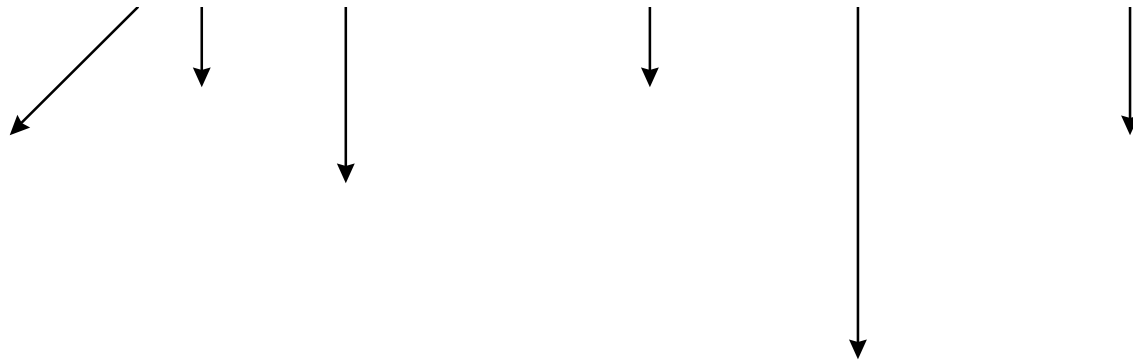


I hf Laq`y hmf ?n e?f ` ku` mhr dc
khf g s Lf ` t f d?r g dds r?` mc ?oqn ehkdr

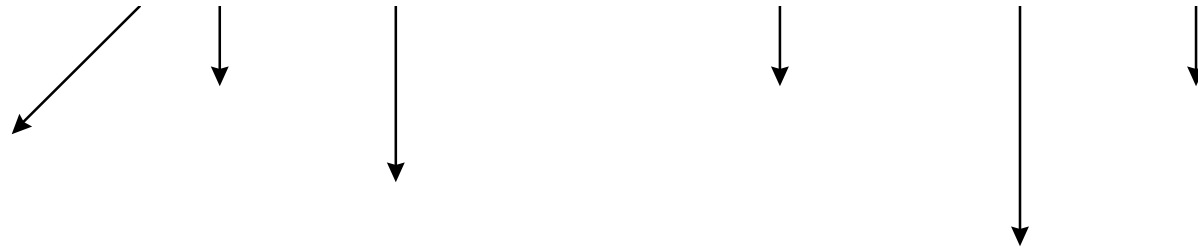
bg`q`bsdqhrs lb?n e
dkdbsqn kxs lb`kkx?f`ku`mhr dc
rg dds r

**c dr hf m` s hn m?n e
dkdb s qn kx s hb` kx?f` ku` mhr dc
r g dds ?s n ?c hm?dm?POPTQ**



**bg`q`bsdqhrs lb?ed`st qdr?ne
gns Lc h?f`ku`mhrdc ?khf g s Lf`t f d
rg dds r**

c dr hf m` s hm m?n e?` ?g n s Lc ho
f ` ku` mhr dc ?r g dds ?s n
c hm?dm?POPSQ



MELTING POINT / BOILING POINT

Material	Melting point	Boiling point
Zinc	419 °C	908 °C
Steel	1500 °C	---
CuSi 3	950 °C	---



MIG-BRAZING

ADVANTAGES OF BRONZE-WIRES

- no corrosion of the weld seam
- minimal spatter ejection
- low coating burn off
- low heat input
- easy after-weld machining of the seam
- cathodic protection of base metal



MIG-BRAZING

SG-CU SI3 DIN 1733

Cu	Si	Sn	Zn	Mn	Fe
>94,00	2,80-4,0	<0,20	<0,20	0,50-1,50	<0,30

Tensile strength: > 392 N/mm²

Yield stress: > 147 N/mm²

Delatation (l=5d): 46%

Hardness (Brinell): 85-100 HB

Melting range: 910-1025°C

Welding position (DIN EN 287): PA, PB, PC, PD, PF



MIG-BRAZING

OVERLAP WELD



Weld

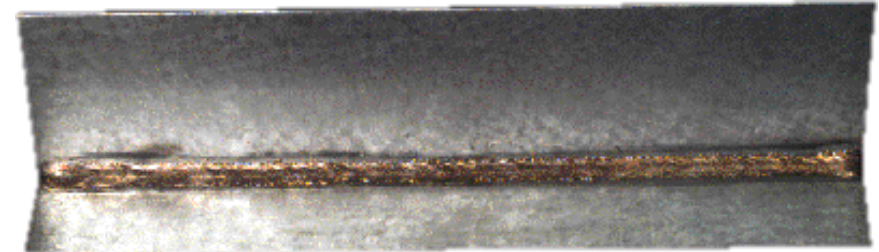
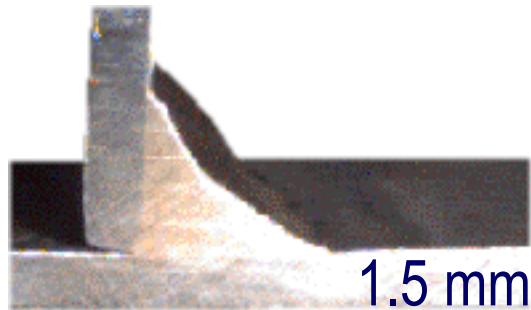


Backside



MIG-BRAZING

MIG-BRAZING / PULSED ARC



Power source:

Wire electrode:

Gas:

Welding speed:

Welding current:

Arc-voltage:

Wire speed:

TPS 450

CuSi 3 \varnothing 0.9 mm

I1-Ar100%

40 cm/min

112 A

15.2 V

7.4 m/min



MIG-BRAZING

SPECIMENS



MIG-BRAZING

POROSITY

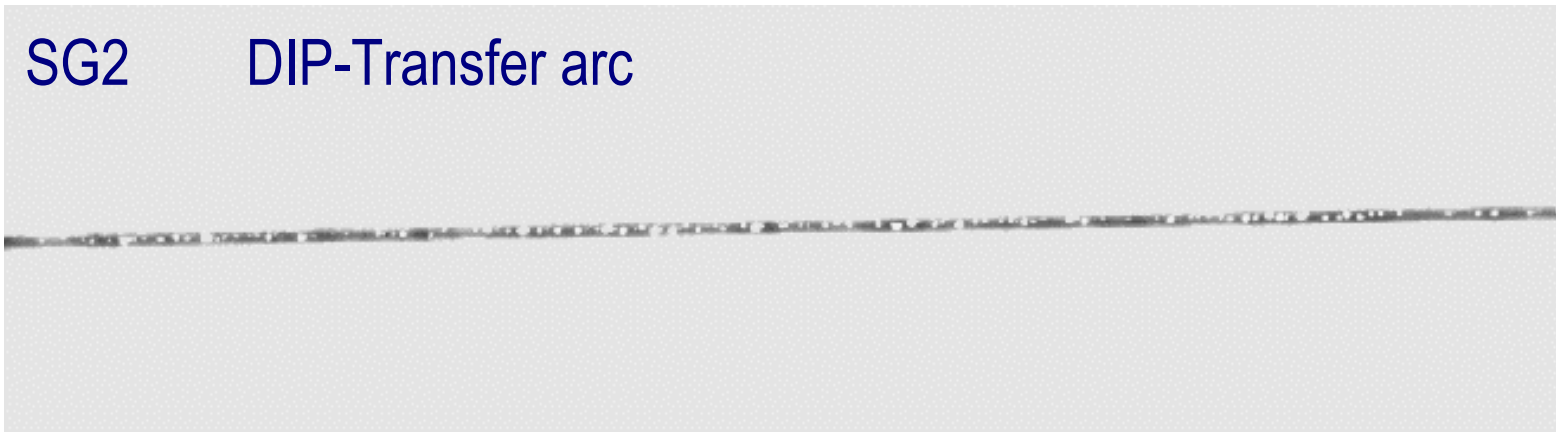
CuSi 3

Pulsed arc



SG2

DIP-Transfer arc



MIG-BRAZING

BENDING TEST

Gauge of bending root : 2 x a

a	b	Side of tensile	Angle of bend	Remarks
mm	mm			
2,4	24,9	D*	120	ok
2,4	24,9	W**	68	ok

D* = final pass

W** = root layer



MIG-BRAZING

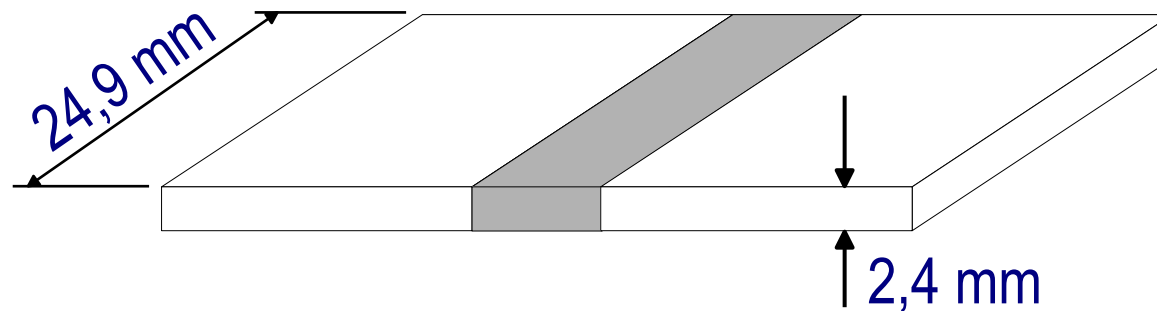
TENSILE TEST AT EN 10 002 T.1

Test temperature: 20°C

Yield stress: 266 N/mm²

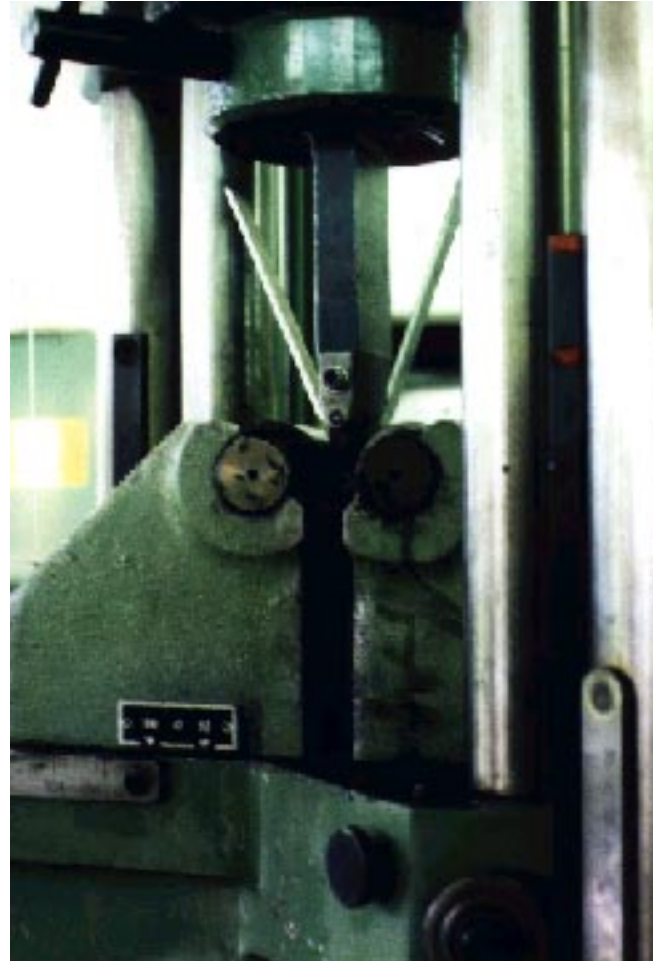
Tensile strength: 340 N/mm²

Remarks: fracture in base metal



MIG-BRAZING

BENDING TEST



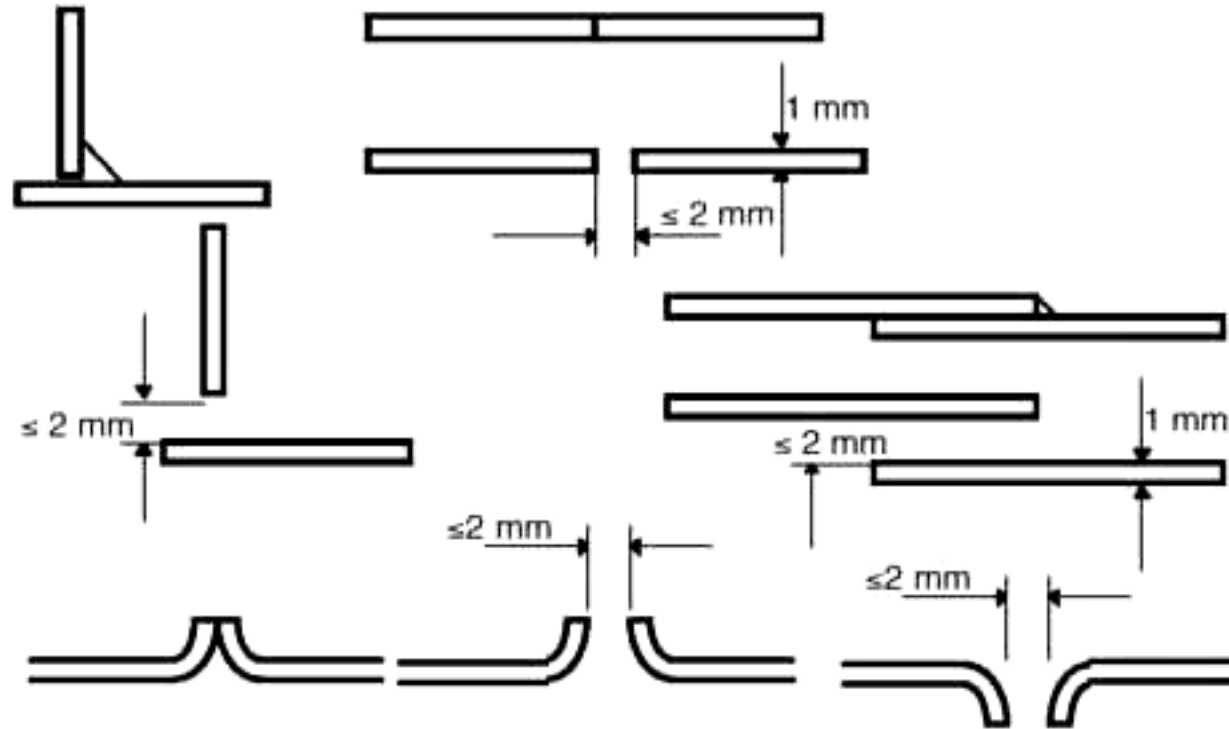
MIG-BRAZING

TENSION TEST



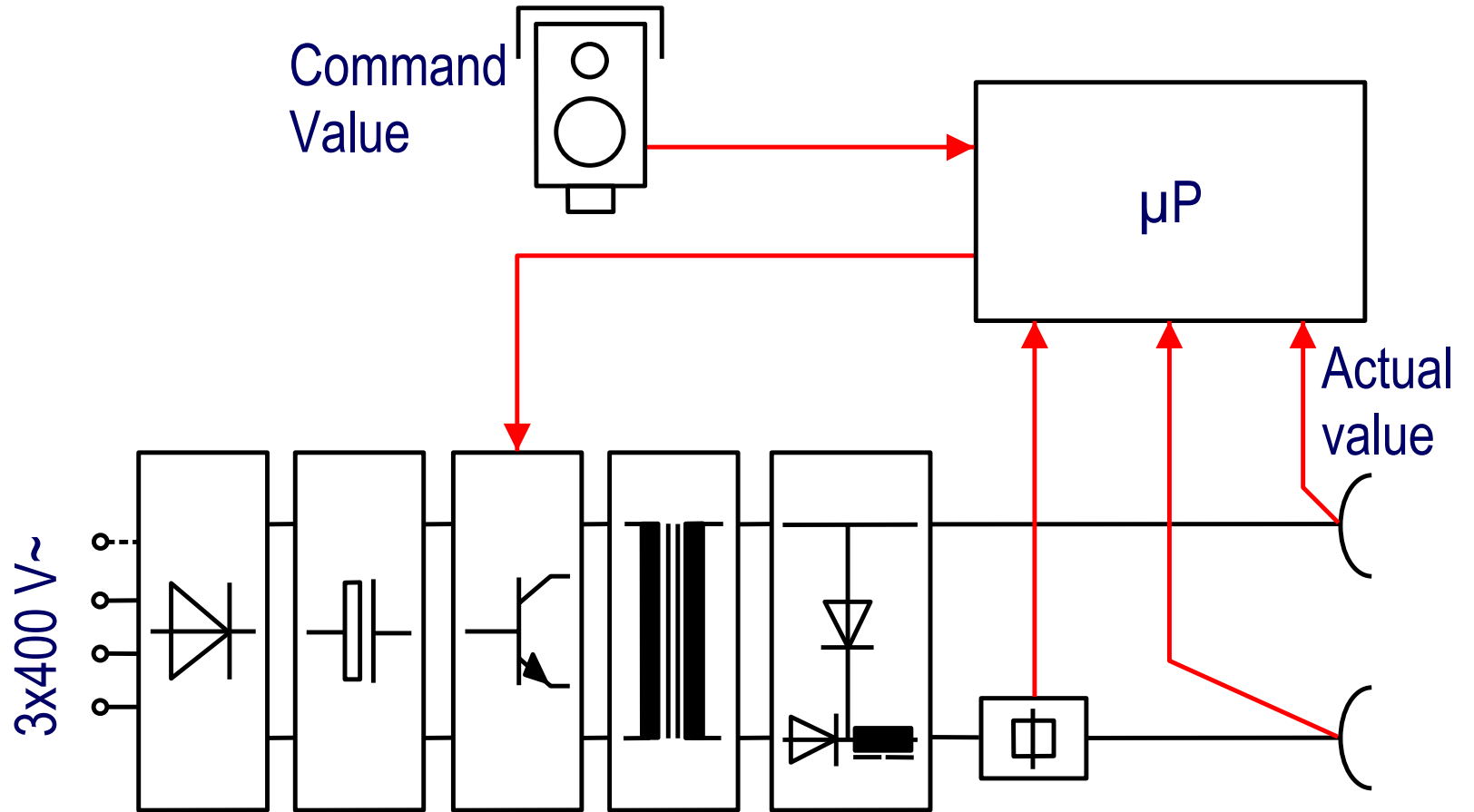
MIG-BRAZING

JOINT DESIGN



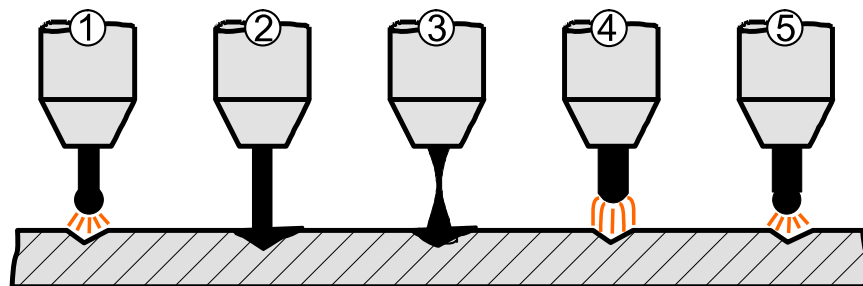
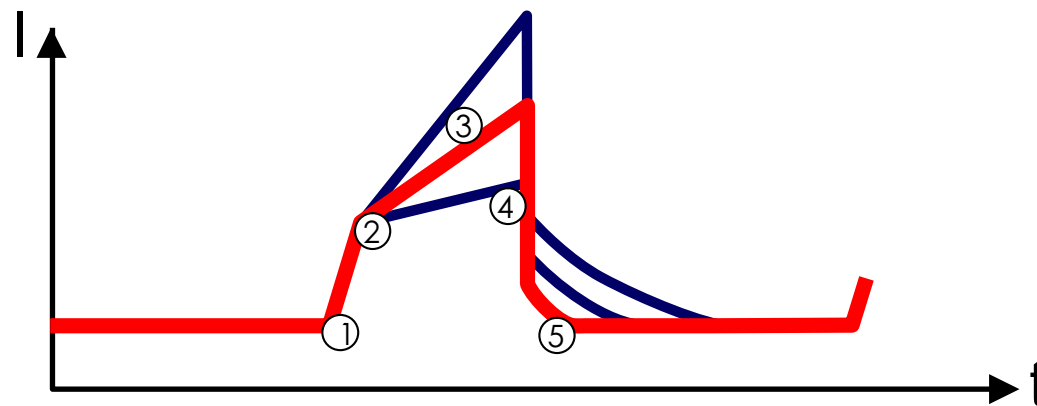
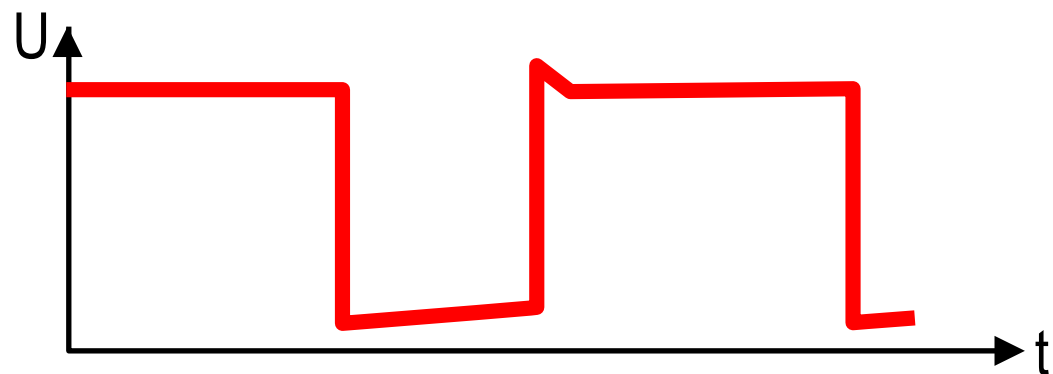
MIG-BRAZING

POWER SOURCE



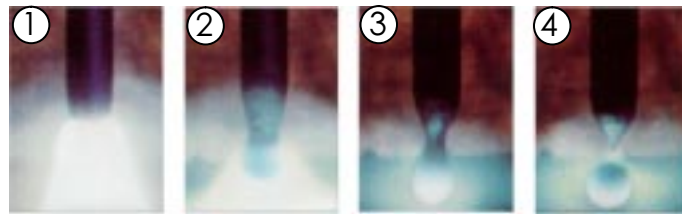
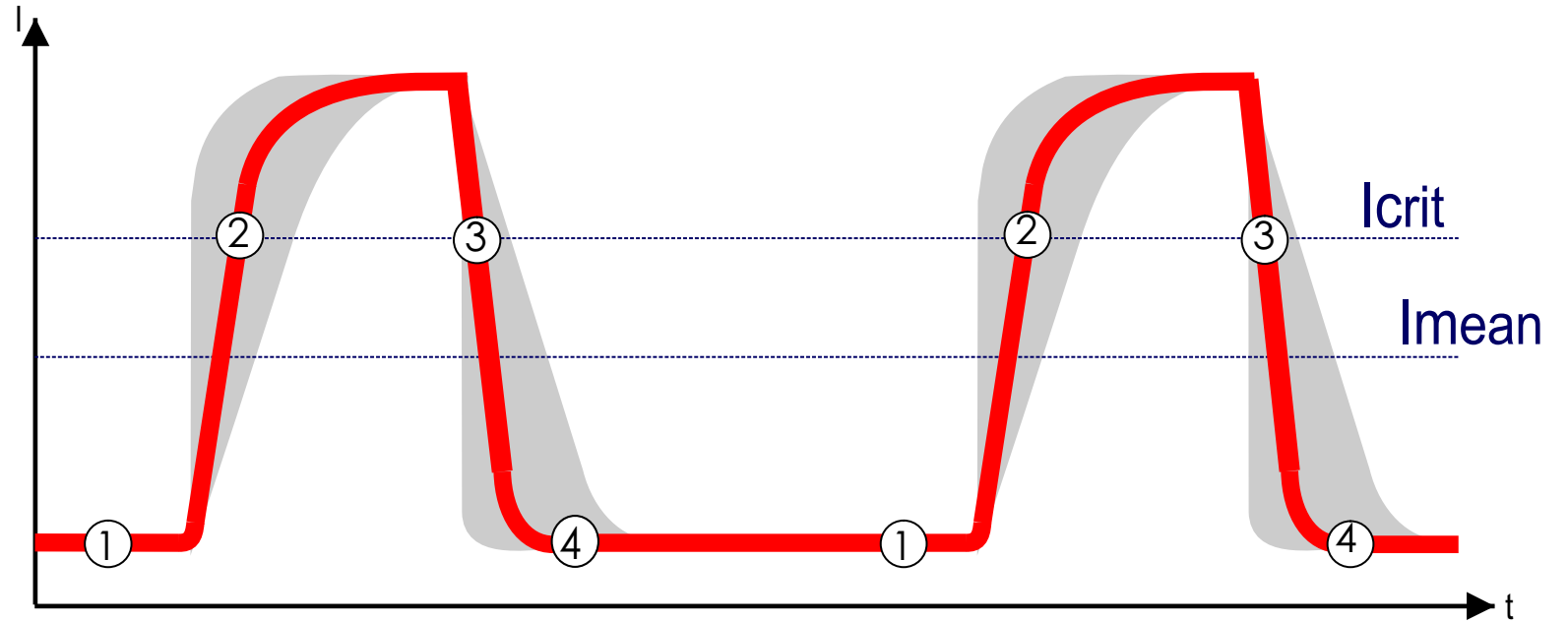
MIG-BRAZING

PRECISE DETACHMENT OF DROP



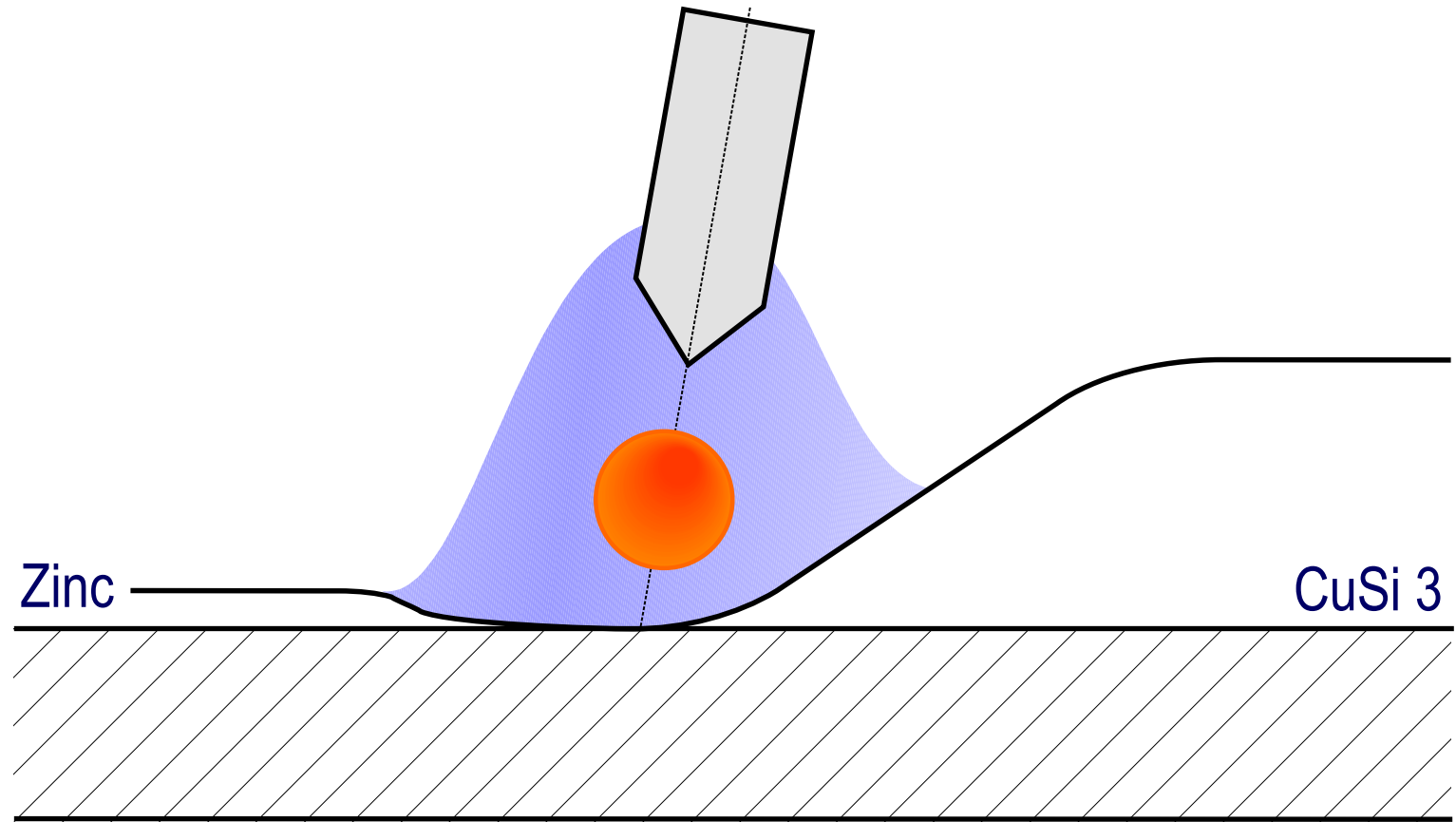
MIG-BRAZING

VARIABLE PULSE FORM



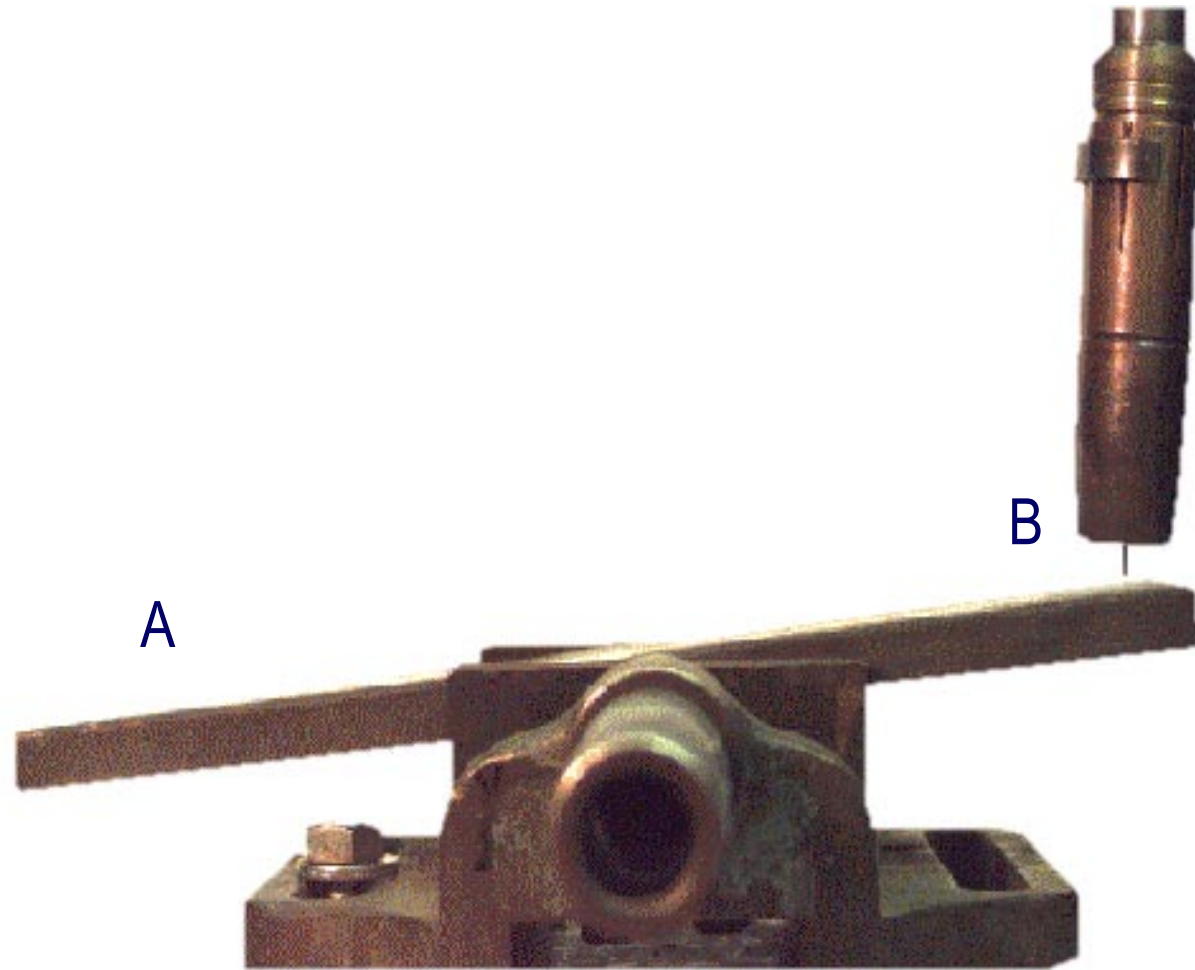
MIG-BRAZING

TORCH INCLINATION



MIG-BRAZING

TEST CONFIGURATION



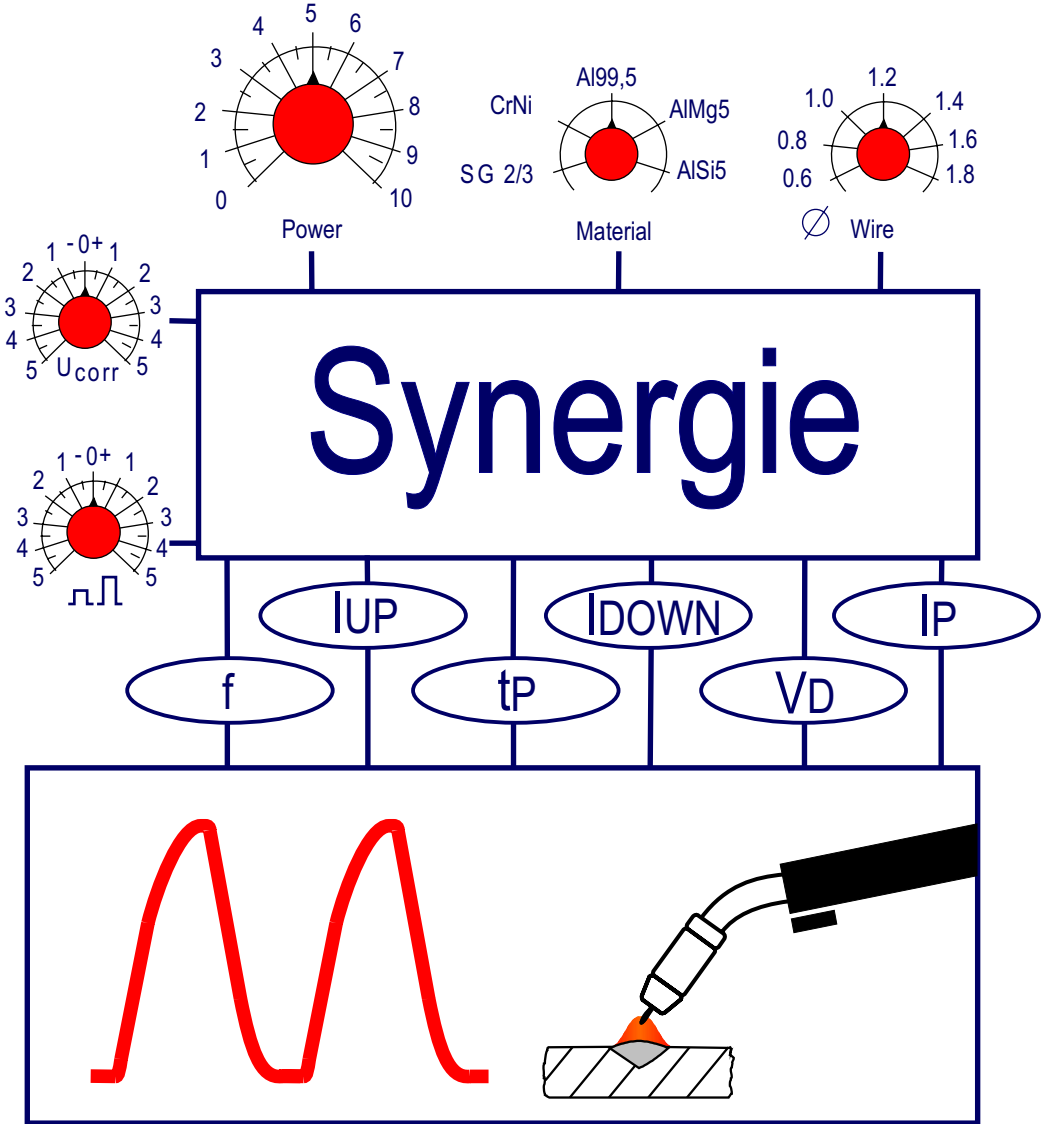
Distance A: 35mm

Distance B: 8mm



MIG-BRAZING

SYNERGIC-OPERATION



MIG-BRAZING

ROBOT TORCH



MIG-BRAZING

AUTOMOTIVE



MIG-BRAZING

BYCYCLE FRAME



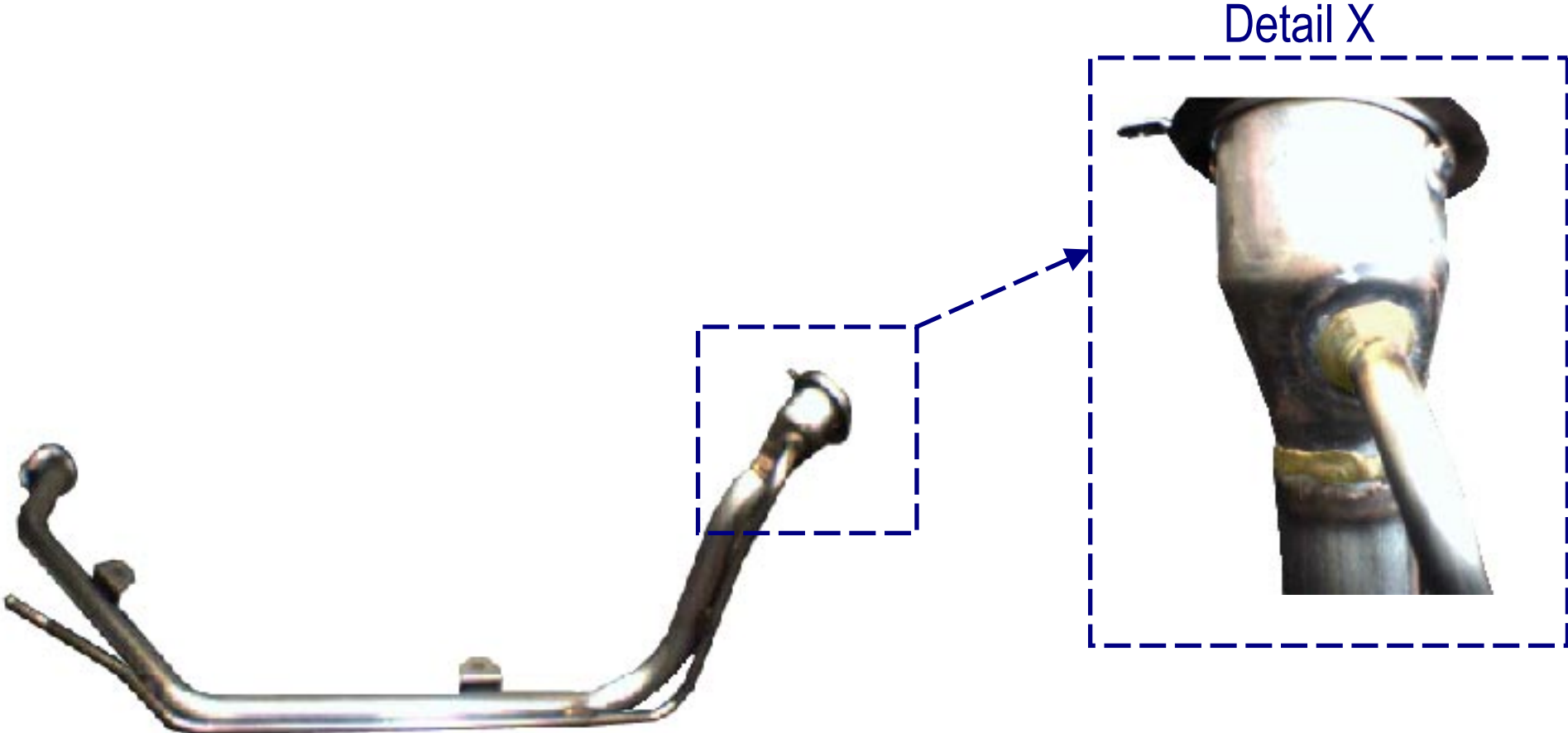
MIG-BRAZING

STRIP TO PIPE JOINT



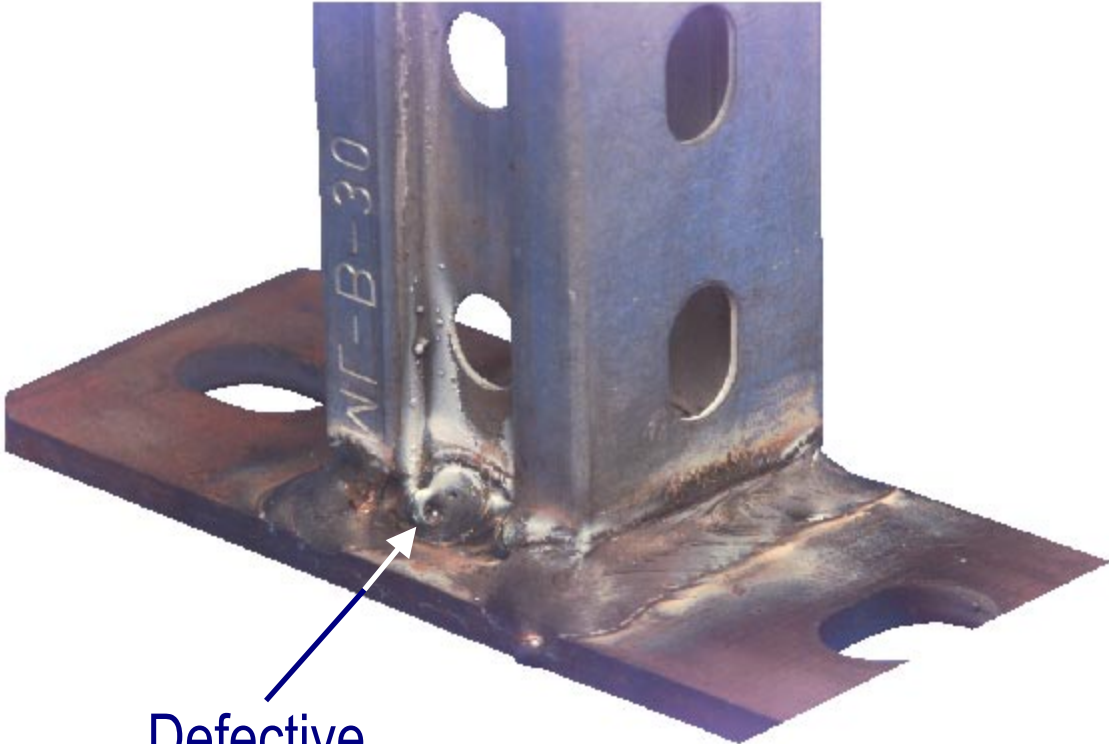
MIG-BRAZING

FUEL INLET

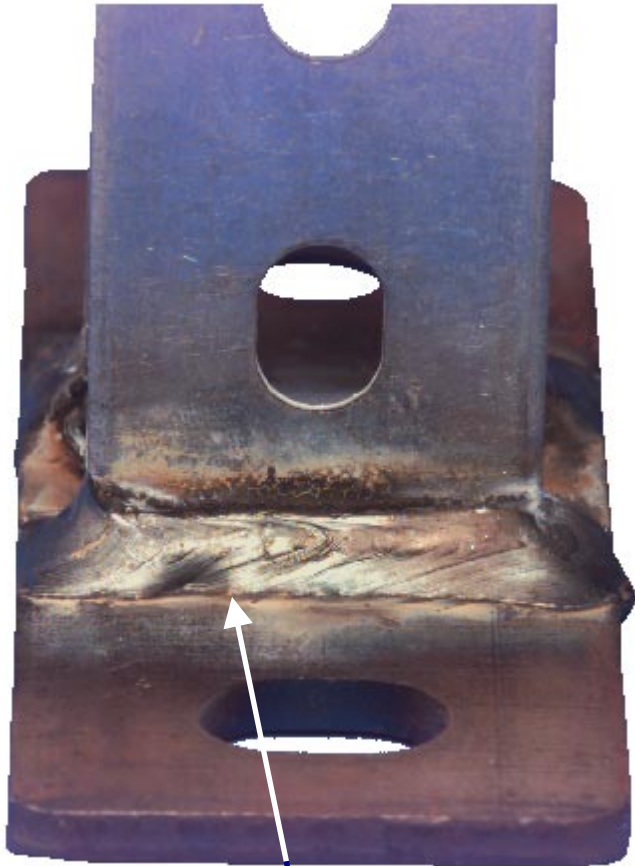


MIG-BRAZING

CONSOLES OF STORE-SHELF-UNITS



Defective
MAG-welding

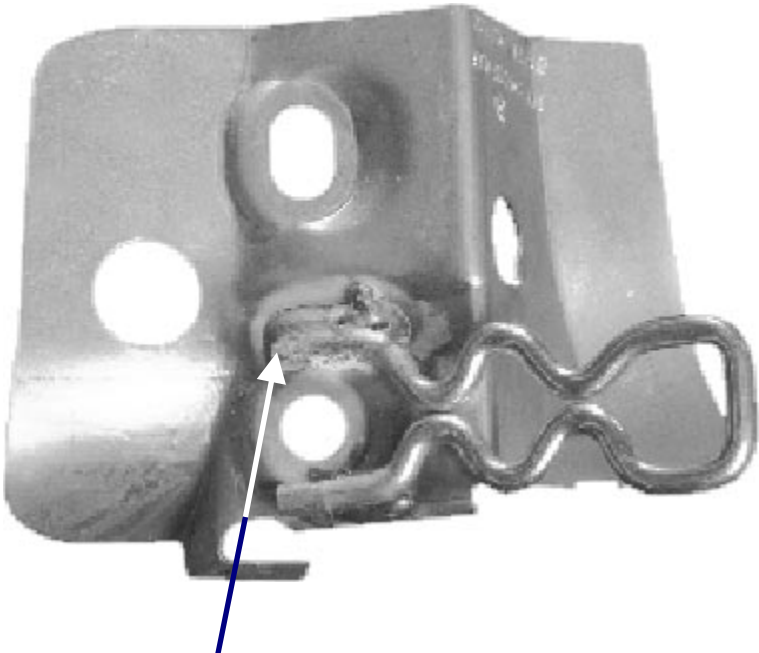


MIG-brazing
pore-free

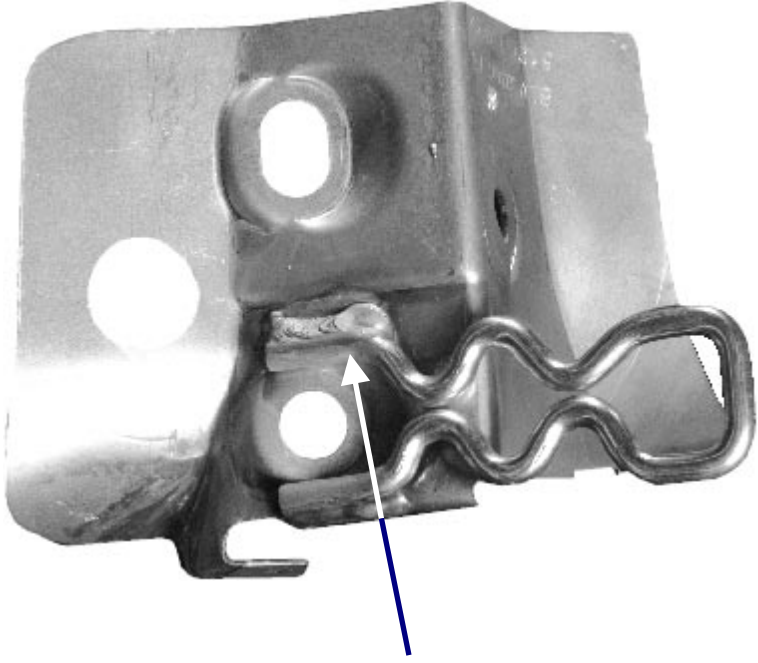


MIG-BRAZING

COMPONENT OF THE CAR INDUSTRY



MAG-welding
20 per cent rejects
through porosity



MIG-brazing
pore-free



MIG-BRAZING

BACK VIEW OF THE REFERENCE WELD

MAG-welding
protective layer
damaged

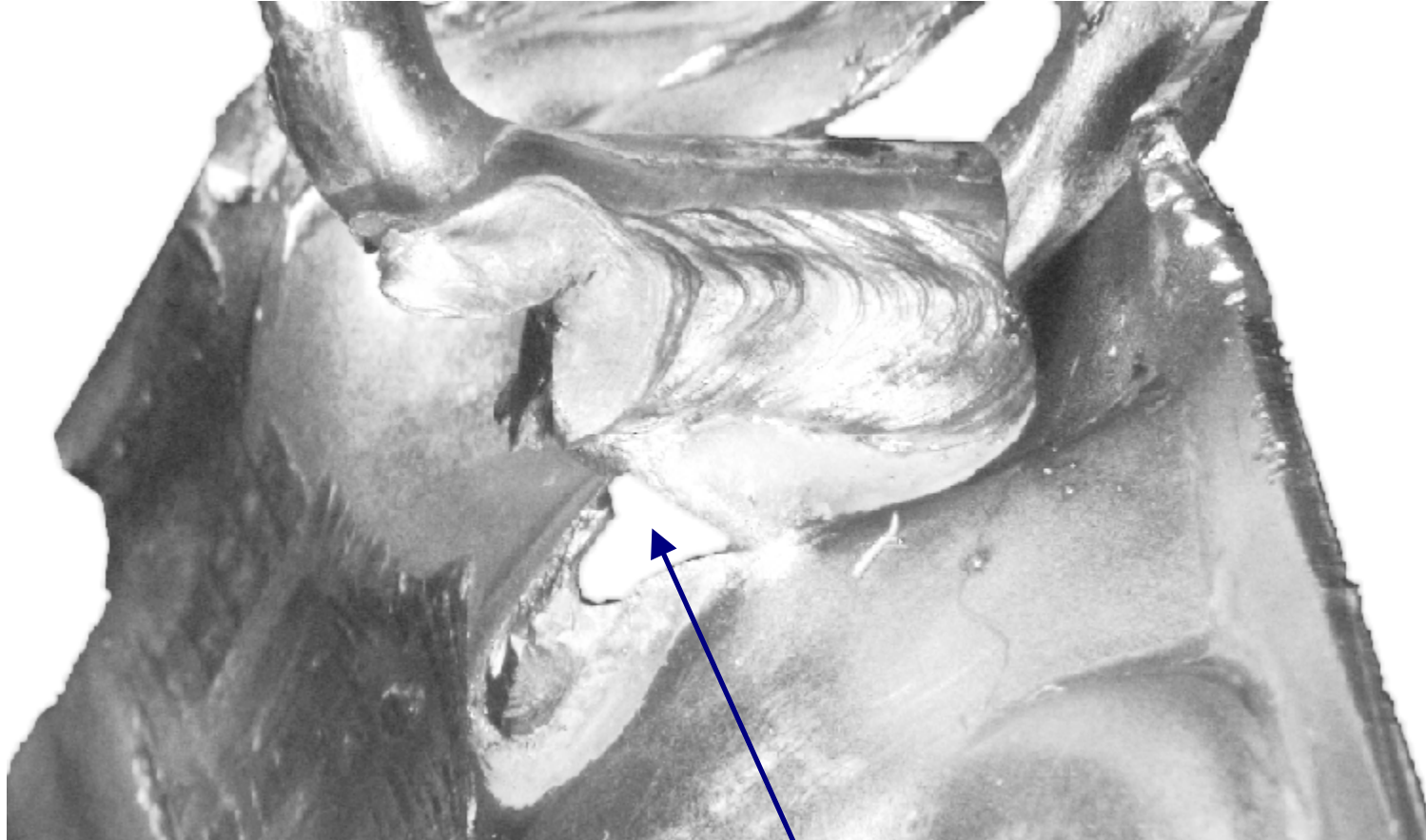


MIG-brazing
protective
layer un-
damaged



MIG-BRAZING

MIG-BRAZING



Fracture in the base metal