Technical datasheet

3M™ Speedglas™ Welding Filter 9100V
3M™ Speedglas™ Welding Filter 9100X
3M™ Speedglas™ Welding Filter 9100XX
3M™ Speedglas™ Welding Filter 9100XXi

Description:

The Speedglas welding filter series 9100:

- Is designed to be used together with 3M™ Speedglas™ Welding Shield Series 9100.
- Is suitable for most welding applications up to Shade 13 in the dark state.
- Has permanent protection (Shade 13 equivalent) against harmful UV- and IR- radiation, regardless of whether the filter is in the light or dark state or whether the auto-darkening function is operational.
- Is easy to operate and maintain.
- Has seven different Shade Number settings in the dark state, split into two groups 5, 8 and 9-13.
- Has seven user selectable levels of detector sensitivity to ensure a reliable arc detection.
- Can be locked in a constant dark or light state.
- Has excellent visibility in light state, shade 3, for easy welding preparation and after treatment.
- Has three optical sensors.
- Has multiple adjustments for highest comfort
- Solar panel power assistance (except 9100XX and 9100XXi).
- External button to reach grinding mode (9100XXi)

Applications:

The 9100 series welding filter is designed for most welding processes, such as MMA, MIG/MAG, TIG, plasma welding and oxyacetylene welding/cutting. The 9100 series welding filter can also be used for grinding applications.

Approvals:

The products meet the requirements of the European Community Directive 89/686/EEC (Personal Protective Equipment Directive) and are thus CE marked. The products comply with the harmonized European Standards EN 379 and EN 166. Certification under Article 10, EC Type-Examination has been issued by DIN Certco Prüf- und Zertifi erungszentrum (Notified body number 0196).

Equipment Marking:

The welding filter is marked with the shade range and optical classifications. The markings on the protection plates indicate the number of the standard (EN166) and safety class for protection against high speed particles. 3M 1BT stands for medium energy impact at extremes of temperature (-5°C and +55°C). K symbol for resistance to surface damage by fine particles. 3M S stands for the basic requirement for increased robustness.

Optical class
EN 166

1	Optical class

EN 379

1/1/1/2 Pos 1	Optical class
1/**1**/1/2 Pos 2	Diffusion of light class.
1/1/**1**/2 Pos 3	Variation of luminous transmittance class.
1/1/1/**2** Pos 4	Angel dependence of luminous transmittance class.

Mechanical Strength
EN 166

No symbol	Minimum robustness
S	Increased robustness
B	Medium energy impact (120 m/s)
T	Tested at extremes of temperature (-5°C and +55°C)

Additional markings on the product refer to other standards.

⚠ 📖 = Read the instructions before use

🗑 = Shall be disposed of as electrical and electronic waste

Standards:

Speedglas 9100:	Standards:	Class:
Welding Filter	EN 379	1/1/1/2
Outer protection plate	EN 166	1BT
Inner protection plate	EN 166	1S

Standards references:
Auto-Darkening Welding Filter
EN 379:2003 Personal eye-protection – Automatic welding filters.
Protection Plate. Clear Safety Lens
EN 166:2001 Personal eye-protection – Specifications.
EN 169:2002 Personal eye-protection – Filters for welding and related techniques – Transmittance requirements and recommended use
EN 61000-6-3:2001 Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments
EN 61000-6-2:2001 Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for Industrial environments

Operating instructions:

ON/OFF (SPEEDGLAS 9100V/9100X/9100XX)

To activate the welding filter, press the SHADE/ON button. The welding filter automatically turns OFF after 1 hour of inactivity.

AUTO ON/OFF (SPEEDGLAS 9100XXi)
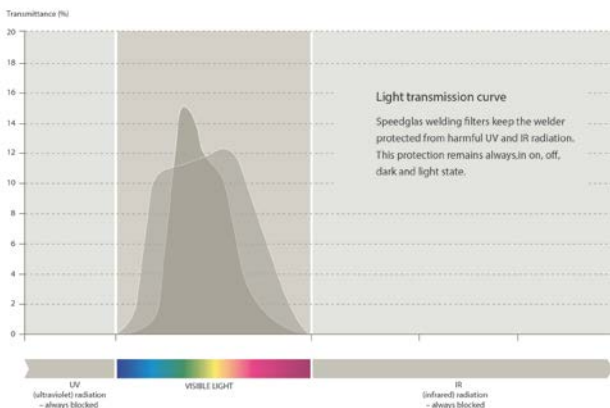The Speedglas 9100XXi has a motion controlled on and off function.

SHADE
Seven different Shade Number settings split into two groups (shade 5 and 8) and (shade 9-13) are available in the dark state. In order to see the current shade number setting, momentarily press the SHADE/ON button. To select another Shade Number, press the SHADE/ON button repeatedly while the indicators on the display are flashing. Move the flashing indicator to the desired Shade Number. To shift between the two shade groups hold the SHADE/ON button down for 2 seconds.

Recommended shade numbers according to EN 379:2003

Welding process	Current in amperes A																			
	1.5	6	10	15	30	40	60	70	100	125	150	175	200	225	250	300	350	400	450	500	600
MMAW (covered electrodes)				8				9		10		11		12			13			14	
MAG			8				9		10		11			12				13		14	
TIG			8		9		10		11			12		13							
MIG					9			10		11			12		13		14				
MIG with light alloys							10		11		12		13		14						
Air-arc gouging				10					11		12		13		14		15				
Plasma jet cutting							9	10	11		12		13								
Microplasma arc welding	4	5		6	7	8	9		10		11		12								
	1.5	6	10	15	30	40	60	70	100	125	150	175	200	225	250	300	350	400	450	500	600

⚠ The table shows the typical shade setting for various working applications. A setting above or below that indentified in the table may be required, according to the conditions of use.

Light transmission curve

Speedglas welding filters keep the welder protected from harmful UV and IR radiation. This protection remains always.in on, off, dark and light state.

SENSITIVITY
The sensitivity setting of the weld arc detection system can be adjusted to accommodate a variety of welding methods and workplace conditions. In order to see the current sensitivity setting, momentarily press the SENS button. To select another setting, press the SENS button repeatedly until the indicator shows the desired setting, as indicated on the indicators.

Position ▢   Locked in light state (shade 3) at all times. Used for grinding (Not for Speedglas 9100XXi).

Position 1   Least sensitive setting. Used if there is interference from other welders' arcs in the vicinity.

Position 2   Normal position. Used for most types of welding indoors and outdoors.

Position 3   Position for welding with low current or with stable welding arcs. (eg TIG welding)

Position 4   Suitable for very low current welding, use of inverter type TIG welding machines.

Position 5   Most sensitive setting. Used for TIG welding where part of the arc is obscured from view.

Position ▢   Locked in selected dark state. Same function as a passive welding filter.

POSITION GRIND MODE (LOCKED LIGHT STATE)
This setting could be used for grinding or other non-welding activities.

SPEEDGLAS 9100V/9100X/9100XX

When the welding filter is locked in the light state (shade 3) the LED under the symbol will flash every 8 seconds to alert the user. The welding filter must be unlocked before arc welding is performed by choosing a sensitivity setting for welding. When the welding filter turns OFF (after 1 hour inactivity), it will automatically leave the locked state and go to sensitivity setting 2.

SPEEDGLAS 9100XXi

To activate the grind mode, press the right side button of the silver front until the LED beside the grind symbol flashes (see above fig). The LED beside the grind symbol will flash every 5 seconds to alert the user. To leave the grind mode, press and release the button again. When the welding filter turns OFF, it will automatically go to welding mode.

MEMORY FUNCTION (SPEEDGLAS 9100XXi)
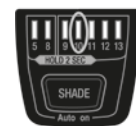
This welding filter has a memory function that enables the user to switch between two different weld settings. When the first weld setting has been made, you have the possibility to programme a second setting. By holding

down the right side button of the silver front for 2-3 seconds (The marked LED, on the illustration above, will indicate (flashing) that you are in the second weld setting) you can manually set the second program. To switch between the two different settings, hold down the right side button of the silver front 2-3 seconds. The LED will indicate (flashing) the change of weld settings.

POSITION 1-5

If the filter does not darken during welding as desired, increase the sensitivity until the welding filter switches reliably. Should the sensitivity be set too high, the filter may remain in the dark state after welding is complete due to ambient light. In this case, adjust the sensitivity downward to a setting where the welding filter both darkens and lightens as desired.

POSITION LOCKED DARK STATE
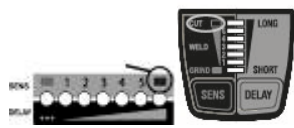
When the welding filter is locked in the dark state and the welding filter turns OFF (after 1 hour inactivity), it will automatically reset to sensitivity setting 2. The shade number to be used in the locked dark state, is selected by the SHADE/ON button.

DELAY

The delay function should be used to set the recovery delay of the welding filter from dark to light according to welding method and current. See table. The scale for the, from dark to light delay function is placed below the indicators.

Delay table for Speedglas 9100V/9100X/9100XX

Delay Shade	*)					d 1**)	d 2**)	Σ	d 1**)	d 2**)	Σ
5	40	40	60	90	130			200			300
8	40	40	60	100	150			250			400
9	40	40	60	100	150	200	300	500	375	625	1000
10	40	40	70	150	200	300	300	600	425	625	1050
11	50	50	80	200	300	375	325	700	475	625	1100
12	50	50	90	250	400	475	325	800	575	625	1200
13	60	60	100	300	450	525	325	850	675	625	1300

*) Comfort mode for tack welding is described in the User Instruction, only valid for Speedglas 9100V/9100X/9100XX
**) Two step recovery only valid for Speedglas 9100V/9100X/9100XX

Delay table for Speedglas 9100XXi

Delay Shade						
5	40	50	80	110	200	300
8	40	60	100	150	250	400
9	40	60	100	150	300	400
10	40	70	150	220	350	400
11	50	80	200	300	400	470
12	50	90	250	370	500	570
13	60	100	300	450	600	800

COMFORT MODE FOR TACK WELDING.
(SPEEDGLAS 9100V/9100X/9100XX)

This setting may help reduce eye fatigue resulting from the eye constantly adjusting to differing light levels during tack welding. Tack welding mode uses an intermediate light state (shade 5). If an arc is not struck within 2 seconds the welding filter will switch to the normal light state (shade 3).

Note that the Sensitivity and Delay function are using the same LED indicators on the display.

IN USE

To check that the electronics and buttons are working, press the buttons and the indicators will flash. The batteries should be replaced when the low battery indicator flashes or indicators do not flash when the buttons are pressed.
The welding filter is equipped with three optical sensors. They react independently causing the filter to darken when a welding arc is struck.

The sensors on the welding filter must be kept clean and uncovered at all times for optimal function. The recommended operating temperature range for the product is -5°C to +55°C. Flashing light sources (e.g. safety strobe lights) can trigger the welding filter when no welding is occurring.

This interference can occur from long distances and/or from reflected light. Welding areas should be shielded from such interference.

Limitations of use:

⚠ Only use with original 3M™ Speedglas™ brand spare parts and accessories listed in the reference leaflet and within the usage conditions given in the Technical Specifications.

⚠ The use of substitute components or modifications not specified in these user instructions might seriously impair protection and may invalidate claims under the warranty or cause the product to be noncompliant with protection classifications and approvals. Use only with welding shields listed in the reference leaflet.

⚠ Eye protectors worn over standard ophthalmic spectacles may transmit impacts thus creating a hazard to the wearer.

⚠ Should the Speedglas 9100 welding filter fail to switch to the dark state in response to an arc, stop welding immediately and inspect the welding filter as described in these instructions. Continued use of a welding filter that fails to switch to the dark state may cause temporary vision loss. If the problem cannot be identified and corrected, do not use the welding filter, contact your supervisor, distributor or 3M for assistance.

⚠ Use of this product in applications outside its intended use, such as laser welding/cutting, may result in permanent eye injury and vision loss.

Spare parts and consumables

Part No.	Description
50 00 05	Speedglas auto-darkening welding filter 9100V 5, 8, 9-13
50 00 15	Speedglas auto-darkening welding filter 9100X 5, 8, 9-13
50 00 25	Speedglas auto-darkening welding filter 9100XX 5, 8, 9-13
50 00 26	Speedglas auto-darkening welding filter 9100XXi 5, 8, 9-13
50 01 26	Speedglas welding filter and silver front 9100 XXi
53 10 00	Battery holder for Speedglas welding filter series 9100 pkg of 2
52 60 00	Outer protection plate standard, pkg of 10
52 70 00	Outer protection plate scratch resistant, pkg of 10
52 70 70	Outer protection plate heat resistant, pkg of 10
52 80 05	Inner protection plate for 9100V filter, pkg of 5 (marked 117x 50)
52 80 15	Inner protection plate for 9100X filter, pkg of 5 (marked 117x 61)
52 80 25	Inner protection plate for 9100XX/ 9100XXi filters, pkg of 5 (marked 117x 77)
53 21 00	Speedglas silver front 9100XXi
42 20 00	Battery, pkg of 2

Accessories

17 10 20	Magnifying lens x1.0
17 10 21	Magnifying lens x1.5
17 10 22	Magnifying lens x2.0
17 10 23	Magnifying lens x2.5

Technical specification

Weight Speedglas welding filter 9100V Speedglas welding filter 9100X Speedglas welding filter 9100XX Speedglas welding filter 9100XXi	160 g 180 g 200 g 200 g
Viewing area Speedglas welding filter 9100V Speedglas welding filter 9100X Speedglas welding filter 9100XX Speedglas welding filter 9100XXi	45 x 93 mm 54 x 107 mm 73 x 107 mm 73 x 107 mm
Switching time (light-dark)	0,1 ms (+23°C)
Opening time (dark-light)	see Recovery Delay table
UV / IR protection	According to shade number 13 (permanent)
Light state	Shade no 3
Dark state	Shade no 5, 8, 9-13
Fail /Safe state	Shade no 5
Battery type	2 x CR2032 (Lithium 3 Volt)
Battery lifetime Speedglas welding filter 9100V Speedglas welding filter 9100X Speedglas welding filter 9100XX Speedglas welding filter 9100XXi	2800 hours 2500 hours 2000 hours 1800 hours
Operating temperature	-5ºC to +55ºC
Material: Welding Filter Protection plate	PA PC