

Protection against liquid droplets & splashes according to EN166

EN166 standard which covers safety spectacles & face shields doesn't require any testing with regard to the chemical resistance of the product material. Clause 7.2.4 checks one-time protection against penetration of liquid droplets.

For instance, face shields penetration meet the standard if the face shield passes the requirements:

- Viewing area with a min. vertical center-line depth of 15 cm when mounted
- Laser test when visor on test head turn in all directions

The EN166 requirement is to check if the face shield is a barrier between the risk and the users face and eyes.

V-Gard 900 integrated over spectacles & faceshield protection against liquid droplets & splashes to EN166

In the V-Gard 900 range, the V-Gard 950 is certified according to the EN166 clause 7.2.4, therefore the integrated face shield and the connecting pivots are marked with the symbol "3". The V-Gard 930 could not get the "3" marking because only when fitted with fully tight goggles does it meet the requirements.

Chemical resistance vs protection against liquid droplets & splashes

Whatever their compliance to EN166/Clause 7.2.4, V-Gard 930 over spectacles and V-Gard 950 face shield are resistant to many chemicals.

To prove guidance on the resistance to contact with liquid chemicals MSA has performed intensive tests with select chemical families:

- Chemical spray to check that there is no significant degradation (e.g. cracking, crazing or opacity) immediately and after one day
- Followed by impact testing to EN166 / Medium Impact (120 m/s) to check there is no crack penetration through the material or danger of failure under impact eg. splitting into two or more pieces



V-Gard 930



V-Gard 950





Testing conditions

The results shown in the table below were obtained under lab conditions (23 ± 2°C and 25 ± 5% relative humidity) in the MSA test labs. For testing purposes, V-Gard 930 over spectacles and V-Gard 950 face shield were positioned in the “as worn” position. 1st observations was made immediately after the spray and another one one day later. The impact testing was then conducted. Face shields and over specs were rinsed before impact testing.

Testing results

The results shown in this Quick Reference Guide are intended as a guide only to help in the selection of V-Gard 930 and V-Gard 950 for the intended application. While the table shows the performance against certain chemicals, it is not intended to be all inclusive. Moreover such testing is not required by safety standards so our below recommendations don't bring into question the face shield standard marking. The face shield with the lowest ratings can still protect from an accidental one-time splash.

Chemical Family		Representative Chemical			Chemical listed in EN14458 (1)
			V-Gard 900	V-Gard 950	
INORGANIC CHEMICALS	ACID MINERAL	Sulfuric Acid	*	*	■
	INORGANIC ACID	Hydrochloric Acid (35% wt)	***	*	
		Sodium Hydroxide (25% wt)	*	*	
		Sodium Hydroxide (10% wt)	*	*	■
INORGANIC BASE	Ammonium Hydroxide (28% wt)	***	***		
ORGANIC CHEMICALS	ALCOHOL	Ethanol	***	***	
		Butan-1-ol	***	***	■
	ALDEHYDE	Butyraldehyde	**	NR	
	ALIPHATIC HYDROCARBON	n-Heptane	***	***	■
		Gasoline	***	***	
	AROMATIC HYDROCARBON	Toluene	***	***	
		p-Xylene	***	***	■
	ESTER	Butyl Acetate	***	*	
		Ethyl Ether	***	***	
KETONE	Methyl Isobutyl Ketone (MIBK)	***	***		
SPECIALTY CHEMICALS	BUG SPRAY	Deet	***	*	

NR – Not recommended: Crack(s) and/or sever warp and/or severe haze can be observed on the visor after chemical spray

One-Star (*): No cracking; only slight warp and/or haze observed on visor by un-aided eye after chemical spray.

Two-Star ():** No cracking; only slight warp and/or haze observed on visor under microscope after chemical spray.

Three-Star (*):** No cracking; no warp or haze observed under microscope after chemical spray.

(1) EN14458 - Faceshields and visors for use with firefighters' and high performance industrial safety helmets.