INSTRUCTIONS FOR USING NOMOGRAM

(1) TO DETERMINE $\Delta 1$, PASS A LINE THROUGH THE GIVEN TEMPERATURE IN COLUMN 1 AND THROUGH THE EXPANSION LENGTH, L1 IN COLUMN 4. THE EXPANSION, $\Delta 1$, IS READ AT THE LINE INTERSECTION IN COLUMN 5.

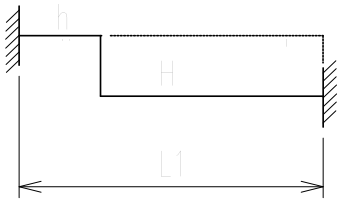
(2) TO DETERMINE L2, PASS A LINE THROUGH THE EXPANSION, $\Delta 1$, IN COLUMN 5 AND THROUGH THE PIPE SIZE IN COLUMN 3.
THE REQUIRED LENGTH, L2 IS READ AT THE LINE INTERSECTION IN COLUMN 2.

LIMITATIONS TO THE USE OF THE "L" BEND NOMOGRAM

"Z" BENDS

(1) IF $\frac{L1}{L2} \geq 1.6$

THE "Z" BEND MAY BE CONSIDERED SAFE IF THE EQUIVALENT "L" BEND, SHOWN DOTTED IS SAFE.

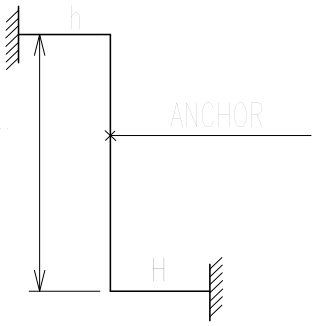


$\frac{h}{H}_{OPTIMUM} = 0,2$

(2) IF $\frac{L1}{L2} < 1.6$

THE "Z" BEND MUST BE AN IMAGINARY ANCHOR INTO TWO "L" BENDS WHICH MAY BE CHECKED ON THE "L" BEND NOMOGRAM.

ALTERNATIVELY THE BEND SHOULD BE CHECKED BY MEANS OF SOME PROPER METHOD.



$\frac{h}{H}_{OPTIMUM} = 1$

"L" BEND NOMOGRAM

INSTRUCTIONS & LIMITATIONS FOR PIPING FLEXIBILITY & STRESS ABALYSIS

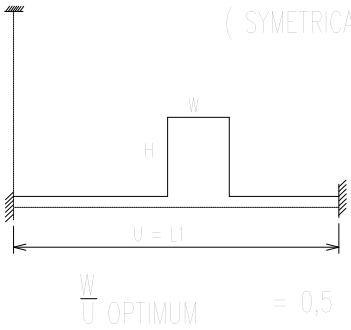
EXPANSION U-BENDS

(1) IF $0{,}1 \le \frac{W}{U} \le 0{,}9$

THIS BEND CAN BE CHECKED ON "L" BEND NOMOGRAM BY MAKING

L1 = U

L2 = 2H

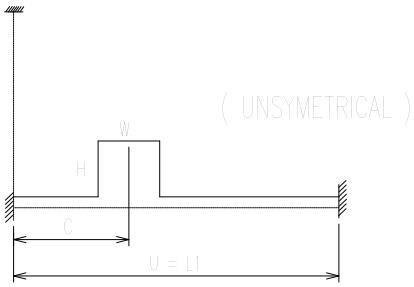


$\frac{W}{U}$ OPTIMUM = 0,5

(2) IF $0{,}1 \le \frac{W}{U} \le 0{,}2$

AND $\frac{1}{3} \le \frac{C}{U} \le \frac{1}{2}$

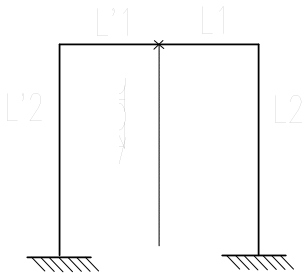
THIS BEND CAN BE CHECKED AS DESCRIBED IN (1). SYMETRICAL LOOPS ARE ALWAYS PREFERABLE.



U-BEND STRUCTURE

THE "U" BEND MUST BE SPLIT INTO TWO "L" BENDS BY AN IMAGINARY. THE TWO "L" BENDS CAN BE CHECKED ON THE "L" BEND NOMOGRAM.

ALTERNATIVELY A PROPER CHECK SHOULD BE CARRIED OUT.



3-PLANE PIPE STRUCTURE

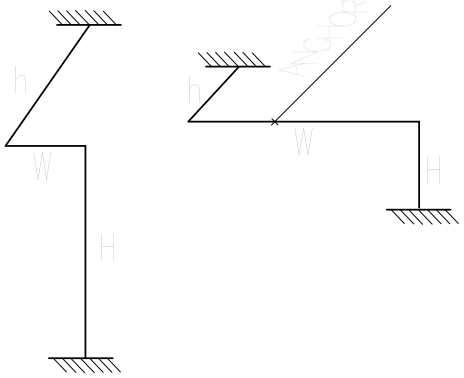
(1) THESE BENDS CAN BE CHECKED ON THE "L" BEND NOMOGRAM BY MAKING.

L1 = H

L2 = W + h

OR L1 = h

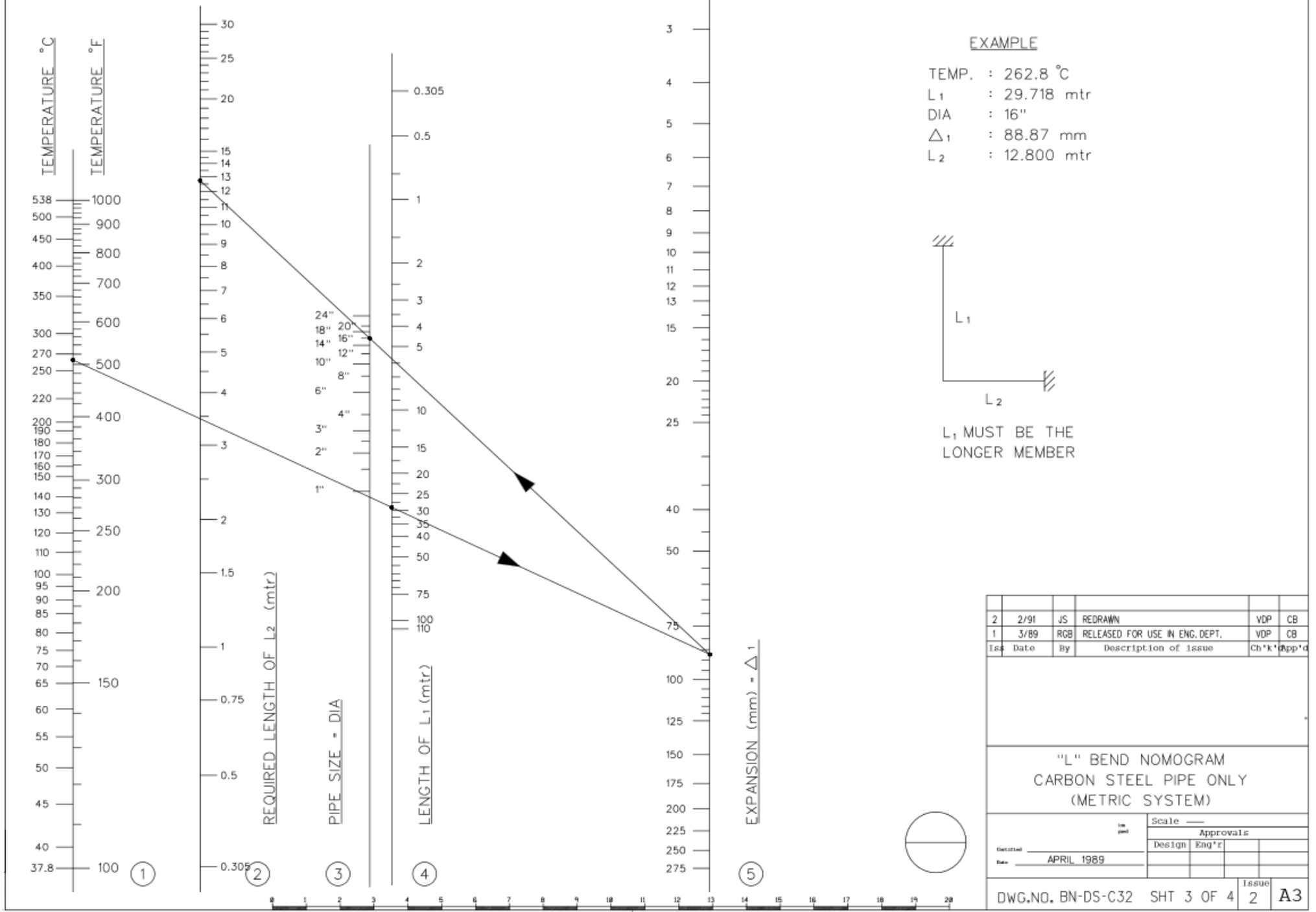
L2 = W + H



(2) IF THE EXPANSION OF W IS CRITICAL THE BEND MUST BE SPLIT BY AN IMAGINARY ANCHOR INTO "L" BENDS, WHICH CAN BE CHECKED ON THE "L" BEND NOMOGRAM. ALTERNATIVELY A PROPER METHOD SHOULD BE USED.

"L" BEND NOMOGRAM

INSTRUCTIONS & LIMITATIONS FOR PIPING FLEXIBILITY & STRESS ABALYSIS



EXAMPLE

TEMP. : 262.8 °C
L_1 : 29.718 mtr
DIA : 16"
$\triangle_1$: 88.87 mm
L_2 : 12.800 mtr

L_1 MUST BE THE LONGER MEMBER

Iss	Date	By	Description of issue	Ch'k'd	App'd
2	2/91	JS	REDRAWN	VDP	CB
1	3/89	RGB	RELEASED FOR USE IN ENG. DEPT.	VDP	CB

"L" BEND NOMOGRAM
CARBON STEEL PIPE ONLY
(METRIC SYSTEM)

Scale —
Approvals
Design | Eng'r
Date APRIL 1989

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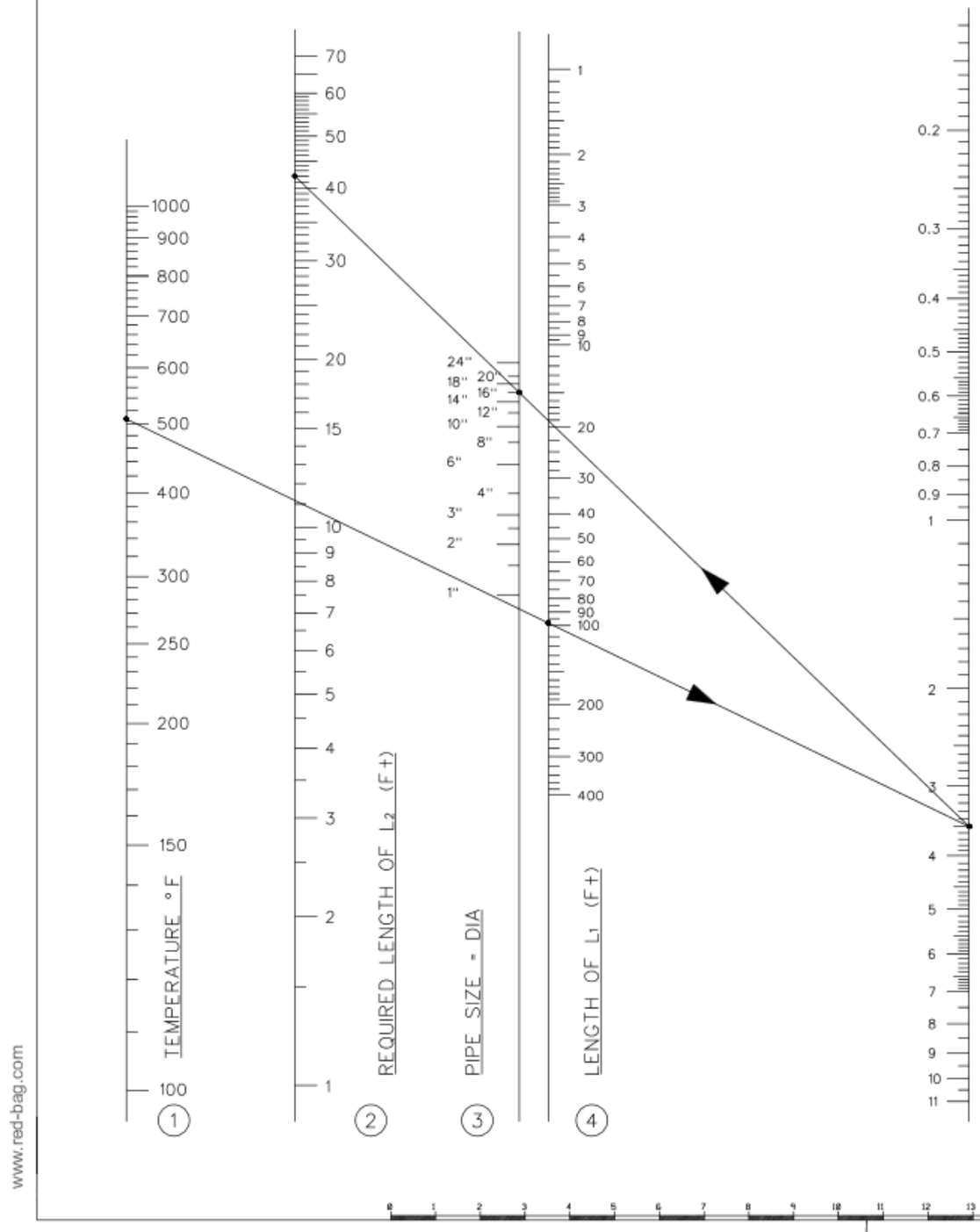
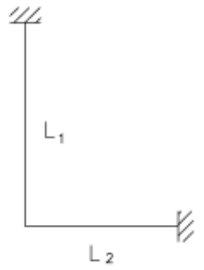


EXAMPLE

TEMP. : 505° F
L_1 : 97' -6"
DIA : 16"
Δ_1 : 3½"
L_2 : 42' -0"



L1 MUST BE THE LONGER MEMBER

Iss	Date	By	Description of issue	Ch'k'd	App'd
2	2/91	JS	REDRAWN	VDP	CB
1	3/89	RGB	RELEASED FOR USE IN ENG. DEPT.	VDP	CB

"L" BEND NOMOGRAM
CARBON STEEL PIPE ONLY
(IMPERIAL SYSTEM)

Scale —
Approvals: Design | Eng'r

Date APRIL 1989

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