1A PLANNING AND DEVELOPMENT

SHERIDAN COLLEGE GOES DANISH IMPLEMENTING THEIR DISTRICT ENERGY

AGENDA

1. Background – up till now
2. District Energy on two campuses – current work
3. System optimisation and some advantages
4. A little bit on Standards
5. Questions?

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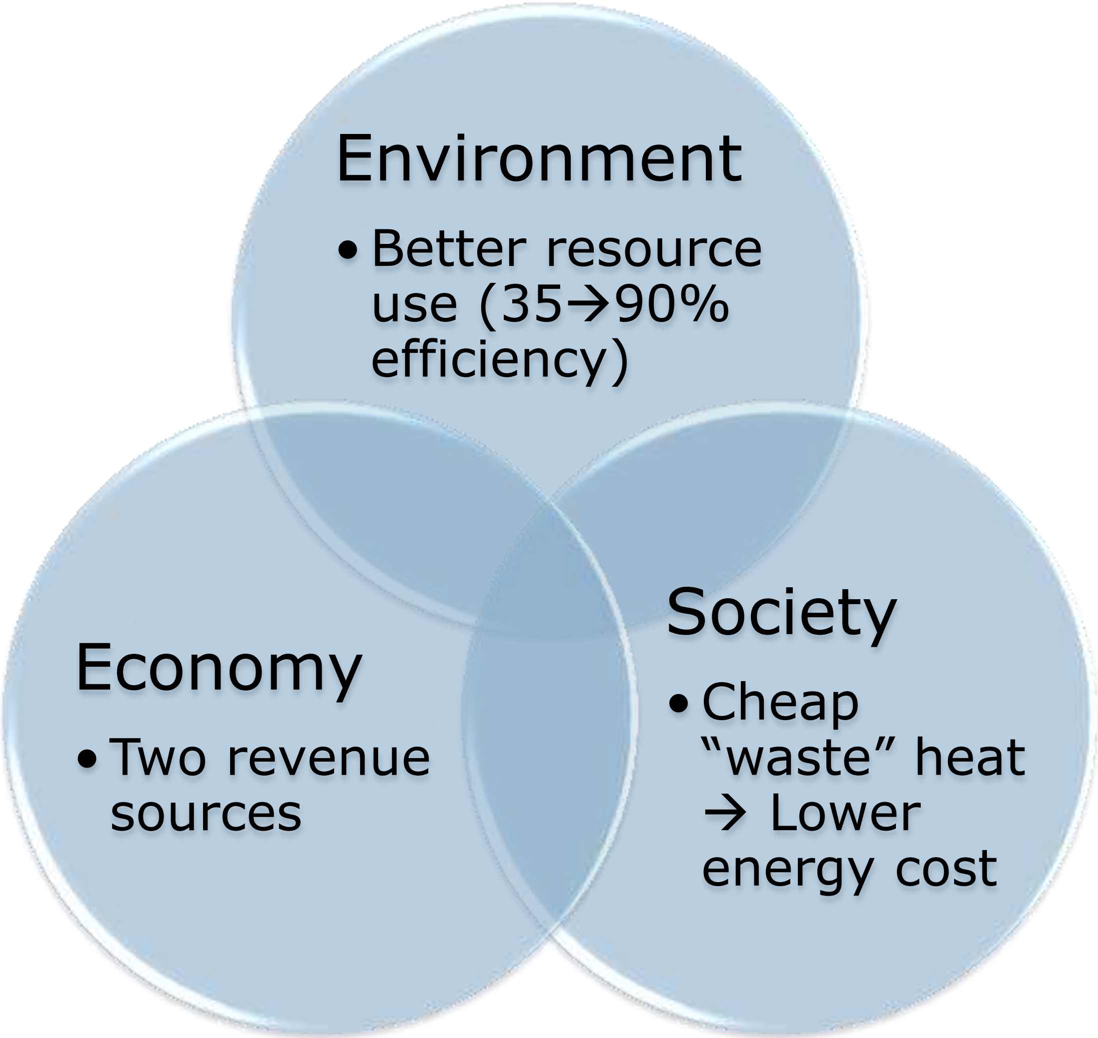
SUSTAINABILITY AT SHERIDAN

RAMBOLL

TRIPLE SUSTAINABILITY



INTEGRATED ENERGY & CLIMATE MASTER PLAN (IECMP)

- Sheridan Integrated Energy & Climate Master Plan (IECMP) Taskforce
- A comprehensive technical, investment and savings plan
- Active participation of students and faculty

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IEMP Framing Objectives

- Energy Efficiency Gain
  - *At least 50% by 2030 below 2005 baseline*
- Greenhouse gas emissions reduction
  - *At least 60% by 2030*
- Internal Rate of Return
  - *At least 7% on recommended investment*

- Ensure energy supply reliability
- Create campus-wide energy culture
- Be a platform for new energy technologies
- Offer competitive energy and climate curricula
- National and Community Role Model

PROJECT PROCESS

1. Development & feasibility
2. Design & Engineering
3. Tendering & Procurement
4. Construction & Commissioning
5. O&M

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DISTRICT ENERGY SYSTEM – SHERIDAN COLLEGE

Challenge

Develop district energy for the two campuses – Davis & Trafalgar

What we do

Owners engineer.

Advise college on planning, technical and economic matters.

Design district energy system.

Effect

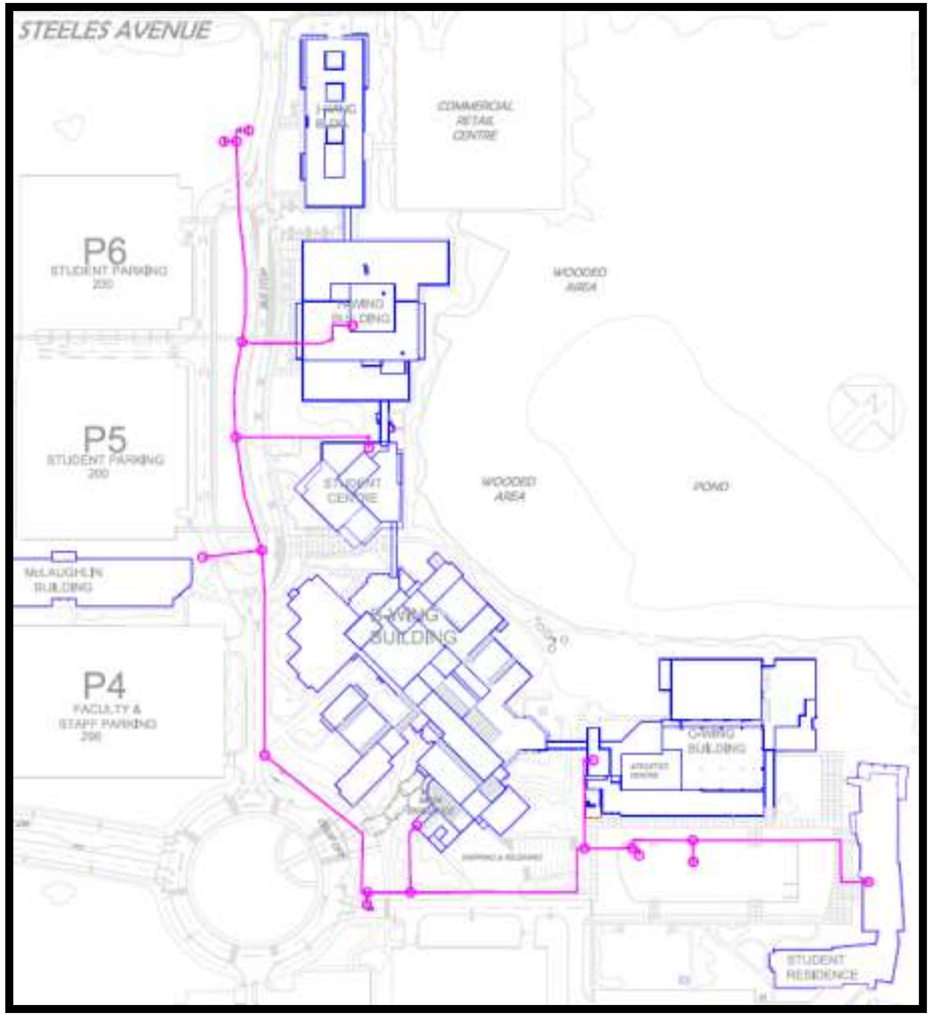
Raise energy efficiency.

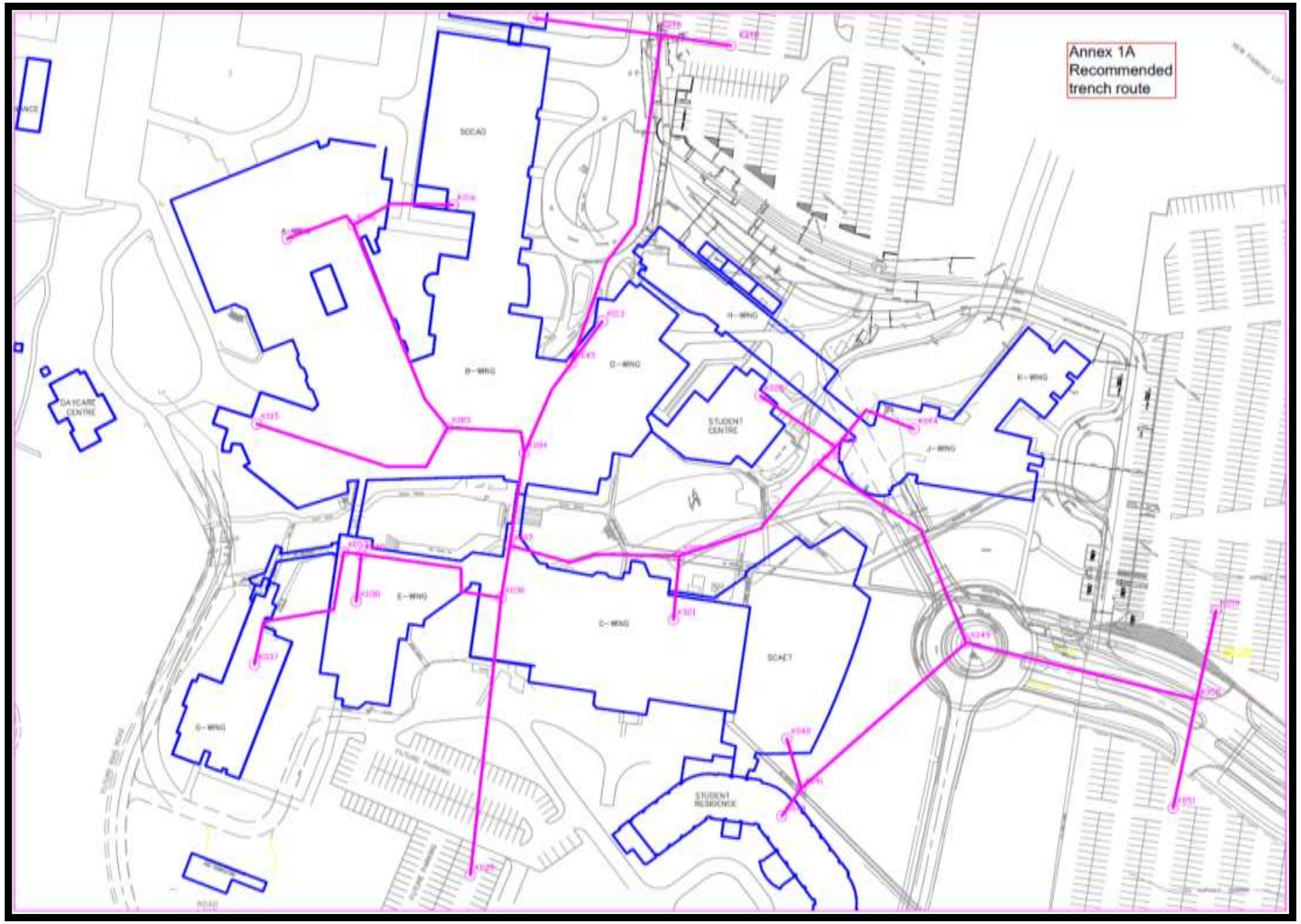
Lower costs

Future proof energy system.

…

DAVIS AND TRAFALGAR CAMPUS





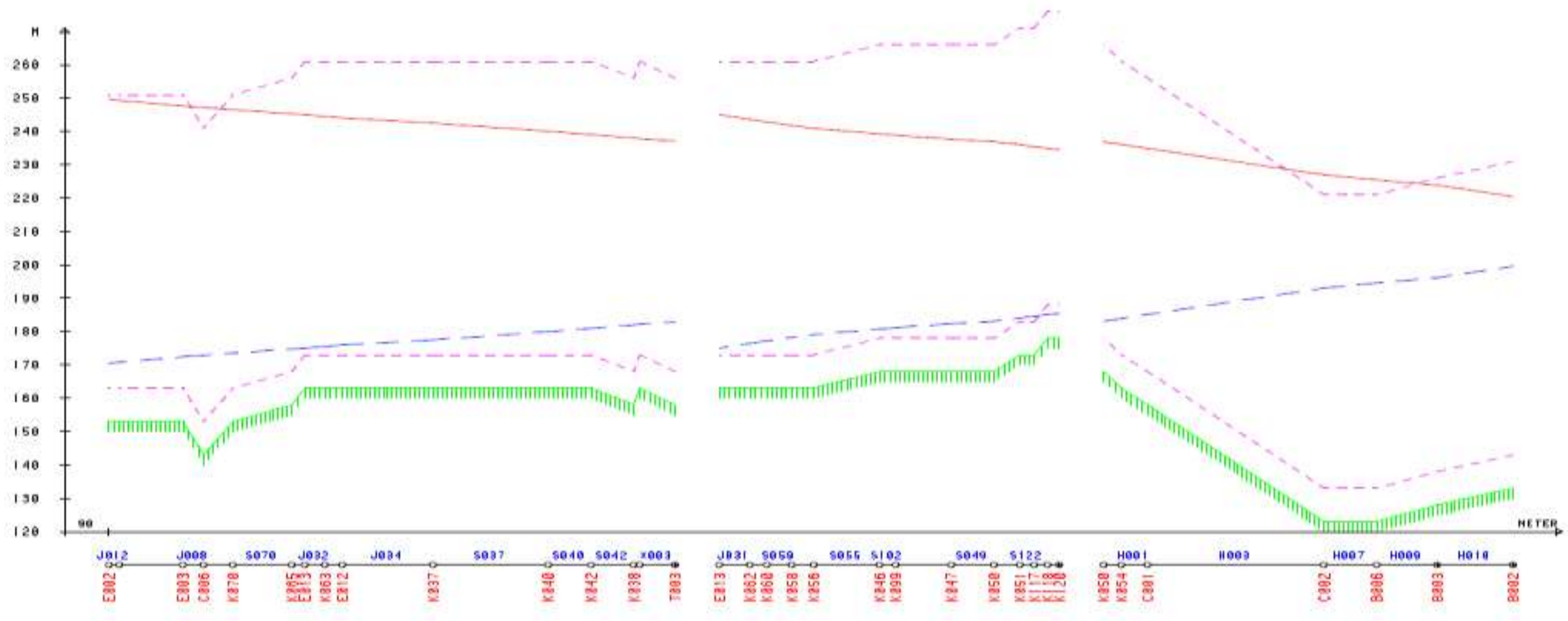
WORK TO DATE AND IN PROGRESS

WHOLE SYSTEM APPROACH

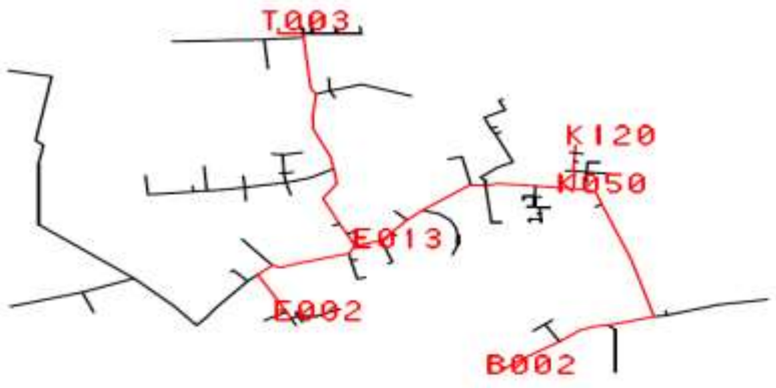
- Hydraulic optimization analysis using proprietary software, SR2, for both Davis and Trafalgar campus
  - Heating for Davis Campus
  - Heating and cooling for Trafalgar Campus
- Study for location of Trafalgar Energy Centre
- High level review of Davis Energy Centre

- Detailed piping design - distribution
  - In ground, above ground, and in buildings
- Energy Centre design at Trafalgar
  - Hybrid dual location design utilizing a new location and existing buildings to house the energy plant
- Energy Transfer Station (ETS) specifications tailored to each building’s requirements

HYDRAULIC OPTIMIZATION



- Roughly 70% of investment is usually in the network
- Pressure ratings, design against surge, water hammer, cavitation and thermal fatigue
- System Rornet engineering tool



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PIPING DESIGN CHALLENGE

Design Goals

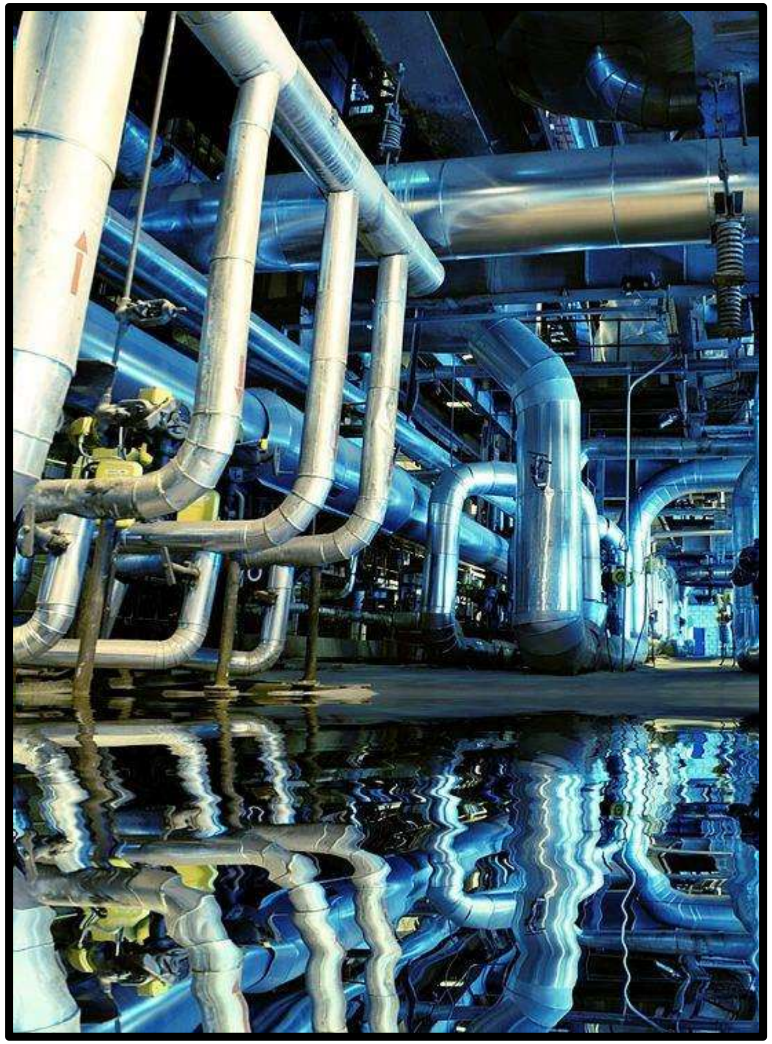
- Low operating supply temperature for minimal heat/energy loss which in turn reduces operating costs

- Maximum delta T at energy transfer stations for maximum energy transfer, maximum value for pumping costs which in turn reduces operating costs

- Maximize pipe flow capacity to allow for smaller pipes which in turn reduces capital investment and heat losses

ENERGY TRANSFER STATION - ETS

- Each connection is hydraulically separate from the network
- Allows buildings to operate individually from the network
- Protects the network from building related issues
- EU ETS manufacturers coming to the Canadian market
- Each connection point is metered individually



SOME PICTURES FROM REAL LIFE IN CANADA

PREINSULATED PIPING ADVANTAGES

- Bending flexibility – easier installation around bends which reduces installation costs
- Insulation – retains heat/energy which reduces operating costs
- Leak alarm system – detects and locates leaks which reduces operating costs
    - For both heating and cooling pipes

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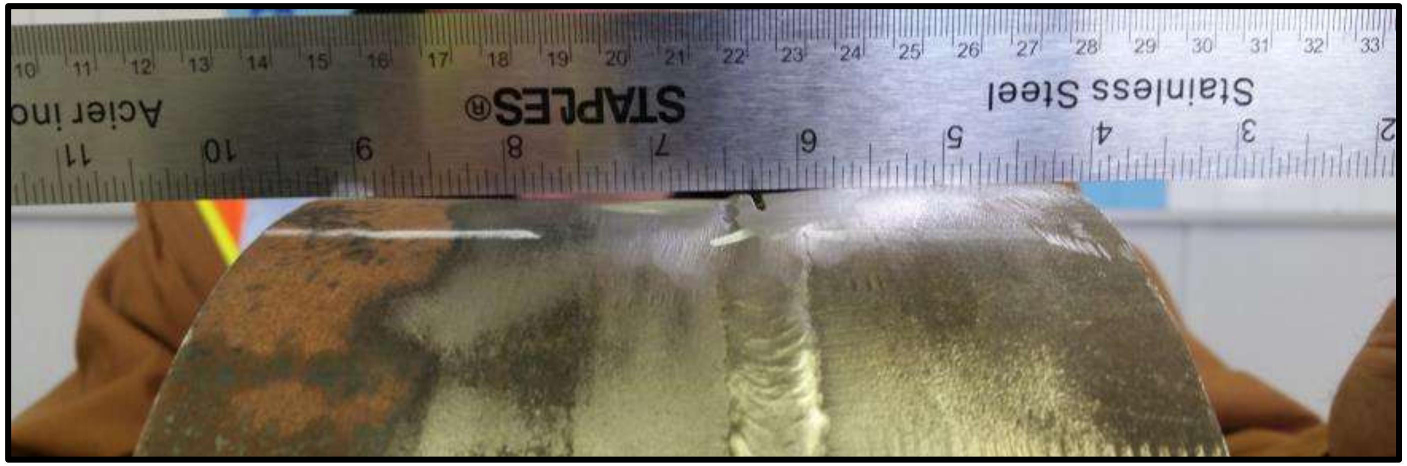
PIPING INSTALLATION - BEST OF BOTH CONTINENTS
CSA, ASME VS EN STANDARDS

O-Reg 220 (CSA B51, ASME B31.1, etc.)

- X-Ray not required
- Alignment to be within 2mm
- Hydrostatic pressure test to be 1.5 times the design pressure, held for 10 minutes, then reduced to design for leak test

EN 13941 – Design and installation of preinsulated bonded pipe systems for district heating

- X-Ray required on 10% of welds
- Alignment to be within 1mm
- Pressure test is not required, but weld leak tightness test of all welds is



THANK YOU

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READ MORE ON OUR WEBSITE:
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