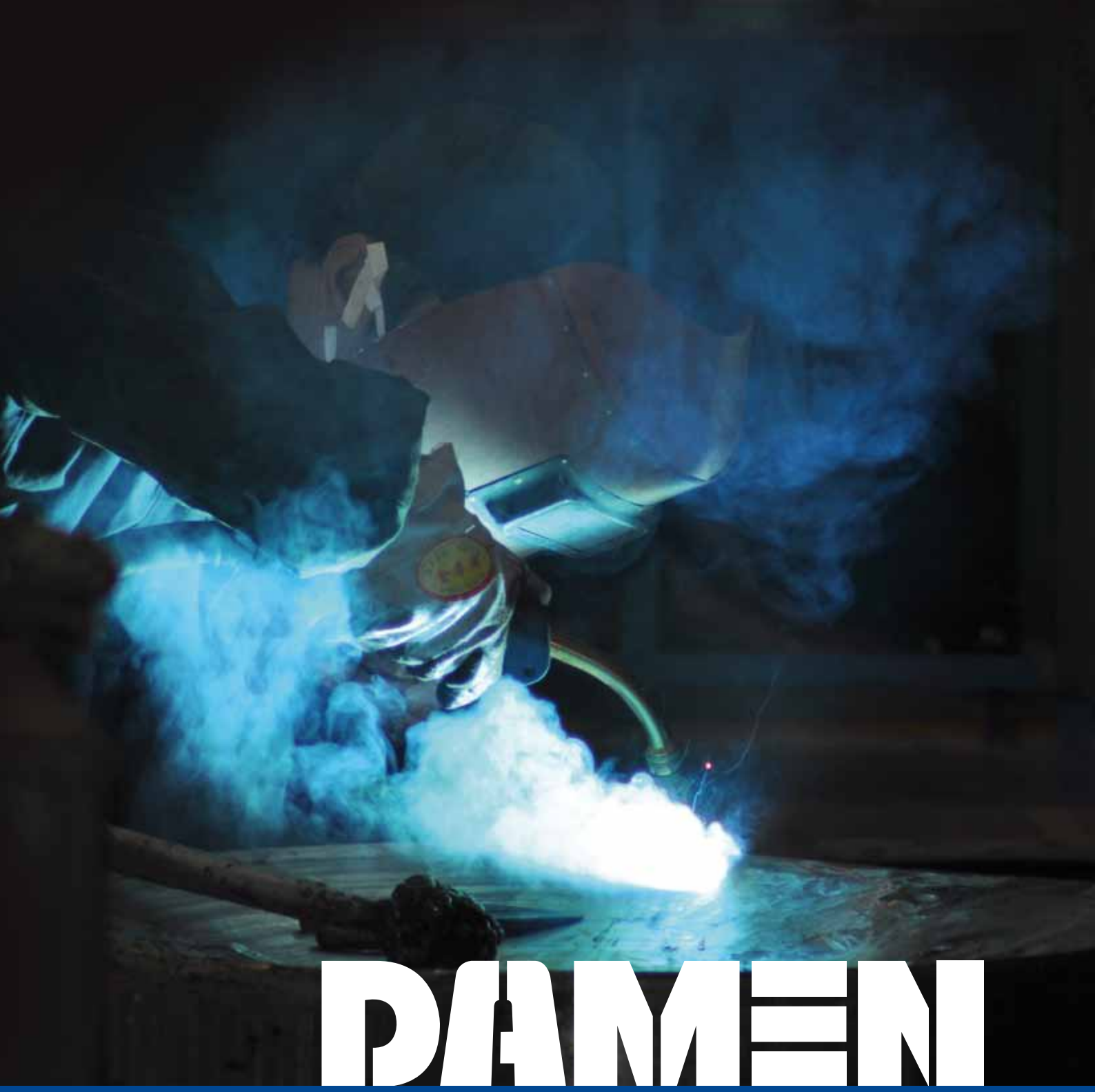

DAMEN

DAMEN SCHELDE MARINE SERVICES

RECONDITIONING

INTRODUCTION

Damen Schelde Marine Services (DSMS) is an independent operating Company within the Royal Schelde Group, which in turn is part of the Damen Shipyard Group. Our main area of operation is in the manufacturing and supply of diesel engine parts, primarily for the marine industry.

Having been a licensee manufacturer of New Sulzer Diesel for over 70 years, DSMS has a wealth of technical knowledge and experience. This enables us to supply our customers with "added value support".

DSMS reconditioning was founded in 2005 with the strategy to fulfill the need of European owners/managers for marine diesel reconditioning in China. With our long European experience on the field of reconditioning and manufacturing , DSMS is giving you high quality and service against competitive prices.

DAMEN SCHELDE MARINE SERVICES

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OUR MACHINERY

The machinery in our workshop is the most modern machinery, CNC controlled, which guarantees that all machined parts are in accordance with the latest specifications of the engine builders.

The CNC controlled boring tables, can machine parts up to 3x2 mtr. with a maximum weight of 20.000 kg. They are able to machine pockets and bores in all necessary angles and within the tight tolerances subscribed by the engine builders.

The CNC controlled vertical turning machines are able to machine piston crowns and covers.

WELDING

All welding procedures are approved by Lloyds which includes:

- SUBMERGED ARC WELDING (AUTOMATIC)
- MIG/TIG WELDING (AUTOMATIC/HAND)
- ANNEELING IN OUR OWN OVEN WITH THERMOGRAPH

PRE-INSPECTION

Before starting the pre-inspection, the parts are cleaned by grit blasting or ultrasonic/chemical cleaning.

The pre-inspection is carried out by the following methods:

- MAGNA-FLUX
- ULTRASONIC
- DYE-CHECK
- ENDOSCOPE

After the pre-inspection an official inspection report and quotation is made, based on the reconditioning procedures approved by class.

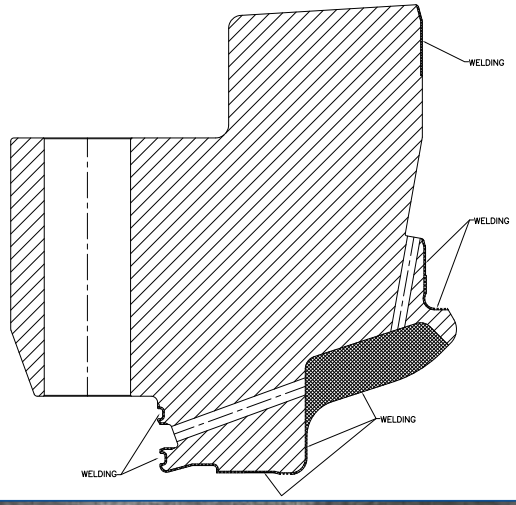
CYLINDER COVERS

Cylinder covers of the latest design, like MC and RT, are reconditioned by machining and rewelding. The complete combustion bowl to 3~4 mm above the cooling bores, which guarantees that all cracks are machined out and the combustion bowl is rewelded to the original dimensions.

Also the landing faces are pre-machined and welded, to bring the cover back to original new building dimensions.
After welding, the covers are heat treated in our own oven. They will be heated up to 650°C and be kept on this temperature for 4 hrs, than slowly cooled down.

After the heat treatment, the covers are placed on the horizontal boring machine, to re-drill all cooling bores and pockets.

Reconditioning Suzler
RTA Cylinder Cover



CYLINDER COVERS

After drilling the cooling bores and pockets, Inconel 625 layers are welded around the fuel tip holes to protect this area against the fuel spray.

Combustion face/landing faces/o-ring grooves are machined on the vertical CNC turning lathe to the original dimensions as specified by the engine builder drawings.
Finally the covers are pressure tested for class and painted to protect them against corrosion.

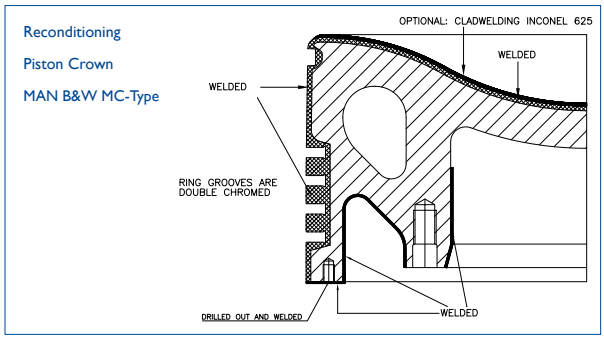
DAMEN SCHELDE MARINE SERVICES

PISTON CROWNS

Before piston crowns are welded the complete ring groove section, outside diameter, and the entire top of the crown is removed. Also inner sealing faces will be pre-machined. Piston crowns are heat treated (anneeling) in our own oven to release welding stresses.

DAMEN SCHELDE MARINE SERVICES

PISTON CROWNS



Machining takes place on CNC controlled turning machines which can automatically machine the parabolic crown top. Also machining of the ring grooves is programmed to ensure the ring grooves heights according to the engine builders' specification. Ring grooves are double chromium plated.

DAMEN SCHELDE MARINE SERVICES

EXHAUST VALVE SPINDLES/SEATS

Spindles/seats made of following materials can be reconditioned:

- AISI307 (St.St) in combination with stellite
- Nimonic 80A

First the spindles/seats are analysed to know what kind of base materials are used. This will determine the welding procedure.

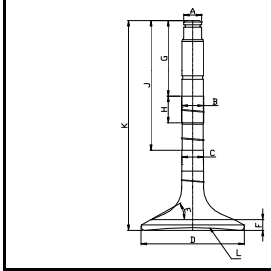
All burned/worn layers are machined off and rewelded on automatic welding machines. Final machining takes place on horizontal CNC controlled turning lathe to meet the original tolerances specified by the engine builders.

After machining a full measurement report is made, also the seating area/bottom side and fillet to stem is dye checked.

INSPECTION REPORT

DAMEN SCHELDE MARINE SERVICES
RECONDITIONING

Description:	EXH.VALVE SPINDLE
Engine type:	B&W S60MC
Customer:	
Vessel name :	
Job No. :	606543
DATE	13/07/2011



DIMENSION

	ORIGINAL	BEFORE	AFTER
A	Ø60	60	
B	Ø72 -0.03/-0.076	71,71	
C	Ø72.5 +0.15/+0.20		
D	Ø341	341	
E	30.3° 0/+0.1°	30,5	
F	37	37,1	
G	263	263	
H	390	390	
J	827	827	
K	1163 ±0.3	1160	
L		1 mm	


PICTURE 1


PICTURE 2


PICTURE 3


PICTURE 3

Base Material	Nimonic80A	✓
	AISI307	
seating area	Inconel625	
	AISI307	
	Nimonic80A	✓
	Ok	
	Worn	
	Cracked	
under disc	Inconel625	
	Nimonic80A	✓
	burned off	✓ 3 mm
	Cracked	
	Ok	
chromium layer stem	Worn	✓
	Cracked	
	Damaged	✓
REMARK		

ACCESSORIES	STAMPS/MARKINGS
	N80A-03-123

Inspection by :	PAN	Approved by:	ZHOU

DAMEN SCHELDE MARINE SERVICES

PISTON RODS

Process:

- Pre-machining till clean material
- Preheating of entire rod to 200°C
- Automatic SAW welding of running surface
- Stress relieving in oven (650C/4h)
- Machining running surface to 0.2mm above original diameter
- MPI check
- Surface hardening of running surface
- Final grinding of running surface to original diameter
- MPI check
- Skimming upper/lower flange in line with running surface
- MAX wear: 4mm (if more there will be additional costs for extra welding time/material)
- Hardness after repair: HB 300

Engine parts for the following 4-stroke engine types can be reconditioned:

- Pielstick
- Daihatsu
- Yanmar
- Wartsila
- MAK

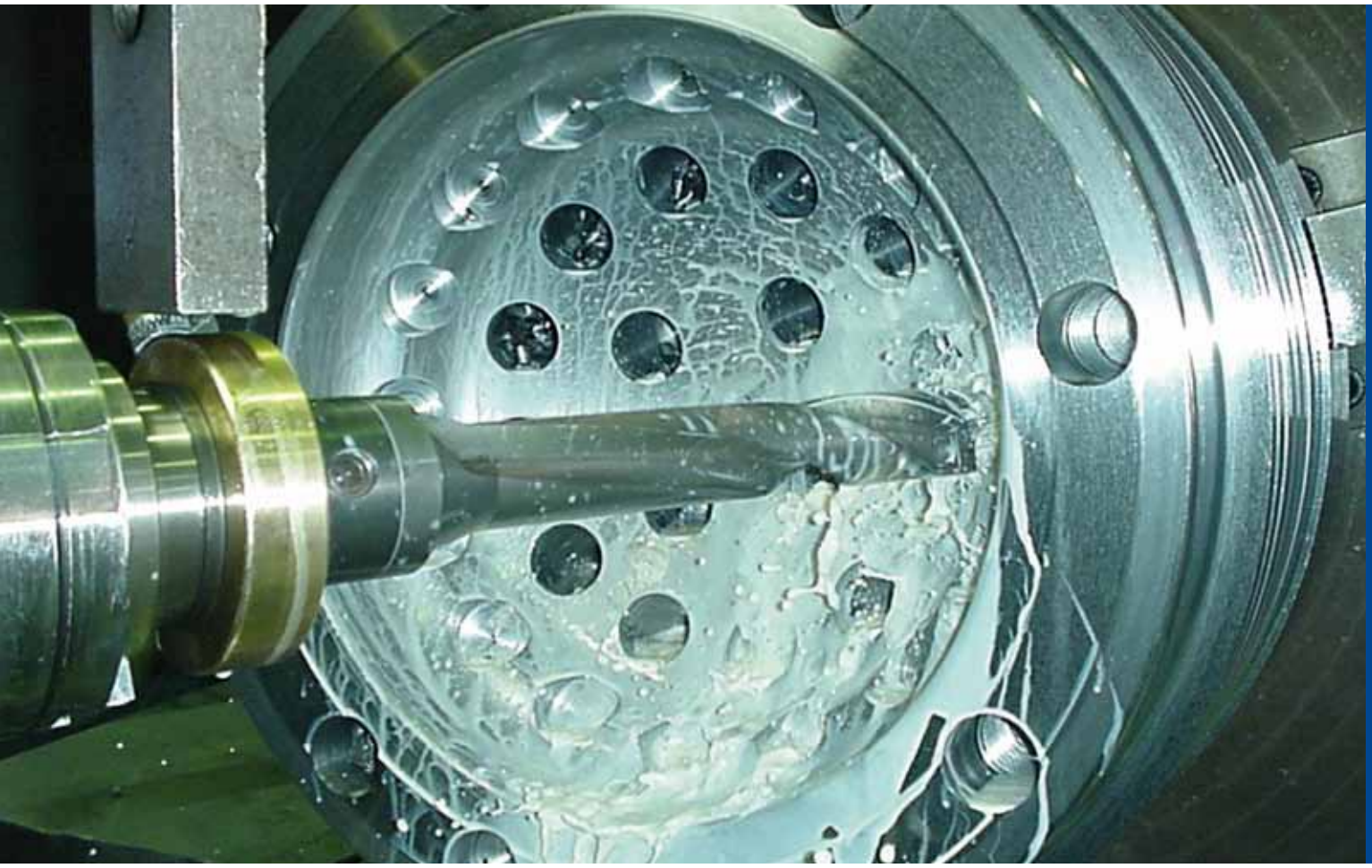
Complete reconditioned a/e covers, including own produced seats and guide bushes

RECONDITIONING OF THE CONNECTION RODS

Repair procedure:

- Check dimensions of big end bore with bolts on torque, check small end bore
- Serrations are inspected by MPI
- Grinding serrations
- To get the big end bore back to the original dimensions, first the serrations are grinded. Then the big end bore is re-machined to the original size.
- Inspection: dimensions + MPI

NEW PRODUCTS 2-STROKE



Automatic drilling of cooling water holes in a NEW SULZER RTA piston crown (forged steel)

NEW B&W L60MC piston crown
(cast steel)

OTHER NEW PRODUCTS

NEW BERGEN KRG-6 (hf) covers

NEW JACKS

HYDRAULIC RODS

CERTIFICATION

All our reconditioning procedures are approved by Lloyds.

DRY DOCK SUPPORT

From our workshop / warehouse in Shanghai we offer dry dock support service.

With European Supervision and project management,

the following services are offered;

- Complete overhaul of Auxiliary Engines at a lump sum price.
- Adjusting and timing of fuel pump blocks for all engine types.
- Overhaul of Turbo Chargers.
- Overhaul or new manufactured parts for Deck Equipment.
- Reconditioning of Two Stroke and Four Stroke engine parts, with Lloyds certificate if applicable.

LOGISTIC SUPPORT

EUROPE

- Own warehouse
- Direct collection/supply in all European ports
- Sea/air freight: import/export

CHINA

- Own warehouse
- Direct collection/supply in all Chinese ports
- Sea/air freight: import/export
- Import/export Licence

land

air

sea

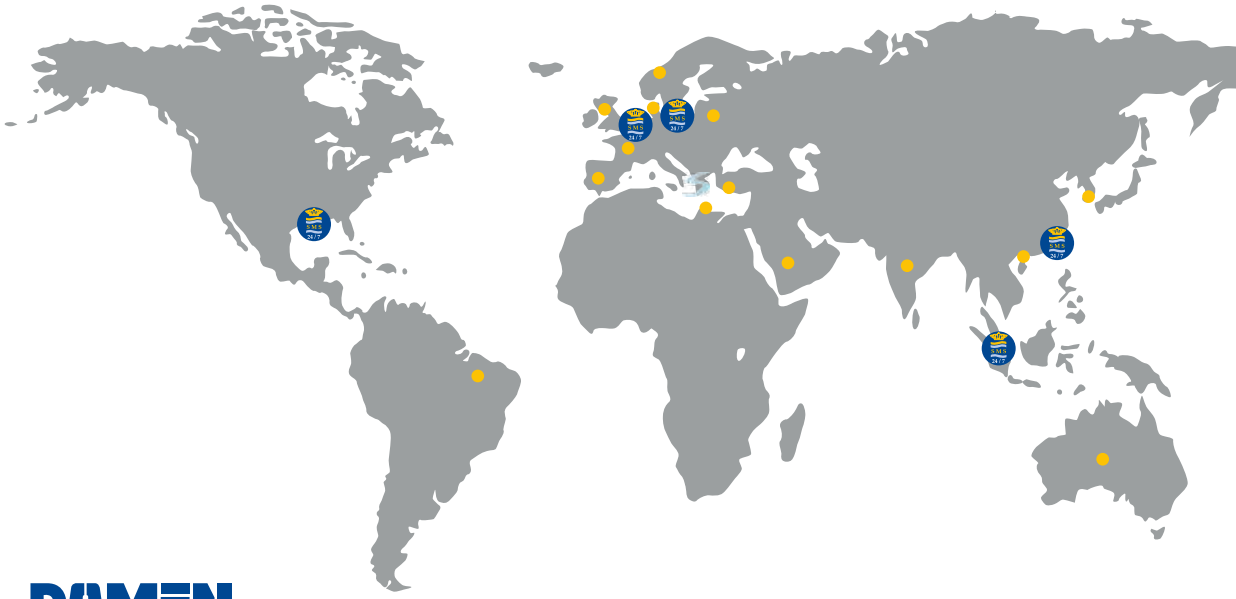
SCOPE

A wide range of spares is directly available from stock for a worldwide delivery within 24 hours.

Our scope covers the following engine or system types:

- SULZER
- B&W
- DAIHATSU
- YANMAR
- BOSCH REXROTH (WABCO/NABCO)
- SERVICE
- RECONDITIONING
- NAVAL SPARE PARTS

GLOBAL NETWORK



DAMEN SCHELDE MARINE SERVICES

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