



Technical Bulletin
DVS 3420



European Research
Association for Sheet
Metal Working

Technical Bulletin DVS 3420

Clinching – basics

Technical Committee of the DVS

Working Group V10 "Mechanical Joining" by the joint committee for DVS and EFB

Subgroup V 10.2 / MF2 "Clinching"

This technical bulletin was created in collaboration between the EFB - Europäische Forschungsgesellschaft für Blechverarbeitung e.V. and the German Welding Society DVS – Deutscher Verband für Schweißen und verwandte Verfahren e.V.

This publication has been drawn up by a group of experienced specialists working in an honorary capacity and its consideration is recommended. The user should always check to what extent the contents are applicable to his particular case and whether the version on hand is still valid. No liability can be accepted by the DVS – Deutscher Verband für Schweißen und verwandte Verfahren e.V., the EFB - Europäische Forschungsgesellschaft für Blechverarbeitung e.V. and those participating in the drawing up of the document

Content:

1.	Purpose and scope of the technical bulletin	3
2.	Fundamental principles	
2.1.	Terms and definitions.....	3
2.2.	Classification of clinch joints.....	3
2.3.	Process variants.....	4
2.3.1.	Single-stage, round clinching process without cutting element.....	4
2.3.2.	Single-stage, round clinching process with cutting element or pre-punched hole.....	5
2.3.3.	Single-stage, non-round clinching process.....	6
2.3.4.	Clinching with low or no button protrusion.....	7
2.4.	Designations.....	9
2.5.	Joint properties.....	10
2.5.1.	Quasistatic load.....	10
2.5.2.	Fatigue load.....	11
3.	Design	12
3.1.	Symbolic representation on drawings.....	12
3.2.	Constructive component design.....	13
3.2.1.	Arrangement of the components.....	13
3.2.2.	Component dimensions at the join (design guidelines).....	13
3.3.	Suitability of materials for clinching.....	14
3.3.1.	Parent materials.....	14
3.3.2.	Workpiece surface coating / condition.....	15
4.	Production	16
4.1.	Machinery and equipment.....	16
4.2.	Technological parameters and process information.....	16
4.2.1.	Joining distance, joining and downholder force.....	16
4.2.2.	Tool wear and life time.....	17
5.	Quality assurance	17
5.1.	Non-destructive test.....	17
5.1.1.	Visual inspection.....	17
5.1.2.	Checking the bottom thickness and outer diameter.....	17
5.1.3.	Online testing (process monitoring).....	18
5.1.4.	Tool inspection.....	19
5.2.	Destructive test.....	19
5.2.1.	Macrosection (Cross Section).....	20
5.2.2.	Strength analysis.....	20
6.	Reworking and repair	22
7.	Occupational safety and environmental protection	22
7.1.	Occupational safety.....	22
7.2.	Environmental protection.....	22
8.	Alternative processes	22
8.1.	Pulsed tool movement.....	22
8.2.	Overlaid tool movement.....	23
8.3.	Clinching with flat anvil and die-side button protrusion.....	23
9.	References	23