halves ➡ Easy Service

Connector tightening without tools
➡ Easy Service and transportation

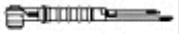
“Snap on” connectors on water hoses ➡ Easy Service

Bending support is flexible and works also as mechanical protector for hoses and cables ➡ Less sensitive design for damages

TTC TIG torches
Torch body / Neck alternatives

4296450 A

TTC/TTK

		TTC130/TTK130	TTC130F/TTK130F	TTC160/TTK160	TTC160S/TTK160S	TTC220/TTK220	TTC200W/TTK300W	TTC250W/TTK350W	TTC250WS/TTK250WS
P	4285650 	*	L	L	L	L			
P	9878040 Flex 	L	*	L	L	L			
	4270580 	L	L	*	L	*			
P	4285660 						*	L	L
	4270600 						L	*	L
	4276530  SN 15	L	L	L	*	L			
P	4276300 	L	L	L	*	L	L	L	*
	4276290 	L	L	L	L	L	L	L	L
	4276550  SN 25 W						L	L	*

- Standard TTC series TIG torch bodies can be equipped with following alternative necks:

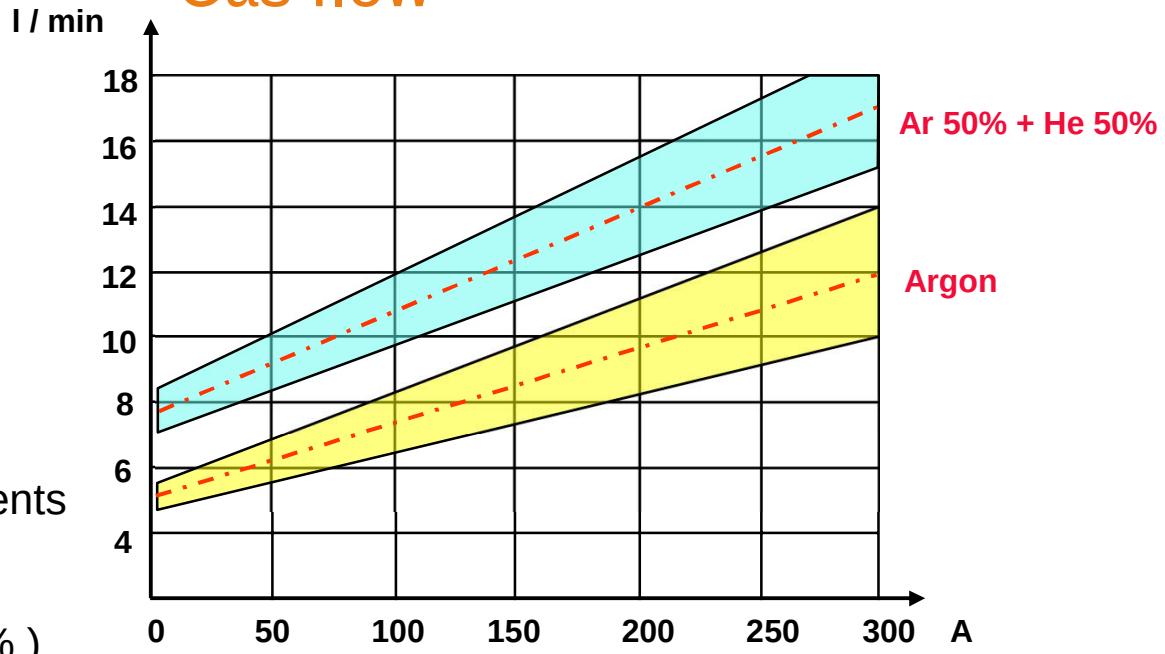
* Delivery equipment

L Optional accessory

P “Small” torch consumable parts

Gas flow

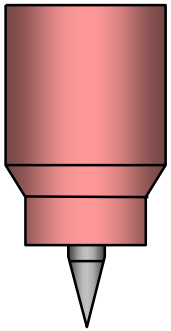
- **Gas flow depends:**
  - Used shielding gas
  - Welding Current
  - Base material
  - Weld joint type
  - Weld Quality requirements



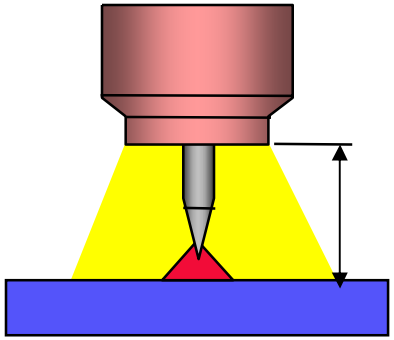
- **Argon:** (Argon 4.8 = 99,998%)
- Most common TIG shielding gas for Ss, Fe, Al & alloys because it's economical and easily available
- Suitable for welding of thin and medium thickness materials from 0,5 mm up to 8,0 mm on productive way
- With thicker Aluminiums is needed pre heat base material up to 150 - 300°C depending of material thickness

- **Argon + Helium mix gases:**
- Ar + He mix gases decreases need of pre heat with thicker aluminium base materials
- Helium is lighter than Argon, so more shielding gas flow is needed
- Helium's higher arc energy increases penetration for the reason of higher arc Voltage
- Most common gas mixes: 75% Ar + 25% He or 50% Ar + 50% He or 75% He + 25% Ar also pure Helium

Gas nozzle / lens



- **Gas nozzle:**
- Recommended to use mainly for general welding applications
- When welding Current is increasing also the need of shielding is increasing
- Max electrode stick out from gas nozzle is 6,0 mm (fillet joint)



- **Gas lens benefits and features:**
- Gas lens gives more stable flow of shielding gas than normal gas nozzle (gas flow is laminar, reduce risk for turbulance flow)
- Allows to take more electrode stick out (max 25 mm in fillet joint)
- Entering to narrow spaces is easier
- Economical, TIG torch components lifetime is increasing
- Visibility to welding area and weld pool is better
- More comfortable to welder, because TIG torch works cooler
- Improved shielding for outdoor use at sites etc

- **Generally:**
- Gas lens improves welding quality, because it decreases welding defects (less risk for porosity) and reduces post treatment (better colours in Stainless steel welding)
- Aluminium, Stainless steel, Titanium and quality welds on piping are recommended to weld only by using gas lens for the reason of reliable gas shielding

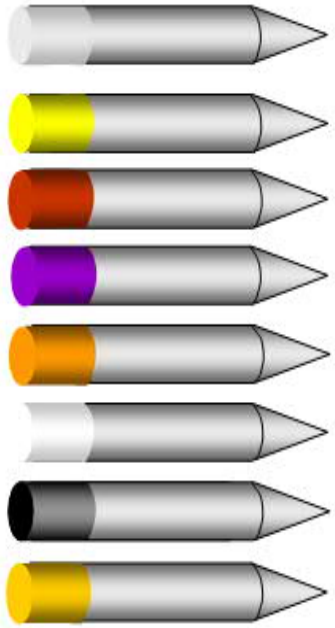
Gas lens / Nozzle

- **Gas lens / Nozzle number**
- Comes from inches 1/16” (1,5875 mm)
- Ex. diameter on n:o 5 is 5 x 1,5875 mm = 7,9 mm (inside diameter)
- Gas lens / nozzle inside diameter must be in min as big as weld pool
- Gas lens / nozzle inside min diameter is 4 x electrode diameter

- **For aluminium AC TIG welding is recommended to use gas lens:**
- Better shielding, no turbulence on gas flow
- Better visibility to the weld pool, electrode max stick out length 20 - 25mm
- Better to reach joints, which are difficult to access
- Longer lifetime of TIG torch components
- In market is various lengths of gas lenses and nozzles, profiles and materials for different weld joint types and welding applications.

Tungsten electrodes

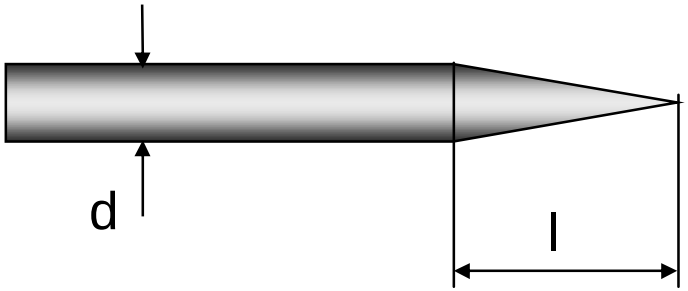
WC 20	98% W + 2% Ce	Gray	AC / DC
WT 10	99% W + 1% Th	Yellow	DC (AC)
WT 20	98% W + 2% Th	Red	DC
WT 30	97% W + 3% Th	Lilac	DC
WT 40	96% W + 4% Th	Orange	DC
WZ 8	99% W + 1% Zr	White	(AC)
WL 10	99% W + 1 La	Black	AC / DC
WL 15	98,5% W + 1,5% La	Gold	AC / DC



- **Ss / Fe DC TIG welding recommended electrode types are:**
  - WC 20 (grey), WT 20 (red) and WL 15 (gold)
- **Aluminium AC TIG welding recommended electrode types are:**
  - WC 20 (grey), WT 20 (red) and WL 15 (gold)
  - These electrode types make possible to use sharp electrode head form

TIG electrode sharpening

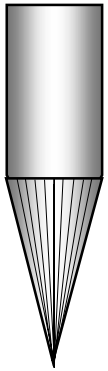
- **Electrode sharpening on DC - polarity:**



l = 1...5 x d

d = 2,4 mm

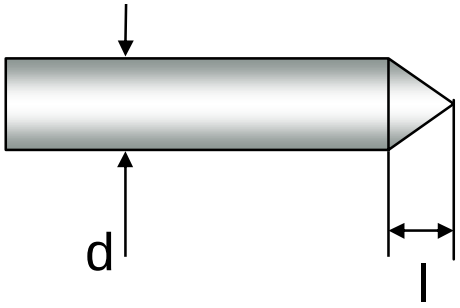
l = 5 x 2,4 mm = 12,0 mm



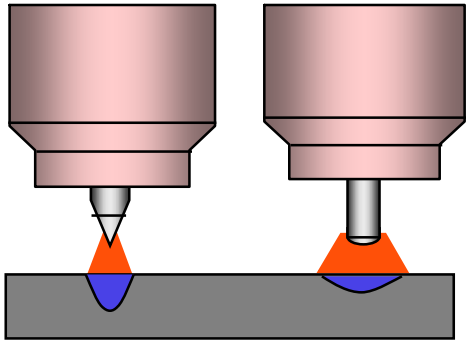
- Correct electrode diameter depends on used welding Current
- Every electrode have min….max operation range in Current
- Used sharpening length depends on used welding Current
- Grind sharp angle so that grinding scratches are longitudinal

Sharp electrode use on AC TIG

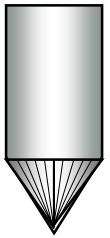
l = 1…1,5 x d



- Modern AC inverter power source allows sharp electrode use
- With same Amperes and with same arc length where with conventional AC machine electrode has a ball point head



- Narrow weld, better visual look
- Penetration is better, also better weld strength
- More welding speed, more productivity
- Smaller heat input, less base material deformation

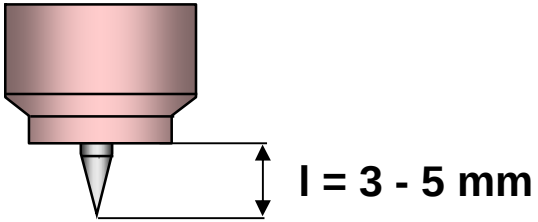


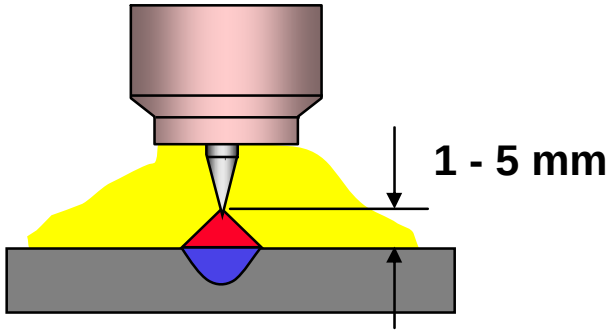
- Best benefits can be seen in fillet joints
- Electrode operation range in Amperes is bigger
- Use grey, red or gold color code TIG electrodes

- WP electrodes green (pure W), can't be used with sharp electrode function

Electrode head stick out length

- **Electrode stick out and arc length in DC TIG welding**





- Electrode stick out length depends on welded joint type
  - On fillet joint stick out can be longest, because joint collects shielding gas flow
  - On outside corner shortest, because joint divides shielding gas flow
- General recommendation for AC & DC TIG welding stick out with normal gas nozzle

l = 2 - 3 x Electrode diameter

- Longer arc length makes wider weld seam and increase base material heat input

Weld data

- **Stainless steel**

Plate Thickness	Joint type	Flat pos. (A)	Vertical pos. (A)	Overhead pos. (A)	Filler wire	Electrode diameter	Travel speed
1,0 mm	Butt joint	25 - 40	20 - 45	20 - 40	1,6	1,0	250 - 300
	Overlapped	60	55	55	1,6	1,0	250 - 300
	Corner joint	40	35	35	1,6	1,0	250 - 300
	Fillet joint	55	50	50	1,6	1,0	250 - 300
2,0 mm	Butt joint	80 - 110	75 - 100	70 - 100	1,6 - 2,4	1,6 - 2,4	175 - 225
	Overlapped	110	100	100	1,6	1,6 - 2,4	175 - 225
	Corner joint	80	75	70	1,6	1,6 - 2,4	175 - 225
	Fillet joint	105	95	95	1,6	1,6 - 2,4	175 - 225
3,0 mm	Butt joint	90 - 180	90 - 165	90 - 160	2,4 - 3,2	2,4	125 - 175
	Overlapped	130	120	115	2,4 - 3,2	2,4	125 - 175
	Corner joint	110	100	100	2,4 - 3,2	2,4	125 - 175
	Fillet joint	125	115	110	2,4 - 3,2	2,4	125 - 175
4,0 mm	Butt joint	120 - 200	110 - 185	110 - 180	3,2	2,4 - 3,2	100 - 150
	Overlapped	185	170	165	3,2	2,4 - 3,2	100 - 150
	Fillet joint	180	165	160	3,2	2,4 - 3,2	100 - 150
5,0 mm	Corner joint	160	140	140	2,4 - 3,2	3,2	100 - 150

Weld data

- **Aluminium**

Plate thickness	Joint type	Flat pos. (A)	Vertical pos. (A)	Overhead pos. (A)	Filler wire	Electrode diameter	Travel speed
1,0 mm	Edge joint	35 - 45	35 - 40	35 - 40	- / 1,6	1,6	200 - 250
	Butt joint	30 - 40	30 - 40	30 - 40	1,6 / 2,4	1,6	275 - 325
	Overlapped	40 - 50	40 - 45	40 - 45	1,6 / 2,4	1,6	250 - 300
	Corner joint	35 - 45	35 - 45	35 - 45	1,6 / 2,4	1,6	250 - 300
	Fillet joint	45 - 55	45 - 55	45 - 55	1,6 / 2,4	1,6	250 - 300
2,0 mm	Edge joint	60 - 80	55 - 75	60 - 70	1,6 - 2,4	1,6 - 2,4	175 - 200
	Butt joint	50 - 70	50 - 70	50 - 60	1,6 - 2,4	1,6 - 2,4	175 - 200
	Corner joint	50 - 75	50 - 60	50 - 60	1,6 - 2,4	1,6 - 2,4	200 - 225
	Fillet joint	60 - 80	60 - 80	50 - 70	1,6 - 2,4	1,6 - 2,4	200 - 225
3,0 mm	Butt joint	100 - 130	100 - 120	100 - 120	2,4 - 3,2	2,4	185 - 225
	Over lapped	120 - 150	120 - 140	120 - 150	2,4 - 3,2	2,4	185 - 225
	Corner joint	110 - 140	110 - 130	120 - 140	2,4 - 3,2	2,4	175 - 200
	Fillet joint	120 - 140	110 - 130	110 - 130	2,4 - 3,2	2,4	185 - 225
4,0 mm	Butt joint	150 - 180	140 - 180	140 - 180	3,2 - 4,0	2,4 - 3,2	160 - 200
	Overlapped	160 - 190	170 - 180	160 - 180	3,2 - 4,0	2,4 - 3,2	180 - 220
	Fillet joint	160 - 200	160 - 180	160 - 180	3,2 - 4,0	2,4 - 3,2	160 - 200
5,0 mm	Butt joint	160 - 220	160 - 200	160 - 190	3,2 - 4,0	2,4 - 3,2	160 - 220
	Corner joint	160 - 220	140 - 190	140 - 190	3,2 - 4,0	2,4 - 3,2	150 - 220
	Fillet joint	180 - 230	160 - 210	160 - 200	3,2 - 4,0	2,4 - 3,2	170 - 200