



“REarc” welding – Reduced Exposures in arc-welding



Proposal for a welding industry initiative.

Draft for discussion with the industries concerned

2020, May 9th

NEW: IARC⁽¹⁾ MONOGRAPHS Vol. 118/2018 “Welding” ON THE EVALUATION OF CARCINOGENIC RISKS TO HUMANS

Source: <http://publications.iarc.fr/569> , Welding, Evaluation, page 265

6.1 Cancer in humans

There is *sufficient evidence* for the carcinogenicity of welding fumes for humans. Welding fumes cause cancer of the lung. Positive associations have been observed with cancer of the kidney.

There is *sufficient evidence* for the carcinogenicity of ultraviolet radiation from welding for humans . Ultraviolet radiation from welding causes ocular melanoma.

6.3 Overall evaluation

Welding fumes are *carcinogenic to humans* (Group 1).

Ultraviolet radiation from welding is *carcinogenic to humans* (Group 1).



¹⁾: IARC = International Agency for Research on Cancer, is a WHO institution defining carcinogenicity classes for substances or processes. These classes are considered, among other data, by international, national, or local OSH authorities for definition of adequate occupational exposure limits and recommendation of prevention measures. Subsequently, national OSH authorities define range of legally binding prevention measures for risk control in the industry. Implementation and effectiveness are controlled by industrial insurances and local OSH institutions.

Occupational Health & Safety duties promote industrial development in arc welding.

The industry addresses this new situation with innovation, social and economic responsibility => sustainable arc welding.

Background Facts:

- Arc welding processes are known to be emitting hazardous fumes, gases and radiation.
- Occupational Safety and Health (OSH) authorities have continuously reduced Occupational Exposure Limits (OELs) for several substances.
- The welding industry has reacted responsibly investing in prevention measures, mainly into fume extraction, PPE⁽¹⁾ and workplace ventilation.
- Until 2017, only selective welding fume components like Cr6+ or Ni-oxides were categorized by IARC⁽²⁾ as "Carcinogenic to Humans, Group1".
- In 2018, IARC has re-classified all "welding fumes" (without further specification) and arc welding UV radiation as "Carcinogenic to Humans, Group1".

Exemplary reactions 2019

today

Possible Scenario

OHS Authorities

- UK / Feb. 2019: HSE Safety alert to industry on fumes in mild steel welding
- Austria / Feb. 2019: approved ocular melanoma from arc UV radiation as occupational disease
- USA / June 2019: ACGIH added welding fumes on Tier 1 list for Notice of Intended Changes 2020

- EU / 2020: EU OSHA scientific committees might give new guidance on carcinogenic substances in welding, based on IARC categorization
- EU / 2020+: National authorities will adjust existing regulations in line with EU.
- USA / 2020+: scientific agencies like ACGIH, NIOSH could recommend new TLVs, NICs
- All / 2021: national or local authorities will implement new prevention measures for control and monitoring

Industry

- Manufacturers of fume extraction and personal protection equipment advertise quoting IARC publication, using also national industry associations
- Welding OEMs started to issue corporate statement to IARC publication on internet homepage, recommending adequate protection measures

- Will wait for reaction from national OSH authorities with regulatory power
- Will first invest into fume extraction, PPE and space ventilation to immediately reduce carcinogenicity risks.
- Will try to avoid arc welding where possible, substitution by e.g. casting, adhesive bonding, mechanical joining, etc.
- Loss of know how in welding technology, innovation and added value.

⁽¹⁾: PPE = personal protection equipment

⁽²⁾: IARC = International Agency for Research on Cancer, a WHO institution defining carcinogenicity classes for substances or processes.

Proposed Industry Initiative: an alliance of welding technology users and providers, welding associations, OSH authorities, academia, education and standardization.

MISSION: „REarc Welding“ – „Reduce Exposures in arc-welding“

- Targets:**
1. Prevent sustainably the risk for occupational diseases and cancer for all employees in the welding production
 2. Maintain qualified workplaces and relevant value add in the EU

DRAFT for discussion with industries concerned

Strategic Approach

- Establish an industry-driven alliance to jointly address the challenge - no company, association or institute can solve this alone
- Collaborative innovation and market implementation of arc welding technologies, equipment and consumables capable to reduce or eliminate risks from process emissions classified as carcinogenic Group 1 by IARC⁽¹⁾ in 2018.
- Shift the industry to low emission technologies using improved or new equipment and consumables.
- Proactive information and education of managers and employees for best possible risk prevention.
- Implement new preventive measures along the process chain and monitor their local efficacy with help of OSH authorities.

⁽¹⁾: IARC = International Agency for Research on Cancer, a WHO institution defining carcinogenicity classes for substances or processes. These classes are considered, among other data, by European, national, or local authorities to determine adequate occupational exposure limits and measures for risk control.

Collaboration will accelerate both development and implementation. Industry Initiative “REarc welding” shall align 2 activity streams.

“REarc welding” as short title for “Reduce Exposures in arc welding”

DRAFT for discussion with stakeholders



➤ Innovation

Selective examples, non-comprehensive

- GAW processes without metal vapors
- Combinations of new consumables and/or parameters for lowest possible process emissions
- Fast track standardization and certifications
- Sensors and data systems for exposure analytics

Safe & Competitive welding workplaces via technology.



➤ Information

Selective examples, non-comprehensive

- Digital campaigns for risk awareness
- Special prevention training programs for managers, welders and bystanders
- Efficacy proof for newly implemented prevention methods, based on monitored data analytics

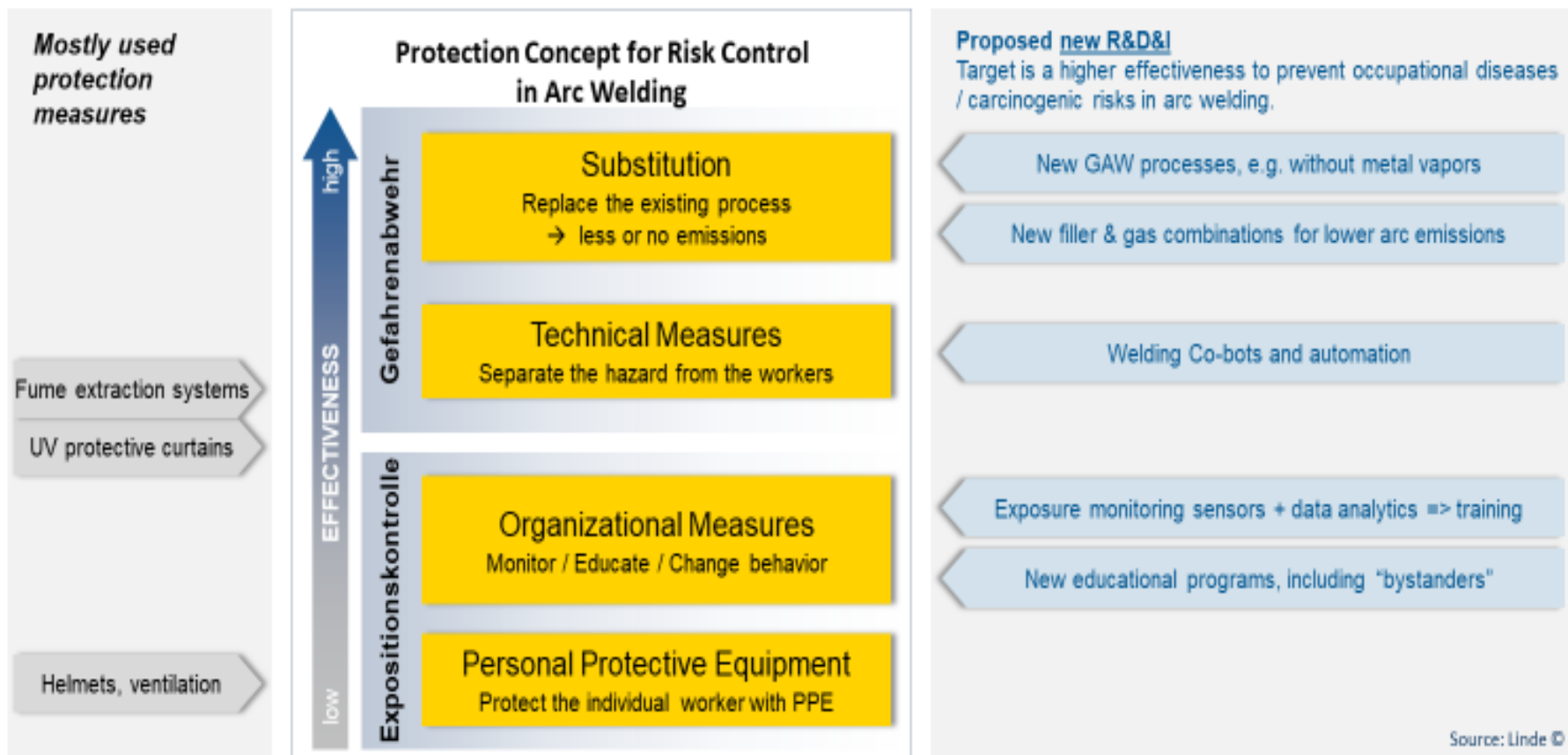
Safe & Competitive welding workplaces via education.

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Stakeholder Alliance:

- Welding associations (coordination)
- Welding technology users
- Welding technology providers
- OSH authorities
- Research institutes, academia
- Standardization and certification bodies
- Educational institutions
- Related industry associations
- Public funding

New (public funded) activities in the “REarc⁽¹⁾ welding” initiative shall target higher effectiveness with regard to the protection concept of preventive measures: exemplarily proposed R&D&I.



Welding Associations play a key role in the “REarc welding” initiative.

Example Germany: DVS – initiative agreed in principle, detailed plans under discussion

“REarc welding” as short title for “Reduce Exposures in arc welding”

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DVS

Forschungsvereinigung
Research association -
industry lead network,
including academic
institutes, OSH
authorities, regulatory
bodies.

INNOVATION – public funded

- Regular projects within FA1, FA3, FA Q6 (~ 2-4 Mio. € / year)
- Research cluster REarc welding AIF & DFG (~ 4 Mio. € / 3 years)
- AIF PLUS Cluster / Project Network
- Research alliance BMWi directly; same as for Lightweight Construction, only smaller, faster
- Participation in EC funded „Horizon Europe”, e.g. for „Education” with EWF
- Synergies with related innovation areas, e.g. Welding 4.0

Foster **technological leadership** of the German/European welding industry and academia.

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Safeguard qualified workplaces
Benefit from value add generated by arc welding
Re-build social trust in welding profession

DVS Verband

Industrial association of
welding technology
users and providers:
coordinating specific
standardization,
certification, education,
political representation.

IMPLEMENTATION – industry funded

- Represent welding industry in OSH governance forums
- Set new industry standards, with DIN and OSH authorities
- Accelerate certification of technologies, products (e.g. TÜV, CERT)
- Implement OSH specific education for industry (e.g. GSI-SLVs)
- Communicate via own channels, e.g. <https://www.home-of-welding.com/>, newsletters, conferences.

Ensure awareness and availability as well as best possible **OSH prevention practices** for welders.

INTERNAL

1: Work place risk assessment

- Following industry-specific guidelines and standards
- OSH authorities, if exposures assumed to exceed OELs.

2. Selection of measures for risk prevention

HIERARCHY OF CONTROLS



3. Implementation of measures

- Considering OSH regulation, technical and economic criteria

4. Effectiveness Check*

- Documented by employer
- Verified by OSH authorities

Feedback loop / restart if working environment changes

* Note: severity of measures, documentation and control for carcinogenic hazards is different from hazards classified non-carcinogenic !

UK 2017: example for an industrial alliance addressing OSH risks in welding

Information => Awareness => Measures => Risk Control = PREVENTION

INTERNAL



Source: 2017 started campaign from British Occupational Hygiene Society BOHS "Breathe Freely"
<https://www.breathefreely.org.uk/breathefreelymanufacturing.html>

Industrial alliance supported by government, OSH authorities, hygienist associations, universities and manufacturing industry; with selective sponsoring from welding safety OEMs, for dedicated chapters.

WE SUPPORT BREATHE FREELY

Working together to tackle occupational lung disease

www.breathefreely.org.uk

